

Higgins organization typifies enterprising spirit of new industrial South. Page 88

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Number 2

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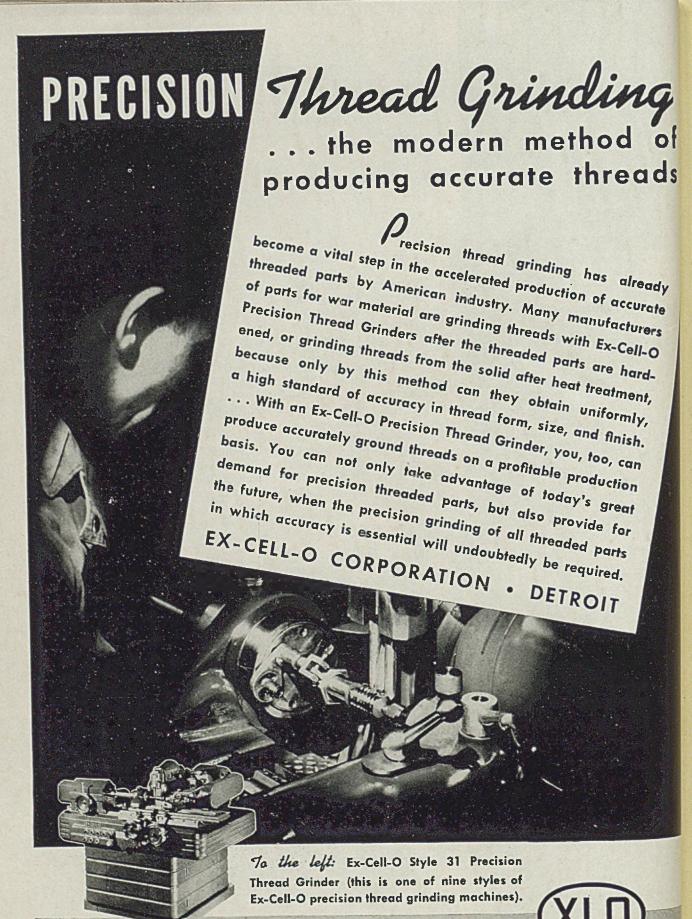
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JTEEL July 12, 1943

2,000,000 TONS OF STEEL: Every producer, distributor, fabricator and consumer of steel has a big stake in the "Steel for Victory" drive. The objective is to get an additional 2,000,000 tons of steel out of production or out of other channels during the last half of 1943.

Sponsors of the program look to three sources for this additional tonnage—increased output from existing facilities, better distribution through a "share the steel" campaign and speeding up of the steel expansion program so that some facilities will be in production ahead of schedule.

While many steel executives believe the lastnamed expedient offers the best possibilities, it happens that the first tangible successes in the drive have come from the "share the steel" campaign. During the first few days of the drive scores of steel consumers in widely scattered sections of the country (p. 72) voluntarily reduced their orders on mill books by 75,000 tons. This is only 3.75 per cent of the 2,000,000-ton goal, but it is an encouraging beginning.

Getting more output out of existing facilities will be difficult because of the necessity of occasionally shutting down hard-pressed facilities for repairs. More efficient distribution, arising from a better balance in inventories among users, has definite possibilities as attested by the 75,000 tons already saved. Even more promising is speeding of the construction program because in some instances the delivery of one or more vital pieces of equipment may advance the completion date of a furnace or mill by precious weeks or months.

Steel men know that achieving this goal of an additional 2,000,000 tons is a stiff assignment, but the industry has licked far more formidable problems. This one can be licked.

FEWER, BUT STRONGER: In spite of the impetus of war, there are fewer foundries in the United States today than there were two years ago. To be exact, the number of casting plants now stands at 4802, compared with 4812 in 1941.

This decrease, as revealed in the 1943-44 edition

of Penton's Foundry List (p. 94), does not mean that American foundries are backward in the war effort. On the contrary, capacity and production are up sharply as a result of war activities. What has happened is that numerous small or poorly located casting shops have closed down, while fewer but much larger plants have been built in response to war demand.

Steel foundries have received the greatest impetus from the war. The number of plants has increased in two years from 298 to 334 and since the beginning of this emergency capacity has more than doubled.

Taking the foundry industry as a whole, the marked increase in capacity which is concentrated in fewer but more efficient plants is a sign of strength.

POSTWAR PARADISE: In reading the postwar program drafted by the executive committee of the United Automobile Workers—CIO, one is struck by its close adherence to the views openly or secretly held by the more visionary members of the inner circle of new dealers.

The planks of the program (p. 83) call for union labor representation in every conceivable postwar activity of the government; maintenance of labor standards during the reconversion period "against any attempt... to lengthen hours, reduce wages or lower living standards; full guarantees to all members of the armed forces including a \$2500 'separation bonus'"; "government or municipal ownership and operation of monopolistic industries and of industries strategically necessary to the national safety"; broad government control of industrial activities; a huge government construction program involving housing, schools, highways, hospitals, power projects, etc.; and reduction of the work week to 30 hours without reducing wages.

It is difficult to see how intelligent men sincerely interested in the future of the union movement or in the future welfare of union members can earnestly support some of the planks of this platform.

(OVER)

If most of the plans proposed actually were carried out, union members in common with all other citizens would find themselves living in a nation guided by dreamers and ruled by bureaucrats. The slavery of the people to these masters would so thoroughly impair the profit motive that private enterprise would be destroyed. Collectivism of some sort would supplant our capitalistic system and unions would lose all of their power to the state.

A practical postwar plan should provide for work and responsibility as well as rewards and benefits. The UAW proposal is long on what one receives from the pictured postwar paradise but short on what one contributes to it.

the difficulty in maintaining adequate supplies of fuel oil in the Atlantic states, many manufacturers are being forced to adapt their oil-burning boiler plants to the use of coal. The cost of conversion is considerable and it is not easy to obtain some of the equipment required. Naturally, these handicaps raise the question as to whether or not there is an acceptable substitute for fuel oil other than coal.

Preliminary tests indicate that the possibility of substituting colloidal fuel for oil should be investigated thoroughly. The emergency fuel used in these tests (p. 98) consisted of a mixture of 40 per cent pulverized bituminous coal and 60 per cent No. 6 (bunker C) fuel oil. It is estimated that if a colloidal fuel of this type can be adapted to oil-burning equipment successfully, it will reduce fuel-oil consumption in boiler plants about a third.

FIRE POWER IS ANSWER: Fire power is a term of great significance in this war. It means the weight of ammunition that can be shot from a single gun or from all the guns of a fighting unit within a specified period of time.

Two years ago American aircraft—fighters as well as bombers (p. 100)—were deficient in fire power. Today they have it in abundance and tomorrow they will have it far in excess of anything the enemy can develop.

War contractors who have wondered why there have been so many changes in aircraft design will find part of the answer in fire power. In the race to beat the enemy on this score, frequent changes in gun mounts, turrets, armor, etc. have been neces-

sary. The result, as measured in air supremacy all over the world, is highly gratifying.

whom the mention of New Orleans brings to mind memories of the Mardi Gras, the old French quarter and Creole cooking will be amazed at the extent to which the war has made the city a focal point of industrial activity. Today it is an important embarkation port (p. 88), is the center of a sizable shipbuilding industry, is in the process of getting into production on aircraft and is going ahead by leaps and bounds in magnesium, oil, synthetic rubber and plywood.

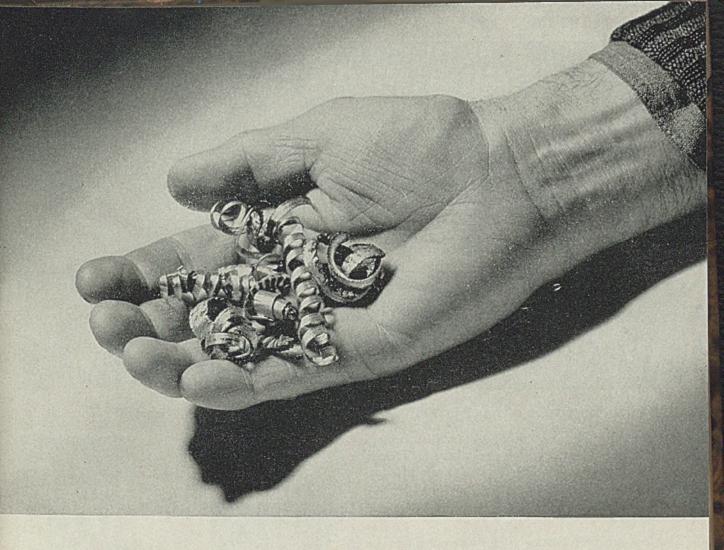
Civic leaders in the Crescent City hope that by intelligent planning they can retain a large portion of the new facilities after the war has ended. They are pointing their efforts toward making New Orleans a principal gateway to South and Central American commerce. Andrew Jackson Higgins, who is to New Orleans what Henry J. Kaiser is to the West Coast, has been building Eureka boats for the United States and some of the Allied nations, but he envisions the use of these shallow-draft craft in opening up the jungles of the Amazon. His plans for aircraft are equally spectacular, being centered around cargo carriers and helicopters.

New Orleans unquestionably has become the hub of a new and important group of wartime industries. It will be interesting to see how its ambitious plans for peacetime pan out.

TOO LITTLE, TOO LATE? This nation has done a good job in producing munitions but a poor job in producing food. The farm implements the farmer needs to plow, plant, till and harvest are just as important to the production of food as machine tools are to the production of munitions. That is one reason why proper attention to the farm machinery requirements for 1944 (p. 67) rates high among the domestic problems confronting Washington today.

E. L. Shaner

EDITOR-IN-CHIEF



# "Swarf" Is Valuable Stuff

"Swarf" is the word used in England for all the metal cut away by machinists' tools—turnings, chips, shavings, etc. There, as in America, "swarf" is valuable because it may contain critical alloys—alloys that cannot be replaced unless reclaimed, and they cannot be reclaimed if "swarf" from various types of steel is mixed.

Review your methods of segregation today. See that blueprints are clearly marked for the type of steel to be used. Check your system of "swarf" identification, from machine to truck or railroad car. Establish effective, but simple, markings for machines, tote boxes, chip buggies, V-dump trailers, and salvage bins. Provide adequate supervision to prevent carelessness, and mistakes by new employees.

"Swarf" is valuable stuff. When carefully seg-

regated, it assures more production tools—assures more airplanes, guns, armor for the protection of our fighting men.

SHEETS · STRIP · TIN PLATE

BARS · PLATE
TRACK ACCESSORIES

FLOOR PLATE

STRUCTURALS

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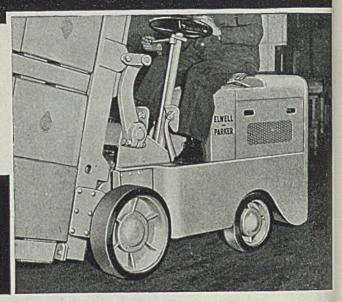
Kansas City

**New York** 

# You're Running on Your "Spares"

To maintain full-time operation of your Power Industrial Trucks, you must get More Months from Your Present Tires—

# Keep an Eye on Your Floors!



1,000,000 more tons of Steel in 1943 - not 1944 when synthetic rubber will be available.

Present indications are there will not be enough latex rubber Tires for Power Industrial Trucks. Meantime, Industrial Truck Engineers are collaborating with Rubber Company Engineers in conducting exhaustive tests on Tires made of new compounds.

You have to have Trucks to get war contracts out on schedule. So take good care of the Tires you are using today—they probably are your "spares" for the present.

To prolong the usefulness of your present Tires, Elwell-Parker urges you to instruct your men or women Truck Operators to follow strictly these vitally important principles. Thus you will conserve critical rubber while getting your war job done.

These rules are for your Truck Operators to heed:

Avoid broken glass, metal chips You can gouge out chunks of rubber, ruin Tires in mere days. Look ahead of you. Keep floor clear of sharp trash. Good housekeeping pays.



#### Stay off the curb

Short cuts save no time. Running Tires over any obstruction not only chews up rubber but tears Tires off rims and damages the Truck.





Keep out of "chock-holes"

Avoid depressions or cracks in floor or pavement. You not only destroy Tires but soon wreck the Truck

#### Don't drive through oil

Grease attacks and rapidly destroys rubber. Never drive over patches of oil or accumulated grease. Clean Tires periodically.

Truck is no battering ram. Don't try to start loads by hauling off and giving a smack—you can ruin the Truck mechanism beside tearing miles off Tires by spinning the wheels.

Wouldn't you like to place reprints of this advertisement into your

of this advertisement into your Truck Operators' hands? We will be glad to send them. If in terested in training women to drive your Trucks, ask for new Elwell-Parker Instruction Manual "Lady, will you give a Lift"

The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland 14,016



# ELWELL-PARKER

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## Implement Prospects

### BEST SINCE ADVENT OF WAR

New program commensurate with nation's food goal. . . . Controlled Materials Plan assures logical allocation of steel and other essential metals. . . Fear continues that adequate metals will not be provided

FOR the year beginning July 1, manufacturers of farm machinery and equipment theoretically face the best prospects since the advent of war, although there is serious question whether these prospects can be fulfilled.

Following a year and a half of enforced curtailment of operations through government adoption of a short-sighted food production program, and inability to obtain adequate steel and other vital materials to meet even the meager schedules which were allowed, farm equipment industry is heartened by the considerably expanded program announced in the second week in June.

Not only is the new program more nearly commensurate with the nation's food production goal, but it has the aspect of being more practical and workable.

Probably the element contributing most in its favor is that the Controlled Materials Plan is now in full operation and when steel and other essential metals are allotted to a definite use, there should be some degree of assurance, at least,

By ERLE F. ROSS Associate Editor, Steel

that these will be available and on an established schedule.

However, some of the optimism which the equipment industry expressed upon announcement of the expanded program has faded, and fear is growing that in spite of CMP adequate steel will not be available to make the new schedules possible of full attainment. Setting up production schedules and providing steel to meet them are two different and independent matters. WPB merely authorized higher production schedules and stated that farm machinery makers will be allowed to use stipulated quantities of steel. It did not issue directives for this steel, but is leaving it up to individual manufac-

turers to obtain their own requirements. The farm machinery program now ranks alongside of other essential war needs, but it seems obvious that it will suffer if insufficient steel is available to meet Army, Navy and Maritime Commission requirements.

In the first place, the new equipment program was announced too late for manufacturers to plan for and place steel orders in any size for third quarter. CMP orders must be validated and given allotment numbers, and this takes time. In the second place, mills are already booked solidly for third quarter and they are filling rapidly for fourth quarter, thus are not in a favorable position to accept farm equipment industry orders for prompt delivery. Consequently, except for those manufacturers which had been able to anticipate future needs closely and place tentative orders subject to later validation, the expanded farm equipment program was principally a nice sounding gesture for the present.

Even under CMP, there is a feeling that WPB's Steel Requirements Committee has assigned more allocations for steel

Move to provide additional machinery and equipment to the hard pressed farmer serves to encourage the hope that the nation's food production problem will be eased over coming months. Typical farm scene shown at top. Below tractor drivers furrow the land in curving contours





Farmall-A tractor, shown above, is pulling a one-row middle buster, an implement widely used in the South and Southwest. The tractor will cover 11 acres a day in middle busting operations

in third quarter than can be produced in that period. How much in excess is not known, but WPB recently announced that output in third quarter would fall 1,000,000 short of requirements, and this was before the coal strike interfered with operations. Typical of difficulty which equipment makers are experiencing in acquiring steel is that of a manufacturer whose production quota is 80 per cent of his 1940 output. In spite of his quota, his CMP applications were validated to allow him only 90 per cent of his requirements for the quarter beginning July 1; 60 per cent for the quarter beginning Oct. 1; 80 per cent for the quarter beginning Ian. 1, 1944; and 100 per cent for the quarter beginning April 1, 1944. This will give him an average of 82.5 per cent of his requirements for the year, or 66 per cent of his 1940 output.

During recent months, warehouse steel stocks have improved measurably through WPB directive orders, and today some distributors are actually soliciting business for certain products. Among these are hot and cold-rolled sheets, which are extremely tight at mills. Implement makers, who use these products, are finding supplies available from warehouses but at the warehouse differential over mills. To these manufacturers, unable to get sheets from mills, this situation is irksome.

In the new farm machinery program for the year beginning July 1, a total of 900,000 tors of carbon steel has been allocated by WPB to provide operations approximating 80 per cent of 1940. This compares with 40 per cent in effect in second quarter of this year and 20 per cent in first quarter, and neither had been attained because under the priorities system steel could not be obtained by equipment manufacturers. Of this 900,000 tons of steel, 300,000 tons is to be made available in third quarter and ad-

vance authorization has been approved for 200,000 tons in each of the three quarters Oct. 1, 1943, Jan. 1, 1944, and April 1, 1944.

In connection with these allocations, WPB issued a new Limitation Order L-257, effective July 1, to replace L-170 in effect Oct. 21, 1942. Under the new order, a farm equipment builder is permitted to make any item for domestic sale up to percentages indicated for that item in Schedule A. The production quotas of specified items are worked out on the basis of the advance authorization of 900,000 tons of carbon steel for the period July 1 to June 30, 1944.

#### Flexibility in Planning

Most significant, L-257 brackets a large number of items in the schedule to allow manufacturers maximum flexibility on planning their production. Thus, to assure adequate production, distribution, maintenance and repair facilities, the order eliminates the concentration features of L-170. This means that the large producers whose sales are over \$10,000,000 in value, are permitted to come back into farm equipment production.

Efforts to concentrate production for 1943 in the smaller plants turned out to be a painful failure. In ordering concentration, WPB had overlooked the fact that the smaller factories lacked national distribution facilities.

Elimination of the concentration features of L-170 likely will mean the larger producers will re-enter the field and that their distribution facilities will be utilized again. The industry has plenty of plant

TD-6 TracTracTor of the International Harvester Co., shown below, will double disk 10 feet or do other work in proportion. Lighter loads are handled as efficiently as heavier loads



capacity because many of its large munitions orders are being made in new or reorganized plants. Furthermore, most of the industry companies are having their war contracts canceled or significantly scaled down.

With new steel and other materials to

start arriving July 1, the question arises as to whether this will provide farm machinery for 1943 crops. From 60 to 120 days are required to turn steel and other materials into finished machines and get them where the government directs manufacturers to send them. Some of the

equipment will be in the farm territories by Sept. 1.

There is no chance that this new steel could be turned into machinery in time to be used in raising and cultivating this year's crop, but increased production of repair parts will begin in July, and in this category the new materials will be helpful this year.

Although farmers generally, as well as implement makers were heartened by the increased machinery production program, agricultural groups fear that the decision came too late to be of appreciable help to this year's production.

## Present, Past and Pending

#### NEW MACHINE TO SAVE LARGE STEEL TONNAGE

Pittsburgh—Pittsburgh Steel Co. is installing a new machine for upsetting railroad car axles from steel tubing which is expected to save 100,000 tons of steel a year. Machine was built by R. D. Wood Co., Philadelphia.

#### ■ NEW LOCK IS OPENED AT SOO

DULUTH—One more link in the vital Great Lakes waterway system was provided when on July 11 United States Army engineers opened the new MacArthur lock at the Sault Ste. Marie passage.

#### ■ LONG-RANGE DEVELOPMENT PROGRAM PUSHED

New York—International Minerals & Chemical Corp. is assembling a large staff of scientists and building new laboratories at several of its mines and plants to undertake a long range program that will help to develop the company in the future as well as increasing its ability to speed war production.

#### WESTINGHOUSE CO-ORDINATES ELECTRONICS ACTIVITIES

East Pittsburgh, Pa.—Because of the increasing importance of electronics to the war and its promise of even greater industrial achievements in the future, Westinghouse Electric & Mfg. Co. has co-ordinated all its electronic activities under a group of engineer specialists.

#### PROPOSES HELICOPTER-PLANE FREIGHT SERVICE

CHICACO—Burlington Transportation Co. has applied to the Civil Aeronautics Board for authority to operate helicopter-type aircraft in freight service over 3000-mile route in Illinois, Iowa, Nebraska, Colorado, Wyoming and Missouri. The company also seeks authority to operate helicopter-type passenger service over a 6380-mile route in 12 western states.

#### ■ WILL BUILD TRANSPORT PLANE IN MISSOURI

New York—Curtiss-Wright plans quantity production of its large twin-engined airliner type transport plane in a Missouri plant. Plane already is being built in company's New York plants. The plane has a wingspan of 108 feet, weighs about 50,000 pounds loaded, and is powered with two 2000-horsepower engines.

#### ALLOW STEEL FOR ONE LICENSE PLATE PER CAR

Washington—States are permitted to use sheet or strip steel on hand, not heavier than 22 gage and listed as idle or excess inventory, to manufacture one 1944 license plate per motor vehicle under the terms of a new War Production Board order. Limiting license plates to one per car will effect a saving of 12,500 tons of steel. Prewar annual requirements were about 20,000 tons.

#### ROLLBACK IN TUBULAR GOODS CONSIDERED

Washington—The rollback of tubular goods prices is definitely being considered, according to OPA sources, but has not "jelled" as yet. No early action is anticipated.

#### NO RADICAL CHANGES IN BROADCASTING SEEN

Schenectady, N. Y.—While war developments are expected to bring improvements in broadcast transmitters, General Electric Co. engineers see no radical changes that will prematurely obsolete present equipment. In the field of postwar broadcasting replacement by FM stations of many low-powered AM stations is anticipated.

#### Senate Bloc Suggested To "Decentralize" Steel

Formation of a new Senate bloc to promote "decentralization of iron and steel production" was reported proposed last week by Senator Pat McCarran, Democrat, of Nevada, in letters to 55 senators.

According to an Associated Press report, objectives of the group would be to foster new and expanded facilities for production of iron and steel in areas outside the few acknowledged steel centers which, according to Senator McCarran, now account for about 90 per cent of the nation's iron and steel output.

#### Mines Bureau Gets Funds To Advance Minerals Program

Exploratory and development work of the Bureau of Mines looking toward expansion of local resources of steelmaking materials was given additional stimulus last week with announcement of a \$2,000,000 appropriation for this purpose.

Projects directly benefited include iron ore, coal, coke, fluorspar and related materials. Also included were the bureau's pilot plant and laboratory programs.

Other funds allocated to the Bureau of Mines are for the following purposes:

To explore bauxite and alunite clays, \$1,860,000; for manganese exploration and laboratory work, \$900,000; for magnesium development, \$225,000; for sponge iron, \$400,000; for investigation of critical and essential minerals deposits, \$3,900,000; for developing methods of producing alumina from low-grade bauxite and clays, \$490,000.

These funds have been made available to the bureau in addition to the regular and continuing appropriations for safety work, etc. Officials hope to reach an early decision on projects which are to receive the additional money.

# Armed Forces, Munitions Industries Need 3,600,000 More in Next Year

Civilian employment to be reduced by 2,300,000. . . Labor force must be raised 1,300,000. . . Transfers from area to area necessary. . . Agriculture and unemployed now at minimum

TO THE armed services and the munitions industries between now and July 1, 1944, must be added a total of 3,600,000 persons, according to the latest prognostications of the War Manpower Commission. This must be accomplished despite the greatest stringency in the manpower market yet faced by this country.

With slight or no reserve of unemployed on which to draw, the task must be accomplished by transfers from industry into the armed services, from industry to more essential industry, and from less critical to more critical areas.

Even in the critical areas and industries, young men will be withdrawn for the armed services; replacements by older workers or women will be necessary for inductees.

Employment in nonessential industries will be contracted further. This declining civilian employment will yield workers to meet new demands only if such workers, who for the most part are not in critical labor markets, can be transferred physically to the localities where they are needed.

Recruitment of additional women not now in the labor force will be more difficult in the coming year in view of the fact that those most able to accept employment already have been recruited.

"Intensive recruitment measures are necessary to assure full utilization of women, negroes and other available labor reserves in the shortage areas," according to the WMC.

"While transfers of workers from area to area should be made only after full utilization of local reserves, such transfers will be required in many areas. In such cases, every effort should be made to transfer as much production as possible out of areas to which it is necessary to transfer workers. The stringency of the present manpower situation requires that these objectives be obtained with a minimum of disruption in employment and production. Positive measures are required to reduce undesirable migration to channel hiring, to train workers, and to improve utilization of the present labor force."

Total manpower requirements a year from now are estimated at 65,900,000,

compared with present requirements of 64,600,000, an increase of 1,300,000. This includes an increase of 2,000,000 in the armed services (exclusive of replacements), 1,600,000 more in munitions industries, and a decrease of 2,300,000 in other nonagricultural industries. No change is expected in agriculture nor in the unemployed.

Net effect of such change is shown in the following table:

#### ALL-WOMAN PLANT

Northern Aircraft Products Division of the Aviation Corp. at Toledo, O., is the first plant of its kind in the country to be staffed entirely by women on production operations. Precision aircraft engine parts and propellers are made at the plant.

During the next four months when the production force is brought up to maximum, only women will be hired for production work, according to William F. Wise, executive vice president. Men are employed at the plant as job setters, supervisors and instructors.

Increase of

			THET CASE OF
	July, 1943	July, 1944 (In millions)	Decrease
Armed forces	9.3	11.3	+2.0
Armed forces  Munitions industries	10.0	11.6	+1.6
Other nonagricultural industries	32.3	30.0	-2.3
Other nonagricultural industries	12.0	12.0	0
Agriculture Total employed and armed forces	63.6	64.9	+1.3
Unemployed	1.0	1.0	0
			110
Total manpower requirements	64.6	65.9	+1.3

# More Cargo Ships Built in 6 Months Of 1943 Than in All of Last Year

MORE cargo ships were built in the nation's shipyards in the first six months of 1943 than in all of 1942, figures released by the Maritime Commission last week show.

In June the shipyards of the nation delivered 168 cargo vessels bringing total production for the first half of the year to 879 ships aggregating 8,818,622 deadweight tons. In the entire year 1942 the yards produced 746 vessels totaling 8,089,732 deadweight tons.

The June output of 168 vessels aggregating 1,676,500 deadweight tons compared with the record total of 175 for May (31 days), and 157 in April.

June construction brought a new record for ships delivered by an individual yard. The California Shipbuilding Corp. sent 20 Liberty ships into service compared with 18 delivered in May and 19 in April. The Shipbuilding Division of the Permanente Metals Corp. turned in a total of 25 Liberties; these were built in the former Richmond Yards No. 1 and 2 which until recently were run as sep-

arate yards. In the future they will be

Other high totals turned in included 14 Liberty ships by Bethlehem-Fairfield Shipyard, Baltimore, and 17 Liberties by the Oregon Shipbuilding Corp., Portland, Oreg.

The total of 168 vessels included 115 Liberty ships, 19 C-type cargo ships, nine coastal cargo vessels, 11 M. C. tankers, three coastal tankers, three special types, six sea-going tugs, and two ore carriers.

The West Coast region produced 82 ships totaling 870,800 deadweight tons or 51.94 per cent of the national total. The East Coast built 30.39 per cent of the tonnage, or 509,300 deadweight tons represented by 45 vessels. On the Gulf Coast 25 ships with combined deadweight tonnage of 237,800 were delivered, accounting for 14.48 per cent of the grand total. The remaining 3.49 per cent of the tonnage was delivered from Great Lakes region yards which built 16 ships.

## May Production Fails To Gain

Leveling off largely caused by changes in military program, due to experience in battles. . . WPB officials warn second half production must exceed first six months by 50 per cent

SHIFTS in military program necessitated by battlefront experience held May munitions production to the April level. War Production Board's index was 563 (based on November, 1941, as 100), the same as the revised April figure.

This was "not a discouraging sign", according to WPB Chairman Donald M. Nelson, who said preliminary estimates indicated June production was slightly better

At the same time, WPB officials warned that the country will have to produce 50 per cent more war goods in the second half of this year than in the first half. This estimate was substantiated by a report on the progress of the four major programs. Of the four, merchant ships are the farthest advanced with 44 per cent of the year's objective completed by June 30. Army ordnance and output of naval vessels were estimated to be 40 per cent complete while the year's aircraft program is 35 per cent complete.

Munitions now are being produced at a rate of \$60,000,000,000 a year and the total for the 12-month period is expected to run beyond \$65,000,000,000.

Aircraft and related munitions and equipment produced in May showed an increase of 5 per cent over April, on a dollar basis, and 10 per cent on airframe weight basis. Trend continued toward production of heavier planes.

Production of Army and Navy vessels, and Navy ordnance and equipment gained 2 per cent. Completion of naval vessels represented 204,000 displacement tons, an increase of 30 per cent over April, and 9 per cent over the best previous monthly achievement. Marked progress is being made in delivery of destroyer escort vessels.

Ground ordnance declined 3 per cent.

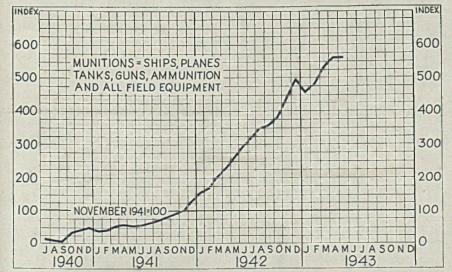
Merchant vessels, measured in value of work put in place, declined 4 per cent. Deliveries, however, were up to 1,771,000 deadweight tons, an increase of 179,000 tons over April. Tanker production reached a new high as result of deliveries not scheduled until June. Output of minor types was increased by delivery of four ore carriers and amounted to 110,000 tons, compared with 37,000 tons in April.

Production of miscellaneous munitions declined 7 per cent in the month. Military automotive vehicle output rose 3 per cent, but was offset by a falling off in clothing and other equipment and supplies.

#### Tool Backlogs Shrink As May Bookings Decline

Machine tool builders continued to eat into their unfilled order backlog in May at a rapid rate as indicated by figures just revealed by the War Production Board. May bookings at \$48,091,000 were the smallest since WPB first began recording statistics beginning with 1942. April orders totaled \$57,359,000 and for May, 1942 were \$166,945,000.

May shipments continued at close to the high rate of the last few months at \$113,710,000, comparing with \$118,-



031,000 for April and \$103,364,000 for May, 1942.

Unfilled machine tool orders at the end of April were \$643,643,000 and the indicated figure for May 31 was \$578,000,000. This is the smallest backlog since the end of July, 1941 when the industry had orders amounting to \$572,000,000. An all-time peak of \$1,389,363,000 was established June 30, 1942.

#### Steel Payrolls Reach New Peak During May

Steel industry payrolls reached a new high mark in May when \$137,404,000 were distributed to the industry's employes, according to the American Iron and Steel Institute.

Total for May was more than \$500,000 higher than the previous peak of \$136,813,000 paid out in March, and is substantially above the total of \$117,403,000 paid out in May, 1942. In April this year, a shorter month, steel payrolls totaled \$133,275,000.

Hourly earnings of wage-earning steel employes likewise set a new record in May, averaging 113.4 cents per hour, compared with the previous peak of 111.2 cents per hour in April of this year. In May a year ago, steel employe earnings averaged 101.1 cents per hour.

During May, the total number of employes on the industry's payrolls averaged 632,000, as against 634,000 in April and 656,000 in May of last year.

Wage earners worked an average of 41.9 hours per week in May, compared with 42.5 hours per week in April and 37.7 hours per week in May, 1942.

#### House Group Votes To Let Guffey Act Expire

Members of the House Ways and Means Committee who last week rejected extension of the Guffey Coal act contended that since the government had taken over the coal mines as an aftermath of strikes, the act was no longer necessary, that it had failed to stabilize the industry and that it had resulted in higher prices for coal consumers.

Enacted in 1937 to put a floor under prices at the mine and thereby to prevent unregulated competition in an industry long involved in serious price competition, the Guffey Act will expire Aug. 23 unless President Roosevelt, the mine operators, unions and other proponents are successful in their campaign for its reinstatement.

II. L. Findlay, Ohio coal operator, testified that failure to continue the act would result in a severe shortage of coal.

# "SHARE THE STEEL" Drive Reported Off to Good Start



IRVING S. OLDS



BENJAMIN F. FAIRLESS

Government aggressively pushing effort to obtain 2,000,000 additional tons in last half of year. . . Industry executives think chief hope for success rests in bringing in of new capacity

ALTHOUGH considerable skepticism is expressed in some quarters with respect to the possibilities for success of the government's effort to obtain 2,000,000 additional tons of steel in the last half of the year, the War Production Board's Steel Division reports encouraging progress in the first week of the drive.

Approximately an additional 75,000 tons of steel have been made available for war production as the result of the

first few days operation of the "Share the Steel" campaign, it was announced last week by John T. Whiting, new director of the Steel Division.

The "Share the Steel" campaign involves the discussion of inventories with more than 2000 manufacturers to see if stocks on hand permit the cancellation or deferment of third and fourth quarter orders on producers' books without interfering with authorized programs.

To carry his personal plea for uninterrupted production to the steelworkers, WPB Chairman Donald M. Nelson paid a visit to the Homestead works of Carnegie-Illinois Steel Corp. Shown bending over and peering into a furnace are, left to right: C. E. Wilson, WPB executive vice chairman; CIO President Philip Murray; and Mr. Nelson. Acme photo

As of July 3, with only several score consumers visited, the following results have been obtained, the tonnage figures representing either cancellations of existing orders on mills, or cancellations of allotments authorized by a claimant agency, but not yet placed on mills: Atlanta region, 14,000 tons; Chicago region, 5000 tons; Philadelphia region, 27,000 tons; Cleveland region, 13,200 tons; Dallas region, 17,000 tons.

"We have got off to an excellent start in this drive," Mr. Whiting said, "and with the continued co-operation which we have been getting, I know that the country is going to have available a large tonnage of steel for important war production which will go far in meeting the over-all goal of 2,000,000 tons of additional steel in the third and fourth quarters."

Whatever success is met in the government-sponsored drive there is little question prospects are not too encouraging, some industry officials believe.

For one thing, the drive was launched under inauspicious circumstances considering the fact a substantial tonnage has been lost from current production through the closing down of blast furnaces and open hearths as a result of the coal mine suspensions.

At a press conference recently in Cleveland, Irving S. Olds, chairman, and Benjamin F. Fairless, president, United States Steel Corp., said it was their opinion the chief hope for obtaining additional tonnage rests in the ability of the government to hurry along the steel expansion program.

Mr. Fairless said the steel drive launched at a meeting in Pittsburgh July 1, was a three-pronged effort involving redistribution of supplies wherever possible, increasing of production from existing facilities, and enlargement of output through the bringing in of plants now in process of construction.

He said that in the case of his own

corporation alone the steel tonnage lost in one week as a result of the coal strike totaled 35,000 to 45,000 tons of ingots. This was in addition to tonnage lost in previous weeks due to suspension of mining operations.

He declined to estimate the total industry loss of steel as a result of the coal strike but in other quarters it was believed to have run as high as 150,000 tons per week.

At the moment the situation with respect to coal mining and steel production is greatly improved. Conditions have brightened considerably with the steady return of miners to the pits, in fact so much so, that at least seven of the eighteen blast furnaces which had been made idle resumed blowing last week. Prospects are good that additional stacks will go into blast within the next few days.

#### Conference Held in Cleveland

The newsmen's conference with the steel officials followed the showing of the corporation's latest motion picture "To Each Other" to some six hundred businessmen and industrialists at Hotel Cleveland.

Both Mr. Olds and Mr. Fairless were confident that ore supplies would be adequate for this year's steel production needs despite the late opening of the lake shipping season and the fact that ore shipments to date this year are about 27 per cent behind the movement in the corresponding period of last year.

It was believed shipments the remainder of the season, providing the season is not shortened by weather, will permit the lake carriers to make up the deficit.

The ore shipment goal this year was set at 90,000,000 tons, and to July 1 the total movement from the upper lakes amounted to 24,793,890 tons compared with 33,952,166 in the like period last year.

Mr. Fairless said that there are no particular worries about iron ore for the current year, but said it was possible that should the season be cut short some difficulty might be encountered next spring.

Backing up this view, A. H. Ferbert, president, Pittsburgh Steamship Co., United States Steel lake shipping subsidiary, said that the Pittsburgh fleet in the week ended July 3 brought down the largest weekly tonnage of iron ore in lake shipping history, a total of 1,400,000 tons. The Pittsburgh Steamship fleet handles about 40 per cent of the iron ore shipped down the Great Lakes.

Answering a question with respect to the repeated reports of rapidly decreasing supplies of high-grade iron ore in the Lake Superior district, Chairman Olds said there will be plenty of economically

usable ore on the Lake Superior ranges in the lifetime of "all those present in the room."

He admitted that the supply of highgrade ore is diminishing under the heavy demands of the war production effort, but said that plans are being made to utilize the lower-grade ores, pointing out that the United States Steel Corp. for the past seven or eight years has been developing in a laboratory in New Jersey a process designed to promote economical use of low grade ores.

Commenting on postwar conditions, the steel corporation executives expressed no fear of competition from the light metals.

"We are not worrying about competition from light metals and plastics when the war ends," said Mr. Fairless. "Creating facilities does not create a market. We've had aluminum a long time. Just because more aluminum plants have been built does not mean aluminum will be a greater competitor of steel and we don't think it will."

With respect to scrap, Mr. Fairless said that up until the time of the coal strike scrap supplies were very comfortable but that the coal strike had changed the picture very radically.

#### Chicago Consumers Asked To Draw on Inventories

Steel consumers in the Chicago district were asked on July 2 to "share the steel" by drawing upon their inventories to the lowest practical working level before asking mills to supply them with more steel. The campaign was initiated by WPB officials at a luncheon meeting at the LaSalle hotel.

The Chicago district, including five counties in Illinois and five in Indiana, is being asked to provide 290,000 tons of steel.

Charles Halcomb, WPB Steel Division, stated steel producers had accumulated backlogs of orders of from 8 to 15 months.

A 7,000,000 ton shortage threatens, according to Mr. Halcomb, with 23,500,-000 tons of carbon and alloy steel having been asked for.

#### STEEL INGOT STATISTICS

								Calculated	
	weekly	Num-							
- Den Hearth - Bessemer -			Electric		—Total—		produc-	ber	
	Per cent		Per cent		Per cent		Per cent	tion, all	of
Net	of	Net	of	Net	of	Net	of	companies	weeks
tons	capac.	tons	capac.	tons	capac.	tons	capac.	Net tons	in mo.

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

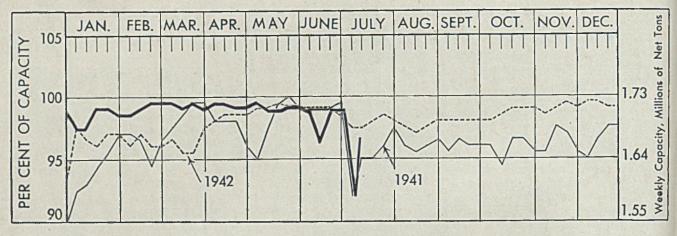
1943										
Jan.	6.576.589	97.8	478.058	85.9	369.395	95.4	7,424,042	96.8	1.675,856	4.43
Feb.	6.033.674	99.3	447.843	89.1	344,532	98.6	6,826,049	98.5	1,706,512	4.00
March	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
1st qtr	19,395,558	99.3	1,429,574	88.4	1.095,146	97.5	21,920,278	98.4	1,704,532	12.86
April	6.509.812	99.9	481.810	89.4	382.532	102.1	7.374.154	99.3	1,718,917	4.29
May	6.664.298	99.1	483.024	86.8	398,057	102.9	7,545,379	98.4	1,703,246	4,43
June	6,188,857	95.0	453,399	84.1	384,645	102.6	7,027,101	94.6	1,638,019	4.29
2nd qtr	19,362,967	98.0	1,418,433	86.7	1,165,234	102.5	21,946,634	97.4	1,686,905	13.01
1st hlf	38,758,525	98.7	2,848,007	\$7.6	2,260,380	100.0	43,866,912	97.9	1,695,667	25.87

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

1942		301111								
Jan. Feb. March	6,322,215 5,785,918 6,572,930	95.3 96.6 99.0	490,874 453,549 493,191	86.0 88.0 86.4	299,017 273,068 325,990	94.2 95.2 102.7	7,112,106 6,512,535 7,392,111	94.5 95.9 98.2	1,605,442 1,628,134 1,668,648	4.43 4.00 4.43
1st qtr	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96,2	1,634,273	12.86
April May June	6,345,133 6,595,440 6,239,674	98.7 99.4 97.1	454,834 453,938 452,528	82.2 79.5 81.8	321,324 333,200 323,100	104.5 104.9 105.1	7,121,291 7,382,578 7,015,302	97.7 98.1 96.3	1,659,975 1,666,496 1,635,269	4.29 4.43 4.29
2nd qtr	19,180,247	98.4	1,361,300	81.2	977,624	104.8	21,519,171	97.4	1,654,049	13.01
1st hlf	37,861,310	97.7	2,798,914	83.9	1,875.699	101.1	42.535,923	96.8	1,644.218	25.87
July' Aug. Sept.	6,345,315 6,414,637 6,286,855	95.7 96.5 97.9	453,686 467,293 437,961	79.6 81.8 79.4	345,957 345,725 332,703	96.6 96.3 95.9	7,144,958 7,227,655 7,057,519	94.5 95.4 96.4	1,616,506 1,631,525 1,648,953	4.42 4.43 4.28
3rd qtr	19,046,807	96.7	1.358,940	80.3	1,024,385	96.3	21,430,132	95.4	1,632,150	13.13
9 mos.	56,908,117	97.3	4,157,854	82.7	2,900,084	99.4	63,966,055	96.3	1,640,155	39.00
Oct. Nov. Dec.	6,750,829 6,371,750 6,471,261	101.5 99.0 97.6	461,897 458,469 475,204	80.9 82.9 83.4	366,788 349,593 358,075	102.2 100.5 100.0	7,579,514 7,179,812 7,304,540	100.0 97.8 96.6	1,710,951 1,673,616 1,652,611	4.43 4.29 4.42
4th qtr	19,593,840	99.4	1,395,570	82.4	1.074,456	100.9	22,063,866	98.2	1,679,137	13.14
2nd hlf	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96,8	1,655,653	26.27
Total	76,501,957	97.9	5,553,424	82.6	3,974,540	99.8	86,029,921	96.8	1.649,979	52.14

The percentages of capacity operated in the first 6 months of 1942 are calculated on weekly capacities of 1,498.029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698.622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Besinning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

The percentages of capacity operated in 1943 are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons. The percentages of capacity operated in the first 6 months of 1942 are calculated on weekly



#### STEEL INGOT PRODUCTION BY MONTHS

					Net Tor	s, 000 omit	ted					
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545						****	
1942	7,112	6,512	7,392	7,122	7,382	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150
					PIG IRON	PRODUCT	TION					
1943	5,194	4,766	5,314	5,035	5,178							
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

#### First Half Record

# 43,866,912 tons of steel produced despite effects of stoppages in coal mines

DESPITE drastic cuts in steel production over the past few weeks output for first half established a new record, according to the American Iron and Steel Institute. Total for the first six months was 43,866,912 net tons, compared with 42,535,923 tons in the corresponding 1942 period. Second quarter output also exceeded that of the similar period last year, 21,946,634 tons, compared with 21,519,171 tons.

June production totaled 7,027,101 tons, against 7,545,379 tons in May and 7,015,302 tons in June, 1942. Last month's tonnage was the smallest since June of last year, with the exception of February, when output was 6,826,049 tons.

For first half this year the industry operated at 97.9 per cent of capacity, in June 94.6 per cent. This is the lowest rate of production since July, 1942, when it was at the same rate.

# Lend-Lease Redistributing 250,000 Tons of Steel

Redistribution of 250,000 tons of finished and semifinished steel products originally intended for Russia, is being handled by the Lend-Lease Administration through a unit especially established for making war use of materials no longer needed under lend-lease. The steel products became available for

#### DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended		San	
	July 10	Change	1942	1941
Pittsburgh	. 97	+20.5	95	99.5
Chicago	98.5	None	101.5	100.5
Eastern Pa	. 93	None	96	97
Youngstown	9.1	None	95	98
Wheeling	. 87	+1	77.5	91
Cleveland	92.5	+2.5	95	96.5
Buffalo	. 90	-2.5	90.5	93
Birmingham	. 95	None	95	90
New England	95	+2	92	90
Cincinnati	. 89	-3	92	88
St. Louis	. 95	None	95.5	98
Detroit	92	None	89	96
Average	. 97	+5	°97.5	°95.0

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

other use when Russian war needs changed. War materials other than steel also are involved.

#### Coal Strike Cuts Week's Steel Output 126,400 Tons

Steel castings and ingot output in the week beginning June 28 dropped 126,-400 tons under the previous week as a result of the coal strike the Steel Division, War Production Board, reported last week.

Estimated production for the week beginning June 28 was 1,563,700 tons compared with 1,690,100 tons the previous week.

Cut by mine strikes, coal production for the first half of 1943 was an estimated 1,729,000 tons less than for the same period in 1942, Solid Fuels Administrator Harold L. Ickes said in studying its effect on the war effort.

#### Ingot Rate 97%

#### Nearly all ground lost previous week regained. All Chicago blast furnaces blowing

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week recovered nearly all the ground lost in the prior period when the coal stoppage cut blast furnace and open hearth operations severely.

The rate rebounded 5 points to 97 per cent of capacity, slightly below the 98½ per cent in the week ending June 26.

Four districts led by Pittsburgh, registered gains, two declined slightly and six were unchanged.

One year ago the rate was 97½ per cent; two years ago it was 95 per cent, both based on capacities as of those dates.

All blast furnaces in the Chicago district are active, Carnegie-Illinois Steel Corp. having lighted its rebuilt Gary No. 7 stack, July 3. Capacity has been enlarged to 1341 tons per day, nearly twice its former rating. This is the first time since June, 1942, all stacks have been blowing.

#### June Plate Production Lowest Since November

June plate production totaled 1,056; 085 tons, lowest since last November, according to the War Production Board. This compares with 1,114,920 tons is May, and an all-time record of 1,167,679 tons reported during March of the year by producers.

# Regulation No. 6 Provides Uniform Method To Obtain Building Supplies

Basic allotment procedure similar to that under Regulation No. 1... Class B products not covered... Does not eliminate necessity of applying for authorization under terms of War Production Board order L-41

CMP REGULATION No. 6 has been issued by the War Production Board, bringing materials for construction and facilities under the Controlled Materials Plan. It provides a uniform method which may be used to obtain materials.

It does not eliminate the necessity for obtaining authorization to construct under terms of order L-41.

For purposes of the regulation, construction includes reconstruction, restoration or remodeling of any structure or project or any extension or alterations of such project. Facilities are machinery or equipment acquired in connection with construction.

#### Allotment Procedure

Controls over construction materials under CMP regulation No. 6 are similar to those exercised over production materials under CMP regulation No. 1. The basic allotment procedure is similar, although in instances where regional WPB offices authorize small projects purchase authority may be granted for any period necessary rather than for a full quarter.

Claimant agencies will be able to make advance allotments to prime consumers within specified limits. Prime consumers who receive allotments for advance quarters may make allotments to their suppliers for advance quarters. The same holds true in the case of secondary consumers. However, no consumer of controlled materials may make an allotment before he receives his own allotment

Prime consumers are persons who receive allotments of controlled materials from a claimant agency. In most cases the prime consumer is the person who is to own the structure or project, and not the general contractor. Exceptions are as follows: Where the structure is to be owned by the Army or Navy, the person who contracts with the Army and Navy for the construction is the prime consumer; if the project is a foreign project, the person holding the export license for the materials required is the prime consumer; in the case of projects financed by Defense Plant Corp., the prime consumer is the person designated as such by DPC.

Manufacturers producing Class A products off the site of construction may ob-

tain their materials through the allotment procedures under this regulation but their use of allotments is governed by CMP regulation No. 1. Controlled materials for the manufacture of Class B products are not obtained under CMP regulation No. 6.

Applications for allotments of controlled materials are filed by prime consumers on various forms as listed in Exhibit A attached to the regulation. Most important among these is WPB-617, formerly PD-200. Under no circumstances are persons seeking materials and authorization to construct permitted to file form PD-200, which WPB-617 replaces. In addition, a request for an amendment to an approved application must be submitted on the new WPB-1548 form which supersedes PD-200B.

Consumers of controlled materials in construction may require their suppliers



JOHN T. WHITING

HEADS STEEL DIVISION:—John T. Whiting, president of Alan Wood Steel Co., Conshohocken, Pa., has been appointed director of the Steel Division, War Production Board, succeeding H. G. Batcheller who recently was named operations vice chairman of WPB. Mr. Whiting had been deputy director of the Steel Division since May 26.

to furnish them with applications for allotments on form CMP-4A, covering the requirements for the products or parts to be supplied. In no case may a consumer include requirements for Class B products in applications for controlled materials needed for construction.

In cases where maintenance or repair work is being performed as part of a construction job for which authorization to begin construction is required under L-41, controlled materials for the maintenance or repair must be included in the prime consumer's application. Materials needed for maintenance or repair of this type may not be obtained under CMP regulations Nos. 5 or 5A, if the cost is in excess of the limits established under L-41, unless specific authorization to do so has been granted by WPB.

However, if maintenance or repair work or a minor capital addition is of a character not requiring specific authorization under L-41, necessary materials may be obtained under CMP regulations Nos. 5 or 5A.

#### WPB Prescribes Forms

Consumers may make allotments of controlled materials on WPB forms prescribed for that purpose. Suppliers must make allotments of controlled materials in the forms and shapes which have been allotted to them and only in those forms.

The regulation includes an alternative form of allotment under which a prime consumer may make simultaneous direct allotments to all secondary consumers in the production chain, regardless of their remoteness from the prime consumer.

Specific limitations on the use of allotments are spelled out in the regulation as follows:

A consumer may not make an allotment in advance of receiving his own allotment; a consumer may not place orders and allot a greater total of controlled materials than have been allotted to him; allotments under CMP regulation No. 6 may neither be made nor received for the production of Class B products; allotments must be used to get materials for the construction for which the allotment was made or to replenish inventory, within the limits established by CMP regulation No. 2.

Consumers may combine in a single allotment to a supplier the controlled materials requirements for several construction jobs which are identified by the same major program number of a particular claimant agency.

The regulation spells out in detail procedures to be followed where, for any reason, changes in allotments are necessary.

Exemption from the usual allotment (Please turn to Page 172)

# WINDOWS of WASHINGTON

#### AFL in Ascendancy

IN INFORMED quarters the action of Congress in prohibiting the National Labor Relations Board from invalidating labor union contracts which have been in effect for more than three months marks the beginning of a period with the American Federation of Labor in the ascendancy insofar as treatment of labor by the government is concerned.

According to AFL, the NLRB has been concerned mainly, since it first was organized, with the welfare of the Congress of Industrial Organizations. When the CIO launched its drive to have the AFL contracts with Kaiser shipyards on the West Coast ruled illegal it proved the straw that broke the camel's back. AFL conducted a very effective lobby in its defensive fight, pointed out that its membership was much greater than that of CIO, and claimed that its war record was better.

Another angle that counted with a Congress which is increasingly determined to keep the administration within bounds was the degree to which the administration had encouraged the CIO ever since its formation. Tide has swung to the side of labor leaders regarded as "more conservative."

#### Widely Read

Dynamics of Industry, published by Harper & Bros. in 1942, is being more widely read by industrialists who are thinking about the postwar economy and who are anxious to contribute toward widespread employment in that period.

Written by two CIO leaders, Clinton S. Golden and H. J. Ruttenberg, the book goes into detail in explaining that the welfare of labor must rest on a prosperous industry.

#### Swing Toward Sales Tax

Despite AFL, CIO and administration opposition to a federal retail sales tax, observers see in process of development in the House Ways and Means Committee a swing toward legislating such a tax. Members of the committee have figured that a 10 per cent sales tax, to apply to sales of all goods including food, would bring some \$5,000,000,000 additional revenue and would help the fight against inflation.

Whether they will act on the Treasury Department's recommendation that income taxes on corporations and on individuals in the medium and high-income groups be increased so as to garner another \$3,000,000,000 remains to be seen but a number of the committee members are inclined to feel that income taxes—as well as taxes on gifts and inheritances

—are pretty close to the limit. There is decided opposition to the Treasury Department's "spending" tax in which the first \$1000 or \$1500 of income would be exempted, with a levy of 10 per cent on the next \$1000 and with progressively higher taxes on larger income. There appears to be considerable opposition to the suggestion that tax exempt state and municipal securities be made taxable, also to the idea of further big increases in taxes on wines, liquor, tobacco and some other items. Support for a "community property" provision does not appear warm.

#### PEAK BRITISH OUTPUT

Great Britain's output of iron and steel ingots last year reached a new high mark, despite all difficulties, according to John Brown, general secretary of the Iron and Steel Federation. He was not permitted by war regulations to release the figures.

Mr. Brown also announced that the victory in North Africa has made available extensive supplies of iron ore for shipment to the United Kingdom. Before the war British imports of ore from Algeria and Tunisia amounted to about 2,000,000 tons annually.

#### Ore Near Pittsburgh

The Bureau of Mines is toying with the idea of having roadbuilding contractors mine iron ore in a deposit some 100 miles East of Pittsburgh. The ore is on the surface and could be scooped up with equipment the contractors have on hand. Optimistic estimates are that some 64,000 tons could be dug per day of which, after washing out the clay in wooden washers, about 16,000 tons would be iron ore of satisfactory quality.

This proposition is one of many the Bureau of Mines has on its agenda but which it has been unable to investigate fully due to the uncertainty over the amount of the appropriation it would get from Congress.

#### Would Aid Early Start?

Possibilities of holding ore boats at upper lake ports over the 1943-1944 winter are under consideration. Purpose is to load boats and send them down the lakes a few days earlier, when navigation opens in 1944. The difficulty is that facilities and services for laying up boats are at the lower lake ports.

#### **NE Steels Gaining**

The Navy Department has made considerable progress in substituting NE (National Emergency) steels for high alloy steels it formerly demanded. It has found that procurement is facilitated by the use of the chromium-nickel-molybdenum types inasmuch as the mills have encountered increasing difficulty in producing the single or binary alloy steels.

Most diesel engine and marine engine parts now are being made of NE steels. Some anchor chain is being made of such material. In Navy Ordnance many torpedo parts and some gun components are being made of NE steels. Many components for Ships, Ordnance, Coast Guard, Marine Corps and other bureaus are now largely made of NE steels.

The greater portion of tonnage in large ship forgings and heavy ordnance, however, will not lend itself to NE steels.

Right now emphasis is on experiments by steel producers and ordnance producers with various analyses that will make it easier for the steel producers to utilize chromium-nickel-molybdenum scrap.

#### Must Do Something

More and more Republican members of Congress are criticizing the contract renegotiation setup on the ground that no thought is given in renegotiation to set up reserves for reconversion of industry after the war. Unless the law is revised to take care of this angle it is sure to be one of the 1944 campaign issues. It will tie in with the argument that something has to be done now to provide for large employment after the war.

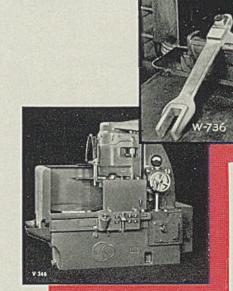
#### **Electronics Magic**

Most specialists in the field of electronics are tied in with the war effort and under military censorship are not permitted to discuss in detail what they are doing. Enough information is obtainable, however, to make it certain that wartime progress in this field will have repercussions in many peacetime industries. For instance, smaller and more efficient tubes have been developed; it seems likely therefore, that manufacturers of radio receiving sets will design their future products around the new tubes. also that manufacturers of other types of products using tubes will do the same. Electronics experts also believe that electronic "scanning" will be widely used in numerous industries, with the result that they will produce more efficiently products of better quality and greater uniformity.

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Grinding cast iron slide lifting levers on the Blanchard No. 18 Surface Grinder.

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Close Limits

A the Blanchard No. 18 on account of the projecting boss. The problem was solved simply enough. The lever is laid on the chuck so that the boss goes through the hole in the center of the chuck. The outer surface, which is lower than the inner surface, is ground. The wheel is then raised, the chuck moved in, and the inner surface is ground. The lever is then turned over and a .290" size block is placed under the ground forked end to make it level with the other end, and both surfaces are finished.

 $\frac{3}{16}$ " of stock is ground off each side to limits of  $\pm .002$ ". 8 pieces (16 surfaces) are ground per hour.

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# Tool Builders' Position Analyzed In Statement to House Committee

Peculiar problems to be confronted in postwar period by the industry taken into consideration by War Department Price Adjustment Board in developing policy. . . Excessive profits held shown by the record

AFTER thorough study of the problem, the War Department Price Adjustment Board has concluded the machine tool industry will face peculiar problems of demand in the postwar period, but at the same time the evidence points to the fact the industry is realizing excessive profits from its current production for war.

This was testimony offered by Herbert J. Taylor, vice chairman, of the board in a statement regarding machine tool industry profits, read recently before the House Naval Affairs Investigating Committee which has been looking into renegotiation of contracts.

Mr. Taylor pointed out in his statement that a number of machine tool contractors have made the claim that, in view of the particular and peculiar factors surrounding the operations of their industry, it has not realized excessive profits and should therefore be exempt from renegotiation.

"These machine tool contractors," he said, "base their contention that their current profits are not excessive on the fact that the war has forced an enormous expansion in output of machine tools to such an extent that the industry is now producing 'ten years normal output in one year' and has provided such an enormous inventory of machine tools in the hands of American industry that demand for new tools will, in the near future, become almost non-existent as a result of this saturation.

"An examination of the machine tool industry serves to indicate that the four years, 1936 through 1939, were years of good business for this industry and may justifiably be used in comparing peacetime and war profits.

"We have figures covering operations for a number of years on nineteen companies which do approximately 40 per cent of the machine tool volume. In 1942, sales of these nineteen companies amounted to \$535,900,000, an expansion of almost eight times average annual sales in the 1936-39 base period, which amounted to \$67,700,000. Profits before income taxes amounted to \$172,500,000 in 1942, an expansion of more than sixteen times the average annual profits in the base period which amounted to

\$10,500,000. It is interesting to note that the rate of profits per dollar of sales increased from 15.6 per cent in the base period to 32.2 per cent in 1942.

"It is true that the high tax rates in force during 1942 substantially reduced the earnings available to stockholders. However, net earnings after all income taxes for the nineteen companies amounted to \$45,500,000 in 1942, an expansion of five and one-half times the average annual net income after taxes of \$8,200,000 earned by the same companies in the base period. These

#### THE OTHER SIDE

Recent testimony at the hearing by the House Naval Affairs Committee on the subject of contract renegotiation brought out sharply opposing views. In STEEL, page 91, July 5 issue, the opinions of two leading machine tool builders were presented. In the accompanying article the position of the War Department Price Adjustment Board is given. — The Editors.

nineteen companies had total net worth at the beginning of 1942 of \$103,900,-000. Thus, we see that profits before income taxes amounted to 166 per cent of net worth, and profits after income taxes amounted to 44 per cent of the net worth of these companies at the beginning of the year. That this rate of profits to net worth, despite heavy taxes, is far above the average is indicated by a compilation by the National City Bank of the net profits of 1336 manufacturing companies which show 1942 profits after income taxes of only 10.1 per cent of their net worth at the beginning of the year. Thus, net profits after all taxes for the machine tool industry were more than four times higher in relation to net worth than existed for a broad sample of American industry.

"The depression period for the machine tool industry (as evidenced by losses from operation) covered the fiveyear period 1930-34 inclusive. The next five years, 1935-39, represented favorable business for this industry, and the following three years (1940-42) were a period of extremely active war production.

"It is interesting to note that during the worst depression in history the machine tool industry, as reflected by these nineteen companies, suffered operating losses of \$17,900,000, and these losses together with nonoperating losses and dividends paid exhausted \$38,300,000 of the invested capital at the beginning of this depression period. In sharp contrast to this picture is the experience of the last three years during which these representative nineteen companies earned \$100,700,000 after all taxes, which is more than their entire invested capital at the beginning of the great depression of the 30's.

"During the last three years alone, despite heavy taxes and despite the disbursement of dividends which appear liberal, the industry was able to more than double its net worth at the beginning of the emergency war period.

"The machine tool industry was the first industry to receive an impetus from the defense program which began in 1940.

"A comparison of balance sheets at the end of 1939 and at the end of 1942 indicates that net working capital expanded from \$35,500,000 to \$57,100,000, an increase of \$21,600,000. In addition, these companies have \$12,600,000 of postwar tax credit which will become liquid funds in the period after the cessation of hostilities. The combination net working capital and the postwar credit now amounts to \$69,700,000 and compares with net working capital of only \$41,000,000 at the end of 1929. A net sum of \$15,500,000 has been invested in plants since the beginning of 1940 and \$27,500,000 in miscellaneous

"It is true that peak demand for machine tools appears to have been reached. The National Machine Tool Builders Association estimates sales in 1943 will decline to \$1,000,000,000 from \$1,300,000,000 reached in 1942.

"We have discussed the outlook of machine tool sales with members of the production department of the Army who have expressed the opinion that sales will not decline below \$500,000,000 in 1944 and will continue at that annual rate as long as the war lasts. Prior to 1940 sales of the industry had never exceeded \$200,000,000, with the exception of one year during the last war.

"Although shipments will decline in 1943 and 1944, it would appear sales for the duration will be more than two times any prewar experience of the industry. The major reasons we are inclined to ac-

cept this estimate of minimum volume of \$500,000,000 are:

"1. The tremendous demand for machine tools by our Allies, England, Russia, China and the others.

"2. The development of more efficient machines which make obsolete large numbers of machine tools currently being used for war production, and, in view of the manpower shortage, it is believed that the production policy of the War Department will require replacement of these older machines; and

"3. The usefulness of the machine tool industry's plants and skilled labor as a

"2. It is true total production during the current war period far exceeds anything in the past, but it must be remembered that machine tools are being used harder by industry than at any time in the past.

"3. A very considerable part of the production of machine tools in recent years has been exported to foreign countries for use in war industry, and consequently, does not saturate domestic demand.

"4. The industry has proven that it can develop new and more efficient machinery which makes obsolete many of not disturbed or considered during the conduct of renegotiation. Sales not subject to renegotiation were composed almost entirely of sales to Defense Plant Corp. and sales on which delivery and payment had been completed prior to April 28, 1942. If this ratio were to hold good for the entire industry on 1942 volume, less than one-half the estimated sales of \$1,300,000,000 in 1942 are subject to renegotiation. Thus, about \$600,000,000 of sales in 1942 are not subject to renegotiation and this compares to total sales of only \$200,000,000 in the best prewar years. As a consequence, the industry may be able to earn more money than at any time during peace-time from its 1942 non-renegotiable business alone.

"Because of its postwar saturation problems, the machine tool industry has received special consideration in renegotiation.

"In conducting renegotiations, the War Department has taken into consideration all the factors surrounding the operations of the industry. The highlights of our approach, together with the evaluation of the factors have been as follows:

"1. The production record of the industry has been outstanding and due credit has been given for this factor.

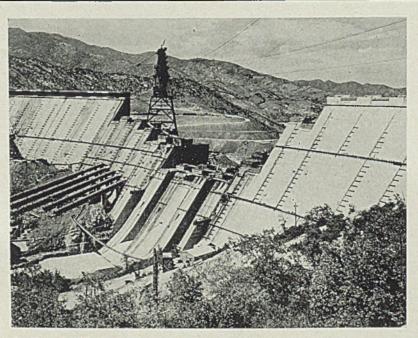
"2. The creative record of the industry in terms of creating efficient machinery has been among the best in American industry and due consideration has been given for this factor.

"3. On the question of price of its products, the machine tool industry does not compare favorably with some industries which have aggressively pursued the policy of reducing prices as costs decline.

"4. In achieving the enormous expansion in volume, the industry has used substantial amounts of government assistance both in terms of plants furnished by the government and working capital advances. In this connection, the machine tool industry stands about mid-way of American industry as many industries have received more government assistance and many have received less.

"5. In connection with risks, the machine tool industry has probably the outstanding risk of saturation of any industry. On the other hand, the industry does not face problems of conversion of plant operations from munitions to peacetime products.

"The machine tool industry has a very high rate of net profit to sales before taxes. The machine tool industry has been left after renegotiation with profits higher in relation to sales than most other industries, which is a reflection of the peculiar problems of the industry."



SACRAMENTO HARNESSED: Shasta Dam, the giant concrete structure that will transform the raging Sacramento river into a docile waterway, now is in the final phase of mass concrete placement. Started in July, 1940, a 900-foot section of the right abutment, upper left, is complete to roadway and sidewalk level. Less than a million yards of concrete remain to be added to the entire dam. NEA photo

subcontractor on munitions, which is a field which has yet to be tapped by the machine tool builders.

"It is the period after the war which worries the more realistic members of the machine tool industry. No one can accurately forecast industrial conditions in general, or conditions in the machine tool industry in particular, during the postwar period.

"However, one must keep in mind several factors:

"1. During the last war, the machine tool industry created a considerable backlog of machines. Examination of the record indicates that in only one year in the ten years following the war, namely the depression year of 1921, did sales by the industry fail to exceed the highest level in prewar years.

the machines it has produced in recent years.

"5. Many tools produced during recent years by the industry are specialized for production of armament articles only and have no adaptation to peace-time industry.

"The above factors have been cited not in an effort to refute the claims of the machine tool industry that saturation is a real problem, but merely to try to appraise how much saturation may well affect sales of this industry. We feel there is ample evidence to indicate the machine tool industry will have a considerable volume of sales in the postwar period.

"The industry had in 1942 a large amount of profits from sales not subject to renegotiation and these profits were

### 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

PREFERENCE RATINGS: Form PD-3A, preference rating instrument used by the Army, Navy, Marrime Commission and other government agencies, will remain in use, although originally the expiration date was June 30.

ALLOTMENT NUMBERS: One allotment number may be substituted for another allotment number on an authorized controlled material order which has been placed with a mill, without changing the position of the order in the mill schedule, War Production Board rules. In such a case, the order will be treated as though it bore the substituted allotment number when order was placed originally, according to interpretation No. 10 to CMP regulation No. 1.

If at the time the allotment symbol is substituted the order itself is otherwise materially changed, the order is to be treated as a new order. Changes which would constitute a new order include the following: (1) A change in the form or shape of the product ordered; (2) advancing of the delivery date; (3) an increase in the quantity ordered. A person substituting one allotment number for another must have an allotment, identified by the substituted number, to support the order.

ELECTRICAL SUPPLIES: All rated orders for wire and cable are now invalid unless they are accompanied by an allotment of materials under CMP. However, CMP provides for procurement of certain warehouse replacement stocks which was not affected by the June 30 cancellation date and can be obtained without the use of allotment numbers. Manufacturers have been directed to set aside certain percentages of their production capacity for warehouse replacements.

GAGE RODS: Beginning with fourth quarter, the following items will be classified as "B" products and will be under the jurisdiction of the WPB industry divisions indicated below: Gage rods and rail clips, Transportation Equipment Division; nut locks and clip bolts, Building and Materials Division; mine ties, Mining Equipment Division.

Producers of these products should file application for allotment forms CMP-4-B with the industry divisions indicated, setting forth their controlled materials requirements for the fourth quarter of 1943 and the first and second quarter of 1944. Such applications should be submitted at the earliest possible date.

#### L ORDERS

CUTLERY: Production of the following types of cutlery will be permitted at the fol-lowing levels, based on amount produced in year ended June 30, 1941: Professional food 225%; professional kitchen, 75%; household kitchen, 35%; household table, 50%; pocket. 60%: scissors. 65%; shears and trimmers. 65%; large heavy-duty hand hair and fetlock clippers. 45%; light weight hand hair clippers. 25%, for export only; industrial, 200%. Silver-plated flatware, surgical instruments, and articles subject to order L-30-d (Miscellaneous Cooking Utensils) are exempt. Bans use of metal in production of hunting knives, carving sets, poultry shears, and manicuring Reduces numbers of patterns within ments. permitted lines. Imposes restrictions on lengths of blades of some knives and minimum specifications are prescribed for hardness of knife blades and sharpening steels. Prohibits processing of metal for production of cutlery included for free distribution or in connection with advertising or sales promotion. (L-140-a)

IRON BOILERS: Manufacture of low pres-

sure cast iron builers is now permitted on a month-to-month basis at a rate not in excess of 100 per cent of productive rate of the corresponding month in 1940. Manufacture of such boilers after July 1 had been prohibited under the original order. Filing of PD-704 is required for military, war housing and hospital use of low pressure boilers. (L-187)

MACHINERY: Restrictions on deliveries of certain items of construction machinery for civilian use have been eased slightly. Post hole diggers, hand carried concrete surfacing machines and "finishers and rodding machines for

### INDEX OF ORDER REVISIONS

Subject	Designation
Abrasives	M-319
Cutlery	
	L-187
Boilers, Power	
Farm Supplies M-5	330, PR No. 19
Imports	M-63
Machinery	
Shipways	P-14-a. b
Vacuum Cleaners	L-222

#### Price Regulations

Core Bind	e	r									GN	IPR
Fluorspar											No.	126
Machines												
Stoves											No.	64

wet concrete" have been made available for civilian as well as military use. (L-192)

VACUUM CLEANERS: No applications for permission to fabricate or assemble industrial vacuum cleaners or blowers will be approved in the future unless accompanied by an order rated AA-5 or higher or unless the applicant indicates a need for the machine justifying such a rating. Rug scrubbing and rug shampooing machines have been brought under control of Rug scrubbing and rug shampooing L-222. Any authorization issued on PD-418 for production or sale of machinery covered by the order must have been approved prior to July 6 to be valid. Restrictions on floor sanding and floor maintenance machines are tightened by requiring WPB authorization for sale or manufacture of such machines made in smaller than those heretofore specified (L-222)

POWER BOILERS: Conservation of the use of steel in manufacture of heavy duty steam boilers is ordered in L-299 which provides that power boilers, except those for locomotives or marine service, may not have a greater metal thickness or quantity of steel than needed to meet the minimum thickness requirements of the American Society of Mechanical Engineers Boiler Construction code. Boilers affected are those for a design pressure exceeding 15 lb. per square inch. Restrictions do not apply to boilers in process on July 1 or those into which a tube is rolled. (L-299)

#### M ORDERS

IMPORTS: Articles containing 25% or more of copper, brass or bronze not elsewhere specified in general imports order M-63, have been added to List II, made up of commodities whose importation must be authorized but whose distribution after arrival is not restricted. Removed from this list are other finished manufactures made from these metals, save those plated with

platinum, gold or silver. (M-63)

ABRASIVES: Following changes have been made in the order controlling supply of manufactured crude abrasive and abrasive grain: Unfused or levigated alumina are excluded from provisions of the order; orders for crude or grain authorized on form WPB 2779 or WPB 2781 must be accepted and delivered if they meet regularly established prices and terms; sequence of deliveries of these orders and of small grain orders not specifically authorized on a WPB 2781, may be scheduled now without regard to preference ratings in the order best suited to maximum production and customers' needs: requirement of a preference rating for "small grain orders" has been eliminated; use of aluminum oxide grain in grit sizes 80 and coarser is prohibited for certain purposes, including blasting or polishing operations for all stone or monumental work, lithographic plate grinding, glass grinding, hulling operations, and non-slip purposes. (M-319)

FARM SUPPLIES: If a distributor's orders from farm distribution outlets for any listed item calls for deliveries in excess of the amount ordered set aside, he may prorate deliveries on the basis of normal shipments regardless of preference ratings (other than AAA). (M-330)

#### P ORDERS

SHIPWAYS: Revocation of orders giving Maritime Commission shipyards preference ratings in buying materials for construction of shipyards and other facilities has been deferred until Aug. 1. On revocation of the orders, priority assistance will be applied for on form WPB-617, formerly PD-200. (P-14-a, b)

#### PRIORITIES REGULATIONS

FARM SUPPLIES: Farmers' cooperatives and any other dealers who sell listed farm supplies at cost or at a markup of not more than 3 per cent, are permitted to replenish stocks on farmers' certificates on a dollar-for-dollar basis. The last date on which a dealer may place an order for farm supplies in anticipation of the receipt of farmers' certificates to cover the amount of his order has been post-poned from July 1 to July 17. (PR No. 19)

#### PRICE REGULATIONS

CORE BINDER: Core-binder, a corn product used in the metal industries because of its adhesive qualities, has been exempted from price control, effective July 10. (General Maximum Price Regulation)

STOVES: Deliveries on contracts or sale made after July 1 of canteen model-1942 and cooking stoves (gasoline, one burner) model 1941 to the armed forces will be subject to price control; deliveries pursuant to contract entered into before that date remain exempt Exemption from price control of all sales to the United States or an allied government of specified articles has been extended to Oct. I. 1943. (No. 64)

FLUORSPAR: General increases of about 55 a ton in maximum prices for all grades of fluor spar, effective July 1, have been authorized Metallurgical grades have a ceiling of \$30 m \$33 a ton, depending upon the grade sold These new prices are to be effective only for a period of 60 days, after which prices grades with an effective calcium fluoride con tent in excess of 60% may be charged on sales approved by WPB. New ceiling price for acid and ceramic grades are \$37 a ton with adjustments for freight differentials. OFA reserves the right to revoke the \$1.50 portion of the incomment of the incomment. the increase granted to encourage production if it appears new development is not being couraged in the degree necessary. Crude fluorspar ores are exempted. Toll agreements for grinding, milling, or other processing of cruer ores are also exempt from price control (No. 126)

MACHINES: Industrial floor surfacing and floor maintenance machinery is now listed specifically as an item covered by price regulation. 136. (No. 136)

# Several Technical Changes Made In Orders Affecting Steel Industry

SEVERAL technical changes in regulations and orders affecting the steel industry were announced by the War Production Board within the past ten days. These actions are as follows:

1—Order M-21-c, which schedules steel plate production, was revoked, its function now being supplanted by the Controlled Materials Plan.

2—Order M-21-d, covering corrosion and heat resistant chrome steel, was amended to permit the use of stainless steel on authorized controlled material orders. Previously, use of stainless steel was permitted only on AA-5 or higher rated orders.

3—An interpretation of priorities regulation No. 1 makes it clear that production directives are not to be interfered with by rated orders for the use of facilities.

4—Steel mills may not establish consigned stocks in the plants of their customers under the permission granted in direction 15 to CMP regulation No. 1 for the maintenance of mill stocks. This is stipulated in an amendment to the direction, issued because the original direction has been too broadly interpreted by certain mills.

5—Because of restrictions on shipping, customers ordering steel for export often are unable to furnish delivery instructions at the time orders are placed. Therefore, the requirement that full delivery details be furnished when export orders are placed is waived in the case of Lend-Lease and Board of Economic Warfare orders by direction No. 20 to CMP regulation No. 1.

6—Order M-24-c, has been re-issued, requiring full segregation of alloy steel scrap. Categories covering recently developed alloy steels and irons have been revised. Steel mills and foundries have been asked to initiate at once a continuing survey of receipts of scrap, particularly carbon and alloy turnings, and to report any incorrectly classified receipts, including the car number, shipper, date, and analysis to the Scrap Section of the Steel Division. The revised order specifically prohibits use of any type of scrap listed in the melting of any but alloy steel or iron.

#### Warning Issued Against Illegal Use of Solder

War Production Board has issued a warning against the illegal use of solder in the automotive repair industry. The board revealed that it has uncovered

many cases in which solder has been used as body filler and for other purposes under the guise of radiator solder.

Almost all radiator repair work is done with one-eighth inch solid wire, acid or rosin core solder, and any supplier receiving orders for solder in other forms is cautioned to exercise utmost care in scrutinizing such orders to ascertain that the material is to be used for the purposes specified and for no other.

#### Seeks Storage Protection Of Critical War Materials

War Production Board with co-operation of other government agencies is taking active steps to assure adequate storage protection of all critical war supplies. As part of the program, the Storage Branch of WPB's Stockpiling and Transportation Division has issued general specifications for the storage of all scarce materials. Specific instructions are being prepared for the storage protection of certain materials which present special problems.

Total of the nation's storage remains fairly constant. With some few additions and some losses by fire, the number of warehouses will remain practically the same for the duration. Best possible use must be made of the floor space available.

For this reason, WPB's Storage Branch is setting up a comprehensive file listing the location of every large warehouse in the United States, showing the type of construction; amount of clear floor space; floor load capacity; alarm systems, sprinkler systems, water supply and other data of fire protection. Each of these warehouses will be checked as to its suitability for all materials on the must-be-protected-at-any-cost list.

It may become necessary to establish storage priorities to make certain that the most critical materials get the kind of protection they require.

#### Heavy Highway Truck Production Quotas Set

Production of 7500 heavy highway trucks and 241 off-the-highway automobile vehicles has been authorized by War Production Board for the third and fourth quarters.

The 14 companies which will produce the heavy highway trucks are:

Autocar Co., Ardmore, Pa.; Brock-

way Motor Truck Co., Cortland, N. Y.; Corbitt Co., Henderson, N. C.; Federal Motor Truck Co., Detroit; General Motors Truck & Coach, Pontiae, Mich.; Four Wheel Drive Auto Co., Clintonville, Wis.; International Harvester Co., Chicago; Kenworth Motor Truck Co., Seattle; Peterbilt Motors Co., Oakland, Calif.; Mack Mfg. Co., New York; Reo Motors Co., Lansing, Mich.; Sterling Motor Truck Co., Milwaukee; Walter Motor Truck Co., Long Island City, N. Y.; White Motor Co., Cleveland.

The 241 off-the-highway vehicles include trucks, truck tractors and trailers. They will be manufactured by Dart Truck Co., Kansas City, Missouri; Euclid Road Machinery Co., Cleveland; Kenworth Motor Truck Co., Seattle; Mack Mfg. Co., New York; and Peterbilt Motors Co., Oakland, Calif.

# Government Takes Action To Conserve Fluorspar

Fluorspar stocks have not been accumulating in sufficient quantity to insure a satisfactory margin against demands of the armed services and essential civilian requirements, the Fluorspar Section of the War Production Board announces. Therefore, every effort is being made to accelerate production and conserve supplies of this material. An increasingly improved position is anticipated for the remainder of this year, however.

The War Labor Board stabilized wages for the fluorspar industry, giving 1400 workers in the six major companies increases averaging 14 cents per hour. OPA has approved general increases of approximately \$5 a ton in maximum prices for all grades of fluorspar.

The importance of fluorspar in steel-making will be evident when it is realized that it requires about 6 pounds of spar to make 1 ton of steel. This means that to make 80,000,000 tons of steel, 240,000 tons of fluorspar are consumed. Approximately 7 pounds of acid fluorspar are needed to make 100 pounds of aluminum so that 10,000 tons of fluorspar must be provided during 1943 for this purpose.

Use of fluorspar in building warships and planes is as follows:

		Fluorspar
Type Ship	Displacement	Needed
Pattleship	45,000 tons	192 tons
Aircraft Carrier	27,000 "	149 "
Heavy Cruiser	13,400 "	67 "
Light Cruiser	10.000 "	52 "
Destroyer	2,200 "	17 "
Submarine	1,500 "	9 "
Type Plane		ar Needed

Type Plane	Fluorspar Needed
B-17	2,700 pounds
B-24	3,000 "
B-25	1,500 "
PB-2v	4.500 "
P-38	1.000 "
P-47	1,000 "

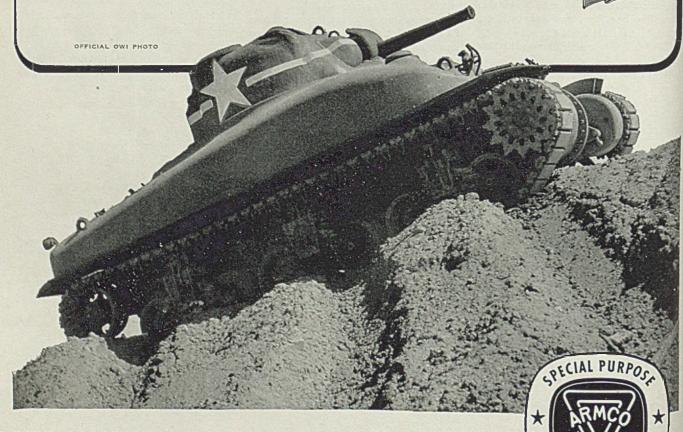
# This redesigned tank part saved 200 TONS of scarce metal

Little things do count. For example, this ball retainer ring for tanks was redesigned to save 200 tons of a scarce metal on one tank order!

The designer who perfected the part applied lessons learned in the mass production of roller skates, bicycles, and automobiles. Formerly the ball retainer ring was cast and machined from a critical metal. Now it is formed and punched from steel—all in one operation. Result: Enough metal saved to provide the rotating bands for 177,000 shells and this is just the beginning.

Almost every day some victory-minded engineer comes up with a new idea for the manufacture of war equipment. Peace-time products that might benefit from stampings are being redesigned too. The field is wide open for stampings that save weight, save time and machine hours.

Let us show you how ARMCO's special-purpose sheet steels can help you do the job you want. For complete information on coated and uncoated grades, write to The American Rolling Mill Co., 1411 Curtis St., Middletown, Ohio.



THE AMERICAN ROLLING MILL COMPANY

# MIRRORS of MOTORDOM

UAW postwar program envisages beneficent (to labor) and paternalistic government to lead all from cradle to grave over rose-strewn path. Provides for labor representation in all bureaucratic activities. . . New military truck program planned

"GOVERNMENT or municipal ownership and operation of monopolistic industries and of industries strategically necessary to the national safety"—that is one of the planks of a postwar program just devised by the executive committee of the United Automobile Workers-CIO.

The program is of interest because of the obvious state of wedded bliss existing between organized labor and the Roosevelt administration. Thus, when the union unfolds its grandiose plans for postwar industry in America, it is almost an automatic fact that they will have the blessing of the Roosevelt gang, and hence it becomes doubly important for industry to know the shape of such plans, for after all it may be the guinea pig on which strange new economic medicines will be tried.

Prefacing its plan with the usual statement introducing all postwar programs, to-wit: That the immediate and primary task is to plan and work for an early victory, the UAW goes on to cite what it calls a fundamental prerequisite to the formulation and execution of any democratic postwar plan-full representation and responsibility at all levels for organized labor. Labor must be permitted to participate fully in all activities and in all government agencies charged with any phase of the administration of the war effort. Labor of all nations must sit in responsible positions at the peace table and in treaty negotiations following victory. Labor must be represented at conferences held during the war dealing with postwar problems. Organized labor must be given representation now on the National Resources Planning Board and Congress should grant the board adequate appropriations to enable it to function as a permanent

If these "musts" are not enough, proceed into the union's plans for reconversion of industry. They include: Establishment of national industry-wide couneils with equal labor participation to work out reconversion schedules; maintenance of labor standards during the reconversion period against any attempt by industry to lengthen hours, reduce wages or lower living standards; legal protection to all workers who transfer from nonessential to essential war jobs so that they will be guaranteed the right to return to former jobs with accumulated seniority; reserve funds to be established by industry to pay out to its

present employes or those who have been inducted into the armed forces, during any postwar unemployment period; and full guarantees to all members of the armed forces covering such little things as a \$2500 separation bonus, a peacetime economy of full employment and full consumption, accumulated seniority on former jobs, free education including training for a trade or profession, weekly allowances to disabled veterans, etc.

#### Full-Blown Utopia

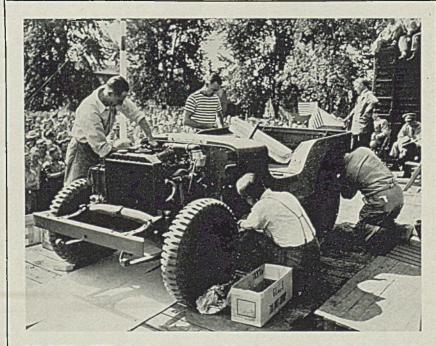
Next come proposals for achieving full employment after the war. First of these is the government ownership plan mentioned above. Then comes government control and regulation of industries to prevent the abuses of monopoly and to assure production in the public interest; a gigantic planned national construction program involving housing, schools, highways, hospitals, recreational facilities, conservation of natural resources and development of more power projects like TVA. On housing, the UAW recommends elimination of temporary war housing to prevent new slum areas and extension of the FHA

to permit development of planned workers' communities.

With a deprecating wave of the hand the UAW avers that "industries can no longer be operated to serve private interests where those interests conflict with the public need. Initiative can find its most useful outlet, greatest recognition and highest reward when exerted in the public service." Not only that, but the working week must be reduced to 30 hours without reduction of pay. Patent laws must not, on the one hand, permit industry to build monopolies nor, on the other hand, permit inventions to be withheld from use in order to preserve existing capital investments; they should be amended to provide that patents be subject to use by every industry upon payment of reasonable royalties.

The UAW is simply telling the world that it can think up a postwar dream world along with the best of our visionaries. Utopia, with a capital UAW, complete economic freedom, security and irresponsibility under a beneficent paternalism that will exude from Washington like honey over the land! All initiative and enterprise to be turned over to a federal bureaucracy which will lead everyone from the cradle to the grave down the rose-strewn path of life. Why not even a checkoff to deduct union dues from social security credits?

The UAW also disposes of the farm



150,000TH JEEP: On-the-spot assembly featured the completion of the 150,000th jeep body to come from the plant of the American Central Mfg. Corp., Connersville, Ind. A five-man crew from Willys-Overland, Toledo, O., for which American Central makes the jeep bodies, required just 18 minutes to bolt the body to chassis

problem with a few well-turned proposals:

- 1. Elimination of the farm tenant through government regulations of land ownership by absentee farmers and limiting of acreage holding, and extensive government purchase and reclamation of land now under absentee control for disposition among working farmers for home ownership under a "homestead act".
- 2. Guarantee of stability of farmers' income through stabilization of farm prices, with definite floors over extended periods.
- 3. Extension of adequate crop insurance against the hazards of crop failures, etc.
- 4. Government control of distribution of farm produce to avoid surpluses and shortages with participation by farmer co-operatives, both in policy making and distribution.
- 5. Economic use of farm machinery on community basis through government-encouraged pooling projects.

Then the health, education and security of the people must be supervised by this postwar supergovernment. Federal scholarships, complete with living costs, must be granted qualified students. Jobs must be guaranteed in line with courses of study. A new cabinet post of Secretary of Education and Health should be established. A federal social security program should be enacted which will provide adequate protection, from cradle to grave, for every person in America. And a federal insurance agency should be established which will sell to the people at cost, life and other basic insurance policies.

#### Heavy-Duty Truck Program

Industry circles report now in the formulative stages the most pretentious manufacturing program for heavy-duty military trucks ever conceived. All principal truck manufacturers will participate, along with the complete list of smaller builders. The vehicles will range in capacity from 2½-ton up to 10-ton and over, nearly all six-wheel jobs with six-wheel drive. Bulk of production is contemplated in a new 7-8 ton model class. Output is slated to start at the turn of the year if not sooner and will aim at something like 10,000 a month.

Power units may be standardized on three or four types of engines such as Hercules, a new Continental engine and a General Motors Truck unit.

Bottleneck of the program is likely to come in axles and transmissions, since there is only a limited number of companies equipped to build these units. Principal one, of course, is Timken-Detroit Axle, but facilities of companies like White Motor, Mack, Eaton Mfg.,



NO ABSENTEE: Eighty-four years old and with 32 years' service with Mack Trucks Inc., Plainfield, N. J., David A. "Dad" Teeter has been tardy only once. When his plant received the Army-Navy "E", Teeter accepted for employes

and Clark Equipment may be pressed into service, and it is possible that some plants formerly busy supplying components for combat tanks and now slowed down can be switched over to truck work.

The new heavy-duty truck program will be superposed on present production schedules, it is said, and reflects the increasing favor of the military for out-size hauling units which in some cases have proved more capable of negotiating rough terrain.

For the last six months of this year, the WPB has authorized the production of 7500 heavy trucks for civilian use, plus an undisclosed number of buses apportioned among a dozen or more manufacturers, virtually the same ones that will participate in the greatly expanded military truck program for 1944.

Letters of intent covering contracts for materials and facilities to produce 5-inch dual purpose gun mounts for the Navy have been received by Fisher Body in Detroit. The contract represents the second largest awarded by the Navy in this district and will be distributed among four plants in the Michigan area. The mount weighs 40,000 pounds complete, and in its manufacturing and assembly requires some of the heaviest equipment yet installed by Fisher. Subcontracts totaling 48 per cent of the dollar volume of the contract have already been awarded outside suppliers.

An example of the high quality of

workmanship required in the job is the requisite that all welders pass a thorough examination and officially qualify before special naval officers before being assigned to the project. Welded sections are 100 per cent magnafluxed, and the average time consumed in inspection of a complete mount is three weeks. Delivery of the first unit is expected sometime this fall.

Another precision manufacturing job under way here for some time is the Sperry antiaircraft gun director, on which Ford is a principal contractor. There are over 12,000 parts in the director, and a highly involved system of gaging and inspection has been developed. The company was commissioned to build the directors in October, 1941, and will shortly reach production schedules assigned, although output in May matched that of the Sperry company.

Brig. Gen. Alfred R. Glancy, deputy chief of ordnance and chief of the Tank-Automotive Center here, will go on inactive duty this week for an operation which may incapacitate him for several months. He will be succeeded by Brig. Gen. Walter B. Boatwright, now chief of the New York Ordnance District.

#### FHA Has \$500 Million To Aid Postwar Home Boom

The accumulation of a tremendous deferred demand for family dwelling units caused by postponement of nonessential construction until after the war will be met largely by a building program featuring the small-type home financed with the help of FIIA mortgage insurance, according to Earle S. Draper, deputy commissioner of the Federal Housing Administration.

Mr. Draper pointed out that under Title 2 of the National Housing Act, about \$500,000,000 in mortgage insurance for postwar home building is available and, subject to presidential approval, the authorization of \$1,000,000,000 more of insurance can be made available if needed.

# Truman Group To Study U. S. Rights in Foreign Airports

To effect immediate settlement of postwar rights of the United States to use airfields and other military installations built abroad by this country, the Senate War Investigating Committee is sending a commission of its members on a world-girdling inspection trip.

Senators Mead, Brewster, Russell, Chandler and Lodge have been delegated to make the trip and report to the Truman Committee.



BRASS . BRONZE . COPPER . EVERDUR . MONEL . STAINLESS

# MEN OF INDUSIKY

George Montague Williams has joined Curtiss-Wright Corp., New York, and will be elected a vice president to assist the president, G. W. Vaughan, in directing the company's war effort. Mr. Williams is on leave of absence from the Russell Mfg. Corp., Middletown, Conn., of which he is president, and was previously assistant to Tom M. Girdler, board chairman, Consolidated Vultee Aircraft Corp., and Republic Steel Corp., Cleveland.

E. W. Kempton has been appointed assistant vice president, industrial relations, and Edward C. Myers, assistant to the vice president, industrial relations, of the United States Steel Corp. of Delaware. Since January, 1941, Mr. Kempton has been assistant director of industrial relations at Pittsburgh for the corporation. Prior to that appointment he was director of industrial relations for American Steel & Wire Co. with headquarters at Cleveland. Prior to his latest appointment, Mr. Myer was senior staff assistant in charge of personnel, Industrial Relations Department, United States Steel Corp. subsidiaries, Pittsburgh district.

Roland E. Fulton, has been appointed director of industrial relations, Cook Electric Co., Chicago.

John T. Llewellyn, president, Chicago Malleable Castings Co., Chicago, and Allied Steel Castings Co., Harvey, Ill., was tendered a testimonial dinner at the South Shore Club, July 7, by approximately 150 of his associates in the two companies on the occasion of his eightieth birthday. He established Chi-



JULIAN M. AVERY

Who has been appointed vice president in charge of research and development, Diamond Alkali Co., Pittsburgh, as announced in STEEL, June 28, p. 74.







W. F. KELLY



JOSEPH L. MULLIN

cago Malleable in 1899 and Allied Steel Castings in 1918.

Ernest Muller has been appointed assistant to Mark A. Follansbee, vice president in charge of sales, Follansbee Steel Corp., Pittsburgh. Mr. Muller will devote a major part of his efforts to formulation of the company's postwar objectives. Formerly he was associated with American Steel & Wire Co., Cleveland.

John B. Whitted, formerly with Stewart-Warner Corp., Chicago, has been appointed chief engineer, Soreng-Manegold Co., Chicago.

Frank E. Bates, manager of the melting division, Worthington Pump & Machinery Corp., Buffalo, was elected chairman of the Western New York chapter, American Foundrymen's Association. Other officers elected were: Reinhold D. Loesch, treasurer, Lake



J. L. MAUTHE

Who has been appointed operating vice president, Youngstown Sheet & Tube Co., Youngstown, O., as announced in STEEL, July 5, p. 88.

Eric Foundry Co., Buffalo, vice chairman; J. Ralph Turner, president, Queen City Sand & Supply Co., Buffalo, secretary; Martin W. Pohlman, vice president, Pohlman Foundry Co. Inc., Buffalo, treasurer.

Joseph L. Mullin has been appointed general superintendent of foundries, American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill. W. F. Kelly has been named works manager at the New Castle, Del. plant, succeeding Mr. Mullin.

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James M. Morehouse has been appointed general manager, order division, sales department, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding Merle N. Smith, retired. Russell B. Gunia has been named manager of the company's stainless steel bureau, metallurgist division.

Carlton B. Tibbetts, president, Los Angeles Steel Casting Co., Los Angeles, has been appointed chairman of the Los Angeles Committee for Economic Development. Purpose of the committee is to assist commerce and industry in making their maximum contribution to high levels of productive employment in the postwar period.

Robert L. Coe, vice president, Chase Brass & Copper Co. Inc., Waterbury, Conn., was re-elected president of the Copper and Brass Research Association. Theodore E. Veltfort and Bertram B. Caddle were re-elected manager and secretary, respectively of the association. Other officers elected were: vice presidents, Wylie Brown, president, Phelps Dodge Copper Products Corp., New York; John A. Coe, chairman of the board, American Brass Co., Waterbury, Conn.; William M. Gross, vice president,



FRED J. WOOD

Scovill Mfg. Co., Waterbury, Conn.; Curtis L. Smith, treasurer, National Copper & Smelting Co., Cleveland; Herman W. Steinkraus, president, Bridgeport Brass Co., Bridgeport, Conn.; C. Donald Dallas, president, Revere Copper & Brass, Inc., Rome, N. Y., was re-elected treasurer.

Charles J. Stakel, assistant manager, Cleveland-Cliffs Iron Co. mines in Michigan, will become manager of all of the Cleveland-Cliffs Lake Superior mines July 15, succeeding Stuart Elliott, who is retiring after 45 years with the company.

Fred J. Wood has been appointed district manager, Jessop Steel Co. Ltd., Toronto, Ont.

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Stowell C. Wasson, previously works manager, Indianapolis plant, National Malleable & Steel Castings Co., has been appointed manager of the Cicero, Ill. and Melrose Park, Chicago, plants. R. S. Davis, assistant manager at Indianapolis since 1929, succeeds Mr. Wasson. W. M. Ewing has been elected manager of the Sharon, Pa. plant, succeeding Walton L. Woody, who has been elected vice president with headquarters in Cleveland. Joseph O. Houze, manager, and Houston L. Hiatt, sales manager, Cicero works, have retired.

Robert N. Yates has been named sales manager, Erie Foundry Co., Erie, Pa.

Elmer L. Sutherland, managing partner of the New York and Chicago offices of Lawrence Scudder & Co., has been elected vice president, Aeronea Aircraft Corp., Middletown, Ohio.

Fred I. Merrick has been named chairman of the board, Standard Horse Nail Corp., New Brighton, Pa., succeeding the late John D. Bruhn. G. B. Sheers has been made president and general manager; R. S. Merrick, vice president; U. S. Couch, secretary; A. L. Bingham, treasurer; and C. K. Kennedy, assistant secretary-treasurer.

Roy Stephens, executive assistant, and L. H. LaMotte, manager, Washington office, have been elected vice presidents, International Business Machines Corp., New York. Garland B. Briggs, formerly manager of the Norfolk, Va., office, was elected assistant treasurer. John E. Zollinger, previously manager of the Cleveland office, was appointed eastern sales manager, and Clarence W. Christman was named manager, department of applications, New York.

Harry W. Lundin has been named director, safety and plant protection section, department of industrial relations, Monsanto Chemical Co., St. Louis.

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#### OBITUARIES . . .

J. E. MacMurray, 81, founder and former chairman, Acme Steel Co., Chicago, died July 1 in South Pasadena, Calif.

Otto J. Kuenhold, 62, development engineer in the humidifying department of Monmouth Products Co., Cleveland, died July 2 in that city.

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Frank L. Cross, 72, inventor of the Cross automatic feeder for printing presses and folding machines, died July 1 in Port Washington, Long Island, N. Y. In 1905 Mr. Cross helped organize the Cross Feeder Co. of Boston, and he served as the company's chief engineer until it was purchased by Dexter Folder Co., New York, in 1938.

Samuel Brown, 72, founder and president, Brown-Dorrance Electric Co., Pittsburgh, died June 25 in that city.

Frederick F. Skeel, 72, retired vice president and western sales manager, Crouse-Hinds Co., Syracuse, N. Y., died June 25 in Evanston, Ill.

William James Foster, 72, assistant engineer, alternating current engineering department, General Electric Co., Schenectady, N. Y., died July 2 in that city. In 1931 Dr. Foster received the Lamme medal, awarded annually by the American Institute of Electrical Engineers.

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Louis C. Marburg, 67, co-founder and secretary-treasurer of Marburg Bros. Inc., New York, died June 25 at Montelair, N. J.

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George Stevenson MacMaster, 47, Los Angeles district manager, Otis Elevator Co., New York, died recently in that city.

John S. Beaton, 67, general superintendent, Perfection Stove Co., Cleveland, before his retirement in 1938, died July 1 in that city.

Rufus Kellog, 58, former sales manager, Square D Co., Detroit, died June 30 in Fort Lauderdale, Fla.

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Charles H. Wilcox, 86, pioneer of the midwest steel industry, died July 3 in Chicago. Mr. Wilcox joined the late John W. Gates in purchasing a number of tin mills which became part of United States Steel Corp., New York.

Charles W. Underwood, 76, formerly Buffalo district manager for Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., died June 30 in Buffalo.

George D. McGill, 52, president, McGill Metal Products Co., Marengo, Ill., died July 1 in Chicago.

W. J. Waterman, 67, W. A. Waterman Inc., Exeter, Calif., died June 21 in that city.

Henry Scott, 68, former stove manufacturer, died July 6 in Portsmouth, O.

W. C. Shinn, 73, president, Chicago Lock Co., Chicago, died June 24 in that city.

Alfred Shakespeare, 58, superintendent, Gear Processing Co., Cleveland, died in that city July 3.

William Dyson, owner of Hallidie Machinery Co., Seattle, died recently in that city.

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William Hoyt Evilsizer, 40, purchasing agent, Lockheed Aircraft Corp., Burbank, Calif., died recently.

William H. Smith, 76, field engineer and assistant to the president, Industrial Brownhoist Corp., Bay City, Mich., died July 6 in that city.



Crescent City bursting at seams under pressure of war expansion. . . Once greatest banana port in the world, its eyes are focused on bright future wrapped up in cargo planes, new type boats, synthetic rubber, magnesium, oil and plywood

THE CRESCENT CITY, now bursting its seams under the pressure of war production and war shipping, occasionally casts a nostalgic look back on the days when it was the greatest banana port in the world, unloading 23,000,000 bunches a year, but now its eyes are focused on a bright future wrapped up with great new cargo airplanes and new types of boats to probe the unexplored profits of the South American jungles.

Along with these visions are other projects already germinated—synthetic rubber, magnesium, plywood and oil and its by-products.

Today the bananas are no longer coming in as they used to, and much of New Orleans' old-world glamour and beauty have become tarnished by the influx of thousands of soldiers and sailors and by a 31 per cent increase in population (from 580,000), required to staff war activity.

For the city is now an army embarkation point for men and supplies. It is the center of a bustling boat-building industry led by Higgins Industries Inc., Delta Shipbuilding, and others. It is in the throes of developing important airplane production, both at the vast new plant of Consolidated Aircraft along the shores of Lake Pontchartrain, and at Higgins Aircraft.

Much of its former glory as one of the nation's busiest ports, however, has been usurped by neighboring cities, such as Mobile, Port Arthur, Lake Charles and

Below at right — Multiple-torch cutters burning out small pieces of reinforcing from heavy-gage ship plate and at Galveston and Houston, Texas.

George Gardiner of the New Orleans Association of Commerce dissents from this view, pointing out that New Orleans is handling more business with Latin America than ever before, and more commercial, as distinguished from military, foreign trade than any port in the United States, not excluding New York. Lines which suspended operations at other ports, especially New York, are operating fleets out of New Orleans. Since Pearl Harbor, 74 foreign freight brokers and forwarders, from other parts of the country, have established offices in New Orleans.

#### Tour Industrial Installations

Gov. Sam Jones only recently headed a party of New Orleans business men who toured the \$200,000,000 port and industrial installations at Lake Charles, and returned amazed. Cities Service Oil Co. there has erected one of the most modern refineries in the world, with crude capacity of 80,000 barrels a day. Still months from operation, this installation also includes a butadiene plant, supplying this material to Firestone which will operate the polymerization plant having capacity of 55,000 tons of latex a year-twice the capacity of the synthetic rubber plant which recently started production at Baton Rouge, operated by Copolymer Corp. Also at Lake Charles, a new magnesium plant has begun limited production.

After viewing the extensive Lake Charles development, Governor Jones said significantly, "Seventy-five per cent of these new factories of which we now boast, if not more, will be lost to us after the war unless we define a program that is sufficiently and logically well founded to hold them."

Many southerners are determined such a loss will not occur and even now are making the "sufficient and logical" plans to avoid it. As in other coastal sections of the country, the planners are not looking back into the country for the future. but out across the stretch of blue ocean, in the case of New Orleans out across the Gulf of Mexico in the direction of Central and South America. They are not only looking that way, but sending their experts out to take soundings. As a harbinger of things to come, Pan-American Airways has announced inception of a trans-gulf flight service to Guatemala from New Orleans. Over a year ago an emissary of Higgins Industries organized an expedition into the jungles of southern Venezuela and the Amazon basin and returned with a plan for conquering the dense reaches of the jungles by means of a new type of diesel-engine amphibian carrier boats which Higgins is prepared to build. Of this, more later.

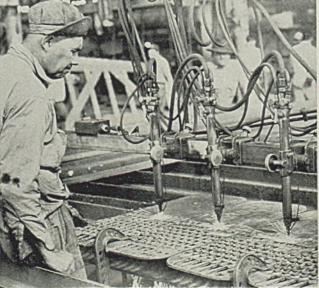
New Orleans civic leaders are proceeding with plans for a huge Pan-American Fiesta to be held in New Orleans after the war to stimulate trade and travel between South-Central America countries and the U.S. As a matter of fact, this fiesta was originally scheduled for Oct. 12, 1942, with William G. Zetzmann, as general chairman, but the war forced its postponement. His committee has mailed out 3000 copies of a prospectus on the celebration and the response has been enthusiastic. For one thing, the promoters estimate it would bring \$35,-000,000 into the coffers of New Orleans and the state of Louisiana.

#### Many Fiestas Planned

(Ed. Note: Apparently there are going to be a lot of fiestas after the war, for both in Southern California and in San Francisco, there is talk of new and bigger expositions such as the one held on Treasure Island in Oakland Bay, which gave a terrific lift to business and industry in the Bay Area. Doubtless the Pacific Northwest would demand a fiesta there too, for its backers are sure it has come of age industrially and commercially, and all three Pacific regions are planning various inviting trade gestures which they will make toward distant shores after the war).

One of the main business arteries of New Orleans is, strangely enough, a canal—the Inner Harbor Navigational canal it is called officially, or the Industrial canal popularly—connecting the Mississippi on the south to Lake Pontchartrain on the north, with a lock at the river end. This is a 5-mile channel







Laying out patterns on large section of plate for prefabrication of tank lighter component. Photo by Higgins Industries, Inc.

30 feet deep and 150 feet wide, constructed and operated by the Board of Commissioners of the Port of New Orleans. Along both sides is an industrial "reservation" of several thousand acres, docks for an assortment of commercial enterprises such as the Jones & Laughlin Steel Corp. docks, terminus for river shipments of steel down the Mississippi by barge. Both banks of the canal are protected by levees for their full length, and approximately at the center are four slips. Ample property is still available for industrial development, a recent new-

comer being the Industrial canal plant at Higgins Industries, now building a variety of the smaller types of all-steel military craft such as tank lighters, landing barges, etc.

Northern terminus of the canal is just to the west of the New Orleans municipal airport, originally known as Shushan airport, built on a half-square mile of triangular shaped land jutting out into Lake Pontehartrain. Southern end meets the Mississippi just across from the naval reservation and navy docks in Algiers, the river here being about 34-mile wide.

It may not be known generally, but the city of New Orleans is over 100 miles up river from the Gulf of Mexico. Incoming vessels use one of two passes the South pass with depth of 30 feet and width of 750 feet, or the Southwest pass, with 35 foot depth and 1000-foot width.

#### Storehouse of Chemicals

Total length of publicly owned and improved wharf frontages at New Orleans is nearly 8 miles and represents an investment of \$50,000,000. This is in addition to a large number of privately owned facilities at the port. State facilities include a cotton warehouse for 462,000 bales; a grain elevator of 2,622,000-bushel capacity; a bulk commodity handling plant for such materials as coal, coke, ore and sulphur; and a bulk vegetable oil handling plant for cocoanut oil, palm kernel oil, olive oil foots, linseed oil, etc.

Oil, salt, sulphur, natural gas, limestone, oyster shells, cellulose from trees, cotton plants and bagasse, plus large quantities of pine, gum, ash and cypress lumber and their derivatives have made the state of Louisiana a storehouse of chemical raw materials, and chemical manufacturing industries have gravitated

to the New Orleans area in recent years, along with oil refineries and their new cousins, the synthetic rubber industries. The district is becoming an important center, as well, for tung oil or China wood oil, following the planting of thousands of acres of cutover lands to tung trees.

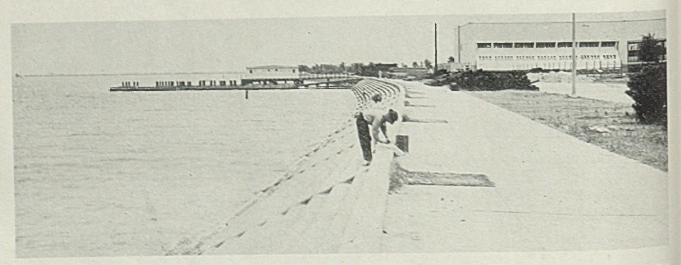
Andrew Jackson Higgins is a magical name in New Orleans these days, and some of the boys sitting around the bar at the Roosevelt hotel, sipping their Ramos gin fizzes, like to call him the Henry J. Kaiser of the South. But proud New Orleanians take this as an insult, for their Andrew Jackson, they stoutly maintain, puts to shame the West Coast industrial giant and easily outdistances comparison. Both, it must be admitted, are distinct phenomena.

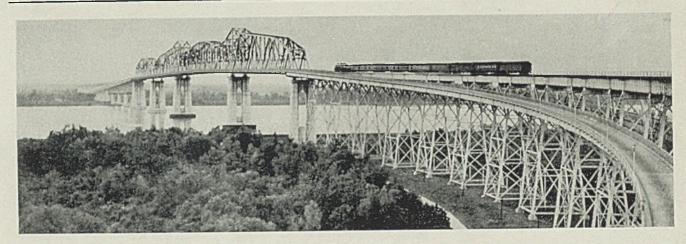
Andrew Jackson Higgins is no newcomer to New Orleans, and he was not always the "great guy" he is made to appear today. Born in Columbus, Nebr., in 1886, he built his first boat, it is recorded, at the age of 12 in his family's home cellar in Omaha. At 22 he was operating a sawmill in Mobile and exchanging his own dressed lumber for cargoes of tropical woods from Caribbean countries. This did not last and he moved to New Orleans where he started a similar lumber and export business, which collapsed in the hard days of 1922.

Meanwhile, he kept up his interest in fast boats, and Higgins speed boats held many records in Mississippi and Gulf races. Shortly before the turn of the '20s, Andrew Jackson Higgins hit upon the Eureka-type boat, a relatively small powered craft capable of travel in swamps and low water, with propeller and shaft protectively encased in a tunnel in the hull. The boats looked promising for oil company exploration work through the Louisiana bayous and along the

Hangar building, boat house and start of ramp leading into Lake Pontchartrain are shown in this view along the seawall. Main plant is back to the right, while in the distance is the municipal airport extending out into the lake?

Photo by Leon Trice





The Huey P. Long bridge across the Mississippi at New Orleans, a \$13,000,000 rail and highway structure 4.4 miles long completed late in 1935. From the top of the steel superstructure at the center to the bottom of the central pier 170 feet below mean Gulf level is a distance of 400 feet. Photo by New Orleans News

Amazon. But the depression caught up with Higgins Industries in 1931 and Eureka'd them into receivership.

Somehow Higgins limped through the succeeding years until 1936 when he received orders for two river steamer inspection boats for the government. Then came the war, and orders for Eureka boats for England, Finland and the U. S. Navy. Because of their ruggedness and shallow draft, these boats make excellent landing craft, and by now have been built in several versions, seeing extensive service with both British and U. S. forces.

Higgins is looking far beyond the present conflict for profitable use of his Eureka boats. As mentioned before, they and some of their progeny are visioued as the means for opening up the Amazon jungles for economical removal of crude rubber. Key to the plan is a new type of amphibian ship-truck which can operate in shallow water, climb over rocks and drive along river banks. Establishment of regular inland routes for fleets of these amphibians, with additional barges and diesel tugs for open-water use seem to suggest the possibility of opening up the Amazon interior and perhaps even of providing waterway connection between Venezuela, Brazil and Colombia so that profitable use can be made of vegetable and mineral resources which cannot now be reached.

Higgins Industries boat plants are three in number, the previously mentioned Industrial canal plant, where most of the welded steel boat and tank lighter construction work is carried out; the second the City Park avenue plant, where operations are principally with wood, and the third a St. Charles avenue plant which has now reverted to a salesroom. It was near the latter location where some time ago Higgins was building boats in the street outside the plant, to the consterna-

tion of old New Orleans residents. This work now, however, has been shifted to the other two plants.

The company is now in process of taking over a fourth plant, a building formerly occupied by the Continental Can Co., reportedly for manufacture of a new type of landing barge engine. In all Higgins employes number about 12,000 and they constitute a devoted and enthusiastic family, all paid-up members of the A. F. of L. incidentally.

#### Higgins Aircraft Plans Bud

But the most fabulous of the new Higgins enterprises is the budding Higgins Aircraft Corp. plant now going up amidst the swamps of the Micheaud (Mee-shoo) district of New Orleans. Originally this location was to be the scene of a shipyard, where Higgins was going to out-Kaiser Kaiser on Liberty ships. They would be launched in an extension of the Intracoastal canal, an inland waterway which now connects New Orleans with Houston and Corpus Christi, Tex., without touching the Gulf, and eventually will be cut on through from New Orleans to Mobile, Ala. Suddenly, last summer, the Maritime Commission canceled the Liberty ship contract with Higgins, and New Orleans began buzzing with wonderment. A little thing like this did not daunt old A. J. who bustled off to Washington and returned with a letter of intent from the Air Corps to build 1200 Curtis C-76 cargo airplanes of plywood. Even before the Maritime Commission had finished tearing down the start of the shipyards, Higgins engineers and surveyors were moving into the 1200-acre Micheaud property to figure out how to make an aircraft plant grow where a shipyard had started to take shape. The site is only 6 feet above sea level and while you can get plenty of argument that this is no swamp around New Orleans, nevertheless, the story is that engineers had to fight off snakes and alligators while they were struggling to get the plant foundations in. Plant design was developed by Albert Kahn Associated Architects and Engineers, Detroit, which has a field crew on the scene. As of June 1 the plant was about 75 per cent completed and some equipment was moving in, although in December the Higgins Aircraft people said it would be ready by April 1 and the first plane would roll out by July 1. Obviously no such miracle will be wrought.

Among other novel aspects of the Micheaud plant will be installation of a neat 10,000 ton capacity air conditioning system.

A. J. did not fool when he started his airplane organization. First he went out and signed up Col. John H. Jouett, then head of the languishing Aeronautical Chamber of Commerce of America, and well acquainted with airplane designers and engineers throughout the country. He became a vice president of Higgins Aircraft. In a February speech, Col. Jouett told the Texas section of the S.A.E. that the new aircraft plant would be completed by June, and the first plane by November. Right now it looks as though even the colonel were being a little over optimistic.

Then, in January of this year, came to New Orleans air famous Guiseppe Mario Bellanca, 56-year-old founder, chairman and director of Bellanca Aireraft Corp., Wilmington, Del. Reason: To work for Higgins Aircraft in developing a cargo airplane. On Jan. 28, the United Press carried a story quoting Higgins in connection with his "supercargo" plane to the effect that it would be a modified type of "flying wing", with displacement of 400,000 pounds, adding that he expected it to be in production "very soon" in large quantities and at low cost. As if this were not enough, A. J. further confounded his listeners by adding that his aeronautical experts were working on a postwar helicopter, to sell for around \$1500, and designed "something like the jalopy in the automobile business."

The Curtis Caravan plane, or C-76 as the Army calls it, is said to be the first plane designed primarily as a short-route cargo carrier, each plane requiring in its construction 50,000 square feet of plywood. The plane has two engines, standard gross weight 35,000 pounds, 20,000 pounds empty. Average cruising speed is 160 miles an hour; fuel capacity 600 gallons. The plane has tricycle landing gear and the floor of the cargo hold is only 36 inches off the ground. It loads both at the nose and at the side, has an interior track hoist and is fitted to tow gliders (or at least was originally). These data are from a recently issued OWI report on air trans-

So, with Higgins Aircraft planning to build 1200 C-76s, it began to look like the company was going to need sixty to seventy million feet of plywood, and New Orleans is a long way from Portland, Oreg., now the center of the plywood industry. So Higgins early this spring announced plans for a small plywood plant to be built in New Orleans. This led to a storm of protest in Congress by senators from the West Coast and the North, among them Senator Wiley of Wisconsin. Higgins countered with the statement the plant was "definitely if not desperately needed to insure success in completing contracts for Army plywood planes."

Of the C-76 airplane, the OWI states: "It is being built in large part under subcontract with a Virginia plastic firm, a piano company in Ohio, and a Kentucky plant which has been manufacturing tobacco hogsheads, army bunks and bodies for trucks and station wagons."

Higgins' venture into plywood may

be tied in closely with the activities of one Harry Atwood, researcher with Higgins Aircraft, who has developed what is called a "seasational kind of woven plywood". Atwood also is busy on the Higgins giant cargo plane. Another member of the Higgins Aircraft engineering braintrust is George Allward who has had extensive experience in the use of plywood and plastics in airplane fuselages, once being associated with Duramold and Fairchild companies, and later with the Howard Hughes organization in Culver City, Calif. It is Hughes, incidentally, who is now working with Kaiser on his "superdooper" cargo plane to be built on the West Coast.

Four other aces-in-the-hole on which Andrew Jackson Higgins can count are his sons—Edmond C., Andrew J. Jr., Frank O., and Roland C. The first, Edmond, is manager of the new Industrial canal plant. Andrew Junior is general manager of the City Park plant. Frank is general manager of the Higgins Aircraft plant, and Roland, for the present, is in the Army, but before entering the service last December he was superintendent of construction of landing boats.

#### Brother Directs Repair Plant

A. J. also has a brother, Frank P. Higgins, who is in charge of the St. Charles salesroom and repair plant. He, in turn, has two sons, Edward and Jack, the former now in the Army and the latter a student at Tulane University. This phase of Higgins activity revolves around handling New Orleans and the Gulf Coast sales and service of Hall-Scott and Gray Marine engines; Lorimer, Enterprise and General Motors diesels; skiffs, sailboats and pleasure cruisers; Evinrude and Elto outboard motors; Higgins ship-to-shore telephones; Carrier air conditioning units, and marine hardware and appliancesno small assignment in itself.

First airplanes from New Orleans probably will not be Higgins-built, but rather Consolidated's P4Y patrol bombers for the Navy. In a spacious and modern plant along Lake Pontchartrain near the airport and at the north end of Franklin avenue, equipment and personnel are rapidly being assembled for this undertaking and the first plane should roll down a ramp on its beaching gear and into the lake by late fall.

The P4Y-1 is a new two-motor seaplane which has been hailed by the Navy as the fastest flying boat ever built. Prototype is Consolidated Vultee's model 31, shown in an accompanying illustration. This new patrol plane, which Consolidated has christened the Corregidor, is designed for combat and cargo duty. It will be powered with two 2000-horse-power motors, is 74 feet long, 25 feet high and weighs about 25 tons. Wingspread is 110 feet.

The new plant, with reinforced concrete columns and asbestos shingle walls, was erected originally for Nash-Kelvinator Corp. to assemble Vought-Sikorsky Excalibur flying boats, with numerous subassemblies coming from Nash plants in the north. Months ago, however, the Navy suspended the contract, Nash engineers and other personnel went back home and Consolidated was brought into the picture, for reasons never fully explained to the public.

In the switch to the new design considerable modification has been called for in the plant itself. Inasmuch as the Nash-Kelvinator flying boat was to be largely an assembly job, provision was not made in the original buildings for many of the manufacturing processes required by Consolidated. Consequently a machine tool and drop hammer building has had to be added, additional space for engineering, accounting and administrative employes, a larger ramp and numer-

(Please turn to Page 151)

# They Say:

"I can think of no better training for a business man in the handling of his present labor problems than to take a place on a Labor Board panel, or on the board itself."— Roger D. Lapham, retiring industry member, National War Labor Board, and president of the American-Hawaiian Steamship Co., San Francisco.

"Another major development of the year has been improvement in shipbuilding technique to where, as far as possible, mass production methods are used."—Lynn H. Korndorff, president, Federal Shipbuilding & Dry Dock Co.

"We are not worrying about competition from light metals and plastics when the war ends. Creating facilities does not create a market."—Benjamin F. Fairless, president, United States Steel Corp.

"What is most urgently needed is the application of plain, hard-headed common sense to our problems. We need to think a lot less about politics and a lot more about winning the war."—Eric A. Johnston, president, Chamber of Commerce of the United States.

"America cannot remain strong and free if in the postwar period we have too much unemployment for too long. That is a direct invitation to dictatorship."—Paul G. Hoffman, president, Studebaker Corp., South Bend, Ind., chairman, Committee for Economic Development.

# May Plate Production Heavy

Output during month represents 136.8 per cent of capacity. Average for five months of year 141.9 per cent. Tonnage maintained at high level in other products

PRODUCTION of steel products for sale in May totaled 5,586,447 net tons, according to the American Iron and Steel Institute. Iron products totaled 14,711 tons, pig iron 777,239 tons and ingot molds 84,474 tons.

Cumulative total of steel products for the year to June 1 was 27,781,209 tons, of which 2,038,772 tons were shipped to other members of the industry.

Steel plate production for May was

1,067,858 tons, which represented 136.8 per cent of rated capacity. For five months average production was at 141.9 per cent of capacity.

Sheet production was 683,627 tons, at 59.6 per cent of capacity. For five months sheet output averaged 65.2 per cent of capacity. The lower rate in sheets is a result of plate production on sheet mills.

Steel bars produced in May totaled

20,568 tons, which represented 120.5 per cent of capacity.

Total number of companies included in these statistics is 183, which in 1942 represented 98.8 per cent of the total output of finished rolled products. In accordance with government policy export figures cannot be published and these columns are blank in the accompanying table, which supplies full statistics for May and five months this year.

Factory sales of mechanical stokers in May totaled 2436 units, compared with 2464 in April and 5053 in May, 1942, according to the Bureau of the Census. For five months sales have been 12,808 compared with 41,027 in the corresponding period in 1942.

	Canacit			AN IRON AND :			ucta			1341	1943	ME CELENIES
	C-p-C-	1	1		A SECTION AND ADDRESS			Разристин гов 5	ALE-NET TORS			
			8			Curren	at Month	WIND CARSINGS I		Yes	e to Date	
			8	Annual Consider		1		sipmenta	MARKET STREET	BV: A S	S	hipments
	Y Care	companies	Item	Annual Capacity Net tons	Total	Per cent of capacity	Export	To members of the industry for con- version into further finished products	Total	Per Cent of capacity	Export	To members of the bull to the transition into furth finished product
	The same of the	1.1.	-		722,478		Company (200)	207,008	3,390,017	***		985,8
Ingota, blooms, billets, slabs,	sheet bars, etc		1	5,412,580	320,010	69.6		XXXXXXX	1:606.698	71.7		*****
Heavy structural shapes		10	2	338,000	3,938			XXXXXX	9,404	6.7		
Steel piling		43	3		1,067,858			2.273	5,395,835	141.9	No. of Concession, Name of Street, or other party of the Concession, Name of Street, or other pa	17.2
Plates-Sheared and Univer	reller	21	4	9,189,740				37,920	335,591	III		177,7
Skelp		6	5	IIIIII	70,371	III				49.8		
Rails-Standard (over 60 lt	<u>*)</u>	14	6	3,629,260	136,443	44.3		_ XXXXXX	747,580	51.9		XXXXX
Light (60 lbs. and u		6	7	309,690	16,363			XXXXXXX.	66.516 11,866			
All other (Incl. gird	AND RESIDENCE AND RESIDENCE AND RESIDENCE	2	8	102,000	1,288			_ XXXXXXX		28,1		
Splice bar and the plates		13	9	1,120,270	52,652	55.3		TXXXXX	271,882	58.6		*****
Barn-Merchant		40	10	*****	592,267	III		91,380	2,978,341	***		391,9
Concrete reinforcing	New hiller		11	******	25,379	xxx		******	172,838			
Condition remarking	Rerolling		12	******	7,258	***			37,473	XXX		x x x x x
Cold finished—Carb	Comments of the last of the last		13	******	148,761	***		******	732,023	XXX		IXXXX
Alloy—Hot rolled	VII		14	******	270,336			37,324	1,260,625			191,4
Cold finished		- 0	15	XXXXXXX	40,774				196,435	ETT		
Hoope and baling be		4	16	******	9,938			******	39,097	XXX		XXXXX
		63	-	14,706,525	1.094.713			128,704	5,416,832	89.0		583,4
	TOTAL BARS		17						100,556		Contract Contract	XXXXXX
Tool steel bars (rolled and	forged)	17	18	200,840	20,566			XXXXXXX				
Pipe and tube-B. W		15	19	2,236,040	109,089	57.4		XXXXXXX	545,501	The real Party lies		XXXXX
L. W		8	20	845,400	41,723	58.1		xxxxxxx	235,049			XXXXXI
Electric w	eld	7.	21	1,149,250	95,820	98.1		TIXIXI	424,103			XXXXX
Seamless		15	22	3,082,400	182,261	69.6		X X X X X X X	892,620			XXXXXX
Conduit		7	23	190,000	5,185	32.1		XIXXXXX	26,071			****
Mechanica	I Tubing	11	24	597,800	64,023	126.1		XXXXXXX	312,103			IIII
Wire rods	100000000000000000000000000000000000000	21	25	xxxxxxx	99,03 158,07	xxx		16,792	495,605			99,
Wire—Drawn		41	26	2,366,150	158,07	78.6		4,982	814,614			23.9
Nails and staples.		19	27	1,116,640	67.442	2 71.1		- XXXXXXX	357,021			xxxx:
Barbed and twisted	the second secon	15	28	482,280	21,831	53.3		******	101,025	50.6		XXXXX
Woven wire fence		16	29	778,060	20,202	2 30.6		******	84,952	56.7		XXXXX
Bale ties		12	30	128,420	9,745	89.3			45,081			XXXXX
All other wire pro	The state of the s	8	31	78,220	4,89	1 73.6		******	26,049			*****
Fence posts		11	32	125,065	2,25	21.2			8,975	17.3		
		10	33	339,700	25,75				120,136	85.4		
Black plate		5	33	508,620	1,21			******	8,168			
Tin-plate—Hot rolled		10	35	3,816,340	201.70	The residence of the last of t		*****	857,652			****
Cold reduced		25	-		478,11			17.977	2,542,729		1000	80.
Sheets-Hot rolled.		14	36	XXXXXXX	62,52		10-00-01110111	XXXXXXX	337,130			
Galvanized		14	37	******	115.38			******	613.736		Transferience Pro-	****
Cold rolled	*****		38	XXXXXXX	27,60			******	151,076		101120 10	****
All other		14	39	******					3,644,671			80.
	TOTAL SHEETS	28	40	13,497,570	683,62			17,977				71
Strip-Hot rolled		55	41	3,200,890	125,81			14,737	644,35			
Cold rolled		39	42	2,057,340	96,79			******	470,70			XXXXX
Wheels (car, rolled steel)		5	43	424,820	20,05			XXXXXX	94,28			
Axlea		6	44	453,470	13,87				70,10			- IXIXI
Track spikes		11	45	308,350	12,36	9 47.8			63,62			****
All other		5	46	42,000	16,98	5 476.0			85,96	194.6		****
	L PRODUCTS	159		******	5,586,44			1,30,303	27.781.20	9. 111		2.038.

1170	Pig iron, ferro manganese and spiegel	26	4R	******	777,239		373,197	3,754,583	***	 786.74
	Inset moulds	5	49	******	84,474		xxxxxx	400,216		 XXXXXX
-	Res	10	50	170,110	7,773	53.8	72	41,247	58.6	1,38
- 5	Pipe and tubes	2	51	106,000	6,100	67.7	******	37,277	85.0	*****
9 5	All other	1	52	56,000	838	17.6	-	6,622	28.6	
Ž.	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	******	14,(11	***	12	85,146	***	

# 4802 Operating In United States

Total decreases by ten in two years. . . Canada adds 46. . . Chicago leads cities

FOUR thousand eight hundred and two foundries are in operation in the United States, according to the 1943-44 edition of *Penton's Foundry List*, recently compiled by the Penton Publishing Co., publishers of STEEL. This represents a loss of ten foundries since the list was last compiled in 1941.

During the same two-year period, the number of foundries in Canada increased by 46, bringing the total to 493 in the Dominion.

A complete tabulation of the casting plants in United States and Canada is shown in the accompanying table.

Number of gray iron foundries decreased from 3006 to 2890, although the shrinkage has been confined to the smaller plants. Steel foundries increased in num-

ber from 298 in 1941 to 334 in 1943. Increase in capacity has been greater.

The number of exclusive nonferrous foundries increased from 1446 in 1941 to 1506 at present. Nonferrous departments of other foundries decreased from 1354 to 1114.

Chicago again occupies first place as a foundry city with a total of 159. Other leading centers and number of foundries: Los Angeles, 133; New York, 116; Cleveland, 106; Detroit, 92; Milwaukee, 69; Philadelphia, 67; Boston, 56; Toronto, 55; St. Louis, 51; Cincinnati, 51; Mineapolis and St. Paul combined, 60.

### FOUNDRY DISTRIBUTION—UNITED STATES AND CANADA

## Reclaim Tool Steel Scrap

To meet increased demand for special alloys. . . Acute shortage of tungsten, cobalt

INCREASED demand for tool and special alloy steel has caused an acute shortage of tungsten, molybdenum and cobalt. This in turn has intensified interest in the salvaging of tool steel scrap, a matter which often was neglected before the alloy shortages developed.

Because of lack of experience of most users with this type salvage, it is being directed by producers and dealer-specialists.

Tool steel scrap includes high-speed

steel scrap materials with a tungsten content of 1 per cent or more or a molybdenum content of 1½ per cent or more with or without cobalt. It appears on the market in the form of broken, obsolete and worn-out tools, machine shop millings and turnings and broken or obsolete industrial supplies and equipment.

Most common articles manufactured from tool steel are: augers, blanking and molding dies, bolt headers, boring tools, broaches, chisels, cutters, medical instruments, drill rods, finishing tools, friction saws, gages, hack saws, high duty shafts, high-speed drill bits, hot saws, lathe tools, metal dies, metal punches, milling tools, reamers, rivet sets, rock drills, saws for cutting and slitting, shear blades, taps.

If the alloy content of the scrap is not known, most common method of identifying it is the spark test. In this test both ends of the article are sparked on a 30 to 60 grain emery wheel traveling at a surface speed of from 7500 to 8000 feet a minute. Presence of different alloying elements in steel produce different sparks which enable a trained operator to identify the article as to type of tool steel scrap.

Major consumers of tool steel scrap are the producers of tool and high-speed steel. These companies include: Allegheny Ludlum Steel Corp., Dunkirk, N. Y.; Braeburn Alloy Steel Corp., Braeburn, Pa.; Bethlehem Steel Co., Bethlehem, Pa.; Carpenter Steel Co., Reading, Pa.; Columbia Tool Steel Co., Chicago Heights, Ill.; Copperweld Steel Co., Warren, O; Crucible Steel Co. of America, New York; Henry Disston & Sons Inc., Tacony, Philadelphia; Heppenstall Co., Pittsburgh; Firth-Sterling Co., McKeesport, Pa.; Ingersoll Steel & Disc Co., New Castle, Ind.; Jessop Steel Co., Washington, Pa.; Latrobe Electric Steel Co., Latrobe, Pa.; Simonds Saw & Steel Co., Lockport, N. Y.; Midvale Co., Nicetown, Philadelphia; Universal-Cyclops Steel Co., Bridgeville, Pa.; Vanadium-Alloys Steel Co., Pittsburgh; and Vulcan Crucible Steel Co., Aliquippa, Pa.

Dealers specializing in handling tool steel scrap are equipped to spark-test and in some cases to make a chemical analysis of the scrap. These include: Metallurgical Products Co., Philadelphia; Frankel Co. Inc., Detroit; I. Schumann & Co., Cleveland; M. N. Landay Co., Pittsburgh; Philip G. Smith Co., Detroit; and Chicago Alloy Products Co., Chicago.

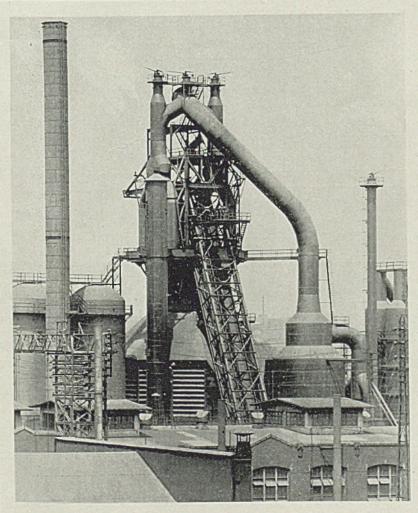
#### Industrialists Support Minerals Stockpiling

Support for the creation of a peacetime stockpile of strategic metals for use in any future emergency has been given by private industry representatives in further hearings on the Scrugham bill (Steel, July 5, p. 77).

R. C. Allen, vice president, Oglebay Norton & Co., Cleveland, said all critical metals produced in this country in excess of domestic needs or a ten-year period should be placed in the mineral reservoir.

F. E. Wormser, secretary, Lead Industries Association, New York, proposed government-held mineral supplies be held from the market after the war to prevent a price sag.

Sidney Ball, New York mining engineer, expressed the opinion a new war will require a quantity of metals even greater than needed in the present conflict. He proposed this country accept domestically scarce minerals in international exchange as a means of building up stocks.



MORE IRON CAPACITY: New stack blown in at Bethlehem Steel Co.'s Bethlehem, Pa., plant July 1. Installation includes three stoves; turbo blower of 100,000 cubic feet of air a minute capacity at 30 pounds per square inch pressure; two 100,000 pounds per hour boilers, combination coal and blast furnace gas fired; new water intake and pumping station; electric precipitation equipment for final cleaning of blast furnace gas

# THE BUSINESS TREND

# Indexes Mirror Critical Snags in War Production

THE enormous proportions of American war output, tangible proof of continued pressure on production facilities, still do not blot out a precipitant decline in activity of several of its principal components. The markedly lower rates of steel and coal production and shrinkage in carloadings recorded recently inevitably impaired the momentum of the industrial machine.

STEEL—Production of open-hearth, bessemer and electric furnace ingots was recovering last week after dropping 6½ points to 92 per cent of capacity as a result of the coal strike. This was the lowest rate set by the industry since early July, 1941. A year ago the rate was 97½ per cent.

CARLOADINGS—Loadings of revenue freight during the period ended June 26 totaled 760,844 cars, a decrease of 107,397 units from previous week and 92,574 fewer cars than were loaded in like period a year ago. Largest loss was in coal loadings, 97,743 units. Decreases of 10,153 cars for ore and coke and of 7495 units for forest products accounted for most of the deficiency.

COAL—Bituminous and anthracite operations have been almost fully restored to the pre-strike rate. For the week ended June 26, latest available date, soft coal output fell to 775,000 tons, off 1,242,000 tons from preceding week.

MANPOWER-New estimates of War Manpower Com-

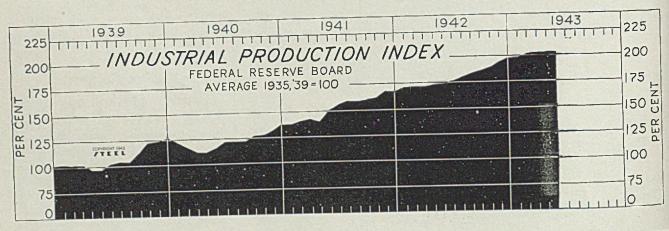
mission call for an increase of 3.6 million men between now and next July. Two million more men are needed for the armed services and 1.6 million more workers for munitions industries. Non-agricultural industries are expected to reduce their labor requirements by 2.3 million.

MACHINE TOOLS—Although the industry looks for a marked decline from present levels of activity by early 1944, as the job of equipping war plants draws to its end, the time has not yet arrived when actual tool operations can be appreciably reduced.

CIVILIAN GOODS—Drive is again under way to boost output of many needed consumer items. Vigorous objections have been voiced by the armed services and WPB members supervising allotments of steel, copper and aluminum, but the program being drawn up by WPB's division of civilian requirements has formidable political support.

Scheme envisages manufacture of a broad list of consumer goods which are not short the country over but are critically scarce in certain areas. A. D. Whiteside, WPB vice chairman, believes that by mobilizing the nation's technological skill he can make more of some civilian items with fewer critical materials.

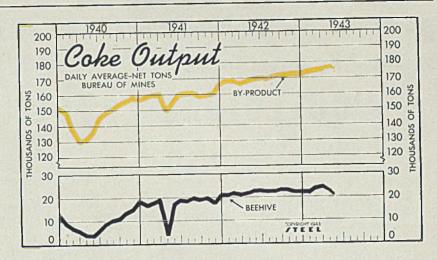
MAY PRODUCTION—With the exception of ammunition, aircraft and one class of merchant vessels, volume of war production in May was virtually unchanged from April, according to the War Production Board. The tapering off of the production chart-line on which WPB's findings are based corresponds with the performance of Federal Reserve Board's index of industrial production which failed to show an increase for May over the April level of 203.

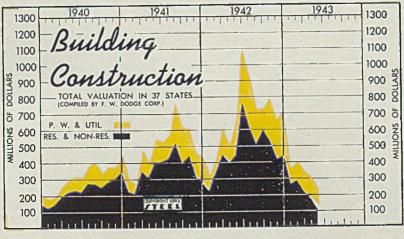


INDUSTRY  Steel Ingot Output (per cent of capacity). Electric Power Distributed (million kilowatt hours). Bituminous Coal Production (daily av.—1000 tons)† Petroleum Production (daily av.—1000 bbls.) Construction Volume (ENR—unit \$1,000,000) Automobile and Truck Output (Ward's, number). *Dates on request. †Lag of one week. †!Preliminary.	Latest	Prior	Month	Year
	Period°	Week	Ago	Ago
	92.0	98.5	98.5	97.5
	4,000††	4,120	3,990	3,424
	775	2,017	1,967	1,904
	3,946††	3,955	3,933	3,297
	60.1	53.7	106.9	217.8
	18,645	19,185	16,215	22,680
TRADE  Freight Car Loadings (unit—1000 cars)†  Business Failures (Dun & Bradstreet, number).  Money in Circulation (in millions of dollars).  Retail Sales (change from like week year ago).  †1Six months. †Preliminary.	\$17,420	761 60 \$17,154 +14%	668 56 \$17,196 +15%	853 186 \$12,431 +29%††

#### Coke Output Bureau of Mines

	(Daily av	erage-Net	tons)	
	-Bv-Pr	oduct	-Beel	nive
	1943	1942	1943	1942
Jan.	174,044	168,508	21,440	20,874
Feb.	175,107	168,414	23,991	21,771
Mar	175,051	167,733	24,369	21,032
Apr	175,857	168,960	22,932	21,843
May		170,187	21,298	22,571
		170,593		22,487
		170,244		22,197
		171,443		22,333
		172,110		23,106
		172,211		23,148
		173,029		22,106
The second second		173,163		22,000
Average		170,549		22,122





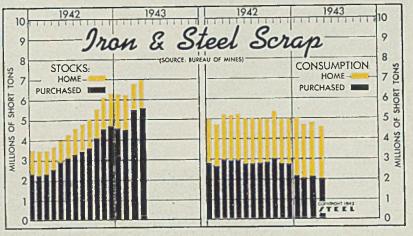
#### Construction Valuation In 37 States

	(Uı	nit—\$1,	000,000		
		Public Works- Utilities			ential- -Res.
	Total	1943	1942	1943	1942
Jan.	350.7	85.8	90.8	264.8	226.0
Feb.	393.5	112.9	95.9	280.5	337.6
Mar.	339.7	123.0	159.7	216.7	451.1
April	303.3	127.7	101.7	175.6	397.0
May	234.4	95.8	227.7	138.6	445.8
lune			436.4		753.8
July			327.3		616.4
Aug.			213.1		507.9
Sept.			129.6		593.6
Oct.			246.2		534.2
Nov.			241.0		413.2
Dec.			271.0		437.7
Total			2,540.4		5,714.3

#### Iron and Steel Scrap Bureau of Mines

(Gross tons-000 omitted)

	Consumers' Stocks			tal mption
	1943	1942	1943	1942
Jan	6,233	3,503	5,031	4,956
Feb.	6,209	3,455	4,680	4,708
Mar.	6,850	3,460	4,787	5,221
Apr.	6,918	3,582	4,642	5,156
May	7	3,972		5,225
June		4,297		5,000
July		4,579		5,006
Aug.		4,780		5,015
Sept.		4,993		4,955
Oct.		5,530		5,342
Nov.		6.078		4,930
Dec.		6,274		5,037
4	-	The same	100	
Total		54,503		60,551



Bank Clearings (Dun & Bradstreet, total in millions) Federal Gross Debt (in billions of dollars) Bond Volume, NYSE (millions of dollars) Stock Sales, NYSE (thousands of shares) Loans and Investments (in millions)† United States Gov't. Obligations Held† †Member banks, Federal Reserve System.	5,279 \$46,147	Prior Week \$9,058 140.1 52.4 4,672 \$46,965 32,364	Month Ago \$7,769 140.0 41.8 5,736 \$47,068 32,275	Year Ago \$7,266 77.4 33.1 1,417 \$31,587 15,316
PRICES  STEEL's composite finished steel price average  Spot Commodity Index (Moody's, 15 items)†  Industrial Raw Materials (Bureau of Labor index)†  Manufactured Products (Bureau of Labor index)†  †1931=100; Friday seriese. 11926=100.	114.2	\$56.73 244.1 114.5 100.0	\$56.73 246.1 114.3 100.9	\$56.73 232.4 99.6 98.8

### **Tests Indicate Oil Consumption Can Be Cut**

#### A Third by Substituting . . . .

## "COLLOIDAL" FUEL for OIL

SHORTAGE of fuel oil caused by the war is forcing many oil-burning boiler plants to use coal. The cost of installing coal-burning equipment is frequently quite high. Operators of a number of such plants are giving much consideration to the emergency use in present equipment of mixtures of pulverized coal and fuel oil, popularly termed "colloidal fuel," a substitution that would save about one-third the oil.

Involved in this decision are questions as to procurement of the fuel, costs and operating problems.

Procurement: At present there is no commercial source of colloidal fuel. Various concerns are considering its production. Larger users could consider setting up their own grinding and mixing plants. This is now being done by at least one oil user. Studies are now being undertaken by the Bureau of Mines and the Atlantic Refining Co. to develop a low-cost mixing device. Standard pulverizing equipment now on the market will grind coal to the fineness used in the tests described here.

Costs: The question of costs is rather involved. How much can be afforded

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L. R. BURDICK, Senior Fuel Engineer Both of Division of Solid Fuels Utilization for War, Bureau of Mines

And

A. B. HERSBERGER
Research & Development Department,
Atlantic Refining Co., Philadelphia

for an emergency fuel is an individual matter. Cost of equipment for complete conversion to coal may be very high. Under normal conditions in the past, the use of colloidal fuel has never proved an attractive proposition. Most oil-burning plants are in areas where under normal

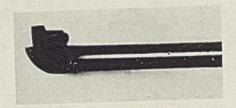


Fig. 1. (Above)—Standard steam atomizing burner used was made by Best. Fuel reaches a horizontal slot at the burner tip through the lower pipe; the steam reaches a vertical slot through the upper pipe and sweeps the fuel into the combustion chamber

conditions it has been economical to burn oil.

Colloidal fuel will cost more if the expense of handling, pulverizing and mixing the coal results in a coal B.t.u. cost higher than the oil B.t.u. cost. If needed equipment is obtainable, the Atlantic Refining Co. estimates that on a production scale of 1,000,000 barrels of colloidal fuel per year this fuel could be sold in their area at about the same cost per million B.t.u.'s as that of the 16 gravity fuel oil now being delivered.

Operating Problems: To the oil-burning operator, used to the relative ease of handling and burning fuel oil, adding pulverized coal to oil is something of the nature of adding a contaminant. Properly organized operating routine is required to solve the new operating problems that arise from the changed characteristics of the fuel. Colloidal fuel is about 10 per cent heavier in weight per unit volume than oil; it is about seven or eight times as viscous; it requires more power for pumping, decreasing pump capacities; it is much more abrasive; if the coal does not stay in suspension, pastelike accumulations occur in various parts of the equipment such as tanks, heaters, and valves; the ash from the coal in the mixture is set free in the furnace.

To obtain information on the operating

Fig. 2—Pulverized coal and oil mixing device used for batch mixing some 7000 gallons. Funnel for coal is shown on suction line from tank to pump. Discharge line from pump runs back to tank, part of which is shown here back of pump



problems involved, the Bureau of Mines, in co-operation with the Atlantic Refining Co. ran about a month's operating test on a colloidal fuel at one of the Atlantic boiler plants in Philadelphia. The test was run as part of the regular plant steam production with the usual company operators.

Fuel used was a mixture of 40 per cent pulverized bituminous coal and 60 per cent No. 6 (Bunker C) fuel oil, no "fixateur" or stabilizer being added. Previous research at the Atlantic laboratories on stabilities of mixtures showed about 40 per cent coal to be the optimum amount. The coals used were high volatile bituminous with about 37 per cent volatile and 5 to 8 per cent ash. Ash softening temperatures ranged from about 2300 to 2700 degrees Fahr. The oil had a viscosity of about 50 to 70 seconds Furol at 122 degrees Fahr. The viscosity of the mixture was about 300 to 500 seconds Furol at this temperature.

Three different batches of fuel were burned, the main difference being in the fineness of the grinding of the coal. Batches of coal were ground to pass about 88, 95 and 99 per cent through a United States standard 230-mesh screen (62 microns). This is considerably finer than that ordinarily used at plants burning pulverized coal. The Atlantic laboratory research indicated that a still finer grinding would be necessary for a colloidal fuel that would be reasonably stable.

Mixing: In general, it was found that the mixing of the coal and the oil required for the tests was less difficult than had been anticipated. A simple batchmixing device shown in Fig. 2 was used. The fuel oil required for the batch, about 7000 gallons, was put in the plant storage tank and then pumped from the tank suction line by an ordinary reciprocating pump. Its temperature was kept at about 85 degrees Fahr, by steam coils in the tank. A funnel in the suction line, mounted on a T and valve, was kept filled with pulverized coal. See Fig. 2. Under handvalve control, the coal was allowed to flow slowly into the stream of oil on its way to the pump. The mixture was discharged by the pump through two horizontal parallel pipes, each having an orifice near the end. The two streams of fuel met at the base of the vertical pipe, passed up and back into the storage tank.

The fuel was spilled into the tank at two outlets, one at each end of the tank. The coal was fed into the oil at the rate of about 1500 pounds per hour, the fuel being continually circulated at the rate of about 9000 gallons per hour.

After the required amount of coal was fed for the batch, the fuel was circulated for about 12 hours. Laboratory tests of samples of fuel taken at various places throughout the tank showed the mixture to be uniform. No further recirculating of the fuel was done during the burning tests at the boiler plant, the mixing device being valved off from the suction line.

Boiler Equipment: Typical boilerplant equipment was used. The suction line from the outside oil storage tank ran underground about 100 feet to the heaterpump set, Fig. 3. A steam line that helped maintain fuel temperatures to the pump paralleled the oil suction line. One pump was a reciprocating and one was a rotary. The fuel was heated to temperatures between 160 and 180 degrees Fahr, at the set and pumped about 110 feet to the boiler.

The burner used was a standard Best steam atomizing type, shown in Fig. 1. The fuel reaches a horizontal slot at the burner tip through the lower pipe; the steam reaches a vertical slot through the upper pipe and sweeps the fuel into the furnaces. The fuel and steam were under hand control.

The boiler was a 151-horsepower long-drum straight water-tube B & W 8 tubes wide and 9 tubes high. Fig. 4 shows the boiler front. The furnace was a typical brick set furnace, 10 feet high at the front from the floor to the tubes and 6 feet high at the rear. The furnace width was 5 feet and its length 15 feet, giving a furnace of about 600 cubic feet. The burner entered the furnace at the rear under a horizontal baffle extending about halfway the length of the tubes resting on the first row. The gases crossed through the tubes upward at the front

(Please turn to Page 137)

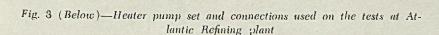
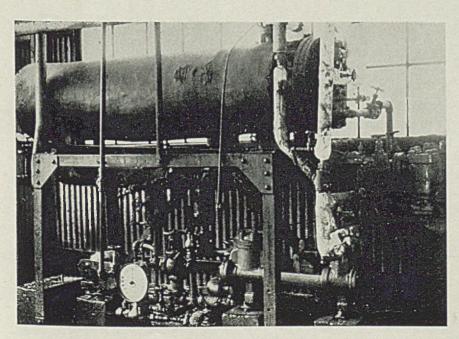
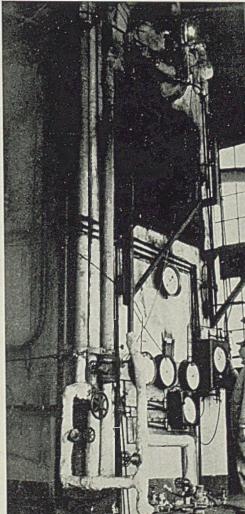


Fig. 4. (Right)—View of front of the 151-horsepower long-drum straight water-tube hoiler made by Babcock & Wilcox







OF ALL the aeronautical and military technical terms handled so glibly by columnists and commentators, perhaps none has been so much misunderstood or so poorly evaluated as "fire power".

Our military planes must possess a whole complement of highly jacked-up characteristics if they are to show superiority over enemy aircraft. They must conceivably have great level flying speed, high rate of climb, high ceiling, excellent maneuverability. But without fire power, the best plane in the world can be at the mercy of an inferior enemy craft with a single machine gun.

Much has been learned about the effect of various aircraft weapons in combat use. Much was known long before this present war started. Air action over Spain was taken to heart by many foreign nations, fortunately the British were the best students, and we may never know what we owe to the R.A.F. for their magnificent showing during the air blitzes over Britain. Heavily machine gunned Spitfires and Hurricanes did the trick then.

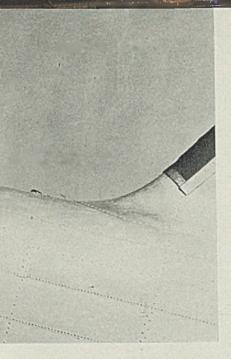
Today, with so many types of bombers and fighters in action, more radical means are indicated, more machine guns, more cannon, and new combat teamwork techniques.

British Spitfires and Hurricanes carried eight .30-caliber machine guns in

their wings, four on each side. How did these fast flying, fast fighting pursuits manage to down enough Germans with machine gun fire, whereas the Germans had both machine guns and cannon on their own planes?

#### The Answer Is Fire Power

Fire power is measured in terms of amount of ammunition, of weight of ammunition that can be shot from a single gun or from all the guns on a plane within a specified period of time. R.A.F. fighters of two years ago could pump out bullets at the rate of 1100 per gun per minute. Multiplied by eight, this means 8800 rounds per minute.



Right—Illustration shows splinters (actual size) from a Madsen 20-millimeter gun's 146-gram armor piercing tracer bullet when fired through a piece of armor plate (1-inch thick and testing 490 brinell) when placed 600 yards from gun. Splinters concentrated in area 18 inches in diameter 1 yard back of plate. Devastating effect can easily be imagined

By LOUIS BRUCHISS Ordnance & Aircraft Engineer New York

Each round weighs about 0.025 pound. Multiplied by 8800 this means 220 pounds of machine gun fire per minute.

Of course, no plane is ever able to maintain constant fire at an enemy plane for such a long period. A few seconds, at the utmost, is the longest period during which sighting, aiming and firing can take place. Within this time, enemy craft will maneuvre out of position, and a new offensive run must be taken, if possible. Total weight of fire is given only for comparison. The above performance was accomplished by the Hurricane I and the Spitfire IIa. The Hurricane IIb was equipped with twelve .30-caliber machine guns with a total firing rate of 13,200 rounds and a total fire weight of 330 pounds per minute.

Compare this with the German Messerschmitt Me 109F 1 and 2 which carried two .30-caliber machine guns and one 20-millimeter cannon each. The machine guns had a 700-round per minute firing rate, totaling 1400 rounds or a weight of 40 pounds per minute. The cannon-fired shells weighing ¼-pound or a total weight of about 225 pounds per minute (attained through a cannon firing rate of 900 rounds per minute with the Mauser cannon, fastest firing

in the world).

Total weight

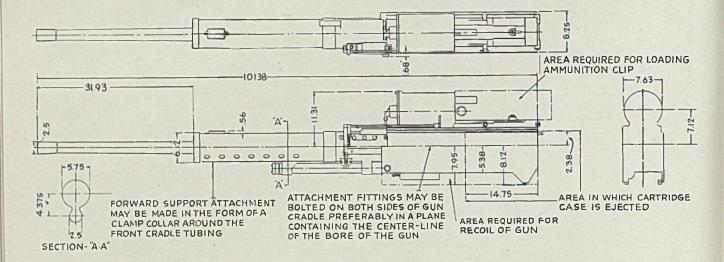
Total weight was still only 265 pounds against the British 220 pounds. These were for fighters and do not forget that the British for the most part shot down bombers which did not have fixed guns as do all fighters. The .30-caliber flexible guns of the German bombers were not up to the concentrated fury of the British fire, backed by more flexible planes and high speed.

The British rapidly adapted the fighting twins, the Spitfire Vb and Hurricane IIc, equipping the first with four .30-caliber machine guns and two Hispano Oerlikon cannon of 20-millimeter, and the latter with four 20-millimeter cannon. The cannon have a firing rate of 600 rounds per minute, giving the Spitfire a total fire weight per minute of 410 pounds and the Hurricane a total of 600 pounds. This is exceeded only in the Beaufighter I, which has six machine guns and four cannon with a total fire weight of 765 pounds per minute.

It is readily evident that fighter planes cannot carry unlimited ammunition. A few minutes maintained fire would necessitate tons of ammunition which they cannot carry. Machine guns were desirable because they were comparatively reliable, had a very high firing rate, even if this did not result in high total fire weight. The point is that a high firing rate assures some hits being scored, while a lower firing rate, as with cannon, may mean higher fire weight, but fire weight does not mean anything if it does not reach the enemy plane. Therefore the compromise between machine guns and cannon in the Spitfire and Beaufighter.

The Hurricane He has dispensed with machine guns altogether, giving all of its space to the four 20-millimeter cannon and ammunition. With a total firing rate of 2400 rounds per minute, this is not too bad. But reduced to seconds, this means only 40 rounds per second, not too wonderful, by the way, when an enemy craft may be passing you at a relative speed of 800 miles per hour!

In the first World war, the French tried out several installations of 37-millimeter cannon mounted on the engine to fire through a hollow propeller hub. The 1½-inch shell thrown out from this cannon did havoc to planes. One direct hit with it definitely brought a plane down, and even today practically no fighter can survive a direct hit with it,



and most bombers will suffer heavy damage,

Several French and at least one American flyer, Captain George Prince, tried out this lethal installation with some success. Its use was discontinued, most likely because of the weight of the cannon and its ammunition, the terrific recoil it must have had, and probably because accuracy and definite results were not always forthcoming. The plane equipped with the 37-millimeter may have had no other weapons and it is possible that enemy fighters would bank around and riddle the cannon plane with machine gun fire.

Today, the 37-millimeter automatic cannon is standard equipment for the Bell P-39, together with two .30-caliber and four .50-caliber machine guns. The British, favoring the 20-millimeter, have installed a 20-millimeter in the Bell, allowing them to obtain a higher firing rate and the use of more ammunition. The Lockheed Lightning P-38 also uses a 37-millimeter cannon together with a number of machine guns in the nose of its twin engined structure.

The Germans long ago had 20-millimeter cannon firing from the nose of the Messerschmitt. Now the Focke Wolf 190 has four 20-millimeter cannon in the wings, divided into two makes, the Mauser and the Oerlikon, one Mauser and one Oerlikon to each side.

There had been much discussion on the efficacy of 20-millimeter shells of both armor piercing and explosive type. Our military armament men have held that .50-caliber machine guns, if enough could be supplied per plane, were sufficient. In installations where really devastating power was desired, the \$7-millimeter was indicated. A prominent naval armament officer, Commander W. F. Boone, has stated that experiments showed a .60-caliber to be the optimum aircraft gun size.

In an article written a little more than a year ago Commander Boone stated that if curves were plotted representing

A typical 37-millimeter aircraft cannon design

all the factors which entered into the decision of choice of gun caliber for the fixed gun battery of a fighter plane, these curves would converge around the .60-caliber point, which means that a gun slightly larger than our .50-caliber was the optimum size.

This, however, was a year ago. Commander Boone hastened to add that the aircraft armament picture was changing constantly, with a continued race on between armor plate on the one hand and larger caliber guns on the other. Actually, armament experts see no limit to the size of the guns nor the thickness of armor plate which military aircraft of the future may carry.

#### Fire Power Measured in Seconds

Another important point, especially in regards defensive tactics, revolves about the location of the guns. If all are fixed to fire forward, the plane may easily be vulnerable to enemy craft from the rear. Similarly heavy bombers need fire power in the "belly" to prevent leaving a vulnerable point there.

Now while "fire power" may be the amount of metal that can be thrown at a target within a given time interval, it is also true that a plane having very heavy fire power may be inferior in an armament sense to another plane having lower fire power, but having a different setup of fixed or flexible guns. A plane carrying only 37-millimeter cannon for example, might have great fire power when measured per minute, but ultimately the test of fire power is measured in seconds. This means that the best offensive or defensive guns a plane can carry must have a high cyclic rate, and that if it mounts large caliber guns, they must be supplemented by a number of smaller caliber ones. In other words, there should be diversification of gun sizes.

On the other hand, there is a source of worry in the fact that while we expect to fly our heavy bombers through to vital enemy inland targets and have them come back to their bases, though attacked and hit by enemy planes carrying 20-millimeter cannon, how will our fighters without such cannon fare against enemy bombers?

This problem is being solved by arranging for 37-millimeter cannon on our planes; by assuring that our bombers carry more armament in more positions than the enemy. This is being done by arranging for improved types of machine gun and cannon ammunition which carry farther. When the range increases it does not follow that the plane mounting the guns will make full use of this maximum range, but it does mean that the trajectory will be flatter and that more accurate firing will result.

There are other developments which have to do with actual fire control of the large guns to be mounted on our fighters and bombers, and with new types of weapons which will materially reduce if not eliminate the enormous recoil of the present aircraft cannon. With these new weapons at our command, our superiority over the enemy.

Fire power may be further broken down into type and size of ammunition fired from a plane. A fighter with an offensive fire power of 765 pounds per minute as the Beaufighter I will throw 1234 pounds of metal per second against the enemy. If this weight is composed entirely of .30-caliber bullets, they may conceivably all hit the target without damaging it fatally, because each individual bullet would have low striking power and their total effect would be spread over wide sections of the target. If, however, two to four 37-millimeter shells with a total weight of much less than 12 pounds hit the target the result may be materially different. If one 3inch shell could be lobbed at the enemy,

(Please turn to Page 139)

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SCREWS BOLTS RIVETS	No. 1 (Type410) C10 Cr. 13.00	This stainless provides fair machining and good cold heading properties. It contains just enough chromium to yield ruly "stainless" properties. It resists the corrosive effects of fresh water, gasoline, crude oil, alcohol, ammonia, etc	190,000	Brinell 387	7.78	1200° F	Yes	Carpenter Stainless No. 1 is also used for springs, valve trim, pump shafts, and many heat treated parts. Available in forging billets, bars, wire, and strip.
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CHEMICAL PROCESS EQUIPMENT	No. 3 (Type 442) C15 Cr. 20.00 Cu. 1.00	This stainless is easy to form, bend, blank or punch. In addition to providing corrosion resistance to salt water, practically all organic chemicals and acids, it has excellent heat resistance properties.	125,000	Rockwell C 28 187 Brinell	7.69	1600° F	Yes	No. 3 does not become embritted by glain growth at high temperature — used for scale resisting purposes. Furnace parts, sool blowers, ladles for molten non-ferrous metal, etc. are made from it. Available in bars, forging billets, strip, wire and welded tubing.
OIL FIELD EQUIPMENT	No. 4 (Type 302) C10 Cr. 18.00 Ni. 8.00	This tough and ductile stainless responds easily to deep-drawing, blanking and forging. It has all the corrosion resistance of No. 1 and No. 3, plus resistance to dyes, foodstuffs, most organic chemicals and a wide variety of inorganic chemicals.	85,000	Rockwell C 43 160 Brinell	7.93	1600° F	No	Used extensively in form of cold rolled strip for stampings, springs, etc.—and in the form of wire for woven screens, dipping baskets, etc. Available in bars, forging billets, strip and wire.
INSTRUMENT PARTS	No. 5 (Type 416) C10 Cr. 13.50 S30	No. 5 machines in automatic screw machines about like SAC 1120. Cut- ting speeds between 125 and 200 surface feel per minute are common. This stainless resists the corrosive action of mercury, steam, crude oil, sugar solutions, mine water, etc.	80,000	Brinell 351	7.77	1200° F	Yes	A Free-Machining grade for parts made on automatic screw machines or machine from forgings—such as value trim, pump shafts, hexagons for nuts, capscrews, and other hexagonal parts. Available in forging billets, bars and wire.
MOLDING and TRIM	No. 6 (Type 430 C10 Cr. 17.00	same corrosive elements as Carpen	125,000	Rockwell C 25 150 Brinell	1 305 3 50	1300° F	Yes	Used in the form of cold rolled strip for making stampings, etc. In the form of cold drawn wire for woren screens, screws, bolts, rivets, and other cold headed products. Avail- able in bars, forging billets, strip and wire.
SCREW MACHINE PARTS	No. 8 (Type 303 C10 Cr. 18,00 Ni. 8,00 Se25	stainless is generally used instead of No. 4. This type provides the same		Rockwell C 35 160 Brinel	A LOUIS NO.	1600° F	No	A Free-Machining grade for use in automatic screw machines or forgings to be machined. Recommended for parts requiring greater corrosion resistance than Carpenter Stainless No. 5. Available in same forms as No. 6.

\*NOTE: Physical properties depend upon form, heat treatment or cold working. Slightly wider ranges of properties are possible in certain forms. Take up your special problems with our Metallurgical Department.

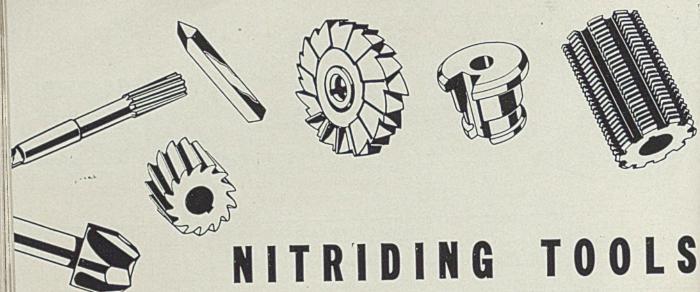
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In Liquid Salt Baths

A group of small tools suited to nitriding in a salt bath

By G. W. ESAU E. F. Houghton & Co. Philadelphia

NITRIDING—the production of a superficial hard case on heat-treated high-speed-steel tools—has been studied by manufacturers of salt bath materials as a research project for developing a liquid salt nitriding bath that will assure uniform and controllable results. As a result of the project, an effective salt bath for the nitriding operation was developed and has been utilized for several years. In the creation of the successful product, the reason for the erratic results obtained from the mixtures of potassium and sodium cyanides used in earlier practice was incidentally disclosed.

Research revealed that the objectionable feature of the earlier mixtures the formation of carbides—was at a definite ratio with the depreciation of the cyanide, and at the same time explained the soft skin which often resulted.

It was definitely proven that any appreciable formation of carbon produces the soft skin. Actual carburization of the surface of high-speed steel in former nitride casing was responsible for a result which many heat treaters had believed due to decarburization in the preceding heat treatment.

When the potassium and sodium cyanides mixture was fresh and unimpaired, the case would be practically all nitride, with little or no carbide. With continued cyanide depletion, however, the nitride diminished and carbide formation increased, with carbide percentage at times greater than the nitride.

A modern liquid salt bath for nitriding has a melting point of 920 degrees Fahr, with an operating range of 1000 to 1200 degrees Fahr, to select an ex-

ample. It is a cyanide base bath, to which other materials have been added to control the rate of cyanide decomposition, to control the rate of nitride absorption, and to inhibit the absorption of carbon or carbides.

Stable and uniform results are obtained from this balance of factors. The addition of fresh salts to replace dragout losses will usually maintain bath efficiency. If there is little drag-out loss, the bath can be bailed out periodically by 5 to 10 per cent and replacement made with fresh salts. Conventional salt-bath equipment is used. Pressed steel pots give exceptionally long pot life at the low temperature involved.

The temperature must be closely controlled to avoid exceeding the final tempering temperature which, with finish grind, precedes the nitriding bath. The risk to be avoided is the production of a soft core of the original high-speed analysis under the case.

Usual temperature of the nitriding temperature is either at, or slightly below, final tempering temperature—generally in the range 1025 to 1050 degrees Fahr. Extremely fragile tools are treated in the range 950 to 1000 degrees Fahr. Time of treatment varies from 10 to 90

minutes.

Tools subject to considerable chatter or shock, especially those used on ferrous materials, are treated for shorter periods for best results, whereas longer treatment is of advantage in nitriding tools for nonferrous metals and plastics. Temperatures would be the same in both ranges, depending upon the other variables and the tempering temperature

which was utilized.

An extremely heavy case should be avoided. A heavier case will yield more pieces of work between grinds, but the possible number of grinds per total tool life might be decreased, due to deeper chipping when the tool does fail.

The usual depth of the nitride penetration is from 0.001 to 0.002-inch for treatments of 30 to 90 minutes, and below 0.001-inch for treatments of 10 to 20 minutes. The superficial case is extremely hard and cannot be measured by ordinary hardness methods, but must be determined by scratch test or Vickers hardness readings.

At 1050 degrees Fahr., 30 minutes immersion, a penetration of 0.0013-inch averaged 937 brinell; at 60 minutes, penetration of 0.0017-inch averaged 1026 brinell; at 90 minutes, penetration of 0.0019-inch averaged 1065 brinell. These readings were determined by Vickers and transposed to brinell figures. These brinells may be slightly low, as even the Vickers may be recording some of the hardness of the true high-speed-steel backing and not the true abrasive hardness of the nitride case, where the case is so thin.

The high-speed steel manufacturer has gone to great pains to determine the ideal analysis and eutectics of the alloys in his steels to give the greatest hardness and performance when properly hardened, therefore any additions to or subtractions from these elements are not usually beneficial. So the heat treater should be very careful not to alter the outside analysis in his work unless it is by an approved process. Nitriding does add a certain extreme

## PORTER DIESEL ELECTRIC SWITCHER

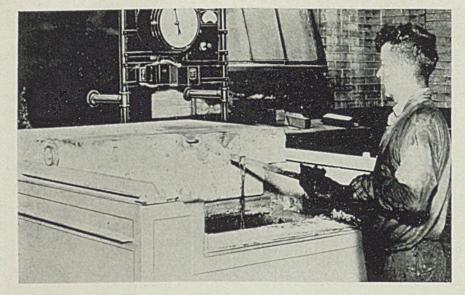






Designed to provide instantly-available motive power for a wide range of switching jobs, the 80-ton Porter Diesel-Electric sets a new high standard of availability and low-cost operation. Modern in every respect, the new PORTER has many features of advanced engineering design, placing it far ahead of its field. The locomotive illustrated is powered by two independent 250 h. p. Diesel-Electric units. Thermostatically-controlled oil cooling system insures proper lubrication at low cost. Safety platform with steps at all corners speeds up switching operations. This mighty 80-ton Porter is an ideal unit for all heavy switching purposes. Complete description sent on request.





abrasive hardness to the outer skin without penetrating to any great depth, and thereby not altering the ductility of the entire tool. Carburization of the 18-4-1 tungsten type and decarburization of the "moly" type do produce soft skins to a depth which cannot be corrected.

The nitriding treatment does not increase the size of the tool, when tempering has been completely effected. Many tests and measurements have determined that variations in size between proper tempering operation and nitriding in the liquid salt fall within 0.0001-inch. Any greater variation would not be due to the nitriding action, but is caused by undue transformation of austenite to martensite, which is induced by improper heat treatment and draw prior to nitriding.

The ideal condition for high-speed steel, after hardening, is the austenitic state in which most of the tungsten and chromium carbides are absorbed in solid solution. This austenitic state is then drawn at 1050 to 1150 degrees Fahr. so that it slightly approaches the martensitic.

It is essential that tools be correctly heat treated before nitriding, with no carburized or decarburized layers. Of the two, a slightly decarburized layer would be preferable, as the addition of nitrides to the surface of the steel will tend to neutralize the soft skin produced by decarburization. When soft skin is caused by over-carburization, the addition of nitrides to the surface laver will have substantially less effect in producing the desired superficial hard case. A super-saturation of elements above that put in by the tool steel manufacturer does not usually add to the qualities of an already high-alloy high-speed steel, so care must be used with any atmosphere which will add to or subtract from these elements.

Complete salt-bath treatment throughout eliminates these variables. The present salt-bath materials are easily controlled, so that any type of high-speed steel, including the molybdenum types which are prone to decarburization, can be heat treated without carburization or decarburization. This complete salt-bath treatment of high-speed steel tools is gradually replacing the "controlled atmosphere" method.

The increase in tool life resulting from the salt-bath nitriding treatment when applied to correctly heat-treated tools is phenomenal. There are many cases where tool life has been increased by 200 to 300 per cent, and in some instances to as high as 500 per cent.

#### Cost Is Very Low

The expense of the salt-bath treatment in heat treating and nitriding highspeed steel tools is extremely low, and should be eliminated as a factor when compared to the actual savings accruing from increased tool life and greater production between regrinding operations.

Another important point contributing to ultimate production figures is the cutting oil. Efficacy here is not a matter of sulphur content only, but how that sulphur is "wrapped up." As the high-speed steel manufacturer has carefully wrapped up all his alloys into an ideal eutectic combination or analysis, so also the fats, the chlorines and the sulphurs must be efficiently combined to release what is necessary at the tip of that tool and on the chip.

The treatment of high-speed tools is most important today. Formerly any fair treatment gave good results. Now, since we are trying to get the optimum out of every tool, we dig deeper into our former failures, thereby discovering errors and improvements in methods of procedure. The time out for tool changes

and fresh setups was formerly regarded as of little importance. Now we watch pieces per grind and total pieces per tool—all to keep machines constantly in motion and to save high-alloy steels.

#### Saves Enough Copper To String 25,000 Miles of Wire

More than 4,400,000 pounds of copper or enough to make 70,500,000 30-caliber cartridge cases or more than 25,000 miles of No. 12 telephone wire, it is estimated, will be saved by Sloan Valve Co., Chicago, in manufacturing a redesigned toilet flush valve. According to the company, the net copper content of the valve was reduced from approximately 6 pounds to less than 4 ounces.

The savings resulted from substituting various plastics and malleable iron for the more critical brass used in the component parts of the unit.

The new valve, called the "victory", is the result of collaboration between Sloan engineers and the Chicago Molded Products Co.

Body of the flush valve presented the best opportunity to conserve copper, now being of malleable iron. A plastic lining is incorporated in the body.

#### Synthetic Sponge Rubber Stays Soft at 40° Below

A synthetic rubber sponge which will stay soft and compressible at 40 degrees Fahr. below zero was recently developed by B. F. Goodrich Co., Akron, O. Of medium density, it is black in color, and can be furnished in slabs or molded shapes.

#### Flex-Abrasive Offers New Line of Metal Removers

A new line of self-dressing, flexible abrasive wheels and points for deburring exterior edges and finishing irregular surfaces, ordinarily hard to reach, such as holes, openings and corners is announced by Flex-Abrasive Co., 100 North Lasalle street, Chicago.

Metal removers in the line are made in different types and sizes for use on hard alloy steels or other materials.

Mandrels are of tapered thread construction, firmly locking the abrasive wheel or point to the shaft by its rotary motion. According to the company, an inexperienced operator can remove or replace a wheel or point from the mandrel quickly without use of tools.





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## SPOT WELDING ALUMINUM

Why is spot welding of aluminum in aircraft desirable; and if it is desirable, why is it not employed more widely? What is the best type of welding equipment? What are the relationships between time, power, pressure and tip diameter? Is there an "ideal" electrode material? How about refrigerating the tips?

(This is No. 2 in a Series on Metallurgy of Resistance Welding)

EVER SINCE recognition of the importance of airpower in modern warfare, the use of welding for aluminum fabrication has seen intensive development.

Although both gas and are welding of aluminum were well established arts, there was much to be learned about spot welding the aluminum alloys.

As usually happens under the stress of wartime research, the scientific knowledge of the many factors contributing to consistently good spot welding of aluminum materials has progressed so rapidly that metallurgical factors have been advanced further than engineering applications.

Spot welding quite generally is restricted by aircraft designers to secondary structures—parts whose failure would not seriously affect the performance of the airplane. Riveting remains By HAROLD LAWRENCE Metallurgist and Welding Engineer

standard practice in by far the majority of primary structure designs, notwithstanding the obvious advantages afforded by spot welding.

With manhours of labor at a premium, the savings in labor introduced by spot welding become most important. For example a flush riveted panel comprising a sheet 24 x 60 inches and five angle stiffeners requires 88.3 man minutes whereas the same panel may be spot welded in 32.8 man minutes. Or take another skin-stiffener assembly where riveting consumes 32.1 man minutes per unit while the spot welded assembly time is but 13.5 man minutes. In these two typical examples welding takes less than half the time required for a first class riveting job.

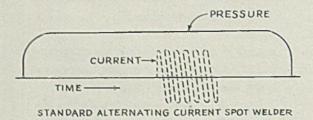
Streamlining aircraft structures for aerodynamic reasons has been practiced for some years. Projecting rivet heads introduce resistance due to drag. Power to carry the aircraft at top speed is thereby increased. Or if the power is held constant, a smooth rather than a rough surface will lead to greater speed. Of course a smooth surface may be achieved by flush riveting although the cost is high and the time consumed far out of line compared with welding.

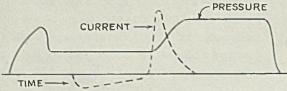
#### Rivets Allow Flexibility

Why then, if the advantages of spot welded construction have not been overstated, have designers been reluctant to specify this type of construction? The reasons are twofold. First, the riveted structure is more flexible with enough play in the entire structure to allow, presumably, each rivet to assume its share of the total load. Spot welds being more rigid cannot yield to permit even stress distribution unless they possess considerable ductility.

Second, perfection in the structure of spot welds, metallurgically speaking, is not attained 100 per cent of the time. Cracks and structural inhomogeneities are discovered from time to time and it is feared that these imperfections detract

Fig. 1—Electrical characteristics of three basic types of machines for spot welding aluminum including standard alternating-current spot welder, electromagnetic storedenergy equipment and electrostatic stored-energy systems





ELECTROMAGNETIC STANDARD ENERGY SPOT WELDER

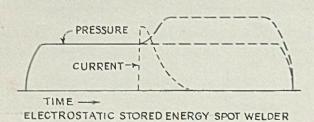


TABLE I—Machine Settings for Alternating-Current Spot Welding of
Aluminum Alloys

Corporation Corporation Times are the set of the second of t

		Anuminum	Anoys		
B. & S.	Gage	Time,	Current,	Tip pres	sure, lb.
No.	Inch	Cycles	Amperes	Min.	Max.
26	0.016	4	14,000	200	400
24	0.020	6	16,000	300	500
22	0.025	6	17,000	300	500
20	0.032	8	18,000	400	600
18	0.040	8 10	20,000 22,000	400 500	600 700
14	0.064	10	24,000	500	700
12	0.081	12	28,000	600	800
10	0.102	12	32,000	800	1,000
8	0.128	15	35,000	800	1,200

#### TABLE II—Typical KVA Demand on 60-Cycle Single-Phase A-C

Aluminum Gage	12 in.	18 in.	24 in.	30 in.	36 in.
0.020	50	60	70	80	90
0.040	75	80	95	110	130
0.060	100	125	140	150	190
0.080	150	160	190	210	250
0.125	200	250	300	330	400

TABLE III—Typical KVA Demand of Stored Energy Aluminum Welding Machines

Aluminum Gage	Operating Speed Spots per minute	Kva Demand
0.020	110	40
0.035	90	40
0.060	70	50
0.080	50	50
0.125	20	70

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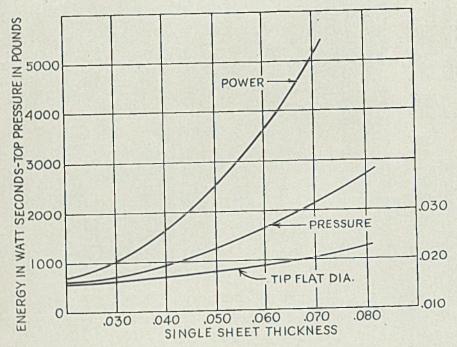


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from the satisfactory performance of welded structures.

All welding progress has been made as a result of time consuming tests that have gradually pushed back the frontier of ignorance. Similarly extensive testing programs are now under way to prove to the skeptics (and when the importance of safety is realized, the skeptics have their points) that adequately designed welded structures containing good, although not necessarily perfect, spot welds will mean more and better aircraft with a fixed number of expendable manhours of labor.

Since by far the greatest amount of spot welding is done in the aircraft industry, this discussion will center about the problems of that particular field. However, the uses of resistance welding in joining the aluminum alloys in other industries will not differ appreciably from aircraft fabricating practices. While most of this article will consider spot welding, it must be understood that the same factors will be encountered in seam welding which may be considered to be nothing but spot welding with the spots spaced as close together that they overlap.

Both spot and seam welding of the aluminum alloys is accomplished by three fundamental types of equipment—alternating current, magnetic energy storage and condenser energy storage. Fig. 1 illustrates the simple pressure, current and time relationships possessed by each of these welding units.

As was pointed out in an earlier article on spot welding of steel (see "Metallurgy of Spot Welding", Steel, March 29, 1943, p. 100), the heat generated in a spot weld is proportional to *IRT* where *I* is the current, *R* is the resis-

tance and T is the time. These relationships make spot welding under a fairly wide group of conditions relatively simple in welding steel with its rather wide plastic range. With aluminum, though, the problem is somewhat more complex.

Aluminum has a high heat conductivity and low resistance which means that the weld must be made quickly if the heat losses are not to be excessive. The answer lies in high weld currents and short weld cycles together with precise pressure control tuned to the comparatively narrow plastic ranges of aluminum alloys. Heat input must be so rapid that little heat can escape from the weld nugget during the time of the weld.

Of course the use of high currents with alternating-current spot welding machines results in a heavy power demand on that single phase of the power line that energizes the primary of the welding transformer. Along with this heavy demand are the detrimental influences, from the point of view of efficient use of power, of a low lagging power factor together with a low load factor. Of course these problems can be solved with additional electrical equipment but the trend has been away from the alternating current types of welders to the stored energy varieties which possess more favorable power characteristics.

In alternating-current welding, the welding current is obtained from the secondary coil of a welding transformer having a turn ratio of from 20:1 to 100:1. Either 220 or 440-volt 60-cycle power is used to energize the primary coil. And electronic tubes are generally selected to control the time of welding.

The welding current required is a

Fig. 2 — Stored-energy machine settings for spot welding 24 ST Alclad material

function of the thickness of the material to be welded. Current is adjusted in steps of about 1000 amperes by means of taps on the primary of the transformer or through a separate auto-transformer.

Frequently delayed ignition of the electronic timer tubes is arranged so as to change the wave shape of the welding current. This method may be utilized to reduce the current to about 50 per cent of maximum while a series-parallel switch may be provided on the welding transformer primary to permit a reduction in current to 25 per cent of maximum. Such arrangements permit normal ranges of material thicknesses to be covered adequately.

Although the welding pressure may be applied by mechanical means, compressed air operation is most popular because a compressed air supply is readily available in most plants.

Because of the rapid softening of aluminum at welding temperatures, a slight movement of the welding electrode into the material being welded is desirable. Although the movement is small, it must take place very rapidly—in about 0.002 to 0.005-second. For this reason a moving electrode system possessing low inertia and virtually frictionless is necessary to keep the electrodes and the material being welded in positive contact.

Both magnetically and mechanically operated welding contractors have been used as switches in the supply line of the welding transformer primary in order to control the welding times. An accuracy of plus or minus one cycle is necessary. Furthermore, it is desirable that welding timers be adjustable to operate to close the circuit at a definite point in the voltage wave and to open the circuit when the welding current passes through zero.

Many alternating-current welders are equipped with electronic controls to regulate the duration of the welding current. Uniform weld appearance and improved spot consistency are obtained when electronic controls start the flow of current in synchronism with the supply voltage. When electronic controls adjust the magnitude as well as the time of welding current, a smooth, stepless adjustment of welding heat results.

Table I lists the recommended welding conditions for alternating current spot welding of aluminum alloys.

Since the aircraft companies employ large numbers of spot welders, there arose a demand for a machine that re-

(Please turn to Page 140)



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# Trend in Electric

MELTING of steel in the basic electric furnace is based on three important fundamentals:

1. When the charge is melted the combination of a high degree of oxidation plus high lime in the slag and low temperature permits the elimination of phosphorus as calcium phosphate.

2. After the first slag is removed, a second high lime and low silica slag of extremely low oxidizing power, combined with high temperature, promotes low sulphur and equilibrium conditions in the metal.

3. A dead melted inactive bath on the cold side means steel high in inclusions and otherwise low in quality.

The first of these three fundamentals is common to the basic open hearth, as during the melting and oxidation period the basic electric furnace program is similar to that of the basic open hearth. The importance of low temperature in combination with a highly oxidizing bath has in many cases been overlooked as a most important factor in the elimination of phosphorus. In many electric furnaces (and some open hearths) much trouble has been met with in trying to oxidize phosphorus at temperatures which were too high.

There is some disagreement among electric furnace operators as to the exact function of the second slag. In many cases much time and effort are put upon obtaining a calcium carbide type of slag, as if this were the sole criterion involved in the making of electric furnace steel. The first and most important advantage of the second slag is its high basicity and its low oxidizing power. This is the combination which permits the making of steel under conditions where equilibrium is obtained with the very minimum of products of oxidation.

There are few if any melters who have not been convinced that the combination of an active bath with high temperature is necessary to insure cleanliness and to minimize the tendency towards flaky steel.

Melting in the basic electric furnace can be divided into six different periods, as follows:

- 1. Charging the furnace
- 2. Melting the charge
- 3. Oxidation period
- 4. Deoxidation period
- 5. Adjusting of analysis
- 6. Repairing furnace after tapping

Charging Period: The charge period is an important factor in the production time required as well as in the quality of the steel produced. The charge should, if possible, be of sufficient density so that it can be entirely charged in a single operation, leaving no excess for recharging after an initial melting period. Likewise, the charge should be such as to facilitate as rapidly as possible the formation of a pool of liquid metal on the bottom under the electrodes. The scrap should be selected so as to utilize the high voltage taps to a maximum by spreading the arc throughout the charge. This means that the charge must not be too solid or packed so closely that the arc will be localized. If too large a mass is in the heavy billet type of scrap, there may be considerable difficulty in getting either a complete melt or a maximum distribution of the arc for the quickest melting

Just what constitutes the ideal charge is difficult to say, but since a proper distribution of the charge is of extreme importance in the melting, each melter should make a special study of this phase of his operations. Certainly a large amount of heavy bars and billets is desirable, but with them should be charged a sufficient amount of plate scrap, flashings, crushed turnings, etc., to insure the maximum results from the power consumed. It seems to be the general opinion that a small amount of light scrap is desirable on the bottom of the furnace inside the electrode circle. If possible, the heaviest scrap should be directly under the electrodes.

One of the questions which must be answered in selecting an electric furnace is that of the manner in which it is to be charged. In the large type of furnace there is some difference of opinion as to the relative advantage of top charging and charging by means of a charging machine. It is obvious that the top charge method has some advantages, but it also has some serious disadvantages. With a proper grade of scrap and with experience in putting this scrap into the charging bucket, it is possible to reduce the time of charging to a matter of a few minutes. There is also room for much improvement in the charging bucket design. With the poorer grades of scrap it is difficult to arrange the scrap so that the arcs are used to best advantage. The charging bucket in which the bottom is held in position by a heavy rope that burns off in the presence of the hot furnace bottom requires that the bucket be a considerable distance above the furnace bottom to permit free swinging of the bottom segments after the rope burns off. This results in a considerable shock to the furnace bottom and interferes with the placing of scrap where most needed.

The charging machine method, on the other hand, has the serious disadvantage of requiring a considerably longer time, although with less wear and tear on the furnace itself. It permits of a better arrangement of the scrap in the furnace so that it is possible in some cases for the loss of time in charging to be offset by the faster melting. Apparently the top-charged furnace is at its best in ranges up to 40 tons capacity, while in sizes above 40 tons the charging machine type is preferred.

Melting Period: The question of ore addition with the charge is one which has not been fully answered. One group insists that some ore be charged with the scrap. Another believes that no ore should go in with the charge, but that heavy additions should be made as soon as the charge is partially melted.

By H. W. McQUAID
Assistant Chief Metallurgist
Republic Steel Corp.
Cleveland

From a paper presented before American Iron and Steel Institute, New York, May 27.

Steelmak

A third group believes that no ore should be added until the scrap is completely melted. Apparently the first group represents the most modern and successful practice, since it is not at all uncommon in some of the larger plants to add up to 3000 pounds of ore with the charge in a 60-ton heat. Addition of the ore with the charge has merit in that it insures oxidation of the phosphorus. This oxidation takes place most rapidly at the lowest temperatures, which would, of course, be those at which the bath was first formed. Some plants have difficulty with the action of the ore boil on the electrodes and prefer to add the ore just as soon as there is sufficient bath to permit it, without too violent action under the electrode.

Some melters, even with a heavy charge which will permit the full charging of all the scrap at one time, prefer to hold out some low phosphoruslow-carbon scrap which they add after the first melt-down in order to act as a cooling agent to insure as complete elimination of phosphorus as possible. There is also some difference of opinion as to the lime addition, some melters preferring to add lime with the charge and others to make the initial lime addition after the bath has been well formed. Most melters seem to prefer to add some lime after melt-down, whether they have added any with the charge or not. The lime charge varies considerably from one plant to another, ranging from approximately 2 to 4 per cent. Most successful melters, especially on the larger furnaces, seem to have better results with the lower lime addition, insisting that the high lime charges are a factor in the power consumption. They claim that a 2 per cent lime charge is adequate to retain the phosphorus in the slag as calcium phosphate and that any addition above this unnecessarily increases the resistance to the arc.

Relatively high carbon on melt-down and ore lime charges are important to achieve maximum speed of phosphorus reduction, low hydrogen and fast working of the heat. If the charge is one which would tend to melt low in

carbon it is actually better to charge coke or scrap electrodes on the bottom are close enough to the bottom to insure

carbon it is actually better to charge coke or scrap electrodes on the bottom to get the advantage of the lower melting point of the higher carbon steel. The carbon boil is an important factor in producing the highest quality steel and must be included in the melting program.

The melting time in the basic electric furnace is the most expensive period, during which the furnace is being utilized to do work for which it is least well adapted. Power consumption and electrode consumption are at the highest. The design of the furnace and the power available enter, of course, into the rate of melting, but it has been my observation that operators seem to be afraid to utilize to the maximum the power they have available and, consequently, do not push their furnaces as much as they could.

Some operators are having good success by using to a maximum the voltage and power available. One successful melter is strongly of the opinion that maximum power should be used from the start of melting; that the quicker melting will have less adverse effect on the furnace itself. This, of course, is governed by the type of scrap which is being used. If the charge consists of too much heavy scrap the voltage must be

arc close enough to the bottom to insure liquid melting at this point. If the arcs are too long, with an excessively dense charge, there is a tendency for the liquid bath to be formed before the heavy scrap on the bottom has completely melted, a difficult condition to overcome. The fundamental requirement of melting is to melt from the bottom up, and this usually means that the electrodes must penetrate close to the bottom before applying all possible power. In doing this, of course, it is necessary that a liquid bath be formed of sufficient size to protect it. After the electrodes have penetrated close to the bottom the maximum power should then be applied to complete the melting of all the scrap as soon as possible. This is one means of shortening the time of a heat and all possible power should be used after the electrodes have reached the low point. Every effort should be made to prevent the formation of a bath in which the surface is hot and liquid while the bath in contact with the bottom is in a relatively cool, pasty condition, which resists melting.

The contour of the furnace bottom and walls should be designed for fast melting. Many furnaces have improperly built up bottoms with banks too flat and bottom too deep. The angle of the sidewalls and the backwalls should be steeper than is generally the case. Good results have been obtained by increasing both the steepness of the walls and the flatness of the bottom. Walls should not be so steep that all metal cannot be removed from them in tapping the furnace, but they should be as steep as possible up to this point. Increasing the steepness of the banks and walls

slag at a highly accelerated rate. In fact, where we have an inactive bath and low temperature at the bottom, the inclusions are most difficult, if not impossible, to remove.

There is some difference of opinion as to the best means for insuring steel of maximum cleanliness, but the first requirement in this respect is the avoidance of a cold, inactive bath. Most successful producers of the highest grade

electric furnace steel, in order to meet

severe requirements under microscopic

and macroscopic etch tests, feel that a

high degree of oxidation is essential.

They recommend the charging of ore or

scale with the scrap or their introduc-

tion as early as possible into the first

bath formed. Some successful melters

feel that in addition to being an im-

portant factor in phosphorus reduction

and necessary to insure low hydrogen, it

is essential to the proper cleaning up of

the steel. Some insist that the metallic

silicon be reduced to as near zero as

possible. Complete oxidation of the sili-

con may be of importance in insuring

that, during the subsequent period of

deoxidation, no silicon is being oxidized

while other less stable oxides are being

As soon as the bath is completely

melted down, the first step in proceed-

ing with the heat is to check the bath

for analysis. Tests should be taken for

carbon, manganese, phosphorus, sulphur,

chromium, nickel and molybdenum. If

the nickel and molybdenum residuals

are of no particular interest these analy-

could be made to the production of basic electric furnace alloy steels would be the widespread adoption of specifications for the chromium-nickel-molybdenum types. The general use of steels of this type, such as are specified in the N.E. grades, would simplify greatly the handling of scrap for the electric furnace and would permit important savings at those particular shops where alloy additions are made.

One of the greatest contributions which could be made to production of basic electric allov steels would be the widesoread adoption of specifications for chromium-nickel-molybdenum types

reduced.

As soon as the tests are taken, it is customary to add ore and then the balance of the lime necessary to produce a slag having the desired basic properties and a bath with a high degree of oxidation. By the time the reports on the carbon are back from the laboratory, if the oxidation has been sufficient, and the temperature has increased to the point where carbon is being actively removed, it will generally be found that the silicon has approached zero and that further oxidation is unnecessary.

promotes the use of a higher and wider bottom. This decreases the adverse effect of arcs which come too close to the bottom on melting and also facilitates greatly the ease with which the total scrap melts down. One of the signs of a poor furnace contour is the tendency of scrap to lie on the banks and require "pushing in." It is my observation that the study of bank and bottom contour is of primary importance in obtaining the fastest melting with the minimum of harm to the furnace itself.

If the analysis indicates that the carbon is still higher than desired, it will be necessary to prolong the oxidation period until the carbon is safely under the minimum specified. If the conditions for charging and melting have been correct, the phosphorus should be under 0.020 per cent, which is satisfactory for practically all alloy steel requirements. There is some tendency for phosphorus reversion if the lime-silica ratio is too low and if the temperature too high. For this reason the melter should check the lime-silica ratio wherever there is any doubt by making a "pancake" test, which indicates by its appearance when the slag is definitely basic.

Oxidation Period: The next period in the making of basic electric furnace steel is the oxidation period. This period, begun with the formation of the liquid steel, is a most important factor in the production of high-quality electric furnace steel. It is the period during which phosphorus, silicon, carbon, manganese, etc., are oxidized and during which the temperature of the bath is increased to the point where the steel can reach high enough fluidity to permit the removal of solid nonmetallic inclusions. The degree of oxidation of the bath is determined by the chemical and physical characteristics of the scrap and the grade of steel being produced. Low phosphorus, low silicon and oil-free scrap require less oxidation than those charges containing high phosphorus, high silicon and oily scrap.

Deoxidation Period: We have now reached the end of the oxidation period and should immediately start to remove the iron oxide from the bath and at the same time all possible insoluble oxides which would make the heat un-

Steels which must be low in hydrogen, and lower carbon steels, naturally require more oxidation than the highearbon grades. High oxidation is important in promoting uniform temperature, in reducing hydrogen difficulties, and in insuring low phosphorus. The action which results from the high oxidation is beneficial in promoting circulation of the colder steel on the bottom, so that from this standpoint alone action is important. The circulation is an important factor in cleaning up the bath by causing the formation through contact of larger inclusions from smaller ones. These larger inclusions, as the bath becomes more fluid, rise into the and with increased temperature and high manganese the chromium recovery from the slag is high

If manganese reboil and manganese addition is timed cor-

rectly, only about 20 per cent manganese is lost in first slag,

ses can be eliminated. In some heats it is also desirable at this point to analyze for copper, tin, etc.

The problem of residuals has become acute due to the difficulty of obtaining scrap which is free from nickel, molybdenum and copper. If the specifications require a nickel-chromium, a nickel-molybdenum, or a chromium-molybdenum type of steel, all of which grades are commonly specified for aircraft use, scrap must be available and the charge must be selected so that the unwanted element is below the maximum. One of the greatest contributions which

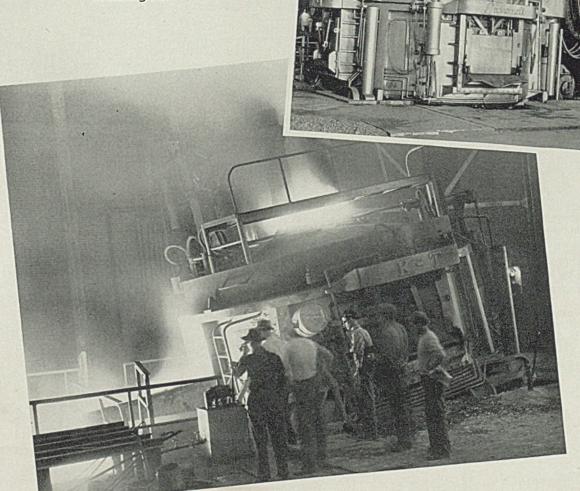
desirable from the standpoint of cleanliness. The object of the deoxidation period primarily is to obtain a bath which is as free from oxides and sulphides of all types as is commercially possible and in doing this to have it in equilibrium with a slag which is also commercially free from iron oxide. At the end of the oxidation period the steel should be increasing rapidly in temperature, approaching at least 2900 degrees Fahr.; the carbon should be about 10 points below the desired minimum, the silicon should be close to zero, and the

(Please turn to Page 142)

# MOORE RAPID LECTROMEST FURNACES

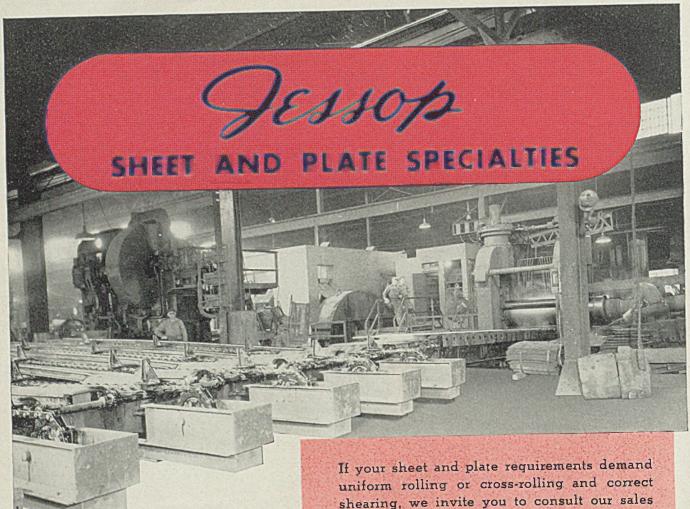
For the production of plain carbon and alloy steels for ingots and castings, and gray and malleable irons.

Fast economical quality tonnages.



Pittsburgh Lectromelt Furnace Corp.
PITTSBURGH . . . . PENNA.

July 12, 1943



## JESSOP STEEL COMPANY

HEAD OFFICE AND WORKS

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FSTABLISHED 1901

If your sheet and plate requirements demand uniform rolling or cross-rolling and correct shearing, we invite you to consult our sales representatives, located in all principal cities. These products have improved physical properties and unusual freedom from scale, pit marks, and surface imperfections. All orders, large and small, receive individual attention both in manufacture and service.

Our quality products in sheet and plate specialties are:

High Speed Sheet Stainless-Clad Steel Solid Stainless Steel Circular Saw Steels

Light Armor Plate (Homogeneous) Light Armor Plate (Face Hardened) Light Armor Plate (Non-Magnetic)

Rectangular Saw Steels
Aircraft X-4130 Sheets
Cutlery Steels

Gin Saw Steel Magnet Steels Knife Blade Steels

Hacksaw Sheets

(High Speed, Tungsten, Alloy, Carbon)

Back Spring Steels Non-Magnetic Steels

Quality Spring Steel

And many other specialties.

What are your special requirements in grades of electrically melted steel?

#### CHOOSING

# THE RIGHT SLING

By C. R. HOCHMUTH Assistant Works Manager Kearney & Trecker Corp. Milwaukee

AS MANUFACTURERS of milling machines, we have to handle a variety of loads throughout our plant, such as steel rods, rough castings, parts with finished surfaces and completed assemblies. In addition to truck and trailer transportation throughout the plant and a roller conveyor on the loading dock, many loads are handled by a crawler crane in the receiving department and by overhead electric traveling cranes and jib cranes in the plant.

In the selection of slings for suspending the loads from the crane hooks, consideration has been given to the ease of manipulating the sling, the possibility of the sling becoming damaged by sharp corners on the load, the effect of the sling on polished surfaces, and the ease of sling inspection.

Where the sling does not come in contact with polished surfaces, we favor the wire-rope sling, preferably made of preformed rope. Where polished surfaces must be protected, we employ slings of manila rope.

All our wire-rope slings are made of new rope or rope in first-class condition. Worn rope is never used for this purpose because the strength of a rope is reduced by wear and therefore the factor of safety is in question. The dropping of a load because of rope failure is apt to be an expensive lesson, to say nothing of the tie-up in production it might cause.

Slings with spliced eyes or loops are preferred to slings having clip fastenings. The splicing of ropes should be entrusted only to men having considerable experience in such work. Since an improperly made splice may be only about half as strong as one correctly made, we watch

our splicing carefully and employ only well trained men for this work. We use thimbles, wherever possible, to reinforce the spliced eye, thereby preventing distortion of the eye, or bight, due to the lead.

In selecting rope for slings, consideration should be given to the risks of handling the sling. Some ropes tend to "barb" when they become worn while others do not. These "barbs," which are ends of broken wires sticking out from the rope, can cause puncture wounds or lacerations to the hands of the men handling the sling. Such wounds are looked upon by medical men as being a probable cause of infection since they often are deep seated. Yet the injured man frequently considers them too superficial to report for first-aid treatment. One of the advantages of preformed rope is that it does not tend to "barb" when wear takes place, eliminating this hazard. Splicers also report that the ease of handling the preformed rope enables them to reduce the time required for splicing.

Where the strands of the rope are cut off after splicing, they present a hazard to those handling the rope. We eliminate this danger by serving the entire splice with soft annealed wire, thereby covering the exposed ends of the strands. After the serving is applied, we put on just enough solder so that the serving wire will not unwind should it become broken, the solder holding it in place.

Slings of preformed rope do not tend to kink or loop and therefore are more easily attached to and detached from the load. This is especially important in those slings consisting of two or more ropes attached to a common ring or link. These slings do not twist up if made of preformed rope, and therefore it is not necessary to disentangle them every time they are used.

Perhaps the worst thing that can hap-(Please turn to Page 148) IN BRITAIN our Ministry of Food has a pet slogan: "Food is a munition of war!" That is to say we have realized from the outbreak of war that the efficient feeding of the population, and particularly of the vast body of war workers in the factories and workshops, is as important a wartime task as the actual production of the final guns, tanks or airplanes. Workers who are under-fed—or, for that matter, over-fed or wrongly fed—are not going to produce maximum results.

Tiredness, nervousness and definite ill-health, often due solely to lack of proper nutrition, can quickly play havoc with factory production charts. For these

reasons it is imperative to ensure that factory workers are given plenty of good, nourishing food, together with adequate time and restful surroundings for eating their meals. Now, such a worthy aim can be simply put into practice

in peacetime, when there is an abundance of all necessary foods and equipment. But in wartime—well, the task becomes definitely not so simple.

There are endless difficulties to be overcome-the lack of the right nutritive foods, the vast increase in the numbers of workers to be fed, the problems of providing alternative cooking facilities that feeding can be carried on even if air raids have put normal cooking equipment out of action-and so on. After nearly four years of hard war-time conditions, it can definitely be stated that here in Britain we have at last overcome all the main difficulties and put our industrial catering on an ordered, efficient basis. To do this we have had to suffer much and learn much, and I feel that the results of these experiences, outlined in brief, can be of considerable assistance to manufacturers and industrial catering firms in America.

When war broke out, there was an immediate mobilization and expansion of Britain's industrial resources. Work began at once on the erection of hundreds of new war factories, some in existing industrial areas, but many more dotted about all over the country, come in quite isolated spots. At the same time, existing factories went about extending their production plants to the maximum, taking in large numbers of extra workers. Coinciding with their production worries, harassed works managers were faced with urgent demands for the provision of huge air raid shelters,

# FEEDING BRITAIN'S WORKERS

Today, industrial canteens and government sponsored communal feeding establishments account for 43 per cent of Britain's catering places. These include more than 5000 industrial canteens operating in war plants; 500 canteens on building and civil engineering sites, docks and the like; and nearly 1000 canteens at coal mines. In addition, some 2000 British official restaurants have been set up, many of them serving industrial areas

By D. V. BAKER

fire-watching and civil defense protection, and so on. Consequently, it was hardly surprising that, at first, the canteen and feeding problems did not receive the amount of attention that it demanded.

Fortunately, this state of affairs was quite temporary, thanks largely to good educational work on the part of our Ministries of Food and Labor, both of which quickly set up special departments to deal specifically with the provision, supplying and staffing of industrial canteens. The Ministry of Labor issued a regulation that henceforth every factory or workshop employing 250 or more workers must provide its own canteen for its workers. Naturally, a great many of the larger factories already had canteens, but many of the medium-size places had rather neglected this side of their welfare in peacetime. Following the new order, then, this position was regulated and improved all round.

At the same time, some judicious propaganda in trade and technical papers, sponsored by the Ministry of Food, succeeded in persuading a surprisingly large number of smaller manufacturers to make special arrangements for obtaining meals for their workers. In some cases joint arrangements were made with a number of other nearby small firms; or an arrangement was made for a local catering establishment to provide special cheap meals at a set

time; or an arrangement was made for a catering firm to supply a daily lorryload of hot cooked meals from their kitchens.

The larger factories, however, were faced with a number of problems. In the first place, they had to provide a much greater output of hot meals than in peacetime necessitating the installation of new and enlarged cooking equipment. Here the Ministry of Food took a hand, and a special order was issued under which supplies of catering equipment were earmarked especially for industrial canteens (i.e. the latter were given priority demands). At the same

time the Ministry, by arrangement with other government production departments, arranged that where necessary catering machinery makers should specially adapt their production schedules to produce vital machinery for industrial canteens. The

 Ministry argued, and of course they were quite correct, that this job of work was of vital importance to the war effort.

All the large factories were speedily supplied with huge steam heating plants, heat storage cookers, gas and electric cookers, new types of automatic washing machines, and so on. At the same time, with the guidance of the Ministry of Food and the Ministry of Home Security (which is responsible for civil defense) the opportunity was taken, as far as possible, to have installed alternative methods of cooking, independent of central fuel systems, which could be used in the event air raid damage put normal cooking systems out of action.

For this purpose, special types of cookers, working on anthracite and coke were installed—while another development was the introduction of special insulated containers which would store food and keep it hot for several hours. During air raids these have proved to be invaluable, as it has been possible to cook hot foods on an independently-fueled central cooking system, and pack the foods in the insulated containers and take them out to various factories whose own cooking systems have been damaged.

The next immediate problem was the organization, administration and layout of the canteens. In the first place, it was essential that the minimum amount of labor should be used in operating the canteens, labor being so vital and valuable in wartime. For this reason the Ministry of Food encouraged manufac-

## No Longer is "PHILOSOPHER'S WOOL" pulled over a Brass-Caster's Eyes



In the old days, a brass-caster stirring his crucible would often get a whiff of "Philosopher's Wool" from the boiling zinc...like steam from the fabled Philosopher's Stone...that would give him the "spelter's shakes". Yet it never occurred to him that the casting might suffer because of his passing staggers. For he did most of his work by smell or touch or some other rule of thumb. Then, brass was sold "as is", and no questions asked.

But there's no trace of fog remaining in brassmaking practice today. At Bristol, any question asked by any brass-fabricator can be answered promptly and specifically... and the answer will hold good throughout any number of sheet, rod or wire shipments that are completed to the specifications agreed upon. Automatic production control, repeated laboratory checks, and searching physical tests guarantee that the customer gets his brass from Bristol exactly right for the job it has to do.

That's the way war-production plants all over the world are getting Bristol Brass today... in the ever-increasing quantities needed to seize the offensive on all United Nations fighting fronts. And when the war is won, Bristol will have a lot of new knowledge to put to work for the products of peace.

### **BRISTOL BRASS**

★ Buy War Bonds to Buy Brass for Bullets ★

THE BRISTOL BRASS CORPORATION, MAKERS OF BRASS SINCE 1850, AT BRISTOL, CONNECTICUT

turers to plan out their canteens as much as possible on a self-service basis, with a minimum number of permanent staff to superintend the service, handle cash, etc. The self-service system, we have found, makes for greater speed as well as economy in personnel, and it is applied quite widely in our factories. In fact, many canteens are laid out especially as self-service units. A system of guard rails is used; diners come in at one entrance, collect dishes and utensils from special open cupboards or trays, pick up their various dishes down a row of serving compartments, then pass into the restaurant. At the end of the meal they deposit their dirty crockery at a specially labeled compartment (thus savcanteens, it is necessary to operate three or four "shift" lunches—serving, on an average, perhaps 300 to 500 workers at a time. In very big plants, where the workers range up to 10,000, there are of course, three or four separate canteens

Wastage of food, either in buying or cooking, being a real crime in wartime, it has been essential that every factory canteen have a fully-trained cook, alive to all these problems. Our Ministry of Food have again been helpful here, as they have arranged special courses of training for canteens cooks. In addition, they send down instructors and demonstrators to the factories. Furthermore, the Ministry will, if necessary,

#### Industrial Catering Equipment Pool

Britain's Ministry of Food, by arrangement with the Ministry of Works and Buildings, has set up a catering equipment pool, comprising no less than 160 different items—including double oven ranges, boiling pans, galvanized vegetable racks, washing machines, storage cylinders, tea and coffee pots, glazed sinks, potato peelers, mixing machines, etc. All main supplies are now produced to standardized patterns with production distributed among a large variety of manufacturers, thus facilitating and speeding the rate of supplies. From this pool, industrial canteen managers are able to obtain priority supplies.

ing time and energy on clearing up tables), and pass out by a single cashier box. Most factories favor a cash payment system, but some have adapted a check or counterfoil system, workers purchasing a book of tickets, each entitling them to a meal, and using them during a week. This again, does save time.

In regard to the appearance and equipment of the actual restaurant section of the canteens, most firms have taken the Ministry of Food's advice and adopted bright colorful decorations, comfortable and modern seating accommodations, phonograph and radio music and so on. Some firms arrange for concerts and talks during canteen meals, but generally the workers prefer to cat their meals and have a cheerful gossip with their friends. There are many firms, incidentally, who have employed wellknown artists to decorate the walls of their canteens-it having been found that color plays an important part in encouraging workers to relax. Brightly colored table tops and chairs are being favored, too, and colored floors.

Third, and of course most important of all, is the question of food itself. Large-scale cooking has problems all of its own. Again, in regard to most of the supply complete charts and memorandums as to what foods are needed, where and when they can best be purchased, how they can be utilized to insure no wastage, and so on.

Special training is also given in buying, though here regulations give canteen managers priority in the food markets, so there is usually not much difficulty in obtaining sufficient quantities, though very often the choice in variety is limited. It is here, of course, that a fully-trained cook is invaluable, for planning menus in wartime for many hundreds of people is no easy matter. Canteens are supplied with extra supplies of the rationed products, such as margarine and butter, cheese, bacon, meat, tea, sugar, etc. But even so it is not possible to use them extravagantly.

On the other hand, generally speaking, there have been very abundant supplies of home-grown vegetables, and it has been the tendency of our canteens to use vegetables on a scale never before contemplated. Taking the average, it would seem that every canteen does manage to supply a meat or fish dish every day, but at the same time alternative vegetarian dishes, and salads cold dishes, and the like are provided. In this way, a gradual, but nonetheless

definite re-orientation of workers' food ideas has been taking place.

If compelled to eat the new and substitute dishes, workers might have refused point blank; however, seeing them available, they have gradually been persuaded to sample them—and, liking them, to sample them again. In the past year or so, canteen managers report a surprising increase in the number of vegetarian meals sold—particularly such tasty dishes as cauliflower cheese, macaroni and cheese, vegetable pies, potato pies, etc.

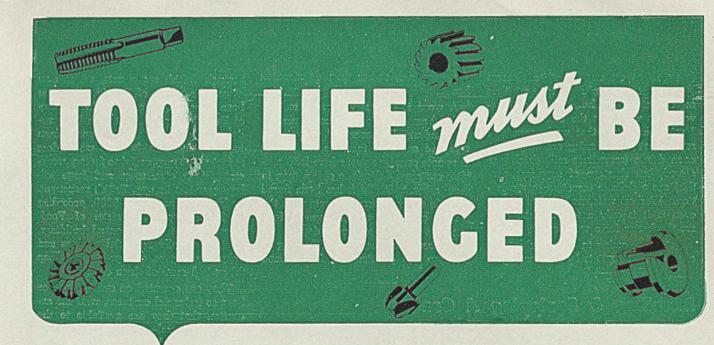
#### Salads Popular

Fresh salads, too, have become more and more in demand. Of course, all this is actually to the good, since medical opinion now agrees that it is such foods that help to give the workers better health and stamina. Naturally, the trend has been very largely encouraged by the steady educative advertising of the Ministry of Food. This advertising, prepared in conjunction with the Ministry of Agriculture, who are able to supply details of which products are in best supply, has aimed at persuading British workers to eat more and more of food that is home-produced. It is having a great success-though of course, this does not detract from a very real appreciation of the tasty foodstuffs sent over from America.

Working on the basis outlined and with the aid of special advice and guidance from the Government departments plus the advantage of cheap wholesale buying, a typical British factory canteen today supplies the worker with a good hot mid-day meal for a price varying between 10d (20c) and 1s 2d (26c). This meal consists of soup, a main dish or entree and vegetables, a hot or cold sweet, and a cup of coffee or tea. If the workers were to go to an outside private restaurant, run on commercial lines, they would probably have to pay up to 2s for the same meal. Canteens are naturally not able to supply a la carte menus-it is always a set meal, though with one or two alternatives (such as a salad). At the same time, a certain amount of incidentals are sold -such as biscuits, sandwiches, light drinks, etc.

It should be realized, too, that our canteens also supply breakfasts, teas and suppers, since most factories now work all day and night, and there are always workers coming off or on a shift who want a meal. Similarly, the canteen staffs work on 8-hour shifts.

Another important function of the canteen is the provision of hot drinks and soups which are taken into the factory workshops—favorite times being 11 o'clock in the morning, 3 o'clock in the



## Houghton offers 2 helpful ideas



## SALT BATH CASING OF TOOLS

Molten salt bath treatment of tools after the regular cycle of heat treatment has resulted in triple tool life—and more!

This nitride case is applied by a few minutes' immersion at 1000-1050° F., and provides hardness up to 1100 Brinell.

Spline broaches, for example, lasted for only 12 pieces in one plant. After nitriding the broaches they produced 300 pieces. Another user of Liquid Heat 720—the Houghton salt for this purpose—reports an increase from 100 shells per tap between grinds, to 2200 shells before grinding was necessary. In many instances, tool life has been increased 300 to 500%. Some plants make it a practice to treat all new broaches before using them.

The cost of this salt bath treatment is extremely low—the results extremely valuable in conserving precious tools. Write for copy of paper presented at A. S. T. E. Convention describing this final casing treatment in detail.



## OF CUTTING FLUIDS

One important way to preserve precious tools is to examine carefully the cutting fluids being used.

Anti-welding properties are provided by sulphur additions of the right type, correctly blended. Extreme pressure properties enable the oils to carry greater loads, withstand higher pressures. Carefully chosen additives permit the use of lighter-colored oils, giving better visibility of the work.

Treatments such as these mean longer tool life, finer finish, and the faster production so vitally needed today.

#### BUY THE BASE AND SAVE THE SPACE

Houghton Cutting Concentrates enable the user to purchase blending oil locally and save needed shipping space on crowded transportation lines. These bases are highly concentrated, enabling greater dilutions. A selection to handle any machining operation can be readily made if you consult the Houghton Man.

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afternoon, 10 o'clock at night, 2 o'clock in the morning. For this purpose, every canteen has a stock of the insulated containers referred to earlier. These are mounted on casters and wheeled from shop to shop. Drinks or soups are thus served out boiling hot, instead of lukewarm, as would be the case otherwise. I might add here that works managers report that mid-morning and mid-afternoon drinks (sometimes milk drinks are served, but shortage of supplies limits this) are a definite incentive to production. Workers welcome the short break, even if it is only a few minutes, and are the better for a warming drink.

Naturally, owing to definite shortages of various foods, it is by no means posdieting and feeding.

There has had to be considerable reduction in consumption of cakes and pastries, and even bread; but this, too, has improved, rather than deteriorated health.

A word is necessary here as to special and unusual circumstances connected with industrial catering. For instance, many of our new factories are set up in remote country areas, where food supplies are more difficult to obtain than in town areas. Usually it has been found possible to make arrangements with the railway companies to bring special food carriages down from central depots. At the same time, one way of helping to alleviate the position has been found

the factory being able to cope with minor meals, drinks, and the like.

Finally, mention should be made of the great scheme of communal feeding, through British restaurants, which now covers the whole of Britain. This has been directly sponsored by the Ministry of Food by arrangement with local authorities and is a service apart from industrial canteens, but one which does in fact prove very useful to factory workers. Every city, town and large village now has its own British restaurant. Today there are about 2000, according to Lord Woolton, Minister of Food. These are set up in central buildings, operated usually by social workers and voluntary helpers, and provide a cheap 9d or 10d meal of three courses.

They are operated on much the same lines as industrial canteens, with the exception that they are available to the public in general—particularly to housewives, shop and office staffs, etc. But in practice, quite a large number of factory workers, seeking a change, or according to their taste, make use of these British restaurants. There is usually a British restaurant for each big industrial area. Experience has shown that it is invaluable for absorbing various groups of workers and providing quick meals, thus saving possible waiting at a busy works canteen.

#### Installing & Equipping A Canteen

Here is how a British engineering firm set up its own medium-sized canteen. An old store-room was taken over, large enough to hold about 200 people. To minimize fatigue, the original cement floor was covered with wooden boards. One section was converted into a dining-room, with plain simple wooden tables and chairs (though in general our canteens prefer long bench tables and seats). Cooking equipment was installed, with the aid of a Ministry of Food expert, and included two General Electric and three gas cookers, two sinks and draining boards, a Frigidaire and a Lumley heater, ensuring a constant supply of boiling water-while connected to this unit was a smaller urn for storage of hot milk, cocoa, etc. In addition a steamer was installed, capable of producing 156 individually steamed puddings simultaneously. Another practical item was a set of metal containers, each capable of holding one portion of hot food. This canteen opens from 7 a.m. to 11 p.m., serving two full meals and various snacks and is staffed by eight workers, working 8-hour shifts.

sible to supply workers with the most nutritional meals possible. However, thanks again to special advice and reports by the Ministry of Food, canteen managers are able to plan menus that will provide as nourishing a meal as All the latest information possible. about vitamins, proteins, carbohydrates and other food values are now taught to cooks, who are able to make good use of this knowledge. Among general items, we have found that increased supplies of cheese and egg and milk products, also of pulse foods and green vegetables, tend to offset any food values lost through shortages of other necessary foodstuffs.

Experience has shown us that reduced quantities of meat-stuffs definitely have no harmful effect on workers—rather, if anything, there seems to have been an improvement. Certainly it is generally agreed here by medical men that the fitness of the British people is higher than it was in many years before the war, despite the longer hours of work. This is attributed largely to improvements in

in the encouragement of land cultivation by the factory workers. There is a constant and general "Dig for Victory" campaign over here. This can have a special application to big factories, many of which have large open grounds. Most of our big firms have now taken up cultivation of every available piece of land. Often the workers are glad to take responsibility for allotments of their own, selling the food direct to the canteen.

Another way in which the isolated factories have met their problems has been the usage of mobile canteens. These usually consist of converted lorries or cars with trailers. They are equipped with compression steam cookers, insulated urns, water tanks—in fact, everything for the kitchen—together with alternative and independent fuel systems. Most of these mobile kitchens can serve up to 500 hot meals within 2 or 3 hours. They are often sent out once a day from a town to isolated factories, and serve their purpose admirably in providing a necessary hot mid-day meal—

#### How Great Britain Has Managed Price Control

Rationing and Price Control in Great, Britain, by Jules Backman; paper, 68 pages, 5¼ x 8 inches; published by the Brookings Institution, Washington, for 50 cents.

The eleven chapters of this review of Great Britain's experience cover the basic legislation and regulations, control agencies, raw material controls, food controls, price control and rationing of nonfood products and services, rent control, wage policy, fiscal policy, enforcement, price trends and highlights of the British experience.

Under food control the author treats of agricultural prices, food prices, subsidies and rationing, with interrelations of each.

Under non-foods and services he treats of the prices-of-goods act, the goods-andservices act, charges for services, standardization and quality specifications and rationing.

The author takes a middle course in appraising the effort and effects as developed in Great Britain and calls attention to differences in the situation there and in this country.

In the final chapter he sums up the highlights that have appeared as a result of the various plans to control business conditions under stress of war.



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No holding up vital jobs while you wait for your grinding wheels or mounted wheels\*.

Timing and scheduling are everything now. That's why our streamlined QUICK SERVICE is such an important asset.

Fully approved and endorsed by W P B, here's our wartime speed setup:

- Manufacture only wheels 3" in diameter and under. To speed production, larger sizes are eliminated for the duration.
- No quitting whistle. We are on the job making wheels 24 hours a day, every day.
- Our central location brings us closer to many plants.

No time lost in transfer connections or long distance shipping.

#### CHICAGO GRINDING WHEELS

The wheels of proved qualityknown for performance, cutting and long life.

Any shape, grain and grade, any size up to 3" in diameter. From this army of wheels you can select one custom built for your job.

TRY ONE-Tell us the kind of equipment, the job, and size wheel you want to try. We'll send it postpaid.

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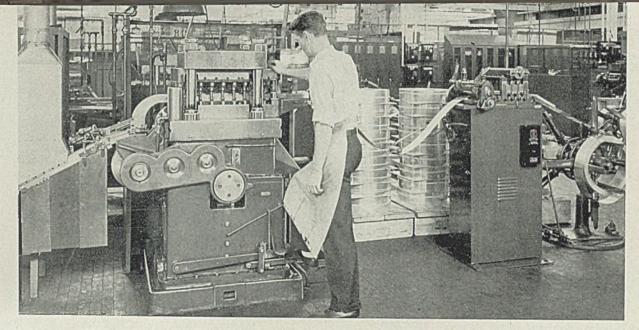
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HATED ANTED MOUNTED WHEELS GRINDING WHEELS \*Half a century of spe-cialization has estab-lished our reputation as the Small Wheel People of the Abrasive Indus-try You can bank on us.





This unit is one of a battery of special automatic presses that utilizes hot and cold air in the production of frames for Addressograph plates. Data and photo from Compressed Air Institute, New York

35 Miles of Compressed Air Help

### "BEAT THE PROMISE"

THE VALUE of compressed air power in war production was strongly emphasized in a recent survey of its uses at Addressograph-Multigraph Corp. by the Compressed Air Institute of New York. Practically all factory departments use compressed air. Two compressors furnish an average of approximately 390 cubic feet of compressed air per kilowatt hour of power consumed.

About 35 miles of pipelines for the compressed air system serve the more than 300,000 square feet of floor space at this plant. More than 2350 outlets are distributed at key points. A pressure of 78 pounds per square inch is maintained for maximum requirements. Storage facilities consist of two tanks; one 4 x 11½ feet, and one 3½ x 8½ feet.

When the main shift is on duty, a 175-horsepower compressor equipped with a Kleon air filter, is used to supply a greater volume of compressed air. It operates at 257 revolutions per minute. During the night shift, the larger air volume is not required and a 50-horsepower compressor furnishes sufficient volume. Its speed is 277 revolutions per minute. By rotating the use of the compressors, the life of each is prolonged and waste of surplus electric power is prevented. Yet, both compressor units are available for emergencies.

The compressors are of two cylinders each, with cylinder diameters in the larger unit being 18 and 11 inches, and

in the smaller unit, 13 and 8 inches. Cylinder stroke in the larger compressor is 14 inches, and 12 inches in the smaller unit. The automatic cut-in and cut-out points on the 175-horsepower unit are 76 and 85 pounds per square inch respectively, and 75 and 85 pounds per square inch respectively on the 50-horsepower unit.

The uses of compressed air throughout the plant are many and varied. Scores of outlets are furnished for general uses such as cleaning surfaces prior to painting, for spray painting and for cleaning excess metal from machine parts. For most such common uses, Hansen and Cleveland Pneumatic nozzles are suspended from overhead supply line outlets.

One of the most interesting applications concerns the use of compressed air in conjunction with a battery of eight Loshbaugh-Jordan No. 4 upright presses. Each of these presses punch, perforate and form 3200 soldiers' identification tags per hour. A jet for compressed air, located in a fixed position at the side of the die, releases intermittent blasts of air which are synchronized with the forming operations. As the nickelsilver tags are completed, the air blast loosens the tag from the die and blows it into a chute which carries it to a floor-level receptacle.

One of the most interesting applications concerns the use of compressed air in the production of zinc and alloy plate frames for Addressograph machines. The punching and forming of these units is handled on Henry and Wright presses specially designed for this purpose. See accompanying illustration. Finished frames are produced at the rate of 3000 per hour.

Due to the extremely high press speed, the strip material is fed from a continuous roll held on a spindle. It is saturated with an oil coolant to preserve the cutting edges of the punches and dies during each of the 11 progressive steps in press operation. As the completed frames reach the discharge track, shown in illustration, they pass through an electrically heated oven which quickly dries the oil film on the metal. An additional jet of cold air then strikes the frame units, clearing the completed frames of chips and metal particles.

With war restrictions promoting increased activity in used equipment, the rebuild department is making more use of compressed air for initial cleaning of old Addressograph and Multigraph machines sent in for reconditioning. Several outlets provide air lines for cleaning out the accumulated dirt and grease. Special Hansen nozzles with 6-inch and 8-inch extensions are used for cleaning central clutch assemblies, motor armatures and other parts of machine that are ordinarily inaccessible. The additional use of compressed air cleaning

methods are said to have reduced considerably the time necessary for recon-

Compressed air also plays an important part in the production of Multigraph type. Hundreds of fonts of type are east daily from molten metal-after which it is ejected in a moving line of separate type characters. Two air jets, one directed against each side of the finished work, blow off all loose metal particles so that each character unit is clean and sharp. This air cleaning operation saves time and eliminataes many defective units that would otherwise be rejected in final inspection.

These and many other uses of pneumatic power in Addressograph-Multigraph factory procedures, indicate how compressed air can serve a major purpose and solve production problems.

### The Effect of the War Program on . . . .

## **Electrical Contact Materials**

MANY electrical contact materials have been restricted and allocated under the war program, and as a result compositions and mechanical designs of many items have been revised, new materials introduced, and scrap reclamation facilities improved by the industry. The severe service requirements of war equipment have also dictated the revision of compositions for certain appli-

Materials which are restricted by supply or allocation include tungsten, silver and alloys of iridium. Currently the use of iridio-platinum contact alloys is restricted by allocation to aviation magnetos and certain types of aviation voltage regulators. The platinum-ruthenium series of contact alloys, such as Fansteel Fasaloy No. 12, have very successfully replaced iridio-platinum for voltage regulators, many types of aviation magnetos and for sensitive instruments.

Silver, one of our most plentiful con-

Contact Material

Platinum-iridium

Tungsten

Platinum

Silver

Palladium

Coppet

Molybdenum

Nickel alloys and

Tungsten alloys and

admixtures

admixtures

By C. B. GWYN JR. Chief Engineer—Contacts Fansteel Metallurgical Corp. North Chicago, III.

tact materials, is currently under restricted contact use, but pending legislation should quickly remedy this. The supply is ample for all requirements.

Tungsten for electrical contact purposes has now been removed from the allocation group, and it may be had without restriction. The supply for this purpose is ample.

Typical examples of compositions revised to meet war requirements are found in aircraft and tank relays. In similar civilian relay services fine or coin silver or silver-base alloys are suitable. However, due to the large safety factor required in the corresponding war equipment, it has been found necessary to go to alloys or admixtures having special are-quenching or nonwelding properties.

Fastell grade E, having as its main constituents molybdenum and silver, is an example.

Materials which must be supplied in new forms and mechanical designs to meet war service requirements include those used in many control units. These units are so sensitive or work in such rapid sequences or under such unrestricted conditions of temperature, atmosphere and altitude as to require close mechanical tolerances and often special shapes in the form of cones, rounds, balls, etc. The production steps required were not formerly considered feasible, but these units are now items of routine production.

In order to conserve vital copper, zinc, etc., tests have been conducted, and as a result many composite types of contacts now have plated steel backings. A composite contact is one having a facing of contact material and a brazed or bonded backing of, for example, copper. Before such substitutions could be made it was necessary to develop dependable corrosion-resistant platings or claddings for the steel backings. It was also necessary to determine the effective load capacity of such backings and to redesign contact assemblies proportion-

Table I indicates contact materials, present supply of these materials and recommended substitutes chosen with regard to availability and suitability. It must be recognized that no general rules can be established for interchange of contact materials. However, any of the reliable contact manufacturers in the United States will gladly co-operate in establishing acceptable substitutes for any given types of service. This is particularly vital on new equipment.

Greater care than ever before is being employed to conserve all scrap contact material and to keep it segregated by composition so as to utilize it fully with the minimum effort possible.

Our present supplies of contact materials should see us through the emergency if we all co-operate carefully in design, substitution and conservation.

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#### TABLE I-Electrical Contact Materials

Recommended Substitutes, in Preferred Order (Chosen with regard to availability and suitability)

Present Supply Molybdenum, silver Not allocated, supply

satisfactory Tungsten, palladium, gold, silver Allocated, fair supply

Platinum-ruthenium, tungsten, Allocated, very palladium alloys limited supply

Silver-base alloys, copper, palladium Allocated, but

ample supply Palladium alloys, silver alloys Not allocated, ample

supply Tungsten, silver, palladium Not allocated,

ample supply Copper-base alloys, clad or plated steel Allocated, supply lim-

ited but available Tungsten-base alloys or admixtures, Allocated, supply molybdenum-base alloys or admixtures limited

Molybdenum-base alloys or admixtures, Not allocated on silver-base alloys or admixtures tungsten content, silver or copper

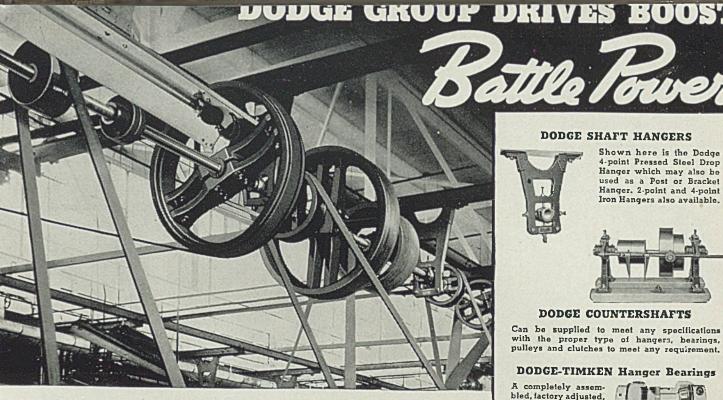
silver-base alloys or admixtures

supply plentiful Tungsten-base alloys or admixtures, Not allocated on Molybdenum alloys molybdenum content, and admixtures silver and copper content allocated; supply plentiful

content allocated:

Greater care than ever before is being employed to conserve all scrap contact material, and particularly vital on new equipment. to keep it segregated by composition so as to utilize it fully with the minimum effort possible

Note: It must be recognized that no general rules can be established for interchange of contact materials. However, any of the reliable contact manufacturers in the United States will gladly cooperate in establishing acceptable substitutes for any given types of service. This is



#### "SHARE-THE-RIDE" Principle in POWER TRANSMISSION

Modern Dodge Group Drive applies share-the-ride principles to horsepower delivery. Taken from its source, capacity power, over short power "roadbeds," is delivered enroute to a group of production machines. Group drive permits one motor to do the work of several (a powerful advantage in these war days when conservation of materials and manpower is so vital).

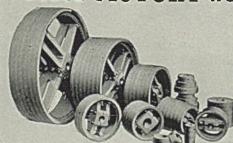
Dodge Group Drive puts all the power in the job . . . boosts battle power, hastens Victory! By reducing connected horsepower, conservation is assured in motors, wiring, controls and other critical equipment and materials. Initial cost is low . . . fixed charges and maintenance costs are reduced. Cost of horsepower-delivery drops.

In the complete Dodge line are all the component parts for group drive ... shaftings, hangers, pulleys, bearings, clutches ... as well as individual motor drives, including D-V Matched Quality V-Belt Drives.

Contact nearest Dodge Distributor or write

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana, U.S.A.

### DODGE VICTORY WOOD SPLIT PULLEYS



Great tractive pull . . . long belt life . . . power saving. Balanced. Interchangeable bushings (for various sizes of shafts). Compression fastening to shaft. Easy to install. Light weight. They conserve metal!

THROW ALL YOUR SCRAP INTO THE FIGHT!

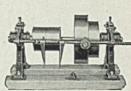
BUY MORE WAR BONDS!

THE RIGHT DRIVE FOR EVERY JOB

#### DODGE SHAFT HANGERS



Shown here is the Dodge 4-point Pressed Steel Drop Hanger which may also be used as a Post or Bracket Hanger. 2-point and 4-point Iron Hangers also available.



#### DODGE COUNTERSHAFTS

Can be supplied to meet any specifications with the proper type of hangers, bearings, pulleys and clutches to meet any requirement.

#### **DODGE-TIMKEN Hanger Bearings**

A completely assembled, factory adjusted, pre-lubricated unit delivered ready to install. Effectively seal-



ed against admission of dirt or loss of lubricant.

#### DODGE STEEL SPLIT PULLEYS

Strong, rugged, light in weight. Easy to erect. Grooveless oval crown permits low belt tension—saves power. Also wood and iron pulleys for every service.



#### DODGE FRICTION CLUTCHES



The Dodge Solid Friction Clutch shown here is particularly adapted for modern group drives and general power transmission service. Other types and sizes up to 1000 HP. at 100 R.P.M.

#### DODGE-TIMKEN PILLOW BLOCKS

For power transmisor machinery applications, Completely assembled, factory adjusted, pre-lubricated; seals exclude dust and dirt and retain lubricant. Easy to install. Long life (30,000 hours



of service under conditions for which they are adapted) . . . (good for 50 million revolutions without re-lubrication, under normal conditions).



PUT ALL YOUR POWER IN THE JOE

### INDUSTRIAL EQUIPMENT

#### Welding Positioner

Ransome Machinery Co., Dunellen, N. J., announces a new welding positioner designed to handle loads up to 500 pounds with the center of gravity of load 6 inches away from the table top and with a 6-inch eccentricity. It is being offered in hand or motor-operated models and is particularly suited to work ordinarily handled by women welders.

The motorized unit includes a Reeves variable speed drive providing a speed range of up to 1 revolution per minute of the table top. Tilting range is a full 135 degrees from horizontal or 45 degrees beyond vertical providing the "down under" position for all downhand welds.

The 26-inch diameter circular table top is T-slotted. All gears are of the



cut-tooth type. Machine is furnished with a regular base for bench work or with a sub-base giving a height adjustment from 27 up to 42 inches from the floor line to the table top.

A clutch arrangement permits free rotation of the table top by hand when required. The motorized units can be supplied with a hand wheel in place of a motor for tilting if desired.

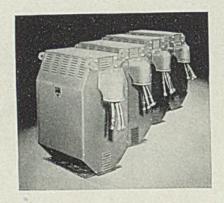
#### **Dry-Type Transformers**

General Electric Co., Schenectady, N. Y., announces a new series of drytype natural-draft transformers for indoor use on 600 volts and below. Compared with the series they supersede, size and weight of the new transformers have been materially reduced.

Ventilation has been made more effective by slanting louvered side plates inward at the bottom and top of the case. The new transformer has a 2-legged core with a high and low voltage coil on each leg. The core is clamped at its top and bottom, with the bottom clamps also serving as mounting feet. Used thus, they provide a base, being drilled so that the transformer may be bolted to the mounting surface if desired.

The top clamps are used for lifting

the transformer, and also serve as the upper bracket, if the transformer is wall mounted. Because of the unusual case design, the unit can be mounted against a wall or close to other units with little



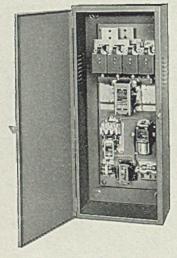
or no effect on temperature rise. The high and low voltage coils are concentric with air ducts between them which provide extra insulation and cooling.

Use of two small coils instead of one large coil has permitted them to be designed with more turns of smaller wire for the same copper loss, resulting in lower exciting current and lower inrush currents when the primary of the transformer is energized.

The transformer case is of light-gage steel since it only provides a protective covering for the coils and is not used for lifting or mounting.

#### Safety Control

Industrial Controller Division, Square D Co., Milwaukee, recently introduced a new safety control for alternating-current are welders which eliminates the hazard created by high open circuit voltages. The safety panels developed, referred to



as class 8992, climinate operator injury due to physical contact from electrode to grounded metal surfaces when not welding.

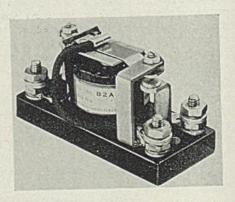
They eliminate this hazard by automatically disconnecting the welder transformer after the arc is broken. The transformer is automatically reconnected the instant the operator touches the electrode to the work.

The manufacturer stresses an economy angle also. When the safety panels are used, the welding transformer primary circuit is connected to the power line only while the arc is held.

Substantial saving in power is effected, it is said, when a number of welders are used on a single power system and the power factor is improved. The new safety panels can be used with any make or model of alternating-current transformer type are welder. External connections are said to be simple.

#### Power Circuit Relay

Ward Leonard Electric Co., Mount Vernon, N. Y., is offering a bulletin 103 relay designed particularly for aircraft power circuits. It will perform at high values of acceleration of gravity and



also under conditions of vibration and shock, it is said.

Armature and contact assembly of the unit are designed to retain either position under these conditions, it is said. The normally-open single-pole contacts are rated 25 amperes at 24 volts direct-current non-inductive load, with good characteristics on inductive loads. The contact gap and tail spring tension are adjustable. Bakelite nearly %-inch thick forms the base of the relay, measuring 1% x 3½ inches.

#### Coolant Pumps

Pioneer Pump & Mfg. Co., Detroit, is now offering three new war model coolant pumps designed to save critical materials. Each model, it is reported, is available in 17 standard sizes.

Not only do the pumps save critical metals, but their versatility of application, permitting interchangeability with other make pumps, enables a user to keep his inventory reduced to a minimum, for

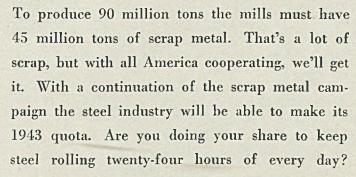
## Thanks to the Continuous Scrap Drive



## PRODUCES 24 HOURS OF EVERY DAY



A minimum of 90 million tons. That's what is expected of the steel industry in 1943.











THE NEWPORT ROLLING MILL COMPANY THE GLOBE IRON ROOFING & CORRUGATING CO. each pump presents the possibility of many different applications.

Model VBD features three outlets to permit piping to either right or left side, or back into coolant sump through intake bracket.

Model VA is used where submersion in coolant sump is more practical or less objectionable than outside mounting would be.

Model VC is designed for external use in cases where a tank cannot be utilized efficiently, mounted with either vertical or horizontal bracket.

#### Belt Grinder

Hammond Machinery Builders Inc., 1611 Douglas avenue, Kalamazoo, Mich., recently introduced a new improved 6inch Wet-N-Dri abrasive belt grinder which can be adjusted from vertical to horizontal position while running. Its



belt tension and tracking device can likewise be adjusted while running.

The machine is totally enclosed for safety. It now incorporates a new heavy, large cast base and larger sludge pan and new pulley-motor mountings which are easily adjusted from outside the base. The Dri machine is arranged for an individual dust collector or for connection to an exhaust system. Work table can be adjusted to any desired working angle and is available as a bench or floor model. The grinder is equipped with tank and pump unit and can also be equipped for watermain connection only.

#### Turret Truck

Salsbury Corp., 1161 East Florence avenue, Los Angeles, reports seven new features have been added to its improved

lift type turret truck. Among these is an easy-to-reach, band-operated hydraulic lift lever at the right of the driver's platform.

At the left of the platform is the loadwheel brake pedal, which actuates inter-



nal expanding brakes on the two load wheels. Operator's platform of this newer unit is 4 inches wider than those of previous models.

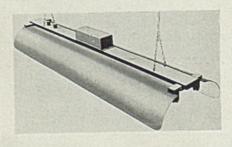
According to the company, one of the most important features of the truck is the fully enclosed primary drive chain. The lift platform also is now tapered to permit oblique angle entrances to skids. End rail on platform also is higher and heavier and is mounted in sockets for easy removal.

#### Bearing Puller

Armstrong-Bray & Co., 5364 Northwest Highway, Chicago, is offering a new bearing and battery terminal puller in two sizes known as Steelgrip No. 13 and 13A. Both (2-inch and 5-inch reach), feature drop-forged arms of heat treated steel. Their hooks are thin enough so they will fit between bearings and motor housings, and long enough to reach the bearing race.

#### Fluorescent Fixtures

Martin-Gibson Co., 999 Harper avenue, Detroit, announces a new 5000 line of industrial fluorescent lighting fixtures which features the Flexi-Coupler,



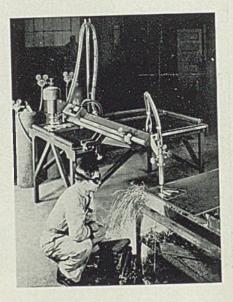
a device which permits spacing of fixture units as much as 6 inches apart, yet preserves all features of a continuousrun installation.

According to the company, the feature makes possible the use of only nine 100-watt fixtures in a 50-foot run instead

of ten. New lightweight channels conforming to the government conservation order is another innovation of the line. Units are being offered in two 40-watt, three 40-watt and two 100-watt sizes after July 1.

#### **Cutting Machine**

National Cylinder Gas Co., 205 West Wacker drive, Chicago, is offering a new type JR shape cutting machine designed to handle cutting jobs from the smallest up to an overall size of 3 x 4. Adopting construction features from its large type "RR", the new unit has a uniform speed of travel from 2 to 35 inches



per minute which is maintained by the driving mechanism.

End positioning of torch—one of the JR's features—provides a flexibility for quick adjustment of the torch in relation to the end of the carriage, making it unnecessary to place the plate to the exact position on the cutting table, it is reported. A hand-wheel provides micro-adjustment of the torch to the starting position. Other features consist of templet and manual tracer and circle cutting attachment. The tension and driving rollers grip the templet and follow its exact contour so that the shape is automatically cut out of the plate by the torch.

Fingertip control of the manual tracer allows accurate tracing of the master drawing. The drive wheel holds automatically to any desired straight line without guidance. The circle cutting attachment cuts any circle from 3 to 36 inches in diameter.

#### Flow Switch

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is offering a new



THE COOPER-BESSEMER CORP., renowned builder of top-quality engines and compressors for vital war and peacetime equipment, is discovering how to reap the benefits of TOCCO Induction Hardening to the fullest extent. Its progressive engineers have scheduled 158 different parts for this versatile "one-man heat-treating department"; are already TOCCO-hardening 79 parts, 75 of which are pictured above. Highlights of these operations:

Sizes of parts vary from ½ oz. set screws to 186-lb. cross-head pins.

Materials include SAE 52100, SAE 4615, SAE 1112, SAE 1045, NE 8620 and Meehanite Metals.

Typical time savings: Formerly hardened 100

large wrist pins in 13.5 hrs.; now they TOCCO-harden 100 in 3.5 hrs.—saving 10 hrs. per 100 pins. Push-rod buttons formerly required 3 minutes, now 15 seconds. They're now TOCCO-hardening cams, valves and other parts in ¼ to ⅓ former time.

Typical production: In 12 man-hours, TOCCO hardens 1800 pieces—12 different parts—12 different set-ups.

Other benefits: TOCCO's localized hardening eliminates straightening, reduces grinding or machining. The compact, clean TOCCO machine affords favorable working conditions.

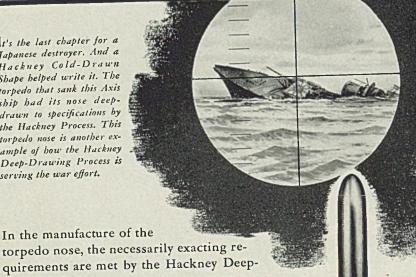
Our experienced engineers will show you ways in which TOCCO can improve your production.

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio



HARDENING ANNEALING BRAZING HEATING for forming and forging Steel fish with a cold-drawn nose

It's the last chapter for a Japanese destroyer. And a Hackney Cold-Drawn Shape belped write it. The torpedo that sank this Axis ship had its nose deepdrawn to specifications by the Hackney Process. This torpedo nose is another example of how the Hackney Deep-Drawing Process is serving the war effort.



Drawing Process. This manufacturing method was pioneered by Pressed Steel Tank Company, and is now being used not only for torpedo noses but for a wide and varied range of war products.

In the process a solid, circular sheet of metal is cold-drawn to shape by means of hydraulic presses, especially designed for the purpose. The result is a product having a smooth finish, uniform thickness and temper. Also flaws or laminations in the finished product are completely eliminated.

Many manufacturers have been assured of faster production, greater durability, decreased over-all weight, increased strength, improved appearance-

and other important advantages - by using Hackney Deep-Drawn Shapes.

It may be that some of your wartime production problems or one involving your postwar products can be solved by a deep-drawn shape.

Pressed Steel Tank Company engineers will be glad to work with you. Write for full details.

Pressed Steel Tank Company

MANUFACTURERS OF HACKNEY PRODUCTS General Offices and Factory · 1461 SOUTH 66th STREET Milwaukee, Wisconsin

> DEEP-DRAWN SHAPES AND SHELLS



electro-thermostatic flow switch for resistance welding and other applications which detects the lack of proper cooling water required for adequate cooling of ignitron tubes.

The switch is designed for use where a liquid is used for cooling and where a smooth positive acting flow switch is required. It consists of a 100-watt transformer having a one-turn secondary short circuited through a piece of high resistance stainless steel tubing through which flows the water from the ignitron tubes.

A normally closed two-pole thermostatic switch is used. It is available in either a 11/2 or 31/2 gallons per minute size in both a 25 or 50/60 cycle 220/440 volt rating.

Furnished with a spring mounting to insure against excessive tightening of switch elements, the electro-thermostatic flow switch is being offered with or without enclosing steel cabinet, and all parts are easily accessible for replacements.

#### Surface Plate Stand

Challenge Machinery Co., Grand Haven, Mich., recently designed a portable, all-steel surface plate stand equipped with wheels for easy portability from one plant location to another. It af-

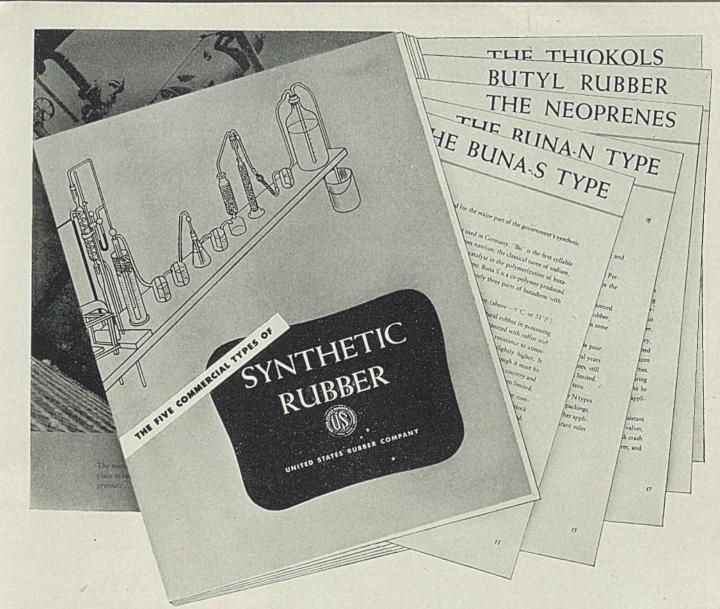


fords a solid, arc-welded base. stand is being offered in three standard sizes to accommodate 18 x 24, 24 x 24 and 24 x 36-inch surface plates. Units also are supplied without wheels.

#### Industrial Thermometer

Taylor Instrument Cos., Rochester, N. Y., announces a one-piece industrial thermometer designed to save critical materials. The one-piece case of the unit is shallower which makes it possible to see the mercury column through a wider angle of vision.

The chromium-plated bezel of the thermometer fits snugly into the grooved



## WHAT IS SYNTHETIC RUBBER? HOW IS IT MADE? WHERE IS IT USED? HOW DOES IT COMPARE WITH NATURAL RUBBER? You'll find the answers in this new book

As the supply of natural rubber diminishes, undoubtedly more and more mechanical goods will be made of synthetic rubber...hose, belts, packings, molded goods, tank linings, and other rubber products used by industry.

Having worked in the field of synthetic rubber for more than twenty years, we know what each of the five types will do; what chemicals such as sulfur, carbon-black, or ultra-accelerators must be added, and how to compound them. We work with all five types; use the type available that is best suited for the purpose.

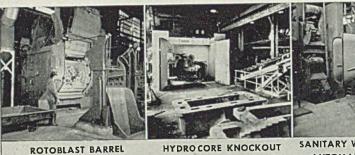
You can get an over-all picture of the properties and characteristics of synthetic rubber in the new book recently published by United States Rubber Company. A request for "The Five Commercial Types of Synthetic Rubber" made on your company letterhead will be filled promptly. Address your letter to Dept. 21.

### UNITED STATES RUBBER COMPANY

Listen to the Philharmonic Symphony program over the CBS naturark, Sunday afternoon 3:00 to 4:30 E. W. T. Carl Van Doren and a guest star present an interlude of historical significance.

1230 SIXTH AVENUE . ROCKEFELLER CENTER . NEW YORK IN CANADA: DOMINION RUBBER COMPANY, LTD.

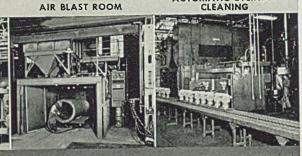




ROTOBLAST TABLE

HYDROCORE KNOCKOUT

SANITARY WARE CLEANING AUTOMATIC CYLINDER CLEANING



YOU GET S-P-E-E-D WITH EFFICIENCY IN BLAST CLEANING EQUIPMENT MADE BY

## 

World's Largest Manufacturer of Blast Cleaning and Dust Control Equipment





AIR BLAST CABINET AUTOMATIC BOMB CLEANING



DUST COLLECTOR DUST COLLECTOR



ROTOBLAST BARREL AIR BLAST ROOM







case in such a way as to hold the thick glass front securely against four wavy tension springs. Latter are fastened securely under the scale by screws. This construction can withstand vibration and severe shocks.

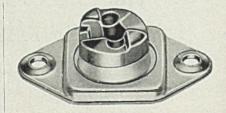
In addition, the new instrument is equipped with easy-reading Binoc tub-



ing. The tubing is being furnished in many combinations of straight and angle stems, with threaded or union connections, and in many standard temperature ranges, within the limits of -40degrees Fahr. to +750 degrees Fahr. Standard scale lengths are 7 and 9 inches.

#### Floating Cam Collar

Camloc Fastener Corp., 420 Lexington avenue, New York, announces the addition to its line of fasteners a floating cam collar which allows large spot-



ting tolerances. It is adaptable to metal, plastic and plywood, and can be used with both slotted and wing-head stud assemblies.

#### Cable Connector

Jackson Products, 3265 Wight street, Detroit, announces a new fully insulated cable connector for arc welding that locks tightly and unlocks quickly. Its female section is soldered direct to cable lead, while the male section is soldered to the cable extension.

Removable insulators of the unit are



Winning the "Battle of Production" involves a lot more than a supremacy of materials, machinery and manpower. One major fire . . . or a small fire that results in crippling damage by the extinguishing medium . . . can halt or slow down war production in a dozen vital plants.

Cardox Fire Extinguishing Systems are guarding against these crippling fires in plants producing a wide variety of critical war products. For example, individually engineered applications are on duty in important plants producing such military necessities as:

Airplanes, Aviation Engines, Aviation Carburetors, Airplane Parts, Engine Parts, Plastics, Rubber Products, Processed Fabric, Tanks, Tank Engines, Cold Strip Steel, Armor Plate, Forgings, Solvents, Motor Fuel, Electric Power.

By instant smothering of fire and cooling of combustibles through the mass discharge... at high rate of flow... of low pressure, low temperature CO<sub>2</sub>, Cardox Systems provide the all-important advantage of fast, complete extinguishment of large or small fires—without damage by the extinguishing medium.

Today, Cardox is concentrating its engineering and manufacturing facilities on two basic activities: (1) Designing and manufacturing of Cardox Fire Extinguishing Systems needed to make it possible for the Armed Forces of America to have more planes, guns, tanks and ammunition; (2) working with industry on plans to increase the efficiency of fire protection both today and after the war.

If you would like more information, write on company letterhead for Bulletin 873.

#### CARDOX CORPORATION BELL BUILDING • CHICAGO, ILLINOIS

District Offices in New York 

Washington
Detroit 

Cleveland 

Atlanta 

Pittsburgh
San Francisco 

Los Angeles 

Seattle

\* BUY WAR BONDS

#### How Cardox Systems Protect War Industries

- Timed discharges, as needed, through huilt-in piping systems... supplied instantly from a single storage unit holding tons (if required) of liquid Cardox CO<sub>2</sub>.
- Mass discharge of Cardox CO2 "knocks out" fire, by . . .
- Reducing oxygen content of the atmosphere below the concentration necessary for combustion, and . . .
- Cooling combustibles and fire zone below ignition temperature . . .
- Extinguishing fire quickly and completely without damage from extinguishing medium.

#### CARDOX—CO<sub>2</sub> Systems with Enhanced Fire Extinguishing Performance

- A. Uniformity of CO2 characteristics.
- B. Extinguishing medium with uniformly greater cooling effect.
- C. Accurate projection of CO<sub>2</sub> through greater distances.
- D. Timed discharges, as needed, through built-in piping systems . . . supplied quickly from a single tank holding tons of liquid Cardox CO<sub>2</sub>.



## PAGE for WIRE



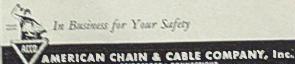
Today's production of PAGE WIRE, of course, is directed to the war effort and to essential industry—whether it be Stainless Steel Shaped Wire, Carbon Steel Shaped Wire, Welding Wire or such general items as Spring Wire, Bond Wire, Telephone Wire, etc.

As examples: (1) the springs used in a rifle that has attained a world-wide reputation for its performance in battle, are Page Stainless Steel Spring Wire; and (2) a special electrode developed by Page for welding armor—a contribution to the production of tanks.

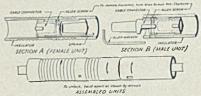
Although completely occupied with the war effort, you will find our organization well able to work with you on plans you may have for the use of wire after the war.

#### PAGE STEEL AND WIRE DIVISION

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



securely held in position with Allen screws. Connection is made by inserting male section into female section. Thus, with a twist, the locking spring rides the

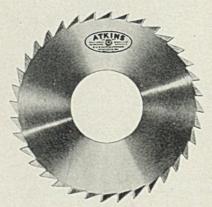


cam into position holding both sections tight.

Female section of the connector, which is known as the "Quik-Trik", when installed on a cable lead, may also be used as a holder handle and connected directly to the "stinger" end of a Jackson model TA holder.

#### Metal Saw

E. C. Atkins & Co., Indianapolis, is offering a new high-speed steel saw for slotting super-charge wheels and many other kindred operations, sawing ferrous and nonferrous metals where accuracy is a first requirement. It is made 0.062-



inch on tooth edge by 0.052-inch at mandrel. Each tooth has a relief clearance ground at the back of each tooth to the depth of the gullet, which allows for sufficient clearance where tolerances as close as 0.0002-inch must be maintained.

#### Toggle Pliers

Detroit Stamping Co., 359 Midland avenue, Detroit, recently added to its line new No. 455 toggle pliers for holding piping, tubes, rods or other cylin-



drical parts during manufacturing operations. The pliers lock into position and hold securely at any point within their gripping range, and are easily and quickly released.

#### "Colloidal" Fuel

(Continued from Page 99)

of the boiler, then followed the usual vertical baffling, crossing the tubes twice more to reach the damper outlet at the top of the tubes at the rear.

Test Operations: The boiler was first operated on oil to establish normal operating characteristics. It was then operated continuously on colloidal fuel. Ratings from about 40 to over 200 per cent were carried without difficulty, but for a considerable part of the test the boiler was operated at about 100 per cent of its rating. At this rating, it was found that the suction at the oil pump dropped from about 1.5 pounds per square inch pressure for oil to 4 inch vacuum for colloidal fuel. The pressure at the oil control valve was maintained for both fuels at about 30 pounds per square inch. At the burner the pressure for oil was practically zero; for colloidal fuel it was about 2 pounds per square inch. The steam consumption increased about 70 per

The load on the pump increased. Under one set of operating conditions this load was about doubled. When colloidal fuel is being considered in present plant equipment, thorough attention should be given the problems of increased suctions, pressures and loadings on pumps. Pump capacities may be lowered.

Colloidal fuel has considerable abrasiveness. It acts something like a lapping powder. It is doubtful, however, if this characteristic would necessarily be a serious handicap to successful operation. Equipment affected should be watched and repaired as found necessary. There was wear on the rotary pump in the heater pump set, most of the wear being at the spindle. No repairing, however, was found necessary during the run. There was also some cutting at the burner tip.

Settling: When colloidal fuel is being considered, the question always arises as to the possible settling out of the coal from the mixture. This depends on many factors, such as fineness of the grinding of the coal, the type of oil, the temperatures involved, and the agitation or movement given the fuel. Undoubtedly the finer the coal is ground the better it will remain in suspension. As a practical matter, however, it is desirable not to grind the coal any finer than it is absolutely necessary.

Where most settling is apt to occur is in the heater. At this point, parts of the fuel are heated much higher than the average temperature of the fuel leaving the heater; the higher the temperature, the more the settling expected. In general, it is best not to have the fuel any hotter than necessary at any point in the system up to the furnace. Operating routine can



Address\_

City\_

State



DUST is perhaps the most cruel and treacherous safety peril of all.

Most other hazards are localized. Usually they threaten individuals singly. And when they strike the effect is immediate and visible.

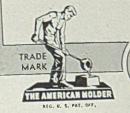
Dust, however, threatens everyone within its reach. It attacks gradually and unseen, but its effect can be devastating.

That is why the dust control problem in your plant should be so carefully studied. Do not regard it with complacency. It is the most important factor in your entire safety program.

If you need counsel, write us and we will put a qualified dust control engineer on the job at once. Also write for our latest catalog No. 72, describing American high-efficiency dust control equipment.

AMERICAN
FOUNDRY EQUIPMENT CO.
509 S. BYRKIT ST., MISHAWAKA, IND





AMERICAN DUST COLLECTORS he arranged to clean the heater as found necessary. If there are two heaters, they could be used alternately.

On the tests of the Atlantic Refining plant, it was found unnecessary to clean the heater on any of the runs that lasted about 7 days each. There was appreciable accumulation, however, in the heater when the 88-per cent and 95-per cent coal through 230 mesh were used; there was practically none when the 99-per cent coal was used. Some settling in the tank occurred with the 88-per cent coal but none with the 95 and 99-per cent as long as the storage tank was kept around 85 degrees Fahr.

No settling or clogging was experienced in the lines, although they were relatively long. There was some clogging in the meters and screens. Occasionally, throughout the day, the oil control valve tended to clog, but it could be readily cleared by opening it wide quickly. None of these difficulties were of moment. No boiler shutdowns occurred from operating troubles.

No difficulties arose in burning the fuel in the furnace with the steam atomizing type of burner. The flame responded smoothly to changes of boiler load and to variations of the quantity of air used for combustion. It could be controlled with the same ease as fuel oil. The carbon dioxide content of the products of combustion could be carried as chosen up to about 16 per cent with no carbon monoxide. Burving colloidal fuel after it is in the furnace does not present much of a problem. Experiments are now under way on the rotary cup-type of burner, which thus far has shown good combustion.

Ash Deposits: Troubles from the ash of the coal in the furnace were less than had been anticipated. The use of pulverized coal has supplied a vast amount of information on the action of ash in boiler furnaces and passes. It is not desirable to re-explore this field to any great extent in connection with an emergency fuel.

If a plant operator wishes to estimate about how much trouble he might have from ash, what those troubles are and how they can be met, he might visit a few pulverized coal burning plants that are similar to his plant and operating with similar coal at about the same loads. In general he should expect much less ash troubles. After about one week's operation, there was no dripping or slagging. The fly ash on the tubes was cleaned without difficulty every 8 hours during the test by the boiler soot blowers.

About the same boiler efficiencies were obtained with both oil and colloidal fuel.

Inquiries regarding additional details of these tests should be addressed to the Bureau of Mines, Washington.

#### More Fire Power

(Continued from Page 102)

or assuming that ultimately we may be able to get a 5 to 6-inch shell away from a plane to an enemy aerial target and have this shell hit the plane once, we would then bring the plane down with a firepower that may have been a fraction of that of the Beaufighter I.

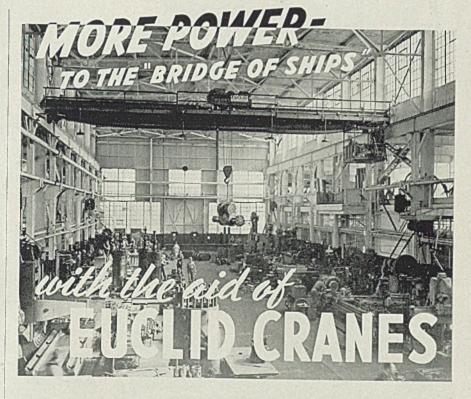
To most observers in recent years and months, it appeared that every known weapon should be used and none overlooked, with an open mind for new ones.

#### Results Vindicated Experts

The magnificent results of both our land and carrier based fighters as well as our heavy bombers has vindicated all the confidence American aviation experts had in our planes. An analysis will show that the marked success of the Flying Fortresses has been due in large measure to the increased number of gun positions, and consequently greater number of guns that could be brought to bear from any point of the plane, in lesser measure to clever tactics employed in mass air raids. Among these tactics are certain types of formation flying which enables several of the big bombers to concentrate their combined fire power on fighters making attack runs upon any one of them. With the possibility of bringing up to seven machine guns to bear on an enemy fighter from one fortress, (actual number of guns is more), we can multiply seven by the number of bombers in any formation close enough to each other to engage in common defense and arrive at a figure ranging anywhere from twenty-one to nerhaps forty-two or more machine guns. No wonder we have shot down scores of German and Jap fighters without any serious lesses to our Flying Fortresses.

Another advantage in favor of our multi-gunned bombers is that the gunners can fire their guns at an enemy fighter for a longer period than he can fire at them. The enemy can only fire while he is diving on the bomber, and then he must pull up and swerve away. Our guns are spitting at him while he is taking his run at us, and following him as he flashes by overhead and on the other side by operate gunners and by the upper and perhaps the forward gun turret.

A point to remember also, is that the larger aircraft such as our heavy bombers can take shell fire from enemy fighters and in most cases survive these attacks. Naturally, some planes will come back with gaping holes in wings and fuselage, one or more engines out of commission, and with perhaps several of the crew wounded or killed. But they will come back, and this fact alone means that enemy losses in planes and



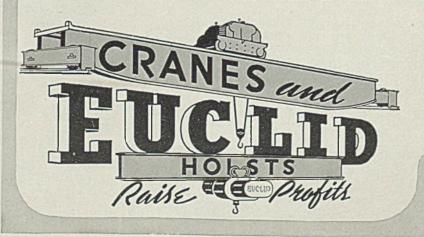
PARTIALLY due to this 15 ton Euclid Crane in the plant of the Maryland Drydock Company of Baltimore, MORE POWER in a greater number of vessels moves into the "bridge of ships".

It combines two essentials—SPEED to meet production schedules and SMOOTHNESS OF CONTROL to facilitate assembly operations.

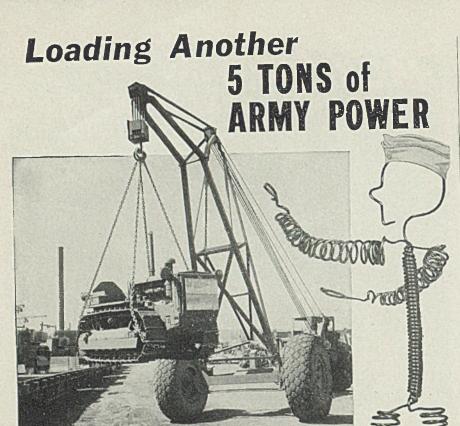
Loads can be raised or lowered as the trolley moves across the bridge while the crane travels speedily lengthwise of the building. The operator has remarkable control in lowering engine crankshafts, cylinders, etc. slowly and safely into position during assembly operations. Greatly appreciated is the auxiliary hoist for more efficient handling of light loads.

Other Euclid features include: the incorporation of: liberally proportioned parts throughout, the best type of antifriction bearings, advanced methods of lubrication and quick, easy facilities for inspection, adjustment or repairs. These features combine to afford a long life of service with remarkable freedom from shut-downs and repairs.

### THE EUCLID CRANE & HOIST CO. 1365 CHARDON RD., EUCLID, O.



July 12, 1943



KEYSTONE

Wire

Valuable time is gained loading this 5-ton package of Diesel power. A Tournacrane, equipped with several hundred feet of rugged cable, swings it quickly and easily onto the railroad car. Then comes another and another—ready for a quick trip to a battle area.

In the large number of such cranes located at key points, wire is at war. Wire mill production plays an integral role in planes, tanks, guns, ships and ammunition, too.

In these unglamorous ways, Keystone is devoting a major share of production to speeding Victory. Then we hope to be able to meet, at least partially, a towering, pent-up civilian demand.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Special Analysis Wire for All Industrial Uses

SPRING WIRE

In the scene above, three major uses of wire mill production are indicated: welding rod in producing the crane and tractor, rope wire for the cables, chain wire for the sling.



Continuing the Victory depends on MORE SCRAP!

men must run in much higher ratio than

But, it will be argued, the enemy may also be expected to employ heavy bombers with increased armor and heavy fire power. How can we expect to bring them down? The answer lies in our faster planes and better pilots, in our newest fighter creations, among which the Republic Thunderbolt, with eight .50-caliber guns in the wings, with heavy armor protecting the pilot, with high rate of climb and unsurpassed ceiling; in the British Typhoon with similar characteristics, both of which planes are in high gear production.

#### Secret Projects Answer

The answer lies in the many secret projects being developed at Wright Field, some of which will be ready within a few weeks, some within a few months, and some of which are long range projects which are destined for fulfillment in a year or two. The Army Air Forces have already revealed in offthe-record conferences with American newspaper men on the spot that some arms being worked on in our Army technical laboratories represent amazing advances in aircraft ordnance that will definitely upset the apple-cart of enemy air resistance. What these weapons are cannot even be hinted at here.

Two years ago our aircraft, both fighters and bombers, did not have enough fire power. Today, they definitely have it. Tomorrow they will surpass anything the enemy may have. On this point, we can rest assured.

#### Welding Aluminum

(Continued from Page 110)

quired a lower consumption of power over a longer period of time. Magnetic-energy-storage units provided the answer to this problem. In such equipment the welding energy is stored in an inductor transformer by establishing a direct current of from 100 to 400 amperes in the primary circuit of the transformer. When this current is interrupted by a magnetic contactor, a high value of current is established momentarily in the secondary circuit flowing through the work being welded. In from 0.01 to 0.05-second this current falls off to a low value.

#### Pressure Can Be Varied

Magnetic-energy-storage spot welders are equipped with an electrode pressure system that allows the pressure to be varied during the progress of the welding. Excellent welds are produced by this means while the direct current, usually obtained through rectifying a 3-phase 440 or 220-volt shop supply, brings about a maximum power demand that