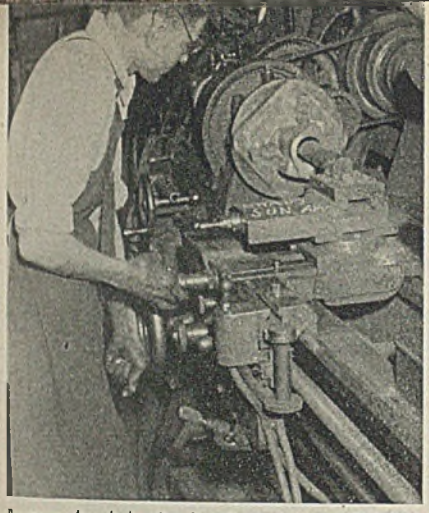


Boypower has helped solve the problem of labor shortage for many war subcontractors. Page 71

STEEL

The Magazine of Metalworking and Metalproducing

SEPTEMBER 6, 1943

Volume 113 *Number 10*

NEWS

Community Action Gets Results 69
Dayton-Springfield manpower program sets national pattern

Manpower 71
Munitions 72
Labor 73
Present, Past and Pending 73
Production Statistics 74
Steelworks Operations 75
Raw Materials 76
Aircraft Steel 77
Materials Control 80
WPB-OPA 82
Consumer Goods 83
Blast Furnace Repair 84
Postwar Planning 85
Men of Industry 86
Obituaries 87
New Facilities 96
Activities 97
Pacific Coast 98

TECHNICAL

Larger Electrodes More Than Double Welding Speed 104
Cut total fabricating time by 30 per cent

User Report No. 19 on Experience with NE Steels 106
Low but adequately alloyed steels used 10 years

Latest Complete Listing of NE Alloy Steels 112
American Iron and Steel Institute's tabulation

Important Factors in Grinding Carbide-Tipped Tools 114
Carbide producer tells how to extend tool life

Chromium Plate for Engineering Applications 118
Critical thickness and finish factors detailed

Unified Drives Increase Rod Mill Production 120
Columbia Steel's new rod mill, Pittsburg, Calif.

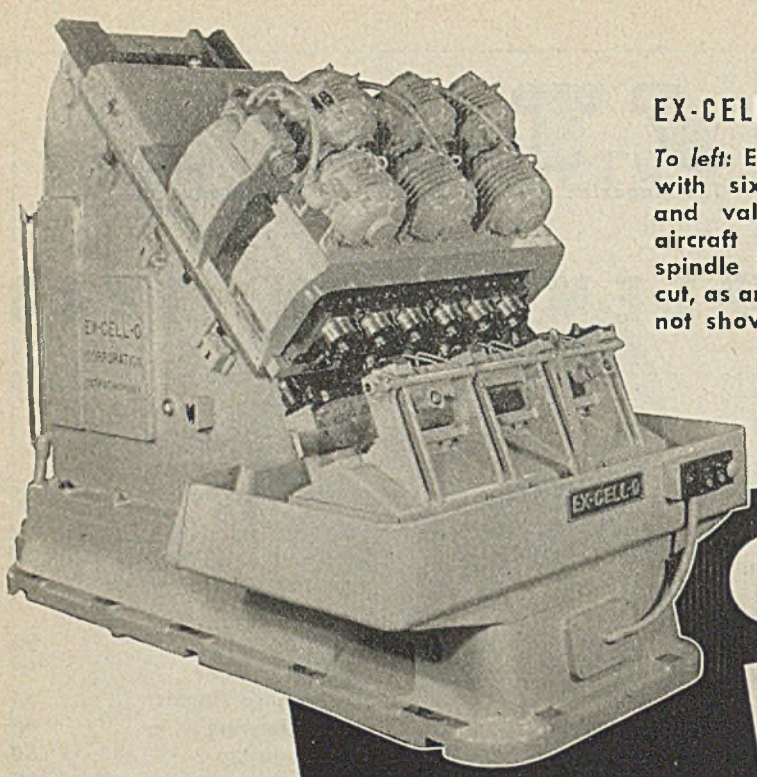
FEATURES

As the Editor Views the News 65
Windows of Washington 78
Mirrors of Motordom 89
Wing Tips 92
The Business Trend 102
Construction and Enterprise 184

MARKETS

New Buying Wave Expected as Next Year's Needs Appear 161
Market Prices and Composites 162
Automobile Builders Inquiring for Postwar Machine Tool Needs 180
WMC Seeks to Shift Workers from Shipyards to Aircraft Plants 182

Index to Advertisers 191
Where-to-Buy Products Index carried quarterly



EX-CELL-O CYLINDER BORING MACHINE

To left: Ex-Cell-O angular type machine equipped with six spindles to finish bore valve seats and valve guide holes in cylinder head of aircraft engine on a production basis. Each spindle is individually adjustable for depth of cut, as are the tools in the boring bars (boring bars, not shown in picture, are piloted in the fixture).

SPECIAL MACHINES

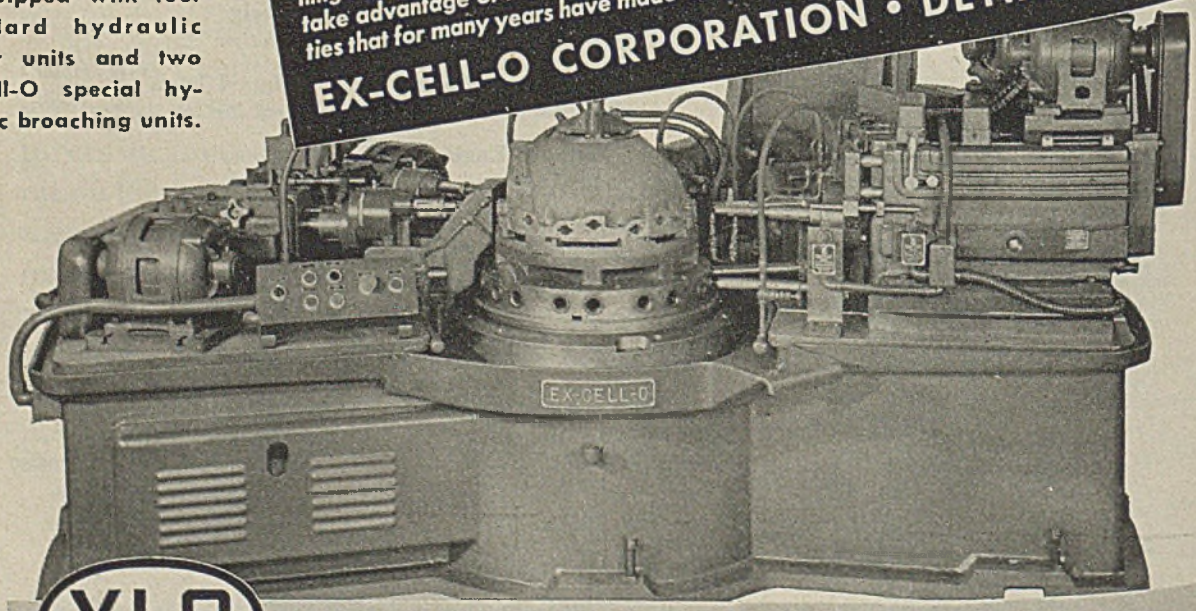
...for today's production...and tomorrow's

For years Ex-Cell-O has been familiarly known as "the headquarters" for special single-purpose machines for turning out accurate parts at a high rate of speed . . . machines that frequently perform numerous operations in one setting of the work and often bring not only a substantial increase in the number of parts produced hourly but also improved quality and reduced unit cost. . . . This is why so many manufacturers have turned to Ex-Cell-O for equipment to meet their war production schedules; why Ex-Cell-O designed machines will figure in the post-war plans of an increasing number of American industries. . . . If you are planning for tomorrow, when the new standards will necessitate costs that are competitive, take advantage of the wide engineering experience and extensive manufacturing facilities that for many years have made Ex-Cell-O a leader in the precision machine tool field.

EX-CELL-O CORPORATION • DETROIT, MICH.

EX-CELL-O SIX-WAY MACHINE

Below: Ex-Cell-O six-way machine for drilling, broaching and reaming valve guide holes in a magnesium crankcase. This machine is equipped with four standard hydraulic power units and two Ex-Cell-O special hydraulic broaching units.



XLO

EX-CELL-O *for* PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT PURE-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS

"Share the Steel" Plan Succeeding!

Idle Steel Goes into War Production

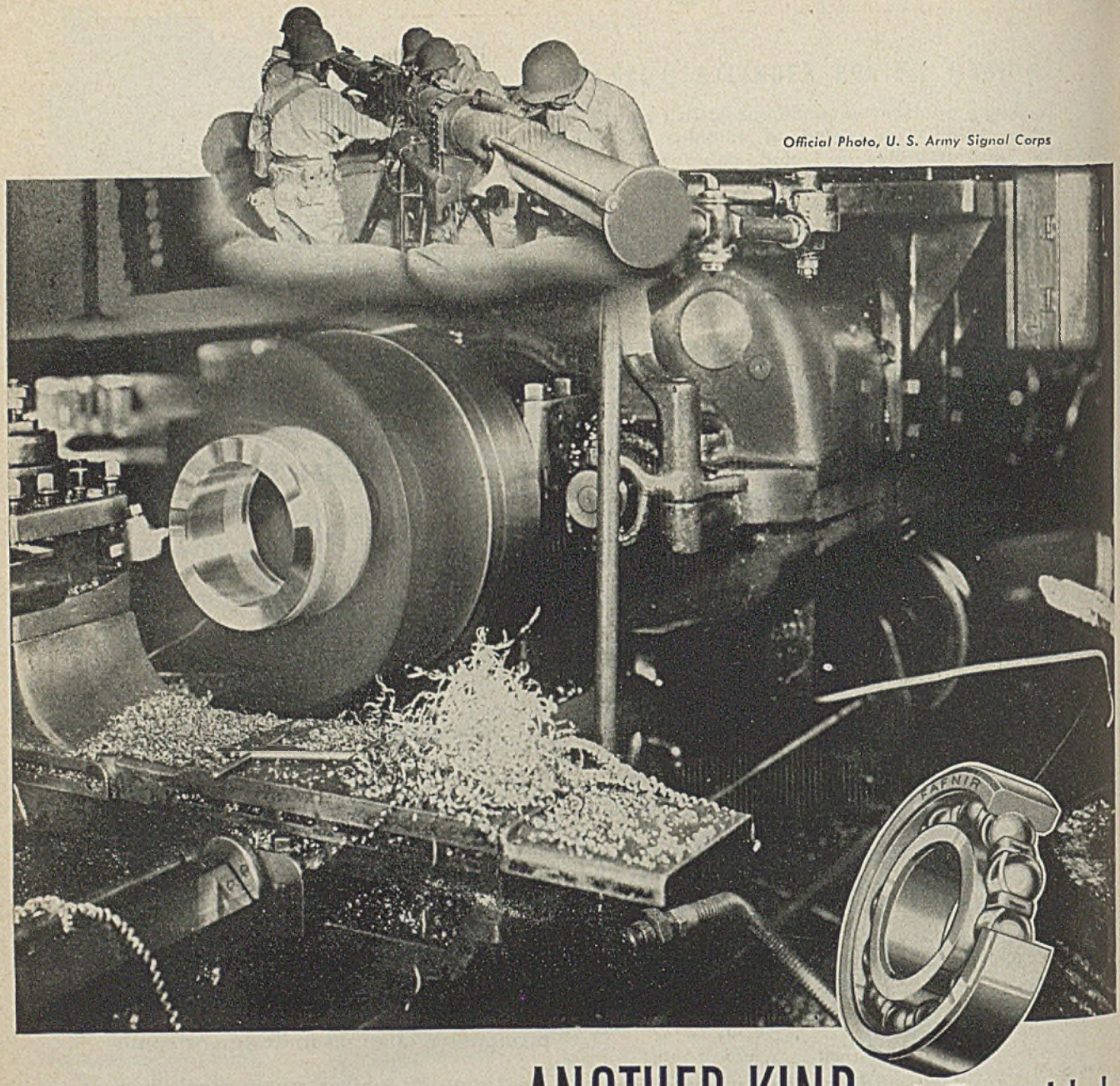
American steel-users, cooperating in the WPB's "Share the Steel" program, already have released approximately a million tons by eliminating idle or duplicate stocks, and through cancellation of mill tonnages on order. Another million tons are in prospect. This will mean the equivalent of adding two million tons of steel production for war use in the third and fourth quarters which is the goal of the War Production Board.

Constantly improving warehouse stocks help to make this program safe and practical because one stock in a manufacturer's inventory serves only one manufacturer, while a similar stock in a centrally located steel warehouse serves thousands of manufacturers. The warehouse stock moves faster and less steel is required.

The need is urgent! Let's keep every ton of steel working. It will not only help the war effort, but it is good business to hold your inventory to a practical working level. Then if increased production, changes in design or some emergency requires more steel in a hurry, you can always depend on your nearby steel-service plant.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. STEEL-SERVICE PLANTS AT: CHICAGO, ST. LOUIS, DETROIT, MILWAUKEE, CINCINNATI, CLEVELAND, BUFFALO, BOSTON, PHILADELPHIA, JERSEY CITY



Official Photo, U. S. Army Signal Corps

Getting the Range on ANOTHER KIND of Trouble!

A slight chatter in a machine tool in a Michigan factory may cause a machine gun to jam in Africa. An important piece of equipment forced out of action in Delaware may mean that a Marine in New Guinea runs out of ammunition. Discouraging the relentless attack of *trouble* is a matter of most serious concern throughout our great war industry, right now.

This need to eliminate troubles, slow-downs and breakdowns in these hard working machines is magnifying the importance of Ball Bearings! Friction-free Fafnir Ball Bearings were made to discourage these casualties. Their rugged stamina and Balanced Design . . . larger balls and deeper races . . keep them on the job on machines whose work-day is 24 hours *every day*. Their in-built precision defeats chatter and deflections on machines that must hold tolerances on the button . . . month after month. The Fafnir Bearing Company, New Britain, Conn.

ARMY (E) NAVY

FAFNIR

BALL BEARINGS

Trailer camps, used in many war production centers to alleviate acute housing shortages, require intelligent community co-operation in their administration. Units in the camp shown above house four people, but are considered only temporary shelter pending construction of more adequate facilities

COMMUNITY ACTION GETS RESULTS

Better and more complete utilization of available labor to be sought through nation-wide program patterned after plan now being successfully operated in the Dayton-Springfield, O., area and at Buffalo

"COMMUNITY leadership" campaign to bring about better and more complete utilization of labor and thus relieve a manpower problem that now rapidly is becoming really critical in many areas is about to be launched on a country-wide scale.

The type of pattern on which community action is to be set up already has been successfully developed and used in the Dayton-Springfield area in Ohio and at Buffalo. Action now is under way to organize similar community groups on the West Coast and in the Connecticut valley, now the most acute labor-shortage areas. Similar groups will be organized elsewhere as rapidly as possible.

Whereas a few months ago there were comparatively few critical labor areas, today they number some 55 and according to present threats will be somewhere between 75 and 100 before the end of the year—unless effective action can be taken in time.

"This whole problem of labor has gotten far beyond the point where it can be solved out of Washington," remarks a top man concerned with this subject. "The only sound solution is to move work and people in such a way as to place first emphasis on war production. That is a problem that can be solved only with full community help and leadership."

One of the community efforts that is regarded as having unusual merit is the one that has accomplished such amazing results in the Dayton-Springfield area. So highly does the War Manpower Commission regard the Dayton-Springfield community group plan that it called upon the Office of War Information to report on it in order to make it easier for other communities to launch similar plans. The following is a summary of the high spots of the OWI report.

Efforts Bring Reclassification

The Dayton-Springfield labor market was reclassified on July 29 by the WMC into group two (areas of labor stringency or in which a labor shortage may be anticipated within six months). Since last winter, it had been in group one (areas of acute labor shortage and, therefore, denied additional war contracts). The change in classification enables Dayton and Springfield war plants to renew their present contracts and, in some cases, to accept new ones. In addition to bringing this satisfactory result, the community campaign relieved much of the stress on services and wartime living conditions. It stopped most of the flow of outsiders into the community where no housing was available to them and made it possible to carry on war production with the persons who were already in Dayton and Springfield.

Dayton relieved its situation through the following steps:

1—The WMC area labor-management committee stopped inmigration. All manufacturers and retailers agreed not to hire any persons who had been in the community less than 30 days, except with the approval of the United States Employment Service. Approval is granted only in cases of key workers of construction crews, there being a local shortage of the latter. As a result, hiring of outsiders has fallen from 500 a week to about 125.

2—Dayton and Springfield manufacturers voluntarily agreed not to seek any contracts that would require them to hire more workers than they had estimated they would need in their O. E. S. (manpower inventory) reports of May 1, except with WMC approval.

3—Retailers, including the large department stores, agreed to reduce full-time employment to 1940 levels.

4—The Wright and Patterson airfields, for purpose of operating efficiency, adopted a policy of decentralizing wherever possible and took definite action toward fuller and better utilization of manpower at the fields.

5—The larger war plants declared a 90-day moratorium on hiring while determining the true manpower situation in the community.

6—Radio stations, posters and newspapers warned outsiders to stay away from Dayton unless they possessed special skills not available in the community.

7—Manufacturers and the airfields were polled to secure revised and realistic estimates of future labor needs. It was determined that manpower estimates for the year ended May 1, 1943, were 11,085 more than actual hirings. The poll resulted in decreasing manpower estimates for the next three months by 9622 and for the next year by 18,394.

8—Since women were the area's biggest source of potential manpower, manufacturers were asked to "reserve" certain occupations exclusively for women. It was found that women could handle 6000 jobs filled by men.

9—Volunteers conducted a Gallup-type poll of the women in the area and found there were more available for wartime jobs than had been estimated pre-

viously. WMC had credited Dayton-Springfield with 9000 potential women workers not already employed. The new poll showed 10,137 women available full time, 7508 part time and 9272 "available maybe."

10—An information campaign is now being conducted through newspapers, press, billboards, radio, motion pictures and special pamphlets to get women to take wartime jobs.

Stores Establish Evening Hours

11—Stores, banks, ration stations, barber shops, beauty parlors and other community services were persuaded to remain open two nights a week for the benefit of war workers. This is the first war center in the nation to take this important step.

12—Many Dayton families have responded to a patriotic appeal and have "opened their homes" to war workers.

13—Five hundred private homes were converted into apartments, several dormitories were erected and housing projects speeded to fill the acute need for family-type housing.

14—Nine buses were added to the line providing service to the airfields, located in isolated sections between Dayton and Springfield. Expansion of the fields created the greatest demand for manpower in the area. However, Dayton, which supplied 90 per cent of the airfield workers, found that the bus lines were so overtaxed that workers often had to wait as long as an hour and a half for room on a bus and spent that time in line at unsheltered loading stations. Sheltered platforms were built and nine large buses added to the line, cutting the waiting time to 15 minutes or less.

15—A special survey was made preparatory to organizing a community-wide recreational program in both Dayton and Springfield.

16—Frills were eliminated from laundry and restaurant services so that more people could be served and waiting time reduced.

The population of Dayton in the past three years has increased from 210,718 to more than 275,000. In the same period Springfield has grown from 70,662 to more than 85,000. Neither city was prepared for this sudden growth and all sorts of bad situations developed. There were shortages of housing, transportation, recreational facilities, physicians, dentists, nurses, hospitals. There was a huge labor turnover when imported workers rebelled at the Dayton living conditions and went back home. Absenteeism was high.

The situation reached a climax in January of this year when it was spontaneously recognized that concerted action would have to be taken to get it

ROBERT C. GOODWIN
Director, Region V, War Manpower Commission

under control. The first step was the appointment of an advisory committee composed of Dr. F. G. Barr, the National Cash Register Co.; Otto L. Spaeth, Dayton Tool & Engineering Co.; O. L. Beardsley, Frigidaire division, General Motors Corp.; A. R. Fors, Airtemp Corp.; R. E. Armstrong and H. C. Jones, American Federation of Labor, and Orville L. Kuhnle and Clyde Mathews, representing the Congress of Industrial Organizations.

This committee drew up the following employment stabilization program:

1—To provide for the orderly transfer of workers to the jobs in which they can best serve the war effort.

2—To prevent labor pirating.

3—To prohibit useless change of jobs by workers; to curtail the labor waste involved in labor turnover.

4—To encourage more friendly and less hasty interaction between management and labor by requiring separation interviews before an employe leaves his job.

Adopts Similar Program

A similar program was adopted by a Springfield committee composed of John H. Horstman, Robbins & Meyers Inc.; Howard W. Gustafson, Oliver Farm Equipment Co.; J. Robert Groff, James Leffel & Co.; William C. Jordan, Steel Products Engineering Co.; Walter Bailey and Stanley Colliver, Congress of Industrial Organizations, and Edward E. Forrer and Glen Detling, American Federation of Labor.

As a result of deliberations by these committees under the leadership of the War Manpower Commission, the following emergency committee—comprising Dayton's socalled "first team"—was organized: S. C. Allyn, president, the National Cash Register Co.; Col. E. A. Deeds, chairman, the National Cash Register Co.; M. A. Spayd, executive vice president, Standard Cash Register Co., and president, Dayton Chamber of Commerce; Paul W. Williams, managing director, Dayton Chamber of Commerce; Maj. Gen. Walter H. Frank, commanding general, Air Service Command, Army Air Forces; Frederick H. Rike, president, Rike-Kumler Co.; Charles F. Kettering, vice president, General Motors Corp.; Mayor Frank M. Krebs, Brig. Gen. Charles E. Branshaw, commanding general, Army Air Forces Materiel Command, Wright Field; Walter H. J. Behm, president, Winters National Bank & Trust Co.; James H. Davis, General Motors Corp.; Marion A. Gregg, WMC's area director; R. E. Armstrong, Charles Bratten Jr. and Harvey C. Jones of the American Federation of Labor, and Jack Fiske, Fred Fudge and Orville Kuhnle of the Congress of Industrial Organizations.

Situation Seemed Hopeless

The emergency committee faced a situation whose solution appeared almost impossible. It held meetings and outlined a course of action. It called meetings of manufacturers and businessmen and asked for needed information. They were asked to agree to the "controlled hiring" plan. They were asked to utilize existing labor more effectively. The committee studied housing and other needs. It obtained priorities enabling construction of a new hospital. It made recommendations to the Office of Defense Transportation which brought an improvement in transportation facilities. It arranged for a child care program to permit more women to work in war plants. It asked the laundries to cut out frills and luxury service and it found more women workers for the laundries.

The plan which provides for an interview between employer and employe before the latter leaves his job for employment elsewhere, is showing specially good results. This policy, along with the better transportation and other services in the community, has cut turnover from 10 to 12 per cent a month to 6.4 per cent on the average.

That a job has been done in the Dayton-Springfield area is attested by this statement by Robert C. Goodwin, regional director, War Manpower Commission, for Ohio, Michigan and Kentucky:

"This is no longer an acute labor shortage area. We had a hard time deciding to remove it from the list. We did so only after being convinced that the whole community, management, labor and the public, was ready to go all the way in its effort to use all available local labor to the fullest possible extent. We believe that employment stabilization will continue to work and that the area will stay out of the shortage list."

Boypower Breaks Bottleneck

Small midwestern machine shop finds solution to labor shortage in youths and white collar workers. . . Becomes efficient subcontractor

HOW a small midwestern machine shop licked the problem of materials and labor shortages to avert disaster to itself and become a unit in the American munitions producing machine is the story of the Portland Machine & Tool Works, Portland, Ind.

It is a story of ingenuity, of community co-operation, and of willing sacrifice to bolster the war effort.

Soon after Pearl Harbor, this plant, in common with many others, found that materials previously used for civilian production were being allocated only to war plants. Skilled labor of these small plants was gravitating toward the larger war industries.

Portland Machine & Tool Works, whose principal business had been the repairing of farm machinery, found itself with inadequate priorities to obtain materials, and only one employe in addition to the two operators. Closing the shop appeared inevitable.

What to do?

The operators, Henry Doctor and Fred Hilgeman, talked with Portland business men and with the Army ordnance officials. The Army men pointed out the possibilities of obtaining war work in the form of subcontracts. Through extension of the prime contractor's priorities, this would solve the materials problem.

First order obtained was for machining 1800 torpedo parts.

Necessary additional machinery was obtained by purchasing discarded tool and die machinery and equipping them with special jigs and fixtures.

But labor was still a problem. Here the citizens of Portland, a town of only a few thousand people, came to the rescue. Boys of high school age were trained to man the machines during the day. At night, local business men, bankers, lawyers and clerks took over. Each worker was trained to do a special type of work.

Now some 30 employees keep the wheels of this small plant—it has only about 3000 square feet of floor space—turning to capacity around the clock, making machined parts for PT boats, submarines, bombs, tanks and Liberty ships.

The "50 per cent manpower and 50 per cent boypower" system worked so well that school authorities are cooperating with all industry in the community to develop a system whereby the boys can be rotated on half shifts during the school year.

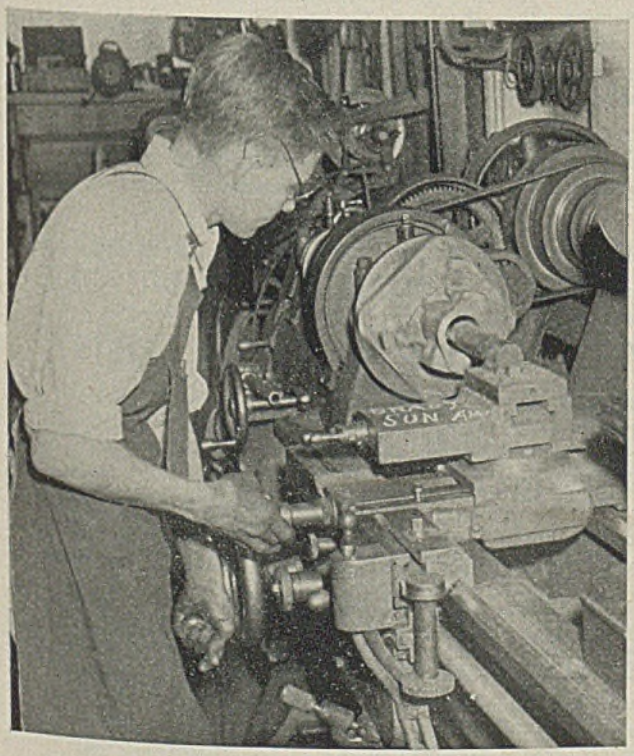
General manager of the plant is Gordon Meeker, who during the day handles all the community's legal affairs as city attorney and devotes his evenings to the direction of the company.

What will happen to this and similar plants after the war? Mr. Meeker says:

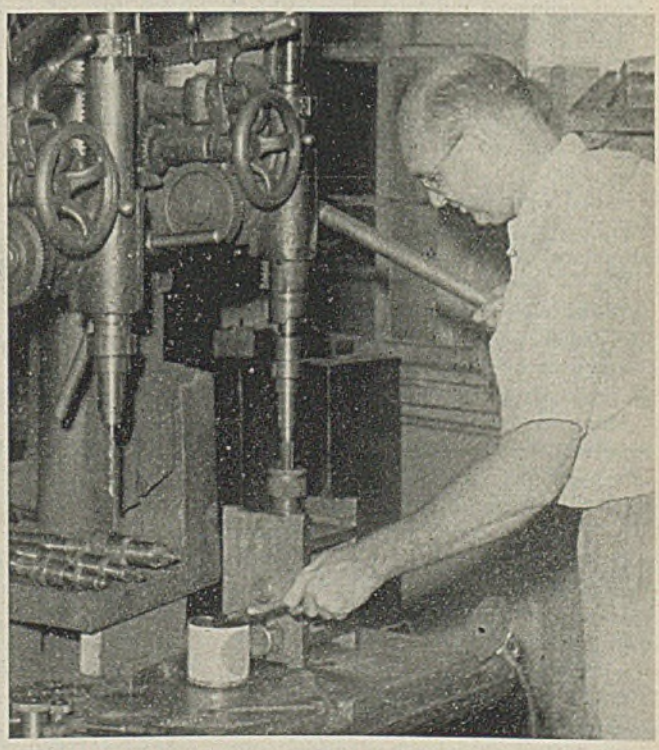
"The present emergency not only gave small business a chance to help with the war effort, but the contacts made with the larger manufacturers through subcontracts present an opportunity after the war to continue business when these large firms switch to peacetime products. If we do a good job today, we certainly will get our share of business tomorrow."

Foundry Workers Needed in Three Midwest States

Foundries in Indiana, Illinois, and Wisconsin will need 13,000 new workers early in September. This was disclosed last week by Dean William H. Spencer, regional director, War Manpower Commission.



Boypower is the answer to the manpower shortage in Portland, Ind. Here a 16-year-old operates a lathe. The youths are trained in a variety of operations and are keenly interested in their jobs



John Jaqua, a banker, takes his turn on the night shift operating a drill press. Lawyers, clerks and business men work enthusiastically in this small plant to keep parts moving to prime contractors

Arms Output Gains 3% in July

Aircraft, signal equipment and Army ammunition present most difficult production problems of future. Sharp increases in ship construction scheduled but peak is near

MUNITIONS production increased 3 percent in July, moving away from the level of April, May and June, WPB Chairman Donald M. Nelson reported last week.

The munitions output index, covering ships, planes, tanks, ordnance, and miscellaneous items, rose to 593 from a revised figure of 573 for June.

A noteworthy achievement for the month was a 17 per cent increase in signal equipment and a 25 per cent increase in delivery of destroyers and destroyer escorts.

Ground ordnance advanced 6 per cent to meet schedules. July output established a new record.

Aircraft and related munitions also helped to dominate the month's showing, moving 5 per cent ahead of the preceding month.

"In many programs," Mr. Nelson's report said, "production problems have been largely licked and peak production rates have been achieved or are not far off. The most difficult production problems that remain are concentrated in three major programs where important further increases are required: Airplanes, signal equipment and Army ammunition."

Airplane production increased 4 per cent in July over June and was 143 per cent ahead of July, 1942.

Army ammunition showed no increase in July but was 45 per cent ahead of July, 1942

Signal equipment, in addition to gaining 17 per cent in July, was 145 per cent ahead of the same month a year ago.

The 4 per cent increase in aircraft included a 19 per cent increase in fighting planes and an 8 per cent increase for transports. Heavy bombers increased 13 per cent.

Ship construction calls for sharp increases in the immediate future but peak rates are not far off. Naval vessels showed a 7 per cent increase in July over June and an 85 per cent increase over July a year ago. Merchant ships increased 4 per cent in July and 81 per cent over a year ago. These figures take into account work on ships not yet completed.

Other programs, including artillery, antiaircraft guns, small arms, combat and motor vehicles, and miscellaneous and quartermaster items increased moderately.

Mr. Nelson mentioned a number of smaller programs where considerable progress has been made. These include:

The production problem in magnesium and aluminum has been overcome.

Quartz crystal output, important in communication, has been increased markedly.

A new important domestic industry, diamond dies, has been erected.

Substitution programs have been of considerable assistance in remedying the tight situation in jewel bearings.

Another achievement is the development of a generally satisfactory situation in steel.

In the accompanying table of munitions production index, figures for 1942 and 1943 have been revised.

MUNITIONS INDEX

(November 1941 = 100)

Month	1940	1941	1942	1943
Jan.		41	166	460
Feb.		45	182	486
Mar.		52	213	530
Apr.		60	247	563
May		57	276	564
June		59	309	573
July	23	64	339	593
Aug.	22	72	372	...
Sept.	22	83	387	...
Oct.	27	91	403	...
Nov.	34	100	448	...
Dec.	50	133	497	...

Non-CMP Units Consolidate Material Needs on One Form

Applications for priorities assistance (form WPB-2613) to be used by persons not operating under the Controlled Materials Plan, for fourth quarter aid, have been mailed to companies operating under priorities regulation No. 11B. This regulation and form, which is an application for aid in obtaining other than controlled materials, enables manufacturers who do not operate under CMP to consolidate their material requirements on one application.

Following changes have been made in WPB-2613 and in regulation No. 11B: (1) Production schedules now may be authorized as much as one year in advance; (2) if priority assistance is needed to purchase materials that are covered by a WPB order which requires a special application be filed stating quantity, grade, type, and size, such requests may be made on WPB-2613, making it unnecessary to file the application specified in the order; (3) persons using small amounts of controlled materials may no longer make application for such items on form WPB-2613.

Manufacturers using WPB-2613 are requested to have their application in Washington by Sept. 15.

British Production Rises 25 Per Cent

British munitions production in the second quarter of 1943 was 25 per cent higher than the comparable period in 1942, according to Oliver Lyttelton, Minister of Production.

Aircraft output was 44 per cent higher in structural weight than a year ago.

Munitions output for the first half year equalled schedules.

Contract Termination Problem Seen Eased by Broader V Loan Basis

GOVERNMENT guaranteed V loans will be made available to war contractors and subcontractors on a broader basis than heretofore, effective immediately, under a plan jointly announced last week by the War and Navy Departments, the U. S. Maritime Commission and the Federal Reserve Board.

In the past, advances under V loans have been restricted, in general, to working capital needs for war production. The broadening of the plan will enable contractors to obtain use of most of their own working capital immediately upon termination of their contracts.

The contractor or subcontractor will obtain a V loan exactly as at present except that, if the loan is intended to free his own working capital upon termination of contracts as well as to provide him with working capital needed to finance them, then there are to be two changes in the present guarantee agreement, viz:

(1) The bank will be required at all times to have a participation in the loan and, accordingly, the original percentage of guarantee specified in the guarantee agreement will not be increased by reason of contract cancellations, and

(2) The bank must share with the government any commitment fee, which may not exceed ½ of 1 per cent per annum on the undisbursed portion of the

credit, in the same proportion that the guarantee fee now bears to the interest payable on V loan, viz; if the percentage of guarantee is

60 per cent, the government's share is 10 per cent of the commitment fee.
65 per cent, the government's share is 12½ per cent of the commitment fee.
70 per cent, the government's share is 15 per cent of the commitment fee.
75 per cent, the government's share is 17½ per cent of the commitment fee.
80 per cent, the government's share is 20 per cent of the commitment fee.
85 per cent, the government's share is 22½ per cent of the commitment fee.
90 per cent, the government's share is 25 per cent of the commitment fee.

The amount of loans which a contractor will be entitled to obtain in the event of cancellations of his contracts will be stated in the loan agreement as a percentage of inventories, work in process, accounts receivable, and (without duplication) amounts paid or concurrently to be paid by him to subcontractors or suppliers by reason of contract cancellations.

Present, Past and Pending

COAL STRIKE LEADERS DRAW SUSPENDED SENTENCES

PITTSBURGH—Twenty-seven coal strike leaders who pleaded no contest to charges of violating the Smith-Connally antistrike law were given suspended sentences of six months and placed on probation for three years by Federal Judge F. P. Schoonmaker. Three others indicted on the same charge were unable to appear in court.

o o o

HAIRLIKE STEEL WIRE USED FOR RECORDINGS

SCHENECTADY, N. Y.—Hairlike steel wire is being used in a new type of sound recorder by observation planes in overseas war zones, according to General Electric Co. More than an hour of continuous speech can be magnetically recorded on 11,500 feet of wire wound on a spool no larger than a doughnut.

o o o

FACTORY WAGES UP 82.4 PER CENT SINCE WAR STARTED

NEW YORK—Factory workers' wages have increased 82.4 per cent on a weekly basis since the war started, according to the National Association of Manufacturers. Increase in "real" wages has been 44 per cent.

o o o

CLEVELAND BANS IN-MIGRANT WORKERS FOR 60 DAYS

CLEVELAND—In-migration of workers to this war production center has been banned for 60 days to relieve congestion in housing and other facilities by the War Manpower Commission's labor-management committee.

o o o

WASHING MACHINE PRODUCTION MUST WAIT UNTIL 1944

WASHINGTON—Production of a limited number of washing machines to meet minimum civilian needs must wait until 1944, members of the industry have been advised by WPB. However, manufacture of repair parts may be permitted earlier.

o o o

H. G. PORCH RETIRES AS LUKENS SALES MANAGER

COATESVILLE, PA.—Harry G. Porch, since 1900 manager of sales at Boston for Lukens Steel Co., has retired. He is succeeded by R. H. McCracken, formerly with the sales department, Central Iron & Steel Co., Harrisburg, Pa.

o o o

BLAST FURNACE CONSTRUCTION LAGGING

WASHINGTON—Blast furnace expansion program as of Sept. 1 was 3,000,000 tons behind the original schedule. Under the original plan, construction was to have been completed by July 1; it now appears the program will not be completed until next March.

o o o

FORGINGS SOLD BY WAREHOUSES CONTROLLED MATERIALS

WASHINGTON—Steel forgings sold by warehouses are controlled materials whether they are made by a steel producer or forging shop, WPB ruled in announcing Direction 25 to CMP Regulation No. 1. Warehouse orders for forgings must be accompanied by form WPB 2333, formerly CMP 11.

WLB Raises Self Above State Law

Board holds its rulings take precedence in opinion involving Wisconsin employment peace act

RULINGS of the National War Labor Board supersede acts of state legislatures in labor relations matters in time of war. This is the opinion of the board, written by Wayne Morse, public member, in a case involving conformity of a WLB order to Wisconsin employment peace act.

The opinion was given in the case of the J. Greenebaum Tanning Co., which had been directed by the board to grant a maintenance of membership contract to a CIO union but had objected on the ground the board's order conflicted with the Wisconsin statute. The state law provides that an agreement for union security is invalid unless approved by three-fourths or more of the employes.

"No law of a state which is aimed at inserting conditions in a collective bargaining contract between an employer and the bargaining agent of the employes can be said to supersede any order of the War Labor Board regulating relations between employer and employe in time of war when the power to issue that regulation flows from the war powers of the United States," Mr. Morse wrote.

In a second policy-making action the board assumed jurisdiction over a threatened jurisdictional strike at the Allis-Chalmers Mfg. Co. plant at Springfield, Ill., under Smith-Connally antistrike act.

Portal-to-Portal Wage Refusal Explained by WLB

An explanation of its refusal to approve payment of an extra $1.25 a day to Illinois coal miners for the time they pass traveling underground to and from work was given last week by the War Labor Board. The board held:

1. "The mine workers are not entitled to extra compensation under the fair labor standards act (wage and hour law) until the weekly working time exceeds 40 hours."

2. The miners failed to establish that the $1.25 was "not an indirect wage increase in violation of wage stabilization policies."

WLB Chairman William H. Davis said that in the proposed settlement "the figure of $1.25 per day is arrived at by processes of rationalization which wholly ignore the fact that the mine workers are not entitled to extra compensation under the fair labor standards act."

Steel for Sale Output Up in July

Exceeds June total but falls short of May. . . Bars, plates lead tonnage. . . Aircraft tubing makes gain. . . Practically all important products score increase

PRODUCTION of steel and iron for sale in July totaled 5,488,735 net tons, against 5,464,593 tons in June, according to the American Iron and Steel Institute. For the first seven months this year production aggregated 38,681,830 tons. July production also included 722,989 tons of pig iron for sale, 83,182 tons of ingot molds and 16,654 tons of iron products, including bars, pipe and tubes.

Practically all important steel products showed an increase over June output, mainly the result of the extra day, but this was not sufficient to equal production of May, 5,586,447 tons.

Bars continued to lead in tonnage, 1,088,522 tons in July, 1,087,241 in June, with plates, including sheared and universal, 1,051,288 tons in July, 1,004,005 in June. Total sheets, including all kinds, hot and cold-rolled and galvanized, were 703,350 tons in July, 695,833 in June.

Plate production was at 135 per cent of rated capacity, bars at 87.2 per cent and sheets at 61.5 per cent, the latter low mark being the result of much sheet capacity being on plate production.

The only products except plates which exceeded rated capacity were mechanical tubing, of which the aircraft industry requires large quantities, and tool steel bars, demand for which is heavy to equip the expanded machine tool equipment now in use. Output of mechanical tubing in July was 61,978 tons, representing 122.3 per cent of capacity, compared with 61,573 tons in June. Tool steel bars represented 17,263 tons in July, 101.4 per cent of capacity, against 19,231 tons in June.

During July 419,723 tons of steel prod-

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

JULY - 1943 (period)

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	Year to Date: Total	Year to Date: Per Cent of capacity	Year to Date: Shipments: Export	Year to Date: Shipments: To members of the industry for conversion into further finished products
STEEL PRODUCTS	Ingots, blooms, billets, slabs, sheet bars, etc.	44	1	xxxxxxx	548,031	xxx		196,970	4,673,381	xxx		1,371,097
	Heavy structural shapes	10	2	3,412,580	298,291	65.0		xxxxxxx	2,185,006	69.5		xxxxxxx
	Steel piling	4	3	338,600	8,517	29.7		xxxxxxx	22,581	11.5		xxxxxxx
	Plates—Sheared and Universal	21	4	9,189,740	1,051,288	135.0		3,288	7,451,113	139.6		22,550
	Skelp	6	5	xxxxxxx	57,240	xxx		41,808	468,479	xxx		279,628
	Rails—Standard (over 60 lbs.)	4	6	3,329,260	148,095	46.1		xxxxxxx	1,041,265	49.4		xxxxxxx
	Light (60 lbs. and under)	6	7	309,690	21,047	82.2		xxxxxxx	102,806	57.1		xxxxxxx
	All other (incl. girder, guard, etc.)	2	8	102,000	2,438	28.2		xxxxxxx	15,525	25.9		xxxxxxx
	Splice bar and tie plates	13	9	1,120,270	46,235	48.7		xxxxxxx	370,108	56.9		xxxxxxx
	Bars—Merchant	40	10	xxxxxxx	594,555	xxx		62,640	4,141,966	xxx		223,532
	Concrete reinforcing—New billet	15	11	xxxxxxx	39,251	xxx		xxxxxxx	253,404	xxx		xxxxxxx
	Rerolling	16	12	xxxxxxx	6,141	xxx		xxxxxxx	53,542	xxx		xxxxxxx
	Cold finished—Carbon	23	13	xxxxxxx	148,387	xxx		xxxxxxx	1,025,919	xxx		xxxxxxx
	Alloy—Hot rolled	20	14	xxxxxxx	251,419	xxx		34,816	1,776,426	xxx		254,004
	Cold finished	19	15	xxxxxxx	39,871	xxx		xxxxxxx	280,308	xxx		xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	8,798	xxx		xxxxxxx	60,130	xxx		xxxxxxx
	TOTAL BARS	63	17	14,719,525	1,088,522	87.2		115,456	7,591,795	88.8		817,536
	Tool steel bars (rolled and forged)	17	18	200,840	17,263	101.4		xxxxxxx	137,050	117.5		xxxxxxx
	Pipe and tube—B. W.	12	19	2,231,040	109,936	58.1		xxxxxxx	764,953	59.0		xxxxxxx
	L. W.	8	20	845,400	44,704	62.4		xxxxxxx	327,615	66.7		xxxxxxx
	Electric weld	8	21	1,149,250	82,906	85.1		xxxxxxx	602,301	90.2		xxxxxxx
	Seamless	15	22	3,082,400	180,225	69.0		xxxxxxx	1,241,693	69.3		xxxxxxx
	Conduit	7	23	194,000	4,603	24.9		xxxxxxx	35,365	32.0		xxxxxxx
	Mechanical Tubing	11	24	597,800	51,978	122.3		xxxxxxx	435,654	125.4		138,252
	Wire rods	22	25	xxxxxxx	58,506	xxx		19,422	696,377	xxx		35,047
	Wire—Drawn	41	26	2,356,350	164,120	82.2		5,970	1,139,387	81.2		xxxxxxx
	Nails and staples	10	27	1,116,640	65,983	69.6		xxxxxxx	490,504	75.5		xxxxxxx
	Barbed and twisted	15	28	482,280	23,480	60.1		xxxxxxx	142,567	50.9		xxxxxxx
	Woven wire fence	16	29	778,060	23,224	35.2		xxxxxxx	129,626	28.7		xxxxxxx
	Bale ties	12	30	128,420	9,929	91.2		xxxxxxx	65,414	87.7		xxxxxxx
	All other wire products	8	31	78,220	4,536	68.4		xxxxxxx	35,524	78.4		xxxxxxx
	Fence posts	11	32	112,065	5,356	56.4		xxxxxxx	19,289	29.5		-
	Black plate	10	33	339,100	27,496	97.5		-	175,398	88.9		xxxxxxx
	Tin plate—Hot rolled	4	34	483,620	1,346	2.6		xxxxxxx	10,597	3.8		xxxxxxx
	Cold reduced	10	35	3,841,340	207,371	63.7		xxxxxxx	1,283,830	57.5		119,664
	Sheets—Hot rolled	19	36	xxxxxxx	487,541	xxx		19,428	3,505,278	xxx		xxxxxxx
	Galvanized	14	37	xxxxxxx	67,259	xxx		xxxxxxx	469,148	xxx		xxxxxxx
	Cold rolled	14	38	xxxxxxx	120,426	xxx		xxxxxxx	858,251	xxx		xxxxxxx
	All other	15	39	xxxxxxx	28,124	xxx		xxxxxxx	211,192	xxx		119,664
	TOTAL SHEETS	28	40	13,497,570	703,350	61.5		19,428	5,043,869	64.3		102,749
	Strip—Hot rolled	22	41	3,201,690	120,425	44.4		17,381	886,327	47.7		xxxxxxx
	Cold rolled	39	42	2,059,740	100,355	57.5		xxxxxxx	668,476	55.9		xxxxxxx
	Wheels (car, rolled steel)	5	43	424,820	19,270	53.5		xxxxxxx	131,133	53.1		xxxxxxx
	Axles	6	44	453,470	11,784	30.7		xxxxxxx	95,078	36.1		xxxxxxx
	Track spikes	11	45	308,350	9,428	36.1		xxxxxxx	85,492	47.7		xxxxxxx
	All other	5	46	xxxxxxx	16,415	xxx		xxxxxxx	116,352	xxx		2,836,644
	TOTAL STEEL PRODUCTS	159	47	xxxxxxx	5,488,735	xxx		419,723	38,681,830	xxx		
	Pig iron, ferro manganese and spiegel	25	48	xxxxxxx	722,989	xxx		356,264	5,206,248	xxx		2,403,647
	Ingot moulds	2	49	xxxxxxx	83,182	xxx		xxxxxxx	562,451	xxx		xxxxxxx
IRON PRODUCTS	Bars	10	50	170,110	8,000	55.5		291	57,212	57.9		1,970
	Pipe and tubes	2	51	106,000	7,489	83.3		xxxxxxx	51,175	83.1		xxxxxxx
	All other	1	52	26,000	1,165	24.5			8,505	26.1		-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	xxxxxxx	16,654	xxx		291	115,892	xxx		1,970

ucts were shipped to other members of the industry for conversion into further finished products. In seven months such shipments totaled 2,886,644 tons.

Companies included in these statistics numbered 183 and in 1942 represented 98.8 per cent of total output of finished rolled products. Adhering to government policy export figures can not be published and these columns are blank in the accompanying table, which supplies full statistics for July and cumulative figures for seven months.

Inland Steel's New Ovens Produce 1000 Tons of Coke

Seventy-three by-product coke ovens went into operation recently to produce about 1000 tons of coke daily at the Indiana Harbor plant of the Inland Steel Co.

The ovens are part of a project undertaken for the Defense Plant Corp. by the company. Project consists of two blast furnaces and related facilities, including also a second battery of coke ovens.

Canadian Steel, Pig Iron Output Higher in July

Production of steel and iron in Canada in July was higher than in June, but output continues to range on a lower level than the records made last year, the Dominion Bureau of Statistics reports. In July pig iron output was at 70.8 per cent of rated capacity, compared with 98.3 per cent in the corresponding month last year; steel ingot and castings production was at 85.11 per cent in July, compared with 89.5 a year ago.

During July a new blast furnace was lighted, making a total of 13 for the Dominion, with rated capacity of 2,348,160 tons annually. The new furnace is at the Sydney, N. S., plant of the Dominion Steel & Coal Corp. Another blast furnace, said to be the largest in the British Commonwealth, will be blown in soon at the Sault Ste. Marie plant of Algoma Steel Corp.

Production figures for July, with comparisons, in net tons, are as follows:

	Steel ingots, castings	Pig iron	Ferro-alloys
July, 1943	250,508	151,369	21,408
June, 1943	239,501	147,889	18,151
July, 1942	256,560	172,153	15,961
7 Mos. 1943	1,749,661	1,019,158	133,201
7 Mos. 1942	1,815,798	1,146,153	124,561
7 Mos. 1941	1,507,141	814,862	118,136

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Sept. 14	Change	Same Week 1942	Same Week 1941
Pittsburgh	99.5	+1	94	98
Chicago	99.5	+0.5	101.5	101
Eastern Pa.	95	None	95	95
Youngstown	98	None	97	96
Wheeling	98	−5	83	94
Cleveland	94	−5	96.5	95
Buffalo	90.5	None	90.5	90.5
Birmingham	95	None	95	95
New England	92	−5	92	90
Cincinnati	94	+2	95	89
St. Louis	73	−16	95.5	98
Detroit	90	+7	86	86
Average	99	+0.5	°98	°95.5

°Based on steelmaking capacities as of these dates.

Steel Production Advances to 99%

Completion of open-hearth furnace repairs boosts ingot production at leading centers

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week recorded a slight gain of one-half point to 99 per cent of capacity.

A year ago the national rate was 98 per cent; two years ago it was 95.5 per cent, both based on capacities as of those dates.

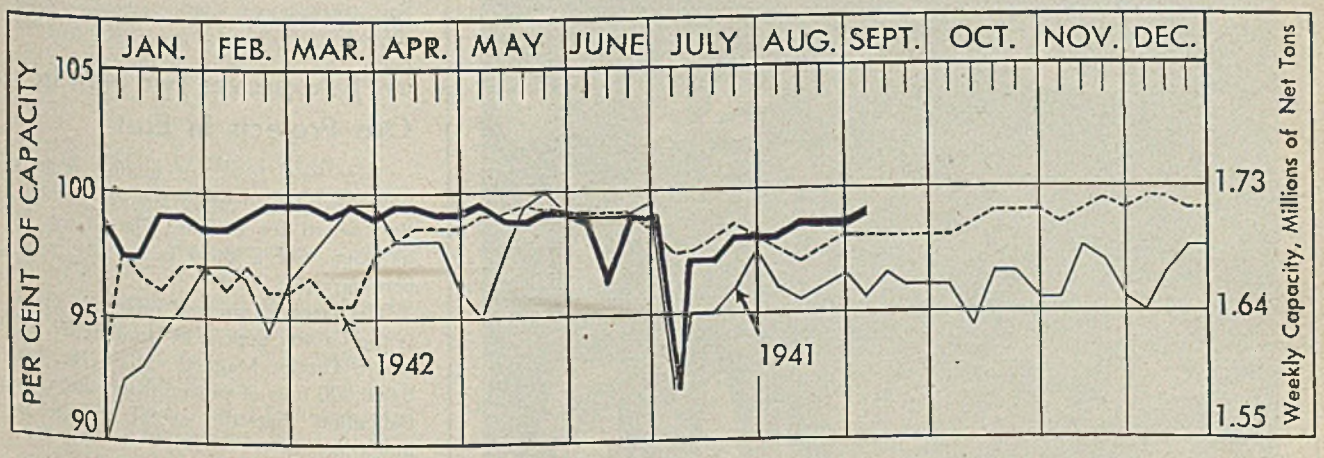
Completion of open-hearth furnace repairs raised steel ingot operating schedules during the latest period at Pittsburgh, Chicago, Detroit and Cincinnati. Gains in these areas more than offset lower operating schedules in the Cleveland, Wheeling and St. Louis districts.

A strike at Granite City Steel Co., resulting from a controversy about the 48-hour week, lowered the St. Louis district's steel rate 16 points to 73 per cent last week.

Blast furnace operations in the Buffalo district are expected to slip six points this week as the Hanna Furnace Co. is scheduled to blow out a furnace for relining. The reverse situation is anticipated soon in the Youngstown area with the placing of an additional blast furnace in operation expected this week.

Carnegie-Illinois Steel Corp.'s Edgar Thomson "E" blast furnace has been blown out.

COMPARATIVE STEEL INGOT OPERATIONS



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545	7,027	7,376					
1942	7,112	6,512	7,892	7,122	7,382	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	5,035	5,173	4,836	5,023					
1942	4,983	4,500	5,035	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Fall Scrap Drive Planned To Prevent Winter Supply Shortage

Normal cold-weather decline in collections coupled with labor scarcity in dealers' yards prompt government action. . . . Nationwide salvage campaign scheduled to start Oct. 1 and continue through Nov. 15

FEAR of a possible iron and steel scrap shortage this winter has prompted the War Production Board and the scrap industry to plan a new nationwide salvage campaign. The drive is scheduled to start Oct. 1 and continue through Nov. 15.

While supplies have been fairly easy in recent months, WPB officials believe the scarcity of workers in dealers' yards and the normal decline in collections when cold weather begins may cause stocks to become inadequate. Many dealers have only 33 to 60 per cent of normal working forces, a recent survey indicated.

John D. Whiting, WPB Steel Division director, in a letter to steel mills and foundries asked full support for local salvage committees and urged companies to build up large inventories.

Warning that the government must aid the dealers in maintaining labor forces sufficient to collect, prepare and ship scrap, E. C. Barringer, president, Institute of Scrap Iron and Steel Inc., recently told the War Manpower Commission:

"The situation is genuinely serious and calls for immediate correction, especially in view of the false sense of security concerning the supply of scrap."

More Battlefield Scrap Arriving

An increasingly important source for scrap is seen in the rising volume of salvage returned from overseas. This salvage flow has risen to a point where it requires special handling. Segregation centers have been established near two major ports and other centers are being constructed. Army Service Forces have established detailed policies for handling the returned material, which is discharged onto lighters or cars at the port to avoid clogging which might delay the outward flow of men and material.

At the segregation centers, a threefold job is performed:

1. Repairable property is sorted out and sent to the proper installations for repair and re-issue.

2. Careful check is made to see that no material of an explosive nature is contained in scrap when sold. As an additional safety factor, no sale is permitted of material that may prove to be of explosive nature in the course of remelting. Fired cartridge cases are forwarded to an Army installation where they are "popped" or deprimed to eliminate any explosive charge that may remain in the detonator.

3. Remaining scrap is sold by bids in accordance with Army regulations. The Army sells this substantially in the form received and the scrap industry performs its usual functions to cutting the metal to suitable size and sorting to OPA specifications.

Scrap stocks and consumption varied only slightly during the first six months this year. Summary of stocks and consumption:

Stocks at end of Month
(000 omitted)

	Scrap		
	Purchased	Home	Pig iron
June, 1943	5,385	1,531	1,374
May, 1943	5,414	1,491	1,328
Apr., 1943	5,416	1,502	1,327
Mar., 1943	5,343	1,507	1,350
Feb., 1943	5,354	1,517	1,370
Jan., 1943	5,401	1,476	1,302
Dec., 1942	5,501	1,429	1,272
Nov., 1942	5,363	1,379	1,191
Oct., 1942	4,956	1,304	1,130

Consumption during Month

	Scrap		
	Purchased	Home	Pig iron
June, 1943	1,944	2,549	4,289
May, 1943	2,053	2,670	4,511
Apr., 1943	2,019	2,623	4,423
Mar., 1943	2,102	2,685	4,660
Feb., 1943	1,857	2,321	4,162
Jan., 1943	1,942	2,550	4,515
Dec., 1942	2,016	2,481	4,465
Nov., 1942	1,905	2,496	4,360
Oct., 1942	2,061	2,709	4,594

POLITICS AND STEEL: Thomas E. Dewey, New York's governor and favorite Republican candidate for the presidency in most polls, gets his first view of steel mill operations at the Buffalo plant of Republic Steel Corp. At his left is Frank C. Farrell, Republic's Buffalo district manager, and at his right, Donald B. Gillies, Republic vice president

WPB Approves Two New Iron Ore Projects in East

Two new iron ore mining projects have been approved by the War Production Board for Defense Plant Corp. financing, and a third is actively under consideration.

The largest approved project involved is the Croton deposit at Brewster, N. Y., where Croton Magnetic Mines Inc. has 8,000,000 tons of proven magnetite, with indication that the actual tonnage is much larger.

This ore, containing 30 per cent iron in the natural state, will be crushed, concentrated and sintered to an average analysis of 65 to 66 per cent iron for the most part, but as much of it as desired will be reground, reconcentrated and resintered to an analysis of 70 per cent or more iron, with phosphorus 0.01 per

cent and silica 0.25 per cent.

Output is to be about 500,000 tons of sintered concentrate annually, equivalent to 650,000 tons of lake ore.

The other approved project involves a deposit of magnetite near Boyertown, Pa., to be operated by the Boyertown Iron Mine Co., Boyertown. This deposit is similar to the famous Pennsylvania Cornwall ore. It is a 36 per cent ore which is to be crushed, concentrated and sintered to an analyses of 61 to 62 per cent iron, 0.05 per cent phosphorus and 5 per cent silica. Thus, it is well within bessemer limits. Output of sintered concentrate will range somewhere between 200,000 and 250,000 tons annually. Although the size of this deposit is not yet definitely known, enough ore has been proved to make it certain that this will be a self-liquidating venture; it is expected to yield several million tons before exhaustion.

Deposit Reportedly Large

The project under study involves a large deposit owned by The Scotia Mining Co., Scotia, Pa., in which iron ore and clay occurs in a mixture of about 4 to 6 parts of clay to one of iron ore. The plan is to install a sink-float and log washer plant, thus concentrating the ore by washing out the clay. The concentrated product would contain 50 per cent or more iron, 9 per cent silica and the phosphorus content would be low. The plan calls for annual production of 400,000 tons of concentrate. While this deposit is known to be large, its exact size is not known. The Bureau of Mines continues its exploration work at Scotia.

It is possible that additional iron mining projects will be recommended. The Bureau of Mines, by virtue of its increased appropriation for the 1943-1944 fiscal year, is launching an extensive geophysical program to determine the extent and quality of mineral deposits over large areas.

Third War Loan Drive To Be Launched Sept. 9

Third War Loan campaign, designed to sell $15,000,000,000 in war bonds to nonbanking sources, will be launched by the Treasury Department, Sept. 9.

Slogan for the drive will be "Back the Attack with War Bonds."

The goal for the third loan campaign represents the largest financing program in the history of the world. The campaign will continue for three weeks.

In the Second War Loan, Americans, including banks, invested $18,533,000,000 in bonds, more than $5,000,000,000 in excess of the announced objective. More than 33,000,000 sales of "E" bonds to individuals were reported.

Introducing New NE 8600 Grade

Materials Conservation Committee asks metal of the 0.15 to 0.25 per cent molybdenum range be considered wherever practicable. . . Held comparable to NE 8740

INTRODUCTION of a new National Emergency steel of the 8600 series to be comparable to NE 8740 but with a molybdenum content of 0.15 to 0.25 per cent has been announced by the Operating Committee on Aircraft Materials Conservation.

Although steel conforming to AN-S-15 and AN-S-16 will continue to be available for aircraft uses, the committee asks that where new tests for new applications are to be conducted, consideration be given to testing compositions of the 0.15 to 0.25 per cent molybdenum range wherever practicable.

Specifications approved by joint action of the Army Air Forces, Navy Bureau of Aeronautics, and Aircraft Resources Control Office, Aircraft Production Board include the following:

A. Steel Bar and Rod

(1) AN-S-13, (0.18 to 0.23 carbon) chrome-nickel-molybdenum. Equivalent to NE 8620. Primarily for carburizing, as an alternate for such steels as SAE 2317, 3120, 4119, 4620 and 6120.

(2) AN-S-14, (0.27 to 0.33 carbon) chrome-nickel-molybdenum. Equivalent to NE 8630. Acceptable as an alternate for AN-QQ-S-684 (SAE X4130) in all applications; for SAE 2330 (AN-QQ-S-689), 3130, 4037 (AN-S-9), and 6130.

(3) AN-S-15, (0.33 to 0.38 carbon) chrome-nickel-molybdenum. Equivalent to NE 8735.

(4) AN-S-16, (0.38 to 0.43 carbon) chrome-nickel-molybdenum. Equivalent to NE 8740. Similar welding characteristics to SAE 4140 steel. Acceptable as an alternate for the steels already mentioned above, if necessary to obtain specified higher mechanical properties in larger sections, and for such steels as SAE 2335, 2340, 3135, 3140 (AN-QQ-S-690), 4135, 4140 (AN-QQ-S-752), 4640, 6140, and 6150 (AN-QQ-S-687). It is desirable that arrangements be made with the steel producers to aim for the lower range of molybdenum, i.e., 0.20 to 0.25 per cent.

B. Steel Sheet and Strip

(1) AN-S-12, (0.27 to 0.33 carbon) chrome-nickel-molybdenum. This steel is intended primarily as a weldable alternate for SAE X4130 sheet and strip (AN-QQ-S-685).

(2) AN-S-22, (0.33 to 0.38 carbon) chrome-nickel-molybdenum. This steel is intended primarily as an alternate for SAE 4135 sheet, strip (AN-QQ-S-686).

C. Steel Tubing

(1) AN-T-15, Seamless (0.27 to 0.33 carbon) chrome-nickel-molybdenum. This steel is intended primarily as weldable alternate for SAE X4130 seamless tubing (AN-WW-T-850).

(2) AN-T-33, Welded, (0.27 to 0.33 carbon) chrome-nickel-molybdenum. This steel is intended primarily as a weldable alternate for SAE X4130 welded tubing (AN-T-3). Provided the inside flash does not interfere with its intended application, this tubing and tubing conforming to AN-T-15 are acceptable as being interchangeable for all applications.

(3) AN-T-22, Seamless (0.33 to 0.38 carbon) chrome-nickel-molybdenum. This steel is intended primarily as an alternative for SAE 4135 seamless tubing (AN-WW-T-852).

The nickel content in the above mentioned specifications is being increased from a range of 0.40 to 0.60 to a range of 0.40 to 0.70 per cent.

Seeks Clear Definition of "Industry" in Planning

Asserting proposed appointment of a co-ordinator for the plans of various government agencies and departments on the reconversion of industry and agriculture to a peacetime basis, once the war is ended, would be timely, George A. Sloan, New York city commissioner of commerce and chairman of the mayor's Business Advisory Committee, declared recently one of the first responsibilities of the co-ordinator "should be to make clear what is meant by 'industry' when we speak of postwar responsibility."

Time Revised for Placing Steel Castings Orders

Time allowed by WPB between placement of steel castings orders and first day of the month in which delivery is requested has been lengthened under CMP regulation No. 1. Distinction now is made between carbon and alloy steel castings.

Following is the new time table for new carbon steel and new alloy steel requirements, respectively: 500 pounds and over, 45 and 60 days; over 500 to 5000 pounds, 60 and 75 days; over 5000 to 30,000 pounds, 75 and 90 days; over 30,000 pounds, 90 and 105 days.

WINDOWS of WASHINGTON

Heavier Business Taxes?

TAX EXPERTS in close contact with members of the House whose views usually predominate in formulating tax laws think it a safe bet that the next act will call for an increase of about four billion dollars of revenue to be obtained from higher income taxes on corporations and increases in excise taxes. Higher taxes on incomes of individuals are not believed likely. Support for a 10 per cent general retail sales tax appears to be growing. There are a number of proposals whose fate is not yet determined. By one of them $60,000,000 would be raised by a tax on checks. Another, aimed not only at raising revenue but also at helping to reduce congestion on the railroads, calls for a 33½ per cent tax on pullman fares.

Makes Nice Pile

Recently a large corporation, acting under one of the War Production Board's regulations, sent out questionnaires to some 22,000 customers. After putting the replies through the office machinery this corporation sent to Washington a sheaf of sheets approximately two feet square and about six inches deep. This batch of statistics was received on Aug. 10 and WPB officials since have discovered that nobody in the WPB has made any use whatever of the material. As a result of this episode another drive to reduce paper work by industry has been launched.

Getting Homesick?

Accelerated departure from Washington of many members of the War Production Board organization has forced more concentrated attention to the growing need to decentralize the board's activities. Many of the functions of the board can be handled more effectively out of regional and district offices than in Washington. Early action in the direction of decentralization is expected because many more people are eager to go "back home".

Cutbacks Easing

Future terminations and cutbacks of war contracts will be much less disturbing to production lines than in the early months of 1943. Tank production may be cut back further but not much. Heavy ammunition is not being expended as rapidly as expected and will be cut back. There is a possibility that small arms and ammunition may be cut back somewhat. Programs that will not be cut back include ships, high-octane gasoline, synthetic rubber, most heavy and light artillery, tank-borne guns, bombs of the various types. Programs to be stepped up include aircraft, large Army trucks, railroad equipment and supplies, rayon tire cores, tire manufacturing facilities. . . . New construction is declining and by end of 1943 will be at approximately peacetime level. Machine tool manufacture is dropping sharply and by the end of 1943 will be at approximately 30 per cent of capacity.

RENEGOTIATION DIVISION

Due to growing pace and scope of the War Department's price renegotiation program, the War Department Price Adjustment Board was set up as of Sept. 1, as a Staff Division of the Army Service Forces, known as the Renegotiation Division.

The change is administrative and does not affect personnel.

The division will continue renegotiating contracts in co-operation with private industry, which to date has resulted in recoveries and price reductions on Army work amounting to nearly two and three-quarters billion dollars. Added to the results obtained by the price adjustment units of other agencies, the total is nearly four billion dollars. Latest available exact total, as of July 31, 1943, is $3,955,845,000, of which the Army portion was $2,743,500,000.

Might Be Effective

A War Production Board official thinks smart manufacturers might better their labor position by advertising in their local newspapers for "carpenters," "masons," "plumbers" rather than for "machinists," "welders," "turret lathe operators." With new construction work falling off rapidly many building tradesmen, as well as workers in plants manufacturing building materials, are idle and many more will be without work as the year approaches its end.

Need Boypower

When War Manpower Commissioner Paul V. McNutt last week called on the millions of high school and other students to continue working in industry on a part-time basis when they go back to school in September, it was the first official acknowledgment of the part these boys played during the summer of 1943 in preventing a much worse labor situation than actually developed. Their departure from full-time jobs will create many problems.

Picture Too Bright

So strong a case was developed for synthetic gasoline to be produced from coal and lignite when the O'Mahoney War Minerals Subcommittee held hearings at Salt Lake City, Utah, and Sheridan, Wyo., recently, that governors and other prominent persons in Western states expressed curiosity over the fact such a synthetic gasoline program had not been launched a good many years ago. Representatives of the United States Bureau of Mines and other witnesses not only spoke about wonderful future possibilities but about what actually has been accomplished in past years to pave the way for a synthetic industry. They sold a fine bill of goods but there will be considerable difficulty in delivering. A vast amount of investigation remains to be undertaken before we can have a synthetic gasoline and motor fuel industry based on coal and lignite.

Bright Spot

One of the bright spots in the military picture is that we are losing far fewer aircraft in combat than was expected. The rate of attrition was expected to be as high as 20 per cent. Actually it is around 8 per cent. Improvements that continually are being made in our aircraft will reduce the rate even below this figure.

Not That Easy

Hearing that the supply of aluminum now is easier, a number of manufacturers have approached the War Production Board for permission to resume production of aluminum pots and pans and other goods. They are told that the situation is not that easy. The Aluminum and Magnesium Division reports growing acuteness of the problem of keeping aluminum producing plants manned by sufficient labor makes it necessary to husband all supplies for the war program.

Paper Shortage

An extremely critical shortage of pulp and paper is the next warfare emergency on the calendar. Inventories are being used up at a dangerous pace. Cause is depletion of lumberjacks by drafting them into the armed forces or by their finding employment in other industries. War Production Board is taking action to get more men back into the forest and is trying to find more trucks, power saws and other equipment for their use. Even so, paper will be scarce and a system somewhat like the Controlled Materials Plan now is being devised to secure equitable distribution.

FREE

THE BLANCHARD WORK BOOK

Work DONE ON THE BLANCHARD

26

The Blanchard No. 18 is a Consistent Profit Maker on Flat Surface Work

LARGE work of thin section is usually difficult to grind under the best of conditions. Here the Blanchard method of surface grinding shows to full advantage—the work is held on the magnetic chuck and the wheel takes broad cuts over the surface at each pass. This results in greater accuracy, finer finish, and better production—the Blanchard grinds metal at all times—not air.

Above, a No. 18 Blanchard is grinding 18" x 24" steel engine end plates of thin sections. .020" of stock is ground off each side to limits of ±.002" at a production of 5 plates (14 surfaces) per hour. Note also the variety of other parts which are ground on this machine.

At the left, another No. 18 Blanchard in the same plant is used for grinding large, heavy cast iron flywheel housings. 1/16" to 3/32" of stock is ground off one side of the casting to limits of ±.002". Production is 3 housings per hour.

Tool Work Ground on No. 18-36" Chuck

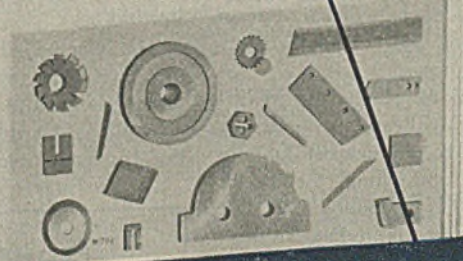
Tool rooms and shops that specialize in making tools and dies find the No. 18 a very profitable machine. They like its ability to grind fast and accurately without danger of heating the work.

The picture at upper left shows small cutters so thin that they are held in openings in a thin plate laid on the chuck.

27

At the upper right is a load of small steel die blocks.

Below is a group of tool work ranging from small reamer blades up to a form tool for a fire mold. Other tool work that is profitably ground on the Blanchard includes milling cutter teeth, cutoff blades, reamer blades, form tools, sides of die blocks, saws and cutters, knives, die sections, die bases and stripper plates.



Whether or not you now own a Blanchard Surface Grinder, the Blanchard Work Book will show you how to handle your surface grinding jobs more easily, accurately, and economically. There are 80 pages, spiral bound for your convenience, packed full of production data and information on grinding small or large lots. The coupon is for your convenience — Write for your Work Book TODAY!

CAMBRIDGE, MASS., U. S. A.

BLANCHARD
MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS.

COUPON

Without obligation, please send me the Blanchard Work Book.

NAME..... TITLE.....

COMPANY.....

CITY..... STATE.....

S

CMP HITS BULLSEYE; FILLING NEEDS

Early skepticism as to stability of program vanishing. Changes to be made only as experience shows tangible benefits to result

J. A. KRUG

Program vice chairman who has general supervision over distribution of materials. OWI photo

WHAT success is the Controlled Materials Plan meeting in directing critical materials into maximum production of war products and essential civilian goods?

After two months' full operation under the plan the consensus in both governmental and industrial circles is that it is meeting, and likely will continue to meet, expectations fully and satisfactorily.

Recent decision of officials in Washington to limit classification changes in the official class B product list to only nine instead of converting the entire list to class A has dispelled the last vestige of doubt among industrial buyers as to the future form of governmental control over production and distribution of critical materials. It has quieted widespread criticism of continual changes in the regulations and restored confidence in the stability of the plan as it now stands.

Under direction of J. A. Krug, as WPB program vice chairman, Harold J. Boeschenstein, director, Production Controls Bureau, and Walter C. Skuce, director, Controlled Materials Plan Division, the program has been placed on an efficient operating basis.

Mr. Krug is authorized to direct and supervise various units and functions of WPB, including the Production Controls Bureau. This bureau develops policies, plans, and general methods for controlling distribution of materials, for scheduling production and delivery of products, and for controlling inventories. The director is primarily responsible for initiating appropriate priorities regulations, CMP regulations, regulations governing scheduling, and other regulations applicable to more than one industry for controlling the distribution of materials, for scheduling production and delivery of products, and for controlling inventories.

The Controlled Materials Plan Division is charged with recommending policies, plans, and general methods for controlling the distribution of materials, and for maintaining a continuous review of the overall operations under resulting directives.

"Experience in operation of CMP indicates it is basically sound and, consequently, changes in the plan in the future will be limited in scope and will be made only as experience makes it clear that tangible benefits are to be derived," Mr. Krug said recently.

"Attention must now be directed toward better administration and operation of the plan both within government and on the part of industry," he continued, "in order to improve requirements data, to improve allotment procedure, and to improve the authorization of production schedules for extended periods. Much improvement must also be made in placement of delivery orders to cover scheduled requirements for advance quarters so that better planning and scheduling may be accomplished."

Industry approval of the plan has been general for several weeks, but many executives have been skeptical in view of the serious consideration given the recent proposal to shift the entire class B product list to the "A" list. This move would have put all the various standard component parts and civilian items under military control.

Opposition to any such change was overpowering and resulted in restrict-

PROMPT ACTION

Prime and secondary consumers of controlled materials who make allotments to their suppliers were urged recently by Walter C. Skuce, director of CMP Division, to make their allotments as soon as they are in a position to do so.

"In cases where consumers receive advance allotments of controlled materials, they should likewise make advance allotments to their suppliers in order to permit the placement of orders as early as possible," he said.

"Failure to place orders and make allotments promptly could interrupt the flow of materials and parts to end-product programs."

HAROLD J. BOESCHENSTEIN

Director of Production Controls Bureau who develops policies for scheduling production. Photo by Blackstone studios

WALTER C. SKUCE

Director of Controlled Materials Division who recommends plans for controlling material distribution

ing the classification changes to nine. This would indicate that officials charged with administration of the plan have heeded industry's claim that while members of the CMP organization can adjust their activities smoothly and quickly to any change in procedure it takes several months for individual members of industry to make similar adjustments.

Revision in the CMP class B product list, effective beginning with the first quarter operations in 1944, represents the final action with respect to any major class B product classification. Industrialists now may concentrate their energies on production problems. This had not been possible during the past two years when valuable time and effort was devoted to solving numerous supply and distribution problems arising from frequent changes in procedure under CMP, PRP and previous priority programs.

Although WPB officials have announced that the plan has undergone its final major alteration, it retains one of its most important characteristics—that of flexibility. Directives will continue to be issued by WPB, altering the flow of materials as necessity dictates. Minor adjustments also will be made in procedure of operation under the various regulations but the fundamental principles will be maintained.

CMP officials, acting often on suggestions made by industry, have simplified the reporting procedure whenever possible. Simplification of reports is an important phase of WPB's program to improve requirements data.

The latest example of this is the issuance of form CMP-32 which is the form to be used for reporting return of allotments. It is being made available to all manufacturers, both prime consumers and secondary consumers, in order that there may be a standard form and a standard procedure for returning unusable allotments of controlled materials to claimant agencies, industry divisions, or customers from whom they previously have received allotments.

Form CMP-32 should be used when: (1) The consumer finds that he has received an allotment of controlled materials which is greater than actually required for the quarter indicated; (2) contracts have been cancelled or reduced after receipt of allotments; (3) production (or construction) is disrupted by strikes, floods, labor shortages, etc.; (4) the consumer fills a substantial portion of any of his requirements, covered by an allotment, through the acquisition of controlled material, in any other manner than by use of the allotment; (5) the consumer finds that his inventory plus acceptance of delivery of materials will exceed the quantities permitted under CMP regulation No. 2.

Allotments will be returned up through the chain; that is, a secondary consumer will return unusable allotments to the consumer from whom he obtained his original allotment and a prime consumer will return unusable allotments to the claimant agency or industry division from whom he received his original allotment. This new procedure and new form supersede form WPB-3029 which was a one-time form used to return allotments directly to the WPB.

The steel warehouse industry is urging officials in Washington to grant them relief in filling certain orders. Until July 1 warehouses were permitted to fill only orders rated AA-5 or higher but now they can honor only authorized

(*Please turn to Page* 157)

WPB Announces Formation of Advisory Committees

War Production Board has announced the formation of the following industry advisory committees:

Molybdenum

Marx Hirsch, Molybdenum Corp. of America; Carl M. Loeb, Climax Molybdenum Co.; C. T. Ulrich, Kennecott Copper Corp.; and R. Van Fleet, U. S. Vanadium Corp.; all of New York.

Power and Distribution Transformer

John H. Darby, president, Erie Electric Co. Inc., Buffalo; A. C. Farmer, assistant to vice president, Westinghouse Electric & Mfg. Co., Sharon, Pa.; Samuel Horelick, president, Pennsylvania Transformer Co., Pittsburgh; H. F. McRell, assistant manager, General Electric Co., Pittsfield, Mass.; J. J. Mullen Jr., executive vice president, Moloney Electric Co., St. Louis; S. W. Stockwell, Davis Transformer Co., Concord, N. H., and A. Marcus, Eisler Engineering Co., Newark, N. J.

Welded Steel Tubing

T. C. Bright, Revere Copper & Brass Inc., Rome, N. Y.; James A. Ireland, Republic Steel Corp., Cleveland; Arthur E. Jones, Metal Forming Corp., Elkhart, Ind.; R. D. Malm, Clayton Mark & Co., Evanston, Ill.; C. E. Miller, Michigan Steel Tube Products Co., Detroit; and A. K. Smalley, Carpenter Steel Co., Roselle, N. J.

Vacuum Closure

L. T. Crabbe, Phoenix Metal Cap Co., Chicago; E. C. Emanuel, Armstrong Cork Co., Lancaster, Pa.; G. L. McClain, Aluminum Seal Co., New Kensington, Pa.; Charles Raney, Anchor Hocking Glass Corp., Lancaster, O.; Earl F. Turner, Hazel-Atlas Glass Co., Wheeling, W. Va.; A. H. Warth, Crown Cork & Seal Co., Baltimore; J. M. Wheaton, Owens-Illinois Glass Co., Toledo, O., and Phil White, White Cap Co., Chicago.

Contractors Construction Machinery

E. A. Daylor, E. A. Daylor Co., Coatesville, Pa.; Morris E. De Witt, Porter-DeWitt Construction Co., Kirkwood, Mo.; U. Rutledge Hill, Clifford Hill & Co. Inc., Dallas, Tex.; J. J. McLaughlin, Great Falls, Mont.; Wade E. Moore, Forcum James Co., Dyersburg, Tenn.; Joseph R. Perini, B. Perini Sons Inc., Framingham, Mass.; James J. Skelly, James J. Skelly Co., Media, Pa.; C. W. Smith, Smith Engineering & Construction Co., Pensacola, Fla.; D. W. Winkleman, D. W. Winkleman Co., Syracuse, N. Y.; Carl E. Nelson, Logan, Utah, and F. W. Parrott, C. F. Lytle Co., Sioux City, Iowa.

Bakery Machinery Manufacturers

C. D. Ackerman, Peerless Bread Machinery Co., Sidney, O.; A. M. Bornhofen, sales manager, Anetsberger Bros., Chicago; Claud Bryson, Baker Perkins Co., New York; W. Clark Dean, Union Steel Products Co., Albion, Mich.; T. F. Freed, Read Machinery Co. Inc., York, Pa.; Fred D. Pfening, Fred D. Pfening Co., Columbus, O.; D. W. Smith, president, Colborne Mfg. Co., Chicago; A. W. Gellman, Gellman Mfg. Co., Rock Island, Ill.; C. A. Ginter, Oliver Machinery Co., Grand Rapids, Mich.; Gay Larsen, general manager, Middleby-Marshall Oven Co., Chicago; E. J. Lauterbur, Hobart Mfg. Co., Troy, O.; Martin Miller, American Machine & Foundry Co., New York; C. L. Russell, American Bakers Machinery Co., St. Louis Mo.; Lee B. Thomas, Katzinger Pan Co., Chicago; and Thomas S. Vierow, Kotten Machine Co., Brooklyn, N. Y.

Aluminum Foundry

Government presiding officer is Frederick Ayer II. Committee members are: C. J. Amick, vice president, Century Metalcraft Corp., Los Angeles; C. A. Brantingham, president, Ebaloy Foundries Inc., Rockford, Ill.; Bruce W. Burroughs, executive vice president, National Bronze & Aluminum Foundry Co., Cleveland; E. G. Fahlman, president, Permold Co., Medina, O.; Grant Fink, Servel Inc., Evansville, Ind.; Frank Gaines, vice president, So-Cal Foundry, Los Angeles; H. G. Lamker, superintendent of foundries, Wright Aeronautical Corp., Pater-

(*Please turn to Page* 158)

PRIORITIES–ALLOCATIONS–PRICES

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

INSTRUCTIONS

PRODUCTION SCHEDULES: Manufacturers of class A civilian type end products, who have received allotments and authorized production schedules from various claimant agencies and from a WPB industry division, and who discover that because of labor shortage, lack of capacity, delays in material deliveries or other causes they will be unable to meet all authorized production schedules, should report the matter to the appropriate WPB industry division so that it may furnish directions. Class A civilian type end products are specified items which are purchased by claimant agencies directly from the manufacturer.

SUSPENDED ORDERS: When a customer suspends an order or an item of an order which a steel producer previously has accepted, the order or item loses its status as an accepted order and must be removed from the producer's schedule. If a suspended order is released at a later date, it must be treated as a new order received on that date. If the new delivery date is in the same quarter for which it originally was scheduled, the customer must confirm his prior certification that he is authorized to use the allotment number on the order. If the new delivery date specified is in a later quarter, the customer must furnish an appropriate allotment and confirm his prior certification.

TARDY ALLOTMENTS: Reports on form CMP-2B received by the Steel Division during July indicate that some producers accepted second quarter allotments after June 30. Steel producers have been reminded that an allotment is valid only in the quarter for which it has been issued. It cannot be used for placing authorized controlled material orders in any other quarter. Therefore, steel producers should not accept an allotment after the last day of the quarter for which it was issued irrespective of the fact the material required was produced in a previous quarter.

L ORDERS

BEDS, BED SPRINGS: Permission to use rail steel angles and bessemer or low-carbon steel for frames and borders in manufacture of coil, flat and fabric bed springs has been granted. Manufacturers' quota allowances of iron and steel for bed spring production during the three months beginning July 1, 1943, have been increased from 3¼ per cent to 10 per cent of the amount used by each manufacturer in his aggregate production of coil, flat and fabric bed springs (which were not integral parts of beds or other sleeping equipment) during the base year ended June 30, 1941. (L-49)

REPLACEMENT BATTERIES: Permits any manufacturer of replacement batteries, except those located in Niagara Falls, N. Y., Los Angeles, San Francisco, Seattle, and Portland, Oreg., to increase their production up to 5 per cent over 1941 sales, providing their total sales for that year were over 25 000 units. For smaller manufacturers whose sales for 1941 did not reach the 25 000 unit total, authorization is extended to build up to that quantity for the year 1943. (L-180)

NE STEEL PRODUCTS: Standard specifications for various types of steel pipe are embodied in schedules 11, 12, and 13 to order L-211. Schedule 11 provides specifications and standard sizes for steel pressure pipe commonly used in power plants and certain industrial plants. They cover both carbon and alloy steel piping in lapwelded, seamless, electric resistance welded, and fusion welded grades.

Schedule 12, covering steel pressure tubes, includes boiler, cracking still, heat exchanger, condenser, and superheater tubes.

Schedule 13 sets up specifications for steel pipe, exclusive of pipe covered by other schedules, and certain specialty items such as corrugated pipe, dredge pipe, etc. (L-211)

HARDWARE: Specifies in a new schedule (II) permitted sizes, types and grades of marine joiner hardware; materials that may be used in its manufacture, effective Sept. 27. Ferrous metals and plastics are required as substitutes for brass or bronze wherever practicable, and brass and bronze when used must be mainly secondary metal. Permits use of brass or bronze for certain purposes on board ship where ferrous metals would not be suitable due to magnetic disturbances and the corrosive action of salt water spray. Manufacturers must report by Sept. 17 on WPB-1902 (formerly PD-754) to WPB the catalog number, size and style of each type of lock or latch he is manufacturing. Exempted from the provisions of schedule II are repair parts; hardware manufactured from parts in possession of the producer on or before Aug. 28; and hardware manufactured to fill contracts with the Army, Navy, Maritime Commission, or War Shipping Administration executed before Aug. 28. (L-236)

INDEX OF ORDER REVISIONS

Subject	Designation
Batteries, Replacement	L-180
Beds, Bed Springs	L-49
Hardware	L-236
Machinery and Equipment:	
Farm	L-257, L-257-a
Logging, Wood Products	L-311
NE Steel Products	L-211
Petroleum Industry Materials	P-98-c
Printing Plates	M-99, M-339
Price Regulations	
Castings, Iron Malleable	No. 341
Pig Iron	No. 10
Pipe, Reusable Iron and Steel	No. 230

FARM MACHINERY AND EQUIPMENT: Basic order governing production of farm machinery and equipment has been extended for an indefinite period. It was due to expire June 30, 1944, but now will be amended periodically as requirements arise. Schedules for future quota periods will be issued several months before the start of each annual period opening July 1. Until new quota schedules are issued each producer is expected to plan production on current applicable schedules which are designated as "A" and cover the period July 1, 1943, to June 30, 1944. Unless a new schedule is announced in the meantime, schedule A may also be considered as applicable for the period beginning July 1, 1944. Several additional countries have been added to schedule X-9 of order L-257-a, at the request of the Office of Foreign Relief and Rehabilitation, in order that special quotas can be assigned if necessary. (L-257, L-257-a)

LOGGING, LUMBER AND WOOD PRODUCTS MACHINERY AND EQUIPMENT: A new order (L-311) covers control over distribution and manufacture of logging, lumber and wood products machinery and equipment, including following types: dry kilns and redriers, machinery for logging, saw and planing mills, veneer and plywood products, wood containers, and general woodworking machinery and equipment. Restricts purchase orders for machinery having a producer's list price of over $350 on Oct. 15, 1942, (designated as class I) to those authorized by WPB. Application for authorization and preference rating is made by the purchaser on form WPB-3131. Exempted from the authorization provision are purchase orders which are: (1) For machinery to be used directly by the Army, Navy, Maritime Commission or War Shipping Administration; (2) placed by a producer or dealer to fill authorized orders actually received, or to replace machinery delivered from inventory to fill authorized orders, or (3) included in preference ratings assigned under authorization to begin construction work (form WPB-617, formerly PD-200). Purchase orders for machinery valued at $350 or less, by a producer's list price on Oct. 15, 1942, (designated as class II) are restricted to those with preference ratings of AA-5 or higher. Dealers' inventories of class II machinery are limited to five of any one size or type irrespective of manufacturing make. Further control over class II machinery is provided by limiting manufacture in any one month to 50 per cent by dollar value of the combined amount shipped by a producer during the second and third preceding months. This limit, however, may be exceeded to permit filling specific orders with AA-5 or higher rating, actually received by a producer.

All producers must file monthly operations reports on form WPB-3130 on or before the 10th of each month, beginning with October. Restrictions on purchase orders are effective Sept. 11. (L-311)

M ORDERS

PRINTING PLATES: Restrictions on use of copper and zinc in printing plates have been combined in a single order, M-339, which also includes certain new provisions. These operations formerly were governed by orders M-99 and M-9-c. Restricts use of zinc to 50 per cent by weight of a person's 1941 quarterly usage; of copper to 60 per cent of a person's 1940 quarterly usage. A new provision permits the borrowing of 15 per cent against the next quarter's quota, and also allows use of any unused quota from the previous quarter. Copper and zinc used in plates ordered by any department or agency of the government are exempted from the quota established by the new order. Also exempted are copper and zinc used in plates which are made exclusively for printed matter which is ordered directly from the producer of the printed matter by any department or agency of the government, but only when the person who orders the plates is both the person in whose name the government order is placed and the person who actually produces the printed matter. Purchase orders for plates which are properly exempted under this provision must carry the certification called for in the order.

The order provides that for each four pounds of 16-gage photo-engravers' sheet copper (which were in finished form before July 1, 1943, and which now are in the possession of photo-engravers and suppliers) which a photo-engraver uses, he may charge only three pounds against his allowable usage. There is no similar provision for the partial ex-quota use of 16-gage zinc.

Electrotypers will be permitted 50 per cent of their allowable usage of copper in the form of virgin anodes beginning with the fourth quarter of 1943, instead of 25 per cent in this form and 75 per cent in the form of scrap. No increase in the over-all allowable usage of 60 per cent of a person's 1940 quarterly usage is permitted except that a 10 per cent bonus is allowed when 95 per cent or more of a person's allowable usage is in the form of scrap. Delivery, acceptance and use of copper scrap remain subject to the controls of (M-9-b, M-99, M-339)

P ORDERS

PETROLEUM INDUSTRY MATERIALS: Both used and new equipment in the petroleum industry now may be sold by one operator to a supplier as intermediary prior to its resale to another petroleum operator, without a

direct resale being involved. Suppliers may now also purchase and accumulate odd and end lots of new and used oil country tubular goods from various operators and re-sell complete strings to other operators. Neither preference ratings nor controlled materials allotment numbers may be used or are required in purchasing or re-selling either used or new materials acquired from petroleum operators.

However, new controlled materials acquired by suppliers from mills or equipment distributors under order M-21-b-2 or field stocks of oil country tubular goods which are now being established under WPB directives may be sold on the basis of allotment numbers. Newly-established field stocks of tubular goods require special allotment numbers in addition and may not be sold until these special allotment numbers including the symbol "FS" are obtained. (P-98-c)

PRICE REGULATIONS

PIG IRON: An increase to $34 from $28 per gross ton, f.o.b. furnace, in the maximum price of Lake Superior charcoal pig iron, retroactive to July 1 has been authorized by OPA. (No. 10)

REUSABLE IRON AND STEEL PIPE: Specific maximum prices, effective Sept. 4, for joint welding reusable iron and steel pipe have been established at 11 cents per lineal inch of circumference for standard weight pipe and heavier and 10 cents per lineal inch of circumference for lighter than standard weight pipe. Maximum for prime coating reusable iron and steel pipe is established at $7.50 per net ton of weight of pipe after prime coating but may be charged only when the service is performed at request of the buyer for preservative purposes. A maximum price of 70 per cent of the mill carload delivered price at the shipping point is established for light weight spiral weld pipe and all reusable iron and steel pipe of an outside diameter larger than 26 inches. (No. 230)

MALLEABLE IRON CASTINGS: Sellers of malleable iron castings now may add effective Sept. 4, overtime costs in computing their maximum prices when using the "formula" or "pre-base period" pricing methods provided in price regulation No. 341. Under the "base period" method, maximum prices are the highest at which the producer contracted to sell between Oct. 1 and Oct. 15, 1941. This method does not permit the adding of overtime costs to "base period" maximum prices.

Under the "formula" method, the seller must use his pricing method in effect for him on Oct. 15, 1941, employing the same rates, bases and customary mark-up used by him on that date, except that he may compute overhead rates on the bases of his experience in the foundry during the period from Jan. 1 to June 30, 1942.

Under the "pre-base period" method, the seller's maximum price is established as the actual price at which he last sold a similar casting prior to Oct. 1, 1941. Method by which overtime costs may be added in computing "pre-base period" and "formula" maximum prices is divided into four steps: (1) Seller selects whether he shall compute overtime on a monthly or quarterly basis; (2) computes the overtime premium per dollar of sales of malleable iron castings for the month or quarter, as the case may be, which precedes the period in which the casting in question is priced; (3) reduces this overtime premium per dollar of sales by the percentage by which average hourly earnings during the preceding period exceeds average hourly earnings in his plant in the payroll period immediately preceding Oct. 15, 1941; (4) applies the resultant rate in (3) to the maximum price of the casting which would otherwise be arrived at without the inclusion of any overtime. (No. 341)

Appointments - Resignations

James A. Folger has been appointed regional director of the WPB regional office, San Francisco, to succeed Harry H. Fair.

Manufacture May Be Increased by Using Excess or Frozen Steel Stocks

Reserve of 400,000 tons in various shapes and forms held by Steel Recovery Corp. should be drawn upon by manufacturers of permitted civilian products whose production is governed by tonnage received through CMP allotments

BY USING excess or frozen steel stocks obtainable through the Steel Recovery Corp., manufacturers of certain permitted civilian products may possibly increase output of these items, it was pointed out last week by the Consumer Durable Goods Division, War Production Board.

This is true particularly of manufacturers whose production is governed by the amount of steel received through CMP allotments.

The corporation at present has available about 400,000 tons of such steel in a variety of shapes and forms.

Cautioning that this does not mean any relaxation of present restrictions on manufacture of consumer goods, officials of the division said that consumption of the steel stocks must conform to existing WPB limitation orders and other regulations.

It was pointed out that oftentimes CMP allotments of steel to manufacturers of civilian goods are not large enough to permit attainment of the permitted production level of those goods. In such cases, officials said, use of excess or frozen steel stocks listed with the Steel Recovery Corp. would permit increased production of the consumer item involved without violations of any exisiting WPB regulation.

Excess or frozen steel stocks listed with the recovery corporation can be used over and above the CMP allotment made to the individual manufacturer. As long as he does not violate WPB limitation orders, the manufacturer does not have to deduct such steel from his CMP allotment, officials said.

Manufacturers must also conform to their authorized production schedules when these are issued to them by WPB. However, when the schedules are based on the allotment of controlled materials plus the material withdrawn from inventory, output may be increased to the extent permitted by the use of excess or frozen steel stocks.

Sales of excess or frozen steel stocks reported to Steel Recovery Corp. must be authorized on form WPB-2757 in accordance with provisions of priorities regulation No. 13, which controls sale of excess or frozen industrial material. Inquiries should be directed to any WPB regional office or to the Steel Recovery Corp., Pittsburgh.

Manufacturers should state the class, grade, size (and whether there are acceptable substitutes as to size), heat treatment or steel required and proposed use.

WPB Clarifies NE Steel Limitation Order L-211

Conditions under which customer specifications may be used in the purchase of products covered by the various schedules of order L-211 have been set forth by the War Production Board in interpretation No. 1 to the order. Order L-211 requires producers to manufacture various steel products to certain designated specifications and prohibits the acceptance of such products which the customer has reason to believe were produced in violation thereof.

A producer may accept an order to a customer's private specifications for any steel product for which a specification is prescribed by a schedule to order L-211 provided:

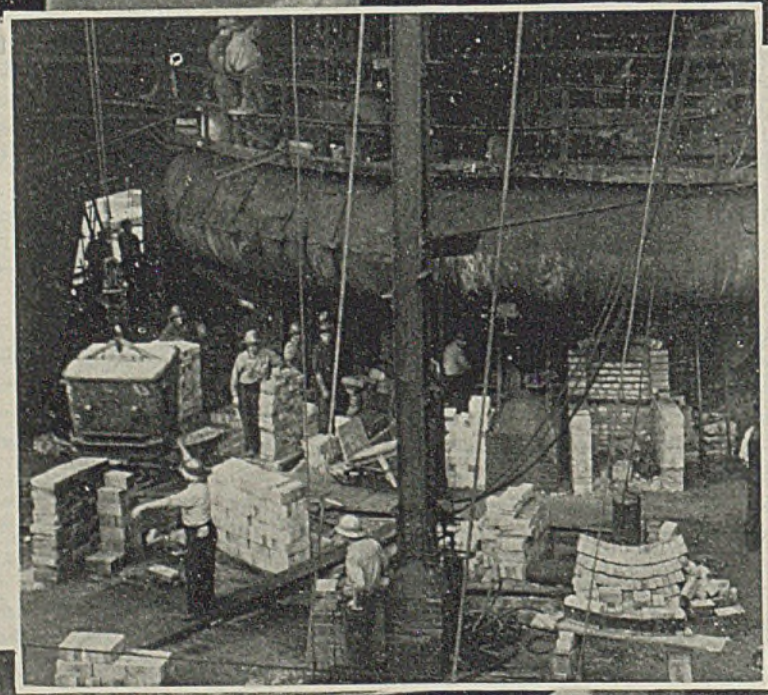
"(1) That such customer specification is in agreement with a definite specification designated in the schedule, and provided the purchaser so states in placing his order, or

"(2) That such customer specification specifies only such requirements as the customer is authorized to specify in the schedule, or such directions as are necessary to the contract, which do not violate the provisions of the schedules.

"No other customer specification for such products may be accepted except on authorization on appeal in accordance with limitation order L-211."

Labor Shortage Curtails Die-Head, Chaser Output

Production of die-heads, chasers and collapsible taps is still critical, War Production Board was advised last week by industry representatives. Production is retarded by the difficulty of retaining skilled workmen due to enlistments and shifts to other jobs. Inexperienced labor is causing an increase in output of damaged pieces.



Bethlehem Relines Stack in 19 Days

JOHNSTOWN, PA., plant of Bethlehem Steel Co. laid claim to a new all-time record when relining of its No. 6 blast furnace was completed Aug. 28 in 18 days and 20½ hours, about one-third the usual time required.

The stack, built in 1879, has an 18-foot diameter hearth and is 86 feet 9⅞ inches in height. Capacity is 21,000 tons of pig iron a month.

General Manager R. E. Hough is shown at left in upper photo shaking hands with E. W. Trexler, superintendent of mechanical department, as he congratulated the men on their accomplishment. Others in photo, left to right: Robert Rodgers, assistant superintendent of mechanical department; William Reese, foreman of brick masons; Ralph McCleester, general foreman of construction; Frank Heeney, assistant to superintendent of mechanical department; Ted Fairchild, general foreman of bricklayers; H. M. Crossett, assistant general manager; George Rodgers, assistant superintendent of mechanical department; and Gordon Baer, superintendent of blast furnaces.

Center photo shows workmen swinging in a load of brick during the relining.

Lower view shows tapping of the salamander.

Whither Surplus War Plants?

United States Chamber of Commerce organizes committee to consider problem of disposing of unneeded factories and supplies

IMMEDIATE and continuing study of the problem of disposing of surplus war plants and supplies is being undertaken by the United States Chamber of Commerce. A special business men's committee to consider the subject has been formed and 27 representatives of varied lines of industry already have accepted President Eric Johnston's invitation to participate in the work. Chairman is Albert C. Mattei, a vice president of the chamber and president of the Honolulu Oil Corp., San Francisco.

First meeting of the group, known as the Special Committee on Utilization of War Plants and Surplus Property, will be held in Washington Sept. 9-10. At that time, a preliminary survey of the scope and extent of the problem will be made. An invitation has been extended to business men to bring to the attention of the committee phases of the problem that are of particular concern to them. Communications should be addressed to T. W. Howard, manager of the chamber's department of manufacture, who is secretary of the committee.

In a statement outlining the committee's purposes, the chamber said:

"Even before military operations reach their greatest intensity, the war agencies are finding that they have excess stocks of some kinds of war material and supplies. The accumulation of such stocks is inevitable in a highly mechanized war. New weapons, redesigned facilities and necessary changes in the fighting man's equipment make obsolete munitions and supplies previously in use.

"As the war goes on and comes to a close, the problem of the disposition of surplus property will become increasingly important.

"There will be the problem, at the end of the war, of the proper and efficient utilization of the great special-purpose manufacturing plants.

"Looking ahead at the immensity of these problems and in the recognition that they will affect nearly every field of business, the national chamber has set up a strong committee which will undertake immediately, preliminary consideration of the entire subject and devote itself continuously to specific problems as they arise."

WHEN PEACE COMES

New processes and new products now being planned by industry for the postwar era are described in "Testimony to the Future," a booklet just published by the National Association of Manufacturers.

Covering a wide range from plastic thread window screens to mass produced railroad car wheels of metals more resistant to heat caused by brake shoes, the report warns the public not to expect radical changes in consumer products immediately. Manufacturers will first attempt to get peacetime industry under way rapidly and this best can be done by making models perfected before the war, with minor improvements.

Texas Foundry Group Plans Oct. 29 Meeting

First meeting of the newly organized Texas foundry group is scheduled at Houston, Tex., Oct. 29, according to the organization committee headed by F. M. Wittlinger. Guest speaker will be R. G. McElwee, chairman, cupola research project, American Foundrymen's Association.

Arrangements are being made to have a second meeting a day or two later at either Dallas or Fort Worth.

WPB Proposes Using War Prisoners in Ore Mines

War Production Board's iron ore executives reportedly have suggested use of war prisoners in eastern mines to alleviate the critical labor shortage in Eastern iron ore mines.

No labor shortage in western mines has been reported. Another proposal is the use of war prisoners on railroads, thus releasing railroad workers for work in the mines. No action has been taken yet.

They Say:

"Absolute victory in this war will give greater opportunities to the world because the winning of the war in itself is proving that concerted action can accomplish things."—**President Roosevelt.**

o o o

"The enlightened business management of this nation must and will adapt itself to this emotional age in which people are thinking constantly of human rights. There is but one difference between management and labor, and that is that management has the responsibility for perpetuating the business and therefore must make decisions which affect the life of the business."—**Frederick C. Crawford,** president, National Association of Manufacturers.

o o o

"To win the peace, to insure perpetuation of our American institutions, high levels of employment and productivity must be achieved as quickly as may be possible in the early postwar period. That objective can be reached only by immediate bold, effective planning on the part of the employers of America."—**Louis Ruthenburg,** president, Servel Inc., Evansville, Ind.

"Adoption of a joint master plan by the government, labor, and industry, which would provide for a more definite and specific disposition of manpower, improvement of personnel placement methods, and planning a postwar industrial policy which would give war workers some promise that they will not be left jobless, is necessary if we want our plants to be manned effectively."—Professor **Walter Rauthenstrauch,** director, industrial engineering department, Columbia University.

o o o

"It must be borne in mind constantly that realization of our hopes for steady employment and prosperity in postwar America is dependent upon an economic climate in which research and industrial expansion can attain maximum growth. There must be a revision in tax policies which are preventing industry from accumulating adequate reserves for reconversion and increased peacetime production facilities. New investment capital must be encouraged into industry if we are to enjoy the full harvest of our ingenuity and productive capacity."—**Dr. A. R. Olpin,** director, Research Foundation, Ohio State University.

MEN of INDUSTRY

T. H. McSHEEHY

FRANK SHUGERT

J. C. VIGNOS

P. S. JONES

T. H. McSheehy has been appointed sales manager, Wire Rope division, Wickwire Spencer Steel Co., New York. **J. A. Old** succeeds Mr. McSheehy as Pacific Coast sales manager.

—o—

Frank Shugert, formerly industrial relations director, Ranger Aircraft Engine division, Fairchild Aircraft Corp., Jamaica, N. Y., has been appointed director of industrial relations, Elastic Stop Nut Corp., Union, N. J.

—o—

G. H. Sheldon, vice president in charge of production, Upson-Walton Co., Cleveland, has been elected a member of the board of directors.

—o—

Malcolm G. Kirk, former manager, priorities section, Pittsburgh Screw & Bolt Corp., Pittsburgh, has been appointed manager of the company's American Equipment division, Norristown, Pa., succeeding the late John A. Longacre.

—o—

Carl F. Freedman, general manager, American Agile Corp., Cleveland, has been named a vice president.

—o—

Lawrence D. Bell, president, Bell Aircraft Corp., Buffalo, has been elected president of the Aircraft War Production Council, East Coast, Inc., succeeding **J. Carlton Ward Jr.**, president, Fairchild Engine & Airplane Corp., New York. **L. C. Goad**, vice president, General Motors Corp., Detroit, has been elected vice president of the council. The term of both offices is four months.

—o—

John C. Sykora, sales manager for the past 14 years, Commercial division, Gould Storage Battery Corp., Depew, N. Y., has been elected vice president.

—o—

Bryan C. S. Elliott, chief of the bureau of taxes for Carnegie-Illinois Steel Corp., Pittsburgh, since 1941, has been appointed supervisor, tax division. Mr. Elliott is a member of the American Institute of Accounting.

—o—

J. C. Vignos, formerly assistant executive vice president, Ohio Ferro Alloys Corp., Canton, O., has been named general sales manager. Mr. Vignos succeeds **H. A. Landon**, who has become Pacific Coast representative for the company.

—o—

I. Frank Brownson, regional co-ordinator, Appliance division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed manager of the division's laundry equipment department.

—o—

Hal M. Stone has been appointed assistant manager, coal department, Cleveland-Cliffs Iron Co., Cleveland.

—o—

Harry T. Worthington, formerly sales and production executive, Manning, Maxwell & Moore, New York, has joined Beardsley & Piper Co., Chicago, as general manager.

—o—

Lowell E. White, former test pilot for Wright Aeronautical Corp., Paterson, N. J., has joined the research engineering staff of C-O-Two Fire Equipment Co., Newark, N. J.

—o—

Louis F. Holtzman has joined the public relations staff of Consolidated Vultee Aircraft Corp., San Diego, Calif.

—o—

L. E. Hammer has joined Worthington Pump & Machinery Corp. as assistant works manager of the Moore Steam Turbine division, Wellsville, N. Y.

—o—

F. L. Magee has been appointed to the new post of general production manager and assistant to vice president, **I. W. Wilson**, Aluminum Co. of America, Pittsburgh. **Donovan Wilmot** has been named product manager for sheet, succeeding Mr. Magee and he in turn is succeeded as product manager for ingot by **Ralph V. Davies**. **Edward B. Wilber**, Washington office manager since 1935, has been transferred to head of the New York office, and **Arthur P. Hall** takes his place as Washington manager.

—o—

P. S. Jones, former manager, New York sales territory, Cutler-Hammer Inc., Milwaukee, has been appointed general sales manager for the company's thirty selling territories throughout the country.

—o—

Arch H. Copeland and **John Berdan** have been appointed assistant sales directors, Diamond Alkali Co., Pittsburgh, and **J. D. Mattern** has been named manager of alkali sales.

—o—

William J. Conley, former faculty member of Rochester University, has joined Lincoln Electric Co., Cleveland, as consulting engineer.

—o—

R. S. Arnold, superintendent, Ideal Foundry Co., Newton Falls, O., subsidiary of Republic Steel Corp., Cleveland, has resigned.

—o—

W. H. Richardson, former assistant general sales manager, Timken Roller Bearing Co., Canton, O., has been appointed general manager of all activities for Timken on the West Coast and in the Orient, with headquarters in San Francisco.

—o—

Clayborn L. Jackson, editor of *Acme News*, house organ of Acme Steel Co., Chicago, has been elected president of the American Association of Industrial Editors, Ottumwa, Iowa. Other officers elected were: First vice president, **Clint McKnight**, Diamond Alkali Co., Painesville, O.; second vice president, **Ralph Lewis**, Caterpillar Tractor Co., Peoria, Ill.; third vice president, **Maxey Morrison**, Curtiss Wright Corp., Caldwell, N. J.

RUBERT J. LINDQUIST

secretary, Jane Lavin, International Resistance Co., Philadelphia; treasurer, H. E. Hornberger, Gulf States Paper Co., Tuscaloosa, Ala.

—o—

Rubert J. Lindquist, since 1941 vice president and director, Reynolds Metals Co., Richmond, Va., has joined Curtiss-Wright Corp., New York, and has been elected vice president in charge of finance. Prior to his association with Reynolds, Mr. Lindquist held the position of chief auditor, Reconstruction Finance Corp., from 1932 to 1941.

—o—

Herbert Davis, former assistant superintendent in charge of the seamless hot mills, Youngstown Sheet & Tube Co., Youngstown, O., has joined Hi-Alloy Castings Co., New Brighton, Pa., as metallurgist.

—o—

Philip B. Stull, former general manager, paper makers chemical department, Hercules Powder Co., Wilmington, Del., has been elected vice president, and is succeeded as manager of the PMC department by **Ralph B. McKinney.** Mr. Stull became associated with Hercules in 1926 when the Virginia Cellulose Co. of Hopewell, Va., of which he was president, was acquired by them. In 1933 he was elected a director of Hercules.

—o—

W. B. Rose has joined Pemco Co., Baltimore, as advertising manager. Previously, Mr. Rose had been in the national advertising department of the *Philadelphia Evening Ledger.* **O. L. Davis** has been appointed purchasing agent for Pemco. Mr. Davis' wide experience includes association with Western Electric Co., New York, Acme Steel Co., Chicago, and Brainard Steel Corp., Warren, O.

—o—

Delos M. Palmer, former dean of engineering, University of Toledo, has been appointed plant engineer, American Propeller Corp., Toledo, O.

—o—

Robert R. Rhodehamel, former head of the planning department, National Acme Co., Cleveland, has been named general sales manager.

—o—

William C. Cuntz has been appointed Pittsburgh district manager, Welding division, Metal & Thermit Corp., New York. The territory under Mr. Cuntz's supervision is comprised of southern New Jersey, Pennsylvania, Ohio and all of the Southeastern states, including Kentucky, Tennessee and Alabama. **James M. Wilson** has been named district engineer at Pittsburgh, and **Louis G. Vock** has been appointed a Chicago district engineer.

—o—

Charles G. Berwind, vice president and director, Berwind-White Coal Mining Co., Philadelphia, has been elected director of Pennsylvania Salt Mfg. Co., Philadelphia.

—o—

OBITUARIES . . .

Shurly Christy Hodge, 61, president and treasurer, Taylor-Shantz Co. Inc., Rochester, N. Y., died there Aug. 28.

—o—

William A. MacKenzie, 73, director, Crucible Steel Co. of America, Milwaukee, died Aug. 29 in Syracuse, N. Y. Mr. MacKenzie also was a director of the New Process Gear Co., Syracuse, and the Toledo Shipbuilding Co. Inc., Toledo, O.

—o—

Mortimer C. Rosenfeld, 67, founder and former president, Grabler Mfg. Co., Cleveland, died Aug. 27 in that city.

—o—

Alexander Laughlin, 77, founder and president, Alexander Laughlin & Co., Pittsburgh, and one of that city's leading industrialists for half a century, died there Aug. 30.

—o—

Fay H. Rosencrants, 54, vice president, Combustion Engineering Co. Inc., New York, and an authority on steam-power plants and boiler design, died Aug. 26 in Scarsdale, N. Y.

—o—

J. H. Schroeder, 58, traffic manager since 1938, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., died there Aug. 24.

—o—

Guy Hinchman Noble, 66, retired engineer, Structural Gypsum Co., New York, died in Plainfield, N. J., Aug. 29.

—o—

George W. Crist, 57, sales engineer in Detroit for Cleveland Graphite Bronze Co., Cleveland, died in Detroit Aug. 27.

—o—

William D. Thomas, 55, president, W. D. Thomas Co., New York, died recently in Hewlitt, N. Y. Mr. Thomas at one time had been president of Sandvik Steel Co., New York, and also had been associated with the Stanley Steel Works, Bridgeport, Conn.

—o—

Charles T. Dabney, midwestern district representative, Briggs Clarifier Co., Washington, died Aug. 25 in Toledo, O., while attending a business conference.

—o—

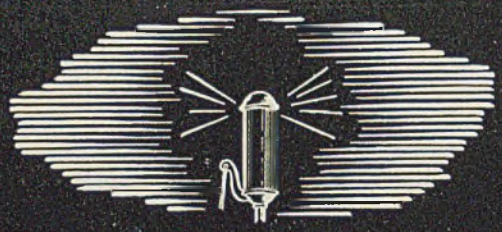
Gordon A. Webb, 50, district sales representative in Detroit for Pressed Steel Co., Wilkes-Barre, Pa., and Ohio Steel Foundry Co., Springfield, O., died in Detroit, Aug. 23. An active member of the American Society for Metals, Mr. Webb was well known throughout the metalworking and metal treating industries.

PAUL DIETZ

Who has been appointed export sales manager, General Machinery division, Allis-Chalmers Mfg. Co., Milwaukee, noted in STEEL, Aug. 30, p. 54.

FRED F. MURRAY

Who has been elected president, Oil Well Supply Co., Dallas, Tex., subsidiary of United States Steel Corp., as reported in STEEL, Aug. 30, p. 55.



Dare We Speak of Peace?

Yes—because it means so much to all of us individually. With it will come again those products of industry like the car, the radio and the refrigerator, which never were luxuries so much as necessities. And those who are thinking in post-war terms are asked to remember that Weatherhead will be prepared to help build these products again as well as the many strange new ones destined to emerge from this war.

Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND, OHIO
Manufacturers of vital parts for the automotive, aviation, refrigeration and other key industries.

Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada—St. Thomas, Ontario

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Automotive industry plants devoted to mass production of aircraft engines proving fertile field for advanced ideas in machining, grinding, etc. . . General Motors begins negotiations for changes in union contract

DETROIT

BECAUSE aircraft engines have never until recently been built in mass numbers, and because motor company master mechanics, tool engineers and process men have a thorough understanding of the principles of mass production by virtue of experience, new plants which the motor companies have undertaken to operate for production of these engines have been fertile fields for advanced ideas in machining, grinding, materials handling, etc. Innovations have been many and are still in process of installation.

Chevrolet's plants at Buffalo, Buick's at Melrose Park, Ill., Studebaker's in South Bend, Ft. Wayne and Chicago, Nash's in Kenosha, Ford's in Detroit, Chrysler's in Chicago—all building engines under license from either Pratt & Whitney or Wright Aeronautical—are witnessing the application of the best brains of the metalworking and automotive industries to the mass output of radial aircraft engines. They are doing things differently from what the prime contractors ever thought of, and the results are speaking for themselves in terms of volume of production, man-hours of labor and costs.

Fortunately the licensees are not bound by any restrictions on processing methods, so long as the end part meets inspection limits. If time can be saved by shaving gears instead of grinding them, and distortion in quenching can be avoided, then "shave 'em" is the order. Such complicated machine units as the "Greenlee line" for finishing aluminum cylinder heads, the rectangular Foote-Burt valve hole machines now going in at Buick and Ford, and the numerous types of multiple-spindle machines for machining pistons represent equipment with a distinct automotive flavor, born of the years of experience of automotive engineers in doing a job better and faster with less labor. Essentially they are triumphs of man over metals.

On the other side of the ledger there are many irksome phases of aviation engine building that chafe the automotive companies—too complicated parts design, too much fussiness on surface finishing, too much metal to be removed from rough forgings or castings, etc. But these are unimportant alongside the production achievements which are accomplished facts.

A typical case proves the point, so it may be pertinent to examine it in some detail. At the Chevrolet Buffalo operation, engineers were itching over the slow procedure involved in milling fins on the insides of pistons. Each forged aluminum piston is shaped with interior bosses on opposite sides of the skirt which are milled down to form a series of cooling fins. They were formerly cut on a single-spindle vertical milling machine. A new unit was developed with two spindles which could be moved hydraulically into the cut after the piston was chucked on the machine. The cutters were of high-speed steel, nine of them being keyed to each spindle to form the series of fins. Each cutter cost about $10, so the two tools complete ran about $180. Trouble developed with breakage of the cutters through the sharp corner of the keyway, so the doctors were called in.

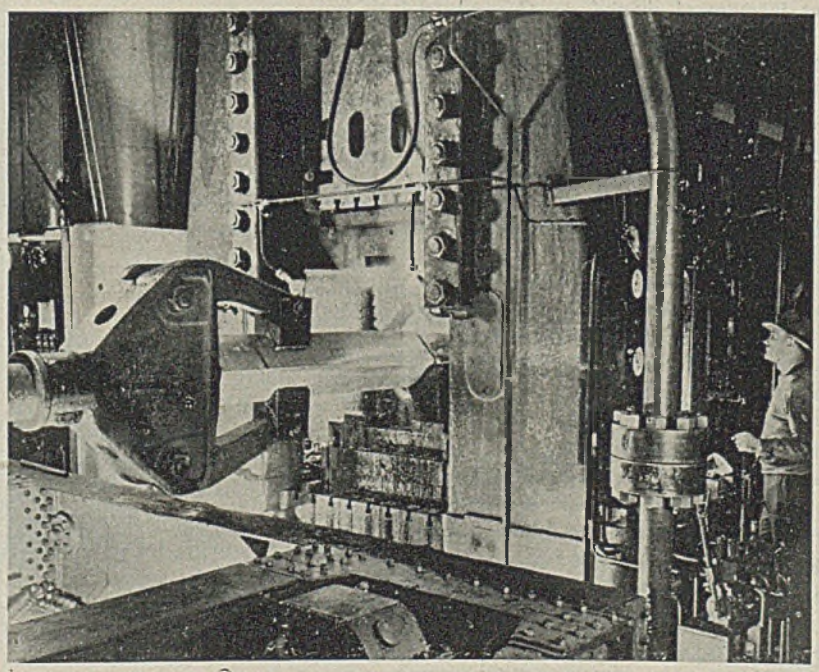
Cutting Points Are Tipped

The novel solution finally worked out was to blank the cutter disks from cold-rolled steel stock, then to tip the cutting points with high-speed steel, using a conventional welding torch and a cast high-speed steel welding rod, and finally to grind them sharp. Cutter produced by this method could be supplied for $1.50 each, or $27 for the two complete tools—a saving of $153 per set over the old style, not counting the further savings resulting from the virtual elimination of cutter breakage because of the softer, more ductile backing material.

This leads to consideration of another highly interesting development, the casting of high-speed steel welding rods, and here the trail winds to the Gorham Tool Co. in Detroit, which went through a long program of study, research and experiment before perfection of the process of sand casting 16-inch welding rods of high-speed steel. Key to the success finally achieved is believed to be the inclusion of 1 per cent boron in the metal which contains roughly 6-8 per cent molybdenum, 8 cobalt, 4 chromium, 2 vanadium and 1.15 carbon. Boron is added in the form of ferroboron and is a powerful deoxidizer. It assists in giving the proper fluidity to make the molten metal fill the sand molds in which the small-diameter rods are cast.

Gorham operates its own small foundry, with two Ajax induction melting furnaces of 200-225 pound capacity, sand preparation and reclaiming system, molding benches, shakeout, sandblast, heat treating furnaces, pattern shop and laboratory.

The welding rods are cast in ⅛, $\frac{3}{16}$ and ¼-inch diameters, the ⅛-inch size being 13 inches long and the others 16 inches. Molds are gated at one side and metal flows from the gate into a runner



FORGING ALUMINUM: Cogging down a 12-inch square aluminum alloy billet, 9 feet in length, to a 9-inch square section, this 3000-ton press at the aluminum forge division of Chevrolet Motor Division is one of the largest in the business. Reduction in cross section of billet increases tensile strength from 40,000 to 55,000 pounds per square inch. Cogged section will be sliced into "biscuits," and forged into aircraft engine crankcase parts

which feeds the series of parallel horizontal holes extending from it. There are 29 rods cast in the ⅛-inch size, spaced about ¼-inch apart; 28 of the ⅜-inch size and 25 of the ¼-inch. The smallest are made in a 12 x 16-inch flask, the others in a 13 x 18 inch. After being shaken out of the sand the rods are sandblasted and centerless ground, no annealing being required. One of the finished rods may be flexed measurably in the hand without breaking, and when dropped on a hard surface gives a ring characteristic of rolled material.

Consider another case. Finish grinding of pistons at the Chevrolet plant in Buffalo is complicated by the fact that the piston design calls for four different diameters plus a slight taper next to the ring grooves. Variation from maximum to minimum diameter is only 0.010-inch and the operation formerly was carried out by properly orienting the piston against a narrow grinding wheel in successive stages. Now a wheel has been developed which is the same width as the piston skirt and which can be dressed to the exact profile of the skirt. Grinding machines are equipped with dressers which by means of a suitable template check contours of the wheels regularly and keep them within limits.

Favors Incentive Pay Plan

Convinced that the introduction of individual incentive pay plans will increase war production from 10 to 25 per cent without increase of manpower, General Motors has included this proposal in a list of 16 "suggestions" which it presented to union leaders as negotiations for changes in the present contract began last week. The suggestions were the results of an intensive canvass of the corporation's entire supervisory organization, from foremen to general managers, and all of them are aimed at increasing production, improving efficiency, conserving manpower, improving discipline, promoting better relations between employes and management, and eliminating abuses by union committeemen of the privilege granted them to take time off their jobs to handle grievances.

Among the suggestions, many of broad basic import to any company operating under union contract, are the following:

1. Eliminate maintenance of membership provision because it amounts to little more than a closed shop.

2. Require discontinuance of scurrilous attacks and false accusations villifying management in official union papers, handbills and other literature, which undermine morale and retard the war effort.

3. Amend the contract to eliminate the investigation of the same grievance by a number of different committeemen.

4. Amend the contract to provide that all employes must first submit grievances to foremen who shall be given an opportunity to adjust them before such grievances are handled by the union.

5. Reduce by 50 per cent the amount of time available to committeemen. This will still allow ample time for prompt handling of all legitimate grievances.

6. Seniority lists are to be furnished the union not more than twice each year, with changes furnished the union at three-month intervals.

7. Amend the contract to make it clear that merit, ability and capacity on the job and potential for further advancement shall be the determining factors in the transfer and promotion of employes to higher paid jobs on war production, with seniority secondary to the foregoing.

8. Require the union to withdraw its opposition and lend its support to individual piecework or other incentive method of pay when it has been determined by the management that the introduction of such incentive method of pay will increase the production of war materials. Any change in the wage payment plans will be negotiated with the shop committee before being placed in effect.

Incentive pay systems are swinging back into favor as a logical means of boosting production in the face of dwindling manpower. As a general thing they have the tacit support of the WPB through vice chairman C. E. Wilson, although he appears to favor a shop-wide incentive system instead of the individual incentive.

There is an important distinction. Under proposals suggested by Wilson, a given plant would be told that if it could increase its output, say, 20 per cent, a commensurate increase in pay would be given to all employes. Unions would be more apt to grab at such a system than at one which rewards individual merit or capability, but the individual who may have a little extra push on his job suffers thereby at the expense of the entire working force, and the incentive thus could logically be expected to disappear in the sphere of the individual workman.

It is extremely doubtful if the UAW-CIO, led by the cagey Walter P. Reuther in its negotiations with GM, will accede to any individual incentive system. It will be branded as a dastardly trick to sweat more out of workers and enrich the coffers of General Motors. Some time ago, a leading union official, speaking off-the-record, said that, with a few reservations, he was in favor of incentive systems, but that a plant had to grow into them and he did not consider union members in the large corporations like General Motors, Ford or Chrysler as yet "ripe" enough for incentive pay.

NEW TWIST

New twist in labor troubles developed last week at Murray Corp. of America when Local No. 2 of the UAW-CIO decided it would set its own working hours. Originally the plant had been working 8-hour shifts with 30-minute no-pay lunch periods. Then the union decided it would prefer to work a 9-hour shift, including a 15-minute paid lunch period. The management agreed and put the plan into effect, but shortly the union reversed its stand and decided to go back to the original schedule, claiming that workers were being docked because they were tardy returning from lunch.

The management demurred, but last Monday noon several hundred overstayed the 15-minute lunch period, forced their way through plant gates. Later the night shift appeared an hour and a half early, crashed the plant gates and went to their jobs while the day shift left after only 8 hours of work. The plant closed Wednesday for annual inventory period through Labor Day.

War Plants' Safety Records Improve

Deaths caused by accidents in war plants are one to one and a half times lower than in the first World War, according to the 1943 edition of *Accident Facts*, statistical yearbook of the National Safety Council. The increase from 1941 to 1942 has been less than the increase from 1917 to 1918, both years when many new and inexperienced workers were added.

The council's record show that women have an unexpectedly good safety record. Only 350 women died last year as result of occupational injuries, compared with 300 in 1940, prewar year when comparatively few were employed in hazardous jobs.

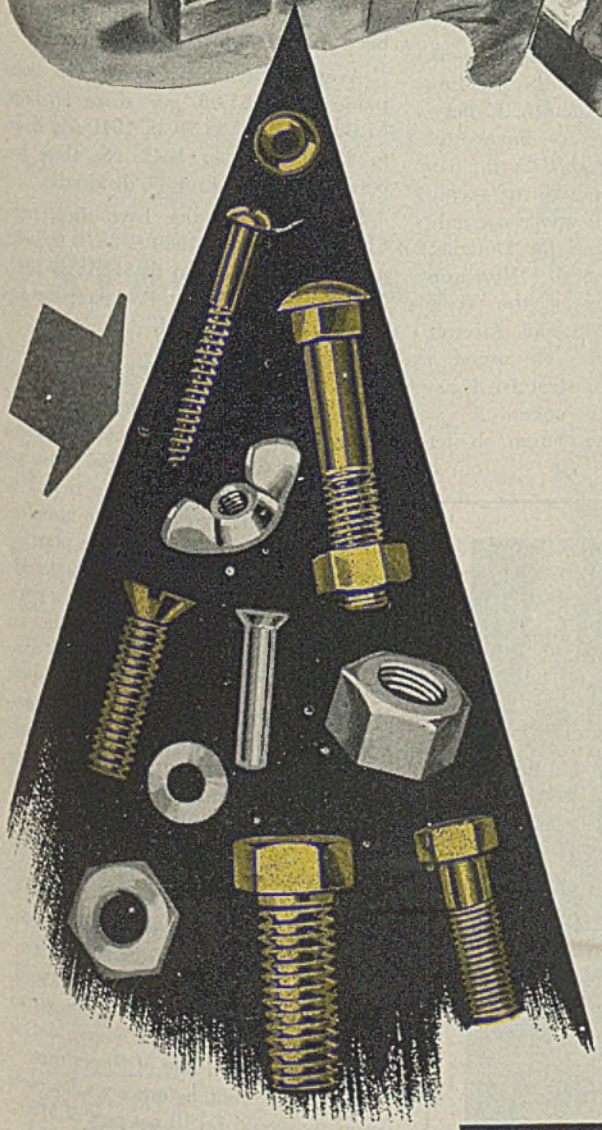
American Steel & Wire Co. Sells Consolidated Works

American Steel & Wire Co., subsidiary, United States Steel Corp., recently sold its Consolidated works in Cleveland to John W. Galbreath, Columbus, O., real estate broker.

Established in 1889 by the Baackes Wire Nail Co., Consolidated Works consists of 12 main buildings in addition to auxiliary structures.

2¢ WOULD HAVE PREVENTED THIS SHUT DOWN

. . . . 2c MORE FOR A NON-RUSTING BOLT IN A VITAL PART



CAN A COUPLE OF PENNIES more per bolt save thousands of dollars? Indeed they can . . . and Harper Fastenings are proving it every day. Saving huge sums by preventing hidden destruction by rust and corrosion. They help war production machinery to stand up under today's grueling speed and overtime.

Such tremendous trifles, these Harper non-ferrous and stainless fastenings. Trifling too, in their extra cost. Yet tremendous in their usefulness.

4320 STOCK ITEMS . . . of bolts, nuts, screws, washers, rivets and accessories in the non-ferrous and stainless alloys.

WRITE FOR CATALOG . . . and reference book—80 pages—4 colors—193 illustrations—numerous tables and other data. Free when requested on a company letterhead.

THE H. M. HARPER COMPANY
2646 Fletcher Street, Chicago
BRANCHES: 45 West Broadway, New York City; 1617 Pennsylvania Blvd., Philadelphia; 332 I. N. Van Nuys Bldg., Los Angeles.
Offices in Principal Cities

HARPER *Chicago*
EVERLASTING FASTENINGS

ARMY E NAVY
Awarded Dec. 7, 1942
Star added June 7, 1943

BRASS • BRONZE • COPPER • EVERDUR • MONEL • STAINLESS

WING TIPS

Renegotiation after taxes, provision in tax laws for necessary reserves for postwar transition, and changes in present contract termination policies to protect employes suggested for aircraft companies

SURVIVAL of the aircraft industry in some semblance of its present form when the war ends is a matter receiving the serious concern of its leaders. They are fully aware that the present volume of business in no wise can be or will be sustained, but they look out over their three-quarters of a million employes and then at the scant reserves they have been able to set aside for postwar readjustment, and shudder at the thought of trying to keep all or even most of these people busy when military orders dwindle.

Contract renegotiation and excess profits tax laws hit the aircraft industry particularly hard because it has a low tax base in comparison with other established industries by virtue of its low volume of business in prewar years. Furthermore, reserves tentatively set aside for postwar transition are subject to renegotiation, and finally no adequate provisions have been made for gradual termination of war contracts to avoid complete disruption of the industry should the war end suddenly and the Army and Navy thereupon jettison all airplane orders.

It may be argued that the aircraft industry was built to its present magnificence entirely by government funds, or the people's money, both for plants and equipment and for the products, hence, is it entirely fair that the industry's future should be underwritten by such funds? However, this point becomes largely academic when it is realized that one of the first postwar aims of all planners is to maintain full employment. If the airplane companies are forced to liquidate 75 or 80 per cent of their employes at the end of the war, the employment problem would be considerably complicated.

States Industry's Case Clearly

Speaking recently before the House Naval Affairs Committee investigating the defense program, Francis A. Callery, vice president in charge of finance of Consolidated Vultee Aircraft Corp., San Diego, Calif., stated the industry's case clearly and pungently. He spoke not only for his own company, but for Douglas, Lockheed, North American, Northrop and Ryan—all members of the West Coast section of the National Aircraft War Production Council. He urged a three-point program of constructive legislative steps to be taken at once:

1. Base contract renegotiation on net profits *after* taxes, and exempt net profits up to 3 per cent of sales (or whatever rate is determined as reasonable).

2. Provide in the tax law for necessary reserves for postwar transition; and exempt these reserves from renegotiation.

3. Change the present provision for termination of war contracts so as to protect the contractors and in turn the employes now working on tremendously expanded war production.

Certainly it is true that stockholders of aircraft companies are not getting rich out of expanded wartime production. Averaging figures of six leading air-frame manufacturers—Boeing, Consolidated Vultee, Douglas, Lockheed, Martin and North American—the price of common shares of stock in 1939 ranged between $41.70 and $22.81. In 1940 the high was $42.97 and the low $25.72. In 1943, the range so far has been $29.97 high and $21.91 low.

Average dividend of these six companies was $1.06 per share in 1939, $1.96 in 1940, $2.79 in 1941 and down to $1.96 again in 1942. So there has been no skyrocketing of dividends.

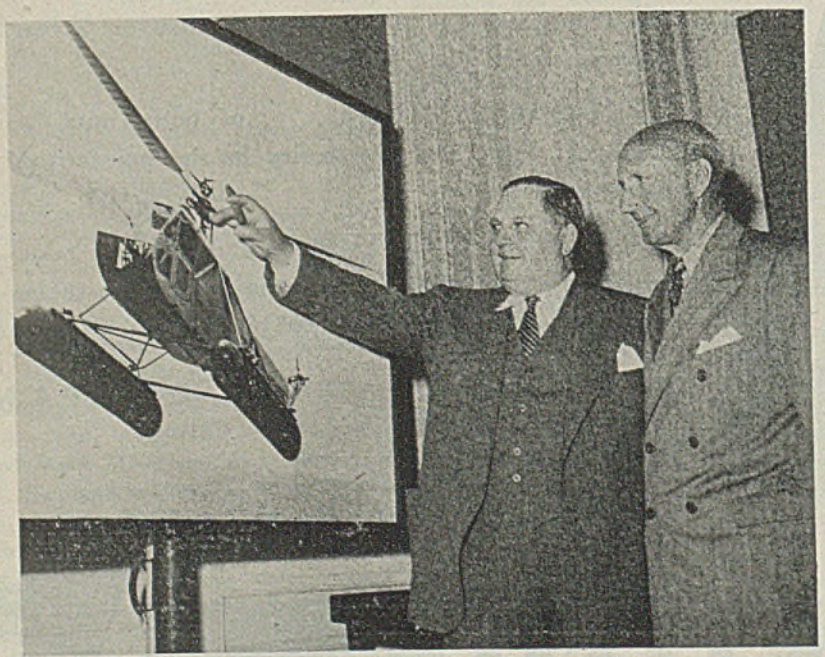
Earnings of course have risen, from $1.83 per share in 1939 to $5.00 in 1940, to $9.61 in 1941 and to $12.18 in 1942. But these are more book-keeping figures and show up only in reserves.

Draws Interesting Analogy

Callery drew an interesting analogy of the cost of an airplane to the government from two different suppliers. Assume an identical type of airplane is sold to the government by each of two manufacturers at a price of $150,000, this price being set after all renegotiation adjustments and after allowing each company a profit of 10 per cent before taxes. Further assume one company is an aircraft company which designed, developed and spent its own money on the airplane. This company naturally has a low tax base, arising from low earnings and even losses in prior years, and its profits are taxed at the 80 per cent overall limitation. The second manufacturer, an automobile company perhaps, would be building the plane to the aircraft company's designs and specifications and would be benefiting by the know-how of the aircraft company. This manufacturer, it is assumed, has a favorable tax base, arising from high earnings in former years, and is taxed at an overall rate of 50 per cent.

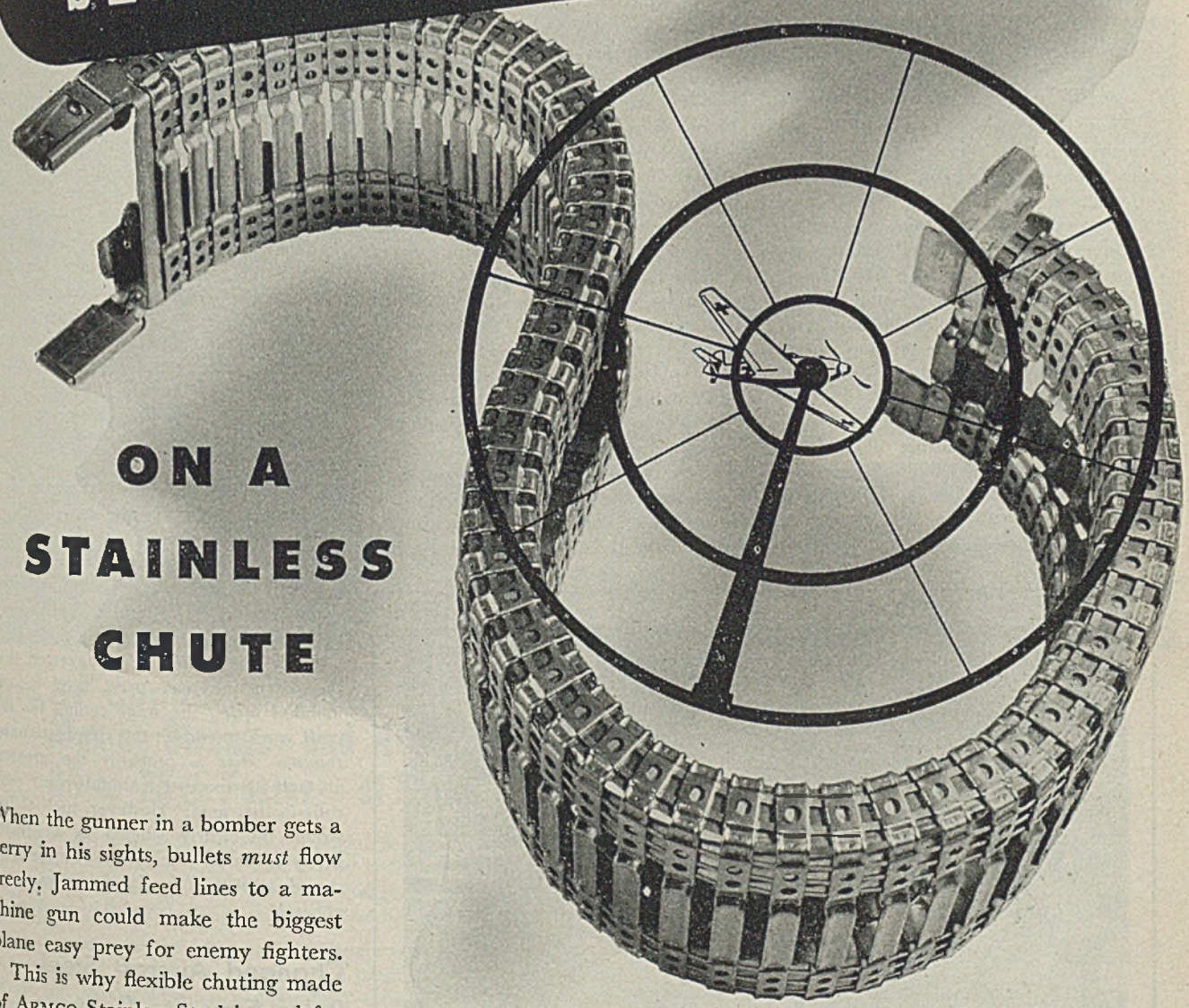
Now, the profit before taxes for each company would be 10 per cent of $150,000 or $15,000. The aircraft company would pay a tax of 80 per cent, leaving 20 per cent, or $3000 for its net profit. The other manufacturer would pay a tax of 50 per cent of the $15,000 profit, leaving net profit after taxes of $7500.

If the original price is $150,000 and



VERSATILE: George W. Mason, president, Nash-Kelvinator Corp., Detroit, points out to A. M. Wibel, recently elected vice president, how, by altering the pitch of the rotating blades, the Sikorsky helicopter can fly forward, backward, sidewise, or straight up and down

JERRY'S NUMBER COMES UP



ON A STAINLESS CHUTE

When the gunner in a bomber gets a Jerry in his sights, bullets *must* flow freely. Jammed feed lines to a machine gun could make the biggest plane easy prey for enemy fighters.

This is why flexible chuting made of ARMCO Stainless Steel is used for the feeder system. Attached to large ammunition boxes, stainless chuting carries cartridge belts safely and surely to rapid-firing guns. Bullet-filled belts skim over the smooth surfaces without a hitch.

There are other vital reasons for using ARMCO Stainless. This versatile metal is strong and durable; there is little danger that the flexible links will break during combat. It resists the severe abrasion of desert service or the corrosive attack of sea and jungle air. There are no rust particles to gather on cartridges or belts.

How do these advantages of ARMCO Stainless stack up for *your* war-work — or for peace-time products you may be planning. Whether they're on the drawing board or just in the "idea stage" consider using ARMCO Stainless. We'll be glad to work with you. Just write to The American Rolling Mill Company, 2521 Curtis St., Middletown, Ohio.

STAINLESS ARMCO STEEL

THE AMERICAN ROLLING MILL COMPANY

the profit before taxes $15,000, the manufacturer's cost of the airplane would be $135,000. The net cost to the government, however, washing out taxes as in one pocket and out the other, would be the manufacturer's cost plus the net profit to the manufacturer after taxes. In the case of the aircraft manufacturer, this would be $135,000 plus $3000, or $138,000; in the other case $135,000 plus $7500, or $142,500.

Hypothetical Case Interesting

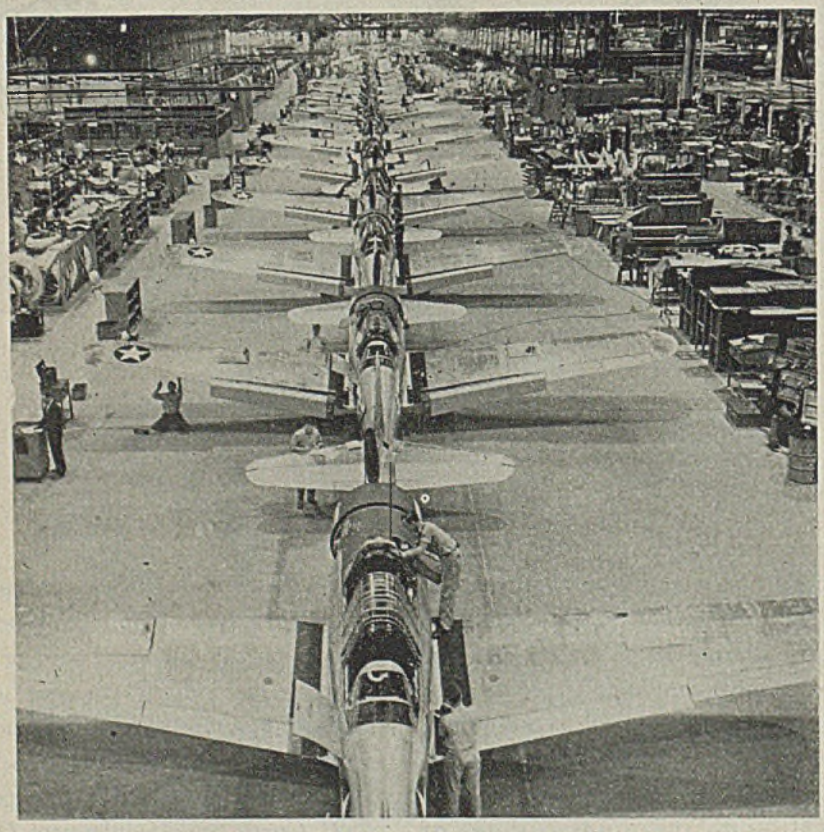
Thus, in this purely hypothetical case, which possibly may be paralleled throughout industry in general, the government would be paying $4500 more for the same product from one manufacturer than from the other, and one company would be making $4500 more profit in wartime for the same service. In substance this has the startling effect of a subsidy to hold up earnings during the war of companies that were profitable before the war!

On the question of anemic reserves, Callery cited some further illuminating figures. Consolidated Vultee sales have expanded from $3,600,000 in 1939, to $9,300,000 in 1940, to $94,800,000 in eleven months of 1941, to $304,000,000 for the year ended Nov. 30, 1942, and to an estimated $350,000,000 for the year ending this November. That is expansion of a neat 18,000 per cent in five years!

Net working capital of Consolidated Vultee after suggested renegotiation settlements, as of Nov. 30, 1942, amounted to approximately $9,000,000, or about 2.25 per cent of sales in 1942 and less than 1.5 per cent of estimated sales for the current year. It is also the equivalent of about two weeks' payroll for C-V.

Last November Consolidated alone had liabilities and commitments of $546,000,000 against which it had cash, receivables and inventories and government supply contracts covering commitments to subcontractors and suppliers. In addition there was the $9,000,000 working capital. If you are a student of corporate finance, figure out the margin of capital to risk and learn why airplane company vice presidents cannot sleep some nights.

If price renegotiation boards adopt a long-range viewpoint and keep in mind the logic of taking every reasonable step now to ease the postwar transition of all industry, they cannot escape the conclusion that the three points mentioned earlier—basing renegotiations on net profits *after* taxes; providing better reserves for the transitional period and exempting these reserves from renegotiation; and lessening the danger of 24-hour contract cancellations—are not only entirely sound but also economically imperative.



PARTIAL DAY'S OUTPUT: Their propellers almost touching the next ship's rudder, basic trainer planes flow tail first down the assembly line at Consolidated Vultee Aircraft Corp., Downey, Calif. The eleven planes shown are only part of one day's production of the line, claimed by the company to be the fastest in the world

Baruch Report Lists Ways To Increase Plane Output

Report covering Bernard M. Baruch's special survey of manpower in the aircraft industry has been submitted to War Mobilization Director James F. Byrnes, according to reliable sources.

The War Department, concerned over the recent sharp drop in plane output, placed its problem before Director Byrnes for emergency action, and the Baruch survey was started Aug. 5.

Although more than twenty recommendations are contained in the report, it is understood they do not include any proposal for immediate adoption of a national service act as a blanket remedy.

One of the recommendations is said to deal with perhaps the most difficult problem confronted by West Coast plants: The differential between aircraft workers' frozen wage rates and the wages offered by shipyards and various other war industries.

From one source it is suggested that the Baruch report may have recommended lifting the wage ceiling for aircraft work to correct this differential and remove what is probably the greatest obstacle to increased aircraft-plant payrolls in that area. However, such a step would be clearly labeled as an emergency measure which was not to be construed as lifting the lid from wages in general.

Changed Aircraft Steel Rules Expedite Delivery

To meet current problems in distributing steel through official aircraft warehouses, the Aircraft Scheduling Unit has effected three new features for expediting deliveries to aircraft contractors:

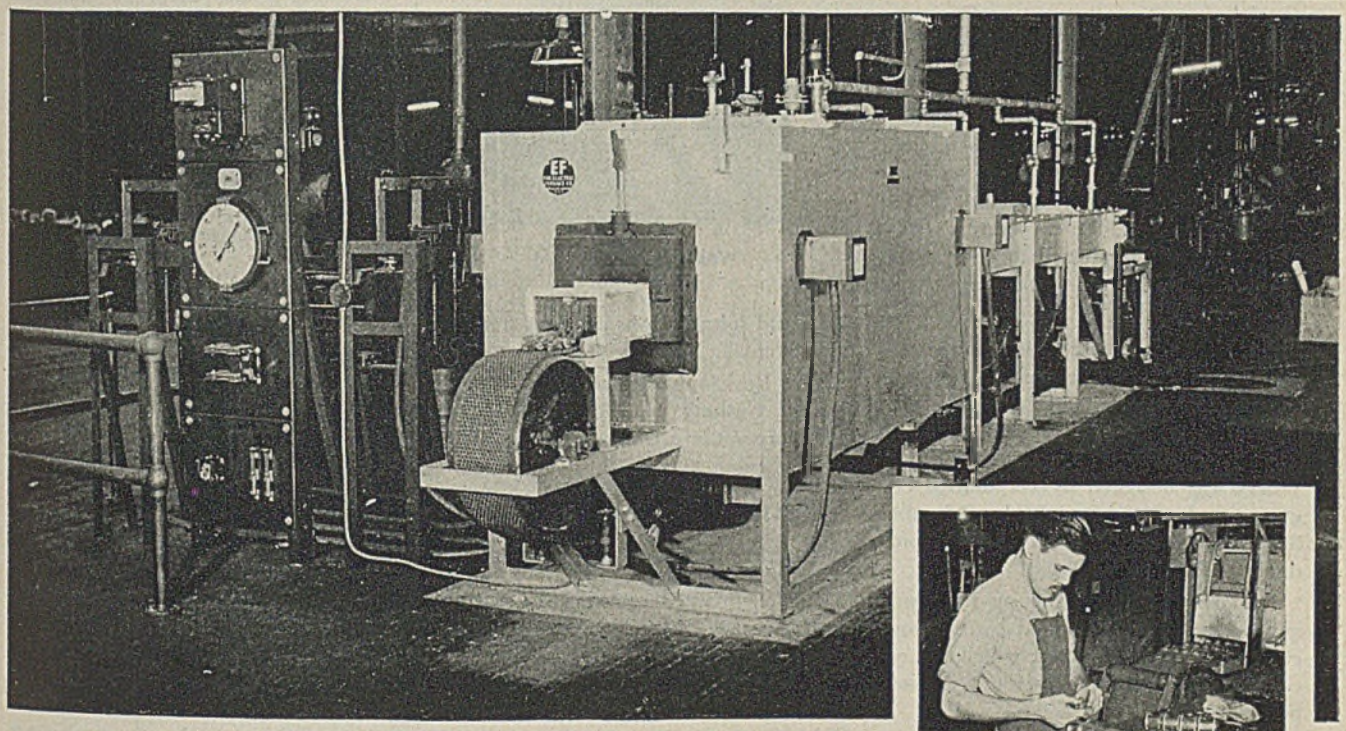
(1) *Back Orders*—Official aircraft steel warehouses are now permitted to accept back orders from aircraft contractors for small quantities of earmarked steel. However, warehouses may not hold the materials in the warehouse to fill these orders. Warehouses are not *required* to accept a back order but they will do so if the item is of standard size normally carried by the warehouse, and if the warehouse believes it will be able to fill the order.

If, at a later date, it appears that

(*Please turn to Page* 159)

EF FURNACES

For Every Industrial Heat Treating Process

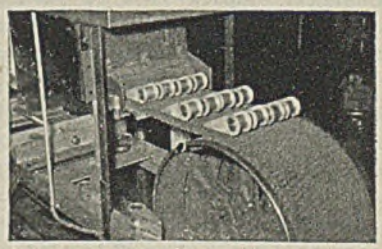


The operator assembles the parts and places them on the furnace conveyors.

This EF Copper Brazing Furnace is Making Stronger and Neater Joints 60 to 75% Faster—at 1/4 the Former Cost

"Greatly improved results—neater, stronger joints—60 to 75% faster, at about one quarter the former labor cost," that briefly is the report received from the production manager of a prominent midwestern plant after installing the above EF continuous copper brazing furnace for joining some of their miscellaneous steel assemblies.

Within a month after their first brazing furnace was installed, a second similar but larger EF furnace was ordered for joining other products—both furnaces are now operating side by side, joining all kinds of assemblies—large and small—neatly, economically and securely.

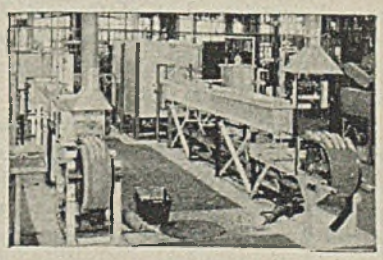


The assemblies are discharged at the other end... all units securely and neatly joined.

Products difficult or expensive to make in one piece can be made in several pieces and joined—thus not only reducing the cost but actually improving the quality and appearance. Products requiring several stampings joined or requiring screw machine parts, forgings and stampings to complete the unit, can be neatly and economically joined right in the production line in your shop. Strong, leak-proof joints are made and the completed unit is discharged from the furnace—clean and bright.

Any number of joints in the same product or any number of pieces can be joined at one time. The most intricate parts or assemblies are made to actually "grow together," and joints made which are as strong, or even stronger than the original parts. On some parts it is possible to anneal and braze in one operation.

Investigate the brazing process for your products. With slight changes in design you may be able to join your metal assemblies, neater, cheaper and stronger by this method.



Send for printed matter showing various other types of EF copper brazing furnaces.

Investigate the Copper Brazing Process for Joining YOUR Metal Parts

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

Mathesius Heads Geneva Steel

Named president of newly organized U. S. Steel Subsidiary to operate Geneva works

WALTHER MATHESIUS, vice president in charge of operations of the United States Steel Corp. of Delaware, has been elected president and director of the Geneva Steel Co., the corporation's subsidiary recently organized to operate the $180,000,000 Defense Plant Corp. works at Geneva, Utah.

The Utah facilities, which are scheduled for substantial completion by the end of the year, were ordered by the government primarily to provide steel for West Coast shipbuilding. The Geneva Works was designed by corporation engineers and erected for DPC by Columbia Steel Co., U. S. Steel's Pacific Coast producing subsidiary.

No construction fee was paid nor will any operating fees be paid by the government to the corporation, which will receive reimbursement only for its out-of-pocket expense.

Geneva Works is an integrated plant with raw materials facilities, coke ovens, blast furnaces, steelmaking and finishing equipment. Capacity will be 1,200,000 tons of ingots, 700,000 tons of plates and 250,000 tons of structural steel annually.

Despite delay in obtaining materials due to lack of sufficiently high priorities and difficulty in obtaining labor, the plant is now nearing completion on a 1600-acre site which less than two years ago was an agricultural district.

Mr. Mathesius, who will build the organization of the new company, has been with U. S. Steel since 1911. He served as general superintendent of Carnegie-Illinois Steel Corp.'s South Chicago Works, and in 1935 was made manager of operations of the Chicago district.

Other officers elected, all of whom will serve on the board of directors, are: J. R. Gregory, vice president, sales; J. E. Butler, controller; J. Wohlend, treasurer; and Merrill Russell, secretary and general attorney.

Mr. Gregory, associated with U. S. Steel for 25 years, has been vice president and general manager of sales for Columbia Steel Co.

Both Mr. Butler and Mr. Wohlend have been associated with Columbia Steel for a number of years. Recently, Mr. Butler has been in charge of accounting for the construction of the Geneva Works. Mr. Wohlend formerly was assistant treasurer of Columbia.

WALTHER MATHESIUS

Mr. Russell has been a member of Knapp, Cushing, Hershberger & Stevenson, corporation's Chicago counsel.

Industry Expansion Still Mounts in Chicago Area

Capital invested in new industries and expansions in the Chicago area during August was $16,742,000, sending the total invested in new factories for the first eight months of 1943 to $127,071,937.

With the inclusion of the investments made in industrial plants during the past month, according to statistics prepared by the industrial department, Chicago Association of Commerce, the grand total plant development and expansion program for the war effort, since July, 1940, has climbed to $945,726,937.

DPC Authorizes Plant Expansion, Equipment

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

Cutter Laboratories Inc., Berkeley, Calif., for plant facilities in California, $600,000.

Indianapolis Wirebound Box Co., Indianapolis, $50,000 for equipment at a plant in Texas.

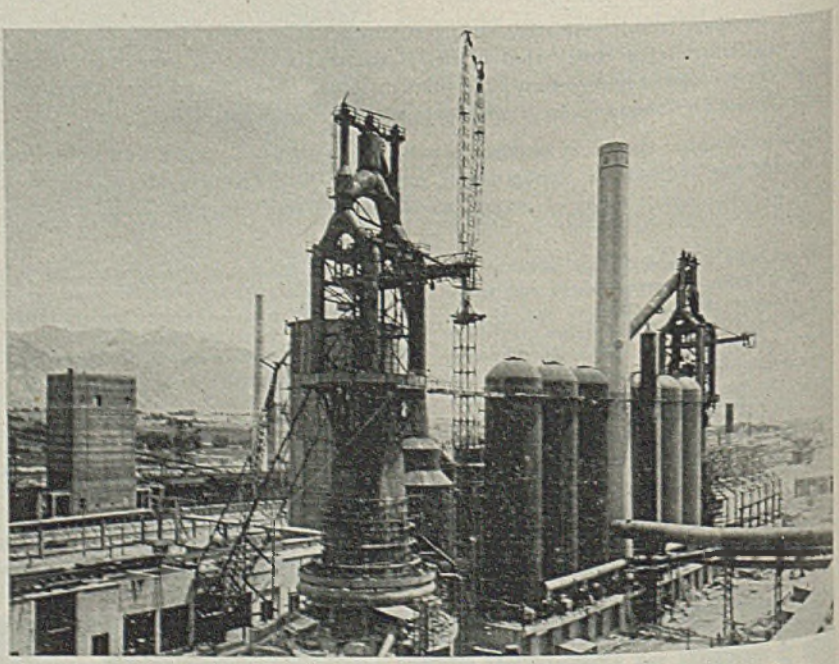
Rheem Mfg. Co., South Gate, Calif., for equipment at a plant in California, $110,000.

Lombard Iron Works Co., Augusta, Ga., $60,000 for additional equipment at a plant in Georgia.

New Pipe Line Will Take 215,000 Tons of Steel

Construction of a new 1200-mile natural gas pipeline from the southwest to the Appalachian manufacturing area for the winter of 1944-45 has been approved. War Production Board has advised the Federal Power Commission that it would issue necessary authorization for materials as soon as the commission decides whether Tennessee Gas & Transmission Co. or the Hope Natural Gas Co. will build the line.

Neither line has any substantial advantage over the other in requirements for critical materials and equipment, since both are slightly more than 1200 miles long and will require about 215,000 tons of steel. The completed line will be either 22 or 24-inch.



This close-up of No. 2 blast furnace of the Geneva Steel Works, near Provo, Utah, shows the immensity of the plant being built by Columbia Steel Co. for the government. When completed, the $180,000,000 plant will embrace more than 1600 acres

National Malleable Celebrating 75th Anniversary

Booklet portrays interesting history serving many industries such as iron and steel, railroads and mining

National Malleable & Steel Castings Co., incorporated in Cleveland in 1868 as the Cleveland Malleable Iron Co., this year is celebrating its 75th anniversary.

Founders of the company were Alfred A. Pope, John C. Coonley, J. H. Whittemore, and Bronson B. Tuttle. Other malleable iron foundries were established in Chicago, Indianapolis, and Toledo and in 1891 were combined to form the National Malleable Castings Co. Present name was adopted in 1923. A 36-page illustrated book, portraying the company's history, is being distributed to customers, stockholders and employes.

National headquarters and research laboratories are maintained in Cleveland with plants situated in Cleveland, Chicago, Indianapolis and Sharon, Pa. Sales offices are located in Cleveland, Indianapolis, Chicago, New York city, Philadelphia, St. Louis, and San Francisco.

Some of the industries served by the company are iron and steel, metal mining, coal mining, agricultural implements, pipe lines, construction, hardware and plumbing, automotive, railroads, and shipbuilding.

Officers include Henry F. Pope, chairman of the board; Charles H. McCrea, president; James A. Slater and Walton L. Moody, vice presidents; Cleve H. Pomeroy, secretary and treasurer; Wilson H. Moriarty, assistant to president, and Benjamin Nields, assistant vice president. Directors are Henry F. Pope, Charles H. McCrea, W. G. Kranz, Cleve H. Pomeroy, James A. Slater, Howard Coonley, Herbert Pope, Donald S. Tuttle, and Harris Whittemore Jr.

BRIEFS . . .

Cleveland Cap Screw Co., Cleveland, announces organization of an aircraft parts division under the direction of Howard R. Rusk.

—o—

P. R. Mallory & Co. Inc., Indianapolis, Ind., has been awarded a third star for the "E" pennant won in January, 1942.

—o—

Weirton Steel Co., Weirton, W. Va., held a labor day celebration on Sept. 4 and Sept. 6 with all branches of the armed forces represented by six men decorated for service under fire in war theatres. Outstanding feature was a patriotic pageant.

—o—

American Gear Manufacturers Association will hold its fall meeting at Edgewater Beach hotel, Chicago, Oct. 25-27.

—o—

Macwhyte Co., Kenosha, Wis., has been presented with its second Army-Navy "E" award. First award was received by the company on Nov. 21, 1942.

—o—

Dow Chemical Co. has opened additional offices in the eastern area. New York offices have been maintained for several years under the management of Ralph E. Dorland. Clayton S. Shoemaker has been appointed eastern sales manager and Frederick A. Koch, assistant.

—o—

Duraloy Co., Scottdale, Pa., producer of static and centrifugal high alloy castings, announces appointment of Robert Onan as sales representative in Chicago and Kilsby & Graham as agents in the California area.

—o—

Metallizing Co. of America announces purchase of a building at 135 Cedar street, New York city, for eastern sales headquarters and service operations in that area.

—o—

Mills Industries Inc., Chicago, is the newly adopted corporate name of the Mills Novelty Co., effective Sept. 1.

—o—

Webster-Brinkley Co. was presented an additional gold star for its "M" burgee on Aug. 25.

—o—

Craft Mfg. Co., Chicago, announces removal of general offices and factory to 3949 W. Schubert avenue, Chicago.

—o—

Tulsa Chemical Co. was incorporated July 1 with headquarters at Tulsa, Okla. Interest in the company is divided among the Pennsylvania Salt Mfg. Co., Philadelphia, Mahoning Mining Co., Rosiclare, Ill., and Ozark Chemical Co., Tulsa.

—o—

Westinghouse Electric & Mfg. Co., Pittsburgh, has leased a three story building at 24 Warren place, Newark, N. J. It contains 10,000 square feet of space and will be used by the motor division.

—o—

Republic Steel Corp., Cleveland, announces purchase of the Everhard Mfg. Co., Camden avenue and Seventh street, S. W., Canton, O. The company is a producer of window screens and storm windows. It is entirely engaged in war production for the Army and Navy.

—o—

Coulter-Sibbett Steel Co. has been appointed distributor of Timken graphitic steels in Arizona and southern California, according to announcement by the Steel and Tube division, Timken Roller Bearing Co., Canton, O. Office and warehouse are located at 1801 East Slauson, Los Angeles, 11, Calif.

—o—

Earle M. Jorgensen Co., distributors of Timken graphitic steel in Texas and Oklahoma, have expanded their activities to include sale of graphitic steel in Arizona and Southern California.

Production Awards Granted To More Industrial Plants

Additional metalworking and metal-producing plants have won Army-Navy production awards for outstanding performance in war production. Plants honored follow:

Aro Equipment Corp., Cleveland.
Barlow & Seelig Mfg. Co., Ripon, Wis.
E. J. Brach & Sons, Chicago.
Chicago Telephone Supply Co., Elkhart, Ind.
Coast Centerless Grinding Co., Los Angeles.
Ferro Machine & Foundry Co., Cleveland.
Great Lakes Spring Corp., Chicago.
Infilco Inc., Chicago.
Le Roi Co., West Allis, Wis.
Micro Switch Corp., Freeport, Ill.
Nash-Kelvinator Corp., Lansing, Mich.
National Union Radio Corp., Newark, N. J.
Pfaudler Co., Elyria, O.
Babcock & Wilcox Co., Alliance, O.
Central California War Industries Inc., Fresno, Calif.
Craftsweld Equipment Co., Long Island City, N. Y.
Hamilton Foundry & Machine Co., Hamilton, O.
Hazeltine Electronics Corp., Long Island, N. Y.
Herman Pneumatic Machine Co., Zelienople, Pa.
King Machine Tool Co., Cincinnati, O.
McGraw Electric Co., Elgin, Ill.
Midwest Piping & Supply Co., Los Angeles.
Minneapolis Electric Steel Castings Co., Minneapolis, Minn.
Shenango-Penn Mold Co., Dover, O.
Twin Disc Clutch Co., Racine, Wis.
Warren Steam Pump Co., Warren, Mass.

Sellstrom Mfg. Co. Celebrates Anniversary

Sellstrom Mfg. Co., Chicago, organized in 1923 under the presidency of the late G. A. Peterson, celebrated its twentieth anniversary of business with a noon-day luncheon for management and employes.

The company occupies a six story building where it manufactures and distributes a complete line of safety equipment for eyes and face such as goggles, helmets, shields, lenses, respirators and similar products. G. E. Sellstrom is president of the company.

DYNAMIC LOS ANGELES PLANS FOR THE FUTURE

Area, now fifth industrially in the nation, moving ahead with aggressive plan for adapting war-swollen economy to peacetime role. . . Seeks efficient development of region's natural resources, greater manufacturing self-sufficiency

By A. H. ALLEN
Associate Editor, STEEL

"DYNAMIC metropolitan Los Angeles is the capital of the western civilization," modestly proclaims the Los Angeles Chamber of Commerce, adding that "industrial development in Los Angeles county has been a march of giants. The area now ranks in the first five of the nation, and contains more branch plants of nationally known manufacturers than any other metropolitan district of the west."

If you can tone down the hoop-la a little, the statements probably are factually correct, but like the rest of the West Coast, Los Angeles sees plenty of shoals ahead, and is taking steps now to circumnavigate them.

If you doubt the industrial potency of Los Angeles county today, the industrial department of the Chamber of Commerce will throw figures at you until you're dizzy. Ninety-nine million dollars worth of new plants built in 1942. Second area in the country with respect to volume of war contract backlogs. Fifth industrial county in the United States. Formerly second only to Akron, O., in manufacture of rubber tires. Fifty-five synthetic rubber projects now under way. Sixty aluminum foundries. Sixty-four plastic molding companies. Two aluminum extrusion plants and one reduction plant. A total of 5800 manufacturing plants, with 5000 member companies in the chamber. Roughly 1000 prime and subcontractors in the aviation business, employing over 300,000. Seventy thousand workers in shipyards. And so on.

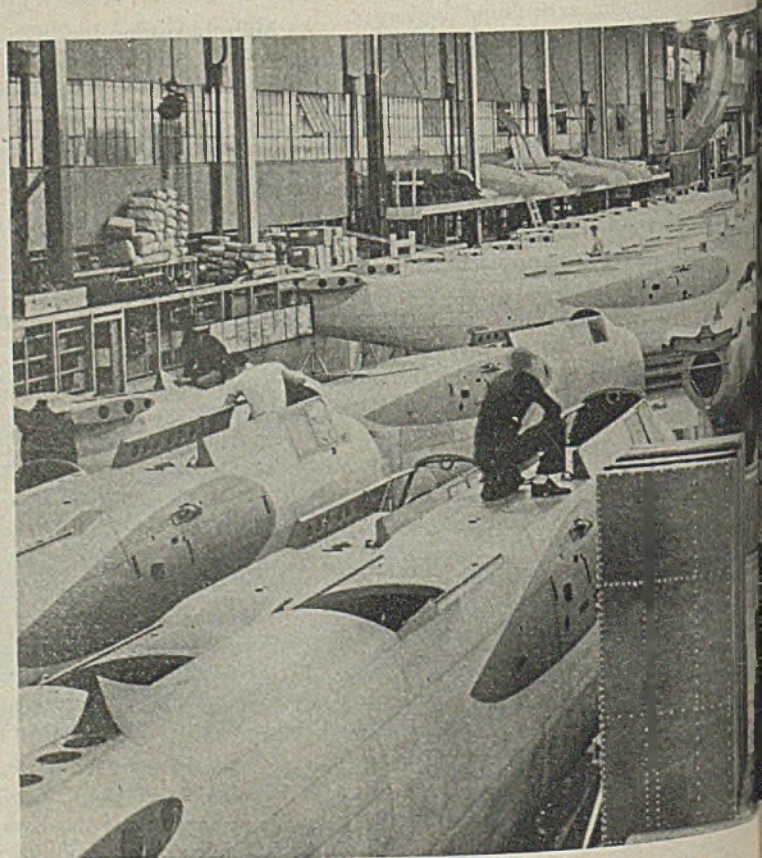
These are cold hard facts. You can laugh all you want about the braggadocio of the Los Angeles Chamber of Commerce, the liquid sunshine, the high fogs and the city limits signs in Arizona, but there is one fact that is inescapable: The chamber is a well-organized, driving force in all phases of progress in southern California—cultural and industrial—to a far greater extent than similar bodies in any eastern or middle western city. The results of this aggressive policy speak for themselves. Even now the industrial department of the chamber under direction of James F. Bone is well along on a concrete, positive plan for maintaining some semblance of current industrial activity in postwar years, attracting new industries to the area, and in particular building up more basic industries to supply materials and equipment formerly brought in from other sections of the country.

It may be of interest to sketch the outlines of the industrial development plan drawn up by Bone and his associates for Los Angeles county. Essentially the plan looks toward enabling the community to do a better war production job and secondly toward working with industrial prospects who are looking ahead and considering factory locations for the manufacture of goods under a civilian economy—in other words, a blueprint for action.

Basic policy of the program has 11 phases, as follows:

1. To promote industries necessary for the balanced economic development of the country and its trade area.

2. To promote efficient and economical use of all natural resources available in



the Southwest through the industrial extraction, refining, processing and fabrication of these resources.

3. To seek, foster and co-operate with research laboratories of universities, government and private foundations looking toward the development of new techniques in the treatment of basic resources and local materials.

4. (And this is an important one). To discover products for which a market exists in southern California but which are not produced there; to determine if such products can be made there economically and if so to call these opportunities first to the attention of manufacturers already operating in the area. Failing to find interest locally it is proposed to call these opportunities to the attention of manufacturers elsewhere who may be interested in capitalizing on them.

5. To seek continuously the development of industries producing basic materials and equipment utilized by industry, thus helping to lower the manufacturing costs of fabricators already operating in the area, thereby placing them in a position to extend their markets.

6. To encourage proper utilization of industrial real estate within the county, thereby maintaining property values and tax revenues.

7. To avoid subsidy of new industry through such devices as free sites, promotional financing, tax exemptions and the use of the chamber's name in financing operations.

8. To encourage and foster vocational training and protect the right of labor to work without prejudice to its interests by virtue of membership or lack of membership in any union. (Los Angeles, in contrast to other Coast cities, is largely an open-shop area, and its business men feel most keenly about organizational incursions such as the UAW-CIO has attempted in the aircraft plants with almost no success. Freedom of business and industry from widespread unionization has meant lower living costs in Los Angeles, but of course labor is quick to pick up this fact as pointing to subnormal wage levels.)

9. To oppose any legislation detrimental to the development of industry coming within the confines of these enunciated policies.

10. To utilize and capitalize on the rail, water, motor truck and air transportation facilities serving the county. (Here is a neat blanketing of the transportation question which avoids laying the cham-

At right is pictured a street scene in one of the busiest business sections of Los Angeles. The area ranks fifth in the nation industrially

Below is an interior view of one of the many airplane plants in the Los Angeles area. More than 200,000 persons are employed by aircraft plants in the Los Angeles area

ber open to charges of favoritism.)

11. To work toward the reduction of trade barriers existing between states and the discouragement of the erection of additional barriers between states.

Not mentioned in this Magna Charta for the future, still obviously an important factor is the encouragement of foreign trade around the Pacific rim for West Coast producers. If Los Angeles industry is to enhance its stature further, it must either compete successfully in eastern and middle western markets, or it must reach out for the lion's share of markets for consumer goods which are foreseen among nations bordering the Pacific ocean north and south.

Going a little further, the chamber has prepared detailed lists of materials available locally to Los Angeles, or available by rail or water import. Probing into the nature of present leading industries, it is seen that the Los Angeles area has concentrated in producing creature comforts, and has been characterized largely by the assembly and fabrication of materials into articles of high value rather than the processing and refinement of raw materials and natural resources. Motion pictures, sportswear, cosmetics, automobiles, petroleum products, tires, and tubes, furniture, airplanes, specialty food products, electrical appliances, pottery, dinnerware and art goods —these are the lines in which Los Angeles has directed the bulk of its industrial effort; that is, just prior to the present all-out war production. Markets have been extended by building original style, form or utility into products to create a buying urge. But this business is continually faced with loss of eastern trade because manufacturers there soon copy original Los Angeles products and undersell the West Coast suppliers.

Thus, the problem becomes one of finding ways and means to reduce the costs of West Coast producers without lowering wages, and the best way to do this appears to be the development of more basic industries utilizing materials and resources available in the Southwest. Here is the principal field for potential postwar progress all along the West Coast.

Lacks Basic Industries

What are these basic industries lacking in Los Angeles county, for example? Well, here is a list of a few types of plants in this category: Abrasives, hydrochloric and nitric acids, alumina preparation, aluminum sheet rolling, copper refinery, rolling and wire mills; cork, cotton mill, textile printing, ferroalloys, plate glass, window glass, hydrogen peroxide, lead smelter, lithopone, magnesium refinery and extrusion equipment, cast iron pipe foundry, seamless steel pipe, plastic powders, rayon mill and rayon weaving equipment, synthetic (alcohol) rubber plant, silk mill, tool steel mill, tannery, tin plate, tin smelter, titanium pigments, woolen mill, white lead, wire mill, zinc smelter.

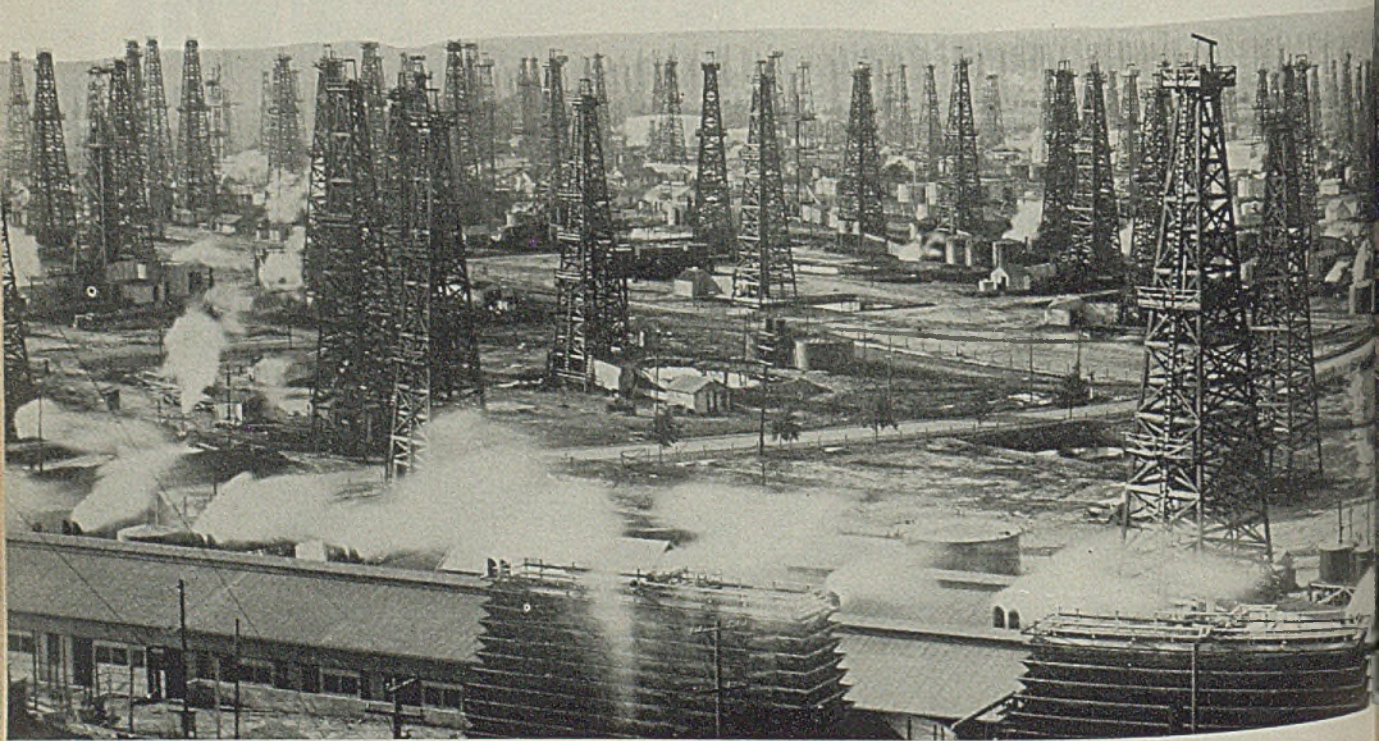
Take a look now at some of the industrial materials and supplies used in quantity by Los Angeles manufacturers but not produced there. They include: Barium carbonate, dry batteries, bearings, small bolts and nuts, fancy bottles, buttons, milk and ice cream cans, calcium carbide, carboys, chalk, metal and 19 fiber conduit, drill bits, electric light bulbs, fluorescent lighting tubes, glass brick and blocks, grinding wheels, furniture and refrigerator hardware, hinges, pole-line hardware, lead foil, mohair, nails, pigments, sandpaper, wood screws, thread, tin foil, machining tools, carpenters' tools, metal collapsible tubes and zinc oxide.

In preferred position because of their more pressing need, particularly since they relate to present war contracts, are the following new plant possibilities: Aluminum sheet rolling, airplane and marine engines, ferromanganese, ferrotungsten, magnesium extrusions and forgings, plastic powders and sheets, plywood, propellers, guayule rubber, tool steel and tools for machining operations.

This exploratory work by the Chamber of Commerce has been well received by Los Angeles industry. Already more detailed surveys are being conducted for at least 20 companies now engaged in war production work, principally aviation, seeking to line up specific types of manufacturing and products to which these plants can be converted when war orders dwindle.

The five principal airframe manufacturers—Douglas at Santa Monica, El Segundo and Long Beach; North American at Inglewood; Vultee at Downey; Lockheed and Vega at Burbank, and

Tankers and tank cars shuttle northward along the Pacific coast with their cargoes of petroleum products obtained from such rich fields as this one located in southern California. California is regarded as the oil reservoir of the west but reserves are declining



Northrop at Hawthorne—know that the present inordinately high level of aircraft production will hit the skids probably the moment Germany and Italy are beaten. They realize that while a measure of airplane production will be continued for the Army and Navy, and for foreign governments, it will be in no wise possible to keep better than 200,000 men and women on the payrolls unless some types of consumer goods manufacture can be undertaken. So they are looking over the field with large magnifying glasses.

Lookheed-Vega is said to have explored the possibilities of manufacturing over 140 types of consumer products, and the company's recent acquisition of Pacific Finance Co. lends credence to plans for mass production and selling of some type of consumers goods. Other market research staffs are studying electric typewriters, washing machines, stoves, refrigerators, automobiles, whatnot, in the effort to have something ready to put into production when the war load eases. But the principal problem will not be so much one of manufacturing as it will be sales and distribution. After all, a warehouse full of 1,000,000 new low-cost air conditioning units means little if there is no merchandising program ready to line up dealers and customers to take the product.

Postwar shipbuilding may be slated for the skids on the Coast but another California industry—oil and its by-products—seems destined for marked acceleration. California is the oil reservoir for the West and even now tankers and tank car trains shuttle back and forth from southern California to the various cities northward with cargoes of petroleum. The fields at Signal Hill, Venice and other sections around Los Angeles, with their thousands of wood and steel derricks dotting the landscape, have been landmarks for years. Back in the good old days of 1930 these wells pumped over 135,000,000 barrels of crude annually; they are now down well under 100,000,000 barrels annually, or about one-third of the total production for California.

Oil Reserves Declining

But the sad story on oil is that reserves are petering out, now being set at only 10 to 15 years. H. D. Collier, president, Standard of California, is quoted as saying that within five years California will have to be importing 150,000 barrels a day or at a rate of 50,000,000 barrels a year. Other oil company executives agree that the banner years of crude production (and consumption, too, for that matter) are past in California.

Coincident with this startling news is the shifting of oil production, refining and by-product manufacture from southern California to the San Francisco Bay area where a booming industrial chemicals industry based on petroleum is in the making.

Standard of California says it is processing about half the crude oil in California north of the Tehachapi range which divides southern California from the Bay area. Even oil from fields at Bakersfield and Taft, nearer to Los Angeles than to San Francisco, is being pumped into the Bay region because it is less expensive to do so than to push it up over the Tehachapi and down to Los Angeles. Many astute industrialists think new developments in petroleum technology will do more to rescue the postwar West Coast than all the planning which aggressive committees can now conceive. Paint bases, industrial solvents, plastic powders, fertilizers, synthetic rubbers—these and many other new materials will spring from advanced techniques in processing of petroleum, and San Francisco will be a focal point in their supply.

In respect to general living and working conditions, a hot spot on the West Coast is San Diego which has experienced a population increase of just about 100 per cent since 1940. The present total is close to 400,000. Most of this increase is the result of expanded operations at Consolidated Vultee Aircraft which operates two huge plants about a mile apart on opposite sides of Pacific Highway. On top of the boom at Consolidated thousands more have come into the area in connection with activity at naval and marine bases. The quiet restfulness of San Diego which used to attract retired millionares has been rudely shattered if not completely dissipated.

Numerous agencies in addition to the Los Angeles Chamber of Commerce are vigorously attacking the postwar problem of Los Angeles and the entire West Coast. The United States Chamber of Commerce, trade associations, individual industries, and organizations like Paul Hoffman's Committee for Economic Development are all busy.

Expenditure of $142,000,000 and employment of an average 70,000 for the first six years after the war is envisioned by the Los Angeles city council which has approved its engineer's survey report calling for disbursement of $36,000,000 on public works the first year after the war when the need for jobs will be at a peak, and $106,000,000 over the next five years.

Crowded with Industrial Workers

Of a few things the West Coast can be sure. The war's end will see a plethora of people, plants and materials ready and waiting on the West Coast. The swollen ranks of industrial workers will be difficult to dissipate, many of them already having purchased new homes and settled on the Coast for good. A moderate climate and the scenic beauty of the region are powerful magnets to counteract occasional homesickness. California alone will have 340,000 returning soldiers. Hundreds of thousands of other service men whose homes are in other parts of the country but who have been stationed on the West Coast doubtless will decide to stay there and make their fortunes. The sprawling aircraft plants, shipyards, aluminum and magnesium plants, hydro-electric projects, foundries and other war-built enterprises will still be there.

What the formula is for compounding men, machines and materials into peacetime prosperity no one knows, but one can be sure the aggressive spirit and dynamic drive of western industrial leaders will be seeking it out, and the chances are good they may find it.

This article is the fourth of a series. The fifth will appear next week.

Output Gains Hinge on Improved Labor Supply

LITTLE change in industrial activity occurred during the latest weekly period. Steel ingot production remained at record levels on a tonnage basis, limited only by necessary open-hearth furnace repairs; bituminous coal output and engineering construction receded moderately; truck and automobile assemblies recorded a slight gain, and electric power consumption established a new all-time record. Revenue freight carloadings registered a small increase to reach the highest level attained this year.

Key war plants are continuing to encounter difficulty in expanding output because of manpower shortages, while scarcity of critical materials is hampering production in some instances.

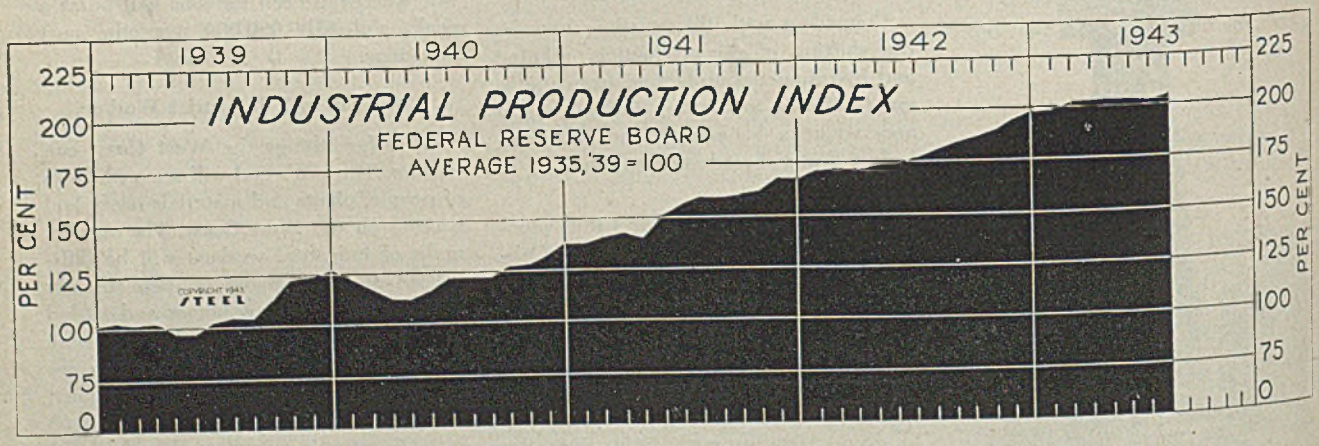
CONSTRUCTION—While both public and private construction activity has declined sharply this year, building firms are shaping plans for postwar activity. F. W. Dodge Corp. predicts an increase of 30 per cent in new industrial plant construction in the ten years after the war, compared with the prewar decade. Postwar housing construction is expected to be three times the volume of the depression-restricted decade of the thirties.

Building construction during July recorded the fifth consecutive monthly decline to $183.7 million. With the exception of residential building, construction in each of the major classifications declined in the latest period.

Bookings of fabricated structural steel during July of 63,220 tons were slightly more than half that recorded in the like period last year, and represented a sharp decline from the June total of 100,427 tons. Fabricated structural steel shipments recorded the fourth consecutive monthly decline, with 60,962 tons for July, compared with 81,843 in June and 189,937 in like month a year ago. Tonnage available for future fabrication as of July 31 totaled 286,279 tons. This is in sharp contrast with 808,600 tons on like date a year ago.

JULY PRODUCTION—A new peak in industrial output occurred during July, following a moderate decline in the preceding month. Both changes were ascribed largely to fluctuations in bituminous coal output. The Federal Reserve Board's index of industrial activity rose three points during July to a new high of 205; a year ago the index stood at 178. Reflecting the improved coal supply situation, the board's index of iron and steel output for July was up two points to 203. The index registering activity in nonferrous metals and products was off six points during July to 189.

In manufacturing industries output of most durable products continued to increase throughout July, reflecting a rise of three per cent in production of munitions. WPB index figure on munitions output stood at 593 for July, compared with 339 recorded in the corresponding period last year.



FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	98.5	98.5	98.0	98.0
Electric Power Distributed (million kilowatt hours)	4,322	4,265	4,227	3,640
Bituminous Coal Production (daily av.—1000 tons)	1,992	2,017	1,983	1,844
Petroleum Production (daily av.—1000 bbls.)	4,218	4,239	4,119	3,972
Construction Volume (ENR—unit $1,000,000)	$40.6	$41.6	$41.2	$217.8
Automobile and Truck Output (Ward's—number units)	20,055	19,820	19,900	21,100

*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	895†	891	886	899
Business Failures (Dun & Bradstreet, number)	45	54	48	147
Money in Circulation (in millions of dollars)‡	$18,303	$18,241	$17,799	$13,057
Department Store Sales (change from like week a year ago)‡	+4%	+7%	+20%	None

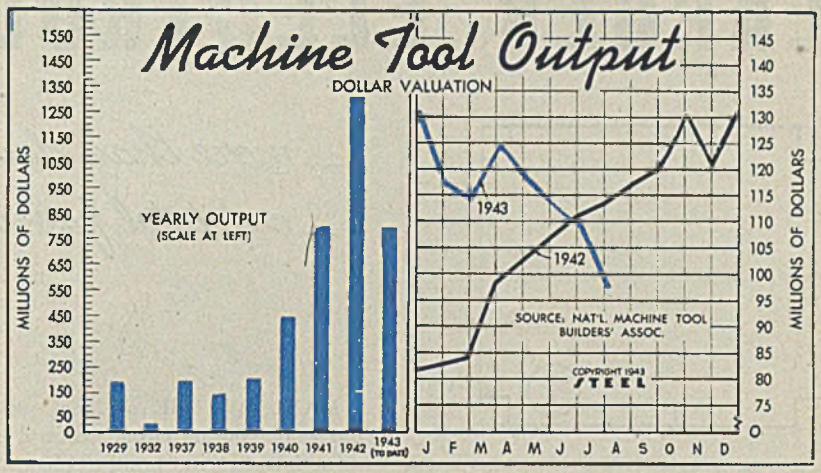
†Preliminary. ‡Federal Reserve Board.

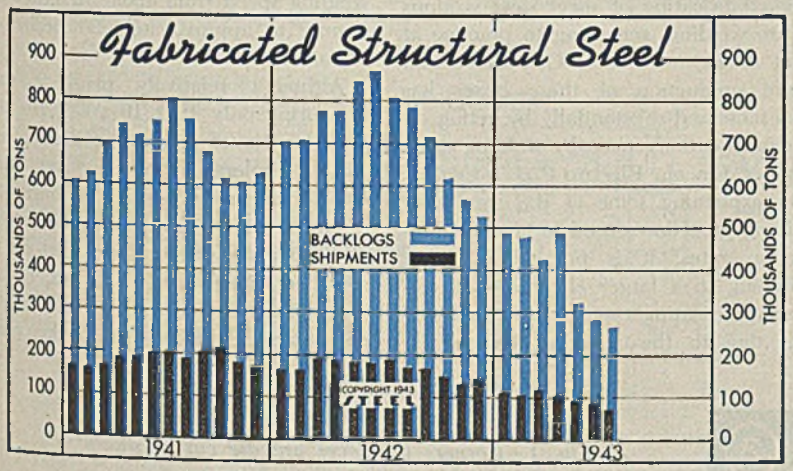
Machine Tool Output

(000 omitted)

	1943	1942	1941
Jan.	$117,384	$83,547	$50,700
Feb.	114,593	84,432	54,000
Mar.	125,445	98,358	57,400
Apr.	118,031	103,364	60,300
May	113,710	107,297	60,800
June	108,689	111,090	69,070
July	97,428	113,596	63,019
Aug.	.....	117,342	70,069
Sept.	.....	119,883	74,906
Oct.	.....	130,008	84,178
Nov.	.....	120,871	81,320
Dec.	.....	131,960	81,435

Year	
1942	1,321,862
1941	812,462
1940	450,000
1939	210,000





Fabricated Structural Steel†

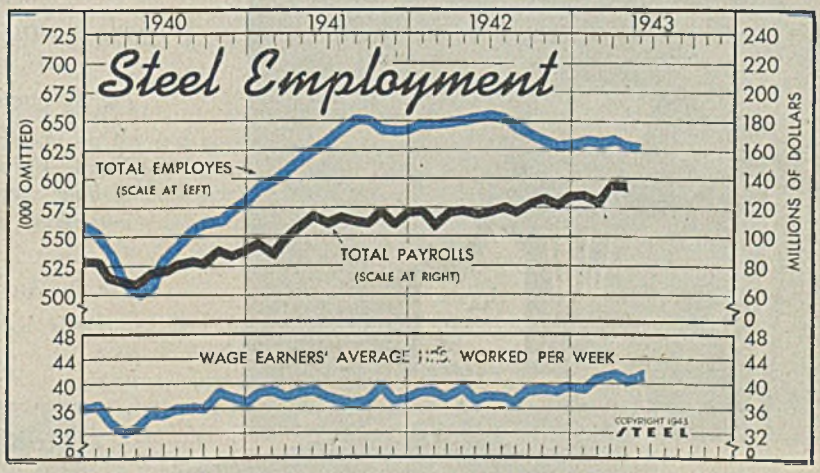
(1000 tons)

	Shipments			Backlogs		
	1943	1942	1941	1943	1942	1941
Jan.	109.9	167.8	164.6	489.3	704.4	601.5
Feb.	109.1	164.6	161.4	475.6	706.7	624.2
Mar.	113.3	191.3	170.2	424.4	777.7	697.2
Apr.	102.5	187.2	189.8	385.3	772.4	741.9
May	94.9	184.2	191.9	306.6	843.8	718.9
June	81.8	182.7	200.5	290.3	869.8	747.4
July	61.0	189.9	203.0	286.3	808.6	802.7
Aug.	.....	173.9	189.3	.....	783.5	754.5
Sept.	.....	169.8	204.1	.....	716.0	678.5
Oct.	.....	152.9	217.7	.....	617.7	614.4
Nov.	.....	130.4	182.6	.....	566.6	602.9
Dec.	.....	145.3	176.1	.....	523.5	626.0

†Source: American Institute of Steel Construction.

Steel Employment

	Employes—Number (000 omitted)		Total Payrolls (Unit—$1,000,000)	
	1943	1942	1943	1942
Jan.	637	651	129.7	118.8
Feb.	635	651	122.8	108.5
Mar.	637	653	136.8	117.0
Apr.	634	654	133.3	118.5
May	632	656	137.4	117.4
June	631	659	136.2	118.0
July	.....	655	.....	120.7
Aug.	.....	647	.....	118.7
Sept.	.....	641	.....	124.8
Oct.	.....	635	.....	126.6
Nov.	.....	632	.....	122.8
Dec.	.....	633	.....	129.3



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—billions)	$7,446	$8.335	$7,936	$6,232
Federal Gross Debt (billions)	$147.6	$147.3	$144.8	$85.8
Bond Volume, NYSE (millions)	$28.6	$34.1	$70.1	$43.4
Stock Sales, NYSE (000)	2,698	2,941	8,162	1,788
Loans and Investments (millions)†	$47,040	$46,899	$46,612	$34,517
United States Government Obligations Held (millions)†	$34,574	$34,437	$32,510	$20,425

†Member banks, Federal Reserve System.

PRICES

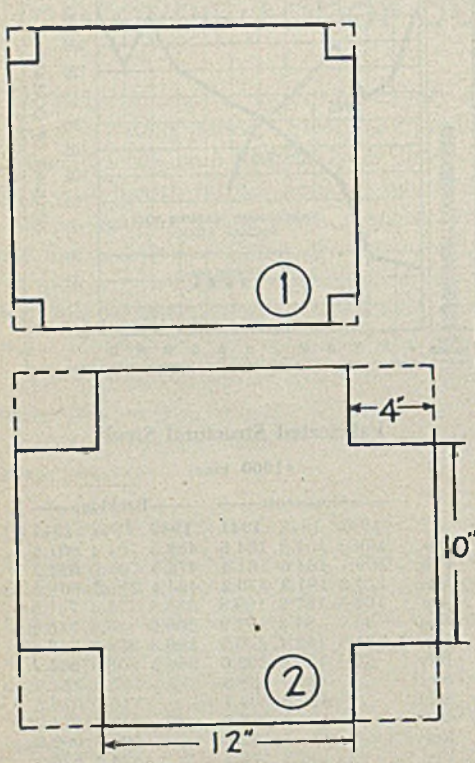
STEEL's composite finished steel price average	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items)†	246.9	245.2	243.8	231.1
Industrial Raw Materials (Bureau of Labor index)‡	112.7	112.3	113.3	101.0
Manufactured Products (Bureau of Labor index)‡	100.0	100.0	99.8	99.1

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

LARGER ELECTRODES . . . .

..more than double welding speed ..cut total fabricating time by 30 per cent

By GEORGE WOOD
Plant Superintendent
Bryant Heater Co.
Cleveland

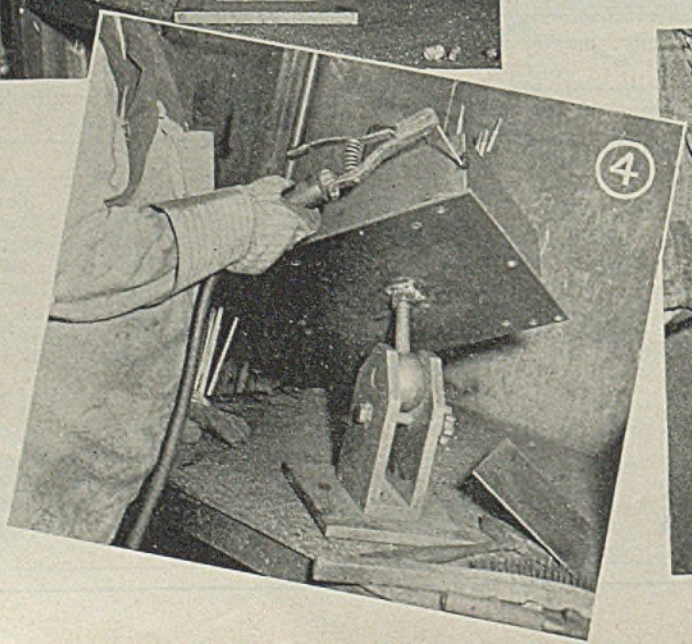


MANUFACTURE of large size fuse boxes for housing electric control equipment for vital gun-firing mechanisms involves fabricating of sheet steel sections by arc welding, according to practice at plant of Bryant Heater Co., Cleveland. There production of these boxes has been increased substantially by acting on recommendations made by welding engineers of Lincoln Electric Co.

In explaining some of the significant welding procedures used to increase production rates, it is pointed out that switching to a larger electrode size reduced fabricating time by about 30 per cent due to the resulting increase in welding speed from about 12 inches per minute to approximately 30 inches per minute.

Although relatively small in size, measuring only 12 x 10 x 4 inches, the fuse box is of interesting design, (see Fig. 6), tolerances of plus and minus 0.030-inch being required throughout.

Metal for the box proper consists of 47-S-10 plain carbon sheet steel cut to specified dimensions. The box, of 13-gage, and cover of 12-gage, are die cut as shown in Figs. 1 and 2, then press



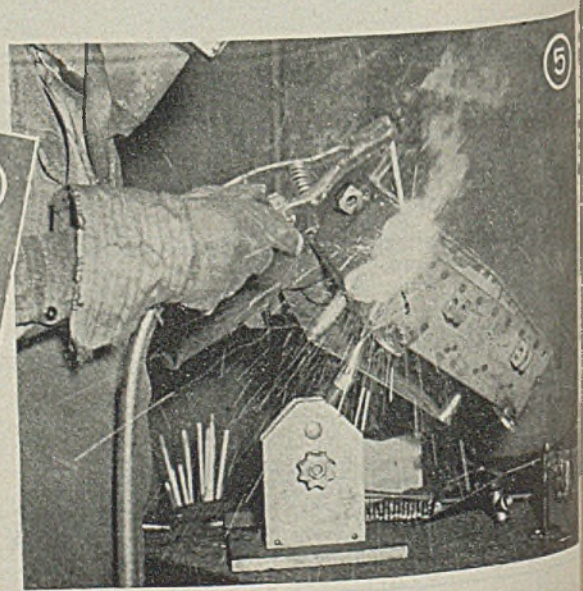


Fig. 1—Corners for cover are die cut as shown here prior to forming box cover

Fig. 2—Die cut flat sheet of 13-gage, 47-S-10 steel, prior to forming into box shape

Fig. 3—Intermittent welding technique used to fuse mounting straps to the box

Fig. 4—Corner welding seams of fuse box. Specially built positioner of ball and socket type permits tilting the work to the most effective position for depositing metal

Fig. 5—Arc welding cover bolt brackets—two to each side of the fuse box

formed to shape, producing a minimum number and length of seams to be arc welded. Only the four short corner joints are welded, the four bottom corners being obtained by bending.

After forming the box, the sides are first joined with a single tack weld at each of the four corners to retain the true shape in handling during subsequent welding operations.

Brackets and lugs are then spot welded in place—a total of 16 brackets being required for the box and 8 lugs for the cover. Correct positioning of these parts is obtained by means of special fixtures, one of which clamps to the sides of the box and one to the cover. Openings in these fixtures accommodate each box bracket, both inside and outside the box, and each of the cover lugs. Thus these parts are quickly located in position yet held to exact specifications.

In addition to the brackets and lugs, Z-angle strips of 16-gage mild steel are mounted inside the box, running the full length of each of the four sides near the top edge. This Z-channel forms a groove for installing the rubber gasket which will be explained later. A special clamping fixture is also used for positioning these strips prior to spot welding.

Parts Within Operator's Reach

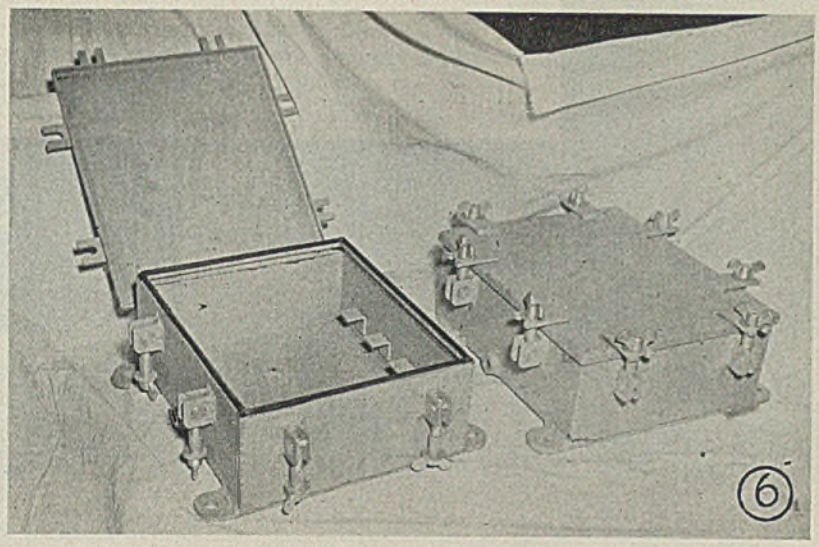
Individual containers holding each separate kind of bracket, lug and length of Z-angle strip are located within convenient reach of the operator to facilitate this phase of the work.

When the units reach the arc welding operations, all component parts are in place, ready for final fabrication.

In each of the successive arc welding operations the same basic work positioner is used to effect maximum speed and efficiency, but demountable fixtures for holding the work are provided for each specific phase of the job.

Construction details of this unique work positioning unit are clearly shown in Fig. 4. It consists of a 3-inch diameter steel ball mounted between ¼-inch steel plates attached vertically to a flat base of the same metal. The threaded shaft extending from the ball can be tilted to any desired angle by simply loosening the handwheel at the side of one of the vertical pieces, adjusting the shaft and ball to the correct angle, then clamping the ball into a fixed position by tightening the handwheel. Each fixture has a threaded nut or coupling attached to the underside so that it can easily be attached to the threaded shaft. Thus the work can be rotated quickly for arc welding on any side or corner of the box or cover.

In the first arc welding operation, illustrated in Fig. 3, the two main mounting brackets are being fused to the bottom of the box. Positioning of these



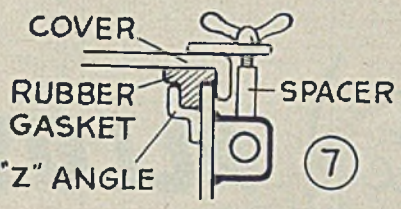


Fig. 6—"Open" and "closed" views of all-welded fuse box. Closed box shows method of clamping cover to make structure water-tight

Fig. 7—Cross section showing water and air-tight seal at cover with clamping arrangement

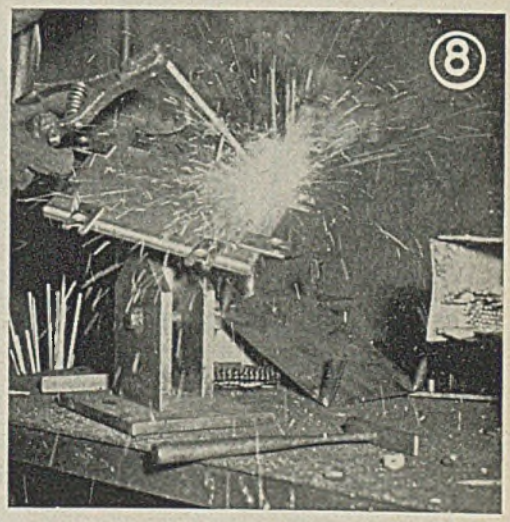


Fig. 8—Putting the finishing weld on the last cover bolt lug. Same type of positioning jig with different removable top fixtures is used throughout the operations

pieces is accomplished by laying each of the flat pieces of 3/16-inch bar stock parallel along two opposite sides of the box bottom and placing four intermittent welds along each side of the bar. Bars are 1¾ inches wide and 13 inches long.

The work is positioned at about a 30-degree angle as shown and welded downhand using 3/16-inch shielded arc electrode. This size electrode results in greater speed and efficiency compared with the ⅛-inch diameter size formerly used. Welding current is set at about 270 amperes.

Since the bar stock is considerably thicker than the sheet forming the box, the electric arc is directed more toward the bar stock in order to get desired penetration without burn-through in the thinner, 13-gage steel of the box itself.

In this instance, the demountable fixture for the positioner is a plate which slips inside the box, permitting the work to be tilted at any angle.

Prior to welding along the under-side as shown in Fig. 3, the mounting brackets, or straps, are arc welded along their top-side to the side of the box and across the width of the strap, thus securing them in position for the final welds as previously described.

In welding the corner joints for the box, the holding fixture shown in Fig. 4 is used. It is made up of a steel plate section with an outside diameter larger than that of the box. In this case, a nut was welded to the bottom center of the fixture for attaching it to the threaded shaft of the positioner. This detail is clearly shown in Fig. 4. The box is held to the flat surface of the fixture by means of two studs set in the top of the plate and fitting through the hole in each end of one of the mounting straps.

Here again, the work is slanted at about 30 degrees and the seam is welded downhand, using the recommended 5/32-inch electrode with current set at 180 amperes. Formerly, ⅛-inch electrodes were used for this operation with propor-

(*Please turn to Page* 141)

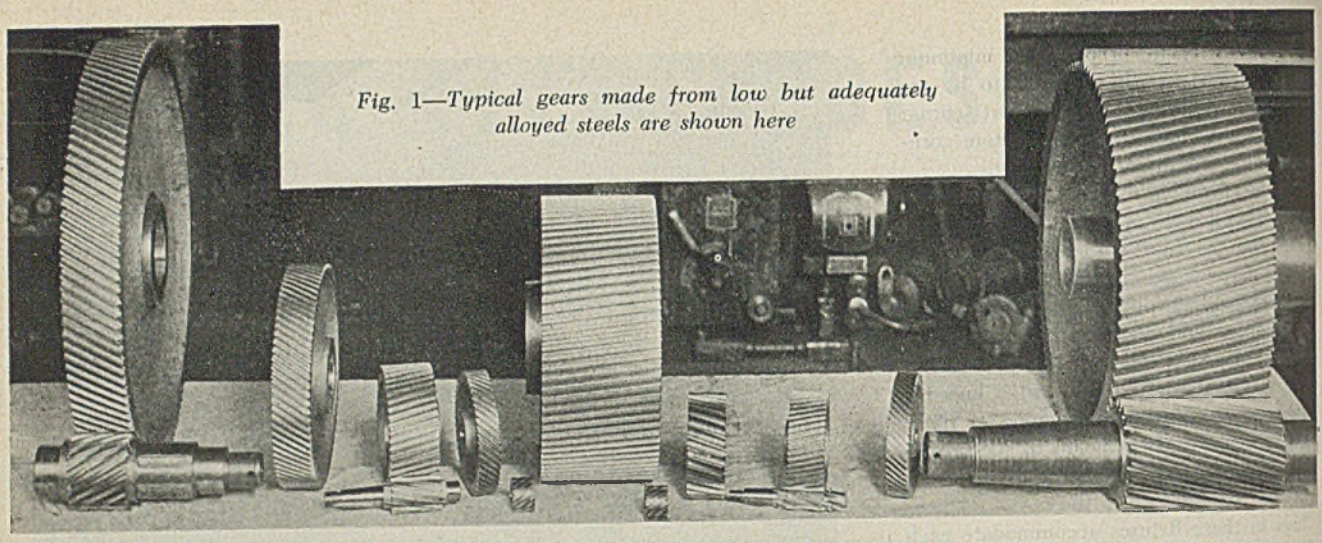


Fig. 1—Typical gears made from low but adequately alloyed steels are shown here

User Report No. 19 on Experience with . . . .

By E. J. WELLAUER
Supervisor
Research and Metallurgy
The Falk Corp.
Milwaukee

NE (National Emergency) ALLOY STEELS

Low but adequately alloyed steels have been used for industrial purposes well over 15 years. They have been employed by this company for more than 10 years. This experience forms the background for the discussion presented here concerning steels for use in industrial gearing

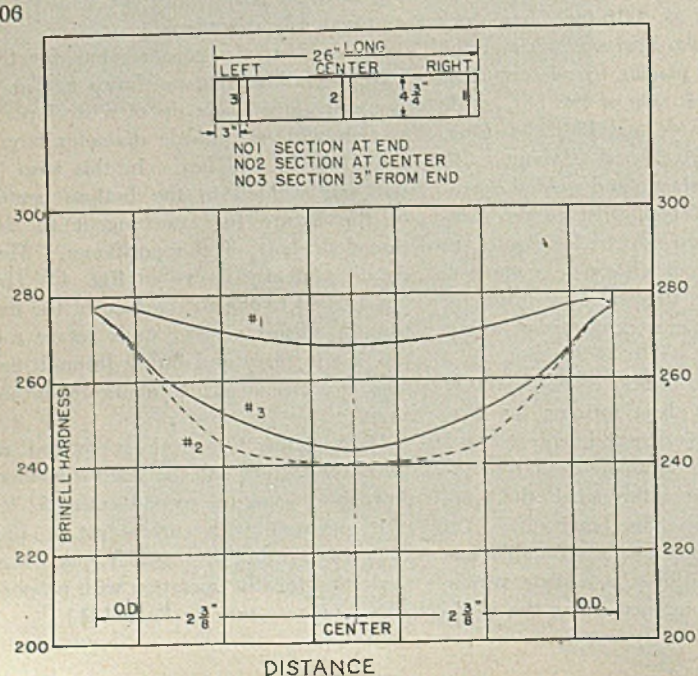
THE OLD ADAGE that there is no "new idea without a pedigree" has a pertinent application to the present use of the so-called lean alloy NE (National Emergency) steels. As a matter of fact, similar steels comparable in analysis, both as to alloys present and total alloy content, have been used for industrial purposes for well over 15 years.

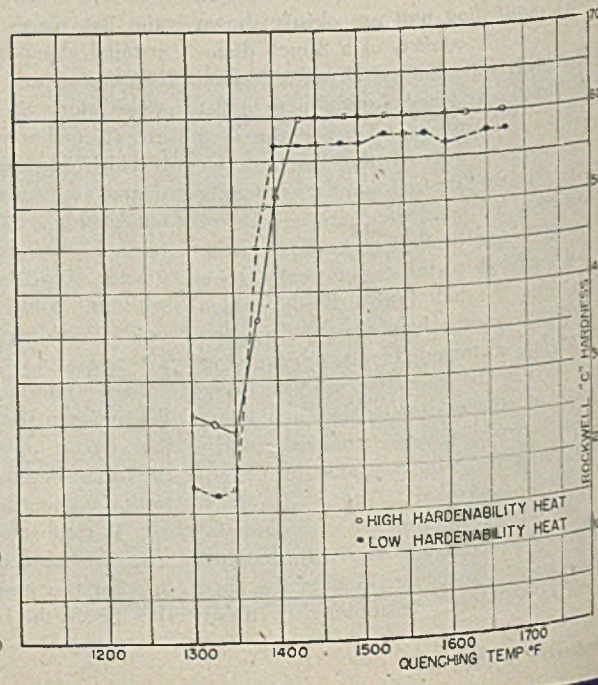
The following discussion covers over 10 years of experience with low alloy steels used for thousands of industrial gears particularly of the commercial and speed reducer types. Typical examples are shown in Fig. 1.

In selecting an alloy composition it was necessary to provide a steel capable of being heat treated to between 115,000 and 180,000 pounds per square inch tensile strength, and possessing a fairly high ratio of yield to ultimate strength. The steel had to be capable of being

Fig. 2. (Left, below)—Transverse hardness values in manganese-chromium-molybdenum steel

Fig. 3. (Right)—Water quench-out test, small specimens of manganese-chromium-molybdenum steel





treated in sections up to 4 inches diameter at the higher tensiles and up to 8 inches diameter at the lower tensiles.

The steel had to harden adequately when subjected to an oil quench used to minimize warpage and the hazard of cracking when variations in diameter occurred.

The performance of commercial gearing is primarily dependent upon the accuracy and tooth profile finish, therefore, excellent machinability is of the utmost importance. To obtain the high order of accuracy, it is usually necessary to cut after heat treatment. This is a definite problem where the hardness is 360 brinell or higher. Experience with standard SAE analyses indicated inadequate machinability and it was initially decided that some progress might be made with sulphurized steels.

Hardenability Only Difficult Factor

To obtain good wearing properties along with adequate hardenability, it was thought desirable to depend upon high carbon with additions of such carbide formers as manganese, chromium and molybdenum. A survey of available steels showed that material could be had from several sources, with analyses in the ranges shown below in per cent:

Carbon	0.35—0.50
Manganese	0.85—1.50
Chromium	0.30—0.85
Molybdenum	0.10—0.30
Sulphur	0.05—0.14

Steels having compositions within these ranges were used for several years, and the difficulties encountered pointed the way for adjustments to improve the performance. As might be expected, the only major difficulty experienced was hardenability. It was found that the carbon had to be increased to the upper limit for best results. Manganese definitely had to be over 1 per cent but to avoid danger of cracking had to be maintained below 1.50 per cent. Chromium for sufficient hardenability had to be above 0.50 per cent, although increases above 0.80 per cent adversely affected machinability.

Experience with sulphurized steels from 0.05 to 0.14 per cent sulphur showed the extremely high sulphurs did not increase the machinability proportionately and usually required higher manganese to produce a good rolling and forging steel. Extremely satisfactory results in regards to physical properties with moderate sulphurizing gradually increased the use of sulphurized steels particularly in view of the excellent machinability obtained.

Nickel was not specified since a residual was always secured ranging from 0.08 to 0.20 per cent. The early production runs were made with coarse-grained steels with a view of increasing the hardenability and machinability. A change was made a number of years ago to a fine-grained steel without noticeable differences in results, due mainly to the

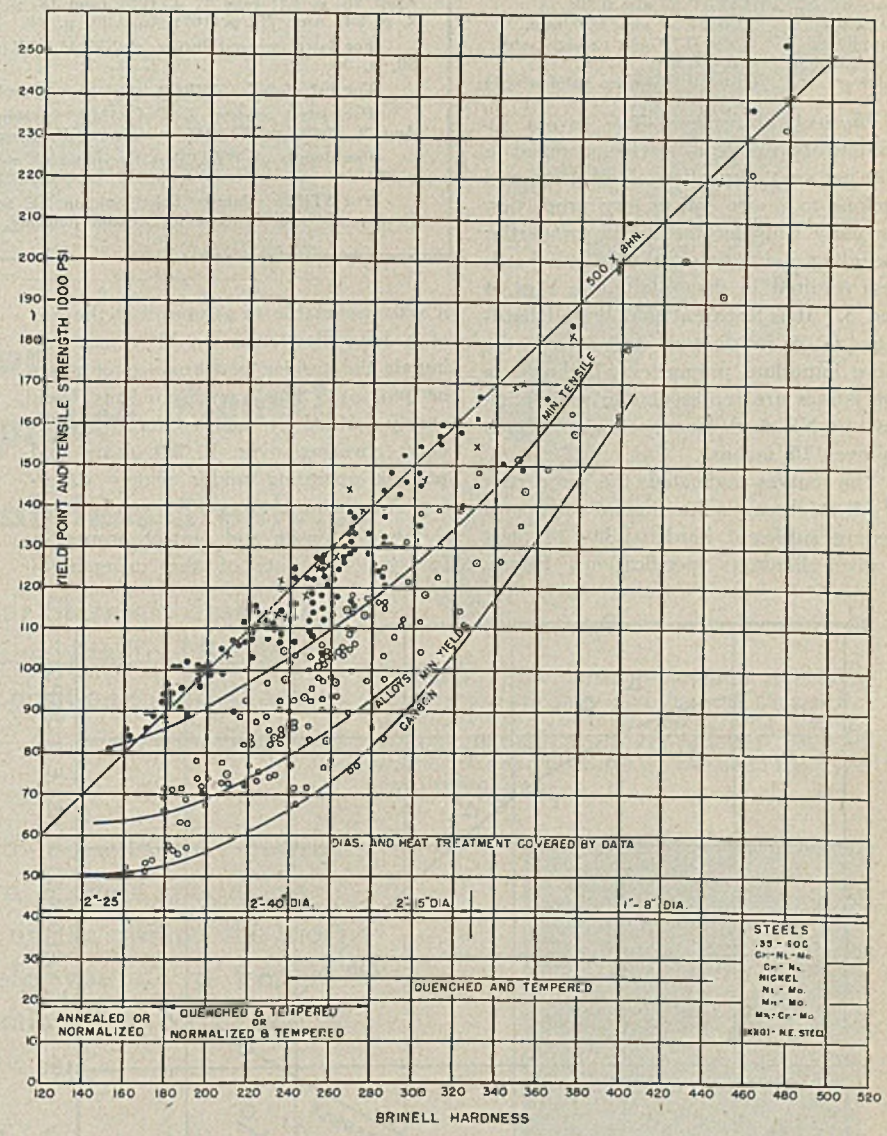


Fig. 4. (*Right, above*)—*Tensile properties vs. brinell hardness*

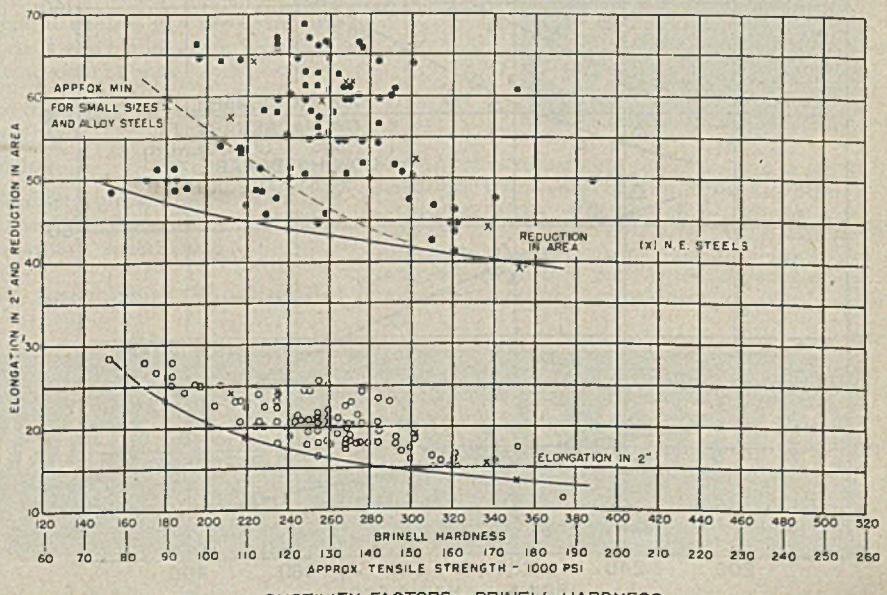


Fig. 5. (*Right, below*)—*Ductility factors vs. brinell hardness, forged and rolled carbon and alloy steels*

balance of alloys which had already been developed.

This experience resulted in the development of the following analysis for general purposes, which analysis is quite close to a number of "trade-name" alloys available today:

Carbon	0.47—0.57 aim 0.50
Manganese	1.00—1.35 aim 1.10 min.
Chromium	0.50—0.70 aim to high side
Molybdenum	0.10—0.20
Sulphur	0.06—0.10 (when sulphurized)

Physical Properties: The severe requirements of gear service demand a 100 per cent inspection of all gears and pinions to insure satisfactory properties. An early study of the tensile properties including ductility vs. the brinell hardness resulted in data plotted in Figs. 4 and 5. It is apparent that brinell hardness is a satisfactory check of the more important properties. Included in the curves are representative production tests on NE steels from sections of 1 inch to over 15 inches.

The curves indicated the properties of all steels are quite similar when possessing sufficient hardenability to meet a given hardness specification. Hence, it was reasonable to assume that the use of a low alloy steel would in no way impair the service performance of gears or pinions. This conclusion has been amply verified by many years of experience covering over 10,000 gears and pinions operating under widely differing circumstances.

Typical tensile and impact properties for various heats of the manganese-chromium-molybdenum steel discussed are plotted in Fig. 6. It is quite obvious that the characteristics are identical to those obtained with the standard higher alloyed steels.

For information on development of NE steels and data on their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 8, p. 90; March 22, p. 78; March 29, p. 76; April 5, p. 116 and 118; Aug. 2, p. 100.

For reports from users of NE steels, see Nov. 16, 1942, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109; March 15, p. 96; March 29, p. 72; April 26, p. 84; June 7, p. 106; June 14, p. 98; June 21, p. 92; July 26, p. 88; Aug. 2, p. 94; Aug. 23, p. 107; Aug. 30, p. 66.

For latest revised listing of NE ALLOY steels, see March 1, 1943, p. 98 and Aug. 30, p. 38.

For list of NE CARBON steels, see March 8, 1943, p. 90.

For latest revised list of AMS (Aeronautical Materials Specification) steels, see Aug. 9, 1943, p. 92. AMS nonferrous alloys are also listed there.

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

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

Production Heat Treatment: As might be expected, the problem of heat treating low alloy steels is entirely one of variations in hardenability. The variations between heats of low alloy steels has a greater effect upon production heat treatment than proportional differences with higher alloys. The following are but a few typical examples of difficulties which can be expected by the user of low alloy steels, particularly when the sections involved are over 2 to 3 inches.

When heat treating high alloy steels, the smallest section cannot have a hardness higher than that corresponding to the carbon content. If the alloy is sufficiently high to transform the large section, a fairly close hardness differential will exist. However, a low alloy steel on the low hardenability side will result in an appreciable difference in final hardness as shown in the following table:

HARDNESS VARIATIONS

Low Hardenability Manganese-Chromium-Molybdenum Heat: Stepped Shaft—Oil Quenched 1600°F.

Step		Brinell
Diameter	Length	Hardness
1¾"	1½"	415
2¼"	4¾"	363
3¾"	4¾"	341

There are applications which cannot have such a high differential in hardness. A number of procedures can be utilized to overcome such difficulties when found in heats of low hardenability. The shaft can be quenched in the rough before machining, using a water quench if a higher hardness is desired. As an alternative, the small

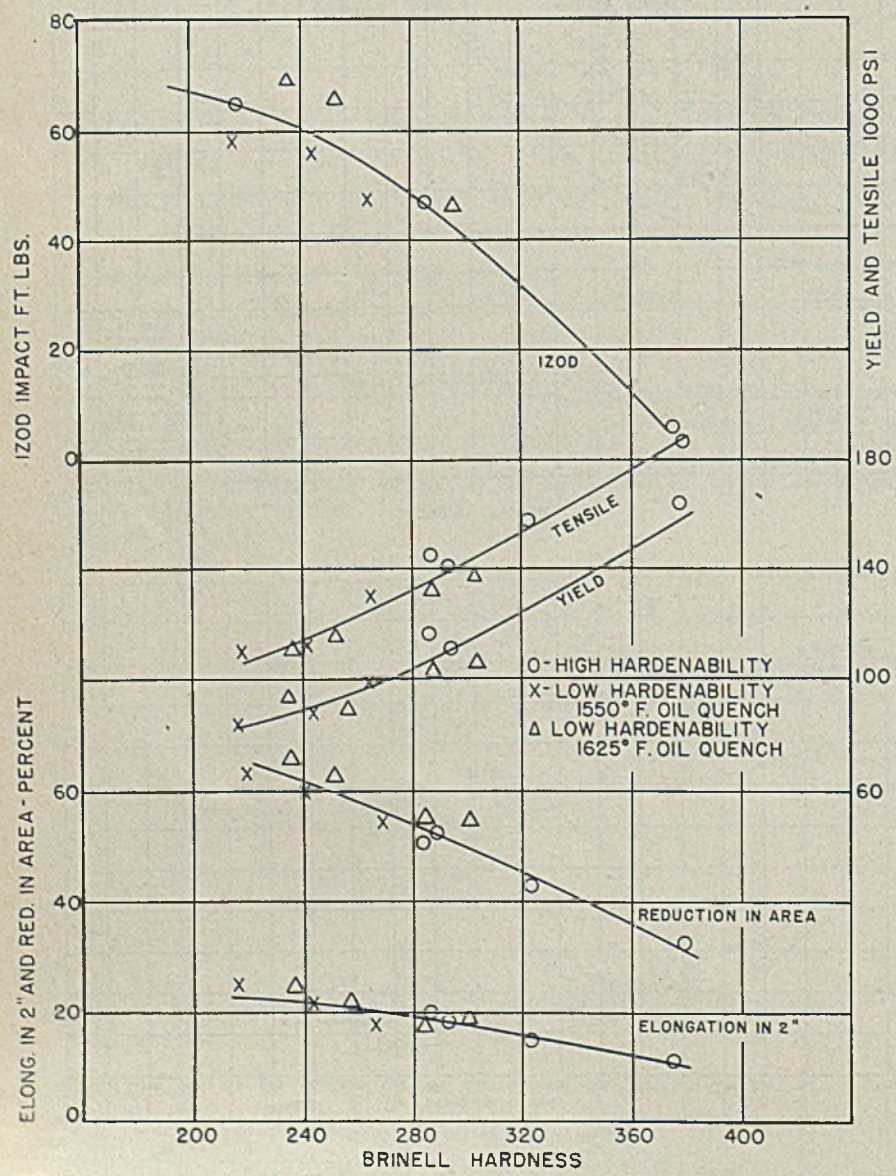
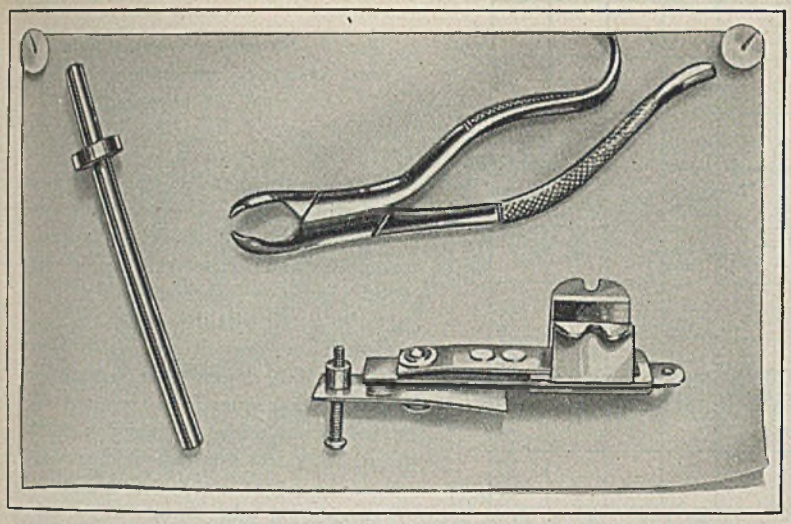
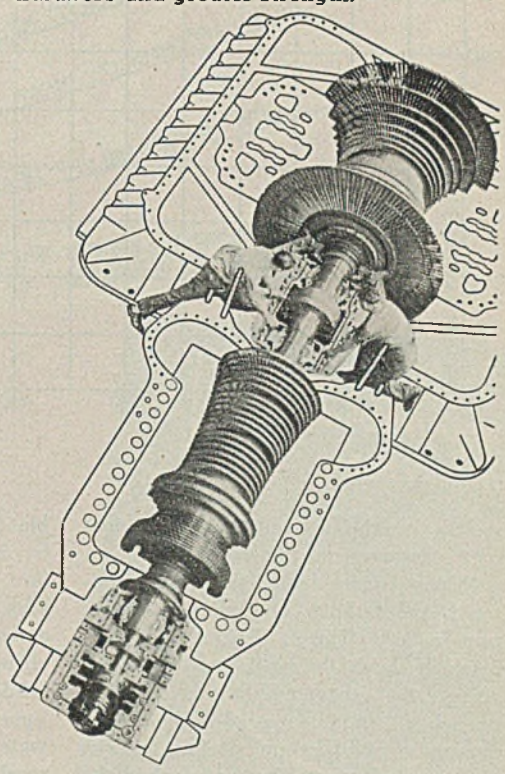


Fig. 6—Physical properties of 3½-inch rounds oil quenched from 1550 and 1625 degrees Fahr.



Long-wearing *valve stems, heat control assembly units and dental instruments are made from Carpenter Stainless—for positive protection against corrosive elements, extra hardness and greater strength.*



Strength . . . *corrosion resistance and uniformity are all provided by the Carpenter Stainless used for precision turbine blades. And many other Stainless products stay on the job longer because of Carpenter's rigid quality control.*

TO HELP YOU PLAN for Easier Fabricating—Improved Products with Stainless Steel . . .

• Let Carpenter help you with your Stainless design and fabricating problems. As we produce both Tool Steels and Stainless Steels, we are in a good position to provide help in solving fabricating problems—as well as Stainless design-engineering problems.

For on-the-spot assistance, get in touch with your nearby Carpenter representative. He can provide much useful information for your engineers to use in getting the most from Stainless. And he can help you do a trouble-shooting job all along the production line. Make use of his diversified experience.

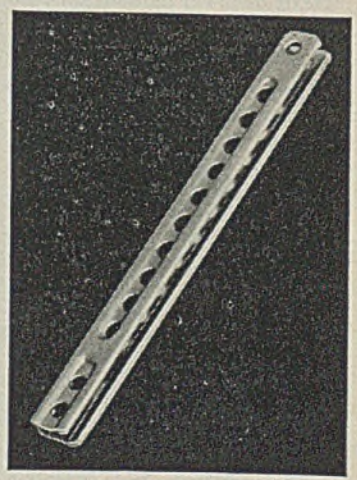
More Planning Help for you to use!

Ask for your copy of this useful book if you are designing new or improved products, or if you could use information on these Stainless fabricating operations:

- *Forging*
- *Blanking*
- *Grinding*
- *Heat Treating*
- *Shearing*
- *Welding*
- *Machining*
- *Punching*
- *Soldering*

"Working Data for Carpenter Stainless Steels" is offered free to Stainless users in the U. S. A.—so for your copy drop us a note on your company letterhead.

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



Faster fabricating *with fewer rejects is made possible with soft and ductile Carpenter Stainless Strip. Uniformity of gauge and working properties—coil after coil—reduces rejects and saves time. And note how the long edges on this part were folded flat on themselves without cracking.*

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

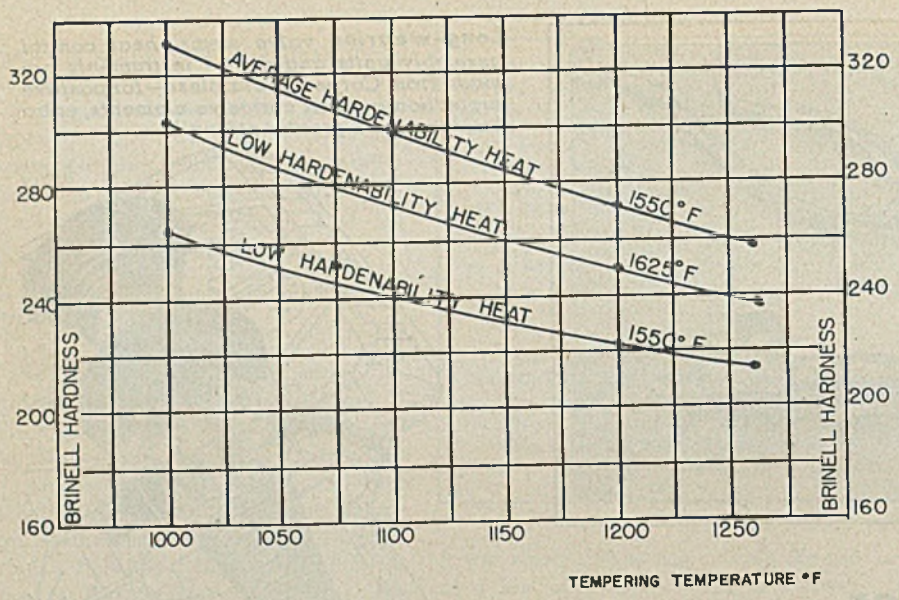


Fig. 7—Brinell hardness vs. quench and tempering temperature, 3-inch rounds, oil quenched

section can be masked during quenching or re-tempered in a bath.

When larger diameters are encountered, the familiar end effect becomes pronounced. This is illustrated by Fig. 2 which shows the hardness distribution across the diameter of a 4¾-inch quenched and tempered manganese-chromium-molybdenum steel at various positions. It is to be noted that the end slab No. 1 had much higher hardness than either of the other two. The heat had fairly good hardenability as indicated by the fact that sections No. 2 and 3 were practically identical.

Heats of lower hardenability will show much higher differentials. When brinell tests and even tensile bars are taken from heats of low hardenability, care must be taken to insure results corresponding to the central portion rather than the ends, particularly if the center portion is more highly stressed.

When heats of very low hardenability are encountered, it is sometimes possible to get a higher quenched hardness by increasing the quenching temperature. An experiment was conducted with two manganese-chromium-molybdenum heats—one with below-standard chemicals and consequently very low in hardenability, the other close to the upper limits. A "quench-out" test in water with small specimens gave the results shown in Fig. 3. Approximately the same results, except for a somewhat lower hardness, were obtained with small sections when oil quenched.

However, in sizes of 3 or 4 inches in diameter, a definite difference of approximately 80 brinell points hardness at various tempering temperatures was encountered. This difference could have been compensated for by reducing the tempering temperature but this was undesirable with batch loads including other heats.

An increase in quenching temperature from 1550 to 1625 degrees Fahr. raised the hardness sufficiently to enable pieces so quenched to be tempered with other heats. The results are plotted in Fig. 7: Full checks on the tensile properties and impact resistance showed good results as indicated by Fig. 6. It is to be noted that the impact at a 1625 degree Fahr. quench was slightly better than the 1550 degree Fahr. quench. The use of higher quench temperatures will often prove useful in securing results from heats low in hardenability which otherwise might not fit into a given set of production procedures.

Hardness explorations across "as quenched" bars were initially used to compare the hardenability of various heats. It was found, however, that in low hardenability heats the drop-off in hardness varied considerably between heats when tempered at the higher temperatures of 1000 to 1250 degrees Fahr. It was found necessary to draw at various temperatures and then make brinell explorations in order to obtain information useful for production. The Jominy end-quench method has proved particularly valuable since a plot of numerous heats when correlated with production performance for various diameters indicated various ranges which immediately illustrate the quality of heat for given production conditions. A Jominy plot of various ranges is shown in Fig. 8 along with various NE heats which would perform similarly. It should be realized that such plots can best function when based upon actual production since variables in heat treating processes, particularly the quenching media, greatly affect the ultimate results obtained by various plants.

Experience with Large Sections: Experiments were conducted for the last 8 years with a number of low alloy steels for large sections 10 to 20 inches in diameter in an effort to reduce the cost of such massive forgings. No attempt was made to get full hardness across the sections since only the gear tooth depth required the specified hardness. The results were satisfactory in regards to the metallurgical factors, although in all cases a water quench was required. This presented a problem since all smaller shaft ends or other extreme variations in sections required masking to reduce the danger of cracking. It was possible to secure tensile strengths of 115,000 to 140,000 pounds per square inch to the desired depth. Combinations of carbon and molyb-

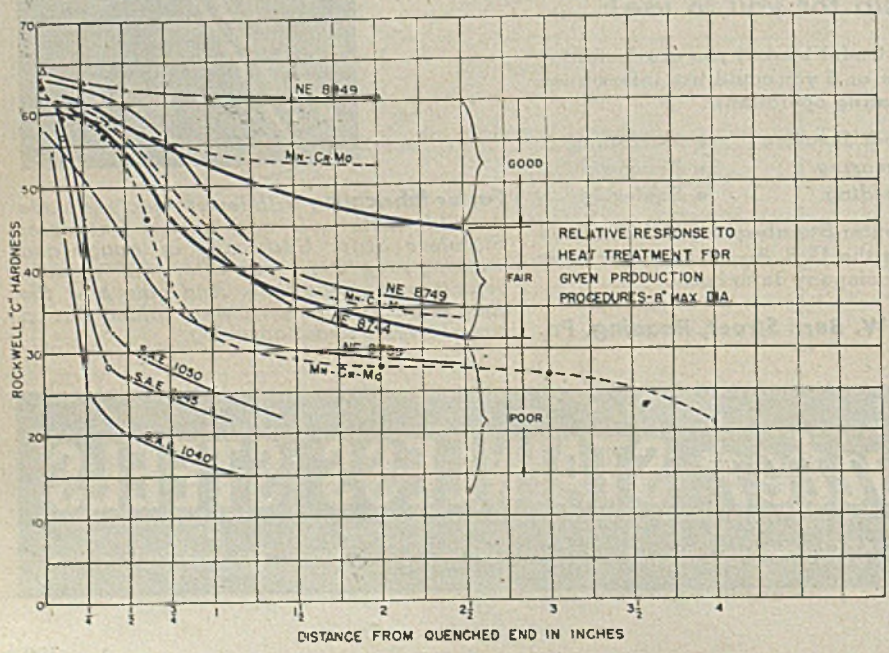


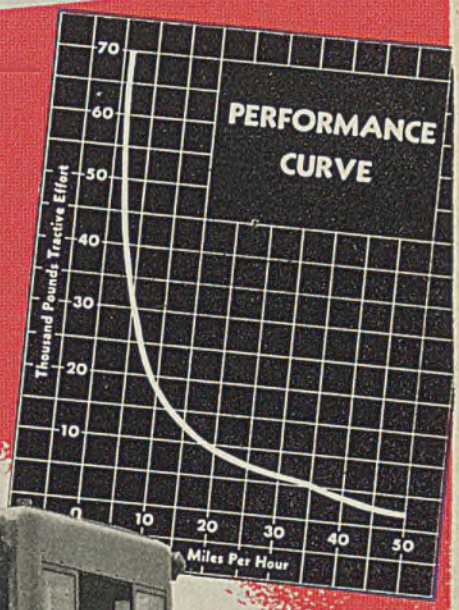
Fig. 8—End-quench hardenability curves compared

100 Ton PORTER

650 H.P. DIESEL ELECTRIC SWITCHER

TWIN-POWERED FOR DOUBLE AVAILABILITY

Built for heavy yard, terminal and belt-line work, this newest 100-ton 650 horse power PORTER is in every sense a railroad man's switcher. Powered by two complete Diesel-Electric Units, it is equal to the toughest switching job, yet is versatile enough to be used for light work. Its two independent power plants insure constant availability and unlimited operating range. Complete specifications on request.



PORTER Better Built Locomotives
Established 1866

ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES

H. K. PORTER COMPANY, INC.
PITTSBURGH PENNSYLVANIA

denum, chromium-molybdenum, etc., were tried. Uniformly, the main difficulty for gears involved poor machinability.

As an example, a quenched and tempered carbon-molybdenum 15-inch diameter pinion required three times the cutting time of an SAE-4340 steel normalized and tempered to the same physicals.

The hob wear was increased approximately 40 per cent even with the slower feeds and speeds. A higher quenching temperature was tried in an effort to effect complete solution of the carbides with but slight improvement.

Obviously, the increased machining time and decreased tool life of the expensive equipment used to produce accurate gearing easily nullified any economies resulting by the use of lower alloys. The lengthened gear cutting period could not be tolerated in times such as these.

Experiments with sulphurized steels of large sections were not particularly successful due to the inability to get good results in forging.

Experience would indicate that a sufficiently high alloy content to produce physicals of from 115,000 to 130,000 pounds per square inch by a straight normalize and temper are required to obtain good machinability for large gears and pinions. For shafts and similar items requiring less complicated machining, the lower allowed steels when liquid quenched and tempered are entirely satisfactory.

Here is an application requiring alloys not for the purpose of securing engineering properties, but mainly to obtain most desirable production characteristics.

The data presented here serve to illustrate that the use of lower alloyed steels has been tried and found practicable in many years of production and field experience.

The problems encountered are similar to those found by new users of the NE steels.

Cognizance must be given the fact that for a given section increased alloy contents exhibit the law of "diminishing returns" when the maximum hardness associated with the carbon content or required physicals have been secured. The problem therefore has always been one of adequate alloying which might be a low alloy but never the misnomer "lean alloy" if "lean" designates insufficient alloying to produce the desired results.

CARBON-MANGANESE STEELS

	C	Mn	Si
NE 1330	0.28-0.33	1.60-1.90	0.20-0.35
NE 1335	0.33-0.38	1.60-1.90	0.20-0.35
NE 1340	0.38-0.43	1.60-1.90	0.20-0.35
NE 1345	0.43-0.48	1.60-1.90	0.20-0.35
NE 1350	0.48-0.53	1.60-1.90	0.20-0.35

NICKEL-CHROMIUM-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 8613	0.12-0.17	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8615	0.13-0.18	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8617	0.15-0.20	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8620	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8630	0.28-0.33	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8635	0.33-0.38	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8637	0.35-0.40	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8640	0.38-0.43	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8642	0.40-0.45	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8645	0.43-0.48	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8650	0.48-0.53	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8720	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.20-0.30

SILICON-MANGANESE AND SILICON-MANGANESE-CHROMIUM STEELS

	C	Mn	Si	Cr
NE 9255	0.50-0.60	0.70-0.95	1.80-2.20	.....
NE 9260	0.55-0.65	0.75-1.00	1.80-2.20	.....
NE 9261	0.55-0.65	0.75-1.00	1.80-2.20	0.10-0.25
NE 9262	0.55-0.65	0.75-1.00	1.80-2.20	0.25-0.40

MANGANESE-NICKEL-CHROMIUM-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 9415	0.13-0.18	0.80-1.10	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9420	0.18-0.23	0.80-1.00	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9422	0.20-0.25	0.80-1.10	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9425	0.23-0.28	0.80-1.10	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9430	0.28-0.33	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9435	0.33-0.38	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9437	0.35-0.40	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9440	0.38-0.43	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9442	0.40-0.45	1.00-1.30	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9445	0.43-0.48	1.00-1.30	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9450	0.48-0.53	1.20-1.50	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9537	0.35-0.40	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9540	0.38-0.43	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9545	0.43-0.48	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9545	0.40-0.45	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9550	0.48-0.53	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25

CARBON-CHROMIUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 52100A	0.95-1.10	0.25-0.45	0.20-0.35	1.30-1.60	0.35 max.	0.08 max.
NE 52100B	0.95-1.10	0.25-0.45	0.20-0.35	0.90-1.15	0.35 max.	0.08 max.
NE 52100C	0.95-1.10	0.25-0.45	0.20-0.35	0.40-0.60	0.35 max.	0.08 max.

Newly Revised NE Steel Compositions Are Listed

As mentioned briefly in STEEL last week, p. 37, the NE (National Emergency) steel listings have been revised to meet conditions surrounding the use of scrap in production of these steels. The revised list as issued by the American Iron and Steel Institute, New York, is shown in the accompanying table.

The NE-9400 series have had their silicon content reduced from 0.40-0.60 to 0.20-0.35 per cent. This change is said to be a benefit to the steel, particularly in heat treatment. The former high silicon was conducive to formation of "fisheyes," it is reported.

Chromium content in the NE-9400 series has been increased from 0.20-0.40 to 0.30-0.50 per cent while the nickel content has undergone a similar increase of from 0.20-0.50 to 0.30-0.60 per cent. It is questionable that these two increases can be judged as reflecting a somewhat easier situation in supply, rather it is believed to be due more to increases in scrap residuals due to great quantities of high-alloy scrap resulting from armor-plate operations and similar work.

Note also that new NE steels added include NE-9261, NE-9425 and NE-9545. Compositions discontinued include NE-8020, NE-8442 and the entire NE-9600 series. Chromium content of NE-9262 was revised to read 0.25 to 0.40 per cent.

This listing was published by the American Iron and Steel Institute under date of August 15, 1943, and supersedes the list carried in STEEL of March 1, 1943, on p. 98. For list of NE CARBON steels see March 8, p. 90. For test of AMS (Aeronautical Materials Specification) steels, see Aug. 9, p. 92.

Many of these parts are less than one inch in diameter. the thin separations around their edges are reflected upon the screen at 22 magnifications, and inspected for perfect alignment.

Courtesy Westinghouse Electric & Manufacturing Company

INACCURACIES in Vital Airplane Parts are ELIMINATED by inspection with Jones & Lamson Optical Comparators

THESE small commutators for aircraft radio sets were examined with a magnifying glass until the Westinghouse Electric & Manufacturing Company installed **Jones & Lamson Optical Comparators** for the inspection of these parts.

Now they are inspected rapidly, positively and with less fatigue. Moreover, production was increased by 20 per cent.

Many other farsighted manufacturers have discovered the practical advantages of inspection by optical projection, after consulting Jones & Lamson inspection engineers. They are always ready to study your problems and make recommendations based on more than twenty years experience in this field.

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

JONES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.

Profit-producing Machine Tools

GRINDING CARBIDE TOOLS

By W. L. KENNICOTT
Tool Engineer
McKenna Metals Co.
Latrobe, Pa.

Proper attention to a few important factors in grinding can greatly extend the life of carbide-tipped tools used for cutting steel

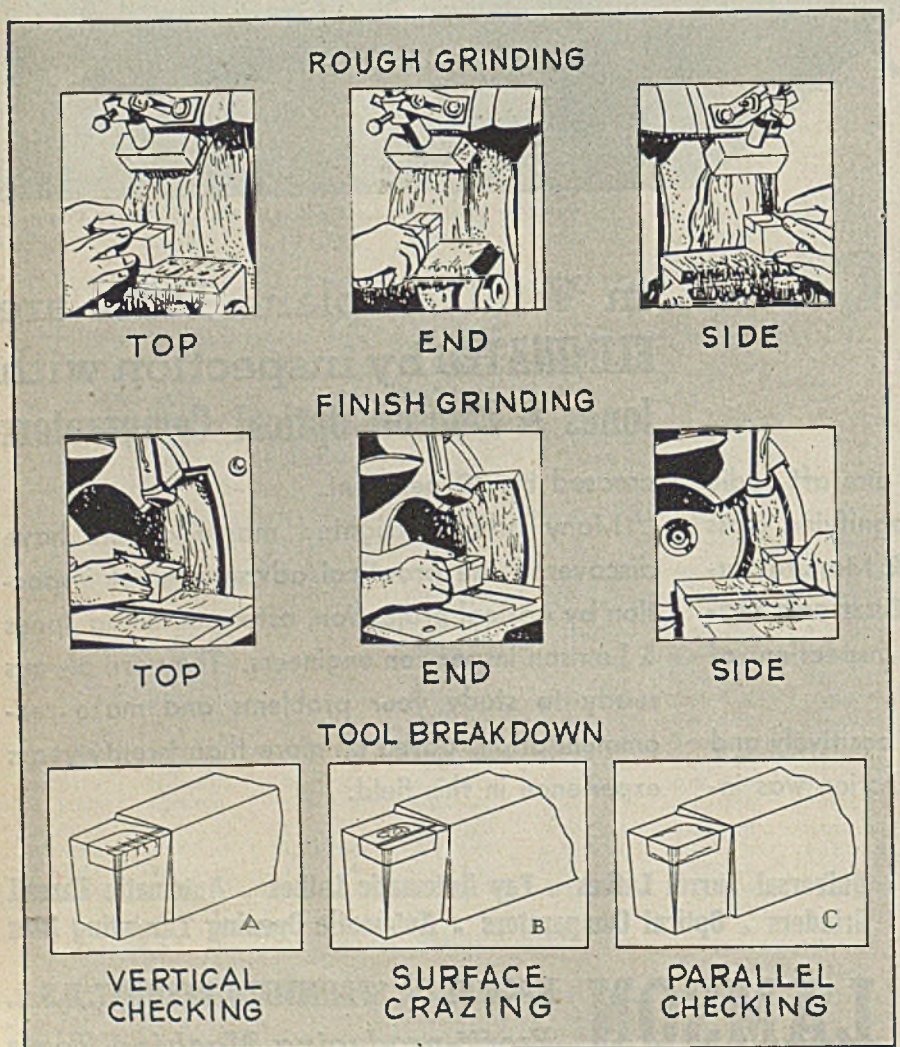
TO CONSERVE vital carbide-tipped steel-cutting tools, proper consideration should be given to methods of grinding. Improper grinding methods can produce structural weaknesses in carbide tips which are not characteristic of the cutting composition itself. This structural breakdown takes the form of cracks or checks in the carbide and often makes the tool appear inherently weak.

Carbide tools can be protected from breakdown on the job due to cracks or checks by wet grinding them properly when resharpening becomes necessary.

Avoid dry grinding methods whenever possible, particularly on tools larger than ⅝-inch square. If a quantity of tools can be ground at one time, it is possible to dry grind each one a short time and lay it aside to cool, but a great deal of time is lost and, frequently the urgency for getting a particular tool finished results in grinding it with insufficient cooling periods with the result that the tool is cracked or checked.

When cracked tools break down in a machine, the regrinding requires removal of considerable material instead of the few thousandths necessary in normal resharpening. The additional grinding further ties up the grinding room, and the heat put on the tool grinders often results in heat on the tools, further aggravating conditions. *In other words dry grinding is possible but not usually practical.*

In addition to eliminating tool damage from checking, wet grinding is faster than dry, permits the use of more durable wheels, and washes away abrasive dusts. Frequently wet grinding will eliminate a finish grind on large roughing tools since 80 or 100-grit wheels running under coolant produce a fine enough cutting edge for many jobs.



Rough Grinding

Rapid grinding is possible on large green or grey grit special loose-bond silicon-carbide wheels, using a water coolant with enough sal soda to make an alkaline solution and prevent rusting of the machine. A 60-grit soft-bond wheel of as large a diameter as possible should be used. A 20-inch diameter straight wheel is preferred for rough grinding the usual run of large tools such as are used in machining shell bodies and other ordnance work.

The coolant should cover the entire working face of the wheel and make contact with the wheel just above the tool. An ample flow should be provided, not a jet or spray. A spur wheel dresser should be used frequently to keep the new silicon carbide crystals exposed. An experienced operator can keep the wheel dressed with the tool being ground by maintaining a constant movement of the tool back and forth across the wheel as well as rocking the tool in both directions. Alternate light and heavy pressure should be used in order to break the silicon carbide crystals and thus maintain a sharp, free cutting wheel. The flow of water, hardness of the wheel bond, and other grinding conditions should be such that the tool, pulled rapidly away from the wheel while grinding, should not feel warm when touched with the finger.

To permit rocking the tool in all directions during the roughing operation, a narrow tool rest (approximately 1½ inches) should be used. This rest may be set at an angle about 2 to 3 degrees more than the clearance angle required, thus permitting a final pass over the wheel with the tool held on the rest to true up the angles for finished grinding.

Finish Grinding

A large cup wheel between 90 and 120-grit on a wet grinder is recommended for finish grinding steel-cutting carbide tools. Keep the tool moving back and forth across the wheel, since the large tool rest used to true up the angles does not permit rocking the tool. Dressing the wheel with about 1/32-inch crown in the center of the face will decrease the area of contact and permit

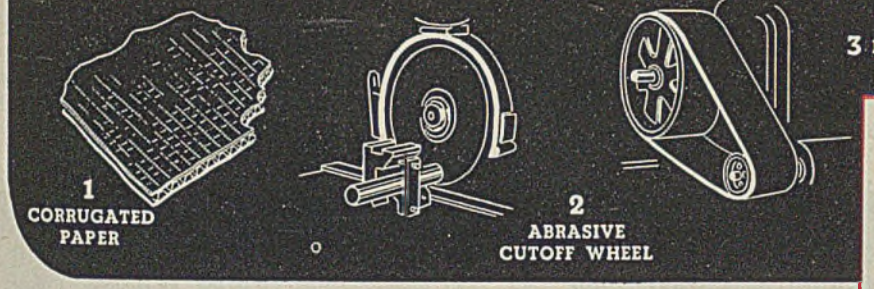
(*Please turn to Page 154*)

WIN A WAR BOND . . . tell why

dag COLLOIDAL GRAPHITE

REG. U.S. PAT. OFF.

IS IMPORTANT in the Manufacture or Use of Each of the 4 Items Illustrated



*dag Colloidal Graphite in the Electronics Industry

A graphite film formed from **dag** colloidal graphite is used on the inside walls of cathode ray tubes as a ray-focusing anode. Such a coating also serves to reduce light reflection from the glowing filament and because of getter properties it possesses, assures the maintenance of a high vacuum.

It is also possible to fabricate special non-metallic electrodes using mica discs carrying a graphite coating. In addition to being light and strong, they are non-magnetic and do not warp.

When the grids of certain types of receiving and transmitting tubes are treated with colloidal graphite, undesirable thermionic emissions are minimized.

Being resistant to electron bombardment, graphite coated tube parts do not readily emit secondary electrons. "Back" emission difficulties are likewise reduced since graphite films have little affinity for any particles that may be sputtered from activated filaments.

Coatings formed with certain **dag** dispersions are amply conductive to enable them to function as effective electrostatic shields. These are useful in connection with vacuum tubes, electronic musical instruments, special research equipment and the like.

Colloidal graphite may also be used for the production of both fixed and variable resistors. By altering concentration of suspension, method of application and subsequent treatments, it is possible to obtain a wide range of ohmic values.

These and numerous other applications for **dag** colloidal graphite in the field of electronics, are set forth in a new bulletin 432-AZ available free on request.

*A TYPICAL APPLICATION

How to Win

Acheson Colloids Corporation will give a $25.00 War Bond to each of the 5 people who submit complete and accurate answers together with the 5 best letters on the question, "Why is **dag** colloidal graphite important in the manufacture and/or use of each of the products pictured here?" (1) State business connections (no one in the graphite field or their families is eligible). (2) All entries must be legible. (3) All entries must state the publication in which the advertisement was seen. (4) Entries must be postmarked not later than October 15, 1943. (5) In case of ties, duplicate awards will be made. (6) Entries become the property of the Acheson Colloids Corp. (7) The verdict of the judges will be final.

These are two more of the War Bond Winners. Others will be introduced in subsequent issues.

Mr. Fred. E. Schubert, Chief Engineer, Operation and Maintenance of the 20000 KW Municipal Power Station, Columbus, Ohio.

Mr. Edward Littlejohn with The General Engineering Company (Canada) Limited, Toronto, Canada.

dag COLLOIDAL PRODUCTS

ACHESON COLLOIDS CORPORATION

PORT HURON MICHIGAN

Cantilever Bar Increases

FLAME-CUTTING OUTPUT

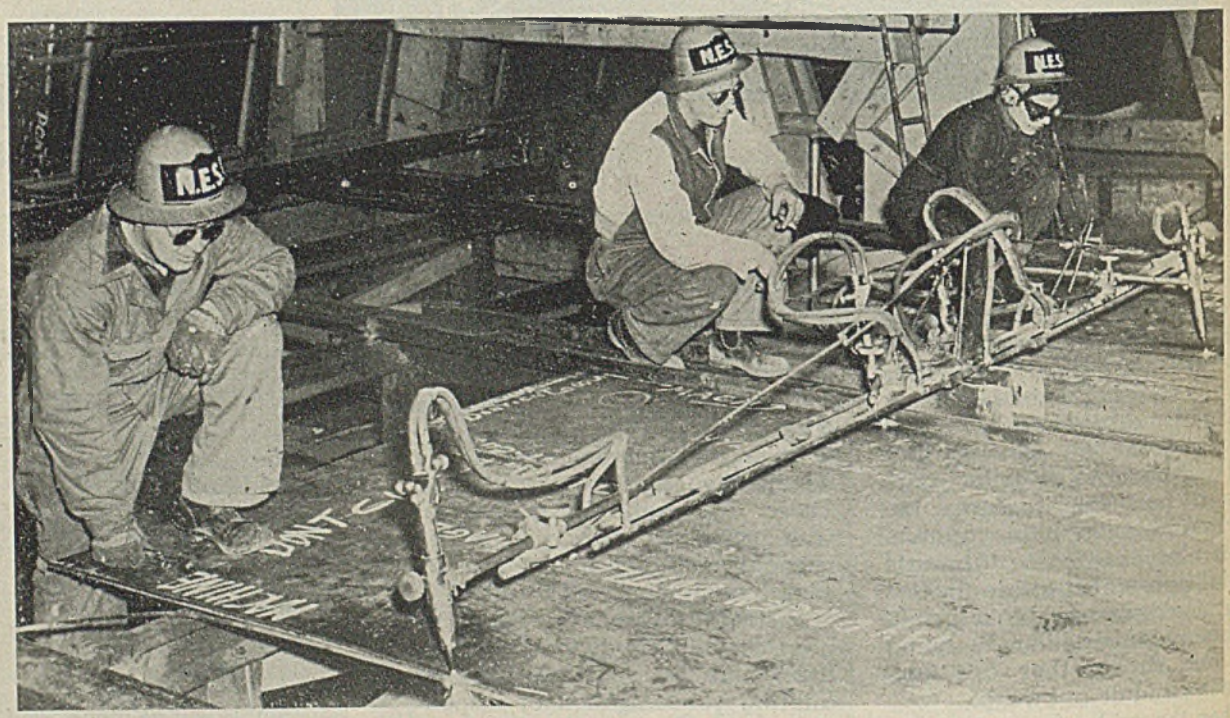
A device for multiplying the productive output of a portable flame-cutting machine is now in use in a New England shipyard, accomplishing in a single stroke the work normally produced by two or more machines.

As shown in accompanying illustration, this attachment consists of a 10-foot bar balanced crosswise on an Airco No. 4, Radiagraph, supplied by Air Reduction Sales Co., New York, with the ends supported cantilever fashion by turnbuckled rods welded at the apex to a vertical plate section. The four torches are in adjustable positions for trimming parallel edges simultaneously on two plates, one on each side of the machine tracks.

The 40-foot track is laid in the trough of several sections of structural channel welded end-to-end. Cumbersome lengths of gas hose are eliminated by the use of gas pipes mounted parallel to the torch bar. Four round mounting pads are welded at intervals on each side of the bar so the torches can be fixed in any position along the bar, making possible fine adjustments by means of the rack and handscrew supporting each torch.

Not only is linear cutting quadrupled by this device, but plate edges are cut parallel with maximum accuracy. The secondary benefit obtained from this is a more precise fitup in assembly, with consequent faster welding of butt joints.

Three operators are required to maintain torch adjustment, but on regular production work the machine has produced 1240 linear feet of cutting in 8 hours. The average for a single machine at this shipyard is 300 feet per 8-hour shift.



Relates Advantages of White Cement Floor

Lighting on underside work surfaces is increased by 61 per cent and on vertical work surfaces by 20 per cent, according to the booklet, "Light from Floors Speeds War Production" published by Universal Atlas Cement Co., Chrysler building, New York, in describing a new type of light-reflecting floor now being used by many aircraft plants.

Built of concrete made with white Portland cement instead of gray cement or other darker materials, the light-reflecting floors become giant reflectors instead of giant absorbers of light, states the publication. This in turn increases illumination and helps increase production, reduce accidents, boost morale and preserve health.

Examples in the book show how a white cement floor compared with a gray floor in the same plant reduces shadows and dark areas and promotes visibility by reducing the contrast between the visual task and the surrounding background.

Seeks Acceptance of Bolt Packaging Practice

Simplified form of practice recommendation R60-30, "Packaging of Carriage, Machine and Lag Bolts," is now being circulated to all manufacturers of bolts, associations and other interested groups for acceptance according to the Division of Simplified Practice, National Bureau of Standards, Washington.

Revision of the practice was recently planned and consummated by the Standards Committee of the Division of Simplified Practice in collaboration with a like body of the American Institute of Bolt, Nut and Rivet Manufacturers.

Original practice of packaging these items was drafted in 1927, then later revised in 1930. Copies of the proposed revision are available, upon request, from the Division of Simplified Practice.

What are you *doing* about *Planning*?

MOST everyone is *thinking* about planning ahead. But it's what you are *doing* about planning that will count in your favor —and in favor of your company, in the postwar years.

Planning can*not* be left until the end of the war. By that time industry must be prepared to go all out for peacetime products, as it is now going all out for maximum war production. Success in achieving satisfactory postwar goals, depends upon our preparedness to speedily reconvert manufacturing, engineering and distribution facilities the moment the opportunity arrives.

To *do* something about planning, *more* and *better* information is needed. For months STEEL has been gathering and publishing such information for the metalworking and metal-producing industry. Examples are, the series of 10 articles on "Postwar Planning", prepared by E. C. Kreutzberg, Editor, and Art Allen's searching analysis of "The Postwar Automobile". (Both are available in booklet form on request.)

STEEL's postwar planning program is under the direction of a full time *planning* editor who has the cooperation of *all* of our editors and correspondents. The information developed is being made available to metalworking management through the pages of STEEL.

If your responsibility is sales or advertising to metalworking markets, watch STEEL from week to week for this special postwar planning information. As a further aid to you, we have prepared a brief analysis of the major postwar problem confronting business; a sales quota planning chart which you can use to project your sales in relation to the industry; and a check list of postwar planning projects. Ask STEEL's representative for copies.

STEEL

The Magazine of Metalworking and Metalproducing · Cleveland 13, Ohio

CHROMIUM PLATE

Its Thickness and Finish Requirements

By T. G. COYLE
Technical Director
United Chromium Inc.
New York

THE RECENTLY accepted ASTM "Tentative Recommended Practice for Chromium Plating of Steel for Engineering Use" (B 177-43 T) outlines quite completely methods and operating conditions for electrodepositing chromium directly on steel. The details of the procedure and operating techniques there described may be considered to apply to chromium plating on steel generally, without special reference to the type of article to be plated, or to the particular function the chromium plate is to perform.

It should not be concluded from this, however, that all steel articles are chromium plated alike; on the contrary, for best results different applications require different thicknesses of deposit, and some require special plating conditions and finishing treatments.

Use of Article Determines "Plate"

The purpose here is to give information on such requirements, and to treat more specifically some of the commonly used applications. In short, the information given here on "how much plate" is intended to complement the recommendations on "how to plate" as outlined in tentative recommended practice B 117 mentioned above.

While a great amount of testing in both field and laboratory has been carried out on the various applications of chromium plate on steel, no attempt is made here to describe these tests or to include test data. The recommendations on plate thickness and plating conditions or plate treatment are based principally on experience in the field over many years and represent the most commonly accepted practices.

As will be apparent from the following, setting up complete specifications on chromium-plate applications for engineering use is hardly practicable. *Thickness and finish requirements vary not only from one class of service to another, and from one class of articles to another, but even among different articles in the same type of service.* Conditions of service, such as load, abrasion, temperature, and corrosion, not uncommonly differ for the same class of article and require diverse amounts and treatments of plate.

Pump rods, for example, working in different type wells, some under severe corrosive conditions, others under severe abrasive conditions, might require different handling for the different service conditions; or drawing dies and plugs on different drawing operations might require different thicknesses of deposit for best results in each case.

Other Factors To Consider

Conversely, the condition of the article itself as to size, shape, or construction might dictate the kind of finish or the amount of plate to be used. An example here is a cylinder, or a gage, worn oversize or out of round, thereby requiring a heavier plate or a different method of processing than would otherwise be recommended.

Each application is, in varying degree, an individual problem. The information in the following on plate thickness values and plating conditions or finishing treatments should be considered in this light, and taken as a general guide, with any individual case possibly requiring a departure from the recommendations given.

Wear-Resistant Applications: Most applications of chromium plate on steel for engineering use are made primarily to obtain better abrasion resistance and to decrease wear on the plated article or part. Into this category fall most tools, cutters, gages, dies, and machine parts, as well as bearing surfaces, printing surfaces, rods, plungers, and similar equipment.

Plug gages, ring gages and other gages of various types are generally finished with a chromium plate 0.001 to 0.0015-inch thick. Beyond giving a deposit of sufficient thickness to withstand the load and pressure of the gaging operation, the object is to have a deposit of thickness greater than the wear tolerance of the gage. In this way a chromium surface is maintained throughout the accuracy life of the gage, and at the same time the underlying steel basis metal is protected from wear or scoring or other damage so that the gage can be resized very easily by dissolving ("stripping") the remaining chromium and replating the gage. This practice, it should be noted, also applies to many of the other applications discussed below, in particular drawing dies and materials, many machine parts and certain tools.

Advantages of Thin Plating

In some gaging operations where tolerances are extremely small or the gage must have a sharp working edge, the chromium plate thickness should be only of the order of 0.0001 to 0.0003-inch. The purpose here is to avoid chipping or spalling of the plate that might occur on the sharp edge if heavier deposits were used. The thinner deposits, even though they may afford lesser increase in number of gaging operations than the heavier plate, still give the advantages of the chromium working surface, and are desired for this reason as well as for protection of the steel and the resizing practice the plating makes possible.

In practice, the usual procedure is to grind the gage undersize by the amount of plate thickness required, plate oversize by an amount sufficient to give grinding stock, and finally grind or lap back to gage size, leaving a finished chromium deposit of the required thickness.

In cases where the thin (0.0001 to 0.0003-inch) deposits are used, the gage

(*Please turn to Page 145*)

From a paper presented at meeting of the American Society for Testing Materials, Philadelphia, June 28 to July 2, 1943.

CURTAINS OF SMOKE that mean "Curtains" FOR THE AXIS!

ON battlefronts all over the world, United Nations troops are advancing upon and capturing the strongholds of the enemy. The quick and successful completion of many of these advancing actions, with a relatively small loss of men and equipment, is due to a protective missle—unique in land warfare—the smoke shell. Fired from tanks it lays down a curtain of smoke similar to the smoke screens used in naval engagements—affords infantry and armored units vital protection in carrying out strategic maneuvers.

The latest and most efficient types of this aid to our fighters are made of light wall WELDED STEEL TUBING. They are more efficient because this method of tubing fabrication permits increased packing volume, with consequent greater screenage per pound of projectile.

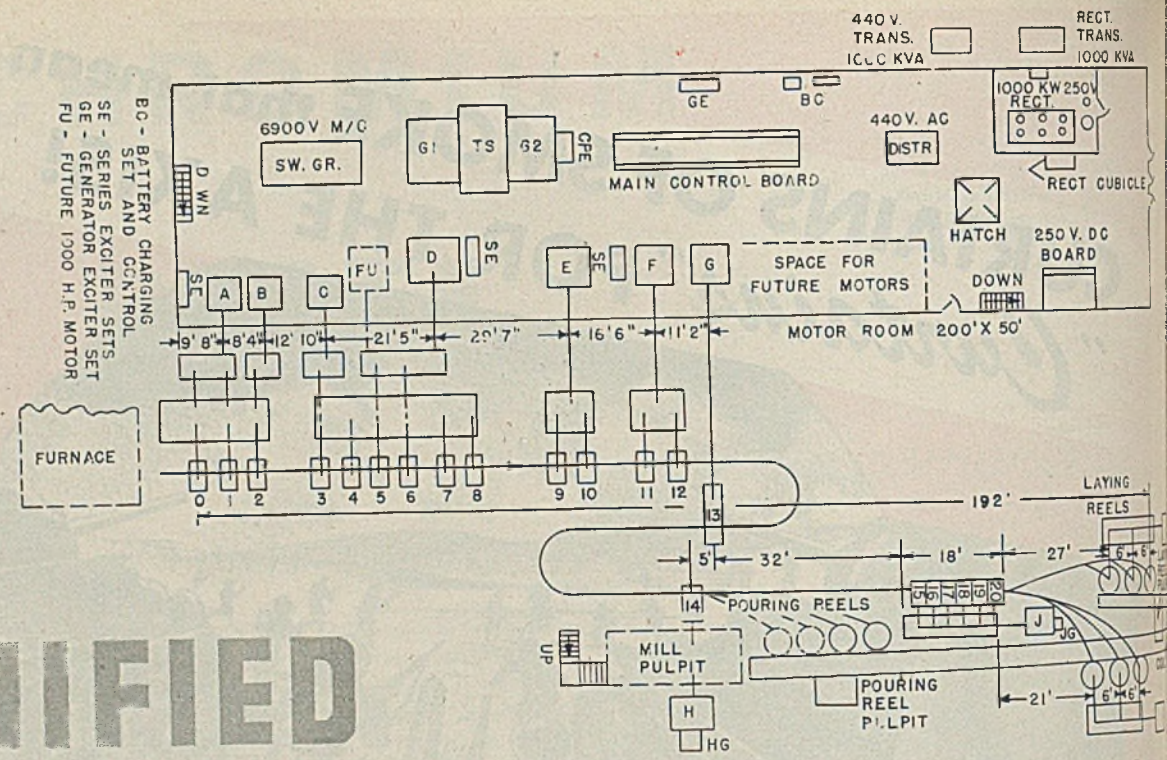
WELDED STEEL TUBING is being employed to advantage in a host of other war items. We're making many of them. If you are manufacturing a product that has a tubing problem—if you need an additional source of supply or wish counsel on how WELDED STEEL TUBING may help you to do a better, quicker job—get in touch with us. We will gladly cooperate in every way we can.

THE STANDARD TUBE CO.

Detroit STANCO Michigan

Welded Tubing *Steel Forgings*

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



UNIFIED DRIVES

By F. R. GRANT
Steel Mill Division
and
G. L. BEAVER
Sales Engineer, Pacific District
General Electric Co.
Schenectady, N. Y.

INCREASE ROD MILL PRODUCTION

ANOTHER step has been achieved in the war expansion program with the completion and full-time operation of the Columbia Steel Co.'s new continuous rod mill at the Pittsburg, Calif. works. Operation of this mill, the most modern continuous type built for 3-strand rolling in the United States, materially adds to the finished steel facilities in the Pacific Coast area.

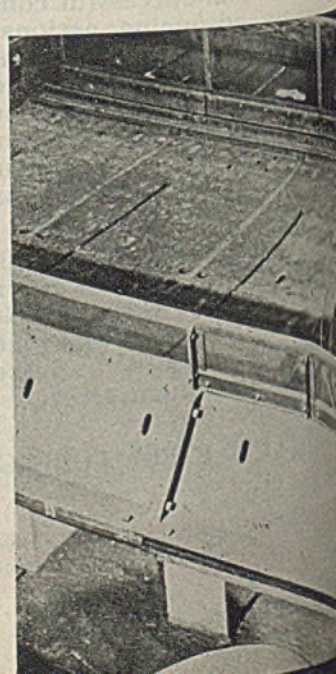
At this mill, rods produced from billets, 30 feet long and weighing 600 pounds, pass through the last finishing stand to the reels at the rate of 48 miles per hour. At this speed, from one 600-pound billet, a No. 5 rod nearly a mile long is delivered to the reels in about a minute from the time the billet leaves the suspended-arch type heating furnace.

Operation at this mill, which furnishes rods to Columbia's adjacent wire mill, is continuous from the time the cold billet enters the furnace until the bundle of finished rods is placed on the shipping platform at the end of the mill. These 30-foot rods are fed one by one into the upper end of a 33 x 50-foot furnace which has an hourly heating capacity of 50 tons of billets, thus insuring a steady flow. All steel-heating operations are automatically controlled from fuel mixture ratios to the temperature of the heated billet.

Billets are heated slowly and uniformly until they reach the proper rolling temperature. Then they are pushed out from the lower end of the furnace into the "bite" of the rolls of the first of nine roughing stands.

The mill, as shown in Fig. 1, comprises a total of nine roughing stands, Nos. 0 to 8 inclusive; six intermediate roughers, Nos. 9 to 14 inclusive and, six finishing stands, Nos. 15 to 20 inclusive, for rods. Three strands of steel can be handled simultaneously through the entire mill. An interesting operating feature lies in the fact that steel from one billet is being rolled in all of the 21 stands at the same time. When the leading end of the rod being rolled emerges from the last stand, approximately two-thirds of the original billet still remains in the furnace, and has not yet entered the first stand.

Nine adjustable-speed, direct-current motors, A to H inclusive, and J, are used for driving the mill stands. This sectionalized drive is in marked contrast with the drives used for older types of rod mills, which were driven by single-speed, large capacity, alternating-current motors through a system of line shafts and gearing. By dividing the mill into a number of units, each with its individual direct-current motor, it is possible to change the speed rela-



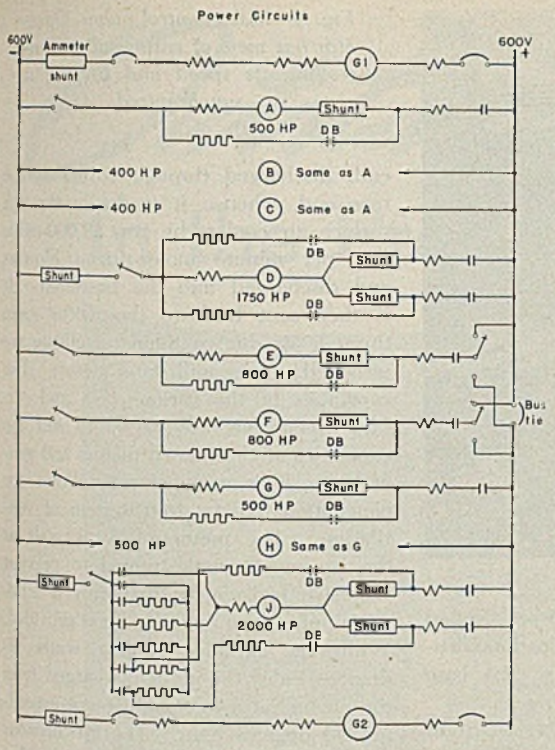


Fig. 1. (*Opposite page*) — *Rod mill layout showing location of roughing, intermediate and finishing stands*

Fig. 2. (*Immediate left*) — *Principal circuits of main motors and* 600-*volt generators*

tionship between the various stands quickly and easily, thus permitting a greater variety of products and more easy operation of the mill. The wide range of rolling schedules made possible by this flexibility in control is one of the chief advantages of the sectionalized type of drive.

Provision is made to feed the rod automatically into each successive stand and into the reels, thus entirely eliminating manual manipulation of the hot materials. Fig. 3 shows the intermediate section of the mill in which the repeaters between stands Nos. 12 and 13 and Nos. 13 and 14 are located. Following stand No. 14, the mill is arranged so that the output of this stand may be sent either directly to the pouring reels when reeling the heavier rod products, or to stands Nos. 15 to 20, inclusive, for further reductions and ultimate delivery to the laying reels when rolling rods of smaller diameter.

After leaving the final finishing stand, the rod passes through water-cooled connecting pipes to the reels. From the reels, the bundles of finished rods are switched onto an apron conveyor and headed toward the loading platform. At the end of this conveyor, the bundles are transferred automatically to a hook-carrier conveyor, designed to cool the rods before handling.

Rod bundles are removed from the hook conveyor by manually-operated air hoists and placed on stands. Groups of coiled rods are then picked up from the stands by tractors and loaded on specially constructed flat cars for transfer to the wire mill.

Mill Is Separate Unit

The rod mill is a complete unit separate from the rest of the rolling mills and is served by its own auxiliary equipment. The roll shop for shaping and renewing the rolls is entirely modern in every respect. Seven of the nine main drive motors are housed in a separate motor room, which is air-conditioned to remove the heat of the motors and to protect them from dust and other abrasives in the air. A water recirculating system is provided, made up of a settling tank, a clari-floculator tank, a cooling tower, and suitable pressure pumps for returning the water to the mill, so that only make-up water is required.

A quick roll change feature of the rod mill is the conventional type of wobblers with the innovation of built-in universal drives on the coupling boxes and spindles, which minimizes loss of time for roll changes, and provides smooth, vibrationless running of the mill.

Mill rolls are being carried by fabric and ball thrust bearings adapted to the requirements of the job according to the most recent experience in rolling mill equipment. The size of the rod ordinarily produced in the mill is No. 4½ gage, but the mill is capable of producing No. 5 gage up to and including 1-inch coiled rods.

Electric equipment for this mill was supplied by the General Electric Co. Main drive motors, which are of the ad-

Fig. 3. (*Left below*)—*Three strands of rods being looped from continuous roughing stands into semicontinuous intermediate stands*

Fig. 4. (*Right*)—*Motor room showing mill motors, main motor-generator set, main control board and related equipment*

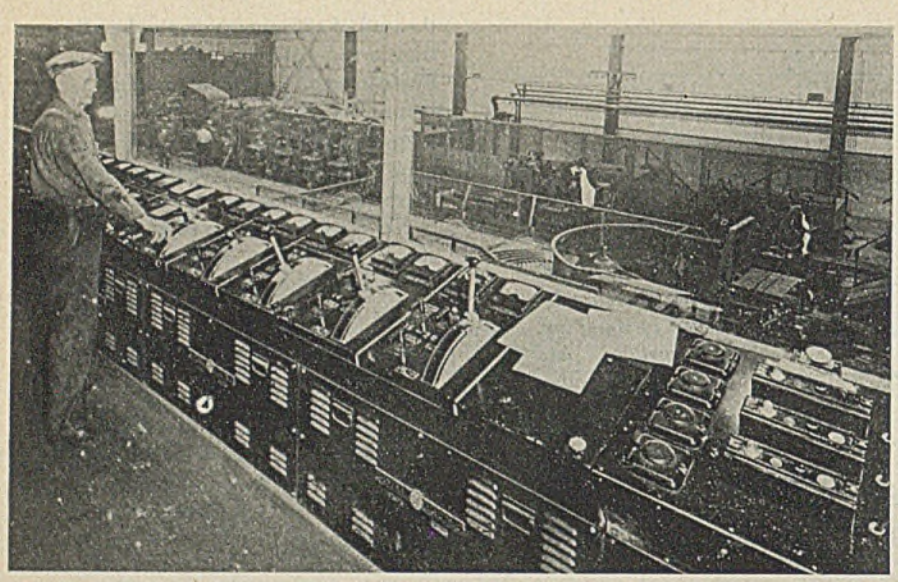


Fig. 5—Main control pulpit. Operator has view of entire mill in controlling its speed and keeping it synchronized

justable-speed mill type and which are for operation at 600 volts, are as follows:

Mill stand	Motor	Horsepower	Revolutions per minute
0-1	A	500	250/750
2	B	400	250/750
3	C	400	250/750
4-8, incl.	D	1750	150/450
9-10	E	800	300/900
11-12	F	800	300/900
13	G	500	225/625
14	H	500	225/625
15-20	J	2000	450/690

The mill motors are operated from two 2500-kilowatt, 600/450-volt generators, one of which normally supplies power from the first four motors and the other, normally, for the last three motors. Provision is made for supplying motors E and F, either one or the other, or both, from either generator. These generators and a 150-kilowatt, 250-volt exciter, are driven by a 7200-horsepower, 0.8 power factor, 514-rpm, 6600-volt, 3-phase, 60-cycle synchronous motor, forming a 4-unit motor-generator set. The 150-kilowatt, 250-volt exciter supplies excitation for the main roll motors and for general control purposes.

Speed Regulation Provided

All of the motors have separately excited main fields and separate auxiliary windings on the main field poles. In order to obviate as much as possible variation in speed of the rolls the auxiliary fields are energized from series-compound exciters, designed to maintain a speed regulation of not more than 1½ per cent variation from full load to friction load.

Motors as well as the generators are designed for continuous operation as open machines at rated loads with a temperature rise of the windings not exceeding 40 degrees Cent. They will also carry momentary loads of 200 per cent at any speed up to 200 per cent of base speed and 175 per cent load momentarily from 200 to 300 per cent base speed.

For furnishing 250-volt, direct-current power for cranes and mill auxiliaries, a 1000-kilowatt, 250-volt ignitron, single-anode, multiple-tank, mercury-arc rectifier is used. For supplying 440-volt, 3-phase, 60-cycle, alternating current for miscellaneous small constant-speed drives, a 1000-kilowatt ampere 6600/480-volt, 3-phase, oil-cooled transformer is installed. This transformer and the rectifier transformer are both located just outside the wall of the motor room adjacent to the 440-volt distribution switchgear and rectifier.

A general view of the motor room is shown in Fig. 4. In this room, 200 x 50 feet, are placed mill motors A to G, inclusive, for stands Nos. 0 to 13, inclusive, the main motor-generator set, the 6600-volt, metal-clad alternating-current switchgear, the main control board, and switchgear for the 440-volt alternating-current and 250-volt direct-current feeder circuits. The main control boards provide control facilities for the 660-volt, direct-current generators and motors and their related exciters, as well as for the control of the 440-volt alternating-current motors. Also installed in the motor room are various smaller motor-generator sets, such as the 3-series exciter motor-generator sets, the generator field exciter motor-generator set, and a small battery-charging motor-generator set.

In the basement of the motor room are placed generator and motor field rheostats, the starting reactor for the 7200 horsepower synchronous motor, the mill stand motor dynamic-braking resistors, the battery, and the ventilating equipment.

Air from the motor room is taken into the main generators at the commutator end, discharged through covers at the rear end, whence it is drawn through surface air coolers by two 29,000-cubic feet per minute motor-driven blowers and discharged into the basement. It is then sent back to the motor room through air ducts. Similar facilities are provided for the mill stand motors. The capacities of the various fans and surface air coolers are varied to suit the capacities of the related motors and generators. This arrangement follows the conventional down-draft system of ventilation. The motor room as well as the basement is constructed to prevent excessive leakage, so that only a minimum quantity of make-up air is provided. With the entrance cooling water 80 degrees Fahr. the air is discharged from the coolers at a temperature not exceeding 90 degrees Fahr. The synchronous motor driving the generators is provided with enclosing covers and corresponding appropriate facilities for forced-ventilation. Motors H and J driving stand No. 14 and the finishing train are located in the mill proper. They are provided with enclosing covers and each is supplied with cool air by a motor-driven fan in a closed, self-contained, recirculating system with surface air-coolers.

Connected to the armature shafts of motors H and J are direct-current generators for supplying power to motors driving the reels. Generator HG on motor H is rated 18.8/52 kilowatts and operates the two adjustable-speed pouring-reel motors, each of which is rated 25-horsepower. Motor J drives a 32.6/50-kilowatt generator JG which supplies power to two 20-horsepower adjustable-speed motors driving the six laying reels. In this manner the reels automatically follow any speed variations of the drives H and J.

Control and Switchgear Equipment

Power is brought to the metal-clad switchgear in the motor room at 6600 volts, 60 cycles, and is controlled by oil circuit breakers of 500,000-kilowatt amperes interrupting capacity. The 7200-horsepower synchronous motor of the main set is started at reduced voltage by the conventional starting reactor. The metal-clad switchgear is shown in the background at the right in Fig. 4, with all instruments, relays, and control switches mounted on hinged front doors, thus minimizing the conduit, wiring, and installation costs.

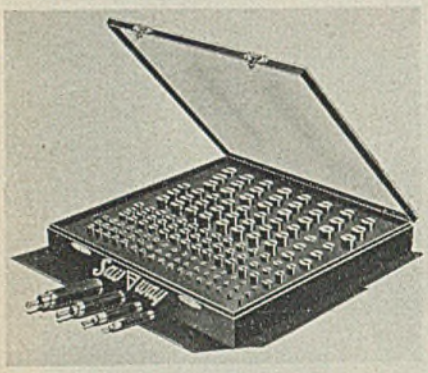
The principal circuits of the main motors and the 600-volt generators are

(*Please turn to Page* 151)

INDUSTRIAL EQUIPMENT

Plug Gages

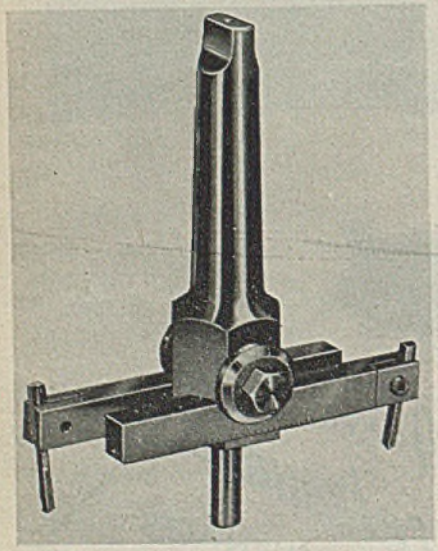
Sav-Way Industries, 4875 East Eight Mile road, Detroit, announces a master set of standard plug gages for hole inspecting. They are set in increments of 1/64ths, starting at ¼-inch and going to



1 inch. There are three plugs of each nominal size—0.0005-inch over, standard, and 0.0005-inch under. All plugs are deep frozen before finish grinding to relieve internal strain and provide accelerated aging, and are held to gage makers' tolerance lap finish. The set includes 147 plugs and 4 handles in a plastic case which has a transparent cover permitting a clear view of the contents.

Adjustable Fly Cutter

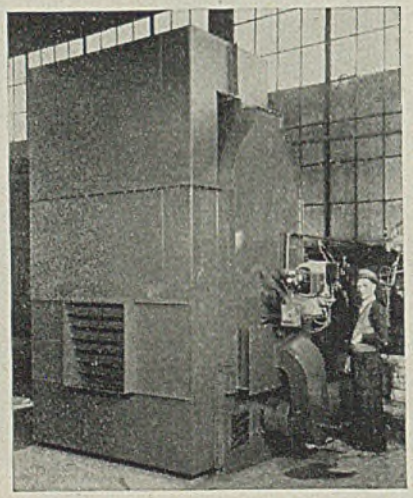
Robert H. Clark Co., 3424 Sunset boulevard, Los Angeles 26, has developed a new fly cutter for cutting holes or disks in metals of thicknesses up to 1 inch, including boiler plate, stainless steel and cast iron. The tool provides a generous clearance between work and the body of the cutter, making possible



deeper cuts with less strain on the tool. The cutting technique eliminates chatter and assures clean holes. It is being made with straight or tapered shank and covers expansions of 4 to 10 inches in diameter, including all decimal or fractional intermediate sizes.

Air Heater

Dravo Corp., 300 Penn avenue, Pittsburgh, recently introduced a method for producing temperatures between 150 and 350 degrees Fahr. in direct-fired air heaters for dehydration and chemical processes. The high temperatures are obtained from heaters with carbon steel combustion chambers, by means of a recirculating device. Its action allows heated air to be fed back to the heater's intake, so that the normal temperature rise obtainable by wiping air around a carbon steel fire box will produce any temperature up to 350 degrees Fahr., according to the percentage of the air that is recirculated. The percentage is



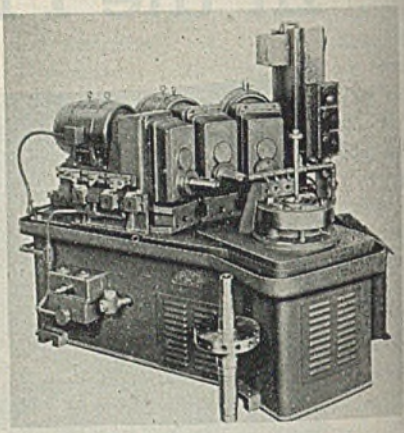
regulated by a damper in the recirculating duct.

The method is now incorporated in a new Dravo heater which is being offered for use with oil, gas or coal as fuel. Heaters designed for coal can be converted to oil or gas when conditions make these fuels available after the war. Saving of fuel as a result of high efficiency of heat abstraction and negligible radiation losses; quickness and flexibility of the installation are some of the heater's features.

Drilling Machine

Tripling production on aircraft part operations is accomplished by use of an automatic cycle machine which drills 15 holes, equally spaced around an extended pan on a forged aircraft propeller shaft. This machine, designed and built by Snyder Tool Engineering Co., 3400 East Lafayette, Detroit, is a horizontal three-way hydraulically-operated drilling machine with three drill heads, each with individual hydraulic feed cylinder. The three heads are geared together for single electrical control.

Operation is automatic and continuous until all 15 holes have been drilled. Index mechanism is electrically synchron-



ized and after five indexes, the machine stops for unloading and reloading.

Hydraulic equipment is housed in the welded steel base, and coolant is contained in a separate tank and trough at the side of the machine.

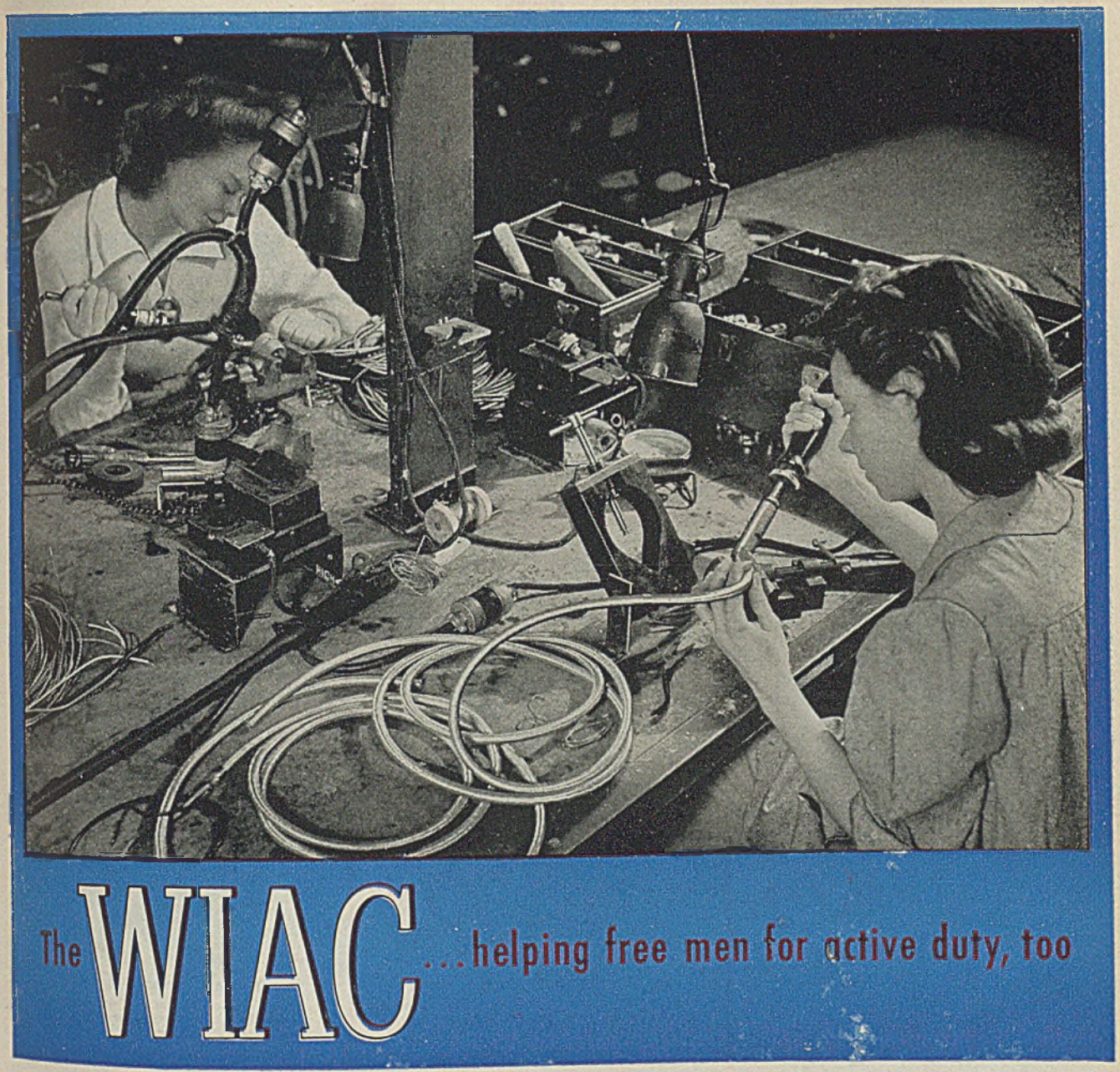
Elevating Table

Lyon-Raymond Corp., 1261 Madison street, Greene, N. Y., has incorporated improvements in the Lyon hydraulic elevating table for use in handling dies, locating work in convenient positions for welding, transferring heavy parts from one level to another, supporting overhanging work, bringing work to convenient heights for the operator, and operations where easy foot-actuated elevation is convenient. It operates advantageously with all loads up to its maxi-

mum capacity of 2000 pounds.

The table top is 30 inches square, having a lowered height of 29 inches, an elevated height of 43 inches, and an elevation of 14 inches. Standard stock table

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



The WIAC ...helping free men for active duty, too

When considering the important contribution that women are making towards the war effort, don't overlook the Women's Industrial Auxiliary Corps.

Like their sisters in the service auxiliaries, these women workers in practically every type of war plant are today doing many of the "tremendous trifles" so important to all-out war production.

Here, American Flexible Low-Tension Shielded Conduit is being made ready for final assembly into a medium bomber built by a prominent Eastern plane builder. Threading electrical wires through the conduit and soldering on end connections was formerly done exclusively by men. Today, however, with a minimum of training, women are doing the job equally as well, and in many cases, faster.

Flying with our bombers is only one of the important jobs assigned to American Metal Hose products. In industry, various types of American Flexible Metal Hose and Tubing convey water, gas, steam and oil; it's also used in vacuum service for removing filings and dust; as misalignment connectors or for absorbing vibration in pipe lines—to name but a few applications where these products serve with distinction.

When you have an application requiring metal hose or tubing, regardless of its nature, we invite you to "go American." For in the American line there's one than can probably help you do the job just a little bit better. Our Technical Department will gladly assist with your particular problem.

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.
43203

ANACONDA

American Metal Hose

BUY ALL THE BONDS YOU CAN AFFORD . . . TURN IN ALL THE SCRAP YOU CAN FIND

Prompt Delivery!

ON THESE WESTINGHOUSE WELDERS

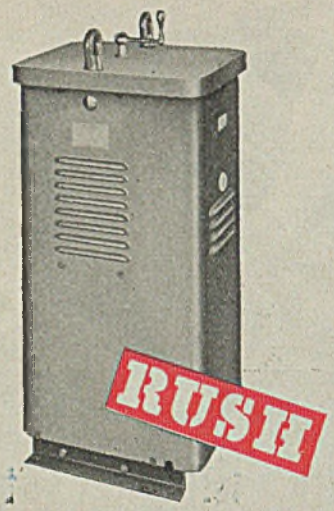
Need a-c or d-c arc welding machines? Westinghouse offers any of the models shown on this page for *immediate delivery*.

Westinghouse A-C Arc Welders boost welding speeds from 15 to 30 per cent . . . because arc blow is eliminated; heavier electrodes can be used; no "time-outs" for maintenance are necessary.

Westinghouse D-C Flexarc Welders, with new Arcontrol, are the favorite of welding engineers and operators everywhere. Just one simple adjustment gives the welding current desired . . . and Arcontrol offers choice of three types of arc.

For quick delivery or more information, call your Westinghouse distributor or Westinghouse office.

J-90477



FOR HEAVY-DUTY, PRODUCTION WELDING

A-C Welder Model WC-3C—500 amperes. Infinite number of current settings from 100 to 625 amperes.

FOR HEAVIER THAN AVERAGE WORK

A-C Welder Model WC-2C—300 amperes. Infinite number of current settings from 60 to 375 amperes.

FOR ALL-PURPOSE WELDING

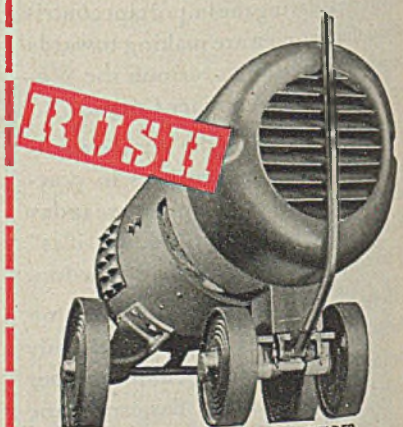
A-C Welder Model WT-4C—200 amperes. Has 27 different current settings from 20 to 250 amperes.

FOR MAINTENANCE AND LIGHT WORK

A-C Welder Model WT-1C—100 amperes. Has 15 current settings from 20 to 140 amperes.

FOR UNIONMELT* WELDING

Westinghouse A-C Welders for use with the Unionmelt Process available in 500, 750, 1,000 and 1,500-ampere models.



300-AMPERE FLEXARC D-C WELDER

New single preset current adjustment plus ARCONTROL. No exciter, rheostat or reactors to fiddle with.

*Registered trade-mark of The Linde Air Products Co.

Westinghouse WELDERS

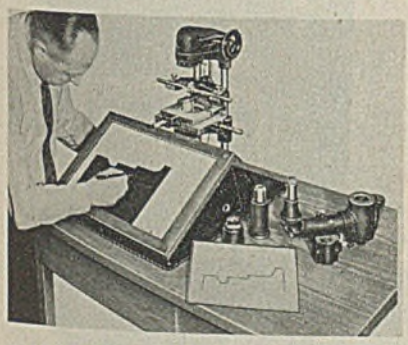
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

can be furnished with the following optional features: A floor lock to keep table from moving on its casters; a spring balanced towing handle; locking device which allows table top to be turned and locked each 15 degrees throughout the entire circumference; collapsible retaining bars for table sides to hold work on table; four swivel casters; stationary unit with feet in place of casters; a two-speed hydraulic foot pump substituted for the single-speed pump, giving double speed with lighter loads. Special tables also can be furnished with other features, including different capacities, sizes of table top, lowered and elevated heights.

Improved Projector

A larger beam of parallel light, permitting the use of larger diameter lenses in the low-power series is the feature of a new model Wilder projector introduced by George Scherr Co., 128 Lafayette street, New York, recently. Use of a 2-inch diameter condenser in the unit greatly increases the optical efficiency of the instrument.

An innovation of the instrument is a



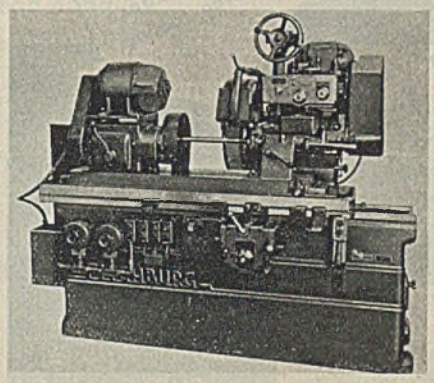
newly designed, fully enclosed head, with a more modernized and better ventilated lamp housing. For maximum smoothness of operation, spiral gears are used in the focusing motion. The setting thus becomes self-locking to a certain extent. Lenses of the projector are set in larger and heavier mounts. This facilitates changing and proper positioning in the lens cone. The diameter of the new 10X lens is 1⅜ inches and that of the new 20X lens 13/16-inch.

Precision Grinder

Increased work production, greater accuracy and finer finish are features of a new type B 10-inch plain cylindrical automatic precision grinder recently placed on the market by Fitchburg Grinding Machine Corp., Fitchburg, Mass. It is designed to handle a wide range and a number of types of jobs.

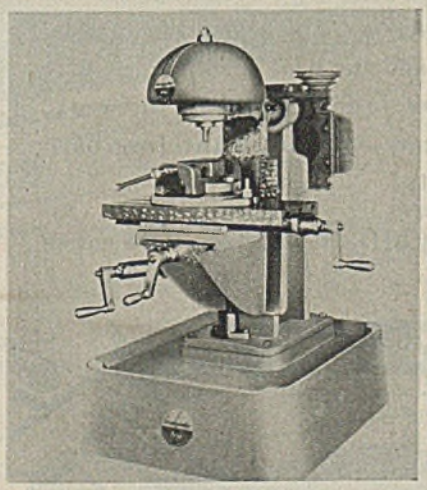
The new grinder is equipped with a fixed standard bowgage wheelhead unit. The bowgage head goes through a completely automatic cycle—rapid traverse to the work, correct feed, grinding dwell and rapid return—started by one pushbutton. Feed movements are controlled in 0.0001-inch on the wheel feed dial.

Individual motor drives are used for the bowgage wheelhead unit, table traverse, work spindle and coolant pump. Each motor is conveniently located, and belt adjustments are readily made. Electric circuits of the grinder are centrally located in a cabinet, and pushbutton controls for the individual motors are all located at the operator's finger tips. Base of the machine is of box construction with heavy walls and cross ribs.



Bench Milling Machine

Benchmaster Tool Co., 2952 West Pico, Los Angeles, announces an improved vertical bench milling machine with a quick-change attachment for horizontal milling. The 2½-inch diameter arm supporting the spindle head is clamped rigidly to the column and can be readily adjusted to rotate the spindle 60 degrees either side of center. The entire head



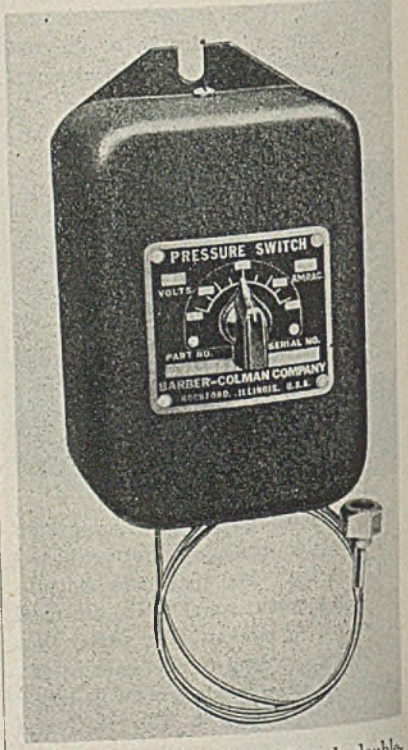
can be removed easily and replaced with an enclosed horizontal milling attachment. Thus, a variety of jobs such as precision die making, die sinking, profiling, jig boring, key slotting, etc., can be handled on this machine.

Compactly designed, this two-way ma-

chine stands 30 inches high, has a precision ground table 6 x 14 inches, with three ⅝-inch T-slots on 2-inch centers. Micrometer adjustments for the table movements are operated by convenient splined disengageable hand cranks. Graduated dials reading in thousandths of an inch make resetting simple. Proper tension on the V-belt at all times is assured by a floating motor mount. Rapid changes of the four spindle speeds (450, 850, 1400 and 2100 revolutions per minute) are possible without the use of tools. The spindle has a No. 2 Morse taper. The milling machine is powered with a 1/3-horsepower motor.

Pressure Switch

Barber-Colman Co., Rockford, Ill., is offering a new micro pressure switch for proportioning control of motor-operated valves, power units, program switches, etc., for the regulation of steam, air and



gas pressures. It is a single-pole double-throw 3-wire instrument with positioning solenoid.

The unit features a pressure sensitive bellows mechanism, mounted on a bakelite sub-base and enclosed in a metal case for surface mounting. To protect contacts, it is provided with a built-in condenser. The switch is adjusted externally but the setting may be locked in place by means of internal locking screws.

Crane Control

Cutler-Hammer Inc., Milwaukee, announces a perfected alternating-current crane control which eliminates install-

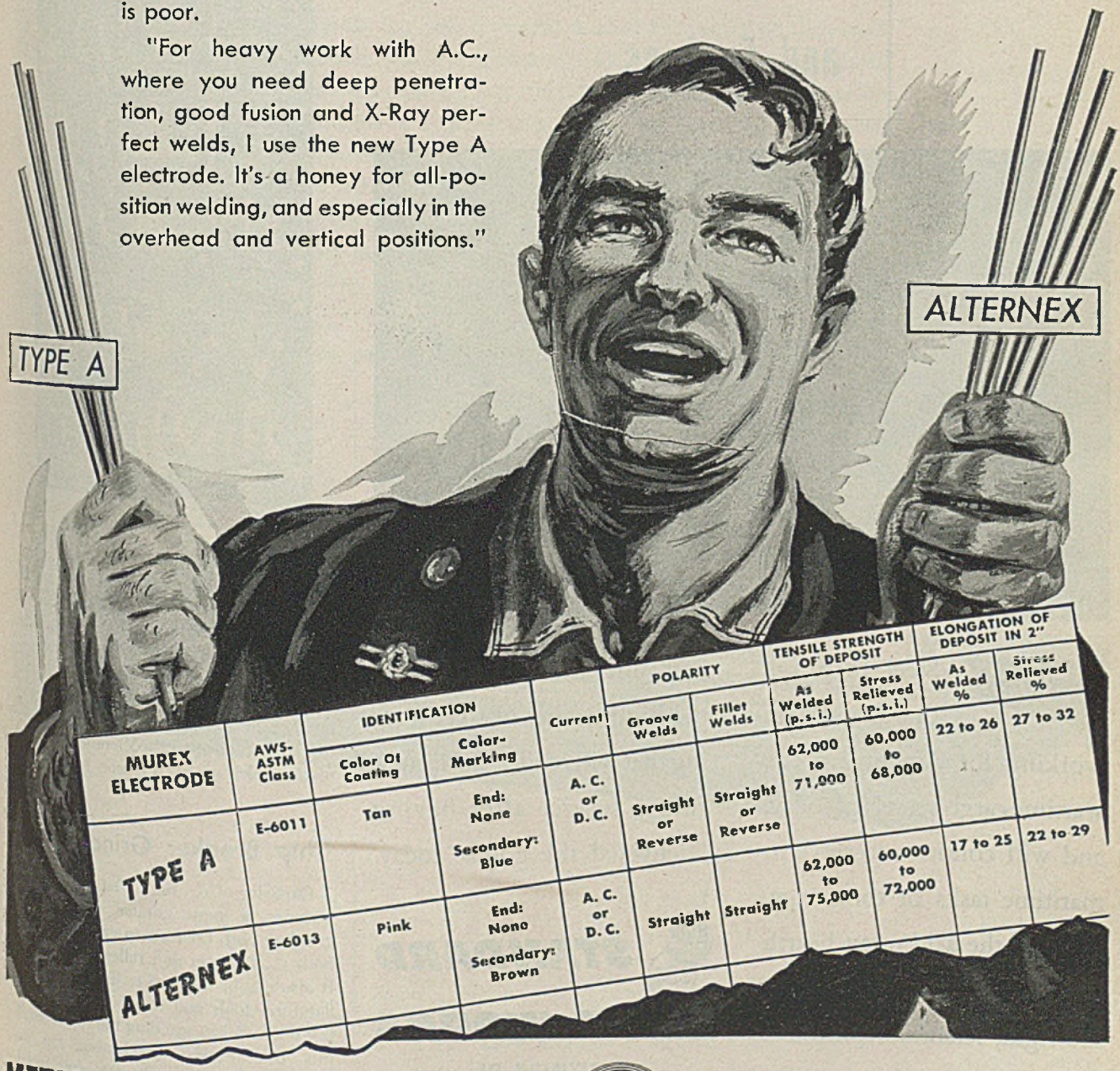
"They're a Sweet Pair for All-Around A.C. Work"

"With these two rods I can handle 'most any kind of mild steel welding when I want to use A.C.

"I use Alternex mainly with low open circuit, transformer type welders, and for light gauge work. It's colder than a Type A rod, so it's especially good where fit-up is poor.

"For heavy work with A.C., where you need deep penetration, good fusion and X-Ray perfect welds, I use the new Type A electrode. It's a honey for all-position welding, and especially in the overhead and vertical positions."

Send for the new Murex wall chart. It gives specifications on all Murex Electrodes, describes their applications and illustrates six ways of improving welding practice.



MUREX ELECTRODE	AWS-ASTM Class	IDENTIFICATION		Current	POLARITY		TENSILE STRENGTH OF DEPOSIT		ELONGATION OF DEPOSIT IN 2"	
		Color Of Coating	Color-Marking		Groove Welds	Fillet Welds	As Welded (p.s.i.)	Stress Relieved (p.s.i.)	As Welded %	Stress Relieved %
TYPE A	E-6011	Tan	End: None Secondary: Blue	A. C. or D. C.	Straight or Reverse	Straight or Reverse	62,000 to 71,000	60,000 to 68,000	22 to 26	27 to 32
ALTERNEX	E-6013	Pink	End: None Secondary: Brown	A. C. or D. C.	Straight	Straight	62,000 to 75,000	60,000 to 72,000	17 to 25	22 to 29

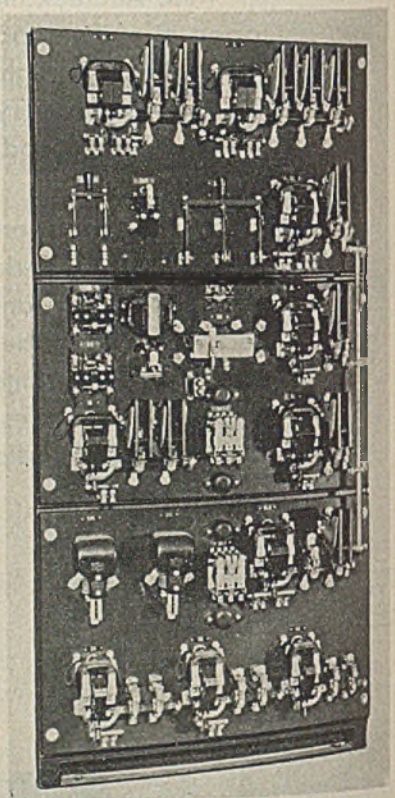
METAL & THERMIT CORPORATION

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

120 BROADWAY, NEW YORK

ALBANY • CHICAGO • PITTSBURGH
SO. SAN FRANCISCO • TORONTO

tion of direct-current generating equipment or rectifiers. It provides dynamic lowering over five stable speed points, accurate inching for spotting loads and timed acceleration in both directions from a standard 5-speed master. In lowering, the retarding torque increases as the master switch is notched back until, in the "off" position, maximum dynamic braking is combined with an auxiliary electrically operated brake for a quick, complete stop. Mechanical load brakes are



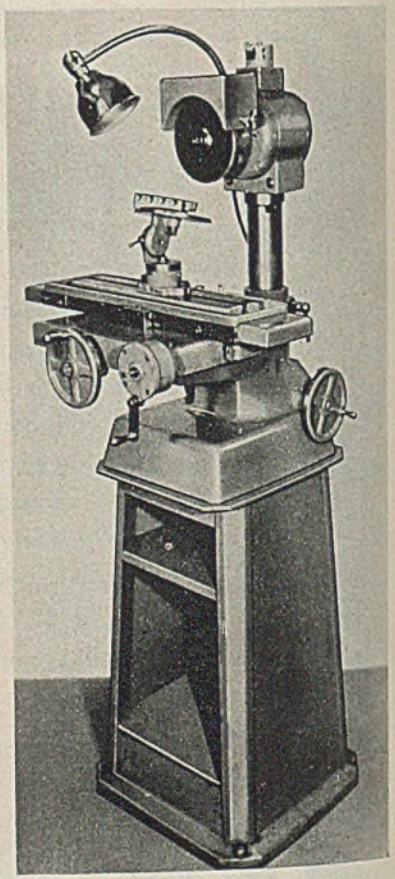
entirely eliminated with this new control. Operation of the 5-speed master switch duplicates conventional direct-current crane operation. Moving the master switch to the first point lowering or hoisting provides a slow speed which is increased as the master switch is moved to successive notches. If the master is moved directly to the last position, acceleration is automatic under control of time limit relays.

Chip Breaker Grinder

Carboloy Co. Inc., Detroit 32, announces a new grinder designed for grinding chip breakers in carbide tools of both single point and roller turner types. It also can be adapted to use for grinding flat form tools and round or square boring bits. When grinding the top of small bits the traverse mechanism can be changed from direct drive to slow speed through a 5:1 reduction ratio. This gives a short stroke at slow speed.

The grinder can handle tools up to 2 inches wide. Table length of the grinder, which has 10¾ inches of travel, makes

possible the grinding of breakers in both right and lefthand tools without moving the universal fixture on the table. Designed to use 6-inch wheels, the head is vertically adjustable from either side of the machine. To facilitate the grinding of chip breakers in roller turner tools, the universal fixture is designed to tip 90 degrees either side of horizontal and the center of the fixture can be cross-fed 1



inch past the center of the wheel. Rugged knee construction is beneficial where accuracy is required in grinding flat form tools.

A base, 29 inches high with large storage space, is available with the machine. The universal fixture and vise for holding tools up to 1¼ inches wide is provided with the grinder; also as standard equipment are a wheel guard and wheel lubricant tank, necessary wrenches, and flexible light bracket and reflector. Standard motor is single-phase 110-volt 60-cycle ¼-horsepower at 3450 revolutions per minute. Shipping weight of grinder without pedestal is 290 pounds; with pedestal approximately 390 pounds.

Heating Device

An automatically-controlled development for adding heat to industrial liquids in heat exchangers in order to maintain constant temperatures is announced by Niagara Blower Co., 6 East Forty-fifth street, New York. It can be used to

TO MASS PRODUCE PARTS LIKE THESE...

Turn to Turchan

THE ALL-HYDRAULIC DUPLICATOR

THE *forte* of Turchan Followers is high speed production of parts like those pictured here. Any part of irregular or eccentric shape or contour — any part that normally requires time-killing and painstaking hours on a machine tool *can be produced with a Turchan-equipped machine tool from three to twenty times faster.*

Turchan-equipped machine tools do not require highly skilled operators — no matter how intricate the machining job on hand may be. Any fair machine hand can handle one efficiently.

Turchan Followers attach easily to any standard lathe, shaper, grinder, planer or mill. Furthermore, they can be quickly disengaged whenever direct machining is desired. That's why many production men are *Turning to Turchan,* for faster, more efficient output. *Send for our new, free booklet on Turchan Followers today.*

TURN TO Turchan

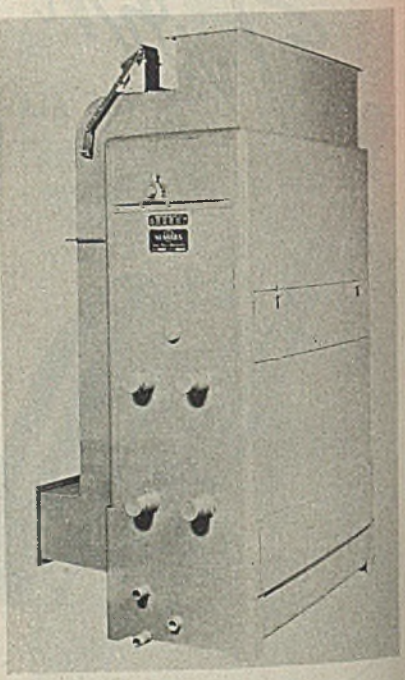
FOLLOWER MACHINE CO.

Originators of Hydraulic Duplicating Attachments

8255 Livernois Avenue — Detroit 4, Michigan

control temperatures in industrial, chemical processes and electrical equipment by controlling jacket-water temperatures, also quenching baths in the heat treating of metals, cutting oils and lubricants in metalworking, machining and wire drawing.

Temperatures are controlled by using either a steam coil or injector or an electric heating unit to heat the spray water. The heating device is put into operation by thermostatic control at the desired point, preventing the liquid from becoming too cold for the process in which it is used, or from becoming viscous with



retarded flow and loss of capacity, or from congealing or freezing. This also makes it possible to install the heat exchanger successfully out of doors, or to use fresh, out-of-door air to increase its evaporative cooling capacity.

Milling Cutter

Super Tool Co., 21650 Hoover road, Detroit, announces a new carbide-tipped milling cutter with cast alloy body said to be instrumental for production increases of as much as 300 per cent in milling aircraft landing gear parts.

Made with a minimum number of flutes necessary for various classes of work, the cutter is designed so simple that its price is reduced to a point where it can be used generally on short runs and for general shop tooling.

A feature of the development is it can be operated at greater speeds—providing finishes comparable to ground surfaces. Greater accuracy also is claimed at these higher operating speeds. The feed per tooth being lower, the cutting pressure is lessened and there is con-

You bet they're Tough

...making 'em tough is our business

WARTIME PRODUCTS

ARMOR PLATE FOR AIRCRAFT, TANKS, AND TANK RETRIEVERS

ARMOR SHIELDS FOR GUN MOUNTS

SPRINGS FOR JEEPS, HALF-TRACKS, AND TANK RETRIEVERS

FORGINGS FOR AIRCRAFT

BOLO KNIVES FOR FILIPINO REGIMENTS

PEACETIME PRODUCTS

SPRINGS AND BUMPERS FOR PASSENGER CARS, TRUCKS, AND TRAILERS, ASSEMBLED ON THE PACIFIC COAST

HIGHWAY GUARD RAILS AND ROAD-CENTER DIVIDERS

AGRICULTURAL CULTIVATOR STEELS

OTHER PRODUCTS USING HEAT-TREATED, SPRING-STEEL

"This award symbolizes your country's appreciation of the achievement of every man and woman in the United States Spring and Bumper Company"

ROBERT P. PATTERSON
Under Secretary of War, July 24, 1943

Your sons (and ours) are fighting this war with the most modern, highly developed weapons, many of which are equipped with unbelievably tough armor plate. The ability of this armor to stop or deflect enemy fire means life itself to our fighting men.

We believe you are interested in the award of an Army-Navy "E" to the men and women of the United States Spring & Bumper Co., because much of the war equipment they have been making is armor plate for aircraft, tanks, tank retrievers and gun mounts.

United States Spring & Bumper Co. is the first armor plate manufacturer on the Pacific Coast. An important and difficult task was assigned those who labor at heat-treating furnaces — great straightening presses — the scores of arduous tasks necessary to the production of armor plate. They did their work so well that now all the workers at United States Spring & Bumper Co. proudly wear the Army-Navy "E" pins awarded to them by their country for their achievement.

And above our plant now flies the Army-Navy "E" flag — a constant reminder to all of us of our great obligation to the many who place such faith and confidence in our work.

★ *YES, it is YOUR WAR BONDS, and OURS, which will assure more...and still better...airplanes, tanks, guns, and other vital weapons for our fighting men whose need is so great.*

UNITED STATES SPRING AND BUMPER CO.

JOHN B. RAUEN, *President*

4951 ALCOA AVENUE • LOS ANGELES 11, CALIFORNIA

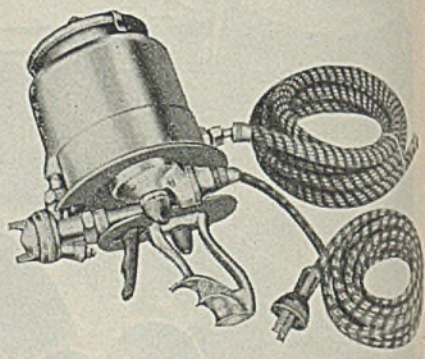
sequently less distortion of the work. Another advantage is the throwing off of the major portion of the heat in the chip, leaving less to be absorbed by the work and the cutter.

On actual production jobs, the cutter is being used successfully in steel at surface speeds of 400 to 600 feet per minute with tooth load varying with the hardness of the steel from 0.0005 to 0.0025-inch, it is said. Standard cutters for cutting cast iron, brass, bronze, copper, aluminum and magnesium are supplied in diameters from 3 to8 inches in a variety of widths. These tools are 4 or 6 flutes. For cutting steel, sizes are offered with 6 to 16 flutes, according to the diameter.

Electrically-Heated Airbrush

Better insulation for trigger and handle—better balance for easy operation and precise control of round and fan spray by calibrated dial are features of the new type F-974 electrically heated airbrush introduced by Paasche Airbrush Co., 1909 Diversey Parkway, Chicago.

The unit heats both the air and material. Heat is thermostatically controlled from a low of 180 degrees Fahr. to a medium of 260 degrees and a high of 320 degrees Fahr.



A new type cup with large 3⅝-inch opening and removable snap-on cover simplifies cleaning and filling of the unit.

About 10 to 30 pounds of air pressure are required to operate the airbrush.

Welder

Glenn-Roberts Co., 1009 Fruitvale avenue, Oakland, Calif., reports a new model, G-3 49, heavy-duty manually-operated transformer-type alternating-current welder. An oversize core, working at low flux densities, insures an extra margin of safety in handling continuous welding loads. Two open-circuit voltages give a wide variety of applications, par-

ARMOR-VIT ... now on army field ranges

ORIGINALLY, Army field ranges were made of stainless steel. Due to the need for conversion to less critical materials, this specification was changed to galvanized sides and back, porcelain enameled interior, zinc plated castings, and all other parts finished in oil or wax.

But Army field ranges have to "take it" whether in the Aleutians or the Solomons. The transportation hazards and abuse to which they are subjected are almost unbelievable. 800° F. in the interior, with salt air or salt-water on the exterior. . . . Well, the ordinary finishes just wouldn't stand up—and the army said "No" to any bright metals in the field.

The problem was to get a finish that had both endurance and low reflectance. The answer was: **ARMOR-VIT.** Here was a finish, available in olive-drab, gray or black, which was highly resistant to corrosion, rust, impact, scratching, abrasion, heat, thermal shock, alkalis, or acids. Its lusterless, matte finish provided the necessary camouflage.

Being a priority-free finish, **ARMOR-VIT** is making it possible for some manufacturers to substitute iron or steel for the more critical metals, such as chromium, zinc, nickel, cadmium, bronze, brass, tin, etc. Investigate **ARMOR-VIT** today. It has remarkable properties.

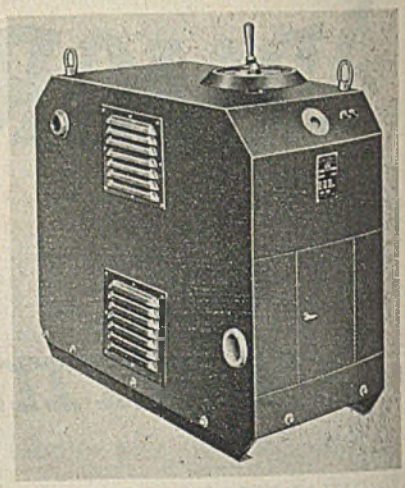
Although ceramic in nature, there is no comparison between **ARMOR-VIT** *and porcelain enamel, paint, lacquer or synthetic finishes. It is non-volatile, non-explosive. It withstands heat of over 1000° F., and is unaffected by the standard 200-hour salt spray tests, or weatherometer tests equal to 5 years normal weather.*

ARMOR-VIT DIVISION

CHICAGO VITREOUS ENAMEL PRODUCT CO.

Cicero, Illinois

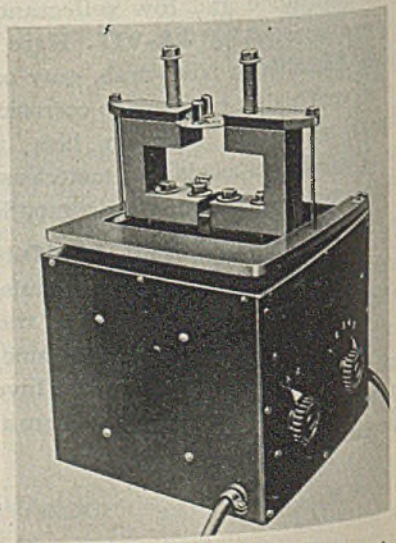
ticularly for heavy plate, within the machine's output range of 100-675 amperes. Because the welder remains extremely cool at work (meeting the temperature rise



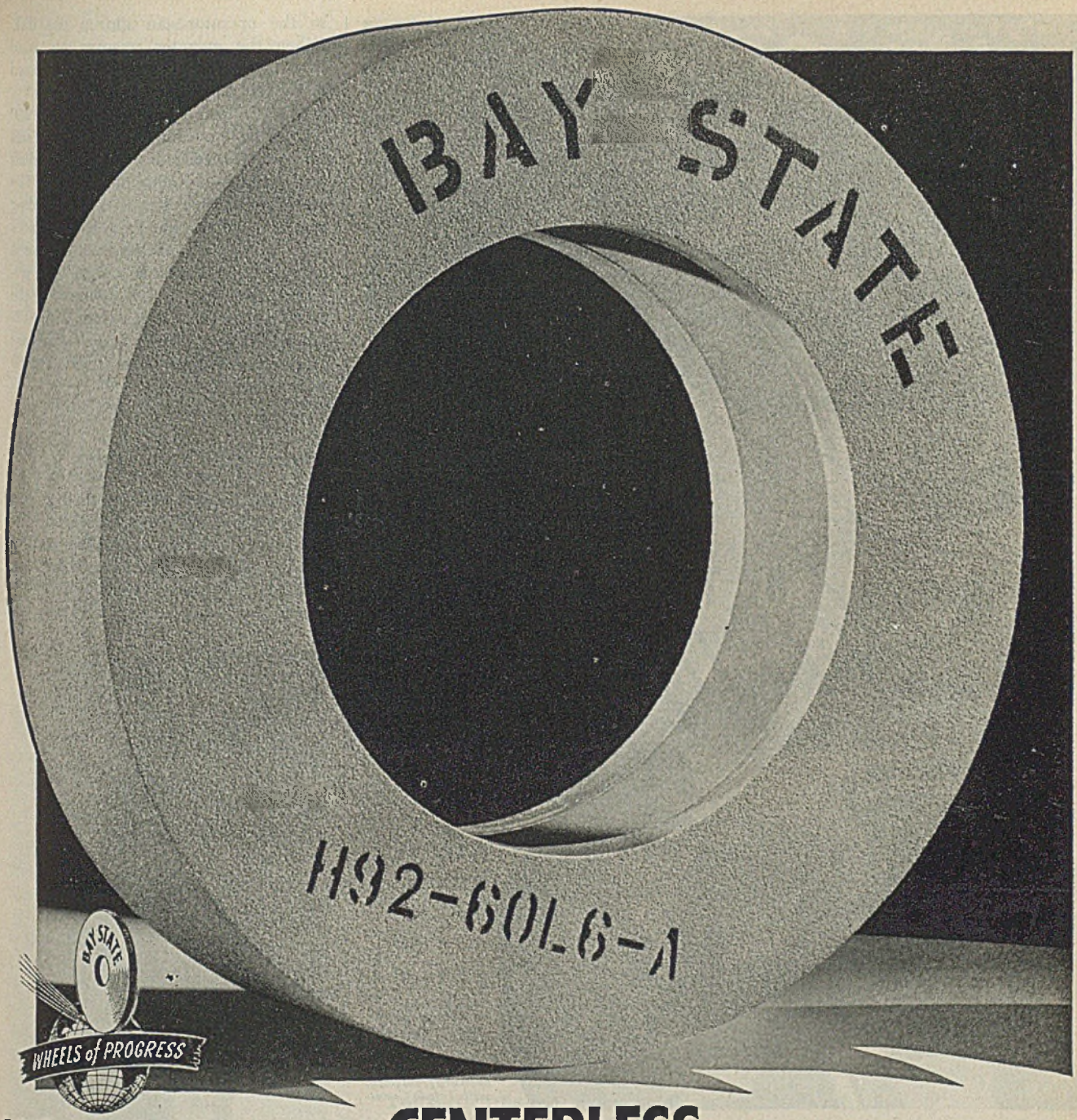
specifications of NEMA) without having its forced ventilation system in operation, no damage to the machine will result if the standard forced ventilation system should at any time become inoperative. A contactor with push button control is provided, and the machine can be changed from hand to automatic operation when desired. Rods from ⅛ to ⅜-inch diameter can be handled—the only required adjustment is a twist of the hand wheel.

Soldering Transformer

American Car & Foundry Co., 30 Church street, New York, is offering a new electric soldering transformer, type



T-37, for crimping two brass cups with a ring of soft solder between the cup and the brass disk, shown in the illustration. The disk here is of brass, about ⅛-inch thick, between 2½ and 3 inches in diameter. By pressing down on the transite board of the unit, the front edges of the copper pressure shoes spring up



Wheels for *any* CENTERLESS Grinding Job!

There are reasons for BAY STATE Superiority through Scientific Manufacturing Control.

1. FRACTIONAL GRADES — permit a wider range for a more accurate wheel selection.
2. CONTROLLED POROSITY — assures duplication.
3. H9 BOND — offers cooler cutting, greater wheel life, better production.
4. PATENTED INSTRUMENTS — for checking the hardness of grades. *Send for Bulletin.*

BAY STATE

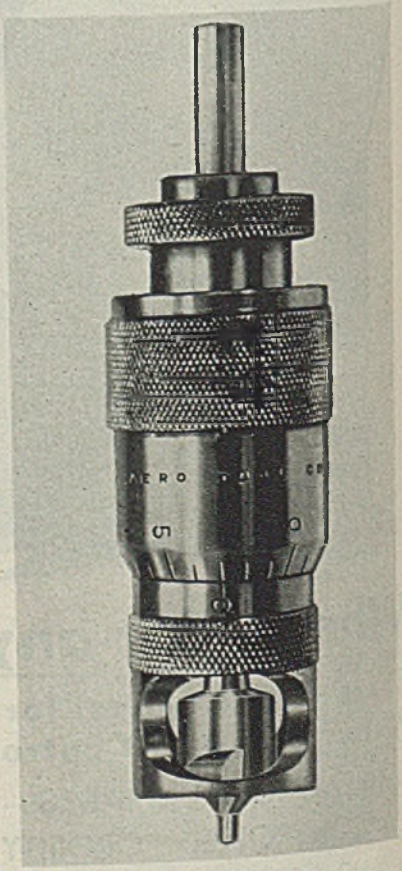
ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

so the operator can slip in the disk. When the operator removes his hand from the lever the disk is firmly pressed to the electrodes by these pressures.

With a load of 9½ amperes on 220 volts, the transformer runs the soft solder in 11 seconds. A—on the dials in the front—is high, and B is low. The unit features five heat speeds, providing ten heat ranges for the various grades of work. The transformer is composed of four legs of silicon steel; the primary capacity is 4-kilovolt-amperes; the secondary capacity runs from 2 to 0.7-kilovolt-ampere. The 1-turn secondary features a 9-voltage range from 0.3 to 0.9 volts.

Improved Countersink

A split keeper which is used to give positive set to the retainer collar on bearings is now incorporated in all micrometer stop countersinks manufactured by Aero Tool Co., Burbank, Calif. With this feature, no amount of vibration will



loosen the bearing retainer and cause damage to the tool or material on which it is used.

Keeper inserts work on the slotted, taper shaft principle. Force is directed toward the shaft center under constant, even pressure. The unit may be immediately disassembled by hand as no tools are required. On-the-job oiling and other required servicing becomes a matter of moments.

Larger Electrodes

(*Continued from Page* 105)

tionately lower rate of weld deposition. The threaded shaft of the positioner permits the box to be easily rotated for welding a continuous bead along each successive corner joint.

In welding the eight U-shaped bolt brackets to the sides of the box, a different fixture is required for the positioner. This fixture, Fig. 5, has a post mounted on each corner of a flat plate. Two of the posts have a pin extending from the top over which the box is mounted by passing the pins through the holes in one of the mounting straps. The box rests on the top of the other two posts of the fixture. A union is welded to the bottom center of this fixture and screws on the shaft of the positioner.

Fig. 5 shows the welding operator finish-welding the bolt brackets which have a thickness of ⅛-inch. A bead is placed along the top and sides of the bracket at the points where it contacts the side of the box.

Electrode Change Speeds Work

The work is tilted at about a 30-degree angle. Increased speed and efficiency were obtained here by changing from ⅛-inch electrodes to the present 3/16-inch size, using a current setting of about 270 amperes.

After the lugs have been tack welded to the cover, the finish welding is done on the same fixture employed in welding the mounting straps, Fig. 3. In this instance, the fixture plate fits inside the cover as indicated in Fig. 8. A bead of weld metal is placed along the back edge of the ⅛-inch thick cover lugs, fusing them directly to the cover. Here the same current setting and electrode size used for welding the side bolt brackets is employed—3/16-inch rod at 270 amperes.

The work is tilted at about 30 degrees and the cover is revolved on the positioner shaft so the downhand position can be used for welding each pair of lugs on successive sides of the cover.

The L-shaped brackets of ⅛-inch mild steel which are located on the inside of the box near the bottom, see Fig. 6, are used as supports for two fuse blocks which are later installed in the completed unit. These inside brackets, also positioned by means of special clamping fixtures, are spot welded only and do not require arc welding. Three of these brackets are visible inside the open box at the left in Fig. 6.

After all welding operations have been completed, the entire box and cover are spray painted, then a one-piece molded rubber gasket is hand-pressed into the channel formed between the Z-angle and the top sides of the box. The gas-

ket is shown in place in the box at the left, Fig. 6. A rubber mastic material is first applied in the channel to seal in the gasket and produce a tight, waterproof fitting. The gasket is of such thickness that the top edge of the rubber extends slightly above the top edges of the box.

Hinged thumb screws are then fitted into the side brackets of the box. These fittings are chromium plated and consist of a pin with a threaded hole in the center, into which a threaded bolt is screwed. A spacer, placed over each threaded bolt between the pin and the cover lug, Fig. 7, acts as a pressure equalizer when tightening down the cover.

In other words, the thumb screws can be tightened down only to the point permitted by the spacer, assuring equal pressure on all eight clamping points. The cross-section view, Fig. 7, illustrates how the pressure exerted by the cover against the rubber gasket spreads the top edge of the gasket against the underside of the cover, assuring a tight seal.

The completed box, with the cover fully clamped into place, is shown at the right in Fig. 6. Completed boxes are tested for water-tight construction by placing them under water and injecting air into the box through the drain outlet fitting welded in the side near the bottom of the box. The fitting is threaded so the air line can be attached to it securely. The boxes must show no leak when an air pressure of 5 pounds per square inch is applied.

The manufacturer reports rejects have been practically eliminated because of carefully welding the joints and the effective method of sealing the cover. Results of these fabricating operations have generally proved satisfactory. The greater welding efficiency and speed obtained by increasing electrode sizes also has proved satisfactory. The benefits are due to a higher rate of weld deposit and a marked reduction in number of electrode changes necessary.

Booklet Discusses Sands Used in Various Foundries

Advantages of synthetic sands over natural molding sands, steel sand formulas, proper mixing of Bentonite and sand in the foundry, and the use of Volclay Bentonite in the gray iron foundry are among subjects discussed in a new 48-page booklet recently issued by American Colloid Co., Chicago.

Entitled *Foundry Sand Practice*, the publication is written by Clyde A. Sanders, company engineer. Besides discussing sands used in malleable, steel and gray iron foundries, it provides a number of tables useful to foundrymen.