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# STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, No. 2

July 9, 1945

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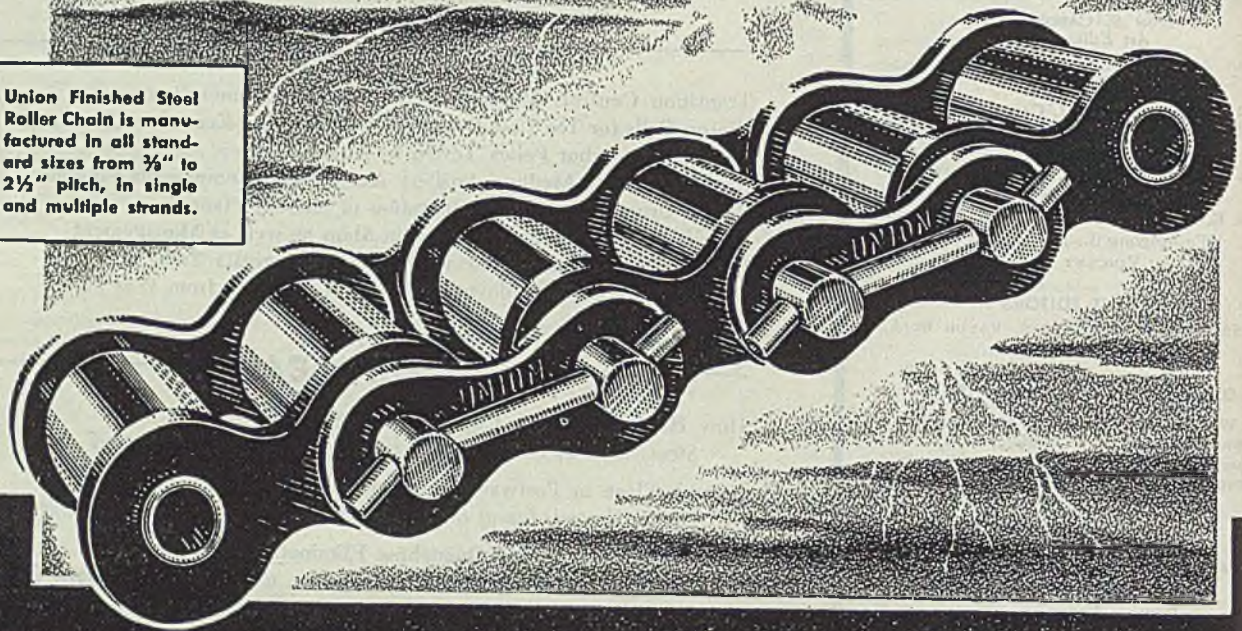
## NEXT WEEK...

Hardenability Band Data for 35 Steels  
 High-Speed Drilling, Reaming and Tapping  
 The Tee-Bend Test for Welded Structures  
 Safe Handling of Organic Solvents  
 Rod Mill Facilities at Columbia Steel Co.





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Roller chain type

Silent chain type



## Economic Shackles

It is to be hoped that the midyear report of Fred M. Vinson, director of War Mobilization and Reconversion, does not reflect final Truman economic policy. It leans too heavily upon the efficacy of government planning.

According to the Vinson program, hope for postwar economic well-being rests on three essentials: 1. Increased wages to offset in part the loss of overtime pay and to sustain high mass purchasing power. 2. Stabilized prices—not much above present levels. 3. Revised taxes to encourage business to expand during the postwar period.

To be absolutely fair to Mr. Vinson, one must admit that he places great emphasis upon the importance of private initiative. He says, "After the war, the American economy must be dynamic, with expanding business, expanding markets, expanding employment and opportunity. . . . This expansion must be brought about by positive politics on the part of business, agriculture, labor and local, state and federal governments. . . . Especially important are the plans which individual business men are now making for postwar activities."

This nod to private enterprise, coupled with the recommendation for tax relief for business, would be highly encouraging if it were not for the fact that the Vinson concept of wage and price control may prove to be more destructive than the dependence upon private enterprise and tax assistance prove to be constructive.

The Vinson wage and price program implies regulation. In fact, government fiscal, tax and other policies all are to be keyed to "full employment." This will involve planning to the "n"th degree and, if planning by government for postwar is no better than its planning of the domestic economy for war, it will be a hindrance to "full employment."

One reason why government planning and regulation during the war has not inspired confidence in any quarter is that those who direct wage and price regulations frequently overlook the fact that wages should bear some relation to the value of services rendered and prices should bear a relation to the value of goods produced.

From the Vinson report, it would seem that if the planners feel it is necessary, they will be permitted to rule that employers pay \$1.50 for \$1.00 worth of work or that producers accept 90 cents for a product that is worth \$1.00.

Arbitrary regulation of wages and prices which ignores economic values will not work. Government policy should provide the greatest reasonable freedom for private enterprise to function effectively. That is the only safe formula for postwar economic stability.

---

**TIN PLATE BIGNESS:** Just before retiring from office, Attorney General Francis Biddle issued a report on the disposition of the government-owned steel plant at Geneva, Utah.

The report stresses the importance of decentralizing the American steel industry to curb the dominating influence of eastern producers, states that 20 per cent of tin plate consumption is in the West, reviews the heavy concentration of tin plate production in eight integrated companies and of tin

plate consumption in two canmaking companies and recommends a disposal of western government-owned steel plants that will stimulate production of tin plate on an "independent" basis.

One wonders how this can be accomplished. The steel industry has grown up in accordance with federal laws affecting business and in response to certain economic developments which have encouraged bigness for certain products, among them tin plate. If through government manipulation, Gen-

(OVER)



eva goes to an "independent," who is able with or without government help to buck the domination of eastern integrated companies, that "independent" in a few years will find itself in exactly the same position of dominance as the present eastern mills. Also, through the normal play of consolidation and acquisition, the concentration of capacity probably will be no less than it is today.

It will be difficult to cut down economic "bigness."

—p. 76

**ONE AGENCY ENOUGH:** Henry Wallace may soon vie with Maury Maverick as the chief benefactor of small business. To date the latter's Smaller War Plants Corp. has been the most vociferous and most effective champion of businesses of modest size. However, there are signs that Mr. Wallace's Small Business Division of the Department of Commerce aspires to a more prominent role in the affairs of small business.

Wallace appointed a Small Business Advisory Committee. It was an exceptionally good committee and its report, submitted on May 28, is constructive. If the Small Business Division of the Department of Commerce were to adopt the committee's recommendations and were staffed to carry them out intelligently, this division might well become the focal point for aid to small business.

One thing is clear. There is no need for two agencies doing the same work. Cannot SWPC be merged into the Small Business Division? —p. 80

**DANGEROUS REBELLION:** Something is radically wrong when one sees in the current wave of work stoppages so many instances of open rebellion against authority. If this rebellion were solely against WLB, it could be understood. It is the rebellion of strikers against their own union leaders, some of whom are the ablest officials in the labor movement and men of the highest integrity, that should concern the nation now.

These acts of insubordination, attended by a reckless disregard for the sanctity of a union contract, prove that the present laws are inadequate. The situation of widespread lawlessness should cause Messrs. Green, Murray and Lewis to check carefully with their brainiest aids to seek a solution. Perhaps they will discover that the three leaders were hasty and ill-advised in attacking the 2B-1H bill so vehemently. Possibly that bill, offered by temperate, liberal sponsors, would help conscientious labor officials to maintain discipline. Certainly it would be preferable to a law dictated by an irate, fed-up public.

—p. 74

**SIGNS OF THE TIMES:** Last Tuesday morning Henry Ford II proudly drove a moonstone gray two-door sedan off the assembly line at the River Rouge plant of Ford Motor Co. This marked the resumption of passenger car production after a suspension which lasted 1241 days or nearly 3½ years. Ford output will be about 400 cars in July (pp. 75, 87) and 4000 next month, with production in later months conforming to government controls which now limit Ford assemblies to under 40,000 in the last half. . . . The Ford resumption was the most spectacular indication that the transition from an all-out war economy, scheduled to begin July 1, actually was under way. Some other civilian hard goods are beginning to trickle from manufacturers' plants (p. 71) but the flow will be restricted for some time by the scarcity of materials and the tightness in manpower. . . . Meanwhile the Army continues to cut back the war production program. Last week the military reduced by \$20 million a month the output of medium artillery ammunition (p. 75), this in addition to a 50 per cent cutback in the artillery shell program announced in the previous week. . . . Donald Richberg, one of the authors of the Hatch-Burton-Ball labor bill, challenged labor leader critics of the bill to debate its merits (p. 74) and offered to post a forfeit of \$1000 if he does not prove to impartial judges that their attacks have been "unfair, inaccurate and misleading." We would enjoy this debate, if held. . . . Case studies of the effectiveness of X-ray examination of metals in correcting production techniques during the war (p. 102) indicate that this method will be an important factor in "trouble shooting" in the postwar period. . . . D. Roy Shoults, vice president of sales, Bell Aircraft Corp., believes commercial aviation will be advanced tremendously by wartime experience. He foresees 400 to 500 mph for normal commercial flight (p. 94) with radar aids for all-weather operation. . . . Philip S. Shoemaker again cites reasons why it is good policy (p. 78) to acquaint employes with facts about renegotiation and how it affects their interests. . . . Study of the government's authorization for resuming automobile production shows that on the basis of 1941 production, quotas for General Motors, Chrysler and Ford (p. 87) were trimmed to permit larger assignments for Studebaker, Hudson, Packard, Nash, Willys, Graham-Paige and Crosley.



EDITOR-IN-CHIEF





Special duty trucks gather steel samples for the laboratory.



A truck is unloaded at the laboratory, and immediately starts another round trip.



Plate samples are punched to rough form, then milled. Others are sawed, turned, drilled etc., as required.



Many samples undergo rigid chemical tests.



Metallurgical tests are extremely important for quality control.



# Inland Tests Steel by the Ton

Operator determining physical properties on one of the many tensile testing machines in the Inland laboratory.

Darting from mill building to mill building—many times a day, and at night—are Inland trucks on special duty, a duty of vital interest to every user of Inland steel.

They are the sample trucks which rush samples of Inland products to the main laboratory where all required tests must be completed, reported and checked against specifications before steel is shipped.

Samples are gathered for the laboratory at semi-finishing mills—pieces from billets, slabs, etc., that will be

tested before the steel is rolled into final form. Also collected are samples of finished products. Depending upon requirements, every piece of steel delivered to the Inland laboratory undergoes rigid physical, chemical, and metallurgical tests. Many of these tests are special developments by Inland—tests that are fast and extremely accurate.

Yes, Inland daily tests tons and tons of steel to assure every customer that his order will measure up to every requirement.



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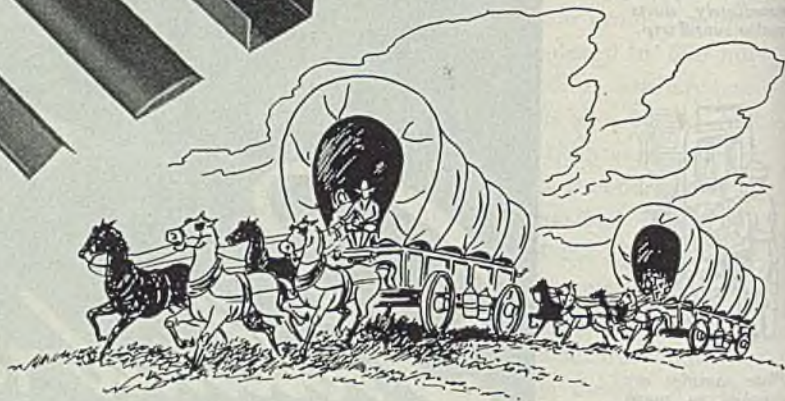
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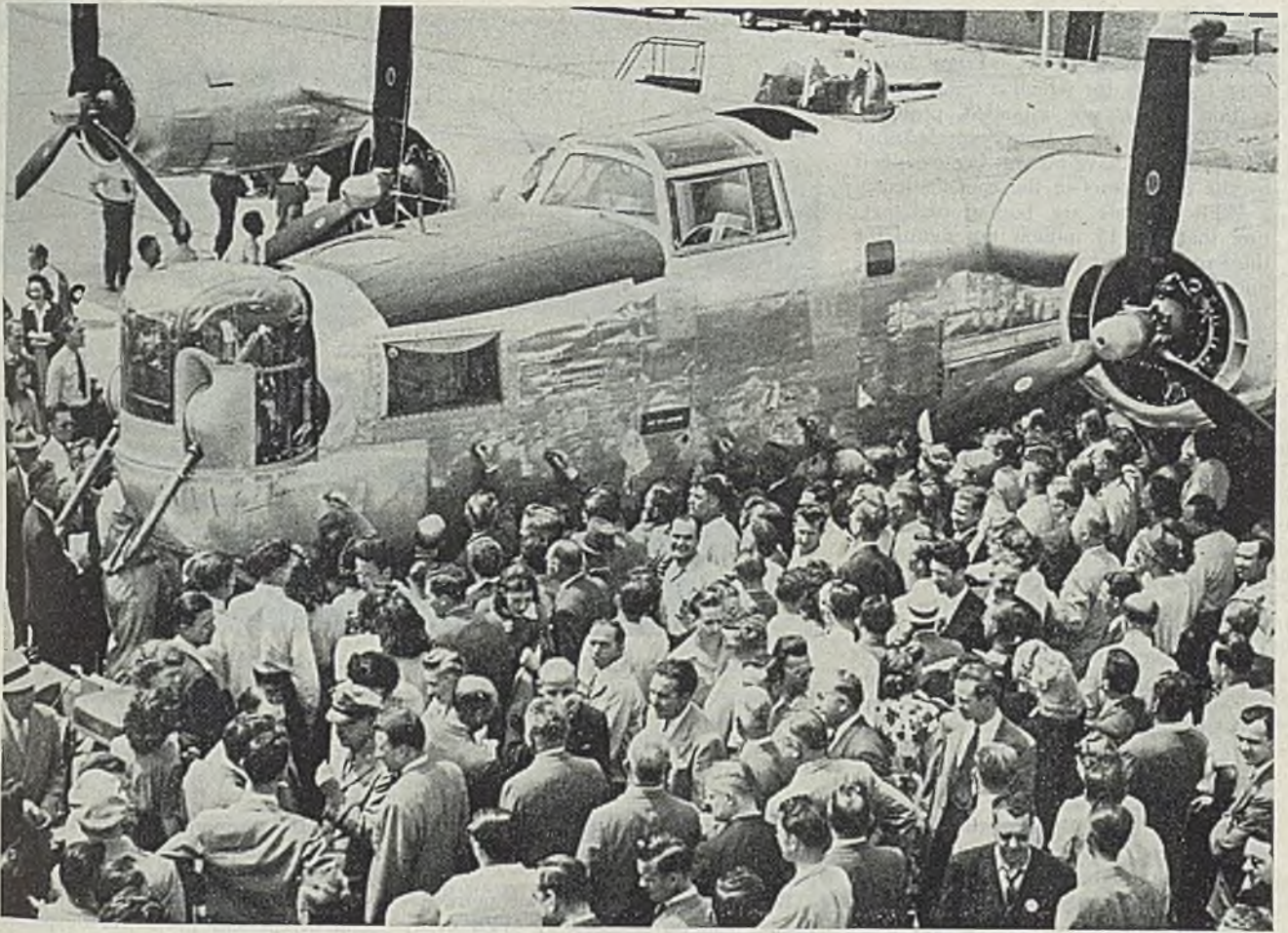
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WESTERN REPRESENTATIVE: F. SOMERS PETERSON, 57 CALIFORNIA ST., SAN FRANCISCO, CAL.







*Hundreds of Willow Run bomber plant employes gather around the last Liberator to come off the Ford assembly line to sign their names on the fuselage. That is the 8685th Liberator the Ford-operated plant has produced in three years*

## Transition Controls Simplified

*Many restrictions lifted as country starts switch from all-out war economy to one permitting substantial manufacture of civilian goods. Shortages of critical material and components will continue principal obstacle*

THIS MONTH officially ushered in the transition period from an all-out war economy to one in which will be permitted as much peacetime goods manufacture as is consistent with prosecution of the war against Japan.

The reconversion process already is well started. First of the postwar automobiles have rolled from the assembly lines. Similarly, other civilian hard goods are beginning to trickle from manufacturers' plants. Munitions cutbacks are releasing an increasing amount of materials, facilities and manpower.

A considerable portion of the strict wartime controls over materials and manpower have been lifted or modified. Local manpower officials now have au-

thority to suspend wartime regulations either in communities or individual plants if they decide such action will not interfere with war production.

A revised and simplified priorities system leading to ultimate discontinuance of priorities control for "virtually everything except military requirements" as soon as war-supporting and essential civilian production no longer need general help has been announced by the War Production Board.

War Production Board orders restricting the production of hard goods are either revoked or subject to the "spot authorization" procedure. Production quota limitations of numerous items have been removed.

Only apparent barriers in the way of a substantial volume of civilian goods output are shortages of materials and components, scarcity of labor in certain areas and of required skills and the unavoidable transitional delays. How formidable these barriers may be cannot yet be judged with accuracy.

WPB estimates third quarter war steel requirements will amount to 15 million tons, compared with 16.1 million tons in each of the first two quarters. Allowing 300,000 tons a quarter as a cushion for losses due to strikes, breakdowns, etc., an indicated 800,000 tons of steel will be available for civilian use.

WPB has ordered a 25 per cent reduction in sheet steel inventories held by war plants, which is expected to make more material available for automobile manufacture. Similar cut was decreed in strip steel stocks to aid manufacturers of household appliances and other items.

However, WPB estimates second quar-



ter CMP steel tonnage carryover to be 1.9 million tons, enough to keep the mills busy for ten days. Prime munitions contracts for which a considerable portion of this was intended, probably 500,000 tons, have been canceled but the steel mills have not yet been notified by the contractors of the cancellations.

WPB officials are hoping and betting that the 15 million ton figure for third quarter war production will be reduced substantially during the period by further cutbacks and that the freed steel will be made available for civilian use. At present, however, they cannot estimate with any certainty the tonnage that will be available.

A suggestion that present controls on components entering into steel production should be maintained until rated orders drop below 85 per cent of productive capacity has been offered to WPB by the Steel Operations and Metallurgical Industry Advisory Committee. The committee listed pig iron, scrap, coke and elements entering into the production of alloy steel among the products on which government restrictions should be maintained until their respective supply situations ease.

In revealing details of the revised and simplified priorities system, WPB Chairman J. A. Krug described the last half of 1945 as a transition period to "give business an opportunity to adjust its operations to the new system" which will go into effect Jan. 1, 1946.

#### New Priorities System Outlined

The new priorities system will be introduced gradually during the next six months. This transition period is designed to cushion the impact of the transition from a system under which nearly all production has been regulated to a new system under which military requirements will have top priority but civilian business generally will operate both without production restrictions and without affirmative priorities assistance.

Meanwhile the procedures outlined in the new priorities regulation 29 will be instituted gradually. There also will be changes in other WPB regulations and orders and WPB has cautioned that if there should be any inconsistency between PR 29 and other WPB regulations or orders, PR 29 controls "unless the order expressly states the contrary."

Under the new priorities rating system the present AA rating method and the Controlled Materials Plan will be discontinued at the end of 1945 and replaced by a system in which the AAA rating will still be assigned in emergencies as under existing procedures, but a new MM rating will be assigned by military agencies. WPB itself will assign the MM rating only in cases where it clearly is necessary for the war effort or for requirements of similar urgency.

During the transition period, the MM rating will be equivalent to AA-1. The AA ratings also will be retained for cer-



Handmade model of the new Mercury, to be produced by Ford within 60 to 90 days, reveals principally a redesigned front end, making extensive use of zinc die castings. First new Fords already are rolling from assembly lines. NEA photo

tain materials, if it is not practical to adapt existing controls to the new system.

Beginning Oct. 1, 1945, no more AA ratings will be assigned by WPB or by other agencies except for deliveries to be made before Jan. 1. Before Oct. 1, WPB will cancel outstanding AA ratings calling for delivery after the end of 1945, whenever this can be done without interfering with war production or war-supporting activities.

Beginning as soon as possible, the military services will assign MM ratings to orders and contracts placed during the transition period for delivery during or after the transition period. They also may change existing orders with AA ratings to MM ratings if necessary to assure delivery on schedule.

At the end of 1945, the Controlled Materials Plan and all its regulations will expire automatically, except that part which restricts inventories. However, the delivery of controlled materials during the third and fourth quarters will continue to be regulated by the plan alone and not by ratings.

Other WPB announcements as the transition period started include:

All allotments of materials for third and subsequent quarters that are identified by the CMP allotment symbols Z-1 and Z-2 have been canceled.

An increase of 126,000 units in the truck production ceiling for the last half of 1945 has been approved.

Manufacture of electric irons has been removed from production control.

Production quota limitations on farm machinery and equivalent and related parts have been removed.

Control over manufacture of cast bathtubs and restrictions limiting steel have been removed.

Manufacturers of radio equipment and component parts will be permitted to convert to civilian production under "spot authorization" provided by PR 29 if and when facilities are released from reduced military requirements.

Meanwhile, WPB predicted that munitions production in July will begin to show the effects of cutbacks and the revised schedules set up for the coming front war. May munitions production totaled \$4.6 billion, within 1 per cent of schedules, and the June figure will show only a slight drop from May output.

May production was about 7 per cent less than in March. Declines occurred in all major categories except ammunition. Comparative figures for March, April and May:

	(Millions)		
	March	April	May
Aircraft	\$1,234	\$1,155	\$1,111
Ships (incl. maint. and repair)	831	782	741
Guns and Fire Control	269	261	251
Ammunition	700	692	681
Combat and Motor Veh.	501	443	431
Communication and Electronic equipment	338	338	321
Other equipment	1,080	977	961
Total	\$4,953	\$4,648	\$4,511

The latest munitions schedules call for a total production in the next 12 months just short of \$42 billion. By the second quarter of next year, output will be down to an annual rate of \$38 billion, more than 35 per cent below the level of March.



## Vinson Calls for Tax Law Modernization; Offers 9-Point Postwar Economic Charter

WARNING that we must have plans for an early defeat of Japan as well as a late one, Fred M. Vinson, director of War Mobilization and Reconversion, has outlined a "postwar economic charter" calling for modernization of tax laws, high wages, full employment and a long-range public works program.

In his quarterly report to the President and Congress, Mr. Vinson said the American people are "in the pleasant predicament of having to learn to live 50 per cent better than they ever have lived before."

To attain the overall objective of a durable peace, Mr. Vinson suggested a five-point plan:

Meet all requirements of the Pacific war.

Reconvert and expand civilian production as fast as possible, both to increase the supply of goods and provide jobs for those released from the armed forces and from war work.

Protect resources as far as possible from the inescapable shock of reconversion.

Provide food and aid that will help the liberated countries to lift themselves to their feet and become self-sustaining.

Work toward a high level economy so America can know the twin peacetime blessings of abundant production and full employment.

### Outlines Economic Charter

His nine-point program for the postwar economic charter, phrased in the generalities of a political platform, included the following:

Complete modernization of the tax laws.

A program to help small business.

A fair, vigorous antimonopoly program.

Measures to reduce industrial strife and encourage higher wages.

Breaking down the barriers to foreign trade.

Expansion of social security.

Measures to improve conditions of the farmer.

A long-term program of public works.

A fiscal policy aimed at maintaining the economy at or near full employment and co-ordinating all government programs that have either an inflationary or deflationary effect.

Mr. Vinson said he regarded overhaul of the tax structure as "the foundation of our entire program to reach and maintain full employment after the war."

"I believe the following principles should guide us in constructing our tax program:

"1. Taxes should be levied in such a way that they have the least harmful effect on the expansion of business investment and the creation of jobs, be-

cause productive employment is the source of our standard of living, of all income, and of the revenue which the government collects from taxes.

"2. Taxes should be levied in such a way that will have the least harmful effect on the maintenance of mass markets and mass purchasing power, because that is the basis of business, labor and agricultural prosperity.

"3. Taxes must be fair among people.

"4. Tax policy should be integrated with a fiscal policy designed to prevent inflation and deflation."

### WPB Orders 25 Per Cent Cut in Sheet Inventories

To prevent sheet and strip steel from becoming a bottleneck in reconversion to fabricated products on which production restrictions have been lifted, WPB in the first of a series of moves designed to spread available supply among metal-

working industries, has ordered an immediate 25 per cent reduction in permissive inventories. This reduces inventories from 60 to 45 days, WPB in taking other steps to relieve congestion in certain steel products will investigate inventories and purchase order position, notably sheets; will seek more effective use of manufacturers' inventories of idle and excess sheets and strip; increase sheet production with present facilities based on WMC drive for an additional 2000 workers and proposed expenditure of \$50 million by private industry for new flat-rolled finishing capacity.

WPB estimates reconversion in the next four months will require about 350,000 tons of sheets and strip in gages now in short supply. WPB reveals all hot strip mill units have been returned to sheet production except for manpower limitations or to meet plate requirements which cannot be produced on other than strip mill units due to extra deep drawing and pickling. For finishing flat rolled steel WPB reveals a total of 39 projects involving about \$34 million have been approved with additional projects costing \$21 million under consideration.

## Present, Past and Pending

### ■ KNUDSEN ELECTED DIRECTOR OF GENERAL MOTORS CORP.

DETROIT—Lt. Gen. William S. Knudsen has been elected a director of General Motors Corp. from which he resigned Sept. 3, 1940, to enter government service. Col. Graeme K. Howard has been elected a vice president of the corporation.

### ■ CARNEGIE STRIKE COSTS 15,000-TON OUTPUT LOSS

CHICAGO—About 15,000 tons of steel ingot production was lost at South Works, Carnegie-Illinois Steel Corp., last week when 1200 employes were forced into idleness by a strike of 28 maintenance men.

### ■ WICKWIRE SPENCER APPROVES MERGER PROPOSAL

NEW YORK—Wickwire Spencer Steel Co. has accepted in principle the proposal of Colorado Fuel & Iron Corp., Denver, for merger of the two companies. E. C. Bowers and R. T. Dunlap have been appointed to negotiate a formal merger agreement.

### ■ WILLEYS-OVERLAND TO START MAKING CIVILIAN JEEPS

TOLEDO—Willeys-Overland Motors Inc. will produce 3000 to 4000 civilian Jeeps a month during the last half of 1945, with volume production scheduled to start in August, according to Charles E. Sorensen, president.

### ■ INVESTMENT FIRMS BUY INTEREST IN EQUIPMENT FIRM

MISHAWAKA, IND.—First York Corp. and Utility Equities Corp., two investment firms, have acquired a substantial interest in American Foundry Equipment Co., this city.

### ■ CONTRACT TERMINATIONS OFFSET BY NEW ORDERS AT GE

SCHENECTADY, N. Y.—Termination of war contracts held by General Electric Co., while proceeding at a substantial rate, has left few gaps in the company's overall business because of the large volume of new orders.

### ■ FEA REFUSES REQUEST TO SHIP RAILS TO SPAIN

NEW YORK—Foreign Economic Administration has rejected a request by private American exporters for authority to ship 100,000 tons of steel rails to Spain.

### ■ OPA MERGES IRON AND STEEL, NONFERROUS BRANCHES

WASHINGTON—Iron and Steel and the Nonferrous Metals price branches, Office of Price Administration, have been merged into a new Metals Price Branch. Warren M. Huff has been named price executive of the new branch.



# Government Labor Policy Tested by Wave of Strikes

*Major changes thought in making as thousands of workers continue idle in some vital war industries. Labor Department strengthening seen in the offing. Proposed Industrial Relations Act gains in favor*

STRIKES involving thousands of workers continued to plague war production on a broad scale last week. Chief trouble appeared to be in the rubber industry, some 37,000 workers being idle in two major disputes at Akron, O., one of which was in its third week. But serious work interruptions were also reported in such vital war industries as glass, petroleum and automotive parts. Strikes last week tied up newspaper deliveries in New York city, and were threatened in a number of other lines, including transportation.

Total number of strikers last week was reported down from the preceding week when an estimated 100,000 workers were idle in walkouts throughout the country. Agreements to end a number of major stoppages in Detroit and elsewhere trimmed the total number of strikers, but new stoppages at other points since, to some extent, have offset the trimming.

Current unrest in the ranks of labor is believed but the beginning of a period of acute labor trouble. As war orders are cut back on an increasing scale, accompanying shortening in the hours of work, curtailed take-home pay, and dis-

placement of some workers are thought likely to spark the fuze of labor discord on a rising scale. Since V-E Day strikes have more than doubled in number, and government labor authorities are frankly apprehensive that the situation may get worse before it gets better.

Most of the current difficulties, it is believed, stem from the letdown in morale following the victory in Europe. Union rivalries have played an important role in several major walkouts. However, minor grievances have been so prominent as to tag them with the label of excuses for something more deepseated in labor relations. Basically, it is thought, the walkouts are symptomatic of the fear of idleness and shortened take-home pay expected to accompany the trimming of war production schedules.

With public indignation over the interruptions in war production mounting, the nation is looking hopefully to Washington for some move which will clarify



LEWIS B. SCHWELLENBACH

the situation and at the same time strengthen the government's position in dealing with labor strife, current and prospective. As a matter of fact, that some major changes in government labor relations policies now are in the making is seen in some quarters, changes which may bear significantly on the whole government program for handling labor matters.

The new secretary of labor, Lewis B. Schwellenbach, has indicated he is planning to revamp his department so as to substantially strengthen it. Not only is he bringing in some new personalities, but he has intimated that he plans to make the department a far greater force in government labor relations than it has



SEN. HAROLD H. BURTON



SEN. JOSEPH H. BALL



SEN. CARL A. HATCH



# Army Cuts Back Medium Artillery Ammunition Components Program

*Production of storage cases, cartridge cases, containers, fuzes, primers and boosters reduced approximately \$20 million monthly. Estimate 7600 workers in 83 plants will be released by September*

ANOTHER major step in adjustment of the nation's war production program, reductions of approximately \$20 million a month in the production of medium artillery ammunition components, was announced last week by the Army.

This follows an Army announcement the week preceding that a 50 per cent overall reduction in the nation's artillery shell program was being put into effect.

The cutbacks announced last week after a two-day meeting in Chicago of Army and plant officials include such ammunition components as storage cases, cartridge cases, containers, fuzes, primers, and boosters.

It was estimated that approximately 7600 workers in 83 plants throughout the nation would be released between now and Sept. 1. Manpower was not affected in 118 other plants represented at the meeting. No estimate was given as to the number of workers affected in subcontractors' plants.

The cutbacks were approved by the Production Readjustment Committee of the War Production Board.

It was explained that while production schedules were cut extensively in all cases, only 25 plants received complete cancellations of their contracts. Most plants, although ordered to produce at reduced rates, will retain large potential capacity in case of future emergency needs by the Army.

Following are plants which are expected to release from 100 to 250 workers between now and Sept. 1:

Air Cooled Motors, Syracuse, N. Y., 135; Bridgeport Brass Co., Indianapolis, Ind., 100; Bulova Watch Co., Philadelphia, 136; Chase Brass Co., Waterbury, Conn., 160; Commercial Controls Corp., Rochester, N. Y., 150; Dixie Metal Products, Bessemer, Ala., 206; Franklin Machine & Foundry, Providence, R. I., 170.

General Aircraft Equipment Co., South Norwalk, Conn., 150; General Outdoor Advertising Co., Jacksonville, Fla., 122; Grenada Industries, Grenada, Miss., 110; Harrison Sheet Steel Co., Chicago, 125; Heywood Wakefield Co., Gardner, Mass., 125; Jamestown Steel Partitions, Jamestown, N. Y., 100; Landis Machine Co., St. Louis, 100.

Line Material Co., East Stroudsburg, Pa., 103; Martin & Schwartz, Inc., Salisbury, Md., 119; Mullins Mfg. Co., Warren, O., 100; Multiplex Mfg. Co., Berwick, Pa., 214; National Lead Co., Granite

City, Ill., 200; Newark Stove Co., Newark, O., 170; Titan Metal Mfg. Co., Bellefonte, Pa., 100; Tracy Mfg. Co., Pittsburgh, 108.

Following are plants which are expected to release over 250 workers between now and Sept. 1:

Elastic Stop Nut Corp., Lincoln, Neb., 670; Robertshaw Thermostat Co., Youngwood, Pa., 550; Scovill Mfg. Co., Waterbury, Conn., 554; Sunbeam Electric Co., Evansville, Ind., 300; Supreme Knitting Machine Co., Brooklyn, N. Y., 295.

## First 1946 Fords Driven Off Rouge Assembly Line

After 1241 days or nearly 3½ years of suspended passenger car production, the first assemblies of 1946 Fords were driven off the Rouge plant assembly line on schedule last Tuesday morning, the first model being a moonstone gray two-door sedan, with Henry Ford II at the wheel as lights blazed, cameras clicked and newsreels ground out the event.

Stretched out behind No. 1 along the assembly line in B building were a score or more of other cars in various stages of assembly. Efforts are being made to turn out 15 to 20 cars per day this month, and to step up schedules to better than 4000 next month. Eventually, the younger Mr. Ford told newsmen, the company hopes to push production to 8000 per day. However, the Ford quota for this year is under 40,000, and if this is not increased it is felt likely over 50,000 more working people will have to be laid off at the plant.

That Ford was able to get production initiated so soon is a tribute to the engineering and mechanical staffs of the company. In the press shop alone, now 90 per cent reconverted, more than 3,000,000 tons of heavy machinery, dies and other equipment had to be brought in, removed or relocated.

First passenger car production from the Ford plant will be rushed out to dealers, probably on consignment, but no sales will be possible until prices are determined.

First hand-made models of the Mercury and Lincoln passenger cars also were shown last week and reveal principally redesigned front ends, making extensive use of die castings.

Four new assembly plants will be built throughout the country for Ford.

been in recent years. For example, he has promised to bring into the department numerous government boards and agencies set up during the Roosevelt administration to handle labor questions, and which have been acting independently of the Labor Department. These include the National Labor Relations Board, the War Labor Board, the United States Employment Service, and numerous advisory committees in the War Production Board and the War Manpower Commission. The multiplicity of agencies, which often have been in conflict in their rulings on labor matters, has been a source of interminable confusion in recent years. Elimination of some of these "vagrant" bureaus and the centralizing of authority, it is believed by many experts on labor policy, will go a long way toward creation of sound government labor policies which will function more efficiently in the interest of the public at large.

Meanwhile the Federal Industrial Relations Act, sponsored by Senators Carl A. Hatch (Dem., N. Mex.), Harold H. Burton (Rep., O.), and Joseph H. Ball (Rep., Minn.) continues to gain favor. This bill, vigorously denounced by such labor leaders as William Green, Philip Murray and John L. Lewis, in its principal provisions would bar strikes and make arbitration compulsory in disputes affecting public utilities or public services such as milk, coal or oil; would make the Wagner act ban on unfair practices apply to unions as well as management; and would permit a "closed shop" only if 75 per cent of the workers were members of the union, and 60 per cent of them ratified the "closed shop" demand.

### Challenges Labor Critics

Last week, Donald Richberg, chairman of the Citizens' Committee to Promote Industrial Peace, which drew up the Hatch-Burton-Ball bill, challenged labor critics of the measure to debate its merits. Mr. Richberg, who has served frequently as counsel for the railway brotherhoods, and was co-author of the Railway Labor Act, the Norris-LaGuardia Act and the National Industrial Recovery Act, all helpful to organized labor in advancing its cause over the past twenty years, offered to post a forfeit of \$1000 if he does not prove to impartial judges that the statements from labor union sources concerning the proposed legislation have been unfair, inaccurate and misleading. He said the labor peace plan can harm no one except those labor leaders who can hold their jobs only by maintaining warfare between employers and employees.

Union labor views the proposed Federal Industrial Relations Act as a frontal attack on the Wagner Labor Disputes Act, the "Magna Charta of labor." On the other hand Senator Ball, one of the bill's sponsors, says the program which the new bill incorporates is necessary to avert danger of a knockdown, drag-out fight between management and labor.



# Biddle Recommends Independent Operation of Geneva Steel Plant

*Tin plate seen as key to future of western steel industry. Retiring attorney general believes war-born facilities can be converted to supply half of West's requirements for containers. Hits dominating influence of eastern mills*

DECENTRALIZATION of the country's steel industry to end the dominating influence of large eastern producers and the encouragement of independent, competitive operation of the West's war expanded steel capacity was recommended by retiring Attorney General Francis Biddle in a report to Congress on the disposal of surplus steel plants. The report, Mr. Biddle's fourth on the disposition of surplus property, was his swan song; after submitting the report, he relinquished the Department of Justice to Tom C. Clark, President Truman's appointee.

The report holds that the future of large-scale steel production in the western states is dependent principally upon an orderly conversion which would supply one-half the West's demand for tin plate containers. It notes that the inevitable drop in ship production on the West Coast will create a reconversion problem unequalled in the country and adds that "successful continuous steelmaking operations in the West afford the soundest basis for future industrial expansion in that area."

Mr. Biddle's survey shows that 20 per cent of all United States tin plate consumption is in the West, although before the war almost all this market was supplied by the East. It indicates a postwar western tin plate market sufficient to provide a basis for large-scale operations, providing certain requirements are met. He lists these as the most important requirements: "First, that the western steel industry be free from monopolistic control so that it can adopt pricing policies which will permit it to compete aggressively with the eastern mills. Up to the present time, tin plate has not been sold on a competitive basis in the West. A concentration of producers and consumers has resulted in high and rigid prices. The future owners of the newly developed western steel plants should have the opportunity to enter into this market on a competitive basis.

"Second, it is of the utmost importance that the future railway rates reflect the competitive advantages of location and bear logical relationship to transportation costs on raw materials and semifinished products within or into the region.

"These factors are of the utmost importance for the future of the government-owned steel plant at Geneva, Utah.

The future disposition of this plant with its 1,280,000 tons of ingots is crucial to the reconversion program in the West. The policies and purposes of those who buy this government plant may well be the determining factor in the future of the western steel industry. Everything possible should be done to assist potential purchasers of the Geneva steel plant to draw plans for its operation.

## Favorable Operating Costs Seen

"The conclusion that the western tin plate industry will provide the basis for the continuation of large scale continuous steel production in the West is, of course, dependent upon certain findings as to relative operating costs. All the information now available appears to point toward favorable operating costs for western tin plate production. But potential purchasers of the Geneva Steel plant should have made available to them an adequate appraisal of its operating costs. A cost study of the Geneva Steel plant has been undertaken for the Defense Plant Corp. It is recommended that the results of this study be made available on a widespread basis, and that in the meantime as much interim information on the results of the study as possible be given to potential purchasers."

The report points out that tin plate is today almost exclusively produced by large integrated steelmaking companies whose operations extend from ore mining to the manufacture of pig iron, ingots and the rolling of wide variety of steel products, in addition to the coating of the finished steel with tin to make the finished product tin plates. Independent nonintegrated producers of tin plate have virtually been eliminated from the tin plate business.

As early as 1938, 84 per cent of the tin plate producing capacity in the United States was in the hands of eight integrated steel producing companies and of this number three concerns controlled about 60 per cent of the capacity. The analysis shows that with the advent of the newer methods of producing tin plate the degree of concentration in the industry has increased. It is estimated that 95 per cent of the current capacity is controlled by the eight integrated companies, of which four companies now control approximately 75 per cent of the capacity.

Practically all of the tin plate produced is used in the manufacture of containers. "The container industry is also characterized by a high degree of concentration of control," the report notes. The American Can Co. and the Continental Can Co. have approximately 85 per cent of all can sales and control almost the same percentage of the purchases of tin plate from the steel companies. In the western area, approximately 90 per cent of the purchases of tin plate

is used in the manufacture of containers.

Practically all of the tin plate produced is used in the manufacture of containers.



FAREWELL TO BIDDLE: Department of Justice staff tenders a farewell party to retiring Attorney General Francis Biddle. Mr. Biddle is shown here shaking hands with Tom C. Clark, his successor. NEA photo



estimated to be controlled by three principal producers of containers.

"Historically, tin plate prices have been determined principally by negotiation by the American Can Co., the principal buyer, and the United States Steel Corp., the principal seller. Both the purchasing of tin plate and the selling of cans is normally done under long-term contracts from three to five years' duration, and the price of cans is controlled by the price of tin plate through these contracts. The fact that both the selling and buying of tin plate has been highly concentrated has made for these effective contract control arrangements and has served to eliminate price competition. The elimination of price competition in addition has been furthered by the common use of a basing point system in the sale of tin plate. This basing point system has made for artificially high prices on the West Coast."

It is estimated that a potential market amounting to approximately 500,000 tons per year will exist in the West for the consumption of tin plate. It is concluded that western steel mills should be able to sell about half of this amount. This conclusion is based upon such relative cost figures as have been obtainable, upon the assumption that competitive freight rates will be established, and that there will be effective competitive pricing in the West. It is believed that in the postwar market eastern tin plate shipped from plants having all-water access to western markets, principally Birmingham and Sparrows Point, Md., can provide effective competition for western mills and at the same time opportunity will be afforded for the maintenance and growth of a healthy western steel industry.

**Urges Competitive Operation**

Throughout the report, Mr. Biddle argues for competitive and independent operation of the Geneva Steel plant. He contends that capture of substantial tin plate business is vital to successful operation of integrated continuous rolling facilities in the West, inasmuch as normally more than 40 per cent of the demand for flat-rolled steel in the area is for tin plate.

"It is clear that the prospective tin plate market is vital to the disposition of the government-owned Geneva plant in which continuous rolling is technologically logical. The success of continuous operation in the West will stand or fall on tin plate business. On the other hand, substantial tin plate business is developed by Geneva, successful operation of that plant can be conservatively forecast."

The report includes a table on possible distribution of western steel sales required for the operation of Geneva, which indicates that if the plant obtains 20 per cent of the amount of the steel business done in the West in 1937, opera-

tions at two-thirds of capacity can be achieved.

	Thou- sands of Net Tons	Per Cent of Western Consumption 1937
Ingot capacity	1,280.0	
Equivalent finished product	896.0	
Flat-rolled products	(405.0)	37
Plates	50.0*	23
Skelp		
H. R. sheets, strip	90.0	41
C. R. sheets, strip	10.0†	35
Galvanized sheets	55.0†	36
Tin plate	200.0†	43
Other rolled products	(192.3)	
Rails (over 60 lbs.)		
Heavy shapes	40.0	24
Wire rods, bars	60.0	16
Pipe, tubes	92.3*	19
Plain wire		
Other	°	
Exports	°	
Tonnage required for utilizing 66 2/3 per cent of equivalent product capacity	597.3	21

\* Most favorable prospects for substantial increase.

† Production of these products requires additional rolling facilities.

Mr. Biddle contends fuller distribution knowledge and more positive salesmanship of the Geneva property is required to achieve the desired result of stimulating the western industry.

"Practically no stimulation of demand among possible buyers has been attempted. There is a disposition to wait and see what is offered. In the meantime, Geneva may be declared surplus.

"Independent competitive operation is essential. Principal competition can be expected from eastern producers (principal western interests have complementary facilities). Disposal to eastern steel interests, especially those with water access to western ports, would substantially lessen competition and could retard development of western facilities. . .

"The government should be prepared to finance the additional rolling facilities required, construction to be begun as soon as possible.

"Disposal by sale to the highest bidder will too severely limit possible purchasers. Careful provision must be made against acquisition of the plant by those having other interests which would be protected by limited operation at Geneva. If satisfactory independent purchasers cannot be found, every effort should be made to secure independent, competitive operation under lease, purchase price to be determined on the basis of actual operating experience over a reasonable period."

Mr. Biddle summarizes the report in 15 conclusions, as follows:

1. Basic steelmaking capacity has been more than doubled in the West since 1938. Most of this increase is accounted for by two new integrated companies—Geneva and Fontana.

2. Prior to the war there were no integrated large-scale steelmaking plants

in the West except for the Colorado Fuel & Iron Corp. works, east of the Rocky Mountains at Minnequa, Colo. The principal products produced in the West prior to the war were rails, bars, shapes and wire products. In most of these categories western capacity was sufficient for western demand in those sizes for which rolling facilities were available, but for other principal items of steel consumption there was almost complete dependence upon eastern production. Two of the most important of these categories were tubular products and tin plate. (1937 consumption of these items in 11 western states was approximately 480,000 and 450,000 tons respectively.)

3. The great increase in steel productive capacity in the West during war years was occasioned largely by the requirements of the western shipbuilding program. In 1938 western plate capacity was approximately 25,000 tons; in 1944 it was 1,025,000 tons.

4. Most of the increase in plate capacity is at the government-owned plant at Geneva, Utah, and the government financed plant of the Kaiser Co. at Fontana, Calif. At Geneva, the larger plant (ingot capacity 1,280,000 tons), plates are produced by continuous operation, so that with the addition of two more stands of rolls, light flat-rolled products by continuous methods would require what in effect would be duplication of much of the present plate rolling facilities.

5. Postwar requirements in the West, even under the most optimistic estimates, could sustain only a small fraction of present western plate making capacity, so that conversion to other products is required for continued operation of the new plants.

6. Continuous production of steel products in the West affords the most promising possibility for utilizing the large investment at Geneva, but such operation must be able to envisage a substantial market for light flat-rolled products (sheets, strip and tin plate).

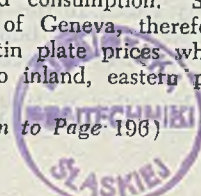
7. Participation in western tin plate requirements is the key to successful continuous operation in the West. Demand for this product is substantial and has been increasing each year.

8. The relative cost data available, including assembled raw materials and probable transportation costs to principal markets, are favorable, even in comparison to eastern seaboard producers.

9. Early determination of reasonable commercial rates on western rail movement of steel is essential.

10. Market participation will not, however, be achieved without aggressive independent pricing. The tin plate market is concentrated both with respect to production and consumption. Successful operation of Geneva, therefore, requires western tin plate prices which are unattractive to inland, eastern producers.

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# Renegotiation Shoe Pinches Man In Shop as Well as Management

*Employment possibilities and payrolls in postwar period hinge on industry's ability to set aside reserves to carry on in lean years. Workers should be informed as to what renegotiation is and how it works*

By PHILIP S. SHOEMAKER\*

THREE men in one shop died of pneumonia in a month. Few people paid attention. War strain and the change from outdoor living to confining shop work had drained the last of their reserve strength. These men had been overseas in combat units, but they were not counted among the war casualties, for it was now 1920. "No help wanted" signs were appearing on the gates. The war and all the cheering and parades had ended. Only small boys still talked about the war. But the big battle for a living was on!

There were small and large plants that failed that year. Inventory losses totaling billions wiped out reserves that had been accumulated during the war. Millions of workers walked the streets looking for jobs. This was the industry's first postwar shock.

## Cites Industry's 1920 Experience

There was a certain small manufacturing plant in an Ohio city which barely survived. Without fanfare after the armistice the veterans who had been employed previous to their service were invited to come back. Likewise the loyal older men who had worked throughout the war were retained, if they needed work. It was a ticklish situation, for there was no backlog of orders. When the genial president of this small corporation was asked "how come" by his banker, he replied that he was building up his "stock." Two lean years later saw all the accumulated profits of the war paid out in payrolls. Deflation had reduced market prices 40 per cent so when an order came in each machine went out at a sizable loss. By 1921 it was necessary to borrow to continue operating. Only guts and a friendly banker pulled that concern through.

It took 19 years for the company to get clear of bank debt. In 1939 the last note at the bank was paid off. It had been a long, hard struggle, but eminently worthwhile. The stockholders, the shopmen and the banker—the whole community in fact—were benefitted as was the nation!

In 1942, the management and employees took pride and satisfaction in helping industry retool. In this small plant in the first war year was built almost \$2½ million worth of the most critical machine

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tools required by industry to produce millions of armament parts for the fighting forces.

As a taxpayer it shared the costs of war in proportion to its income, and in co-operation with the government in holding down war profits, it agreed to submit to renegotiation proceedings.

Summarizing the firm's 3-year operations from Dec. 31, 1941, to Dec. 31,

## TERMINATIONS

Commitments canceled by contract terminations during May totaled \$5,100,000,000, compared with \$1,800,000,000 in April, Robert H. Hinckley, director of contract settlement, reported last week.

"During May the settlement rate was increased to \$1,700,000,000, compared with \$800,000,000 per month during the third quarter of last year," Mr. Hinckley said. "It is expected that the rate of settlement will rise further between now and September. In August and September, settlements should be above a \$2,000,000,000-per-month rate, since by that time claims will have been filed or waived, and settlement reached on a considerable portion of the terminations made in April and May."

1944, renegotiable sales were \$5,250,000, representing 85 per cent of the total volume. Profits of \$1,207,000 were earned on renegotiable sales. Income and excess profits taxes covering both war production and the commercial profits were \$1,203,000. The Price Adjustment Board determined that "excessive profits" existed on renegotiable sales to the extent of \$605,000. After the revenue department recomputed the taxes each year the company was required to refund sums totaling \$119,000.

Therefore, after payment of taxes and renegotiation the net profit amounted to \$195,000. This was a progressive return on its net worth of 18 per cent. The company paid \$30,000 dividends in the three years, thereby adding \$165,000 to its net worth. Working capital was enhanced by \$29,000 and equipment and

plant assets were increased by \$108,000 and \$28,000 was in excess profits refund credit bonds.

As this is not an exceptional case, but quite representative of thousands of small war contractors, it is presented as a typical experience. It raises two questions: How did the Price Adjustment Board determine that in the respective year X dollars were "excessive profits" and secondly, how might renegotiation funds adversely affect the employment situation after the war.

High taxes are the inevitable evil companions of war. Some idea of the tax picture may be gained from a paragraph appearing in *Fortune*, May, 1945, issue: "The steel industry in 1917 made more than three times as much money after taxes as in 1944 on a little more than half as much as steel." There was no renegotiation in 1917. It is noteworthy that our present excess profits taxes are scaled as high as 95 per cent of sales.

Every man in a manufacturing plant knows that production cannot be even measured off by days or months. The production key, of course, is the backlog and the grouping of items in lots for simultaneous production. Therefore, production does not conveniently fall into regular, uniform units, sales and its resultant profits will be equally uneven. Fiscal years are purely for the convenience of accountants, and of course the tax collector and renegotiators.

## Careful Budgeting Necessary

Corporations, partnerships or private ownership enterprises, like individuals, have to come up with cash when settling their annual tax liability. This is also true when making renegotiation refunds. This takes extremely careful budgeting, because profits are not always visible in cash. To prepare for succeeding commitments, profits might easily have been converted into new inventories; in equipment (as was the case in the company described) and in accounts receivable. In addition to meeting the taxes, part of the company's profits must carry the invisible ear-mark of cash for the "tide-over" "reserve-building" for the inevitable cyclical period of depression. And, of course, every good management has payroll reserves for a couple of months period to tide over terminations of part or all backlog. Other invisible ear-marks are replacements of worn-out equipment and constant expenditures for improvement of old products and development of new ones. In short, the lean and hungry policy of management as regards the hoarding of cash may easily be the difference between a solvent company and a sheriff's sale two years after victory.

The concern which I described has a current average shop payroll of \$300,000. Among the members of the National Association of Manufacturers there are 12,000 companies that employ fewer than 500 people. The large majority of these while regarded as "small," are subject to renegotiation. Yet less than half of the



corporate revenue of the country is subject to renegotiation.

The small manufacturer eyes the hotels, railroads, mines and mercantile establishments which are exempted from renegotiation and in consequence have been able, because of war business, to retire bonds and put away reserves for future use. He also questions why the "tiny" manufacturer with less than \$500,000 war production annually is screened out as being too small for the renegotiators to bother with. Yet he must go through the wringer of both renegotiation and taxes with the result that he faces virtual confiscation of his reserves. There is in this uneven burden of war taxation an element of discrimination which is new and unwholesome.

The small manufacturer who is subject to renegotiation may have an advantage which should be capitalized. By making known his renegotiation troubles he can let his employees know that for him the war has not been all "beer and skittles." Andrew Carnegie once said that the human side of an organization is the most important aspect of business. Emergencies have a way of unifying men through a spirit of helpfulness. In the approaching postwar period management and men jointly will face an emergency no less grave than the one we are passing through.

The link between the manufacturer and the shopmen is the foreman. He must keep costs in line; he must have accurate knowledge of production. He attends conferences with the management. He can best interpret to his men the nature, the moods, and the trials of their management. He can acquaint them with the current and postwar problems which bear directly upon the ability of the management to survive and continue to provide employment.

#### Foremen Should Be Well Informed

The foreman is likewise the first operating man with whom GI Joe will work. The more informed he is regarding business in general and his company in particular, the more he can impart an understanding of business and industry's problems to the ex-service men who have been out of touch with industry. For example, there is the importance of knowing what renegotiation is and how it works!

Physicians may not confirm this, but businessmen certify that the money nerve is just over the heart. Most small manufacturers in war production found their earnings placed them in at least the 80 per cent tax bracket. It was not until April 28, 1942, when the Renegotiation Act was passed they learned that in addition to being taxed, they would be subject the renegotiation. It was well into 1943 before the 1942 annual operations were reviewed and the first determinations on renegotiation announced. To say these manufacturers were surprised at the amount of cash refunds requested would be an understatement. Managements were too stunned at first even to

phone their congressmen! The situation was somewhat like the editor who told his reporter they couldn't put him in jail. "I know," said the reporter, "but I'm phoning from there."

With very good reason, these small war contractors sought the required official approval so as to be able to pay their men higher wages. It would have cost the companies nothing, for whatever wage increases were approved would have been borne by the government inasmuch as the taxes and renegotiation refunds would have been just that much less. But the wage stabilization board met these requests with little show of enthusiasm, in line with the restraints imposed by Congress to check inflation. To offset pirating of workers by new war industries, whose wage-scales had not yet been established was still another reason, as was the manufacturer's earnest desire to meet the rising cost of living of his men and enable them to accelerate the payments on their home mortgages.

Certainly there is little doubt that renegotiation has disturbed the small manufacturer in war production more than any phase of the war. With a scarcity of office help, it was necessary to prepare comprehensive analyses of the company's operations; then there were repeated visits to the Price Adjustment Board and in some cases travel to Washington all of which consumed much nervous energy and time which could be ill-spared from

plant direction. The large corporations, with full administrative staffs and adequate counsel experienced relatively little pressure from these proceedings.

In determining whether a concern has made "excessive profits," renegotiators say that many other factors besides the rate of profits must be taken into consideration. The principal ones are the volume which is renegotiable, that is, products of business during a fiscal year period whose end-use is directly or indirectly for the war. Other factors are the degree of speed with which companies have met their delivery schedules, the care with which they have used labor and conserved material, the cost at which they have been produced, the inventive and management contributions which they have provided, not only for their production but which they have provided to help other people engaged in the war effort. Also the source of capital which is used in making war products; whether or not a company used government facilities or financing. Another criterion is the general performance of the company in handling its production and the efficiency or lack of it with which its operations have been conducted. The factor of cost of manufacture is the biggest single factor in arriving at an allowable profit. As volume of business increased over the year preceding the rate of allowable profit is lowered. Other indexes are the quality of

(Please turn to Page 196)

## TRANSITION TOPICS

**RECONVERSION**—Simplified priorities system designed to cushion shock of changeover to limited civilian goods production during second half of 1945. Many controls and restrictions lifted. See page 71.

**ECONOMIC CHARTER**—War Mobilization and Reconversion Director Vinson offers nine-point postwar program. Asks modernization of tax law structure. See page 73.

**LABOR**—Shift in administration's labor policy may follow wave of strikes in critical industries. See page 74.

**SURPLUS PLANTS**—Competitive, independent ownership of western steel plants recommended by retiring attorney general. Tin plate called key to successful, continuous operation of war-born facilities. See page 76.

**SMALL BUSINESS**—Commerce Department will attempt to increase assistance to small business. See page 80.

**AIRCRAFT**—Technical advances of war period will have profound influence on postwar aviation, particularly in jet propulsion, pilotless planes, rocket power, radar and micro-wave techniques. See page 94.

**INDUSTRIAL X-RAY**—Place to be taken by X-ray after reconversion of industry will be determined by its record. Efficient use of metals, fewer rejections and lower costs afforded by medium seen as cause for expansion. See page 102.

**THERMIT CASTINGS**—Thermit welding process, having proved adaptable to production of steel castings, makes available to industry a new source for limited quantities. See page 105.



# Commerce Department Will Seek To Expand Plans To Aid Small Business

*Advisory committee recommends department increase assistance to little firms in finance and credit, technical advice and in obtaining tax laws that will not unduly burden them and restrict expansion and employment*

A LIVELY contest for the peacetime stewardship of small business is expected to open this fall when the Department of Commerce asks Congress for a larger appropriation to enable it to give increased assistance to the segment of the economy which falls into this category. At present, at least three government agencies are catering to small business, a situation in which exists considerable duplication of effort and personnel.

Most active agency working in behalf of small business is the Smaller War Plants Corp., created by Congress in June, 1942, as a war agency. It was believed at the time there should be more small business participation in war production and to reach this objective it was necessary to set up a new agency with authority to book prime contracts and sublet them to small business, to lend money to small plants going into war production, and render other assistance to small business.

At the time the creation of the Smaller War Plants Corp. was under dis-

cussion there were numerous criticisms that Jesse Jones, then secretary of commerce and federal loan administrator, was failing in both these posts to give sufficient help to small business. In particular, Mr. Jones was accused of a loan policy which helped big business.

As a result of these criticisms, Mr. Jones took two principal actions. The Small Business unit which he had established in December of 1941 in the Bureau of Foreign and Domestic Commerce was expanded into the Small Business Division of the department in the spring of 1944. At the same time, he adopted a more liberal publicity policy at the Reconstruction Finance Corp. and the releases which the RFC handed out laid more emphasis on loans the RFC was making to small business.

The Smaller War Plants Corp. encountered rough sailing at the start of its career. It was a new organization and its policies and methods had to be built from the ground up. It had difficulty in enlisting the services of competent engineers

and financial men. It made slow progress in winning recognition from the various procurement agencies, as the Army and Navy, which had established their buying methods and were reluctant to place contracts with the SWPC for subcontracting by the latter.

Eventually, under a lot of needling by members of Congress, and with additional grants of authority from Congress from time to time, the SWPC began to make itself felt. This has been especially the case since energetic Maury Maverick became its chairman at the start of 1944. From the start, Mr. Maverick has viewed his present job as a crusade, and he has breathed fire night and day against the foes, real or fancied, of small business. In addition to his ability to speak and write forcefully and colorfully at a moment's notice, Mr. Maverick has organized a high-powered publicity staff that is the envy of many other government agencies. Especially envied is the ease and facility with which Mr. Maverick obtains ever larger grants of authority from Congress.

Today the SWPC has authority to give technical and other advice to small business in general. It has authority to grant or guarantee loans to small business. It books prime contracts from the government and subcontracts them to small business. Its chairman is a vice chairman of the War Production Board, by mandate of Congress, to see to it that small business gets fair treatment from the WPB. The SWPC also has specific mandates under the Surplus Property Act and the Contract Settlement Act to protect small business, and particularly the interests of World War II veterans, in the administration of these acts. The SWPC has a large headquarters staff in Washington to direct its manifold activities; it has regional offices in Boston, New York, Philadelphia, Atlanta, Cleveland, Chicago, Kansas City, Dallas, Denver, San Francisco, Detroit, Minneapolis, Seattle and Los Angeles.

## Congress Considering New Proposals

In line with his policy of always planning something bigger and better, Mr. Maverick now has a number of requests before Congress. He recommends enactment of a loan insurance plan aimed at encouraging the banks to lend more money to small business, with SWPC guarantees. He urged a comprehensive program under which the SWPC would seek to increase small business participation in export trade. Also, he asks for a larger appropriation to permit expansion of the SWPC's Technical Advisory Service which, says Mr. Maverick, "is the biggest and best idea developed in this war."

That was the situation Henry A. Wallace encountered when he, on March 1, 1945, was appointed to succeed Mr. Jones as secretary of commerce. It bothered him a great deal for Mr. Wallace, on the one hand, had very definite plans for improving the country's general economic level by encouraging prosperity for small business; on the other hand, the Smaller



**CARRY ON:** A preparatory commission, named as the final official business of the San Francisco conference, plan to carry on the conference work. Members, left to right: Dr. Hsu Mo, Chinese ambassador to Turkey; Dr. Leo Pasvolsky, United States Department of State official and acting chairman of the commission; Alger Hiss, secretary-general of the conference; and Herbert Evatt, chairman of the Australian delegation.

NEA photo





## Have you seen the new day coming?

Even in the pre-dawn darkness of war there are signs that it is on the way. . . . It can be the greatest day the world has ever known.

Already men, materials and American ideals have penetrated to the last wildernesses of the earth. There's a trans-Atlantic flight every 13 minutes of the day and night . . . 160,000 miles of air routes being flown by American transport planes . . . our air strength is double that of the rest of the world combined . . . our manufacturing

productivity half of the world's total capacity. We have what it takes to force prosperity and to enforce peace.

We at Bryant feel that we're part of the new day that's coming. Our record in war links us with great production achievements, from the millionths-of-an-inch precision in the modern airplane engine to the millions of things that we'll help to produce more simply, faster, for less. We urge you to call us in now!



**BRYANT CHUCKING GRINDER COMPANY**

SPRINGFIELD  
VERMONT, U.S.A.



Business Division of the department was being operated on a very skimpy and inadequate basis.

One of the first things Mr. Wallace did was to appoint a Small Business Advisory Committee to study the needs of small business and determine what the government should do about the problem. This committee submitted its report to Mr. Wallace on May 28—and Mr. Wallace was much pleased with it. Since then, the report has received continuous study by department officials; there have been and continue to be numerous conferences on how the department should organize, and what sort of policies it should adopt, to give effect to the Small Business Advisory Committee's recommendations. Not the least of the difficulties facing the department is that of meeting the competition of the Smaller War Plants Corp. when it asks Congress for a larger appropriation to enable the department to build up its small business service.

The Small Business Advisory Committee report on which the department now is building its case states unequivocally that the Department of Commerce "is the proper government agency to interpret the small business problem to the government, to recommend a course of action, and to execute the plan. The facilities of the department appear to be organized along a proper pattern for this objective, but we do not believe that the facilities are adequate to cover the many phases of a desirable program."

The report calls for a planning staff at the policy level to consider the basic problems of small business, such as the ability of small business to compete with big business. This planning staff would study legislative proposals affecting competition, taxation, finance and other basic factors. It would deal primarily with the activities of the Bureau of Foreign and Domestic Commerce, but would work in close contact with Congress, the Treasury Department, Federal Trade Commission, Department of Justice and other government agencies whose activities have a bearing on small business. It also would conduct an educational study.

A digest of the main body of the report follows:

**Taxation** — The tax system should: 1.—Provide adequate revenue to protect the credit of the United States and safeguard the monetary system; 2.—should not impose burdens on business which restrict expansion of production and employment, discourage the opening and development of new and small business, affect adversely the competitive position of small as compared to large business, or influence business decisions unduly; 3.—should distribute the tax burden equitably among all income levels insofar as that is consistent with objective No. 2; for example, the tax burden must not fall so heavily on any group as substantially to affect incentives to produce or invest or to restrict unduly the demand for consumer goods.

### Recommends Revision of Tax Laws

To permit small business to build up adequate liquid working capital, and to obtain immediately funds rightfully theirs under the present tax structure, the report recommends these changes in present tax legislation: 1.—Increase earnings exempt from excess profits tax from \$10,000 to \$25,000 effective Jan. 1, 1946; 2.—repeal the excess profits tax as of the beginning of the year following cessation of hostilities with Japan; 3.—permit corporations to take their 10 per cent excess profits tax credit for 1944 and subsequent years as a deduction against tax payments for those years; 4.—advance maturity of bonds representing 10 per cent excess profits tax credit for 1941 through 1943 to Jan. 1, 1946; 5.—modify immediately the carry-back provisions to permit postponement of current tax payments on the previous year's taxes to the amount of estimated refunds accruing under present provisions as a result of subnormal earnings.

The report recommends speeding up amortization refunds, also a modification of carry-back provisions applying to deficits to make immediately available liquid working capital which would eventually belong to the company under present law.

**Management Aid**—Where larger business organizations have the facilities for investigating, studying and solving their own management problems, the smaller operators must look elsewhere for such aid, the report says. It recommends that the department conduct a large number of specialized studies and publish reports. In particular there should be a "going into business" series of reports.

The report recommends that the department reprint for civilian use the series of books prepared by the Army on establishing and operating different kinds of business. It also recommends creation of a new series of books to describe operations involved in different kinds of business and manufacturing. It recommends also more frequent and more diversified census studies.

**Finance and Credit** — A substantial demand for long-term funds by small business is foreseen in the report. In order that these funds may be forthcoming, the department is asked to sponsor a scheme involving government guarantee of long-term loans made by private financing institutions; a new, special type of low-interest loan should be developed, to be liquidated in 10 to 15 years, and to be negotiated without encumbering receivables, inventories and other current assets. Also, the report recommends, the department should study the extent to which the government should make direct loans to small business, the credit problem of small business in the export field, the credit problems of returning veterans, and the problems of small, particularly new, producers whose liquidity is endangered by payment of taxes.

The Small Business Advisory Committee which drafted this program that now is the major item of new business for Department of Commerce officials comprises: Ivan Allen Sr., chairman; Walter Ringer, vice chairman; Vincent L. Browner, Ernest G. Draper, W. E. Harber, Lou E. Holland, E. H. Lane, Stacy May, John R. Pinkett, Prentiss M. Brown, Ralph Flanders, Eric Johnston, A. W. Lutz, Morris S. Rosenthal, George Ruppel and John W. Snyder.



**ALL DIESEL UNITS:** These diesel-electric locomotives built by General Electric and American Locomotive Co. for the New York, Susquehanna & Western Railroad

are making that railroad the first in America completely equipped with all diesel-electric units. The Susquehanna line bought 16 of the new locomotives



# PRIORITIES-ALLOCATIONS-PRICES

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

## REVOCATIONS

**MACHINE TOOLS:** Order L-147, which prohibited special electrical specifications for machine tools, except in specified circumstances, has been revoked. Manufacture and delivery of machine tools remain subject to all other applicable WPB orders and regulations. (L-147)

## AMENDMENTS

**CONTROLLED MATERIALS:** Direction 44 (steel not needed by producers or distributors to fill authorized controlled material orders) to CMP regulation 1 and Direction 5 (disposal of controlled materials procured by a warehouse or distributor for his stock from idle and excess inventories) to CMP regulation 4 have been revoked, since they became obsolete with open-ending of CMP on July 1. (CMP 1, 4)

**CAST IRON BATHTUBS:** Direction 6 to order L-42 has been revoked. This direction required manufacturers to apply to WPB for authorization to produce cast iron bathtubs; limited sales to purchase orders from the military, for authorized construction projects, and to farmers whose applications had been approved by WPB, and other specified users. (L-42)

**CASKETS:** Iron, steel, copper and aluminum now may be used in production of caskets, shipping cases and burial vaults without limitation. Tin, antimony, antimonial lead, lead or zinc may be used in production of burial vaults only to the extent that such use is not restricted in orders M-43, M-112 and the M-38 series and the M-11 series. All restrictions in order L-64 on the use of metal in production of metal liners have been deleted, including the necessity to obtain certificates of essentiality for the use of metal liners. Metal limitations also have been removed on production of casket-handle hardware and casket corners, which are still subject to the restrictions on the number of designs permitted by L-64.

The order's schedule A specifications on casket designs and dimensions do not apply to the production of caskets, burial vaults or shipping cases made of metal, or of plastic caskets, nor do they apply to any type of shipping case or burial vault made or assembled for military orders.

Restrictions on painting, coating or staining burial units have been deleted from the order, while schedule B has been added, limiting the use of cotton and rayon fabrics in caskets. (L-64)

**PLUMBING EQUIPMENT:** AA-3 rating assigned to distributors for purchasing plumbing, heating and cooking equipment, with certain exceptions, may not be used for purchasing metal bathtubs. (L-79)

**LEAD:** An increase of 25 per cent in third-quarter allocations of lead for automotive batteries over the second-quarter allocations has been granted. This means that 900,000 more batteries can be produced in the third quarter, or a total of 4,700,000. Allocations have been increased to 25 per cent of the 1944 use for that purpose compared with 20 per cent on the same basis during the second quarter of this year. (M-38)

**CONSTRUCTION:** AA-3 preference rating and allotment symbols H-1, H-2 or H-3 assigned by Order P-55-c may be used for all materials to be used in projects approved by the National Housing Agency, except as specifically prohibited or restricted by schedule I and schedule II of the order. (P-55-c)

## INSTRUCTIONS

**ELECTRONIC EQUIPMENT:** Production, distribution and sale of transformers, resistors, capacitors or other radio components designed for use in equipment not involving the use of vacuum or gaseous tubes or designed for use in equipment specifically excluded from order L-265 are not subject to the restrictions of that order. Consequently, such components may be manufactured and sold in accordance with Priorities Regulation 1 and other applicable WPB orders and regulations.

## PRIORITIES REGULATIONS

**CLASS B PRODUCTS:** Any class B product manufactured on an authorized production schedule may be sold to fill any orders received, whether rated or unrtd, as long as rated orders are given the precedence required by Priorities Regulation 1 or other applicable regulations or unless a particular WPB order provides otherwise. This is true even though the CMP-4B application (for controlled materials) was filed with the expectation that all sales would be made on rated orders or on particular orders, and even though all production materials required were obtained by the use of priorities assistance. (PR-1)

## PRICE REGULATIONS

**CONSUMER GOODS:** Seven items of consumer durable goods have been added to the list of commodities on which manufacturers may apply for price increases in some circumstances involving production at a loss, effective July 4. These items are: Carpenter's planes, compass saws, hand saws, lineman's pliers, toy embossed wooden blocks, wire-tied box springs and wooden domino and checker games. Manufacturers whose ceilings for these items are below the prevailing price for the same items may apply for a price increase in either of the following circumstances:

1. If the applicant's entire manufacturing operation is being conducted at a loss, or will be so within 90 days.

2. If his manufacturing operation as a whole is being conducted at a profit, but the maximum price of the article in question is below his manufacturing and packing cost. Shipping cost, where delivered prices are quoted or where the manufacturer is permitted to pass on to the buyer all or part of the freight cost, may be allowed in this case.

Toy manufacturers newly entering the field have been made subject again to the requirement that proposed ceiling prices for new products be expressly approved by OPA before sales are made. They have been made subject to the "fourth pricing method" of the consumer durable goods regulation which requires manufacturers, who are unable to fix their own ceiling prices by reference to ceilings of the same or comparable items of their own manufacture, to apply to OPA for a price. (No. 188)

## Consumers Durable Goods Division, WPB, Reorganized

Consumers Durable Goods Division, War Production Board, has been reorganized to facilitate the output of war-essential items and the reconversion to civilian production during the transitional period between V-E and V-J days.

The announcement was made by Stanley E. Adams, director of the division.

Furniture and Household Goods branch and Photographic and Personal Goods branch have been consolidated in a new administrative unit, the Household and Personal Goods branch, with George D. Morton as chief.

Wendell S. Kuhn has been assigned to head a new Houseware and Personal Goods section of the new branch which includes the following items: Lawn mowers, bicycles and powercycles, office supplies, military insignia, clocks and watches, church goods, houseware, personal goods, sporting goods, food serving equipment and musical instruments.

Winston A. Bryant will take over Mr. Morton's former responsibilities as head of the House Furnishings and Morticians' Goods section, which is unchanged in its activities. The Metal Furniture section remains under the direction of John L. Rowland, and the Photographic section continues under Lincoln V. Burrows.

Organization of the Electric Goods branch of the division has not been changed, still consisting of the Appliance section and the Lamp and Battery section.

## WPB Clarifies Construction Restrictions in Scrap Yards

Amount of construction work that may be done in a metal scrap dealer's plant in a year without War Production Board authorization depends on whether the type of business is industrial or commercial, War Production Board explained recently. If the plant manufactures, processes or assembles goods, the scrap dealer may spend up to \$25,000 on construction work in a year without WPB authorization, under terms of order L-41. If the type of activity is commercial, the exemption for construction work on the same basis is only \$5000.

A scrap dealer's plant is considered industrial if it is primarily engaged in such processing operations as baling, pressing or briquetting light iron, cutting up heavy melting steel, breaking up cast iron, detinning cans or smelting non-ferrous metals for the purpose of making the scrap available for further use. It is considered commercial if it is an automobile graveyard where automobiles are taken apart and the parts sold without change; or a yard where items are sorted and cleaned.

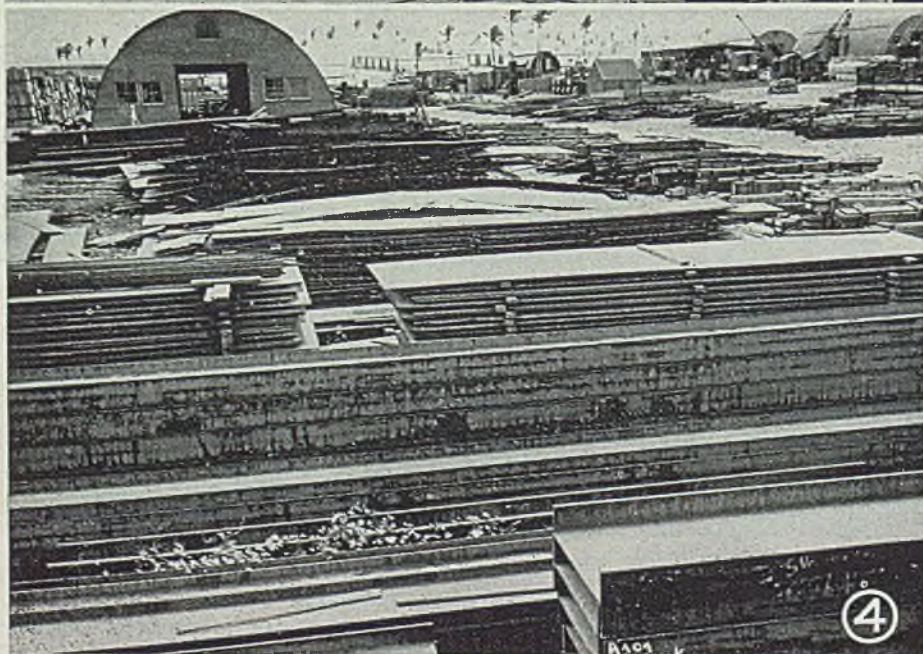
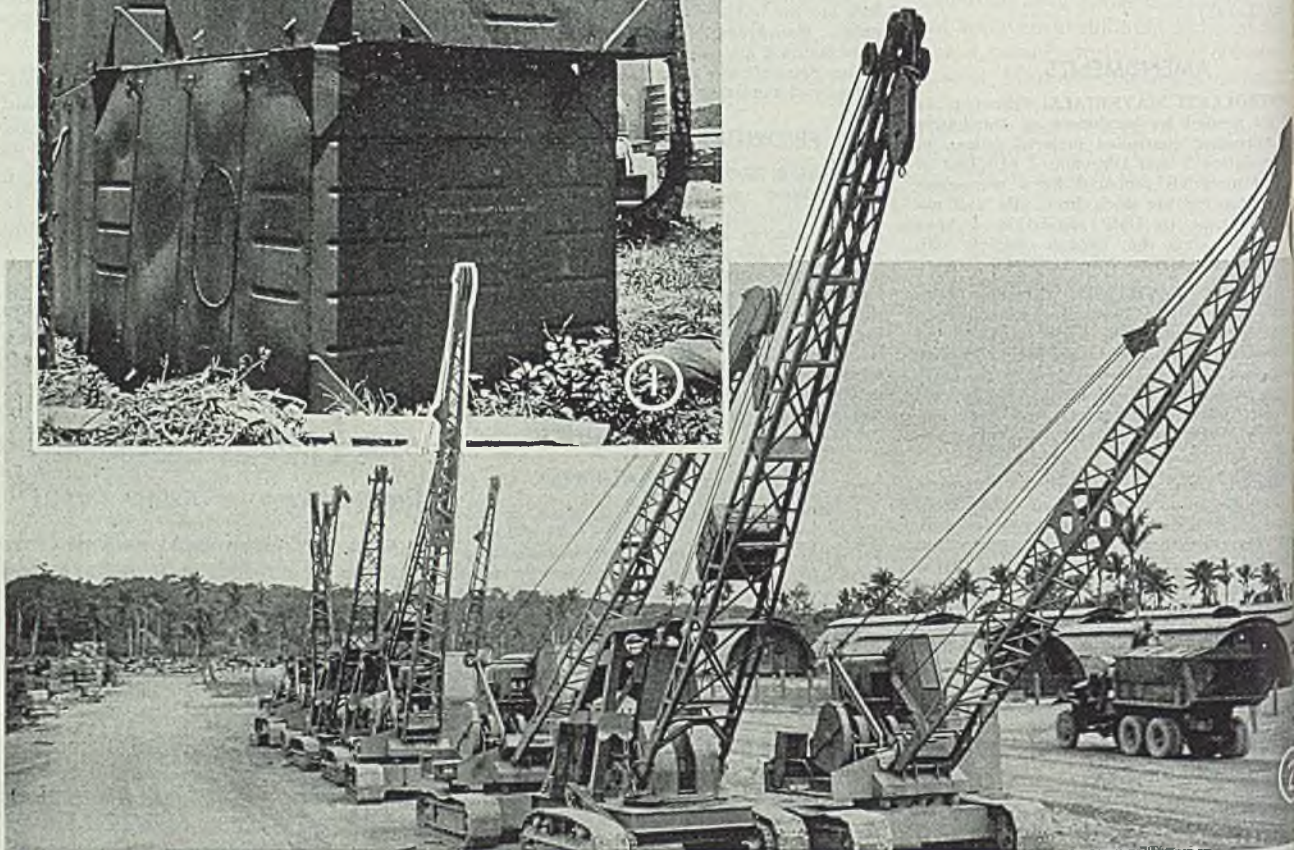
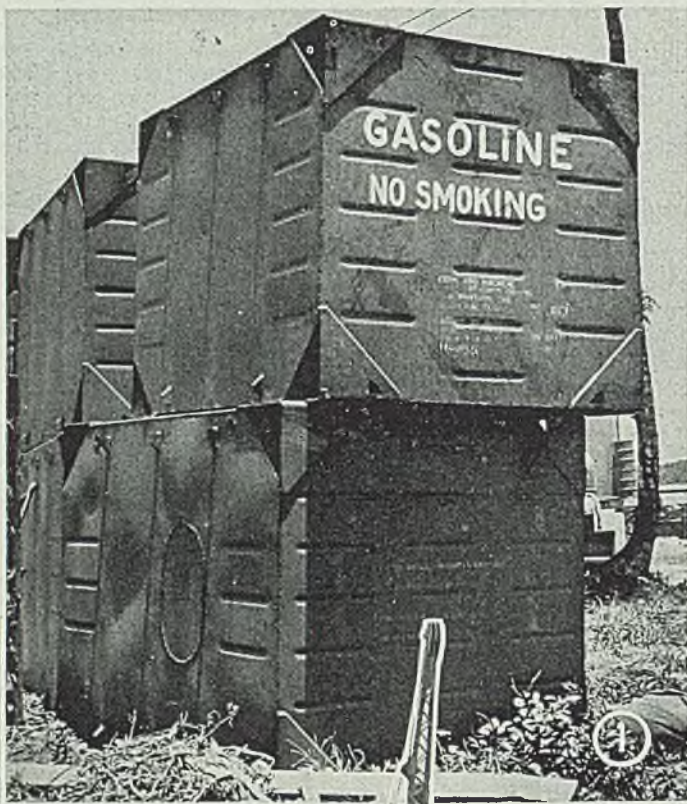
## Appointment

R. C. Allen of Oglebay-Norton & Co., Cleveland, has been appointed deputy vice chairman of the Office of Metals and Minerals, War Production Board. Mr. Allen resigned in August, 1942, as deputy director of the Steel Division in charge of raw materials to return to Oglebay-Norton.



# Vast Material

Fig. 1—Pontoon tanks fabricated from steel plates serve a wide variety of uses at Pacific bases. Here they have been adapted for gasoline storage tanks





# Needs Pose Huge Logistics Task

EQUIPMENT and materiel requirements for waging war in the Pacific are vast and varied. Thousands of supply items already have been transported halfway around the world to support United States forces driving toward Japan. In many cases, circumstances necessitate ingenious use of this material, often for purposes other than that for which it was originally designed. The accompanying Navy photographs indicate the immensity of the Pacific supply problem.

*Fig. 2—Stock of derricks at the Guam naval supply depot, ready to be moved wherever needed. The depot carries more than 100,000 items, including all types of fuel, radio and radio parts, ordnance, engines and a complete list of general storekeepers' items*

*available in a range of sizes to meet all the Navy's needs*

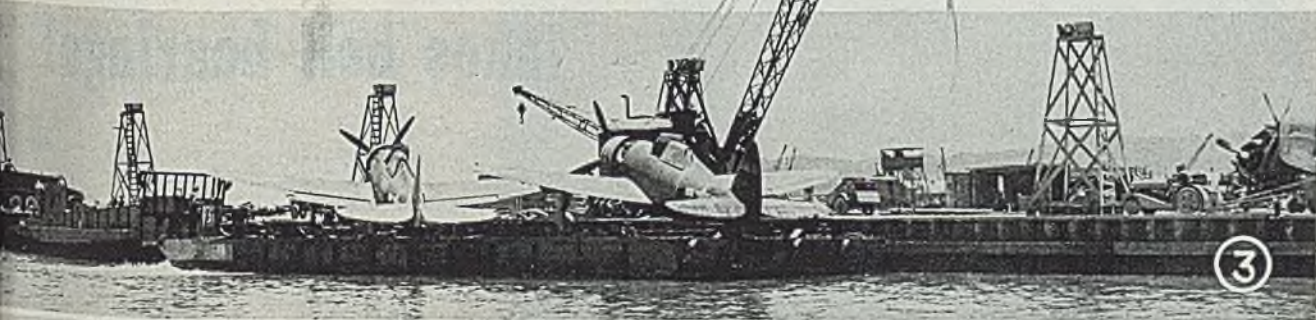
*Fig. 5—Steel landing mat sections are finding numerous uses which*

*their designers probably did not have in mind. They are widely used for fencing and walkways on coral islands. This view shows their use to solve the seating problem in an open-air theater on one of the Marshall islands*

*Fig. 3—Pontoon float moves combat aircraft to a carrier*

*Fig. 4—Portion of the steel storage yard at the Guam naval supply depot. Thousands of tons of sections, mainly plates and shapes, are*

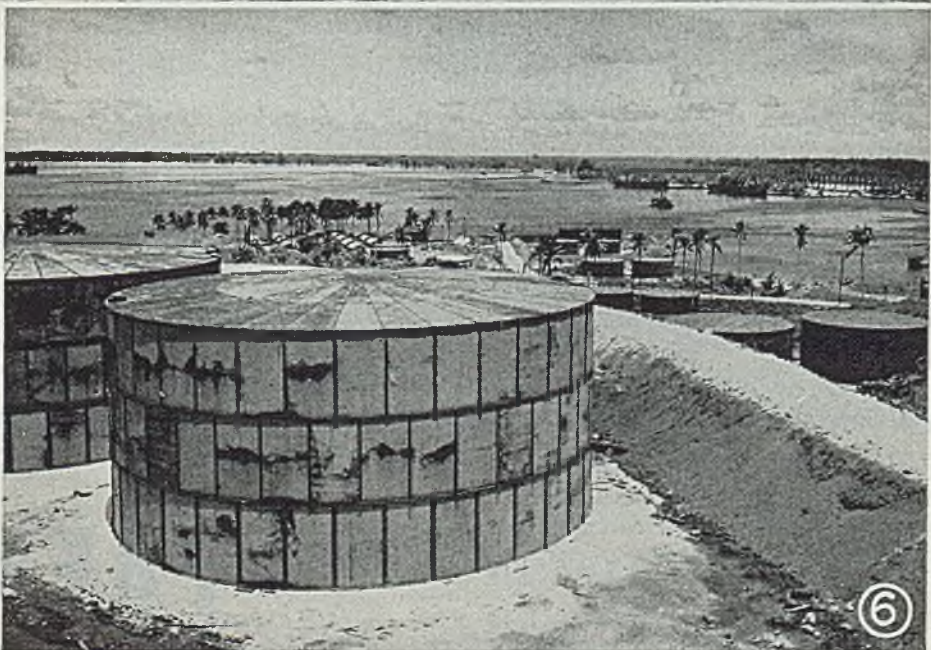
*Fig. 6—Largest single requirement in the Pacific war is fuel and lubricants which are now being shipped to that area at a rate of 1,660,000 tons monthly. Storing and handling is a major problem. Here is shown a small tank farm*



3



5



6



# STAND BACK,

# Paul Bunyan..



## ..Rough stuff like this takes ball bearings!

Out in the Pacific Northwest country the trees are even taller than the lumberjack's stories. Getting one of these monster Redwoods or Douglas Firs down is a job but nothing like the job of getting it up . . . and out. They have a machine out there for doing that which makes Paul's blue ox, "Babe", look like a yearling calf. It's a heavy-duty hoisting, towing rig for hooking up to the power take-off of a tractor. It'll pull up to 45,000 pounds at the rate of 79 feet a minute. And

one of the features that enables this mechanical blue ox to handle several times the maximum capacity of the tractor itself is the use of large-ball, deep-groove Fafnir Ball Bearings. It takes this Fafnir "balanced design" to take this kind of rough-and-tumble shock

If that's the kind of bearing performance you want then you want to talk with a Fafnir Field Engineer. Write us in detail today. The Fafnir Bearing Co., New Britain, Connecticut.

MOST COMPLETE LINE IN AMERICA

# FAFNIR BALL BEARINGS



# MIRRORS of MOTORDOM

**Ford gets started on new passenger car production. Willys authorized to build 20,000 civilian jeeps over remainder of year. Quotas set by War Production Board trim down large producers, give advantage to smaller builders**

STARTING bell has sounded, and by the time this appears in print Ford will have rolled a few 1946 models off assembly lines. July schedule is reliably reported to call for completion of 200 jobs, with around 4000 slated for August, 8000 in September, and 9000 monthly over the balance of the year, assuming it will be necessary to stay within the quota allocation of 39,910 covering the last half of the year. First Fords were slated to be christened Tuesday, July 3, and rush calls were going out to various suppliers for certain final trim parts to be in the Rouge plant for sure on July 2.

A rash of strikes in various Ford departments over the past three weeks, springing principally from the conflicts between AFL and CIO maintenance crews and machinery movers, has not eased the Ford reconversion picture any, but orders from R. J. Thomas, president of the UAW-CIO, for all maintenance workers in plants where strikes were in progress to report immediately for work served to clear the air somewhat.

Meanwhile Willys-Overland in Toledo, O., is showing the press its civilian jeep model next week Monday, followed by a demonstration at C. E. Sorenson's farm in New Hudson, Mich., on Tuesday. Willys has been given WPB authorization to build 20,000 civilian jeeps over the balance of the year, over and above the company's passenger car quota of 8000. Company officials believe they can sell even more jeeps than are planned, but must carry along production of the military version, contracts calling for something like 90,000 more of these, running into the last quarter of 1946. Outwardly the civilian jeep closely resembles the military model, except that the spare tire is mounted in the right side, while the top appears to cover only the front seat.

## Ford Has Head Start

With Ford apparently getting the jump on the rest of the industry as far as initial production is concerned, the pressure is now on Chevrolet and Plymouth. Of the two, it is likely Chevrolet will be the next of the Big Three to have assemblies under way. First shipments of parts were scheduled to be in Fisher Body plants on July 2, so it will be unlikely to see any finished bodies ready before the end of the month; whether chassis will be ready to receive them as yet is not clear.

Comparison of 1941 production history percentagewise with new authorizations for passenger car production shows how the larger manufacturers were trimmed down on their quotas to permit larger

assignments to the smaller manufacturers.

	Per Cent 1941 Production	New authori- zation
General Motors Corp.	48.41	41.29
Chrysler Corp. ....	23.13	21.55
Ford Motor Co. ....	18.57	17.83
Studebaker Corp. ....	3.17	4.03
Hudson Motor Car Co.	2.10	3.13
Packard Motor Car Co.	2.12	2.91
Nash-Kelvinator Corp.	1.74	2.83
Willys-Overland ....	0.71	2.31
Graham-Paige ....	...	2.31
Crosley Corp. ....	...	2.31
Miscellaneous ....	0.05	...
	100.00	100.00

Latest production authorization made by the WPB covers another 100,000 trucks

and commercial cars, bringing revised 1945 totals to over 540,000, or already twice the total allocation of passenger cars. While military requirements are included, they constitute only a small portion of the total which is principally in the light and medium truck classifications.

Increase of 20 per cent in third-quarter lead allocations for automotive batteries has been granted by the WPB. This will permit production of 900,000 more storage batteries over the original 3,800,000 scheduled for the third quarter.

Detroit Ordnance District has announced the Fisher Body tank contract for M-26 heavy tanks built at the Grand Blanc, Mich., tank arsenal has been rescheduled downward to effect termination in April, 1946. The rescheduling will effect approximately 3000 tank units and spare parts with estimated value of more than \$211 million, over a period of ten months. However, negotiations are under way which will place additional



**INCENDIARY BOMB:** K. T. Keller, president, Chrysler Corp., holds a "Tokyo Firefly," a new incendiary bomb which weighs ten pounds and throws off 40 globules of flaming oil. Chrysler has received a contract to produce 7,500,000 of these bombs at its Evansville, Ind., ordnance plant.  
NEA photo

(Material in this department is protected by copyright and its use in any form without permission is prohibited)



contracts for combat vehicles in the plant, what type it is not revealed.

DOD also discloses reduction in the production of truck cargo bodies at Covered Wagon Co., Mt. Clemens, Mich., covering 1700 bodies valued at \$495,000 over a period of six months. No labor displacement will occur before September. The company has supplied over 21,000 of these bodies since Pearl Harbor.

Toledo ordnance officers report the Bullet Core Division of Willys-Overland has ceased production of 0.30 and 0.50 caliber ammunition, with the plant equipment retained on a standby basis. Reductions also have been made in schedules for 155-millimeter shells, affecting 500, in addition to 400 affected by the bullet core termination.

Michigan leads other states in reconversion construction applications. Out of a national total of \$155 million approved by the WPB for necessary immediate construction work, plants in this state account for 204 of a total of 754 applications, the automotive industry in the forefront with 193 approved applications involving \$115 million. Refrigerator manufacturers were second with 44 requests totaling \$4,750,000.

Ford has announced purchase of a 100-acre tract of land at St. Louis for construction of an assembly plant with daily capacity of 500 cars. Employment at the new plant, located near the St. Louis airport, will total approximately 3000. About 700,000 square feet of floor space will be provided in the one-story 520 x 1500-foot structure. Concurrently the company is offering for

sale a 374-acre tract at the confluence of the Meramec and Mississippi rivers which has been owned for several years and was considered for a time as a site for the new assembly plant.

Other proposed plant expansions include purchase of an additional 40 acres of land by Chrysler Corp. adjacent to its parts buildings at San Leandro, Calif. Verne G. Orr, vice president of Chrysler Motors of California, in a recent talk before the San Leandro Chamber of Commerce, emphasized the difficulty the average citizen will have in purchasing any passenger cars built this year, and said 55,000 units of authorized production would be needed for dealers' samples. Questioned as to what Chrysler proposed to do on the new property, he declined to be specific other than to say, "We certainly aren't going into the truck gardening business."

#### Parts Price Policy Uncertain

The automotive parts industry advisory committee met in Washington recently with OPA officials, with no result so far as any tangible indication of OPA's eventual action on parts prices. Session was devoted mainly to exploratory questions, although the committee did vote unanimously against any flat industry-wide percentage increase factors as unfair and impractical; and for increase factors to be applied on a company basis, or at the option of the manufacturer, on a product-group of individual product basis with each company. The committee pointed out to OPA that even if the parts-makers did have a suitable price formula today, many could not figure prices until

the OPA had also set its policy for components such as steel and gray iron castings, forgings, screw machine parts, etc. Early action on these basic items seems imperative.

Last bomber from the Ford Willow Run plant was wheeled onto the flight apron June 28. It was No. 8685 and originally was scheduled to be christened Henry Ford. However, he preferred to have his name left off and suggested plant employes autograph the ship instead. The vast bomber plant is now an eerie place with some of the equipment moved out and virtually all production operations suspended.

Latest proposal for utility of the plant has been made by Walter Reuther of the UAW-CIO, who suggests the union itself consider the possibility of acquiring the plant under lease for production of prefabricated housing elements. His suggestion is probably just an effort to "needle" Henry J. Kaiser into taking some action on the suggestion made to him by R. J. Thomas of the UAW-CIO that his organization consider the acquisition of Willow Run. Kaiser is known to have extensive plans in the prefabricated housing field.

At the moment it does not appear likely Ford will conclude arrangements to occupy a part of Willow Run for manufacture of tractors and implements. The Ferguson tractor interests have announced plans to move eventually toward production of 1,000,000 tractors annually priced at something over \$500, supplemented by a line of 60 or more attachable implements. This is no small potatoes as far as manufacturing is concerned, but the plan now appears to be to house this activity in the Ford Highland Park plant rather than at Willow Run.

#### Transportation Is Problem

With a fair volume of passenger car production now perhaps only a few weeks away, one of the unanswered questions is how assemblies are to be moved out to dealers and customers. Rail shipment probably will be difficult if not impossible. Driveaway trailers have been set aside in storage lots long since, and even if they were available there is the little matter of gasoline. So far as is known, there are no OPA provisions covering allocations of gasoline to the driveaway of new passenger cars.

Another problem looming in the near future is a possible collapse in used car prices, accompanied by reluctance on the part of dealers to accept trade-ins because of old age and extensive amount of service and repair such used cars will require.

Official decision on what amount and degree of plating will be allowed in passenger cars is expected to develop at the auto industry meeting in Washington this week. Betting is that for the present nickel will be excluded, forcing platers to use the chrome-on-copper method which was necessary for the final run of 1942 models.



**HELP TO DISABLED:** World War II veteran, Ted Jones, right, discharged from the Marines after losing both his lower arms and one leg, finds a job despite his handicaps. He shows how metal tabs on the A. O. Smith Corp.'s rate book, combined with Alnico steel-tipped pencil, magnetizes the pages to facilitate turning them. NEA photo



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Plan your product to be a winner . . . in the face of keen future competition . . . by using Harper Everlasting Fastenings—the fastenings that (1) resist rust and corrosion, (2) stand up in the presence of many acids, alkalis and other tough conditions, (3) add years of service life **AT LOW COST**, (4) can be removed with ordinary tools and used again and again. Every Harper fastening is made of either brass, copper, naval bronze, silicon bronze, Monel or stainless steel (nothing in common steel).

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# MEN of INDUSTRY



W. D. KENNEDY

William D. Kennedy, vice president and manager of Wright Aeronautical Corp.'s Cincinnati, O. plant, has been named vice president and general manager of the corporation with headquarters at Paterson, N. J. Mr. Kennedy, who joined Wright Aeronautical in 1928, succeeds P. B. Taylor, who has resigned as vice president and acting general manager.

Floyd Rose has resigned as president, Vanadium-Alloys Steel Co., Latrobe, Pa., and has been succeeded by Roy C. McKenna, who will serve as both president and chairman. R. B. George was elected sales vice president; L. D. Bowman, production vice president, and F. P. Underwood, vice president and secretary. J. P. Gill, vice president, was appointed chairman of a newly formed executive committee which includes Messrs. Underwood, George, Bowman and Alexander Nimick. J. Cleveland McKenna was elected a director to fill the unexpired term of Mr. Rose.

William J. Carroll has returned as president to Carroll-McCreary Co. Inc., Brooklyn, N. Y., after serving as a lieutenant commander with the U. S. Navy.

William L. Davis has been elected vice president in charge of operations, United States Steel Supply Co., Chicago. Mr. Davis has been associated with U. S. Steel subsidiaries for the past 40 years.

Tom M. Girdler, chairman, Republic Steel Corp., Cleveland; Robert I. Ingalls Jr., president, Ingalls Iron Works Co., Birmingham; Charles J. Haines, president, National Cylinder Gas Co., Chicago, have been elected members of the board of directors, Girdler Corp., Louisville, Ky.

James H. Smith, general manager of the Saginaw, Mich., Malleable Iron Division, General Motors Corp., Detroit, has been named a member of the staff of W. C. Williams Jr., General Motors



G. D. MOOMAW

vice president and group executive in charge of Accessories Division. B. A. Dolens, manager of battery operations, Delco Remy Division, Anderson, Ind., succeeds Mr. Smith as head of Saginaw Malleable.

Calvin Verity, formerly vice chairman and treasurer and a member of the board of directors, Rustless Iron & Steel Corp., Baltimore, has been elected president succeeding Charles R. Hook, who was both chairman and president. W. W. Sebald was elected first vice president, a new office in the company. G. D. Moomaw, formerly vice president in charge of operations and a director, was elected vice president and general manager. He succeeds C. L. Kingsbury, resigned. George W. Clearwater, assistant treasurer, was elected treasurer.

Conrad A. Goldstrohm has returned to American Chain Division, American Chain & Cable Co. Inc., Bridgeport, Conn., after serving as chief, Chain Section, Tools Division, War Production Board, Washington. He will make his headquarters at York, Pa.

Irving J. Johnston, research engineer, Hibbing, Minn., has been named concentration engineer, Oliver Iron Mining Co.'s research laboratory, West Duluth, Minn.

George D. Wilson, associated with Latrobe Electric Steel Co. in the Detroit area for 13 years, has been appointed manager of the Detroit district office, Howell Electric Motors Co., Howell, Mich.

Wallace J. Habermas has been named manager of the automotive section, Detroit district, Industrial Products Sales Division, B. F. Goodrich Co., Akron, O. A. D. Eastman, formerly manager of office and technical personnel, Salary Personnel Division, has been named director of personnel service, succeeding C. V. Molesworth, resigned. Earl R. Kambrich,

formerly in the Dayton, O., office has been transferred to the Los Angeles district as a sales representative. He is succeeded by John W. Oakes, who has been a member of the new products department with headquarters in Akron. R. L. Custer has been transferred to industrial products sales.

David F. Beard has been named manager of advertising and public relations, Aluminum Division, Reynolds Metal Co., Louisville, Ky. Donald G. Dunn has been appointed manager of marketing research.

Henry G. Schmidt, chairman of the board, North American Coal Corp., Cleveland, was elected president and chief executive officer. O. C. Larsen resigned as president.

T. A. Ives has been appointed fleet engineer, Pittsburgh Steamship Co., Cleveland, succeeding the late Earl R. Tray.

Verne R. Martin has been appointed general sales manager, Maytag Co., Newton, Iowa. Associated with the company 20 years, he recently had been assistant manager, Kansas City branch.

Dr. William E. Wickenden, president, Case School of Applied Science, Cleveland, was elected president, American Institute of Electrical Engineers, New York. S. H. Mortensen, chief electrical engineer, Allis-Chalmers Mfg. Co., Milwaukee, was awarded the institute's Lamme medal.

Lester H. Roemer, assistant sales manager, R. K. LeBlond Machine Tool Co., Cincinnati, recently was named New York district manager for that company.

Gerard F. Norton has been named general manager of the engineering department, Crawford, Callan & Co., New York, import and export merchants. Mr. Norton will handle the export of machinery and industrial equipment to all foreign markets.

J. W. Ashby has returned to the Columbus, O., plant, Surface Combustion Corp., Toledo, O., as manager of application engineering. Mr. Ashby has been serving as Pacific Coast manager of engineering, Janitrol Aircraft Division. Also returning to Columbus from Los Angeles is G. P. Mandel. Burton M. Sharpe replaces Mr. Mandel as aircraft application engineer on the West Coast.

A. W. Fraser, Chicago district manager, Worthington Pump & Machinery Corp., Harrison, N. J., has been appointed war damage inspector and general European manager for the company, with headquarters in Paris. Mr. Fraser will be succeeded as Chicago district manager by W. C. Chalk, who has been at-



assistant district manager for the past eight years. **J. B. Laramy**, a member of the Chicago executive staff, has been named assistant district manager.

**R. C. Cosgrove**, vice president and general manager, Manufacturing Division, Crosley Corp., Cincinnati, O., has been re-elected president, Radio Manufacturers' Association for the coming year.

**O. R. Pandy** has been promoted to assistant chief mechanical officer with headquarters at Cleveland, for the New York, Chicago & St. Louis Railroad. Mr. Pandy formerly was general roundhouse foreman at Conneaut, O.

**Harold E. Piggott**, formerly in charge of purchases, has been promoted to assistant sales manager, Dockson Corp., Detroit. **Vincent D. Tappero**, plant manager, has assumed the additional duties of director of purchases; **Robert Nelson**, formerly general shop foreman, has been promoted to production manager.

**L. T. Dalecke**, assistant director of Fisher Body's aircraft section and former resident manager of its Cleveland bomber plant, has been named general factory manager of Fisher Body assembly plants. **H. D. Burnside**, general factory manager, Fisher Body's B-25 and B-17 bomber programs, succeeds Mr. Dalecke as assistant director of the aircraft section under **George C. Paterson**, general manufacturing manager.

Pennsylvania Salt Mfg. Co., Philadelphia, has added the following to its research and development staff: **Dr. C. E. Imman**, formerly with Hooker Electrochemical Co., Niagara Falls, N. Y.; **H. S. Fisher**, of Aluminum Co. of America, Pittsburgh; **O. T. Aeppli**, Attapulgus Clay Co., Philadelphia, and **E. P. Street**, a recent graduate of Yale University.

**Thomas J. Bannan**, president, Western Gear Works, Seattle and Los Angeles, and its associate, Pacific Gear & Tool Works, San Francisco, recently was elected vice president, American Gear Manufacturers' Association, Wilkesburg, Pa.

**David S. Hammerman**, executive vice president, Deteco Scales Inc., Brooklyn, N. Y., recently was elected a director.

**Col. T. B. Holliday**, has been appointed chief, Engineering Division's equipment laboratory, Army Air Forces, Wright Field, Dayton, O. He succeeds **Col. S. R. Stewart**.

**F. L. Alexander** has been appointed assistant national director, Kelite Products, Inc., Los Angeles, to supervise the company's new plant in Dallas, Texas, as well as all regional offices in the Southwestern Division. Other appointments include: **Earl Lester**, divisional manager



DAN BECK

in charge of all service engineers in the Southwestern Division; **Roy South**, plant superintendent; and **F. J. Oxspring**, plant foreman.

**Dan Beck**, for the past 14 years an executive with Dodge Division, Chrysler Corp., Detroit, has opened offices in Detroit to operate the Executives Selection & Training Institute. The service is designed to supplement hiring and promoting procedures of business and industry.

**T. Verhoef** has been appointed Seattle manager, Broderick & Bascom Rope Co., St. Louis, succeeding **E. B. Drisko**, resigned. Mr. Verhoef has been with the organization 18 years and has been in charge of operations the past eight years.

**Arthur H. Suckow**, chief metallurgist, Symington-Gould Corp., Rochester, N. Y., has been elected chairman of the Western New York Chapter, American Foundrymen's Association, Chicago. Other officers elected are: **Henry C. Winte**, vice chairman; **Martin W. Pohlman**, treasurer and **Leo A. Merryman**, secretary.

**Donald S. Russell** recently was named director of contracts, Bell Aircraft Corp., Buffalo.

**J. P. Skehan** has been promoted to assistant sales manager for sheet and Vuepak materials, Monsanto Chemical Co.'s Plastics Division, with headquarters at Springfield, Mass. He succeeds **S. A. Bell** who resigned to join Columbia Protokosite Co., Carlstadt, N. J.

**John F. Collyer**, president, B. F. Goodrich Co., Akron, O., has been named a member of the executive committee, International Chamber of Commerce.

Milwaukee Association of Purchasing Agents at its recent annual meeting elected the following officers: **Lyll C. Stilt**, Kimberly-Clark Corp., Neenah, Wis., president; **Edward L. Block**, Unit



R. R. STRATTON

Drop Forge Division, Fuller Mfg. Co., Milwaukee, vice president; **Fred Syburg**, Chain Belt Co., Milwaukee, secretary; **Clifford H. Dawley**, Ampco Metal Inc., Milwaukee, treasurer. Directors: **Ray W. Brick**, Carnation Co., Oconomowoc, Wis.; **E. L. Janke**, Joseph T. Ryerson & Son Inc., Milwaukee; **J. M. Hamilton**, Dumore Co., Racine, Wis.; **Howell W. Pritchard**, Kearney-Trecker Products Corp., Milwaukee; **N. A. Schowalter**, West Bend Aluminum Co., West Bend, Wis.

**R. R. Stratton** has become sales manager, Davies Can Co., Cleveland, resigning as district manager, Smaller War Plants Corp. Before entering government service three years ago, Mr. Stratton served Ford Motor Co. in several executive positions.

**William B. McGorum** recently was named district sales manager, New York sales district, ACF-Brill Motors Co.

**Robert M. Honegger** has been named general manager of the Farrel-Birmingham Co.'s gear plant, Buffalo. He succeeds **Lester D. Chirgwin**, who, in March, 1945, was elected vice president in charge of manufacturing in the four Farrel-Birmingham plants.

**Clarence W. Newman**, director of research, Virginia State Chamber of Commerce, Richmond, Va., has been appointed industrial analyst, Chesapeake & Ohio Railway, and will make his headquarters at Huntington, W. Va.

**D. C. Prescott** has been appointed to the sales staff, Baldwin Locomotive Works, Philadelphia, for the North Central district, with headquarters in Chicago. Mr. Prescott formerly was mechanical engineer at Omaha, Nebr., for the Union Pacific Railroad.

**Robert Gregg**, president, Tennessee Coal, Iron & Railroad Co., Birmingham; **Robert Strickland**, president, Trust Co. of Georgia, Atlanta; **Cecil Woods**, presi-





JOHN F. HUTSON

Who was named Chicago district sales manager, Railway Sales Division, National Malleable & Steel Castings Co., Cleveland, as noted in STEEL, July 2, p. 78.



S. RILEY WILLIAMS

Who has been appointed director of international business, Worthington Pump & Machinery Corp., Harrison, N. J., as noted in STEEL, July 2, p. 77.



G. S. CRANE

Who has been elected president, Cutler-Hammer Inc., Milwaukee, succeeding F. R. Bascor, chairman of the board, as noted in STEEL, July 2, p. 76.

dent, Volunteer Life Insurance Co., Chattanooga, Tenn.; and George J. Pecaro, plant manager at Meridian, Miss., Flintkote Co., New York, have been named trustees of the Southern Research Institute, Birmingham.

Wilbur R. Manock, secretary and treasurer, Horton Steel Works Ltd., Ft. Erie, Ont., Canada, has been elected president, succeeding the late George Terry Horton.

Chauncey L. Baker, for the past 20 years industrial relations manager, Lackawanna plant, Lackawanna, N. Y., of Bethlehem Steel Co., Bethlehem, Pa., is retiring. He is succeeded by John E. Jacobs, assistant to the general manager, who will also continue in that capacity.

W. C. Snyder Jr., has resigned as vice president and director, Blaw-Knox Co., Pittsburgh, and as president, Lewis Foundry & Machine Division, Blaw-Knox Co., to accept the position of president and general manager, Conti-

mental Foundry & Machine Co., East Chicago, Ind. He succeeds G. N. Herman who has retired because of ill-health. Frank E. Walling, vice president, Lewis Foundry & Machine Division, has been acting manager of that company.

Col. Nelson S. Talbott has been named administrative assistant to the chief of engineering and procurement, Air Technical Service Command, Wright Field, Dayton, O., and Col. Robert L. Finkenshaedt, Chicago, has been named commanding officer of the newly-formed Central District, A. T. S. C., with headquarters in Chicago.

Electric Metal Makers Guild Inc. has elected the following officers for the coming year: President, J. A. deBondy, superintendent of melting, Manitoba Steel Foundries Ltd., Selkirk, Manitoba, Canada; vice president, J. E. Arthur, superintendent of melting, Crucible Steel Co. of America, Park works, Pittsburgh; and secretary-treasurer, D. L. Clark, super-

intendent of melting, Simonds Saw and Steel Co. at Lockport, N. Y.

A. S. Knoizen, Franklin, Pa., recently was elected a director, Reliance Electric & Engineering Co., Cleveland. He replaces John D. Fackler, who resigned a member of the board but remains legal counsel. Mr. Knoizen is executive vice president, Joy Mfg. Co., Franklin.

James J. Mellon, president, Clark Control Co., Cleveland, has resigned to accept a confidential assignment with the United States government. W. E. Williams, former vice president, will serve as president until a successor is elected.

P. D. Corkum, superintendent of Racine, Wis., plant of Massey-Harris Co. since 1938, has been transferred to the company's Toronto, Ont., factory. Robert Johnson has been appointed superintendent, Tractor Division, and Robert L. Bascor will succeed Mr. Johnson as superintendent of the tank plant.

OBITUARIES . . .

Donald L. McCubbin, 55, manager of the Cincinnati steel service plant, Joseph T. Ryerson & Son Inc., died June 29 in that city. Mr. McCubbin had been associated with the company 30 years.

B. G. Erskine, 62, chairman of the board and former president, Sylvania Electric Products Inc., New York, died at his home at Emporium, Pa., recently.

Max Spillman, 64, a consulting engineer with the Centrifugal Pump Division, Worthington Pump & Machinery Co., Harrison, N. J., died recently at his home in Clifton, N. J. For his outstanding work in pump engineering, National

Association of Manufacturers awarded him its Pioneer medal in 1940.

John B. Strauch, 75, St. Louis, died at his home in that city. Mr. Strauch served as president and later as chairman of the board, National Bearing Metals Corp. until the company became a division of American Brake Shoe Co.

Roland R. Ware, 61, president, Clarage Fan Co., Kalamazoo, Mich., died recently.

Eugene A. McBride, 57, plant manager, Thompson Products Inc., and its subsidiary, Thompson Aircraft Products Co., Cleveland, for 16 years, died June 28.

William Walter, 82, founder and former president, Walter Motor Truck

Co., Ridgewood, Long Island, and pioneer in the automobile industry, died recently at his home in New York.

Raymond W. Towne, 49, assistant secretary and first assistant to the vice president, Worthington Pump & Machinery Corp. at the company's Wellsville, N. Y. plant, died June 25.

Benjamin Briscoe, 78, automobile pioneer and former president, Maxwell Briscoe Motor Co. which later became part of the Chrysler Corp., died June 26 at his home near Dunnellon, Fla.

Frederick C. Renner, 44, general manager of sales, Organic Chemicals Division, Monsanto Chemical Co., St. Louis, died June 26 in St. Louis.



# California Factory Employment Down 31 Per Cent from War Peak

*Number of workers drops 34,700 in May. Reduction largely due to order cutbacks in aircraft plants. Survey shows one out of every four laid-off workers in San Francisco area returning to postwar homes*

## SAN FRANCISCO

FACTORY employment in California continues its downward trend. During May, production workers in durable and nondurable lines declined another 34,700 to a total of about 670,000 at the end of the month. Since the peak of employment in 1943, this represents a decline of 31 per cent.

Order cutbacks in aircraft plants were the biggest cause of the May reduction, that industry reporting a decline of 14,900 workers to a total of 141,200 on May 31. Since April, 1943, peak payrolls in aircraft manufacturing plants have been cut 103,500, or 42 per cent.

Private shipyards, which had a further decline of 3700 employes in May, now have 45 per cent fewer workers than at the peak. The heaviest reductions are still to come, however, within a month or two.

There are now 49,000 iron and steel workers in California, down 9000, or 18 per cent, from the wartime peak.

Although California's economic structure has not been upset by these steady reductions in employment, the state may begin to face a serious problem during the next six to 12 months.

In commenting on this prospect, Col. Alexander F. Heron, director of the State Reconstruction and Reemployment Commission, said:

"So far there has been no real distress due to unemployment. There are about 2200 persons drawing unemployment insurance in the San Francisco area, representing an increase of only about 530 during the last month. This indicates that we have a sponge situation. That is, workers as they drop out are so far by no means going into breadlines, but are being absorbed in many ways."

During the war, a large number of industrial facilities were established in the West, such as the new steel plants, aluminum and magnesium mills and several hundreds of fabricating factories of various kinds. All over the country similar expansion has occurred, of course. The postwar result will be that competition for markets will be much keener than in the past because of increase in the capacity to produce things the public uses.

One of the main pegs on which the West has been hanging its hopes for a postwar industrial economy (by using the war-built plants) has been the prospect that a large number of workers who migrated to the Coast during the war

would live on in the West after the war. This resultant increase in permanent population, it was hoped, would form the basis for a sharply expanded market for things the West could produce in competition for the same things produced in the East.

Undoubtedly a certain proportion of the in-migrants will stay on after the war. But, on the basis of current trends, many more already are leaving than had been anticipated. Independent surveys show that in the San Francisco bay area about one out of every four laid-off workers has been going back home. When the families of these out-migrants are taken into consideration, that means much of the war-gained population already has been lost. As cutbacks increase the ratio of out-migration probably will increase.

## Kenworth Motor Truck To Build Plant at Renton, Wash.

Construction by Kenworth Motor Truck Corp. of the largest, most modern truck and bus manufacturing plant west

of the Mississippi will begin immediately, Paul Pigott, president, announced in Seattle last week.

The factory will be built in Renton, Wash., on property owned by Pacific Car & Foundry Co. at an estimated cost of \$250,000 to \$300,000. It and other units will provide 200,000 square feet of floor area.

When the new plant is completed, Kenworth will move its operations from Seattle to Renton, where integrated production will be established in conjunction with the large, modern machine shop and foundry of Pacific Car & Foundry Co.

Kenworth operations will continue under the direction of John Holmstrom, general manager, and will employ the present personnel of Kenworth, together with the personnel of the body building shop at Pacific Car & Foundry Co.

In addition to the building in Renton, Kenworth is planning to establish a large factory distribution branch in downtown Seattle to handle service, parts and new truck sales.

In January of this year, Pacific Car & Foundry Co. acquired a controlling interest in Kenworth and new officers were named. In addition to Messrs. Pigott and Holmstrom, these include Ferdinand Schmitz, president and general manager of Everett Pacific Shipbuilding & Dry Dock Co., who was named a Kenworth vice president; Vernon A. Smith, who continued in his former position as vice president and sales manager; John Cannon, secretary-treasurer, now on military leave; Kenneth Worthington and F. D. Pittsburgh, assistant secretary-treasurer.



**SECRET REVEALED:** An \$18 million secretly built Army port on isolated Excursion inlet, Alaska, and used only 11 months will be dismantled for salvage by 700 prisoners of war, first to be sent outside the U.S.  
NEA photo



# WING TIPS

*Technical advancements of war period will have profound influence in postwar aviation, particularly in jet propulsion, pilotless aircraft, rocket power and all-weather operations made possible by radar and micro-wave techniques*

DURING the years immediately ahead—and probably sooner than many think—aviation will be influenced profoundly by a series of technical developments rapidly advanced by the war. Among these are jet propulsion and the gas turbine, pilotless aircraft and guided missiles, rocket power, all-weather operations made possible by radar and micro-wave techniques and the practical development of helicopters.

This is the opinion of D. Roy Shoults, vice president of sales, Bell Aircraft Corp., Buffalo, expressed recently before the American Society of Mechanical Engineers at Chicago.

"To put the matter into perspective, it might be said that modern aircraft progress can be characterized as the conquest of the third and fourth dimensions; the third dimension, altitude, the fourth dimension, speed," said Mr. Shoults.

"Future progress in airplane development and utilization will be in connection with increases in speed, altitude performance and effective utilization of load carrying capacity and availability at high speeds, high altitudes or long ranges.

"To consider the first factor of speed as affecting future design, according to

the Bell official, we would expect progress by:

"1. Increases of propulsive power per unit of weight or size of power plant or unit of fuel consumed.

"2. Increasing effectiveness of wing design, including various means of extending wing surfaces for assistance in landing or takeoff such as now provided by various flap designs.

"3. Cleaning up the airplane from an aerodynamic standpoint to reduce the parasitic drag to an absolute minimum by smoothing up surfaces, removing projections and eliminating configurations which cause air flow interference.

"Further progress in high speed flight leads one to the consideration of so-called critical speeds or discussions of mach numbers. Mach number is an expression of the ratio of velocity of air flow to the velocity of sound at a particular point. A mach number of 1.0 indicates that the air flow velocity is equal to the velocity of sound.

"For velocities at or near mach number 1.0, the air in front of an object moving in the atmosphere is compressed and subsequently flows around the object with considerable loss. This results in high drag and consequently extremely high values of power are required to produce

such velocities," Mr. Shoults explained. "As the speed of sound is proportional to the square root of the absolute temperature it is lower at high altitude than at sea level and consequently compressibility and critical mach number difficulties are usually encountered first in flight in the frigid atmosphere at high altitude.

"Future research in high speed flight will most certainly emphasize methods of reducing the ill effects of compressibility. With propeller driven aircraft the vector velocity of the propeller tip in free air is considerably greater than the absolute speed of the aircraft through the air, consequently the propeller tip enters the compressibility range with consequent loss of propulsive efficiency before the rest of the structure suffers seriously from compressibility. This is one of the reasons that jet propelled power plants have been so effective in increasing the maximum speeds of today's fighter aircraft.

"Another characteristic of jet propulsion power plants favorable to high speed flight is that the power plant is essentially a constant thrust device rather than a constant horsepower one as is the conventional engine. As the speed of flight is increased the horsepower available from a given jet power plant increases substantially in proportion to aircraft speed and at speeds of 400-500 mph the jet propulsion plant produces more horsepower for a given space or weight than can conventional piston type engine driving propellers. As speeds increase above this range the effectiveness of the jet plant increases in proportion."

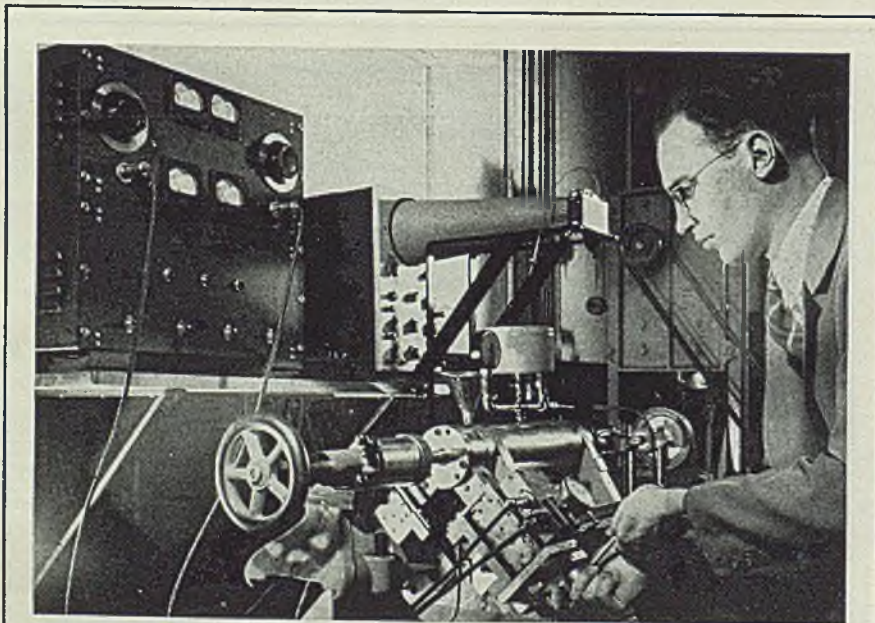
The Germans in their V-1 weapons have shown the possibility of utilization of unusual thermodynamic cycles for specific uses, and Mr. Shoults expressed confidence future developments will increase the utility of the resonant jet reaction engines. Such engines will undoubtedly be of greatest use for military purposes where cheapness and expendability are of greater importance than low specific fuel consumption and long life.

## Rockets Excite Interest

"The rocket type power plants," he said, "after years of experimentation, are now exciting terrific interest as a result of the terrifying success that the Germans realized in their V-2 weapon.

"In the further development of private, commercial or military flying, in order to maintain the maximum utility of the service, progress must and will be made in 'all weather' operation."

Of first importance in this connection is the development of radio aids to permit the pilot to take off and land with assurance and safety under substantially zero-zero conditions. Developments of the micro-wave and radar techniques will, within a few years, permit complete blind flight including takeoffs and landings and will probably go further to the point of automatically controlling



ACCURATE: A new measuring instrument having a precision never yet demanded by industry was described by Gerard M. Foley, research physicist of Battelle Memorial Institute, Columbus, O., before the Chicago section of the American Society of Mechanical Engineers. An unusual type of electrical micrometer, the instrument measures movements or changes in position as small as one-tenth millionth of an inch



*this is important  
when you buy  
Cold-Rolled  
Stainless Sheets*



All stainless steel cold-rolled sheets have much in common. They are rustless and they possess high strength. But frequently there is one important difference. It is in the *finish*.

The amount of cold reduction determines the quality of the surface. There are two methods of rolling—the handmill and the continuous mill.

#### **GREATER COLD REDUCTION**

The Armco-invented continuous process of rolling gives stainless sheets as much as *four times the amount of cold reduction* given sheets produced by the handmill process.

An ARMCO No. 2B Finish continuous process sheet, for example, is hot rolled down to .140 (10 gage) in wide coils hundreds of feet long. These are then reduced to .037 (20 gage) on continuous cold-reduction mills. This is about *74 per cent cold reduction*. On the old-fashioned handmill the sheet would normally be hot rolled to about .045, then cold reduced to .037. This is 18 per cent cold reduction.

#### **DRAWS WELL, LOOKS BETTER**

Cold-reduction by the continuous mill method produces a dense, fine-grain sheet which draws exceptionally well, looks more attractive and polishes easily. It has a beautiful appearance even when unpolished.

You'll be time and money ahead when you specify stainless sheets cold reduced on continuous mills. For more information on ARMCO No. 2B finish sheets, just address The American Rolling Mill Company, 2371 Curtis Street, Middletown, Ohio.

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**Special-Purpose Sheet Steels**





trolling the airplane during the landing under zero visibility conditions. Much standardization work will necessarily need to be done in this connection so that the aids used are at least nationwide and probably worldwide in availability.

As air speeds increase to the 400-500 mph category for normal commercial operation, Mr. Shoults said, radar aids will be doubly necessary even under good weather conditions for the visibility over or near most of our large cities is only a few miles by reason of the high smoke content in the atmosphere. The 500 mph aircraft must begin to slow down 25 to 30 miles before landing even if approaching at low altitude. Traffic control in airport regions will necessarily be improved to control the approach of such flights with minimized delays and adequate safety.

The other major factor in "all weather" flying is the problem of ice accumulation on the aircraft.

Commercial aircraft transports have been and will be developed to almost any maximum size that the traffic will justify. It is believed that there is no fundamental design limitations which would prevent the successful construction of a million pound aircraft. In recent years aircraft weights have doubled from 30,000 to 60,000 pounds and doubled again to the 1/8th million pound size as exemplified by the B-29 and are now being again doubled to 1/4-million pounds gross weight in commercial aircraft as recently announced.

## New Aircraft Electrical System Provides Greater Power, Saving in Weight and Wire

TWICE the electrical power of the B-29 with 20 per cent less weight of motors and a saving of more than 2000 pounds in wire have been worked out in the electrical system of a newer and much larger airplane than the B-29, by Col. T. B. Holliday, AAF engineer at Wright Field, O., who recently was appointed chief of the engineering division's equipment laboratory there. Secret of the development, according to information from the Air Technical Service Command, is a change to 400-cycle high-frequency alternating current, permitting a reduction in the amount of "iron" needed for a given horsepower.

Colonel Holliday has pioneered the use of electric motors to drive aircraft accessories. He established specifications by which weight of motors, generators and wire was reduced importantly, making possible the operation of generators at high altitudes. Number of electric motors in a pursuit plane has been increased from none to 11, while more than 140 have been installed in the large bombers. Output of generators has been increased by 1600 per cent.

It is not entirely clear what the "newer and larger plane than the B-29" is, but it is possibly a reference to the B-36, ultralong-range bomber designed by Con-

solidated Vultec and in the planning stage since early in the war. Peacetime version of this huge ship doubtless is the Consolidated Model 37 transport, pictures of which have been released, with announcement it would be furnished Pan-American Airways after the war. As now drawn up, it is a six-engine, 204-passenger transport with speed of 300-400 miles per hour, and twelve times larger than the DC-3 airline transport now in use.

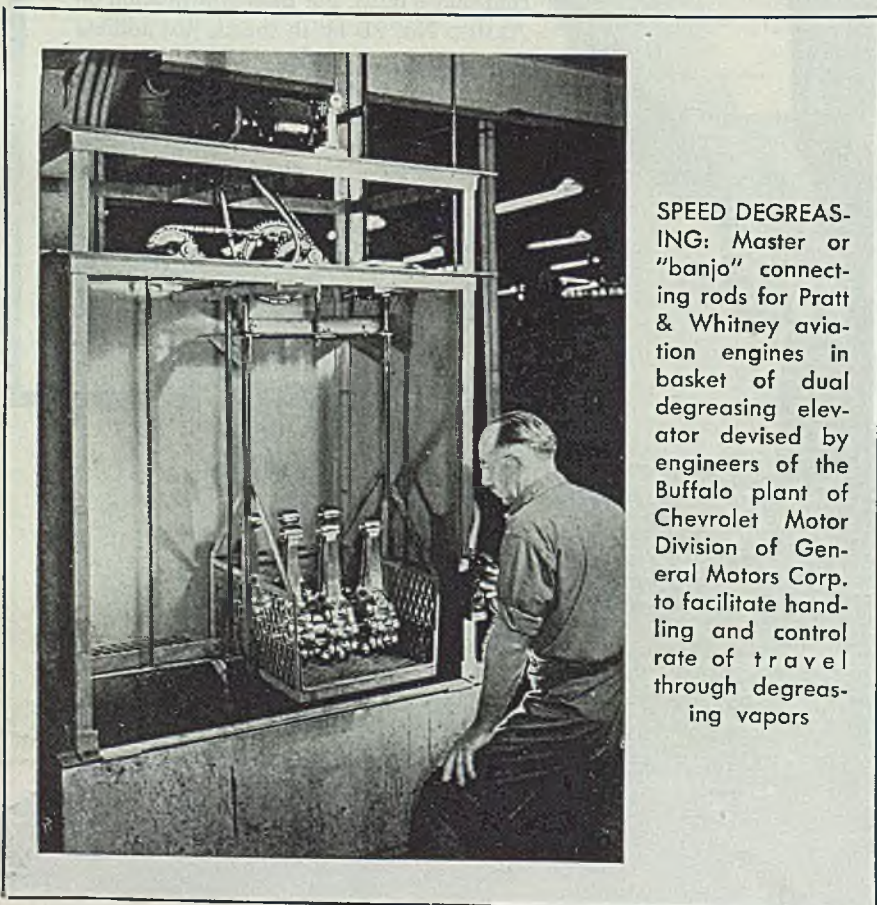
In a military version, the six pusher-type engines conceivably could develop something like 18,000 combined horsepower, and sufficient gasoline might be carried to provide close to 10,000-mile operating range. Although no announcement has been made, it is considered possible at least the military model shortly will be ready for testing, particularly in view of the fact many of the specifications of the Model 37 are stated to be "restricted by military necessity."

Latest news flash from Consolidated on the Model 37 relates to the possible use of helium gas instead of air in the giant tires on the liner. Air required to fill the tires would weigh 180 pounds, against 26 pounds of helium. Further the company has computed the 160-ton plane will weigh 745 pounds less at 25,000 feet altitude because of the diminished pull of gravity.

## Wright Aeronautical To Release Educational Film

"Power House of Aviation," a new educational film produced around the Wright Cyclone 18 aircraft engine, will be released soon for showing to appropriate groups throughout the country. Starting with a brief review of the history of the Wright Aeronautical Corp. the picture takes the audience on a personally conducted tour through the plants, and shows how the most modern, high-production machine tools and processes have been successfully applied to the ultra-precision work demanded by these engines. In contrast with these new methods, some of the earlier processes are shown to enable the audience to appreciate the advances made in manufacturing methods during the war years.

Methods of producing both the cast and forged cylinder heads, as well as numerous other parts, are shown in some detail, together with the various steps of assembly, inspection, and test. The closing scenes show Cyclones in action on all the different fronts, installed in such famous fighting ships as the Boeing Fortress and Superfortress, in the Martin Mars, the Lockheed Constellation, and other planes of the Army Air Forces.

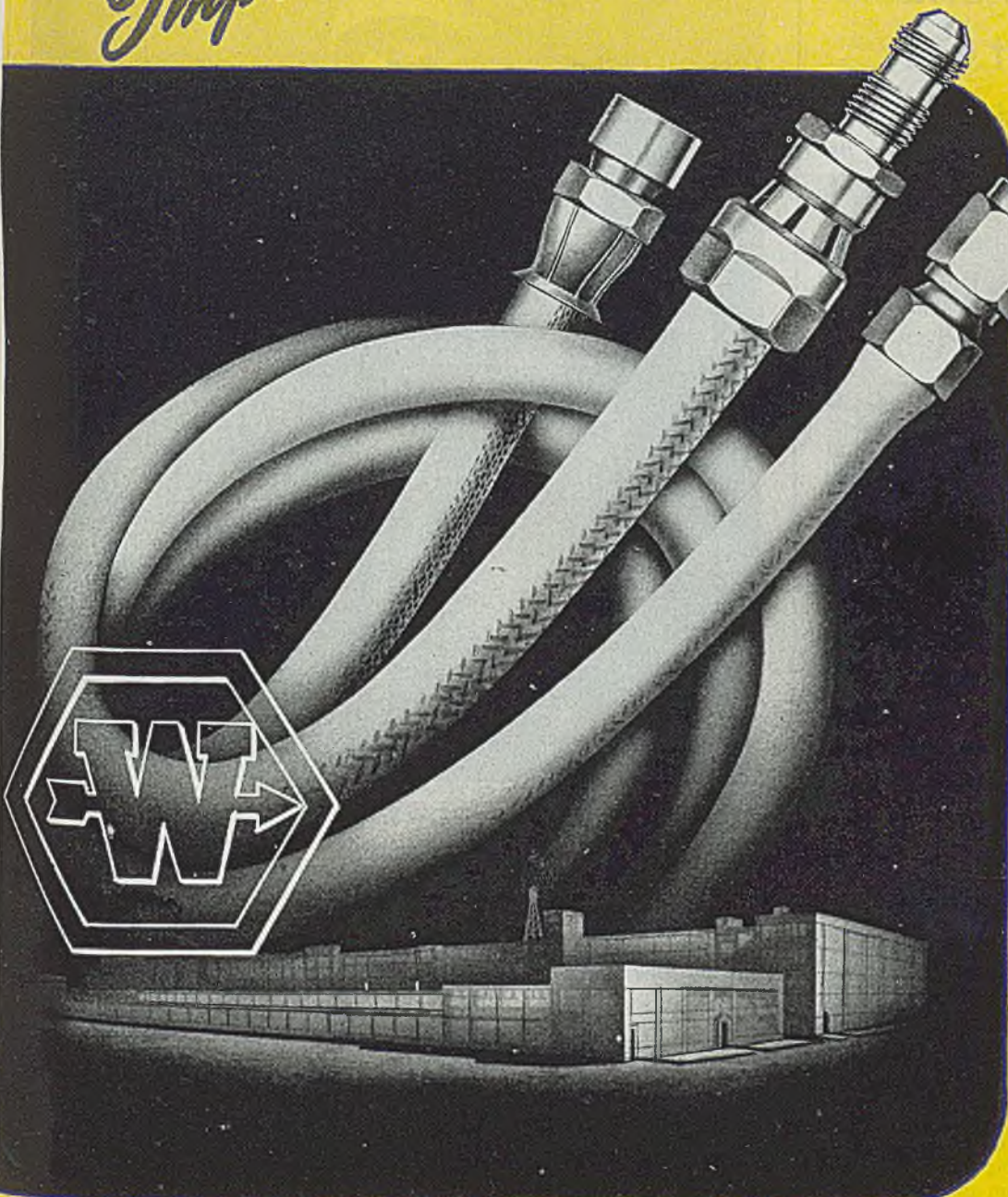


**SPEED DEGREASING:** Master or "banjo" connecting rods for Pratt & Whitney aviation engines in basket of dual degreasing elevator devised by engineers of the Buffalo plant of Chevrolet Motor Division of General Motors Corp. to facilitate handling and control rate of travel through degreasing vapors



*Improved*

## INDUSTRIAL HOSE LINES



In addition to industrial hose, Weatherhead plants make all types of fittings, valves, hydraulic cylinders and other parts for these industries:

### AUTOMOTIVE

★

### REFRIGERATION

★

### RAILROAD

★

### MARINE

★

### FARM EQUIPMENT

★

### ROAD MACHINERY

★

### DIESEL

★

### L. P. GAS

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### APPLIANCE MANUFACTURERS

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## Barium Acquires Control of Erie Bolt & Nut Co.

*Purchase is additional step in Barium's program to widen its activities in correlated lines of production*

BARIUM Steel Corp., Canton, O., has acquired control of the Erie Bolt & Nut Co., Erie, Pa., through the former's wholly owned subsidiary, Clyde Iron Works Inc., Duluth.

Acquisition of Erie Bolt & Nut Co. is another step in the postwar program of Barium Steel to broaden its activities in correlated lines of production. Negotiations are pending for further expansion through acquisition or merger with other companies.

Erie Bolt & Nut Co. is a supplier of special alloy bolts, studs, and related products to manufacturers of railroad and farm equipment, airplane producers, construction companies, gasoline plants, machinery, rubber, and other businesses. Its present management and personnel will be retained.

The Erie company is operating at capacity. While a large part of its activity is presently devoted to supplying demands of the Army and Navy its machinery and operating facilities require no reconversion or interruption for manufacture of peacetime products. Through the Barium and Clyde organizations the demand on Erie Bolt & Nut will be augmented considerably. The Clyde Iron Works Inc., full control of which was obtained by Barium Steel last September, is one of the principal producers of whirleys, hoists, and similar machinery, with agencies in foreign countries as well as in the leading cities of America.

With acquisition of Erie Bolt & Nut Co. the Barium Steel Corp. now operates three plants producing important steel products. The Barium forging plant at Canton has originated and produced several die and piston rod steels and last year expanded facilities by purchase and lease of additional equipment. Clyde Iron Works Inc. produces equipment for industrial, contracting, railroad, oil and mining, logging and naval lines.

### Jorgensen Co. Constructs Additional Steel Warehouse

Earle M. Jorgensen Co., steel distributor, has completed foundations for an additional warehouse, its fourth in Los Angeles. The new structure, 80 x 300 feet, will be devoted exclusively to handling plates and is designed especially for that purpose.



**"INSULATING" WELDING GLOVES:** Novel safety device at Graham-Paige Motors Corp., Detroit, is this mitt-dryer designed to protect employees welding amphibian tanks. Perspiration, with its high salt content, is a good conductor of electricity and increases the danger of serious shock to workers handling electrical equipment. To eliminate the hazard, welding gloves now are dried rapidly by slipping them over narrow chimneys protruding from a metal cabinet which contains a heater and fan

## BRIEFS . . . .

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

Allegheny Ludlum Steel Corp., Brackenridge, Pa., has issued its first news letter that will be sent quarterly to stockholders.

Pullman-Standard Car Mfg. Co., Chicago, announced that the Distinguished Service to Safety award of the National Safety Council has been won for all of its 12 plants.

Society of Automotive Engineers Inc., 29 West 39th Street, New York 18, is distributing its 1945 handbook.

Thomas Machine Mfg. Co., Pittsburgh, has appointed the following as sales

agencies: Northern Machinery & Supply Co., Minneapolis; Richard Ives Co., Denver; J. M. Grisley, Salt Lake City, Utah; Dawson Machinery Co., Seattle; Harroun Rickard & McCone Co., San Francisco and Los Angeles; C. J. Harter Machinery Co., Houston and Dallas, Tex.; Robert R. Stephens Machinery Co., St. Louis; George E. Zweifel & Co., Portland, Ore.; Bryant Machinery & Engineering Co., Milwaukee; and Noland Co., Nashville, Tenn.

General Motors Corp.'s Electro-Motive Division, LaGrange, Ill., has leased 126,000 square feet of the Defense Plant Corp.'s aluminum sheet plant at McCook



Ill., and will use it for fabricating operations.

—o—

Wilson Welder & Metals Co. Inc., New York, has appointed Graybar Electric Co. exclusive distributor of Wilson electrodes in areas served by Graybar's Cincinnati, Cleveland and Pittsburgh offices.

—o—

Baltimore & Ohio Railroad has applied to the U. S. Corps of Engineers for permission to construct coal and ore docks, piers and bulkheads and for dredging on the south shore of Maumee Bay, Lake Erie, O., outside and east of Toledo, and outside and west of Harbor View, O.

—o—

Baldwin Locomotive Works, Philadelphia, will open a headquarters in Paris in September to provide coverage for Baldwin's heavy machinery in France and its colonies, Belgium, and Holland. Thomas Butts will direct the office.

—o—

H. K. Porter Co. Inc., Pittsburgh, has moved its Rochester, N. Y., offices to Buffalo. W. A. Coyle, former assistant combustion engineer with Republic Steel Corp. at Buffalo, will be district manager for the Porter company.

—o—

Sprague Electric Co., North Adams, Mass., has received the Air Technical Command's Approved Quality Control rating indicating the firm's inspection organization can be entrusted with full responsibility in assuring that products meet all requirements of the Army Air Forces.

—o—

Ekco Products Co., Chicago, has purchased a five-story building at 31 Madison Avenue, New York, and will remodel it to provide show rooms and offices for Ekco executives in the latter city.

—o—

Robert H. Clark Co., 9330 Santa Monica Boulevard, Beverly Hills, Calif., will build an addition to its plant to provide for an increase in production of cutting tools and tool holders. A new catalog of the company's products is now available.

—o—

Sterling Engine Co., Buffalo, has received orders for \$2 million worth of diesel engines to drive electrical generating plants in rehabilitation work abroad and to propel diesel-electric cars for western railroads.

—o—

Central States Steel Inc., Kansas City, Mo., has leased a warehouse at 637 Schmidt Road, Davenport, Iowa, where the company will open a wholesale warehouse for steel and wire products.

—o—

Nox-Rust Corp., Chicago, has opened the following new sales offices: Buffalo, 1200 Niagara Street, with C. R. Craig in charge; Philadelphia, Meadow & Wolf Streets, with L. J. LaBarge of Commercial Warehouse Co. in charge; Water-

bury, Conn., 531 Bank Street, with G. R. Angrave in charge; and Cleveland, 14511 Woodworth Avenue, with T. C. White in charge.

—o—

Westinghouse Electric Corp., Pittsburgh, has presented to Arthur E. Marsh, Madison, N. J., \$3063, highest award the firm ever made under its suggestion system. Mr. Marsh's suggestion reduced by 62 per cent the quantity of gold alloy wire needed to solder electronic tube parts.

—o—

Gray Foundry Inc., Poultney, Vt., has taken over the American Pipe Bending Machine Co. Inc., Boston, and entire operations will be conducted from Poultney.

—o—

Pipe Machinery Co., Cleveland, announced that Homer B. "Tex" Johnson, 549 West Washington Boulevard, Chicago, will represent it exclusively in the Chicago-Milwaukee area.

—o—

Fowler Mfg. Co. is located in its new factory, 2545 S. E. Gladstone Street, Portland 2, Ore.

### ASTM Names Bell Telephone Engineer as New President

New officers have been chosen for the American Society for Testing Materials, Philadelphia.

President is J. R. Townsend, materials engineer, Bell Telephone Laboratories Inc., New York, and vice president is

T. A. Boyd, head of the fuel department, Research Laboratories Division, General Motors Corp., Detroit. Members of the executive committee are: John R. Freeman Jr., technical manager, American Brass Co., Waterbury, Conn.; L. J. Markardt, assistant director, U. S. Forest Products Laboratory, Madison, Wis.; Carlton H. Rose, chemist, National Lead Co., Research Laboratories, Brooklyn, N. Y.; L. P. Spalding, chief research engineer, North American Aviation Inc., Inglewood, Calif.; and William A. Zinzow, chief physicist, Bakelite Corp., Bloomfield, N. J.

### Las Vegas Plant Expects Increase in Production

The Pneumatic Tool Division of Steel Conversion Corp., Las Vegas, Nev., is producing more than 800 units a day and in the next three months the output will rise to about 2400 units daily.

Facilities are also available now at the Las Vegas plant for general repair of custom industrial tools. G. A. Duemling, president, said a larger building will be built soon on the company's property, and by the end of the year the company will be employing more than 200 men. Mr. Duemling contemplates establishing other plants to give the West complete service on custom tools.

Steel Conversion Corp. is not affiliated with the Steel Conversion & Supply Co., Pittsburgh, but is using the same patents and processes.



HONORED: Dr. Charles E. Skinner, center, founder of Westinghouse Electric Corp.'s research laboratories, Pittsburgh, was honored on his eightieth birthday. Discussing research advances with him are F. D. Newbury, left, Westinghouse vice president, and Dr. L. W. Chubb, laboratories director



# How the Hercules Powder Co.

## PURCHASES STAINLESS

Development of Satisfactory Working Specifications and tests for steels for use in chemical processing are described

OUR experiences in the purchase of the so-called stainless steels stem from a short terse set of specifications which over the years has evolved into the following:

**Weak Mixed Acid Corrosion Test:** "This material shall passivate, with a total loss not exceeding 0.25 grams per square inch when tested in boiling weak mixed acid, in accordance with Hercules Powder Co. Method C-38-2."

**Boiling 65 Per Cent Nitric Acid Test:** "Nonaustenitic materials (similar to Types 430, 442, and 445) shall have a corrosion rate not greater than 0.075-in. per year and austenitic materials (similar to Types 304, 316, 317, 347) not greater than 0.040-in. per year, when tested in boiling 65 per cent nitric acid in accordance with Hercules Powder Co. Method C-38-1."

The demand in these short specifications makes clear the conditions under which the material is to operate and leaves nothing to luck or chance, nor do they demand the ultimate of skill and dexterity in checking them. The resultant experiences in meeting these specifications have not been cloaked in heroics. Our requests for high quality under these conditions have been met with calm judgment, co-operative effort and careful study of changing operating conditions. The result is a consistent improvement in materials, as shown on

By W. L. HEWES  
Assistant Director of Purchases  
Hercules Powder Co. Inc.  
Wilmington, Del.

our test report cards, a few of which are exhibited in Tables I and II.

We are obtaining with less frequency, poor tests as shown in Table III.

We do not reject material on first test but subject it to a second and occasionally a third test. If the final results confirm the first test, even then the material is not immediately rejected but the plant demands are scanned very carefully to find a place for the material where the corrosive conditions are less severe than that for which the material was purchased.

The above tests are reported here merely to indicate the wide field of material used.

All our orders for alloy material for

critical corrosive conditions are purchased under specifications which both mills and warehouses have shown an anxiety to meet. The conditions have been met firmly and successfully without the fanfare of advertisement.

However, from a purchasing viewpoint the recent advertising of the chemical industry is a challenge to the steel industry to display to the purchasing and consuming public what is undoubtedly going on quietly behind the scenes in the development of improved steels sought by the chemical industry for production. Many of these improved chemical production processes were heretofore thought to be impossible or limited in use because of the lack of advanced types of steels to limit the corrosive actions of the new chemical products.

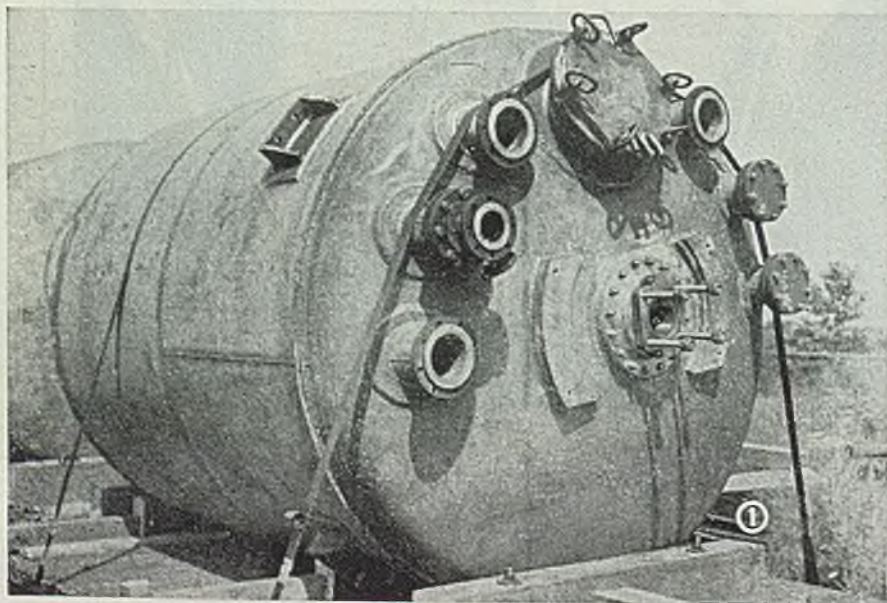
Early in the History of alloy production, steel mills were handicapped by the tonnage principle so long prevailing in the industry. It was difficult for a steel

(Please turn to Page 134)

Fig. 1—One of eight KA 2 SMO Type 316 stainless steel tanks 96 in. outside diameter, 11 ft 7 $\frac{3}{8}$  in. high and  $\frac{1}{2}$ -in. thick fabricated by Edge Moor Iron Works, Wilmington, Del.

Fig. 2—Here one of 20 Type 430 stainless steel tanks is being fabricated by Edge Moor Iron Works. Tank is 96 in. outside diameter, 25 ft long, with walls  $\frac{3}{8}$ -in. thick. As this material requires unusual care to prevent cracks, it was annealed at 1425°F and furnace cooled.

Fig. 3—Three sections and top cap of a Type 430 stainless steel tower made from  $\frac{5}{8}$ -in. thick stock. Each section is 13 ft long, 64 in. in diameter. Fabricated by Downington Iron Works, Downington, Pa.





# STEELS

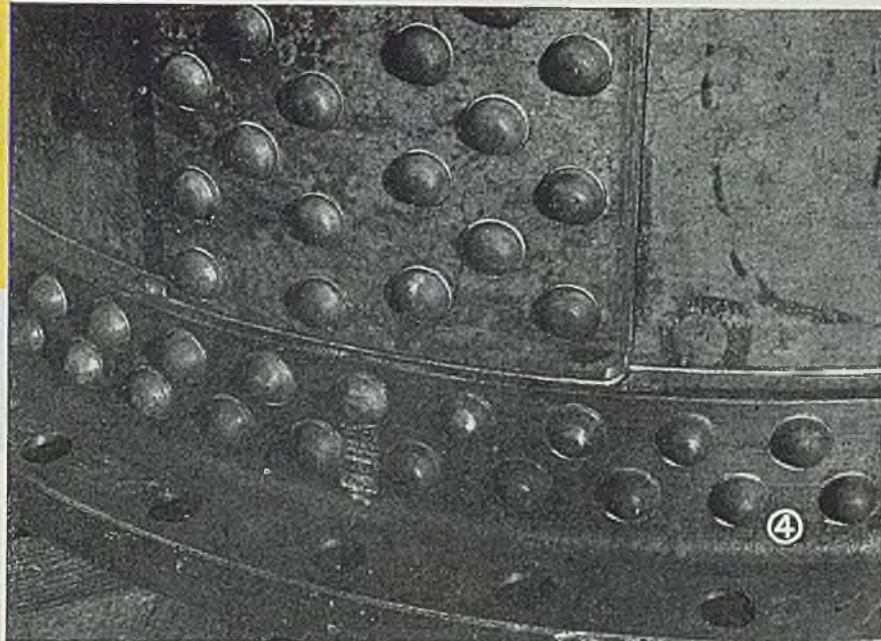


Fig. 4—Closeup of a riveted section of one of the units in Fig. 3. These two views are regarded as good examples of riveted work in stainless steel

TABLE I—WEAK MIXED ACID CORROSION TEST

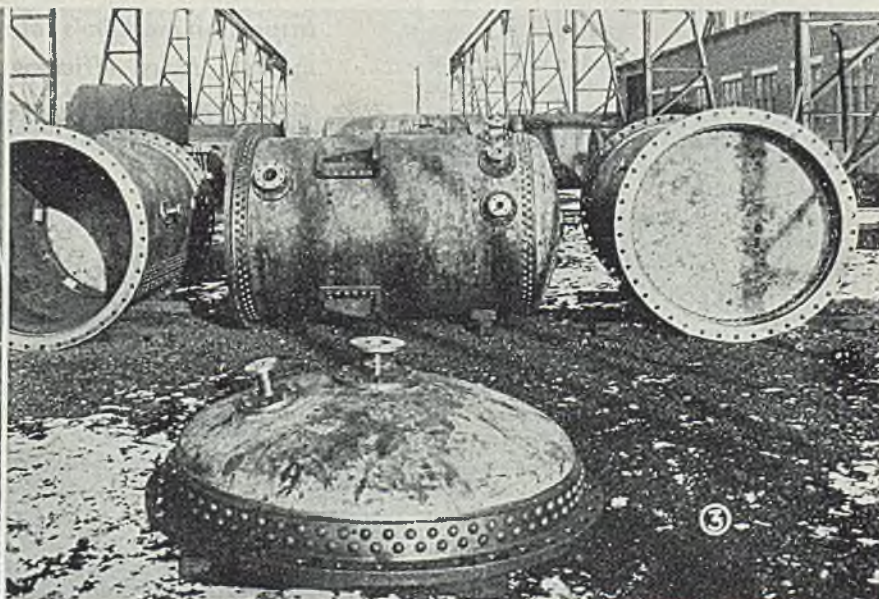
Material	Total Weight Loss Hours Boil				Penetration After 12 Hours (Inch)
	2	4	8	12	
12 Sheets 24 ga. 36 x 91" Type 316 Ka2SMO No. 1 white finish (For general plant use)	0.0000	0.0000	0.0000	0.0000	0.00000
9#—1 Pc. 1 1/4" Chrome Tubing 18-8 Type 302 (For compressor room)	0.0008	0.0008	0.0011	0.0020	0.00002
4—8" Ka2SMO Gate Valves (For boiling tub house)	0.0002	0.0002	0.0005	0.0005	0.00001
50 lbs. 3/4" dia. chrome Electrodes (For general plant use)	0.0000	0.0000	0.0000	0.0000	0.00000
50—3/8" x 1 1/4" Rd. Hd. Rivets Type 304 18-8% Chrome (For boiling tub house)	0.0021	0.0021	0.0021	0.0028	0.00001
1 Bar 2 1/4" Dia. x 6' x 1" Lg. Ka2SMO, Type 316 Stainless Steel (For paddle arms—tub house)	0.0000	0.0000	0.0000	0.0000	0.00000
100 Pcs. 3/4" x 1/4" x 3/8" Stainless Steel Washers (For boiling tub house)	0.0006	0.0006	0.0006	0.0006	0.00000

TABLE II—STRAIGHT NITRIC ACID TEST

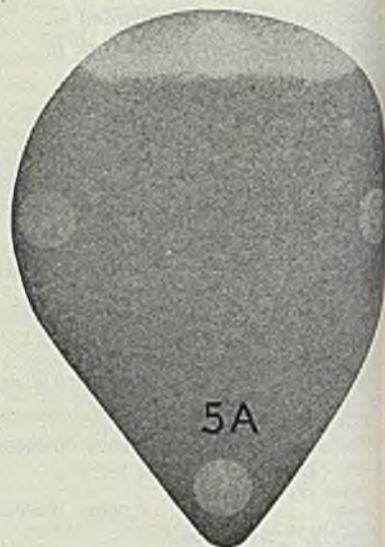
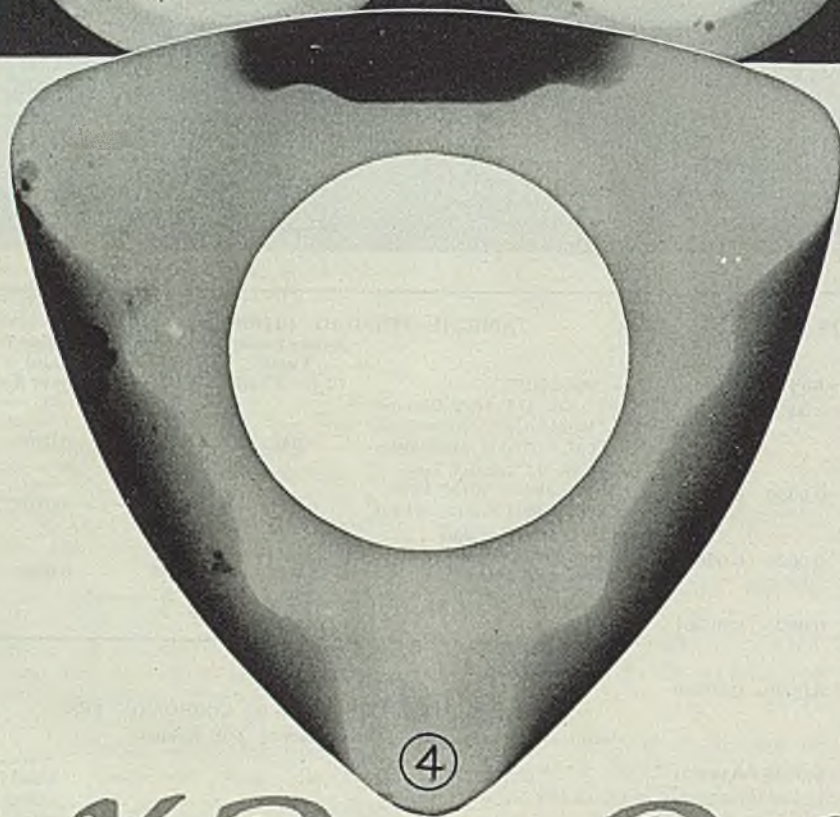
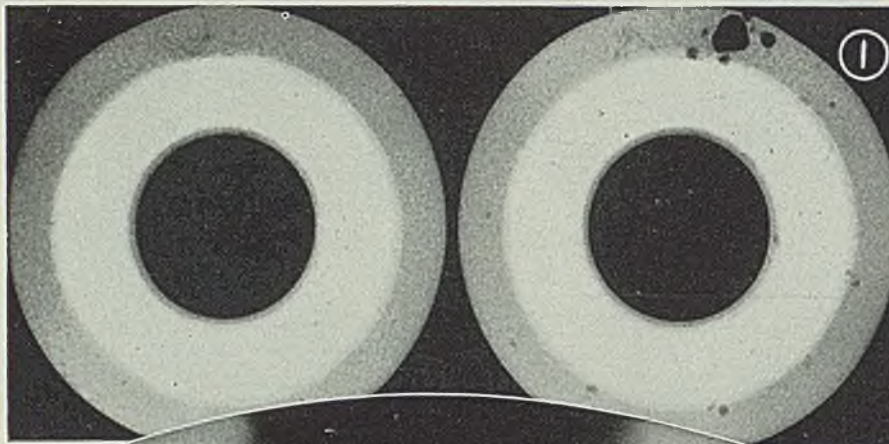
Material	Inches Penetration Per Year According To		
	First 12-Hour Boil	Second 12-Hour Boil	Third 12-Hour Boil
4—1" No. 111 18-8 Chrome Flanged Gate Valves (For ammonia oxidation)	0.044	0.048	0.036
64.76 lbs. (7 spools) Type 304 Stainless Steel Wire (For making carboy wires)	0.0184	0.0284	0.0105
1—1" O.D. Type 430 Seamless Tubing (For acid plant)	0.035	0.025	0.039

TABLE III—WEAK MIXED ACID CORROSION TEST (Sample of unsatisfactory test results)

Material	—Total Weight Loss Hours Boil—				Penetration After 12 Hours (Inch)
	2	4	8	12	
5 lbs.—3/8" x 3/8" Flat Head Rivets Type 430 Chrome (For nitrating area use)	0.4336	0.4336	0.4336	0.7494	0.01215







# X-Ray in Postwar Era

INCREASED knowledge and a growing realization of the usefulness of the potent force, X-ray, have taken all the mystery out of at least one aspect, and today industry is aware that it has a tool at its disposal which will tell "volumes" about otherwise hidden secrets of many products. Roentgen in 1895 could hardly have suspected that one day his laboratory achievement would be an accepted means of proving soundness of repairs to parts which would otherwise be scrapped, of developing casting techniques, determining proper pouring temperatures, eliminating excess metal through efficient design, proving accurate placement and bonding of inserts, or of performing any of a number of other important functions.

Use of X-ray as an inspection device, especially in connection with shell casings and loaded shells, has received wide publicity, but little has been written on

its potentialities as a production tool in the all-important postwar era. It would seem that in this respect it will prove most valuable.

Importance of efficient and rapid war production has led to installation of X-ray equipment or radium in hundreds of plants, and management has been given an opportunity to observe at first hand how really effective X-rays can be in helping to turn out faultless products of war. Many of these same plants can be counted on to continue and expand their use of that equipment as an aid to

*Inspection medium's relatively brief history replete with achievements. More efficient use of metals, fewer rejections, and lower costs through proper design make strong argument for X-ray expansion in next few years*

the production of consumer goods.

The Rochester, N. Y., plant of Delco Appliance, a division of General Motors, is one of many that have found X-ray a boon to production. Electrical appliances they make for aircraft and other war products must be right. Delco employs X-ray extensively as a development aid for new products in its own plant and for those of its suppliers, and as a constant accurate check-on the quality of regular production.

Consider the case of an aircraft electrical appliance which required a new type



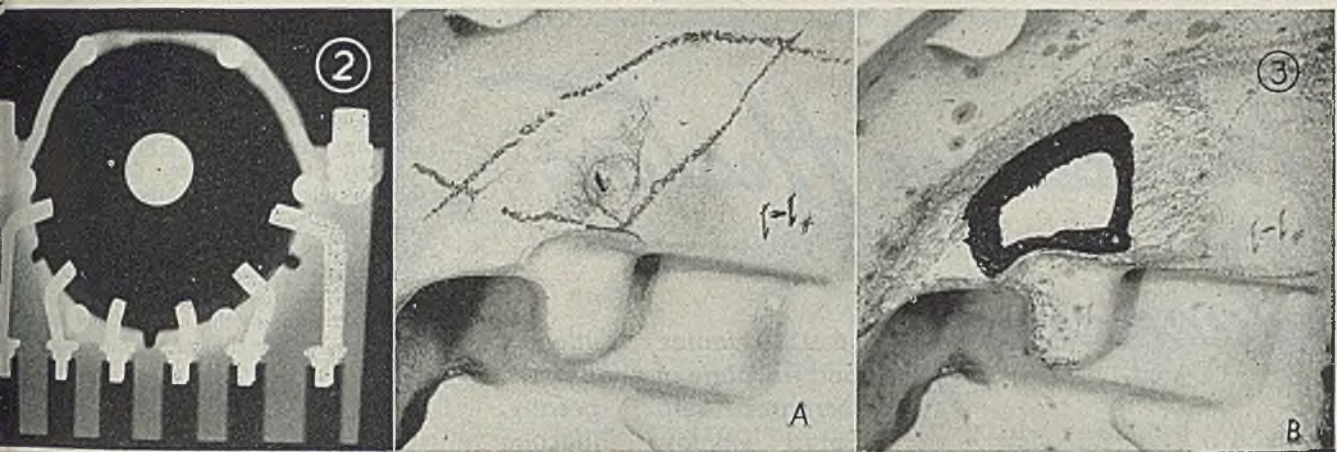


Fig. 1—Radiographic inspection of this simple bearing housing revealed defects in sample at right. Blowholes and porosity have been eliminated in sample at left

Fig. 2—Imperfect distributor molding at left is distinguished easily from acceptable one on right by radiography. Badly bent insert in left-hand view could arc with adjoining insert, preventing proper functioning of distributor

Fig. 3—Closeups of typical flaw (before welding, left) in 40-lb casting of flywheel housing, and after welding, right, as shown radiographically

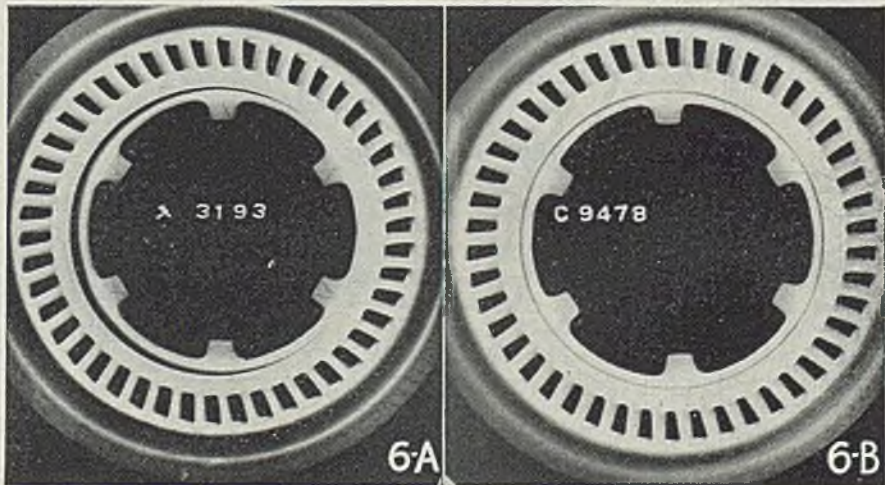
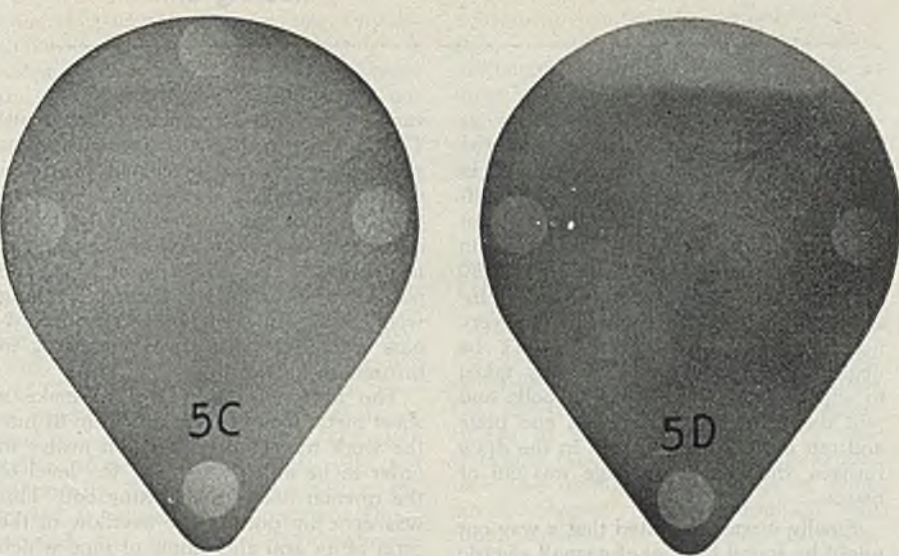
Fig. 4—Radiograph of defective cast aluminum housing which led to improved casting technique

Fig. 5—Four stages of improvement in castings following experiments to reduce grain size and porosity by controlling pouring temperature. Radiographs of exhibits a, b and c proved temperatures were too high. Sample 5d, accepted, was poured at 1250°F

Fig. 6—An early attempt at alloy steel supercharger diaphragm was X-rayed (left) and resulted in sound castings of type shown at right

of housing. Plans called for a housing of cast aluminum containing several inserts in the form of bronze bearings, copper tubes, laminated soft iron field parts, and several brass strips. Blueprints for the housing were released to a foundry which developed what appeared to be a satisfactory technique and began delivery of castings to Delco, who radiographed them as a part of its standard procedure. Some of the initial lot were rejected for flaws. The foundry made changes in its technique and began delivery of improved castings, but some irregularities continued. Delco radiographed all castings received every day for a period of 3 weeks while the foundry continued to make changes suggested by

(Please turn to Page 156)





# Progressive Heating. Quenching ...

... eliminates brittleness  
and warpage of small parts,  
increases output greatly.  
Setup employs induction  
heating unit

By A. R. HOTCHKISS

HARDENING such small parts as spacers has been exasperating to the metallurgist and production personnel in many shops for years because of inability to keep down brittleness and prevent warpage. Loss from these two evils in one shop recently reached as high as 80 per cent on some batches. A little insignificant job at the best, but one very necessary in assembly, it couldn't be neglected. Even when time was taken to slip them on long carriage bolts and pull them down tight with an end plate and nut before placing them in the draw furnace, the loss of warpage was out of reason.

Finally it was suggested that a way out might be found by way of a small electric induction heater. The manufacturer had told us very little about the machine when he sold it to us. This left me free to try anything, which after all does have its ad-

vantages from an experimental viewpoint. The idea of heating and quenching progressively in this case seemed worth an early investigation since from a half to two thirds of the part would be below quenching temperature while the rest was in treatment. I hoped this would hold the part from warpage while correct timing would bring the part up to desired hardness without over treatment resulting in brittleness.

The first step taken was to make a sheet metal tank of such size as to fit into the work tray of the induction heater in order to be able to regulate the level of the quench below the heating coil. This was done by putting the overflow in the form of an arm and elbow of pipe which fitted snugly enough to stay in any position to which it was turned. The end of the pipe scribing the circumference of a circle raised the level as it was turned upward and lowered when moved in the opposite direction.

Into the rear of the tank a stand made of insulating slate was placed and sup-

ported rigidly on the rear edge of the tank itself. Down its sharply sloping face and below the upper edge of the tank level, a slit of just the width and length to allow the heating coil of four turns of the 1/8-in. copper tubing to sit halfway through (see diagram) and allow a clear space for the spacer to be slid down the face of the stand, through the heating coil and on into the quenching solution below. Strips of insulating material were bolted into place to guide the part through the coil without touching it and at the same time hold it against the face of the stand. The quench level in the tank was brought up to 1 in. below the heating coil.

Spacers were slid through by hand by means of asbestos cord at various speeds and checked for rockwell C readings until it was determined that proper hardness and evenness of readings were obtainable without warpage, even after being drawn while lying loose in the furnace. This latter check was made to prove to ourselves that the general effect of the treatment did not introduce internal stresses that reacted in the same way as they did in an overhardened part drawn back. In actual practice it was proposed to treat up to proper hardness and eliminate the draw entirely.

## Automatic Feed Developed

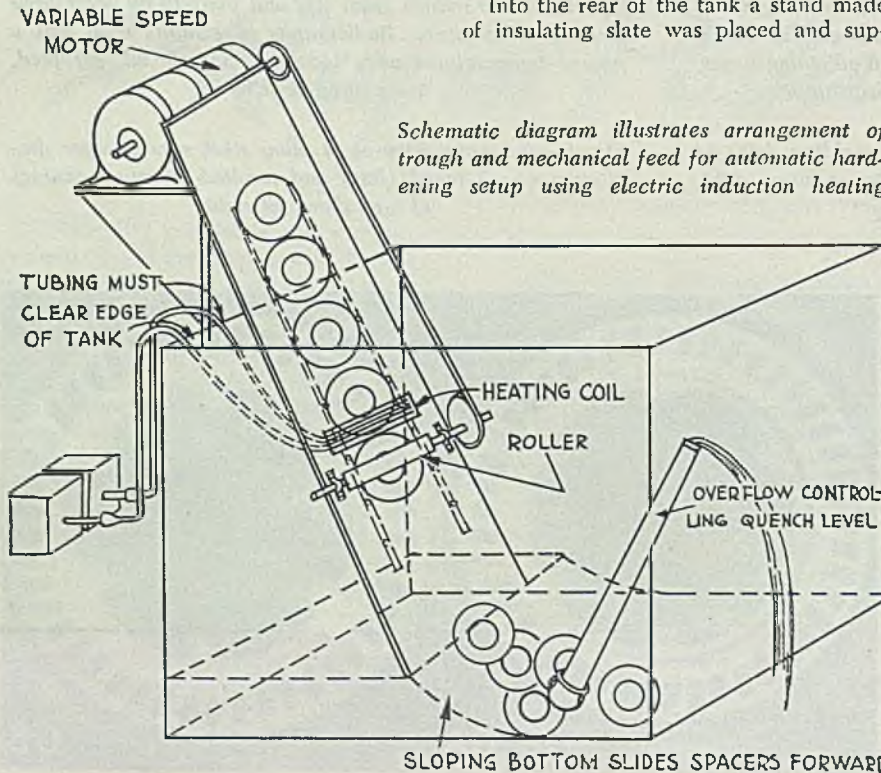
From here on our job was to refine and improve the stand; develop an automatic feeding system for the spacers whose speed could be varied evenly through a range applicable to all types and sizes of spacers that might be treated; and circulate the quenching solution around the part being quenched.

The guides on the stand were made adjustable by assembling the bolts holding them in slots that allowed spacers of various diameters to be accommodated. The heating coil slot was lengthened for insertion of heating coils of various diameters.

In regard to the automatic feed, approximately 2 in. below the quench level a rubber covered shaft was mounted on spring supports across the path, followed by the spacers. The end of the shaft extending over the edge of the stand carried a grooved pulley and was thus belted to a fractional horsepower direct current variable speed motor in which a reduction gear had been built. By this means a slow variable speed motion was obtained.

Before starting the operation enough spacers are introduced to fill the guides down into the roller. Then the heater is turned on, the variable speed motor started. Then the operator keeps the guides filled. By adjusting the motor speed, the proper movement is easily determined to give a rockwell C reading of 50 to 60. The first spacer through is caught and fed back through again.

The inlet for the quenching solution is introduced through the sidewalls of the tank by means of tubes extending from both sides over the front and back of the spacer at the quenching level. The



Schematic diagram illustrates arrangement of trough and mechanical feed for automatic hardening setup using electric induction heating

(Please turn to Page 162)



## Grind Helices to Order

To produce the plunger helice controlling amount of fuel delivered by injection pumps to extreme accuracy necessary, helices are ground in specially designed machine using a Norton grinding wheel  $\frac{3}{4} \times 1/16 \times 5/32$ -in., operated at 40,000 rpm by an air turbine spindle. Unique micrometer type gage with high optical magnification is employed to measure accuracy of operation.

. . .

## New Rustproofing Material

A phosphate type of finish for iron and steel, providing protection from rust as well as a base for organic finishes, has been developed by Du-Lite Chemical Corp. With an oil dip, it is a satisfactory finish by itself for many applications. As a paint lacquer base, the crystalline surface of the microscopically porous coat affords such a strong "grip" that chipping or peeling is said to be almost impossible. The finish meets Army specifications for its type, and was developed under a company fellowship at Syracuse University.

. . .

## Coating for Zinc

The Bonderizing process, best known as a paint base coating for iron, steel and zinc surfaces, also may serve to protect zinc-coated products and zinc-base die castings from corrosion where no paint is applied. This treatment results in the conversion of their surface to an insoluble phosphate coating that substantially retards the development of the white salts of zinc corrosion on such products. The finish becomes an

# Engineering

## NOTES

integral part of the surface through chemical reaction with the metal. It forms equally well in recesses and holes and on flat surfaces. The process is unaffected by heat used to remove moisture or to dry paint.

. . .

## Smallest Unit of "Nothing"

Dehydration of blood plasma, penicillin and foods provided the know-how for vastly increased industrial applications of high-vacuum by which liquids are "boiled" at temperatures as low as freezing. In air pressures that approach the absolute vacuum of interstellar space, heavy-molecule oils are fractionally distilled, magnesium is extracted from ore, and lenses are glare-proofed by molecular bombardment. These new high-vacuums are pulled by recently developed diffusion pumps, operating in tandem with compound roughing units of mechanical pumps or steam jet evactors. In multiple stages, this

equipment can reduce air pressure to below 1 micron (one-thousandth of a millimeter). By using vapors such as those of mercury to entrain the remaining air molecules, a diffusion pump further decreases pressure to (a hundred-thousandth) 0.00001-micron. *Process Industries Quarterly*.

. . .

## Lilliputian Tubing

Research on an important material for the government has made possible the development by North American Philips Co. Inc. of an ultra-thin-wall seamless tubing in various diameters, with wall thickness ranging from 0.0001 to 0.001-in. The tubing can be made of gold, silver, copper, nickel, chromium and other metals. It is uniform in thickness and absolutely air-tight. Possible fields of application are as yet unexplored, but its suitability for use in delicate instruments and high-frequency radio circuits has been suggested.

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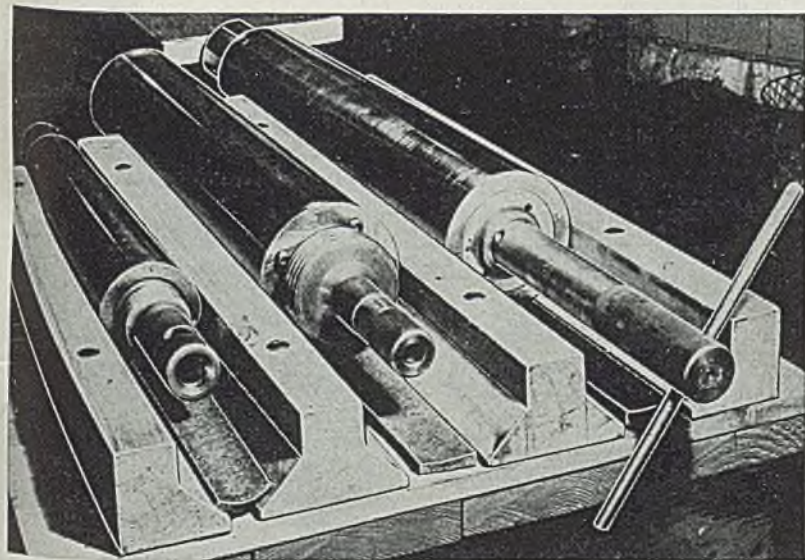
## Improves Thermocouple

Heat resisting stainless steel soon will replace another material in the secondary protecting tube of platinum thermocouple assemblies manufactured by Brown Instrument Co., Philadelphia. It is said the change will result in longer service life for the protecting tube assembly by eliminating freezing of tube and checking oxidation; also it will facilitate easy removal of assembly for inspection. Thermocouple assemblies are used with two-hole silica block for glass tank crowns.

. . .

## Thermit Castings

The thermit welding process now has been adapted to the production of steel castings. As in making thermit welds, finely divided aluminum and iron oxide are ignited in a crucible. The molten metal then is poured into a mold after cooling somewhat from the peak temperature of 4000° F. A typical steel analyzed C 0.25, Mn 0.68, Si 0.11, Al 0.60, S 0.02-0.04 and P 0.02-0.04.

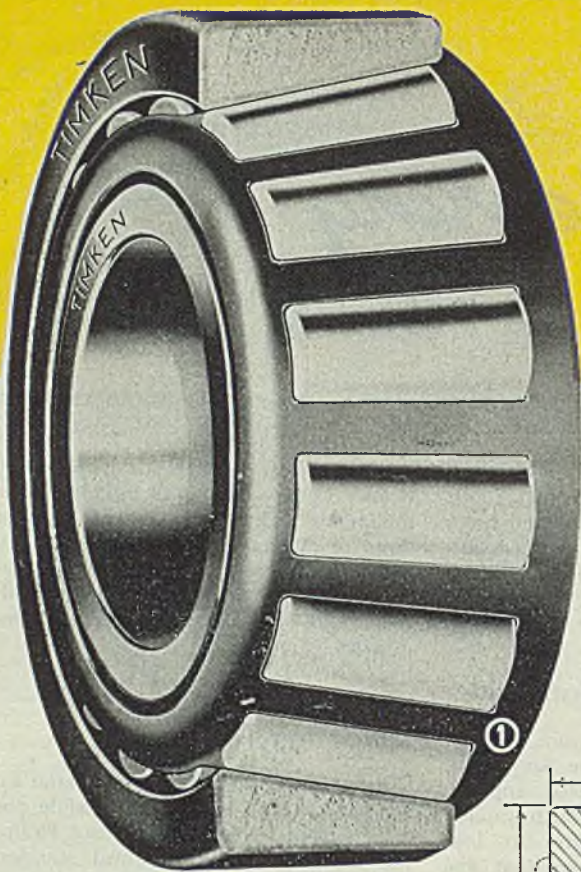


**PLUG GAGE RACK:** Cleaning and oiling of large plug gages, which must be free of all dirt and grit before being inserted into chambers to be checked, is solved at one stroke by storing gages on oil soaked felt strips between dividers of the rack shown here. One or two turns on the felt prevents rust and cleans the gage, according to Westinghouse Electric Corp.



Many Special Machines  
Help Produce

# TAPERED



Bearing rollers are automatically gaged and grouped for selective fits; outer and inner races gaged by operators on special setups. Unique design, engineering and production features result in a precision famed wherever wheels and shafts must turn easily

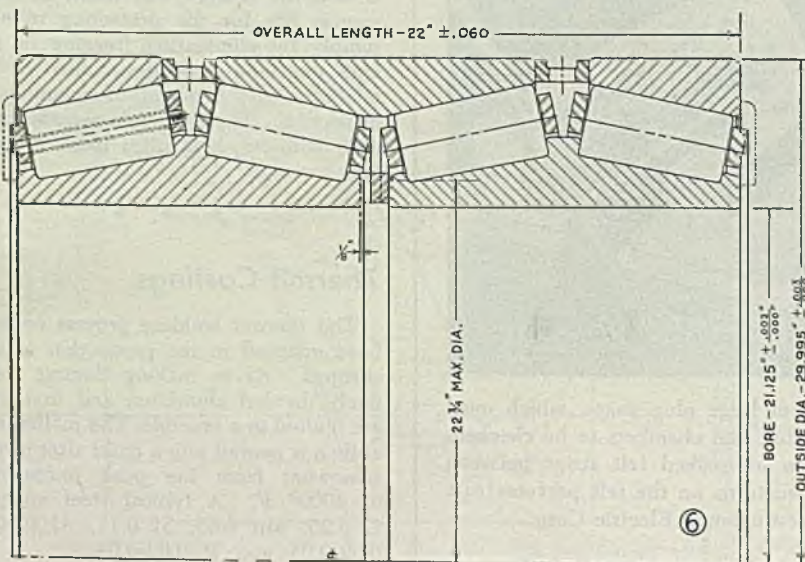
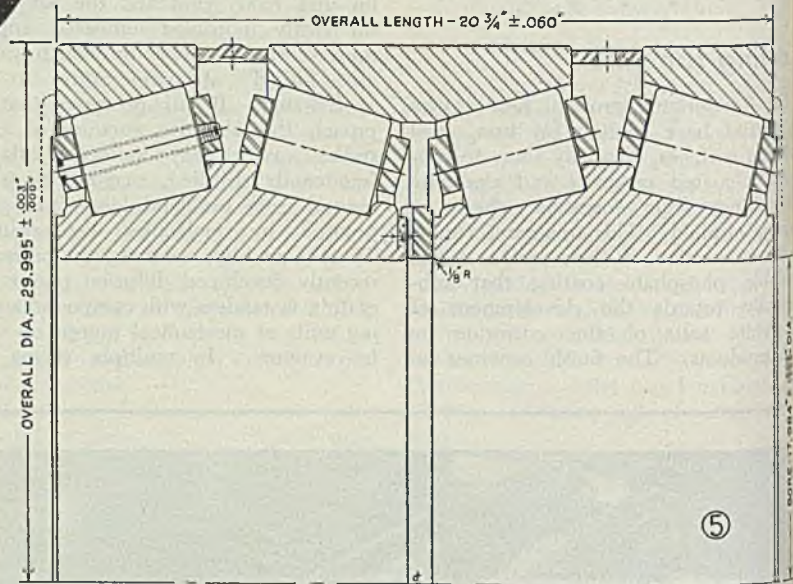
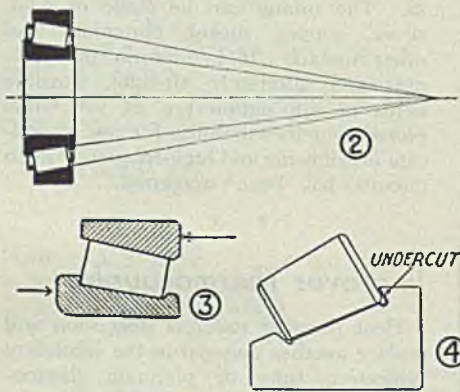


Fig. 1—Tapered roller bearing as made by Timken consists of inner race (cone), outer race (cup), rollers and cage

Fig. 2—Sectional diagram showing how extensions of tapered contacting surfaces meet on bearing axis, thus obtaining true rolling motion

Fig. 3—Section through bearing shows how tapered surfaces provide wedge action that absorbs axial loads as well as radial loads, in turn enabling the bearing to carry loads from any direction



# ROLLER BEARINGS

## At Timken

DURING the early 90's when Henry Timken was a blacksmith in St. Louis, Mo., he developed the unique, highly efficient, tapered roller bearing which today bears his name. As he made his business grow from a tiny smithy to a 4-story carriage factory, he had seen that carriages should have better bearings. He was among the first to equip carriages with bearings of any kind, and quickly turned from ball bearings to the more efficient tapered roller bearing he had patented.

As a result, the Timken Roller Bearing Co. was founded in 1898 by Henry H. and William R., the hard-working sons of the first Henry Timken. In 1904 the business was moved to Canton, O., for reasons of transportation and supply. By 1922, it had grown by 200 times, showing an annual output of 22,500,000 bearings as compared with 120,000 in 1902.

Today, production facilities covering more than 2,000,000 square feet of floor space at Canton, Gambinus, Columbus, Wooster and Mt. Vernon, O., have a still greater output. Canton plants alone have over 13 miles of standard gage railroad track. In 1916 the company built its own steel mill to furnish the special high-grade electric-furnace alloy steel required for Timken bearings, a plant today rated one of the world's largest producers of high-quality electric-furnace steel.

**Excellent Performance:** Wherever a precision bearing is wanted to handle heavy loads at high speeds, there you will usually find a Timken tapered roller bearing. In fact, they unquestionably dominate anti-friction bearings in automotive and railroad fields as well as in all types of industrial machinery. They are standard equipment in a majority of all makes of cars, trucks and busses. Railroad cars and locomotives, steel-mill roll necks, machine-tool spindles, oil-field machinery, compressor crankshafts, paper making machines are but a few of industry's tough jobs taken over by Timken bearings. The use of these bearings has so revolutionized previous ideas of bearing performance that it is well worth

while to briefly examine the mechanical principles that have made possible this exceptional performance.

**Load-Carrying Ability:** An outstanding characteristic of the tapered roller bearing is its ability to carry both heavy thrust and radial loads. In referring to Figs. 1, 2 and 3, the arrangement of the tapered rollers between tapered inner and outer races is such that the thrust (axial) loads are transformed to a balanced radial load on each of the rollers within the bearing and absorbed by the tapered surfaces in the same manner that a wedge transforms a force applied lengthwise into a force acting at right angles to the surfaces in contact.

True rolling action (Fig. 2) is obtained between rolls and raceways, since lines produced coincident with the faces of the rollers and races all meet at a common point on the axis of the bearing.

Pressure between roll and raceway is distributed uniformly over the entire length of each roller. The *line contact* which withstands the combination of radial and thrust loads (instead of *point contact*, as with ball bearings) accounts for the tremendous capacity of tapered roller bearings. Each roller is positively aligned with respect to a rib on the inner race and therefore is made to carry its proper share of the load. See Fig. 4. To



Fig. 4—Shoulders on inner race keep rollers positioned lengthwise so they divide the load equally, thus extending life

Fig. 5—Section through steel mill roll neck bearing before redesign

Fig. 6—Note how redesigned bearing has same outer diameter, yet its larger bore permits a neck stress of only 65% of former value. Also this new bearing has a rating that will give double the estimated life of the bearing in Fig. 5

Fig. 7—Great range in size of bearings is indicated here. Girl holds 8-oz.,  $\frac{3}{8}$ -in. bore unit alongside 9,500-lb., 51-in. outside diameter steel mill roll neck bearing



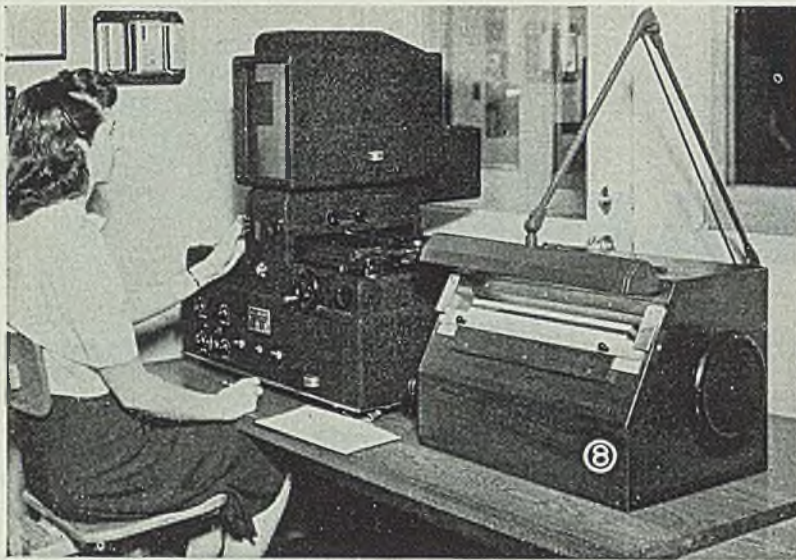


Fig. 8—Setup for reading spectrograph charts in the metallurgical laboratory



Fig. 9—Large outer races are machined on boring mills and other heavy equipment. This is a typical setup

obtain this correct load distribution, the rollers are properly spaced around the cone by the cage, Fig. 1.

With initial load distribution accurately provided for, minimum deformation of the roll occurs. Translated into terms of bearing life and bearing performance, this means greater precision, greater rigidity with less wear and consequently longer life of bearing and the machine parts that it supports. Machine tool manufacturers have found that the extremely rigid mountings made possible by these bearings permit machining practices said to be impossible with any other type of mounting.

**Controlling Wear:** Thus, the design inherently reduces wear to a minimum. Further control of wear is obtained by heat treating the cup (outer race), cone (inner race) and rolls. An extremely hard surface (60-62 rockwell C) is produced by case hardening, a process that at the same time retains a tough elastic inner core.

Timken bearings are rated on the basis of a 3000-hour working life. If 100 bearings are loaded at rated capacity, their average life will be five times this figure, or 15,000 hours. Bearings will last ten times longer at one-half than at full load.

Likewise, their life will be only one-tenth normal if the load is doubled. The above relationship of under and over-loading holds for practically any type of anti-friction bearing and to a certain degree applies to life expectancy on gears and many machine tool mechanisms, report Timken engineers.

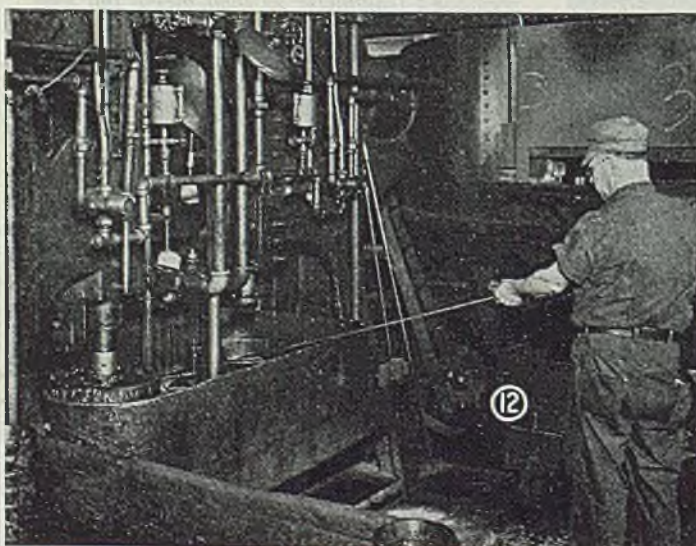
**Continued Improvement:** For many years, the company has maintained a large research staff with the most modern facilities for the purpose of devising and developing further improvements. Typical of these efforts toward continual improvement is the new line of bearings for steel mill roll necks. Here the problem was to rearrange the proportions of present bearings to pack increased bearing capacity into a limited space.

Paul Haager, assistant chief engineer, Industrial Division, explains the limits. "The maximum outside diameter of a bearing for a specific mill roll size is

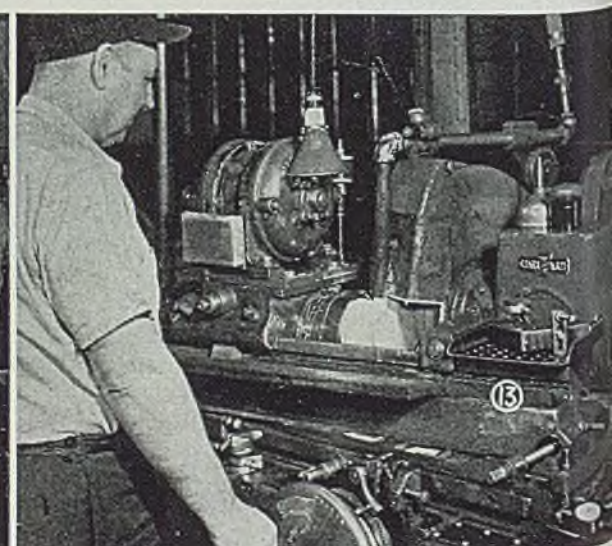
obviously restricted by the outside diameter of the mill roll and the clearance provided. Maximum bearing width is limited since stress on the roll neck increases directly with bearing width. The neck stress for a given load also varies inversely as the cube of the bearing bore. Thus the inside diameter of the bearing must be as large as possible and still provide the necessary capacity."

In making the redesign, all bearing roll proportions were analyzed and the most satisfactory proportions worked out for a specific job. After this analysis was completed for a single size bearing it was possible to lay out a complete line of roll neck bearings for all mill sizes ranging up to 60-in. mills.

Steel mill type bearings so redesigned have ratings up to 40 per cent higher than bearings supplied on the previous design. Proportions in these new bearings provide more internal bearing rigidity

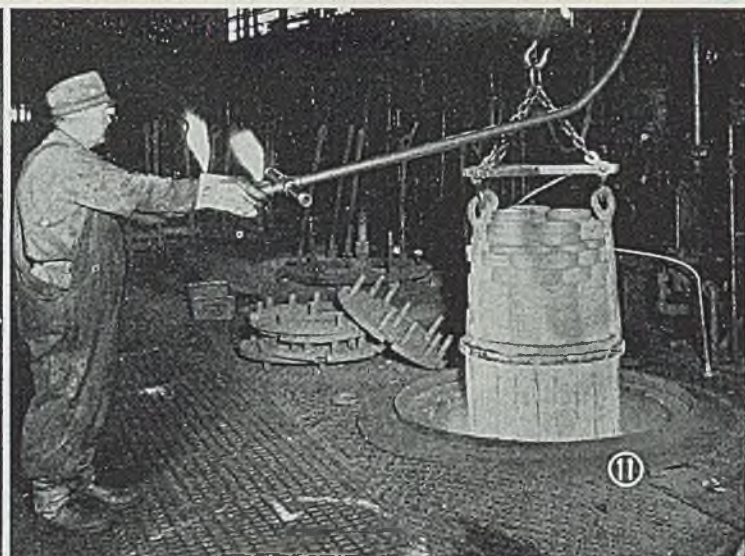
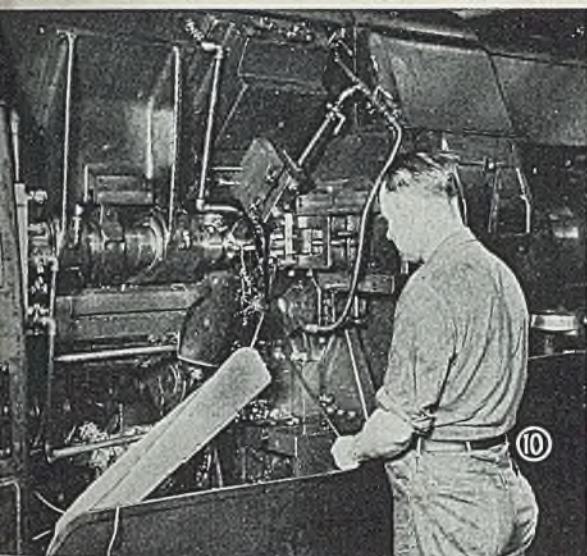


12



13





idity, better distribution of load to the rollers within the bearing, and greater mill rigidity—in turn leading to greater precision in rolling.

Figs. 5 and 6, showing sections through old and new designs respectively, reveal the change in proportion. The new bearing, Fig. 6, has a rating that will double the estimated life of the bearing, yet it has the same outside diameter as the old bearing, Fig. 5. Larger bore of the new bearing means that neck stress is only 65 per cent of that with old bearing.

**Wide Range In Size, Style, Application:** Timken tapered roller bearings are made in an amazing number of sizes and types for an almost endless variety of

applications. Sizes range from the small unit the girl in Fig. 7 is holding in her hand up to the large bearing alongside of her for back-up rolls on a steel mill. The small unit has a  $\frac{3}{8}$ -in. bore, a 1-in. outside diameter, is  $\frac{3}{8}$ -in. wide, weighs 8 oz, has a single row of rolls with a capacity of 250 lb at 50 rpm. The large bearing has four rows of rolls, measures 36 in. wide, 51 in. outside diameter, has a  $3\frac{1}{2}$ -in. bore. It weighs 9,500 lb and has a radial load capacity of 4,000,000 lb at normal mill speeds.

An idea of the great variation in types and sizes can be had from the fact that 3500 different ones are cataloged, divided into approximately 63 different classes for industrial machinery and into

many other classes for automotive and railroad equipment.

**Materials:** Since analysis and metal structures also greatly affect bearing performance, all Timken bearings are made from high-quality nickel-alloy steels produced in the company's electric furnaces at Canton. Bearings up to 6-in. bore, 10-in. outside diameter are made from SAE-4620 stock; larger sizes from SAE-3312, a steel somewhat tougher and more shock resistant, with  $3\frac{3}{4}$  to  $4\frac{1}{4}$  per cent nickel,  $1\frac{1}{2}$  per cent molybdenum. Stock is case carburizing type, since all bearing parts except the cage are carburized to produce an extremely hard case for maximum wear resistance.

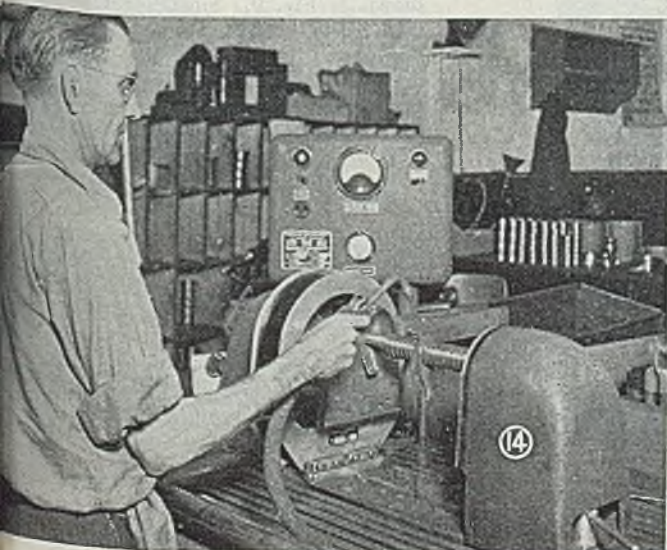
All Timken tapered roller bearings

Fig. 12—Races are heated for hardening in rotary furnaces like the unit at right, then to avoid distortion are quenched in special dies in machines such as shown at left

Fig. 13—Finish grinding by skilled operators comes before final checking

Fig. 14—Quantity of small races being Magnaflux tested for hidden flaws

Fig. 15—Special setup for gaging cones (inner races) employs tapered surface of race to magnify radial dimensions. See text for detailed explanation





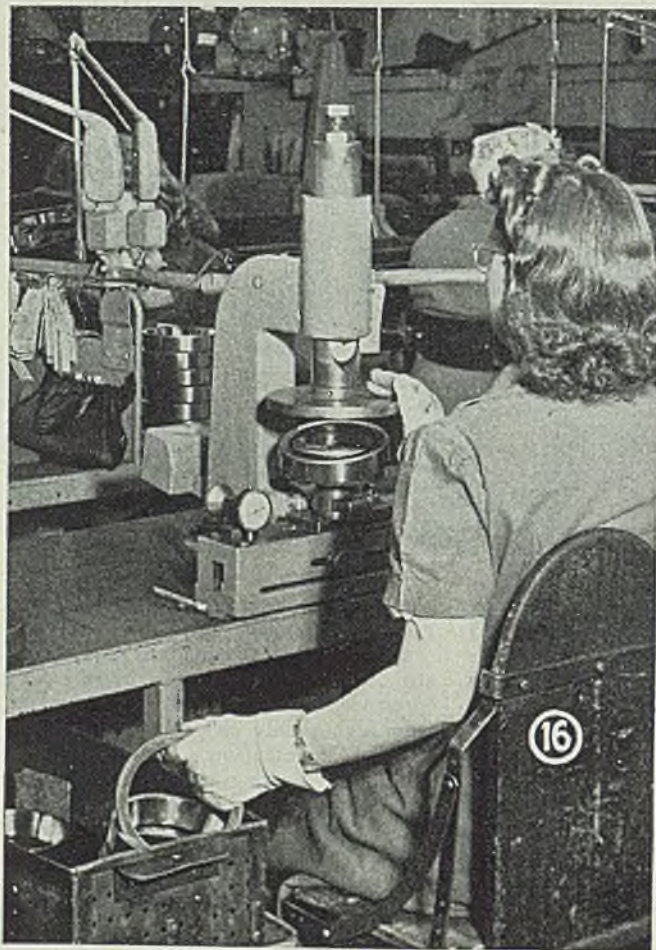


Fig. 16—Outer races (cups) are gaged here in a setup similar to that shown in Fig. 15

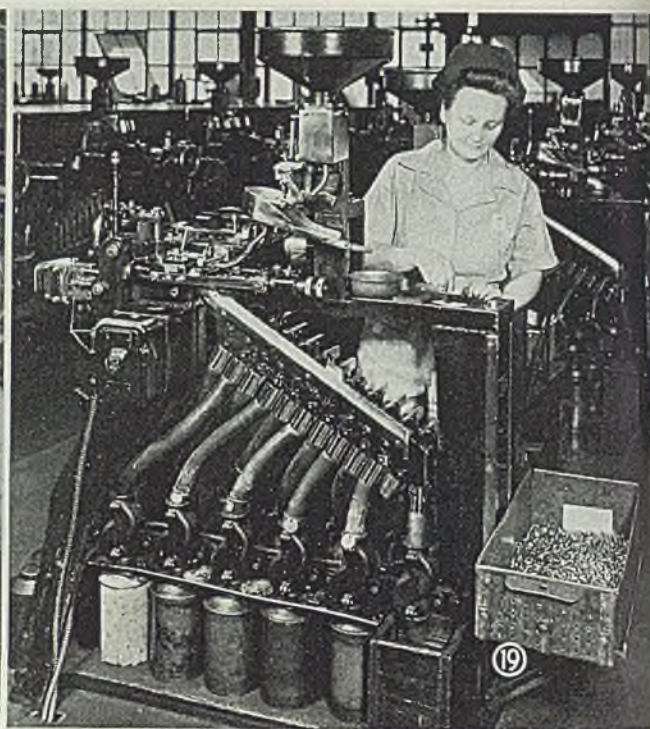


Fig. 17—Upsetters make tapered rollers by cold forming heavy wire stock

Fig. 18—Centerless grinding from two to six times, depending upon size and precision, is done in units like this in production of rollers. Note automatic hopper feed

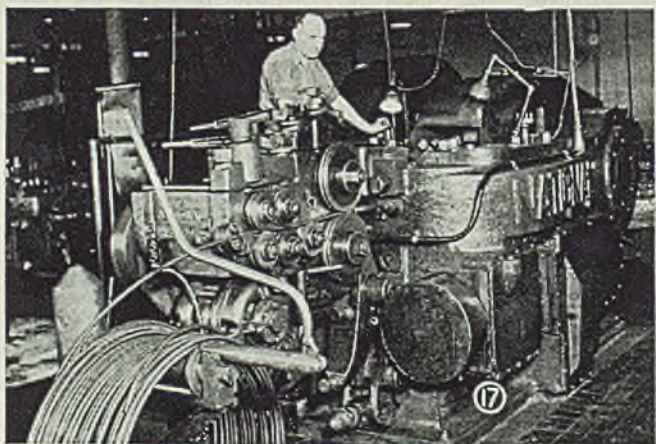
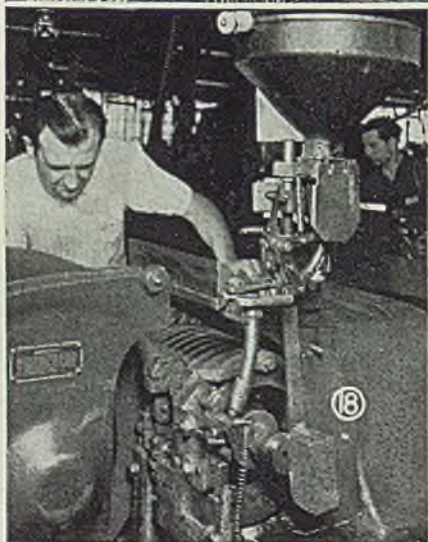


Fig. 19—Overall view of automatic gaging machine for separating rollers into groups meeting close dimensional tolerance ranges



consists essentially of four elements:

- inner race, designated as the cone because of its shape
- outer race, which fits around the cone and roller assembly and is called the cup
- tapered rollers which roll between cup and cone
- cage which serves as a retainer to make assembled rollers and cone a single easily handled unit; also it maintains proper spacing between rollers.

**Production of Races:** For bearings above 10 in. outside diameter, both inner and outer races are made of forgings. Smaller size bearings have races made from seamless tubing. Fig. 8 is

a view in the metallurgical control laboratory showing an operator reading density of lines on a spectrographic plate, part of the system for checking the percentage of various elements in the steel before it is approved for use in manufacturing.

Large races are machined on turret lathes or boring mills such as the one shown in Fig. 9. Small races are handled on 4 or 6-spindle automatic screw machines. Fig. 10 reveals the working head of one of these large automatics. Small parts then are case carburized in rotary carburizing furnaces, large races being loaded into racks and carburized in vertical pit-type units as in Fig. 11.

Then races are hardened by reheating in rotary furnaces and quenching in oil while clamped in dies, Fig. 12. These dies are so designed as to control flow of oil to produce fast uniform cooling action on the part, thus avoiding any tendency towards distortion.

Now the parts are ready for finish machining which is done by grinding. Timken has one of the largest grinding departments in the world, using approximately \$500,000 worth of grinding wheels yearly. More than \$20,000



# How to IMPROVE YOUR PRODUCTS and LOWER UNIT COSTS

## REJECTS CUT 50% ON PRECISION INSTRUMENT PARTS WITH CARPENTER STAINLESS

When a manufacturer can improve his product and lower unit costs at one and the same time, his methods bear investigating. Here's the story of a control instrument manufacturer who did just that by switching to uniform, easy-working Carpenter Stainless Steels.

In the first place, parts for temperature control instruments like this must be precision-made to give accurate readings. Second, they must be long wearing to provide years of trouble-free service. Third, they must be corrosion resistant to keep functioning in the face of corrosive industrial fumes and dust.

All signs pointed to Stainless Steel. But *ordinary* Stainless wouldn't do. It had to be Stainless that would machine, blank, and form easily and economically, lot after lot.

You can imagine how pleased the manufacturer was when he found that easy-working Carpenter Stainless Steels not only filled the bill on every count, but *cut rejects in half!*

It just reaffirms a point we've been constantly stressing; you can do it better at lower cost with Carpenter Stainless Steels. Keep this in mind when you plan your new or redesigned products. And remember your nearby Carpenter representative can give you experienced help in selecting the *right* Stainless for the job.

Over 200 parts in this temperature control instrument were precision formed, blanked, stamped and machined from Carpenter Stainless Steels. For easy-to-fabricate Stainless specify Carpenter for your new or redesigned products.



FOR SHORT CUTS to making finer products at less cost, send for your copy of "Working Data for Carpenter Stainless Steels". A note on your company letterhead, indicating your title is all that's necessary.

The Carpenter Steel Company • 139 W. Bern Street • Reading, Pa.

# Carpenter STAINLESS STEELS



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Indianapolis, New York, Philadelphia, St. Louis





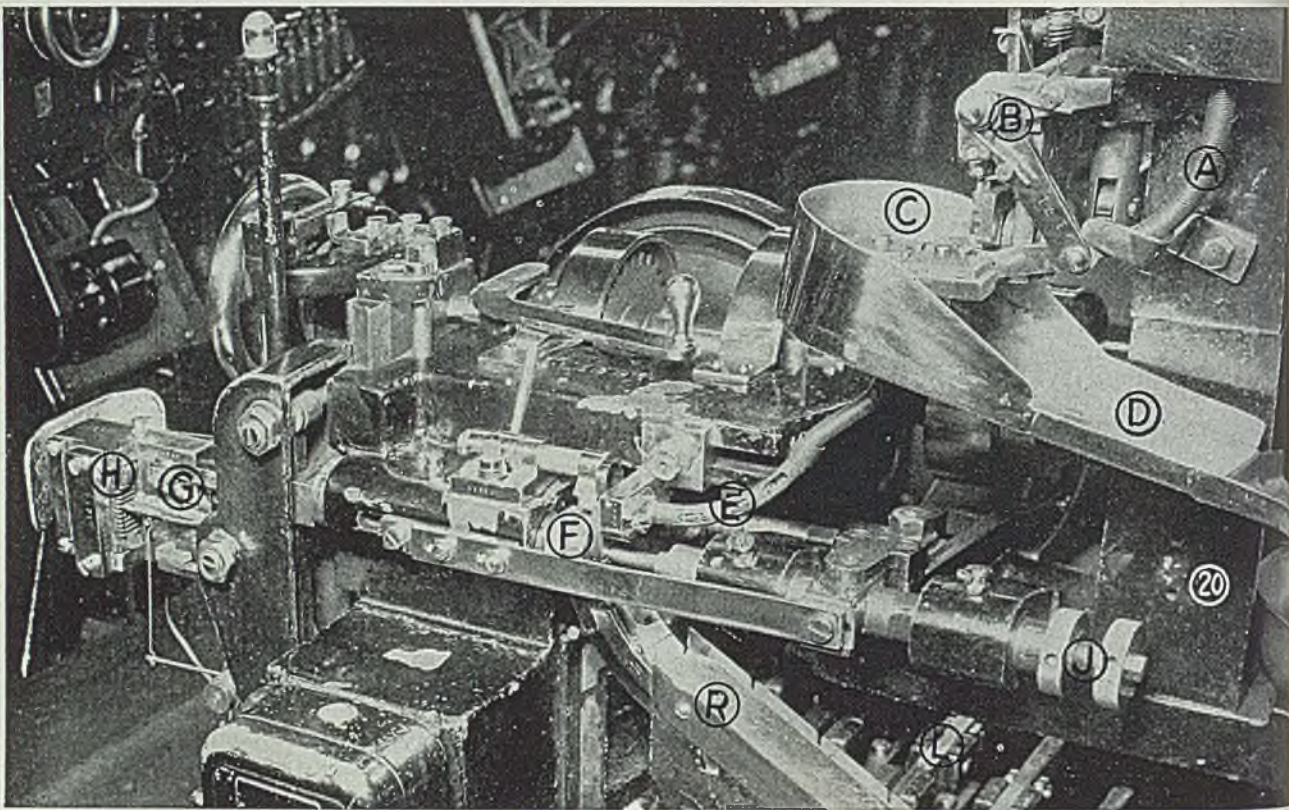


Fig. 20—Closeup of automatic gaging head diagrammed schematically in Fig. 21. Operation is detailed in text

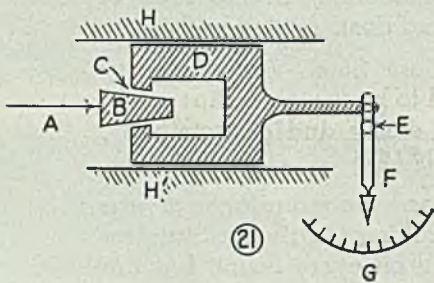


Fig. 21—Simplified schematic of elements of automatic gaging heads that separate rollers into precise tolerance ranges. See Fig. 20

Fig. 22—Semi-automatic setup for assembling and closing bearings. Girl fills cage, places it in automatic 2-station closing machine which discharges onto belt conveyor

Fig. 23—The trained ear can quickly check a bearing by its sound as it is operated at high speed in a special setup as shown here. Note belt conveyor

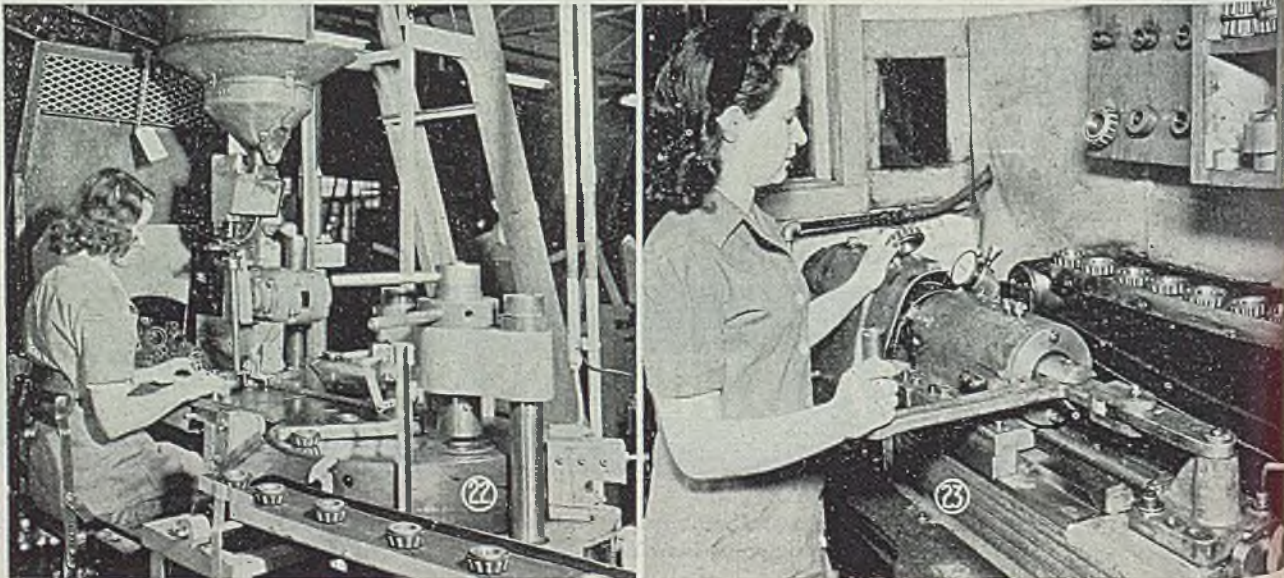
spent each year for diamonds used in dressing the wheels frequently to assure the smooth operation required for the finished parts. While many of these grinding operations are handled on automatic machines, much still depends upon

skilled operators like the one in Fig. 13. Running surfaces of cones, cups and rollers of precision type bearings are finished to a surface smoothness down to 5-6 microinches.

Special Gaging Setups: Timken is very proud of the precision standards it main-

tains in its bearings. While it is difficult to set up standards, maintaining them is not done without effort. The 35 per cent of all employees devote the full time to inspection, and many gaging machines of almost unbelievable

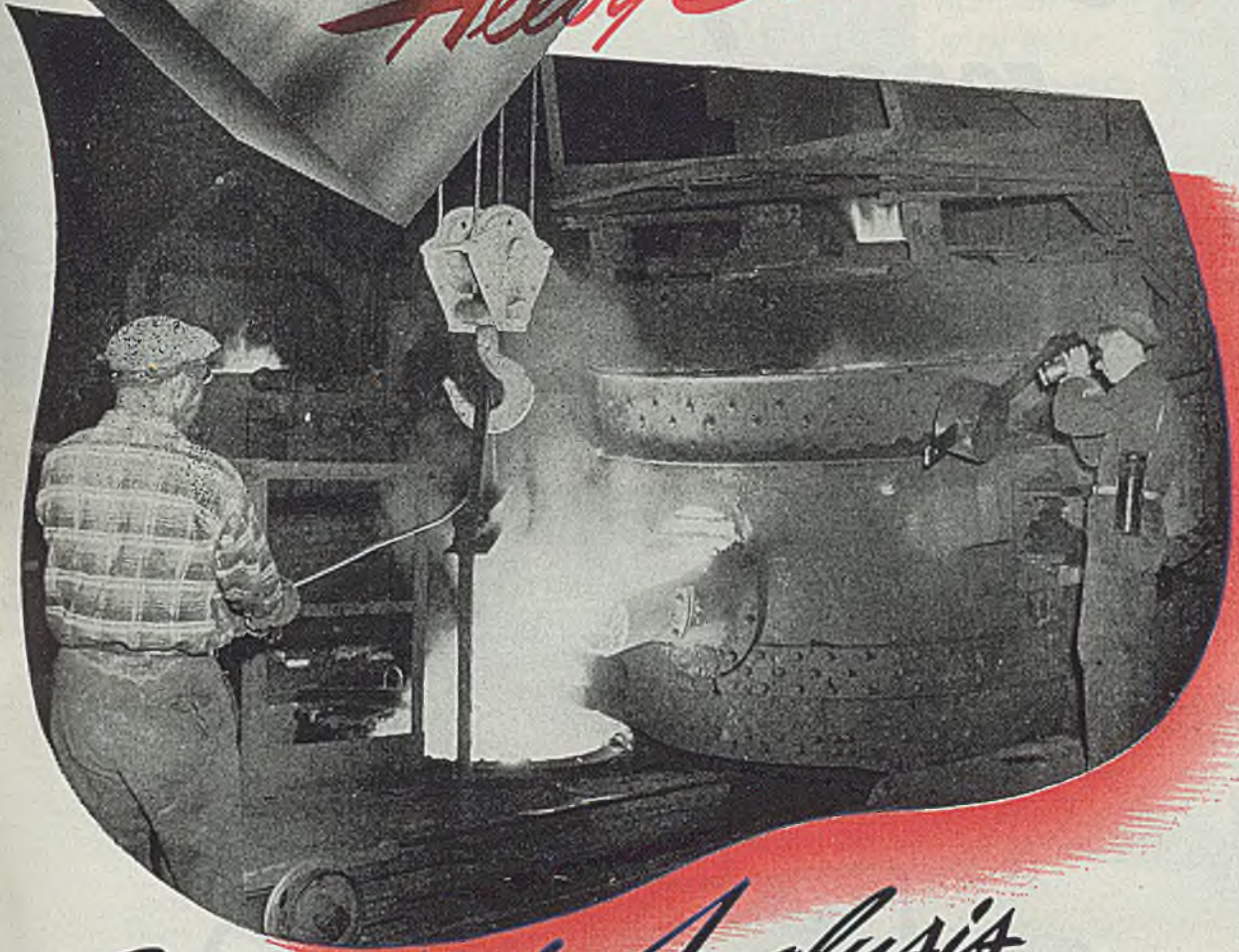
(Please turn to Page 164)





# FORT PITT

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When you buy FORT PITT Alloy Steel Castings, you can be certain that the analysis of the delivered job will be precisely as specified. Fort Pitt *quality control* follows every step of the production of your order, from the alloying of the steel to the final inspection

of the finished casting. Every heat is sampled by skilled metallurgists and subjected to a series of exacting chemical and physical tests. Accurate duplication of analysis throughout the job is a "must" at FORT PITT foundry.

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# Milling

New method features complete automatic cycle after loading through combined hydraulic and electronic control of cutter head

## FORGED CYLINDER HEADS

MILLING circular, partial and dome fins on a forged aluminum airplane cylinder head is performed by a special machine which will handle in two operations the milling of the same number of fins which formerly required four machines and four separate operations. Milling of circular and partial fins is done in one operation. Milling of dome fins requires a change in cams, cutter and work-holding fixture on the machine shown in the accompanying illustration.

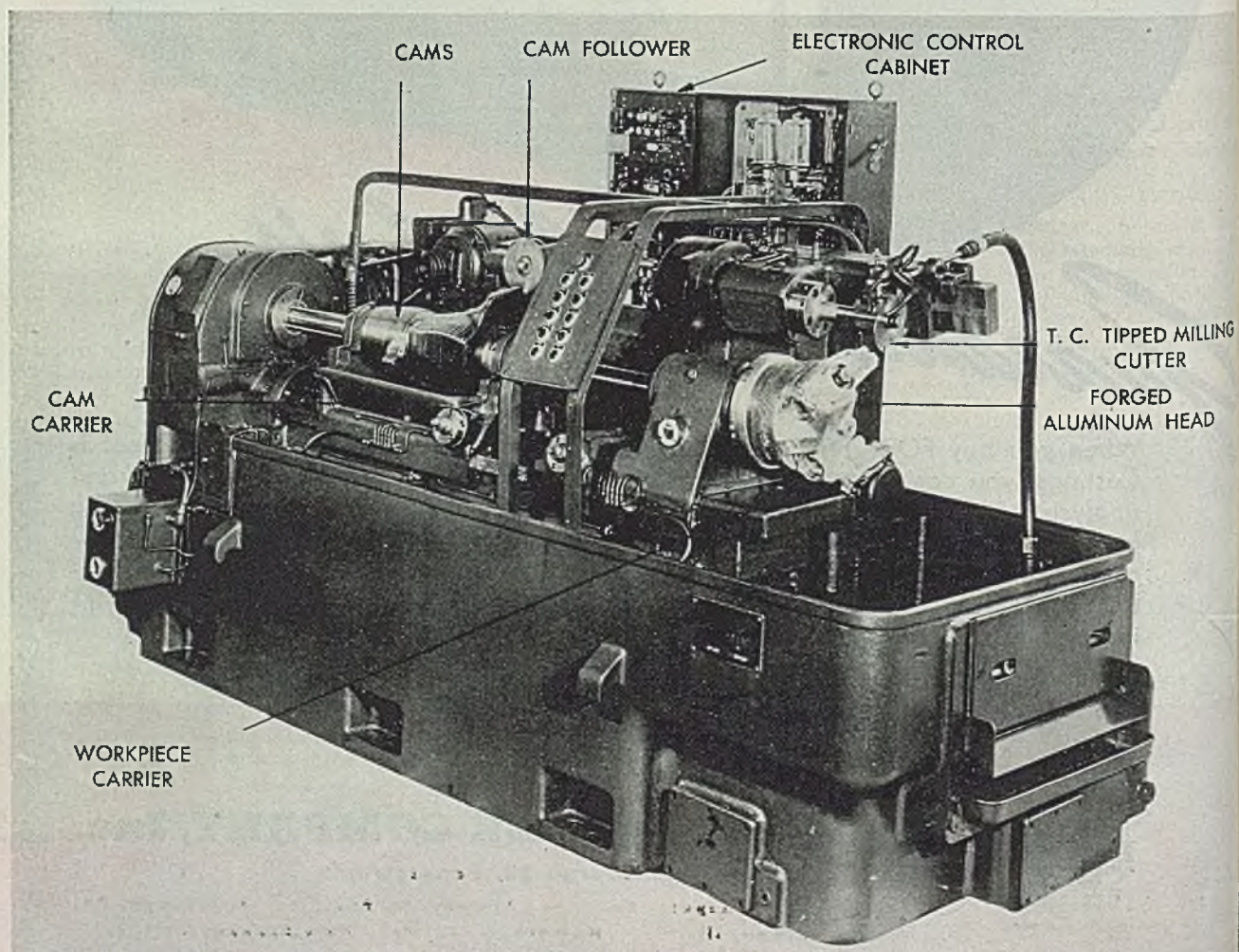
A combination of electronic and hydraulic controls is employed. Feature of this machine, made by Sundstrand Machine Tool Co., Rockford, Ill., is the arrangement for controlling cutter load. The path followed by the cutter is very

irregular and constantly changing in shape and depth for each successive fin. With the automatic electronic feed control, the fragile cutter is kept loaded to full capacity. If the cut becomes light, the rate of feed increases; and if the cut becomes heavy, the rate of feed decreases. Rate of feed varies automatically within a range of 6 to 60 ipm, with the actual rate depending upon depth of cut and horsepower consumed.

A complete automatic cycle is followed after loading. Operator merely presses control buttons and the pivot arm which carries both cutter and cam roller rapidly travels down to within  $\frac{1}{8}$ -in. of the start of the cut. The shaft which carries master cam and work part

then starts to rotate. The pivot arm feeds the cutter into the part until the cam roller contacts the cam. Cam then controls path of the cutter until a complete fin has been cut. The pivot arm hydraulically actuated, then moves cutter away from part and cam roller away from master cam—the shaft carrying cams and work part rotates back, at high speed, to its starting position. The cam carrier and work carrier slides the next cam is in position under the cam roller and the work part is in position for cutting the next fin.

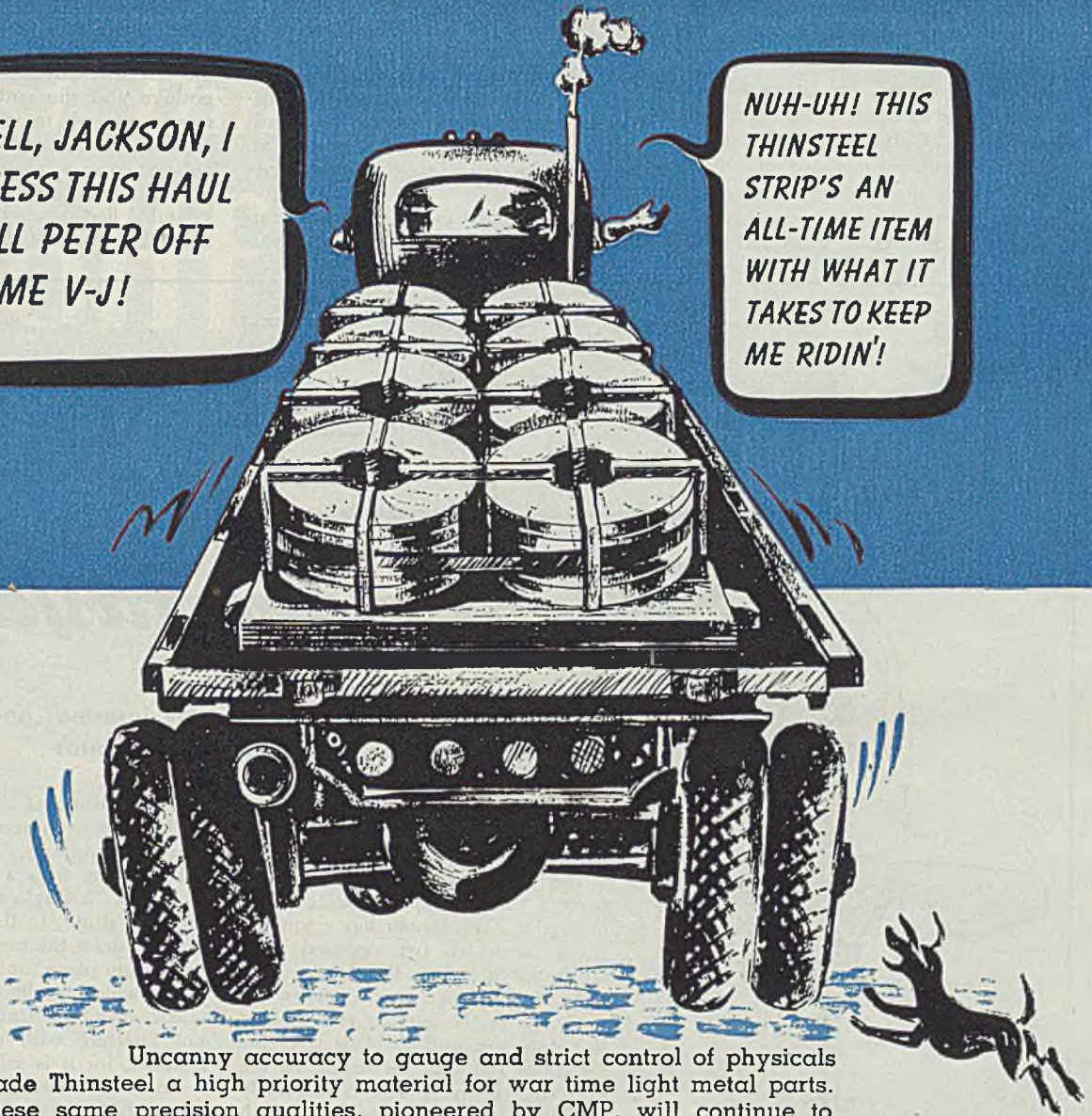
Cutting and indexing cycle described continues automatically until the last fin has been cut, after which the cam





WELL, JACKSON, I  
GUESS THIS HAUL  
WILL PETER OFF  
COME V-J!

NUH-UH! THIS  
THINSTEEL  
STRIP'S AN  
ALL-TIME ITEM  
WITH WHAT IT  
TAKES TO KEEP  
ME RIDIN'!



Uncanny accuracy to gauge and strict control of physicals made Thinsteel a high priority material for war time light metal parts. These same precision qualities, pioneered by CMP, will continue to deliver more usable feet per pound, more finished parts per ton. Your fabrication of light gauge strip steel can be trouble-free, extra-profitable if you'll use CMP's cooperative advisory service.

## Thinsteel Facts

Coils up to 300 lbs. per inch  
of width

Carbon and alloy grades  
Extremely close tolerances

Wide range of physicals  
Width up to 24 inches

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rier slide and the work holding slide return to starting position, and the machine automatically stops.

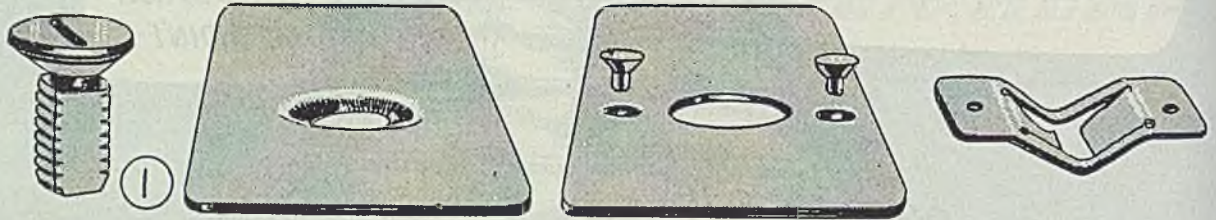
Irregular path of the cutter is controlled by a set of cams, one cam for each fin to be cut. Cutter head and cam follower roller both are mounted on a single casting which pivots on widely spaced bearings, providing direct cam control to cutter head. Master cams and work

part are mounted on one splined shaft, thus eliminating the possibility of error between rotation of cams and rotation of part. Work part is rotated through its feed and rapid traverse cycle by an electrically controlled mechanical feed box. Linear index of cams from station-to-station is through a positive index plate and lead screw.

Work is totally enclosed during cutting cycle. With a completely automat-

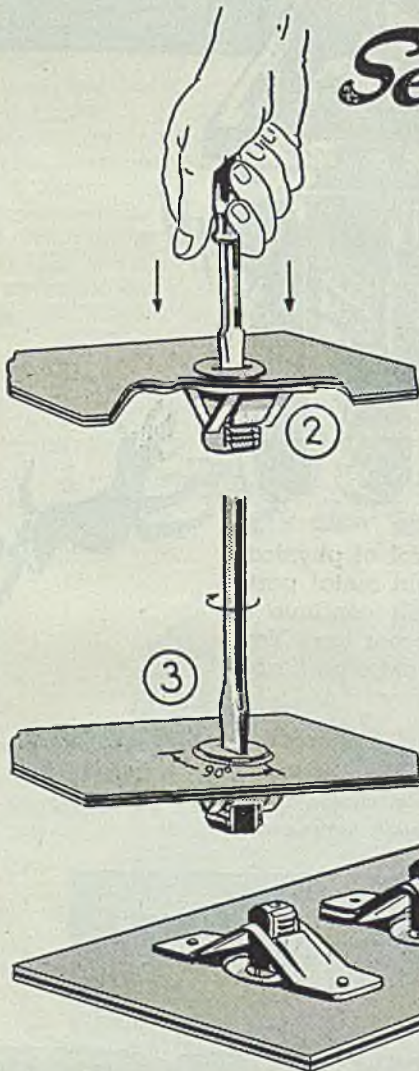
ic cycle, the operator can run one or more machines if so desired. There is no waste motion or cutting of air under the irregular cutting as adjustments are positive and the cutter can be set for rapid approach to within 1/8-in. of each fin. Either individual or a central coolant system may be used.

By combining several operations, considerable floor space has been saved over the old method of machining.



## Self-Aligning Fastener

—is lightweight, easily and quickly inserted, and can be nested to handle heavy loads



since demonstrated its adaptability as an all-purpose fastener for both aircraft and non-aircraft applications.

The Carls fastener consists of two parts, a stud and a receptacle, shown in Fig. 1. The former has a squared shank on which two opposed sides are serrated, while the latter is of spring clip design and engages the serrations in the manner of a ratchet to secure the stud in place. As the serrations run the full length of the stud and the receptacle is extremely flexible, it is possible to use one length of stud for all applications as against anywhere from 30 to 40 lengths required with fasteners of the cross-pin type. Likewise, this permits starting the studs with the two pieces out

are started one at a time. After all studs have been started in their respective positions, they are then driven home with a screw driver, as in Fig. 2. A single sharp tap suffices for each stud. In this way it is possible to draw the cowling evenly and surely into place similarly to the manner in which a cylinder block is tightened. Misalignment of sheets does not interfere with operation of the fastener, for it is self-adjusting.

To remove a cowling fastened with the new Martin device, it is only necessary to turn the studs a quarter turn to either side to disengage them, as illustrated in Fig. 3. But, while studs are easily disengaged when desired, it is impossible for them to loosen due to vibration.

This fastener, in a number 7 size, is completely interchangeable with AN228 and AN232 fasteners as far as the drilling and dimpling of the sheets on which it is mounted is concerned. With a single receptacle it can withstand loads in excess of 900 lb., and this can be increased further by stacking that is, by nesting two or three receptacles to engage a single stud, as in Fig. 4.

In addition to cowling attachment and similar aircraft applications, other uses for which the new fastener is suggested range from attaching automobile crank cases and auxiliary freight car doors to inspection plates, heating and ventilating ducts, grain storage bins, and portable sheet metal buildings.

Fastener is easily and cheaply fabricated because no cross pin is necessary and one stud length may be standardized on for all purposes.

A LIGHTWEIGHT, self-aligning, spring-lock fastener of unique design which is believed to offer many advantages over other types has been developed by Carl P. Sorenson, chief standards engineer of Glenn L. Martin Co.

Known as the Carls, after its inventor, the new fastener originally was designed to overcome difficulties in attaching aircraft cowlings, but has

of alignment and letting them align themselves as the studs are driven home.

To fasten a cowling with the new fastener, it is first brought into approximate visual alignment. As there is no cross pin, the stud can be removed to permit visual installation, although a horseshoe washer may be used to keep the stud in the dimpled hole when desired. Then the studs



# First Things First means

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vide... an individualistic, intelligent and helpful service that follows through in the field, in the office, and in the warehouse **to get things done for you.**

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WELDED tubing has made tremendous strides over the past 20 years. Developed originally as a light gage mechanical tube with a wall thickness of about 1/16-in. or less for such uses as bedsteads and automobile exhaust pipes, its use has gradually expanded until there is practically no field of use for tubing where welded tube has not been given approval. In achieving this acceptance, welded tube has been put through extensive tests and trial installations and has proven its efficiency and durability beyond any question in the mind of the user. The outstanding example is the millions of feet of boiler tubing now in use.

The method of manufacture is essentially simple. The raw material, which is flat-rolled stock sheared to very accurate width, is formed cold into a butted tube and the edges butt-welded by a continuous process. Obviously, there are several major advantages to a tube made in such a manner, as the surface both inside and outside is that of a rolled product and therefore free from defects. Generally, no further operations are necessary except for the standard finishing operations such as straightening, cutting to length, inspection, etc., unless special tolerances or especially high physical properties are required, in which event the tube is given a cold draw pass to obtain these properties.

As a further improvement in welding technique, we have developed an electric nondestructive method of testing to which every foot of tubing is subjected.

#### Engine Mounts

Welded tubing is used extensively for airplane engine mounts either in the X-4130 or 8630 analysis. These mounts must withstand not only the tremendous loads of tension, compression and torque generated by powerful engine units, but in addition, must be designed to provide for shock loads caused by landing, with the weight of the engine far forward of the wing's leading edge.

The tubing is made from cold rolled steel which has been annealed because experience has proven that the softer the raw material, the simpler the welding technique. Weldability also is improved by heat treatment prior to final normalizing operation. After welding, all tubes are normalized at about 1650-1700°F. This heat treatment results in complete recrystallization of the weld area, making it uniform with the rest of the tubing, and in addition, results in physical properties which conform to the requirements of various applicable specifications — 75,000 psi minimum yield point and 95,000 psi minimum tensile strength.

After normalizing, the tubing is given a tempering or stress relieving operation at 800 to 1000°F, depending upon size and chemistry of the individual heat. The normalizing operation is done in a continuous controlled-atmosphere furnace so that no scale is raised on the tube and original cold-rolled surface of the raw material is retained. The tempering

or blueing operation also is accomplished in the continuous furnace immediately following the normalizing section. There is no scale except for a very thin blue oxide coating which is hardly measurable and does not interfere with any subsequent assembly operations. The tempering operation also accomplishes a two-fold purpose: It relieves any internal stresses resulting from the normalizing treatment and further increases the yield

strength in the joint.

Second operation is to weld the lugs which are usually steel forgings, to the ring. Since these must be aligned accurately, the ring is straightened after the lugs are welded to it. Heat treatment to relieve stresses may be applied during various steps of the assembly to insure freedom from stresses which might result in cracks.

In a Glenn L. Martin Engineering Lecture, prepared by John J. Buckler, it is pointed out that, although finished assemblies are held to close dimensions it is impossible to keep them to the tolerances required without some machining. Dimensions then can be held to tolerances as close as plus or minus 0.005-in. by drilling, reaming, counter boring and countersinking. All of these operations on the finished mount are performed by a radial drill which requires two special fixtures.

Completed unit is subjected to Magnaflux inspection for cracks, laps, seams, inclusions, and other welding defects. This operation is applied primarily as a check on the assembly welding operations, since tubing already has been checked for quality by the much more sensitive tube-testing equipment.

#### Aircraft Intake Tubes

Due to severity of fabrication operations, close tolerances, physical requirements of finished parts and rigid inspection, production of aircraft engine intake tubes presents a very difficult problem.

Tubing is made from low carbon steel to Aeronautical Material Specification 5053. To successfully meet the requirements, the tubing must have (1) sound homogeneous steel free from laminations, seams, blisters, jiggers, scale marks, etc.; (2) maximum ductility; (3) freedom inside and outside from scratches, mandrel marks, shears, waves, dents, etc. and must be free from steel particles and abrasives, rusts and oxides; (4) ability to stand considerable reduction of area; and (5) close size and wall thickness tolerances.

The problem as to whether these requirements could be met in a relative large diameter, light wall tube (2% in. 2.9/16 in. by 20 gage) offered a real challenge to the welded tube manufacturers when it was presented to them in the early days of the war.

Starting with specially selected closely controlled, cold-rolled steel, it was found that many operations were required to produce satisfactory tubing. Welding, heat treating, straightening and nondestructive electric testing require special equipment and supervision. Furthermore, the idea of absolute cleanliness required a general educational campaign.

Some of the problems involved are: —Bending tubing 2.9/16 in. outside diameter by 0.035-in. wall thickness

# Tube

## FABRICATING TECHNIQUES

*Precisely fabricated tubular parts will be within reach of most designers for peacetime manufacturing because producers and fabricators are emerging from war experience well equipped to surmount technical difficulties*

By J. S. ADELSON

Chief Metallurgical Engineer

and

PARK HILL

Chief Process and Inspection Engineer

Steel & Tubes Division

Republic Steel Corp.

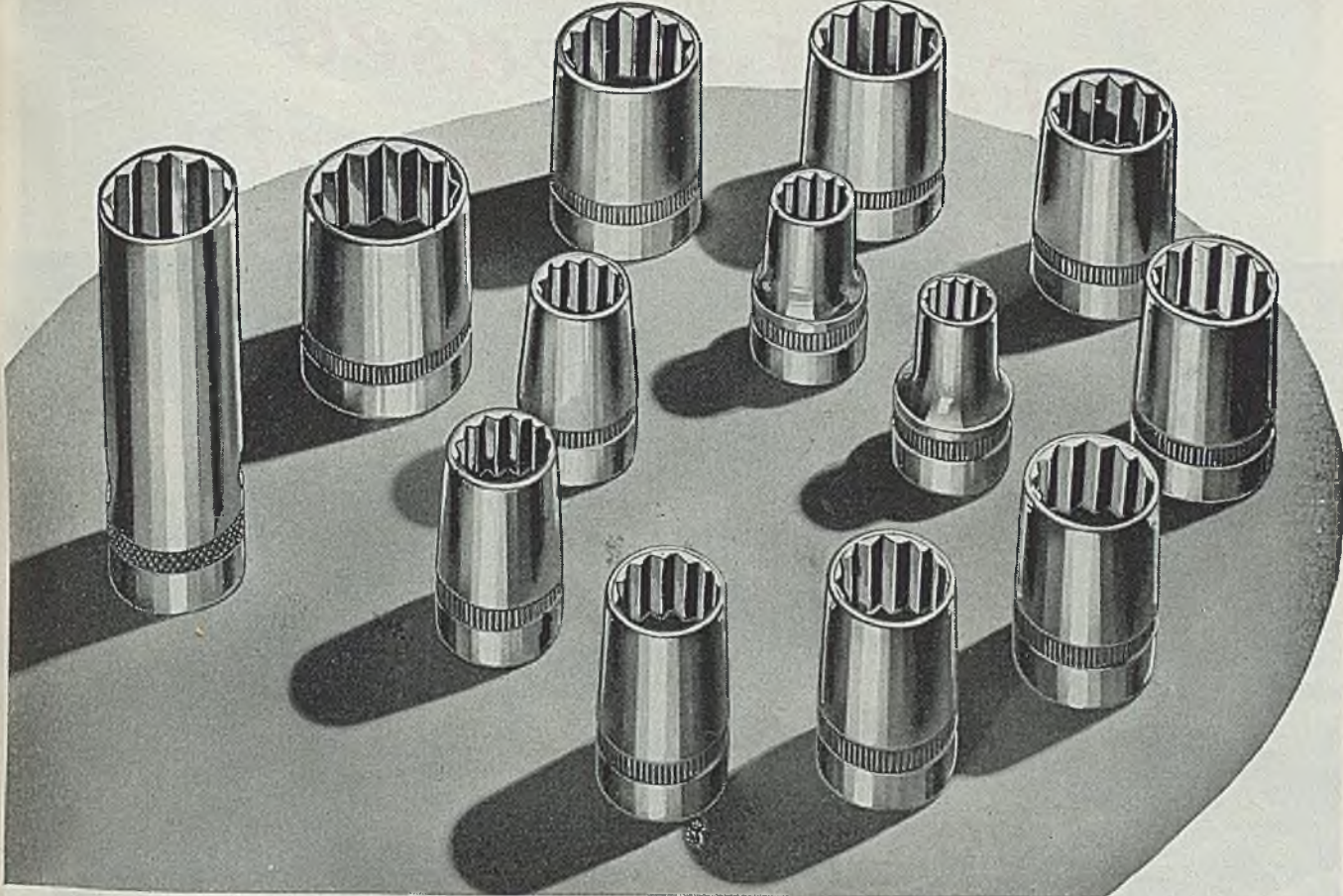
Cleveland

point and may even result in increased ductility.

After heat treatment, tubing is straightened, given the electric nondestructive test, checked in the laboratory to insure conformance to physical requirements, oiled, and cut to the proper length.

First operation in the assembly of the motor mount is forming the ring. This is done cold in a rolling machine which insures accurate dimensions in contour. The ring then is completed by welding the open ends. This welding operation and subsequent welding operations may be either arc or acetylene. General practice is to use a low carbon rod as filler metal since it has been found that suffi-





# WRENCH SOCKETS MADE FROM STEEL that is **STRONG** but not **"STUBBORN"**

• Machining wrench sockets was a tough production problem. That was before Sulfite-Treated Alloy Steel was used. Now, machining operations are much faster and easier with far fewer rejections of the finished product.

With no sacrifice of strength, Sulfite-Treatment removes the "stubbornness" from steel, giving it "magic machinability." Labor and material costs are slashed, tool life is tremendously extended and production increases.

Sulfite-Treated Steel is metallurgy's latest answer to machining problems. Developed by our metallurgists, it is one more example of Wisconsin Steel's leadership in the manufacture of high-grade alloy and special steels.

Whatever your machining problems, you owe it to yourself to investigate the special qualities of Sulfite-Treated Steel. Our sales and metallurgical staffs are at your service. They will be glad to show you how Sulfite-Treated Steel may be applied to your product.

## WISCONSIN STEEL COMPANY

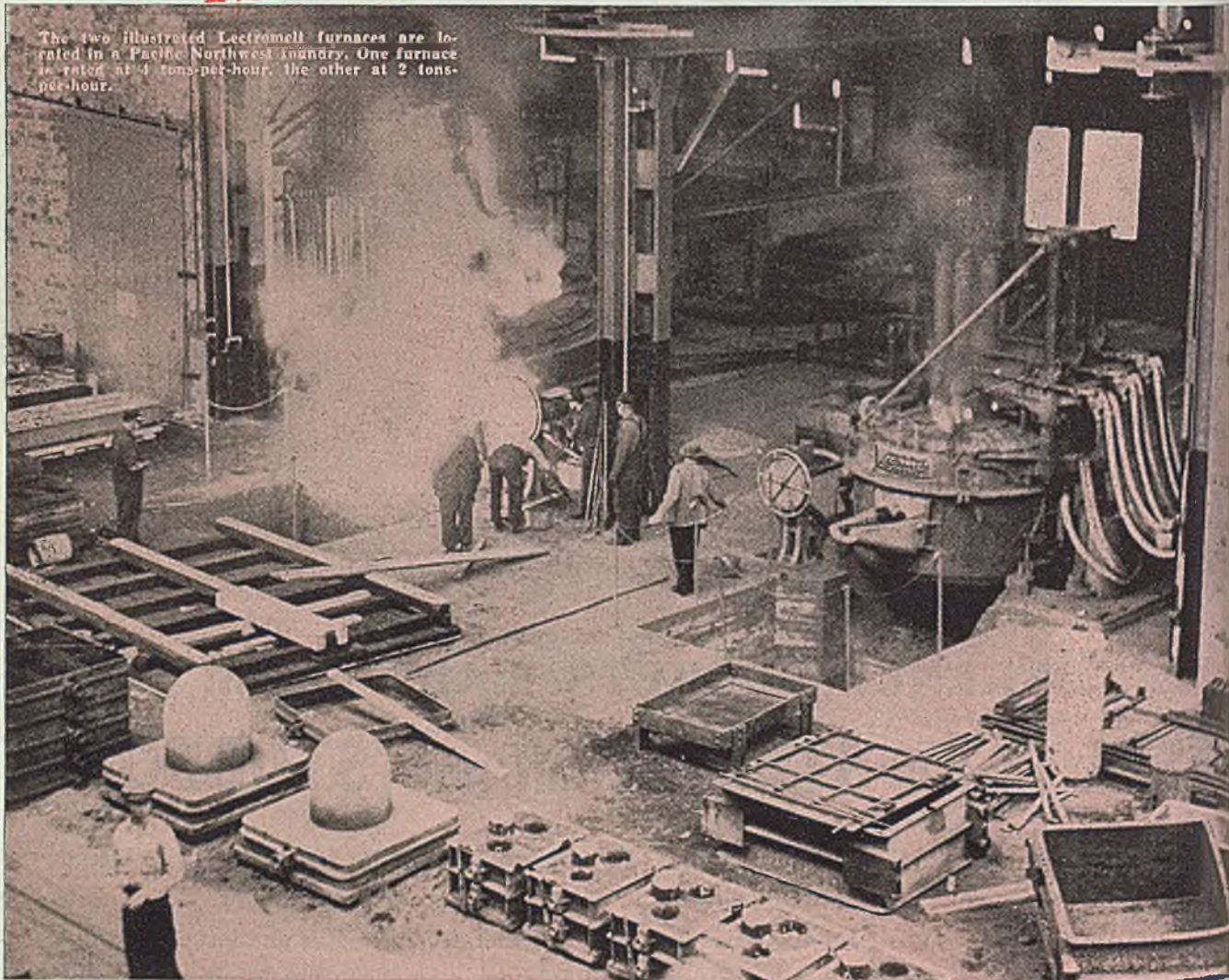
180 North Michigan Avenue

Chicago 1, Illinois

# WISCONSIN **SULFITE-TREATED STEEL**



# For Increased Melting Capacity



The two illustrated Lectromelt furnaces are located in a Pacific Northwest foundry. One furnace is rated at 4 tons-per-hour, the other at 2 tons-per-hour.

★Standard Lectromelt furnaces customarily melt down their rated capacity of cold charge within one hour's time when operating on single slag basic practice or on acid practice. Most Lectromelt furnaces have poured heats considerably in excess of their rated hourly capacities to meet special requirements, when necessary. In addition, the top-charge feature permits quick charging by means of drop-bottom bucket, thus losing little time between heats.

Increased production demands for quality steels and irons are readily met by Lectromelt users. Write for information about our top-charge furnaces, available in sizes ranging from 100 tons down to 250 pounds.



MOORE-RAPID

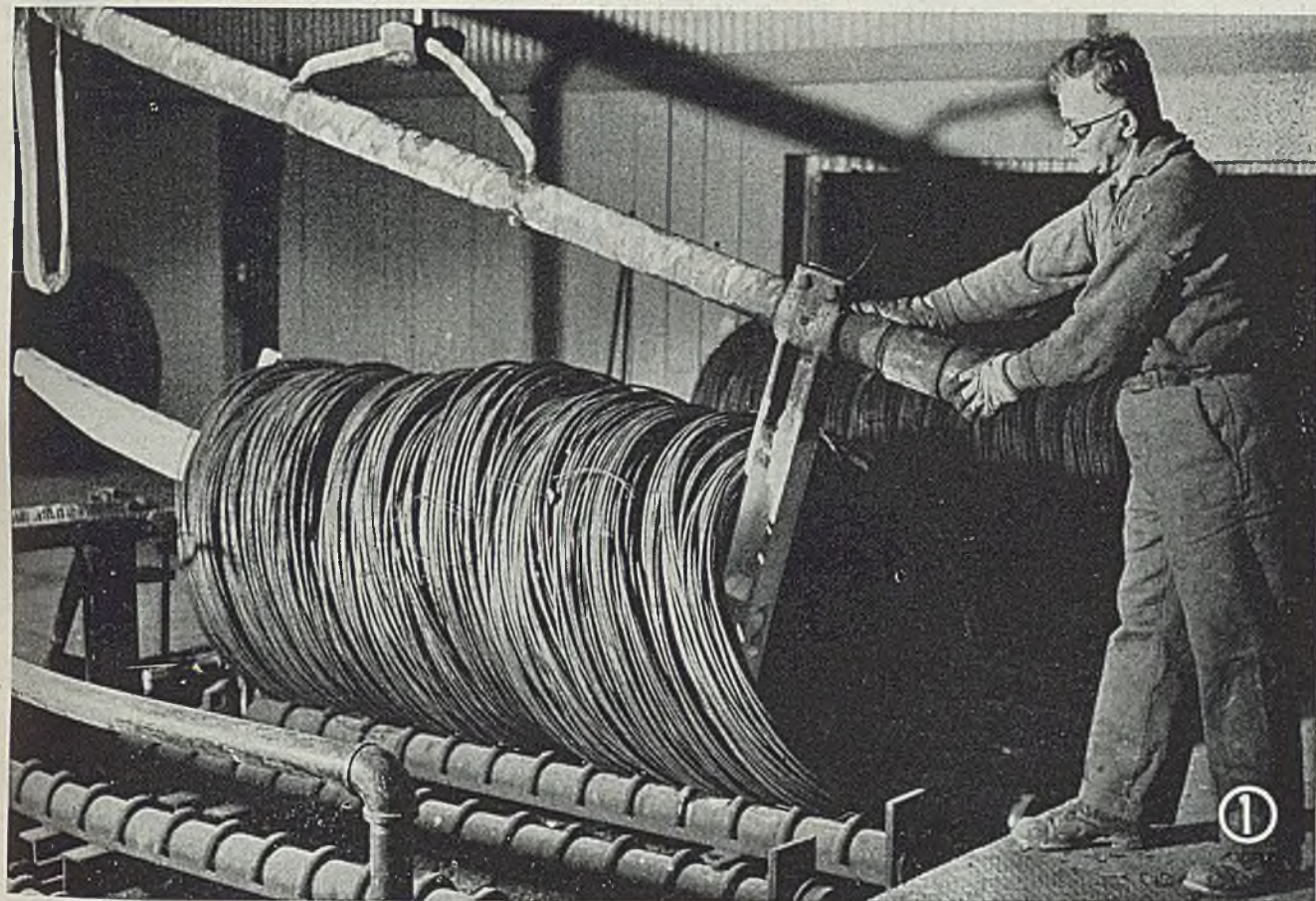
## Lectromelt

FURNACES

★ ★ ★

PITTSBURGH LECTROMELT  
FURNACE CORPORATION  
PITTSBURGH 30, PENNA.





# Rod Conveyor

## ELIMINATES STOCK-PILING IN CLEANING HOUSE

*Installation of 110-foot chain conveyor at eastern wire mill reduces obstructions and solves transportation problem between storage and cleaning departments. Conveyor is brought to rest by limit switch and is set in motion by operator of cleaning house crane. Coils are moved in upright position*

A SPECIALLY designed and constructed conveyor is easing the burden of materials handling between the rod storage and cleaning departments of the recently constructed wire mill of the American Steel & Wire Co., at Worcester, Mass. In addition, due to ease of control of the movement of the conveyor, no stock-piling of material in the cleaning house awaiting processing is necessary, with

attendant elimination of confusion and reduction in the number of obstructions.

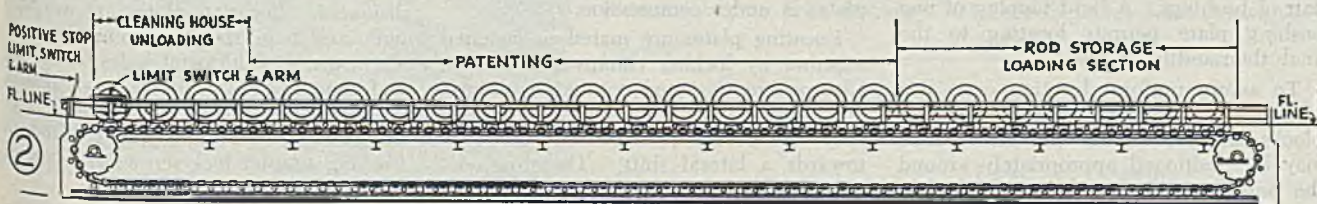
Hot-rolled rods used at the Worcester wire mill are shipped from the rod mill to the rod storage building of the wire mill in standard railroad cars. They are unloaded by a crane equipped with an open-end hairpin hook, lifting loads of approximately 3000 lb and placing them in bins in such a way as to enable

crane operator to remove pin loads as a unit. To meet cleaning department demands, rods taken from bins are placed on conveyor at loading section end.

The conveyor, built by the Chain Belt Co., Milwaukee, is composed of two endless chains running horizontally and parallel, a few inches below floor level from the rod storage building to the

Fig. 1—Unloading end of conveyor showing yoke for handling rods in and out of picklers

Fig. 2—Elevation of conveyor showing loading, patenting and unloading sections





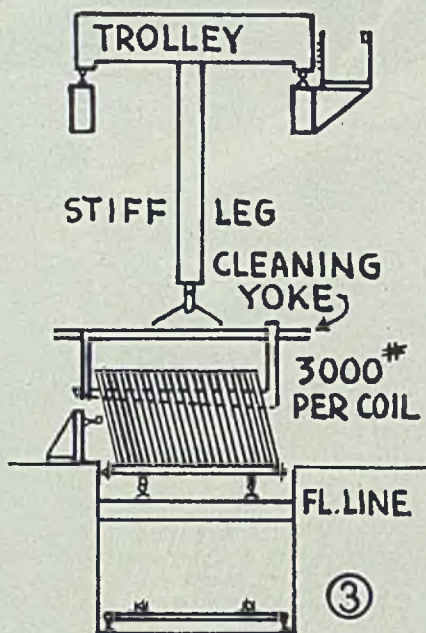
cleaning department, a distance of 110 ft. The two chains are connected by 4-in. diameter pipes welded to links spaced 18 in. apart. The conveyor is a full 7 ft in width.

When carrying the load, the chains ride on 6-in. diameter wheels with 1-in. flanges and set in a foot from each edge of conveyor. Rollers are spaced 18-in. apart from center to center and ride on rails whose centers are 4 ft 6½ in. apart.

On the top side of the conveyor is another set of 6-in. rollers, on which it rides below the floor line after passing over the end sprocket reel and travels in the reverse direction on the return trip. Inasmuch as the only load these rollers carry is the weight of the conveyor, it is necessary to have them set at intervals of only 3 ft or attached to every second link of the chains. The latter set of rollers are placed at the extreme edges of the conveyor and ride on rails 7½ ft apart. The absence of a heavy load permitted the designers to place the rollers in this position, where they do not interfere with loading.

The coils of rod must be maintained in an almost vertical position to enable the crane operator to insert the cleaning

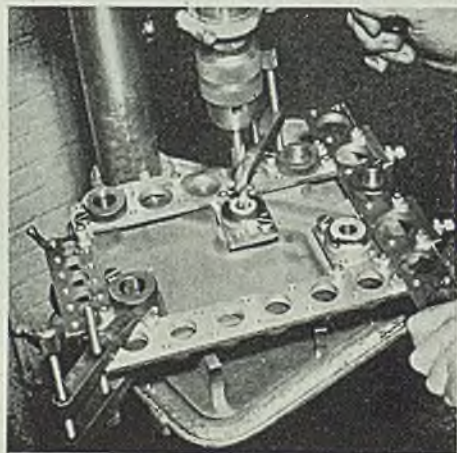
Fig. 3—Method of handling rod coils at unloading section



yoke when removing them to begin cleaning operations. For this purpose a rail was installed running the full length of one side of the conveyor at a height of 2 ft above the floor level. The rod coils rest against the rail and slide along it as the conveyor moves, being held in an almost upright position.

The conveyor is moved by a pair of sprockets at the cleaning house end. The sprockets are driven by a 15 hp motor giving the conveyor a speed of 24.6 fpm. As a pinload of rods reaches a predetermined spot in the cleaning house, contacts a limit switch arm, stopping the drive motor. The load then can be removed by the cleaning crane. The crane operator moves another pin of rods into position simply by pressing a button starting the drive motor.

The working parts of the unit are set into the floor so that all that is visible at the floor line are the links of the chains, their connecting pipes and return rollers, in addition to the rail and guide plates. Total depth of the unit below the floor line is 6 ft 8 in. Takeup sprockets are equipped with set screws by means of which tension on the conveyor line may be satisfactorily adjusted.



Production and Inspection Jigs and Fixtures Made from Set of 150 Precision Components Forming a

# UNIVERSAL ASSEMBLY

QUICK and accurate assembly of a wide variety of production and inspection jigs and fixtures is said to be provided by a set of 150 precision components, including master location plates that can be assembled to conform to any layout by means of special locking clamps and screws; and combinations of drill jig bushings, drill bushing adapters and lock screws mounted on the location plate according to specified center distances of holes to be drilled.

Locating pins are inserted in drill bushings before final locking of the unit of location plates and bushings. With a vernier caliper set for hole center-to-center distance plus one-half the diameters of the respective locating pins, measurements are made over the pins of any pair of bushings. A light tapping of one bushing plate permits locating to the final thousandth or less.

To assure uniform location on a run of castings or work pieces, adjusting blocks and screws are provided which may be positioned appropriately around the outside of the whole assembly.

The Micro-King Borlocator, made by Steel Tools Inc., Cleveland, may be used for inspection fixtures as well as production jigs. A master assembly of bushings and pins set up as a multiple plug gage will permit inspections of center hole locations. Relationship of hole location to outer edges of work pieces may be checked by the adjusting or positioning blocks.

Location plates are chrome plated and precision made in straight, parallel, and square shapes. They may be assembled end to end, side by side, or end to side. To assure accuracy and rigidity, interlocking plate grooves incorporate a half-wedge in cross-section so that mating of two plates forms a full wedge. Thus, contact area of any two locked plates is under compression.

Locating plates are mated or fastened together by locking clamps and screws. Clamps are designed so that as screws are tightened the clamping action exerts only compression, with no tendency towards a lateral shift. Therefore, accuracy of adjustment is not upset by

final clamping action after exact positioning of one location plate in relation to another.

Location plate holes are at uniformly fixed and accurate center positions and accommodate drill bushing adapters, allowing a variety of bushing outside diameters and wall thicknesses to be accommodated at each hole position. An assortment of location plates with different bushing adapter hole sizes and spacings is included with the standard set. Hole center distances provided are said to be appropriate to many simple jobs where one location plate is used for locating a series of holes.

Two location plates can be clamped together and displaced laterally to provide an infinite number of hole center distances. Location plates are available with any hole size or center distances. To insure that sufficient holes for locking and clamping are available, regardless of jig assembly intricacy, an adequate number of tapped holes are provided for both bushing adapter lock screws and location plate clamping screws.



# Grinding Questions Answered

By Allen Steele, Manager, Dayton Grinding Wheel Division  
SIMONDS WORDEN WHITE COMPANY



This series of questions and answers is presented as a practical aid in the solution of many of the more common grinding problems. Readers are invited to send in their own grinding questions, without obligation of any sort. All questions will be answered by mail or in this column. No identities will be revealed if published.

**18 a.** "We have a centerless job on a soft steel bar 2" in diameter and 30 1/2" long. We had been using a wheel with a 4" face, 60 grain, medium hardness, and it did a good job. To increase production, we recently switched to a wheel with 8" face, same grain and grade, but we are having trouble with chatter. How can this be remedied?"

**A.** As you did not make any mention of the blade, we are of the opinion that you possibly overlooked reducing the top angle of blade when you changed from a 4" to an 8" faced wheel and that this is the probable cause of the chatter. Assuming that the top angle of the blade was about 30 degrees with the 4" faced wheel, it should be no more than 20 to 25 degrees with the 8" face. The reason for this is that the side pressure against the blade increases with the width of the grinding wheel, for quite obviously an 8" faced wheel will exert a much greater pressure against the blade than a wheel with a 4" face. And when this pressure is too great, it tends to squeeze the work up and out of contact with the blade. By reducing the blade angle as suggested, the squeezing pressure is reduced and thus the cause of the chatter is eliminated.

**19 a.** "I enjoy reading your 'Grinding Questions Answered' very much. I have learned something from every series you've published. Do you have Dayton wheels for grinding carbide tipped tools on a bench stand grinder that uses 7" wheels?"

**A.** For the roughing operation in grinding carbide tipped tools we recommend

our C-60 G-14-V-14 (old marking 960 G-2V). For the finishing operation—C-120 G-14-V-14 (old marking 9120 G-2-V). I hope we may add your name to the long list of shops which now use these wheels.

**20 a.** "On thread grinding jobs when is it best to use a wheel with a vitrified bond? When is it best to use a resinoid bond?"

**A.** There are a number of factors which may go to determine the selection of the grinding wheel bond for thread grinding. As a general rule a wheel with a vitrified bond is chosen where close tolerances are required in either the form or lead, for internal grinding, and in the case of worms where several cuts are taken with a light feed.

As for wheels with a resinoid bond, these are generally chosen for high production jobs, i.e., where the parts can be finished with a minimum of cuts, where the work speed is high, and where extremely close tolerances are not required.

**21 a.** "Is it a sign of improperly adjusted work guides when work finishes up with a 'barrel shape' in throughfeed centerless grinding?"

**A.** In throughfeed centerless grinding, "barrel shaped" work can be caused by both the front guides and the rear guides being deflected towards the regulating wheel—or the latter may have a convex face.

**22 a.** "Are the stones in diamond dressing and truing tools always the same in respect to quality and shape?"

**A.** No, diamonds in dressing and truing tools differ in both type and shape according to the use which is made of them. For small external wheels of fine grain and hard grade, 1/4 to 1 1/4 carat octahedron shaped Brazilian stones are usually employed. For softer wheels octahedron shaped grey or brown stones can be used. Smaller grey and brown stones—1/8 to 3/4 carat—with long natural points, are used for small internal wheels. Wheels used for thread and hob grinding call for stones that are long with natural points or sharp splinters. Gear grinding wheels demand the finest and most carefully selected brown or Brazilian octahedron shaped stones.

**23 a.** "After a wheel has once been balanced on a precision job, what is the technical reason for re-balancing it as its diameter wears smaller?"

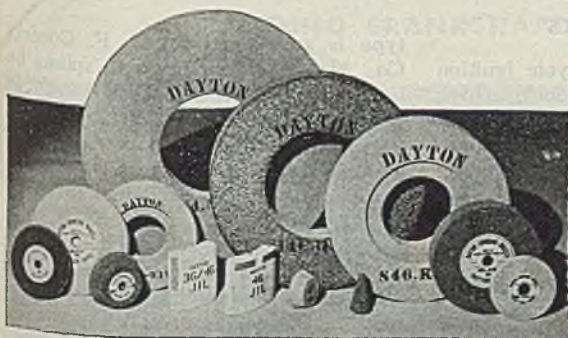
**A.** Although the modern grinding wheel is a precision tool and in the light of present knowledge is as "near-perfect" as we know how to make it, there are points of unequal density in all wheels. Because of this, a wheel may get out-of-balance as it wears down. Hence, the necessity for re-balancing it as its diameter becomes smaller.

READY NOW... a guide to better grinding!

101 "Answers" to everyday grinding problems—indexed for quick, easy reference—will be sent FREE to anyone interested in better grinding practices. Just fill in and mail coupon below.  
SIMONDS WORDEN WHITE CO., DAYTON 7, OHIO.



## DAYTON GRINDING WHEELS



SIMONDS WORDEN WHITE CO.,  
714 Negley Place, Dayton 7, Ohio

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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



# INDUSTRIAL EQUIPMENT

## Roughness Meter

To enable control of the surface finish of high explosive caliber shells, Physicists Research Co., Ann Arbor, Mich., announces type CP roughness meter. It provides measurements of

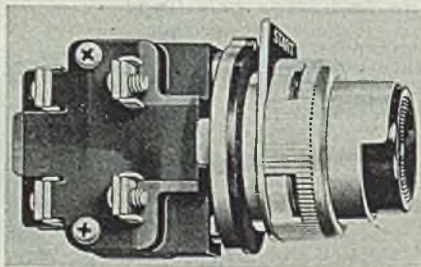


average roughness on extremely coarse surfaces such as shells. Readings of the meter are directly in microinches of average roughness of the surface being measured. Meter and scale selector provide full scale ranges of 300, 1000 and 3000 microinches.

Tracer is designed for hand operation and built for use on rough shell surfaces. It has a blunt diamond point for tracing the surface. Diamond point is automatically self-adjusting to any curvature from 1½ in. OD to flat.

## Oiltight Pushbuttons

Designed primarily for group mounting on machinery or control enclosures, a new line of class 9001, type T oiltight pushbuttons is introduced by Industrial Controller Division, Square D Co., 4041 North Richards street, Milwaukee 12. While oiltightness is the principal feature of this line, there are several other advantages. Although this type unit is more compact and can be mounted on



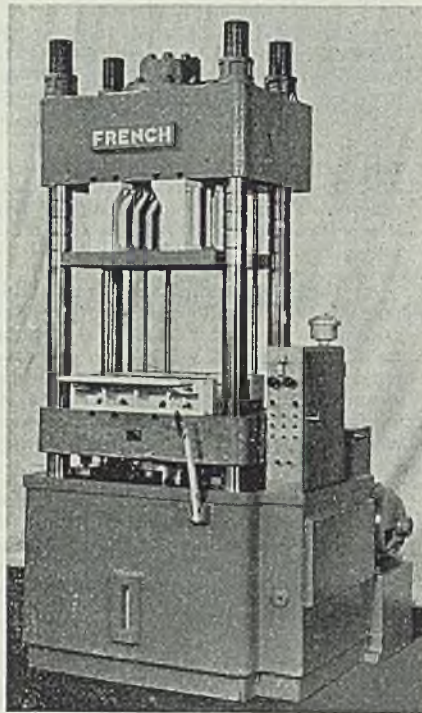
closer centers than previous types, there is no sacrifice of accessibility. All terminal screws can be reached with a screw driver without going in at an angle.

To install it, the unit is inserted through the panel and prevented from turning by a dowel. After the legend plate is slipped on, a thread ring firmly clamps the unit into position. As the

operating mechanism and contact block are separate units, it is possible to obtain a combination to cover a wide range of circuit requirements with a limited stock of three types of operators and four types of contact blocks.

## Plastic Molding Press

A newly designed molding machine which is a combination compression and transfer molding press is offered by French Oil Mill Machinery Co., Piqua, O. It is a self-contained unit with hydraulic pumping equipment built into the bed of the machine. Each unit is complete with a fully automatic cycle controller covering various types of molding. Tim-



ing intervals and changes from one type of molding to another can be changed and adjusted instantly.

Presses are fast acting and are used in connection with high frequency pre-heating units to obtain maximum production speeds. The idle closing speed is 300 ipm. The 100 ton press is powered with a 5 hp motor and the 200 press with a 7½ hp motor.

## Ignition Transformers

Three new 115 v, 400 cycle ignition transformers, designed to provide a high voltage for igniting fuel in gasoline-fired, aircraft-cabin heaters and deicers are announced by General Electric Co., Schenectady, N. Y. Units are shielded and filtered to minimize radio interference over all wave bands from 110 kc to 200 megacycles.

Two of the transformers, with an output capacity of 6000 v each, are of

single-secondary type. Third has a double secondary, rated 6000/6000 v for heaters with dual ignition or for two separate heaters with single ignition systems. Units are housed in plated steel cases and all coils are embedded in a



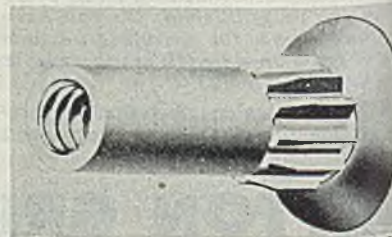
specially developed high melting point moisture resistant insulating compound. They will operate over a wide range of ambient temperatures from minus 70 to 140 F at altitudes from sea level to 45,000 ft.

## Reset Type Starters

Two new manual reset type starters for 100 w fluorescent lamps, designated as COP-6 and COP-64, are announced by Sylvania Electric Products Inc., Salem, Mass. COP-6 is a two-contact starter while COP-64 is provided with four contacts for use in fixtures designed for another type of starting circuit. A push button manual reset facilitates normal lamp operation when faulty lamps are replaced.

## Splined Type Nut

For use in wood, plastics, leather, hard rubber or other material where it is necessary to anchor a nut for attaching accessories, a new Rivnut of the splined



type is announced by B. F. Goodrich Co., Akron, O. In this nut, splines beneath the countersunk head supply resistance to torque, while the bulge or "upset" which forms below the end of the splines furnishes tension resistance. Splined Rivnut is locked into place two ways. Internal threads left intact within the shank take an attachment screw for installation of accessories. It can be installed with same type tools regularly used for heading conventional types of

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



# Double-Barrelled

# SHORT-CUT

Briggs and Stratton  
tells how to cut costs  
...improve quality with

# TOCCO

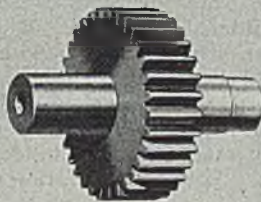
## OLD WAY



HARDEN TO 32 R.C.



MACHINE

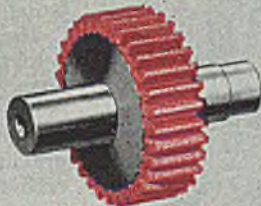


PRESS FIT

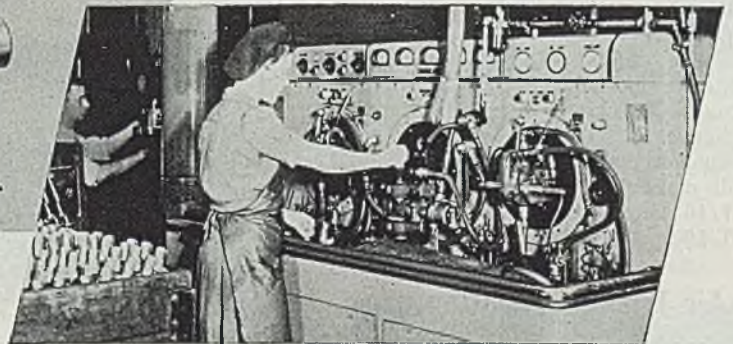
## WITH TOCCO



MACHINE



HARDEN TO 42 R.C.  
AND SHRINK-FIT



**Part:** Engine gear and shaft.

Pitch diam. of gear 2", face

$\frac{5}{8}$ ". One of 18 parts which are hardened by  
Briggs & Stratton Corp. on one TOCCO machine.

**Short-cut No. 1.** Formerly hardened gear blank to  
machinable limit (32 R.C.) and cut teeth when  
hard . . . Now cut teeth in soft gear blank and  
TOCCO-harden teeth to 40-45 R.C. . . . Results:  
Gear-cutting is faster because metal is soft. Gear  
life is increased because of greater hardness.

**Short-cut No. 2.** Formerly press-fitted gear on  
shaft as separate operation . . . Now TOCCO  
shrink fits gear on shaft simultaneously with  
TOCCO-Hardening of gear . . . Result: Elim-  
inates an operation.

TOCCO does the entire hardening and shrink-  
fitting operation in 15 seconds. Absence of scale  
and distortion makes the part perfectly accurate  
and uniform . . . ready for assembly.

The TOCCO machine, clean, compact and  
devoid of radiant heat and hot gases, is located  
in the center of the machine shop handy to  
machining operations.

TOCCO Engineers will gladly help you develop  
similar improvements in your metal working pro-  
duction. "Results with TOCCO," Bul. 14, free  
on request.

THE OHIO CRANKSHAFT COMPANY • Cleveland 1, Ohio



# TOCCO

HARDENING . . . BRAZING  
ANNEALING . . . HEATING

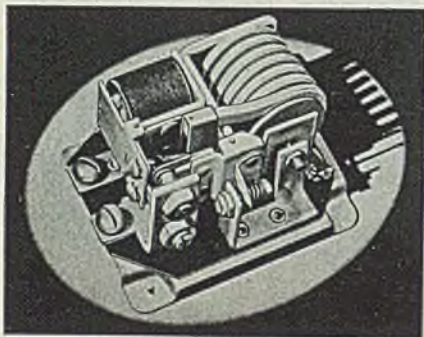




Rivnuts in metal. These must be adjusted, however, to accommodate the longer shank of splined type. Like other types, it is being made in three regular sizes, 6-32, 8-32 and 10-32 in aluminum or brass.

## Reverse Current Relay

Originally designed for use on auxiliary engine-driven power generators in Army tanks and bombing planes, type 9100 reverse current relay is offered

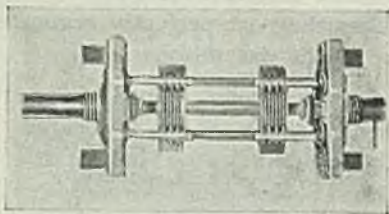


by R-B-M Mfg. Co., Division of Essex Wire Corp., Logansport, Ind. It is effective for any "tough" low voltage dc application.

The design of the device incorporates a magnetic latch which prevents accidental closing of armature and contacts due to vibration or heavy shock. Contacts are rated at 100 amp at 30 v dc maximum. Dimensions are: Width, 4 1/16 in.; depth, 3 7/16-in.; height, 2 1/16-in.; weight, approximately 1.6 lb.

## Air Trimmer Condenser

Comar Electric Co., 2701 Belmont avenue, Chicago 18, announces a new air trimmer condenser. The unit is available



either single or dual and has a ceramic mounting base with brass plates and mounting studs, cadmium, silver or nickel plated as required. Capacities range from 5 to 140 magnetomotive force with the following standard air gaps: 0.012, 0.015, 0.019, 0.030 and 0.045.

## Oscillator or Amplifier

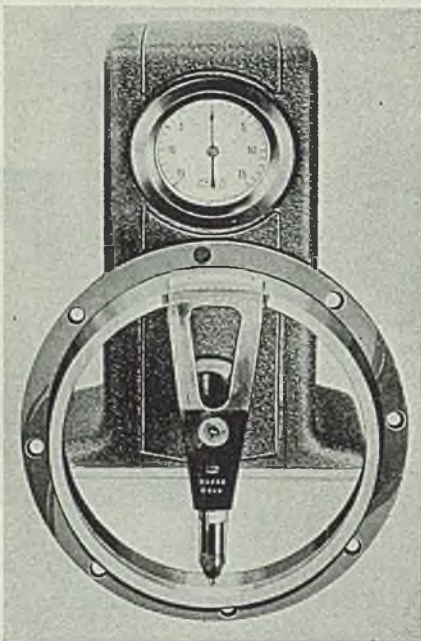
Amperex 233 is specially suited for use as a Class C oscillator or amplifier for generating radio frequency power at frequencies up to 30 Mc. Use of two grid arms makes neutralization more convenient in the amplifier connection. They also permit cooler operation of the grid when the tube is used at higher fre-

quencies either in a self-excited oscillator or power amplifier.

General characteristics include: Filament voltage, 24 v; current, 70 amp; thermionic emission, 16 amp; amplification factor, 52. Direct interelectrode capacitance: Grid to plate 24 uuf; grid to filament, 22 uuf; plate to filament, 1.5 uuf. This unit is offered by Amperex Electronic Corp. Inc., 79 Washington street, Brooklyn 1, N. Y.

## Hole Checker

A new method of gaging the inside diameter of a large bearing housing to vary close tolerances is shown by the illustrated application of the hole checker offered by American Gauge Co., 172 Bayard street, Dayton 1, O. A special sizing plug was developed with the upper part of the plug finished to exact radius of inside bearing housing. Lower part carries the gag-



ing head which is calibrated for high and low limits of accuracy. Contact point is highly polished norbide.

By using this type sizing plug, work can be checked for size, taper and out-of-round condition on large diameters. The hole checker is air operated and set with high and low limit master ring gages. Tolerance is 0.0005-in.

## Self-Contained Oven

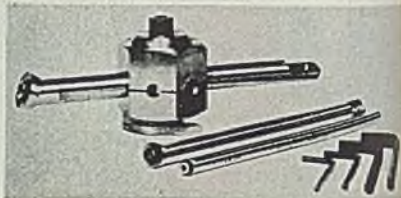
Designed for laboratory and pilot plant use, a compact and self-contained oven is introduced by Industrial Oven Engineering Co., 11621 Detroit avenue, Cleveland 2. Sizes of oven working space range from 3 x 3 x 3 ft to 6 x 6 x 6 ft, in increments of 1 ft and special sizes are furnished to specification. Temperatures range up to 900°F with a differential of plus or minus 2°. This type of oven is usually furnished with electrical heating equipment, but is designed to use any type of fuel. In each case, the heating

equipment is contained within the oven shell.

Oven is designed particularly for precision experimental work in drying, baking, evaporating, polymerizing, aging and heat treating, especially in cases where highly volatile solvents are used.

## Tool Holder

Shearcut Tool Co., Bellingham, Wash., announces a new type boring and cutting tool holder for use with their boring and turning tools. It is made in five sizes to accommodate lathes and screw machines from 10 to 36 in. swing. Each tool holder



is provided with three boring bars, one which is arranged for turning in the smaller sizes. In the larger sizes two bars are arranged for turning as well as boring.

The device is boxed and complete with three boring bars, six Shearcut bits, three wrenches for the cutter bit holding screws and wrenches for boring bar holder. Working, operating, and regrinding instructions are enclosed with each tool holder.

## Rivet Remover

A new tool to remove rivets quickly without enlarging the hole or distorting the skin is offered by Topflight Tool Co., Towson 4, Md. The defective rivet is instantly removed and a new rivet of the same size installed without distortion



of the sheet. Guides, chucks, drills are eliminated. A two way bucking bar is provided with each rivet remover.

Standard models remove 1/8 and 5/16 in. rivets. Special models are available for any size rivet. The remover is attached to a standard automatic rivet gun. The pulsating action operates the rivet removing tool without effort on the part of the operator.

## Power Control Tube

A new 15,000 v thyatron power control tube providing split cycle control of high power for heating units and radio transmitters is announced by Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J. For electronic equipment designers, the thyatron WL-67 makes possible smooth and instantaneous



Looking for ways to improve your Product?

Try *American*

## FLEXIBLE METAL HOSE and TUBING

WOULD YOU LIKE to make your product more convenient, safe or economical to install or operate?

Then look into the possibilities offered by American Flexible Metal Hose and Tubing.

Sturdy, leakproof connections of this material have improved literally thousands of types of products and equipment...from heavy machinery to small accessories. Illustrated are three examples...on each, flexible metal tubing is used to excellent advantage, yet for an entirely different purpose.

Find out where flexible connections in your product or equipment could better compensate for movement of parts, vibration and misalignment...or where gases, liquids or steam could be conveyed more easily or safely.

Flexible metal assemblies are usually easy to order and install. If *your* needs are unusual, our Technical Department can probably help.

45296

### AMERICAN METAL HOSE BRANCH OF THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

Keep Faith With Your Fighters and Yourself!  
Buy War Bonds for Keeps



# American Metal Hose

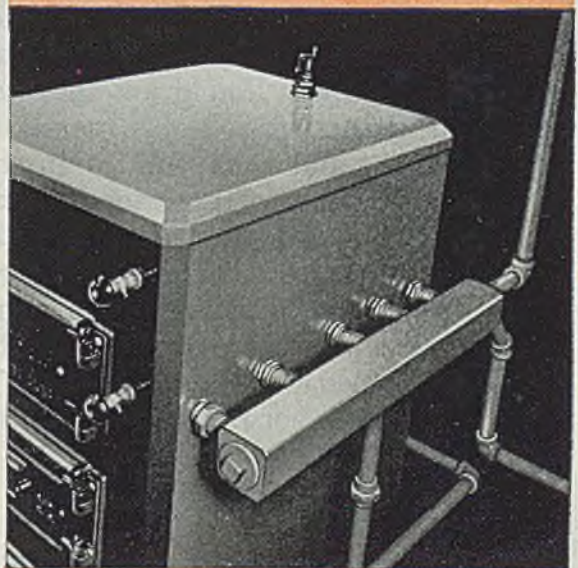
#### FLEXIBLE EXTENSION FOR INHALATOR

Through use of American Flexible Metal Tubing on this medical appliance, the vapor stream is directed as desired without moving the whole unit.



#### PROTECTING X-RAY MACHINE CABLE

Interlocked Stainless Flexible Metal Hose used to reinforce end of electric cable and prevent wiring failure.

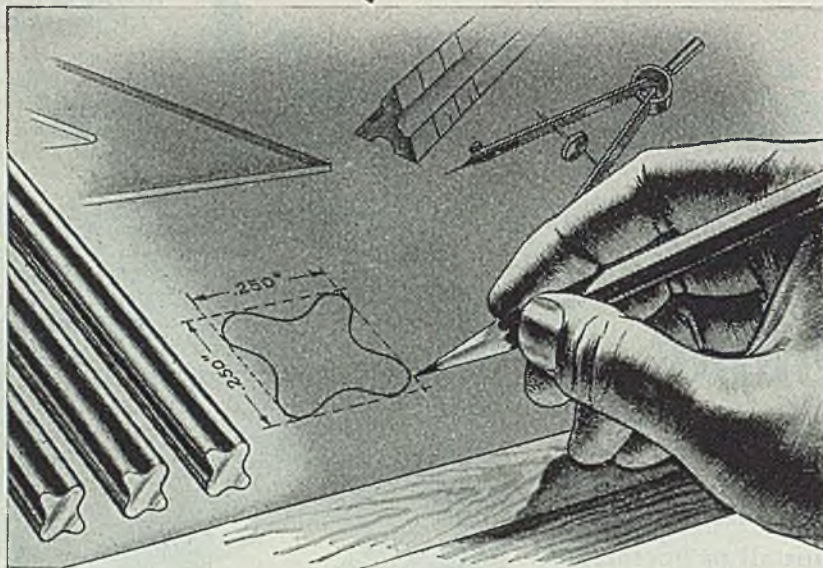


#### BOILER—"HEADER HEATER" CONNECTIONS

Installation made quickly and easily through use of American Seamless Flexible Bronze Tubing connections.



# PAGE Shaped WIRE



## YOU DRAW THE SHAPE . . . PAGE CAN DRAW THE WIRE

Certainly PAGE is now drawing wire in many shapes—triangles, rectangles, octagons, hexagons, keystones, ovals, half-rounds, many other hard-to-describe special shapes. If you have use for shaped wire in the manufacture of your product, you are not limited to standard shapes. You draw the *shape*—PAGE can draw the *wire*.

Yes, and PAGE will go further than that. From years of experience, PAGE has learned much about the economical application of shaped wire to manufacture. PAGE offers you the benefit of this experience in finding ways to cut your production costs through the use of shaped wire.

For wire or information about wire—get in touch with Page!



Specifically, PAGE Shaped Wire is made in sectional areas to .250" square—widths to  $\frac{3}{8}$ "—of carbon or stainless steels.

**ACCO**



Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles,  
New York, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

**PAGE STEEL AND WIRE DIVISION  
AMERICAN CHAIN & CABLE**

TRADE  
MARK

ous power control from 0 to 100 per cent load; simplified automatic load control; high speed automatic overload protection; low space and weight requirements and low power requirements. The grid-controlled mercury vapor recti-



fier tube is designed to combine the high voltage characteristics of a kryptonatron, control qualities of a thyratron and efficiency of a phanotron.

## Elevating Ladder Tower

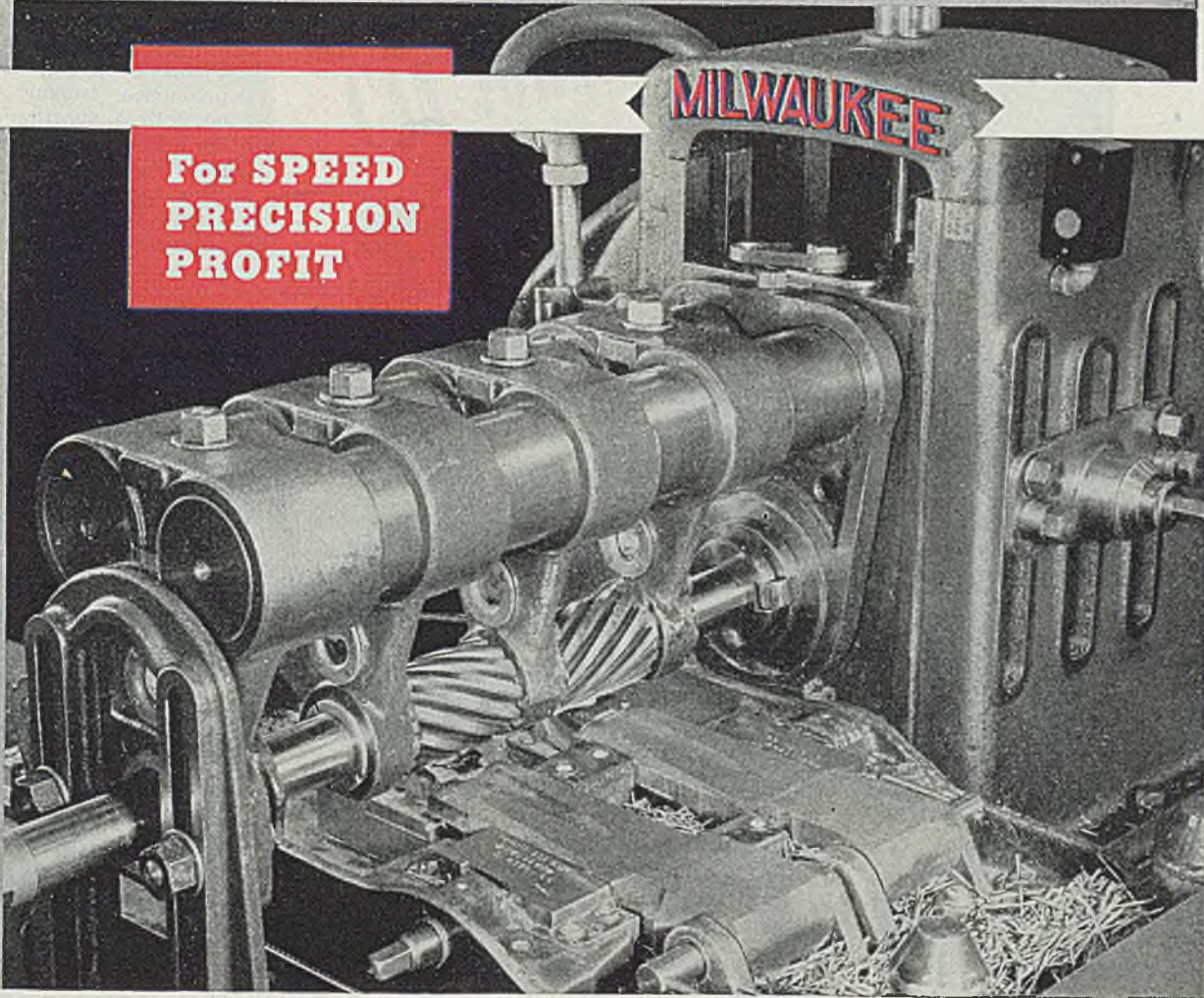
A new Multi-Purpose elevating ladder tower is announced by Universal Fittings & Scaffolding Co., Zelienople, Pa. The tower is elevated and extended by a hand-operated winch, self-locking at any extended height. It has a 360° turning radius for manual or automatic operation and has a variable inclination from 45° to 75°.

The ladder is made in three sections, locked in place by continuous steel guides operating on sleeve type bronze roller bearings. The standard tower opens to a 35 ft 2 in. maximum working height when at a 75° angle, with a minimum working height of 22 ft 8 in. when at a 45° angle. Fully extended height of unit itself is 38 ft. There is a 5 ft 10 in. lap of the middle section of the ladder over the



YOU CAN SAY THAT AGAIN -  
"PUT IT ON A *Milwaukee*"

**For SPEED  
PRECISION  
PROFIT**



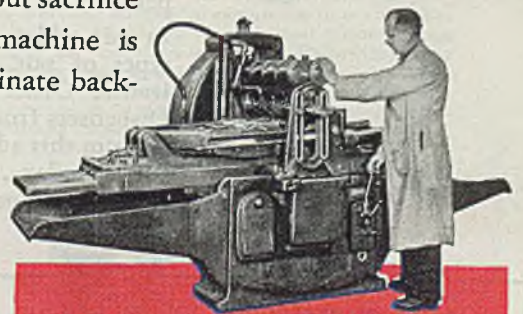
This heavy contour milling operation on a 1248 Milwaukee Simplex Milling Machine illustrates the rigidity of the machine itself. Using a rise and fall fixture the helical plain milling cutters removed  $\frac{1}{8}$  inch to  $\frac{3}{16}$  inches of stock from a steel forging. Ample cutter support is provided by the outer arm brace and the four arbor supports.

Often called "production type milling machines", the Milwaukee Simplex Series machines are designed for strength, compactness, and rigidity to withstand the strain of continuous quantity production.

Spindle construction is such as to provide greater range without sacrifice of rigidity. Basically designed for climb milling, this machine is equipped with an adjustable nut and ground screw to eliminate backlash in both directions of the table. Workpieces, ordinarily difficult to hold, are milled at faster feeds, with smoother finish and increased cutter life.

Write for new descriptive Bulletin B20 giving complete details on the Milwaukee Simplex and Duplex Series of Milling Machines.

Over-all view of the Milwaukee Simplex machine used on the above milling operations.



**KEARNEY & TRECKER  
CORPORATION**

MILWAUKEE 14, WISCONSIN

*Milwaukee Machine Tools*





# Morton's SALT TABLETS



TURN KNOB  
**NOW AS FAMILIAR  
AND NECESSARY AS  
THE FIRST AID STATION**



In the middle thirties salt tablets were a novel idea. Today practically all leading industrial plants wouldn't think of eliminating either salt tablets or first aid stations. Both are essential — the one to help prevent accidents, the other to repair them.

When workers sweat, their bodies lose essential salt. This loss causes Heat-Fag, inalertness, fatigue, heat prostrations. Accidents increase. Production goes down.

Morton's Salt Tablets at every drinking fountain provide an easy, simple, effective way to restore this vital salt lost through sweat. The cost is less than a cent a man per week.

In salt tablets, as with other grades and types of salt, Morton is the recognized leader. Order Morton's Salt Tablets and Dispensers from your distributor or directly from this advertisement. Write for free folder today . . . Morton Salt Company, 310 S. Michigan Ave., Chicago 4, Illinois.



#### MORTON'S DISPENSERS

They deliver salt tablets, one at a time, quickly, cleanly—no waste. Sanitary, easily filled, durable.

800 Tablet size - - \$3.25

#### MORTON'S SALT TABLETS

Morton's Salt Tablets are available either plain or with dextrose.

Case of 9,000, 10-grain salt tablets - - - - -	\$2.60
Salt Dextrose Tablets, case of 9,000 - - - - -	\$3.15

**MORTON'S SALT TABLETS**

lower section. Top section has a 4 x 8 in. overlap on center section. A folding 24 x 30 in. work platform is at the top of ladder tower with an adjustable tubular guard rail. A trap door permits easy access to work platform.

### Tap Holders

Releasing type tap holders, announced by Champion Sales Co., 2832 East Grand boulevard, Detroit 14, permit production tapping to aircraft limits on both automatics and turret lathes. Because of the design, rigidity, positive drive and precision construction of these tap holders, first thread out is always a full thread. Release point is accurate and tap rotates freely on re-



lease, giving positive depth control. Blind holes can be bottomed with minimum risk of tap breakage; and tap withdrawn without damage to threads.

All working parts are made of alloy steel, heat treated and finished to thousandths limits. Multiple jaw clutch design gives positive drive and instant release and minimizes wear. Designed for use on automatic machines and turret lathes, these holders can be used on practically any type of tapping machine.

This tool was developed by Z & W Machine Products Inc., Cleveland. They are available for right and left hand tapping, in sizes for 1/4 to 1 1/2-in. taps.

### Safety Guards

New safety guards offered by Wright Austin Co., 354 West Woodbridge street, Detroit 26, are completely transparent, allow full view of the machine and without hindrance to any kind of operation. Sparks, metallic particles, splashing liquids and the like are curtailed by an invisible, chip proof barrier.

Guards are made from a heavy plastic material which is as clear as



# CAN JOHNNY forget HIS GUN?



WHAT can we do about Johnny and the thousands of other boys who are returning from war disabled . . . who have already sacrificed so much? Must these boys sacrifice also the heritage for which indeed they fought . . . the right to be independent, free; the right to prepare for and work at a good American job of their own choosing? That's what these lads most want! Not sappy sympathy! Not the dole!

Unquestionably, this is the nation's No. 1 obligation. It *cannot* be solely a government obligation. It is the prime responsibility of every industrial and business executive in every company large and small, in towns big and little, to give these boys their chance to become self-supporting citizens, proud to be able to take full advantage of their American heritage.

Like a good many other concerns, Cooper-Bessemer conducts a special, carefully-planned apprenticeship and employment program for disabled veterans, enabling these boys to become full-fledged "journeymen" with a well-rounded background of specialized study and training. First in Ohio to adopt such a plan, we have had ample time to prove that it works out to mutual advantage. To put it mildly, the boys are eager . . . hungry for success . . . and exceptionally capable.

Perhaps a detailed explanation of our successful plan would be helpful to you in shaping up a program exactly suited to your own particular conditions. It is yours for the asking. In any case, you can, if you will, help Johnny to *forget* his gun.

★ ★ ★

The inset above shows a group of handicapped war veterans in classroom study at Cooper-Bessemer's Mount Vernon, Ohio, plant. These boys, discharged from Crile Hospital at Brecksville, Ohio, and other U. S. Veterans Administration Hospitals, also receive actual shop practice as part of progressive apprenticeship and employment program.

★ ★ ★

Additional information on this subject, covering proposed programs and successful experience in many types of industry, may of course be obtained from various sources such as the Retraining and Reemployment Administration, local and state Veterans Service Committees, War Apprenticeship Training Service, the Disabled Veteran Rehabilitation Committee of the Associated Business Papers in New York City, and others.



BUILDERS OF DEPENDABLE ENGINES FOR 112 YEARS



# "Our BAKER TRUCKS have proven that they can "take it" and DO THE JOB AT LESS COST"

**CASE HISTORY OF BAKER TRUCKS IN A LARGE FORGE PLANT**

May 11, 1945

Baker Industrial Truck Division  
Baker Raulang Company  
Cleveland, Ohio

Gentlemen:

You recently delivered to us another Baker lowlift platform truck, a 5-ton model, equipped with power unit. This truck, like our others, is being used to handle hot forgings, dies, cut steel and numerous other handling jobs in our plant.

Our first Baker truck was purchased in 1937 to replace one unit of another make of truck which used direct gasoline engine drive. The Baker truck soon proved to us that the flexibility of control and ruggedness of construction built into these machines was what we needed.

We are now 100% Baker equipped and our choice has been well justified. These trucks receive extremely hard service as we have many ramps, short turns and rough surface conditions over which they must operate with capacity loads. Our Baker trucks have proven that they can "take it" and do the job at less cost.

Yours very truly,



Forging stock en route to furnaces from yard storage



Forgings from hammers delivered to inspection department



Finished forgings carried to and from yard storage in skid boxes

The above letter, written by the vice president of a mid-western forge plant, typifies the kind of service to be expected of Baker Trucks. The company decided to standardize on Baker soon after the first purchase in 1937. As the letter states, the choice has been well justified.

The trucks have enabled the plant to maintain stepped up production in spite of manpower shortage. Tonnage figures are almost impossible to calculate. All forging steel is handled seven times: receiving to storage, to hammers, to inspection, to annealing, to cleaning (pickling or sand blast), to storage and to shipping.

The new Baker Catalog No. 52 describes many case histories in a wide variety of installations. Call your nearest Baker representative, or write for your copy today.



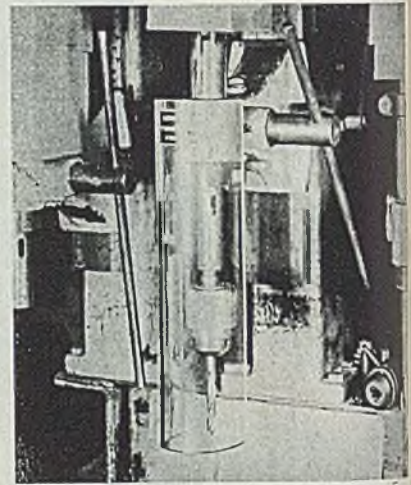
Carrying skid box of forgings up ramp to shipping platform

## BAKER INDUSTRIAL TRUCK DIVISION

of The Baker-Raulang Co.  
2167 WEST 25th STREET  
CLEVELAND, OHIO

In Canada: Railway & Power Engineering Corporation, Ltd.

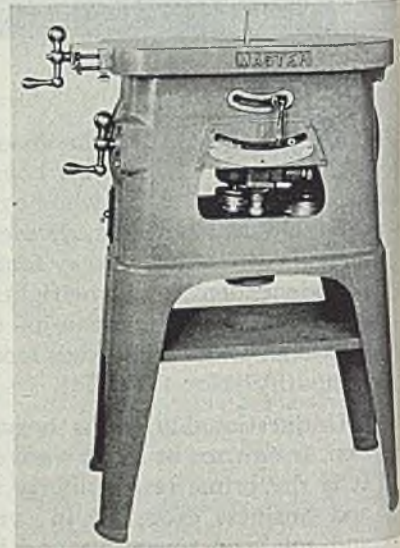
window glass but has toughness and high resiliency. Its properties enable it to be sawed or drilled as easily as wood, yet molded into practically any shape



contour. Guards are available in standard sizes and can be supplied in size or shape to fit any machine.

## Spindle Machine

A spindle machine which can be used either with a wide variety of milling cutters to machine wood and soft metal, or with various sizes of abrasive sleeves as a spindle sander, has been developed by Kindt-Collins Co., 12651 Elmwood



avenue, Cleveland 11. Its spindle oscillates for sanding work and is nonoscillating for milling work.

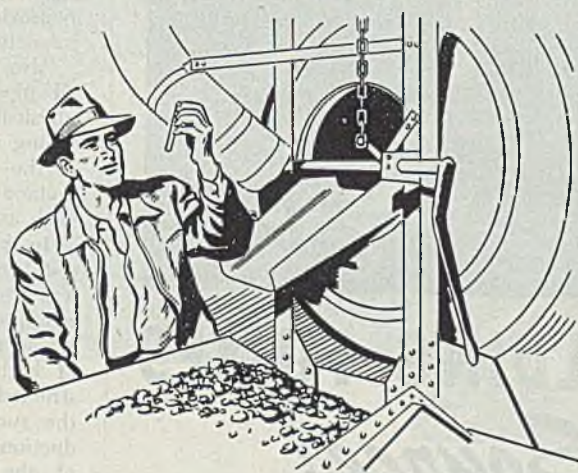
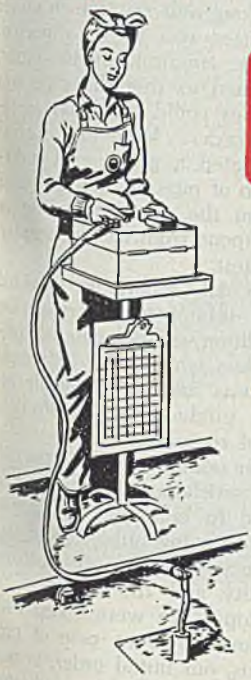
The machine is particularly useful for duplicating small or large quantities of any given piece of wood or metal and is used with various special fixtures. It is standard with various milling cutters of various shapes, diameters and tapers, and abrasive sleeves ranging from 1/4 to 1 in. diameter, attached to spindle by means of collets. Spindle speeds are 3500, 5000 and 7000 rpm, developed by a 1/2 hp. 3500 rpm motor. Spindle tilts to 45° controls and adjustment handles are accessible and degrees for tilting the plate are marked 5/32-in. apart on a polishing plate.





# Unforgettable

# EXPERIENCES!



ADDED TOGETHER, the working years of a faithful group of 369 National Carbon Company employees exceed 70 centuries of unforgettable experiences! *And forgotten manufacturing experience . . .* with "National" carbon and "Acheson" graphite electrodes for electric furnaces. These loyal workers have been associated with us from 15 to 35 years each.

Now in its 60th year, National Carbon looks at the record of this group, and the many hundred others who have contributed so much to its history.

Some have improved plant machinery, or perfected its use. Others have developed formulas to yield

stronger electrodes, or to give them lower electric resistance. Still others have helped customers use electrodes more effectively. A complete list of such achievements would be long indeed!

We truly believe that this unmatched manufacturing experience, extending over six decades, is of utmost importance to the quality of furnace electrodes . . . one of "the five essential things you never see" in them but which are basic to our products. The other "unseen" essentials are: Selection of raw materials, manufacturing control, customer service, and continuing research. Your inquiries are cordially invited.



The registered trade-marks "National" and "Acheson" and the "National" and "Acheson" Seals distinguish products of National Carbon Company, Inc.

**NATIONAL CARBON COMPANY, INC.**  
 Unit of Union Carbide and Carbon Corporation

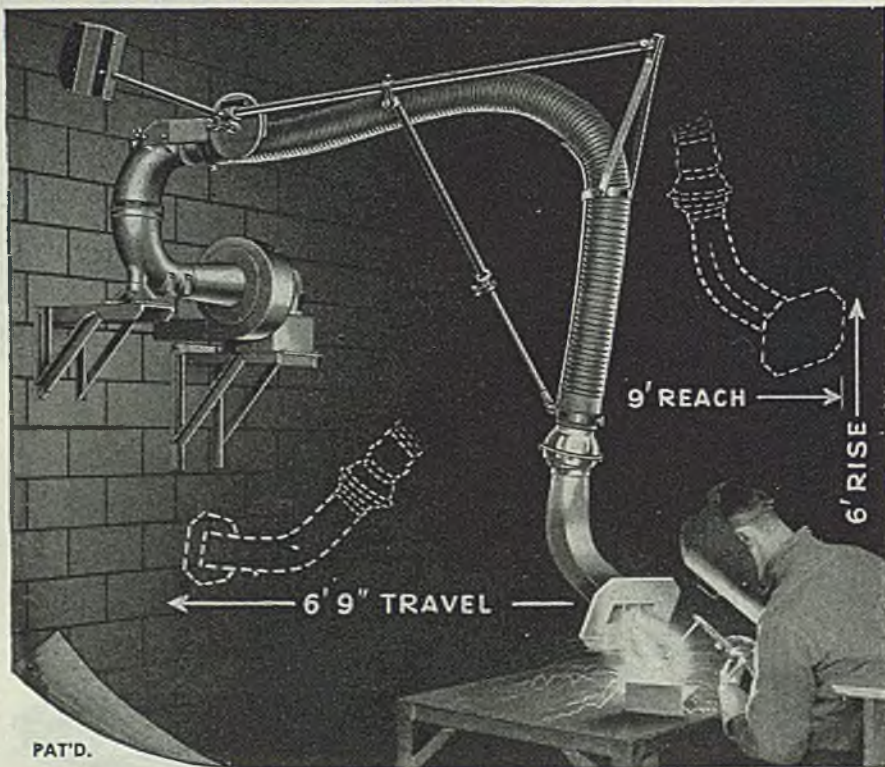
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KEEP YOUR EYE ON THE INFANTRY . . . THE DOUGHBOY DOES IT!



# RUEMELIN Fume Collector



PAT'D.

## REMOVES WELDING FUMES *At the Source!*

No longer need your employees inhale welding fumes. A Ruemelin Fume Collector solves the problem, quickly and efficiently. It produces a powerful suction that draws out noxious gases, smoke and heat at the source. Guards employee health, resulting in less welder fatigue, therefore greater plant output. Has many exclusive features: (1) Clears shop air with minimum loss of building heat. (2) Exhaust snout can be positioned instantly and conveniently. (3) Covers maximum welding territory, vertically, horizontally and by circle swing. (4) Shipped completely assembled, easy to install. Thousands of Ruemelin Fume Collectors now serving war industries everywhere. 9 ft. and 15 ft. sizes available.

We gladly offer engineering service for your fume collector installation. Write for Bulletin 37-C.

## RUEMELIN MFG. CO.

3882 NORTH PALMER STREET

MILWAUKEE 12, WISCONSIN, U. S. A.

MANUFACTURERS AND ENGINEERS  
SAND BLAST AND DUST COLLECTING  
EQUIPMENT, WELDING FUME COLLECTORS

## Purchasing Stainless Steel

(Continued from Page 100)

man to appreciate the market for a high-priced, low-tonnage product when he was accustomed to think in terms of high tonnage.

In our first purchase of chrome alloy steel pipe, we encountered this difficulty. We found it to influence our subsequent purchases greatly. A tube mill, after some discussion, accepted our order for a sizable amount of pipe, indicating, however, a fairly long delivery, which under the circumstances was to be expected. Within the time condition on the order, the mill informed us that the pipe was run and samples could be taken as required by the order. With that original order, we initiated a practice of ordering each length of pipe or tubing  $\frac{1}{4}$  to  $\frac{1}{2}$  in. longer than the use required so as to provide coupons from each length for inspection of test.

Also, in the early orders, we inspected all pipe and tubing to determine the physical condition of the material, providing inspectors who would be present at the mill tests and who actually examined for production imperfections such as out of roundness.

In the Order under Discussion, the mill tests proved satisfactory and the mill was instructed to take and submit the samples. After being subjected to our accelerated tests, the pipe proved to be of high quality and the mill was instructed to ship. We were elated with the success and apparent ease of production on this, our initial order, in face of the predicted difficulties indicated by other representatives of the steel industry.

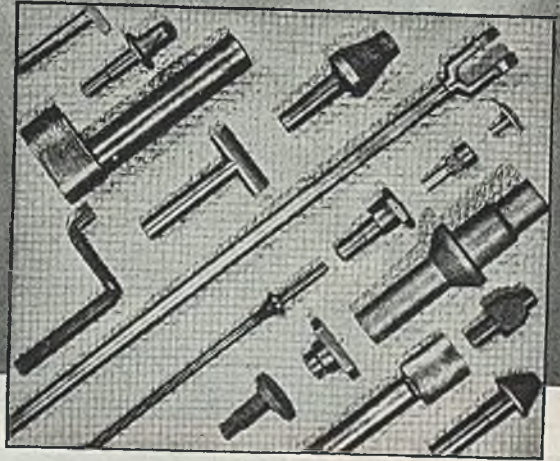
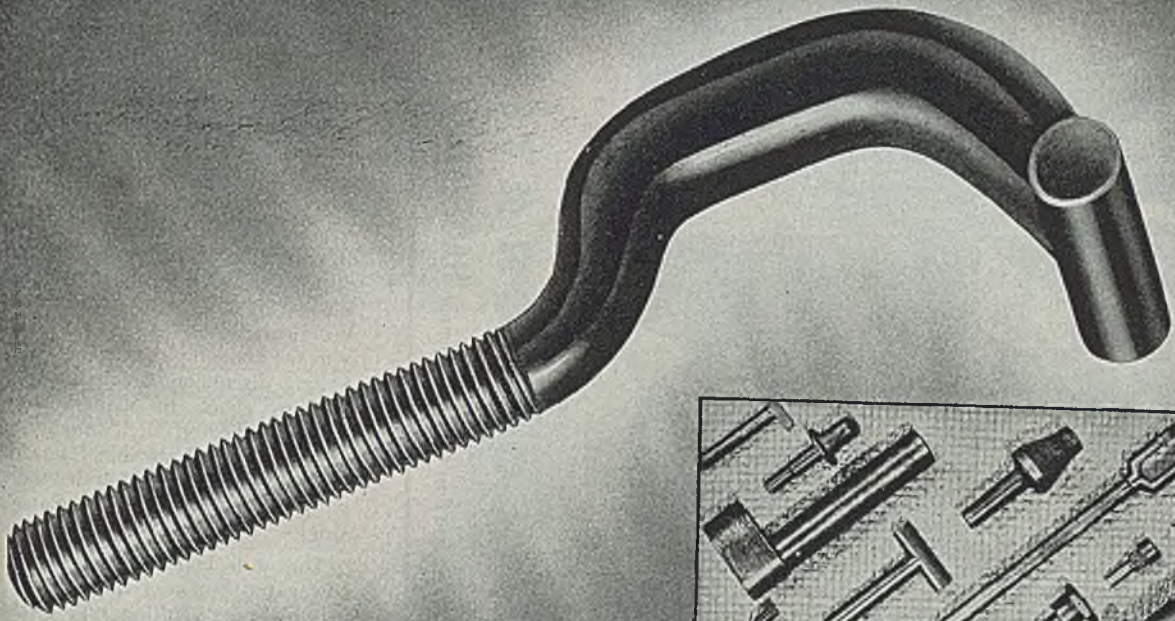
Two weeks went by and no shipping papers arrived. A wire brought the information that the order was not completed. Puzzled by the reply in view of the known facts, we sent a representative to the mill. Within a few hours he reported that he found the pipe in the finishing department being laboriously polished inside and out. When asked for an explanation, the mill explained that any product which ran over a dollar a pound should look the part. The polishing operation was immediately abandoned as we wanted pipe and not hand rails. This was our introduction to the influence of the tonnage principle of the steel mills on chrome alloy production.

It has been a long journey from those days but now it can be pointed to with pride that at least one of the tube mills has a research laboratory where conditioning and careful handling play an important part in critical analysis and chemical composition of the tubing as the microbe fighting laboratories of the food industry.

Our first experience with what would be called in the chemical or food industry a "microbe-infected steel" was associated with an early production of plates. The first plates run in this particular mill while not entirely satisfactory in mill test due to the tendency toward



100 YEARS *Making strong the things that make America strong*



**COLD-FORGED . . . on bolt-making machinery . . .**

*for strength, accuracy, appearance and economy*

The same method that is used so successfully to manufacture RB&W EMPIRE Bolts was used to produce these special parts . . . with maximum strength, accuracy and appearance, and at lowest cost.

Cold-forging on RB&W equipment increases tensile strength, intensifying the grain while preserving the flow lines of the metal . . . and provides an automatic inspection of the material. Headed parts are formed with extreme accuracy, for modern machinery is operated to close tolerances. Threads are perfect. Appearance is unmistakably that of a quality product.

Costs are lower, because RB&W's equipment operates at very high speeds, and, in cold-forging, the scrap waste is virtually eliminated.

**THE LONGEST EXPERIENCE IN AUTOMATIC COLD-FORGING**

This is RB&W's 100th year. The history of this company is also the history of automatic cold-forging, for it introduced the original automatic cold-heading machine and has since pioneered in many respects to improve the quality and lower the costs of fasteners and other parts which can be cold-forged.

In planning new parts, consider the

many metal shapes which can be produced by cold-forging and also that RB&W's experience and facilities make it your logical source of supply. At present, wartime commitments have monopolized those facilities; meanwhile, keep in mind the advantages of this method.

**RB&W**

Russell, Burdsall & Ward Bolt and Nut Company. Factories at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle . . . with the industry's most complete, easiest-to-use catalog.



AND ALLIED FASTENING PRODUCTS - SINCE 1845

**RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY**



# ROTOBLAST

# AIR BLAST

# Rolling

# Down

**PANGBORN CORPORATION**  
*World's largest manufacturer of Blast Cleaning and Dust Control Equipment* **HAGERSTOWN, MD.**



uneven gage, running particularly heavy in the center sections, gave an otherwise satisfactory physical and accelerated test and was released to the fabricator. In those days, we were in the habit of ordering sheet and plate also in large dimensions than required to accommodate the procurement of samples for physical as well as corrosion tests. The heavier gage increased the price on the invoices on a per pound basis but we were not inclined to be unreasonable on that score, figuring we in turn were faced with corrosive conditions and the heavier gage would result in longer life.

Much to our surprise, the first piece of apparatus placed in operation quickly developed the holes from what we later learned to call a "tubercular" condition. We hurried out to the mill to consult with the company's operating department. A long discussion developed nothing, so a close check of manufacturing procedure indicated high quality materials should result. Late that following afternoon, we all went into the mill to observe the rolling of a few plates for our order.

The mill had an old, badly rusted corrugated iron roof through many holes in which the slanting rays of the afternoon sun shone to throw an eerie light on the somber interior. The dirt floor was deep in iron oxides, finely divided by years of constant tramping and every step and every movement of material and equipment stirred up clouds of this dust to which was added larger pieces shaken loose from the roof with each jar that passed through the rolls. These particles passed down through the spotlight of the sun's rays in swift, erratic courses to their final resting place to be on the floor or the hot plates in process.

All in the little party that afternoon quickly became conscious of this dangerous atmospheric influence on those precious plates passing backward and forward through the rolls.

Probably we shall wait a long time until high cost alloy steel will be subjected to the great care exercised in the products of the food and chemical industries. Today, however, we are becoming aware that alloy steel is almost as susceptible to dirt-laden air as the products of the latter industries.

For a Number of Years, we continued the practice established with our initial orders, purchasing directly from the steel companies the alloy steel required for fabrication of our apparatus and equipment. This included everything down to the last plate, sheet, bar, bolt, nut, washer, rivet and welding rod. This practice has since been abandoned, but we found it a necessary precaution for many reasons.

Uniformity in analysis was important in those days before the adoption of standard compositions for given types of steels and the lack of uniformity in operating conditions in the few mills in production. The producing companies were critical of our seeming over-anxiety to obtain uniform steel. It required a considerable amount of educational effort



# How To Avoid Misapplication of Aluminum Permanent-Mold-Castings

WRITE FOR COPY OF TECHNICAL REFERENCE BOOKLET **PMC 45**

*Does Your Future Depend on the Use of Aluminum Alloy Permanent-Mold-Castings?*

*Advantages Which Aluminum Alloy Permanent-Mold-Castings Offer You*

*Suggestions for Designing Parts For Aluminum Permanent-Mold-Casting Techniques*

*Aluminum Alloys That Are Suitable for Permanent-Mold-Castings*

**PERMOLD**  
ALUMINUM CASTINGS

*Aluminum Permanent-Mold-Castings Applications*

## A Permold Engineering and Metallurgical Review brings you:

- 1 Sound engineering experience (24 years) in utilizing aluminum alloys, and in developing permanent-mold-casting techniques, to meet a wide range of service requirements.
- 2 Design suggestions, resulting from hundreds of applications of permanent-mold-castings, to guide you in obtaining unusual savings available through the use of high strength aluminum alloys and lighter weight sections.
- 3 Recommendations covering correct combinations of physical properties required to meet given service conditions; and how to utilize the excellent physical properties and heat treatment potentialities of aluminum alloys to protect your product against failure.
- 4 Estimates of cost-reducing possibilities which may be realized through the use of permanent-mold-castings and metal from re-melt sources.
- 5 Technical facts resulting from comparisons of materials, processes, and costs usually overlooked and unappreciated except by those of broad specialized experience in the highly skilled art of permanent-mold-casting on a mass production basis.

**perMold**

**T**HE DESIGNING ENGINEER who would avoid the pitfalls of misapplication that often penalize development work will find in this new technical reference booklet on permanent-mold-castings useful and reliable information on how to obtain the utmost of every advantage available in permanent-mold-castings. Practical suggestions for designing parts for aluminum permanent-mold-casting techniques, plus a brief treatise on aluminum alloys that are suitable for permanent-mold-castings, provide guidance for design engineers, metallurgists, production and management executives who must determine when, where, and how to employ permanent-mold-castings and to obtain lowest piece price for each part at the point of assembly. This booklet presents 27 years of accumulated engineering and metallurgical experience and 24 years of permanent-mold-casting experience that is also available through a Permold Engineer or Metallurgist. Ask a Permold Engineer to bring you a copy of this booklet or write for your copy today.

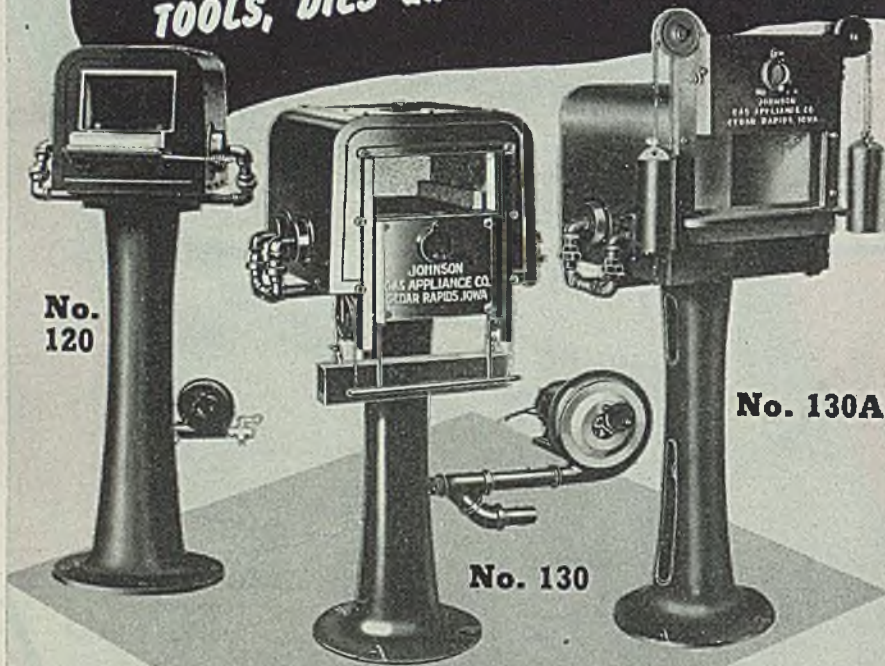
**THE PERMOLD COMPANY**

830 WEST LIBERTY STREET • MEDINA, OHIO

28 Miles Southwest of Cleveland



# FAST ECONOMICAL HEAT-TREATING HIGH SPEED STEEL TOOLS, DIES and PARTS . . .



No. 120

No. 130

No. 130A

## Quick Acting Johnson Furnaces

By concentrating heat where needed and insulating against loss with high temperature refractory, JOHNSON Furnaces reach operating temperatures FASTER to save time and gas. Designed primarily for heat-treating high-speed steels, they are equally efficient for hardening any steel tools, dies, or small metal parts. Write today for literature giving complete specifications. JOHNSON engineers will help you select the type and size which meet your heat-treating requirements.

No. 120 Hi-Speed Heat-Treating Furnace. Reaches 1500° in 5 minutes. 2300°F. in 30 minutes. Firebox 5 x 7½ x 13½. \$129.50 F.O.B. Factory.

No. 130 Hi-Speed Heat-Treating Furnace. Consistently develops 2300°F. in 25 minutes. Firebox 5½ x 13 x 13½. \$248.00 F.O.B. Factory.

No. 130A Hi-Speed Heat-Treating Furnace. Features counter-balanced door opening upwards. Firebox 7¼ x 13 x 16½. With 4 or 6 burners for temperatures 1400 to 2400°F. 4-Burner Unit shown. . . . \$295.00 F.O.B. Factory. 6-Burner Unit \$325.00 F.O.B. Factory.

No. 70 Hi-Speed Bench Furnace. Firebox 5 x 7¼ x 9. \$89.50 F.O.B. Factory.

No. 70



2250°F. in 30 minutes from a cold start!

Free SEND COUPON FOR CATALOG

JOHNSON GAS APPLIANCE CO.  
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on our part to acquaint the many individuals in the several companies with our problems in corrosion.

Occasionally, it was necessary to start all over again when one company would drop out of the field and a new one would enter. A fabricator would follow his usual practice in steel purchasing and buy his list of materials for any given job from several production or warehouse sources of plates, sheets, bars, etc. Mill reports on chemical and physical tests were not then in general use.

Steel companies were critical of the credit of fabricators from whom they were accustomed to accept orders in lots of steel at a few cents per pound, but hesitated to grant credit to the same fabricators for large quantities of material that was higher priced and critically examined.

We, in turn, found it expedient to assure final delivery of satisfactory and highly priced equipment to follow through all phases of production and fabrication. Our orders on the mills were based on bills of material furnished by the fabricator, but the burden of responsibility for the delivery of satisfactory material to the fabricator rested with ourselves.

In the Handling of highly expensive material, this arrangement was agreeable to the fabricator. The fraternization thereby set up between producer, fabricator, and consumer brought an appreciation of each other's problems that contributed to the education of interested parties and the development of the new high quality of metal and furthered the feeling of mutual respect prevailing in the several industries.

In the education of the fabricator to the necessity of observing our demands for quality production, we originally went so far as to furnish the early fabricators with lock boxes in which the welding rod for our job was carried each morning from the tool room to the job by our resident inspector, and he, in turn, locked the box at the end of the day's work, put the key in his pocket, and returned the box to the tool room for safe keeping. The box itself was marked with the job number. The mill, in turn, maintained a constant contact with the fabricator to assist him with his fabricating difficulties.

As the old timers will recall, we also were much plagued in those early days when riveting was still in general practice, upon coming into the shop in the morning, to find the rivet heads popping off our tanks like so many buttons on a vest enclosing an oversized chest.

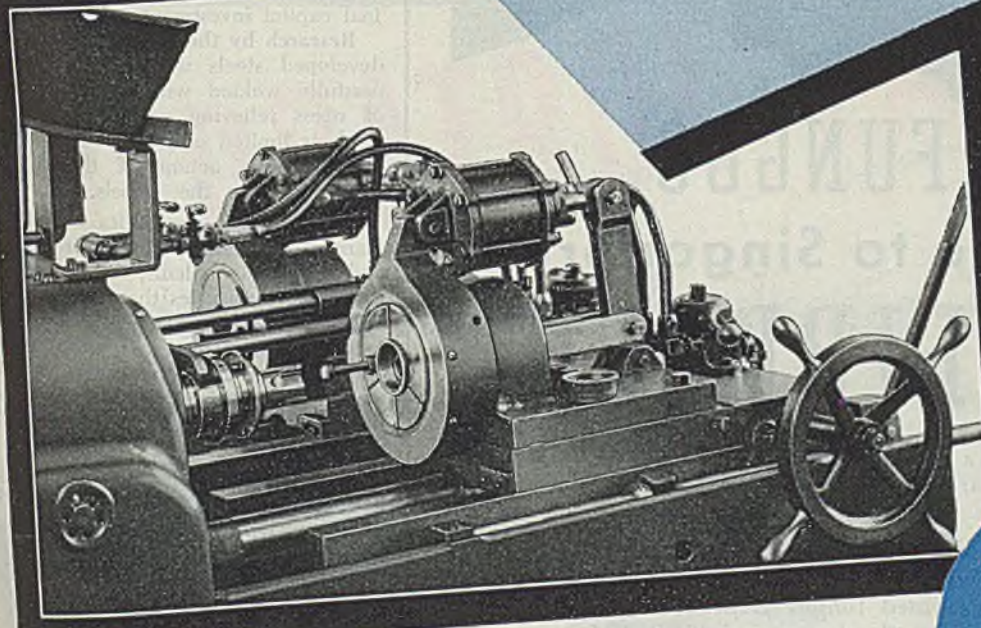
All material except the rivets (and later welding rod) for a given job could be obtained from the steel companies where uniformity of production could be controlled. Unfortunately, rivets had to be obtained from a separate source. When we succeeded in obtaining the co-operation of the rivet producing companies (fortunately they were not long following) by placing their orders in turn for bar stock with the same controlled production and even furnishing



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bar stock to them on our own order our headaches ceased.

Later, as the art of welding advanced and became under the codes an acceptable procedure in fabrication, we had less trouble with the quality of the weld rod as we early insisted on its production by the same source as the balance of the material to be fabricated. Our greatest difficulty from the latter procedure was to educate the welders into a conscientious observance of the rule that like materials should be welded with like rod. Of course, welders could weld metals with a dissimilar rod and took righteous pride in the fact. They were not long getting the idea but until the steel companies' metallurgists and the consumer learned the value of stress relieving, X-raying and other attendant procedures, development of satisfactory welding methods was hesitant and backward.

Here, again, problems of heavy capital investment were bravely faced by the fabricator confronted by the demands of code construction for stress relieving. The installation of X-ray equipment and the erection of furnaces by the fabricators to meet the new demand occasionally cost more than original capital investment in the company.

Research by the Steel Companies also developed steels which could be successfully welded without the necessity of stress relieving. The use of these steels is limited only by the severity of the corrosive action of the products to be used in the vessels.

The chemical companies in their demands for steels to meet their corrosive and erosive problems, realized earlier than other industries the value of stressing purity of products in selling campaigns for new materials placed on the market, both as entirely new materials and as competition for older established markets. Corrosion of equipment was recognized as a source of impurity.

Reverting back to our old problem in the purchase of pipe and tubing, the ease with which our first order for pipe was produced gave us no hint of the subsequent problems which did develop in the production of this important material in the construction of modern chemical plants.

Due to low yields and high cost of production, our first source of supply soon abandoned the production of seamless alloy pipe and tube.

It should be mentioned here that we and other consumers of this commodity were slow in contributing to the development of welded seam pipe, mainly because of the slow development of the art of welding.

We were constantly in the field at this time seeking a new source for the production of seamless tubing and our persistency was soon rewarded. Another firm became interested in our requirements and for a time produced highly satisfactory pipe and tubing. However, it was much discouraged, as was our previous source of supply, by the tendency of the pipe and tubing to buckle.



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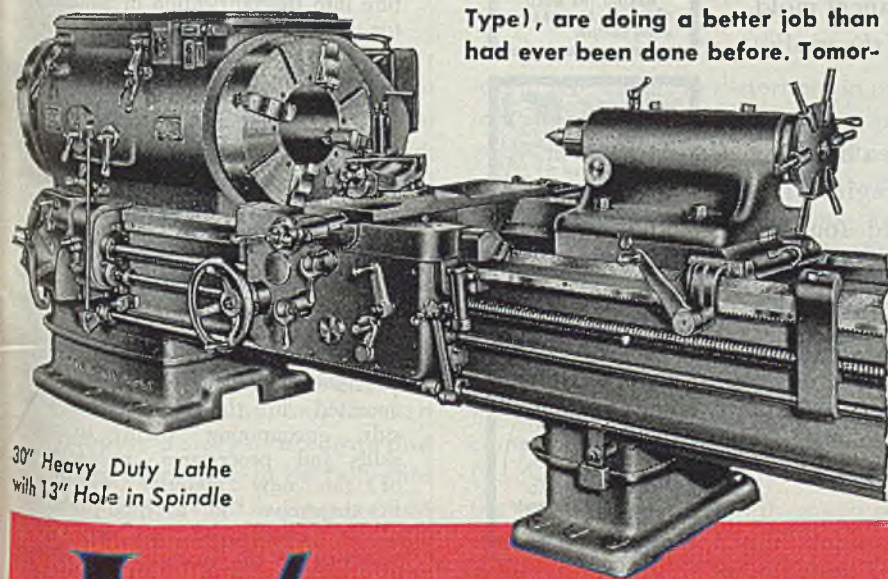
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open along a straight seam after the drawing operation was completed and frequently even for a considerable time thereafter. For no apparent reason tubing which the night before appeared to be physically perfect would be found split open in the morning, or the ruptures would occur in shipment.

Again our source of supply was eliminated, this time chiefly because the company was taken over by another organization and the new company was not then alloy-minded. It has been contended that if this small mill had been allowed to fight their problem through it would have found the solution much sooner, as it seemed to be nearer a solution than most others were sometimes after this event.

For a long time, it was our policy as with other alloy items in order to insure uniform quality, to purchase the pipe billets from the steel mill and furnish them to the pipe mill for drawing. Thus, we had a close insight into the problem of yields.

Other companies became interested and then although the problems continued, they were slowly solved one at a time to reduce eventually the yield loss to a point where the operation was profitable. In the meantime, enough companies were producing to meet, at a fashion, our requirements together with the growing demands of the chemical industry. It was common practice during this period for the larger purchasers to consult with each other and allocate the production of a certain mill among themselves to suit their requirements.

As the confidence we held in our own sales, production and operating policies was yielding greater sales, our production was increasing beyond the point where small sized screwed joint pipe and tubing was adequate to carry the operating loads and a demand for larger size tubing, beyond the conventional screwed joint, was developing. Our first adventure into the fabrication of flanged joints for seamless alloy tubing brought encouraging results.

Pipe Fabricating Companies accepted our orders for fabricated alloy pipe when our plans for a considerable step up in production was projected, confident of their ability to Van Stone pipe with only a little more difficulty than they were experiencing with high carbon steel pipe. As usual, we were furnishing all the pipe, flanges, bolting, gaskets, etc. This arrangement was acceptable to the pipe fabricator, as had been with the plate fabricator.

These agreements with the fabricator operated in the nature of a subsidy encouraging them to develop skills and procedures in fabrication of the new material without having to themselves in a high-priced material. It encouraged a very careful handling of the material and close attention to details.

We bespeak high praise for all fabricators who worked with us in the early stages of alloy fabrication, through the statement that our losses under these arrangements were almost nil in comparison



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Quick Change  
Gear Lathe



No. 840  
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**SPECIFICATIONS** common to all Logan Lathes: Swing over bed, 10 1/2"; Bed width across ways, 6-15/16"; Bed length, 43 1/2"; Size of hole through spindle, 25/32"; Spindle nose diameter and threads per inch, 1 1/2"-8, 12 Spindle speeds: 30 to 1450 r.p.m.; size of motor 1/2 or 1/3 h.p., 1750 r.p.m.; Preloaded precision ball bearing spindle mounting; Drum type reversing motor switch and cord; Precision ground ways, 2 prismatic "V" ways, and 2 flat ways.

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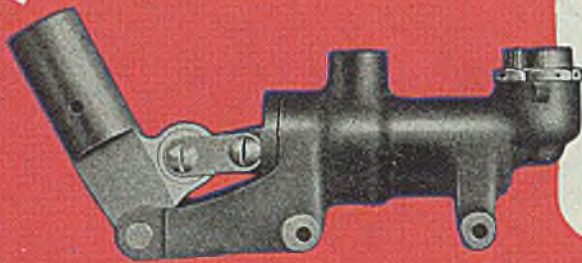
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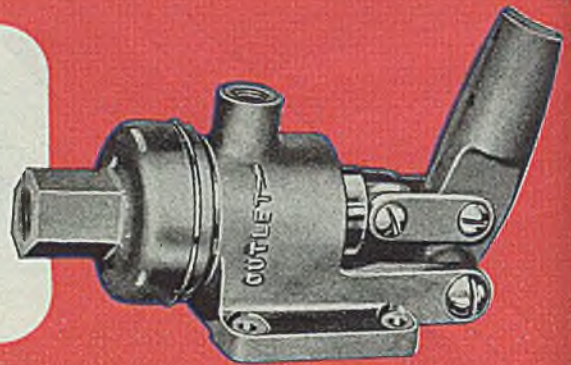


**MODEL 1H-622-D**

TYPE . . . . . Conforms to spec. AN-P-14 and drawing AN 6201-1.  
 DISPLACEMENT . . . 1.5 cubic inches maximum per complete cycle.  
 CAPACITY . . . . . 0.19 g.p.m. at 30 cycles per min. at 1500 p.s.i.  
 OPERATING PRESSURE . . . 1500 p.s.i. with a handle torque of 1100 in. lbs.  
 HANDLE . . . . . Usually not supplied with this unit.  
 WEIGHT . . . . . 2.4 pounds without handle.

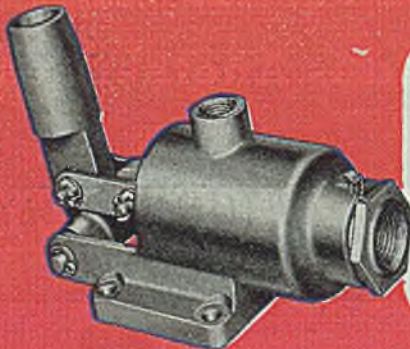
**MODEL 1H-437-F**

TYPE . . . . . Hand operated, double acting differential piston.  
 DISPLACEMENT . . . 1.6 cu. inches maximum per each complete cycle.  
 CAPACITY . . . . . 0.20 g.p.m. at 30 cycles per min. at 1000 p.s.i.  
 OPERATING PRESSURE . . . 1000 p.s.i. with 50-lb. force exerted on handle.  
 HANDLE . . . . . Detachable, 18 $\frac{3}{8}$  in. long, 50° total movement.  
 WEIGHT . . . . . 2.5 pounds with handle.



**MODEL 1H-437-K**

TYPE . . . . . Hand operated, double acting differential piston.  
 DISPLACEMENT . . . 1.6 cu. inches maximum per each complete cycle.  
 CAPACITY . . . . . 0.20 g.p.m. at 30 cycles per min. at 1000 p.s.i.  
 OPERATING PRESSURE . . . 1000 p.s.i. with 50-lb. force exerted on handle.  
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# HELPFUL LITERATURE

## 1. Molten Metal Pumps

Ruthman Machinery Co.—4-page illustrated folder "Another 'First' by Ruthman!" describes Gusher molten metal pumps which handle lead, babbitt, solder, zinc and other alloys at temperatures up to 1000 degrees Fahr. and reduce accident hazard.

## 2. Material Handling Units

Revolvator Co.—Illustrated broadside "The Art of Piling for Modern Industry" covers line of portable elevators and accessories for moving, lifting, piling and stacking various types of raw material and finished products.

## 3. Synthetic Resin Products

Resistoflex Corp.—16-page illustrated catalog presents information on properties, characteristics and specifications of products made from compar solventproof vinyl resin. Articles covered include various types of hose, tubing, end fittings, industrial gloves, work aprons, mechanical molded goods, coatings, adhesives and paints.

## 4. Arc Welding Electrodes

Reld-Avery Co.—24-page illustrated booklet "Raco Arc Welding Electrodes" gives applications, welding procedure, welding codes, physical properties of weld metal, recommended current ranges and sizes of electrodes and welding rods for various types of work.

## 5. Automatic Control

Reeves Pulley Co.—6-page illustrated folder No. G-452 describes automatic hydraulic controls for synchronization of different machines and of separate sections of single machine, and maintenance of constant tension, uniform periphery and winding speeds, uniform pressure, weight, liquid level, temperature and other variable elements.

## 6. Traveling Cranes

Reading Chain & Block Corp.—16-page illustrated bulletin "The Why and How of Faster Production" contains data on traveling cranes and unit parts such as crane trolleys, end construction, gear cases, bridge drives and cabs. Illustrations show cranes in use in various plants.

## 7. Electrostatic Coating

Harper J. Ransburg Co.—8-page illustrated booklet "Ransburg Electrostatic Painting Processes" describes electrostatic process for spraying, dipping, coating and detearing. Parts are shown in process and diagrams indicate principle.

## 8. Engineering Data

Rohle Testing Machine Div., American Machine & Metals, Inc.—4-page engineering chart No. A-889 includes tables on percentage reduction of area for tensile test specimens, hardness conversion chart for hardened steels, and table of circle dimensions, with diameters ranging from 0.001 to 1,000 inch in increments of 0.001 inch. Formulas and hardness conversion data are included.

## 9. Collets & Stock Pushers

Sheffer Collet Co.—20-page illustrated loose leaf catalog No. 45 gives specifications and prices of line of collets and stock pushers. Information is conveniently arranged by maker's name and type of machine.

## 10. Castings

Meehanite Research Institute of America, Inc.—127-page illustrated bulletin No. 22 is entitled "Stories of Meehanite in Industry." This is collection of articles about Meehanite castings which have appeared in various trade publications.

## 11. Lighting Equipment

Sylvania Electric Products Inc.—8-page illustrated "Lighting Products" bulletin contains comprehensive information about industrial, commercial, portable and inspection types of fluorescent fixtures. Data are given on fluorescent lamps, starters and lamp holders. Also described are incandescent lamps and fixtures.

## 12. Magnesium Castings

Superior Bearing Bronze Co.—4-page illustrated "Lighting Products" bulletin contains facts for design engineers on design and application of products employing this metal. Comparative properties of magnesium and other structural metals are tabulated.

## 13. Air Compressors

Sullivan Machinery Co.—42-page full-color brochure "Modern Industrial Compressors" describes machines for furnishing compressed air for industry's heaviest demands. Complete details of machines and production facilities of company are outlined. Various types and sizes of compressors are described.

## 14. Finishing Method

Sturgis Products Co.—6-page illustrated folder presents details of Roto-Finish mechanical de-burring and finishing process for metal parts. This method can be used for grinding, de-burring, polishing, honing and coloring. Typical machines developed for application of process are described.

## 15. Turret Lathes

South Bend Lathe Works—12-page illustrated bulletin No. 901 presents specifications and other information on series 900 and series 1000 South Bend turret lathes. These machine tools are designed for high speed machining of small chucking and bar work requiring close tolerances. They are especially adapted to second operations.

## 16. Plastics & Stampings

Standard Products Co.—16-page illustrated bulletin "Standard Products" explains facilities of company in engineering and production of molded and extruded plastics and rubber parts, metal stampings, war materiel and window channel. Typical parts produced are shown.

## 17. Coolers

Ross Heater & Mfg. Co.—24-page illustrated bulletin No. 5322 covers types CP and CF coolers designed for continuous service for lubricating, cutting, quenching and transformer oil, hydraulic presses, engine jacket water, refrigerant emulsions, small vapor condensers and oil pump systems. Performance charts and dimension tables are included.

## 18. Rotary Pumps

Geo. D. Roper Corp.—32-page illustrated booklet "How to Solve Pumping Problems" contains discussion of steps to follow in selection of rotary pumps. General information and numerous technical data tables complete the publication.

## 19. Melting Furnaces

W. S. Rockwell Co.—4-page illustrated bulletin No. 411 covers oil or gas fired stationary and tilting type crucible melting furnaces for aluminum, brass, bronze, copper, gold, monel metal, nickel, silver and other nonferrous metals. Reverberatory melting furnaces are also covered.

## 20. Milling Cutter Checker

Michigan Tool Co.—4-page illustrated bulletin No. 471-44 shows features and applications of Model No. 471 hob and milling cutter resharpening checker which utilizes two standard indicator assemblies. Diameters up to 10 inches and spread between centers of 16 inches can be handled.

## 21. Resistance Welding

Sciaky Bros.—8-page illustrated bulletin 204-A describes this company's "three phase to single phase" system for welding heavy gages. Technical discussion is based on article from STEEL. Four models of welders are shown and characteristics and uses are briefly covered.

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## 22. Bearing Selection

Safer Bearing Corp.—6-page illustrated bulletin No. 652 is entitled, "How to Select the Correct Bearing in Machine Design." Line type selection charts simplify choice of single or double row bearings for given speed, radial and thrust load, and operating conditions.

## 23. Rebuilt Machine Tools

Simmons Machine Tool Corp.—80-page illustrated bulletin "The Simmons Way" shows company's facilities for engineered machine tool rebuilding. Modernizing of machine tools with Micro-speed drive and power rapid traverse is discussed. Designing and building of special purpose machines are described.

## 24. Acetylene Generator

Sight Feed Generator Co.—18-page illustrated bulletin 44-G describes Sight Feed acetylene generators for making welding and cutting gas as required. Simple and safe in operation, equipment requires only carbide and water. Typical installations are shown.

## 25. Phosphor Bronze

Seymour Mfg. Co.—8-page illustrated booklet presents sizes, specifications, tempers, tolerances, properties and uses of grades A, B, C, D and special free-turning phosphor bronze in sheet, rod and wire forms. Phosphor bronze welding rod is also covered.

## 26. Centrifugal Castings

Shenango-Penn Mold Co.—8-page illustrated bulletin No. 143 discusses advantages of ferrous and nonferrous centrifugal castings and presents chart of characteristics and applications of numerous types. Methods of manufacture are described and pictures of typical castings are included.

## 27. Metal Products

Schneider Metal Mfg. Co.—24-page illustrated booklet "The Schneider Way to Better Designed, Engineered, Fabricated Metal Products" discusses complete service available for fabrication of metal merchandising displays, sign erection equipment, industrial metal products and various types of component parts.

## 28. Dust & Fume Collector

Claude B. Schneible Co.—4-page illustrated folder No. 145 deals with type EC Multi-Wash dust and fume collector consisting of Multi-Wash collector tower, Multi-Louvre dewatering tank, Wear-Proof pump for recirculating cleansing liquid and suction fan. This model is portable and self-contained.

## 29. Rust Prevention

Shell Oil Co.—40-page illustrated bulletin discusses subject of rust prevention through use of Shell Ensis coatings. Typical problems are outlined and their solutions given. Features, range of application and types of rust prevention products are also described. Other data on protective coatings are included.

## 30. Convection Furnaces

Surface Combustion—4-page illustrated bulletin No. SC-122 is entitled, "Convection Heating in Surface Combustion Furnaces." Typical models and their application are described. Table gives Rockwell hardness versus drawing temperatures for SAE steels and their NE substitutes.

## 31. Honing

Micromatic Hone Corp.—8-page illustrated form No. AR-67 describes machine tools, fixtures, tools and abrasives which are used to generate finished surfaces in cylindrical parts. Specifications are given on new vertical Hydro-boner, as well as on Micromatic honing machines and tools.

## 32. Wire Working Machines

F. B. Shuster Mfg. Co.—4-page illustrated bulletin describes wire straightening and cutting machines with capacities of  $\frac{1}{8}$ -inch to  $\frac{1}{4}$ -inch. Various models are shown and mechanical advantages are discussed.

## 33. Refractories

Richard C. Remmey Son Co.—52-page illustrated catalog contains valuable information concerning use of refractory products, refractory shapes and standard shapes, and includes estimating sheets and general information. Specifications, sizes and engineering data of use in applying refractory products are covered.

## 34. Boring Machines

Stokerunit Corp.—12-page illustrated catalog on "Simplex Precision Boring Machines" discusses advantages, operation, design and operating features, and electrical equipment employed in this machine tool. Specifications are tabulated for various sizes and models.

## 35. Portable Electric Sander

Sterling Tool Products Co.—4-page illustrated bulletin No. S-203 describes model 1000 portable electric sander which features Orbit motion. Abrasive grits are driven in  $\frac{1}{4}$ -inch orbits against work at rate of 5000 cycles per minute.

## 36. Gas & Oil Burners

Peabody Engineering Corp.—4-page illustrated bulletin No. 902 describes type M combined gas and oil burners which are available in full range of sizes and are suitable for heating boilers, industrial furnaces, power boilers and oil refinery furnaces. Fuel may be natural, refined or manufactured gas.

## 37. Threading Equipment

Murchey Machine & Tool Co.—42-page illustrated reference manual contains engineering and operating data on company's line of threading equipment. Die heads, taps, thread systems, conversion data and other information are included.

## 38. Manufacturing Locations

Dept. of Commerce, Commonwealth of Pennsylvania—24-page illustrated bulletin "Let Your Business Grow in Pennsylvania" explains factors which state offers to business enterprises. Power, raw material, taxes, skilled labor, transportation and other advantages are listed.

## 39. Flexible Metal Tubing

Pennsylvania Flexible Metallic Tubing Co.—Illustrated bulletins No. 90-C and No. 91 cover Penflex Weld high pressure flexible all-metal tubing and Penflex interlocked flexible metal tar and asphalt hose, respectively. Applications, design variations and specifications are listed.

## 40. Cutting Oils

Sun Oil Co.—84-page illustrated booklet "Cutting and Grinding Facts" describes various types of Sunoco emulsifying cutting oils. Case studies in various plants covering lathe work, milling, hobbing, drilling, grinding, pipe threading, lubrication and cold rolling are quoted.

## 41. Protective Coatings

Quigley Co.—6-page illustrated bulletin No. 379 describes Triple-A Mill White and Dairy White finishes. First is light reflecting coating which is adaptable for use in factories, warehouses, industrial and other buildings. Gloss, semi-gloss, flat and enamel undercoat types are available. Dairy White produces hard, high-gloss finish and under normal conditions will dry in 4 hours.

## 42. Steel Fabrication

Stacey Bros. Gas Construction Co.—44-page illustrated bulletin No. G-45 presents comprehensive picture story of fabrication and erection of gas holders, storage tanks, processing vessels and other structures. Production erection facilities of company are shown in action.

## 43. Carbide Tools

Spe-D-Cut Tool Co.—28-page illustrated catalog No. R-20 on carbide-tipped cutting tools gives details on line of tool bits, boring tools, router bits, milling cutters, fly cutters, inch centers and special tools. Engineering data are included to aid in proper use of carbide-tipped cutting tools.

## 44. Malleable Castings

Saginaw Malleable Iron Div., General Motors Corp.—48-page illustrated booklet entitled "... this is the story of our part in the war" shows typical parts produced, company facilities and personnel, and comparative scenes of processes in World War I and II.

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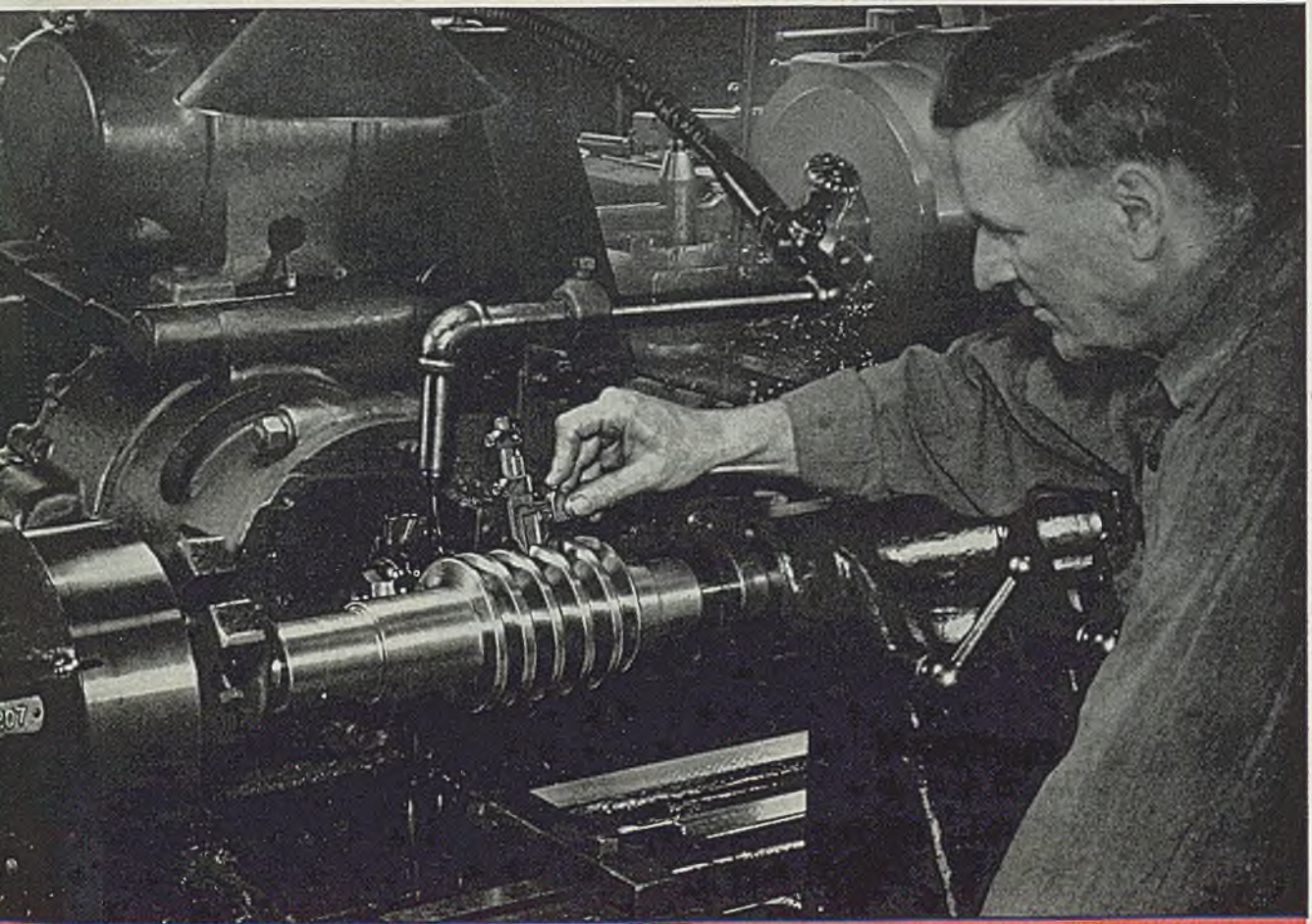
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Cutting precision worm threads on special thread milling machine.

## Men, Metals, Machines and Micrometers



You can have these four essentials of production and still not make a usable or salable part, yet proper application of all four results in a superior product.

Take our case, for example, **MEN** — We have the men, craftsmen indeed. Over a thousand years of accumulated experience and skill. **METALS** — Furnished to your exact specifications, forged, cast or rolled. Our engineers are available to make metallurgical recommendations. **MACHINES** — No shop is better equipped, gear shapers, hobbers, generators, thread millers, mills, lothes, etc., in endless variety. **MICROMETERS** — Used intelligently in our plant as are dial indicators, gages and other precision devices, to check the accuracy of every gear.

The Illinois Gear trademark on your gear means it's a "Five Star Gear." ★ Material double-checked. ★ Cut by a highly skilled craftsman. ★ Required accuracy inbuilt. ★ Double-inspected after completion. ★ Delivery as promised.

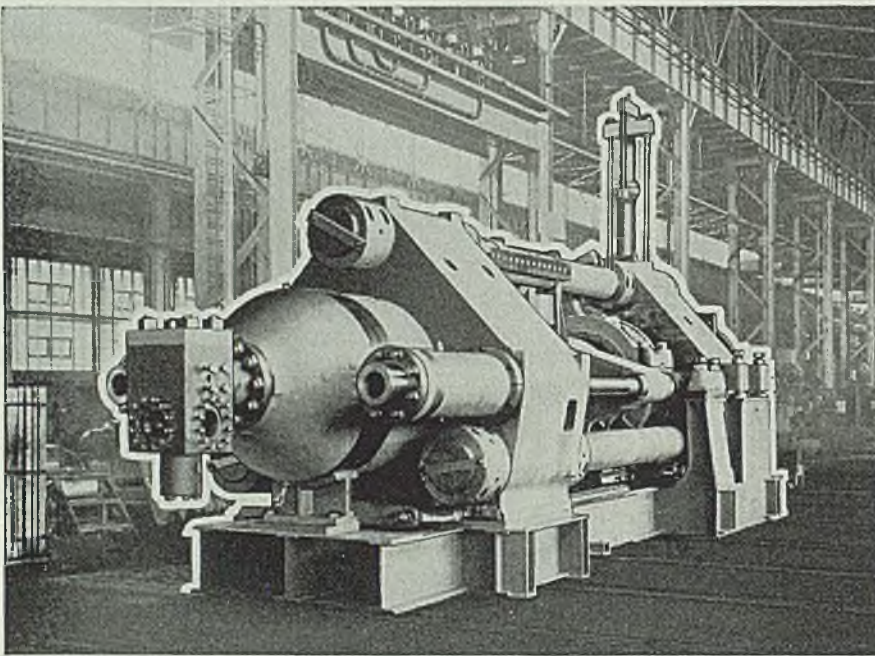
Our Catalog No. 89 will help you — it covers gears, their types, use and manufacture.

ILLINOIS GEAR & MACHINE CO., Chicago (35), Ill.

*"The mark on Finer Gears"*

# ILLINOIS GEAR & MACHINE COMPANY





# SCHLOEMANN EXTRUSION PRESSES

have *Super-Standard Features*

With capacities ranging from 850 to 5000 tons, Schloemann Presses are designed to extrude all extrudable shapes, in all metals that lend themselves to this process. This, of course, is standard. But Schloemann exceeds the standard in several exclusive and highly important respects.

For instance, the patented method of supporting platen and container holder permits thermal expansion in all directions without losing alignment with those parts of the machine that remain cold.

Three-phase induction heating of the container affords ample and uniform heat under close control, a feature of utmost importance to long container life and quality of the extruded product.

Independent movement of mandrel from press stem enables the piercing of billets that have been cast solid. This avoids the oxidized skin encountered with hollow cast billets and provides tubing with smooth internal surfaces.

These and other super-standard features set up a definite Schloemann advantage. Their tangible results are economy in operating and maintenance costs, greater flexibility and diversity, convenience and long life.

If you have a problem or special need, or if there is a size or type of extrusion in which you are especially interested, Schloemann Engineers offer their fullest assistance.

# SCHLOEMANN

ENGINEERING CORPORATION

1105 Empire Bldg.

Pittsburgh 22, Pa.

HYDRAULIC PRESSES • ROLLING MILL MACHINERY

parison to the volume of work done in the shops. We did have some losses which were embarrassing as only that particular material required for the job had been processed, making it necessary to produce more material or take a chance in obtaining material of like composition from another source.

Some difficulty was encountered in this respect but it was never insurmountable. No ill-feeling occurred on either side and almost all the firms who passed through these trying times with us are still fabricating for us, our mutual admiration and esteem unaltered. All of these firms have contributed commendable accomplishments in the production of capital equipment for the ordnance plants. Their work has been a valuable contribution to the war program.

Back again to our experience in fabricating Van Stone type joint alloy pipe. We had ordered large quantities of pipe, confident that the pipe fabricator would have a minimum of difficulty.

With the Delivery of the first pipe, the fabricator, after several unsuccessful attempts to Van Stone, refused to proceed with the order, largely because he was handling material which was not his own. A visit to his plant and a study of the problem showed that the pipe would split in several places on the flange when the flange was rolled beyond a certain point. We determined to experiment by cutting a number of 18-in. lengths and after a few trials, established that incipient cracks in the end cut on this pipe, caused partly by the condition of the cutting tool, opened up in the flanging operation. After experimenting with about 100 pieces by using different cutting methods, varying the heating and speeds in the flanging operation, we were much discouraged with the limited results and foresaw the destruction of all our expensive pipe in our futile experiments. We had only four or five successful flanges out of the hundred to reward us for our work. We found several of these cracked open in the next day or so.

About this time someone, not the fabricator or his men, as they had withdrawn from the job in order to reduce charges against the job, had the happy thought that *if we would machine the cut end, we would work out the heat cracks*. This was done on several pieces and every operation resulted in a perfect expansion. We held up the procedure for several days to determine whether they would develop cracks as the result of this cold working. The machining procedure solved our problem on this early pipe but subsequently the tube companies learned of better pipe production methods, and, with the use of a disk cutter, they improved the type of cut, giving better yields in the cold working operation.

Our first experience with the disk cutter nearly wrecked our growing faith in alloy pipe and tube production. When the first samples cut from pipe with the new cutter were delivered, the samples showed an extremely poor accelerated



# Keeps Metal PASSIVE\*



...another Plus that adds

to **RED LEAD'S** Extra Rust Protection...

There is no question about Red Lead's acceptance throughout industry as the standard priming paint for making metal LAST.

One important reason is its ability to keep metal surfaces in a "passive" or rust-inhibiting state. Authorities agree that metal protective paint should be rust-inhibitive to give satisfactory performance.

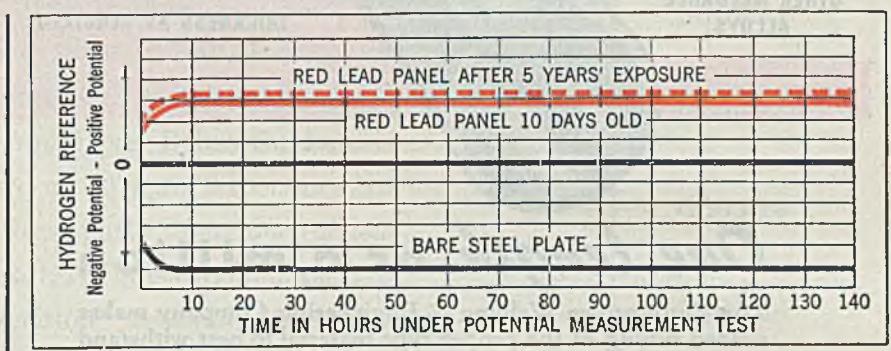
Time-potential curves, such as the one at right, are used to express rust-inhibitive properties of paint and thus indicate its effectiveness of protection. They show the effect of Red Lead on the potential of steel in the presence of moisture or water.

For example, a steel panel whose potential is *positive*, relative to hydrogen, is considered to be in a passive or non-corroding state. A negative potential indicates corrosion activity or rusting. The graph shows clearly the rust-inhibitive effect of Red Lead paint on steel as contrasted with the rapid and continuous rusting of unpainted steel.

Note that in this test a Red Lead paint film which had weathered 5 years was just as effective in preventing rust as one which had dried for only 10 days.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead.



## \*Proof That Red Lead Keeps Metal Passive

In the above test a piece of unpainted steel was immersed in water. Iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential (see above graph). However, when steel panels painted with Red Lead were immersed un-

der the same conditions, ferric and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

Write for New Booklet—"Red Lead in Corrosion Resistant Paints" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas... ranging from Red Lead-Linseed Oil paints to Red Lead-Mixed Pigment-Varnish types. If you haven't received your copy, address nearest branch listed at right.

Lead paints for both underwater and atmospheric use is available through our technical staff.



NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 30, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston 25, W. Va. (Evans Lead Division).

All types of metal-protective paints are constantly being tested under all conditions at National Lead's many proving grounds. The benefit of our extensive experience with Red

# DUTCH BOY RED LEAD



# WELDCO

## CORROSION RESISTING TUBING



### One length or a million

The Youngstown Welding & Engineering Company makes welded tubing of the proper type material to best withstand your corrosion conditions. It is available in odd or standard sizes, in limited quantities or carload lots. It will meet your requirements for pressure and uniformity. Special equipment with low setup charges permits production of special tubing for individual needs at a practical cost.

### FITTINGS AND FABRICATED PIPING

A complete line of Weldco fittings is available. Weldco's well-equipped plant is in position to fabricate the entire pipe assembly you require.



**THE YOUNGSTOWN WELDING & ENGINEERING CO.**

3711 OAKWOOD AVE. YOUNGSTOWN, OHIO

SEND FOR LITERATURE

*Specialists in Corrosion Resistance*

test. We had not known about the installation of the new cutter. By that time, mill experiences with the scientific production of alloy pipe and tubing were such that with the manufacturer's record available and ladle analysis, results of accelerated tests on the coupons could be confidently predicted. In this lot of tubes, nothing was wrong with the composition, physical characteristics or manufacturer's record of production. Yet several sets of samples taken from both ends of the tubes gave extremely poor test results and the mill checked with our tests, as by that time we had co-ordinated the test methods of our laboratories and those of the mills.

While studying the problem, a casual examination of an untested coupon indicated a bluish tint on both faces of the coupon, *indicating heating on supposedly cold-worked surface.* An examination of the other fresh coupons showed the same blue tint. A change in the speed of the cutting disk and the speed of the cut piece through the cutter, immediately solved the difficulty and this lot of pipe passed without further trouble.

We were bothered in the early stages of pipe production by the appearance of small clean holes in the pipe after it had been in use for a short time. Here, again, our experience with contamination in the rolling of plate stood us in good stead. An improvement in the drawing dies and a step-up in the production of alloy pipe and tubing warranted confining the use of drawing benches to production of alloy pipe and tubing alone, thereby eliminating infinitesimal high carbon steel slivers from the dies. This eliminated the development of the holes mentioned above.

Our Own Ideas regarding pipe and tubing are changing rapidly with the development of the art of welding. For a long time, we hesitated to use welded seam tubing. We have kept abreast of the developments in this field, trying out small lots here and there in our plants and our experiences are indicating locations where this type of tubing can be used. Many situations will continue to call for seamless tube in an unabated volume.

In the early use of chrome alloy materials, they were not recognized by any code or state law as suitable for pressure vessels and, therefore, it was necessary to obtain special approval of the insurance companies and State Board of Pressure Vessel Inspectors for the state in which they were to be used for each piece of equipment.

Later the ASME Code for unfired pressure vessels recognized this use of these austenitic steels, which has to a considerable extent simplified our problems.

Manufacturer's records of complete chemical and physical tests are furnished along with the material supplied on our orders.

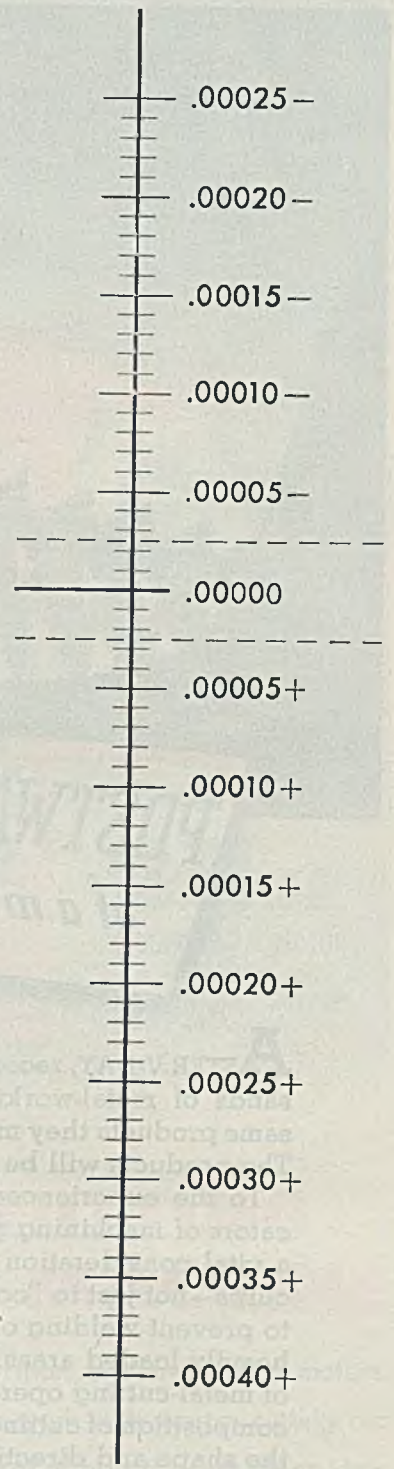
Our purchases of alloy castings were similarly fraught with problems. For a long time, however, our early purchases of castings were absolutely free of any



# Mass Precision and "ghost" tolerances

"Ghost" tolerances hover near the zero mark—these are tolerances in "quarter-tenths" and "millionths". To obtain such accuracy requires the proper machines, correct processes, skilled workmen, and gages to show the results. Nichols has all the factors necessary to produce parts to "ghost" tolerances—and *something more*. It has the knowledge (based on 40 years' experience) to produce these parts *in volume, at low cost*. In short, Nichols can manufacture "mass precision" assemblies for you that can be priced to meet competition. When your work calls for "ghost" tolerances, call for Nichols. A free copy of "Mass Precision" is yours for the asking.

W. H. NICHOLS & SONS, 48 WOERD AVE.,  
WALTHAM 54, MASSACHUSETTS



"Accurate" *Nichols*







## POSTWAR PRODUCT *of a million machines*

**A**FTER V-DAY, reconversion notwithstanding, thousands of metal-working factories will turn out the same products they made during and before the War. The products will be chips.

To the experienced eye, chips are valuable indicators of machining performance. Cutting fluids are a vital consideration in developing properly formed chips—not just to “cool” the tool and workpiece, but to prevent welding of metal to tool and to lubricate heavily loaded areas. So interrelated are the factors of metal-cutting operations that slight changes in the composition of cutting fluids alone can radically alter the shape and direction of chips.

Stuart men know how to make properly balanced cutting fluids—and how to apply them for top results. Through them, 80 years of experience is yours for the asking.

The 60-page Stuart booklet, “Cutting Fluids for Better Machining,” contains interesting facts about chips and cutting fluids. Write D. A. Stuart Oil Co., Limited, 2735½ So. Troy St., Chicago 23, Illinois.

# D. A. Stuart Oil Co.

LIMITED

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Stocks in Principal Metal-Working Centers



difficulty and our demands slowly rose to a point where we were spending several thousand dollars a year and obtaining beautiful tests in comparison with a succession of headaches accumulated as our demands for other alloy items developed.

Suddenly our latest deliveries of castings began to go bad but the old castings still held up. Our experience by that time was such that we instantly guessed that the mill had changed its methods of production and we confidently approached the company, firm in a belief that a co-operative effort would overcome the problem quickly.

To our amazement our supplier refused to listen to us, pointing to their long experience with alloy castings and blindly claiming a change in our operating procedure must have developed the difficulty. We were confident that could not be the answer, as our production was on absolute chemical control and the slightest deviation in procedure would instantly show up in the plant laboratory. Nevertheless, we conducted a careful check at our plant and found no change in our procedure.

This was reported back to our supplier who adamantly maintained the same attitude and even refused us admission to his plant on the ground that their method of production of certain other alloys was a closely guarded secret and a view of the production of our castings would disclose that operation to experienced eyes.

There was nothing to do but grant the demand of the foundry to complete our orders while we conducted our own investigation. In the meantime we were getting desperate for castings. We made our own analysis of the castings and had them checked by professional laboratories.

The Result Confirmed Our Suspicions—the nickel content in the latter straight 18 per cent castings in which we were accustomed to specify no nickel showed a strong measureable quantity of this metal. We called this situation to the foundry's attention but received only a curt reply.

We could only look for another source of castings. Fortunately, during the negotiations, we had been approached by a new firm entering into the alloy casting field. Its appearance and our subsequent satisfactory experience with its product took a tremendous burden from our shoulders.

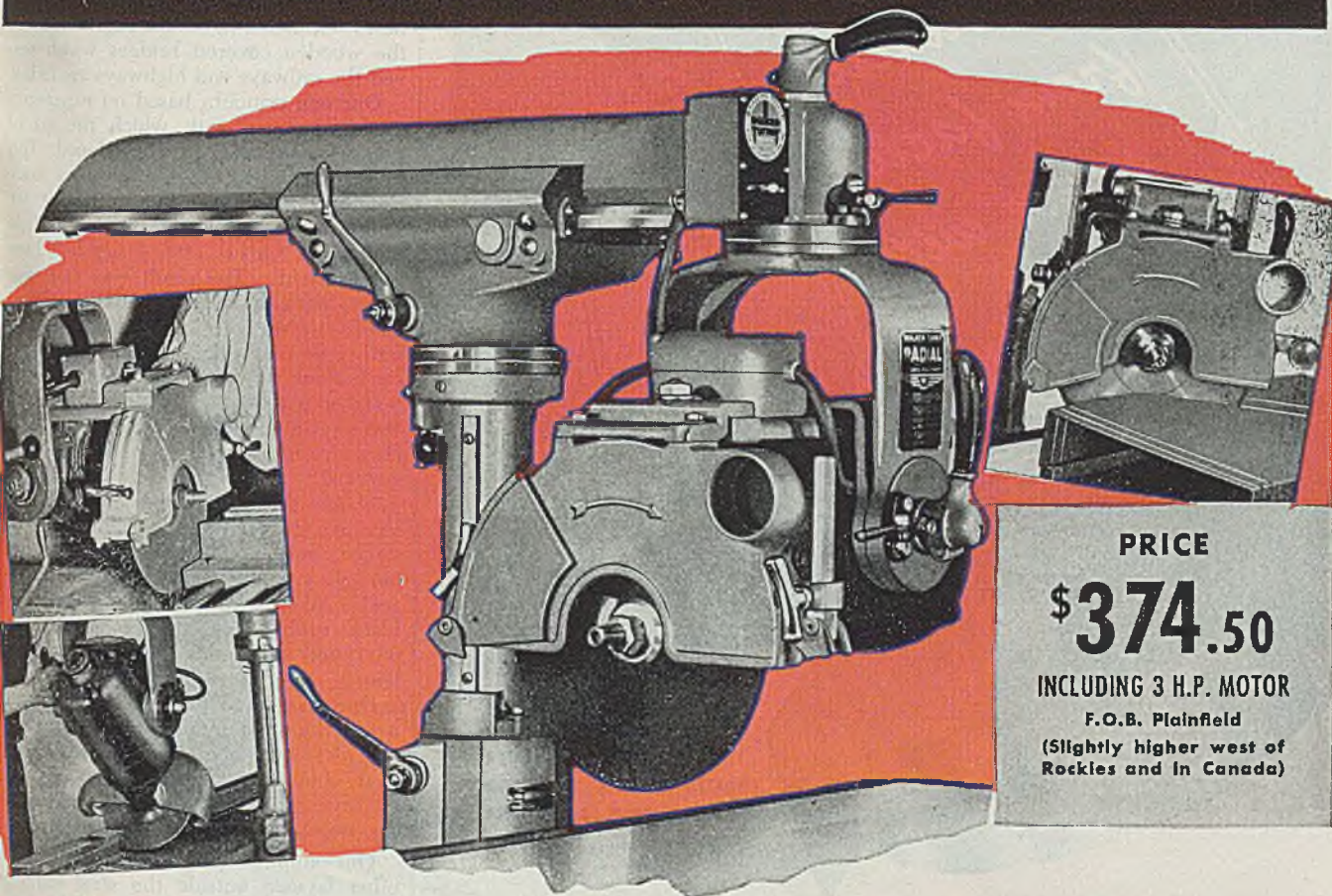
The above difficulties are reported only to show both sides of our experience in contributing to the development of an industry. It was the only dark spot.

The production of alloy metals undoubtedly is still a new industry, although identified with the steel industry. The demands for alloys are now so large that specialists who have not been trained in the old school of tonnage production must be attracted to this field.

We are convinced that these men looking into the future without prejudice can foresee an alloy production mill comparable in its technique with the air con-



**THIS** *Universal Head* **SIMPLIFIES**  
**COMPLICATED CUTTING OPERATIONS**



**PRICE**

**\$374.50**

INCLUDING 3 H.P. MOTOR

F.O.B. Plainfield

(Slightly higher west of  
Rockies and in Canada)

**Walker-Turner** **METAL-CUTTING  
 RADIAL MACHINE**

The head on a Walker-Turner Metal-Cutting Radial Machine can be quickly set to cut at any angle. Cuts wide metal shapes. Will dado, trench, miter, even operate with motor in vertical position. Patented Walker-Turner Geared Motor is shock-proof, gets shaft closer to work, makes deep cuts

with smaller blades than in conventional motors. Blade feeds through work with shorter cutting arc and less frictional heat. Operator gets clear view of work, no interference from overhanging arm. Write today for complete information.

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**MACHINE TOOLS**

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





ELECTRO-COATED ZINC, COPPER, NICKEL AND BRASS . . . HOT DIPPED TIN AND SOLDER . . . LACQUER COATED IN COLORS . . . UNCOATED PRECISION STRIP, CARBON AND ALLOY SPECIALTIES.

When it comes to making a choice of materials for your product, don't overlook precoated cold rolled strip steel. ThomaStrip is available with coatings of zinc, copper, brass, nickel, tin, solder, and lacquer in color. These precoated finishes solve your plating and finishing problems and often entirely eliminate plating in fabricating plants. Crack-proof and peelproof finishes speed production and provide uniform coatings on inside and out of complicated parts. Write for literature today.

**THE THOMAS STEEL CO. • WARREN, OHIO**  
COLD ROLLED STRIP STEEL SPECIALISTS

ditioned, clean, scientifically controlled plants of the food and dairy industries. In these plants science can reduce the cost of production materially below those of today. These men should know that with each 1 cent per pound reduction in selling price of alloy steel, the field will be remarkably increased and at no sacrifice to the carbon steel industry.

They will be convinced, for instance, that the bridge built of carbon steel will be as outmoded in future engineering, as the wooden covered bridges which served the railways and highways are today.

Our one criticism based on experience is the slowness with which the art of producing the alloy tube developed. This branch lagged behind the advances made in other materials. The reason is the refusal of the early entrants in the field to proceed further after losses had been accumulated. The result was that each succeeding entrant, lacking the experience gained by the previous casualty, started farther down the ladder than was necessary. Now, however, like similar conditions in many other fields of endeavor, the pipe industry promises to run ahead of scientific advance in other classes of material.

Many other experiences could be enumerated if space would permit, for instance, our early discouragement when our chrome alloy plates under certain acids, changed to a condition similar to black rubber and the co-operation of interested steel mills to solve this problem.

Our plants and personnel always have urged the steel industry to observe our use of alloy steels, and the results we have obtained. Through these contacts, all have co-operated with enthusiasm in the standardization of accelerated tests.

Our admiration is added to that of other laymen outside the steel industry for the tremendous energy and vast scope of an industry which is based on a product selling for a few cents a pound at the mills. We can be sure such an industry will develop steels selling at economical prices, which will eventually widen its scope of operations.

## Trench Knife Performs Variety of Jobs

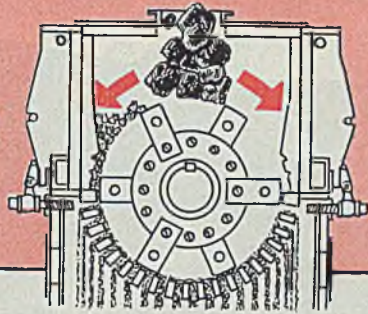
A utilitarian trench knife, manufactured by Imperial Knife Co., Providence, R. I., is made so that it fits over muzzle of a carbine rifle for use as a bayonet and also can be used to open cans, pull nails, whittle wood, and do many odd jobs.

Knife is made of finely tempered steel and is formed, ground, heat treated and honed to a razor-like edge. After a final polishing, blade is Parkerized to resist corrosive effects of all kinds of weather, according to a recent issue of *The Parkerizer*, published by Parker Rust-Proof Co., Detroit 11. Finish both protects blade from rust and also removes gleam that might attract enemy attention in combat. Blade is provided with a handle composed of leather rings tightly pressed together on shaft.

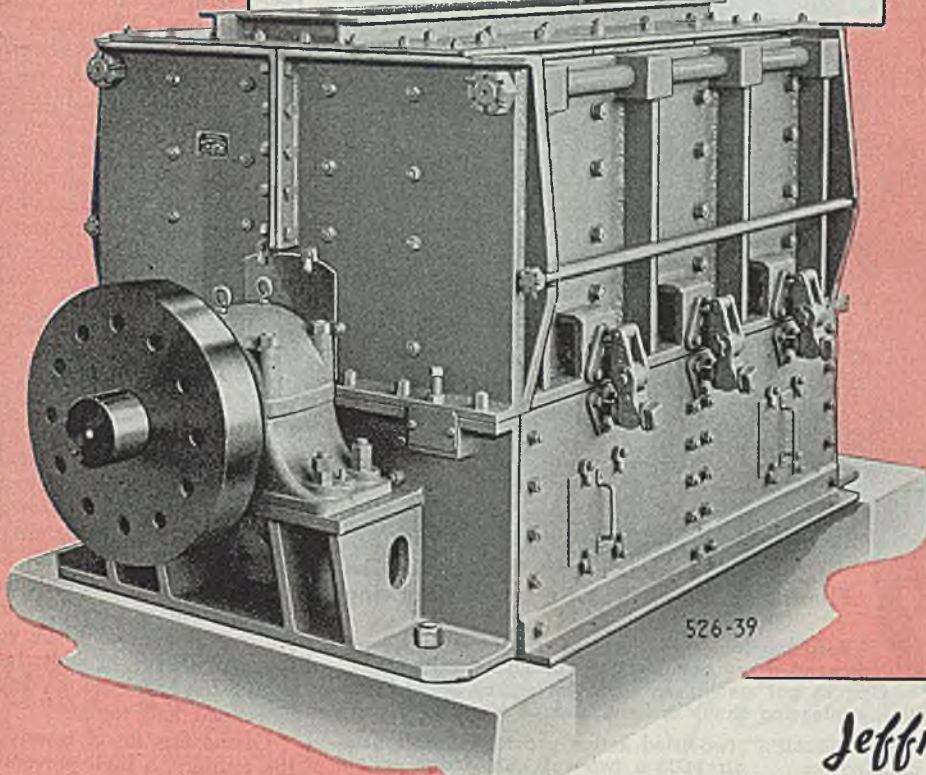


REVERSIBLE TO

SAVE YOU TIME



The reversible feature of this Jeffrey Heavy Duty Hammer Crusher saves 50% of the time ordinarily required to turn hammers in one-way crushers.



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Saves time, more economical and better sized product where coal is prepared for making metallurgical coke. Capacities up to 300 T.P.H.



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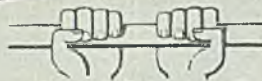
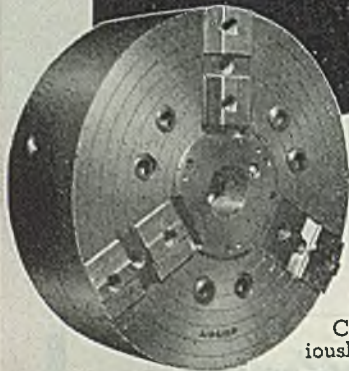




# Get Ready for Reconversion Production



*"Chuck" High Machining Costs*  
with **AIRGRIP**  
*Chucks*



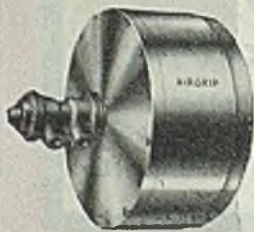
**"AIRGRIP'S" Two-Fisted Gripping Power**

**Eliminates Slow, Costly Manual Chucking**

Reconversion — and returning competition — will demand every possible cost-cutting help. "AIRGRIP" Chucks cut machining costs—save time spent laboriously releasing chuck by hand, reduce set-up time.

Also, "AIRGRIP'S" two-fisted action provides double gripping power . . . air PLUS a two-way cam-wedge action. Locks jaws mechanically when gripping externally or internally. Even if air supply fails, cam-wedge locking power holds work securely, prevents accidents.

To push output up . . . to push production costs down . . . equip your lathes with "AIRGRIP" Chucks.



**"AIRGRIP" Revolving Air Cylinders**

Cut maintenance costs! "AIRGRIP" Revolving Air Cylinders operate for years without attention—wear is automatically taken up by air pressure within cylinder. No manual adjustments. Patented double ball bearings permit speeds formerly impossible.

OTHER ANKER-HOLTH COST REDUCERS include Air Operated Collets, Arbors, Mandrels, Drill Press Chucks, 2- and 3-Jaw Finger and Compensating Chucks, Revolving Air Cylinders, Lubricating Assemblies, 3- or 4-way Air Valves (hand or foot operated), etc. Also Hydraulic Power Units and Fittings.

Write, mentioning Products on which you desire Bulletins

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# ANKER-HOLTH

## MFG. COMPANY

2792 Connors Street

Port Huron, Michigan

When buying new lathes, specify "AIRGRIP" Chucks and Cylinders

## X-Ray in Postwar Era

(Continued from Page 103)

the radiographs. After the 3-week period, co-operation between Delco and the foundry resulted in an improved casting technique which reduced rejects to less than 2 per cent.

It is a safe guess that without X-ray this process of improvements would have consumed a very much longer period of time. A reproduction of a typical X-ray picture of the troublesome housing is shown in Fig. 4.

In another case, a simple aluminum bearing housing was ordered from a foundry, and all deliveries were radiographically inspected upon their receipt. Blow holes and porosity were discovered. Delco returned the faulty parts and sent along sample radiographs. By making an analysis of the problem from the information supplied by the radiographs, this foundry successfully changed its technique, and within a surprisingly short time the rejection rate dropped to less than 1 per cent. Obviously, much more important than the value of such a simple rough casting is the amount of irreplaceable time saved by Delco in machining only perfect castings. Radiographs of good and bad samples of this part appear in right and left halves, respectively of Fig. 1.

### Castings for Electric Motors

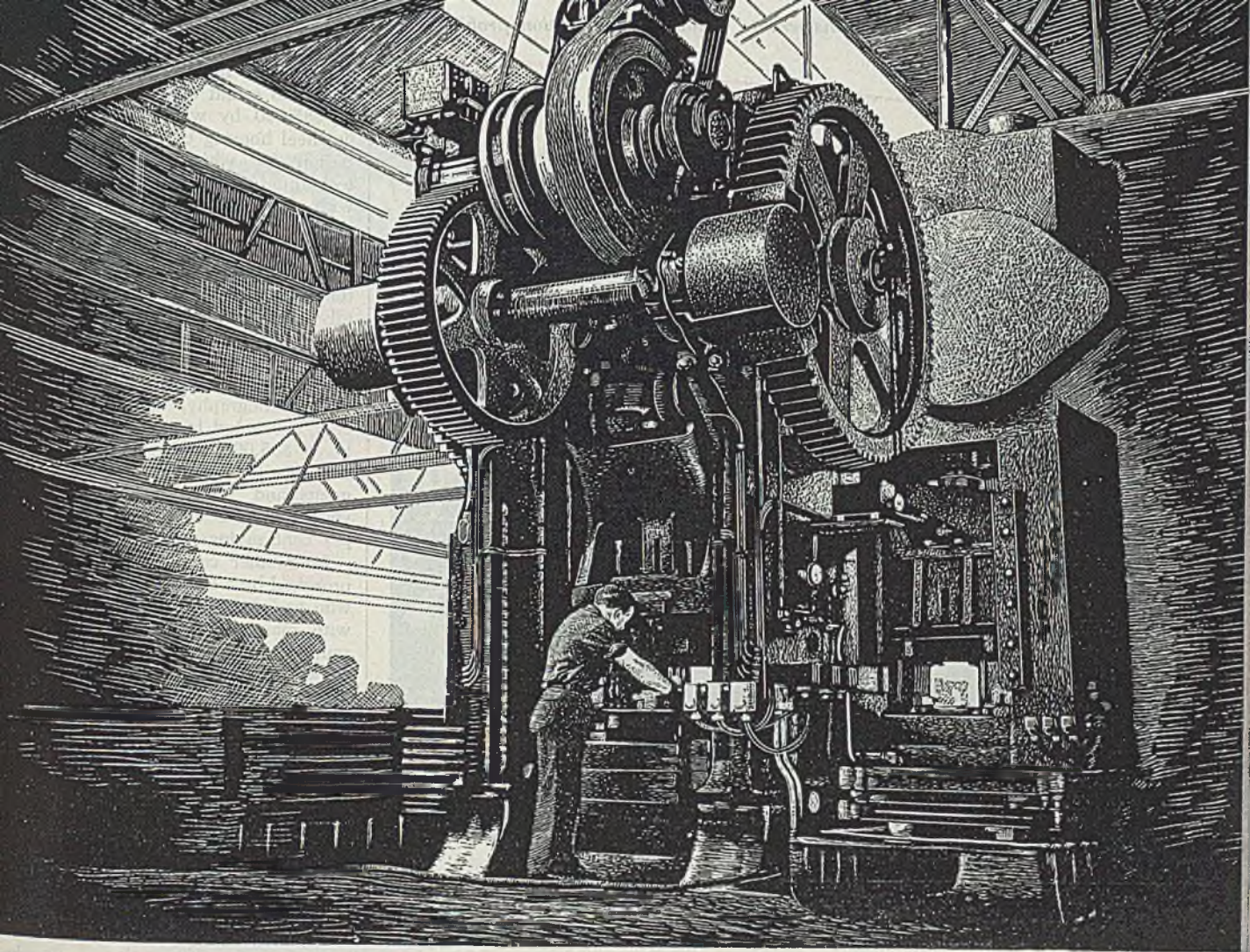
In another case, Delco required considerable quantities of small aluminum motor shaft housing castings which had to be supplied with 3-piece metal inserts. If the inserts were not properly located and soundly bonded to the casting metal, electric motors for which parts were intended could not perform properly. Imperfections here could be very costly, as they could not possibly be determined until after the motor was completely assembled and tested.

Of the first lot of inserts delivered by the foundry, a high percentage were rejected because the inserts were not properly aligned or completely bonded to the base metal. Many changes in technique were tried, radiographed, and studied by the foundry. Problems were finally overcome, and rejection rate on the improved castings is now less than 5 per cent. Here is a case where a part so small that 140 of them can be X-rayed on a 17 x 14 film might nevertheless have proved a very serious production bottleneck without the help of Roentgen's rays.

Delco also finds X-ray useful in connection with its own production of plastic products, such as aircraft distributors with copper inserts. In Fig. 2 are shown radiographs of both imperfect (a) and acceptable (b) distributor moldings. The distributor picture on the left probably would not function properly because one of its inserts is bent so badly that it might arc with one of the inserts on its left. If defect had not become apparent until final assembly, valuable machining hours would have been wasted.

Oberdorfer Foundries at Syracuse





## WHAT TO DO...WHEN A *Big Bertha* BREAKS

When a drop hammer, forging press or similar-sized giant in the factory production line stops its work due to a broken frame or other part, the resultant loss to output and profits is serious. But how different the picture can be when Thermit welding is called on to avert a shutdown and effects a speedy, permanent emergency repair job!

Thermit welding is being used to great advantage to reclaim damaged heavy parts such as axles, machine frames, crankshafts, hot strip rolls, crab couplings, tube rolls, pinions, gears and other heavy tonnage parts.

The Thermit weld is as strong as a forging of the same cross-section and the dense, sound weld

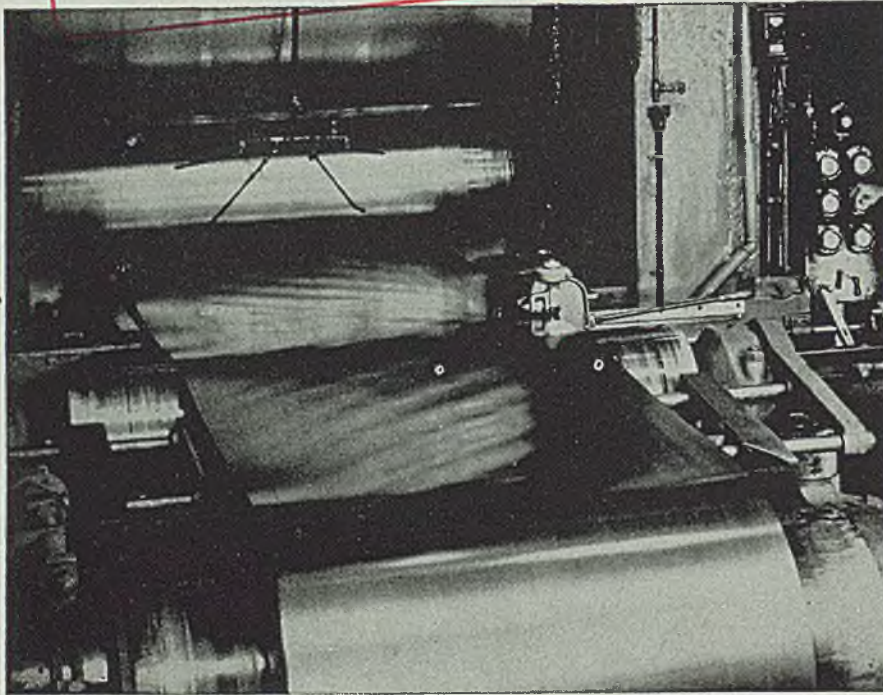
requires no stress relieving. No preliminary machining is necessary. Thermit welding can be done in your own plant by your own crew, after instruction by an M & T supervisor, or at one of the M & T plants.

In addition to repair work, Thermit welding is widely used for the fabrication of large units from smaller castings, forgings, or flame-cut shapes. This saves time, money and handling of very large units. For complete information on the Thermit welding process write today for booklet, "Thermit Welding", to Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y. Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

**Thermit**  **Welding**



# "Penola Prescriptions"



**THE PROBLEM...**In a mill rolling stainless steel, oil is used as a roll lubricant. After cold rolling, the steel is annealed. Considerable effort is required to remove all the oil from the sheets before annealing. This additional process is necessary because oil left on the sheets forms a hard deposit that stains and is difficult to remove.

**THE DIAGNOSIS...**A lubricant which would eliminate the cleaning process, would speed up production, and result in a substantial money saving. This lubricant must provide all the required protection against friction, but must also leave no damaging residue.

## THE PRESCRIPTION...

*Rx*

### CALORIA 50

This unusual lubricant possesses a high melting point. Its most amazing feature however—possessed by no other lubricant, save those in the Caloria group—is that it disappears completely when it evaporates. Spraying Caloria 50 on the stainless sheets during the rolling process entirely eliminates costly and time-wasting cleaning.

## PENOLA LUBRICANTS

PITTSBURGH, PA. • NEW YORK • CHICAGO • DETROIT • ST. LOUIS



PENOLA PRODUCTS HAVE MEANT EXTRA PROTECTION SINCE 1885

N. Y., have found that X-ray pictures have enabled them to convert scrap parts that would be worth only \$840 per month to sound castings having a value of \$35,000 by welding imperfect 40-lb flywheel housing castings of complicated design for which no perfect casting technique yet has been developed. Even with the most careful methods, flaws occurred in this part, causing 12 per cent rejections.

More serious than the scrap loss was the time loss, since deliveries were rapidly falling behind requirements. Fig. 3a is a close-up of a typical flaw as marked. Fig. 3b shows how area appeared after repair weld was made. Here radiography, as proof of soundness, accounted for the salvaging monthly of \$35,000 worth of parts, enabling the foundry to meet delivery requirements and, in addition, to increase yield and pass on to its customer a 20 per cent savings.

In another case, Oberdorfer was approached by a builder of gasoline engines who had designed a new style crankcase with many desirable qualities. It was simpler in design, lighter in weight, and could be machined rapidly and economically. Several other foundrymen who the builder felt could do the job also were contacted. Most of them believed that the casting had such features that it would be impossible to produce and suggested design changes; but since such changes would have eliminated many of the advantages offered by the original, the builder persuaded two of the foundrymen to have a try at it.

### Radiographs Eliminate Defects

After trying for 3 weeks, one foundryman gave up. Oberdorfer was meeting with better success but was having considerable trouble with bad shrinkage in the manifold exhaust ports. By making radiographs of successive castings for study and analysis, they were able to eliminate defect after defect as they occurred. A standard trouble-free pouring technique finally was worked out and delivery of sound castings was started. The engine builder found that castings met requirements and that machining and performance were entirely satisfactory. As a result, Oberdorfer was given an order for all the crankcases required instead of a portion as had been originally intended.

Radiography can be helpful in determining proper pouring temperatures for diecasting as shown by the following case history. A foundry was delivering large quantities of castings that looked good and appeared sound but, as a result of irregularities uncovered during machining, were being rejected in quantities amounting to 45 per cent of production.

These rejects not only cut the yield of the foundry to a very low figure, but caused serious delays in meeting delivery schedules. Careful investigation of the returned rejects by the chief metallurgist determined that the reasons for the rejections were enlarged grain sizes



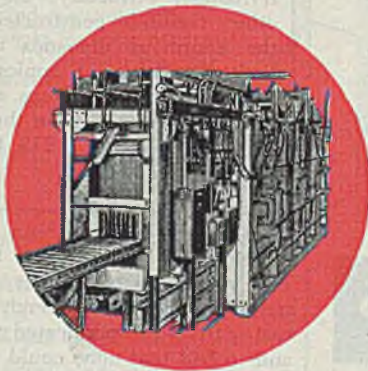
# ENGINEERING

# Plus...

Postwar competition among manufacturers in the metal-working industry will put a high premium on production economy. Because effective heat treatment is so important in determining production costs and product quality in many instances, heat treating processes and equipment merit the closest scrutiny today.

The principal characteristic of the design of a Holcroft Heat Treating Furnace is that it combines combustion and metallurgical engineering with more than 30 years of experience in this one specialized field.

Of this combination, experience is the more important for it is the best assurance that the furnace, when put into commission, will do just what is expected of it and operate at a minimum cost.



*Before carrying your postwar plans any farther, consult with Holcroft engineers on your heat treating procedure.*



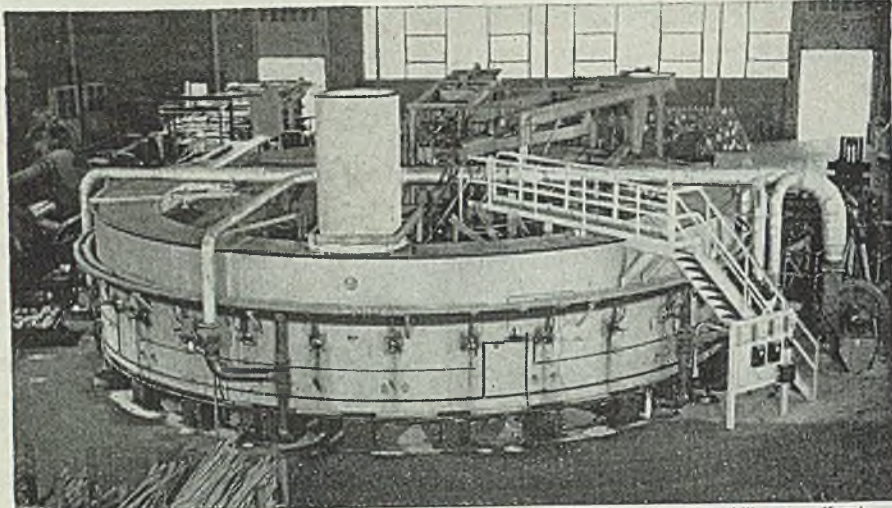
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CHICAGO—C. H. Martin, 1355 Peoples Gas Bldg.  
CANADA—Walker Metal Products, Ltd., Walkerville, Ont.





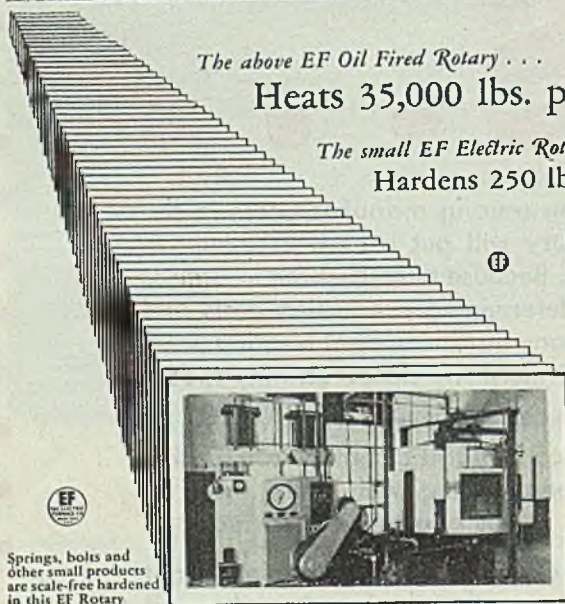
Large billets are uniformly heated in this EF Rotary.

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Our files are the designs and complete records covering the thousands of EF Rotary and other continuous and batch type furnaces we have built—the result of over 25 years of practical furnace building experience.

Products ranging from small balls for bearings to structural shapes 90 feet long are being handled in EF furnaces.

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and porosity caused by imperfect pouring temperatures. The foundrymen felt that the importance of the pouring temperature was overemphasized and pointed to the apparent soundness of the castings which were being produced. Experimental melts were poured at temperatures of 1250, 1350, 1450, and 1550 F, respectively, and radiographed. The latter three were increasingly grainy and porous as shown by the radiographs (Figs. 5a, b, c and d) and only the melt poured at 1250 F was satisfactory. This temperature was adopted as standard and rejections dropped to less than 15 per cent, increasing monthly acceptances by 200,000 lb of production.

Now consider a case in an alloy steel casting foundry. In 1943, the Cooper Alloy Foundry Co. of Hillside, N. J., was offered a contract for turbine-type supercharger diaphragms, with an initial

### "Steel Expansion for War" Available in Book Form

Report prepared by W. A. Hauck of the Steel Division, War Production Board, has been reprinted in the form of a 192-page book with 148 illustrations of principal steel industry projects. Included are details on capacities, costs, reconversion and other factors involving ore transportation, ferroalloy, refractory, blast furnace, other facilities constructed to meet the enormous demands of war. A limited number of copies of "Steel Expansion for War" are available at \$2 each, postpaid, from the Book Department, STEEL, 1213 West Third street, Cleveland 13.

production requirement of ten per day. The requirements on this part are extremely rigid. Even though centrifugally cast, parts were permeated with porosity and so bad that none could be delivered.

Changes could not be made easily in the gating practice because of the centrifugal technique, and the casting design precluded significant changes in pouring temperatures. Moreover, the metal had to be hot enough to flow through the thin vanes in the flange. Experimentation was begun with different sand compositions, mold cleaning and venting practices, and the successive radiographs, made as improvements persisted, soon resulted in sound castings. The difference between an early attempt and the present product is shown in Figs. 6a and 6b. Well over a hundred of these critical parts are now produced daily with rejections less than one-half of 1 per cent—through X-ray.

The 1000-plus users of industrial X-ray are finding that it solves many more problems than those concerning solely with inspection. Its continued use through the postwar years should mean structurally sound and safe, efficiently produced products.

## The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces—For Any Process, Product or Production

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# Investigate

## POLLAK'S CO-RELATED FACILITIES

### FOR MANUFACTURE OF PRODUCTS AND ASSEMBLIES FOR POSTWAR PRODUCTION

Looking ahead to the time when materials and manpower can again be devoted to industrial production, we list below some of the specialized features of Pollak facilities.

Pollak has ample equipment in these specialized departments for coordinated operations

to turn out complete products and assemblies.

Pollak also has engineering and research facilities for designing and building complete products preparatory for production, *when our plants are released from war work.*



#### FACILITY NO. 1

##### BLANKING—STAMPING—DRAWING

Complete facilities in these departments, ranging from very small precision work to medium heavy work in carbon steel, stainless steel, brass, bronze, Monel Metal, Inconel, aluminum and the stronger aluminum alloys. Maximum depth of draw  $11\frac{1}{2}$  inches; maximum diameter of shallow stamping about 45 inches.

#### FACILITY NO. 2

##### SHEET METAL FABRICATING

Ample equipment for long runs in conjunction with other featured services ranging from lightest up to  $\frac{3}{4}$  inch in steel and up to  $\frac{1}{2}$  inch in aluminum. Includes fabrication of tanks and process vessels of all the corrosion resistant metals.

#### FACILITY NO. 3

##### WELDING AND BRAZING

Specializing in and equipped for large production in welding and brazing by oxy-acetylene, oxy-hydrogen and electric arc processes, particularly in the more difficult alloys.

#### FACILITY NO. 4

##### ELECTRIC SPOT WELDING AND SEAM WELDING

Equipped in the various ranges for very light work and up to  $\frac{1}{4}$  inch material in steel and up to  $\frac{1}{8}$  inch material in aluminum.

#### FACILITY NO. 5

##### MACHINE WORK

In this department we are equipped for large scale production. Hand screw work from the smallest up to  $3\frac{1}{2}$  inch diameter bars. Multiple-Spindle Automatic Screw Machine work from the smallest up to  $2\frac{5}{8}$  inch diameter bars. Lathe, Milling Machine and Drill-press work in capacity to balance other departments. In addition to normal, general purpose equipment, we design and build special manufacturing equipment, when justified by production requirements.

These Pollak facilities are operated in conjunction with other manufacturing departments such as Spinning, Electrical Work, Heat Treating, Assembly and Plating. These individual Pollak facilities are operated as a unit and ordinarily they are available only for work of a nature which will keep this operation in balance. However, this limitation is not always applicable.

# POLLAK MANUFACTURING COMPANY

Arlington, New Jersey



of patching is about all that has kept that there might be some shortage

Forming,  
Welding,  
Fabricating—



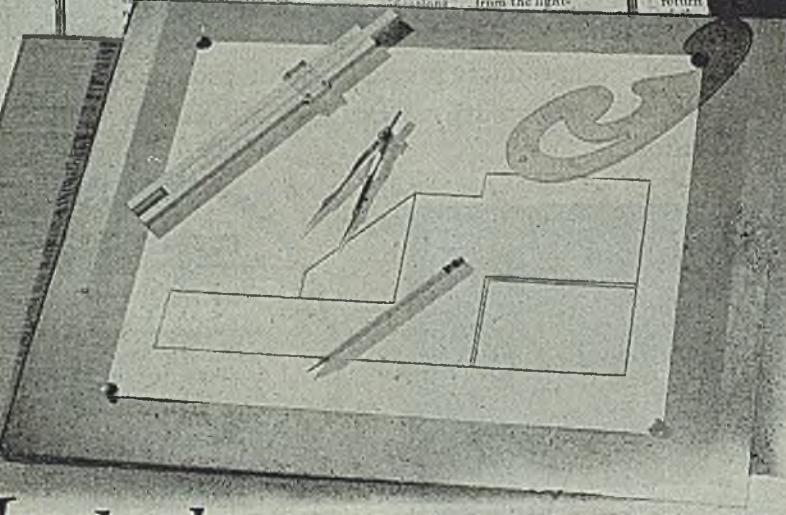
3000 lb. Electro  
Processing Oven  
of 1 1/2' steel plate  
(50" long x 30"  
inside diameter)  
shown with rock  
wool jacket re-  
moved... fabri-  
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Here is an 8 1/2 acre plant... with the most modern equipment for  
rolling, forming, welding and completely fabricating ferrous,  
non-ferrous and alloy metals to your specifications.

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return



Include

## BRANDT in Your Postwar Plans!

Whether you'll return to your old product, or enter an entirely new field after the war, you will more than likely need the services of an experienced metal-fabricating plant. That's where Brandt can help you!

The Brandt 8 1/2-acre plant houses the most modern equipment for shearing, rolling, forming, welding . . . completely fabricating ferrous, non-ferrous and alloy metals to your specifications. Machine capacities range from the lightest gauge sheet up to and including 1 1/4" mild steel or 3/4" armor plate. At the present time our production ranges from small, formed units to huge fabricated assemblies.

Our designers and engineers will welcome the opportunity to assist in planning the details and specifications of your product. Naturally your plans will be held in strictest confidence. So if there is a fabrication or design problem in your postwar plans, we invite you to discuss it with

# BRANDT of Baltimore

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## Progressive Heating

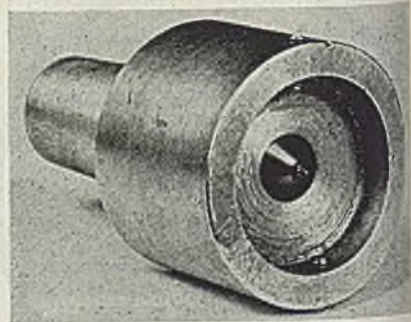
(Concluded from Page 104)

guaranteeing uniform temperature drop.

The time per spacer in treatment was found to range from 3 to 6 sec which means from 600 to 1200 per hour of continuous operation. Actually we have to stop at intervals of approximately 50 spacers and remove the treated parts from the quench. But the output was increased tremendously over the old method, the evils of brittleness and warpage stopped, an operation eliminated, and the job made ideal for a woman operator.

## Head Stock Spindle Turns Large Bolts

A head stock spindle, shown in illustration, has been developed at General Electric's Pittsfield Works to turn large bolts of the body-bound type. Handling time, both in and out of the lathe, has been reduced 50 per cent. Both ends of



bolts are centered, and, when they are placed in the lathe, a drive force is obtained by contact with two 7/8-16-in. set screws. Regardless of how bolts are turned, it is necessary to center both ends for grinding. This method eliminates the slow, conventional method of holding bolts in a chuck, increasing production.

## Bronze Electrode Used with AC, DC Currents

A coated special bronze alloy electrode, EutecTrode 28, has been developed by Eutectic Welding Alloys Co., 40 Worth street, New York 13, for use in arc welding bronze, brass and copper. It is shielded with flux coating, making it suitable for use either on ac or dc current. Electrode deposits dense and tough metal that is a good color match to most bronze, and is said to give welded area substantially the same corrosion resistance as various base metals possess. It also may be used for welding copper and brass or joining these metals to steel, cast iron, or nickel alloys, and for overlaying steel or cast iron to provide good bearing surface. Electrode is available in 1/8-in. and 3/16-in. diameters with a light green tip. Procedure sheet on proper use and application of EutecTrode 28 may be obtained from Dept. A-2 of the company.



*New*

# NORFLEX POLISHING WHEELS

Many finishing, de-burring and polishing jobs on welds can be done better and more economically with NORFLEX\* Polishing Wheels—a new Norton development.

Available in three types to meet varying conditions and requirements they all have the common characteristics of leaving smooth, uniform finishes. In all three types the abrasive is uniformly impregnated throughout the wheels from periphery to hole. Also common to all three is the flexible type of bond which supports and holds the abrasive particles in place.

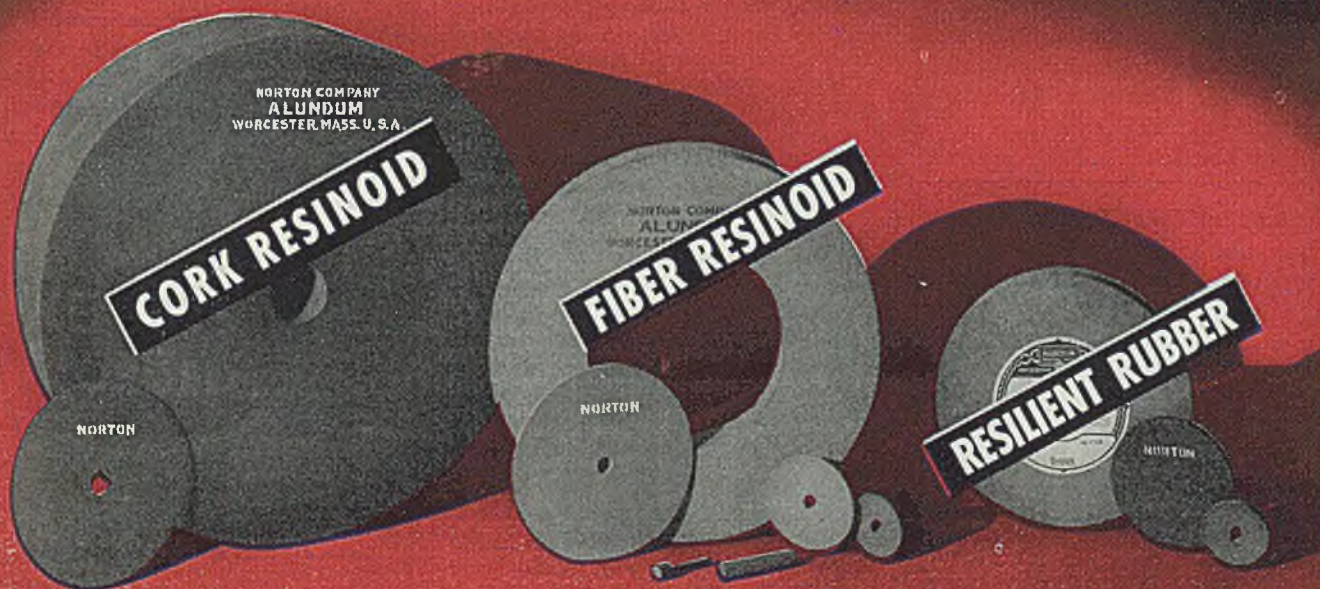
The ability of NORFLEX Polishing Wheels to meet a wide range of conditions is due to the available choice of cushioning materials in the bond: Fiber Resinoid, Type F; Resilient Rubber, Type R; and Cork Resinoid, Type C. Your Norton abrasive engineer or Norton distributor will give you the complete story.

**NORTON COMPANY, WORCESTER 6, MASS.**

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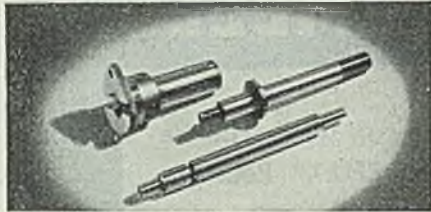


**NORTON ABRASIVES**



## PRECISION PARTS

FOR THE LONG GRIND AHEAD  
IT'S EXPERIENCE THAT COUNTS



... intricate brazing-jobs made easy

When the last Jap lays down his gun, American industry will begin settling back to competitive production. No longer will it be production for production's sake. The business will go to those manufacturers who have learned a faster, better way of doing things, and who can apply their war-time lessons to the peace-time years ahead.

Grinding-out small parts by the thousands, yet holding to amazingly close tolerances, is an Ace war-time accomplishment that offers real competitive and performance advantages. Here you will find the experienced operators, the up-to-the-minute machines and equipment, and the responsibility of intelligent management to handle your parts from rough stock to finished piece.

If you have any small parts and assemblies calling for stamping, machining, heat-treating, and grinding, it will pay you to consult with Ace. Send sketch, blueprint, or sample for quotations.

### GRINDING CAPACITY NOW OPEN

The Idler-Shaft, the Rotor-Shaft, and the Clutch-Bushing shown above are typical of Ace grinding-operations. They involve internal, external, thread, and centerless grinding to .0002" tolerances. Ace makes these parts by the thousands, and a modern, well-equipped inspection department assures uniform accuracy of each piece.



**ACE MANUFACTURING CORPORATION**  
for Precision Parts



1249 E. ERIE AVENUE, PHILADELPHIA 24, PA.

## Tapered Bearings

(Continued from Page 112)

accuracy have been designed and built especially for this work.

So close are the limits maintained that gages for checking angles of cups, cones and rollers are measured on a machine capable of measuring to a single second of arc—one millionth part of a complete circle.

An important step in the inspection of finished cones and cups is the Magnaflox test, Fig. 14. Here the parts are strongly magnetized and a solution carrying small iron particles in suspension is run over the parts, revealing any minute surface or subsurface defects. Even cracks too small for the eye to see become clearly evident.

After demagnetizing to prevent any metal particles from being attracted into the bearing when assembled, the races are gaged for selective assembly; that is, cones slightly oversized on the outside diameter are matched with undersized rollers so that the entire assembly meets the strict standards set up for dimensional accuracy. Similarly, undersized cones are matched with oversized rollers. Parts are assigned an index number according to the group of tolerance limits into which the part happens to fall. Then when selective assembly matches the parts by corresponding groups, a correct bearing assembly results.

Fig. 15 shows one of the special gaging setups employed for sizing cones. Fig. 16 shows a similar setup used in checking cups. Both machines employ the tapered working surfaces to multiply the indications, thus enabling standard dial gages to check diameters with extreme accuracy.

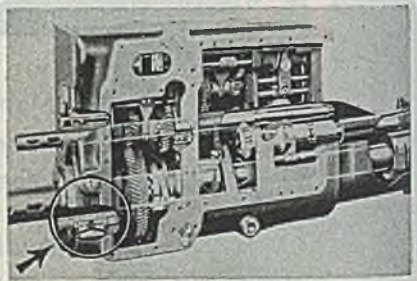
In Fig. 15, the operator places a cone over the lower fixture. A foot-operated treadle then raises the fixture vertically so the tapered surface of the cone engages a master mating surface held stationary in the upper part of the tester. It is easy to see that an undersized cone will go into the master part farther than a correctly sized one. And this measure of displacement from normal position is used to operate a dial gage through a leverage system which mechanically multiplies the movement to still further increase the accuracy of the check.

On this particular setup, the dial is marked uniformly from zero to 12. The limits allowed any cone falling within the range from  $5\frac{3}{4}$  to  $8\frac{1}{4}$  to be passed as O.K.

Fig. 16 shows a similar setup for checking cups. Here the cup is placed over a master mating part on the lower portion of the fixture while a flat plate is moved down against the edge of the cup. A dial gage set to measure axial movement from normal here indicates variations in diameter by utilizing the tapered working surface, as in the setup in Fig. 15.

But the unit in Fig. 16 is also arranged to check uniformity of taper as well. The lower fixture is arranged so

# MAKE MACHINE BEARINGS



## BUSHINGS, SLEEVES, ROLLS AND OTHER HARDENED PARTS OF TOOL STEEL TUBING

Machines can be improved and their manufacturing cost reduced by use of tool steel tubing for tubular and ring-shaped parts. The milling machine headstock shown above has a main spindle sleeve bearing (lower left) made of tool steel tubing, providing several advantages over the previously used bronze bearing. Write for details.

FREE DATA ON  
TOOL STEEL TUBING  
APPLICATIONS

WRITE TODAY  
for your FREE copy



IMMEDIATE  
SHIPMENT FROM STOCK

Carbon and Alloy Steels, H.R. and C.D. • Ball Bearing Steel • Aircraft Steels • Boiler Tubes  
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24S  
ALCLAD 24S  
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ALCLAD 75S



Strong aluminum alloys, available through Alcoa, cover a wide range of mechanical properties.

Designs of peacetime equipment are already feeling the effects of wartime experience with these high strength alloys. The transportation industry, for example, plans to use them to lower weight, increase

speed, reduce power consumption, or get greater payloads.

Data on forming, fabricating and heat-treating these materials are available through Alcoa's engineers. For such information, call our nearest office or write ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pennsylvania.

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*New*

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MALLEABLE  
FERRO-SILICON

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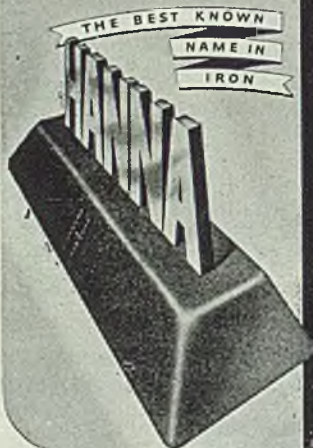
10 lb.

Smaller . . . easier to handle . . . finer grain structure . . . more adaptable to the varied requirements of foundry operation. That's the new HannaTen ingot, produced in all grades of Hanna iron. Take advantage of this important development to attain more uniform distribution in the melt, to assure more accurate control of composition. It's another great Hanna "first."

## The Hanna Furnace Corporation

MERCHANT PIG IRON DIVISION OF  
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that it can move differentially with the upper contact. Then as the fixture is revolved with the cup in contact, any variation in taper will show up as difference in reading of the two dial indicators which are mounted in the lower fixture to read this differential movement.

**Production Of Rollers:** The same steel employed in the races of a bearing is also used in making the rollers. However, it comes from the mill in the form of wire cold drawn from the hot-rolled rod. Smaller sizes of rollers up to 1 1/4 in. in diameter are made on mechanical upsetters, Fig. 17, which work the stock cold to the desired shape. Larger sized rollers are machined from bar stock.

Wire size is chosen so that the up-setter reduces the wire on the small end of the roller and upsets it at the large end.

After being carburized and hardened, rollers are finish ground in centerless grinders like that in Fig. 18. Rollers are ground from two to six times, depending upon size and precision wanted. Rollers are then gaged automatically for selective assembly in specially designed units that divide them into groups according to size. In the broadest tolerance range, each group will cover a range variation of one-fourth of a thousandth of an inch. Usually there are eight groups, four above and four below the nominal dimension. But 12 to 16 may be employed for ultra-precision bearings wherein each group covers a size range of only 0.0001 (1/10,000)-in. or less.

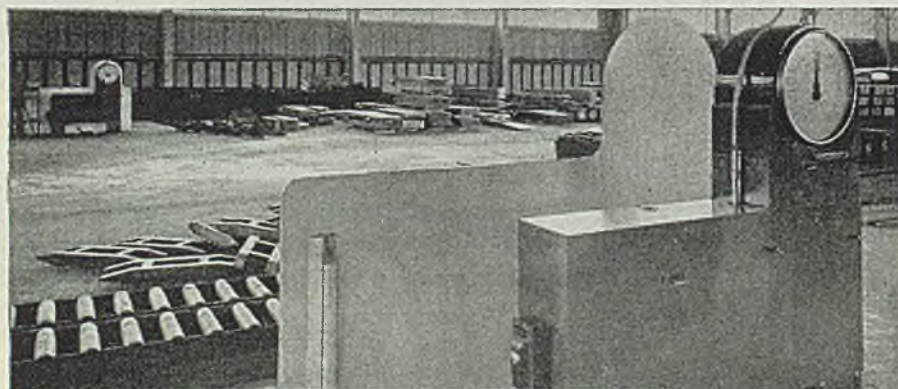
Such extreme precision is essential for proper operation of the bearing, for the load will not be carried uniformly by the rollers unless they are exactly identical in size. That is why they must be matched so closely. Then too, this close grouping enables the rollers to be matched with cups and cones in the various tolerance groups so that the completely assembled bearings will come out exactly to size.

As an example of how these tolerance groups are set up, the nominal diameter of a tapered roller at the midpoint along its length may be 0.50000-inch. For a particular type of bearing where maximum precision is not required, the groups may cover a total range of plus or minus 1/1000-in. divided into eight groups, each covering one-fourth of a thousandth of an inch as follows:

Above:	Below:
0.50000-0.50025	0.50000-0.49975
0.50025-0.50050	0.49975-0.49950
0.50050-0.50075	0.49950-0.49925
0.50075-0.50100	0.49925-0.49900

Of course, ultra precision bearings will have tolerance groups with ranges covering one-tenth of a thousandth, or less.

**Automatic Gaging Machine:** The device that automatically checks the rollers and separates them into the tolerance groups is most interesting. It works at great speed, yet is so accurate that if all the rollers that have been separated into a single group are re-run through the machine, less than 5 per cent of them will go to the groups on either side. And this is unavoidable since that number



## FINISHED Steel WEIGHTS *Automatically* RECORDED

THE accurate recording of finished product weights is a highly important steel mill operation. The illustration shows two Streeter-Amet Type B units. The one in front automatically records the weights of flat sheets as received from the flying shear. The rear unit records weights of sheets in

bundles preparatory to shipment. In both installations, weights are automatically printed in clear type . . . providing accurate, dependable records for all departments concerned. Streeter-Amet recorders serve all branches of the steel industry. Write for an engineering bulletin.

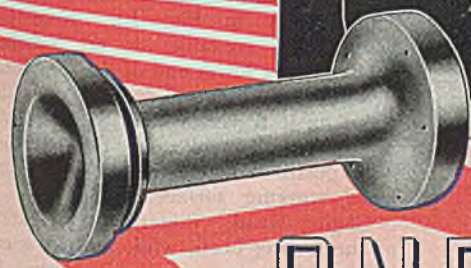
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Automatic Weighers, Recorders, Scales and  
Services. Founded 1888.

# STREETER-AMET



THE MOTION PICTURE



# ONE MACHINE... SETTING...

**PERMITE PERMANENT MOLD ALUMINUM CASTINGS  
CUT TIME ... CUT LABOR ... CUT COSTS**

★ Do you know that multiple-operation machining on aluminum castings is perfectly feasible — when Permitem Permanent Mold Castings are being worked? The permanent metal mold makes castings accurate to  $\pm .01''$ . And all castings are dimensionally uniform, since every casting comes from the same mold. That is why you can use automatic machines with Permitem Permanent Mold Castings — why you may be able to run the whole finishing job with one setting of the machine.

Illustration shows a 6-spindle Acme Gridley Automatic, on which Permitem Permanent Mold Aluminum Cast Master Brake Pistons are being machined at the rate of 1200 per hour.

Permitem Permanent Mold Castings save time—labor—and overhead. You have less metal to remove. Greater tensile strength often permits thinner cross sections, giving you less weight in the finished part. Recommendations and estimates submitted without obligation.



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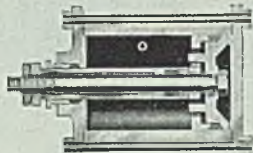
New York: 9 Rockefeller Plaza

Chicago: 616 South Michigan Avenue

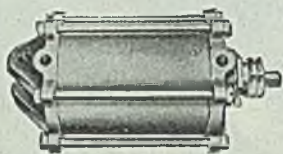
Atlanta: 413 Grant Building

**PERMITE ALUMINUM ALLOY CASTINGS**

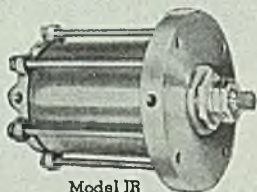




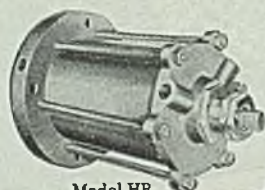
Sectional View



Model BR



Model JR



Model HR

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Hannifin Air Cylinder design provides bored and honed cylinder bodies and adjustable piston packing—two features for better performance.

Proper piston fit in a highly finished cylinder body means minimum leakage, minimum friction, and full power available for useful work. Hannifin cylinders, in all sizes, are bored and honed, producing a cylinder interior that is straight, round, perfectly smooth. The Hannifin adjustable piston packing design allows easy maintenance of a high efficiency piston seal.

Hannifin Air Cylinders are built in a full range of standard types and sizes. Write for Bulletin 57. Hannifin Manufacturing Company, 623 South Kolmar Avenue, Chicago 24, Illinois.

# Hannifin

PNEUMATIC CYLINDERS

## VOLUME PRODUCTION

to meet the Growing Demands of War and Industry for



## WISCONSIN *Air-Cooled* ENGINES



Highly systematized, progressive assembly of Wisconsin heavy-duty air-cooled engines keeps them coming off the production line in a steady, uninterrupted stream. Every operation is handled by a thoroughly trained workman who performs his specialized job with speed and skill.



The picture shows a run of Model VE-4, V-type, 4-cylinder engines going through . . . for power destinations on many types equipment. Perhaps one of these heavy-duty engines has been reserved for service on your equipment.

Most H.P. per pound



# WISCONSIN MOTOR

Corporation

MILWAUKEE 14, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

of rollers in a single group may easily have dimensions right on the limit line.

Thus if all rollers in first group at left above are re-run, some of them may actually be 0.50024 or 0.50025 and these may go either into the first or second group since they are right on the dividing point.

As can be seen in the background in Fig. 19, there are row upon row of these gaging machines, all working automatically. The operator need only keep the hopper loaded. From the gaging head, the rollers slide down a chute. Solenoid operated trap doors in this slide are controlled by the gaging head. As the roller slides down the chute, it encounters one of the trap doors which allows it to drop down a tube leading to one of the dust tight containers in which the individual tolerance groups are collected for selective assembly.

The sloping slide and the tubes leading to the individual containers can be seen clearly in Fig. 19. Note just above each container is an S-shaped casting in the lower end of the tube feeding it. These slow down the falling roller as it traverses the "S" so it will not strike other rollers in the container with possible damage to its highly finished working surface.

**Gaging Head:** Principle of operation of the gaging head, while simple, is extremely ingenious. Fig. 21 shows in simplified schematic form how the tapered surface of the roller is employed to mechanically amplify the diameter reading, similar to the cup and cone gaging setups. The holding device at A feeds the roller B into gaging ring D having a mating tapered surface at C that engages the tapered surface of the roller. It is evident that a roller with smaller nominal diameter at its midpoint will travel into the gaging ring farther than one with a larger diameter.

But A always advances the roller to the same fixed position. So any variation in amount of engagement with the gage ring D will show up by moving D to a different position, since D is free to slide between the guides H and H' and is held against the roller B by a spring, not shown. Thus, the position of D can be used to measure the diameter of the roller.

This is done by mechanically linking the gage ring D with an electrical contacting reed F so F is made to engage one of the contacts at G, according to the position of D. These contacts in turn operate electric solenoids connected to trap doors in the chute down which the roller is discharged immediately after registering in the head. The whole system is carefully calibrated and maintained so that its accuracy is extremely high.

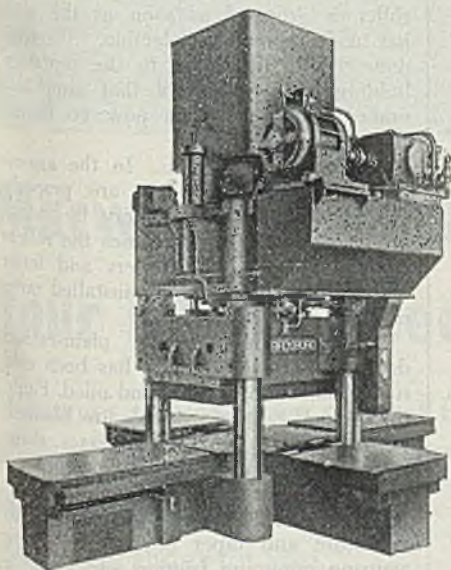
To prevent the reed F from engaging two contacts when the roller gages exactly on the dividing line between two tolerance groups, the reed end is shaped to a knife edge and a mechanism is incorporated to move it radially into the electric contacts through a series of other knife edges which separate the contacts. Thus, the reed cannot con-



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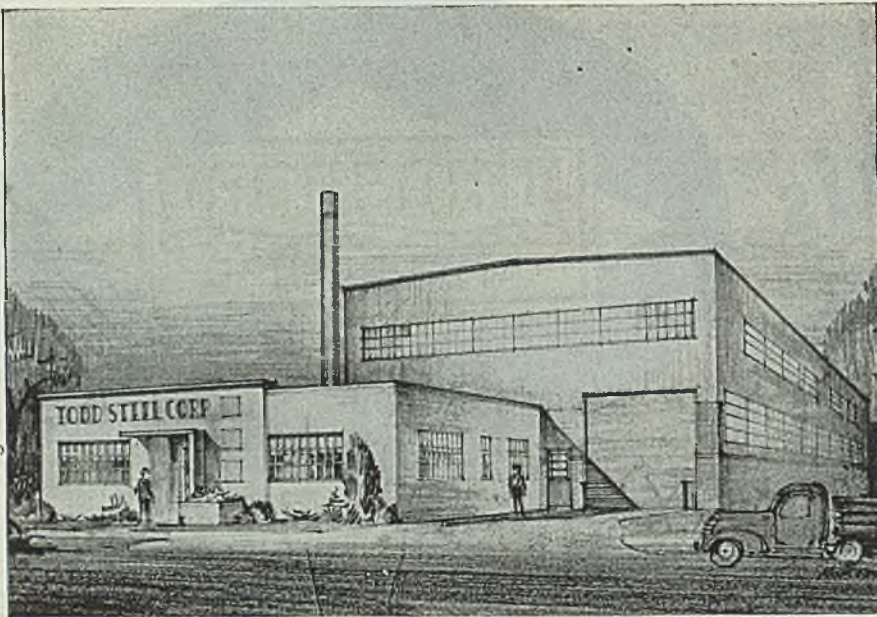
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# **STEEL SERVICE**

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May we serve you?



# **TODD STEEL CORP.**

376 MIDLAND AVENUE

**DETROIT**

**MICHIGAN**

tact more than a single point at a time. Of course, diagram Fig. 21 is simplified for sake of illustrating the action. The actual machine employs a somewhat more complicated arrangement. Let's follow through the operation on the machine as illustrated in the close-up, Fig. 20. The tapered rollers are placed in a hopper fitted with a feed mechanism that sends them down the flexible tube A, Fig. 20, where the escapement and feed mechanism B causes the rollers to drop between two parallel knife edges C spaced just far enough apart to catch the big end of the roller, thus positioning them point down. At this point, any undersize rollers fall through the knife edges and down the chute D into separate containers.

As escapement B feeds an additional roller to the knife edges C, the lead roller already there is dropped down another flexible tube line E, from which point it is fed into the gaging ring at F. This action causes the slide carrying the gaging ring to assume a position depending upon the size of the roller, as was explained above in connection with the schematic, Fig. 21.

Through a mechanical linkage, this operates the reed G (Fig. 20) which selects a contact at H, causing one of the solenoids L to operate one of the trap doors in the chute R down which the roller is dropped as soon as the reed has made its contact selection. The trap door diverts the roller to the container holding other rollers of that same tolerance group. Rollers now go to assembly.

**Production of Cages:** In the assembled bearing, the rollers are properly spaced around the periphery by means of a cage which also confines the rollers so the entire set of rollers and inner race can be handled and installed on a machine as a single unit.

Cages are made from plain-carbon deep-drawing steel which has been cold rolled, annealed, pickled and oiled. Fairly thick stock is used. Cages are blanked, perforated and formed to exact shape desired. The edges which contact the rollers in the cage slots are then "winged" in press dies to exactly conform to the curvature and taper of the rolls, thus assuring minimum friction and long life with minimum wear.

Much of this press work is done on high-speed automatic presses. Use is made of the special graphitic steels perfected by Timken engineers for dies. On a typical job, perforating slots in these cages, graphitic steel dies turned out 300,000 pieces where a set of high-grade tool steel dies produced only 10,000—a 30-to-1 performance ratio in favor of the Timken steel. Too, the finished product had a much better appearance due to less pickup and galling in the dies.

Cages are drawn to relieve stresses and are Parkerized to produce an excellent surface for holding lubricant and reducing wear.

**Assembly of Bearings:** With inner and outer races, rollers and cages accounted for, we are ready to see how they are



# WE MAKE 'EM LARGE OR SMALL!

Here is a striking example of the different size slings made by Macwhyte

**SMALL SLING:** Type No. 5, Macwhyte ATLAS 8-part,  $\frac{1}{8}$ -in., Braided, 3 feet long. Weight — 1 lb.  
Breaking strength — 3.86 tons.  
Safe load with safety factor of 5 — .77 ton.  
Combined safe working load for two — 1.54 tons.

**LARGE SLINGS:** Type No. 2, Macwhyte ATLAS 8-part,  $1\frac{1}{8}$ -in., Braided, 30 feet long. Weight of each — 715 lbs.  
Breaking strength of each — 294.5 tons.  
Safe load with safety factor of 5 — 58.9 tons.  
Combined safe working load for two — 117.8 tons.

## Macwhyte Slings Made in All Sizes to Meet Your Lifting Needs!

Whatever the load, you can get the right size Macwhyte Sling to handle it quickly, easily, safely. We can make one sling or any number of identical slings for you.

Many companies have adopted Macwhyte Slings as standard sling equipment. They anticipate their needs and place blanket orders, with shipments at regular intervals, insuring delivery of slings when they are required.

Buy more War Bonds — hold what you have!

### SEND FOR SLING LITERATURE!

You can avoid production delays by ordering Macwhyte custom-built Slings in time to meet your needs. Ask for recommendations, prices and delivery. Mail your request for more information on your company letterhead. We will send you complete catalog and pictorial literature.

## MACWHYTE COMPANY

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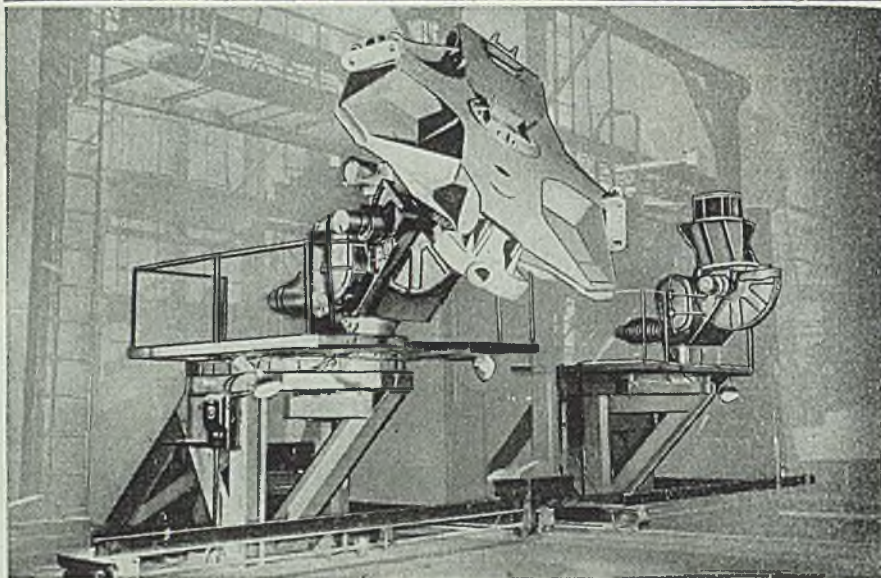
**MACWHYTE SLINGS FOR INDUSTRY**

*"Lifting safety to new heights"*

Macwhyte Wire Rope Slings are made to meet the capacity of any crane built



# C-F POSITIONERS



## Production Set-up like this forecasts a new "shop practice"

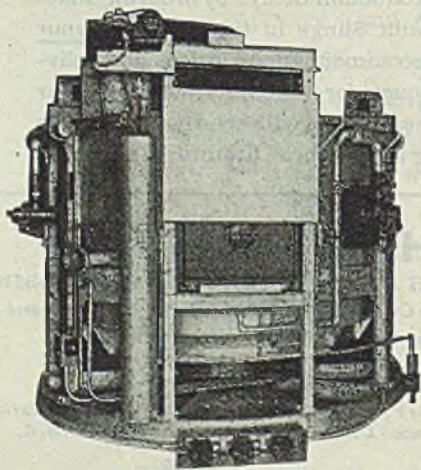
By welding on C-F Positioners, some manufacturers far out-produced all estimates of "possible" "War Production". Not only did this method increase output, it saved material and increased strength and quality while lowering the cost per unit. Under post-war competition automatic welding on C-F Positioners is certain to become standard manufacturing practice for many products. It is a new method that permits downhand welding of all sides and angles from a single set-up. A method you should know and understand.

Write for Bulletin WP-22

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7' 0" Size. Billet—2½" x 2½" x 4½"  
Billets per hour—221. Pounds per hour  
—1768. Used with #3 Maxipress.



### PLUS features:

- \* HAGAN patented method of firing with accurate time and temperature control—every billet forges the same, cold or burned steel is eliminated.
- \* Lower fuel costs with HAGAN Rotary Hearth Furnaces, lower operating temperatures, less heating time, scale losses are lower.
- \* HAGAN furnaces are charged and discharged at one central point labor costs are therefore lower.
- \* Die life is increased, constant uniformity of heated billets.



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informative technical  
bulletins.

## GEORGE J. HAGAN COMPANY

PITTSBURGH, PA.

DETROIT

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LOS ANGELES

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assembled. Fig. 22 shows a typical set-up. Here the cages are fed down to the operating station from a sloping bin at extreme left. Rollers are fed down into bearing from an overhead hopper which automatically loads a vertical tube, in turn carrying the rollers to the assembling fixture.

This loading tube is centered above the fixture and its top is fitted with a universal connection so it may easily be swung over any point of the bearing periphery and there is aligned automatically. A small S-shaped strip mounted on the table just back of the fixture provides a rest point for the discharge end of loading tube when not in use.

Setup works as follows: Operator places the cage in a fixture resembling an outer bearing race; then removes discharge end of loading tube from rest point to periphery of race. As operator revolves cage by hand, rollers fall out end of tube into their slots in the cage. With cage filled, operator sets discharge end of loading tube back on the rest

## Authors of the Bug-Bomb Article

Co-authors of the interesting article on production of "bug bombs" used to spray insecticide, which appeared in STEEL for June 25, Page 118, are P. W. Kohler and E. W. Ditsler, East Springfield, Mass. Works, Westinghouse Electric Corp. Due to an unfortunate oversight, the names of the authors were omitted when this issue of STEEL went to press.

point, inserts an inner race or cone, picks up the cage with rollers and cone and places them in the open station of the automatic 2-station closing machine at right in Fig. 22.

As the machine table revolves, it carries the work under a die head and automatically raises the work to force the cone into position and close the cage in around the rollers, completing the assembly. Machine then ejects the assembly from the dies and an arm pushes it off onto the continuous belt conveyor seen in the foreground, Fig. 22.

After a series of inspection operations, the bearings are cleaned and slushed with a rust preventive. Unit is then packed and is ready to ship.

One of the interesting inspection operations is the noise test. Every bearing is run at high speed (for a short time) and in a setup like that shown in Fig. 23. This is done in specially sound-proofed cells. To a trained ear, the sound of a running bearing tells much about the bearing. Thus, the operator can quickly detect an imperfect unit.

It is this unusual care in inspection, coupled with effective design and the use of hundreds of special machines found nowhere else that accounts for the outstanding performance of Timken tapered roller bearings.





**SAYS THE MAN IN THE HELMET—**

**“Here’s something really hot!  
The new three-purpose  
AIRCO No. 315 Electrode . . .**

*(AWS Classification E 6020)*

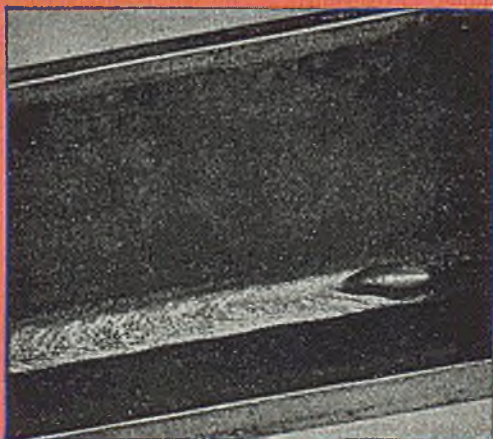
**“I use it for conventional fillet, deep  
fillet, and deep groove welding.  
It’s a honey for all three jobs.**



**“It takes plenty of juice and has a high burn-off rate and faster deposition, which makes it ideal for deep-fillet welding. The arc is steady and forceful and has a fine spraying action, with very low spatter loss.**



**“Passes are deeply convex at the root with good washup and no undercutting at the face. Penetration is medium with normal currents. It’s excellent for all jobs where you need good appearance, high mechanical properties, and welds that will pass rigid X-Ray examination.**



**“Slag covers well and comes off easily. Airco No. 315 can be used with AC and with DC, straight or reverse polarity. You can use it for any job that calls for a 6020 or 6030 electrode.”**

This new electrode is a notable addition to the famous line of Airco electrodes. Whatever your welding need, there’s a quality-proved Airco electrode for every requirement. Catalog No. 120 describes the complete line. Write for a free copy to your local Airco office, or to Dept. S. Address Air Reduction, General Offices: 60 East 42d St., New York 17, N.Y. In Texas, Magnolia Airco Gas Products Company, General Offices: Houston 1, Texas.



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**FOR BETTER WELDS  
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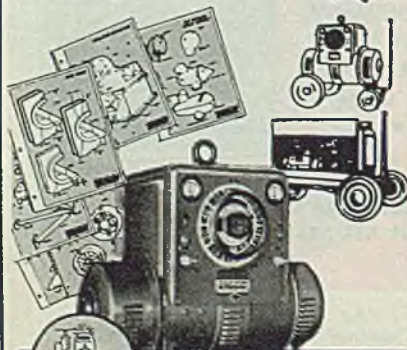
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Hobart's performance alone will prove to you that it is the most outstanding arc welder on the market today. However, don't stop the comparison with performance . . . because Hobart "Simplified" Arc Welding has many more time and money saving advantages. Try its Multi-Range Dual Control and exclusive Remote Control that gives you the correct welding heat for every type of electrode and for every application. Don't overlook its liberal design and quality construction for severest use and long life.

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"One of the World's Largest Builders of  
**Arc Welders**"

**Tube Fabrication**

(Concluded from Page 118)

to 90 degrees on centerline radii as small as 3/4 in.

—Multiple bends, flaring, flanging, expanding, etc. to tolerances 50 per cent closer than previous commercial practice in the industry.

—Making short radius bends with practically no reduction of the inside diameter in the bend area and freedom from wrinkles, waves, scratches and minor fabricating marks.

On some of these parts, it is impossible to locate from either end of the tube after the first operation. Therefore, the first bend must be made to almost zero tolerances and all subsequent locating is from this point.

To prevent rust between operations, parts must be oiled, and in ordinary atmospheres enough dust and grit will accumulate to prevent further fabrication without cleaning. On the more severe mandrel-bending operations, a very heavy lubricating medium is required and means had to be developed to keep this medium free from steel particles, grit, etc.

If the inside diameter and wall thickness could be held to dimensional tolerance of 0.001-in. or if the fabricator could segregate tubes into lots having these dimensional tolerances and build a complete set of tools for each lot, the mandrel bending operation would be relatively simple. Either of these possibilities are, of course, commercially impractical and a satisfactory solution has been largely due to the ingenious tooling on the part of the fabricator plus unusual quality control on the part of the tube manufacturer.

Tooling for other operations, such as flanging, flaring, beading, expanding, spacing, indenting chamfering, etc., has required either new art or tools made to tolerances previously unheard of in tube fabricating work.

**Aircraft Exhaust Header**

From the production of the cold rolled, stainless steel to the final operation on the fabricated aircraft exhaust header, consideration has to be given to the elimination of all minor defects, normally not considered harmful in tubular products. It is the primary unit in removing exhaust gases from a very large aircraft motor and hot spots must be guarded against regardless of costs. This tubular part, 2 1/2 in. outside diameter by 0.049-in. wall thickness, made of 18-8 stabilized stainless, has proved to be another difficult fabricating job. After several years, its production is still limited to one tube producer, one fabricating subcontractor and one prime contractor.

Length of part before flanging is 10.90 in., plus 0.031-in. minus zero, face plate measurement. This means that any variation in degree of perpendicularity of faces is included in length tolerance. There are two bends in close proximity on a 4.219-in. centerline radius. The distance of straight tube on the short end is only 0.668-in. Tolerance on the out-

side diameter of the ends is plus or minus 0.005-in.

These extremely close limits give some indication of the difficulties the fabricating subcontractor faced. Special automatic hydraulically operated equipment had to be designed and built for the sizing and facing operations. On the two mandrel bends it was found that standard hydraulic benders could be used with specially designed tools. Dies, mandrels, wiper blocks, following blocks, etc., were designed to maintain full cross-sectional area in the bends. Normally this can be accomplished by a conventional balling operation after the bends. By this, it meant pushing a series of hardened balls through the part while it is held in the die.

However, due to the tendency of stainless steel to gall, and the requirement of freedom from internal marks or surface defects, it was decided to attempt to maintain the required sectional area on the benders. After design of several sets of experimental tools, this was accomplished.

Bearing pressures in the hydraulic bender were found to be above anything previously encountered and had to be compensated for. Again, elimination of all steel particles, minute cutting burrs and grit and abrasives of all kinds became of paramount importance. It was found that even though the chemistry, physical properties, wall thickness and size tolerances of the tubing were closely controlled by the tube producers, there was enough variation from one lot to another—a lot being that part of one heat, welded, heat treated, etc., at one time—that each lot has to be kept separate through all fabricating operations and specially adjusted for on six of the operations.

In the prime contractor's plant, the finishing operations such as the welding on of fittings and collars, flanging, etc., are of a somewhat conventional nature, but due to dimensional and visual requirements, they are extremely difficult and require familiarity with the best stainless practices.

**Films Aid in Selecting Plastics**

Technical film (No. 1) entitled "Bakelite Plastics—Selecting the Right Thermosetting Molding Material" considers the question of how to select proper thermosetting molding plastics to suit the product. Technical film (No. 2), "Bakelite Plastics—Product Design and Molding Technique for Thermosetting Plastics," presents fundamental principles for correct mold design and molding techniques for parts manufactured from thermosetting materials. Films are intended to guide in understanding proper uses of thermosetting plastics and to serve in training engineering students and plant personnel. Sixteen-millimeter prints are available without cost from Technical Film Library, Bakelite Corp., Unit of Union Carbide and Carbon Corp., 300 Madison Avenue, New York 17.



# BRIGGS PREPARES FOR



# PEACETIME MANUFACTURING



## \$626,000,000 IN WAR BUSINESS

51.7% FOR WAGES \$323,640,000	2.16% FOR DIVIDENDS \$13,520,000
34.32% TO SUPPLIERS \$214,850,000	1.34% FOR DEPRECIATION \$8,390,000
8.89% FOR TAXES \$55,650,000	.88% FOR RECONVERSION \$5,500,000
7.1% LEFT IN BUSINESS \$4,450,000	

Briggs has just completed \$626,000,000 worth of war business—1941 through May 31, 1945—consisting principally of large aircraft assemblies, heavy bomber turrets and heavy and medium tank hulls. Its employment rose from 23,000 to 36,565 in the same period, and it added almost a million square feet of floor space to its manufacturing operations. Still on its books and in production are many more war orders.

### Changes in War Requirements Free Space for Peacetime Work

Now, however, due to changes in war requirements, facilities devoted to war work have been decreased about 20%, thus permitting the Company to continue to be able to meet its war contracts, and at the same time to begin to prepare for peacetime body manufacturing.

### New Foundry Established In Cleveland

The reduction in war work also permits Briggs to make post-war plans in other fields. For some time the Company has been experimenting with plaster molds. Beginning with April of last year, it put into operation on war work a large new foundry in Cleveland, Ohio, using plaster molds exclusively and licensed under what is known as the "Capaco Castings Process." This will soon be available for making intricate and fine castings for peacetime manufacturing.

### Plans Laid for Postwar Plumbing Ware Market

Briggs is also planning to re-enter the plumbing ware market on a large scale. On September 30, 1944 the John Douglas Com-

pany of Cincinnati, Ohio, was purchased—one of the country's oldest independent manufacturers of plumbing ware and plumbing fixtures. In securing this Company, Briggs has added enough plumbing ware facilities to what it already has so that it will be able, in the postwar market, to offer a complete line of plumbing ware for practically all purposes.

### 1944 Profits After Taxes Were \$5,307,161.10

Briggs' profits after taxes in 1944 and after provision for renegotiation of war contracts, costs of plant reconversion, and other costs arising from the war, were \$5,307,161.10, as compared with \$5,239,350.74 in 1943.

The consolidated financial position of the Company and its domestic subsidiaries on December 31, 1944 showed current assets of \$82,647,409.64 and current liabilities of \$54,303,994.08, as compared with current assets of \$99,657,442.40 and current liabilities of \$73,985,660.70 in 1943.

The Company paid a \$2.00 dividend per share of stock in 1944, the same as in 1942 and 1943.

### To Spend \$10,000,000 On Reconversion

Briggs' future plans call for the expenditure of approximately \$10,000,000 for reconversion, re-equipping and new machinery. However, the Company believes that its principal job must continue to be production for war until final victory has been achieved in the Pacific. Until that time, the needs of the Armed Forces will always come first.

**BRIGGS MANUFACTURING COMPANY - DETROIT 14, MICHIGAN**

#### IN WARTIME:

- BODIES FOR BOMBERS, FIGHTERS,
- TANKS AND AMBULANCES, AND
- BOMBER TURRETS.

#### IN PEACETIME:

- BODIES FOR PASSENGER CARS AND
- TRUCKS, PLUMBING WARE, AND NON-
- FERROUS CASTINGS.



# THE BUSINESS TREND

## Strikes May Accentuate Production Downtrend

INDUSTRIAL activity, including steel ingot production which rose 2 percentage points, appeared well sustained in the latest week but there are indications that this display of firmness in the overall industrial picture is only a brief respite in the general slowing down of operations accompanying adjustment of the economy from a two-front to a one-front war basis.

The decline in the various production indexes as cutbacks and terminations of war contracts become increasingly apparent is apt to become even more precipitate from strikes. Most of the recent labor disturbances have arisen as malignant growths from abnormal wartime employment conditions and the coddling of labor by the federal government in the last decade. As the nation continues to adjust from a two-front to a one-front war and later to peacetime it is possible that strikes in increasing numbers will plague industry as labor seeks to maintain high take-home wages despite reduced working hours. Appeals to workers' patriotism to stay on the job are likely to become less effective as the war goes into its closing phases and reconversion grows apace.

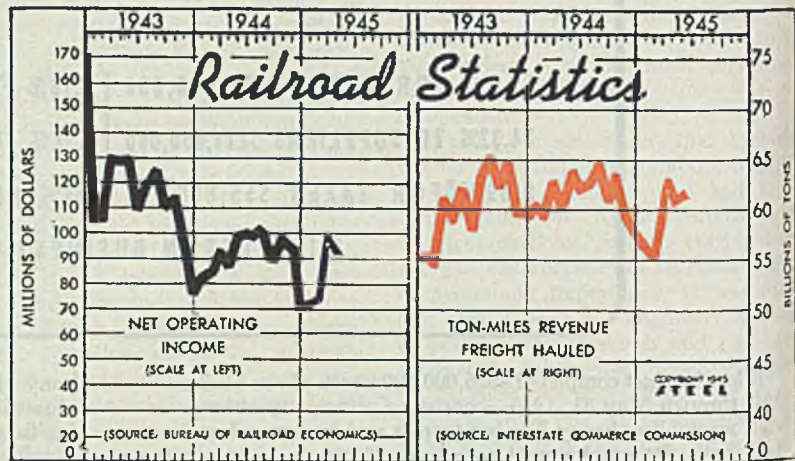
Although industries will proceed with reconversion as rapidly as possible they cannot maintain overall productivity while reconverting. Even after a plant is reconverted it may face production difficulties, for others on whom it depends for materials or parts still may be on war work. Thus with cutbacks and reconversion already bringing industrial production down from the high mark of the two-front war period, a wave of strikes could accentuate the drop.

**LIVING COSTS**—While labor is trying to maintain high take-home pay it gets additional strength for its arguments from the U. S. Department of Labor report that the cost of living in May was higher

than it has been at any time in the past 12 months.

**COMMODITY PRICES**—Decline of 0.1 per cent in the Bureau of Labor Statistics index of commodity prices in the latest week for which data are available results from lower prices for agricultural commodities. However, the index is 2.1 per cent above the corresponding week of last year. Index of raw materials prices eased off 0.3 per cent in the latest week.

**COAL PRODUCTION**—Reduced output in the most recent week for which figures are available adds to the seriousness of the coal situation. Production is 22,301,000 tons or 7.2 per cent behind that for the corresponding period of last year, and it has been estimated that this fuel year's coal requirements will exceed output by 37 million tons.



Statistics of Class I Railroads

	Net Operating Income			Ton-Miles Revenue Freight		
	1945	1944	1943	1945	1944	1943
	(millions)			(billions)		
Jan.	\$73.0	\$84.9	\$105.3	56.8	60.5	55.1
Feb.	73.2	84.5	105.8	55.3	59.3	54.4
March	99.9	92.5	129.7	62.9	62.7	61.2
April	91.9	87.7	128.7	61.6	60.4	59.1
May	...	98.5	129.5	63.4	64.0	62.1
June	...	99.8	109.0	...	62.0	58.0
July	...	98.6	127.8	...	62.8	63.7
Aug.	...	101.4	132.3	...	64.5	65.1
Sept.	...	89.1	110.3	...	61.0	62.5
Oct.	...	97.3	113.1	...	63.5	65.0
Nov.	...	91.6	96.4	...	59.4	59.9
Dec.	...	69.8	76.9	...	57.3	60.6
Ave.	...	\$93.1	\$113.5	...	61.5	60.6

## FIGURES THIS WEEK

### INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	92	90	91.5	96
Electric Power Distributed (million kilowatt hours)	4,360†	4,358	4,204	4,327
Bituminous Coal Production (daily av.—1000 tons)	1,957	1,975	1,969	1,978
Petroleum Production (daily av.—1000 bbls.)	4,860†	4,898	4,859	4,587
Construction Volume (ENR—unit \$1,000,000)	\$46.5	\$41.9	\$21.4	\$34.5
Automobile and Truck Output (Ward's—number units)	19,115	19,490	18,100	19,335

\*Dates on request.

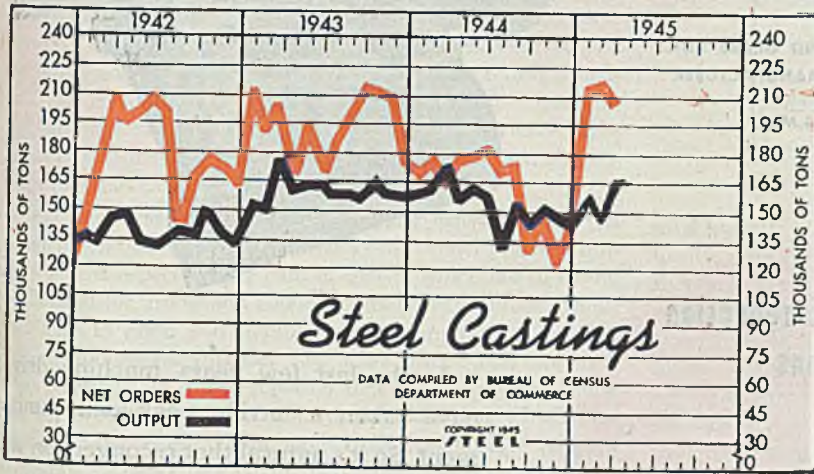
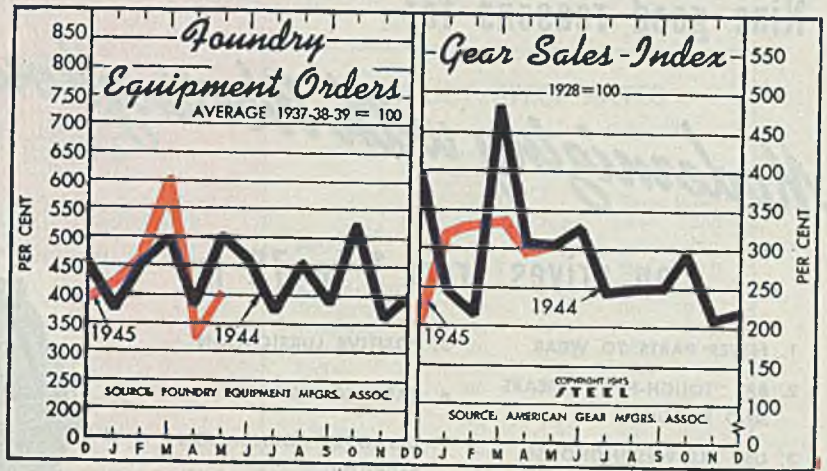
### TRADE

	Latest Period*	Prior Week	Month Ago	Year Ago
Freight Carloadings (unit—1000 cars)	878†	876	838	898
Business Failures (Dun & Bradstreet, number)	14†	17	13	36
Money in Circulation (in millions of dollars)†	\$26,628	\$26,536	\$26,500	\$22,421
Department Store Sales (change from like week a year ago)†	+19%	+14%	+1%	+5%

†Preliminary. †Federal Reserve Board.

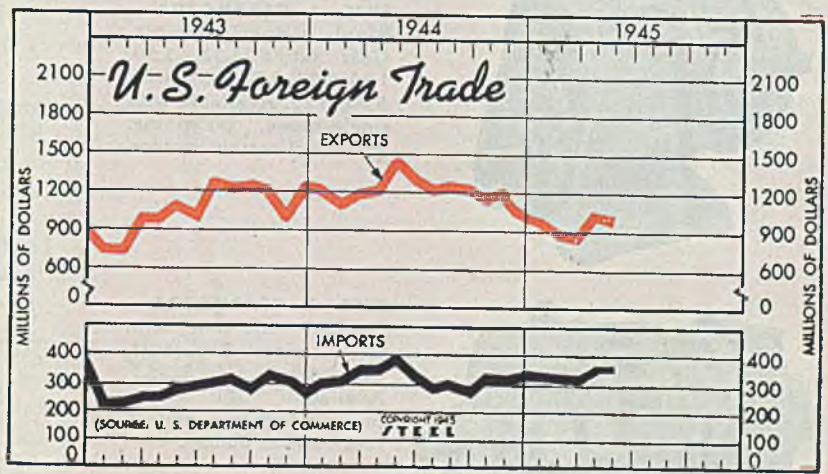


	Foundry Equipment Orders			Gear Sales		
	Monthly Average (1937-38-39=100)			Index (1928=100)		
	1945	1944	1943	1945	1944	1943
Jan.	422.4	442.8	429.8	323	246	268
Feb.	465.3	378.3	399.5	331	214	303
Mar.	604.7	498.4	562.7	339	485	334
Apr.	325.0	385.7	362.7	298	308	240
May	404.7	503.9	348.9	309	305	342
June	...	466.1	413.6	...	328	401
July	...	375.8	379.4	...	242	374
Aug.	...	450.5	390.4	...	247	312
Sept.	...	388.0	346.6	...	248	320
Oct.	...	526.5	486.6	...	293	368
Nov.	...	369.5	388.0	...	209	387
Dec.	...	397.4	442.8	...	219	387
Ave.	426.9	440.3	...	279	338	...



	Commercial Steel Castings†		
	(Net tons in thousands)		
	Orders	1944	Production
Jan.	210.2	167.7	159.8
Feb.	214.4	173.6	161.4
Mar.	203.2	162.6	174.6
Apr.	...	175.1	155.8
May	...	177.0	161.8
June	...	181.8	157.4
July	...	169.9	131.9
Aug.	...	171.3	154.9
Sept.	...	129.8	144.5
Oct.	...	146.1	150.7
Nov.	...	120.7	146.4
Dec.	...	138.7	144.2
Total	...	159.5	153.6

Foreign Trade						
Bureau of Foreign and Domestic Commerce						
(Unit Value—\$1,000,000)						
	Exports			Imports		
	1945	1944	1943	1945	1944	1943
Jan.	900	1,124	730	334	300	228
Feb.	882	1,088	719	324	313	234
Mar.	881	1,197	988	324	359	249
Apr.	1,023	1,182	980	365	359	258
May	1,004	1,419	1,085	365	386	281
June	...	1,271	1,002	...	330	295
July	...	1,198	1,262	...	293	300
Aug.	...	1,207	1,204	...	302	315
Sept.	...	1,199	1,235	...	280	285
Oct.	...	1,140	1,195	...	327	329
Nov.	...	1,184	1,074	...	322	317
Dec.	...	934	1,244	...	336	281
Total	14,102	12,716	...	8,907	8,369	...



	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	\$12,721	\$15,061	\$8,503	\$12,679
Federal Gross Debt (billions)	\$256.9	\$250.4	\$239.2	\$200.2
Bond Volume, NYSE (millions)	\$46.0	\$56.3	\$47.4	\$46.2
Stocks Sales, NYSE (thousands)	11,324	10,088	6,795	9,932
Loans and Investments (billions)†	\$63.0	\$58.9	\$57.5	\$51.2
United States Gov't. Obligations Held (millions)†	\$46,334	\$43,676	\$42,897	\$37,832

	Latest Period*	Prior Week	Month Ago	Year Ago
STEEL's composite finished steel price average	\$58.27	\$58.27	\$58.27	\$56.73
All Commodities†	105.9	106.0	105.9	103.7
Industrial Raw Materials†	118.6	119.0	118.5	113.2
Manufactured Products†	102.0	102.0	102.1	101.1

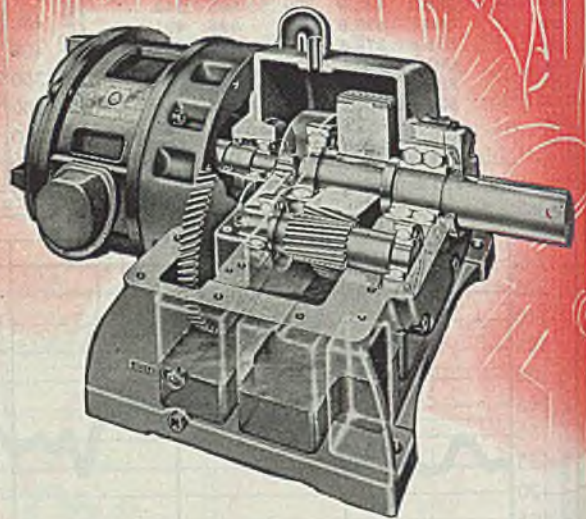


Nine good reasons for

# Modernizing with Westinghouse Gearmotors

on drives from 1 to 75 hp

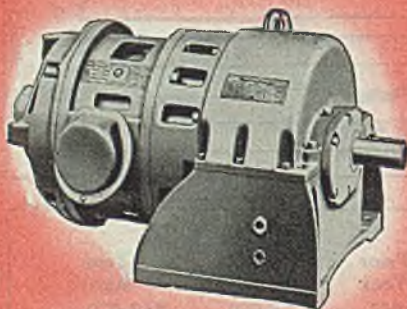
- |   |  |
|---|--|
| 1. FEWER PARTS TO WEAR                        | 5. POSITIVE LUBRICATION                      |
| 2. BPT "TOUGH-HARD" GEARS AND PINIONS         | 6. EASY ACCESSIBILITY                        |
| 3. USE ALL WESTINGHOUSE MOTOR TYPES           | 7. IMPROVED FOUNDATION STABILITY             |
| 4. HIGH EFFICIENCY                            | 8. MOTOR AND GEARS BUILT BY ONE MANUFACTURER |
| 9. DESIGNED AND APPLIED TO A.G.M.A. STANDARDS |  |



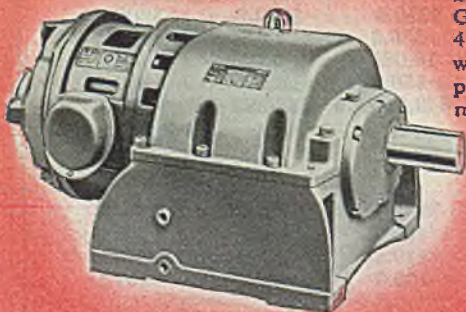
There is a Westinghouse speed reduction unit for most applications



**TYPE A GEARMOTOR—**  
Single-reduction unit.  
Gear ratios 1.22, 1.50, 1.84, 2.24, 2.73, 3.37, 4.17, 5.00, 6.25. Available with single-phase, polyphase, and direct current motors.



**TYPE C GEARMOTOR—**  
Double-reduction unit.  
Gear ratios: 7.61, 9.21, 11.3, 14.0, 17.5, 20.8, 25.7. Available with single-phase, polyphase, and direct current motors.



**TYPE E GEARMOTOR—**  
Double-reduction unit.  
Gear ratios: 31.2, 38.9, 47.3, 52.7, 58.3. Available with single-phase, polyphase, and direct current motors.

In the last few years, machine drives have taken a terrific peak-load punishment. So it's natural that reconversion will require many replacements with modern, economical drives.

When drives require speed reduction... and four out of five do... use a gearmotor. Specifying gearmotors simplifies ordering and delivery... saves installation expense because the complete drive is in one "package".

Westinghouse offers a complete line of gearmotors for speed-reduction drives up to 75 hp, and a complete line of similar speed reducing units for drives up to 1000 hp. Call your Westinghouse Office for information, or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-07229



**Westinghouse**  
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

*Gearmotors*



## WPB Seeks To Clear Mill Books of Duplicate Orders

*Users urged to cancel steel released by cutbacks . . . Effort to provide material for civilian products . . . Unrated orders increasing*

SEEKING to improve the situation existing on steel mill order books War Production Board has asked producers to report principal orders on their books to the end that duplicate contracts may be detected.

It has been apparent for some time that makers of civilian products have placed orders for the same steel with several mills, in the hope that they may obtain a place on rolling schedules. This has obscured the real situation and may have inflated backlogs materially. WPB hopes this action may make it possible to eliminate some duplications and give a truer picture of essential demand.

At the same time Washington is exerting heavy pressure on consumers who have received cutbacks, to cancel released tonnage. This is especially the case in sheets, which are in strong spot demand for drums and containers and other military needs, in addition to rated and unrated civilian programs scheduled for third and fourth quarter. To some extent bars are in a similar position. It is also reported that consideration is being given to revocation of Direction 70, Regulation 1, which permits manufacturers of civilian goods to divert tonnages released by military cutbacks to civilian requirements of like character. At present such diversion is subject to approval by WPB and it is proposed now that further steps be taken to the extent that tonnage be cancelled.

Although rated tonnage is declining, volume of unrated steel is increasing. In June some producers of diversified products received substantially heavier bookings than in May and in spite of cancellations attained a balance close to or exceeding shipments. In some products, notably sheets and pipe, the latter in special demand for bombs, total volume of validated and unvalidated orders, even after cutbacks, has been well in excess

of shipments. However, unrated orders in general can not be firmly scheduled, because of priority of CMP tonnage and therefore are not reflected in delivery promises.

Major cutbacks have been in shells, but so far these have not caused much mill order cancellations and in any case they would not affect schedules much before fourth quarter. Chicago Ordnance District has announced a cutback in medium artillery ammunition components of about \$20 million per month, involving storage and cartridge cases, containers, fuzes, primers and boosters. This appears to apply mainly to future schedules. It is understood this involves a number of contracts on which production has not yet started. Contractors under production are little affected.

Steelmaking operations last week dropped 3½ points to 88½ per cent, mainly due to strikes, in addition to some holiday observance. Cleveland receded 17 points to 76 per cent of capacity, Buffalo dropped 14 points to 79 per cent, Detroit 3 points to 80, Wheeling 10 points to 80½, Pittsburgh 1 point to 87, eastern Pennsylvania 4 points to 86 and Chicago 1 point to 94½ per cent. Cincinnati advanced 2 points to 91 and New England 1 point to 85. Rates were unchanged at Birmingham, 95, St. Louis, 75 and Youngstown 90 per cent.

Increasing strength appears in steelmaking scrap, with melters taking all offerings at ceiling prices and borings and turnings advancing steadily, now being generally only slightly below ceilings. Shipments are being made freely on contracts. Supply is good, but delay is experienced in yard preparation, because of continued labor shortage. No relief has appeared in cast scrap, demand for which is strong, because of tightness of pig iron.

With several blast furnace stacks being blown out for repairs the pig iron situation has tightened and production is no more than needed to meet demand.

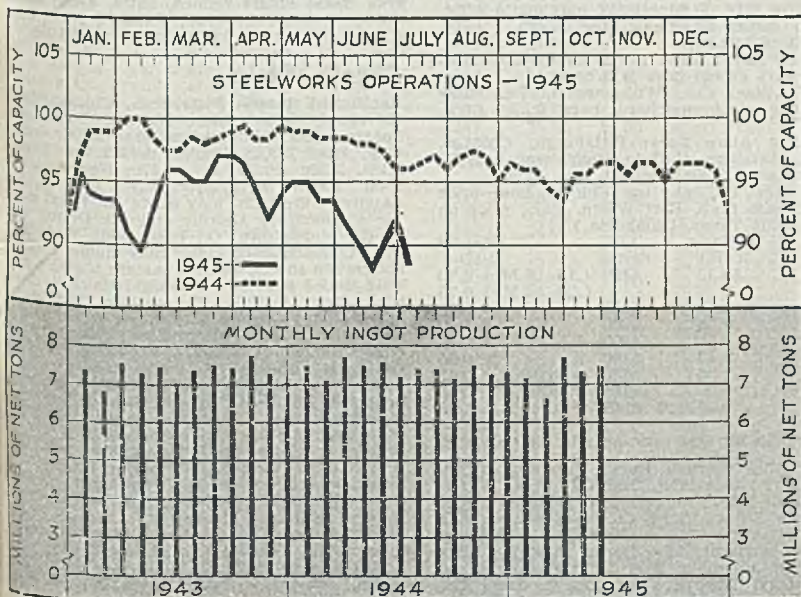
Average composite prices of steel and iron products are steady at ceilings, finished steel at \$58.27, semifinished steel at \$37.80, steelmaking pig iron at \$24.05 and steelmaking scrap at \$19.17.

### DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended		Same Week	
	July 7	Change	1944	1943
Pittsburgh . . . . .	87	-1	88	91
Chicago . . . . .	94.5	-1	99.5	98.5
Eastern Pa. . . . .	86	-4	95	93
Youngstown . . . . .	90	None	96	94
Wheeling . . . . .	80.5	-10	101	86
Cleveland . . . . .	76	-17	92.5	90
Buffalo . . . . .	79	-14	90.5	93
Birmingham . . . . .	95	None	95	95
New England . . . . .	85	+1	89	93
Cincinnati . . . . .	91	+2	72	92
St. Louis . . . . .	75	None	79.5	95
Detroit . . . . .	80	-3	86	92
<b>Average . . . . .</b>	<b>88.5</b>	<b>-3.5</b>	<b>96</b>	<b>92</b>

\*Based on steelmaking capacities as of these dates.









...meling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh	Pacific	Granite
	Base	Ports	City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrica	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	
65	7.25c	8.00c	
58	7.75c	8.50c	
52	8.55c	9.30c	

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

**Cold Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

**Community C. R. Strip:** Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

**Tin, Terve Plate**

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb. base box, \$5.00; Granite City \$5.10.

**Electrolytic Tin Plate:** Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, \$4.50; 0.75 lb. tin \$4.65.

**tin Mill Black Plate:** Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City 3.15c; Pacific ports, boxed 4.05c.

**Lump Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

**Manufacturing Ternes:** (Special Coated) Pittsburgh, Chicago, Gary, 100-base box \$4.30; Granite City \$4.40.

**Roofing Ternes:** Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. \$12.00; 15-lb. \$14.00; 20-lb. \$15.00; 25-lb. \$16; 30-lb. \$17.25; 40-lb. \$19.50.

**Plates**

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles.

**Central Iron & Steel Co.** 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

**Floor Plates:** Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

**Wrought Iron Plates:** Pittsburgh, 3.80c.

**Shapes**

**Structural Shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports.)

**Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).**

**Sheet Piling:** Pittsburgh, Chicago, Buffalo, 2.40c.

**Wire Products, Nails**

**Wire:** Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add \$2 for Worcester, \$1 for Duluth).

Bright basic, bessemer wire ..... 2.75c  
Spring wire ..... 3.35c  
(Pittsburgh Steel Co., 0.20c higher.)

**Wire Products to the Trade:**

**Standard and Cement-coated wire nails, and staples,** 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, DuPont \$2.90; galvanized, \$2.55; Pac. ports \$3.40 and \$3.05

**Annealed fence wire,** 100-lb., Pittsburgh, Chicago, Cleveland ..... 3.20c

**Galvanized fence wire,** 100 lb., Pittsburgh, Chicago, Cleveland ..... 3.55c

**Woven fence,** 1 1/2 gage and heavier, per base column ..... .67c

**Barbed wire,** 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

**Tubular Goods**

**Welded Pipe:** Base price in carloads, threaded

and coupled to consumers at \$20 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld						
In.	Steel			Iron		
	Bk.	Galv.	In.	Bk.	Galv.	
1/2	56	33	1/4	24	3 1/2	
3/4 & 1	59	40 1/2	3/4	30	10	
1 1/2	63 1/2	51	1-1 1/4	34	16	
2	66 1/2	55	1 1/2	38	18 1/2	
3	68 1/2	57 1/2	2	37 1/2	18	

Lap Weld						
In.	Steel			Iron		
	Bk.	Galv.	In.	Bk.	Galv.	
2	61	49 1/2	1 1/4	23	3 1/2	
2 1/2-3	64	54 1/2	1 1/2	28 1/2	10	
3 1/2-6	66	54 1/2	2	30 1/2	12	
7-8	65	52 1/2	2 1/4, 3 1/2	31 1/2	14 1/2	
9-19	64 1/2	52	4	33 1/2	18	
11-12	63 1/2	51	4 1/2	32 1/2	17	
			9-12	28 1/2	12	

**Boiler Tubes:** Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	Seamless		Steel	Iron
	Hot Rolled	Cold Drawn		
1"	13	\$ 7.22	\$ 9.01	
1 1/4"	13	9.26	10.67	
1 1/2"	13	10.23	11.72	\$ 9.72
1 3/4"	13	11.64	13.42	11.06
2"	13	13.04	15.03	12.38
2 1/4"	13	14.54	16.76	13.79
2 1/2"	12	16.01	18.45	15.16
2 3/4"	12	17.54	20.21	16.58
3"	12	18.59	21.42	17.54
3 1/2"	12	19.50	22.48	18.35
4"	11	24.63	28.37	23.15
4 1/2"	10	30.54	35.20	28.66
4 3/4"	10	37.35	43.04	35.22
5"	9	46.87	54.01	44.25
6"	7	71.96	82.93	68.14

**Rails, Supplies**

**Standard rails,** over 60-lb., f.o.b. mill, gross ton, \$43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, \$45.00.

\*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, \$31-\$33.

**Supplies:** Track bolts, 4.75c; heat treated, 5.00c. Tie plates, \$46 net ton, base, Standard spikes, 3.25c.

\*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

**Tool Steels**

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1		67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

**Stainless Steels**

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL					
Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27 00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	26.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00		
*316	40.00	44.00	48.00	40.00	48.00
1321	29.00	34.00	41.00	29.25	38.00
1347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL					
	403	21.50	24.50	29.50	21.25
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
†420	24.00	28.00	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
†430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

**STAINLESS CLAD STEEL (20%)**

304	.....	\$18.00	19.00	.....
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\*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. Government basing point is basing point nearest the consumer providing the lowest delivered price.

**Seconds, maximum prices:** flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate \$2.80 per 100 lbs.; tin plate \$2.25; semifinished 85% of primes; other grades limited to new material ceilings.

**Export ceiling prices** may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

**Bolts, Nuts**

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional, 5%, full containers, add 10%

Carriage and Machine		
1/2 x 6 and smaller	.....	65 1/4 off
Do., 3/4 and 1 x 6-in. and shorter	.....	63 1/4 off
Do., 3/4 to 1 x 6-in. and shorter	.....	61 off
1 1/2 and larger, all lengths	.....	59 off
All diameters, over 6-in. long	.....	59 off
Tire bolts	.....	50 off
Step bolts	.....	56 off
Plow bolts	.....	65 off

**Stove Bolts**

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

**Nuts**

Semifinished hex	U.S.S.	S.A.F.
3/4-inch and less	.....	62
1/2-1-inch	.....	59
1 1/2-1 1/2-inch	.....	57
1 1/2 and larger	.....	56

**Hexagon Cap Screws**

Upset 1-in., smaller	.....	64 off
Milled 1-in., smaller	.....	60 off
Square Head Set Screws		
Upset 1-in., smaller	.....	61 off
Headless 1/4-in., larger	.....	70 off
No. 10, smaller	.....	70 off

**Piling**

Pittsburgh, Chicago, Buffalo ..... 2.40

**Rivets, Washers**

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham		
Structural	.....	3.75
1/2-inch and under	.....	65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers i.c.l.	.....	\$2.75-3.00 off

**Metallurgical Coke**

Price Per Net Ton		
Beehive Ovens		
Connellsville, furnace	.....	97.50
Connellsville, foundry	.....	8.00-8.50
New River, foundry	.....	9.00-9.25
Wise county, foundry	.....	7.75-8.25
Wise county, furnace	.....	7.25-7.75
By-Product Foundry		
Kearney, N. J., ovens	.....	12.65
Chicago, outside delivered	.....	12.80
Chicago, delivered	.....	13.30
Terre Haute, delivered	.....	13.10
Millwaukee, ovens	.....	13.30
New England, delivered	.....	14
St. Louis, delivered	.....	13.30
Birmingham, delivered	.....	10
Indianapolis, delivered	.....	13.10
Cincinnati, delivered	.....	12.80
Cleveland, delivered	.....	12.80
Buffalo, delivered	.....	12
Detroit, delivered	.....	13.30
Philadelphia, delivered	.....	12.80

\*Operators of hand-drawn ovens using trucked coal may charge \$8.00, effective May 26, 1945. †13.65 from other than Ala., Mo., Tenn.

**Coke By-Products**

Spot, gal., freight allowed east of Omaha	.....	15.00c
Pure and 90% benzol	.....	28.00c
Toluol, two degree	.....	27.00c
Solvent naphtha	.....	27.00c
Industrial xylol	.....	27.00c
Per lb. f.o.b. works	.....	
Phenol (car lots, returnable drums)	.....	12.50
Do., less than car lots	.....	15.25
Do., tank cars	.....	11.50
Eastern Plants, per lb.	.....	
Naphthalene flakes, balls, bbis., to jobbers	.....	8.00
Per ton, bulk, f.o.b. port	.....	
Sulphate of ammonia	.....	\$29.20



# WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	Hot bars 8600 series
<b>Easton</b> .....	4.04 <sup>1</sup>	3.91 <sup>2</sup>	3.91 <sup>2</sup>	5.72 <sup>7</sup>	8.77 <sup>4</sup>	4.10 <sup>6</sup>	5.10 <sup>6</sup>	5.22 <sup>14</sup>	4.74 <sup>14</sup>	4.14 <sup>11</sup>	4.71 <sup>5</sup>	6.01 <sup>24</sup>	6.01 <sup>24</sup>
<b>New York</b> .....	3.85 <sup>3</sup>	3.75 <sup>1</sup>	3.76 <sup>1</sup>	5.72 <sup>7</sup>	8.77 <sup>4</sup>	4.10 <sup>6</sup>	5.10 <sup>6</sup>	5.22 <sup>14</sup>	4.74 <sup>14</sup>	4.14 <sup>11</sup>	4.71 <sup>5</sup>	6.01 <sup>24</sup>	6.01 <sup>24</sup>
<b>Jersey City</b> .....	3.85 <sup>3</sup>	3.74 <sup>1</sup>	3.76 <sup>1</sup>	5.72 <sup>7</sup>	8.77 <sup>4</sup>	4.10 <sup>6</sup>	5.10 <sup>6</sup>	5.22 <sup>14</sup>	4.74 <sup>14</sup>	4.14 <sup>11</sup>	4.71 <sup>5</sup>	6.01 <sup>24</sup>	6.01 <sup>24</sup>
<b>Philadelphia</b> .....	3.82 <sup>1</sup>	3.66 <sup>1</sup>	3.60 <sup>5</sup>	5.27 <sup>2</sup>	8.51 <sup>8</sup>	3.92 <sup>1</sup>	4.27 <sup>2</sup>	5.01 <sup>15</sup>	4.87 <sup>25</sup>	4.07 <sup>21</sup>	4.77 <sup>2</sup>	5.81 <sup>6</sup>	5.80 <sup>6</sup>
<b>Baltimore</b> .....	3.80 <sup>2</sup>	3.75 <sup>1</sup>	3.59 <sup>4</sup>	5.25 <sup>2</sup>	8.39 <sup>4</sup>	3.90 <sup>2</sup>	4.25 <sup>2</sup>	4.89 <sup>4</sup>	4.85 <sup>25</sup>	4.05 <sup>21</sup>	.....	.....	.....
<b>Washington</b> .....	3.94 <sup>1</sup>	3.90 <sup>1</sup>	3.79 <sup>1</sup>	5.34 <sup>1</sup>	8.59 <sup>1</sup>	4.04 <sup>1</sup>	4.39 <sup>1</sup>	5.19 <sup>17</sup>	4.84 <sup>10</sup>	4.04 <sup>11</sup>	.....	.....	.....
<b>Norfolk, Va.</b> .....	4.06 <sup>5</sup>	4.02 <sup>1</sup>	3.97 <sup>1</sup>	5.46 <sup>5</sup>	8.77 <sup>1</sup>	4.16 <sup>5</sup>	4.51 <sup>5</sup>	5.37 <sup>17</sup>	4.96 <sup>5</sup>	4.16 <sup>5</sup>	.....	.....	.....
<b>Bethlehem, Pa.*</b> .....	.....	3.45 <sup>1</sup>	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<b>Claymont, Del.*</b> .....	.....	.....	3.45 <sup>1</sup>	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<b>Coatesville, Pa.*</b> .....	.....	.....	3.45 <sup>1</sup>	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<b>Buffalo (city)</b> .....	3.35 <sup>1</sup>	3.40 <sup>1</sup>	3.63 <sup>1</sup>	5.26 <sup>1</sup>	8.35 <sup>1</sup>	3.81 <sup>9</sup>	3.81 <sup>9</sup>	4.75 <sup>16</sup>	4.40 <sup>16</sup>	3.75 <sup>11</sup>	4.69 <sup>5</sup>	5.80 <sup>24</sup>	5.75 <sup>24</sup>
<b>Buffalo (country)</b> .....	3.25 <sup>1</sup>	3.30 <sup>1</sup>	3.30 <sup>1</sup>	4.90 <sup>1</sup>	8.25 <sup>1</sup>	3.81 <sup>9</sup>	3.50 <sup>1</sup>	4.65 <sup>16</sup>	4.30 <sup>16</sup>	3.85 <sup>11</sup>	4.35 <sup>5</sup>	5.60 <sup>24</sup>	5.75 <sup>24</sup>
<b>Pittsburgh (city)</b> .....	3.35 <sup>1</sup>	3.40 <sup>1</sup>	3.40 <sup>1</sup>	5.00 <sup>1</sup>	8.35 <sup>1</sup>	3.60 <sup>1</sup>	3.60 <sup>1</sup>	4.75 <sup>16</sup>	4.40 <sup>16</sup>	3.75 <sup>11</sup>	.....	.....	.....
<b>Pittsburgh (country)</b> .....	3.25 <sup>1</sup>	3.30 <sup>1</sup>	3.30 <sup>1</sup>	4.90 <sup>1</sup>	8.25 <sup>1</sup>	3.50 <sup>1</sup>	3.50 <sup>1</sup>	4.65 <sup>16</sup>	4.30 <sup>16</sup>	3.85 <sup>11</sup>	.....	.....	.....
<b>Cleveland (city)</b> .....	3.35 <sup>1</sup>	3.58 <sup>1</sup>	3.40 <sup>1</sup>	5.18 <sup>1</sup>	8.35 <sup>1</sup>	3.60 <sup>1</sup>	3.60 <sup>1</sup>	4.87 <sup>16</sup>	4.40 <sup>16</sup>	3.75 <sup>11</sup>	4.45 <sup>5</sup>	5.80 <sup>24</sup>	5.63 <sup>24</sup>
<b>Cleveland (country)</b> .....	3.25 <sup>1</sup>	.....	3.30 <sup>1</sup>	.....	8.25 <sup>1</sup>	3.50 <sup>1</sup>	3.50 <sup>1</sup>	.....	4.30 <sup>16</sup>	3.65 <sup>11</sup>	4.35 <sup>5</sup>	.....	.....
<b>Detroit</b> .....	3.45 <sup>1</sup>	3.66 <sup>1</sup>	3.60 <sup>1</sup>	5.28 <sup>1</sup>	8.45 <sup>1</sup>	3.70 <sup>1</sup>	3.70 <sup>1</sup>	5.00 <sup>12</sup>	4.50 <sup>12</sup>	3.80 <sup>11</sup>	4.65 <sup>5</sup>	5.93 <sup>24</sup>	5.93 <sup>24</sup>
<b>Omaha (city, delivered)</b> .....	4.11 <sup>5</sup>	4.16 <sup>5</sup>	4.16 <sup>5</sup>	5.76 <sup>5</sup>	8.65 <sup>5</sup>	4.21 <sup>5</sup>	4.21 <sup>5</sup>	5.60 <sup>18</sup>	5.44 <sup>18</sup>	4.44 <sup>13</sup>	.....	.....	.....
<b>Omaha (country, base)</b> .....	4.01 <sup>5</sup>	4.06 <sup>5</sup>	4.06 <sup>5</sup>	5.66 <sup>5</sup>	8.75 <sup>5</sup>	4.11 <sup>5</sup>	4.11 <sup>5</sup>	5.50 <sup>18</sup>	.....	.....	.....	.....	.....
<b>Cincinnati</b> .....	3.61 <sup>1</sup>	6.39 <sup>1</sup>	3.61 <sup>1</sup>	5.29 <sup>1</sup>	8.42 <sup>5</sup>	3.67 <sup>5</sup>	3.67 <sup>5</sup>	4.82 <sup>12</sup>	4.47 <sup>12</sup>	4.01 <sup>11</sup>	4.71 <sup>1</sup>	6.10	6.10
<b>Youngstown, O.*</b> .....	.....	.....	.....	.....	.....	.....	.....	4.40 <sup>12</sup>	.....	.....	.....	.....	.....
<b>Middletown, O.*</b> .....	.....	.....	.....	.....	3.25 <sup>1</sup>	3.50 <sup>1</sup>	3.50 <sup>1</sup>	4.65 <sup>16</sup>	.....	.....	.....	.....	.....
<b>Chicago (city)</b> .....	3.50 <sup>1</sup>	3.55 <sup>1</sup>	3.55 <sup>1</sup>	5.15 <sup>1</sup>	8.25 <sup>1</sup>	3.60 <sup>1</sup>	3.60 <sup>1</sup>	5.23 <sup>13</sup>	4.20 <sup>14</sup>	3.75 <sup>11</sup>	4.65	5.75 <sup>24</sup>	5.65 <sup>24</sup>
<b>Milwaukee</b> .....	3.63 <sup>7</sup>	3.68 <sup>7</sup>	3.68 <sup>7</sup>	5.23 <sup>7</sup>	8.37 <sup>7</sup>	3.73 <sup>7</sup>	3.73 <sup>7</sup>	5.27 <sup>15</sup>	4.33 <sup>7</sup>	3.88 <sup>7</sup>	4.78 <sup>7</sup>	5.98 <sup>24</sup>	6.08 <sup>24</sup>
<b>Indianapolis</b> .....	3.58 <sup>1</sup>	3.63 <sup>1</sup>	3.63 <sup>1</sup>	5.23 <sup>1</sup>	8.51 <sup>8</sup>	3.76 <sup>8</sup>	3.76 <sup>8</sup>	4.91 <sup>15</sup>	4.56 <sup>15</sup>	3.98 <sup>11</sup>	4.78	6.08 <sup>24</sup>	6.18 <sup>24</sup>
<b>St. Paul</b> .....	3.76 <sup>1</sup>	3.81 <sup>1</sup>	3.81 <sup>1</sup>	5.41 <sup>1</sup>	8.51 <sup>1</sup>	3.86 <sup>1</sup>	3.86 <sup>1</sup>	5.25 <sup>15</sup>	4.46 <sup>14</sup>	4.36 <sup>11</sup>	5.10 <sup>2</sup>	6.09 <sup>24</sup>	6.19 <sup>24</sup>
<b>St. Louis</b> .....	3.64 <sup>7</sup>	3.69 <sup>7</sup>	3.69 <sup>7</sup>	5.29 <sup>7</sup>	8.39 <sup>7</sup>	3.74 <sup>7</sup>	3.74 <sup>7</sup>	5.17 <sup>15</sup>	4.34 <sup>7</sup>	4.03 <sup>11</sup>	4.93 <sup>1</sup>	6.13 <sup>24</sup>	6.31 <sup>24</sup>
<b>Memphis, Tenn.</b> .....	4.01 <sup>5</sup>	4.06 <sup>5</sup>	4.06 <sup>5</sup>	5.78 <sup>5</sup>	8.96 <sup>5</sup>	4.21 <sup>5</sup>	4.21 <sup>5</sup>	5.26 <sup>15</sup>	4.78 <sup>14</sup>	4.33 <sup>11</sup>	.....	.....	.....
<b>Birmingham</b> .....	3.50 <sup>1</sup>	3.55 <sup>1</sup>	3.55 <sup>1</sup>	5.90 <sup>1</sup>	8.45 <sup>1</sup>	3.70 <sup>1</sup>	3.70 <sup>1</sup>	4.75 <sup>15</sup>	4.85 <sup>14</sup>	4.54	5.21 <sup>5</sup>	.....	.....
<b>New Orleans (city)</b> .....	4.10 <sup>4</sup>	3.90 <sup>4</sup>	3.90 <sup>4</sup>	5.85 <sup>4</sup>	4.05 <sup>4</sup>	4.20 <sup>4</sup>	4.20 <sup>4</sup>	5.25 <sup>15</sup>	5.07 <sup>10</sup>	4.60 <sup>11</sup>	5.42 <sup>9</sup>	.....	.....
<b>Houston, Tex.</b> .....	3.75 <sup>1</sup>	4.25 <sup>1</sup>	4.25 <sup>1</sup>	5.50 <sup>1</sup>	8.78 <sup>1</sup>	4.31 <sup>1</sup>	4.31 <sup>1</sup>	5.31 <sup>15</sup>	4.10 <sup>16</sup>	3.65 <sup>11</sup>	.....	.....	.....
<b>Los Angeles</b> .....	4.40 <sup>4</sup>	4.65 <sup>4</sup>	4.95 <sup>4</sup>	7.20 <sup>4</sup>	.....	4.95 <sup>4</sup>	6.75 <sup>4</sup>	6.00 <sup>12</sup>	7.20 <sup>4</sup>	5.58 <sup>11</sup>	5.81 <sup>5</sup>	5.85 <sup>24</sup>	5.95 <sup>24</sup>
<b>San Francisco</b> .....	4.15 <sup>7</sup>	4.35 <sup>7</sup>	4.65 <sup>7</sup>	6.35 <sup>7</sup>	4.55 <sup>7</sup>	4.50 <sup>7</sup>	5.75 <sup>7</sup>	6.35 <sup>15</sup>	7.30 <sup>16</sup>	5.33 <sup>11</sup>	7.33 <sup>3</sup>	8.30 <sup>24</sup>	8.40 <sup>24</sup>
<b>Portland, Ore.</b> .....	4.45 <sup>7</sup>	4.45 <sup>7</sup>	4.75 <sup>7</sup>	6.50 <sup>7</sup>	4.65 <sup>7</sup>	4.75 <sup>7</sup>	6.30 <sup>7</sup>	5.75 <sup>15</sup>	6.60 <sup>15</sup>	5.33 <sup>11</sup>	.....	.....	.....
<b>Tacoma</b> .....	4.35 <sup>6</sup>	4.45 <sup>6</sup>	4.75 <sup>6</sup>	6.50 <sup>6</sup>	4.65 <sup>6</sup>	4.25 <sup>6</sup>	5.45 <sup>6</sup>	5.95 <sup>15</sup>	7.60 <sup>15</sup>	5.78 <sup>11</sup>	.....	.....	8.00 <sup>24</sup>
<b>Seattle</b> .....	4.35 <sup>6</sup>	4.45 <sup>6</sup>	4.75 <sup>6</sup>	6.50 <sup>6</sup>	4.65 <sup>6</sup>	4.25 <sup>6</sup>	5.45 <sup>6</sup>	5.95 <sup>15</sup>	7.05 <sup>15</sup>	5.78 <sup>11</sup>	.....	.....	8.00 <sup>24</sup>

\*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

### BASE QUANTITIES

400 to 1999 pounds; 1—400 to 1,999 pounds; 2—any quantity; 3—300 to 1999 pounds; 4—400 to 8999 pounds; 5—300 to 9999 pounds; 6—400 to 39,999 pounds; 7—under 2000 pounds; 8—under 4000 pounds; 9—500 to 1499 pounds; 10—one bundle to 39,999 pounds; 11—150 to 2249 pounds; 12—150 to 1499 pounds; 13—three to 24 bundles; 14—450 to 1499 pounds; 15—one bundle to 1499 pounds; 16—one to nine bundles; 17—one to six bundles; 18—100 to 749 pounds; 19—300 to 1999 pounds; 20—1500 to 39,999 pounds; 21—1500 to 1999 pounds; 22—1000 to 39,999 pounds; 23—400 to 1499 pounds; 24—1000 to 1999 pounds; 25—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; 26—300 to 4999 pounds.

Ores	Indian and African	Rhodesian	Provo, Utah, and Pueblo, Colo.
<b>Lake Superior Iron Ore</b>	48% 2.8:1 .....	45% no ratio .....	91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 24, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, dock most favorable to the buyer.
<b>Gross ton, 5 1/4% (Natural) Lower Lake Ports</b>	48% 3:1 .....	48% no ratio .....	
	48% no ratio .....	48% 3:1 lump .....	
<b>Old range bessemer</b> .....		Domestic (seller's nearest rail) .....	
<b>Mesabi nonbessemer</b> .....		less \$7 freight allowance .....	
<b>High phosphorus</b> .....			
<b>Mesabi bessemer</b> .....			
<b>Old range nonbessemer</b> .....			
<b>Eastern Local Ore</b>			
<b>Cents, units, del. E. Pa.</b>			
<b>Foundry and basic 56-63% contract</b> .....			
<b>Foreign Ore</b>			
<b>Cents per unit, c.i.f. Atlantic ports</b>			
<b>Manganiferous ore, 45-55% Fe., 6-10% Mang.</b>			
<b>N. African low phos.</b> ..			
<b>Spanish, No. African basic, 50 to 60%</b> .....			
<b>Brazil iron ore, 68-69% f.o.b. Rio de Janeiro</b> ..			
<b>Tungsten Ore</b>			
<b>Chinese wolframite, per short ton unit, duty paid</b> .....			
<b>Chrome Ore</b>			
<b>(Equivalent OPA schedules): Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.</b>			
<b>(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)</b>			

### NATIONAL EMERGENCY STEELS (Hot Rolled)

	Designation	Chemical Composition Limits, Per Cent						Basic open-hearth		Electric furnace	
		Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.....	10-15	70-90	20-35	40-60	40-70	15-25	\$0.65	\$13.00	\$1.15	\$33.00
NE 8720	.....	18-23	70-90	20-35	40-60	40-70	20-30	.70	14.00	1.20	34.00
NE 9415	.....	13-18	30-110	20-35	30-50	30-60	08-15	.75	15.00	1.25	35.00
NE 9425	.....	23-28	80-120	20-35	30-50	30-60	08-15	.75	15.00	1.25	35.00
NE 9442	.....	40-45	1.00-1.30	20-35	30-50	30-60	08-15	.80	16.00	1.30	36.00
NE 9722	.....	20-25	50-80	20-35	10-25	40-70	15-25	.65	13.00	1.15	33.00
NE 9850	.....	28-33	70-90	20-35	70-90	85-115	20-30	1.30	26.00	1.80	38.00
NE 9912	.....	10-15	50-70	20-35	40-60	1.00-1.30	20-30	1.20	24.00	1.55	31.00
NE 9920	.....	18-23	50-70	20-35	40-60	1.00-1.30	20-30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c. per pound on finished products and \$54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.



# Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	\$26.00	\$25.50	\$27.00	\$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50			29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	21.38	20.00	26.00	
Baltimore, del.	26.61			
Boston, del.	26.12			
Chicago, del.	25.22			
Cincinnati, del.	25.06	23.68		
Cleveland, del.	25.12	24.24		
Newark, N. J., del.	27.15			
Philadelphia, del.	26.46	25.96		
St. Louis, del.	25.12	24.24		
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53		27.53	27.03
Syracuse, del.	27.08		28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19			28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Graffiti City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00		25.50
Hamilton, O., base	25.00	24.50		25.00
Cincinnati, del.	25.44	25.61		26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
Pittsburgh, del.				
No. & So. sides	25.69	25.19	26.19	25.69
Utah, base	23.00	22.50		
Sharpville, Pa., base	25.00	24.50	25.50	25.00
Spirous Point, base	26.00	25.50		
Baltimore, del.	26.99			
Steelton, Pa., base		25.50		26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34		27.34
Treton, O., base	25.00	24.50	25.50	25.00
Newarktown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. For phosphorus 0.70% or over deduct 38 cents. For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Home-land, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monaca, Graffiti City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.  
 Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.  
 Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., \$2 per ton; for each additional 0.25% nickel, \$1 per ton.

High Silicon, Silvery  
 6.00-6.50 per cent (base) . . . \$30.50  
 6.51-7.00 . . . \$31.50 9.01-9.50 . . . 36.50  
 7.01-7.50 . . . 32.50 9.51-10.00 . . . 37.50  
 7.51-8.00 . . . 33.50 10.01-10.50 . . . 38.50  
 8.01-8.50 . . . 34.50 10.51-11.00 . . . 39.50  
 8.51-9.00 . . . 35.50 11.01-11.50 . . . 40.50  
 F.o.b. Jackson county, O., per gross ton, Buffalo base prices are \$1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, \$45.50; each additional .50% silicon up to and including 18% add \$1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add \$1.

Bessemer Ferrosilicon  
 Prices same as for high silicon silvery iron, plus \$1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron Northern  
 Lake Superior Furn. . . . \$34.00  
 Chicago, del. . . . 37.34

Southern  
 Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. \$28.50  
 Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge  
 Neville Island, Pa. . . . \$24.50  
 Valley base . . . 24.50

Low Phosphorus  
 Basing points: Birdsboro, Pa., \$30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos. Central Furnace, Cleveland, \$27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Celling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges

from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Celling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by \$1 per ton.

## Refractories

Per 1000 f.o.b. Works, Net Prices  
 Fire Clay Brick  
 Super Duty  
 Pa., Mo., Ky. . . . \$68.50

First Quality  
 Pa., Ill., Md., Mo., Ky. . . . 54.40  
 Alabama, Georgia . . . 54.40  
 New Jersey . . . 59.55  
 Ohio . . . 47.70

Second Quality  
 Pa., Ill., Md., Mo., Ky. . . . 49.35  
 Alabama, Georgia . . . 40.30  
 New Jersey . . . 52.00  
 Ohio . . . 38.15

Malleable Bung Brick  
 All bases . . . 63.45

Silica Brick  
 Pennsylvania . . . 54.40  
 Joliet, E. Chicago . . . 62.45  
 Birmingham, Ala. . . . 54.40

Ladle Brick  
 (Pa., O., W. Va., Mo.)  
 Dry press . . . 32.90  
 Wire cut . . . 30.80

Magnesite  
 Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk . . . 22.00  
 net ton, bags . . . 26.00

Basic Brick  
 Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.  
 Chrome brick . . . \$54.00  
 Chem. bonded chrome . . . 54.00  
 Magnesite brick . . . 76.00  
 Chem. bonded magnesite . . . 65.00

## Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF<sub>2</sub> content, 70% or more, \$33; 65 but less than 70%, \$32; 60 but less than 65%, \$31; less than 60%, \$30. (After Aug. 29 base price any grade \$30.)  
 war chemicals.

## Ferroalloy Prices

Ferromanganese (standard) 78-82% c.i., gross ton, duty paid, \$135; add \$1.50 for packed c.i., \$10 for ton less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn., Tennessee Products Co. is seller, Birmingham, Ala., where shipped; Sheffield Steel & Iron Co. is seller; \$1.70 for each 1%, or fraction contained manganese over 1% or under 78%; delivered Pittsburgh, \$140.33.  
 Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.i., 23c; 2000 lb. to c.i., 23.40c; medium, 14.50c and 15.20c; low carbon, bulk, c.i., 2000 lb. to c.i., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.i., 24.50c; 2000 lb. to c.i., 25.40c; medium, 13.75c and 17.20c; f.o.b. shipping point, freight allowed.  
 Ferrosilicon: 19-21% carlots per gross ton, Palmerton, Pa., \$36; 16-18%, \$35.  
 Electrolytic Manganese: 99.9% plus, gross ton lots, per lb. 37.6 cents.  
 Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium, c.i., 79.50c, 2000 lb. to c.i. central, \$1c and \$2.50c; western, \$2.25c and \$4.75c; f.o.b. shipping point, freight allowed.  
 Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, \$2.25; less-ton lots \$2.30. Spot prices 10 cents per lb. higher.  
 Ferrosilicochrome: High carbon, eastern zone, bulk, c.i., 13c, 2000 lb. to

c.i., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.i., max. 0.06% carbon, 23c, 0.10%, 22.50c, 0.15% 22c, 0.20% 21.50c, 0.30% 21c, 1.00% 20.50c, 2.00% 19.50c, 2000 lb. to c.i., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.i. and .65c for 2000 lb. to c.i.; western, add 1c for bulk, c.i. and 1.85c for 2000 lb. c.i.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.  
 Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.  
 S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.  
 S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang.

4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.  
 SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c, central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.  
 Silicaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.  
 Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 59.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up .4c.  
 CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.  
 CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75,

packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.  
 Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, \$1.20, less ton lots \$1.30, eastern, freight allowed; \$1.2075 and \$1.3075 central; \$1.229 and \$1.329, western; spot add 5c.  
 Manganese-Boron: (Mang. 75% approx., boren 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, \$1.89, less, \$2.01, eastern, freight allowed; \$1.993 and \$2.023 central, \$1.935 and \$2.055 western, spot up 5c.  
 Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, \$1.90, 1 ton to 5 tons, \$2.00, less than 1 ton \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.  
 Chromium-Copper: (Chrom. 8-11%, Cu. 88-90%, iron 1% max., sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.  
 Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.



2.5%) Contract, any quantity, \$1.10 eastern, freight allowed, per pound (anadium oxide contained; contract carlots, \$1.105, less carlots, \$1.108, central; \$1.118 and \$1.133, western; spot add 5c to contracts in all cases. (titanium metal; cast: Contract, ton lots or more \$1.80, less, \$2.30, eastern zone, freight allowed, per pound of metal; \$1.809 and \$2.309 Central, \$1.849 and \$2.349, western, spot up 5c. (titanium-Manganese-Silicon: (C a L in 20% mang. 14-18% and sil. 53-54%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.40c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c. (titanium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c. Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0635c, less .088c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .069c, .0685c, .0855c and .088c, western; spot up .25c. Briquets, Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l. and .2c for 2000 lb. to c.l.; silicomanganese,

eastern, containing exactly 2 lb. manganese and approx. 1/4 lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; ferrosilicon, eastern approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2 1/2 lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l. and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed. Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Lancaster and Washington, Pa., furnace, any quantity 95.00c. Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of \$3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price \$58.50, spot \$62.25. Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk, c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk, c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000

to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon. Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; mln. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon. Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c, f.o.b. shipping point, freight allowed. Ferrotungsten: Spot, carlots, per lb. contained tungsten, \$1.90; freight allowed as far west as St. Louis. Tungsten Metal Powder: spot, not less than 97 per cent, \$2.50-\$2.60; freight allowed as far west as St. Louis. Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots \$1.23; less-ton lots \$1.25; eastern. Spot up 5 cents per lb. Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots \$1.35; less-ton lots \$1.40 eastern. Spot 5 cents per lb. higher. High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight al-

lowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon \$142.50, 3-5% carbon \$137.50. Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium. Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb. Ferrovandium: 35-55%, contract basis, per lb. contained vanadium f.o.b. producers plant with usual freight allowances; open-hearth grade \$2.70; special grade \$2.80; highly-special grade \$2.90. Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk per gross ton \$102.50; packs \$107.50; ton lots \$108; less-ton lots \$112.50. Spot 1/4c per ton higher. Zirconium Alloy: 35-40%, Eastern contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot 1/4 cent higher. Alkifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot 1/2 cent higher. Simulat: (Approx. 20% each Si, Mn., Al.) Contract, frt. all not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c. Borostl: 3 to 4% boron, 40 to 45% Si., \$6.25 lb. cont. Bo., f.o.b. Phila. O., freight not exceeding St. Louis rate allowed.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 130 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

## PHILADELPHIA:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	\$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	14.75-15.25
Mixed Borings, Turnings	12.50-13.00
Machine Shop Turnings	12.50-13.00
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

### Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

## NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	\$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	8.00
Mixed Borings, Turnings	8.00
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

## CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	\$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.00-11.50
Short Shovel Turnings	14.50-15.00
Mixed Borings, Turnings	12.50-13.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

## BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	\$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	6.00-6.50
Mied Borings, Turnings	6.00-6.50
Short Shovel Turnings	8.75-9.75
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50
Boston Differential 99	cents higher,
steel-making grades; Providence	\$1.09 higher.

## PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	\$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00-16.50
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

## VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	\$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	15.00-15.50
Cast Iron Borings	14.00-14.50
Machine Shop Turnings	12.00-12.50
Low Phos. Plate	21.00-22.00

## MANFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	10.50-11.00
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## BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	\$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Revolving Rails	20.50
Angle Splice Bars	20.50

Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50-9.00
Cast Iron Borings	8.50-9.00
Iron Car Wheels	16.50-17.00

## CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	\$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dir. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	12.50-13.00
Mix. Borings, Sht. Turn.	13.25-13.75
Short Shovel Turnings	14.00-14.50
Cast Iron Borings	13.25-13.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point,	
railroad grades f.o.b. tracks)	

## BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	\$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	12.00
Short Shovel Turnings	15.00
Mixed Borings, Turn.	12.00
Cast Iron Borings	14.00
Low Phos.	21.75

## DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	\$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	7.00-7.50
Short Shovel Turnings	10.50-11.00
Cast Iron Borings	9.50-10.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

## ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	\$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00

Machine Turnings	9.00-9.50
Revolving Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	20.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	22.00
Railroad Malleable	16.50
Breakable Cast	19.00
Stove Plate	15.25
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	16.00

## CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	\$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50-8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50-9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

## LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	\$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	4.50
Machine Turnings	4.00
Mixed Borings, Turnings	20.00
No. 1 Cast	

## SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	\$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	11.50
No. 3 Bundles	9.00
Machine Turnings	6.50
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	
Cut Structural, Plate,	13.00
1", under	7.50
Alloy-free Turnings	14.50
Tin Can Bundles	16.00
No. 2 Steel Wheels	23.00
Iron, Steel Axles	15.00
No. 2 Cast Steel	16.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00



# LOGEMANN

## Presses for Sheet Scrap

**THE NATION NEEDS YOUR SHEET SCRAP!**

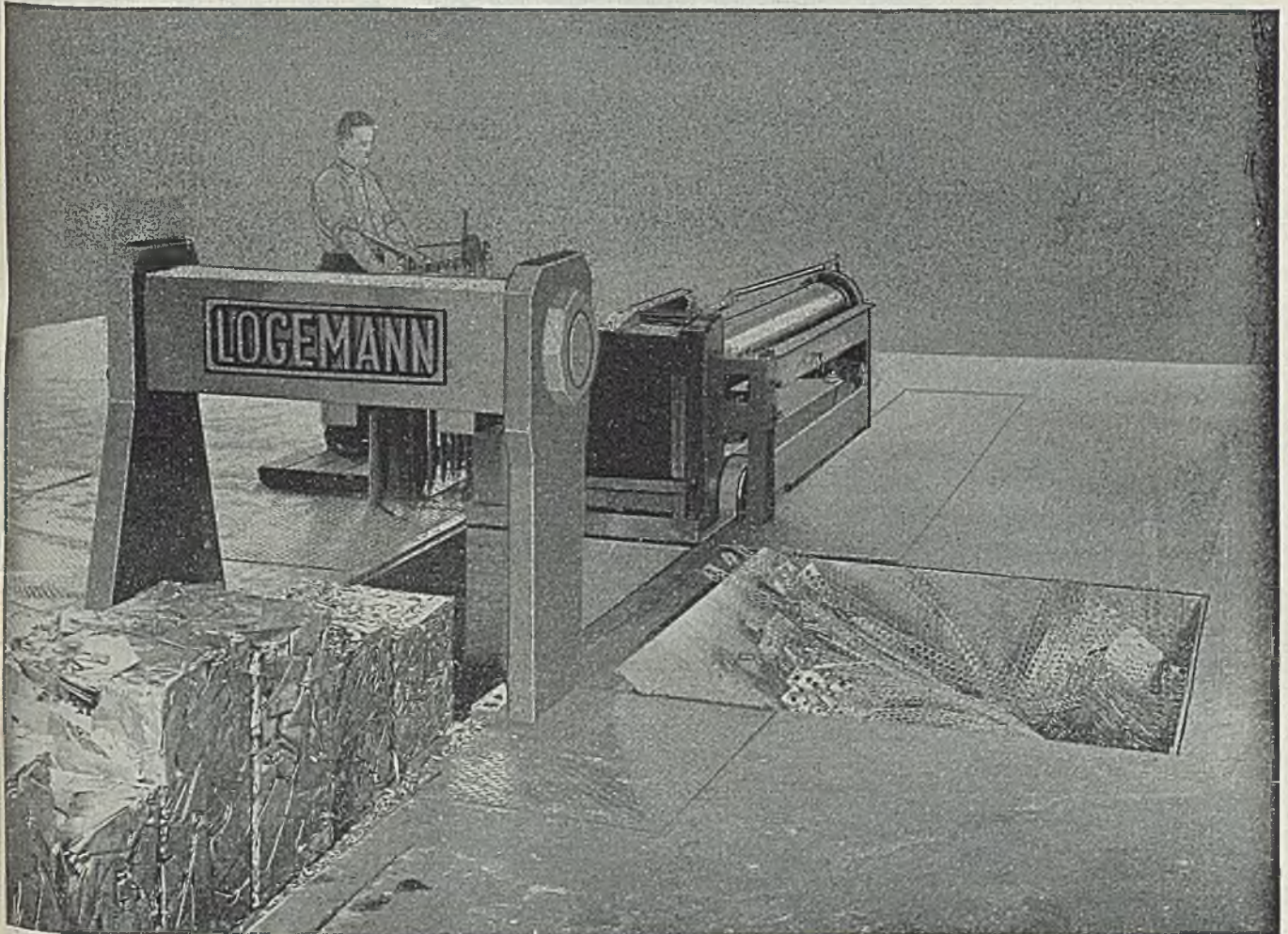
In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service*, presses *designed for automobile plant conditions*, presses *designed for general plant applications*. Write for details.

**LOGEMANN BROTHERS COMPANY**  
3126 W. Burleigh St. Milwaukee, Wisconsin

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.





# NONFERROUS METAL PRICES

**Copper:** Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, 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; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

**Zinc:** Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

**Lead:** Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

**Primary Aluminum:** 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ¼c 2000-9999 lbs.; 1c less through 2000 lbs.

**Secondary Aluminum:** All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barreling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

**Tin:** Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239, 2¼c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

**Antimony:** American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ¼c, 1c, and 3c, respectively.

**Nickel:** Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

**Mercury:** OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., \$191; produced in Texas, Ark. \$193. Foreign, produced in Mexico, duty paid, \$193. Open market, spot, New York, nominal for 50 to 100 flasks; \$158 to \$163 in smaller quantities.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be., \$17 lb. contained Be.

**Cadmium:** Bars ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular"

straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

**Cobalt:** 97-99%, \$1.50 lb. for 550 lb. (bbl.); \$1.52 lb. for 100 lb. (case); \$1.57 lb. under 100 lb.

**Indium:** 99.9%, \$7.50 per troy ounce.

**Gold:** U. S. Treasury, \$35 per ounce.

**Silver:** Open market, N. Y. 44.75c per ounce.

**Platinum:** \$35 per ounce.

**Iridium:** \$165 per troy ounce.

**Palladium:** \$24 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

**Sheet:** Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculey, 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, Herculey, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

**Seamless Tubing:** Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

**Extruded Shapes:** Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

**Angles and Channels:** Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

**Copper Wire:** Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weather-proof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

**Aluminum Sheets and Circles:** 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

**Lead Products:** Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

**Zinc Products:** Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

## Plating Materials

**Chronic Acid:** 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

**Copper Anodes:** Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

**Copper Carbonate:** 52-54% metallic cu, 250 lb. barrels 20.50c.

**Copper Cyanide:** 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

**Sodium Cyanide:** 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

**Nickel Anodes:** 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

**Nickel Chloride:** 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

**Tin Anodes:** 1000 lbs. and over 53.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

**Tin Crystals:** 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

**Sodium Stannate:** 100 or 300-lb. drums 36.50c del.; ton lots 33.50c.

**Zinc Cyanide:** 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

**Brass Mill Allowances:** Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¼c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

## Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze			
90% .....	9.375	9.125	8.625
95% .....	9.500	9.250	8.750
Red Brass, 85% .....	9.125	8.875	8.375
Red Brass, 80% .....	9.125	8.875	8.375
Muntz metal .....	8.000	7.750	7.250
Nickel Sil. 5% .....	9.250	9.000	4.625
Phos. br., A, B, 5% .....	11.000	10.750	9.750
Herculey, 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 to 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 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00-0.40%) 7.25c (lead 0.41-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

**Aluminum Scrap:** Prices f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3c to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

**Lead Scrap:** Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

**Zinc Scrap:** New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ¼c-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ¼c 20,000 or more. Unswaged zinc cross, 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 ¼c 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 per lb. contained nickel only.

**Monel:** No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.



Sheet backlogs continue heaviest of all major steel products and possibility of deliveries of unrated tonnage in third quarter are no brighter. Manufacturers of civilian goods who have expected supplies of sheets and strip for their products find little possibility of obtaining shipments in this quarter, unless priorities assistance is forthcoming.

Boston — Heavier orders for narrow cold strip against allotments dashed hopes for delivery of any substantial unrated volume this quarter. Orders placed on an unrated basis in some instances have been given allotments or priorities assistance for fabrication of components for essential civilian goods for which quotas have been assigned, an instance being producers of stampings. Type-writer builders have both rated and unrated orders in with mills. A flurry in rated orders is ascribed to late allotments by WPB and delays in applications for them on part of some fabricators who had hoped to fill requirements on an unrated basis. This has extended backlogs of priority tonnage with some producers well into fourth quarter. Cancellations continue irregular. No definite promises are made as to unrated shipments in third quarter. Only late cancellations involving tonnage already processed are likely to make available free spot material, providing specifications are suitable.

Hot strip deliveries have improved materially with some mills, reflecting cancellations of forward orders on the part of converters, recently placed on a revised replacement schedule as to hot metal requirements. This also has resulted in revisions in July hot mill schedules.

Chicago — Sheetmakers are hopeful that WLB's request for reports on orders for third quarter will bring a clearing of considerable tonnage. There is a feeling that some consumers have placed unrated orders with several mills in hope of getting deliveries from at least one. Under present conditions, there is scant hope for unrated business to be accommodated this year. Sheets needed urgently for early delivery require a directive and some mills receiving such directives have uncomfortable overloads. Strip mill sizes are not available before March, hot-rolled and hot-rolled pickled in February. Cold-rolled finds openings in December. Galvanized is in March. Narrow and wide strip and hot-rolled strip stands in December, while hot-rolled pickled is not obtainable before February.

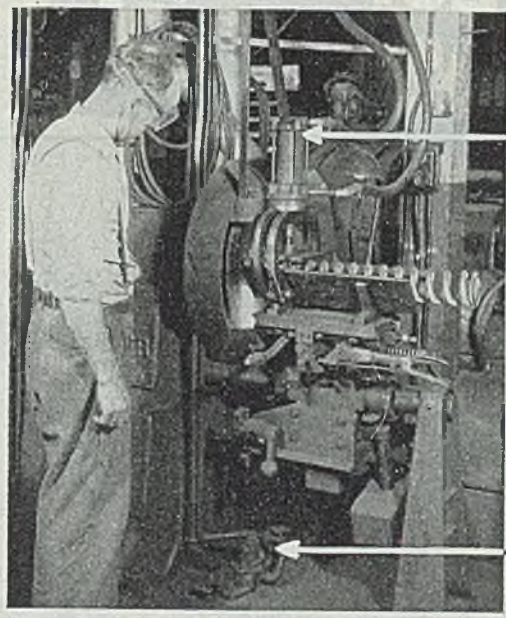
Cleveland — There seems little likelihood that any considerable tonnage of unrated orders for sheets and strip will be rolled this quarter. However, in a few instances abrupt opening in rolling schedules, resulting from contract cancellations, has enabled some producers to ship tonnage for civilian goods account. However, these opportunities are relative-few and tonnage involved is small. Active demand continues for steel on the shell container and steel drum programs, with little change noted in other war requirements. Sheet sellers are booked through the remainder of this year on most items, with galvanized extended into March. Further increase in unrated orders has been noted lately.

Pittsburgh — Sheet mill rolling schedules have been little affected by war contract cutbacks. In many instances contractors have left the tonnage involved in a contract adjustment on mill rolling schedules on the chance of booking other war contracts or that shipment of the steel would be made for civilian goods account. Leading interest here reports near record carryover tonnage in third quarter of about a month's output on galvanized sheets, cold-rolled items and among the lighter gages of hot-rolled sheets. The proportion of unrated orders to CMP authorized tonnage has increased substantially in recent weeks. Sellers report many contractors are placing duplicate unrated orders with

a number of producers on the hope that the tonnage could be meshed into rolling schedules when order cancellations occur. However, little sheet or strip tonnage is expected to be shipped for civilian goods during the third quarter.

The overall steel supply situation for third quarter is expected to leave little or no steel for civilian goods account, trade reports indicate. However, this is on the basis of current military requirements, and therefore does not take into consideration the expected sharp increase in war contract cancellations and cutbacks anticipated during the period. Third quarter war steel requirements are expected to be about 15 million net tons on basis of current schedules, com-

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pared with 16.1 million in the initial three months this year on a two-front war basis. After an allowance of 300,000 tons for mechanical breakdowns, strikes, etc., there is an apparent balance of 800,000 tons for civilian use. However, steel carryover tonnage into third quarter is estimated at 1.9 million. About 500,000 tons of this 1.9 million represents tonnage involved in contract cancellations but which has not yet been reported back to mills.

New York—Although deliveries are not quite so extended, the situation in sheets remains tight. Mills had a carryover into the current quarter of about 600,000 tons and most producers believe they will be unable to catch up before last quarter, if then. This means that

unrated tonnage will be practically out of the question for the current quarter, although there may be a little tonnage in the heavier gages.

Prospects for civilian automobile tonnage in third quarter are poor. Some believe that the automobile builders' best hope lies in the operation of Direction 70, Reg. 1, which permits diversion of military allotments on civilian type products, where cutbacks have occurred. Help may also be gained through application of excess stocks and this should be especially true with regard to stainless steel, on which all mill orders are rated. It appears that there is a fairly good supply of excess stainless steel at various plants throughout the country. However, this tonnage may prove rather

costly as it will be found to be in various shapes, which means a substantial scrap loss; also some will be in grades more difficult to process than those usually specified.

Reflecting recent shell cancellations is a substantial cutback in the order of one large container manufacturer here for long terne shell containers

Cincinnati—Sheet mills in this district went into third quarter with carryover tonnage on rated orders which shows no relaxing in the tight situation on nearby deliveries. Readjustments and cutbacks may release sheets during the quarter for household appliances and other domestic needs, but these developments so far have not been in volume to assure the material. The volume of unvaluated, hence uncheduled, orders is constantly expanding.

St. Louis—Pressure on sheets continues heaviest in two years but a paradoxical labor situation threatens to reduce production by 20 per cent in the next few weeks. In spite of heavy labor layoffs and shutdowns in four major consuming plants, labor shortage is becoming more critical. Rated sheet orders now scheduled for January may be extended soon. As a result of the layoffs, War Manpower Commission advisors here recommend suspension of manpower controls.

### Steel Bars . . .

Bar Prices, Page 180

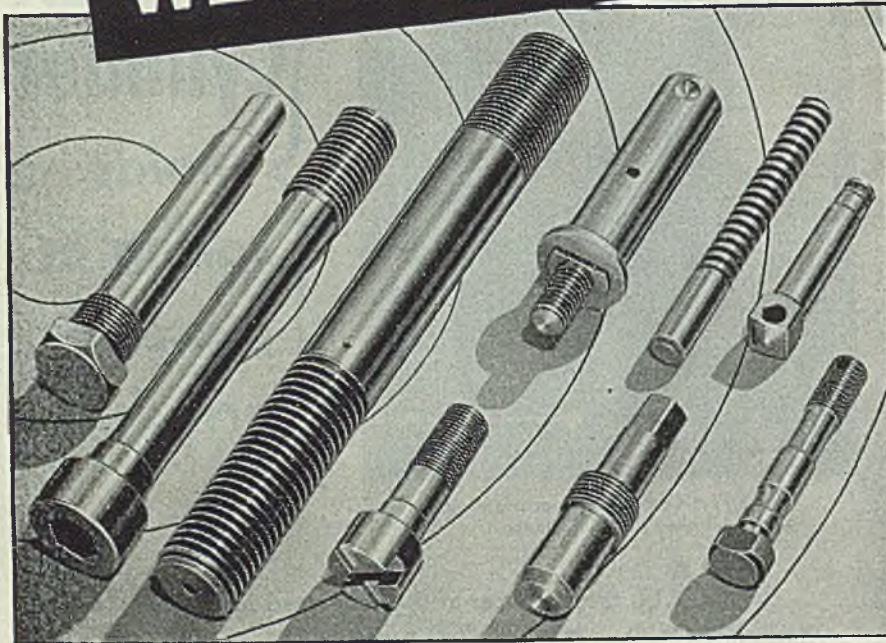
Bar deliveries on smaller diameters are becoming easier and it is possible some "free" tonnage in small sizes may be available in third quarter. The situation is mixed, some producers being booked solidly through third quarter and into fourth. At the same time it is possible to place orders for comparatively prompt delivery, notably in alloys, which are fairly easy, some electric furnace alloy producers being able to promise July delivery.

Philadelphia—Small size hot carbon bars can be had in third quarter and there may even be some "free" tonnage in small specifications before the quarter is over, but little will be available in the sizes involved in recent shell cancellations. Cold-drawn carbon bar schedules may reflect shell cutbacks in third quarter and possibly to a limited extent before the present month is over. However, cold drawers doubt if their operations will be affected much before the last of the year. At present they are booked fairly solidly into November and have nothing to offer before December and January on larger sizes, from about 2 1/4 inches up. Much of this larger size tonnage is going into rockets, although some is for striker components for fire bombs and other munitions.

Cold-drawn alloy bars can be had in August and September, the situation being generally easier as a result of curtailments in aircraft and combat tank programs, which also affect hot-rolled alloys. Some producers of hot-rolled electric furnace alloys still can promise deliveries for July.

Chicago—Considerable confusion exists over the bar situation. Some producers are heavily booked through third quarter and into fourth; but reports are current that it is not difficult to place orders with some makers here and elsewhere for fairly prompt scheduling. This is

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true for alloy grades, which are available for August delivery. Quality and regular carbon grades range from September through December. It is agreed, however, that the shell billet situation has eased considerable, due in part to recent cutbacks in heavy ammunition schedules for the remainder of the year. With the closing of the Geneva structural mill, it is reported that a substantial tonnage of shell billets on order for Kaiser has been transferred to a Chicago mill.

**St. Louis**—Pressure for steel bar delivery is easing under cutbacks in ammunition and bomb production schedules. Labor shortage hampers production. Increasing number of civilian orders for all purposes is adding to potential backlogs.

**New York**—Despite cutbacks in shell work bar sellers continue to quote late in the year and beyond on all but smaller sizes. On hot-top quality steel some producers are quoting well into second quarter next year. Deliveries on alloy bars, on the other hand, are easy, falling generally in August.

### Steel Plates . . .

Plate Prices, Page 181

Plates continue the easiest major steel product, with some capacity for unrated orders expected to be available in third quarter. Buying is light. The situation is unbalanced, a midwestern mill receiving some directives recently in spite of the fact some other mills are actively seeking tonnage. At least one producer can take wide and narrow sheared plates for September and universal for October.

**Chicago**—Plate situation varies according to mill, some makers finding scheduling declining and others holding at a substantial level. One local platemaker in the latter category continues to receive an occasional directive despite the fact that mills in other areas are actively seeking new business. Result is that the local mill is in no position to take on unrated business. Another mill, less heavily booked can take both wide and narrow sheared plates in September, and universal in October.

**Boston**—Plates are available against unrated orders for August with some mills, notably for universal, but open ending of CMP has resulted in small material increase in buying. For Navy ships moderate tonnage is required, but below peak. Some plates are required for ship reconversion but demand from other directions is light. Easing in plates increasingly improves semi-finished supply at some mills.

**Philadelphia**—Plate demand is uneven, with sellers of sheared plates booked six to eight weeks ahead. Capacity for unrated tonnage will be available before third quarter is ended but to date relatively little has been booked.

**New York**—Plate demand is fairly active, with an increasing volume of unrated tonnage and with some scattered orders placed for Sweden, Portugal and the French colonies. Specifications are heavy for ship reconversion and repair.

**Pittsburgh**—Manpower is the major choke point in effort to increase production of sheets on plate mills that have completed plate schedules for shipbuilding and other key war programs. However, progress is being made and it is expected that the tight delivery situation

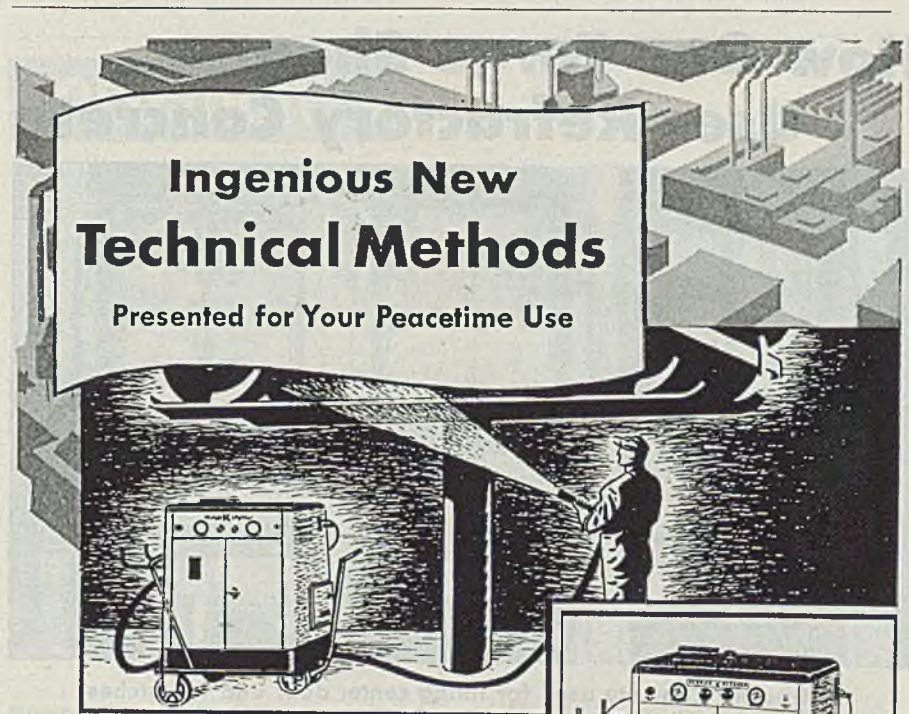
dictate that virtually all merchant wire products are being sought actively. This is surprising in view of the tight restrictions which WPB is enforcing on lumber sales, thus holding down nail consumption, and the fact that heavy rainfall probably will impair crop yield this year. Demand for small sizes of nails and steel fence posts exceeds that for other merchant items. For manufacturers' wire, the trade anticipates that substantial orders for mesh, electrical wires and cables will be offered soon. Consumers are keeping close watch over inventories.

**Boston**—Pressure is increasing for priorities assistance on delivery of wire orders placed by the automotive industry, now with mills on an unrated basis with dim chances for third quarter de-

### Wire . . .

Wire Prices, Page 181

**Chicago**—Dealers and jobbers in-



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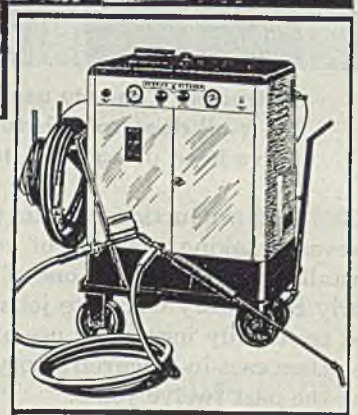
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An economical solution to the problem of cleaning and degreasing trucks, passenger cars, tractors, locomotives, excavators, and the like will be available to garages, service stations, all users of oil-burning equipment, as soon as war demands permit. It is a more efficient steam cleaner now in use by the thousands in the Armed Forces.

Neat "housekeeping" has too often been neglected by industry due to the costliness of hand labor. But the best housekeepers in the World, the U. S. Army, Navy and Marine Corps, dare not neglect frequent and thorough cleaning of all equipment to safeguard against fire and malfunctioning, and to permit fast, certain inspection. This cleaner, developed to meet their high standards, removes grease, dirt and grit 5 times as fast as any other method. It cleans by a balanced combination of heat, detergent, water and friction. It is typically "army" in simplicity of design and operation; in 30 minutes, the entire machine can be dismantled and completely cleaned.

Wartime uses of Wrigley's Spearmint Gum also point the way that industry may benefit when this quality product again becomes available. It will *again* be a "help on the job" in many ways. Right now *no* Wrigley's Spearmint is being made, as present conditions do not permit the manufacture of Wrigley's Spearmint in quantity and quality sufficient for all. But remember the Wrigley's Spearmint wrapper—it is a certificate of highest quality and flavor—and will always remain just that.

You can get complete information from  
Clayton Manufacturing Company, Alhambra, Calif.



The Kerrick Kleaner



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Z-74



livery in volume. Unless firm allotments are forthcoming or cancellations develop in much greater volume than has been the case until now, prospects of delivery of much "free" or open unvalidated volume this quarter are small. Some aircraft volume, including valve spring wire, has been reinstated. Bookings on rated orders are lower and in some instances shipments about balance incoming volume of this type. Aggregate tonnage involved in unrated tonnage offered is heavy, but definite delivery promises are few. Here and there government cancellations have opened some fine wire capacity which is promptly filled by moving rated orders ahead. Nevertheless, several mills are looking for orders for wire 0.021 and finer. Spring and

basic wire schedules are filled with CMP orders. A somewhat tighter situation in rods with some mills is complicated by 40,000 tons wanted for France.

**Buffalo** — Although still working on substantial top priority contracts, a leading wire producer reports a good chance that it will be able to start filling some non-rated low carbon wire business by the end of July. Hopes were based on a falling off in demand as a result of cutbacks in wire for fragmentation bombs.

### Tubular Goods . . .

Tubular Goods Prices, Page 181

Seattle—Inquiry for cast iron pipe is active but delivery is unsatisfactory,

60 days being about the earliest promised. In some instances other types of pipe have been substituted. Seattle has ordered 275 tons of 8 and 16-inch for local improvements from H. C. Purcell for U. S. Pipe & Foundry Co. Pacific States Cast Iron Pipe Co. has booked about 200 tons for Vancouver, Wash. Carlton, Oreg., will open bids July 9 for 14,500 feet of 4, 6 and 10-inch pipe and fittings. R. H. Corey, Portland, Oreg., is engineer. Plentywood, Mont., has approved a \$48,000 bond issue for a proposed water system. Grandview, Wash., has sold a \$20,000 bond issue and will ask bids soon for 8-inch cast iron pipe. E. F. Pugsley, Seattle, is low to Kelso, Wash., for furnishing pipe, at \$40,000 for cast iron pipe and \$36,000 for concrete.

### Tin Plate . . .

Tin Plate Prices, Page 181

Chicago—Despite the fact that November is the first month with openings for tin plate, order volume is substantial and most is unrated. It is a question whether the unvalidated business will find its way into schedules this year. Tin plate makers also report that lend-lease commitments for export against third and fourth quarter directives also aggregate heavier than in several months. Shipments from mills are at a good pace, but trouble may lie ahead as the expanding grain movement from western states increase the strain on box car supply.

**Pittsburgh** — Included in the expansion program of Carnegie-Illinois Steel Corp., recently announced, to increase cold-reduced strip facilities considerably, are several new pots to be installed on the hot-dip lines of the Irvin works. This is an interesting and significant development inasmuch as many observers have written off much hot-dip tin plate equipment as excess capacity. It now appears that postwar demand for dipped plate will be more than currently existing capacity can produce. According to informed sources here, this may also be true of electrolytic lines but as yet there is no evidence to substantiate this point.

### Structural Shapes . . .

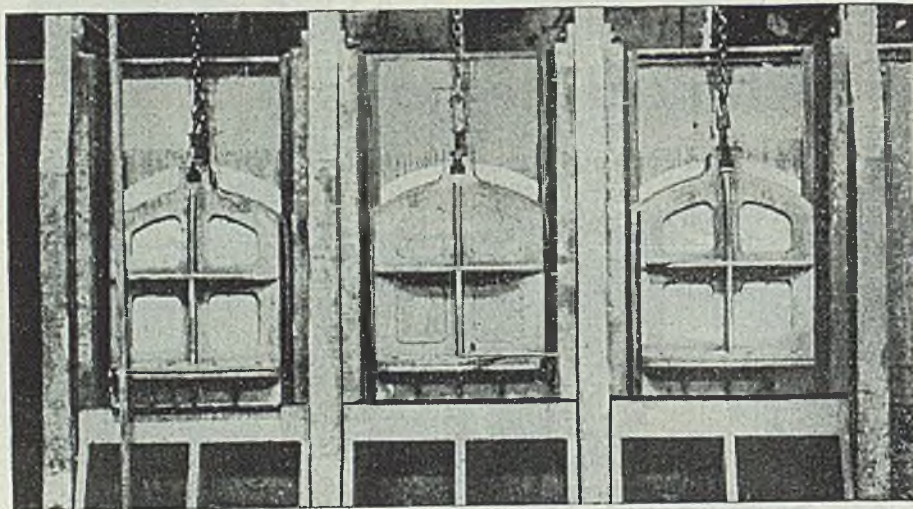
Structural Shape Prices, Page 181

New York —While few structural awards are being noted, inquiry is increasing and is placing a heavy strain on drafting departments of fabricators. In fact, with their forces having been so badly depleted by demands of some of the more urgent war activities, such as shipbuilding, some leading fabricators today are being forced to pass up some of the projects now coming out for figures. Of course, the emergency in some of these lines, such as shipbuilding, is abating; however, not sufficiently yet to make any important difference. Fabricators believe it will be at least another three or four months perhaps before an appreciable easing appears in the supply of draftsmen; and some believe it will be longer than that.

Included in the few awards reported at this time is a plant addition for the New Departure Division of General Motors Corp., Hartford, Conn., requiring 335 tons, placed through Topper & Griggs, New Haven, with Bethlehem Fabricators, Bethlehem, Pa.

One factor for delay in placing struc-

## How One Forge Shop Uses Refractory Concrete



Refractory Concrete used for lining center door and for arches over all doors of this forge furnace. A. Finkl & Sons, Chicago, have been using Refractory Concrete for the past twelve years.

100% war production by this plant prevents taking pictures of recent installations. But here is one of their early Refractory Concrete jobs that led to steadily increasing use of this jointless, cast-in-place refractory during the past twelve years.

**Another example:** Big billets are heated in Finkl's press forge furnaces. The doors often rest on top of the billets. Flame impingement burns off the bottom of the door casting. A lining made up of small pieces doesn't last long, because the pieces drop out. The one-piece Refractory Concrete lining stays where it belongs, even when the bottom of the frame is gone. The frame can be saved

by bolting on a new bottom-plate.

Since 1933, the convenience and economy of Refractory Concrete on such jobs have led Finkl to use it for arches and sub-hearths, for irregular sections and inaccessible locations. For special shapes, they make precast Refractory Concrete units, ready for use in 24 hours. For structures subject to soaking heat, such as furnace foundations, they use Heat-Resistant Concrete made with LUMNITE.

Let us tell you how LUMNITE can save time and money in your plant. The Atlas Lumnite Cement Company (United States Steel Corporation Subsidiary), Dept. S, Chrysler Bldg., New York 17, N. Y.

**LUMNITE FOR REFRACTORY CONCRETE**



tural steel is continued tightening in shape mill deliveries, due in part to further shell work and lend-lease rehabilitation requirements. Mills are booked solidly into September, with one large producer quoting November shipments on standard sections. Prospects for unrated tonnage in third quarter are slim, a situation which is holding up considerable inquiry.

**Philadelphia** — Domestic structural orders are light, although considerable work is being figured and shape schedules are well extended. At least two large producers are out of the market for third quarter on standard sections, with one booked solidly into November. Contributing to this situation is said to be lend-lease business for construction abroad. United Engineers, Philadelphia, is asking bids on an unstated tonnage for a carbon black plant in Texas.

**Chicago** — The recent wave of new construction work has been slow in reaching the stage of award. This is believed to be due to the tightness of steel and also to an inability to gain government approval. In the meantime, new inquiry has been light. However, reports are heard that many new jobs will be out for bids in the next few weeks. September is the first open month on mill books for standard shapes.

**Pittsburgh** — New buying on the storage building and barracks program has brought in a fair tonnage during the past week. There is some miscellaneous construction work, but in the main new tonnage is small compared to backlogs now existing. Cancellations have come through on some contracts and producers here expect some structural tonnage will be available in third quarter for unrated orders despite the fact that most mills are now booked for complete capacity during that period.

**Reinforcing Bars . . .**

Reinforcing Bar Prices, Page 181

**Chicago** — Inquiry for reinforcing steel, except small miscellaneous jobs, has dropped sharply in the last week or ten days. There also has been a decline in awards on which bids are already in. Suppliers report that some projects seem to evaporate after bids are taken, the assumption being that sponsors fail to get government approval.

**Pig Iron . . .**

Pig Iron Prices, Page 183

General shutdown by foundries the first week in July interrupted pig iron melt somewhat but resumption this week will be at full capacity of labor supply. Additional stacks are being blown out for repairs as the hard driving of many past months taken toll of linings. Another stack has been blown out in the Chicago district and one in the Youngstown area. Backlog of war castings orders is estimated at five months.

**Philadelphia** — Curtailment in pig iron shipments the past week because of holiday influence came as a welcome breather for producers as most were behind on shipments, with substantial demand looming. Official Washington estimates place war order backlogs of gray iron foundries at five months. Outlook among basic consumers also is active. A leading Buffalo producer expects to get a large blast furnace back in pro-

duction about the middle of August after being down for repairs since early in the year.

**Chicago** — The fact that many foundries were down last week to give workers a holiday, to check and repair equipment and to take inventory was a welcome relief to pig iron suppliers. With iron in tight supply, due partly to strong demand and partly to a deteriorating blast furnace situation in the district, any lessening of consumption tends to remove the strain. While foundries have had some orders cut back, other business of essential character is in hand to take its place. Inland Steel Co. blew out its Indiana Harbor No. 5 furnace June 23 for relining, leaving 37 of the district's 41 stacks active. Long and active campaigns are taking their toll of furnaces now. In-

terlake Iron Co. found it necessary to take wind off one of its two Federal furnaces four or five days for repairs.

**Boston** — Most consumers strive to maintain inventories close to 30 days and monthly shipments are relatively numerous, without material change in melt. For larger consumers inventory limitations tend to retard normal forward buying and in case of basic this margin, while safe for the season, is dangerously low for periods of uncertain transportation. Shortage of labor continues to hamper increase of melt in several industries on which production controls have been eased or removed.

**Youngstown** — Carnegie-Illinois Steel Corp is blowing out its No. 3 blast furnace at Farrell Works, one of two at the plant, for relining, expected to be

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down for nearly four months.

New York—Pig iron shipments are approaching normal, now that the holiday period is over. Various foundries, although not quite as many as originally expected, closed down during the first week in July for vacations and inventory taking. Unless the weather is excessively hot, the indication is that the melt over the next several weeks will be at as high a rate as the supply of manpower will permit, for plenty of business appears to be in sight.

In connection with recent reports of tentative orders being booked by producers for shipment to Sweden, it is understood that the question of bring-

ing iron ore from Sweden to this country in payment did not seriously enter the negotiations. The business was placed tentatively on the basis of price ruling at time of delivery, with payments to be financed on regular terms.

Cincinnati—The foundry melt during the holiday week was far below normal because of numerous vacation shutdowns. Demand for castings has not slackened and the backlog of orders is heavy. Buying of pig iron for third quarter, however, reflects little hope for a general expansion of operations in the face of limited manpower. Shipments recently have been more satisfactory, and the shutdowns also aided in

building up stocks which were critically short in recent months.

Buffalo — Pig iron demand continues to hold at about recent peak levels. Railroad demands head the list of peacetime and reconversion orders. A growing volume of civilian work is reported edging its way into order books. An increased tonnage is said to be moving to New England consumers, both by canal and by rail.

### Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 181

New York — Bolt and nut manufacturers assert that there has been only a slight overall easing in their backlogs. Cutbacks have not been as heavy as expected and have been offset to a considerable degree by other work, largely for the Army and Navy. At present a large number of bolts, running into the millions, are being figured by fabricators for knock-down barracks. They fall in the range of small sizes, particularly  $\frac{3}{8}$ -inch.

Deliveries on small bolts now average around 10 to 12 weeks, while those on the large range around 4 to 5 weeks, reflecting particularly the lag in heavy building construction.

Bolt and nut makers generally are not accepting unrated orders, as they are not sufficiently sure that they will be able to obtain unrated tonnage from mills to meet the schedules desired.

### Scrap . . .

Scrap Prices, Page 184

Steelmaking scrap and all other grades except light scrap, borings and turnings are strong at ceilings, and the latter are advancing close to the top as demand continues and supply shrinks. Cast grades are continuously scarce and some steelmaking scrap also is less than demand. Lack of yard labor to process steel scrap causes some tightness.

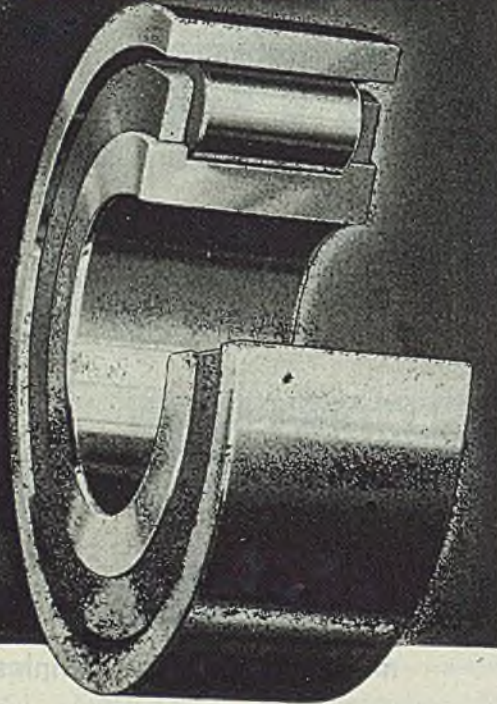
Philadelphia—Machine shop turnings and mixed borings and turnings have advanced again, reaching \$12.50 to \$13, delivered. Expectation is general that these grades will reach ceilings of \$13.75 shortly. No. 3 bundles also are higher, at \$14.75 to \$15.25. All other grades are at ceilings, with demand in general in excess of supply. This is particularly true of cast grades and in less degree in better grades of melting steel. There is a reasonably good supply of steel scrap but not enough labor at yards to process it.

Boston—Strength in heavy melting steel is reflected in firmer prices for lighter steelmaking grades, unprepared and short shoveling turnings, among others. Bids for machine shop turnings are better than \$1.25 above the recent low. Demand for all grades is more active, including chemical borings at ceiling, while recent spot offerings of cast scrap bring out numerous bids at ceiling.

Cleveland—More active demand for all scrap grades is noted here, and movement from this district into the Youngstown area has also increased recently. All softness in turnings prices has disappeared, with machine shop items moving at \$11 to \$11.50. Supply of this grade continues to tighten as effect of cutbacks begins to be reflected in current production schedules. Cast scrap is in particular short supply, with slight easing in

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foundry manpower and borings show moderate increase in gray iron castings output. Considerable tonnage of turnings is moving into this district via lake vessel, and these shipments are expected to be increased over the remainder of the navigation season.

**Pittsburgh**—Further tightening turnings supply is indicated over the next few weeks, resulting from additional war contract cutbacks, particularly in the ammunition program. Reflecting this situation machine shop turnings are up another 50 cents and are currently moving within the range of \$16 to \$16.50. There is active demand for all scrap grades, a reversal of the former intermittent buying policy for stock replenishing. Dealers are trying to move material through yards as quickly as possible, but manpower shortage continues the major limiting factor. Steel foundries have unusually low scrap inventories. This factor, combined with the indicated continuation of current high blast furnace and steel operations are the motivating forces behind present active demand for all scrap grades.

**New York**—While there are few new orders, heavy melting steel and borings and turnings are moving in substantial volume to Bethlehem, Pa., and Sparrows Point, Md. Heavy melting still also is being shipped into the Pittsburgh area. Except for borings and turnings all major grades are at ceilings and undertone in the latter is strong. Brokers are quoting \$8, New York, and \$8.75, Northern New Jersey, on machine turnings and mixed borings and turnings. Curtailment in foundry operations the first week in July for vacations and inventory temporarily eased pressure on cast grades, but cast supply still is far short of demand.

**Cincinnati**—Dullness such as has not been experienced during the wartime years is current in the iron and steel scrap market. The condition is undoubtedly due in part to the holiday and vacations by many melters the week beginning July 1.

Recent purchases by mills have been small, in an apparent effort to reduce inventories. Nevertheless, this lack of interest in buying has not been accompanied by pressure on prices, which are firm at ceiling on heavy grades.

**St. Louis**—Scrap shipments continue low and demand is brisk, mainly from Chicago melters. St. Louis consumers are placing a few orders for local material but none for scrap from remote areas. Reserves are about five weeks. Heavy melting steel is most sought grade.

**Seattle**—Scrap market conditions are satisfactory to steel mills. Good material is plentiful from local sources. Inventories are being held steady. Scrap yards have less difficulty preparing material.

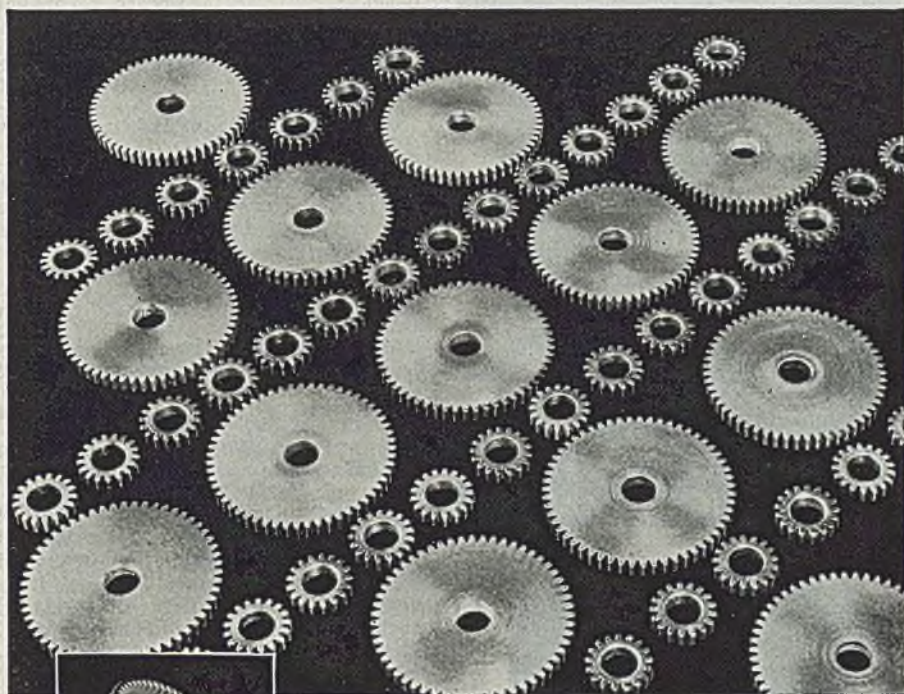
**Los Angeles**—Some No. 1 heavy melting steel is moving east again on priority allocations, indicating no shortage on the Coast. Mill reserves are reported ample and prices have made no advance in the last two weeks. Negligible quantities of war-front scrap are reported arriving as ballast in ships from the Orient. More non-reusable salvage material is entering the market from local sources, partially compensating for smaller tonnages of shipyard scrap. No. 1 heavy melting steel is selling at about \$2 under ceiling.

Receipts of turnings and borings show little change.

**Buffalo**—Stronger tendencies dominate the scrap trade following the recent buying flurry, but no appreciable new business was placed this week. While serious manpower problems still exist, dealers report no difficulty covering previous substantial sales. Dealers find workers released from war plants affected by order cutbacks are not willing to accept scrap yard jobs. Favorable weather, however, has augmented the flow of material. Signs of price hardening are noted among dealers who are discussing the possibility of higher prices on turnings, which advanced \$1 a ton on latest business, but are still below ceil-

ing. No further lake scrap has arrived since the recent re-allocation of upper lakes material originally scheduled for local consumers. The heavy flow of scrap from the eastern seaboard, however, continues, via the barge canal.

**Chicago**—Scrap prices are unchanged. The market continues active, with prime grades at ceiling and turnings and borings holding their recent advances firmly. It is reported but not confirmed the latter have taken full ceiling but these transactions appear to represent broker rather than consumer buying. Deteriorating blast furnace situation is playing a part in demand for turnings and borings. Heavy melting steel not too plentiful and with mills holding operations steady at near



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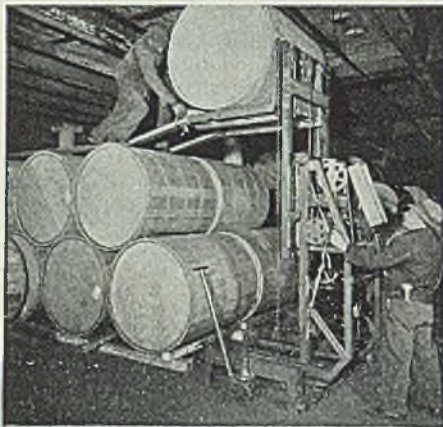
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maximum capacity good material moves readily. Inventory of some mills is not good and allocations are more numerous than recently.

## Iron Ore . . .

Iron Ore Prices, Page 182

Shipments of Lake Superior iron ore in June totaled 10,621,309 gross tons, compared with 11,910,685 tons in June, 1944, according to the Lake Superior Iron Ore Association, Cleveland. Details of shipments from various ports are as follows:

	June, 1945	June, 1944
Escanaba . . . . .	625,753	755,445
Marquette . . . . .	556,905	626,186
Ashland . . . . .	565,037	820,791
Superior . . . . .	3,446,821	3,944,200
Duluth . . . . .	2,838,259	3,076,904
Two Harbors . . . . .	2,521,135	2,687,159
Total U. S. Ports . . . . .	10,553,910	11,910,685
Michipicoten . . . . .	67,399	63,955
Grand Total . . . . .	10,621,309	11,974,640

To July 1 total season shipments totaled 29,024,586 tons, compared with 29,376,930 tons to the corresponding date last year. Details of shipments are as follows:

	1945 To July 1,	1944 To July 1,
Escanaba . . . . .	1,883,154	2,152,141
Marquette . . . . .	1,446,606	1,298,412
Ashland . . . . .	1,757,234	2,095,328
Superior . . . . .	9,177,971	9,422,480
Duluth . . . . .	7,576,176	7,315,776
Two Harbors . . . . .	7,010,491	6,917,562
Total U. S. Ports . . . . .	28,851,632	29,201,699
Michipicoten . . . . .	172,954	175,231
Grand Total . . . . .	29,024,586	29,376,930

A new record for ore cargoes was set July 1 by the BENJAMIN F. FAIRLESS of the Pittsburgh Steamship Co., one of the new 640-footers. This ship loaded 18,593 gross tons at Two Harbors, Minn. The prior record was 18,479 tons, loaded June 23 by a sister ship, ENDERS M. VOORHEES.

## Warehouse . . .

Warehouse Prices, Page 182

Cincinnati—The early-July ordering of steel from jobbers' stocks holds to recent high levels, unaffected by any cutbacks, holidays or vacation shutdowns. Rated demand is such that sales volume is keyed to supplies of active items, and ability, under handicaps, to complete preparation and make deliveries. Jobbers are moving cautiously in respect to the unrated orders.

Los Angeles—Deliveries of plates, except galvanized are expected to ease soon. Aside from this there is little hope of better supply. Mill shipments continue low while requests for shipment are pressing. Pipe and wire products lead in delayed delivery, with alloys slightly less pressing.

Philadelphia — While July got off to a slow start because of the holiday in the first week, warehouse demand in June was active, showing little change from May. Orders were a little lighter but were fully as numerous and one leading distributor reported June business on a dollar basis was equal to that of May.

St. Louis—Warehouse steel stocks show no improvement as a result of war cutbacks. Particular difficulty is met in

sheets, cold-finished bars and tubular goods. Small diameter bars are especially scarce. Demand is slightly less but warehouses still have all the business they can handle. Some gain is expected soon as a result of WPB permitting entry of Z-3 orders, such orders coming in considerable volume.

Cleveland—While buying has slackened somewhat demand is still strong. In some products mill deliveries are better than recently but cancellations to mills have not eased the general situation.

Chicago — Warehouses continue to experience strong demand for steel, but are handicapped in accommodating it by short and unbalanced inventories. Of all products, sheets are needed most urgently, and outlook for obtaining anything near adequate tonnages from mills is discouraging. Demand for structurals also in considerable volume for manufacturing operations rather than building construction. Interest in excess prime plates is running light, despite the fact that plate mill schedules are declining.

## Canada . . .

Toronto, Ont. — There has been comparatively little change in demand in Canadian steel market in the past two or three weeks. While there have been some order cancellations as a result of curtailment in war production there has been no easing in steel supply and with few exceptions delivery is being extended continually. While there is still some buying on war account it is stated that a much larger portion of new business now is associated with civilian manufactures, although no large volume of consumer goods has yet started to flow off assembly lines. Permission has been granted for manufacture of a wide range of civilian goods, including washing machines, vacuum cleaners, electric stoves and numerous other types of household equipment, as well as automobiles and agricultural implements, etc., but most companies still have considerable retooling to do and there is a shortage of steel and other raw materials.

Canadian mills as a whole are heavily loaded with orders and in some special lines one or two producers have withdrawn from the market. Backlogs now extend well into 1946 and on only a few items is surplus capacity available before December. While there has been no change in steel or iron prices in Canada in the past two or three years, some producers are hopeful that government ceiling prices soon may be abandoned and in order to take full advantage of any advance in prices are adhering strictly to their policy of making price as at time of shipment, thus forward delivery contracts do not protect consumers. On many materials mills are not promising delivery for any set period, but most bookings are accepted on an if and when basis.

Sheet supply is specially tight and with continued pouring of new orders there are no indications of early easing. While producers continue to accept business in sheets, deliveries are being more extended and now run almost to the end of first quarter. However, there is a possibility that war cancellations may make additional supplies available to



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civilian users within the next three or four months, but this is problematical at the moment.

There has been little change in bars, both carbon and alloy. While there have been some war contract cancellations, these have been far overshadowed by buying from non-war consumers. Carbon bar demand has been gaining in volume in the past week or ten days and delivery extends well into December with some booking into January.

The plate situation appears easiest of all materials and Ontario mills are quoting delivery within four months. Fresh buying is developing on a broader scale for non-war use and it is not expected there will be much improvement in the present delivery situation this year. Heavy orders have been closed recently from railroad car and locomotive builders and buying on a large scale is reported from agricultural implement makers. Building trades and mining interests also have been more prominent in the market for plates in the past two or three weeks.

Mills are said to be filled with orders for wire and nails and some producers have withdrawn from the market on certain lines of nails. The shortage of nails is said to be due to the fact that skilled labor is not available.

While there was some slowing down in merchant pig iron sales late last week as a result of the Dominion holiday, there are indications of more normal action.

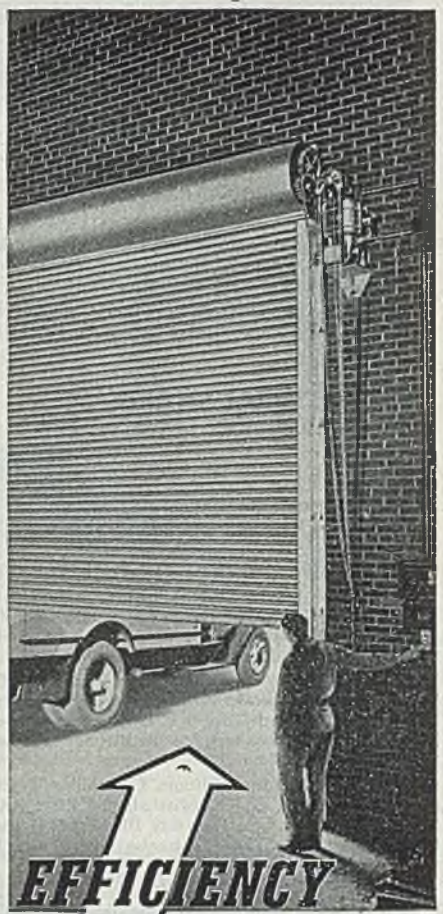
Scrap iron and steel receipts continue in good volume and many dealers now are accumulating supplies for future sorting. However, there has been further slowing in offerings from war plants due to curtailment in war production by a number of plants in this area.

Iron and steel production in Canada showed a minor decline in May from April, according to the Dominion Bureau of Statistics. In May pig iron production amounted to 155,574 net tons which indicates a daily average of 5018 tons compared with 5202 tons per day for April. Output in May also fell below the corresponding month of last year. Production of steel ingots and castings in May totaled 267,643 net tons for a daily average of 8633 tons, compared with 9140 tons per day in April. Production of ferroalloys made a new record for the year at 19,883 net tons. There was no change in the number of blast furnaces blowing in May from the preceding month. At the end of May 9 stacks were in blast and 5 were blown out. Comparative production figures, in net tons, are as follows:

	Steel ingots, castings	Pig iron	Ferro-alloys
May 1945 . . . .	267,643	155,574	19,883
April 1945 . . . .	274,213	156,070	18,350
May 1944 . . . .	263,431	175,207	17,906
5 Mos. 1945 . . .	1,338,503	782,917	80,199
5 Mos. 1944 . . .	1,271,833	627,343	60,316
5 Mos. 1943 . . .	1,259,652	719,900	93,642

### Steel in Europe . . .

London — (By Radio) — Third quarter demand for steel in Great Britain points to increasing confidence in early expansion of the industry. Sheet mills are heavily booked and delivery dates have been further extended. Semifinished steel is needed in larger supply for rollers.



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## REINFORCING BARS . . .

### REINFORCING BARS PLACED

190 tons, wire mesh, SBI route 18, Secs. 13-R and 14-R, Kendall county, Ill., for state highway commission, to American Steel & Wire Co., Chicago; R. R. Anderson Co., Chicago, contractor; bids June 15.

### REINFORCING BARS PENDING

500 tons, veterans hospital, Sioux Falls, S. D., for U. S. Veterans Administration, bids taken May 22 rejected; McGough Bros., St. Paul, was low bidder on general contract.

153 tons, power plant addition, Indianapolis, for Indianapolis Power & Light Co.; bids June 5.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

3900 tons, Ternstedt Mfg. Division, General Motors Corp., Columbus, O., to R. C. Mahon Co., Detroit; bids June 4.

2080 tons, storage warehouse, East Chicago, Ind., for RFC, to Bethlehem Steel Co., Bethlehem, Pa.; bids June 18.

960 tons, power plant addition, Indianapolis, for Indianapolis Power & Light Co., to Central States Bridge & Structural Co., Indianapolis; bids June 5.

335 tons, plant addition, New Departure Division, General Motors Corp., Hartford, Conn., through Topper & Griggs, New Haven, general contractors, to Bethlehem Fabricators, Bethlehem, Pa.

220 tons, factory addition, Caterpillar Tractor Co., Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Fred Harbers Sons, Peoria, Ill., contractor; bids June 15.

### STRUCTURAL STEEL PENDING

1000 tons, store, factory building and boiler house, Nineteen Hundred Corp., St. Joseph,

Mich.; general contract to Pierson Construction Co., Benton Harbor, Mich.; bids June 14.

955 tons, bridge requirements, various locations, for Atchison, Topeka & Santa Fe railroad; bids July 10.

350 tons, factory building, Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.

100 tons, plant addition for Electric Hose & Rubber Co., Wilmington, Del.; general contract to John E. Haley, Wilmington, Del.

Unstated, open grill decking, 8320 square feet, for Montlake bridge improvement, Seattle; plans approved, bids soon.

## PLATES . . .

### PLATES PENDING

Unstated, two 80,000-barrel or storage tanks at Manchester, Wash.; bids in to Navy July 3.

## PIPE . . .

### CAST IRON PIPE PLACED

275 tons, 8 and 16-inch, for local extensions, Seattle, to H. C. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

200 tons, 12,500 feet, for Vancouver, Wash., to Pacific States Cast Iron Pipe Co., Portland, Ore.

### CAST IRON PIPE PENDING

Unstated, 14,500 feet, 4, 6 and 10-inch for Carlton, Ore.; bids July 9.

Unstated, Fourth Avenue N. E. project, Seattle; bids soon.

Unstated, 6, 8 and 10-inch, for army center Opportunity, Wash.; general contract to Rushlight Auto Sprinkler Co., Portland, 74-164.

Unstated, 8-inch for system improvement, Grandview, Wash.; \$20,000 available.

## RAILS, CARS . . .

### RAILROAD CARS PLACED

Eric, 700 fifty-ton box cars, to American Car & Foundry Co., New York; bids on 600 gondolas and 100 covered hoppers will be opened July 9.

### LOCOMOTIVES PLACED

Delaware & Hudson, five freight locomotives, 4-6-6-4 type, to American Locomotive Co., New York.

Northern Pacific, nine diesel-electric switchers, eight of 1000 horsepower, to Baldwin Locomotive Works, Philadelphia, and one 660-horsepower to American Locomotive Co., New York.

### LOCOMOTIVES PENDING

Minneapolis & St. Louis, four 1000-horsepower diesel-electric switchers and one 1350-horsepower diesel unit; purchase authorized.

## Biddle Urges Independent Operation of Geneva Plant

(Concluded from Page 77)

11. Control of western operation by eastern steel interests does not promise independent and competitive pricing.

12. Basic facts such as western operating costs, future transportation rates, market possibilities and disposal terms should be immediately made widely available to insure the widest possible independent interest.

13. Even on the basis of 1937 demand for steel, continuous production in the West is justified if independent operators are not saddled with excessive investment costs.

14. Competition can be expected from eastern producers with all water access to Pacific ports. Continuous production at Geneva would be complementary to the producing facilities in the West.

15. Successful continuous steel making operations in the West afford the soundest basis for future industrial expansion in that area. Western fabricating industries can be expected to develop only when cost of steel is competitive with similar costs in other sections of the country.

## Renegotiation Hits Labor As Well as Management

(Concluded from Page 79)

production and efficiency in lowering costs; increased labor and material costs; complexity of manufacturing techniques; the financial record of the company, what the earnings were over the period 1936-1939, which is the so-called base period; the extent of conversion to the war effort and the percentage of profits to net worth.

The 1942 allocation of a company to a Price Adjustment Board was determined first by its major production item. If it were for Army Ordnance, the District Ordnance board in the nearest proximity to the company handled the renegotiation. If the Engineer Corps used the greatest part of the company's output, that board determined the allowable profit. Each board was a law unto itself. In 1943 and continued in 1944 allocation

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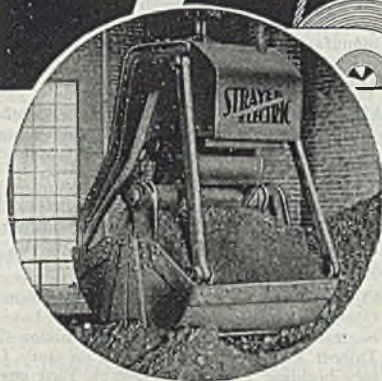
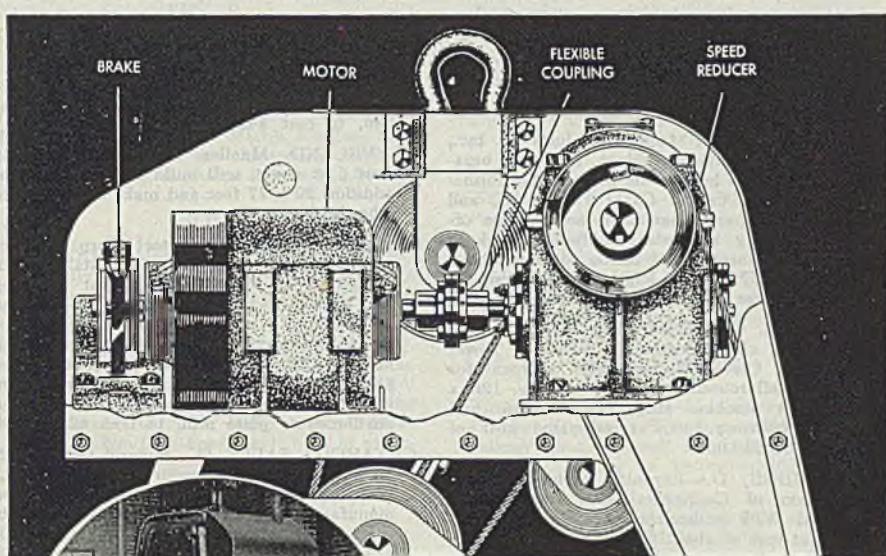
to the services made by industries thereby achieving somewhat more uniformity of standards in judging as to the existence or non-existence of excessive profits. The War Department now conducts all aircraft, textile and rubber renegotiations; the Navy Department has steel and electrical manufacturers, and the RFC has the machine tool industry.

It is indeed a tremendous undertaking for these Price Adjustment Boards. In the early days they started off each day with some manufacturers' challenge: Why do we have renegotiation? The internal revenue law is all that is needed to tax our so-called excess profits. They are likewise confronted by the unspoken basic objection to compulsory repricing and renegotiation by individuals who determine what constitutes "a reasonable profit" without the establishment of rules or standards for making such determinations. They cannot refute the premise that renegotiation deals with current annual profits and not with possible subsequent years' losses. But quite unperturbed, they peg away with their difficult and thankless job of administering this unprecedented law as they see it.

It's a pity that these staffs could not have been recruited from industry, particularly by those who at one time scraped the bottom of the barrel to meet a shop payroll. But most of our seasoned manufacturers are "in there pitching" adding their own products to our armament stockpiles. Therefore the job inevitably fell to accountants who know figures and to the lawyers who know how to interpret laws and directives.

Scraping the bottom of the barrel to meet a shop payroll is a tough experience. Having successfully sweated it through, an employer emerges a different man, schooled in the "facts of life" as they relate to operating a plant. Profits from the "fat" war years have to be intangible cash if they are to be used to meet payrolls in the "lean" years ahead.

In the case cited, the bulk of the profits are in the assets as additional plant and equipment. The management needed this extra capacity to meet his delivery schedules and to increase plant efficiency through building machines in larger lots. In 1942 when he expanded his facilities he never dreamed that over and above his hefty taxes he would be obliged to refund annually an additional sum through renegotiation, and that in three years it would cost him \$119,000. With this nest egg snugly tucked in the bank in war bonds it would have meant facing the postwar period with immeasurably more confidence and aggressiveness. As it now appears, his cushion of cash reserves will not carry through the second postwar year. That will mean he will have to borrow. He will not mind too much, but then should stiff competition, and oversold markets and deflation hit him hard, it will mean hanging the "no help wanted" sign on the gate, and perhaps soon thereafter telling the returned veteran and his older loyal men that it's hopeless to carry on. He will not blame it on anything or anyone, but in his case renegotiation will have proved profoundly wrong.



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# CONSTRUCTION AND ENTERPRISE

## OHIO

**AKRON, O.**—Dover Machine Products Co. Inc., Edward J. Harris, president, has been organized and has bought the plant of the former E. J. James Co. at Canal Fulton, O., and plans to expand operations, erecting an office building and plant addition. Stock is owned by members of Akron Machine Products Co., 572 South High street, Akron, O., manufacturer of tire-building machinery.

**BELLEVUE, O.**—Nickel Plate railroad, J. C. Wallace, chief engineer, Terminal Tower building, Cleveland, has WPB approval for an 18-stall roundhouse and turntable, 120 x 140-foot machine shop, boiler house and other improvements, at estimated cost of about \$1,500,000.

**CAMBRIDGE, O.**—Reynolds Molded Plastics Division of Continental Can Co. has received WPB authorization for plant expansion at cost of about \$500,000 for buildings, which will be one story.

**CLEVELAND**—Cleveland Welding Co., 2115 West 117th street, has permit for a one-story 100 x 200-foot welding building, to cost about \$50,000.

**CLEVELAND**—Modern Gas Furnace Co. has been incorporated with 250 shares no par value to manufacture heating furnaces, by Gerald A. Doyle, agent, 517 N. B. C. building, E. E. Tnit and J. L. Vaughan.

**CLEVELAND**—Republic Steel Corp., Republic building, has received WPB authorization to install a heavy-duty vertical edging stand, bar mill, open hearth and necessary motors and controls at its Youngstown, O., plant, to cost \$107,000.

**CLEVELAND**—Aluminum Co. of America has received WPB authorization for additions to water recirculating building No. 153 and re-

circulating system pumps, chlorinating system, to cost \$42,250.

**CLEVELAND**—Mueller Electric Co., 1583 East 31st street, will build a one-story plant addition 29 x 77 feet and make alterations to other buildings.

**CLEVELAND**—Republic Steel Corp. has received WPB authorization for installation of equipment at Massillon, O., plant including cold-rolling, pickling, annealing, cleaning and slitting units, with construction of a sub-station, to cost \$943,000; addition to plant at Niles, O., 108 x x 220 x 48 feet, costing \$863,000; building addition at Youngstown, including stands and coiler, furnace and auxiliaries to plate mill, to cost \$2,175,000

**CUYAHOGA FALLS, O.**—Summit Grinding & Machine Co. has been incorporated with \$51,000 capital to do precision grinding and manufacture machine parts. H. W. Schwab, First Central Tower building, Akron, O., is agent.

**DAYTON, O.**—Chrysler Corp. has WPB authorization for construction of new boiler house and installation of boilers, stokers, water softeners, etc., to cost \$339,772.

**DAYTON, O.**—National Cash Register Co., 1400 South Main street, has let contract to Industrial Building Co., Reibold building, for a plant addition to cost about \$40,000.

**DAYTON, O.**—Delco Products Co., division of General Motors Corp., First street, has let contract to James I. Barnes Construction Co., Talbott Realty building, for a six-story factory building 172 x 184 feet on First street, estimated to cost \$810,000. Argonaut Realty Co., General Motors Research building, Detroit, is engineer.

**DEFIANCE, O.**—Defiance Metal Products Co., M. Zachrich, general manager, plans a plant

addition 64 x 114 feet, including inside loading dock and crane, to cost about \$40,000.

**NAPOLEON, O.**—Board of public affairs plans postwar water softening plant, and additions to equipment in waterworks plant, to cost about \$200,000.

**SANDUSKY, O.**—Apex Electric Mfg. Co., C. G. Frantz, president, is preparing to reconstruct and enlarge plant at cost of about \$750,000.

**ST. MARYS, O.**—City, City Hall, will take bids soon for a water softening plant to cost about \$120,000. F. G. Browne, Marion, O., is engineer.

**TIFFIN, O.**—General Electric Co., 1885 Broadway, Fort Wayne, Ind., has let contract to the Austin Co., 11612 Euclid avenue Cleveland, for design and construction of a fractional horsepower motor plant, estimated to cost \$5 million.

**TOLEDO, O.**—Schill Pattern Co., 2100 Hendon street, has let contract to John Pisch Co., 1130 Prospect street, for a one-story pattern shop, estimated to cost about \$40,000.

**TOLEDO, O.**—Toledo Smelting & Refining Co., A. F. Suits, general manager, 1011 Avondale street, plans construction of smelter and refinery for nonferrous metals on a site on Maumee river, to cost about \$75,000.

**TOLEDO, O.**—Airite Mfg. Co., 730 Phillips avenue, has let contract to A. Bentley & Sons Co., 201 Belmont street, for a dairy equipment manufacturing plant at 5500 Telegraph road, to cost about \$40,000, with equipment. Hahn & Hayes, 723 Adams street, are architects.

**WELLINGTON, O.**—Lorington Co., Clifford W. Unser, owner, will build a 40 x 100-foot sheet metal fabricating plant on a 3-acre site between Westlake Park and Gas avenue.

## MASSACHUSETTS

**SEEKONK, MASS.**—Water department, Town Hall, has preliminary plans for a complete water supply system, to cost over \$300,000. Whitman & Howard, 89 Broad street, Boston, are engineers.

**SPRINGFIELD, MASS.**—Westinghouse Electric Corp., 653 Page boulevard, East Springfield, has let contract to Ley Construction Corp., 1215 Main street, at \$78,500 for two 29 x 100 foot and two 20 x 128-foot additions.

## CONNECTICUT

**HARTFORD, CONN.**—Aetna Oil Burner Co. Inc., 2074 Park street, has plans for a 100 x 130-foot enameling unit plant addition on Rowe avenue.

**MIDDLETOWN, CONN.**—Russell Mfg. Co., East Main street, has let contract to Dennis O'Brien & Sons Inc., 190 Trumbull street, Hartford, Conn., for a one-story 85 x 125-foot laboratory on East Main street, estimated to cost \$42,000.

**MILFORD, CONN.**—American Windshield Specialty Co., 442 Boston Post road, has let contract to DeFonce Construction Co., 110 Colonial avenue, for a 45 x 180-foot plant on Milford turnpike, estimated to cost \$40,000.

**PORTLAND, CONN.**—Claire Glow Mfg. Co., I. M. Wolfson, 62 Maplewood avenue, West Hartford, manager, has plans by C. M. Gilford, 16 Elm street, East Hartford for postwar construction of one-story 80 x 140-foot plant on Indian Hill avenue, estimated to cost about \$43,000.

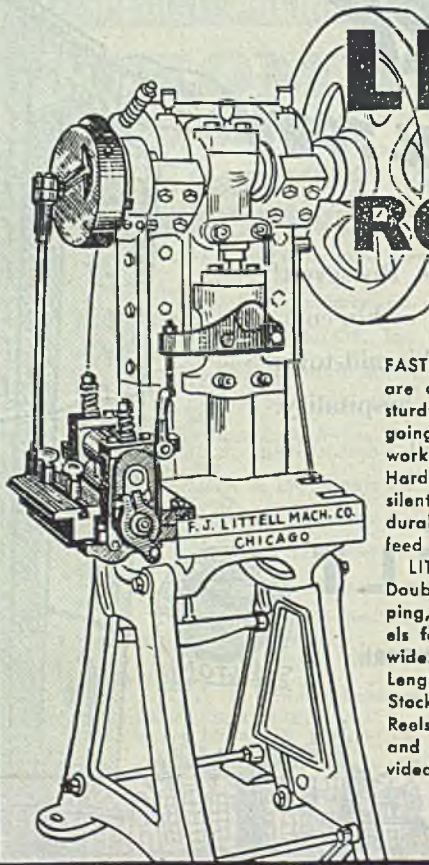
## NEW YORK

**BUFFALO**—Testing cells at the Chevrolet aviation engine plant will be changed over for testing of a new type of jet-propulsion aircraft engines, a contract at not more than \$500,000 has been let to John W. Cowper Co. Inc., 2625 Delaware avenue.

## PENNSYLVANIA

**PITTSBURGH**—Pittsburgh Equitable Meter Co.,

# LITTELL STYLE "M" ROLL FEEDS




*At left*—Standard Style "M" Littell Roll Feed, equipped with a 3-roll Straightener, mounted on left-hand side of an O.B.I. press, feeding left to right. *Below*—same unit, including Littell Automatic Centering Reel.

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**F. J. LITTELL MACHINE CO.**  
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400 Lexington avenue, has let contract to O. H. Martin, 513 North Homewood avenue, for a one-story 114 x 208-foot third story top addition. Franklin & Brown, H. C. Douden Associates, 729 Maryland avenue, architects.

**WEST PITTSBURGH, PA.**—Pennsylvania Power Co., Louis B. Round, New Castle, Pa., vice president and general manager, will double capacity of its power plant at cost of about \$3,200,000. Plans include turbo-generator, boilers, transmission facilities and other equipment. Present capacity is 35,000 kw.

## MICHIGAN

**KALAMAZOO, MICH.**—E. & K. Brass, Bronze & Aluminum Foundry Inc., 1334 Ravine road, has been incorporated with \$25,000 capital to operate a foundry, by William H. Exel, 1803 Shaffer street, Kalamazoo.

## ILLINOIS

**PEORIA, ILL.**—Johnson Instrument Co. has been formed as a branch of Sommer Products Co., manufacturer of electric welding machines, by William A. Johnson and Samuel C. Sommer, to manufacture hay balers and farm tools.

**ROCKFORD, ILL.**—Rockford Screw Products Co. is having plans made for a new plant on a nine-acre site on Harrison avenue.

**WOODSTOCK, ILL.**—Alemite Die Cast & Mfg. Co., 538 Erie street, Toledo, O., has let contract to O. E. Strom, 102 Main street, Crystal Lake, Ill., for a two-story plant addition costing about \$100,000.

## INDIANA

**AUBURN, IND.**—Board of public works, F. A. Potter, secretary, has plans completed for a 500,000-gallon elevated steel water storage tank, to cost about \$100,000. Boyd E. Phelps Inc., 822½ Franklin street, Michigan City, Ind., is consulting engineer.

**EVANSVILLE, IND.**—Serval Inc., L. Ruthenberg, president, Franklin street and Kentucky avenue, plans two one-story plant buildings, 94 x 270 feet and 100 x 100 feet, to cost about \$100,000. E. C. Berendes, 121 NW Fourth street, is architect.

## MISSOURI

**ST. LOUIS**—Southern Equipment Co., 5017 South 38th street, has let contract to L. O. Stocker Co., 806 Olive street, for a one-story 120 x 150-foot factory at 5201 South 38th street, to cost about \$40,000. E. J. Lawler, 808 Olive street, is architect.

**ST. LOUIS**—Hussmann-Ligonier Co., W. B. McMillan, president, 2401 North Leffingwell avenue, has let contract to Fruin-Conn Construction Co., 502 Merchants Laclède building, for two one-story plant buildings, to cost about \$500,000.

**ST. LOUIS**—Marlo Coil Co., 6135 Manchester avenue, has let contract to H. LaBoube, 7404 Devonshire avenue, Shrewsbury, St. Louis, for a one-story 80 x 240-foot addition to cost about \$40,000. Brussell & Viterbo, 808 Olive street, are engineers.

## WISCONSIN

**GREEN BAY, WIS.**—Wisconsin Public Service Corp. has let contract to C. R. Meyer & Sons Co., Oshkosh, Wis., for substructure of power plant to cost about \$3 million for building and equipment. Public Utility Engineering & Service Corp., 231 South LaSalle street, Chicago, are engineers.

**LUXEMBURG, WIS.**—Village, C. Ross, clerk, plans a water and sewage system to cost about \$125,000. McMahon Engineering Co., Menasha, Wis., is engineer.

**PORT WASHINGTON, WIS.**—Wisconsin Electric Power Co., 231 West Michigan street, Milwaukee, plans electric power plant addition costing \$7,119,500. Structural steel to Milwaukee Bridge Co.

## TEXAS

**EL PASO, TEX.**—Texas Aluminum Casting Co. has plans under way for postwar construction of a foundry to cost about \$100,000.

**HOUSTON, TEX.**—A. I. Martin Welding Co., 1107 Austin street, has plans under way for a plant building estimated to cost \$40,000.

## IOWA

**GLENWOOD, IOWA**—City holds special election July 9 on \$249,000 bond issue for a municipal electric light and power plant and equipment.

**NEW HAMPTON, IOWA**—City has plans by J. B. Harris Co., 702 Wesley Temple building, Minneapolis, for improvements to municipal electric light and power plant, including steam generating unit, boiler room addition with coal-handling equipment, etc., at estimated cost of \$125,000.

## CALIFORNIA

**LOS ANGELES**—Western Arc Welding Inc. has building permit for a factory building at 755 Kohler street, 100 x 100 feet, to cost about \$50,000.

**LOS ANGELES**—E. L. Christman has permit for construction of a machine shop at 8259 South Compton avenue, 40 x 50 feet, to cost about \$4500.

**LOS ANGELES**—Coast Coil Spring Co. has let contract to Buttress & McClellan, 1013 East Eighth street, Los Angeles, for a factory and office building at 128 East 58th street, to cost about \$40,000.

**SAN CARLOS, CALIF.**—Welding Services Sales, 605 Old County road, plans rebuilding of its war production plant at cost of about \$75,000.

**SAN FRANCISCO**—Golden West Plating Works, A. D. LaMar, manager, 80 Juniper

street, plans rebuilding its three-story plant, at cost over \$50,000.

**VERNON, CALIF.**—Modern Metal Fabricators have let contract to Buttress & McClellan, 1013 East Eighth street, Los Angeles, for a plant 75 x 125 feet.

## OREGON

**ROSEBURG, OREG.**—Pacific Co-operative Poultry Producers, G. C. Keebey, manager, plans a \$500,000 construction for four Oregon cities, Roseburg, Salem, Newberg and Medford. Plans also are being prepared for a \$300,000 feed mill and additional warehouse facilities at Eugene, Oreg.

## WASHINGTON

**ELLENSBURG, WASH.**—Northwest Chemurgy Co-operative has obtained priorities for machinery for a proposed starch plant here, an existing building to be remodeled for its plant.

**SEATTLE**—Reichold Chemical Inc. is considering sites for construction of a synthetic resin plant in Seattle.

**SEATTLE**—Puget Sound Bridge & Dredging Co. has let contract to General Construction Co. for a pier 50 x 600 feet and a frame powerhouse at its shipyard plant, to cost \$342,000.

**SEATTLE**—Seattle has approved plans and will call bids as soon as materials are available for decking Montlake bridge with open grill steel, to cost about \$36,372, requiring shapes, reinforcing steel and steel decking.

**SEATTLE**—Pacific Car & Foundry Co., owner of a controlling interest in Kenworth Motor Truck Corp., has plans for a truck and bus fabricating plant adjacent to its car shops at Renton, Wash. WPB has approved a \$250,000 project, providing 200,000 square feet of floor space. Kenworth operations will be removed from Seattle.

*Let's talk this thing over...*

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Manufacturers of  
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WELDED TUBING  
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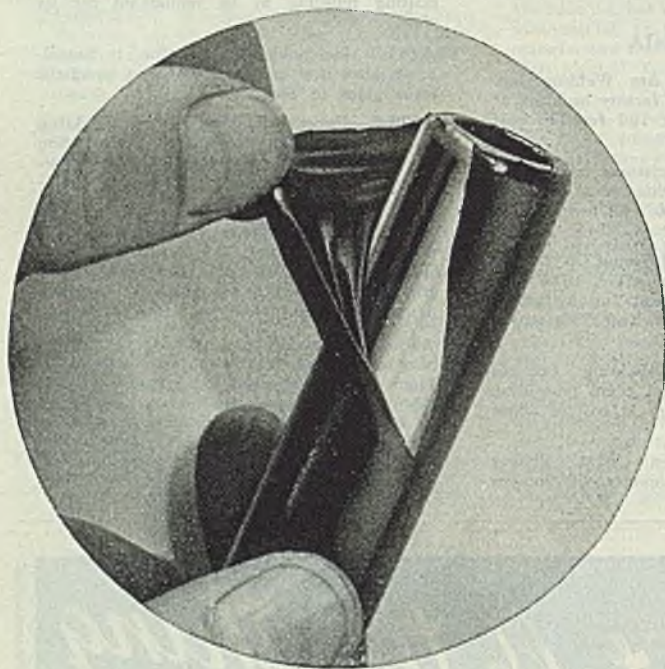
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TOLEDO, OHIO



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Bessemer  
Malleable  
Basic — Foundry

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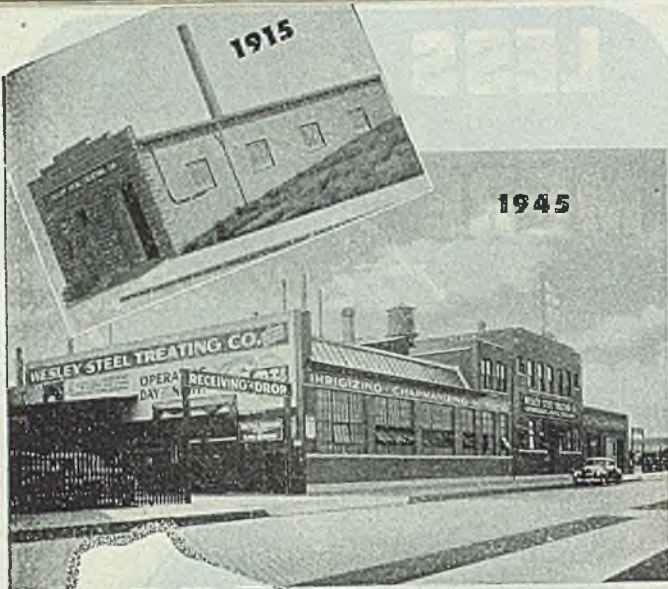
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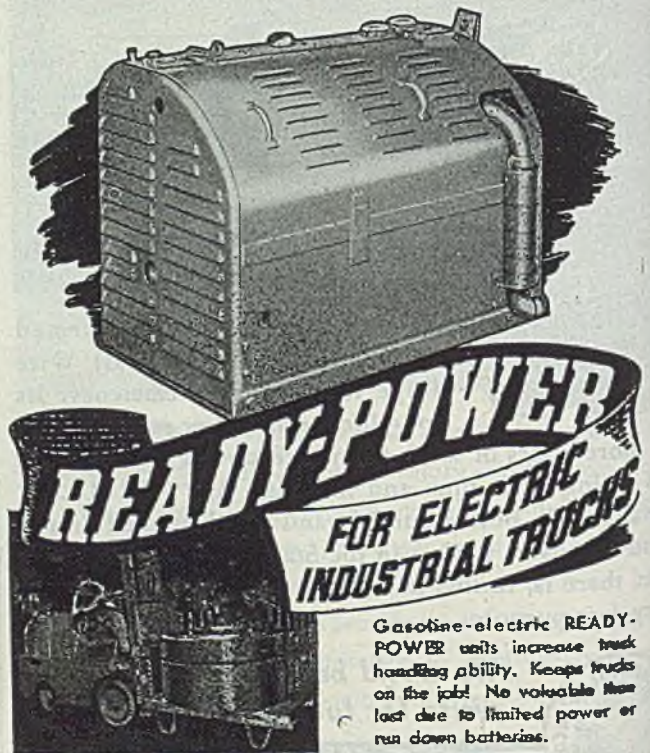
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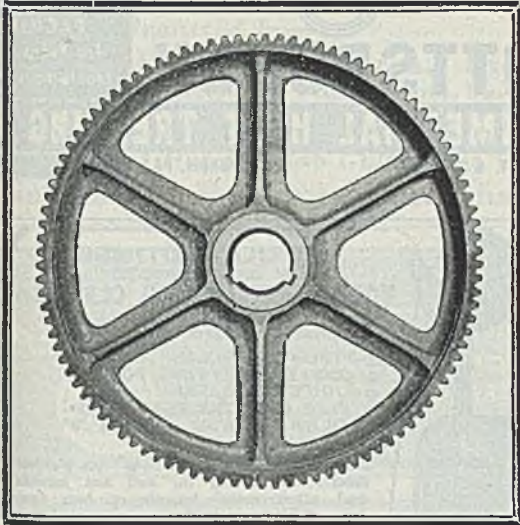
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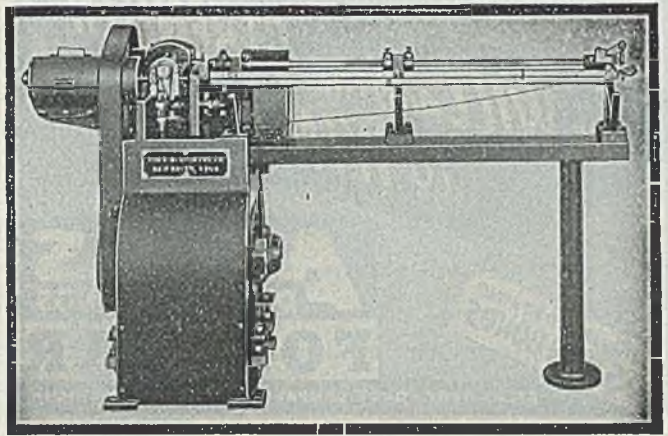
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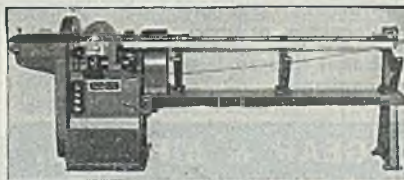
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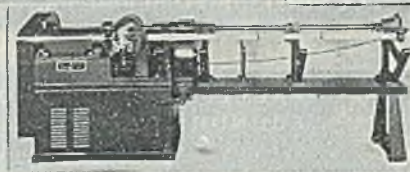
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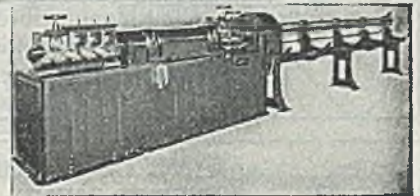


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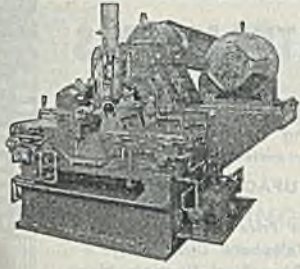
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