

EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

Wm. M. ROONEY IRWIN H. SUCH
News Editor Engineering Editor

J. D. KNOX CUY HUBBARD
Steel Plant Editor Machine Tool Editor

ARTHUR F. MACCONOCHIE
Contributing Editor

DON S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE, W. J. CAMPBELL
G. W. BIRDSALL, F. R. BRIGGS, D. B. WILKIN
New York: B. K. PRICE, L. E. BROWNE
Pittsburgh: R. L. HARTFORD
Chicago: E. F. ROSS Detroit: A. H. ALLEN
Washington: L. M. LAJIM
London: VINCENT DELPORT

ASSISTANT EDITORS

J. G. SULLIVAN, J. M. KURTZ, R. W. SHESTAG
J. M. WHELAN, A. J. FINGULIN

EDITORIAL CORRESPONDENTS

R. W. KINCEY L. C. FELDMAN
Birmingham, Ala. Buffalo, N. Y.

GEORGE R. REISS SAMUEL S. CARR
Youngstown, O. Cincinnati, O.

J. VION PAPIN F. S. TOBIN
St. Louis Toronto, Ont.

LUTHER WHITEMAN
1414 Paducah St., Los Angeles, Calif.

ROBERT BOTTORFF
415 Bush St., San Francisco, Calif.

R. C. HILL
408 Marion St., Seattle, Wash.

BUSINESS STAFF

G. O. HAYS
Business Manager

R. C. JAENKE C. H. BAILEY
Advertising Manager Advertising Service

New York, E. W. KREUTZBERG, K. A. ZOLLNER
Pittsburgh, S. H. JASPER, B. C. SNELL
Chicago, L. C. PELOTT, V. W. VOLK
Cleveland, D. C. KIEFER, H. G. ROWLAND
Los Angeles, F. J. FULLER

J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland 13, Ohio

BRANCH OFFICES

New York 17 16 East 43rd St.
Chicago 11 520 North Michigan Ave.
Pittsburgh 19 2800 Koppers Building
Detroit 2 6560 Cass Ave.
Washington 4 956 National Press Bldg.
Cincinnati 2 2030 Carew Tower
Los Angeles 4 130 N. New Hampshire Ave.
London 2 Caxton St., Westminster, S.W. 1

Published by THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio, E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President and General Manager; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer.

Member, Audit Bureau of Circulations; Associated Business Papers, Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year \$6; two years \$10; all other countries, one year \$12. Single copies (current issues) 25c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1944 by the Penton Publishing Co.



STEEL

The Magazine of Metalworking and Metalproducing

NOVEMBER 20, 1944

Volume 115—Number 21

NEWS

Nazi Resistance Spurs WPB on Critical Items Production	65		
<i>Top officials tour industrial centers to correct lag in output</i>			
Present, Past and Pending	67	WPB-OPA	79
Labor	68	V-E Day Plans	80
Iron Ore	69	Postwar West	83
Meetings	70	Men of Industry	88
Statistics	72	Obituaries	90
Stainless Steel Suit	73	Canada	91
Surplus Property	75	Activities	96

TECHNICAL

Cycle Testing Systems Predict Paint Film Performance	100
<i>Greater wear resistance can be "added" in initial formula</i>	
Method Studies to Improve Riveting Lead to New Techniques	102
<i>Number of operations halved, production speeded by revisions</i>	
Routine Inspection and Salvage of Machinery Weldments	105
<i>Concluding article on procedures for reclaiming rejected work</i>	
Gear Manufacturers Foresee Marked Changes in Postwar Design	112
<i>Research in metals and carbides, vibration studies to bear fruit</i>	
Zinc-Base Alloy Dies Reduce Short-Run Stamping Costs	114
<i>Use of Kirksite enables rapid production of dies from drawings</i>	
Ohio River Sintering Plant Replete with Innovations	120
<i>Efficient layout and newest equipment set 75-tons-per-hour rate</i>	
Plant Truck Battery Charging Goes on Assembly Line Routine	126
<i>Regular servicing guarantees longer life and lower maintenance</i>	
Skid-Load and Power-Truck System Aids Steel Propeller Production	128
<i>Materials handling job is harder than weight of blades implies</i>	

FEATURES

As the Editor Views the News	61	Wing Tips	92
Postwar Previews	73	The Business Trend	98
Windows of Washington	74	Industrial Equipment	136
Mirrors of Motordom	85	Construction and Enterprise	202

MARKETS

War Needs Tighten Steel Picture as Pressure Grows	179
Market Prices and Composites	180
Index to advertisers	209



NICKEL ALLOYS AID THE CHEMICAL INDUSTRY
to KEEP 'EM PRODUCING!

Stainless Steel Lined Polymerization Reactors in Synthetic Rubber Plant

*Equipment of Stainless Steel, Nickel and Monel
 meets many specialized requirements*

Chemical engineers have met America's wartime challenge.

They opened the gates to a mighty flood of products going to war...strategic raw materials, synthetic substitutes, and entirely new substances having advantages all their own.

A factor in this production success is the wide use of stainless steel, Monel, and other corrosion-resistant alloys containing Nickel.

For in the chemical industry corrosion is a large-scale menace.

To wage war on this enemy, chemical engineers enlisted the aid of Nickel, because Nickel imparts to other metals strength and resistance to corrosion and wear. In the chemical field, as in many

others, a little Nickel goes a long way to keep equipment producing.

It prolongs the life of processing apparatus, and protects the purity, color, and uniformity of the product.

Hence, stainless and Nickel alloys are specified widely for acid heaters and caustic coolers, for high-pressure autoclaves and vacuum evaporators, for cracking towers and polymerization reactors, for shipping drums and tank cars, for pumps, piping and storage tanks, for agitators and settlers, for stills and digestors—for every type of equipment that converts laboratory experiments into full-scale chemical operations.

For years we have enjoyed the privilege of cooperating with technical men

of the chemical industry...and of many others. Whatever your industry may be...if you want help in the selection, fabrication, and heat treatment of alloys...we offer you counsel and data.

New Catalog Index

New Catalog C makes it easy for you to get Nickel literature. It gives you capsule synopses of booklets and bulletins on a wide variety of subjects—from industrial applications to metallurgical data and working instructions. Why not send for your copy of Catalog C today?



★ *Nickel* ★

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York 5, N. Y.

Lessons from Britain

In its issue of Oct. 11, 1944 THE TIMES of London carried a comprehensive editorial on the British coal situation. The factors discussed are so pertinent to the currently important problem of preserving private enterprise that American industrialists may well study this British predicament and profit from its lessons.

According to the editorial, coal output per man in the last six months averaged 5 hundredweight less than in the preceding period. The loss is attributed to an increase of 25 per cent in the "voluntary absenteeism" of miners.

However, THE TIMES contends that the situation is much more than a matter of absenteeism. It "is the outstanding instance of an industry handicapped and impoverished by technical backwardness, by the protracted failure of owners and governments to promote a determined policy of modernization and by the resulting and cumulative embitterment of relations between workers, managers and owners."

The editorial explains that while British coal itself has been nationalized, the extraction of coal has not. Much of the coal mined is being removed by antiquated methods of the nineteenth century. These methods prevent the industry from operating at capacity, deny the nation a surplus of coal for postwar export, raise the cost of coal to a prohibitive level and prevent the miners from digging enough coal to justify the wages they demand. In short, coal mining is the heaviest millstone on the neck of British industry.

Two remedies have been proposed. One is to transfer all mining operations to public ownership. The other is to unify the ownership of mines by merging private companies. Neither policy has been pursued earnestly or consistently. Small, independent, inefficient operations still persist.

The situation has two lessons for Americans. First is the demonstrated fact that backwardness in one basic industry imposes severe penalties on other industries. Second is that private industry of the lone-wolf type which acknowledges no responsibility to the public threatens the security of all private enterprise.

These lessons should emphasize to American industrialists the importance of clarifying what we mean by private enterprise. One who engages in private enterprise enjoys a franchise which is valid only as long as he endeavors to serve the public welfare. When he puts private gain too far ahead of public service he runs the risk of forfeiting his franchise.

Once all industrialists recognize and accept wholeheartedly this concept, the sooner the preservation of the private enterprise system in America will be assured.

THE CRITICAL 10%: Partly because of the mercurial disposition of the American public, government officials are finding it necessary to place renewed emphasis upon the importance of maintaining and in some instances increasing the tempo of war production. The stiffening resistance of the Nazis and the encouraging naval victories in the Philippines tend to upset the earlier timetables of V-E and V-J days. For the present, plans for reconversion are pushed into the background and will

be subject to considerable modification. Meanwhile schedules for the production of certain critical war items must be revised upward.

The present urgency for increased output involves about 10 per cent of the war production program. In this "critical 10 per cent" are included heavy artillery and ammunition, heavy trucks, combat tires, superbombers, attack transports and cargo ships, tanks and engine repair parts.

In order to speed up lagging production, WPB

officials are employing what Chairman J. A. Krug calls the "rifle" approach. Delegations from Washington visit trouble spots.

Most of the trouble arises from absenteeism and shortages of manpower and of special machine tools. The immediate problem is to allocate the proper facilities to the "critical 10 per cent" area of production. —p. 65

ACTION WITHOUT FEAR: Chrysler's president, K. T. Keller, has the knack of speaking plainly. Addressing the Pittsburgh Chamber of Commerce, he urged industrial executives to strike out bravely for a return to a healthy peacetime economy. When the time comes, industry should take "swift and confident action without reliance on government, without fear of government or of labor or of stockholders or of its critics."

In the quoted words are the emotions of one who sees the folly of compromising to please everybody. Mr. Keller feels that industrial leaders can do a smart job of reconversion if they will act independently.

Some persons will ask why fear of stockholders is mentioned. Few people realize how frequently good executives hesitate to do the things they know are right because they realize their decisions may lead to unfair criticism or even persecution of their stockholders by government, labor or the public.

Today an industrial executive's lot is not a happy one. —p. 85

PROGRESS IN GEARS: After digesting the meat of the technical discussion at the meeting of the American Gear Manufacturers Association held in Chicago early this month, our machine tool editor picks out three wartime developments which he believes will have a marked effect upon postwar design. The three are tungsten carbide hobs, more effective analysis and control of vibration and better understanding of worm gearing contact temperature conditions.

Experience with each of these developments still is somewhat limited. The potentials and limitations of the carbide-tipped hobs remain to be demonstrated, our knowledge of vibration is far from complete and the work on worm gear contact temperatures still is in the exploratory stage.

Nevertheless, the progress in these and other lines is promising enough to suggest that gear manufacturers after the war will be able to offer lighter and stronger gear mechanisms with unprecedented power-transmitting capacities. —p. 112

LESS PAPER WORK? The Bureau of the Budget is tackling a problem close to the heart of every industrialist. It has informed the Senate Committee on Small Business that the change from war to peace will make it necessary to overhaul and re-establish the federal government's statistical services required by the permanent agencies and to develop "a rounded program to supply the basic industrial statistics needed not only by the government but by industry as well."


According to the bureau, the number of forms in use by government agencies last July 1 was 5870. Of these, permanent departments were using 2470, independent agencies 1406 and emergency agencies 1994.

Many persons familiar with the paper work performed by industrial corporations in accordance with government regulations during the past few years are convinced that more than half of it was of no use to anybody. The waste in paper alone was tremendous; the waste in manpower equally serious. We hope BB can cut down unnecessary reports drastically and hold to a minimum the volume of peacetime paper work. —p. 72

EXODUS FROM WLB: Three public members of the National War Labor Board—William H. Davis, Dr. Frank P. Graham and George Taylor—have offered their resignations. Their decisions to leave their posts, coupled with the recent resignation of Dr. John R. Steelman, director of conciliation, which becomes effective Nov. 25, tend to focus attention upon the government's organization for handling labor affairs.

Historians probably will place a low rating upon the administration of labor policy during World War II. This rating will be unfair to many who, like the four men who are resigning, have worked hard and capably under an impossible set-up. There has been no fixed labor policy and no adequate authority or organization. The President has changed the rules to suit the circumstances and opportunities of the moment.

Hundreds of conscientious public servants deserve much credit for trying to accomplish results under such adverse conditions. They have taken more than their share of abuse. —p. 68


EDITOR-IN-CHIEF



Round-the-Clock Carloading at Inland

Carloading and prompt dispatch of cars from the mill are important to Inland because they are important to Inland's customers. These round-the-clock jobs have been intensively studied, resulting in improved packaging and carloading despite full rolling schedules, shortage of some types of railroad equipment, scarcity of bracing, etc.

When an order is ready for shipment, cars of suitable types are ordered into the mill. Cars to be loaded with the product of one mill are spotted at that mill. When carloads are composed of products from two or more mills, loading is speeded by spotting a car at one mill and trucking

the products of other mills to the car. Throughout each hour of the twenty-four, expeditors keep steel flowing to loading points and as soon as cars are loaded, they are switched to the railroad yard where they are assembled for quick dispatch to our customers.

We invite you to confer with an Inland shipping specialist. He will gladly study your loading, unloading, and shipping problems, giving you all available assistance under the conditions of war, and helping you plan for speedier and more convenient delivery of steel for use in time of peace.

Bars • Floor Plate • Piling • Plates • Rail • Reinforcing Bars • Sheets • Strip
Structurals • Tin Plate • Track Accessories

BUY MORE
WAR BONDS
TODAY!

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Illinois

Sales Offices: Cincinnati • Detroit • Kansas City • Milwaukee • New York • St. Louis • St. Paul

RYERSON



Best Source for Steel

There is more time for creative business-planning when executives recommend Ryerson Steel Service as their companies' source for steel.

Here are the plus values that explain why Ryerson Steel Service is the best source for *all* steel products: Ryerson complete stocks include more than 10,000 different kinds, shapes and sizes of steel. Deliveries are made promptly by truck and rail. When a needed item cannot be delivered from one Ryerson plant, service is available from the Company's ten other plants.

Ryerson quality is uniform and dependable. Ryerson

metallurgical and engineering counsel are of high value. Technical data on hardening is furnished with all alloys.

Ryerson Steel Service represents 102 years of business history. To prove its plus values, place your next order, large or small, with your nearest Ryerson plant. Meanwhile, send today for a Ryerson Stock List.

JOSEPH T. RYERSON & SON, INC. Steel Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

RYERSON STEEL-SERVICE

Nazi Resistance Spurs WPB on Critical Items

Top officials tour industrial centers to correct lag in heavy artillery, ammunition, trucks, superbombers, tires, etc. Soft-pedal reconversion publicity. Victories over Jap fleet may telescope gap between V-E and V-J Days

DECISIVE victories over the Japanese fleet in the Philippines and grinding enemy resistance at the borders of Germany are knocking former reconversion plans into a cocked hat.

It now appears the gap between victory in Europe and victory in Japan will be narrower than was anticipated. The delay in V-E Day and the probable earlier realization of V-J Day may well mean that the effects of sudden contract terminations will be felt immediately after Germany collapses.

When it was believed that a protracted period—a year or more—might elapse between V-E and V-J days, tentative plans called for a 40 per cent reduction in war production after the defeat of Germany. This would allow for com-

parative gradual reconversion. If, however, the war with Japan is in its closing stages when the Nazis fold up, more drastic cuts in Army and Navy requirements will result and surpluses accumulated in Europe can be transferred to the Pacific theatre. A sudden plunge from all-war to all-peace would leave business without opportunity to adjust and the peace might be followed by a period of large-scale inactivity and unemployment and possibly sharp deflation.

In the face of this possibility, military and war production officials are pleading for increased production of munitions, particularly in the "critical 10 per cent" programs. A revived sense of urgency in the production of heavy artillery

El Joe, home on furlough, foregoes night clubs to work in Carnegie-Illinois Steel Corp. South Chicago plant



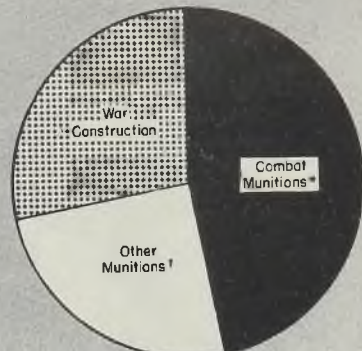
Growth of war production and construction, 1941 to 1944, is shown at right

1941



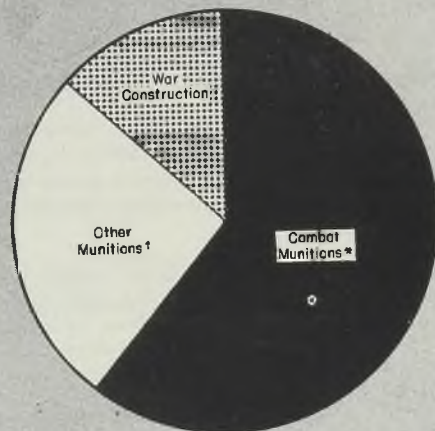
\$ 13,000,000,000

1942



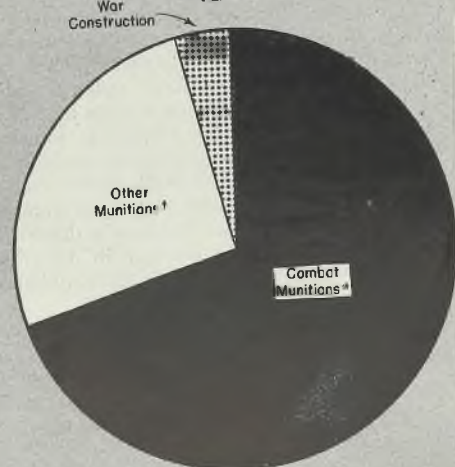
\$ 44,000,000,000

1943



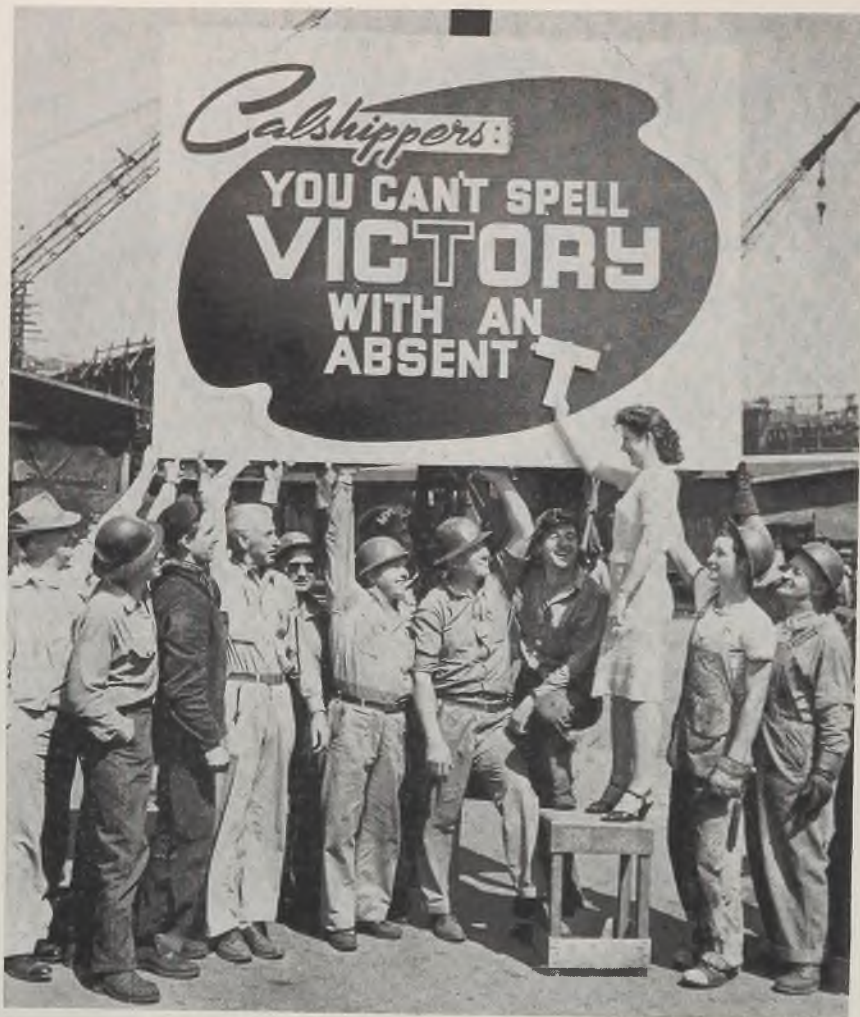
\$ 65,000,000,000

1944



\$ 70,000,000,000

(Actual through August; Schedule thereafter)



Mounting absenteeism, partially as a result of over-optimism, has caused labor-management committees to revive campaigns to impress workers with the importance of staying on the job. Shown above is a large poster at California Shipbuilding Corp. to carry the idea to employees. NEA photo

and ammunition, heavy trucks, combat tires, superbombers, the military vessels known as combat leaders, including attack transports and cargo ships, tanks and engine repair parts, has been noted for several weeks.

Stiff Nazi resistance and the fact that artillery ammunition has had to be rationed in the European theatre has caused war production officials to re-examine the munitions production picture. The record shows that in no month in 1944 has war production reached the dollar volume of December, 1943, when output totaled \$5549 million and the War Production Board index hit 118.

The slump was evident in January of this year when production dropped \$127 million and the WPB index fell two points. The index zigzagged from there on, up and down but mostly down. The low point was reached in July, when production amounted to \$5283 million and the index dropped to 113.

September production, the latest month for which official figures are available, was \$5300 million, and the index 114. This was 2 per cent below the average for the year to date and was 4 per cent

below schedule. The greatest lag was in the most critical items.

October figures are believed to be somewhat better, but not good enough.

The need for stepping up production of the critical items has led WPB officials to hold a series of conferences with Army, Navy and Maritime officials to ascertain just where the shortages lay, what is causing the lag, and to project probable future needs. Last week a group of top WPB, War Manpower Commission, and military officials visited three leading war production centers—Detroit, Chicago and Cleveland—to confer with regional officials, management and labor on the problem of boosting the output of the critical items. The conferences were aimed at correcting the delaying factors in the key programs.

This, according to WPB Chairman J. A. Krug who attended the Chicago and Cleveland meetings, is a "rifle" approach, aimed at specific troubles in specific factories.

The "rifle" tactics, he said, are being used because the situation is different today than a year ago when practically everything was scarce. Now most of the

noncritical 90 per cent programs are on schedule and only a few items are giving trouble.

Lack of manpower of the right kind in the right places has been perhaps the largest single retarding factor in the critical programs. This results from various factors, ranging from increased labor turnover due to a belief the war is practically over and a desire to get back in peacetime work, absenteeism, inadequate housing in war centers, and a general indisposition on the part of workers to produce a full day's work.

Alarmed by the increasing absenteeism which regularly follows encouraging war news, labor-management committees are reviving campaigns to impress workers with the importance of staying on the job. In some plants the absenteeism rate has risen to as high as 18 per cent, resulting in an even greater loss of production due to the fact some of the absentees were key workers whose absence disrupted the production of their crews.

The total labor force was reduced by a million workers in the month of September as teachers and students who had been working during the summer returned to schools, and housewives and others quit their war jobs in the belief the peak need for war goods had passed. The total civilian working force in September was two million less than in July.

Components Causing Difficulties

Other retarding factors in the critical programs include a shortage of specialized machine tools in the heavy artillery ammunition program. Some of the components in the heavy truck program are causing difficulties. Strikes at a leading axle producer's plant have continued intermittently over the past several months and have reduced output to a point where axles have become the major chokepoint in the truck program. Castings also continue to give trouble. Engineering difficulties, now being surmounted, have held up the radar program. Heavy tire production was retarded by a shortage of facilities as well as shortage of manpower.

Military leaders repeatedly have warned that deficiencies in the critical items may prolong the war for months and scarcely a day passes that pleas for increased output are not heard.

The need for holding up production in all lines until the war is finally won and the over-optimism that has resulted from the flood of publicity concerning reconversion are causing government agencies to de-emphasize publicity on reconversion.

Mishandling of reconversion publicity not only has been criticized by the military and war production officials for causing over-optimism, but it also has drawn attacks from industrialists who believe there was more lip service than progress in preparing for a return to civilian production.

One of the more articulate critics of the idle talk on reconversion has been George Romney, managing director of

the Automotive Council for War Production. Pointing out that the automotive industry's actual position and operating policy is that it will not relax its war production efforts until all military requirements have been met, Mr. Romney expresses concern that the country is being misled into belief that reconversion already is well underway.

Not in conflict with the industry's position of maintaining full war production as long as necessary, says Mr. Romney, is the industry's program for pre-reconversion work which will enable the plants to provide employment for hundreds of thousands within a few weeks after "Go

Day"—the time when return to civilian output is authorized. Only about 17,000 men would be required to get the pre-reconversion job done, he contends.

This job, he explains, falls into the following parts: Essential experimental and engineering work; design and building of experimental machine tools; design and building of tools, dies and jigs; ordering of raw materials and advance decision on plant clearance.

"It will take two-and-a-half to three months to reconvert if all the pre-reconversion work is done beforehand. In this case, the depth of reconversion unemployment can be limited to two to three

weeks. In two to three months after the start we could build up to full employment."

While de-emphasizing reconversion publicity on one hand, WPB is quietly facilitating the actual process on the other. The spot authorization program for return to civilian production, where it will not take men, materials and facilities away from the war effort is being continued and its procedure simplified. As of last week, a total of 1914 applications aggregating \$291 million had been approved; this of course represents a fraction of 1 per cent of the total production program.

WPB also is continuing to formulate plans for after V-E Day, although spokesmen are not anxious to give much publicity to these because they must be revised almost continuously as the course of the war changes.

Latest estimates call for war production in the 12 months following V-E Day of \$44 billion, off about 32 per cent from the August rate of \$65 billion. Cutbacks in major munitions programs range from 62 per cent in combat and motor vehicles down to 15 per cent in aircraft. In major categories, the program lines up about as follows:

(Billions of Dollars)

	August Annual Rate	Post V-E Day	Per Cent Change
Aircraft	\$19.0	\$16.2	-15%
Ships	18.8	7.2	-48
Guns, Fire Control	3.3	2.2	-33
Ammunition	7.1	4.6	-35
Combat, Motor Vehicles	5.6	2.1	-62
Communications, Electronics	4.4	2.5	-43
Other Equipment	11.9	9.2	-23

Steel Corp. Shipments Set Ten-Month Record

United States Steel Corp. shipments of finished steel in October brought the total for ten months to 17,639,435 net tons, highest in the history of the company for that period.

October shipments totaled 1,774,969 tons, an increase of 41,367 tons over September, a shorter month, when they were 1,733,602 tons.

(Inter-company shipments not included)
Net Tons

	1944	1943	1942	1941
Jan.	1,730,787	1,658,992	1,738,893	1,682,454
Feb.	1,755,772	1,691,592	1,616,587	1,548,451
Mar.	1,874,795	1,772,397	1,780,938	1,720,366
Apr.	1,756,797	1,630,828	1,758,894	1,687,674
May	1,776,934	1,706,543	1,834,127	1,745,295
June	1,737,769	1,552,663	1,774,068	1,668,637
July	1,754,525	1,660,762	1,765,749	1,666,667
Aug.	1,743,485	1,704,289	1,788,650	1,753,665
Sept.	1,733,602	1,664,577	1,703,570	1,664,227
Oct.	1,774,969	1,794,968	1,787,501	1,851,279
10mo.	17,639,435	16,864,612	17,548,977	16,988,715
Nov.	1,660,594	1,665,545	1,624,186	1,624,186
Dec.	1,719,624	1,849,635	1,846,036	1,846,036
Total	20,244,830	21,064,157	20,458,937	20,458,937
Adjustment			*49,020	*42,333
Total			20,615,137	20,416,604

*Decrease.

Present, Past and Pending

FOY SEEKS RELEASE FROM WPB STEEL DIVISION POST

WASHINGTON—Norman W. Foy, director, Steel Division, War Production Board, is reported anxious to quit his government post by Dec. 1 and return to the Republic Steel Corp., Cleveland. While it is understood his resignation has been submitted, it has not been acted upon by the board.

WAR EXPENDITURES RISE 4.8 PER CENT IN OCTOBER

WASHINGTON—United States war expenditures increased \$343 million, or 4.8 per cent, in October to a total of \$7447 million from \$7104 million in September, according to figures compiled by the Treasury Department. From July 1, 1940, through Oct. 31, 1944, expenditures totaled \$229,600 million.

MARITIME COMMISSION SELLS TANKER TO PURE OIL CO.

CHICAGO—Pure Oil Co., this city, and its subsidiary, the Sabine Transportation Co. Inc., Port Arthur, Tex., has purchased a 16,582-ton tanker now under construction for the Maritime Commission at the Bethlehem-Sparrows Point shipyard, Baltimore. Sale involved the trade-in of three obsolete tankers which will be scrapped when no longer needed in the national emergency.

S. M. RUST ELECTED CHAIRMAN OF RUST ENGINEERING

PITTSBURGH—S. M. Rust, retiring president, Rust Engineering Co., this city, has been elected chairman of the board, and S. M. Rust Jr., who has been serving as executive vice president, has been elected president of the company.

J. H. CALLAN NAMED PRESIDENT OF CRUCIBLE STEEL

NEW YORK—J. H. Callan has been elected president of Crucible Steel Co. of America, this city, William P. Snyder Jr., chairman of the board, announced last week. Mr. Callan, who has been with Crucible for 24 years, has been a member of the executive committee and general assistant and adviser to the president of the company.

ADDITIONAL COPPER ALLOTTED FOR CIVILIAN GOODS

WASHINGTON—Supplemental fourth-quarter allotment of 8015 tons of copper-base alloy has been authorized for the production of certain civilian goods, including a wide line of plumbing and heating components, safety pins, slide and snap fasteners, scales, underground water and gas service connections, interior working parts of mechanical pencils, badges for law enforcement officers and plant protection personnel, and fare tokens.

STEEL RELEASED FOR NONMILITARY OFFICE SUPPLIES

WASHINGTON—Manufacturers of office supplies are now permitted to use iron and steel in production of nonmilitary items up to 12½ per cent of the amount used in 1940. This was provided by the War Production Board in an amendment to limitation order L-73.

FREIGHT CAR ORDERS FOR 1945 RISE TO 35,000

CHICAGO—Orders for 35,000 freight cars already have been ordered for 1945 and an additional 20,000 will be ordered soon, reports J. J. Pelley, president, Association of American Railroads.

WPB ELIMINATES STEEL PLATE MONTHLY REPORTS

WASHINGTON—WPB Steel Division has authorized plate producers to discontinue submitting WPB-653 (summary of plate order reports) after report for December and their monthly telegraphic reports of plate shipments after the October report.



GEORGE W. TAYLOR



WILLIAM H. DAVIS



DR. FRANK P. GRAHAM

Three Public Members of WLB Resign

Davis, Graham and Taylor tell President they wish to leave after steel wage case is settled. Garrison may be appointed chairman. Recent meetings marked by friction and union members charge "stalling tactics"

WASHINGTON

THREE public members of the National War Labor Board have expressed their desire and intention of quitting that agency by or before the first of the year, it was revealed last week.

Chairman William H. Davis announced at a press conference that he had submitted his resignation Aug. 29, his 65th birthday, and had asked the President to be relieved of his duties by Jan. 1. Mr. Davis said he intended to return to his patent law practice in New York.

Dr. Frank P. Graham, president of the University of North Carolina, disclosed his letter of resignation was dated Oct. 9 and that he had asked to be released as soon as the board completes its work on the Little Steel wage formula case which has been before the board since early in the year. It has been known for several months that trustees of the university have been insisting on Dr. Graham's return.

George Taylor, former economics professor at the University of Pennsylvania, is the third public member to resign. Mr. Taylor, the board's vice chairman, offered his resignation Oct. 19, with the suggestion he be permitted to leave Dec. 1 to participate in a "vital educational

program in the postwar period."

Administration officials, including James F. Byrnes, director of the Office of War Mobilization and Reconversion, and Fred M. Vinson, director of economic stabilization, are understood to be hopeful of persuading Mr. Taylor to continue on the board.

Should all three of these three public members leave the board, it is believed that Lloyd K. Garrison, former dean of the University of Wisconsin law school, may be appointed chairman.

Await Decision on Steel Wage Case

All of the three public members who have submitted their resignations indicated they will continue with the board until the steel wage case, the major business before the agency, has been decided. Hearings on this case were concluded several weeks ago and it is expected the board's findings will be sent to the White House soon.

The public members of the board have been the center of increasingly bitter sessions of the board as members of the Congress of Industrial Organizations and the American Federation of Labor have pressed for modification of the Little Steel wage formula and for sharp wage

increases. The unions have accused the public members of "stalling tactics" in handling the steel wage case, keystone to the whole stabilization program.

The friction on the board has been not only between the union and public members, but also between the CIO and the AFL members. The AFL members believe the board has been partial to the CIO, and contend that CIO cases have been rushed to early decisions while AFL cases have been delayed. Another sore point with the AFL is that many of the CIO cases pending before the board provide for retroactive pay to the time the board accepted jurisdiction, whereas most of the AFL cases do not carry such provisions. AFL leaders realize they will face great dissatisfaction in the ranks of their own members if the CIO workers are handed large chunks of accumulated "back pay" while AFL workers get none.

Some speculation arose as to the possibility of Mr. Davis being appointed Secretary of Labor in event the President replaces Miss Frances Perkins, object of much criticism from labor, management and the public during her years of incumbency. Mr. Davis' declared intention of returning to the practice of law, however, made this appear unlikely.

A fourth resignation from a high government labor post was that of Dr. John R. Steelman, director of conciliation. Dr. Steelman's resignation has been accepted and becomes effective Nov. 25.

ie T
 springs
 duced i
 to 65
 12 to elev
 get un
 committee
 and Labor
 introduced
 Pepper
 substituted
 the health
 partial pro
 deems it
 below
 considered
 resolved th
 cases that a
 cents per h
 which the N
 consider
 resolution, to
 the pres
 is intend
 tie, car
 workers
 How
 of elevat
 some secto
 different
 enjoy abo
 their indust
 national Wa
 been using
 demand for
 when ma
 gives appro
 lican Sena
 approval of th
 are importa
 al positions
 puts up to
 visors S
 8-29
 by 380
 son, N.
 al Corp.
 of \$2.0
 8-29
 the prot
 re of La
 Packar
 wa
 Packar
 entered
 aircraft
 their fi
 now
 and
 to hi
 more

Move To Elevate Wage Rate Floor

Hearings started by subcommittee of Senate on resolution introduced in August by Senator Pepper to increase base from 50 to 65 cents per hour

WASHINGTON

A MOVE to elevate the floor under wage rates got under way last week when a subcommittee of the Senate on Education and Labor started hearings on a resolution introduced in August by Sen. Claude Pepper (Dem., Fla.). It reads:

"Whereas substandard wages not only undermine the health and strength of the nation but curtail production; and whereas Congress deems it desirable to determine a rate below which wage rates shall be considered substandard: Therefore, be it resolved that it is the sense of the Congress that a straight time hourly rate of 65 cents per hour is the minimum below which the National War Labor Board shall consider any wage rate substandard."

The resolution, to be pressed for adoption before the present Congress expires on Dec. 31, is intended chiefly to benefit certain textile, cannery and railroad maintenance workers, also certain white collar groups. However, it might have the result of elevating the entire wage level in some sectors by reason of the customary differentials many types of workers enjoy above minimum wage rates in their industries.

The National War Labor Board up to now has been using 50 cents an hour as the benchmark for minimum pay, and only then when management and labor representatives approved.

Republican Senate leaders contend that approval of the Pepper resolution might have important effects in elevating broad portions of the wage structure by amounts up to 15 cents per hour.

Supervisors' Strike

Delays B-29 Production

A strike by 1800 supervisory workers at the Paterson, N. J., plant of the Wright Aeronautical Corp. last week resulted in the layoff of 32,000 other workers producing B-29 engines. The supervisors struck in protest to transfers to lower-paying jobs.

Wave of Labor Disputes

Hits Packard Plant

Recurring wave of labor disputes has hit the Packard plant in recent weeks, being centered in a polishers' department where aircraft engine components are given their final finish. Of the 89,000 workers now at Packard, 10 per cent are colored and many have been upgraded rapidly to highly paid jobs, thereby causing more than a little disgruntlement

among older workers. A recent schedule cutback forced the closing of one polishing department, entirely colored, and the personnel was transferred to a larger polishing department, seniority entitling some of those transferred to jobs ahead of others in the larger department, providing the new workers could prove their ability to handle the work. Colored workers alleged they were given only two days' trial instead of the accustomed three, and last Tuesday all colored employees in the plant walked out en masse. Earlier, polishers who were in danger of losing their jobs to colored workers with greater seniority made violent protests. For the most part, the plant managed to continue in operation.

CIGARETTE SHORTAGE

An acute shortage of cigarettes in the Cleveland district resulted in a sharp rise in absenteeism among workers at about a dozen war plants when supplies at the plants and nearby stores dropped far below demand. Tardiness caused by workers looking for "smokes" has cut into war production.

Byrnes To Stay on Job Until European Victory

James F. Byrnes, director of the Office of War Mobilization and Reconversion, will remain in that post until war in Europe is won, President Roosevelt announced last week. The Chief Executive said he had persuaded Mr. Byrnes to stay after the latter had expressed his desire to return to private life.

Lake Ore Movement in 1944 Now Certain To Top 80.2 Million Tons

CLEVELAND

THE 1944 Lake Superior iron ore shipping season is drawing to a close with the last vessels scheduled to be loaded at upper lake ports by Nov. 25. This will be the first season since 1932 that the lake ore movement was completed before Dec. 1.

In 1943 and 1942 about 700,000 tons of ore were brought down the lakes after Nov. 30 despite the high insurance rates then in effect and adverse weather.

Shipment of iron ore from upper lake ports this season will total about 80.2 million gross tons, in contrast with the 84 million scheduled at the opening of navigation. In 1943 and 1942 the vessel movement totaled 84 and 92 million, respectively.

Vessel interests point out that under pressure of heavy demand the present iron ore fleet could move 110 million tons of ore down the Great Lakes each season.

Trend in monthly iron ore shipments this season compared with 1943 and 1942 is shown in the table below.

Stocks of iron ore at lower lake ports and furnaces Dec. 1 are expected to total 42.2 million gross tons. At the present high rate of consumption of about 7 million tons monthly, it is estimated stocks of ore on April 1, 1945, will total about 14 million tons, or 60 days' supply. Stocks on April 1, 1943 and 1942, amounted to 19.6 and 17.8 million tons, respectively; while the largest tonnage recorded on this date was 35.2 million in 1938.

With a number of blast furnaces currently blown out because of the easier demand for iron for steelmaking purposes, monthly consumption of ore in recent months has fallen below that registered in the like 1943 and 1942 periods. Efforts to reduce steel scrap inventories have also been a major factor in this connection. Through to Dec. 1 this year Lake Superior iron ore consumption is estimated at 73 million tons, compared with 81.5 millions in 1943 and 78.5 millions in 1942. Comparisons of monthly iron ore consumption with other years shown below.

Month	1944	1943	1942
Nov.	3,700*	7,582	7,661
Oct.	10,595	11,613	11,417
Sept.	11,329	12,743	11,848
Aug.	12,289	13,977	13,236
July	12,909	13,589	13,405
June	11,975	11,864	12,625
May	12,114	10,975	12,677
April	5,288	1,955	7,789
March			793
Total	80,200*	83,655	91,441

*Estimated.

Month	1944	1943	1942
Oct.	7,000*	7,751	7,599
Sept.	6,950	7,493	7,176
Aug.	7,342	7,617	7,155
July	7,372	7,156	7,176
June	7,112	6,940	7,034
May	7,558	7,374	7,240
April	7,273	7,186	7,007
March	7,659	7,723	7,109
Feb.	7,207	7,104	6,403
Jan.	7,482	7,765	7,158
Total	72,954*	81,519	78,466

*Estimated.

Machine Tool Distribution Is Discussed

Convention of distributors at Hot Springs, Va., well attended. A. B. Einig is elected president of association

THE TWENTIETH annual meeting of the American Machine Tool Distributors' Association, at the Homestead, Hot Springs, Va., Nov. 13 and 14, drew heavy attendance despite difficulties in transportation. Executives of machinery selling organizations came from all parts of the country—including the West Coast.

An overall review of the Washington situation was presented by Al C. Bryant, president, Bryant Machinery & Engineering Co., Chicago, who has spent much time in Washington during the war, in the interests both of the distributors and builders of machine tools. Among his duties is that of chairman, Committee on Government Relations, National Machine Tool Builders' Association.

Mr. Bryant expressed the conviction that while most people—including political figures—now appreciate that machine tools have been of primary importance in our war program, too few realize their basic importance in our peacetime economy. He stressed the point that as a result of the war, the government itself now looms as the greatest potential competitor to the industry—the eventual distribution of government-owned surplus machinery being a problem even dwarfing in magnitude that of the original production of these machines for the war.

Paul Wooton, Washington correspondent, McGraw-Hill Publishing Co., made reference to the big task of dealing with forthcoming government machine tool surpluses, citing a special recent conference on the subject in Washington, between a group of government officials and editors of several business papers particularly interested in the problem. STEEL was represented at that meeting.

John S. Chafee, director, Tools Division, War Production Board, stated that while there now is a growing number of unrated machine tools theoretically available for postwar projects, actually the critical manpower situation within the industry prevents any widespread deliveries. Rear Admiral Clark H. Woodward, U.S.N., drove home this same thought in his address, "Japan—Our
(Please turn to Page 200)



DISCUSS MANAGEMENT FUNCTIONS: Executives of the National Metal Trades Association, meeting at Lake George, N. Y., recently, discussed management functions of shop executives. Shown at the conference are, left to right, seated in center: Whipple Jacobs, president, Belden Mfg. Co., Chicago; Homer D. Sayre, NMTA commissioner. Seated on steps: William L. Dolle, president, Lodge & Shipley Machine Tool Co., Cincinnati; C. L. Blatchford, NMTA secretary. Standing: Joseph M. Schappert, NMTA director of industrial education; C. J. Uhler, NMTA director of industrial relations; G. W. Hostetter, NMTA industrial consultant; and George J. Earl, NMTA deputy commissioner

Stress on All-Out War Work Restricts Immediate Reconversion

VERY little actual reconversion is now possible, except for the scattering spots where cutbacks in military programs may provide facilities and labor which cannot be used in military production, and resumed civilian spot production is authorized by the War Production Board under its priorities regulation No. 25, Hiland G. Batcheller, chief of operations, WPB, and president, Allegheny Ludlum Steel Corp., told members of the American Management Association meeting in New York city last week.

Mr. Batcheller stressed that war production schedules will continue "tremendously high" during forthcoming months and that they must be accomplished in the face of a yet critical manpower supply.

He reiterated that until these and other critical items are being produced in the quantities so urgently needed, the

WPB's policies on reconversion must be so implemented that war production is not harmed. While this needed stress on all-out war production precludes any substantial immediate reconversion, he pointed out that plans may be made now for the time when this is possible.

Reviewing the effects of the war production program, he said the \$20 billion of new manufacturing plants and equipment constructed during the war will have a most significant effect upon the \$30 billion worth of the prewar facilities with which they will be in competition. Pointing out that 88 per cent of total value of government munitions orders placed have been for metals, he said 1944 production is expected to be greater than 1939 civilian use as follows: Steel, 80 per cent; copper, 250 per cent; aluminum, 800 per cent, and magnesium 6800 per cent. He also cit-

ed the astounding increase in the number of people who are engaged in using these materials and facilities for making and distributing goods (52 million employed plus some 12 million in the armed forces), projecting a problem of employing after the war some 10 million to 12 million more people than ever before and annually absorbing an additional 600,000 which are added to the labor force.

In addition to solving the above-mentioned problems, the readjustment to the changed geographical industrial and population pattern, the dominance of our aircraft and shipbuilding industries, the importance of metals, and the position of smaller business enterprises all are part of the picture, he added.

The problem of reconversion will be complicated during the interim period between the collapse of Germany and the defeat of Japan by the fact that attention must be given simultaneously to pursuit of war and conversion to peace.

The problems of the transitional period following the defeat of Germany will be in the nature of quickly attaining full employment, facility utilization, and economic adjustment. WPB is en-

(Please turn to Page 200)

Small Nations' Welfare Is Vital in World Economy

The future welfare of the world depends upon the growth and prosperity of its smaller nations, Eric A. Johnston, president, Chamber of Commerce of the United States, told delegates from 52 nations at the International Business Conference at Rye, N. Y.

Just as the economic and political welfare of the United States hangs on the fate of the small business man, so the welfare of small nations must be kept uppermost in the formulation of postwar international trade, he declared.

Robert Gaylord, president, National Association of Manufacturers, asserted that manufacturers believe this country must recognize three basic principles if foreign trade is to be expanded successfully: "First, if we are to export goods we must receive payment for them in raw materials and in manufacturing goods of other nations; second, if we are to export capital, we must prepare to do so on the long-term basis and with the knowledge that it can be returned to us only in the shape of goods and services rendered by those who borrow; and, third, that this can be done without lowering or affecting the standards of our own country."

White Named Galvanizers' Committee Head at Meeting

F. G. White, Granite City Steel Co., St. Louis, was elected chairman of the board of governors of the Galvanizers Committee, sponsored by the American

Zinc Institute, New York, at its fifteenth meeting, in the William Penn hotel, Pittsburgh, Nov. 9-10, succeeding D. A. Russell, Youngstown Sheet & Tube Co., Youngstown, O.

R. A. Atkins, Niles Rolling Mill Co., Niles, O., and J. J. Enlow, Lysaght Dominion Sheet Metal Corp. Ltd., Hamilton, Ont., were appointed to the board, which is comprised of seven members. They succeeded Mr. Russell and B. P. Finkbone, American Rolling Mill Co., Middletown, O.

Preparation of steel for galvanizing, with special reference to cold-reduced sheets featured roundtable discussions at the two sessions on Nov. 9, while methods of obtaining better pot life came up for discussion on Friday, along with factors which affect corrosion of galvanized sheets, such as weight coating, adherence, geographical location and atmospheric conditions of exposure. Recent developments in substitute coatings also came up for consideration.

Approximately 70 technical and operating men were present at the group's meeting.

Warehouse Association Establishes New Chapter

Directors of the American Steel Warehouse Association last week approved establishment of the Intermountain chapter of the association to include Utah, and parts of Idaho, Nevada and Wyoming.

H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City, is president of the newly established chapter; S. S. Taylor, the Galigher Co., vice president; H. C. Kimball, Z.C.M.I. Wholesale Hardware Division, secretary-treasurer. Mr. Lambrecht is also chapter director.

MEETINGS

Important business, technical, and trade conventions of interest to metalworking and metal producing industries

American Society of Mechanical Engineers: Annual meeting, Hotel Pennsylvania, New York, Nov. 27-Dec. 1. Secretary is C. E. Davies, 29 W. Thirty-ninth street, New York.

Sixteenth National Exposition of Power and Mechanical Engineering: Madison Square Garden, New York, Nov. 27-Dec. 2. Charles F. Roth, president, International Exposition Co., 480 Lexington avenue, New York, is manager of the exposition.

Symposium on Stress-Corrosion Cracking sponsored jointly by the American Society for Testing Materials and the American Institute of Mining and Metallurgical Engineers: The Benjamin Franklin, Philadelphia, Nov. 29-Dec. 1. A. B. Parsons is secretary, A.I.M.E., 29 West Thirty-ninth street, New York 18.

Steel Products Warehouse Association Inc.: Third annual war conference, Hotel William Penn, Pittsburgh, Dec. 1. Headquarters of the association are at 1060 Union Commerce building, Cleveland 14.

Society of Automotive Engineers Inc.: National air cargo meeting operated by the SAE Chicago section, Hotel Knickerbocker, Chicago, Dec. 4-6. John A. C. Warner is secretary and general manager of the society, 29 West Thirty-ninth street, New York.

Plans Announced For Warehouse Conference

Prominent steel industry leaders on program to address Pittsburgh meeting on critical problems confronting business

PLANS have been completed for the third annual war conference of the Steel Products Warehouse Association Inc., to be held at the William Penn hotel, Pittsburgh, Dec. 1. The one-day meeting is expected to attract warehouse men and steel industry representatives from all parts of the country.

The speaking program for the meeting has been announced as follows:

Howard V. Clark, manager of sales, Carnegie-Illinois Steel Corp., Pittsburgh, will speak on "Wartime Progress in Steel Production."

Hiland C. Batcheller, president, Allegheny Ludlum Steel Corp., Pittsburgh, and operations vice chairman of the War Production Board, will speak on "The Reconversion Program."

J. L. Block, executive vice president, Inland Steel Co., Chicago, is scheduled to address the meeting on "Some Fundamentals of Postwar Planning."

R. C. Todd, assistant vice president the American Rolling Mill Co., Middletown, O., will speak on "The Relationship of Steel Distributors to the Steel Industry."

J. R. Stuart, chief, Warehouse Branch, Steel Division, WPB, will talk on "Warehouse Operations Under War Controls."

National Association of Manufacturers: Fortieth annual Congress of American Industry, Waldorf-Astoria hotel, New York, Dec. 6-8. Secretary is Noel Sargent, 14 West Forty-ninth street, New York 20.

American Society of Refrigerating Engineers: Fortieth annual meeting, Hotel Pennsylvania, New York, Dec. 11-13. David L. Fiske, 37 West Thirty-ninth street, New York, is secretary.

American Society of Agricultural Engineers: Fall meeting, Hotel Stevens, Chicago, Dec. 11-13. Raymond Olney, Box 229, Saint Joseph, Mich., is secretary.

Society of Automotive Engineers Inc.: Annual meeting, Book-Cadillac hotel, Detroit, Jan. 8-12. John A. C. Warner, 29 West Thirty-ninth street, New York, is secretary and general manager.

Institute of Scrap Iron and Steel Inc.: Annual meeting, Cincinnati, Jan. 10-11. President and executive secretary is E. C. Barringer, 1120 Connecticut avenue, N.W., Washington 6.

American Society of Heating and Ventilating Engineers: Fifty-first annual meeting, Hotel Statler, Boston, Jan. 22-24. A. V. Hutchinson, 51 Madison avenue, New York, is secretary.

Plan for Peacetime Statistics

Bureau of Budget informs Senate Small Business Committee of need for rounded program to supply basic data needed by government and industry

CHANGING from war to peace will make it necessary to overhaul and re-establish the federal government's statistical services required by the permanent agencies. It will also be necessary to develop "a rounded program to supply the basic industrial statistics needed not only by the government, but by industry as well," the Bureau of the Budget informed the Senate Committee on Small Business last week.

The bureau informed Congress that it is now emphasizing the need to prepare plans for a peacetime program of current basic industrial statistics, and has asked the agencies concerned to prepare lists of forms which will be dropped after victory has been won.

An analysis made by one war agency of the need for the present informational reports after V-E Day, has disclosed

that about 50 per cent would still be required by that agency; of the remaining half, about two-thirds would be discontinued entirely.

A table accompanying the report shows that the total number of forms in use by the agencies on July 1 of this year was 5870. Of this number the permanent departments were using 2470; the independent agencies, 1406; and the emergency agencies, 994.

The Bureau of the Budget during recent months has received many requests from federal agencies for authority to conduct special and continuing surveys dealing with various aspects of reconversion. With few exceptions these proposals have not been approved.

The attempt to secure some degree of advance planning, the report says, has been facilitated by a letter from the Presi-

dent to the director of the budget which the latter was asked to take the initiative in developing a general program of statistics needed for reconversion. In response to this request, the bureau has worked out with the agencies concerned a series of interrelated projects which together will provide the accurate information on economic conditions needed as a basis for decisions required in the reconversion period by government, business, labor, and other interested groups.

Plans, in fact, have already been made for a census of manufactures covering 1944, probably the peak of wartime production; for a sample census of distribution covering the same year, to provide guidance for small business establishments and to determine whether changes have occurred in the structure of distribution channels; for expansion of data on the labor force, and the collection of state data on employment and unemployment by industries; for collection of data on agricultural and non-agricultural wages and wage rates; a survey of consumer incomes; and a survey of consumer expenditures and savings.

Iron and Steel Products Made for Sale in September

AMERICAN IRON AND STEEL INSTITUTE CAPACITY, PRODUCTION AND SHIPMENTS												Period SEPTEMBER - 1944	
Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month				To Date This Year					
				Production		Shipments (Net Tons)		Production		Shipments (Net Tons)			
				Net Tons	Per cent capacity	Total	To members of the industry for conversion into further finished products	Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products		
Ingot, blooms, billets, tube rounds, sheet and tin bars, etc.	50	1	XXXX	XXXX	XXX	729,811	248,534	XXXX	XXXX	6,582,620	2,179,591		
Structural shapes (heavy)	11	2	9,152,250	311,898	43.7	310,698	XXXX	2,960,120	XXXX	2,880,296	XXXX		
Steel piling	4	3		15,631		14,227	XXXX	70,922	44.2	71,402	XXXX		
Plates (sheared and universal)	62	4		16,726,420		1,011,247	73.9	990,773	54,613	10,066,308	80.4	9,786,376	502,327
Skelp	6	5	XXXX	XXXX	XXXX	70,466	58,285	XXXX	XXXX	626,966	492,672		
Rails—Standard (over 60 lbs.)	4	6	3,625,000	191,802	64.6	197,652	XXXX	1,723,457	63.5	1,708,237	XXXX		
—All other	6	7	525,000	13,741	31.0	16,434	XXXX	141,998	36.1	148,045	XXXX		
Splice bars and tie plates	13	8	1,743,500	59,421	41.6	59,983	XXXX	598,507	45.9	612,386	XXXX		
Track spikes	10	9	350,640	12,049	42.0	12,633	XXXX	110,399	42.1	117,560	XXXX		
Hot Rolled Bars—Carbon	37	10	XXXX	706,862	XXX	587,497	90,459	6,530,773	XXX	5,407,462	710,166		
—Reinforcing—New billet	16	11	XXXX	47,316	XXX	56,634	XXXX	366,755	XXX	395,131	XXXX		
—Re-rolled	14	12	XXXX	5,531	XXX	4,319	XXXX	52,239	XXX	61,851	XXXX		
—Alloy	24	13	XXXX	244,231	XXX	182,866	35,290	2,329,319	XXX	1,699,751	326,089		
—TOTAL	47	14	22,041,870	1,003,940	55.6	831,316	125,749	9,279,686	56.2	7,564,195	1,076,252		
Cold Finished Bars—Carbon	23	15	XXXX	152,868	XXX	152,517	XXXX	1,353,744	XXX	1,349,126	XXXX		
—Alloy	22	16	XXXX	34,620	XXX	30,547	XXXX	307,075	XXX	278,582	XXXX		
—TOTAL	30	17	2,802,250	187,488	81.7	183,064	XXXX	1,660,819	79.2	1,627,708	XXXX		
Tool steel bars	17	18	269,040	13,171	59.6	12,055	XXXX	109,221	54.0	103,708	XXXX		
Pipe and Tubes—Butt weld	16	19	2,162,870	121,206	68.5	122,182	XXXX	1,069,865	66.1	1,070,448	XXXX		
—Lap weld	8	20	920,200	47,453	63.0	47,563	XXXX	432,072	62.7	432,495	XXXX		
—Electric weld	9	21	1,303,300	70,364	66.0	68,125	XXXX	617,117	63.2	612,667	XXXX		
—Seamless	15	22	2,617,300	196,179	91.6	201,936	XXXX	1,750,330	89.3	1,770,182	XXXX		
—Coilcut	7	23	187,000	6,124	40.0	5,307	XXXX	44,564	31.8	43,817	XXXX		
—Mechanical tubing	12	24	1,050,400	72,888	84.8	64,667	XXXX	619,636	78.8	606,567	XXXX		
Wire rods	26	25	7,026,470	354,642	61.7	114,638	36,572	3,380,757	64.3	1,040,718	340,720		
Wire—Drawn	42	26	5,715,600	302,509	64.7	184,613	10,554	2,756,268	64.4	1,626,576	78,624		
—Nails and staples	19	27	1,247,420	47,828	46.8	48,944	XXXX	498,137	53.3	489,006	XXXX		
—Barbed and twisted	15	28	546,030	20,992	47.0	21,152	XXXX	190,591	46.6	188,647	XXXX		
—Woven wire fence	16	29	1,112,200	30,908	33.9	31,719	XXXX	286,120	34.4	282,811	XXXX		
—Bale ties	12	30	149,500	6,054	49.5	6,286	XXXX	58,491	52.3	56,989	XXXX		
Black Plate—Ordinary	9	31	XXXX	XXXX	XXX	44,157	—	XXXX	XXX	365,202	908		
—Chemically treated	8	32	464,000	7,363	19.4	6,633	XXXX	106,598	30.7	100,344	XXXX		
Tin and Terne Plate—Hot dipped	9	33	3,719,650	185,927	61.1	160,021	XXXX	1,462,549	52.5	1,506,413	XXXX		
—Electrolytic	10	34	2,152,400	50,129	28.4	43,664	XXXX	482,817	30.4	458,091	XXXX		
Sheets—Hot rolled	29	35	19,933,720	1,080,933	66.2	555,524	31,160	9,506,700	63.7	4,816,648	199,748		
—Cold rolled	13	36	7,286,380	337,014	56.5	180,519	XXXX	2,779,651	51.0	1,494,583	XXXX		
—Galvanized	15	37	2,826,130	121,113	52.4	123,618	XXXX	990,862	46.8	982,425	XXXX		
Strip—Hot rolled	22	38	8,649,200	228,788	32.3	142,505	21,034	2,016,133	31.1	1,283,750	206,613		
—Cold rolled	35	39	3,266,470	101,717	38.0	96,874	XXXX	900,552	36.8	845,235	XXXX		
Wheels (car, rolled steel)	5	40	348,800	24,297	85.1	24,842	XXXX	220,094	84.3	216,130	XXXX		
Axles	6	41	416,170	14,321	42.0	14,446	XXXX	151,704	48.7	146,719	XXXX		
All other	5	42	168,790	4,953	35.8	4,590	XXXX	35,603	28.2	35,174	XXXX		
TOTAL STEEL PRODUCTS	154	43	XXXX	XXXX	XXX	5,743,437	586,501	XXXX	XXX	52,301,006	5,037,426		
Effective steel finishing capacity	154	44	64,722,000	XXXX	XXX	XXXX	XXXX	XXXX	XXX	XXXX	XXXX		
Percent of shipments to effective finishing capacity	154	45	XXXX	XXXX	XX	97.3%	XXXX	XXXX	XXX	97.5%	XXXX		

Eighteen Companies Indicted by U. S. in Antitrust Action

Indictment charges steel producers with conspiracy to fix and maintain prices on stainless in violation of Sherman antitrust act. Producers accused of holding frequent meetings and using patent licenses to establish prices for products

WASHINGTON

ATTORNEY GENERAL BIDDLE announced last week the federal grand jury at Trenton, N. J., had returned indictments against eighteen companies producing upward of \$175 million of stainless steel annually, charging them with unlawfully fixing noncompetitive prices. The indictment in two counts charged Carnegie-Illinois Steel Corp., Allegheny Ludlum Steel Corp., and 16 other steel manufacturers, and six officers of these firms with conspiracy to fix and maintain prices on stainless steel in violation of the Sherman anti-trust act.

Named as defendants are: Allegheny Ludlum Steel Corp. and Russell M. Allen, Pittsburgh, vice president; Carnegie-Illinois Steel Corp. and Paul F. Voigt Jr., Pittsburgh, manager stainless steel division; Carpenter Steel Co. and J. Herbert Parker, Reading, Pa., president; Crucible Steel Co. of America and R. E. Christie, New York, vice president; Republic Steel

Corp. and Martin H. Schmid, Cleveland, manager of sales, alloy sales division; Eastern Stainless Steel Corp. and T. F. McLaughlin, Baltimore, president; Rustless Iron & Steel Corp., Baltimore; American Rolling Mill Co., Middletown, O.; Bethlehem Steel Corp., Bethlehem, Pa.; Sharon Steel Corp., Sharon, Pa.; Firth-Sterling Steel Co., McKeesport, Pa.; Jessop Steel Co., Washington, Pa.; Latrobe Electric Steel Co., Latrobe, Pa.; Midvale Co., Philadelphia; Pittsburgh Steel Co., Pittsburgh; Superior Steel Corp., Pittsburgh; Timken Roller Bearing Co., Canton, O.; Universal-Cyclops Steel Corp., Bridgeville, Pa.

Named as "co-conspirators" in the indictment were certain predecessor companies of the corporate defendants and the Chemical Foundation Inc., and Nirosta Corp. (Krupp-Nirosta), both of New York.

Indictment alleges that 1942 gross sales of stainless steel finished products in the

United States approximated \$175 million and that the corporate defendants produced and sold more than 90 per cent of this total.

The indictment describes the "sales price" of stainless steel products as composed of the "base price" and "extras". The base price is that quoted for a specified quantity of stainless steel of particular unit size and quality; it varies with chemical analysis of steel and the type of product involved. "Extras" are additions to the base price for specifications, and quantities other than those for which base prices are quoted. According to the indictment, practically no sales of stainless steel are made on base price alone, and the "extras" are a substantial part of the selling price.

The indictment charges that, beginning in 1934 and continuously until the present time, the defendants and co-conspirators have engaged in an unlawful conspiracy arbitrarily to fix and maintain uniform and non-competitive prices, terms and conditions for sale of stainless steel finished products sold in the United States. It charges that a conspiracy was developed and carried out in this manner:

Charges Hotel Meetings Held

1. From time to time the defendants or their representatives met at "stainless steel industry meetings" which were usually held in Pittsburgh, at the Biltmore hotel, New York, or White Sulphur Springs, W. Va., or Hershey, Pa. In 1934 at such meetings the defendants and co-conspirators, it is said, decided to make use of patent licenses held by them from the Chemical Foundation; they therefore agreed to accept amendments to their patent licenses which ostensibly would give the Foundation the right to fix and establish prices for stainless steel finished products made and sold thereunder. The Foundation, on its part, agreed to adopt and announce formally prices and extras for such products as agreed upon at industry meetings.

2. These prices, extras, terms and conditions of sales, as agreed upon in industry meetings, were formally confirmed by the Foundation in letters to its licensees, also in printed booklets. While these letters and booklets purported to deal only with products licensed by the Foundation, the defendants adopted agreed-upon extras, terms and conditions of sale therein for sale of all types of stainless steel finished products they manufactured and sold.

3. Defendants also are said to have agreed at these industry meetings that base prices for stainless steel finished products should be published by the defendant Sharon Steel Corp. and used by the defendants in computing, publishing and determining their own base prices for all types of stainless steel products.

4. Meanwhile, the defendants Carpenter, Crucible, Republic, Bethlehem, Firth-Sterling and Jessop were also licensees of Krupp Nirosta under certain patents relating mainly to heat treatment proc-

(Please turn to Page 196)

POSTWAR PRELIMINARIES

RECONVERSION—Victories over Japanese fleet may telescope gap between V-E and V-J Days, disrupt reconversion plans. Pressure for production of critical items increased. See page 65.

V-E DAY—Celebrations frowned upon by industry and labor. Will await victory over Japan. See page 80.

WEST COAST—New industries hold best promise for Pacific Coast states. Bright opportunities foreseen for area by marketing expert. See page 83.

AUTOMOBILES—Leading manufacturer urges industry to take bold and confident stand in reconversion policies. See page 85.

AIRCRAFT—Designs for high-traffic flying boat terminals for large cities may give United States edge in postwar foreign trade is idea advanced by leading seaplane builder. See page 94.

RIVETING—Time and motion studies, modern gang riveting and multi-purpose upsetting machines, rivets "engineered" for each job, and measures to relieve operator fatigue are improvements in high favor with an industry on the threshold of intense competition for civilian business. See page 102.

PAINT TESTS—New cycle testing systems by which performance of paint films protecting metal surfaces can be predicted accurately soon may be utilized by both manufacturer and user to determine ideal formulae for individual applications. See page 100.

GEARS—Forecast as developments most likely to affect future gear design are a better understanding of worm gearing contact temperature conditions, more effective control of vibration and greater prestige for tungsten carbide hobs. See page 112.

Union Labor Expected To Fight Closed Shop Ban in Two States

Indications are validity of constitutional amendments approved in national election by electorate in Florida and Arkansas will be tested. War Labor Board's maintenance of membership directive at issue

EXPECTATIONS are organized labor under the leadership of the American Federation of Labor will put up a vigorous fight to prevent adoption of constitutional amendments approved in the recent national election by the electorate in Arkansas and Florida prohibiting the closed union shop.

The fight probably will be carried to the Supreme Court where the validity of the closed shop and the National War Labor Board's maintenance of membership directives will be tested. Thus far, WLB has been able to escape a test on these issues in the Supreme Court. Courts in Wisconsin and California ruled that the WLB as a federal agency has authority which supersedes state laws. Other federal courts ruled that WLB directives are not reviewable.

A week before the election the WLB announced it would continue to order maintenance of membership, closed shop and other provisions for settlement of war labor disputes regardless of the results of the Florida, Arkansas and California elections. Jesse Friendland, general counsel, WLB, declared in a formal opinion that no employer or labor union would violate a state law by obeying WLB directives since these federal orders superseded state laws. He cited court decisions on the matter to support his opinion.

A measure which would have guaranteed everyone against interference with his job regardless of whether he belonged to a labor organization was defeated in the California election mainly through the combined efforts of the International Association of Machinists-AFL and other labor groups in the West Coast area.

Besides banning the closed shop, the Arkansas measure banned the WLB's controversial maintenance-of-membership provision which requires union members to maintain their good standing for the duration of a labor-management agreement unless they resign during a 15-day "escape period" at the beginning of the contract.

Supreme Court Again Bars Review of WLB Orders

The principle that the nation's courts can neither review nor enforce the War Labor Board's orders was again supported by the United States Supreme Court last week when it declined to interfere with a lower court's decision.

An appeal of Montgomery Ward & Co., Chicago, from a ruling by the District

of Columbia Court of Appeals in which it held the WLB's actions are administrative and "at most" simply advisory to the President was turned down by the high tribunal without comment.

The company contended the WLB exceeded its statutory powers in issuing orders involving union maintenance, dues, checkoff, and grievance machinery for CIO employes in four Ward stores in Detroit and one each in Jamaica, N. Y., and Denver.

Previously the Supreme Court rejected an appeal by a group of trucking companies from a similar decision by the Court of Appeals.

Procedure the WLB has been following is that in case its orders are disregarded, it turns the cases over to the President for action.

U. S. To Build Surplus Disposal Center at Linden

A disposal center for surplus war supplies with 14 buildings, railroad sidings and fire protection lines, will be con-

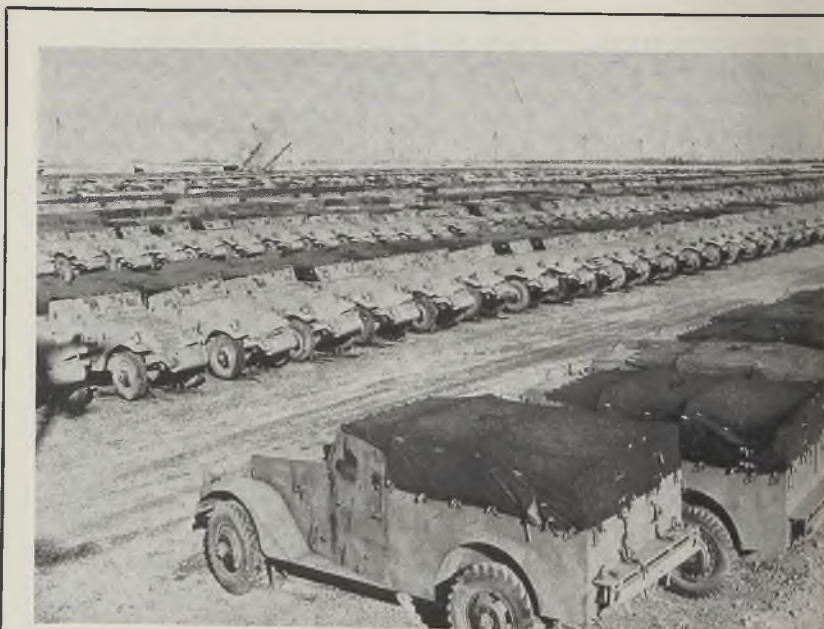
structed by the government, on 126 acres of land adjacent to the General Motors Corp.'s Eastern Aircraft field at Linden, N. J. The government took possession of the acreage under a lease with the Standard Oil Co. which provides for renewal under an annual lease basis.

Bids for construction of the disposal center are being received by a branch of the Army engineers in New York city. Work must be completed in about 90 days. The center is expected to be completed in February. The building program entails 600,000 square feet of storage space. Surplus war stores, Army material and excess stocks from the Navy may be stored there.

Labor-Management Groups Increase by 500 in 4 Months

Labor-management production committees are now operating in more than 5000 war plants throughout the nation after increasing by 500 during the past four months, T. K. Quinn, director general of the War Production Drive, War Production Board, announced recently.

Mr. Quinn said that all of the committees, which aim to expedite and improve production of war materials, are being asked to redouble their efforts on safety programs in order to boost production and at the same time look out for the welfare of workers. He pointed out that occupational disabilities and deaths were responsible for the loss of 270 million days of work during 1943, or the equivalent of the entire year's work of 900,000 men and women in war plants throughout the nation.



SURPLUS: These scout cars, shown at the Lordstown ordnance depot at Warren, O., are part of the 2215 units which recently were declared surplus by the Army and turned over to the Treasury Department for sale. They were used to train troops which since have been issued later models. Signal Corps photo from NEA

FEA Says Jap War Machine Is Well Supplied

Nation is estimated to have capacity to produce 13 million tons of steel ingots annually. Raw materials adequate

SIZE of the Japanese war machine is determined largely by Japan's capacity to make steel, according to a recent estimate of the production capacity of that country by the Foreign Economic Administration. Japan is believed to be obtaining all the iron ore and most of the materials for ferroalloys that she has the productive capacity to handle. She produces about 1,700,000 tons (in iron equivalents) of iron ore annually; obtains about 9,000,000 tons from Manchuria, Korea and China; and about 2,000,000 tons from sections south of Formosa, including the Philippines, Hainan island, and Malaya.

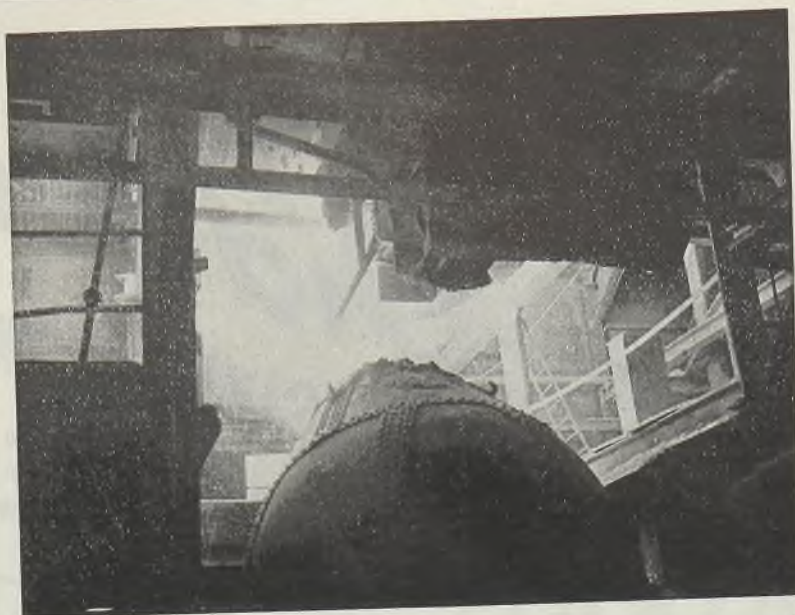
She has a pig iron producing capacity of about 10,000,000 tons and from this, plus scrap iron, about 13,700,000 tons of steel ingots and castings a year. Her rolling mill capacity is about 10,000,000 tons. FEA believes that only amputation of such supplies as flow from Manchuria, China and Korea will seriously starve Japan's steel industries. She is not too well supplied with scrap iron, and her steel has a larger component of pig than is usual in the United States, but her scrap pile is believed to be adequate.

The ability of Japan's economy to transform raw materials into armaments, rather than the availability of raw materials, is the real test of Japan's economic position, FEA said. By full exploitation of resources, use of substitute materials, and utilization of stockpiles, Japan may be able to continue for some time to increase production of critical types of military goods. She has drawn on the raw material resources of her conquests to the extent that her industrial machine could utilize them.

Military estimates indicate that Japan has stockpiles of the following materials for the indicated number of months: Aluminum (in the form of bauxite and alumina), 6 to 18; chromite, 12; copper, 17; magnesium, 6; manganese, 24; molybdenum, 12; mercury, 24; and tin, 96.

Government May Sell Pipelines After War

The government is expected to place on sale after the war the "little big inch" and the "big inch" pipelines, which transport petroleum and petroleum products from the Southwest to the East, according to Washington sources. Cost of transporting the oil through



STEEL AT THE FRONT: Steel for the United States Engineers Corps is being produced in this bessemer converter in Luxemburg. Several hundred tons of steel are being produced daily. Signal Corps photo from NEA

the two pipelines is reportedly cheaper than transport by either tankers or tank cars. The "big inch," which is a 24-inch line stretching from Longview, Tex., to Phoenixville, Pa., a distance of 1254 miles, carries oil at a cost of 38 cents per barrel compared with 60.6 cents by tanker, and \$1.597 by tank car. This includes the gathering cost at the source of the line and the depreciation and amortization of the investment in 20 years. The same line is reduced to 20 inches from Phoenixville to Philadelphia and New York harbor. Total cost of the pipeline was \$77,112,000.

Capital cost of the "little big inch,"

a 20-inch line extending from Texas City and Beaumont, Tex., on the Gulf Coast to the New York harbor area for a total of 1475 miles, is \$65,654,000. Petroleum products, mostly high octane gas, are transported through this line at a cost of 24.3 cents a barrel, compared with 40 cents for tankers and \$1.74 for tank cars.

About 200 million barrels of petroleum have been carried through the two lines thus far. Deliveries over the "big inch" during September averaged approximately 320,000 barrels daily whereas deliveries over the "little big inch" averaged about 207,608 barrels daily.

Hearing of Lincoln Electric's Renegotiation Appeal To Start

OF THE 117 cases in which war contractors seek relief from decisions of the various price adjustment boards under the original Contract Renegotiation act, the first scheduled to be heard is that of the Lincoln Electric Co., Cleveland, against the Navy. Presentation of the case is to begin Nov. 27, before a special 3-judge court appointed by the United States Court of Appeals for the District of Columbia.

A 3-judge court also has been appointed to hear the case of the Mine Safety Appliance Co., Pittsburgh, against the Navy, but no date has been set.

After these initial cases have been disposed of, it is expected that action on the 21 other district court cases,

mostly pending in the District of Columbia Court, will develop more rapidly.

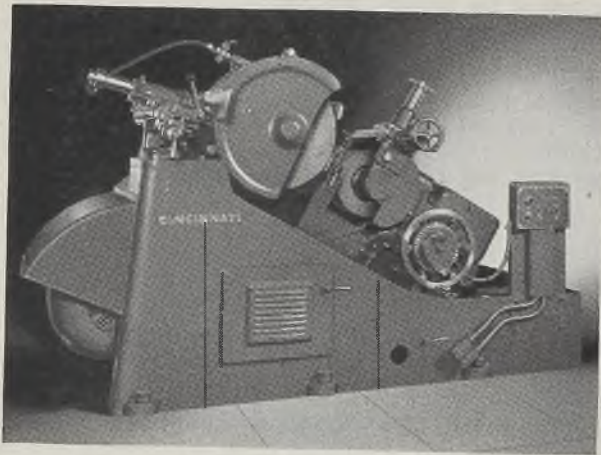
All these decisions, it is expected, will be appealed directly to the Supreme Court, so that none is likely to be terminated until some time next year. The common allegation in all of these cases is that the original Renegotiation act was unconstitutional.

None of the 95 cases brought in the Tax Court of the United States yet has been scheduled for hearing. These are the cases where contractors alleged that the decisions of the renegotiators were unfair. Normally it requires about four months at the least to go through the motions in bringing a case to trial in the Tax Court.

Did you know

YOU CAN GRIND 12 INCH DIAMETER CINCINNATI CENTERLESS

Grinding bearing races of 12" diameter by the centerless method is quite an accomplishment in itself. Those being ground in the illustration at the right presented still another problem — the outside diameter had to be exactly square with the previously ground faces. This was accomplished on a CINCINNATI No. 4 Centerless Grinding Machine,



having increased capacity, with a special in- work rest. ¶ In the retracted position, two p are placed on fingers in the front movable sect of the work rest. As they are advanced into grinding throat, the parts ride up on the work r blade, losing contact with the positioning finger. Further movement squares up the parts betwe the front and rear locating surfaces, which are exactly parallel with each other. Then follows hand infeed movement of the regulating wheel sl to size the parts. ¶ This setup again demonstrat the ability of CINCINNATI Application Engine here at Grinding Headquarters to apply the ec nomical centerless method to unusual grindi problems. Take advantage of their wide exper ence and grinding know-how.

Illustrated at the left is the CINCINNATI No. 4 Centerless Grinding Machine. Complete specifications may be obtained from the factory. CINCINNATI Centerless Grinders are also available in No. 2 and No. 3 sizes. For a brief description of these machines, look in Sweet's Catalog File.

Keep on buying
WAR BONDS

CINCINNATI

CENTER TYPE GRINDING MACHIN

ON A



View from the rear of a CINCINNATI No. 4 Centerless Grinding Machine, having increased capacity, and tooled up to grind the outside diameter of 12" diameter bearing races.

GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

Clayton Submits Comprehensive Report on Activities of SWPA

Agency sold over \$85 million worth in seven months of its existence and had over \$465 million for disposal as of Sept. 30 last. Major problem of disposing of government's present holdings of 500,000 to 600,000 machine tools is yet to come

DURING the seven months of its existence, the Surplus War Property Administration disposed of \$85,007,000 worth of property by Sept. 30, 1944, and had \$465,207,000 worth on hand for disposal as of that date.

These figures were included in a report submitted by W. L. Clayton, administrator, SWPA, to James F. Byrnes, director of war mobilization, last week.

With regard to the general method of disposal, Mr. Clayton said in his report:

"The guiding principle has been to obtain widest possible distribution of surplus property, at fair prices and in quantities small enough to give small purchasers equal opportunity to compete with larger purchasers, and making efficient use of commercial channels of trade so as to avoid the expense and administrative cumbersomeness of putting the government into the retail business, as well as the resultant government competition with private business."

Government Owns Half Million Tools

In the section of the report dealing with machine tools, Mr. Clayton said there were about 900,000 machine tools in the United States when the war in Europe began and that at the present time the government alone owns between 500,000 and 600,000 tools. It was pointed out that a very large proportion of the government-owned tools will eventually be declared surplus.

Relatively few machine tools have yet been declared surplus. On Aug. 22, 1944, 5287 had been declared surplus and 4485 disposed of in over 3000 individual transactions, leaving 802 on hand. "The major problem is thus yet to come," the report said, "as most of the government-owned machine tools are still in war production."

A plan for the disposal of surplus cutting tools has been submitted, although it has not yet been put into operation. Under the plan, any cutting tool manufacturer desiring to do so may become an agent of Defense Plant Corp., the disposal agency for this type of property. Cutting tools becoming available for disposal will then be sent direct to the agent who manufactured them. The agent will inspect, inventory, store and do whatever is necessary to put the tools in first class condition at the expense of DPC. He will then divide the tools into three categories—standard cutting tools, semi-special cutting tools, and special cutting tools. He will then proceed to sell the government-owned cutting tools on a percentage relation with the tools that he

manufactures himself. Sales will be made through regular distributing channels at the same prices that the agent-manufacturer charges for his own tools. On sales of government-owned tools, the agent-manufacturer will receive a commission specified in the agency contract.

Steel and other common metals, the report said, are handled under a recently devised procedure by Metals Reserve Co., involving local sales coupled with a plan for nationwide information and shifting of stocks from one area to another. Two difficulties have been encountered in the disposal of surplus metals: First, the natural desire of purchasers to acquire necessary supplies from their regular sources; second, the unbalanced supply and demand in various localities.

"The first of these difficulties," the report continued, "has been accentuated by the limitations upon uses necessary under wartime conditions, and particularly because of manpower shortages. Be-

cause of these conditions, in many cases the only persons allowed to purchase are also allowed to fill their requirements from prime sources. Since in most cases material is available from prime sources at the present time, and since there is relatively little profit incentive because of taxes and renegotiation, the allowable purchasers are not anxious to acquire the surplus material regardless of price.

"As a result, in many cases the only buying interest has been from dealers who are primarily interested in purchasing on a relatively long-term speculative basis rather than to fill immediate requirements. It has seemed inadvisable to break the market to a level attractive to such speculative buyers, since with the relaxing of limitations which may be expected in the not too distant future, a market will exist which will return to the government a far greater value than would be available by sales today.

"The geographic dislocation which presented a considerable obstacle to sales is being overcome by a procedure which establishes a central inventory with an agent in New York, who performs two functions, bringing together inquiries from one locality and supply to another, and buyers to whom nationwide offerings are of logical interest . . . It is believed that the present operation will result in steadily increasing sales which will be further increased by the development in the field offices of technically skilled personnel to handle the material."

Joint Army-Navy Termination Regulation Simplifies Contract Settlement Procedure

A NEW joint Army-Navy Termination regulation, covering all aspects of fixed-price contract settlements, is expected to simplify and expedite the whole procedure of contract settlement and property disposition. Regardless of whether a contractor is doing business with the Army or Navy, it will now be possible for him to follow one set of rules and file one set of forms. This regulation, known as JTR, supersedes the War Department's procurement regulation No. 15 and replaces Navy directives on contract termination.

The purpose and scope of the new JTR were outlined in a statement issued jointly by the Secretary of the Navy and the Under Secretary of War.

"The joint termination regulation . . . seeks to provide uniform and workable tools for carrying out the three-fold purpose of the Contract Settlement act of 1944; to settle termination claims fairly and quickly, to clear termination inventory from war plants promptly, and to provide adequate interim financing. Like the act, the regulation fully recognizes that the prompt settlement of termination claims can be accomplished only by fair and business like negotiation. . . . In large measure, the regulation provides guides, recommendations, and mechanical aids for reaching speedy and equit-

able settlements, and includes safeguards to protect the government's interests."

Included in the JTR are new uniform settlement proposal forms applicable for all procurement agencies together with covering cost accounting instructions that constitute a new joint accounting manual. These forms have been simplified, making it possible to file practically any type of fixed price settlement proposal on one standard form, with accompanying inventory schedules.

In respect to interim financing, the JTR not only outlines the method by which guaranteed termination loans (V, VT, and T loans) may be obtained through the contractors' commercial bank, but also explains the provisions by which partial payments of at least 75 and up to 90 per cent of a contractor's estimated costs can be obtained from the government within 30 days of application.

Contractors now can make final settlement with their subcontractors of net claims under \$1000 where the claimant keeps or disposes of all termination inventory.

The important problem of plant clearance also has been made easier by a provision that makes it possible for any contractor in the tier above to approve disposal, without further government re-

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

MILK COOLERS: Manufacturers no longer need an AA-5 rating, or better, in order to sell dealers a complete farm milk cooler, or a milk cabinet. An AA-5 rating is needed, however, when manufacturers wish to sell a condensing unit separately.

L ORDERS

PLUMBING FIXTURES: Specifications of the following plumbing supplies have been changed to permit the use of copper in their manufacture: Float rods, flush connections for low tanks; flush valves for low tanks; sink, tub and lavatory plugs and strainers; tank floats; single faucets; combination faucets; shower valves; flushometers; shower and urinal strainers; tubular goods (with the exception of shower rods and fixture traps; and lavatory, bath and closet supply pipes); closet and urinal spuds; shower heads and arms; fixture stops; and cleanout plugs for cast iron soil pipe and fixture traps. (L-42)

GOLF CLUBS: Manufacturers are now permitted to fill Army, Navy and Veterans Administration orders for golf clubs. This action

ceptance of unrated orders, however, must not interfere with delivery of rated orders on hand. Container machinery includes such items as bag-making machinery; metal can and drum-making machinery; paper can, tube, box and carton-making machinery; cap and crown-making machinery. (L-332)

M ORDERS

COPPER AND BRASS: Applications on form CMP-4B to obtain brass strip and brass wire for use during the fourth quarter of 1944 in the manufacture of snap fasteners and certain parts of slide fasteners should be filed not later than Nov. 21 with the Textile, Clothing and Leather Bureau, WPB. Use of brass for these purposes for civilian goods production was established by order M-9-c, as amended, Nov. 13, 1944. The metal allocated for this period provides brass strip and brass wire for manufacture of snap fasteners but does not provide brass wire for manufacture of slide fasteners. Use of brass strip is not permitted for slide fasteners interlocking elements.

Use of copper is now permitted in manufacture of float rods, flushometers, single and combination faucets, shower heads and arms, and various other items of plumbing fixture fittings and trim. (M-9-c)

IRON OXIDE PIGMENTS: Synthetic hydrated yellow iron oxide pigments have been placed under control of order M-383 in order to speed deliveries of these pigments to the military in view of recently increased requirements. Except for orders accompanied by preferred order certificates, all preference ratings for the pigments are canceled under provisions of the order. Orders of pigments for general civilian use may be filled at the discretion of the producers after military requirements have been met. (M-383)

PRICE REGULATIONS

VACUUM CLEANERS: Manufacturers of new household vacuum cleaners and attachments may agree to sell these products at prices that can be increased up to maximum prices that are in effect at the time the product is delivered. (No. 111)

PLUMBING AND HEATING EQUIPMENT: That section of price schedule No. 546 that exempted sales of used and reconditioned plumbing and heating equipment by government agencies has been revoked. The specific method for pricing unlisted items covers the pricing of equipment that does not meet the reconditioning requirements established by the regulation. An erroneous reference to automatic hot water heaters has been deleted from the section outlining the method for determining the ceiling price for type B reconditioned and guaranteed boilers and boiler repair parts. (No. 546)

WPB Clarifies Rule for Precedence of Rated Orders

Date of a purchase order, for placing in sequence on order boards, is now defined in priorities regulation No. 1 as that date when a manufacturer and customer agree on sufficient specifications to begin production. This clarification was necessary because precedence in scheduling between conflicting orders that bear the same preference rating must be given to the order that was received first with the rating.

view of the termination inventory of a subcontractor whose claim is under \$10,000.

Another new development is pretermination planning. Under this concept, the government would plan with the contractor to meet many of the important problems of inevitable termination while the contract is still in force, and well in advance of the day when it will run to completion or be terminated. Depending on the circumstances, the government and the contractor might agree beforehand on items such as the proper overhead charges to be made against the terminated portion of the contract, the unit cost of a contractor's inventory at various stages of manufacture, the manner in which this inventory would be disposed of and the price that should apply.

Services Consolidate Effort

The consolidated termination program setup in the JTR provides for assignment of selected contractors to particular services of the Army or offices of the Navy, rather than duplicating effort by having two or more procurement offices involved. The special feature of the consolidated termination program is the reliance by one service upon the accounting reports and property disposal decision of another service.

Three additional publications, covering different aspects of termination and settlement procedure are available: A pamphlet on the "Standard Contract Settlement Proposal Forms" together with instructions and an outline of a hypothetical termination case; a brochure on "Termination Financing for War Contractors" issued by the Office of Contract Settlement, explaining the procedure for obtaining partial payments or guaranteed loans; and the new Navy "Material Inspection Service Manual on Contract Termination."

War Department fixed-price contracts totaling 1544 in number were terminated during September and 1416 terminated contracts were settled, according to the latest figures released by the department. The September total was the largest since June. Claims totaling \$21,180,000 were paid to contractors during September.

Since termination of war contracts began, a grand total of 29,354 fixed-price contracts have been canceled and of this number 25,560 already have been settled. These operations have canceled work on war contracts which, if completed, would have cost about \$12 billion. Of these cancellations, \$7,794,280,000 worth have been settled by payment to contractors of \$330,100,000.

Terminated fixed-price contracts still in process total 3874, of which 3000 remain unsettled because contractors have submitted no claims. Brig. Gen. David N. Hauseman, U. S. Army, director of the Readjustment Division, says "the settlement of terminated contracts can be materially speeded if contractors will give immediate attention to their part of the job and get their claims in."

INDEX OF ORDER REVISIONS

Subject	Designations
Copper and Brass	M-9-c
Equipment, General Industrial	L-332
Flatware	L-140-b
Golf Clubs	L-93
Instruments, Industrial	L-265
Pigments, Iron Oxide	M-383
Plumbing Fixtures	L-42
Price Regulations	
Plumbing and Heating	
Equipment	No. 546
Vacuum Cleaners	No. 111

was taken to facilitate the fulfillment of military requirements for golf clubs to be used in connection with rehabilitation and recreation programs for service men and war veterans. Prohibition on manufacture of parts for golf clubs has been deleted from the order, but production will be controlled through the allocation of materials. (L-93)

FLATWARE: Six pieces have been added to the list of types of silver-plated, chrome-plated, and stainless flatware that may be made under order L-140-b. The use of copper-base alloy for "blanks" for silver-plated flatware is permitted under provisions of the order as amended. Only copper-base alloy that does not contain nickel (except in impurities) may be used to make "blanks" for the permitted pieces of flatware. Manufacturers who have no flatware production quota under the order may apply for a quota under the spot authorization plan. (L-140-b)

INDUSTRIAL INSTRUMENTS: The following industrial type instruments and their associated circuits have been excluded from restrictions of the electronic equipment order, L-265. Used for measuring or controlling temperature, pressure, flow, liquid level, relative humidity, specific gravity, acidity, alkalinity, speed, and power load or frequency of electric power generating stations. (L-265)

GENERAL INDUSTRIAL EQUIPMENT: Manufacturers of machinery for making containers now are permitted to accept unrated orders and make delivery on such orders, as a result of revocation of order L-332. Ac-

CHICAGO

WITH the war in Europe continuing for a longer period than had been expected a few months back, reason appears to be replacing emotion in the shaping of plans for celebration of V-E Day. Sixty to 90 days ago, prospect of early end of the war raised fears that war workers might rush away from their posts in unbridled exuberance and in such numbers as to interfere seriously with production. That feeling seems now to have passed.

Responsible for this changed attitude is the sobering fact that many more Americans have made the supreme sacrifice and thousands of others will do so before the end comes. Invasion of the Philippines and quickening of the tempo in the Pacific war is adding its influence to the psychology, for it is recognized that capitulation of Germany will constitute only half of victory. Too many families have members in the armed services for those on the production front at home to jeopardize the flow of materials needed for a war yet to be won.

All along, the Office of War Information and the armed forces have been pleading for continuation of work without celebration on V-E Day, and because of prolongation of hostilities they appear to have gained support for their point-of-view. Management was for it from the start, but plans for celebrations were set up as a matter of self-protection. Controlled celebrations seemed preferable to "holidays" which workers might initiate in their momentary enthusiasm.

Rescind Plan for Celebration

One large corporation with several plants in the Midwest worked out a V-E Day plan in considerable detail and made it known in all plants. This involved a 24-hour work holiday without pay, to start and end without confusion to personnel or damage to property. Within the past few days, however, the plan has been rescinded as having been "premature." There was some question, too, as to whether the plan might interfere with programs being evolved by municipalities and civic organizations. So far, this corporation is undecided whether a revised plan, or any plan, is desirable.

Bendix Aviation Corp., Illinois division, Chicago, in September worked out and published a plan for a 24-hour holiday immediately upon the word of V-E Day. Based on a master plan of the corporation's home office in South Bend, Ind., it was made to conform to this plant's specific conditions. With 80 per cent of the workers women, many with husbands, sons or brothers in the service, the emotional angle suggested clearing of the plant for a short period might be desirable. However, time has altered this thinking. Bulk of the plant's work is for the Navy, and the Navy is carrying the load in the Pacific. Under Navy pressure, therefore, the plant's holiday may give way to work as usual.

Pullman-Standard Car Mfg. Co., Chicago, adopted some time ago what now

appears to be the most sensible plan of any. A worker-management committee obtained pledge cards from nearly 100 per cent of the workers that they will not stop work on V-E Day. It will not be surprising if this plan receives wide adoption in industry.

Few steel companies here have established definite plans, although considerable thinking has been done. Since steel-making involves continuous and semi-continuous processes, the chief concern is what might happen to equipment if workers declare a holiday and it is felt such a holiday will be called regardless of a master plan if workers are so minded. Thus the only request of management is that if workers decide to leave, they re-

been acting as a clearing house and has issued a bulletin covering the possible difficulties and what might be expected as well as some suggestions to offset these developments. In part the bulletin reads as follows:

"With regard to industrial plants, it must be borne in mind that when the news of the collapse of Germany is received, the war is by no means at an end for we still have Japan with which to contend. It is most important that production lines be kept moving even though there is much cause for jubilation with the fall of Germany. The ideal situation would be to have all plants continue to operate. If, however, it is felt by management that it would be

V-E Day Work Stoppage On By Industry and

Moves underway at all important war production centers to discourage work interruptions when German war ends. Management, labor and local authorities co-operate to restrain workers' enthusiasm until V-J Day

main at their posts long enough to tap out heats of steel and otherwise leave equipment in good condition for starting up again.

Seek To Combat Absenteeism When Nazis Surrender

PITTSBURGH

Problem of maintaining productive operations through V-E Day has been given considerable thought by industrialists in the Pittsburgh district. A general meeting of industrial and civic interests in the area has been held under the sponsorship of E. A. Fairley, director of public safety, city of Pittsburgh, to attempt to work out some scheme whereby absenteeism can be kept at a minimum.

In order to co-ordinate the effort and pass along some of the suggestions made by the various plants in the district, the Pittsburgh Chamber of Commerce has

impossible to hold employes on the job, then plans should be made to meet the situation. Furthermore, if all plants were closed and the employes started for the Triangle, the congestion would be intolerable.

"Various concerns have accorded this matter considerable thought and study, and as a result, the following general suggestions have been considered as representing a plan that would minimize difficulties and enhance orderliness:

1. "In order to have as orderly a celebration as possible any program should comprehend plans that are in keeping with the particular operation involved. For instance, the following may be pertinent although other arrangements may well be preferable to some organizations insofar as their particular set-up is concerned.

a. "Should the news of the fall of Germany be received during a business day, the suggestion has been offered that employes be released for the remainder of the day with notice that their duties

will be resumed on their regular schedule the ensuing day; or

b. "Should the news be received after the close of business, establishments will remain closed the following day. In those instances where operations are continuous, the suggestion is offered that arrangements be made to notify later turns as to the time they should report for duty.

2. "It would seem pertinent that a skeleton force be maintained to care for equipment and matters incident to the suspension of continuous processes.

3. "Any development of this general subject merits consideration as to the wisdom of publicizing any such plans as may be decided upon by a given

group as it is almost certain that some people would jump at conclusions that such announcement was proof that information was available as to the exact date when hostilities would cease, and as such the action would give rise to unfounded rumors and might even occasion a letdown in the war effort. One view which can be well appreciated so that people will not become overly optimistic is that the instructions should be verbal. Of course there is always danger of verbal instructions being forgotten or misunderstood and this would seem to be a matter for each organization to determine, the decision depending, of course, on the size and complexity of the organization.

4. "We should like to point out that on Nov. 11, 1918, many company vehicles were used to transport employes to the Triangle where great congestion ensued and it would seem expedient that particular attention be given to this point so that the great number will migrate to their own immediate communities.

5. "While there may be little, if any, intentional destruction of property, experience with such occasions indicates that some damage will occur here and there. Obviously, efforts should be made to guide enthusiasm as much as possible into proper channels by various organizations arranging parades, local com-

munity affairs, and so forth, all of which will provide an outlet for mass enthusiasm.

Cleveland Employers Plan To Maintain Production

CLEVELAND

Industrial management and labor leaders are urging continued all-out production on the day Germany collapses. Both groups stress the importance of keeping a steady flow of munitions moving to speed up the military collapse of Japan.

Steel producers and metalworking companies in this district have plans for a brief patriotic exercise on that day, but in most instances intend to maintain full operations.

Should a general walk-out occur, despite efforts to keep the employes on the job, it is not expected that much damage to goods in process of production will result. Vulnerable operations in this connection would include open hearth, blast furnace, coke production and heat treating operations. Abrupt stoppage of machining operations is not expected to result in much damage to material.

Plants of Republic Steel Corp., Jones & Laughlin Steel Corp., and American Steel & Wire Co., in Cleveland, intend

owned

labor



Typical of the combined efforts of industry and labor to prevent any interruption of production of war materials by V-E Day celebrations is that of employes at the plants of the Pullman-Standard Car Mfg. Co., Chicago. Above, members of the co-operative committees of employes from the labor

and management groups at the Aircraft, Carworks, and Calumet harbor plants of the company present to F. M. Gunn, works manager, pledge sheets signed by all but 11 of nearly 12,000 employes in the three divisions indicating their desire to observe V-Day in Europe by staying on the job

to maintain full operations V-E Day. Survey of a representative number of steel, malleable and gray iron foundries indicate the same intention. Among the 20 metalworking companies only three are planning to close down for 24 hours.

Detroit Employers Hope To Keep Workers on Job

DETROIT

Merchants committee has held several meetings here to determine policies to be in effect on V-E Day and they have sought to enlist the aid of plants in the district in the effort to minimize celebrating by keeping plants in operation. Plants generally have concluded they are powerless to keep men on the job if they decide to leave; therefore have instructed supervisory forces to make thorough check on equipment and utilities in the event of a general exodus. Plants having public address systems will flash news of any surrender the moment it is received.

Few announcements have been made here of an official nature. Vickers Inc. carried a brief announcement in its plant newspaper urging employes to keep in mind the importance of continuing production even after V-E Day, but in general little publicity has been given the question. A General Motors policy committee recently decided to table any discussion of what plant procedure to follow on V-E Day, thinking being that consideration of the matter was premature.

More and more the belief is being registered in Detroit that Germany's surrender will be piecemeal, that there will be no single V-E Day and hence restraint of celebrants will be unnecessary. Some disapproval has been voiced to the National War Labor Board order released late in September authorizing employers to pay employes for hours not worked up to 24 after announcement of German surrender, without being considered in violation of the wage stabilization law. Many felt this was just an invitation to working people to take the day off at their employer's expense.

Eastern Steel Producers Plan No V-E Day Stoppage

NEW YORK

Leading eastern steel producers are laying plans to operate on V-E Day. They point out that the country in all probability will still be at war with Japan and the situation in general should be quite different from the Armistice Day in 1918 when all hostilities were concluded.

Every effort will be made by eastern producers to keep all continuous operations going, with special precautions taken to see that open hearth and blast furnace operations are fully manned. Failure in this respect could lead to disastrous results, it is pointed out.

San Francisco To Put Off Celebration Until V-J Day

SAN FRANCISCO

San Franciscans plan to save their war's end celebration—at least on an organized basis—until Japan is beaten. Termination of the European war, when it comes, is viewed here as a "preliminary victory," and attempts are being made to stifle mass celebrations. This is particularly true of efforts in shipyards and other war plants.

Nevertheless, spontaneous celebrations on a considerable scale are expected and are being prepared for by business groups and other civic authorities. Virtually all retail business establishments are planning to close their doors as soon as the victory announcement is made.

San Francisco, which feels it has a bigger stake in the Pacific war than any other mainland city, is going to suppress its jubilation as much as possible on V-E Day, but when Japan is defeated it plans to go all-out in celebration. Since March, 1943, the San Francisco Chamber of Commerce, through a special committee, has been making plans for the end of the Pacific war.

Southern Industry Hopes For No Interruption

BIRMINGHAM

Industry in this area, relying on appeals from the Chamber of Commerce, is asking workers for more production and not less production on V-E Day. Some of the smaller plants are expected to close but major war producers hope to continue production unless celebrations interfere. Retail merchants plan to close but will placard windows with signs directed at workers with this message: "Don't stop now—there are still 70 million Japs on hand."

Youngstown Plans Quiet Celebration of V-E Day

YOUNGSTOWN, O.

Youngstown is planning a very quiet celebration when the Nazis surrender—and hopes that its plans will not go astray. The city will seek to keep its industrial plants operating as usual, its churches and schools open, and its retail stores and liquor dispensing places closed to avoid a repetition of the Armistice Day celebration of 1918.

Making plans for the V-E Day, a group of representative citizens got together here recently and discussed plans for the observance. The group included executives of large industries, city officials, representatives of churches, schools, fraternal organizations, radio stations, the daily newspaper and other groups.

Frank Purnell, president, Youngstown Sheet & Tube Co., the area's largest employer, said his company already has worked out detailed plans. It plans to

keep its supervisory forces intact on the job and these would work to get out workers as scheduled.

"After all," Mr. Purnell said, "when the Germans are defeated, the job is only half done. There will remain a lot of fighting in the Pacific, and this also needs steel. You can't shut down a big steel plant on a moment's notice. That would ruin millions of dollars worth of property—property that is needed to keep the war effort going and to provide jobs in the return to peace."

Sentiment Against Work Stoppage at Cincinnati

CINCINNATI

Less effort has been noticed in industry toward heading off work stoppages when the shooting in Europe stops, than by the pulpit, press, and patriotic organizations in this district. Undoubtedly general sentiment is that the conflict is not so near an end. One foundry owner active in the move for undisturbed production on the day of German collapse ran newspaper advertisements on Armistice Day (Nov. 11) quoting American Legion resolutions which expressed the same appeal.

Job Will Be Only Half Done, Feeling on Coast

LOS ANGELES

Los Angeles City War Council, comprised of 78 organizations of industry, labor, religion, government, entertainment, etc., passed a resolution recently which has been given wide approval calling on all citizens at the end of hostilities with Germany to rededicate themselves to the task of defeating Japan.

The resolution calls for no interruption in the flow of planes, ships, and war goods by celebrations or absenteeism from war plants. It requests prayers and thanksgiving in churches with gratitude that further sacrifice of life in Europe is no longer necessary.

Asks Workers Forego Any V-E Day Work Stoppage

W. J. McIlvane, executive vice president, Copperweld Steel Co., in letters to the company's local union, United Steelworkers of America-CIO, and to Clinton S. Golden, assistant to Philip Murray, CIO president, requested that workers forego any work stoppage for celebration purposes on V-E Day.

In his letter, Mr. McIlvane stated that the company, now engaged in the production of copper-covered steel wire for field telephone use by our fighting forces in Europe and the Pacific, is not sponsoring any V-E Day celebration and will not authorize any work stoppage for celebration purposes. He said the company plans to pay double time to the workers who remain on the job.

Promising Outlook for Far West Industries Predicted by Expert

Marketing professor forecasts growing future outlets for war-born steel and aluminum installations in Coast states. Lists large number of potential markets. Thinks there will be considerable dislocation immediately following war

SAN FRANCISCO
BRIGHT opportunities for postwar development of far western natural resources and industries are foreseen by David E. Faville, professor of marketing, Stanford University Graduate School of Business.

Dr. Faville's views were outlined recently before the San Francisco Advertising Club. He headed a panel of experts which compiled data for a study of the problem.

Emphasizing that the time is past when the West is tied to the industrial apron strings of the East, Dr. Faville forecast growing future outlets for the war-born western steel and aluminum installations. He predicted that the Geneva and Fontana steel mills would convert from production of plates for ships to thin strips to supply the California canning industry's huge demands for tin plate. Tubular steel for the west's oil and natural gas industries is seen by Dr. Faville as another postwar product of the western steel mills. He estimates that facilities which must be added at Geneva and Fontana to convert to these peacetime products will cost each plant between \$30,000,000 and \$40,000,000.

"Future Depends on Ingenuity"

Outlook for an expanding aluminum industry in the West also is good, in Dr. Faville's opinion. "The West's new industrial heritage of the war," he said, "is an aluminum industry with a capacity of nearly a billion pounds of virgin metal a year. But the biggest job is to manufacture lightweight products and ship them to markets at a low rate. The future of this industry depends on the skill and ingenuity of western manufacturing and marketing."

Dr. Faville, quoting his recent marketing studies, said there is an industrial market in the Middle West capable of absorbing 50 per cent of the Northwest's aluminum output. He sees growing uses for aluminum in cooking utensils, candy wrappers, paint, railroad cars and many other items.

In connection with the aluminum industry's prospects in the West, the Stanford professor pointed out that the hydro power produced in the Pacific Northwest is the cheapest in the nation and hydro installations throughout the west will be available for aluminum refining, which requires huge amounts of electrical energy. He estimates a surplus of 1,500,000 kilowatts of power will be released to civilian consumers after the war.

Possibilities for wide development are seen by Dr. Faville for many other phases of western resources. These include:

Plastics from wood products, peach and apricot pits and walnut shells, for making automobile and plane parts, scores of gadgets and household items, apparel and many other goods.

Lumber, which by the recent Du Pont impregnation process, could enter the hardwood markets in furniture, veneers, art goods, prefabricated houses, farm buildings and garages, as well as new uses in rayon, plastics and industrial alcohol.

Oil will have an expanding chemical by-products future with the more than 500 products, such as insecticides, glues and solvents, finding a wider market throughout the nation.

A great tourist business is forecast if a proportionate number of the 15,600,000 Americans who want to travel after the war come west. Tourists spent \$250,000,000 a year before the war and their spending gave direct support to 261,300 persons. The tourist movement is expected to be spurred by lower railroad and plane fares, reduced traveling time and special bargain vacation rates. Increased use of aircraft for freight and transportation of perishable foods also is foreseen.

Dr. Faville has listed a large number of other markets for potential western industrial expansion, basing his studies on a comparison of 1939 (or prewar) production and consumption trends. This survey shows that in 1939 the eleven western states:

"Purchased 13.5 per cent of the radios manufactured in the U.S., but produced only 1.5 per cent.

"Purchased 15 per cent of stoves, ranges and heaters; produced 8.2 per cent.

"Purchased 15 per cent of refrigerators, but produced only 2.6 per cent.

"Bought 14.4 per cent of builders hardware; made only 2.6 per cent.

"Purchased 14.5 per cent of farm equipment; produced 1.3 per cent.

"Bought 10 per cent of chemical products, but made only 5.5 per cent.

"Purchased 10.8 per cent of electrical equipment; produced only 2 per cent."

Before western industry can swing into postwar development, however, Dr. Faville points out, it will face severe re-conversion dislocations. The end of the war will mean closing of 95 per cent of the shipyards, 90 per cent of aircraft production, and will bring a 60 per cent

reduction in the aluminum output.

"We will have to demobilize 41.5 per cent of our working force on the West Coast", he said. "This means two out of every five wartime workers will be looking for peacetime jobs. Our problem is not to convert back to old industries, but to establish entirely new ones. Yet the Department of Commerce says the center of American economic life has shifted markedly westward and southward and that these shifts are here to stay."

Eastern Firms Interested In California Plants

LOS ANGELES

The Los Angeles Chamber of Commerce reports more than twenty-five eastern firms have requested information pertaining to establishment of branch plants in this area. Interested companies included manufacturers of ferrous and nonferrous metal products, chemical manufacturers and all types of industrial equipment such as materials handling, spot welding and electroplating.

Postwar planning was the subject of the second regional conference of the Committee for Economic Development held in Los Angeles, Nov. 9. Approximately 800 industrial and civic leaders from this area and delegates from Nevada were in attendance. It was generally agreed artificial governmental restrictions on industry must be removed after the war if industry is to provide the large-scale employment.

Chiappari Heads Southern California Scrap Chapter

D. J. Chiappari, Charles Harley Co., Los Angeles, has been elected president of the Southern California chapter, Institute of Scrap Iron & Steel Inc., succeeding David B. Rosenthal, Eastern Iron & Metal Co. Ltd., Los Angeles.

Boston Scrap Chapter Elects Cohen President

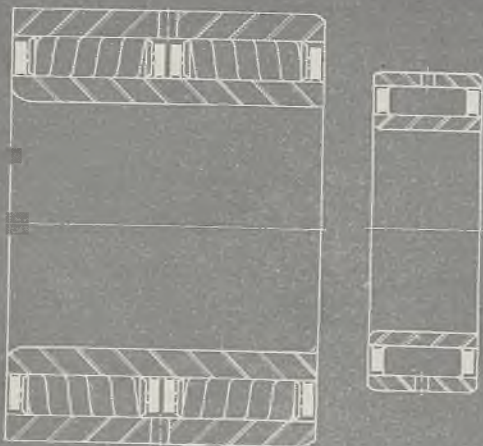
Joseph Cohen, General Scrap Iron Inc., Providence, R. I., has been elected president of the Boston chapter, Institute of Scrap Iron and Steel Inc., to succeed David S. Borowsky, Jacob Borowsky & Sons, Fitchburg, Mass.

Cincinnati Scrap Chapter Elects New Officers

All officers of the Cincinnati chapter of the Institute of Scrap Iron and Steel Inc. were re-elected at a meeting Oct. 25. The officers are: President, Abe Byer, American Compressed Steel Corp., Cincinnati; vice president, Harry Goldberg, Goldberg Iron & Steel Co., Columbus, O., and secretary-treasurer, Sam Lapirow, Lapirow Bros., Cincinnati.

The Equipment that
made 2 world records
producing steel

BEARINGS: **HYATT**



Hyatt wound roller type as used in the table rollers. Hyatt 70,000 series solid roller type as used on line shafts. There's a size and type of Hyatt Roller Bearing for every application.

To a blooming mill that had established a world's record producing 171,440 tons of steel ingots in a month, was added more glory when 512 ingots were rolled by one of the three crews during an 8 hour turn.

Production like that would permit no time out for bearing wear or care, but this mill knew from past experience that with Hyatt Roller Bearings on all table rollers and line shafts all would be well, all the time.

You may be planning record production like this for the equipment you have on the board, and for everyday practical bearing performance, it will pay to consider Hyatts.

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION
Harrison, New Jersey • Chicago • Detroit • Pittsburgh • Oakland, California

T. Ke
return
bor or
convers
KELER'S F
intima
constru
that
through
the plant
he speaks
and creati
The Chrysler
from the
industry to
to a heal
to take
without rela
one of gov
stockholders
during the
problem of
clients were
than the
in the eco
Mr. Kelle
program cover
the recover
and to short
the chang-over
advance the
covering plan
governme
final action
one of plan
and inst
be speeded
to worked
iker and th

WHAT IT
engineering
and C
factory
units
Kaiser
Under C
Water
Chico
Associa
Purch
and

MIRRORS of MOTORDOM

K. T. Keller urges industry to take swift and confident action in returning to peacetime economy, without fear of government, labor or stockholders. Proposes four-point program to shorten reconversion and reduce interim unemployment

CHRYSLER'S K. T. Keller probably has a more intimate knowledge of automobile manufacturing and its many ramifications than any other top executive in the industry. He came up the hard way through the plants and when he talks of plant problems he knows whereof he speaks. Thus, considerable importance attaches to his recent address before steel executives and other members of the Pittsburgh Chamber of Commerce. The Chrysler president sounded off straight from the shoulder in a plea for all industry to strike out bravely in the return to a healthy peacetime economy, and to take swift and confident action without reliance on government, without fear of government or of labor or of stockholders or of its critics.

Emphasizing the peculiar reconversion problem of the motor industry whose plants were transformed more completely than those of most other industries in the conversion to war production, Mr. Keller proposed a four-point program covering steps to be taken to reduce reconversion time to a minimum and to shorten unemployment during such changeovers:

1. Advance decisions by government as to clearing plants. With agreement between government and industry on policy, final action on inventories, actual clearance of plants, reconditioning of buildings and installations of machines would be speeded. (Something like this has been worked out in a small way by Studebaker and the Chicago Ordnance

District in a presettlement of the eventual termination of the company's contract for production of the M-29 personnel carrier, which is still in full production.)

2. Machine tool production required for reconversion should be placed second only to new machines required for urgent military needs, thereby enabling the long-time items needed for peacetime operations to be undertaken in tool and die shops whose war work already has slacked off and whose organizations are available to take on machine tool orders for civilian production. (Possibility of large machine tool orders for lend-lease to Russia and Britain being given the equivalent of top military priority is a disturbing factor, particularly when many such tools are being acquired for postwar production in those countries.)

Priority for Converted Industries

3. Industries which converted to war production should have first call on manpower, available beyond military needs, to facilitate the work of reconversion. So far as both men and materials are concerned, manufacturers whose plants were torn apart and whose civilian production ceased or was seriously curtailed

by war, should be permitted freely to undertake reconversion activities which do not interfere with their war work.

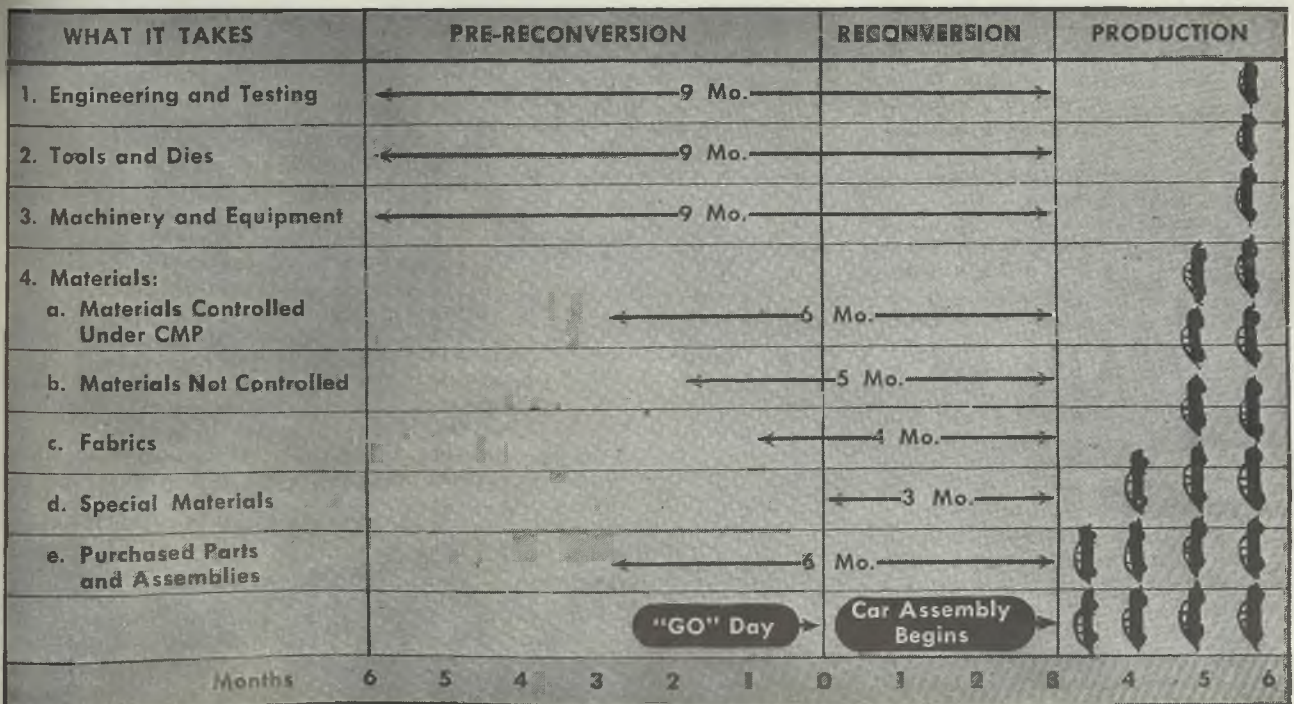
4. Wartime controls should be removed promptly, as soon as actual reconversion begins. It is just not possible to revise and reconcile for reconversion all the conflicting rules and regulations of the many government agencies now engaged piecemeal in handling various problems related to carrying on the war.

These four basic steps reflect the consensus of most automotive thinking. Significant too is Mr. Keller's observations: "Each man who heads a particular American productive company knows better than anyone in government what needs to be done to put his plants to work on peacetime goods. These leaders should not rely on government to get us back to civilian production. They should courageously make known what they believe to be the responsibilities of government, recognizing government may be either obstructive or helpful."

On the question of jobs, Mr. Keller cautioned against too much reliance on manufacturing industry to provide the millions of postwar jobs held necessary for a sound economy. Figures for prewar employment show all manufacturing enterprises in the United States employed less people than are employed in agriculture, and less people than are employed in wholesale and retail trade, construction, transportation, communications and public utilities combined. Further, prewar automobile manufacturing—that is, the end-product plants—employed less than 1 per cent of the total number of people employed. In the Detroit industrial area alone, automobile manufacturing employed less than one-third of all employed in the district.

While most units of the automobile

Chart below shows the consensus of estimates covering basic time factors involved in automotive reconversion plans. Chart by the Automotive Council for War Production



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



VISITOR: Charles F. Kettering, left, vice president and general manager of the General Motors research division, visits the plant of the Sheffield Corp., Dayton, O., where he witnessed a demonstration of recent developments in gages and precision instruments that make possible dimensional control in mass manufacturing. Above he is shown chatting with Louis Polk, right, president of Sheffield, and Walter H. J. Behm, president of the Winters National Bank & Trust Co.

industry have placed scores of orders for materials and parts covering initial manufacturing programs, principal pressure at the moment is being placed on equipment and machine tool suppliers. In this respect there is a rather complicated situation. As mentioned here last week, some tool builders are making shipments on nonrated orders placed earlier this year and are quoting deliveries of two to four months on standard machines; there are others who have not been able to ship a single nonrated order as yet and are quoting up to 30 weeks on such orders now being placed. This places the motor plant buyer in a serious hole, for even though he is able to obtain some machines in fairly good order, if certain other essential units are going to be delayed seven months, it becomes nearly impossible to work out a smooth manufacturing picture. Emergency measures will have to be taken.

For example, Chrysler has been planning an entirely new machining setup on crankshafts, requiring a battery of some 58 new crankshaft lathes. Best deliveries quoted indicate shipments to start in April and to proceed at a rate of one machine a week. On this basis it would be obviously impossible to build any engines in the spring, so the only alternative appears to be to use old-style crankshaft lathes as a stopgap until the new machines can be received. This causes a serious hitch in planning, since if it becomes feasible to build some

automobiles in the next few months, then one manufacturing plan, which may be more or less emergency in character, will have to be energized pending completion of equipment shipments for a final manufacturing setup. Thus two distinct programs must be kept moving at the present time, and the denouement of the European war will determine whether one or both will be the final choice.

Machine Tool Purchases Concluded

A number of machine tool purchases have been concluded by motor companies from batteries of government-owned equipment operated by these companies. Chevrolet, for example, has negotiated for acquisition of 789 units of this type, and Ford recently entered agreement to purchase around \$4,000,000 worth of equipment for eventual tool-room installation. Naturally these tools cannot be removed from present location until their war job has been concluded and no one can foretell when this will be. It is expected the volume of such purchases will speed up materially in the weeks ahead and while they represent just so much new business lost by the machine tool manufacturers, actually this is the soundest way to dispose of surplus equipment, for the purchaser knows exactly the status and condition of the machines and their tooling.

Despite the fact some 500 or more presses of varying capacity have been reported torn out of automotive press

shops for removal elsewhere on war production, these press shops are not too seriously disrupted for at least a partial early resumption of production. Nearly all these shops have presses on order, but deliveries range six months and upward, precluding any early installation and use of new press equipment. Of all the press shops, that of Packard has been the most seriously disturbed, having practically disappeared to make room for machining operations on aircraft engines. At the start Briggs will supply Packard bodies from its Meldrum and Vernor plants which supplied Packard clipper model bodies in the period before the war. Briggs' press shops, including the main Mack plant, have been little disrupted by the incidence of war production. The same is true of the Ford press plant and the De Soto Wyoming plant, where presses were refitted with new dies to handle aircraft stamping.

Extensive list of equipment will be required for a new axle fabrication plant which Chrysler will outfit here for production of axles for the entire Chrysler line of cars. The operation, it now appears, will be located in the former Dodge truck plant on Lynch road, adjoining the Dodge forge plants, where at present a secret war job is under way.

Activity is bubbling in the field of household appliances, of which Detroit and Michigan plants account for a fair share. WPB release of several thousand vacuum cleaners to Eureka Vacuum Cleaner Co. has been announced, and further "spot" authorizations are expected to include electric refrigerators and some other consumer durable goods. Nash-Kelvinator reportedly is readying buys for about 100,000 electric refrigerators in anticipation of their release.

Meanwhile a new organization in Detroit, Rexair Inc., with offices in the Fisher building, is said to be laying the groundwork for an extensive program of material and parts buying for production of a line of vacuum cleaners and possibly washing machines. Exact details of this new company are not known, but it is closely affiliated with the F. L. Jacobs Co. here, taking the first half of its name from Rex Jacobs of that company. Also in the picture are the Fisher brothers interests, which may provide another clue as to future activities of these motor executives.

F. L. Jacobs has been quietly moving ahead in the postwar picture, reinforced with the proceeds of large war orders. C. W. Van Ranst, former Ford engineer, has been associated with the company for a couple of years supervising some undisclosed engine development, and more recently the Continental Die Casting Co. was acquired, providing a source for a variety of die castings essential in production of consumer goods such as vacuum cleaners, washing machines, etc. Continental is managed by the son of C. E. Sorenson, former Ford production chief, now president of Willys. Another pertinent factor is the family connection, by marriage, between Jacobs and the Fishers.

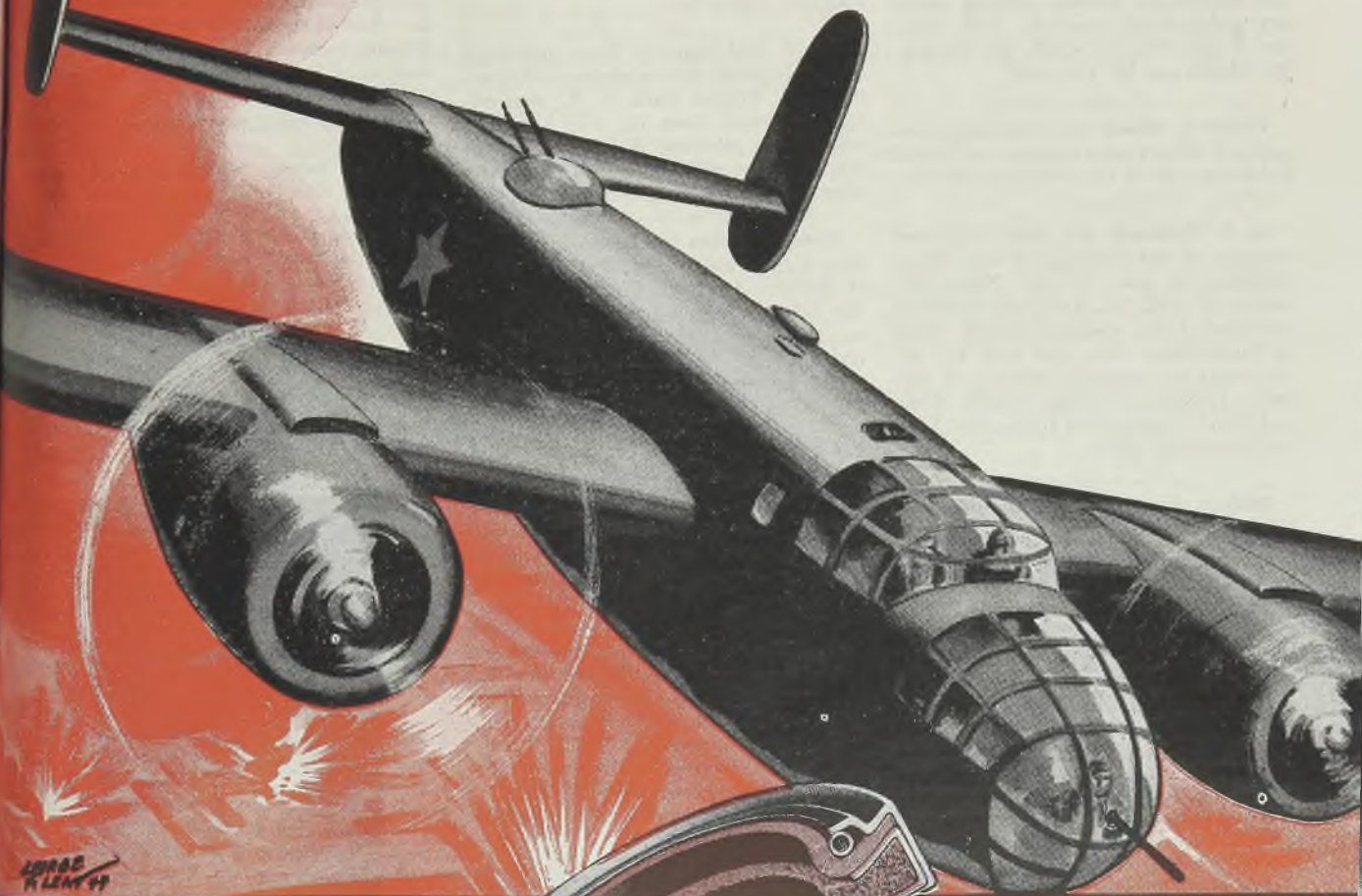
PRELUDE TO VICTORY

We have come a long way since the dark days of Pearl Harbor. Beseized with overwhelming difficulties but steadfastly resisting hurried and unprepared action, America has carefully planned and produced for our armed forces better and more abundant mechanized equipment than the world has ever before seen assembled for the defense of a united people.

Myriads of bearings with shafts revolving at tremendous speeds are involved in this mechanized equipment. And the bearings must be adequately protected—the life-sustaining lubricant kept from seeping out, and dangerous outside matter—dirt, dust, grime, water kept from getting in. Milpaco Oil Seals do this important safeguarding job. They are used in Aircraft, Trucks, Tractors, Landing Craft and other mechanized equipment. They are also used to protect bearings in the many peacetime mechanisms which one day will again add to the comforts of mankind. And while our energies are now diverted toward producing the vast quantities of Milpaco Oil Seals needed for the weapons of invasion, we are trying to take care of our old customers and shall give your inquiries for current needs as well as for future planning every possible consideration.

MICHIGAN LEATHER PRODUCTS COMPANY

6315 East Lafayette Ave., Detroit 7, Mich.



MILPACO

Oil Seals

MEN of INDUSTRY



F. CYRIL GREENHILL

F. Cyril Greenhill has been elected president and assistant treasurer, Acklin Stamping Co., Toledo, O., succeeding Frank E. Craper, who died last July. Other officers elected include: Alvin E. Seeman, executive vice president and treasurer; Harry F. Smith, vice president in charge of manufacturing; George J. Bleim, vice president in charge of purchasing; George F. Medill, secretary, and DeWitt L. Mielke, assistant secretary and assistant treasurer. New directors include Roy W. Craft, Mr. Seeman, Mr. Medill and Mr. Greenhill.

Walter J. Bloom has been appointed assistant district sales manager in Detroit for Weirton Steel Co., Weirton, W. Va.

A. F. Dobbrodtt has been appointed manager of the Pittsburgh district office, Carboly Co. Inc., Detroit. Since September of 1942 Mr. Dobbrodtt has been manager of the southern district office in Birmingham, Ala., and with his appointment the southern territory of Alabama, Tennessee, Georgia, Florida, North and South Carolina will be handled from the Pittsburgh office.

William J. Stebler, vice president of General American Transportation Corp., Chicago, has been named general supervisor of manufacturing for the entire corporation and will make his headquarters in Chicago.

James Swanson has been named assistant purchasing agent, Clark Equipment Co., Buchanan, Mich., and will have charge of all buying activities for Clark Tractor division at Battle Creek, Mich. Mr. Swanson succeeds the late D. E. Leach.

Russell C. Taylor, vice president in charge of general line manufacturing, American Can Co., New York, will assume responsibility for all the company's container manufacturing plants, both general line and packer's, according to an announcement by the company. Con-



W. T. McCARGO

solidation of all manufacturing plants under Mr. Taylor follows the recent creation of a new department of research and development headed by James A. Stewart, vice president, who formerly was in charge of packer's can manufacture. Other personnel changes include appointment of S. D. Arms as general manager of manufacture and Edmund Hoffman as manager of the industrial relations department.

W. T. McCargo has been appointed eastern regional sales manager, Carborundum Co., Niagara Falls, N. Y., succeeding F. Jerome Tone Jr., who has been named vice president in charge of sales. Mr. McCargo returns to Carborundum after four years of government service.

Henry G. Eilers has been named manager of the western territory, International Business Machines Corp., New York. Mr. Eilers, formerly manager of the electric accounting machines division in Minneapolis, will be in charge of sales in all states west of Ohio and will make his headquarters in Chicago.

James T. Mangan and Edward B. Eckland have formed the industrial design and public relations firm of Mangan & Eckland, Board of Trade building, Chicago. Both Mr. Eckland and Mr. Mangan were associated previously with Mills Industries Inc., Chicago.

W. H. Russell has been appointed district manager of the Southwestern district sales office, St. Louis, of Baldwin Locomotive Works, Eddystone, Pa.

Richard S. Johnson has been appointed research engineer on the staff of chief engineer Charles S. Schroeder, Philadelphia division, Yale & Towne Mfg. Co., Stamford, Conn. For the past ten years Mr. Johnson has been chief engineer, International Chain Co., York, Pa.

The following appointments have been announced by Harold B. Donley, manager of the newly-organized Radio Receiver division, Westinghouse Electric

& Mfg. Co., Baltimore. A. L. Herron is manager of cabinets; George Fairie becomes manager of advertising and sales promotion, and J. W. Van Deman has been made manager of the Middle Atlantic district, making his headquarters in Philadelphia.

John P. Fleming, for the past 14 years associated with American Locomotive Works, Schenectady, N. Y., has been appointed general manager, Barium Steel Corp., Canton, O.

R. W. Beil has been appointed general contract manager, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. C. F. Lloyd has been named assistant to the manager of the company's industry departments.

James W. Corey, since 1940 sales vice president of Reliance Electric & Engineering Co., Cleveland, has been elected president, succeeding Clarence L. Collens. Mr. Collens, president of the company for 37 years, has been elected to the newly-created post of chairman of the board. Senior vice president and treasurer H. M. Hitchcock will resign, effective Dec. 31, but will remain a director, and A. M. MacCutcheon, engineering vice president, has been elected to fill the office of senior vice president. C. V. Putnam, secretary, retires immediately, for reasons of health, and Roscoe H. Smith succeeds him, continuing his duties as head of the sales promotion department.

Harvey Seeley Mudd, president and managing director, Cyprus Mines Corp., Los Angeles, has been elected president and director of the American Institute of Mining and Metallurgical Engineers. Vice presidents and directors include: Donald H. McLaughlin, vice president and general manager, Cerro de Pasco Copper Corp., New York, and Leo F. Reinartz, manager of the Middletown division, American Rolling Mill Co., Middletown, O. Other directors are: C. H. Benedict, metallurgical manager, Calu-



L. H. SCHNEIDER

Who has been appointed general manager of production, Toledo Stamping & Mfg. Co., Toledo, O., noted in STEEL, Nov. 13, p. 96.

met & Hecla Consolidated Copper Co., Lake Linden, Mich.; **Robert H. Morris**, general manager, the Gauley Mountain Coal Co., Ansted, W. Va.; **J. C. Nicholls**, assistant to president, International Nickel Co. of Canada Ltd., Toronto; **Clyde E. Weed**, vice president in charge of mining operations, Anaconda Copper Mining Co., New York; **Eugene A. White**, manager, Tacoma smelter, American Smelting & Refining Co., Tacoma, Wash., and **William Embry Wrather**, director, U. S. Geological Survey, Washington.

Lloyd Dopkins has been named eastern division manager, Majestic Radio & Television Corp., Chicago. Previously he had been a division manager for Zenith Radio Corp., Chicago.

William R. Hoyt, general manager, Stamford division, Yale & Towne Mfg. Co., Stamford, Conn., has been elected a director of the Manufacturers' Association of Connecticut.

W. Gibson Carey Jr., president, Yale & Towne Mfg. Co., Stamford, Conn., recently was elected president of the China-American Council of Commerce and Industry, and has been named chairman of the Finance Committee of the Committee for Economic Development.

F. L. Gemmer has been appointed advertising and sales promotion manager, and **Eric E. DeMarsh** has been made chief field engineer, Burndy Engineering Co. Inc., New York.

Gertrude G. Harris, technical librarian of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld Inc., Coatesville, Pa., has been named chairman of the science-technology group of the Special Libraries Association, Philadelphia, which was organized recently by more than 100 technical librarians representing 67 companies in the Philadelphia area.

Granville M. Read, assistant chief engineer, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has been elected a director of Remington Arms Co. Inc., Bridgeport, Conn.

S. R. Edwards has been placed in charge of the new southwestern sales office in Dallas, Tex., of Yarnall-Waring Co., Philadelphia.

A. M. Buxton has been made assistant sales manager, Cooper-Bessemer Corp., Mt. Vernon, O.

O. H. Bowden has been appointed Alabama farm products agent for Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

George A. Mattison Jr., president, Woodstock Slag Corp., Birmingham, Ala., has been elected president of the Associated Industries of Alabama, succeeding **Douglas Stockham**, Stockham Pipe Fittings Co., Birmingham.

J. L. Stuart has joined the technical staff of Sperry Products Inc., Hoboken, N. J., as technical editor.

Harold F. Ray, formerly assistant secretary and treasurer, Electric Bond & Share Co., has joined Wickwire Spencer Steel Co., New York, in an executive accounting capacity.

Ralph M. Hinckley has been appointed abrasive engineer in the Milwaukee territory by Norton Co., Worcester, Mass.

Melvin C. Wilt, released from active duty as a lieutenant-commander in the Supply Corps, U.S.N.R., has returned to carry on his previous duties as executive vice president and general manager of Curtis Lighting Inc., Chicago, and as president of Curtis Lighting of Canada Ltd. **Gerald T. Morrow**, who had as-



L. V. NAGLE

sumed Mr. Wilt's duties during his absence, will return to his former position of vice president in charge of sales.

L. V. Nagle has been appointed vice president in charge of national sales, Udylyte Corp., Detroit. **Donald C. Blum** has joined Udylyte as service engineer in the Buffalo-Rochester, N. Y., area.

Robert Boyd Parker has been appointed assistant to the president, American Brake Shoe Co., New York.

W. H. Dennler, supervisor of personnel placement during the war for General Electric Co., Schenectady, N. Y., has been named assistant to the general sales manager of the company's appliance and merchandise department.

James A. Stewart, vice president, American Can Co., New York, will devote full time to a newly formed department of research and development.

Harry Allen Sutton has resigned as director of engineering, Consolidated Vultee Aircraft Corp., San Diego, Calif. Mr. Sutton joined the company in 1935 as assistant chief engineer and since then has played a vital role in developing Convair's B-24 Liberator, B-32 Dominator superbomber and the Model 39 postwar transport.

Norman G. Brooks has been appointed manager of the Kansas City sales office of United States Steel Supply Co., succeeding **William E. Fry**.

J. R. Randle has been made field service engineer, Shunk Mfg. Co., Bucyrus, O. Previously Mr. Randle was field engineer for Cleveland Rock Drill Co., Cleveland.

W. M. Neal has been appointed Canadian representative on the transportation equipment committee of the Combined Production and Resources Board which is set up to co-ordinate the production and material resources of the United Kingdom, the United States and



A. C. REPPENHAGEN

Who has become secretary, Mid-West Abrasive Co., Detroit, as announced in STEEL, Nov. 13, p. 96.



WILLIAM P. MICHELL

Who has been named assistant chief engineer, Mack Trucks Inc., New York, as announced in STEEL, Nov. 13, p. 96.

Canada. Mr. Neal, who is vice president, Canadian Pacific Railway Co., replaces R. A. C. Henry, recently appointed chairman, Air Transport Board, Department of Munitions and Supply, Ottawa, Que., Canada.

C. D. Allen has been appointed transportation sales engineer on the West Coast for Baldwin Locomotive Works, Eddystone, Pa.

Herman A. Everlien has been named general sales manager and Walter F. Spoerl has been appointed merchandise manager, mechanical goods division, United States Rubber Co., New York. Both positions are newly created.

A. Stull Harris, son of the late A. F. Harris, founder of Harris-Seybold-Potter Co., Cleveland, and formerly vice president in charge of engineering, has been named president of the company, succeeding R. V. Mitchell, who becomes board chairman and chairman of the executive committee. George S. Dively has been made vice president and general manager, while H. A. Porter, vice



GEORGE R. ALLEN

Who has been made general sales manager, Brass division, Kerotest Mfg. Co., Pittsburgh, reported in STEEL, Nov. 13, p. 96.

president sales, and J. W. Valient, vice president in charge of sales, eastern district, have been named members of the executive committee. R. L. Miller be-

comes treasurer, and Frank Szuter, secretary. G. C. Houck has been made assistant treasurer, and N. O. Scourfield, becomes manager of the Seybold division.

Jack W. Forbes has been made sales manager, Wickwire Spencer Metallurgical Corp., Newark, N. J., subsidiary of Wickwire Spencer Steel Co. Previously Mr. Forbes was head of the service department for Western Electric Tube Shop, New York.

J. E. Kanaley, who has been chief of the Tank Automotive Branch of the Chicago Ordnance District for the past few years, has been appointed resident and manufacturing manager, Ordnance Steel Foundry Co., Bettendorf, Iowa. He succeeds S. B. Withington, vice president of Ordnance Steel, who has been placed in charge of manufacturing of all of the six plants operated by Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich. Maj. F. C. Walsh Jr. has been named chief of the Tank Automotive Branch of the Chicago Ordnance District.

OBITUARIES . . .

George A. Martin, 79, board chairman of Sherwin-Williams Co., Cleveland, and leader in the paint and color industries for the past 50 years, died Oct. 31 in Cleveland. Mr. Martin was president of Acme White Lead & Color Works, Detroit; John Lucas Co. Inc., Philadelphia; Ozark Smelting & Mining Co. and the Sherwin-Williams companies of Canada, Cuba and Argentina, and was vice president of Lowe Bros. Co., Dayton, O., and Martin-Senour Co., Chicago. He was a director of Goodyear Tire & Rubber Co., Akron, O.; Wilson & Co. Inc., Chicago, and the Erie railroad.

Walter B. Minch, 67, manager, McKeesport works, Jones & Laughlin Steel Corp., Pittsburgh, died Nov. 8 in Mt. Lebanon, Pa. Before joining Jones & Laughlin in 1939 Mr. Minch had been associated with Western Electric Co. in Chicago; General Motors Corp. at Jackson, Mich.; Kelsey-Hayes Wheel Co., Detroit; Cleveland Welding Co., Cleveland, and Leland Electric Co., Dayton, O. He was past president of the Automobile Tire and Rim Association and a member of the Society of Automotive Engineers.

Herman O. Wolfsen, 65, for the past 28 years an accountant for Sivyer Steel Casting Co., Milwaukee, died Nov. 3 in that city.

Bernard Cunniff, 66, mining engineer and a pioneer in the development of metallic magnesium in the United States, died Nov. 9 in Cambridge, Mass. After the start of World War I Mr. Cunniff began experimental work in the manufac-

ture of metallic magnesium, which had never been made outside Germany, and during the war developed a successful process, establishing electric furnaces at Rumford Falls, Me., and Niagara Falls, N. Y.

Charles W. Olson, 61, retired mechanical engineer, who had been general superintendent at Horsburgh & Scott Co., Cleveland, for a number of years, died Nov. 8 in Cleveland Heights, O. Since Pearl Harbor Mr. Olson had been acting as consultant for the Cleveland Ordnance District as frequently as his health permitted.

Walter J. Krause, who had completed his twenty-fifth year of service with Ohio Electric Mfg. Co., Cleveland, in April of this year, died Nov. 9 in Cleveland.

William F. Berkenheger, 55, consulting engineer for Ducommun Metals & Supply Co., Los Angeles, died Nov. 2 in Glendale, Calif.

Adolph C. Schwarz, 61, assistant sales manager in New York for E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., died Nov. 7 in Westfield, N. J.

Walter W. Mohr, 48, for 16 years chief engineer, Edward Valve & Mfg. Co. Inc., East Chicago, Ind., died Nov. 13 in Hammond, Ind.

Joseph A. Hausfelder, 60, president of the Los Angeles chapter, American Society of Refrigerating Engineers, and prominent in the cold storage and ice industry, having constructed plants in both

this country and Mexico, died Nov. 2 in Santa Monica, Calif.

Orin E. Watson, 70, retired credit expert for General Electric Co., at Nela Park, Cleveland, died Nov. 14 in Schenectady, N. Y.

Elmer F. Larsen, 53, purchasing agent for the John Deere Spreader Works, East Moline, Ill., died Nov. 8.

Charles S. Winston Sr., 54, production contact executive, Dodge-Chicago plant, division Chrysler Corp., Chicago, died there Nov. 11.

Donald M. Judd, 43, sales manager, War Aircraft Mfg. Co., Ft. Lauderdale, Fla., died Nov. 8 in that city.

William L. Sturges, 63, traffic manager, Standard Tool Co., Cleveland, died Nov. 14 in Cleveland.

Ridgely Brown Hilleary, former president of American Foundry Co., Indianapolis, died recently in Louisville, Ky.

Fred W. Pintzke, 70, founder of Superior Bearings Corp., Indianapolis, died recently in that city.

Holly B. Harvey, president and treasurer, Indiana Foundry Co., Muncie, Ind., died there recently. He was chairman of the board of directors of the Indiana Foundry Association.

John W. Grose, secretary and treasurer, Wayne Screw Products Co., Detroit, died Nov. 3.

Dominion's Shipbuilding Plans To Be Revised on Broad Scale

Sharp curtailment in construction of mine sweepers due. Let contracts totaling \$7.2 million for 16 coastal cargo ships of 350 tons. Two restrictive orders of machine tool control rescinded by Department of Munitions and Supply

TORONTO, ONT.

CANADA's shipbuilding program is slated for revision on a rather broad scale, although detailed information will not be forthcoming from C. D. Howe, Minister of Munitions and Supply, for a few days.

It was announced here that there will be sharp curtailment in the building of mine sweepers and that work has been suspended on five of these craft at the Toronto Shipbuilding Co.'s yards, a government owned company, and that workers are being laid off. Building of mine sweepers at other Canadian shipyards also is being curtailed or canceled.

For Quebec and British Columbia shipyards, a new shipbuilding program has been announced which will represent an expenditure on new contracts totaling \$7.2 million. In this connection the Department of Munitions and Supply announces that contracts have been let to four Quebec and West Coast shipbuilders for 16 coastal cargo ships of 350 tons. The ships will be steel hulled, with an 8½ foot draft and length of 140 feet and will serve as all-purpose cargo carriers in the Pacific. Four of these ships will be built at the Geo. T. Davie & Sons Ltd. shipyard at Lauzon, and four by Morton Engineering & Drydock Co. Ltd. at Quebec. North Van Ship Repairs Ltd., Vancouver, has contracts for five of these ships while Victoria Machinery Depot, Victoria, B. C., will build the remaining three. The ships will cost \$450,000 each and will be completed late in 1945. They are being built for Wartime Shipbuilding Ltd. on behalf of the British Ministry of War Transport.

Department of Munitions and Supply announces that two restrictive orders of machine tool control have been rescinded. One of the rescinded orders placed on a permit basis all purchases of machine tools calling for special electrical specifications, and the other governed the purchase of cutting tools from manufacturers and required inventory reports from those possessing cutting tools.

The department also announced that metals control order restricting the use of nonferrous metals in the manufacture of organs has been removed. However, tin is still in short supply, and its use in making organs is governed by the general restrictions on the metal.

With the removal of United States controls over the procurement of magnesium, it has been possible to amend the metals control magnesium order, and imported magnesium now may be freely procured

for any purpose as has been the case with domestic magnesium for some time. A new magnesium order requires only the submission of statistical reports.

The department announced that inventory restrictions on the purchase of copper and zinc for lithographing, photoengraving, rotogravure and electrotyping have been rescinded.

An order for \$7 million worth of farm machinery has been placed by the Canadian government in preparation for the rehabilitation of returned men who decide to settle on the land under provisions of the Veterans' Land act, 1942, F. L. Dickinson, chief inspector for the Manitoba district, announced.

War Department Sets Up 11 Aluminum Scrap Areas

Eleven scrap areas to serve as central points of distribution for aluminum scrap have been established by the War Department. All aluminum to be housed in

the scrap areas is government-owned, and a large part of the material stored represents the residue from war plants using aluminum in their production.

Aluminum scrap solids, as well as castings and briquettes, make up the biggest share of the scrap to be stored. The rest of the scrap supply comes from domestic crashed aircraft. Borings and turnings will continue to be sold on the open market and will not be available at the aluminum scrap areas.

Already prepared to receive aluminum scrap are areas at the Philadelphia Ore Dock, Chicago; Camp Phillips, accommodating Wichita and Kansas City, Kans.; Fort Lewis, taking care of the needs of Seattle, Wash. Other scrap areas are: Sommerville Quartermaster Depot, for New York city; Lake Ontario Ordnance Works, for Buffalo; and Grand Blanc, Mich., to serve Detroit. Areas yet to be activated are: Camp Forrest, for Memphis and Nashville, Tenn.; Camp Howze, for Dallas and Fort Worth, Tex.; Camp Haan, to serve Los Angeles; and Camp Gruber, operating for Tulsa and Oklahoma City, Okla.

Metal Coloring Possible By Chemical Immersion

Steel, copper, brass, bronze, zinc, nickel, tin, gold, silver, aluminum, magnesium and other metals and alloys may be colored, by simple processes of chemical immersion, according to the Colonial Alloys Co., Philadelphia.



50,000TH: Presentation of the 50,000th two-inch mortar M-3, produced by Canadian Elevator Equipment Co. Ltd., Toronto, Ont., is made by Elsie Freedman, a production worker at the plant, to Maj. Gen. Levin H. Campbell Jr., chief of U. S. Ordnance. At right is R. H. Jackson, president of the company

WING TIPS

General Arnold reviews problems of aerial warfare, asks continued high production, but reveals little about new developments in United States aircraft. Number of manufacturers place portion of engineering staffs to work on postwar civilian planes

HOPING to hear news of some of the latest developments in American aircraft, engines and equipment, approximately 1500 industrialists, including top-ranking officials from practically all the motor companies, sat through an elaborate five-course dinner sponsored by the Economic Club of Detroit at the Book-Cadillac hotel Nov. 8, cheered their former compatriot, Lieut. Gen. W. S. Knudsen as he introduced the guest speaker, Gen. H. H. Arnold, commanding general of the Army Air Forces, but were disappointed in their expectations. The general was scheduled to speak on "New Developments in Air Warfare", but instead reviewed the large scale of air operations in the European theater, reported the German Luftwaffe at record strength in numbers of planes but deficient in crews and fuel, examined the difficulties of air warfare against the Japanese, and voiced a strong plea for Detroit industry to maintain and even increase its phenomenal production record in aircraft and related products.

General Knudsen told his listeners that since donning a uniform in 1942 he had flown nearly 185,000 miles inspecting

AAF equipment and bases throughout the world, at the same time visiting 1000 war production plants in this country. He, too, urged continued emphasis on increased production.

While appeals such as the two generals made are commendable in spirit, they appear somewhat strange at this juncture, when there has already been a 40 per cent cut in originally projected schedules for aircraft production in 1944, and further reductions (about 5 per cent or to 75,000 planes) are in prospect for 1945 schedules. Further the Air Technical Service Command, which General Knudsen is now in process of co-ordinating with the Materiel Command as directing head of both, is rushing the training of 3000 officers to handle details of contract termination and reconversion of plants in the aircraft field.

Knudsen Jokes About His Job

Commenting on his new activity at Wright Field, General Knudsen jokingly said he was now in process of learning how to "repair and service the junk he builds", adding that being a former builder of autos stood him in good stead.

The Arnold dinner at Detroit had some other curious aspects. A few days before it was scheduled to be held, cooks and chefs in Detroit hotels decided they would supply no more food for special parties at hotels unless they were given pay raises. The WLB refused to approve such increases, so it looked as though the gustatory treat in honor of General Arnold was off. After much pleading by hotel officials, government agencyrats and others, the chefs finally condescended to relax their demands for this one occasion. After the 1500 guests were seated, along with 50 or 60 luminaries at the speakers' table, the head chef at the hotel was brought in and introduced to Generals Arnold and Knudsen while newspaper cameras clicked. This was the formal approval for serving the food, all in all a very quaint yet typical Detroit situation these days.

In his formal address, General Arnold described the intensive activity against German targets, in which the ratio of British and American "missions" to German missions has been maintained at 1000 to 1. Losses, he indicated, have not been light (42,000 at home and abroad since Pearl Harbor) and planes are being used up at a rapid rate in combat, but fortunately ample reserves of both combat planes and crews can be drawn from to keep up a steady onslaught against the Nazis.

Captured German soldiers report they fear American fighter-bombers more than any other type. A new one, the Douglas A-26 twin-engine design, has only recently gone into combat. During October, fighter-bombers carried out over 30,000 sorties against enemy targets in Europe.

Address Thoroughly "Sifted"

General Arnold has as an escort a corps of officers from the War Department's bureau of public relations who had done a thorough job of "sifting" his address for possible disclosure of restricted information, and who also carefully "filtered" all questions submitted by the listeners for General Arnold to answer following his address. His answers to even these questions were designated as "off the record", although there was nothing in any of them which had even the remotest content of restricted military information.

The questions are hardly worth reviewing here, except for a final one, in which the questioner asked General Arnold what he planned to do after the war, whether he would continue as head of the AAF, whether he would keep on flying, etc. In effect, General Arnold replied, "After the war, I plan to return to a little place I have in the country and if any airplane so much as flies over my house, I'll shoot the damn thing out of the sky."

Two new AAF moving pictures were given their first public showing following the General's share of the program. Prepared by the industrial services division of the War Department, one was



Honoring Gen. H. H. Arnold, commanding general of the Army Air Forces, and Lieut. Gen. W. S. Knudsen, head of the Air Technical Service and Materiel Commands, the Economic Club of Detroit turned out 1500 strong Nov. 8. The generals are seated directly behind the microphone; the speakers' table includes a long list of automotive notables. To General Arnold's right are K. T. Keller of Chrysler, Henry Ford II, Alvan Macauley of Packard, George Mason of Nash-Kelvinator and Fred Zeder of Chrysler. To his left are General Knudsen, Allen Crow of the Economic Club, C. E. Wilson of General Motors, Sen. Homer Ferguson and John Knight of the Knight newspapers. Two hotel chefs and the hotel manager stand behind the guests of honor, the chefs being accorded this distinction because they had agreed to prepare the dinner after an earlier refusal because new wage demands had not been met

RAISES TOOL LIFE *5 Times!*

SUNICUT

increased tool life from 75 to 380 pieces per grind

When maximum tool life on an automatic machining operation is raised from 75 pieces to 380 pieces — simply by changing the cutting oil — it's a story every production man interested in saving time, money or material wants to hear. Well, here it is!

Output was 30 to 75 pieces per tool grind, and there was a high rate of drill breakage. Time and manpower lost in changing and re-grinding tools limited production . . . and to add to their troubles, finish of parts was poor.

Sun Oil Engineers heard of the problem and offered help. After studying the operating conditions, they recommended a change in cutting oils to Sunicut. The shop foreman agreed to a 3-months' trial.

Now 380 pieces per grind is their average tool life — an increase of 305 pieces! Finish is greatly improved . . . and production is up.

Sunicut . . . a clear transparent sulphurized cutting oil . . . has high heat-absorbing and metal-wetting qualities . . . making possible maximum tool life, nth degree accuracy and fine finish.

Ask a Sun Cutting Oil Engineer how Sunicut's advantages can be applied to your own shop. Write today to . . .

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas



SUNOCO

SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

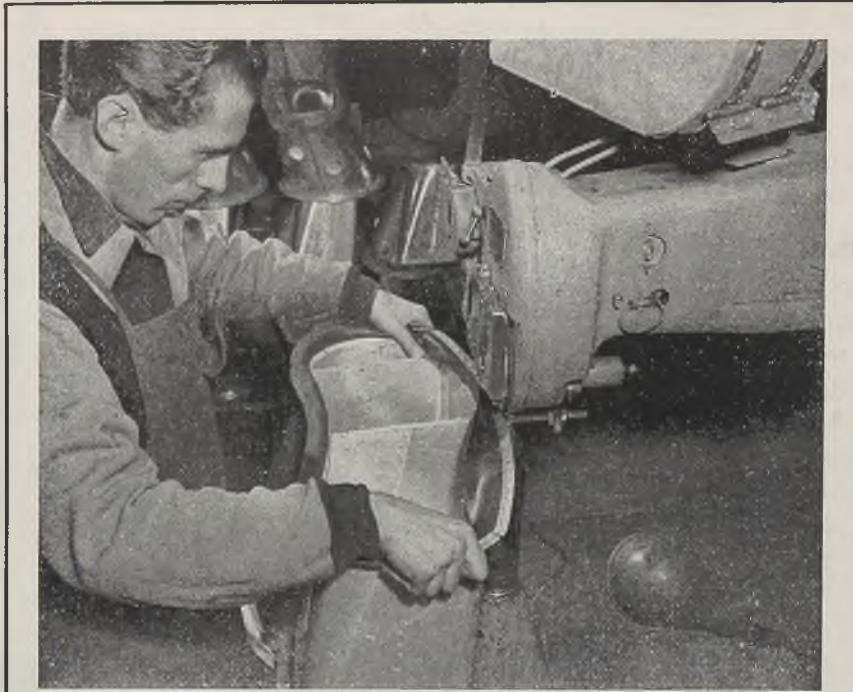
titled "The Birth of the B-29" and showed production and assembly operations on the huge new bomber in the Bell Aircraft plant at Marietta, Ga. Interesting sidelight on the size of the B-29 is the fact its wing span exceeds the length of the MAYFLOWER and also covers a greater length than the first flight of the Wright brothers at Kitty Hawk in 1906. The second film depicted some of the results of air bombing operations on Ploesti oil fields, much of

which was claimed to be so economical it could "put current planes out of business." It is designed for operation on a run such as Washington-Baltimore-New York-Boston, and its designer says it would show a profit on passenger fares of 2½-3½ cents a mile, carrying 36 passengers at 10,000 feet with 250 m.p.h. cruising speed.

Crumman Aircraft Engineering Corp., designer of Navy Hellcats, Helldivers and other combat planes of this type,

Co., San Diego, by the Navy. The plant is already in production and is expected to play an important part in the month ahead in the Navy's stepped-up air war against Japan.

In addition to this latest order, Ryan is already at work on \$18 million of Navy contracts previously received for the same planes, and \$15 million of orders for exhaust manifold systems and aircraft assemblies for other companies. This now gives Ryan a total backlog in excess of \$70 million.



WIRE STITCHER: As easy as fastening sheets of paper together with a desk stapler is the job of assembling non-structural airplane parts with a wire stitcher. At Consolidated Vultee Aircraft Corp.'s Downey, Calif., plant the stitcher is used in place of riveters, speeds assembly

it from captured German negatives, also bombing operations against Mindanao in the Philippines and other Pacific areas.

A number of aircraft manufacturers have placed a portion of their engineering staffs to work on the development of light planes for postwar civilian markets in the so-called "personal" plane category. For competitive reasons, not too much is being said about this work, and resort is even made to the familiar "restricted because of military security reasons" excuse for concealing development work. Whether this is a sound policy appears debatable, for it is logical to expect a company which gets its story across first to prospective buyers might be accorded first consideration when the airplanes are available for sale.

At any rate, the Glenn L. Martin Co. reportedly has a few such designs in the works. One of the oldest names in the aviation industry, Martin can be expected to make a bid for this field. Martin also announced in Chicago recently a new twin-engine commercial aircraft known as the Mercury or model 202

has been authorized to build 25 twin-engine amphibious planes at its Bethpage, New York, plant for civilian sale, provided only workers in training are employed on the project. The craft, said to be a modification of a Navy design, are slated for sale to Latin-American business firms whose employees require air transport. They can carry five passengers.

Another Long Island aircraft manufacturer is testing a postwar amphibian model, announcement of which is looked for early next month.

Five helicopters every six days are being produced by the Sikorsky Aircraft division of United Aircraft Corp., Bridgeport, Conn. The 100th ship recently was completed.

\$40 Million Contract Awarded Ryan Aeronautical

An additional order for over \$40 million covering several hundred planes has been placed with the Ryan Aeronautical

High-Traffic Flying Boat Terminal Designs Offered

Designs for high-traffic flying boat terminals for large cities, based on the belief that seaplanes offer America quick advantage in world trade immediately after the war, were released recently by Glenn L. Martin, president Glenn L. Martin Co.

As an integral part of the plan, Mr. Martin exhibited the design for a unique horseshoe-shaped tug of high maneuverability for the handling of the flying vessels in congested harbor waters and in docking the winged leviathans.

Contending that "flying ships don't have to wait for a great chain of expensive world airports" and that "they can go almost anywhere on earth," Mr. Martin declared that flying boats have suffered in the past from lack of adequate handling facilities in high-density traffic ports. There is no reason for them to be bound to outlying airports, when it is so easy for them to be taken directly into the commercial hearts of cities, he pointed out.

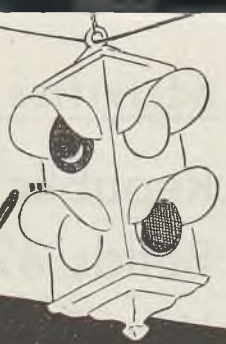
The Martin terminals would be relatively inexpensive, and would require no great area of land, but would use only a modest strip of harbor shoreline for its terminal building and service hangars. One design is in the shape of a pier, jutting into the harbor, with floating tidal docks for the loading and unloading of passengers, mail and cargo. The U-shaped tug would be used to dock the ships in these slips.

Another design is a great circular affair built offshore in the harbor and requiring very little shore space. The terminal building is in the center of the circle and the tidal slips are ranged around the perimeter of the circle. A tunnel would connect the terminal to the land. Still another design would be built along the shoreline and would employ a system of high-speed cable handling for the beaching and launching of the vessels.

The tugs developed by the Martin engineers are built around three high-performance outboard engines—one on each leg of the horseshoe and the other at the bow. Each of these engines would be capable of turning a full 360 degrees, thus allowing it to turn a monster flying ship practically "on its heel." These tugs would meet incoming vessels taxiing in from the water landing areas and would tow laden craft from the terminal to free water for take-off.

The Minute You Order Your ...

HOBART "Simplified" ARC WELDERS



...that's your **GO-SIGN**
for New Design and
Reconversion Plans



The trend is toward welded design because of the innumerable feats that have been accomplished with arc welding . . . increased ship production . . . increased tank production . . . increased gun production . . . and increased production of thousands of other pieces of equipment that bring "VICTORY" closer. Plan now for the largest reconversion **JOB** the world has ever known! Get ready for the light to change! Let **WELDED DESIGN** be your first gear . . . let Hobart "SIMPLIFIED" Arc Welders be your second gear . . . and your third gear will be smooth flowing production of stronger, lighter, better looking products at the lowest possible cost.

HOBART BROS. CO., Box T-1142 TROY, O.
"One of the World's Largest Builders of Arc Welders"



Try'em and you'll prefer them.

HOBART Electrodes

A Better Rod for Every Purpose
Hobart laboratories make rods for each specific job. It is tested—improved—perfected—order Hobart Electrodes and you'll understand why they're the choice of those who want quality. Write for your price list.

HOBART "Simplified" ARC WELDERS



Design FOR ARC WELDING!

This book will help you immensely!
Over 100 Practical and Proven Ideas that have solved design problems for others. It can save you many times its cost. Only **\$3.50**

Sample Pages Sent **FREE** on request!
Postpaid



- Complete Welding Equipment Catalog.
- Sample Pages, "Practical Design for Arc Welding"

Name _____
Position _____ Firm _____
Address _____

Free... this is the BEST POKET WELDER'S CATALOG send for your copies today!
 Check How Many
Please send me items checked below, without obligation.

● HOBART BROTHERS CO., BOX ST-1142, TROY, OHIO

Republic Steel Builds 42 DPC War Projects

Total cost of projects is more than \$200 million during World War II, company reports in recent publication

REPUBLIC STEEL CORP., Cleveland, has undertaken 42 Defense Plant Corp. projects with a total wartime cost of more than \$200 million during World War II, the company reveals in a 100-page booklet recently released entitled *Republic Goes to War*.

Included in these projects are a complete steel plant in Chicago, blast furnaces in Cleveland, Youngstown, O., and Gadsden, Ala., gun barrel plant, electric furnaces and millions of square feet of building expansion.

Republic's steel production almost doubled between 1939 and 1943. In the first year it totaled 4,817,000 tons and in the latter year 8,651,000 tons. Electric furnace steel production leaped from 112,441 tons in 1939 to 1,085,000 tons in 1943.

The book tells how the company changed its 98-inch strip mill to a producer of steel ship plates, how it increased the output of iron ore in its Adirondack mines and how it "mined" 390,000 tons of scrap from abandoned slag dumps.

Up to date Republic plants have received seven Army-Navy awards, one Maritime "M", three Guidon Awards from the Fifth Service Command, War Department, and a National Security Award from the Office of Civilian Defense.

In order to maintain its production, the company reveals that it employed more than 8000 women to replace in part more than 21,000 men who joined the armed services.

With net sales increasing from \$232 million in 1939 to \$270 million for the first six months of 1944, per cent earned on sales decreased from 4.6 per cent in 1939 to 1.6 per cent in 1944. Payrolls increased from \$83,356,000 in 1939 to \$88,759,000 for the first half of 1944, and taxes from \$9,561,000 in 1939 to \$22,801,000 for the first half of 1944. The high in taxes was in 1942 when total taxes amounted to \$77,623,000.

For the first time the company tells the story of its armor plate program in the Canton-Massillon, O., district and of the development of many highly specialized steels for armament purposes.

The booklet devotes a chapter to each of the steel districts and manufacturing plants, to its mines, metallurgy, safety, personnel and finances.



SIXTIETH BIRTHDAY: Ingersoll Sheet & Disc division of Borg Warner Corp. has just observed its sixtieth anniversary. Hosts at a dinner celebrating the occasion were two generations of Ingersolls. They are, left to right: Harold G. and Stephen L. Ingersoll, vice presidents; Roy Ingersoll, president; and Robert S. Ingersoll, works manager of the Kalamazoo, Mich., plant

BRIEFS

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

Olney J. Dean Steel Co., Chicago, has moved its offices to 58 East Washington street, Chicago.

Kennametal Inc., Latrobe, Pa., recently moved its Detroit offices to 5531 Woodward avenue.

Westinghouse Lamp division, Westinghouse Electric & Mfg. Co., Bloomfield, N. J., plans to produce after the war slender fluorescent tubes taller than a man which produce a long ribbon of electric light.

Semi Steel Test Foundry Co., 901 North Kilpatrick avenue, Chicago, is completing a plant expansion which will triple its capacity for gray iron castings.

Truscon Steel Co., Youngstown, O., has moved its Kansas City, Mo., office from the R. A. Long building to 1001 Fluor building.

Ceco Steel Products Corp., Omaha, Nebr., has reopened its office in Des Moines, Iowa, at 616 Walnut building.

Lamb-Grays Harbor Co., Hoquiam, Wash., has a \$750,000 contract for am-

munition and will convert plant and increase its working force.

Consolidated Steel Corp. Ltd., Los Angeles, has acquired a controlling interest in Transmarine Navigation Corp., a stevedoring firm in the Los Angeles harbor area.

Caine Steel Co. of California, subsidiary of Caine Steel Co., Chicago, has acquired the Pennsylvania Steel Co., Los Angeles.

Howard B. Carpenter, Cleveland, announces establishment of consulting services on steel production, including raw materials and operating problems. He is located in the Union Commerce building, Cleveland.

Sioux Road Equipment Co., 500 East Sixth street, Sioux Falls, S. D., has been organized by George Fischer to deal in road construction machinery.

Corcoran Brown Lamp Works, division of Auto-Lite Co., Cincinnati, has selected a plastic coater manufactured by the Youngstown Miller Co., Sandusky, O., for melting and dipping the ethyl cellulose

utilized for the coating of its spark plugs.

Majestic Radio & Television Corp., Chicago, has leased from Defense Plant Corp. and occupied the plant at St. Charles, Ill., formerly operated by Howard Aircraft Corp.

Pittsburgh Steel Co., Pittsburgh, recently honored 15 former employes of its Allenport mill who lost their lives serving in the armed forces.

Moore Drop Forging Co., Springfield, Mass., has published a booklet with 57 four-color kodachrome reproductions which interprets the broad aspect of the company's operations.

Bethlehem Steel Co., Bethlehem, Pa., recently was presented the 1944 first place trophy in the metals section, group A, steel mills division, safety contest of the National Safety Council.

Mullins Mfg. Corp., Warren, O., has adopted a new trademark to identify products made in its Salem and Warren, O., plants. The new trademark consists of a figure of the goddess Diana in a black oval to the left of the word "Mullins."

Jewel Mfg. Co., Chicago, will move Dec. 1 to a recently acquired plant at Grand avenue and Spalding street, Chicago.

Merit Coil & Transformer Corp., Chicago, has completed a new plant at 4427 North Clark street. General offices and the transformer division have been moved to it from the plant at 311 North Desplaines street.

Ace Foundry Co., Chicago, which recently moved to a new plant at 353 North Lamon avenue, Chicago, is now building a one-story addition of approximately 5000 square feet of floor space to be used as the cleaning and core room. It will be completed about Dec. 15.

General Engineering Co., Buffalo, announces development of an automatic riveting machine which combines four operations—drilling, countersinking, placing the rivet, and heading the rivet.

Bell Aircraft Corp., Buffalo, reports it has been notified of a reduction in its contract for P-59A Airacometes, the first jet propulsion plane made in this country. The company plans to remain active in jet research.

Bison Shipbuilding Corp., North Tonawanda, N. Y., with the launching of its 341st LCT has completed its Navy contract.

Seek To Aid Returning Designers and Engineers

A charter recently granted Designers for Industry Research Foundation, Cleve-

land, will make possible the establishment of member companies in principal industrial centers, thereby enabling returning designers and engineers to establish themselves successfully in business. This recently formed non-profit organization, working with its member companies, will further aid in the re-employment of returning servicemen by developing new products for manufacture and sale.

Sets Up New Engineering, Sales, Service Organization

Establishment of a new engineering, sales and service organization to co-ordinate the company's expanding activities in the field of railroad radio communications has been announced by William P. Hilliard, general manager, Bendix Radio division, Bendix Aviation Corp., Baltimore.

R. B. Edwards, who has been responsible for many Bendix developments in the radio transmitter field during his eight-year association with the company, has been named engineering co-ordinator for the new sales and engineering group, which will be under the general direction of W. L. Webb and John W. Hammond, chief engineer and sales manager, respectively, of the Radio division.

AWARDS . . .

Army-Navy production awards were presented to the following war plants for excellence in the manufacture of war materials:

- Aluminum Industries Inc., Cincinnati, receives third white star.
- Amperex Electronic Corp., Brooklyn, N. Y., receives second white star.

Metals Refining Co., division of Glidden Co., Hammond, Ind., receives its first white star. Los Angeles Tube division, Phelps Dodge Copper Products Corp., Los Angeles, receives third star for "M" pennant.

Henry Disston & Sons Inc., Philadelphia, receives second "E" award.

Torrance Works, Columbia Steel Co., San Francisco, receives "M" pennant.

Airseal & Aircraft Inc., Long Island, N. Y. McKeesport Works, Jones & Laughlin Steel Corp., Pittsburgh, receives "E" award.

Dover Stamping & Mfg. Co., Cambridge, Mass., receives "E" award.

Hoover Ball & Bearing Co., Ann Arbor, Mich., receives "E" award.

Askania Regulator Co., Chicago, receives second white star.

George E. Failing Supply Co., Enid, Okla., receives "E" award.

American Meter Co., Philadelphia, "E" award.

Automatic Winding Co., East Newark, N. J., "E" award.

Baker-McMillen Co., Akron, O., "E" award. Bucyrus-Erie Co., Evansville, Ind., "E" award.

Cutler Metal Products Co., Camden, N. J., "E" award.

Elgin National Watch Co., Elgin, Ill., "E" award.

Forgings & Stampings Inc., Rockford, Ill., "E" award.

Gemloid Corp., Long Island, N. Y., "E" award.

Lamson Corp., Syracuse, N. Y., "E" award. Milwaukee Gas Specialty Co., Milwaukee, "E" award.

Polson Rubber Co., Garrettsville, O., "E" award.

Seaboard Coil Spring Corp., Los Angeles. "E" award.

Walters Mfg. Co., Oakmont, Pa., "E" award.

George Weston Ltd., Salamanca, N. Y., "E" award.

Woodstock Typewriter Co., Woodstock, Ill., "E" award.

Kittinger Co. Inc., Buffalo.

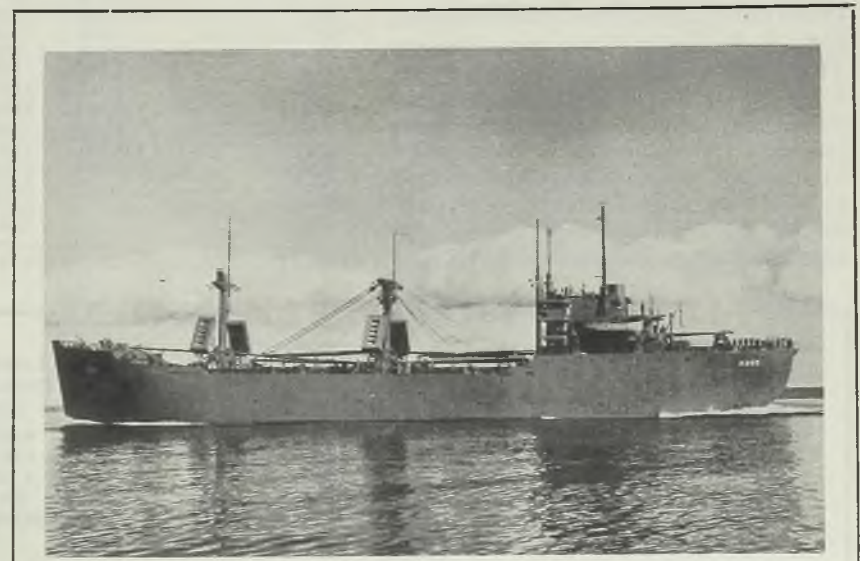
Maytag Co., Newton, Iowa.

Northwest Airlines Inc., Modification Center, St. Paul, Minn.

Sharon Steel Corp., Lowellville, O., and Sharon, Pa.

Sun Rubber Co., Barberton, O.

Union Electric Steel Corp., Carnegie, Pa.



BUILT ON LAKES: Sea trial of the POINSETT, ocean-going cargo vessel built by the United States Maritime Commission in Leathem D. Smith Shipyard, Sturgeon Bay, Wis., was held recently. The ship is 338½ feet long, has a 50-foot beam. It will be taken through the Chicago river to the Illinois river and down the Mississippi to the Gulf

THE BUSINESS TREND

Business Indexes Tend To Lower Levels

MOST industrial indicators continue to fluctuate within a narrow range, but the tendency is toward somewhat lower levels. During the latest period declines were recorded in revenue freight carloadings, bituminous coal production, engineering construction awards and truck assemblies.

Steel ingot production is only slightly below the like 1943 period, although on the basis of percentage of capacity operations the decline from a year ago is greater. For the past two months the steel industry's ingot operations have been moving between the narrow limits of 96.5 and 95 per cent of capacity.

EMPLOYMENT—Total factory employment reached a peak last autumn, but has slid sharply since. Latest figures show manufacturing employment in September totaled 15.9 million, compared with 17.1 million in the like 1943 month. Longer hours, rising operating efficiency and improved utilization of manpower have cushioned the declining trend in total employment. However, many industrialists feel that there is a limit to the improved utilization of labor, as we become more accustomed to producing war materiel.

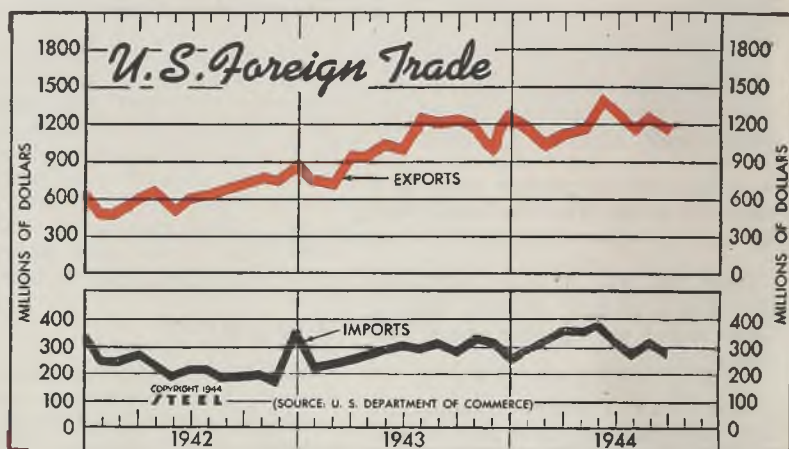
A reversal in the decline in steel mill employment is expected now that plate rolling schedules are due to decline over the next few months with a corresponding increase in sheet rolling schedules. In September the industry's employment averaged 565,200 workers, compared with 569,200 in August, and 619,785 in September, 1943.

CONSTRUCTION—New construction activity in the United States was valued at \$308 million during October. This was 6 per cent under the September total and 40 per cent below the comparable month last year. Continuation of construction controls and seasonal factors are expected to restrict the volume of work put in place during the remaining two months this year, resulting in an estimated \$3.7 billion

volume for this year. This would represent less than half the 1943 construction volume. Both public and privately financed construction declined during the latest period, and were 12 and 50 per cent, respectively, below the comparable 1943 month.

Machinery and equipment deliveries to government financed industrial plants in October, totaled \$64 million, slightly less than the September rate, but 59 per cent under the October, 1943 showing.

FOREIGN TRADE—United States exports declined during September to \$1,197,000,000, comparing with \$1,201,000,000 in August and \$1,235,000,000 in September, 1943. Imports also receded moderately to \$280,000,000, and compared with \$286,000,000 in the like month a year ago. For the first eight months exports represented the largest total for that period in history, aggregating \$9,603,000,000. Many feel a high level of exports is essential to sustain a postwar prosperity.



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

	Exports				Imports			
	1944	1943	1942	1941	1944	1943	1942	1941
Jan.	1,192	730	481	325	300	228	254	229
Feb.	1,086	719	480	303	313	234	254	284
March	1,158	988	628	357	359	249	272	268
April	1,182	980	717	387	359	258	235	287
May	1,419	1,085	535	385	386	281	191	297
June	1,271	1,002	648	330	330	295	215	280
July	1,198	1,262	650	365	293	300	213	278
Aug.	1,201	1,204	708	460	303	315	186	282
Sept.	1,197	1,235	732	425	280	286	196	262
Oct. ....	...	1,193	802	666	...	329	200	304
Nov. ....	...	1,074	787	492	...	317	168	281
Dec. ....	...	1,241	873	653	...	278	358	344
Total .....	...	12,716	8,035	5,147	...	3,369	2,742	3,345

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity).....	96.5	95.5	95.5	99
Electric Power Distributed (million kilowatt hours).....	4,397	4,355	4,355	4,483
Bituminous Coal Production (daily av.—1000 tons).....	1,992	2,025	1,971	511
Petroleum Production (daily av.—1000 bbls.).....	4,727	4,720	4,727	4,436
Construction Volume (ENR—unit \$1,000,000).....	\$8.8	\$32.4	\$57.7	\$63.0
Automobile and Truck Output (Ward's—number units).....	20,900	21,595	19,435	19,300

*Dates on request.

TRADE

	Latest Period*	Prior Week	Month Ago	Year Ago
Freight Carloadings (unit—1000 cars).....	860†	893	899	848
Business Failures (Dun & Bradstreet, number).....	22	11	15	30
Money in Circulation (in millions of dollars)†.....	\$24,674	\$24,409	\$24,099	\$19,514
Department Store Sales (change from like week a year ago)†.....	+11%	+8%	+12%	+11%

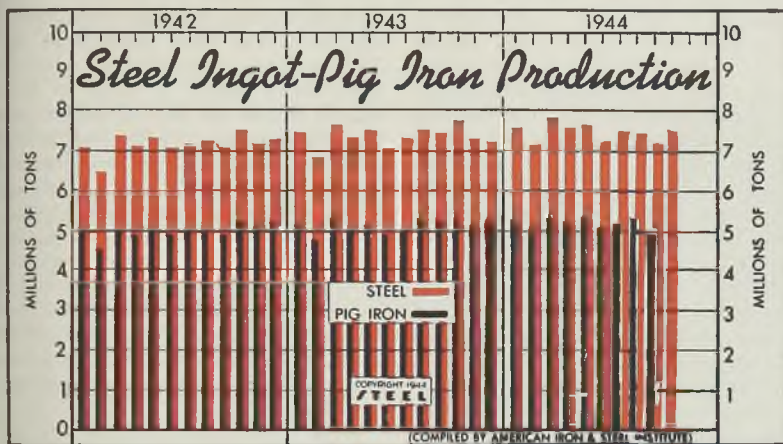
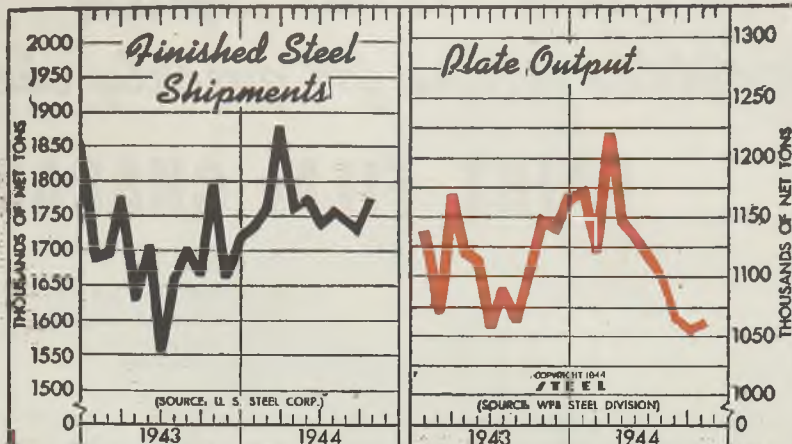
†Preliminary. †Federal Reserve Board.

Steel Shipments†—Plate Production‡

(Net tons; 000 omitted)

	—Shipments—		Plate Output	
	1944	1943	1944	1943
Jan.	1,731	1,686	1,173	1,135
Feb.	1,756	1,692	1,122	1,072
Mar.	1,875	1,772	1,223	1,168
Apr.	1,757	1,631	1,142	1,122
May	1,777	1,707	1,132	1,115
June	1,738	1,553	1,112	1,056
July	1,755	1,661	1,093	1,090
Aug.	1,743	1,705	1,067	1,061
Sept.	1,734	1,665	1,060	1,106
Oct.	1,775	1,795	1,064	1,147
10 mo.	17,639	16,865	11,187	11,072
Nov. ....	.....	1,661	.....	1,142
Dec. ....	.....	1,720	.....	1,169
Total .....	.....	20,245	.....	13,382

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



Iron, Steel Production

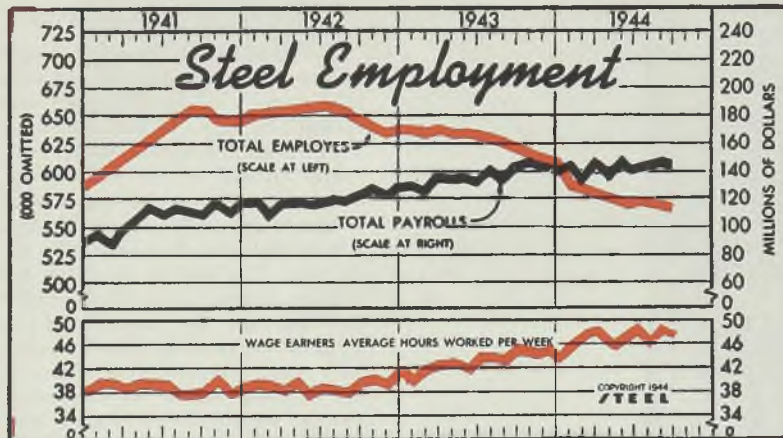
(Net tons—000 omitted)

	—Steel Ingots—		—Pig Iron—	
	1944	1943	1944	1943
Jan.	7,587	7,425	5,276	5,194
Feb.	7,189	6,825	5,083	4,766
March	7,820	7,675	5,434	5,314
April	7,569	7,374	5,243	5,035
May	7,680	7,550	5,343	5,173
June	7,217	7,039	5,057	4,886
July	7,474	7,408	5,157	5,023
Aug.	7,470	7,586	5,210	5,316
Sept.	7,193	7,514	4,988	5,226
Oct.	7,578	7,814	.....	5,324
Nov. ....	.....	7,372	.....	5,096
Dec. ....	.....	7,255	.....	5,213
Total .....	.....	88,836	.....	61,777

Steel Employment

	—Employees—			—Total Payrolls—		
	(000 omitted)	1944	1943	(Unit—\$1,000,000)	1943	1942
Jan.	583	637	651	\$141.8	\$129.7	\$118.8
Feb.	583	635	651	137.6	122.8	108.5
March	578	637	653	145.3	136.8	117.0
April	573	634	654	138.9	133.3	118.5
May	569	632	656	145.4	137.4	117.4
June	570	631	659	140.5	136.2	118.0
July	571	627	655	141.7	142.8	120.7
Aug.	569	625	647	143.9	139.9	118.7
Sept.	565	620	641	142.2	143.8	124.8
Oct. ....	.....	615	635	.....	144.9	126.6
Nov. ....	.....	611	632	.....	141.5	122.8
Dec. ....	.....	605	633	.....	140.2	129.3

†Monthly average; previous reports showed total number regardless of whether they worked one day or full month.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions).....	\$9,229	\$10,629	\$9,049	\$9,044
Federal Gross Debt (billions).....	\$210.5	\$211.8	\$211.2	\$169.5
Bond Volume, NYSE (millions).....	\$36.0	\$35.9	\$31.2	\$51.7
Stocks Sales, NYSE (thousands).....	3,570	3,868	2,959	5,884
Loans and Investments (millions)†.....	\$53,914	\$54,088	\$54,436	\$52,642
United States Government Obligations Held (millions)†.....	\$39,656	\$40,092	\$40,506	\$38,071

†Member banks, Federal Reserve System.

PRICES

	Latest Period*	Prior Week	Month Ago	Year Ago
STEEL's composite finished steel price average.....	\$56.73	\$56.73	\$56.73	\$56.73
Spot Commodity Index (Moody's, 15 items)†.....	248.5	246.6	249.0	243.2
Industrial Raw Materials (Bureau of Labor Index)†.....	114.0	113.5	113.7	112.1
Manufactured Products (Bureau of Labor Index)†.....	101.1	101.1	101.2	100.3

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

New Cycle Testing System provides means for quickly checking

PAINT FILM CHARACTERISTICS

By KAM N. KATHJU
Technical Director
The Arco Co.
Cleveland

NEW cycle testing systems by which the performance of paint films can be accurately predicted has been developed in our plant for use in guiding the formulation and improved application of paints. The specially designed testing equipment, together with a technique for the correlation of test data is now aiding in our development of finishes for post-war use.

The system was evolved to overcome the limitations of testing methods and equipment available at the beginning of

the war period, when paint manufacturers were forced to adopt emergency formulae due to the restricted use of essential paint ingredients. The urgency with which such paints (and special purpose finishes required by the armed services) had to be tested emphasized the shortcomings of the then-existing accelerated testing procedures and underlined the need for more precise correlation of the test results obtained in weathering machines with those of actual outdoor exposure. The first step in development of the new testing system called for the invention of devices by which specific characteristics could be measured and compared. This was essential in order to validate the results of laboratory tests, which could not otherwise be accurately correlated with the results of outdoor exposure on test fences in Florida and Cleveland.

Microknife Ingenious Device

The Microknife was developed to measure scratch resistance and adhesion. It consists of a movable stage which is operated by means of a micrometer screw; a 60 degree diamond point with axis nearly vertical to the test surface and a lever arrangement carrying a beam and weight which makes it possible to apply a measured load (in grams) for successive cuts. The load on the beam and the number of strokes required to cut through the film are the measure of scratch hardness. A constant speed motor drive, with gear reduction and cam, impart the required motion for successive cuts, during which the diamond point is rotated to maintain constant sharpness.

For testing adhesion, the weight is adjusted so that three strokes cut through the film and to a constant depth in the subsurface. The stage carrying the test panel is moved by means of a micrometer screw so that successive cuts can be made at specified distances which are progressively narrowed until the film between the grooves is dislodged. The measure of adhesion of the film to the subsurface is expressed in the number of mils. (0.001-inch) between the grooves where the film is dislodged.

Elasticity of the coating, which represents its capacity to expand with variations of the undersurface, is measured by the Elongauge, which was developed by the modification of a standard Erichsen sheet metal testing machine. The ma-

chine is mounted with its observation well in a vertical position so that water from a hypodermic syringe can be brought in contact with the paint film after the test panel has been clamped in place. The machine is operated by a constant speed drive geared to thrust a $\frac{1}{8}$ -inch spindle against the back of the test panel. The hypodermic needle and the test panel are wired to a galvanometer. So long as the paint film expands with the metal, it acts as an insulator. When it fails, the water contacts the metal of the test panel and a bimetal couple is established between the panel and the copper hypodermic needle, causing the current to flow and deflect the galvanometer. The elasticity is measured in terms of the millimeter draw required to break the film.

With these tools available, we were able to check the results of sub-tropical exposure in Florida against the effects produced in the weathering machine. Hundreds of panels were tested before we finally arrived at our new accelerated weathering cycle in which the results of about 3 weeks exposure have shown a consistently close relationship with the results of 6 months of Florida exposure.

Where the standard weathering machine has two spray nozzles, we added two more, and changed the controls so that one set of carbons (10 hours life)

(Please turn to Page 110)

Fig. 7—This diagram shows the action which takes place in testing paint film flexibility. A tool or spindle is gradually pressed into the under side of the steel panel, the paint film serving as an insulator. When it fails, the water contacts the metal. The bimetal couple established between the panel and the copper needle causes current to flow, deflecting the galvanometer and signalling end of the test

Fig. 8—For testing adhesion, weight is adjusted so that three strokes of the point of the machine in Fig. 3 cut through the film and to a constant depth in the sub-surface. Measure of adhesion is expressed as distance between grooves where film is dislodged

Fig. 1 — Industrial paints are checked rapidly on panels like the one shown here by a new cycle testing system

Fig. 2—Painted panels are exposed to simulated sunshine by rotating them around a powerful carbon arc lamp at the rate of once every 2 hours

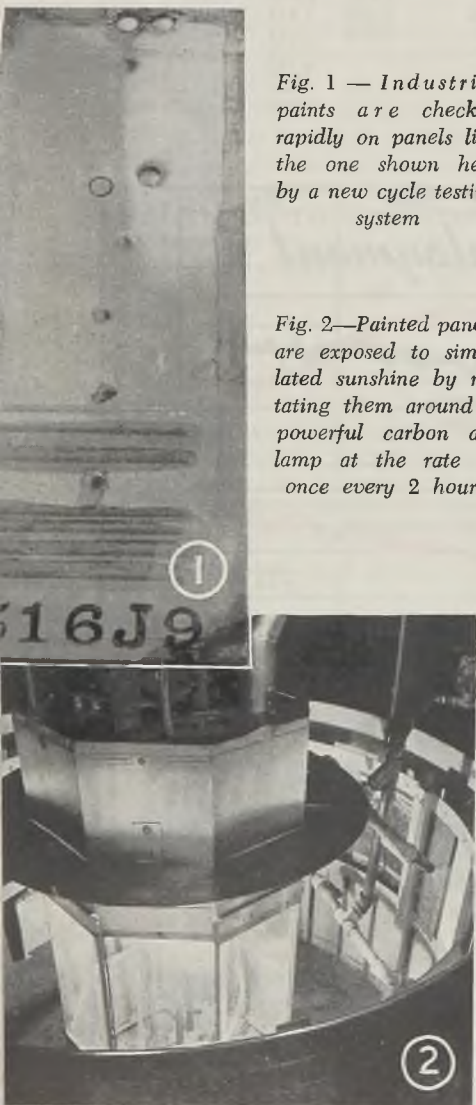


Fig. 3—Scratch resistance and adhesion of paint are measured by means of this machine. It employs a diamond point tool which is rotated at each stroke to maintain constant sharpness over a long period. The load in grams is applied to the point through a lever arrangement carrying beam and weight

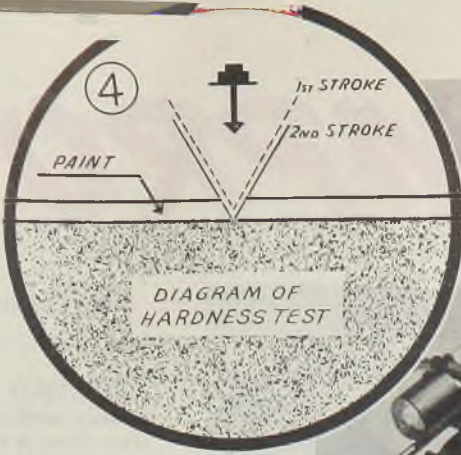


Fig. 4—For testing hardness, the weight on the diamond point of the machine shown in Fig. 3 is adjusted so that two strokes just cut through the coating. Weight in grams required to cut through the film is the measure of its hardness

Fig. 5—A conventional Erichsen sheet metal testing machine was adopted for use in determining flexibility of paint films on metal. Both the copper needle, which may be seen immersed in water in the well, and the steel test panel are wired to a galvanometer. Thus any break in the paint film is recorded instantly

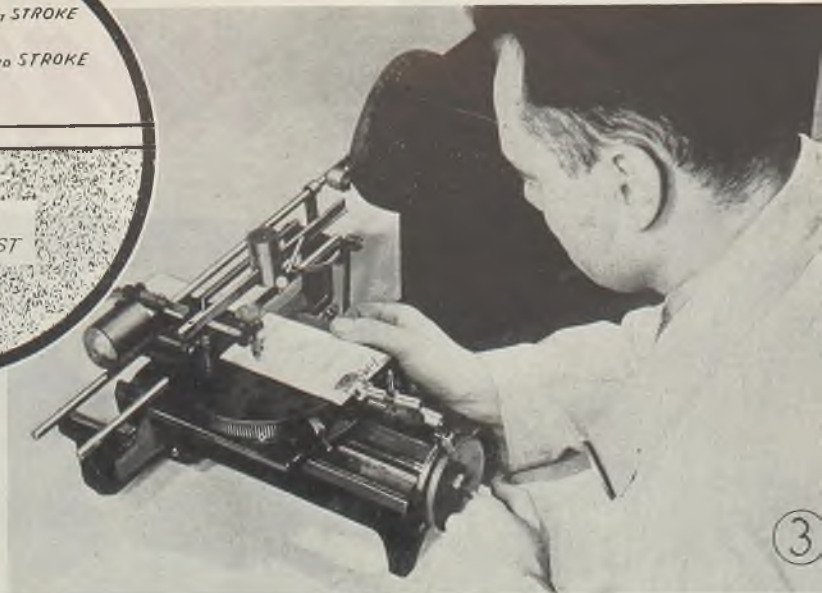
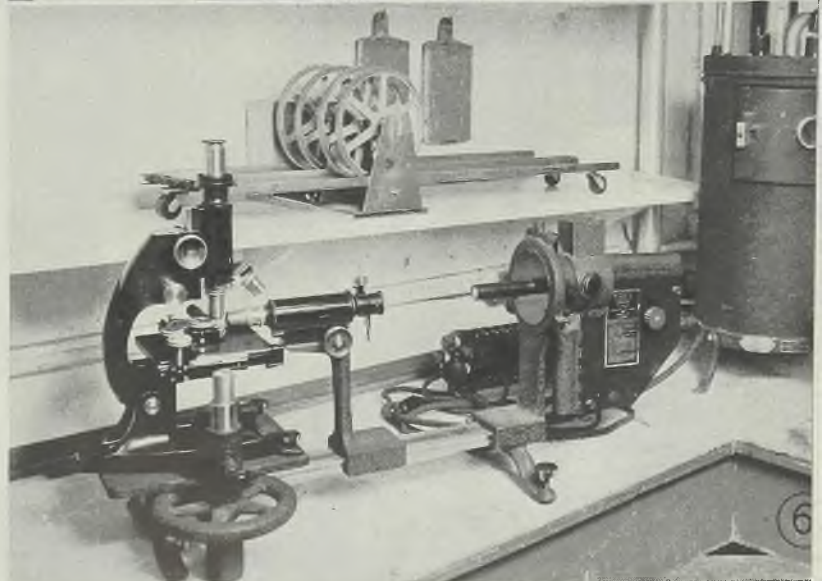
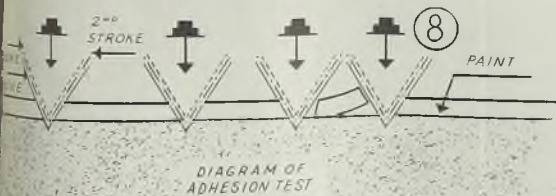
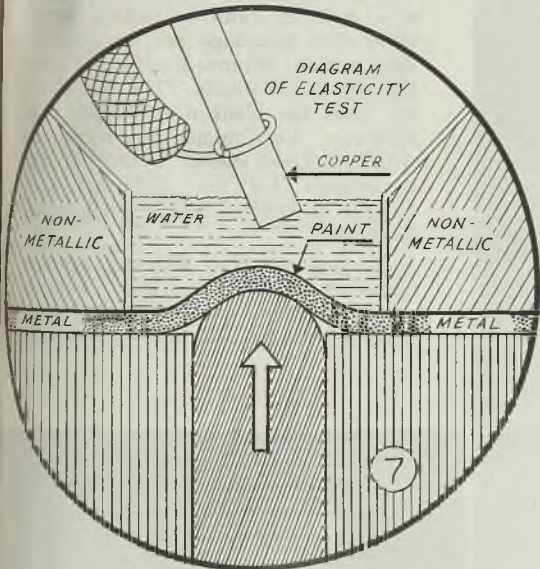
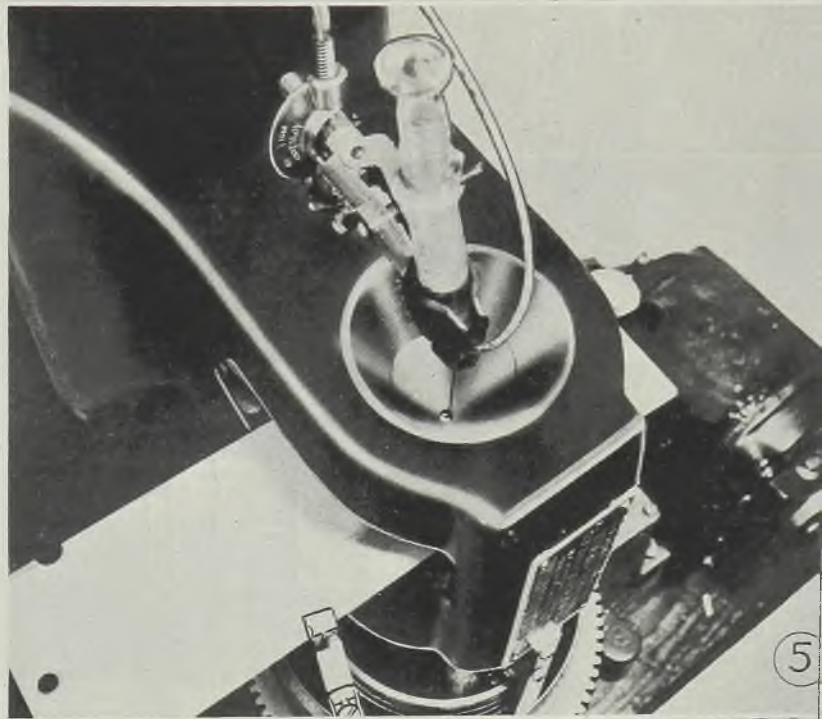
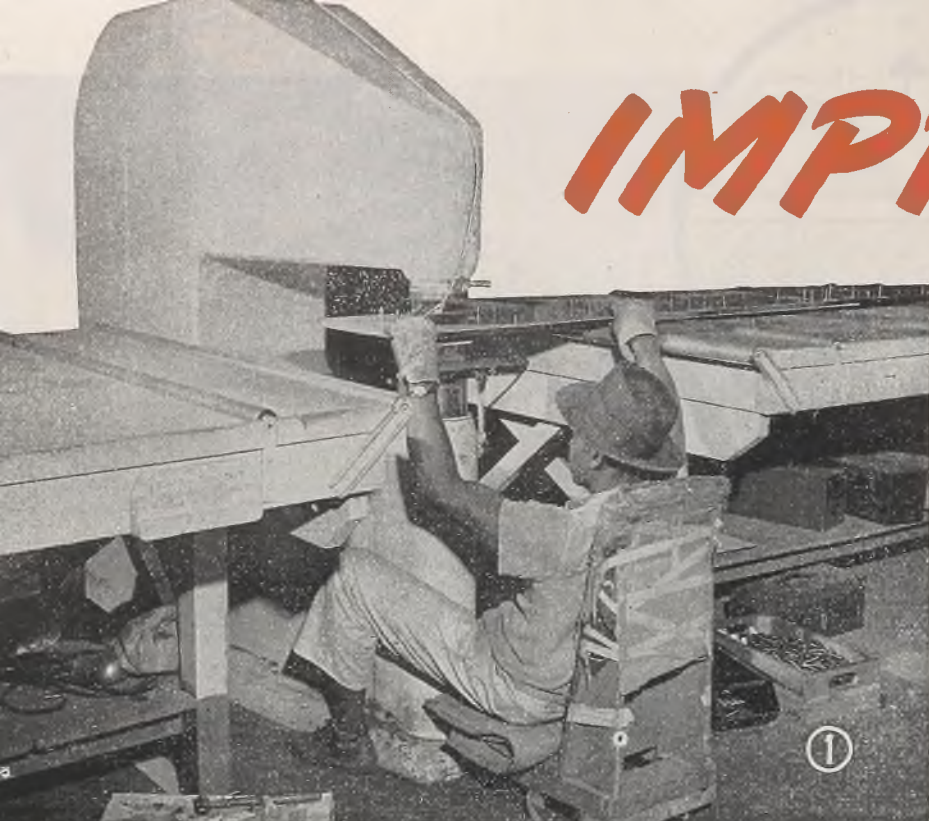


Fig. 6—Paint film thickness is determined by puncturing the painted panel and viewing the extruded edge through a scale on a 300 power microscope. Each division of the scale represents 0.0001-inch



IMPROVEMENT

By G. ELDRIDGE STEDMAN



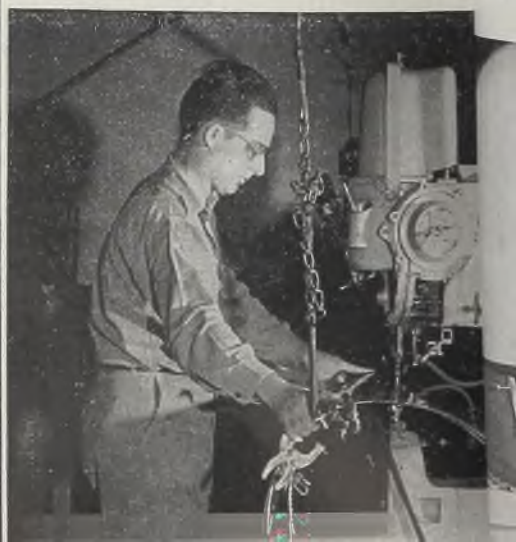
RIVETING is so extensively and universally used in aircraft fabrication that often there is a feeling that no improvements can be made in technique. But there is constant exploration for new ways and means to improve riveting efficiency, and many discoveries afford considerable improvement.

In order to deliver the greatest poundage of airplane per government dollar, North American Aviation, Inc., has made significant improvements in riveting technique by time and motion study and by adopting methods to reduce fatigue, with special attention to easier methods for the feminine riveter. As most riveting on the P-51 Mustang (everything except flat panels) is done by hand, studies have been made to simplify routine, develop easier automatic habits, minimize the human element, and increase efficiency.

Chamfered Rivets Superior

The company prefers chamfered rivets instead of straight shanks, although they cost approximately 3 cents more per pound. Exhaustive tests indicate that they protect tolerances, increase speed, save material, conserve motion, permit more rivet poundage per manhour, reduce rework, improve quality and lower the number of rejects. The best chamfer gives the blank a 0.001-inch rivet clearance. Less training time is required with chamfered rivets. Indirect savings compensate for the additional cost. Fatigue is lowered and riveting speed increased.

Riveting practices affecting operator efficiency deserve attention. For example, the palms of most people's hands perspire. Rivets, held in the palm, cause



RIVETING

... cuts work on typical panel section from 21,253 to 13,492 man-minutes, reduces operations from 15 to 6. Innovation in rivet feeding technique more than doubles number of rivets that can be placed and headed per hour. Typical drilling jig now made in 77½ manhours instead of 500

excessive perspiration, making them difficult to handle. They may be dropped and lost. To eliminate this, towels are kept within easy distance of all rivet operations, rigged as at golf greens or bowling alleys. A number of substances such as chalk and rosin have been used with the towels. Beeswax has been found best, and by wiping the hands on an impregnated towel before each handful of rivets, a riveter's facility can be greatly improved.

Attention has been given to rivet feeding technique. The usual rate of 16 per minute with sizes from ¼ to 3/16-inch has been increased to 32 to 45 rivets per minute by a new system. Usually, the arms are dropped to position the rivet in the fingers, and then the rivet is inserted into the hole with knuckles up. This movement takes so long that the gun may be dropped away from rivet. The new method also palms the rivets, but by practice, they reach the fingers by a roll and are fed into the hole with knuckles down. This permits riveting with a balanced body rhythm, left hand insertion and right hand firing, decreasing waste firing time.

The buckler is the most important member of the riveting team, for only he knows when the job is properly finished. The buckling bar must be held with proper pressure, or bad heads and rework will be necessary. It is believed to be a good idea to place the buckler in the best possible position. This policy results in improved efficiency. Re-

note control riveting guns that permit the buckler to control firing have been developed, but tests are incomplete.

Studies have been made on spacing rivets to prevent distortion. All external surfaces on the P-51 except brazier heads under the fuselage and wing fillets are flush riveted. The process requires rivet head sizes 1½ times shank diameter. All tolerances are plus, and the most difficult degree of flush is plus. The maximum upper limit is 0.006-inch. Fig. 2 shows a particularly difficult flush riveting job.

Although most riveting is done by hand, there is a trend toward machine riveting wherever possible, for uniformity and fast operation. Figs. 1 and 3 show some unusual machine riveting setups.

Investigation Proves Profitable

Drill and rivet studies have resulted in significant savings in time and money. For example, riveting operations on a panel with 204 holes, involving skin and stringer riveting that formerly required 23 operations and a total of 21,253 man minutes per panel (or estimated riveting time of 42,506 man minutes and 30 handling operations per plane) was reduced to 13,492 man minutes per panel (with estimated riveting time reduced to 26,984 man minutes and 12 handling operations per plane).

A number of improvements for flush riveting "make-ready" have been developed. One method is to place stringers, doublers and skin in a horizontal Masonite jig, Fig. 4. Then a 3/32-inch steel "apply" jig, hinged to its back, is lowered over the assembly. A radial arm drill press, called a jackknife drill, rolling on a track at each end of the

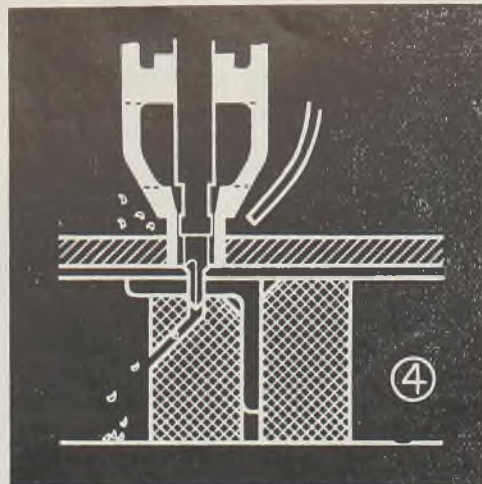


Fig. 4—Aircraft panel fabrication is speeded by fitting the combination drill and countersink with a guide bushing which fits in a hole in the template shown cross-hatched. This positions drill and countersink for drilling the skin and stringer clamped in Masonite jig blocks. Note outlet for chips

table, is used to drill and countersink panels in one fast operation, Fig. 4.

Skin fasteners are inserted for alignment during drilling. When drilling is completed, panels are removed, filled with rivets and fed through a large gang rivet squeezer. The main jig is horizontal, so clamps are not required to hold parts in place and the "apply" jig weight is sufficient to hold parts in place. Each of the old vertical type jigs required 500 manhours for construction; the new type horizontal jigs are built in 77½ manhours. Made from light Masonite, they can be removed from the table for storage, conserving floor space.

The "apply" jig is of color coded steel, to indicate hole size and if countersinking is required. For example: Yellow 5/32-inch countersunk hole; red ¼-inch drilled hole. This eliminates panel pilot holes, rib striping and permits drill countersinking in one operation. It requires fewer fasteners, locates holes more accurately, reduces rework and eliminates elongated holes. It does away with pilot hole drill templates and speeds production. See Fig. 4.

When the jackknife drill actuating lever is depressed, the sleeve fits into the "apply" jig" hole locating the hole and preventing the countersink from

Fig. 1—In this unusual gang riveting setup, operator locates work from below to head eight rivets in a single stroke of the machine. He will average 40 to 50 rivets per minute on this wing panel section

Fig. 2—One of most difficult jobs is riveting 100 per cent flush rivets on a sharply contoured surface as shown here. Great care is required to keep the heads flush with the skin

Fig. 3—This massive machine punches the hole for the rivet, dimples the skin, inserts the rivet and then upsets it—all in rapid automatic sequence under control of the operator's foot pedal



Fig. 6—Workers at North American Aviation's Inglewood plant rivet and buck Hi-Shear rivets with two rivet guns instead of single gun and bucking bar

routing elongated holes. Further pressure on the lever brings the drill down to the work, the spring loaded sleeve acting as a pressure pad to keep the skin tight against the stringer. The sleeve can be adjusted to assure proper countersunk hole depth. An air nozzle blows chips from the work, preventing panel scratching or tool clogging.

An engineering drawing of the panel is reproduced on the "apply" jig by a fluorescent X-ray picture, making it unnecessary to lay out holes. Previous methods required 0.00371-manhour to plot, drill to size, and countersink each hole. The new method drills and countersinks each hole in one operation, instead of three, in 0.001-manhour, approximately one-fourth of the former time. Advantages of this system of fabrication are better quality, less operator fatigue, release of hand drills for other work, elimination of pilot holes, fewer errors, simplified training and uniform work.

Hi-shear rivets, Fig. 5, were originated and perfected at the company's Inglewood plant. Although installed with conventional riveting equipment, Fig. 6, they are essentially threadless steel bolts, with strength characteristics as shown in the accompanying table.

Hi-shear studs are similar to AN hexa-

Fig. 5—Section through Hi-Shear rivet after forming the collar which is slipped over end and sheared off as it is locked under rivet tip. Said to be strong as bolts, these rivets weigh much less than some other types of fasteners

gonal head bolts in material, heat treatment, finish and body diameter. Shear strength is identical. For strength, the rivet must fasten together parts thick enough to develop adequate bearing area. Under this condition, one Hi-shear rivet can replace 2.7 ordinary AD rivets of the same size, and one 5/32-inch diameter Hi-Shear can replace a 1/4-inch diameter AD rivet.

Ordinary rivets fill oversize or elongated holes during riveting. The new type studs, made of steel, require accurately prepared, close-fitting holes to assure proper load distribution.

Spotfacing, used where the surface is not level under the stud, need not be used under the collar unless the surface angle exceeds 5 degrees. Spotfacing of the under head need not be much larger than head diameter. Spotfacing of the collar, however, must be large enough to allow riveting tool clearance.

Has Unusual Characteristics

Studs are of heat treated steel and will not swell during riveting. Proper stud length is important. Collars must be coated with anodic or aluminite finishes and the use of bare aluminum collars avoided. The rivet set hole has a mirror finish for easy operation, and improves with use. New tools require breaking-in period lubrication unless properly polished. The ring of waste material pinched off by shearing of the rivet set at the end of the collar does not drop out of the tool immediately, but is held until several rings accumulate. This type of riveting is so easy that personnel experienced in ordinary riveting tend to overdrive and must acquire the proper touch.

These high speed rivets are approximately five times as fast as bolts. A joint of given strength with sufficient bearing area can be made faster with these rivets. In production, the cost is about two-thirds of other fasteners. Other important savings are in part de-

sign, installation time, and product weight. Weight is about two-fifths of the average complete bolt. Weight reduction also is increased by a reduction in the number of fasteners, and the amount of space they require. They are not smaller than bolts, but require no wrench clearance. Usually they replace two duralumin rivets. No clinching or flashing is possible, eliminating rework. Heads are not recessed, and are smaller than bolt heads or dural rivets. Variable wrench torque is replaced by the constant pressure required to pinch off excess collar length. Rivets are removed without ruining the hole by cutting the

DESIGN LOAD DATA ON HI-SHEAR RIVETS

Nominal Dia. Inch	Shear In Lbs. (see note)	Tension In Lbs. (see note)
5/32	1438	750
3/16	2120	1065
1/4	3680	1990
5/16	5750	3210
3/8	8280	4975

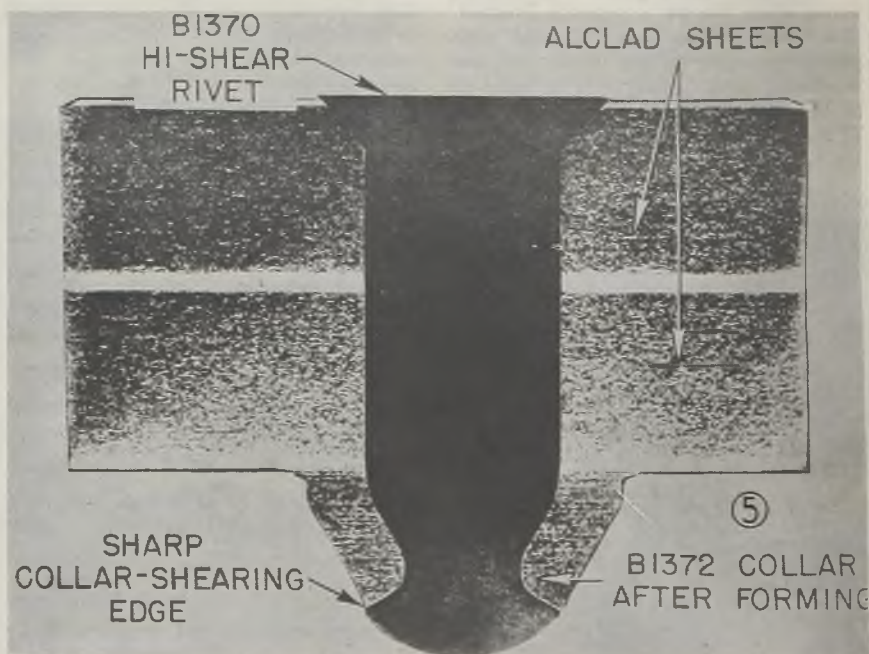
Shear values are based on 75,000 p.s.i. Tension values are based on 50% of tensile strength of equivalent bolt. Tests show at least 40% higher values than those in the table.

collar with a small chisel and driving out the rivet with a punch.

Hi-Shear rivets are easily removed and replaced (about 36 seconds per rivet) and are interchangeable with bolts for field service repairs. They are as strong as bolts in shear strength, eliminate washers and shims, and weigh considerably less than the bolt, nut and washer combination.

Conservative estimates of savings by the use of these rivets during 1943 were a total of 16.41 pounds of material and 10.77 man-hours per P-51 fighter, or a monetary saving per unit of \$92.82. Comparative savings on the B-25 medium

(Please turn to Page 164)



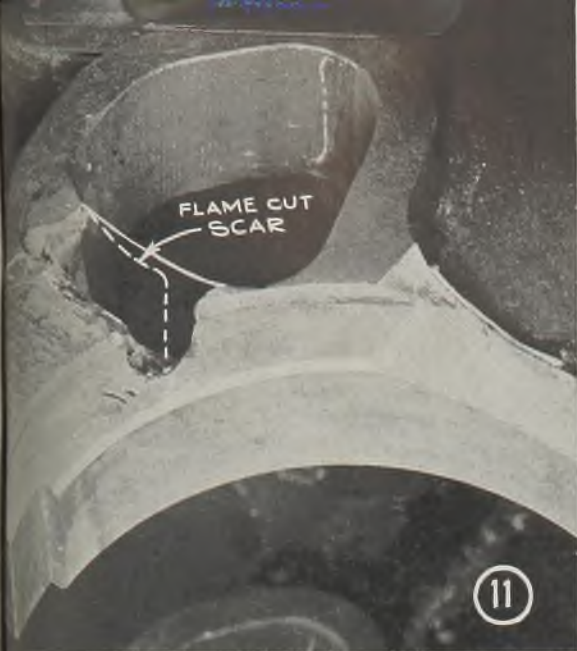


Fig. 11—Defect in diesel block thrust bearing saddle

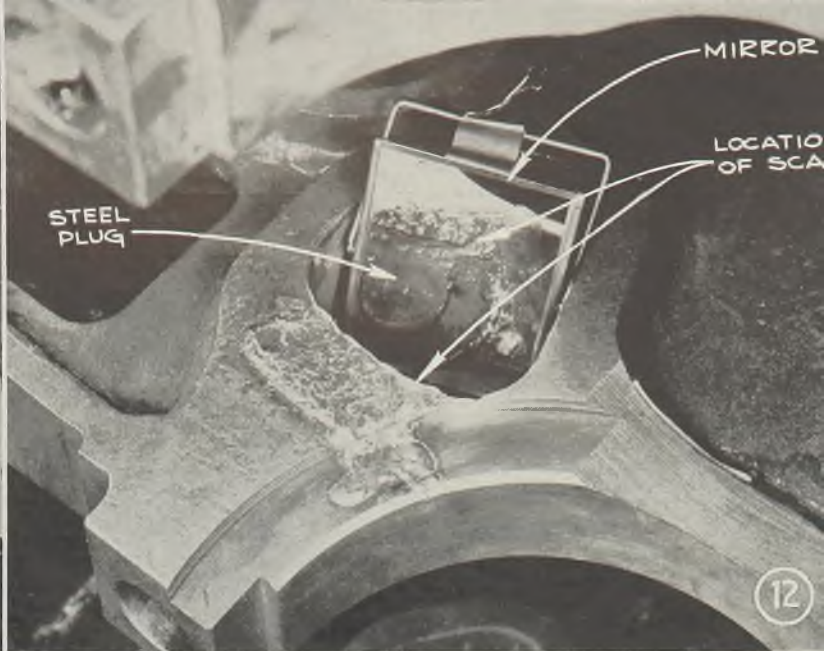


Fig. 12—Defect shown in Fig. 11 after precision welding

Routine Inspection and Salvage of DEFECTIVE MACHINERY WELDMENTS

Need for sound planning to establish operator training, inter-departmental responsibility and use of proper equipment emphasized in second and concluding article. New approaches to metallurgical aspects of salvage welding outlined

By JAMES W. OWENS
Director of Welding
Fairbanks, Morse & Co.
Beloit, Wis.

QUANTITATIVE control of shrinkage by precision welding is an operation requiring care and skill and must be carefully planned. Planning should include procurement of the following tools: A wire brush; manual slag hammer; medium weight pneumatic hammer with a 1½ to 2-inch stroke; three pneumatic chisels with points shaped like the end of a man's thumb, middle and little fingers; two air hoses in addition to the one attached to the pneumatic hammer; and one or more appropriate micrometers. Occasionally, also strain gages are required.

Standardized printed forms for recording and controlling shrinkage by one or both of the two following precision welding techniques should be provided:

Technique No. 1:

- (a) Take micrometer readings before welding.
- (b) Take micrometer readings after all of the following series of operations: The deposition of a weld bead; the hot peening of

the base metal immediately adjacent to the bead; and the cooling of both the bead and the contiguous base metal to the ambient temperature.

- (c) Obtain difference between readings (a) and (b).

Technique No. 2:

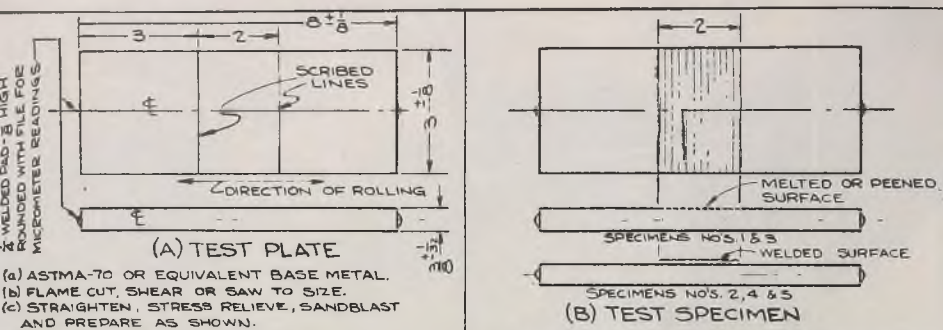
- (a) Take micrometer readings before welding.
- (b) Take micrometer readings after all of the following operations: The deposition of each weld bead, the hot peening of each weld bead and the cooling of both the bead and contiguous base metal to the ambient temperature.
- (c) Obtain the difference between readings (a) and (b).

Step 3 requires the provision of a sufficient quantity of electrodes of the right sizes and grades.

Step 4 in planning includes training and qualification of a welding operator by means of the fundamental technique outlined in Fig. 18 and the qualifications test outlined in Fig. 13.

Step 5 requires, on very important jobs, a mechanic (preferably a machinist) to take, record and immediately calculate the micrometer readings, unless the welding operator is skilled in the use of precision tools.

Up to May, of this year, the author's practice always has been to hot peen the weld metal and to peen the base metal only when it is necessary to do so to get the required tolerances. At this time, an extensive investigation of precision welding was conducted which clearly indicated the feasibility and desirability for one-layer deposits of exclusively peening the base metal, either hot or cold. However, as hot peening was found to minimize the development of cracks, it has been adopted as standard practice in both Techniques Nos. 1 and 2. The results of these tests are briefly summarized in Table II and in the text. The test specimens used for the physical tests of the weld metal deposited by precision welding are shown in Fig. 14. One of the most noticeable and least appreciated factors in the shrinkage of a weld and which is clearly shown in accompanying illustrations, is the fact melted metal in the fusion zone



(a) ASTM-A70 OR EQUIVALENT BASE METAL.
 (b) FLAME CUT, SHEAR OR SAW TO SIZE.
 (c) STRAIGHTEN, STRESS RELIEVE, SANDBLAST AND PREPARE AS SHOWN.

TEST SPEC NO.	PROCEDURE	OBJECTIVES	(2) FINAL SHRINKAGE OR EXPANSION EXPECTED.
1 ⁽¹⁾	PROGRESSIVELY MELT THE BASE METAL WITH OXY-ACET FLAME & AIR QUENCH	TO ILLUSTRATE THE QUANTITATIVE SHRINKAGE DUE TO THE MELTING OF THE BASE METAL AND AIR QUENCHING	-0.025 TO -0.035
2 ⁽¹⁾	PROGRESSIVELY MELT THE BASE METAL WITH CARBON ARC AND AIR QUENCH	TO ILLUSTRATE THE QUANTITATIVE SHRINKAGE DUE TO METAL ARC WELDING AND AIR QUENCHING	-0.020 TO -0.030
3	PROGRESSIVELY WELD WITH COVERED ELECTRODE AND AIR QUENCH	TO ILLUSTRATE THE QUANTITATIVE SHRINKAGE DUE TO METAL ARC WELDING AND AIR QUENCHING	-0.030 TO -0.040
4	PROGRESSIVELY AND EXCESSIVELY PEEN THE BASE METAL COLD	TO ILLUSTRATE THE QUANTITATIVE EFFECT OF EXPANSION DUE TO EXCESSIVE PEENING	+0.180 TO +0.190
5	PRECISION WELD USING TECHNIC NO. 1	TO ILLUSTRATE THE QUANTITATIVE CONTROL OF WELDING SHRINKAGE WITH TWO TECHNIQS	± 0.0005
6	PRECISION WELD USING TECHNIC NO. 2		

TECHNIC:
 (a) - SEE TEXT FOR FUNDAMENTAL TECHNIC.
 (b) - SPECIMENS SHOULD BE PROGRESSIVELY AND CAREFULLY STRAIGHTENED IN A PRESS.
 (c) - MICROMETER READINGS SHOULD BE TAKEN AFTER EACH BEAD (OR PASS) USING TYPE OF FORM DESCRIBED IN TEXT.

(1) ONE OF THESE SPECIMENS SHOULD BE MADE IF EQUIPMENT IS AVAILABLE IF OXY-ACETYLENE MELTING IS EMPLOYED USE A NO 5 TIP (AIRCO). IF CARBON ARC MELTING IS EMPLOYED USE A $\frac{1}{8}$ CARBON AND APPROXIMATELY 105 AMPS (2) - 12 PASSES AND/OR BEADS.

has a greater amount of construction than the superimposed weld metal deposit.

The improved ductility of the metal in the precision welded area, as shown in Table II, also the greater peening range with less peening appeared so attractive that it was immediately applied to practice with complete success. This investigation also led to the development of the qualifications test outlined in Fig. 13 which, in its turn, will make possible vast economies in welded fabrication.

As we are dealing with machinery weldments, and as precision welding is primarily used in this type of fabrication to correct machining errors, a more detailed description of the process will be restricted to the building up of surfaces by one layer of weld metal. This is as follows:

—Use AWS $\frac{1}{8}$ —E6020 electrodes, at approximately 105 amperes, and 4, 5 or 6 beads per inch (6 beads preferred).

—Use either Technique No. 1 or No. 2 depending on the physical properties of the metal desired in the salvaged area. Technique No. 1 is to be preferred if greater ductility is desired with a greater peening range and less peening; whereas Technique No. 2 should be used if higher yield and ultimate strengths, also harder metal are wanted.

—Remove slag from the bead with manual scaling hammer immediately after red color has disappeared. Sometimes a quick wire brushing is desirable.

—Immediately peen, using the technique specified.

—Turn compressed air on bead and contiguous parts of the structure, in full force, as soon as base metal or bead has been peened enough. Completion of cooling should be judged by using

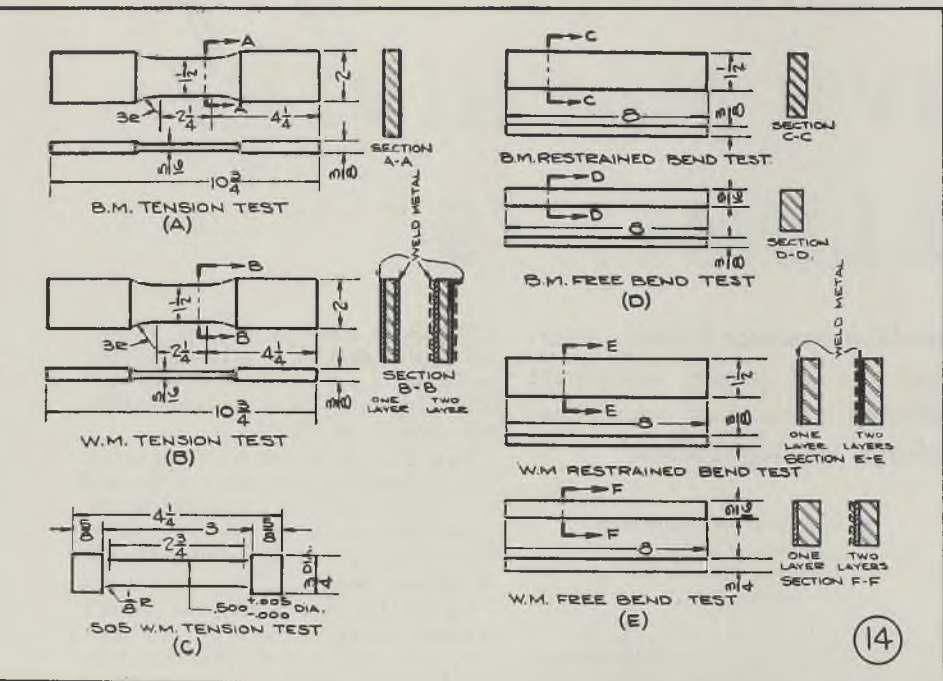


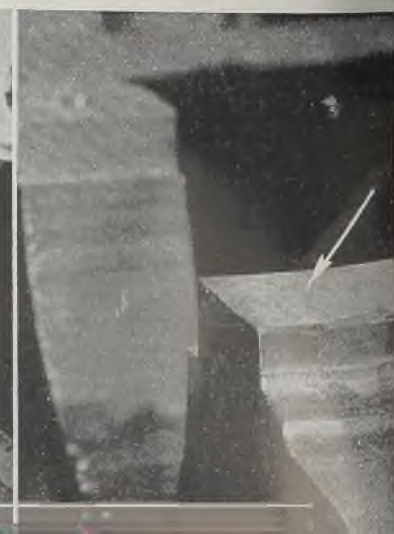
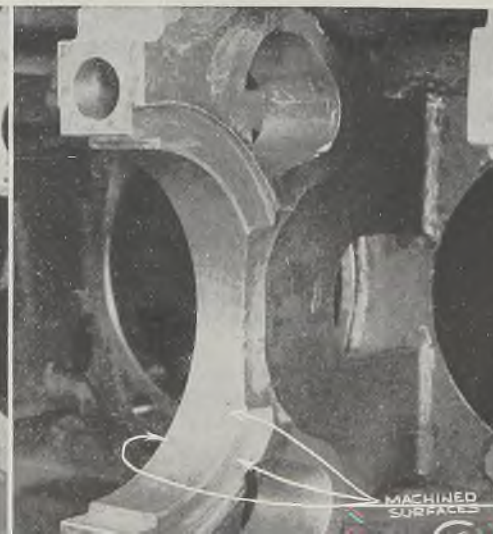
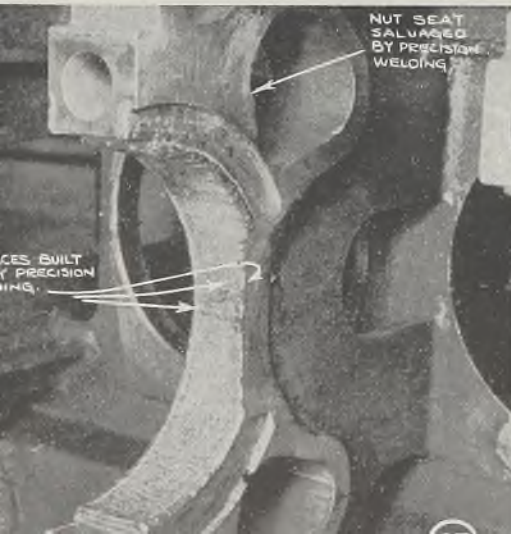
Fig. 13 — Proposed Qualification Test specimens

Fig. 14 — Specimens used for physical tests of weld metal

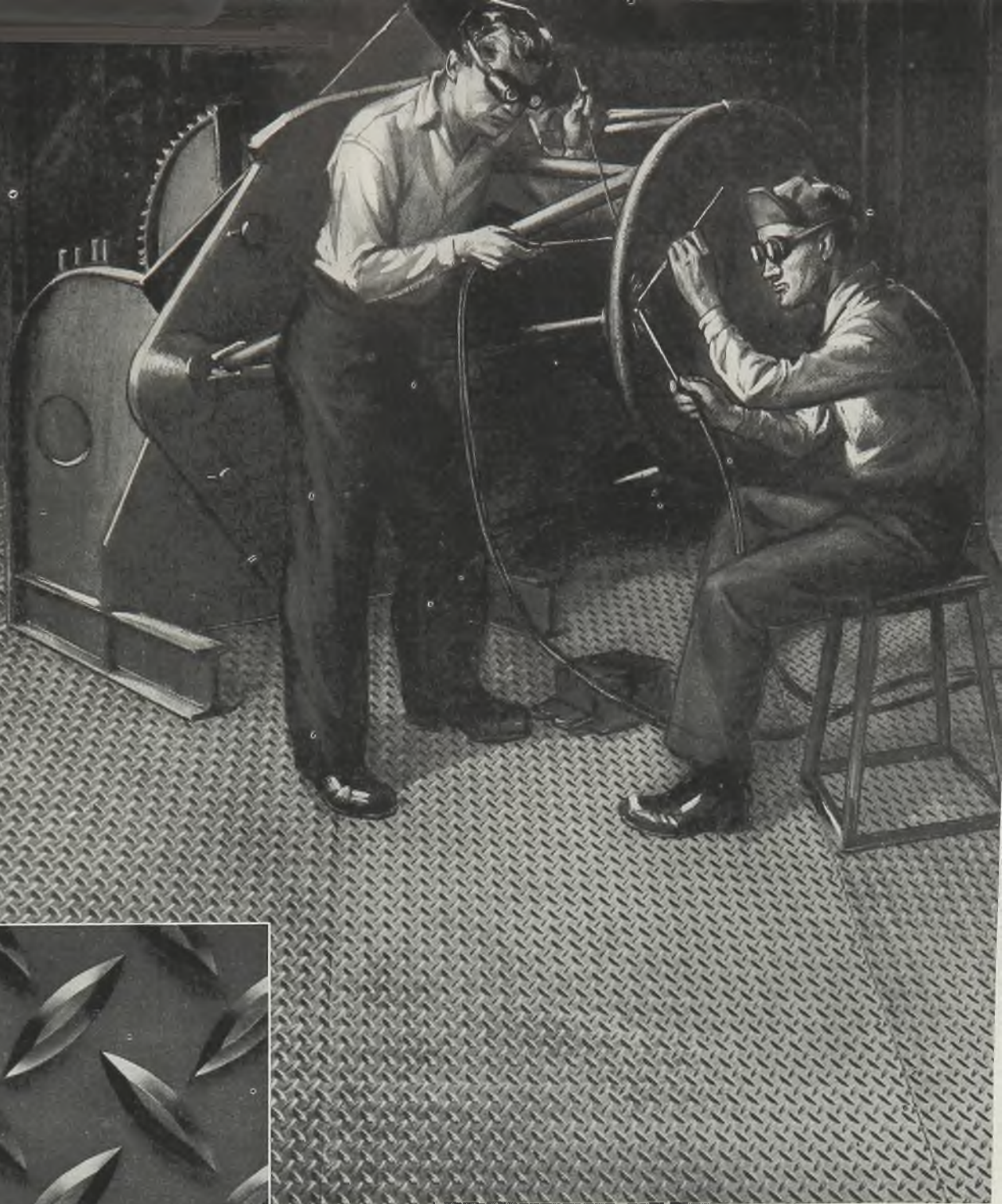
Fig. 15 — Machined surfaces of saddle built up by welding

Fig. 16 — Thrust bearing saddle after machining

Fig. 17 — Salvaged laminated bearing saddle post after rough machining



controlled
metal
of the
4, as the
ster pen
appeared
medically
plete res
to the Co
ous bet
its tur
ies in w
with
non wh
of fabri
ary, a m
gress
g up of
metal. Th
20 elem
eres, an
sda prod
No. 1
ysical
in the
1 is to
ry is de
ye and
No. 2
d and
metal
in the
mer
appeared
aining a
using
air on
the str
ase met
gh. On
judged
Qualit
men
and for
ld metal
surface
welding
earing
ning
minated
rough



Safety increases production . . .

"A.W." Rolled Steel Floor Plate provides safety from costly slipping accidents. Allows workers to perform their jobs with confidence and greater speed. Floors with heavy traffic receive permanent protection. No cracks, no ridges, no worn or slippery surfaces. No time out for repairs. Shown is the Super-Diamond Pattern which resists slipping in any direction. Can be installed overnight without disturbing production. Write for folder.

Other products include Plates, Sheets, Billets, Blooms, Slabs—Carbon, Copper or Alloy analyses.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PENNSYLVANIA : SINCE 1826. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N.C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

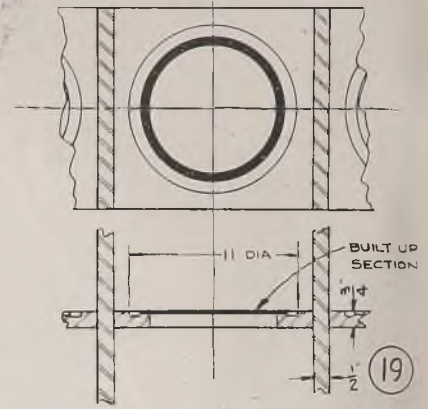
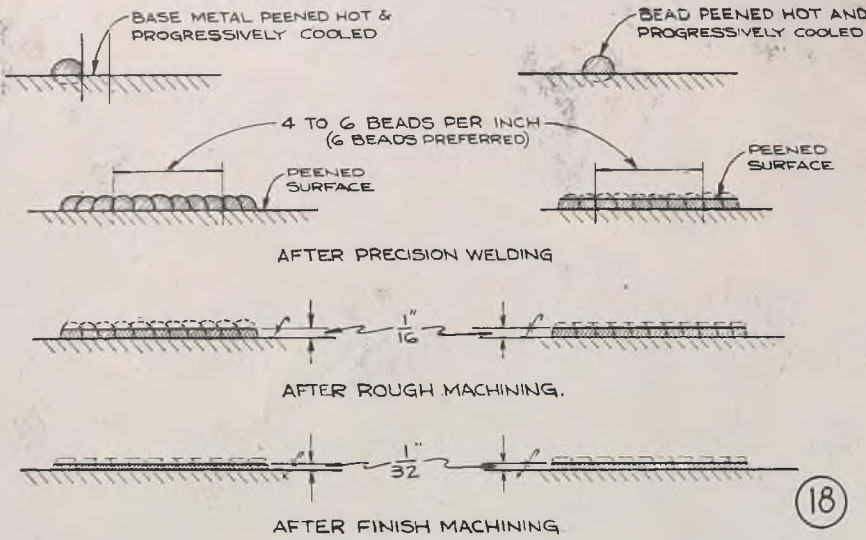


Fig. 18—Fundamental technique for precision welding

Fig. 19—Counterbored surface of 11-inch diameter deck bore of machined diesel engine block weldment built up by precision welding

TABLE II
PROPERTIES OF WELD METAL DEPOSITED BY PRECISION WELDING

TEST:		Technique	Ultimate Strength lbs/sq. in.	Yield Point lbs/sq. in.	Elongation in 2" %	Re- strained Bend % Elonga- tion	Free Bend % Elonga- tion
Type of Specimen TENSION:	Fig. No.						
Base metal	15A						
Weld and base metal	15B	No. 1 (1 layer)	56,700	33,566	47.0	...	...
"	"	No. 2 (1 layer)	73,500	55,860	28.0	...	...
"	"	No. 2 (2 layer) ⁽²⁾	80,000	60,100	7.5	...	...
All weld metal	15C	No. 2 (multiple layer)	82,100	68,600	25.5	...	...
BEND:							
Base metal	15D		...	...	...	19.5	47.0
Weld and base metal	15E	No. 1 (1 layer)	...	...	...	20.3	43.7
"	"	No. 2 (1 layer)	...	...	...	12.5	37.5
"	"	No. 2 (2 layer) ⁽²⁾	18.75	40.6

⁽¹⁾ Only one precision welded specimen of each variable was tested. The data for the base metal specimens is the average of 3 specimens.

⁽²⁾ Rarely used for machining defects. Improved ductility is due to the annealing of the first layer by the second layer which was completely removed in these tests. Direct comparisons of the physical properties of the metal obtained with the two techniques apply only to one layer.

the bare hand to compare temperature of the area welded with sections of structure not affected by welding heat.

—Do not restrain any part of the structure. The precision welding process is predicated on the free movement of the part or parts welded, and these parts should be progressively measured so as to insure, if possible the maintenance of their original dimensions.

Typical Salvage Operations Involving Precision Welding: Precision welding is being used by Fairbanks, Morse & Co. principally to build up bearing saddles and other parts of diesel engine block weldments and auxiliary parts which are found by the machine shop to be inaccurately located; accidentally scored, bored or faced oversize during machining; laminated; scarred by flame cutting; or otherwise defective. It is also used to a very limited extent (because of metallurgical restrictions) for the salvage of completely or partially machined gray iron castings. Some of these salvage operations have required several days for their completion. Figs. 11, 12, 15 and 16 show the thrust bearing saddle of a stress relieved and completely machined 10-cylinder diesel engine block weldment wherein the nut seat, also the saddle and thrust bearing faces were precision welded because of inaccuracies caused by the salvaging of a flame cut scar in the location shown in Fig. 11. This weldment was once scrapped because the salvage operation described was considered impossible. Subsequent to salvaging, this block has, for several months, been subjected to a severe overload test. To date there has

(Please turn to Page 150)

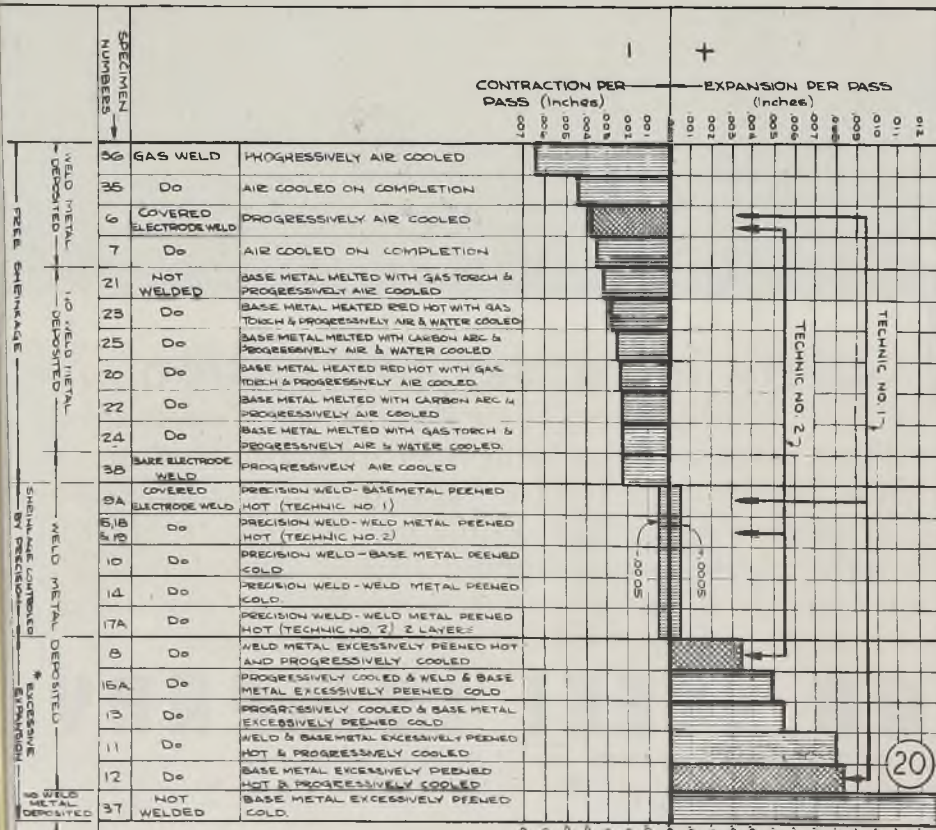
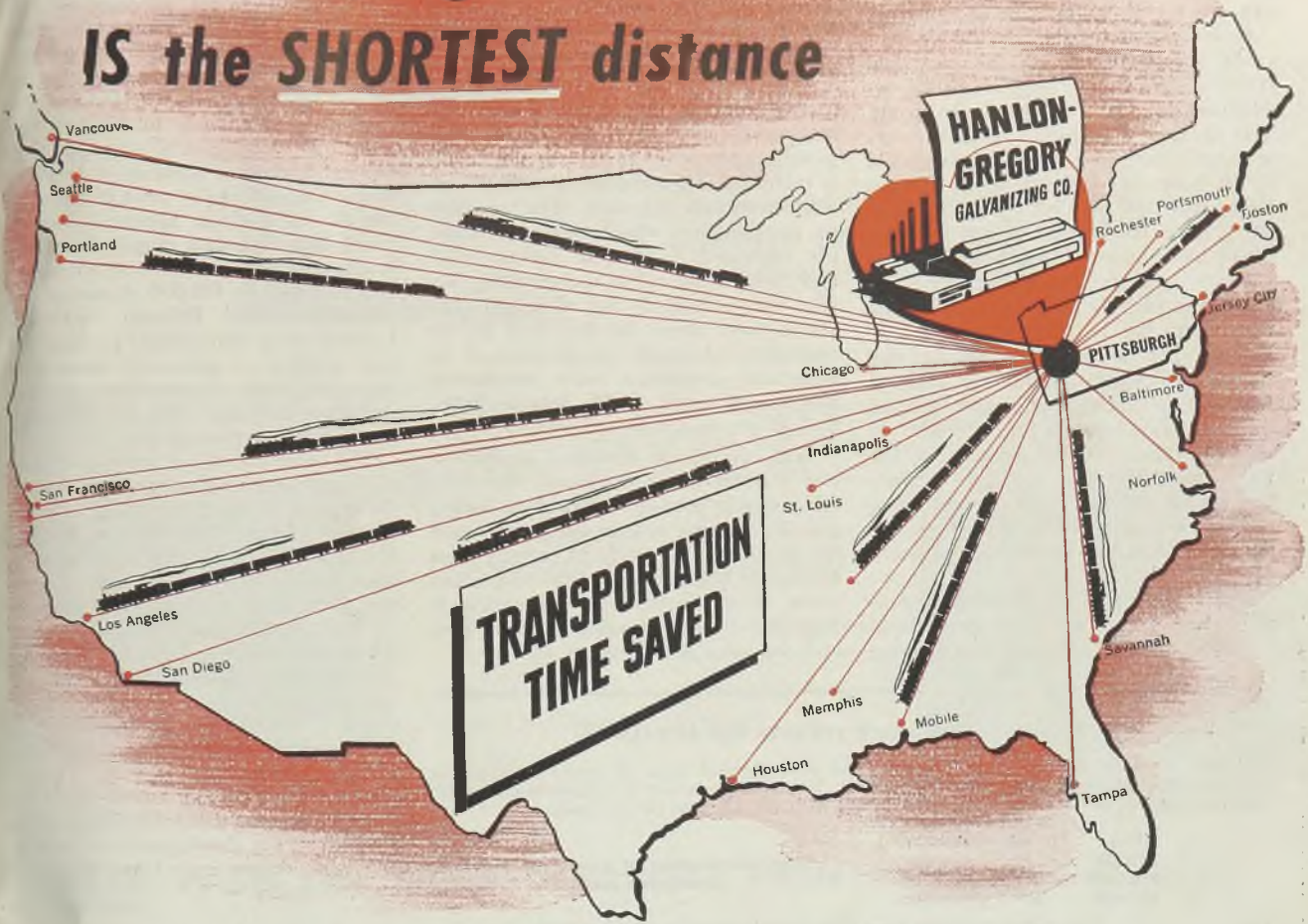


Fig. 20—Diagram of potential range of contraction and expansion involved in precision welding as obtained by use of different thermal processes, also with various cooling and peening procedures

**A straight line
IS the SHORTEST distance**



Our customers from coast-to-coast rely on the facilities of the "world's largest and *fastest*" hot-dip job galvanizing plant for the best possible coating of protective zinc... Our location is truly 'strategic' for fast, dependable service.

THE WORLD'S LARGEST ^{*and Fastest*} JOB GALVANIZING PLANT

In the heart of the
STEEL INDUSTRY



**HANLON-GREGORY
GALVANIZING COMPANY**

PITTSBURGH,

PENNSYLVANIA



Paint Characteristics

(Concluded from Page 101)

could be installed each day instead of two sets for 20 hours of daily operation.

Panels placed in the weathering machine absorb heat from the arc light reaching 120 to 140 degrees Fahr., depending upon the color of the paint. This is the "sunshine". After 6 hours of "day" conditions, they are subjected to 10 hours of darkness at 60 degrees Fahr., with 100 per cent humidity, simulating night conditions. This is followed by 10 more hours of "sunshine."

Every 2 hours throughout the entire aging process, the panels are sprayed with water for 15 minutes. During the sunlight portion of the exposure, this spray provides radiation through water to accelerate chalking, and causes thermal shock as heated panels are cooled to 50 degrees Fahr., the temperature of the water spray. The spray at "night" assures wet panels for the entire period when the arc is not burning, providing also the effect of erosion by storms and heavy dew.

The beginning of the 10 hours of sunshine that follow the night reproduces the effect of the sun temperature drawing

the water out of the saturated films as it would in service on a sunny day after a night of rain or dew. As a further step in making an accurate reproduction of outdoor conditions, every sixth day the panel is subjected to the continuing wet period of two nights and a day.

The accompanying tables illustrate the manner in which test data obtained on panels exposed in the weathering cycle is tabulated, for comparison with the results of outdoor exposure. The varnishes on the panels to which these tables apply contained 5 per cent carbon black and were identical in composition, except with respect to the oil length. The panels were dried for five days in the evaluation laboratory, where constant atmospheric conditions were maintained with temperature at 75 degrees Fahr., and 40 per cent relative humidity.

With the above described equipment and controls at its command, the Arco laboratory is actively engaged in testing painting systems now in use or proposed for application on products ranging from toothpaste tubes to motor cars and ocean going ships. Engineering information is thus placed in the hands of both the user and the paint manufacturer.

TEST DATA FOR THREE FINISHES FOR METALS

Test Data presented here were obtained from the three different types of testing machines on three varnishes containing 5 per cent carbon black, keeping such factors as composition constant with the exception of oil length. The coated panels were dried 5 days before testing.

Time	Grams weight to scratch through	Width in mils of film adhesion loss	Millimeters draw to open film to water penetration	Visual observations of panels exposed in weathering machine
Initial	350 Grams	7.0M	1.83 mm	Jet Black—High Gloss
1 day	360 Grams	6.0M	1.58 mm	Trace duller; bad pinpoint blisters under mask
3 days	470 Grams	7.0M	1.53 mm	Ditto above condition water spotting in wrinkle pattern
7 days	470 Grams	7.0M	0.27 mm	Definite checking. Visible pinpoint blisters; trace bronze
11 days	480 Grams	6.0M	0.15 mm	Conditions as above—medium chalk; bad lightening
15 days	470 Grams	4.0M	0.20 mm	Conditions as above—definite bronze all over
21 days	380 Grams	4.0M	0.21 mm	Very bad checking has developed

Time	Grams weight to scratch through	Width in mils of film adhesion loss	Millimeters draw to open film to water penetration	Visual observations of panels exposed in weathering machine
Initial	350 Grams	8.0M	2.27 mm	Jet Black—High Gloss Enamel
1 day	360 Grams	6.0M	1.41 mm	Trace Duller
3 days	370 Grams	6.0M	1.85 mm	Ditto above and water spotting
7 days	380 Grams	6.0M	1.81 mm	Trace of scattered checking
11 days	390 Grams	5.0M	0.90 mm	Bad to very bad checking No. 20 med.—bad chalk
15 days	410 Grams	5.0M	1.11 mm	All conditions as above. Bad Lightening
21 days	380 Grams	5.0M	0.69 mm	As above with area of rusting

Time	Grams weight to scratch through	Width in mils of film adhesion loss	Millimeters draw to open film to water penetration	Visual observations of panels exposed in weathering machine
Initial	350 Grams	9.0M	2.19 mm	Jet Black—High Gloss Enamel—Ripple shows in gloss
1 day	370 Grams	8.0M	1.60 mm	Trace duller than originally
3 days	380 Grams	7.0M	1.69 mm	Water spotting. Pinpoint blisters
7 days	390 Grams	6.0M	1.65 mm	Ditto above conditions
11 days	400 Grams	7.0M	1.60 mm	Checking in area. Definite chalk
15 days	410 Grams	6.0M	0.86 mm	Medium degree of checking all over panel No. 20
21 days	380 Grams	6.0M	0.88 mm	Ditto above and medium chalk and lightening

Three-Dimensional Views Aid to Metallurgists

Three-dimensional pictures of views through an electron microscope, revealing the shape of ultramicroscopic crystals, of which magnesium and other metals are composed, late in October were demonstrated publicly for the first time.

At the recent annual meeting of the Optical Society of America in New York it was shown that the point of a common pin can be made to appear as vast and rough as a mountain range when photographed through an electron microscope, and enlarged to 100,000 diameters on a three-dimensional Polaroid vectograph. In these three-dimensional pictures, it is now possible to study and measure the shape and space characteristics of minute structures that are extremely difficult to see in ordinary photographs.

The demonstration of techniques in applied electron microscopy was made at the society meeting by Robert D. Heidenreich of Dow Chemical Co., Midland, Mich., where the electron microscope has been used in the investigation of corrosion phenomena in magnesium alloys.

"The combination of the electron microscope and the Polaroid vectograph process offers metallurgists a peephole into the microcosmos," Heidenreich declared. "We can now examine the shape of microstructures just as one can examine the formation of rock in a quarry. The increasing store of knowledge of new characteristics of metals doubtless will be utilized in the development of new alloys that perform even better than those we have today."

Production Welding Shown in Sound Film

A 16-millimeter, 30-minute long sound film, "New Horizons In Welding", shows setups for production welding and welding procedures in high-speed mass production. Methods are illustrated for cutting costs and speeding production of fabricated metal products. Many side-lights are included in scenes depicting the growth of arc welding.

Scenes in a large manufacturing plant show its experimental laboratories, template department, and setup procedures, suggesting time and labor saving devices. A new arc timer, shown in action, is said to permit positive control of costs, procedure, production and quality in production welding. A clock connected with each welding circuit records the exact time for each operation, allowing welders to be paid for time actually spent depositing metal.

This film is available from Harnischfeger Corp., 4400 West National, Milwaukee 14.

Much of the shrinkage or pipe in rimming or semikilled steel ingots is distributed in a spongy area near the top of the ingot with the result that from 87 to 93 per cent of the steel is available for semifinished material.

MAKE ALL OF THESE PRINTS FROM ANY DRAWING



- Black-line print
- Blue-line print
- Red-line print
- Foil print
- Dryphoto print
- Black-line cloth
- Sepia-line intermediate



Ozalid Type 2600—\$370 F.O.B.
Johnson City, N. Y.

With an Ozalid Dry-Developing Machine which you use with your present printer. First expose your drawing with the desired type of Ozalid paper. Then transfer the print to the OZALID DRY-DEVELOPER for quick processing.

With an Ozalid Whiteprint Machine which prints and dry-develops copies of your originals in seconds. No additional equipment necessary.



Ozalid Model F—\$325 F.O.B.
Johnson City, N. Y.

SAVE WITH THE ONLY COMPLETE PRINTMAKING PROCESS

When you adopt Ozalid, you have a versatility found in no other reproduction process—or combination of processes.

For only Ozalid offers you the advantages of Dry-development . . . with a complete line of sensitized materials that will inspire *new* applications in your plant, and promote savings on every side.

Here are just a few uses you'll find for the "OZALID VARIETY" which you can produce quickly in your machine—each print in the same manner.

- **Use Ozalid red, black, blue line prints** to identify prints of different departments . . . to distinguish checked from unchecked prints, etc.
- **Use Ozalid Rapid Black** (new black line paper) to obtain exceptional facsimiles of typewritten material. When the original is good, the print will be still better. **BESIDES OZALID PRINTS WON'T SMUDGE.**
- **Use Ozalid intermediate prints** in place of original drawings to produce subsequent prints . . . to supply branch offices . . . to save valuable time when making design changes.

- **Use Ozalid Dryphoto Paper** to make beautiful reproductions from photographic film-positives . . . or perspective drawings.
- **Use Ozalid cloth** when prints of exceptional strength are desired.
- **Use Ozalid transparent foils to:**
 1. Produce extremely fast-printing intermediates
 2. Make composite prints
 3. Reclaim worn or damaged drawings

See all these prints yourself. *ALSO* learn the complete OZALID story. Write for free booklet of Ozalid Whiteprints and Catalogue today.



OZALID

Division of General Aniline and Film Corporation
Johnson City, New York

Ozalid in Canada—Hughes-Owens Co., Ltd., Montreal

AGMA

SPEAKERS FORESHADOW

THINGS-TO-COME IN GEAR INDUSTRY

Review of engineering papers at recent meeting in Chicago indicates that tungsten carbide hobs; more effective analysis and control of vibration; and better understanding of worm gearing contact temperature conditions; will have marked effect on postwar design

By GUY HUBBARD
Machine Tool Editor, STEEL

AS has been true of many association and technical meetings of late, I spent many hours during the 27th annual meeting, American Gear Manufacturers Association, Edgewater Beach Hotel, Chicago (See Page 83, November 6, 1944, issue of STEEL) "with my ear to the ground" listening for preliminary sounds indicative of a postwar revolution in design and production. I did hear such preliminary rumblings and I will attempt here to interpret what they may mean.

Certain of those rumblings which I detected in Chicago emanated from afar, from the Sunnyvale, California, plant of Joshua Hendy Iron Works, as a matter of fact. Due to the marine propulsion gears being one of the serious bottlenecks in the shipbuilding program, the Navy Department joined forces with Joshua Hendy officials—including Capt. E. D. Almy, U.S.N. (Retired)—to see what could be done with cemented carbides to speed up the hobbing of those highly exacting, vitally needed gears.

Navy and Industry Combine Forces

Through the courtesy of the Joshua Hendy organization and with the Navy's approval, we already have been privileged to describe and illustrate a number of important details (See Page 128, November 13, 1944, issue of STEEL) of design, setup and performance of the unusual superspeed hobs dealt with by Lieut. A. J. Kroog, U.S.N.R., and R. W. Righter, engineer, Navy Department, in their joint paper before AGMA at Chicago. While no one claims that anything like overall perfection has been attained, and while some discussors voiced some skepticism, no one interested in production hobbing can afford to ignore some of the implications—some of the "rumblings."

Despite the expense and the difficulties encountered, the fact remains that Cleveland Hobbing Machine Co. finally did succeed in making for this project a pair of inserted tooth hobs which worked. As Lieut. Kroog expressed it:—"We received little or no encouragement when the idea of the carbide hob was first proposed. The information, that it had

been tried before—and failed, served its purpose in that we gathered as much information as we could regarding past failures in order to analyze the reasons and to profit thereby.

"We in the Navy have had enough experience with carbide tools to believe that such tools are capable of performing practically any metal-removing operation—if they are intelligently applied. This does not mean that a tool necessarily should work the first time, but it does mean that we are convinced that such a tool, properly designed, will work if intelligently applied.

Previous Experience Helped Project

"From our experience with single point lathe tools, we learned the necessity for maximum rigidity and solid support for all carbide cutting edges. From our experience with carbide milling cutters, we learned the necessity for maximum chip load per tooth and the advantages of climb cutting. These considerations apparently were overlooked in connection with earlier carbide hobs. We are convinced that they have been contributing factors to the success of those which we are now using."

Suffice it to say here that after its adjustments had been carefully checked by Gould & Eberhardt engineers, a standard 72-inch hobbing machine of that company's manufacture was set up with the 6-inch, carbide-tipped hob in question. Running at its maximum speed of 100 revolutions per minute (150 surface feet per minute); with 0.04 inch feed per revolution of the gear blank; and "climb cutting" (that is, feed up and rotation of hob down); a C-3 pinion 21 inches in diameter and with 18 $\frac{7}{8}$ -inch face, was successfully produced after one minor arbor resetting of the hob to give better distribution of cutting action.

Finish was excellent and the helix angle checked within 0.0001 inch in 15 inches of length. Cutting action of the hob was very good despite its surface speed being on the low side due to the limited speed of the machine. There was absolutely no chatter or vibration at any stage of the operation. Running at

top speed of 100 revolutions per minute caused the spindle bearings to become hot and they had to be attended to carefully throughout the run. However, they held up and were none the worse for their experience. Chip formation was excellent, there being none of the distortion normally seen in chips removed by conventional hobbing.

As a result of the tests it is planned to modify the 72-inch machine to give spindle speeds up to 194 revolutions per minute; to install a flywheel on the outer end of the arbor; to incorporate automatic force feed oiling; and to provide an upper tie bracket steady rest. A much heavier and sturdier dual head machine of 96-inch capacity also is under consideration, this to be designed "from the ground up" for use of carbide hobs.

Implications of Carbide Hobbing

These "rumblings" can well be interpreted as meaning that, in the postwar era, carbide hobs and machines designed especially for them will make it possible to cut gears of considerably higher tensile strength and greater hardness than heretofore. That will mean gears capable of transmitting more power per inch of width and with longer useful life. It is well within the bounds of reason that several such gears can be finished with only one sharpening of the hob. Don't overlook the fact that there have been several no less surprising developments in machine shop practice in California during the present war.

In his discussion of vibration problems in engineering, F. C. Rushing, mechanics department, Westinghouse Research Laboratories, East Pittsburgh, Pa., started off with the simple statement that mathematical analysis of vibration can be based on Newton's law:—

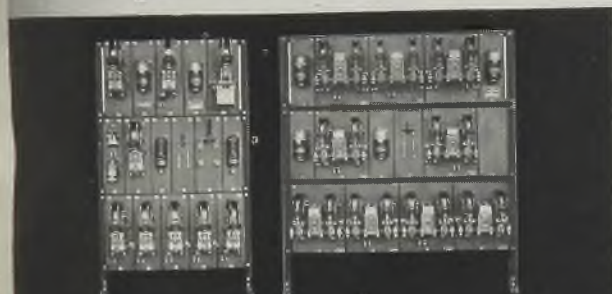
Force = Mass X Acceleration.

The difficulty in dealing with industrial vibration problems lies in the fact that machines in general represent rather complicated mechanical systems having many natural frequencies within their frequency range of operation, resulting in

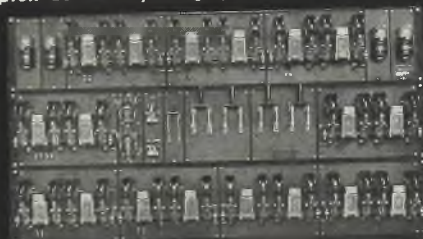
(Please turn to page 117)

THE Nameplate ON THE

CONTROL IS EC&M



For Main, Auxiliary and Boom Hoists, typical Wright Dynamic Lowering Controller, as shown at left, is used. For 2-motor Rotate-motion, Typical Duplex Controller, at right, is used.



Typical Quadruplex Bulletin 921 Controller as used on 8-motor Travel-motion. Each leg has 2 motors in series with all four sets of motors operated in parallel.



EC&M Bulletin 1182 Type NT Master Switch for all motions, shown at left. Each motor is equipped with a Bulletin 1004 Type WB Brake, series-wound for Hoist motors, shunt-wound for Rotate and Travel motors.

THIS is called a fitting-out and repair crane used for ship construction. Several of this type have been built and placed in service quickly. No designer of the first hoisting-machines could ever have dreamed of units of such size . . . such mobility . . . produced so rapidly.

The Allies have been fortunate in that crane builders have satisfied the need for so many war-goods-handling equipments in such a prompt, efficient manner.

Control, although a small part of the cost, is a vital part of every crane. It protects as well as speeds operation. Line-Arc Contactors and Time-Current Relays respond quickly. For 2 or 4 mechanically-connected motor-drives, EC&M Duplex and Quadruplex Controllers keep the motors in step electrically. "Knowing how" can be of great value in getting the most from your cranes, safely. Specify EC&M Control.

A free copy of Booklet 920, "How to Operate a Crane" will be sent on request.

THE ELECTRIC CONTROLLER & MFG. CO.
2700 East 79th Street ★ Cleveland 4, Ohio

Zinc-base alloy dies prove economical for producing

SHORT RUNS of STAMPINGS

ONE of the most difficult problems facing stamping makers and end-product manufacturers is the production of samples or models for the purpose of testing out the marketability of a particular piece of merchandise. The cost and production time required to make standard tools and dies for models often represents too great a gamble for the stamping or metal product manufacturer. Factory and field tests sometimes result in several changes before the final design for mass production is perfected.

In connection with the whole subject of producing samples and short runs, particularly from the standpoint of postwar production, the Pressed Metal Institute is giving special attention to available materials and methods for short run dies. The institute also is weighing the advantages of short runs by organizations geared to mass production as against production by organizations specializing in short runs.

Outlining the use of Kirksite for flexible sheet metal dies and tools, W. W. Broughton, National Lead Co., New York, points out that through the use of this material, engineering drawings can

be converted into serviceable tools in a matter of hours, rather than weeks. "Flexible" tools are low in cost; can be made speedily with a minimum of skilled labor and are easily altered. Many aircraft manufacturers have found this procedure of great importance because of frequent and rapid changes in design following experience in war service.

Kirksite is a zinc-base alloy containing aluminum, copper and magnesium. It was developed in 1939 for the specific purpose of replacing straight zinc for drop hammer dies in the aircraft industry. While a considerable amount of research was done in establishing the exact composition, the original groundwork was the much larger research program conducted by the New Jersey Zinc Co., New York, in developing the die casting alloys. Kirksite is a modification of these alloys based on the sacrifice of fluidity, in the interest of improved physical properties. Fluidity must be high for casting in steel dies, but need not be high for sand castings. In a sand casting Kirksite has about 20 per cent higher tensile strength and 20 points higher brinell hardness

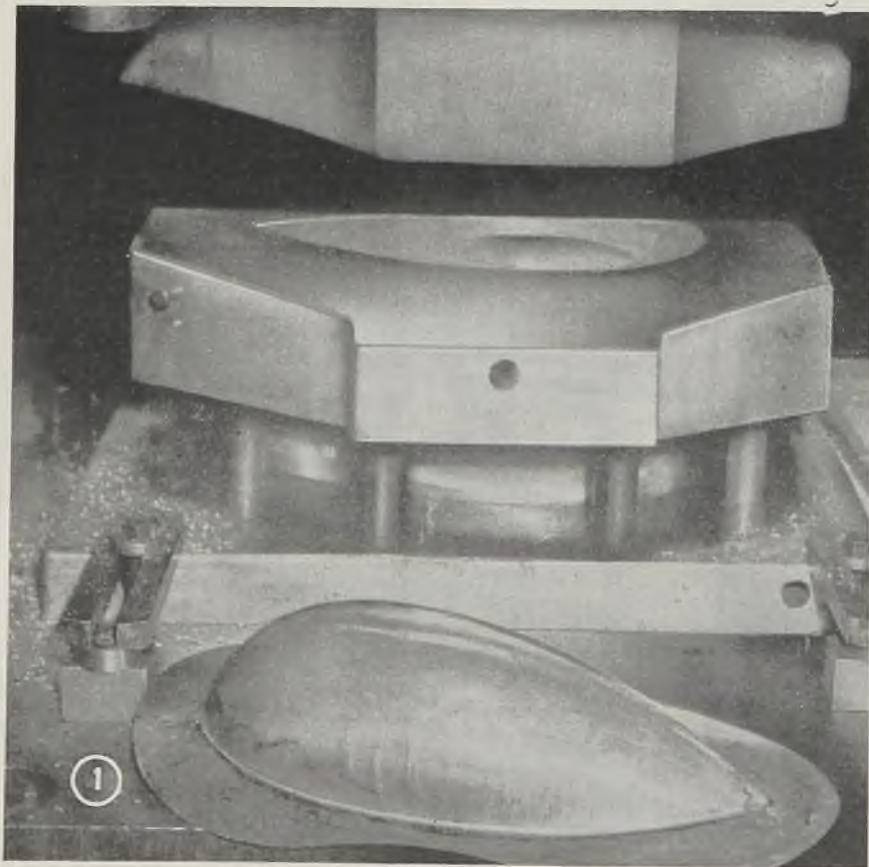
(Please turn to Page 158)



Fig. 1—Three piece zinc-base alloy draw die for steel part

Fig. 2—Sections of droppable fuel tank for Lockheed Lightnings

Fig. 3—This zinc alloy (Kirksite) formed die is used in making stainless steel fire walls for aircraft. Flatness of casting was held within 0.004-inch as cast and no machining was necessary prior to use



Century is helping to meet

INDUSTRY'S No. 1 PROBLEM

—Making more jobs by helping manufacturers
make more and better products at a lower cost.

Tough job? Sure! But American industry and ingenuity will do it!

The manufacturers of machine tools and other types of processing equipment are modernizing their designs with one purpose in mind — to help John Q. Public get more and better products at a lower cost.

Business realists realize that this is the only *practical* method of opening the public's purse strings—and thus, through stimulated demand, build increased production and more jobs.

Electric motors are production tools, too—a component part of the production tools they drive. Hundreds of leading designers who know that Century motors are designed with various combinations of engineering features to meet specific production problems are taking advantage of the production cost saving possibilities of Century motors.

Century's national organization of motor specialists is helping production machinery and appliance manufacturers effect savings in original design, as well as savings in production output.

This means that the *entire business public*—from the manufacturers of production equipment down through the fabricators of thousands of products, the wholesaler and retailer—all of whom are trying to deliver a better product to the final user at a lower cost—have a direct or indirect stake in how well the Century organization does its job of helping others to make more jobs.

If you are a manufacturer of motorized production equipment or appliances—call the nearest one of Century's 31 branch offices.

A Century Motor Specialist can be of greatest help while your design is in the experimental or drafting board stage.



CENTURY ELECTRIC COMPANY • 1806 Pine Street, St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

Weight Lifter—1945 Model.....

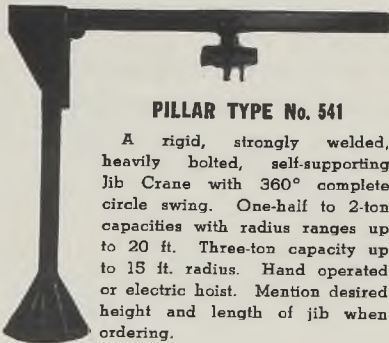
IT'S EASY TO HANDLE HEAVY LOADS
with MONORAIL CRANES



Lifting heavy objects for machine tooling and other operations was once a job "for strong men only". Today it's different.

Now Monorail Cranes make hoisting easy and can be operated by women workers for big savings in manpower. Being fast, they save time. In addition compensation costs due to injuries incurred in manual lifting are reduced to the minimum.

Women at work on wartime production have proved that today's hoisting equipment, such as the Chicago Tramrail installation shown in above photo, can easily and successfully be controlled by feminine hands. Even when loaded to utmost capacity, the same holds true.



PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist. Mention desired height and length of jib when ordering.

Such perfection in the control of Chicago Tramrail hoists is complimented still further when loads are hoisted and transported not only the entire *length* but also the full *breadth* of the room. Or, from one room to another.

This is accomplished through the simple expedient of "transfer points" situated at strategic locations which switch the load from one monorail crane to another.

In steel plants and in the foundry, you will find these Chicago Tramrail Monorail Cranes indispensable for hoisting, positioning and conveying loads over point-of-operation jobs and over storage areas. A trial will convince you.

Write—ask us to submit specific recommendations. No Obligation.

CHICAGO TRAMRAIL COMPANY

2912 CARROLL AVENUE

Phone KEDzie 7475

CHICAGO 12, ILLINOIS

Gearmakers' Meeting

(Concluded from Page 112)

a "scrambled situation hard to analyze. Mr. Rushing cited the case of an electrical machine 18 feet in diameter which developed serious frame vibration at preliminary trial. Study of electrical forces involved revealed probable points of energy input at extreme top and bottom of the frame, where motion was greatest. To prevent energy input, the bottom of the frame was hinged to its foundation with a plate extending lengthwise of the machine.

The resulting system still was capable of vibrating at the same natural frequency—but with its point of "zero" vibration at the bottom. While the exciting force continued to be present, this force could contribute no energy because the bottom of the frame no longer could move up and down. Hence, vibration no longer appeared.

To my way of thinking, Mr. Rushing's interesting examples of successful vibration analysis and correction typify the manner in which theory and plain, old fashioned ingenuity now work together toward America's industrial success. While the mathematical analysis of complicated vibrations and unbalances is no easy process, American engineers have devised ways to cut through this fog of figures and expose the cause of the trouble. Having thus exposed it, their ingenuity enables them to correct it or to counteract it in some simple, common sense way.

George H. Acker, vice president-in-charge of engineering, Cleveland Worm & Gear Co., Cleveland, Ohio, gave further proof of the efficacy of this working partnership of science and craftsmanship in his paper dealing with worm contact

temperatures. I can only hope to touch one or two of the high spots in the setup for this outstanding research project. The paper must attentively be read in full to be appreciated or to be of any real value.

"Its purpose," said Mr. Acker, "is not to delve into the realms of the abstract, but rather to present an account of experiments designed to evaluate worm gear contact temperatures under actual operating conditions."

In brief, the method followed was to employ the contacting faces of operating worms and gears as two elements of a thermo-electric couple, thus determining average temperatures prevailing on those surfaces during the instant of contact. Special worm and gear mountings were designed to fit into a standard speed reducer housing. The one-piece worm and shaft is journaled into antifriction bearings, and extends through both ends of the casing.

On one end is a driving coupling, while the other end is counterbored and threaded for a collector shaft of the same material as the worm shaft. This collector shaft in turn is counterbored part way through and on its exterior thin disks are machined. This reduces its heat transmitting ability and at the same time gives it large radiating surface, like an air cooled engine cylinder. Thus, a collector ring mounted at the outboard end of this shaft and running in a trough of mercury remains practically at room temperature.

The worm gear consists of a bronze flanged rim bolted to a textolite hub which insulates it from the supporting shaft. This shaft has the usual coupling extension at one end, beyond the housing, while its opposite end carries a textolite insulator with cooling rings, to which a

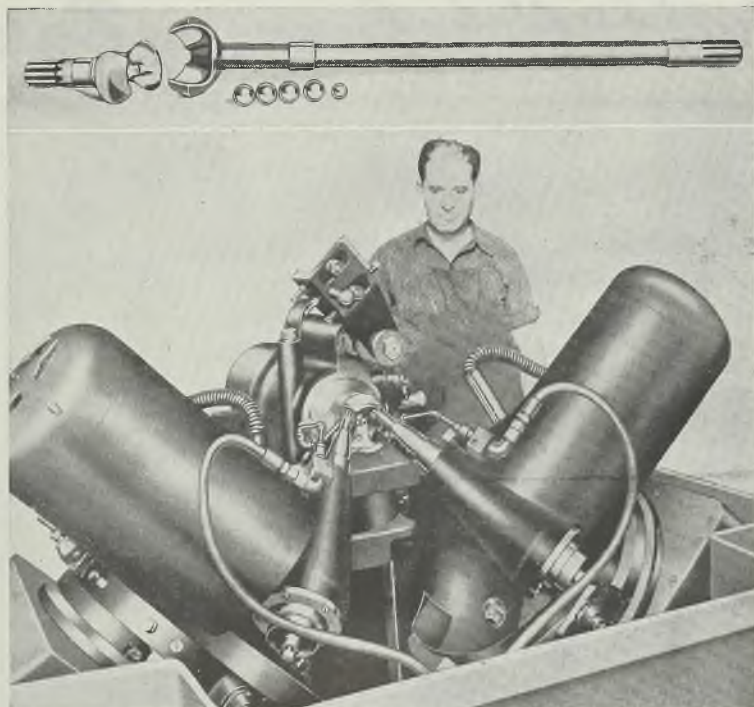
bronze collector ring is attached. This ring, which runs in a trough of mercury, is of the same material as the worm gear rim. Electrical connection between this collector disk and the gear rim is provided by a wire—also of the same material as the gear ring. This passes through holes drilled in the shaft and is anchored to the face of the gear rim. Ordinary copper wires run from the two mercury baths to a potentiometer, so that metal-to-metal contact of the worm threads and gear teeth complete an otherwise open thermo-couple circuit. Using a through-hardened worm shaft of SAE 4150 steel, running with a conventional copper-tin-nickel worm gear bronze, a thermo-electric potential of two millivolts was realized over temperature gradient of 460 degrees Fahr., above a 66 degree Fahr. cold junction.

Without going into details as to the painstaking job of setting up step-by-step the calibration curves of this apparatus, suffice it to say here that useful data have been and are being gained through load tests. Among interesting facts revealed are: (1) That actually "flash temperatures" are not at all alarming in magnitude; and (2) that, while such flash temperatures may in some instances appear to be increased by supplementary cooling of the oil bath, actual contact temperatures are lowered.

The overall conclusion drawn is that there is sound justification for increases in the rating of worm gearing for power transmission purposes, especially in the higher speed ranges and under circumstances of adequate control of oil bath temperature. This is in line with an undercurrent of feeling which I sensed at the meeting that out of the war will emerge lighter, stronger gear mechanisms of amazing power-carrying capacity.

YANKEE INGENUITY

Typical of the American way of manufacturing a complicated automotive detail is this setup in Bendix Products' South Bend plant on the relatively new Bendix-Weiss constant velocity universal joint shown at top of accompanying illustration. By means of the special milling machine developed by the company's own engineers, machining time on the curved ball tracks inside the yoke forging has been reduced by at least 75 per cent. Note how the part is mounted in a quick locking fixture or "workhead" specially designed for it. Also, how good use is made of unit electric drive to each of the two cutter spindles—these spindles being integral with the gear motor reduction units with right angle power take-off. The complete machine shows what can be accomplished when electrical machine tool and tool engineers "get their heads together" on production problems



Engineering

NOTES

Composite Hacksaw Blades

A new method has been developed for the production of blanks for hacksaw blades whereby the cutting edge is high speed steel and the backing or body of the blank is an alloy steel. High speed steel sections are suspended in ingot molds and the alloy steel poured around them. The ingots then are rolled into thin sheets and split into the necessary widths for hacksaw blades.

Shankless Drills

A comparatively new entry into the twist drill field has introduced a shankless drill which is reported to involve manufacturing economies for the company as well as a number of important advantages for the users of these drills. The drill has continuous flutes produced by roll-forging and hot-twisting and is driven positively by a removable taper shank driver. Seven sizes of drivers are adapted for use with 135 drill sizes. Selling prices are 20 to 30 per cent below those of conventional taper shank drills. The drill was perfected in the River

Rouge plant of the Ford Motor Co. 6 years ago.

Direct Steel Production

A company in India proposes to install a pilot plant for the production of high carbon, manganese and chromium alloys at the rate of 5 to 10 tons per day directly from 40-47 per cent magnetic iron ore. The installation would include an ore crusher, magnetic separator and electric steelmaking furnace. The ore has only 0.18 phosphorus, "no" sulfur but is high in silica. The company now is in the market for a complete plant.

Tin Plate Line "Salvation"

A midwestern steel plant has installed a new type of flow-brightening equipment for its continuous electrolytic tin plate lines which is said to involve an important reduction in costs. After the strip has been plated, it passes between two banks of gas fusion burners. There are 75 burners on each side, which altogether deliver 2,500,000 B.t.u. A pair of continuous ribbon burners just below the

two banks of burners just mentioned perform the final surface leveling and fusing operation. The line operates at 600-1000 feet per minute.

Heat-Treated Wheels

A new type of locomotive wheel, now being tested, has an integral, heat-treated "tread." After this integral tread has been completely worn down, it may be machined off and a conventional separate tire can be pressed on, as in the case of an ordinary drive wheel.

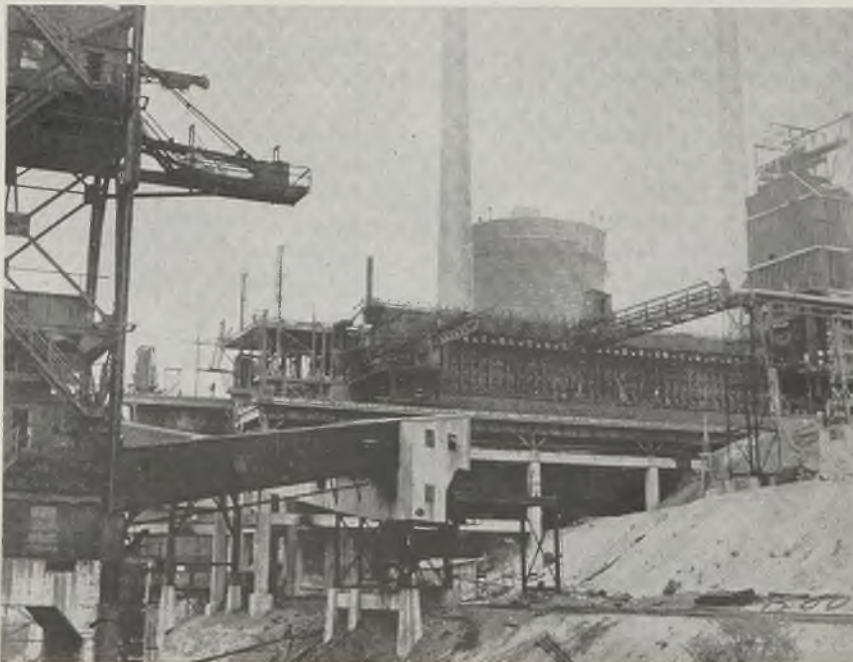
Threading Tool Control

A tool company in Chicago has developed a simple attachment for lathes and turret lathes, whereby a threading tool can be run up to a shoulder without risk of colliding with the shoulder. This device, which can be used either for external or internal threading, easily can be applied to machine tools with cross slides. Its cam action is positive and exactly repetitive, and permits effective use of single point threading tools—including carbide-tipped tools—on production work which ordinarily would require use of dies or taps.

Forged Cylinder Heads

Forged aluminum cylinder heads for aircraft engines are reported working out well in service, despite some rumors to the contrary. Wright is using the heads currently on its engines and, it is understood, some are being assembled on the 3350 engine built at the huge Dodge Chicago plant.

Builds Coke Ovens on Bank of Ohio River



ONE of the most unusual procedures in steel plant construction is shown in the accompanying illustration which depicts the new 45 by-product coke oven installation of the Weirton Steel Co., Weirton, W. Va. This bank of ovens extends out over the Ohio river. The ovens rest on a top-pad or slab made of concrete—61 feet wide, 185 feet long and 7½ feet thick. The pad is supported by 10 main piers of caisson construction. Each pier is 12 feet square and extends 85 feet from rock foundation to top pad. At the top where the piers join the pad they flare out to a square of about 20 feet.

At high water, the Ohio river runs beneath the coal handling equipment, a portion of which is shown at the left; at flood the Ohio river rises to the level of the railroad tracks shown in the right foreground and serving the plant. The highest flood stage of the Ohio river ever recorded in the Weirton-Steubenville district was in 1936, and this height still is below the floor of these by-product coke ovens.

WELDED STEEL BASES



PERFORMANCE • RUGGEDNESS • ECONOMY

WELDED steel bases and frames supporting machine tools, high speed engines and special machines more than proved their superiority under the pressure of wartime production. • New machines for peacetime production are being designed for mounting on fabricated steel structures to eliminate pattern costs . . . to permit design improvements at any time . . . to provide maximum strength with minimum weight . . . and for greater economy. • Van Dorn offers the required specialized knowledge and experience for proper design . . . plus the facilities to economically produce welded steel supporting units.

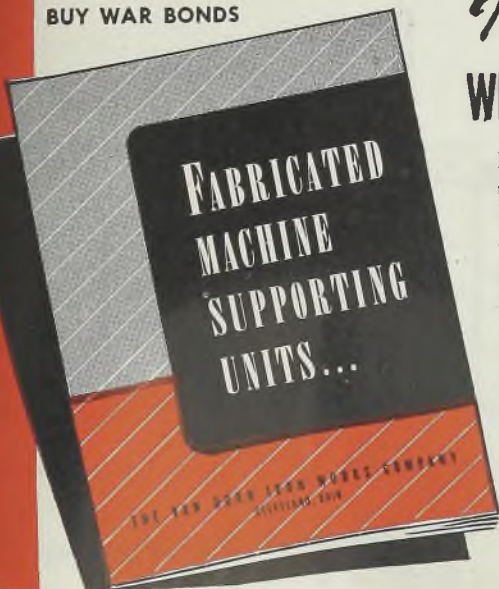
BUY WAR BONDS

Information for you . . . about **WELDED STEEL MACHINE BASES AND FRAMES**

For the convenience of manufacturers who want to investigate the many advantages of welded steel bases and frames, Van Dorn has prepared a book, "FABRICATED MACHINE SUPPORTING UNITS".

This book details the advantages of welded steel supporting units, the importance of special knowledge in designing them and Van Dorn's facilities and experience in building them.

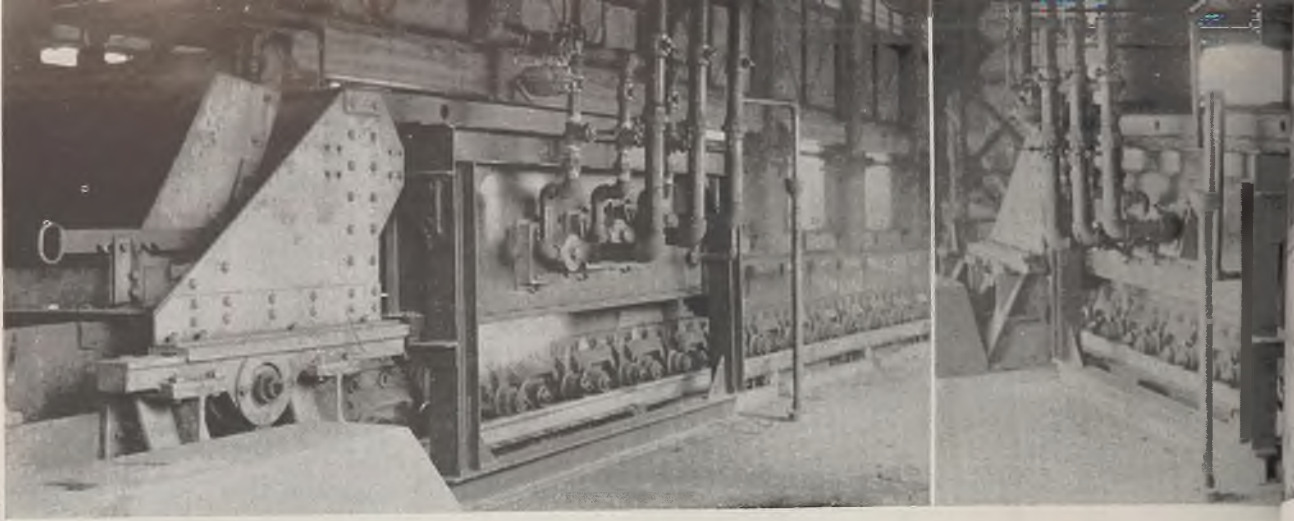
This book will be sent to you free upon request, and will place you under no obligation.



THE VAN DORN

IRON WORKS COMPANY

2685 EAST 79TH STREET • CLEVELAND 4, OHIO



New Sintering Plant

Affords Close Control of Product

New unit complete with car dumper, ore storage yard and railroad equipment at Ohio river plant produces 75 tons per hour. Raw materials are handled and screened outside the sintering building. Auxiliary track hopper and skip provide ample supply of flue dust and coke breeze in bins. Sintering building well ventilated. Dust catchers minimize abrasion

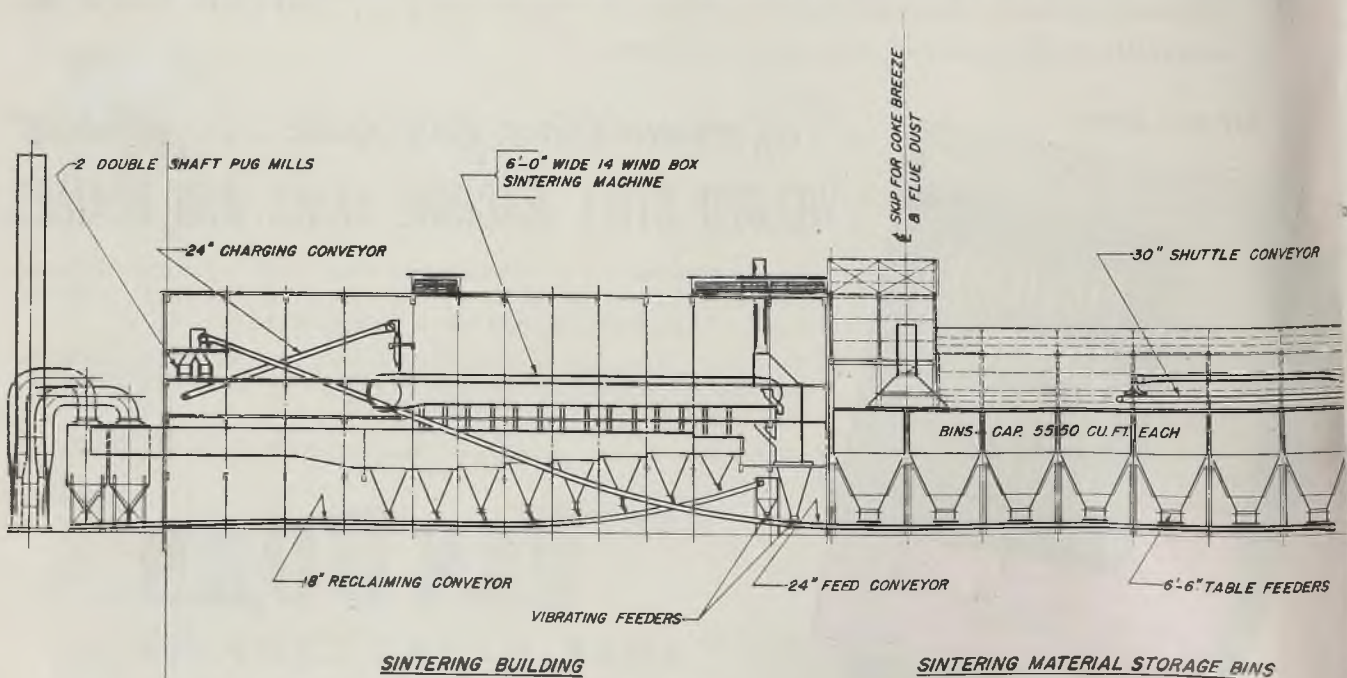
BACK in the early twenties sintering plants were laid down near the trestle of blast furnaces so that flue dust could be brought over the high-line in standard hopper cars and dumped directly into bins. Bucket elevators were widely employed to hoist the flue dust, coke

breeze and limestone to the screening station located at the top of the sintering plant building where it was distributed by gravity to the proper piece of equipment. Fan bearings stayed in service only a few weeks under the cutting action of the dust; sinter left the pallets

at the discharge end of the machine about 50 per cent clinkered; furnace men seldom exceeded 10 to 15 per cent sinter on their furnace burden.

Present sintering plant practice is the same as followed by the oldtime operator. Plant layout has changed; equipment has undergone improvement; sintering beds are carried much higher; burner equipment puts the flame through the material so that little dust passes through the screen at the discharge and high-speed fans provide a suction at the machine that would have been considered fantastic in the twenties.

The newly completed sintering plant or



319'-3 3/4"



(Extreme Left)—Approach to gas-fired ignition furnace

(Left)—Exit end of ignition furnace showing method of arch support

naces is received in standard railroad cars which are unloaded by the car dumper into transfer cars. The car dumper will handle 15 cars per hour. The ore is taken either to the stockhouse bins at the furnace, or to the storage yard where it is stocked for use during the winter months. The ore storage yard is served by a bridge crane to facilitate stocking and loading.

How Stockpile Ore Is Handled

A portion of stockpile ore is sintered. It is moved from stockpile either in a transfer car or side-dump cars direct to the two bins at the track-hopper station. Each bin has a capacity of 3720 cubic feet as filled. Two revolving table feeders independently driven by 7½-horsepower motors deliver 480 tons of ore per hour onto a 30-inch belt conveyor which terminates at a hopper at the top of the screening station. This station was built as an independent unit of the raw material handling system in order to minimize the elevation of the storage bin building, all of which enters into the overall cost of the plant.

Just before the ore from the track hopper station arrives at the screening station it is weighed on a belt scale. At the top of the screening station the ore is discharged on to a 5 x 12-inch double-deck vibrating screen with the top deck of 1-inch mesh and the bottom deck of ½-inch mesh. The product from the top and bottom decks join and are discharged onto a 24-inch reversible conveyor which transfers the

oversized material either into the ore yard pit or in standard railroad cars for delivery to the trestle bins at the blast furnace. Undersized material falls on a 30-inch conveyor belt which delivers it to a 30-inch shuttle conveyor serving all of the storage bins. By this arrangement the raw material handling and screening are independent of sintering plant operation and therefore have no effect on the sintering operation should a breakdown occur somewhere along the line from the track hopper station to the storage bins.

A belt-scale weighs all the fines in transit from the screening station to the sintering plant storage bins. As previously mentioned, a belt-scale weighs the total material in transit from the track hopper station to the screening station. Therefore, the difference between the weights is the amount of the oversized material delivered to the blast furnace trestle bins.

Seven concrete storage bins each with a capacity of 5560 cubic feet serve the sintering plant. Each bin is equipped with a 6½-foot revolving table feeder driven by a 5-horsepower variable-speed motor. These motors are connected to a rheostat which is actuated from the operating floor. Five of the bins are used for storage of scened ore fines. Two bins are used for storing flue dust and coke breeze. These two raw materials, as received from the blast furnace department, are dumped into an auxiliary track hopper outside of the building and are hoisted by skip to a receiving hopper which discharges into the respective bins. These two bins are enclosed in order to maintain a state of cleanliness in the storage building. Provision has been made to handle flue dust and coke breeze at the track hopper station if necessary. The skip was

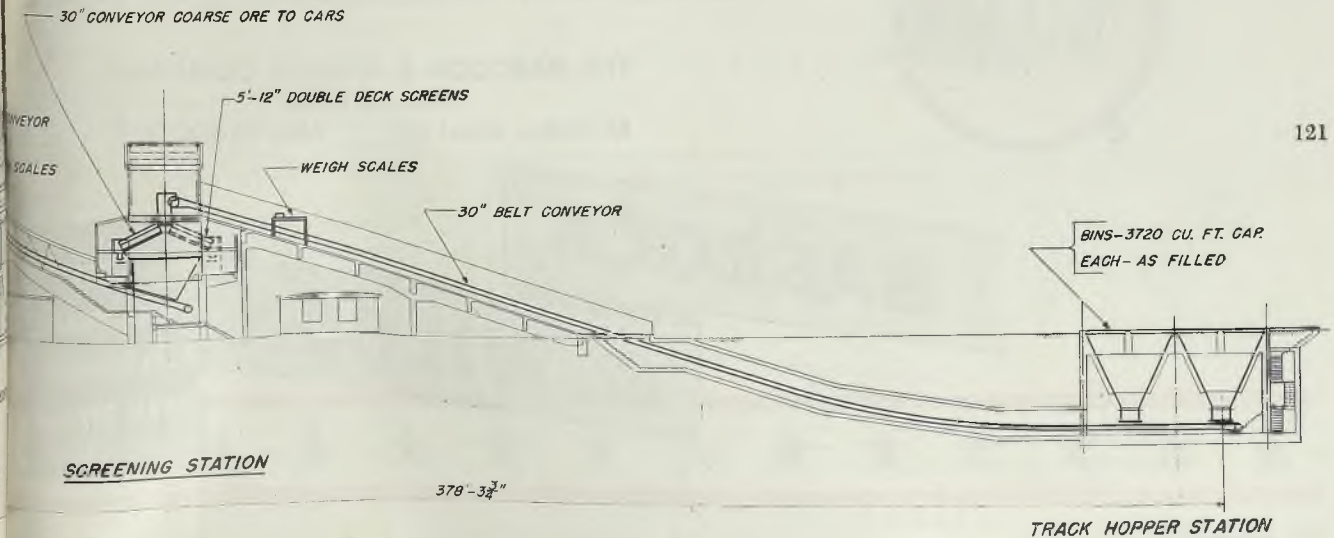
By JOHN D. KNOX
Steel Plant Editor, STEEL

the Wheeling Steel Corp., Steubenville, O., will serve to substantiate what has been said. Here is one of the latest plants to be built in this country—complete in the fullest sense of the word from a car dumper, ore storage yard and railroad equipment to transfer the sinter to the blast furnaces within close proximity.

The plant was designed and built by the Arthur G. McKee & Co., Cleveland. It extends in a straight line almost 700 feet from the track hopper station at one end to the centrifugal dust catchers at the opposite end. The plant started operation July 3 and after 3 hours of sintering, it was up to rated capacity. Since then it has produced at the rate of 1200 tons per 16 hours or 75 tons per hour. While only two 8-hour turns have been operated, plans call for three 8-hour turns in the near future.

All iron ore used at the blast fur-

(Below, left page and right)—Elevation of sintering plant at Steubenville, O.



HOW TO EVALUATE INSULATING FIREBRICK



Consider:

1. Temperature Resistance
2. Light Weight for Low Conductivity
3. Stability
4. Volume Change
5. Manufacturer's Responsibility
6. Value

5

Manufacturer's Responsibility

The insulating firebrick that costs the least on a life-term basis—that will stand up longest in service—that will avoid preventable heat losses and fuel waste—can be selected by a method that is simple and reliable.

Consider the manufacturer's knowledge of insulating firebrick—how long he has made them. Investigate his knowledge of furnaces and the various applications of insulating firebrick. Determine his ability to produce high-grade products—uniformly—consistently. Then you can select the brick that will save money for you—that will minimize fuel costs, maintenance charges, and rebuilding expense, and will increase production.

Your local B&W representative will be glad to give information along the foregoing lines. He can also help with data on the five other checks you can make in selecting—with facts—the most economical insulating firebrick for you.



THE BABCOCK & WILCOX COMPANY

Refractories Division

85 Liberty Street

New York 6, N. Y.

R-191

BABCOCK

& WILCOX

★ BUY
WAR BONDS!
BUY MORE
THAN BEFORE
★



General view of Wheeling Steel Corp.'s sintering plant at Steubenville, O. Raw material bins are housed at right of skip hoist; sintering department at left

installed to provide a means for getting an ample supply of flue dust and coke breeze in the bins during the ore unloading season when main track hoppers are fully occupied.

Beyond the storage bin building is the sintering plant building which is of concrete construction. The operating floor is carried at the same height so that a crane can serve any piece of equipment. In the design of the plant emphasis was placed on constant ventilation and ample working space. No glass is used in the entire plant. Louver dampers are installed on the operating floor of the sintering building. Monitor louvers are provided in the roof over the ignition furnace as well as over the discharge end of the machine. All sashes along the sides of the operating floor are paneled and move on rollers to facilitate opening. Instead of windows and sashes on second floor, which is the hottest portion of the plant, canopies are provided as a means of protection from the weather, and at the same time to afford cross ventilation.

Side Discharge Is Provided

The sintering machine is 72 inches wide by 89 feet 3 inches long and is built with a side discharge so that the product can be directed into the ore yard pit or into railroad cars thus providing either a water-cooled or air-cooled material. A feature of this unit is its adjustable discharge end. To eliminate an excessive drop of pallets when the sinter is discharged, the expansion gap in the pallets is maintained at 7 inches. This is facilitated by 1½-inch filler bars which can be inserted or removed to hold the length of the gap to that desired.

A fan rated at 126,000 cubic feet per minute at 250 degrees Fahr. provides ample suction at the wind boxes of the sintering machine. It is driven by a 1000-horsepower synchronous motor located in an air-conditioned control room. Combustion gases are discharged into a

Side view of gas-fired ignition arch for the continuous sintering machine

steel stack. The fan has louvered dampers interlocked with the motor and controlled from the operating floor. Two centrifugal dust catchers, brick lined throughout, remove particles of dust from the products of combustion before they enter the fan, thus providing protection to the fan blades against abrasion.

Raw materials from the storage bins drop on to a 24-inch main feed conveyor belt and are delivered directly to a hopper serving the pug mills on the main operating floor of the sintering plant. Two pug mills, one serving as a spare, have been installed to insure continuous service. To operate either mill it merely is necessary to change the position of the flapper valve in the chute ahead of the intake. This permits repairs to be made on one mill while the other is operating. An attractive feature of this particular conveyor is that it operates nearby the main floor of the sintering plant in full view of the attendant. He can see the kind of material entering the pug mills and, if a variation occurs, can correct it.

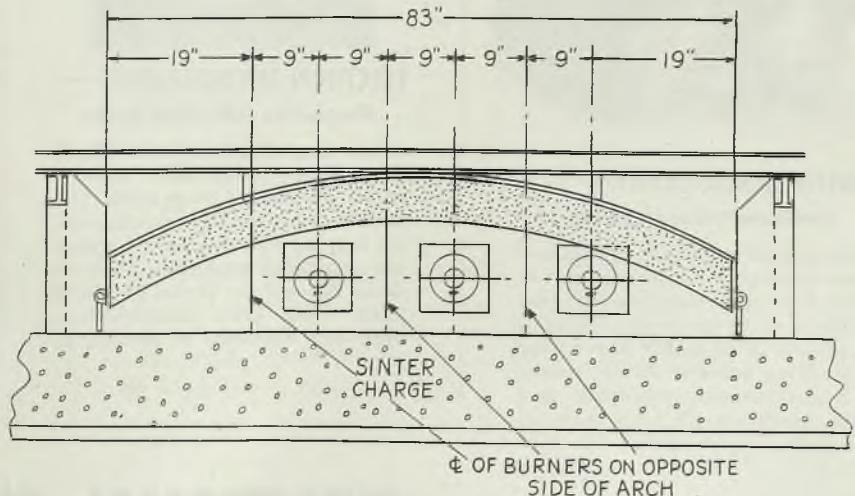
The main feed conveyor immediately

after it leaves the storage bins passes alongside two vibrating feeders, one of which receives its supply of returned fines from the bin beneath the discharge chute grizzly; the other feeder receives its supply of fine dust pulled through the grate bars. The hot sinter fines from these sources are fed on top of the cold raw materials coming from the bins thus protecting the belt from burning.

Built with Three Arches

The ignition furnace is of the Morgan type with three 84-inch arches which are independent of each other and supported from above so that any single arch can be removed and replaced without interfering with the others. The two end arches are identical whereas the center unit is smaller; standard 9-inch keys and straights can be installed without cutting. Three burners are positioned on each side of the furnace. One is set at an angle of 7½ degrees toward the bed, one horizontal and the other at 15 degrees. This permits the flame to impinge at different points on top of the bed. Then each bank of three burners is staggered so that one flame does not conflict with another. The arches can be removed without interfering with the burner arrangement.

From the foregoing it must be obvious
(Please turn to Page 166)



A Timely Report to

ONE of the most rapidly growing developments in industry today is the utilization of photography in specialized applications. From engineering research and design all the way through production, training, inspection, and demonstration, functional photography is performing an increasing number of important jobs—in

addition to its general use in illustration, copying, and other familiar operations.

Highlighted below are a dozen of the ways in which photography is working in industry. They indicate the scope and diversification of its applications . . . perhaps will suggest how it can be applied to your business.



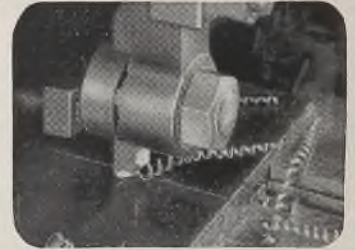
RADIOGRAPHY— *Plays a double role*

Radiography's place in inspection is well known—not so familiar, but becoming increasingly more important, is the way product engineers, foundrymen, welders, and designers use radiography to improve design and production methods . . . saving time, material, manpower, and money.



PHOTO LAYOUT— *Reproduces drawings on metal*

Engineering information is now transferred to metal, or other material, with photographic speed and accuracy. Where the layout is complex—or in quantity reproduction—photo layout saves time and money. Template making is one of its most important uses.



ULTRA-SPEED PHOTOGRAPHY *"Magnifies" time*

Just as photomicrography reveals details of metal structure too small to be seen with the unaided eye, so ultra-speed photography permits the analysis of motion normally too fast to be perceived. It has helped to solve a multitude of problems involving motion.



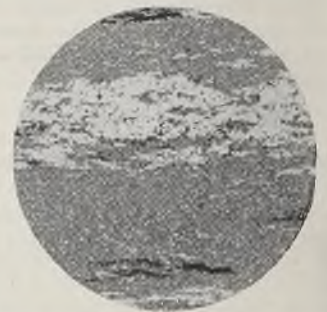
PHOTOMICROGRAPHY— *Basic metallurgical tool*

Photographs of metal surfaces—taken through a microscope, up to 3000 diameters—represent the true structure of the specimen. Photomicrography is of major importance in studying grain structure, results of heat treatment, tempering, and other operations in both research and production control.



ELECTRON MICROGRAPHY— *Magnifies 200,000 times*

Direct magnifications up to 30,000 times—and photographic enlargements up to 200,000—made possible by the electron microscope, are helping to solve many perplexing industrial problems. Showing detail beyond the limits of visible light, these great magnifications open new horizons in metallurgy.



MICRORADIOGRAPHY— *Adds another dimension*

The metallurgist who finds it desirable to observe the sub-surface micro-structure of metals can now do so with the help of microradiography. Details usually masked by necessary etching, such as shrinkage and porosity, and phases invisible on the metal surface, can be clearly differentiated on the microradiograph for study and reference.

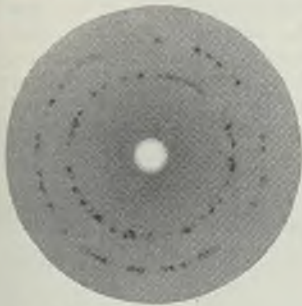
FUNCTIONAL PHOTOGRAPHY...

Industry...



RECORDAK—"Files" bulky drawings on microfilm

Microfilming is becoming standard practice in more and more industries. Drawings, specifications—all paper records—are microfilmed rapidly and economically and stored with a 98% saving in space. Reference time is cut two-thirds with a Recordak "film-file," and full-size prints readily made.



X-RAY DIFFRACTION— Reveals the invisible

Industry is finding many practical applications for crystal analysis by x-ray diffraction. Minute particles, too small to be seen by visible light, modify and diffract x-rays. Recorded on film, the x-rays form diffraction patterns which are of great value to metallurgists and engineers in the search for better materials and methods of metal-treating.



PHOTO-VISUALS— "Know-how" by "Show-how"

Motion pictures, slides, film strips, and photographic operation sheets and manuals have proved the most rapid and efficient means of training. In many other fields—demonstration, promotion and safety, for example—photography tells the story clearly and completely.



STRESS ANALYSIS— Previews performance

Photographic stress analysis studies, similar to the photo-elasticity illustration above, are playing an increasingly important part in product design. Study and analysis of an experimental model's behavior under simulated operating conditions enable predetermination of the product's performance.



SPECTROSCOPY— Analysis in a flash

Fast, accurate qualitative and quantitative chemical analysis, as well as a record for reference, is provided by spectroscopy. Because analyses of even the most complex substances are obtained in minutes, irregularities in production can be avoided and losses prevented.



INSTRUMENT RECORDING— Data reporter

Photography is used to record transient phenomena where instrument fluctuations are too rapid for accurate visual observation—as in cathode-ray oscillograph traces; where the cycle is too long for convenience; where a number of indications must be recorded simultaneously; and generally when a record is needed for detailed study and analysis.

Functional Photography Checklist

We have prepared a checklist which will be useful in determining whether you are getting the most out of modern photography. Write to Eastman Kodak Company, Rochester 4, N. Y.

Analyzes...Improves...Records...Reproduces

Kodak

Arsenal Employs

Assembly Line Charging

for Truck Batteries

MAINTAINING full electrical charge in storage batteries for a fleet of 80 lift and hoist trucks is an operation that assumes assembly line character at the Benicia, Calif., Army Arsenal. These trucks, some of which can raise a full load 12 feet vertically, are part of vital repair operations now in progress on battle damaged war equipment that daily surges through repair shops of one of the oldest military bases in the United States.

Batteries used to power trucks are of the Edison industrial type. Weighing over 1800 pounds each, the 28-cell batteries enable trucks to travel about the base at 5 miles per hour with loads ranging from 3000 to 7000 pounds.

Battery units are brought into the recharging room on a special truck equipped with a hoist. To assure peak operating efficiency, all batteries are recharged on a rotating schedule at the end of each 8-hour shift. During the operating period, it is assumed that the truck has travelled about 30 miles in addition to lifting and stacking work.

To supply sufficient direct current to recharge the batteries, three Westinghouse synchronous motor-generator sets, rated at 75 kilowatts each have been installed. Front of this installation may be seen at extreme left in illustration below.

Principal feature is that control is fully automatic and so arranged that additional machines are connected to the bus as required by the load and are automatically disconnected as the load becomes lighter, the last machine shutting down when the last battery is fully charged. Power control is handled by Westinghouse cubicle switchgear, designed to include three motor control, three generator control and nine charging control units. The incoming 2300-volt line is fed through a primary cubicle equipped with a De-ion oil circuit breaker. Five outgoing circuits on each charging control panel permit simultaneous recharging of 45 big storage batteries.

Largest Operation in West

Because of the size of the installation, largest of its type in battery charging operation in the West, automatic control of generator output was installed to provide adequate charging capacity and to protect against overloads. When the load on any one charging generator reaches maximum rated capacity of 75 kilowatts, the automatic control then cuts in the number two and three motor-generator set as required, providing a maximum recharging capacity of 225 kilowatts. Conversely, when the last bat-

tery on the line has reached its full charge, control relays act to shut down charging equipment. In addition to guarding against storage battery overcharging, this automatic control, believed to be the first of its kind, increases efficiency of the charging set and minimizes maintenance.

Workers shown in left foreground are adding water to the 28-cell batteries on the charging line at Benicia Arsenal, while man at right checks water level of units in the other line.

Among the many uses of the lift and hoist trucks at this Army arsenal are the handling of 3-ton tank motors, frequently raising an assembled unit 12 feet into the air in storage operations; the movement of giant 1000-pound bombs to storage and dispersal points; the distribution of tools and portable repair equipment to points where they are needed; and the movement of a variety of battle damaged equipment, after repair and renewal, from rebuilding shops to docks for return to the fighting fronts. Battery-charging installations of this type are said to be adaptable to many other uses in industry, including the charging of batteries furnishing power to storage battery welders, power for stand-by and emergency use, and similar applications.



WHAT ARE YOUR

NEEDS IN

Circular
PRODUCTS?

1

2

3

4

5

6

7

8

• We are equipped to furnish rough or semi-finished welded products by any welding process — resistance, arc or gas. American Welding Engineers will gladly give you the benefit of years of experience in all kinds of circular weldments. In addition to welded assemblies, our scope includes steel tubing, steel rings and bands in diameters from 4 inches to 8 feet; thickness from 1/4 inch to 3 inches . . . complete rings or segments formed from Tee, channel, angle, or special bar sections. Your inquiry will receive prompt attention without obligation.

1. Flash butt welded ring—two arc welded lugs.
2. Flash butt welded ring—37° flange in 2 1/4" four equal distance slots.
3. Flash butt welded ring—six arc welded lugs.
4. Flash butt welded band 5 1/8" O.D. Flanged to 6 1/16" on 3/32" radius.
5. Flash butt welded band

—13" O.D. expanded one end to 15" O.D.

6. Two flash butt welded rings—7 pieces arc welded in 12 places.
7. Seven flash butt welded rings—arc welded at 5 places.
8. Four flash butt welded rings—fabricated into one unit from 27 pieces.

THE AMERICAN WELDING & MFG. CO.
WARREN, OHIO

BUY MORE WAR BONDS

AMERICAN WELDING

STEEL PRODUCTS FABRICATED BY RESISTANCE, ARC OR GAS WELDING



By **GEORGE E. STRINGFELLOW**

Division Manager
Storage Battery Division
Thomas A. Edison Inc.
West Orange, N. J.

**Highly Efficient
Skid-Load and
Power-Truck System
Facilitates Production of**

Hollow Steel Propellers

EXTREMELY effective in moving materials in production of hollow steel propellers is the combination of power trucks, skids, motorized hand trucks and conveyor systems employed by the Curtiss-Wright Corp., Propeller Division in its plant at Caldwell, N. J.

The light weight of the finished hollow steel propeller is misleading in estimating the handling job, for a much heavier tonnage of raw materials is delivered to the production lines than emerges from them as finished product.

For example, Curtiss blades are con-

structed of two plates of nickel-chrome-molybdenum steel which are milled to an accurately tapering thickness and then are blanked to shape. Thus, delivery of these plates from receiving to rough

stores, and then to the first milling operation, is a heavier materials handling job than the light weight of the finished blade might imply.

Partly to conserve floor space and partly to bring the work to a convenient position for the milling machine operator, the plates are delivered two skid loads at a time, and one above the other, with elevating-platform trucks of 5-ton capacity.

Fig. 1—Many types of conveyor lines supplement power truck handling. Here chain conveyor is handling partially completed propeller blades

Fig. 2—Huge stocks of steel plate for hollow propeller blades are stacked in batches of 20 plates on dunnage strips as shown here

Fig. 3—Plates are removed from storage by motor operated lift which places them on skid frames for delivery to production lines. Photos from Curtiss-Wright Corp., Propeller Division

