STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 10 SEPT. 3, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Modern Heat Treating Practice

Electrolytic Polishing

Guns "Canned" for the Next War

Multiple Brazing Effective on Mass Jobs

Electric Steelmaking Furnace

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ARMY E NAVY

UNION CHAINS

STEEL
September 3, 1945

"Full Employment"

Today, Sept. 3, 1945, the people of the nation are observing the first Labor Day since 1938 that has not been clouded by war. On the occasion of this first peacetime observance in six years, thoughts pertaining to labor inevitably lead to the immediate prospect for employment and to the so-called "full employment" bill which soon will be debated in Congress.

A foretaste of this debate is found in the testimony at the recent hearings of the Senate Banking and Currency Committee. Scores of persons representing government, business and labor presented their views. Their statements show clearly that everybody favors the intent of the bill but few agree as to how its objectives may be achieved.

The major issue seems to be whether the government should only promote or encourage "full employment" or whether it should actually guarantee such employment. Involved in this general question are numerous smaller issues pertaining to the extent of government participation in the program.

The line of dissension is rather clearly marked. Most conservatives in government and business favor a program in which the government's participation is largely in the form of action which would encourage private enterprise to provide a maximum of jobs. The self-styled liberals, including many of the new dealers and most of the labor union leaders, favor participation by the government to the extent of guaranteeing "full employment," regardless of what it may entail.

It is not too difficult to see why this marked difference of opinion exists. The conservatives feel that the only sound major source of employment is private enterprise. The liberals contend that private enterprise cannot do the job, that it failed to do it in the early thirties and that it is unwise to entrust it with the job again.

Neither of these extreme views is likely to prevail. There will be considerable give and take in framing the bill. In the end, it is probable that private enterprise will be given considerable leeway and some encouragement to operate profitably, which is a sound basis for employment. At the same time, the government will be given certain authority to expand social security, to provide "reserve shelf" public works and to engage in other shock-absorbing activities.

The big point to remember in determining government's role in employment is this: If the burden of unproductive activity by the government or under its auspices is too heavy for private enterprise to carry for a reasonable period, the entire scheme will fail.

USERS' PREFERENCES: Guy Hubbard, machine tool editor, has been out in the field during most of the past three months discussing with machine tool builders the implications of this publication's report on users' preferences in regard to the details of postwar machine tools.

In this report, which was summarized in the June 25 issue, 67.2 per cent of the users favored "colors contributing to safety and lighting of work areas." Some builders think this point is controversial. It is, indeed, yet if this sort of coloration becomes general, builders and users should be able to agree on a standard color scheme to avoid confusion.

The report indicated 20.7 per cent of users want "refrigerator units for cutting oils." Many builders think this is a point of limited importance. It is, on a majority of machines, but on some, such as certain hobbers and automatic screw machines, it is truly important.

Again the report showed 62.4 per cent of our informants desire built-in chip disposal units. Some

(OVER)

builders point out that chip disposal, while in some cases requiring built-in expulsion devices, also requires auxiliary equipment to carry the chips away from the machine. It is not wholly a builder's problem.

These are good points. Thrashing them out should prove beneficial to all interests. —p. 124

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CHALLENGE TO STEEL: Walter S. Tower, president, American Iron & Steel Institute, has done a good job of analyzing the steel industry's reconversion problems. He divides them into two categories—internal problems which are largely under the industry's control and less tangible problems outside the industry and beyond its power to solve.

Mr. Tower does not worry too much about the internal problems, although there may be some difficulty, he believes, in re-establishing returning servicemen and in adjusting wages and prices to the postwar pattern of business.

The intangible problems are more serious. They involve the important question of what is to become of government-owned facilities and the implications arising from the fact that the end of war finds American steelmakers in custody of more than half of the world's steelmaking capacity.

The opportunity, if not obligation, implied in our dominant position in steel, says Mr. Tower, is obvious. It is a definite challenge to business statesmanship. —p. 92

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BOON TO HANDICAPPED: Electronics, which played such an important role in World War II, now is available for an unprecedented number of peacetime applications. Among these is an electronic sound gage developed by Timken Roller Bearing Co. Its possibilities in the practical rehabilitation of handicapped persons are so heartening that it is a distinct pleasure to call industry's attention to its advantages.

This gage enables a blind operator to check the dimension of a part within an accuracy of one twenty-five-millionth of an inch. A sound indicator, actuated by the gage, emits three notes. The highest note indicates that the part is oversize. The lowest note indicates it is undersize. The medium note indicates the part is within the size limit specified.

The possibilities of this device are obvious. It will be a boon to many whose sight has been lost or seriously impaired. Timken will release details to manufacturers without charge. —p. 128

POSTWAR POSTSCRIPTS: Although most of the 9800 Army Air Forces contracts spread among 2900 prime contractors and tens of thousands of subcontractors and aggregating $11 billion were terminated immediately upon announcement of Japan's surrender (p. 108), certain contracts were subject only to partial cutbacks and others—notably for experimental work—were not disturbed at all. The aircraft industry hopes that military aircraft production can be maintained at about $1 billion annually, a sharp reduction from the $16 billion of the past year. . . . One sour note in the progress of reconversion is delay in the disposal of surplus property. The RFC list of 252 surplus war plants, built at a cost of $1484 million and to be offered for disposal soon (p. 98), does not include the Willow Run bomber plant. This stimulates conjecture as to the reported deal (p. 101) whereby the Kaiser-Frazer interests would lease the plant. . . . The motor truck industry, comprising 38 large and small manufacturers, expects that by the end of the year production and employment (p. 102) will be close to average levels in the best prewar year. It is estimated the deficiency in the nation's truck fleet is about 2 million units. Peak year in truck output was 1937 when 891,000 were built. . . . American manufacturers who simplified the sizes and varieties of their products during the war under the mandatory orders of WPB (p. 97) can retain the benefits of these programs by utilizing the voluntary machinery built up during 24 years by the National Bureau of Standards. A case in point is a voluntary simplified practice recommendation covering hot-rolled carbon-steel structural shapes (p. 86) which will be made available during September to all interests for consideration, comment and approval. . . . United States has sold to the provisional government of France surplus steel plate and steel pipe which reportedly cost $20,530 (p. 99) for $23,162. . . . One of the most important provisions in WPB revised regulations to speed reconversion (p. 98) is a prohibition of the placing of duplicate orders. . . . Pennsylvania led all other states in the consumption of coke in 1944 (p 107), taking 26 per cent of the total. Ohio was second with 19 per cent. . . . Construction contracts in 37 eastern states in the first seven months of 1945 totaled $1740 million (p. 198), an increase of 51 per cent over awards in the comparable 1944 period.

E. L. Shaner

EDITOR-IN-CHIEF

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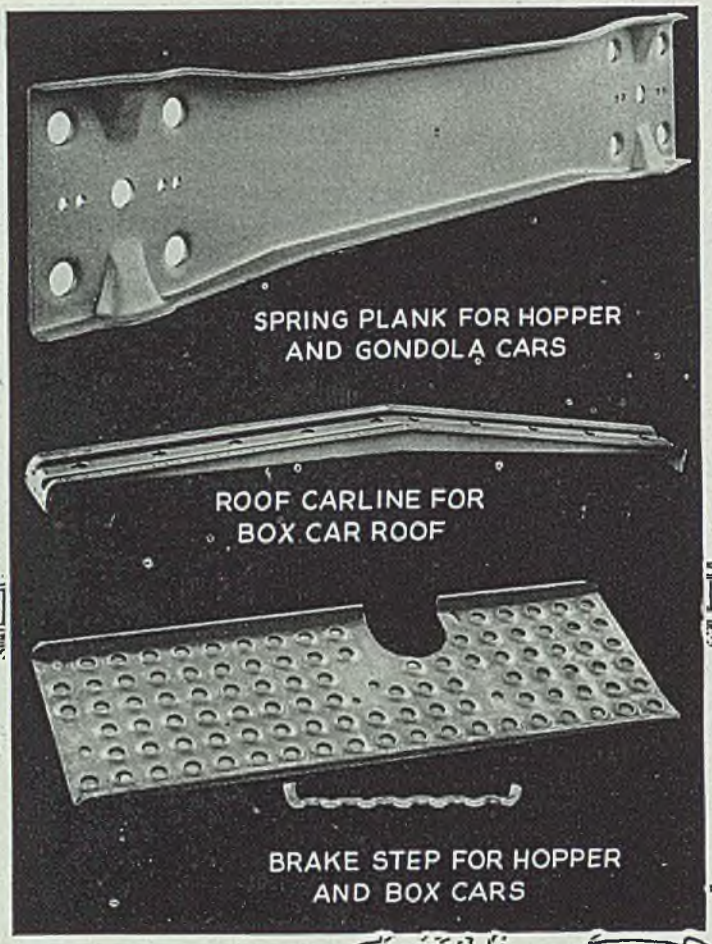
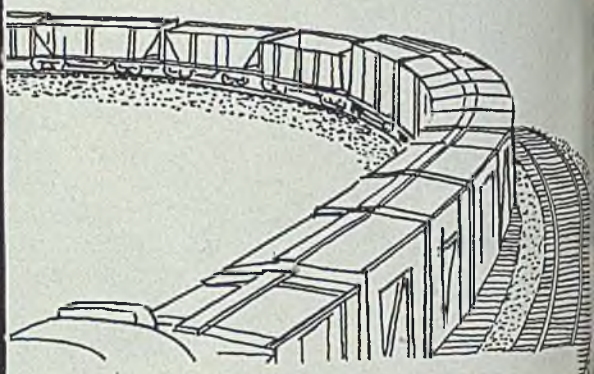
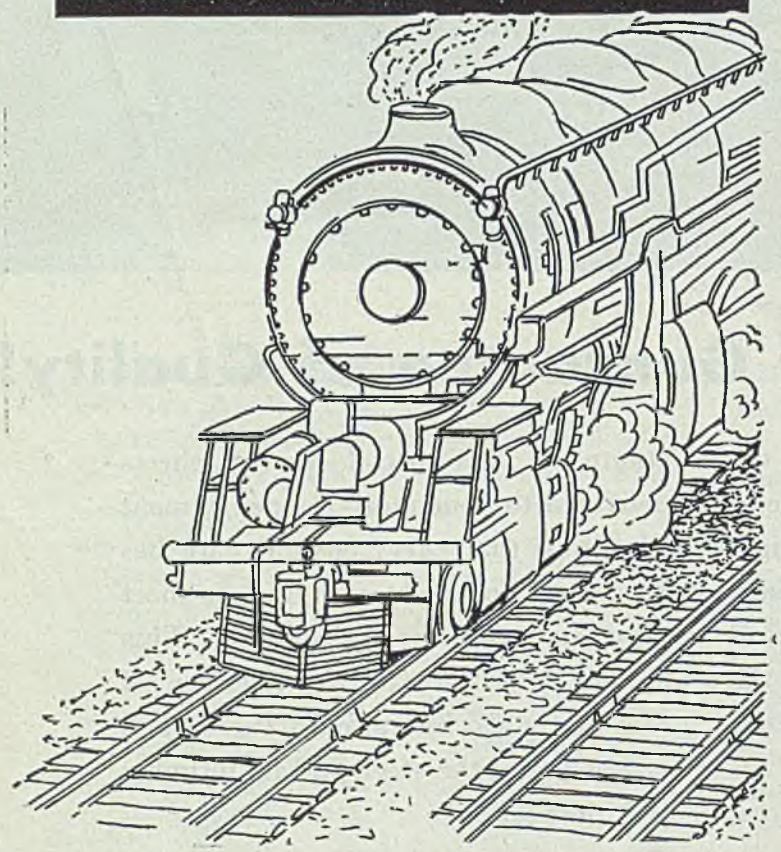


Here is TOMORROW





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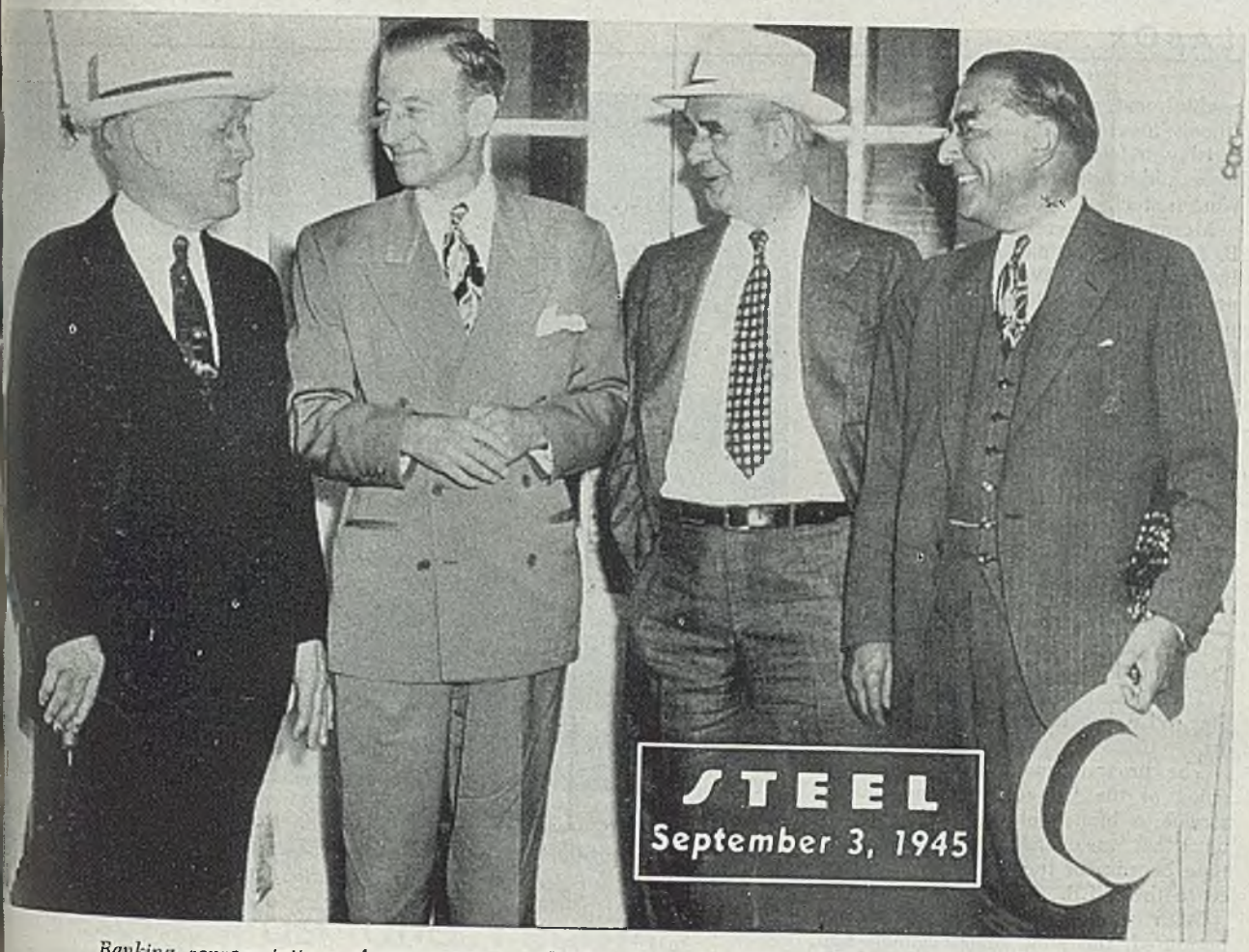

Ranking representatives of management and labor leave the White House after a meeting with President Truman looking toward a conference to evolve an agreement to minimize strikes during the reconversion period. Left to right: William Green, president, American Federation of Labor; Eric Johnston, president, Chamber of Commerce of the United States; Philip Murray, president, Congress of Industrial Organizations; and Ira Mosher, president, National Association of Manufacturers. NEA photo

New Labor Policy Sought as Nation Changes Back to Peace Economy

War Labor Board and wartime controls on wages fading out of picture while millions lose jobs in war plants. Management-labor conference to seek formula to minimize production interruptions during transition period

EW national policy and machinery the handling of labor disputes dur- reconversion, a period likely to be ed by considerable unrest and per- strife, is being formulated.

artime controls and wartime organi- ns, particularly the War Labor rd, are fading out of the picture.

the same time hundreds of thou- ds of workers are losing their jobs to cancellation of war contracts. t two million already have been employed and government officials ect this figure may rise to around eight million by next spring. Already long queues of displaced workers are standing in front of state unemployment compensation bureaus to apply for aid—meager when compared to the fat pay envelopes the workers have been receiving from war factories.

Those workers who retain their jobs are suffering a considerable reduction in take-home pay as work-weeks are cut from 48 or more hours to 40.

This situation has prompted organized labor to demand increases in hourly rates to compensate for the shorter work-week. Automobile workers recently forwarded demands for a 30 per cent increase in hourly rates to General Motors Corp. and have indicated similar demands will be made on other companies. Similar demands have been made by various other groups of workers.

The United Steelworkers of America will formulate demands for wage increases at a meeting of the union's national policy committee in Pittsburgh, Sept. 11. Union officials refused to predict what the demands will be but admitted they will be designed to offset the loss in weekly pay caused by reduction of the work-week from 48 to 40 hours. A 30 per cent increase in hourly rates would be required to hold weekly wages for a 40-hour week at the level formerly received for a 48-hour week.

Return to the shorter work-week is causing some work stoppages. Such a

readjustment of schedules at Carnegie-Illinois Steel Corp.'s Irvin Works near Pittsburgh last week caused a three-day strike and a loss of 15,000 tons of reconversion steel.

Meanwhile, Secretary of Labor Lewis B. Schwellenbach and Chairman George B. Taylor of the War Labor Board announced a new policy for handling disputes which emphasizes settlement by direct negotiation. The WLB will assume jurisdiction over most cases only if both parties agree in advance to accept its decision.

The new program is for the interim period until the WLB passes out of existence, expected to be in about three months, and the formation of new management-labor agreements to replace the wartime no-strike, no-lockout pledge given when America entered the war. Such a management-labor agreement will be sought at a conference called by President Truman for later this month.

The significance of the new policy is that WLB has lost its compulsory powers.

The program envisions the strengthening of the United States conciliation service, a branch of the Labor Department that was overshadowed during wartime because of the large powers granted to the WLB.

With voluntary wage adjustments now permitted, the joint announcement said, every effort will be made to restore collective bargaining to its normal function and to resolve disputes without government interference.

First step under the new program will be for the WLB to return to its regional boards some 3000 unsettled cases. The regional boards in turn will send these back to the disputants.

Preliminary plans for the management-labor conference were made at a meeting of spokesmen for labor and business in Washington, Aug. 24 and a second meeting to complete the plans is scheduled for Sept. 5. The time and place of the conference will be decided this week.

Primary objective of the conference will be to evolve a plan to minimize interruptions to peacetime production. Whether this will mean setting up new machinery to succeed the WLB or whether individual issues will be threshed out has not yet been decided.

Conferees at the first meeting included: John W. Snyder, director of war mobilization and reconversion; Eric Johnston, president of the Chamber of Commerce of the United States; Ira Mosher, president, National Association of Manufacturers; William Green, president, American Federation of Labor; Philip Murray, president, Congress of Industrial Organizations. Secretary of Commerce Henry Wallace and other labor leaders, possibly including John L. Lewis of the United Mine Workers, and leaders of the railway brotherhoods, will be invited to participate in future conferences.

Long queues of unemployed wait from midnight on to place their names with the Detroit office of the United States Employment Service, seeking new jobs or unemployment compensation. NEA photo

Simplified Practice Recommendation for Structural Shapes Under Consideration

A VOLUNTARY simplified practice recommendation for hot-rolled carbon steel structural shapes, as proposed by the Technical Committee on Carbon Steel Plate and Structural Shapes, of the American Iron & Steel Institute, will be made available, this month, to all interests, for consideration, comment and approval, according to the Division of Simplified Practice of the National Bureau of Standards.

The proposal contains 18 tables, covering the nominal sizes, and weights per linear foot of: Sections; beams; stanchions; joists; channels; angles; tees; and zees. Sections and angles used in car-building and shipbuilding are included.

The benefits derived from the use of a simplified list of structural steel shapes during the war are so pronounced, it is felt that a retention of that list, with some modifications, should result in widespread advantage to all industry.

The purpose of the program is to establish a voluntary simplified practice recommendation which lists those structural shapes that have the greatest usage. Among the benefits to be derived from the general adoption of this recommendation are: Increased production, through less frequent roll-changes in the mills; reduction in the inventories of fabricators, warehouses, and manufacturers; and improved service to the ultimate consumer.

For the reason that as many firms as possible should be given an opportunity to examine the proposed recommendation, interested parties are invited to make known their interest by writing to the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

New England Seen Taking Less Steel in Peacetime

Total requirements for steel in New England will be less in peace than during the war. Plate and bar consumption volume will not attain wartime peaks. On the other hand, lighter steel products will be in stronger demand.

Steel producing industry, centered largely in narrow strip and hundreds of wire products, confronts no general reconversion. Now passing through a period of confusion, rescheduling of substantial civilian backlogs will be accomplished shortly.

Under pressure of war, speed has been stressed in production and has brought about new practice and equipment which carried into normal channels, as they will be, will have far-reaching effect.

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Increase in Steel Prices Recommended

Industry Advisory Committee submits resolution to OPA asking for general increase of $7 per ton. Rising costs, decline in operations and loss of profitable war tonnage cited as calling for higher ceilings

NEW YORK

CONFRONTED with rising production costs and shrinking income as the result of war order cancellations, the steel industry is pressing the Office of Price Administration for further price relief.

While details are lacking, it is reported in authoritative trade circles here that a resolution adopted by the Steel Industry Advisory Committee at a meeting on Aug. 24 calling for an overall increase in ceiling prices of $7 per ton, or a flat increase of $7.50 per ton on finished steel products, has been submitted to OPA.

The higher prices are sought by the steelmakers for a number of reasons. For one thing, lower earnings are indicated for the industry as the result of a substantial drop in operations following in the wake of war contract cancellations. Some trade interests say operations may go as low as 50 per cent for some companies. Another reason for the increase is that the profitable war products, such as armor plate, no longer are in tonnage demand and it was this lucrative business which kept the mills in the black throughout the war period. Then, also, it is pointed out that in addition to the overall reduction in steel operations, unit operating costs will be increased by the necessity to handle smaller individual orders for civilian goods production. This means more changing of rolls in contrast with the more lengthy runs on war contracts.

Immediately facing the industry is the threat of a demand for high wages. The steelworkers' union is expected to formulate new demands at a meeting in Pittsburgh, Sept. 11, the general view being it will ask for a sufficiently large increase to offset the drop in take-home pay resulting from the reduction in working time from 48 to 40 hours per week. Lower operations and other cost factors alone offset any savings to the steelmakers resulting from the reduction in overtime wage payment.

For some time past various OPA product committees have been studying the pricing problem of the industry as it concerns extras. Many of these committees, it is reported, have completed their studies and have made recommendations to OPA. Extensive revamping of the extra structure may result in a further drop in normal income of the industry.

In some circles it is pointed out that possibly a partial answer to the steel industry's request for higher ceiling prices may take the form of withdrawal of price control from some products. At present, OPA is reported thinking about eliminating price control from some of the specialties in which capacity is large and in which there is sufficient competition to prevent inflationary prices. Also it is reported OPA is giving some thought to removing the ceiling price schedule on iron ore since demand now is smaller and opening up of foreign sources of supply has intensified competitive conditions.

Present, Past and Pending

ALLEGHENY DEVELOPS NEW TOOL STEEL

KENRIDGE, PA.—Allegheny Ludlum Steel Corp. claims from 25 per cent to more 200 per cent faster machinability is provided by a new tool steel, "Dunkirk EZ."

WARNER & SWASEY TO ENTER TEXTILE MACHINERY FIELD

LAND—Warner & Swasey is entering the textile machinery manufacturing field step in a long-term program of product diversification, says Charles J. Stilwell, sident.

GERMANS DEVELOPED NEW SUPERCUTTING ALLOY

BOKEN, N. J.—Prof. Gregory Comstock, director of research, Powder Metallurgy oratory, Stevens Institute of Technology, reveals the Germans developed a new tting alloy during the war which required no tungsten. It consists essentially nadium and titanium carbides bonded with metallic nickel.

VULCAN IRON RE-ENTERS SUGAR MILL MACHINERY FIELD

KES-BARRE, PA.—Vulcan Iron Works has resumed the manufacture of sugar machinery after a lapse of 30 years, says B. S. Dowd, executive vice president.

RUSTLESS UNDERTAKES EXTENSIVE EXPANSION PROGRAM

TIMORE, MD.—Rustless Iron & Steel Corp. is undertaking a building project costout $2,440,000. This project involves improvement of hot-rolling facilities. 0,000; enlargement of cold-rolled shape mills, $400,000; enlargement of in- and shipping department, $400,000; improvement of power facilities, ,000; installation of new water-reclaiming system, $55,000.

GENERAL MOTORS DEVELOPS NEW AIRCRAFT ENGINE

TROIT—General Motors Corp. has developed a new four-cylinder radial aircraft hp engine with dry weight of only 275 pounds.

CHRYSLER RELINQUISHES ARSENAL, PROVING GROUNDS

TROIT—Chrysler Corp. is turning over to the government the tank arsenal which operated since 1940. "Office, Chief of Ordnance—Detroit" will occupy the as a permanent postwar headquarters. Chrysler also is relinquishing the tank g grounds at Utica, Mich., which it operated under lease from Packard Motor Co.

OPA Officials Admit Steel Price Rise Is Under Study

WASHINGTON

OPA spokesmen admitted last week they had received a request from the steel industry for higher finished steel prices based on the change in the industry's earning position due to cancellations of war requirements.

They said this request will be considered immediately under that portion of President Truman's executive order of Aug. 18, on reconversion, which authorizes the price administrator "to make such adjustments in existing price controls as are necessary to remove gross inequities or to correct maladjustments or inequities which would interfere with the effective transition to a peacetime economy."

OPA spokesmen would not say how soon they may act on steel prices but with the present emphasis on speed in hastening the reconversion development it is possible the answer may materialize in a few weeks.

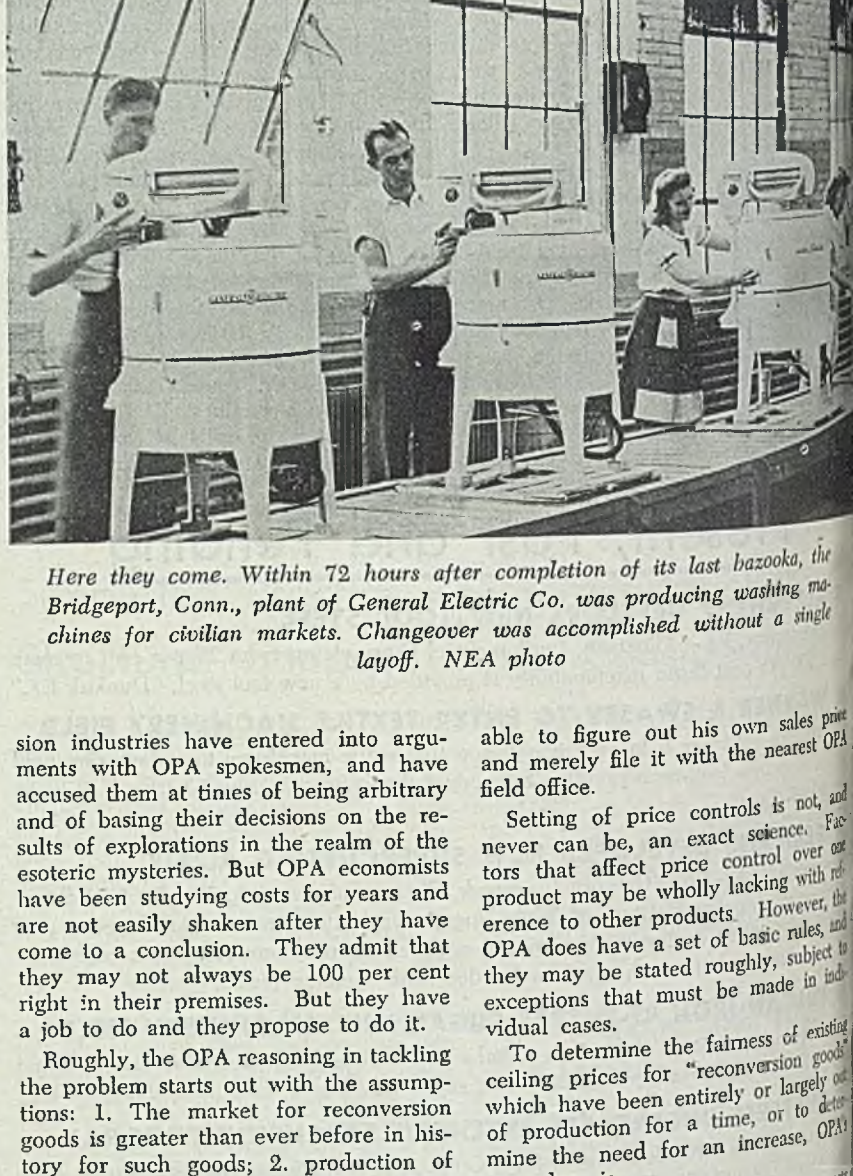
Formulas To Keep Prices of Civilian

FORMULAS for establishment of ceiling prices on reconversion products, one of the Office of Price Administration's most difficult assignments, are nearing completion. Fairness of these prices will determine in large measure the degree of production and employment in the months to come.

The reconversion products fall into two classifications: Consumers durable goods, made largely of steel and other metals; and industrial equipment. Not included are those products which were continued in production during the war, such as shoes, clothing, and many other items, prices on which have been and will continue to be under control.

In establishing reconversion prices, OPA has had to consider two groups. First are the reconversion industries which discontinued normal products during the war and now are confronted with the need for total reconversion. These include the manufacturers of automobiles, radio receiving sets, electric refrigerators, vacuum cleaners, washing machines, toasters, clocks and watches, electric irons, stoves and ranges, lawn mowers, aluminum pots and pans and others.

A second group recognized by OPA are known as "reconverting manufacturers." These are the companies which abandoned their normal civilian output to engage in war production while some of their competitors making the same line of goods continued in civilian production.



Here they come. Within 72 hours after completion of its last bazooka, the Bridgeport, Conn., plant of General Electric Co. was producing washing machines for civilian markets. Changeover was accomplished without a single layoff. NEA photo

Four Objectives Listed

Chester Bowles has listed the four objectives of the OPA's reconversion price fixing policies as follows: 1. To prevent inflation; 2. to make possible full production; 3. to encourage full employment; 4. to relax price controls in one commodity field after another as soon as inflationary danger disappears in each of these fields.

OPA's reconversion pricing assignment under the Stabilization Act of 1942, and which was thus later defined specifically under the President's executive order, is a tough one. The reason is that ascending manufacturing costs are not reflected in existing ceiling prices of the reconversion products for the simple reason that they have been out of production. But prices have to be set on these reconversion goods, for without some adjustment in 1942 prices, many manufacturers would be unable to produce and sell them at a profit. So the OPA has had to make a lot of assumptions about future production costs and sales volume. It is small wonder, therefore, that representatives of reconversion industries have entered into arguments with OPA spokesmen, and have accused them at times of being arbitrary and of basing their decisions on the results of explorations in the realm of the esoteric mysteries. But OPA economists have been studying costs for years and are not easily shaken after they have come to a conclusion. They admit that they may not always be 100 per cent right in their premises. But they have a job to do and they propose to do it.

Roughly, the OPA reasoning in tackling the problem starts out with the assumptions: 1. The market for reconversion goods is greater than ever before in history for such goods; 2. production of these goods will be in record-breaking volume for an indefinite period; 3. unit sales expense will be low because the market already exists; and 4. volume production will enable industry to benefit by what it has learned about efficient labor utilization during the war and thus counterbalance higher unit wage costs.

OPA's announced reconversion pricing goal is to so regulate the controls that most peacetime goods returning to the market will be sold at 1942 retail prices. It has sought, and still is seeking, to formulate controls which may be applied automatically, so that practically every reconversion manufacturer may be able to figure out his own sales price and merely file it with the nearest OPA field office.

Setting of price controls is not, and never can be, an exact science. Factors that affect price control over one product may be wholly lacking with reference to other products. However, the OPA does have a set of basic rules, and they may be stated roughly, subject to exceptions that must be made in individual cases.

To determine the fairness of existing ceiling prices for "reconversion goods" which have been entirely or largely out of production for a time, or to determine the need for an increase, OPA's procedure is:

"If a reconverting industry requests us to re-examine its prices, we will start with its costs and prices in the last period of normal production—usually 1941—or some part of it. We will adjust those costs upwards for two factors: (a) Lawful increases in materials and parts prices, and (b) lawful increases in basic wage rates of factory workers. To the 1941 costs, so adjusted, we will add in place of the 1941 profit margins a more nearly representative peacetime margin received in 1936-1939.

"The excess of the resulting figure over 1941 prices will be expressed in terms

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oods Near 1942 Levels

Automobile builders given plan by which they may fix prices on new cars individually. May pave way for establishing ceilings on other products. Wholesalers and retailers asked to absorb increases granted to manufacturers, on theory that demand will be high, that selling costs per unit will be low, that tradeins will be few and credit losses slight

n industry-wide 'increase factor.' will be a percentage figure by which manufacturer in the industry may ase his 1941 price or prices. He then compare the result with his ing ceiling price—which is usually 1942 price. If the 1941 price, when ed by the use of the 'increase fac- is higher than the existing price, manufacturer can take the former as legal price ceiling. Otherwise, his ing ceiling will continue to apply.

the manufacturer in an industry which an 'increase factor' is an- nced is coming out with new mod- he will first use the method just de- ed to adjust his ceiling price for the d he last sold. He will then use the ted old-model prices as a basis for ing at ceiling prices for the new

his method will be applied to 're- ersion products.' Other products will be made by reconverting manu- urers have been in continuous pro- ion by a substantial number of firms, in judging the fairness of existing ngs for these products it is not neces- to resort to estimates. The new od will not be used in its entirety the same way for all 'reconversion ucts.' Some of these products are like goods that have been produced war. Experience in producing war ds may, therefore, be used as a guide computing the 'increase factors.'"

some instances reconversion price minations or adjustments for in- ual firms will be necessary, rather than an industry-wide review. In such cases OPA will provide for the determination of individual company "increase factors" on the basis, primarily, of such firm's cost experience. In some cases individual company adjustments will be appropriate after industry-wide increase factors have been announced. Such adjustments will be made for firms that would suffer hardship under the industry-wide ceiling price. Three pricing orders for reconverting manufacturers apply to those with annual sales (excluding war contracts) of more than $200,000, $50,000 to $200,000, and less than $50,000:

"A reconversion manufacturer with civilian sales of more than $200,000 may receive an adjustment if he shows that his ceiling price for a product of which he is a reconverting manufacturer does not cover his total 1941 cost for the product, plus an adjustment to reflect subsequent legal increases in materials prices and in his basic wage rate schedule for factory workers.

Small Firms Use Simple Form

"A reconverting manufacturer with annual sales (excluding war contracts) between $50,000 and $200,000 may calculate a new ceiling price on a simpler form. He will add to his 1941 cost, increases in materials prices and increases in his straight-time factory labor rates. To his 1941 cost so adjusted he may add a profit factor equal to his own 1936-1939 profit margin, or one-half the industry average profit in 1936-39, whichever is higher. The greater liberality for the smaller manufacturer is based on indications that he may be less able to absorb initial abnormal costs.

"A reconverting manufacturer with sales of less than $50,000 may calculate a new ceiling price by a still simpler procedure. He may calculate his present total costs. He may then add to his current cost either his own profit margin of the first of the years 1939, 1940 and 1941 for which he has profit data, or one-half the industry average profit margin of 1936-39."

The above three orders apply only to old manufacturers now reconverting to goods which they previously made. Another order now being formulated will provide for small new manufacturers entering the consumer durable goods field.

"Profit factors" so far determined by OPA provide for 15 specified industries and for seven industry groups. By using these factors, in combination with adjustments for increases in materials prices and basic wage rates, individual reconverting firms may obtain price relief over and above prices established after industry-wide reviews of existing ceiling prices of reconversion products. The profit factors, in line with the formula described above, equal one-half of the average percentage margin of profit over total cost for the industry or industry group in the peacetime period of 1938-39. These profit margins, as previously explained, are to be used only when they are higher than the firm's own prewar margin over cost.

The profit factors as they so far have been set for specific industries and industry groups are:

Specified industries: Aluminum cooking utensils (sheet) 6.2 per cent; aluminum cooking utensils (cast) 2.3; bicycles 3.8; clocks and watches 5.5; coin-operated machines 2.4; household scales 4.1; lighting fixtures 2.6; metal caskets 1.6; metal office furniture 5.4; metal toys 5.1; musical instruments except pianos and organs 3.1; office and store machines 8.9; photographic accessories and equipment 8.1; radios and phonographs 3.0; safes and vaults 3.9; small firearms 4.7; wood and upholstered furniture 1.6; domestic stoves (coal and wood, oil gas combinations, gas cooking and gas heating) 3.7; domestic washing machines and ironers 2.6; metal household furniture 2.4; vacuum cleaners 4.6; miscellaneous hardware (excluding products under a builders' hardware regulation not yet issued) 5.1; paper-mill, pulp-mill, and paper products machinery 4.2; printing-trades machinery and equipment 3.0; textile machinery 6.0.

Industry groups: Beds, mattresses, etc.

(*Please turn to Page* 218)

Western Steel Prospects Dimming

Future of Geneva and Fontana plants in doubt. Utah plant may be offered for sale at around $125 million. Kaiser questions fairness of RFC proposal

"DON'T DILLY-DALLY": Henry J. Kaiser, left, West Coast industrialist, testifying before a Senate subcommittee on reconversion problems, accused government of "dilly-dallying" on his proposals to lease government war plants. Left to right, are Kaiser; Committee Secretary J. R. Flanigan; Sen. Harley Kilgore (W. Va.); Sen. Hugh B. Mitchell (Wash.); and Sen. Homer Ferguson (Mich.) NEA photo

SAN FRANCISCO

HOPES of the West Coast for a grown-up integrated steel industry are dimming.

When current uncertainties are resolved, the West will have more facilities than before, but probably not as much as anticipated a few months ago.

That is indicated by recent developments. Some observers are beginning to forecast that the Geneva mill in Utah will be padlocked. Opinions even are heard that Kaiser will be unable to continue operation of the Fontana plant under the terms set by the Reconstruction Finance Corp. in readjusting the loan on that property.

The prospect now is that the Geneva plant will be declared surplus property and will be placed on the market at a price of around $125 million. That is the figure set by Arthur G. McKee & Co., Cleveland, after its engineering survey of the property for the RFC. This amount is the reproduction figure. Cost of the installation to the government was around $215 million.

How soon certification of Geneva as surplus will be made is uncertain. The RFC says there may be a delay. It is understood negotiations between the Kaiser interests and Colorado Fuel & Iron Corp. for Geneva still are proceeding, but as yet there have been "no definite arrangements in the way of sale or lease."

Companies Negotiating Separately

Kaiser and the Colorado company are reported to be negotiating separately, not as a combination such as Mr. Kaiser suggested recently. Incidentally, Kaiser interests have made no public statement as to their plans for Geneva since the announcement of U. S. Steel that it no longer is interested in the plant.

Neither has Mr. Kaiser said one way or the other that he definitely would accept or reject the RFC action in placing two mortgages and a secured note on the Fontana property. Instead, Mr. Kaiser has indicated that he might take the dispute to Congress and eventually to the people, if necessary.

In a long statement commenting on the RFC decision, Mr. Kaiser said Fontana would have to sell western steel at eastern prices "to meet charges of wartime construction, thereby depriving the West of the benefits of a new basic steel industry."

The RFC plan calls for a $69.5 million first mortgage at 4 per cent interest to run for 15 years. This represents $58 million sound value of the present fixed assets plus a new $11.5 million loan to be used for improvements and plant additions. Secondly, there will be a 25-year second mortgage for $34,510,380, without interest, representing the balance of the original loan invested in fixed assets. Last would be a $10,318,000 note secured by 103,180 shares of $100 par 4 per cent first preferred of Kaiser Co. Inc. Interest on the first mortgage loan and dividends on the preferred are payable during the first two years only to the extent earned. The original RFC loan to Kaiser for Fontana was $111,805,000 and with the new $11,500,000 loan will be $123,305,000.

Net profits received by Kaiser Co. from ship construction originally were pledged to the RFC as added security to the original loan. They will continue as such on the readjusted basis. Of ship construction fees and profits received under contracts entered into prior to July 1, 1945, 72½ per cent is to be applied to the principal of the second mortgage and in addition 25 per cent of the earnings of Fontana is also to be applied to the principal, after deducting from such steel division earnings interest, principal payments on the first mortgage and income taxes, but before depreciation. The remaining 27½ per cent of the shipbuilding profits is to be applied on the preferred stock note until paid, and thereafter on the first mortgage.

Up to now approximately $14 million has been received by the RFC from Kaiser's shipbuilding profits, which has been divided $9 million to principal of original loan, $5 million to interest.

The independent engineering survey of the Fontana steel properties for the RFC placed the present-day reproduction cost of the Fontana plant at $63 million. Depreciation further reduced that amount to $58 million, which is the basis for the first mortgage without the new $11.5 million. As the original investment in plant was about $96 million, this amounts to a writedown of the fixed assets of $38 million.

Regarding earnings prospects of Fontana, the engineering survey indicates that with new improvements and expansions and with efficient operation after all costs except depreciation and taxes, the mill should earn at these rates: At 60 per cent of capacity, about $5 million annually; at 70 per cent, about $6.6 million; at between 80 and 100 per cent, approximately $10 million.

RFC Plan Called Harmful To West Coast Industry

LOS ANGELE

Attitude of the Reconstruction F nance Corp. on the refinancing Kaiser's Fontana steel plant "is in effe killing off the steel industry in the We

This was the opinion of a number representative western steel men atte ing a reconversion conference here which industrialists, state and local

cials, labor leaders and agriculturists pre-ented their views on peacetime produc-on in the West. The meeting was alled by Gov. Earl Warren.

Governor Warren informed the group hat "we want to act promptly but not ysterically." He said he was perturbed y reports that RFC, in setting up financ-g arrangements for the Fontana mill, ad apparently stipulated that the pro-ced steel would sell at the eastern ice plus transportation costs to Cali-rnia.

"If that is true, then the West will t have a steel industry," Governor arren declared.

Alden C. Roach, president, Consoli-ted Steel Corp., said steel men here lieved steel could be produced on the st at a reduced price. He averred the price must be low enough to ow western metal to compete with l produced in the East. Mr. Roach voiced surprise that RFC had set an stern price plus freight for Fontana el.

"With that string tied to the proposi-n, the government has garroted the ill," said Mr. Roach.

John A. McCone, president, Bechtel-cCone Corp., said he felt that confer-nces with Washington with the aim of veloping a proper freight rate between s Angeles and Utah would be of aid, ding that the capital setup also must ve fair.

mes Thimmes, president of the CIO ouncil here, and Lloyd Mashburn, sec-y of the AFL Building Trades Coun-l joined in expressing disapproval of e RFC attitude on Fontana.

special legislative session to thrash and act upon the matter of western el appeared to be the majority's de-e as the conference progressed. Most kers touched upon the angle that it ght be a good idea to wait and see what Congress intends doing on nversion legislation on the national ene.

rm Machinery Output on rge in Southern California

arm machinery manufacture in uthern California will reach more than million during the next 12 months, in mparison with approximately $20 mil-n in 1944 and a local production in lue of $14 million, figures released re-ntly by the WPB branch in Los Angeles ffice.

Largest increases will be represented attachments for agricultural machin-y with production of poultry raising d dairying equipment to be stepped only slightly less than prewar figures. Smaller increases are indicated in the ding of earthmoving, fertilizing, spray-g, mowing, harvesting and haying ma-hinery and slightly larger increases on irrigation supplies, garden tractors and motor parts.

Layoffs Continue in Northwest as More War Contracts Are Canceled

SEATTLE

CONTINUED cancellation of war contracts and reduction of personnel at war plants feature the immediate postwar weeks in the Pacific Northwest. Nearly 9000 workers have been laid off at the Portland and Vancouver shipyards, the remaining 14,000 being retained to finish contracts on hand. The Navy has ordered repair work stopped on a number of vessels at the Puget Sound yard. At Vancouver, B. C., it is reported work has been stopped on construction of a naval floating drydock to have cost $1 million, releasing 500 men. It is expected that orders for 11 of 26 naval transport ferries will also be canceled at British Columbia yards, work totaling $22 million.

At the Todd Tacoma yard 2350 were dropped immediately and 450 terminated voluntarily. Winslow yard laid off 300 of a total of 1700. Puget Sound Bridge & Dredging Co. dropped 700 of its 4000 workers. At all yards the graveyard shift has been abolished and a 40-hour week inaugurated. Many workers quit voluntarily, while some of the swing shift labor was taken into other crews.

Boeing began gradual abolition of graveyard shifts, but no layoff program has been started in the 31,256-person crews at Seattle and Renton. No drastic reduction is immediately anticipated as the Superfortress construction program for September will continue heavy.

Other developments as this area turned to postwar conditions included: A powerful bloc of labor unions announces it will demand the same weekly "take-home" pay for 40 hours as has been received for 48 hours.

Interesting industrial and economic data were presented to the Mead Senate committee which met here with Senators Mitchell, Washington, Ferguson, Michigan, and Kilgore, West Virginia, in attendance. Dr. N. H. Engle, University of Washington, declared that there will be fewer unemployed in this area than before the war. He stated the prewar number of employed in this state was 608,000 and 940,000 at the peak of the war activity.

"Our studies indicate that 57,000 women plan to drop out of industry," he said. "In about a year there will be a demand for 840,000 jobs in this state but it is estimated only 750,000 jobs will be available. There were 108,000 unemployed in this state in 1939. We estimate only 86,000 will be unemployed after reconversion which can be reduced to 65,000 because of persons going from one job to another. But this 65,000 can be reduced by establishment of new industries and by construction, in which there is a backlog of $60 million in buildings in Washington."

R. J. Lamont, president, Todd Pacific Shipyards, told the committee he did not see much future in Puget Sound shipyards except in building special types of ships.

Industrial leaders scored the lack of prompt decisions by OPA on prices for new products before the committee. They requested that such rulings should be made within two weeks.

NEW SENATOR: Maj. William F. Knowland, appointed by Gov. Earl Warren, California, to succeed the late Hiram Johnson in the United States Senate, looks over his civilian suits to see what changes must be made. NEA photo

Walter S. Tower

Internal, External Problems Facing Steel on Way Back

President Walter S. Tower of American Iron & Steel Institute sees reconversion in industry a many-faceted job. Says getting back to competitive markets at home will call for high degree of business statesmanship

THE IRON and steel industry confronts two sorts of reconversion problems on the road back from all out war production to its normal place in the peacetime economy, according to Walter S. Tower, president, American Iron & Steel Institute, in a discussion prepared for the 1945 yearbook of the institute.

"On one hand are certain internal problems which are largely under the industry's control," states Mr. Tower. "On the other hand are numerous less tangible problems which are outside the industry and are not within its power to solve."

In the first category, he says, the chief problems relate to readjustment of facilities to normal operation; elimination of obsolete or uneconomic plants and equipment; disposition of government-financed facilities; return of veterans to appropriate places on payrolls; and readjustments of operations to normal working hours.

Chief problems of the second category are: Prompt settlement under canceled war contracts; disposal of surplus stocks resulting from such cancellations; removal of controls imposed by the War Production Board, War Labor Board, Office of Price Administration, and other federal war agencies; revival of competitive markets in place of dictated markets; reflection of customers' problems of reconversion of many sorts; the future of government-owned plants; and the incalculable effects of trying to restore a war-torn world by slow re-creation from a condition of near chaos.

In Mr. Tower's opinion the internal reconversion problems of the steel industry present few difficulties, except, perhaps, in the complications of realigning working forces to provide returning veterans with jobs and in getting back to a normal schedule of working hours.

"To reabsorb any large part of the many thousands who went from the mills into armed service will not be simple under the best conditions," he writes. "It can be much complicated if it comes at a time marked by a declining rate of operations and slackening need of workers. Perhaps even more serious may be the effects of eliminating overtime, by returning to the 40-hour week, with the consequent shrinkage in pay envelopes. Current prices and profit margins offer no room for 'compensating increases' in basic rates of pay even though there were no 'Little Steel formula' at work to prevent such increases. However, none of the factors in this group of reconversion problems needs operate to retard steel production in any reasonable degree."

Steel industry's margin of profit per ton has shrunk steadily during the war period. For example, in the five years April, 1940, to April, 1945, profits fell to a level much below that in 1940 or 1937, the last active year before war demands began to appear. In 1937, Mr. Tower points out, the average net profit on products shipped was more than $5 per ton. In 1940 and 1941 it was still close to that figure, but in 1942 it was not quite $4 and it was down to less than $3 in 1944. At the same time the volume was up almost 40 per cent over the five-year period.

While profits were shrinking, states Mr. Tower, workers fared well in larger earnings, in the five years average earnings of workers paid on hourly, piecework or tonnage basis rising from 83 cents to $1.27 per hour, or an increase of more than 50 per cent. Weekly pay envelopes grew from an average of about $28 to about $59, a rise of 110 per cent.

Recent minor upward changes in ceiling prices for certain products allowed by OPA seem wholly inadequate to correct an unsound relationship between production costs and prices, says Mr. Tower. The chief difficulty, he says, evidently lies in the apparent OPA policy of price control in terms of overall profits rather than fair and equitable prices for specific products.

Especially for companies with a limited range of products, refusal to recognize the fundamental facts that prices are individual to specific products can be disastrous, particularly if volume of output begins to drop, he states.

The intangible reconversion problems confronting the industry, those external to it, cannot be so readily disposed of as can the industry's internal problems, in Mr. Tower's opinion. With respect to surplus stocks of steel he feels that to the extent such stocks consist of special purpose steels they are not likely to be readily adaptable to commercial uses, and consequently should be disposed of as scrap. Regarding the future of government-owned, or wholly financed plants, Mr. Tower says this involves the unknown item of how they will be operated, and on what basis, pointing out that any form of direct or indirect subsidy for such plants can have far-reaching effects on competitive relationships among members of the industry.

"Conceivably," he says, "operation of government plants under subsidy could indefinitely postpone the day of full recovery of market position for some privately owned units."

Mr. Tower favors removal of the various government controls over industry as quickly as possible, pointing out that controls which do not disappear with conditions that gave them birth tend to become permanently entrenched. For steel, he says, it seems obvious that removal of controls as promptly as possible will greatly aid reconversion.

The end of the war finds the America

eel industry a giant in the world of eel. Largest foreign capacity, says r. Tower, probably is that of Russia hich may have as much as 20 million ns. Next comes Great Britain with 5 million tons. Germany and Japan e destined to have considerably smaller eelmaking capacity, at the most no ore than enough to provide for mini- um internal needs of a much reduced ivilian economy.

"The aggregate of those reductions ikely to be even greater than the to- a wartime expansion, which was chiefly the 15 million tons added to this ntry's capacity since 1940," says Mr. ower.

"Getting back to competitive markets some will call for high business tesmanship," he says, "because of the ed expansion of facilities beyond any rmal needs of established markets. tside markets may well look more at- tive than ever before. Overseas the blem of competition, perhaps unim- ant for a time, is likely as soon as n be organized to be complicated the solid front of foreign industries, ked up by the powerful arm of gov- ment.

European Controls Seen Continuing

"Controls and combinations seem in- ble for the war-torn countries of ope for a long time to come. Prob- m of manpower, of materials, and of sport will add to the difficulties im- d by deranged finances and tight- of foreign exchange.

"With more than half the world's steel- ing capacity in this country, the op- unity, if not obligation, is obvious. eeing that opportunity successfully can of vital value to the whole world. ether it can be met is a matter of nal policy toward industry. What policy is to be in regard to overseas mercial activity is still unrevealed."

A significant point brought out in Mr. wer's discussion is that down to the of the war no urgent war program delayed through lack of steel and the same time no essential civilian ply was impaired because steel was ilable. Many normal uses of steel to be curtailed or stopped entirely, tates, but the stocks of goods in- ent in our high standard of equip- for living provided a reserve to ge the gap caused by interrupted ply.

"There will always be an open ques- whether considerations of labor sup- and of plant facilities needed for ing war goods, rather than supply of el were the chief compelling reasons such industrial restrictions," he says, ing out that not any one of the war rs called on the steel industry to pro- the last ton which its furnaces d melt. Even in 1943 and 1944 re was a margin of 4 to 5 million of capacity which was not utilized ause of manpower, materials or lack of place to use in war programs larger tonnages of bessemer or electric furnace steels.

In the five years, June, 1940 through June, 1945, the iron and steel industry produced close to 430 million tons of ingots, mainly for the war effort and the support of a strong domestic economy. Over the 5-year span the average rate of operations was above 95 per cent of practical capacity of all existing furnaces, and only once since August, 1940, did the rate drop below 90 per cent for a full month. The magnitude of the industry's war performance is seen when it is borne in mind that its 5-year war output is not far short of the industry's output in any previous 10-year period.

Battlefield Scrap Survey Mission Leaves Sept. 12

Two representatives each of the steel, the iron and steel scrap, and the nonferrous metal industries will make up a mission sponsored by the War Department to the European and Mediterranean theaters of operations to make a survey on battlefield scrap and allied matters. The mission, which is to leave about Sept. 12, will be abroad 26 days, and will visit France, Belgium, Germany, Italy, and England.

The personnel of the mission is as follows: For the iron and steel scrap industry: Joel Claster, Luria Bros. & Co., Philadelphia; and Edwin C. Barringer, president and executive secretary, Institute of Scrap Iron & Steel Inc. For the steel industry: L. D. Greene, Bethlehem Steel Co.; and N. Ebersole, American Rolling Mill Co. For the nonferrous metal industry: J. B. Neiman, Federated Metals Division, American Smelting & Refining Co., Detroit; and Carl O. Thieme, H. Kramer & Co., Chicago.

FHA Officials Expect Big Expansion in Construction

Expanding home construction will offer large opportunities for employment during the next 12 months in the building and allied industries, Raymond M. Foley, commissioner, Federal Housing Administration of the National Housing Agency, announced recently. FHA officials are concluding studies so that prompt action may be taken as war housing regulations and limiting orders are relaxed or canceled. These studies range from improving service to lenders, builders and home buyers through simplified procedure within FHA itself to rehabilitation of city homes and farm structures on a sound financial basis.

TRANSITION TOPICS

LABOR—New national labor policy in formulation as wartime controls and agencies fade out of picture. Management-labor conference to seek way to minimize interruptions to peacetime production. See page 85.

RECONVERSION PRICING—Steel producers request OPA for $7 increase on steel products. OPA establishes formulas to hold prices of most reconversion items at around 1942 levels. See pages 87, 88.

WEST COAST—Hopes for full-grown integrated steel industry in West dimming. Future of Geneva plant uncertain. See page 90.

STEEL RECONVERSION—Institute president says industry faces both internal and external problems in reverting to peacetime basis. See page 92.

AUTOMOBILES—Reconversion to passenger car production expected to gain speed rapidly after interruption due to Pacific victory. See page 101.

AIRCRAFT—Bottom knocked out of government aircraft production, but industry hopes military output can be stabilized at about $1 billion annually. See page 108.

MACHINE TOOLS—Coloration, temperature - controlled operations, and other projects whose possibilities were explored tentatively during war, command attention of machine tool industry facing new challenges and opportunities. See page 124.

ELECTRONIC GAGE—Novel gaging device for bearings so equipped with electronic controls that blind veterans and other sightless persons using it can meet highest standards of accuracy. See page 128.

THERMIT CASTING—Technique for producing high-grade steel castings of Thermit metal should be well received where castings of many sizes and shapes are wanted in limited quantities. See page 134.

Full Employment Debate To Focus On Extent of Government Backing

Whether government shall "guarantee" jobs for all or only "promote" and "encourage" high level of employment is fundamental issue. Former might entail federal operation of industrial plants

DEBATE on the full employment bill, slated to begin in the Senate soon after Congress reconvenes from its summer recess, is expected to focus largely around one fundamental issue. This, as it took form during the recent hearings of the Senate Banking and Currency Committee, is whether the government should only "promote" or "encourage" full employment, or whether it should enact a flat guarantee of full employment with possible Treasury backing to maintain it.

The issue is especially significant because some proponents of a full government guarantee favor government operation of industrial plants if that should appear necessary to carry out the guarantee. In case of failure of private industry to take over and operate government-owned plants, built at a cost of $15 to $17 billion during the war, the government, with possible Treasury backing, would step in and operate the plants.

This controversy, long dormant in Congress, was aired during the hearing of Philip Murray, CIO president, after some discussion as to the advisability of changing the policy declaration of the full employment bill to substitute a milder word, such as "promote" or "encourage" for the word "assure" in the following:

"It is the policy of the United States to assure the existence at all times of sufficient employment opportunities to enable all Americans who have finished their schooling and who do not have full-time housekeeping responsibilities freely to exercise this right (the right to a job)."

Mr. Murray urged the committee to "accept no substitutes;" he asked for a positive guarantee. He went on to predict that if private enterprise fails to provide well-paid jobs in sufficient numbers, people would demand government operation of industry. Mr. Murray also wanted the guarantee without any strings whatever. He urged that President Roosevelt's Economic Bill of Rights be included in the bill's policy declaration. He asked that the guarantee cover "all persons able to work and seeking work" without stipulating that they must have finished their schooling or that they must not have full-time housekeeping responsibilities. Mr. Murray warned that the test on government vs. private operation of manufacturing plants may come soon. Unless private industry buys or leases government-owned war plants, he declared, there will be pressure that the government operate them.

Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., chairman, Federal Reserve Bank of Boston, and chairman of the Research Committee of the Committee for Economic Development, told the committee that if he had drafted the bill he would have avoided the use of the word "assure" in obligating the government with reference to jobs. "The right to a job," Mr. Flanders thought, should be defined somewhat as follows:

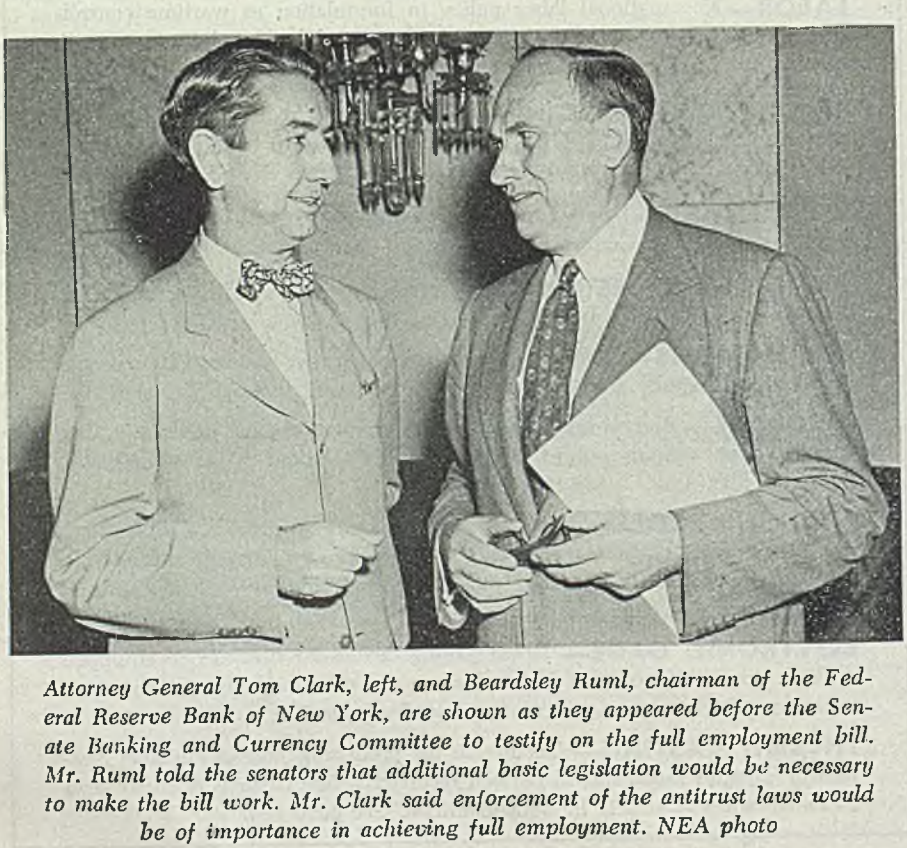
"The man or woman out of a job has the right to expect that all responsible elements of society, and particularly the government, will use all appropriate and effective means to assist his own best efforts in finding productive and profitable work." He added that it is not only the federal government that is responsible in regard to employment; state and local governments also have an obligation. The responsibility also devolves upon business, organized labor and the individual. Mr. Flanders was emphatic in his views about the responsibility resting on the individual.

"The duty of the individual," he said, "is to be productive, self-reliant, and to be energetically in search of employment when out of a job. To assign the right to a job to individuals who do not possess these qualities is to subsidize idleness and encourage them to become social parasites."

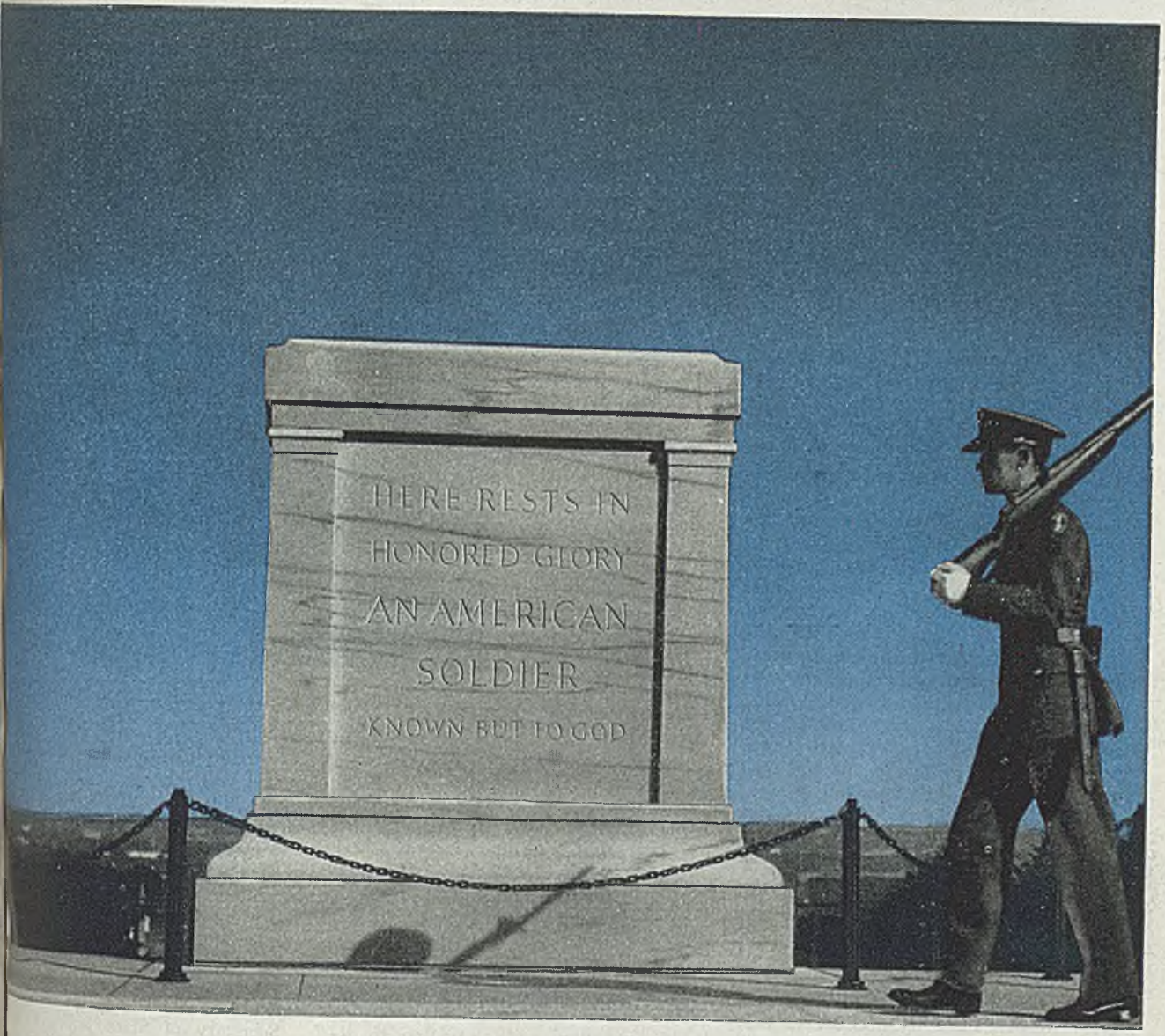
Susceptible to Misinterpretation

In its present form the full employment bill is susceptible to misinterpretation, said Mr. Flanders. The promise in the bill, he indicated, is greater than the possible performance. The government alone, he warned, cannot overcome any future great depression by the timing and volume of government expenditures. If employment ever again gets out of hand, as it did in the '30s, he feared, it would be impossible to provide enough work or markets through the use of government funds without resorting to wartime restrictions such as wage and price controls and a great expansion of the national debt.

The full employment bill, he urged, should be written in clearer language so that there will be no popular misconceptions of what it really provides. For instance, there should be more emphasis on the portion of the bill which instructs the President to recommend programs of congressional action aimed at stimulation of private business from year to year. "If the bill is properly interpreted to cover the whole range of government responsibility," Mr. Flanders said, "it will mark a great step forward in organizing our major social and economic ob-



Attorney General Tom Clark, left, and Beardsley Ruml, chairman of the Federal Reserve Bank of New York, are shown as they appeared before the Senate Banking and Currency Committee to testify on the full employment bill. Mr. Ruml told the senators that additional basic legislation would be necessary to make the bill work. Mr. Clark said enforcement of the antitrust laws would be of importance in achieving full employment. NEA photo



What kind of monument to the Unknown Soldier's son?

...stands one of the most hallowed monuments in the ...rld... and one of the most tragic.

...is American soldier died that the world might be safe ...r his son.

...his son was killed.

...propose a different kind of monument to this second ...nction unknown.

...ica now is more powerful than all the rest of the world.

...powerful in thought . . . A single American magazine ..., printed in 11 languages, outsells any other publica... in 53 countries of the world. People are eager for ...rican ideas.

...powerful in armament...We have twice the air-power, ...from two to four times the naval strength of the rest of ...world totaled together. People respect American might.

More powerful in wealth . . . Over half the earth's total capacity to produce is here in our plants, machinery and skills. People need the things that America can produce.

This stupendous power can break down the barriers of ignorance, intolerance and want. It can keep our nation strong. It can *enforce* decency and peace upon the world. Ours is the chance and the responsibility to set an example for all the peoples of the earth to see.

This would be a monument.

The engineers of the basic machine tool producers can help the men of government and of industry to build that monument . . . to plan now the reconversion of our power to all-out production for a better world.

One of these engineers is a Bryant man. We urge you to call him in today.

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

jective—a high level of employment in the United States."

As a part of the overall job, he said, Congress should undertake an exhaustive study of the relationship of taxation to employment. "The federal government has very large and serious duties to perform if the right to a job is to be made effective," he declared. "It must do much more than store up work for release when unemployment is large. It must prevent the growth of that unemployment by policies which encourage business to expand and investors to undertake new ventures."

Beardsley Ruml, treasurer, R. H. Macy & Co., New York, chairman, Federal Reserve Bank of New York, and active in the councils of the National Planning Association and the Committee for Economic Development, told the committee that full employment is "clearly unobtainable," and the full employment bill attempts to do too much. And the timing of the full employment bill is poor; action on this bill should be held up until the stage for full employment legislation has been better set. He recommended enactment of a 5-point legislative program before a solution to the full employment problem be attempted.

"First of all," said Mr. Ruml, "should come a reform of social security financing that will take the deflation out of social security. Second, we should have a regular federal policy and program in public works and conservation that will tend to stabilize the construction industry at an appropriate level. Third, we should work out our federal tax program so that rates will be set to balance the budget at high employment. Fourth, federal lending activities at home and abroad should be associated harmoniously in federal fiscal policy. Fifth, a policy and program should be adopted directed toward maintaining a prosperous agriculture."

Fears Huge Public Spending

With adoption of such a basic program, he believes, high levels of employment can be maintained. If it is not adopted, he predicted private industry will lag and the program of employment depending upon public spending will become "gigantic and unworkable."

Mr. Ruml did not like the use of the word "assure" in describing the government's responsibility in connection with employment.

"Frankly," he said, "I think it makes little difference practically in the level of employment in 1946, 1947 or the years following how these matters are stated or whether they are stated at all—except for one thing, carelessness and ineptitude at this point may well undermine the prestige of the federal government, or create suspicion and lack of confidence among those whose co-operation is indispensable for the success of the bill. This is the real danger. The introduction of the phrase 'the right to employment' (in the bill's policy declaration) is a singularly inept and unnecessarily provocative formulation of an exceedingly profound insight as to the dependence of human freedom on employment.

"The statement of employment as a right," Mr. Ruml went on, "degrades the concept of human rights. There has been a tendency in recent years for those who desire a more widespread enjoyment of such benefits as education, housing, health, nutrition, and recreation to attach to these truly desirable fruits of social progress the high dignity of fundamental human rights. This extension of the term, human rights, tends to weaken the power and gravity of the concept.

"Is, for example, the 'right to employment' one of those basic rights for which 'governments were instituted among men?' This can hardly be the case, since in the bill the right to work is, in the same sentence which declares it, removed at one stroke from all Americans who have not finished their schooling and who have full-time housekeeping responsibilities. And what about the old people who have been deprived, I think wrongly, of the right to work for more than $14.99 a week if they accept their lawful benefits under social security?"

Mr. Ruml would like to see the policy declaration worded as follows:

"The Congress finds and declares that involuntary unemployment on the part of any citizen is a matter of national concern, that such involuntary unemployment threatens not only the rights and proper privileges of the citizen but menaces the institutions and foundations of a free democratic state."

Expressions by government men were colored by their angles of interest:

Secretary of Agriculture Clinton P. Anderson said that the farms will not provide additions to employment for years to come. "Without a single veteran or war worker returning to rural areas," he said, "the agricultural working force can be maintained during the next few years at its current level." Unless there are employment opportunities in industry for many farm boys and others who find a living on the farm, said Mr. Anderson, agricultural depression threatens.

Secretary of State James F. Byrnes told the committee that failure of the United States to provide full employment domestically would set a bad example for the rest of the world and "will certainly affect and may even determine the direction of the world's political and economic development."

Bishop G. Bromley Oxnam, president Federal Council of Churches of Christ in America, held that "an economic order that cannot provide opportunity for all to work cannot endure." The major Protestant denominations, he said, have gone on record repeatedly for the concept of full employment and "it will be supported by church people everywhere when it becomes law."

James G. Patton, president, National Farmers Union, asked that the bill go farther than merely guarantee full employment. The full employment policy he recommended, should be underwritten with an adequate financial appropriation to maintain consumer income. He also called for enactment of a "companion" program for agriculture.

Some Republican senators indicated they would like some other word than "assure" to apply to the government's responsibility for jobs. Sen. Warren Austin (Rep., Vt.) feared the word "assure" has led some people to believe

EUROPE-BOUND: Edward R. Stettinius, chairman, United States Preparatory Commission, and American representative to the United Nations Conference, shows his credentials to an MP as he boarded the QUEEN MARY at New York enroute to London. Mr. Stettinius, once was chairman of United States Steel Corp. NEA photo

STEE

enactment of the bill could bring out a change in our form of government. Sen. James E. Murray (Dem., Mont.), one of the bill's sponsors, saw need for a change. "What we mean perfectly clear; there is nothing in this anywhere that contemplates the government taking over private business in way," he said. Sen. Robert F. Wagner (Dem., N. Y.), another of the bill's sponsors, said he wouldn't "fuss about that is willing to agree to find another if some senators are going to keep opposing "assure."

interesting committee comment from Sen. Charles W. Tobey (Rep., N.H.) during the hearing of T. J. S. Stone, formerly a municipal court judge Baltimore, and now chairman of the Committee on Social Policies. many people in the walks of life you both tread are turning 'leftward' Some wants to call it that, on issues kind," said Senator Tobey. "Some Republican colleagues may raise eyebrows at what I say, but after consideration I have come to believe that political parties and accepted systems are not the ends of merely the achieving, if they the real end—a fuller life for all I feel now that any economy policy which seeks prosperity class on the basis of scarcity for people is not only unwise, but a sin."

Baxter had told about a time in the depression when "big dairy farmers pouring their milk into the while kids in my city were barefoot and hungry. The war has taught that if we can spend $300 billion war goods to be shot away," he we can at least afford to spend a part of that sum to experiment on make a peacetime economy pro- as fully as the wartime economy."

L. Lewis, mine workers union and William L. Green, president AFL, told the committee that wages and shorter hours would assurance that job opportunities keep pace with production tech- Mr. Lewis offered an amend- the bill making it a specific gov- responsibility to adopt policies view of adjusting and shorten- the hours of labor.

the other hand, William L. Kleitz, president, Guaranty Trust Co., New told the committee that while aims legislation are highly desirable, machinery to effect it is defective. that the assumption by the federal ment for the responsibility for full ment would inevitably lead to the of powers that would eventually the system of free enterprise. L. Donnelly, executive vice presi- Illinois Manufacturers Association, contended the bill would retard tion and increase unemployment would be impractical in operation. serving the objective of the Full Employment bill, Ira Mosher, president, National Association of Manufacturers, advanced what he described as an alternative and positive program for prosperity. This called for:

Proper management of the money and credit system. Elimination of all special privileges and government subsidies, including vigorous enforcement of the anti-trust laws, gradual reduction of tariff rates and revision of labor laws. Assurance of an "adequate flow" of private investment by tax reduction, curtailment of government spending, less regulation and other factors.

In calling the Wagner-Murray bill "unworkable legislation," Mr. Mosher stressed the long-range statistical computation that would be required in formulating an annual "job budget."

Machine Tool Shipments And New Orders Decline

Machine tool shipments in July, as reported by 198 companies, amounted to $32,521,000, compared with $41,040,000 in June, a 20.8 per cent decrease, the Tools Division of the War Production Board reported last week.

The decrease was attributed to the Fourth of July holiday, curtailment of lend-lease, and foundry bottlenecks.

Net new orders also declined, with the cutting off of lend-lease given as a principal reason. Value of such orders, the report shows, was $7,627,000, or 33 per cent below June. As an additional explanation of the decrease, the Tools Division said that military requirements were met, in some cases from surplus.

Unfilled orders decreased to $240,335,000, or 6.4 per cent from June.

OCS Urges Prompt Filing Of Termination Claims

Main problem in contract settlement at present is to make sure that contractors with terminations file their claims promptly, Robert H. Hinckley, director, Office of Contract Settlement, said last week. He urged all contractors who have received termination notices to get their claims in promptly, because delay in filing them may seriously impede the entire contract settlement program.

AWARDS . . .

The Army-Navy "E" award for excellence in manufacture of war materials has been given the following:

American Chain & Cable Co. Inc., Electric Welding Plant & Malleable Foundry, York, Pa.
Cleveland Cap Screw Co., Cleveland.
Continental Can Co., Plant No. 55, Wilkes Barre, Pa.
General Motors Corp., United Motors Service Division, Lima Tank Depot, Lima, O.
Frederick Hart & Co. Inc., Poughkeepsie, N. Y.
Jacobsen Mfg. Co., Racine, Wis.
Tube Methods Inc., Bridgeport, Pa.
Union Fork & Hoe Co., Defense Division, Rome, N. Y.

Advantages of Simplification May Be Retained

Manufacturers can substitute Bureau of Standards' voluntary machinery for mandatory orders issued by WPB

AMERICAN industries which simplified the sizes and varieties of their manufactured products during the war under mandatory orders of the War Production Board can retain the benefits of these programs by utilizing the voluntary machinery built up over a period of 24 years by the National Bureau of Standards, Department of Commerce.

More than 36 prospective simplified practice recommendations are now in process of development under the guidance of the bureau. Among the groups which have indicated an active interest in simplincation is the steel industry.

Savings of 50 per cent to more than 80 per cent in number of sizes and varieties were not uncommon with these simplified practice recommendatioins in operation. For example, pipes, ducts and fittings for warm air heating and air conditioning were cut from 5580 before simplification to 759, or 86 per cent. Pipe fittings of gray cast iron, malleable iron and brass or bronze were reduced from 8566 to 2969, or 65 per cent.

As a contribution to the war effort the War Production Board incorporated simplified practice in many of its mandatory limitation and conservation orders. Its purpose was to conserve scarce material by eliminating unnecessary sizes and varieties and to increase greatly the output of items needed for war purposes and for essential civilian consumption. Very large savings were effected.

Besides being mandatory, a limitation order issued by WPB differs from a simplified practice recommendation developed voluntarily in that it positively controls the actual manufacture of the articles covered. A simplified practice recommendatioin, on the other hand, is dependent upon the voluntary support of all manufacturers, distributors and consumers and confines itself to articles produced for stock purposes. Certain features of mandatory simplified practice imposed as a war measure are not applicable to peacetime on account of legal restrictions. However, where new programs are worked out under the recognized voluntary procedure many of the benefits can be projected into the postwar era.

Representatives of industry while functioning on the various industry advisory committees set up by the WPB had an opportunity to learn a great deal about practical simplification.

WPB Revises Remaining Orders To Help Speed Reconversion

Removes restrictions on special sales of most idle, excess and surplus materials. Establishes "CC" rating for use in breaking bottlenecks. "Open-ending" of utility construction is completed. Tin controls must be continued

OFFICIALS of the War Production Board are still revising governmental controls over industry to help speed reconversion while at the same time maintaining controls where necessary to assure equitable distribution of scarce materials.

Priorities regulation No. 32, embodying all previous WPB inventory restrictions, was issued last week. This action was taken to protect all business against hoarding, buyers' scrambles and accumulation of excessive inventories of materials and components.

All kinds of materials are covered by the new regulation, including raw and semifabricated materials, commodities, equipment, accessories, parts, assemblies or products of any kind, whether or not acquired with priorities assistance. Excepted from the provisions, however, are specified materials in ample supply.

The regulation incorporates inventory rules formerly contained in priorities regulation No. 1 and Controlled Materials Plan regulation No. 2, and lists remaining WPB orders containing inventory restrictions on particular materials. Table 3 of the regulation lists materials which are in ample supply and which are exempt from inventory restrictions. The following materials have been added to the table (old order M-161): Aluminum, pipe fittings (steel and brass), valves (steel and iron), and a few nonmetallics.

One of the most important provisions of the new regulation is the prohibition of placing duplicate orders.

Priorities regulation 25, under which spot authorization for production was authorized in cases when the use of materials and manpower did not interfere with the war program, is revoked.

Restrictions on special sales of most but not all idle, excess and surplus materials have been removed. Through a drastic revision of priorities regulation No. 13, nearly all materials in contract termination inventories and government surplus now may be sold freely and may be used for any permitted civilian production. However, special sales of certain scarce materials are still restricted in the regulation. Moreover, buyers may not use materials acquired under PR-13 in violation of any of the remaining orders of WPB limiting or prohibiting the use of any particular material, or limiting the amount they may receive, or the amount of any product they may make.

The remaining materials subject to domestic special sales restrictions include: Antimony, pig tin, uranium, mining equipment and machinery in the hands of mining producers, and domestic mechanical refrigerators. Furthermore, disposal of contractor termination inventories and government surpluses are still subject to regulations of the Surplus Property Board.

As reported briefly in the Aug. 27 issue of STEEL, WPB has established a new "CC" rating to be used in limited cases to break bottlenecks in reconversion and insure where necessary continued production and services. It is expected that almost all materials will either be in surplus or in comfortable supply and that ratings generally will not be needed.

An applicant for a "CC" rating must show that he has not been able to get delivery without a rating, or that it is needed for reconversion construction or other essential construction. A "CC" rating may be assigned, where needed, to increase production of "reconversion bottlenecks," or in other cases to protect public health and welfare or prevent extraordinary hardships. "CC" ratings may be assigned also in limited cases for essential exports.

WPB will continue the policy of giving small business opportunity to obtain a fair share of materials to this end. WPB officials have been instructed, in considering applications for the new "CC" rating, to give special consideration to needs of small business. "CC" rating is nonextendable. It cannot be extended by a supplier to get production materials or components to make an item sold to a customer, nor to replace inventory materials used to make an item, nor for any other reason.

All "AA" priority ratings on purchase orders which call for delivery after Sept. 30 have been canceled, which will leave in effect the "AAA" (emergency), "MM" (military) and the "CC" ratings in that sequence during the last quarter.

Termination of WPB's Controlled Materials Plan at the end of this quarter should not adversely affect the production of equipment needed in the immediate future. For instance, all allotments for transportation equipment, including those recently announced for the fourth quarter of 1945, have been canceled, except that allotments remain in force until Sept. 30 in case (1) of replacement rail, track accessories and maintenance and operating supplies; (2) passenger train cars.

Purchasers and producers of all types of transportation equipment are, generally speaking, free to buy and sell in all markets as before the war, and to resume normal trade relationships. They may, of course, be served with "AAA" or "CC" ratings and are subject to general inventory restrictions as long as they are in effect, explained H. H. Kelly, director, Division of Materials and Equipment, Office of Transportation.

WPB must maintain tin controls until sufficient reconversion supply is obtained from the Far East.

Utilities orders U-1, U-3 and U-4 have been amended to bring the three orders into conformity with other WPB orders and regulations being issued to end the "AA" priorities system at the end of the present quarter.

Government To Sell 252 Surplus War Plants Built at Estimated Cost of $1484 Million

RECONSTRUCTION Finance Corp. will offer for disposal soon 252 government-owned plants which are no longer needed by the War Department. These plants were built at an estimated cost of about $1484 million. The machine tools and production equipment of these plants, with few exceptions, also will become surplus.

The ten largest, representing an estimated cost of $593,443,434, include two government-owned parts of the Ford Motor Co.'s River Rouge plant at Dearborn, Mich., one manufacturing aircraft engines, and the other, tanks, engines, armored cars, steel and malleable castings and other items. The other eight plants are the Des Moines Ordnance plant, Des Moines, Iowa; Gopher Ordnance Works, St. Paul; Illinois Ordnance plant, Carbondale, Ill.; Keystone Ordnance Works, Geneva, Pa.; Milan Ordnance Center, Milan, Tenn.; Oklahoma Ordnance Plant, Pryor, Okla.; Pine Brook Ordnance Works, Sandusky; and the Sangamon Ordnance plant, Illiopolis, Ill.

Other plants declared surplus by the War Department follow, with those owned by Defense Plant Corp. marked with an asterisk:

Alabama

Ingalls Shipbuilding Corp., Decatur; Tennessee Coal, Iron & Railroad Co., [Ensley Works—Shell Division), Ensley.

Arkansas

Arkansas Ordnance plant, Jacksonville; Ordnance Works, El Dorado.

California

Kobe Inc., Huntington Park; Turlock

...t (Day & Nite Flare Corp.—Ammunition ...tall), Turlock; Yuba Mfg. Co., Benicia; ...a Aircraft Corp., San Francisco; Con...idated Vultee Aircraft Corp., Downey; *In...cial Fabricators Co., Burbank; Kinner Mo... Inc., Glendale; San Bernardino CWS plant, ...Bernardino; National Supply Co., Torrance.

Connecticut

*Colt Patent Fire Arms Co., Hartford; Gen... Motors Corp. (New Departure Division), ...; *High Standard Mfg. Co., Hamden; ...Britain Machine Co., New Britain; *Per...-Elmer Corp., Glenbrook (Stamford).

Delaware

*Pellanca Aircraft Corp., Newcastle.

Illinois

*Ahlberg Bearing Co., *Allied Control Co., ...cago Vitreous Enamel Products Co., *Clear... Machine Co., *Onsrud Machine Works Inc., ...el Steel Car Co. (Armored Tank Divi..., *Simpson Electric Co. (Two plants), ...ard Foundry Co. Inc., all in Chicago; ...F. & John Barnes Co., *W. F. & John ...s Co. (chemical plant), *Gunite Found... Corp., *Sundstrand Machine Tool Co., all ...kford; *Bell & Howell Co., Lincolnwood; ...s Norton Mfg. Co., Geneva; *Continental ...ry & Machine Co., East Chicago; *Eicor, ...North Chicago; International Harvester ...rson Steel Ball Co., both in Cicero; Vic... Ordnance plant (Caterpillar Military En... Co.'s Tractor plant), Decatur; *Tantalum ...n Corp., North Chicago.

Indiana

...g Warner Corp., (Warner Gear Division), ...ne; *Continental Foundry & Machine Co., ...Chicago; Evansville Ordnance plant, Ev...ville; Gary Armor Plate plant, Gary; Gen... Electric Co., Tell City; Indiana Steel ...ucts Co., Valparaiso; Modification Center ..., *Republic Aviation Corp., Servel Inc., ...Evansville.

Iowa

...ance Steel Foundry Co. and Quad ...s Tank Arsenal, both in Bettendorf.

Kansas

...ank Ordnance Works, Pittsburgh.

Kentucky

...eral Electric Co., (Ken-Rad Tube & ... Division), Owensboro; Kentucky Ord... plant, Paducah; Reynolds Metal Corp. ...eynolds Metals Co. (two plants), Louis...; Ohio River Ordnance Works, Henderson.

Louisiana

...E. Reaird Co., Shreveport; *Cities Serv... Refining Corp., Lake Charles; Dixie Ord... Works, Monroe; *Standard Oil Co. of ...ana, Baton Rouge.

Maryland

...endix Aviation Corp. (Bendix Division), ...re; Koppers Co. (Bartlett Hayward Di... *Maryland Sanitary Mfg. Co., both in ...more; Westinghouse Electric & Mfg. Co., ...more.

Massachusetts

...erican Type Foundries Inc., (Cowdrey ...ine Division), Fitchburg Engineering Co., ...of Fitchburg; *General Electric Co. (Ma... and equipment only), West Lynn; ...ston Mfg. Co., Newton; *Reed Prentice ...ant No. 2, Worcester; *Sylvania Electric ...ucts Inc., Wakefield; *Wrentham Products ..., Wrentham; *General Alloys Co., Boston.

Michigan

...rbon Gear & Machine Co., *Ex-Cell-O ..., *Kelsey-Hayes Wheel Co., *Michigan ...Castings Co., *Murchey Machine & Tool ...Weldon Tool Co., *Sal-Way Steel Treat... Co., Timken Detroit Axle Co. (Studebaker ...), *Vinco Corp., Ware... *Hinck Mfg. Co., ...r No. 4001, Briggs Mfg. Co. (Outer Drive ..., all in Detroit; *American Broach & ...ine Co., Ann Arbor; *Auto Specialties ...Co., St. Joseph (Benton Harbor); *Doehler ...ey Corp., *Haskelite Mfg. Co., both in ...d Rapids; Gear Grinding Machine Co., ...roit; *Hanchett Mfg. Co., Big Rapids; ...ational Industries Inc., Ann Arbor; Mid... CWS plant, (Adjacent to Dow Chemical ...plant), Midland; *Morton Mfg. Co., ...erge; *Super Tool Co., Warren; Timken ...Axle Co. (Forge plant), Melvindale; ...ubes Bros., Saginaw; Ford Motor Co. (River ...e Aircraft Engine plant), Dearborn.

Minnesota

...burn & Bigelow, Minneapolis Moline Power Implement Co. (Como Forge plant), Northwestern Aeronautical Corp., all in St. Paul; Minneapolis-Honeywell Regulator Co., Minneapolis.

Mississippi

Gulf Ordnance plant, Aberdeen; Mississippi Ordnance plant, Flora.

Missouri

Missouri Ordnance Works, Louisiana; *Mines Equipment Co., *Scullin Steel Co. (two plants), St. Louis; Modification Center No. 19, Kansas City.

Nebraska

Cornhusker Ordnance plant, Grand Island.

New Jersey

American Type Foundries, Elizabeth; *Couse Laboratories, Newark; *H. L. Crowley & Co. Inc., West Orange; Crucible Steel Co., Harrison; *Aurele M. Gatti Inc., Trenton; *General Ceramics & Steatite Corp., Keasbey; *Hercules Powder Co., Parlin; *Isolantite Inc., Belleville; *National Union Radio Corp., Newark and Maplewood plants, machinery and equipment only; *Radio Condenser Co., Camden; *Gus Reinke Machinery & Tool Co., Hillside; *Tung-Sol Lamp Works Inc. (1st Street plant) and *United Electronics Co., both in Newark; *Models Inc., North Bergen; *Moser-Jewel Co., Perth Amboy.

New York

*Allegheny Ludlum Steel Corp., Dunkirk; American Locomotive Co., General Electric Co. (machinery and equipment only), both in Schenectady; *John J. Chaloux & Co., Colonie; *Dolomite Products Co. Inc., Gates; General Electric Co., Syracuse; General Electric Co., two plants at East Syracuse; *Lithaloys Corp., New York; New York Air Brake Co., Watertown; Lipe-Rollway Corp., Syracuse; New York Ordnance Works, Baldwinsville; Niagara Falls CWS plant, Niagara Falls; *Odenbach Shipbuilding Corp., Greece; Otis Elevator Co., *Worthington Pump & Machinery Corp., both at Buffalo; Phelps Dodge Copper Products Corp., Yonkers; Symington Gould Corp., Depew; *General Railway Signal Co., Symington Gould Corp., both in Rochester; *Utica Drop Forge & Tool Corp., Yorkville; *Fairchild Engine & Airplane Corp. (Ranger Aircraft Division), Jamaica; Modification Center No. 7, Niagara Falls; *Schweizer Aircraft Corp., Big Flats; *Union Fork & Hoe Co., Rome.

North Carolina

*Firestone Tire & Rubber Co., Burlington; *National Carbon Co. Inc., Charlotte.

Ohio

*Allied Machine & Engineering Corp., New Philadelphia; *American Welding & Mfg. Co. (Tank plant), Warren; *Broden Construction Co., *Cleveland Automatic Machine Co., *National Acme Co., *Pipe Machinery Co., *Towmotor Corp., *Warner & Swasey Co., Pesco Products Co., all in Cleveland; Buckeye Ordnance Works, Ironton; *Cincinnati Shaper Co., Cincinnati; *Commercial Shearing & Stamping Co., Youngstown; *Daybrook Hydraulic Corp., Bowling Green; *Ferro Enamel Corp., Bedford; Fostoria CWS plants No. 1 and 2, Fostoria; *Lempco Products Co., Byesville; Liberty Planers Inc., Hamilton; Lima Tank Arsenal and Ohio Steel Foundry Co., both at Lima; Scioto Ordnance plant, Marion; Searchlight Mirror plant No. 2, Mariemont; Timken Ordnance plant, Canton; *Timken Roller Bearing Co., Columbus; Toledo Core plant, Toledo; *Aeronca Aircraft Corp., Middletown; *Waco Aircraft Co., Troy.

Oklahoma

*Cardox Corp., Claremore; *Continental Oil Co., Ponca City; Oklahoma Ordnance Works, Pryor; *Ozark Chemical Defense Corp., Tulsa.

Oregon

*Radio Specialties Mfg. Co. and *Willamette Iron & Steel Co., both in Portland.

Pennsylvania

American Car & Foundry Co., (tank plant) Berwick; *Blaw-Knox Co., Pittsburgh; Bliley Mfg. Co., Erie; *Chambersburg Engineering Co., Chambersburg; *Continental Foundry & Machine Co., Coraopolis; *Erie Resistor Corp., Erie; International Resistance Co. and Philadelphia Armor Plate plant No. 1, both in Philadelphia; *McConway & Torley Corp., Pittsburgh; *National Union Radio Corp., Lansdale and Robesonia plants; *Pittsburgh Steel Foundry Corp., Glassport; Struthers Wells Corp., Titusville; *Stupakoff Ceramic Mfg. Co., Latrobe; *Sylvania Electric Products Inc., Montoursville; Sylvania Electric Products Inc., Towanda and Emporium plants, machinery and equipment only, Brooksville plant, buildings; Trojan Powder Co., Seiple Station; *Tung-Sol Lamp Works Inc., Weatherly; *Vulcanite Portland Cement Co., Willow Grove; *Western Electric Co. Inc. and *Murray Corp. of America, both at Scranton.

Tennessee

Maury CWS plant, Columbia; McDonnell Aircraft Corp. (Including Modification Center No. 15, and Airport plant), Memphis.

Texas

*American Rolling Mill Co. (Sheffield Steel of Texas Division), Converted Rice, *Hughes Tool Co., *Reed Roller Bit Co., *Rheem Mfg. Co., Texas Electric Steel Castings Co., all in or near Houston; Baytown Ordnance Works, Baytown; Bluebonnet Ordnance plant, McGregor; Cactus Ordnance Works, Dumas; *Continental Motors Corp. (Texas Division—Automotive Engines), Garland; *Magnolia Petroleum Co., Beaumont; Pantex Ordnance plant, Amarillo; *Phillips Petroleum Co., Borger.

Utah

*Eitel-McCullough Inc., Salt Lake City.

Virginia

New River Ordnance plant, Pulaski.

Washington

Pacific Car & Foundry Co., 2 plants at Renton.

West Virginia

*Westinghouse Electric & Mfg. Co., Fairmount.

Wisconsin

*Bell Machine Co., Oshkosh; *Giddings Lewis Machine Tool Co., Fond du Lac; *Kenosha Brass Co., Kenosha; *Marathon Battery Co., Wausau; *Motor Castings Co., West Allis; *Kearney & Trecker Corp., Perfex Corp., Vilter Mfg. Co. and Wehr Steel Co. (Tank Armor Castings plant), all in Milwaukee.

France Buys Tonnage of Surplus Steel Plate, Pipe

Sale of steel plate and steel pipe to the provisional government of France constitutes the first sizable sale of overseas surplus to a foreign government, according to the Army-Navy liquidation deputy commissioner, Maj. Gen. D. H. Connolly. The total sales price was $23,162, while the reported cost of the steel was $20,530. The steel is in storage at Oran, Algeria, and Bizerte, Tunis. Breakdown of the sale is as follows: 233,170 pounds of steel plate at $17,862 (reported cost price $15,942) and 3880 feet of steel pipe at $5300 (reported cost price $4587).

Surplus Machine Tools To Be Sold in Hartford

Reconstruction Finance Corp.'s Boston agency will hold a sale Sept. 14-18 of used surplus government-owned machine tools and production equipment at the Park Street plant of Colt Patent Firearms Co., Hartford, Conn. Property comprising this offering includes about 150 items of standard, general and special purpose machine tools and miscellaneous factory equipment. RFC has reappraised and priced this material which may be inspected Sept. 3-13, except Sunday, Sept. 9.

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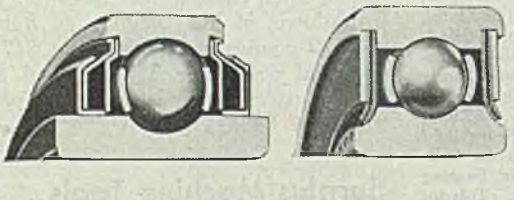


There's no such thing as "just a little oil" when it creeps into and onto such products as paper, textiles, foods or leather goods. Any oil is too much oil.

That's where Fafnir has done some of its greatest pioneering . . . in the development of several types of grease-retaining seals for all types of ball bearings.

For instance, the Fafnir Mechani-Seal, a precision fitted system of interlocking steel plates which actually trap any lubricant that may possibly escape from the bearing.

And the Fafnir Plya-Seal which utilizes the natural flattening out tendency of synthetic rubber to make a self-adjusting washer. It's always grease-tight. It's removable for inspection and servicing. And it's revolutionizing: in many sizes it makes possible a sealed bearing no wider than standard unsealed bearings.

Why pay the high costs of oil spoilage when it costs so little to replace old-fashioned oil-leaking, oil-dripping plain bearings? Let a Fafnir engineer show you how it can be done. The Fafnir Bearing Company, New Britain, Conn.

MOST COMPLETE LINE IN AMERICA

FAFNIR BALL BEARINGS

by A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Immediate effect of Pacific victory is to slow rather than hasten reconversion to passenger car production. Lost time will be quickly made up as assembly lines begin to roll in volume within next six weeks

DETROIT

FEW indications have appeared as yet of any appreciable acceleration in passenger car production schedules, or any advance in the date of initial assemblies. In fact, quite the reverse has been evident in the form of delays occasioned by the V-J day holidays, the necessity for sudden concentration on contract termination details and plant clearance problems, plus a number of scattered nuisance strikes. Precipitate end of the Pacific war actually has delayed production plans by anywhere from one to two weeks, although it is certain this lost time can be more than made up when the assembly lines actually begin to roll in volume within the next six weeks.

The first passenger car came off Hudson lines last Thursday and the event was surrounded with a considerable fanfare of publicity and welkin ringing. Hudson appears to have had a reawakening in the need of public relations, signing up with a New York experts in this field called to bring the company out of the throes which have characterized its security efforts over the past decade. Implication may be the interest shown recently by the Fisher brothers in acquiring controlling interest in Hudson securities, or it may just be that President J. L. Barit has decided, at the instigation of directors, to step out and spend some money to whoop things up for the company and its products. At any rate, Hudson becomes the third producer, following Ford and Willys, to have 1946 models in production.

Nash Deep in Reconversion

Airline announcements have come from a couple of other manufacturers relating to current status and immediate outlook. Nash, for example reports all of their war contracts abruptly canceled, affecting employment of 14,500 men and women. Erased jobs include Pratt & Whitney 2000-horsepower aircraft engines, Hamilton Standard aircraft propellers, helicopters, rocket motors, bomb racks and other miscellaneous items. Immediate effect of the sudden termination was the temporary layoff of 5800 in six Michigan and Wisconsin war production plants.

Awaiting further easing in the flow of automobile materials, Nash expects to have cars in production in 3-4 weeks, reaching operations before this date, while by year-end production of both will have reached the prewar peak. In cars this means 180,000 annually, in refrigerators and appliances 500,000. By mid-1946, it is their confident expectation to boost these totals to 250,000 automobiles annually, and 1,100,000 refrigerator and appliance units.

Pontiac Motor Division also reports all war contracts either terminated or in process of being terminated, necessitating that "a certain number of employees will be temporarily out of work"—a cautious and conservative observation which sheds scant light on the near-term outlook for this division.

The deal reportedly being engineered by the Kaiser-Frazer Corp. for a five-year lease of the Willow Run bomber plant at a fee of $300,000 annually, for production of Kaiser, Frazer and Stout automobiles, Frazer tractors, farm implements and related devices has its unusual and interesting aspects. In the first place, Willow Run was not included on the list of RFC list of surplus war plants offered for sale in this area which might or might not indicate the agency was more interested in leasing the property than in selling it. If the affirmative is true, then certainly a lot of prospective purchasers of RFC-owned surpluses of plants, equipment and materials are going to pull in their horns, for why should they shell out hard earned cash for outright purchases, when they might just as readily negotiate long-term leases?

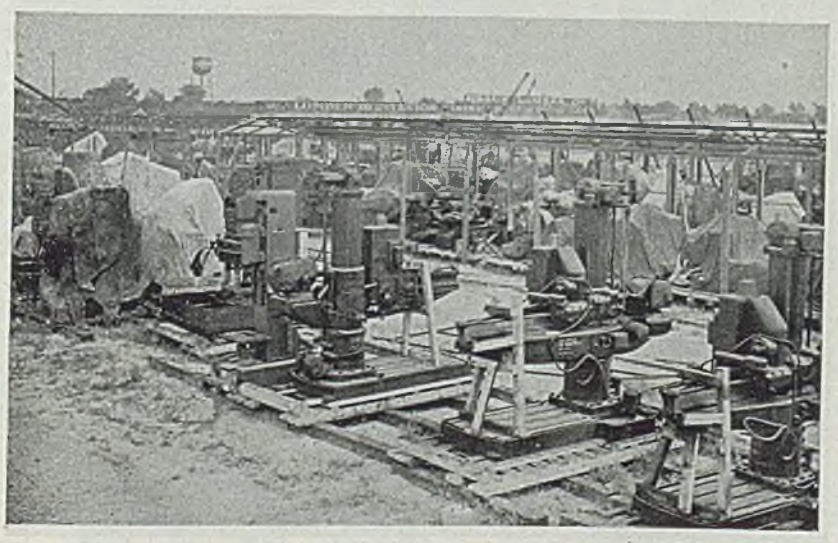
Secondly, a figure of $300,000 annual lease fee would amount to 4 per cent on a valuation of $7.5 million, while the Willow Run property frequently has been referred to as a $100 million project.

Mr. Kaiser has been described as an ardent advocate of leasing government war plants, with the fees related to degree of employment provided, that is, the more jobs offered, the less the rental fee. He has perfectly sound logic in his argument. Is it not better to realize only a modest rental for these expensive plants, if they afford jobs, than to allow them to stand idle?

On the other side of the fence though, there is this to consider: Does not such a leasing of government war plants simply amount to putting the government in business, in competition with private corporations having large plant investments, the operators of such plants thereby becoming in effect managerial talent seeking to turn a profit on government's capital investment yet offering no guarantee of the certainty of such a profit. Thus, it is conceivable that after leasing a plant to a group of operators, the government then might be asked to lease the necessary equipment from war surpluses to get the plant operating, and further, perhaps, even the required materials to initiate production. The government has it all—plants, equipment and material—so why not lease the whole works?

Mr. Frazer speaks officially as though the Willow Run deal were a foregone conclusion, when he says, "The main plant and administration building are ideal for our needs. We are planning to begin the initial production at Willow Run of both the Kaiser automobile, which will be an American-sized car in the popular-price field, and the Frazer automobile, which will be in the medium price bracket . . ."

However, it would appear the entire question of leasing vs. selling government surpluses should be given the most careful consideration in the light of its overall effect on industry in general and not



IN STORAGE: Prior to being sold, war machine tools and equipment moved out of plants are being kept in huge storage yards in the Detroit area. Also to be sold are 70 war production plants in Michigan. NEA photo

solely its effect in temporarily creating a few thousand more jobs.

Lifting of passenger car quotas brought sighs of relief throughout the industry but particularly at Ford where sales manager J. R. Davis, said, "Now we can really get going on the job we'd like to do." Ford did not realize its goal of 4000 assemblies for August, because of unexpected interruptions, but with operations starting at a few branch assembly plants a full head of steam is being built up so that September projections likely will be exceeded.

Production of Lincoln and Mercury models originally not slated until Oct. 15, will be moved up. First Lincoln models will be equipped with the usual 12-cylinder engine, but it now appears certain this engine will eventually be abandoned in favor of a V-8, larger in size than the Ford design. Tank engine contracts at Lincoln, which news reports first had canceled and then reinstated, now are understood to have been definitely canceled except for completion of 8-cylinder engines now in process and the assembly of a lot of 160 engines of an experimental 12-cylinder type, contract for 1600 of which was in force originally.

Ford engineers are restudying carefully the question of gray iron foundry capacity at the Rouge plant, matching it against advancing schedules for passenger car and truck output. Results of the calculations seems to point to a deficiency in available foundry production even at peak output, so there is a preliminary casting about for possible outside sources for gray iron castings. Naturally it will be some time before need for reinforcement becomes imperative, but at least the thinking is in that direction.

By the end of the year it is expected production and employment in the truck manufacturing industry, in which there are some 38 large and small producers, will be close to the average levels which prevailed in the best peacetime year the industry ever experienced. R. T. Purdy of the Motor Truck Division, Automobile Manufacturers' Association, estimates a deficiency in the nation's truck fleet of 2 million units, based upon average annual production of 743,000 vehicles in the six prewar years and average annual production of 87,400 in 1942-1944.

Peak year in truck production was 1937 when 891,000 were built. From estimates, output before year-end should mount to a monthly rate closely approximating that of 1937, while the first quarter of 1946 will find the industry breaking all previous records.

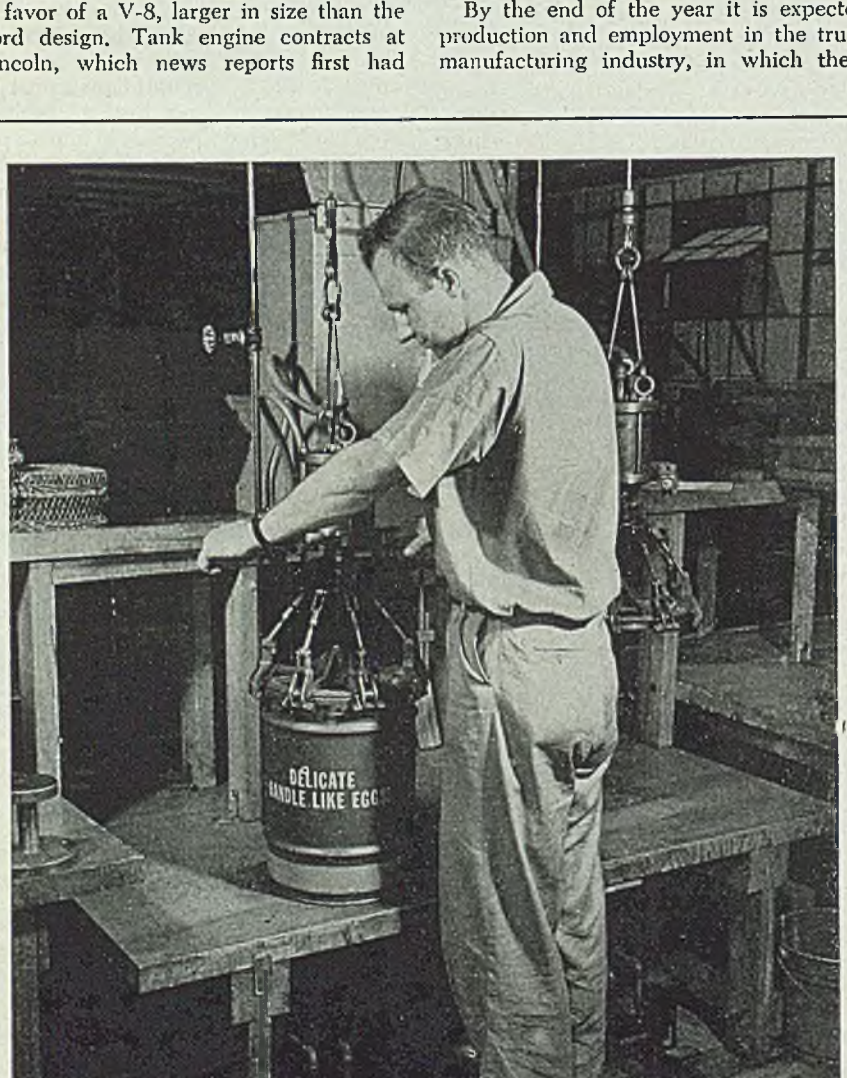
The big, sprawling 27-acre Marysville, Mich., parts depot of Chrysler Motor Parts Corp. is in process of an 11-day inventorying, with 1000 of the staff of 1550 taking part in the complete tabulation of stocks on hand, ranging from small rivets to 800-pound truck frames. This is the master Chrysler parts depot for supplying service items to 6 million Chrysler-built cars and trucks operating in the U. S., and filling orders not only from dealers but from six other company-owned or operated depots.

Car Pricing Formula Announced

New car prices, eagerly awaited by hundreds of parts suppliers to the automotive industry as the gage of prices they can charge the industry, apparently will be worked out individually by the various builders according to an OPA formula which uses 1941 production costs as a base. To these may be added increases in labor and material costs and a profit factor reflecting either the manufacturer's 1936-39 profit margin or one-half the industry's average profit in that period. If the resulting price is lower than the 1942 price, the manufacturer may charge up to this price; if it is higher, he will require OPA approval. OPA officials believe application of the formula will result in retail prices around the 1942 level, which were up 10-15 per cent from 1941.

Individual companies are keeping mum over the situation, Ford, for example, stating merely that prices would be revealed at public showings of cars later this month.

The announcement was a dud for the parts people, many of whom were insisting they would go broke if required to adhere to price levels of October, 1941. Last week their aspirin seemed about ready in the form of an imminent announcement from OPA that ceilings would be completely lifted an all parts going into original equipment for cars and trucks, including stampings and forgings, but with the possible strange exception of ferrous and nonferrous castings. However, buyers will resist any attempts at hog-wild price boosts, and competition between parts makers may keep prices down.



DELICATE: Precision built aircraft instruments that provided "eyes" for bombers which helped defeat Japan had to be handled like eggs in Ternstedt Mfg. Division, Detroit, a unit of Fisher Body Division of General Motors Corp. A workman is shown sealing an air and water tight container in which instruments were shipped

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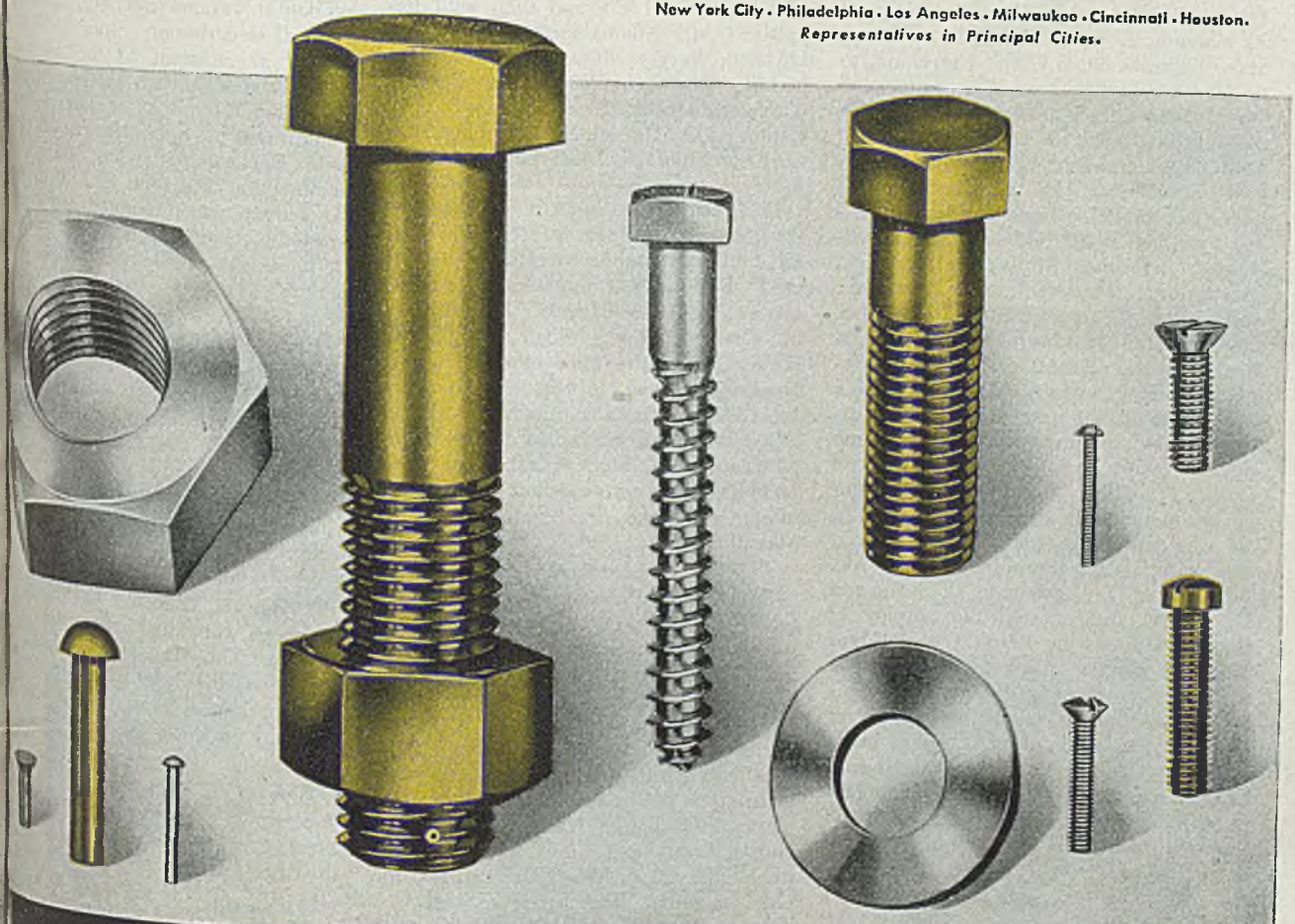

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MEN of INDUSTRY

C. A. ILGENFRITZ

L. I. BARKER

CHARLES H. RHODES

Carl A. Ilgenfritz has been appointed vice president in charge of purchases, Carnegie-Illinois Steel Corp., Pittsburgh, a newly established management responsibility, and **R. L. Van Cleve** has been named general purchasing agent of the company. The appointments are effective Sept. 1. Mr. Ilgenfritz resigned as manager of purchases and raw materials, Republic Steel Corp., Cleveland, to assume his new position. He commenced his business career as a storekeeper with Youngstown Sheet & Tube Co., Youngstown, later transferring to the mechanical department. He joined Brier Hill Steel Co. in 1913, being made purchasing agent in 1918. He later was an organizer of the Stroh-Ilgenfritz Co., Youngstown, dealers in raw materials, resigning as vice president in 1924 to become assistant purchasing agent, Youngstown Sheet & Tube Co. When Republic Steel Corp. was organized in 1930, Mr. Ilgenfritz became director of purchases, having previously held the same position with the Central Alloy Steel Corp., Massillon, O., one of the companies included in the Republic merger. He was made manager of purchases and raw materials for Republic in 1933. Mr. Van Cleve is a graduate of Princeton University, and entered the employ of Carnegie-Illinois in 1914 at the Edgar Thomson works. After several years at that plant he was transferred to the office of the special agent in charge of blast furnaces and scrap. He was made assistant purchasing agent in Pittsburgh in October, 1935. **Frank J. Reif,** general purchasing agent, after more than 33 years' service with Carnegie-Illinois, retired Sept. 1.

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Frank J. Laskey, general purchasing agent, Republic Steel Corp., Cleveland, has been made manager of purchases and raw materials, succeeding **Carl A. Ilgenfritz.** Succeeding Mr. Laskey as general purchasing agent is **William T. Adams,** chief electrical buyer. Mr. Laskey began his business experience with General Fireproofing Co., Youngstown, in 1906, leaving the company's purchasing department in 1917 to become purchasing agent for the Liberty Steel Co., Warren, O. In 1919 he became general purchasing agent of the Newton Steel Co., serving as the result of successive mergers, in the same capacity with the Corrigan-McKinney Steel Co. and then with Republic. Mr. Adams entered the Stark Division, Berger Mfg. Co., Canton, O., in 1919, leaving in 1926 to become sales manager, Moock Electric Supply Co., Canton, O. He joined Republic Steel Corp. as chief electrical buyer in 1933.

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L. I. Barker has been named assistant district sales manager of the Cleveland sales office, Republic Steel Corp., Cleveland. Following a number of years of service with the Cleveland sales office of Carnegie-Illinois Steel Corp., Mr. Barker joined the sales office of Union Drawn Steel Co. in that city in 1924. In 1931 he became manager of the office following merger of the company with Republic Steel Corp., and since 1938 he has been assistant manager of sales, Union Drawn Steel Division in Massillon.

—o—

Paul F. Kohlhaas has been appointed to fill the newly-created position of vice president in charge of engineering, Columbia Steel Co., San Francisco. Mr. Kohlhaas has been chief engineer since 1941. He started in business with the Perin Engineering Co., New York, in 1920 and for 16 years served as engineer assisting in the building of iron and steel plants in England, China, Japan, Manchuria, India and the European continent. In 1936 Mr. Kohlhaas became chief engineer, Tata Iron & Steel Co., near Calcutta, India. He left there in 1940 to become a technical adviser to the Brazilian government on the construction of a steel mill at Rio de Janeiro, the following year becoming associated with Columbia Steel Co.

—o—

J. H. Stoll has been appointed engineer of tests and **T. G. Foulkes** assistant engineer of tests, Bethlehem plant, Bethlehem Steel Co. Mr. Stoll has been employed in the metallurgical department of the Bethlehem plant since 1923, and was appointed assistant engineer of tests in 1927. Mr. Foulkes joined the Bethlehem company in 1922 and has worked in various capacities in the metallurgical department. Since 1939 he has served as assistant to the engineer of tests. **Hal K. Wilson** has been promoted from superintendent of the mechanical department to superintendent of the strip mill, Lackawanna plant, Buffalo, succeeding the late **John E. Miller. Henry R. Turner** was promoted from general master mechanic of the strip mill to superintendent of the mechanical department.

—o—

Charles H. Rhodes, Chicago vice president, United States Steel Corp. of Delaware, Pittsburgh, retired Sept. 1, when he reached the corporation's retirement age. Mr. Rhodes had been associated with the corporation and subsidiary companies since his initial employment with American Steel & Wire Co. in May 1899.

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Taylor H. Beech, Wilkinsburg, Pa., has been appointed representative, Ajax Electric Co. Inc., Philadelphia, and will serve the Pittsburgh area including western Pennsylvania, eastern Ohio and the state of West Virginia.

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Richard J. Beck has been appointed western sales manger, Braeburn Alloy Steel Corp., Braeburn, Pa. His headquarters are in Chicago.

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Charles A. Kirk, formerly vice president in charge of manufacturing, International Business Machines Corp., New York, has been elected executive vice president of the company. Mr. Kirk has been associated with the company for 18 years and served in various systems, service, sales and executive positions in Chicago, Pittsburgh and St. Louis before

being placed in charge of manufacturing in 1941. During the war he handled all of the company's government contracts.

—o—

Robert W. Burgess has been named plant manager, Service Machine Co., Elizabeth, N. J., and he will have charge of engineering and tool production. He formerly supervised war contract tooling and was advisor on war production, Easy Washing Machine Corp., Syracuse, N. Y. Other appointments include: Fred Manning, purchasing agent; Clarence Britain, in charge of tool processing; Lalak, tool and die design; Allen G. Gadett, executive vice president.

—o—

Heber V. Lauer has been named field supervisor, Raw Materials, Fuel & Power division, Chicago district, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Lauer was assistant division superintendent of the plant and blast furnaces at the company's Gary steel works. Jack H. Eisaman has been appointed superintendent, No. 2 electric furnace shop, South Chicago works. Mr. Eisaman formerly was assistant superintendent of that plant's electric furnace and forge press department.

—o—

W. Guy Bagley has been appointed assistant sales manager, Woodward Iron Co., Birmingham. He formerly was associated with Republic Steel Corp., Cleveland, in its Birmingham office.

—o—

Emil C. Ostlund has been appointed chief industrial engineer, American Steel & Wire Co., Cleveland, succeeding Cecil W. Guyatt. He has been associated with the American Steel & Wire Co. since October, 1936, when he started as an industrial engineer at Worcester, Mass. In December, 1943 he was transferred to Cleveland as assistant chief industrial engineer, which position he has held up to the present time.

—o—

Harry W. Barkley has been appointed executive vice president and general manager, National Tool Co., Cleveland. Mr. Barkley was a member of the Ford Motor Co. organization for 27 years, beginning as a student in the Henry Ford Trade School and following Pearl Harbor, becoming superintendent in the Highland Park plant.

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J. B. Trescott has been appointed to the Westinghouse Electric Supply Co. headquarters organization as St. Louis Rural Electrification Authority representative. W. E. Knapp Jr., has been appointed manager of the company's Ft. Worth, Tex. branch, succeeding E. C. Cummins, resigned.

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David L. Booker, for 12 years with National Cast Iron Pipe Division, James B. Clow & Sons, Chicago, has resigned as metallurgist and on Aug. 1 became associated with Thomas Foundries Inc., Birmingham.

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Lee H. Hill, vice president in charge of industrial relations, Allis - Chalmers Mfg. Co., Milwaukee, since 1941, has resigned that position, effective Sept. 1, to accept a post with the McGraw-Hill Publishing Co., New York.

—o—

T. H. Chamberlain, who was named assistant factory manager last year, has been appointed factory manager, Waterbury Mfg. Co., Waterbury, Conn.

—o—

Lowell S. Thomas has returned as president, General Smelting Co., Philadelphia, after serving more than three years with the armed forces. During that time Colonel Thomas was deputy chief, redistribution salvage branch, Army, and prior to that was chief, scrap and salvage section, Army ordnance department.

—o—

B. H. Huffman has been named supervisor of Pittsburgh district sales, Diamond Alkali Co., Pittsburgh. Associated with him will be D. G. Hood and D. W. Powell, as sales representatives in Pittsburgh and the tri-state district.

—o—

William H. Eichengreen has been appointed manager, Commercial Research Division, Inland Steel Co., Chicago. He formerly was assistant manager, Sales Promotion Division, specializing in sales analysis and market research.

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L. W. Babcock has been appointed director of personnel, Hercules Powder Co., Wilmington, Del. He served previously as assistant director of operations, explosives department.

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Richard S. Huested, manager of the Washington office, Curtiss-Wright Corp., New York, since June, 1944, has been named administrative assistant to William D. Kennedy, vice president and general manager, Wright Aeronautical Corp. Robert K. Brown succeeds Mr. Huested in the Washington post.

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George T. Collins has been appointed assistant manager of market research, Pennsylvania Salt Mfg. Co., Philadelphia.

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Lewis A. Harlow, formerly assistant advertising manager, succeeds Harry N. Baum as advertising manager, Fairbanks Morse & Co., Chicago.

—o—

Gunnar Sinding-Larsen, with the Pittsburgh Piping & Equipment Co. Pittsburgh, for 21 years, and chief engineer and member of the board since 1938, has been elected vice president. D. M. Weir Jr., who joined the company in 1931, served as sales engineer for 14 years prior to his recent appointment as general manager of sales.

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Robert J. Stallman has been elected executive vice president, O. B. McClintock Co., Minneapolis. A. C. Colvin has been elected vice president in charge of sales; E. J. Boucher, vice president in charge of engineering; and E. C. Hanson, vice president in charge of production.

—o—

John Q. A. Doolittle, assistant manager since 1943 of the Watervliet, N. Y. plant, Allegheny Ludlum Steel Corp., Brackenridge, Pa., now is general manager. He succeeds W. H. Norris who has

HARRY W. BARKLEY

W. H. EICHENGREEN

J. Q. A. DOOLITTLE

HAROLD WRIGHT

Who has been awarded the Bessemer gold medal, British Iron & Steel Institute, as noted in STEEL, Aug. 20 issue, p. 118.

R. A. LEWIS

Who is retiring as general manager, Bethlehem, Pa., plant, Bethlehem Steel Co., as noted in STEEL, Aug. 27 issue, p. 88.

H. LeROY WHITNEY

Who has been elected chairman, Intercontinental Distributors Inc., New York and Washington, STEEL, Aug. 27 issue, p. 88.

been transferred to the company's headquarters at Brackenridge.

—o—

Paul Paletti has been appointed a member of the sales organization, Ekco Products Co., Chicago.

—o—

Henry A. Mulligan has been named president, War Damage Corp. succeeding **Howard J. Klossner**, resigned. **Willard E. Unzicker** has been named vice president, and **Facius W. Davis**, treasurer of the corporation.

—o—

A. C. Monteith has been named assistant manager, headquarters engineering, Westinghouse Electric Corp., Pittsburgh. He will direct headquarters engineering activities in the absence of **C. A. Powel.** Mr. Monteith also will serve as director of education and **Charles W. MacLean** has been named manager of that department. **Lloyd A. Russ** has been named manager, agency and specialties department, succeeding **W. D. Turnbull**, resigned. **Edgar W. Bartz**, formerly of East Pittsburgh and Trafford, Pa., has been appointed welding specialist for the San Francisco Bay area. **James A. Baubie** has been named director, public relations department, formerly under the direction of **G. Edward Pendray**, assistant to the president, who resigned recently. **Frank C. Cline** has been appointed acting manager, southwestern district, Westinghouse Lamp Division, and will have his headquarters in St. Louis. To succeed Mr. Cline as a special representative in Chicago, **George S. Crawford** has been appointed.

—o—

Francis J. Curtis, vice president Monsanto Chemical Co., St. Louis, has been elected chairman, Society of Chemical Industry, Brooklyn, N. Y. **Sidney D. Kirkpatrick** editor, *Chemical and Metallurgical Engineering*, has been elected vice chairman. **Cyril S. Kimball** and **J. W. H. Randall** have been re-elected honorary secretary and honorary treasurer, respectively. Newly elected members of the executive committee are **W. J. Baeza, G. J. Esselen, C. N. Frey, R. Heggie** and **N. A. Shepard.**

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Tye M. Lett Jr., formerly of General Motors Overseas Operations, New York, has been named assistant director of exports, Crosley Corp., Cincinnati.

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Charles B. White, Charles B. White Co., Houston, Tex., recently was elected a director, Southern Aircraft Corp., Garland, Tex.

—o—

Jean Paul Elkann has been named director of the newly organized International Division, Titan Metal Mfg. Co., Bellefonte, Pa., and his headquarters are in New York. **Armand Elkann** has recently left to represent the company in Europe.

OBITUARIES . . .

John T. Seaman, 63, assistant to the vice president, Columbia Steel & Shafting Co., Pittsburgh, died at his home in Washington, Pa., Aug. 27. He was graduated from Washington & Jefferson College in 1903 and had been associated with Columbia Steel & Shafting Co. since 1915.

—o—

John E. Miller, 40, general superintendent of strip mill, Bethlehem Steel Co.'s Lackawanna plant, Buffalo, died Aug. 24 in that city.

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William B. du Pont, 31, manager, Industrial Division, National Radiator Co., Johnstown, Pa., died in that city recently.

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Charles J. Carr, 60, industrial relations manager, Douglas Aircraft Co. Inc., Santa Monica, Calif., died recently.

Thomas Russell Akin, founder and president, Laclede Steel Co., St. Louis, died recently in that city.

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Joseph G. Jackson, 62, vice president in charge of manufacturing, Ekco Products Co., Chicago, died Aug. 23 in that city.

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William White, secretary and general manager, Euclid Crane & Hoist Co., Euclid, O., died recently.

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Alexander Alloway, 76, superintendent, Erie Art Metal Co., Erie, Pa., died recently in that city.

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Robert Atkinson, 53, sales manager for the Detroit district, Steel Division, Timken Roller Bearing Co., Canton, O., died Aug. 26.

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Elmer E. Gilbert, 78, retired sales manager of the turbine department, General Electric Co., Schenectady, N. Y., died Aug. 26. He had been with the company 43 years when he retired in 1933.

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Adolphus M. Dudley, 68, retired engineer, Westinghouse Electric Corp., Pittsburgh, died at his home in Oakmont, Pa., recently.

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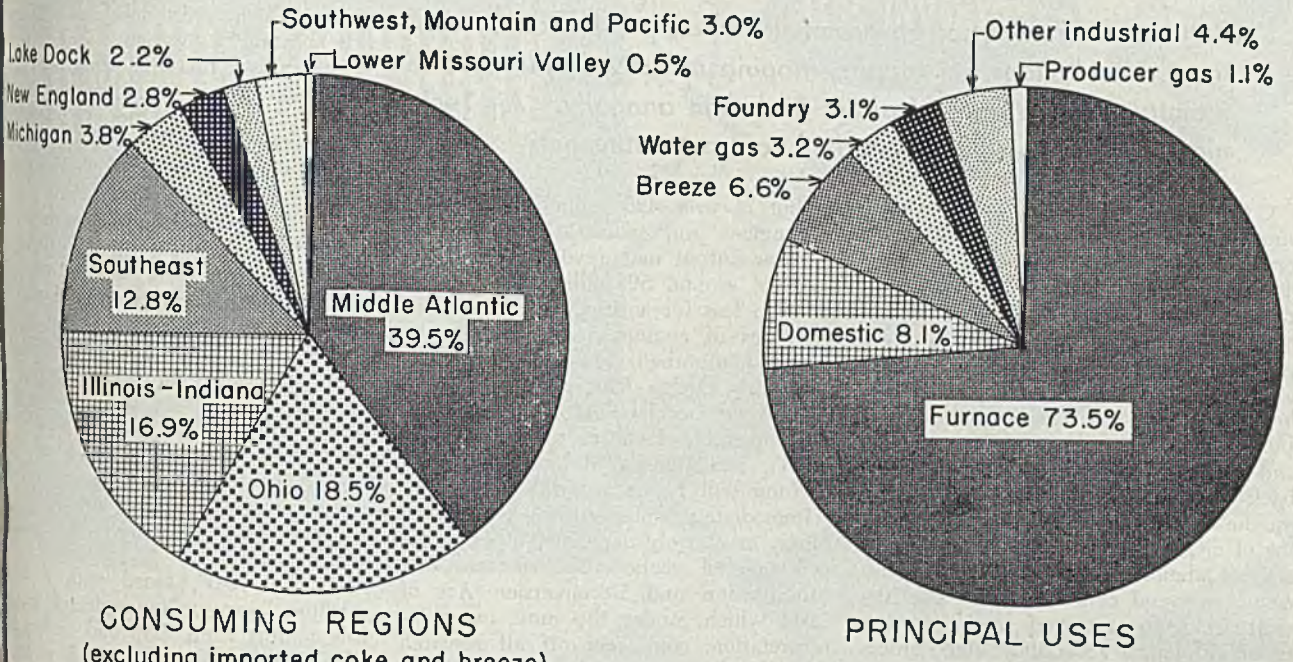
Harry M. Foulkes, 59, buyer and sales representative, Douglas Aircraft Co. Inc., Santa Monica, Calif., died recently.

—o—

John W. Delano, 58, member of the board of directors, Watson-Stillman Co., Roselle, N. J., died Aug. 22 at his summer home in Woodstock, Vt. Mr. Delano retired as vice president and treasurer of the company in 1944.

—o—

William Redfield Perrin, 56, president, William R. Perrin Co. Ltd., Toronto, Ont., died Aug. 22 in that city.



Distribution of byproduct and beehive coke in 1944

Coke Consumption Hit Alltime High in 1944, Bureau of Mines Reports

Annual survey shows 2 per cent gain over use in preceding year. By-product ovens provided 91 per cent of total. Blast furnace consumption down 1 per cent from 1943. Pennsylvania leads as coke consumer

CONSUMPTION of metallurgical coke, both by-product and beehive, in 1944 increased 2 per cent over the previous high mark set in 1943 and reached an alltime high of 72,999,670 net tons, the Bureau of Mines reports. By-product ovens provided 91 per cent of the total, compared with 89 per cent the prior year, reflecting increased by-product capacity completed in 1944. Most of this type of coke is used by producers in adjacent metallurgical works and in 1944 over 89 per cent of the total moved outside producing plants. Shipment by rail accounted for 85 per cent of outside deliveries, trucks 10 per cent and water about 5 per cent.

Beehive coke produced near coal mines usually is shipped to centers of consumption and in 1944 89 per cent of production moved from production sources, 98 per cent by rail and 2 per cent by trucks and boats.

Domestic Shipments Increase

Domestic coke shipments increased 34 per cent over 1943 and were responsible for the gain in consumption in 1944. Domestic coke trade was the second largest consuming channel and accounted for 8 per cent of all coke and breeze consumed, compared with 6 per cent in 1943.

Blast furnace consumption declined slightly, representing approximately 74 per cent of the total, compared with 75 per cent in 1943. Shipments to certain classes of consumers were less and total deliveries to the manufacturing group, foundry, producer gas, water gas, declined from 13 to 12 per cent in 1944. Demand for coke breeze increased 213,597 tons over 1943, to a total of 5,176,191 tons, approximately 6 per cent of the total, the same percentage as in the preceding year.

Coke distribution is widespread and every state of the union and the District of Columbia shared in the record consumption in 1944. Since major use is in smelting of iron ore, principal pig iron producing states showed largest consumption. Pennsylvania led with 26 per cent of all coke consumed. Ohio was second with 19 per cent, with Indiana, New York and Illinois together accounting for 26 per cent. Although New York ranked fourth in total coke consumed it was the leading user of domestic coke and accounted for 19 per cent of total domestic deliveries.

Wartime expansion of blast furnace capacity in the Birmingham district increased coke requirements and for the first time consumption in Alabama exceeded 5 million tons.

The Middle Atlantic states continued to lead in regional consumption of coke, followed by Ohio, Illinois-Indiana and the southeastern states, the same order as in previous annual surveys. Decrease in Pennsylvania in 1944 was the principal factor in drop in total consumption in the Middle Atlantic states. In Ohio, gains in deliveries to blast furnaces and the domestic trade gave an increase of 6 per cent over the former record established in 1943.

Foundry Consumption Heavier

Substantial increases in use of foundry and furnace coke in the Illinois-Indiana region accounted for the gain in that area. Continued gain in coke use in Alabama, mainly in blast furnaces, offset slight decreases in West Virginia and Tennessee and consumption in the southeastern area reached a new high. A significant increase over 1943 was made in the Southwest, Mountain and Pacific region, mainly because of expanded requirements by new blast furnaces in Utah and Texas. Although consumption in Michigan gained 20 per cent over 1943, because of increased domestic use, it fell short of 1940 consumption by 50,846 tons.

Coke and breeze shipments outside continental United States totaled 724,659 tons in 1944. Canada is the principal foreign market for American coke and received 94 per cent of total exports. Fourteen states reported export shipments, with Michigan, Pennsylvania and New York accounting for 86 per cent of the total

WING TIPS

Bottom knocked out of government aircraft production by contract cancellations but industry hoping military output can be maintained at a pace of about $1 billion annually. Air Technical Service Command speeding contract settlements

CONTRACT cancellations have knocked the bottom out of combat aircraft production, and employees by the tens of thousands have been released for their "reconversion holiday." It is hoped, however, that military aircraft production can be continued at a pace of about $1 billion annually, against a level over the past year of about $16 billion, including airframes, engines and propellers. This would be a cutback of about 94 per cent, and to take up the slack there is an estimated backlog of civilian and commercial orders for aircraft amounting to less than $1 billion. Actual war-end cancellations in the aircraft field are reported to be in the neighborhood of $30 billion, since orders had been projected even into 1947.

Companies in the best position to absorb the shock of military cancellations would appear to include Douglas, Consolidated Vultee, Boeing, Lockheed, Glenn Martin and some of the smaller manufacturers of personal-type planes like Luscombe, Aeronca, Cessna, Stinson, Piper, etc. But for all of them severe retrenchment is the order of the day, and the impact will be felt not only by the manufacturers themselves but by their thousands of subcontractors, the sole existence of many of which has been accounted for by the demands of military aviation.

Aircraft engine manufacture, already slashed back precipitately, probably will suffer an even greater percentage cut than aircraft. Thus, compared with 1944 output of over 425 million horsepower in engines and spares, the immediate postwar output may revert to the 1941 level of around 50 million horsepower, or even less for a time, until enormous surpluses of engines and parts can be partially absorbed. Large plants like Chrysler's Dodge Chicago engine unit, the Wright Lockland, O., plant, Chevrolet's extensive facilities at Tonawanda, N. Y., and Buick's Melrose Park, Ill., division will be at a standstill.

Immediate prospects for the aviation industry are largely dependent upon interpretation of section 202 of the War Mobilization and Reconversion Act of 1944 which, under the most exact interpretation, could cut off all research and development work in aircraft, as well as orders for combat craft, the minute the war is declared officially ended (this date is still to be determined) and further might prevent any more military orders until the expiration of the act in June, 1947. The attorney general has been asked for an interpretation of this section of the act. If he should decide on a strict version, it is possible the services would immediately approach Congress for additional appropriations for peacetime aviation development. However, there are a couple of "outs" which might be employed. One is that contracts may be continued if they "will benefit the government or are necessary to avoid substantial physical injury to a plant or property." The other is the use of an executive order by the President which presumably would override existing legislation.

Determined that the Army Air Forces shall not impede American industry in speedy conversion, the Air Technical Service Command is proceeding with rapid settlement of its 10,000 war contracts for Air Forces equipment.

In industrial centers throughout the nation, 114 AAF contract termination teams are arranging contract terminations and clearing factories of wartime material and equipment.

Although a majority of the 9800 AAF contracts, spread among 2900 prime contractors and aggregating $11 billion were completely terminated immediately upon announcement of Japan's surrender, certain contracts were subject only to partial cutbacks, and others notably for experimental work services, were not disturbed at all.

As the AAF, faced with a world-girdling war, metamorphized groundling youths from shop and campus into men with wings, so thousands of American factories far removed from the peacetime aviation industry were called upon to aid in building the world's greatest air fleet.

Thousands of Companies Involved

The end of the war revealed that 2900 firms were working on prime contracts for the AAF. These firms in turn had subcontracted with thousands of other plants (one aircraft company alone listed over 10,000 subcontractors) in producing the 650,000 items used by a modern air force. Of these thousands of firms drafted to wartime military aircraft production, not more than a score were members of the peacetime aviation industry.

Charged with procuring and maintaining airplanes and equipment peculiar to the AAF, the Air Technical Service Command was responsible for this drafting of American industry to build and supply its aerial fleet. And this same command, now headed by Maj. Gen. Hugh J. Knerr, is responsible for economical and fair termination of AAF procurement at the close of the emergency.

For more than a year, the Air Technical Service Command has been grooming a group of specialists in contract termination, the processing of settlements with contractors, and the disposition of surplus property resulting from contract cancellations. The unwinding of the sprawling aircraft war production machine has been carefully planned in every detail to permit rapid transition to peacetime production.

AAF personnel chosen to carry out this important assignment were screened from every activity of the service, selected on the basis of civilian experience in contractual relationship, corporate finance, industrial management, property distribution and disposal. The nucleus was augmented by civilian ne-

MODERN PIONEER: This high performance, Navy-designed "Conestoga" cargo plane with stainless steel skin, named for sturdy covered wagons of the West's pioneers, inaugurated the nation's first 24-hour transcontinental air-cargo contract and nonschedule service by National Skyway Freight Corp., organized and operated by former "Flying Tigers" and "Hump" pilots

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Once coil equipment is installed these advantages begin to reduce your costs: faster production, lower handling costs, fewer stock sizes, less storage space, reduced scrap losses and more economical fabricating procedures.

Get the facts on ARMCO ZINCGRIP coils before you tool up to manufacture a severely formed product that needs a protective zinc coating. Coils are manufactured up to 48 inches wide, depending on gage. Write for the booklet: "Useful Facts About ARMCO ZINCGRIP." Just address The American Rolling Mill Company, 2591 Curtis Street, Middletown, Ohio.

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When your formed or drawn zinc-coated products need an attractive paint finish, specify ARMCO ZINCGRIP with the PAINTGRIP treatment. This mill-Bonderized surface treatment takes and preserves paint. It is available on sheets and coils.

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gotiators and office workers to round out an effective organization of 2228 people, each highly trained in a specialty job.

This organization — the ATSC Readjustment Division — already has processed 11,076 contract terminations for items costing $14,031,873,000, and settled 9042 of them. What's more, it has reduced the time required for settling the average fixed-price contract claim from nearly eight months to 3.4 months.

The number of contract terminations to be handled by the AAF as a result of the end of the war against Japan, although sizably larger than those already in process, does not represent a proportionate increase in workload. A significant feature of AAF procurement is the high concentration, dollar-wise, in a small number of airframe and major equipment and component manufacturers. Only 1300 contractors have AAF contracts totaling over $25,000 each; only 3200 AAF contracts represent purchases over $25,000 each.

"The great majority of the larger installations where the major workload will occur have already had termination experience and are in a position to process cases with maximum efficiency," Brig. Gen. E. W. Rawlings, chief of the ATSC Readjustment Division, pointed out. "The cumulative experience of AAF and contractor personnel, the improvement of organization structures and operational procedures, and the month-by-month reduction in the length of time required by the AAF for settlement of terminated contracts, attest to the preparedness of the Air Technical Service Command to handle the workload resulting from the end of the war."

A basic objective of the ATSC has been the expeditious removal of termination inventory from war contractors' plants. Past performance indicates that current plant clearance procedures have successfully accomplished clearance of war plants within the mandatory 60-day period, with few exceptions. Experience gained following V-E Day terminations indicates that the principal problem posed by new terminations, from the plant clearance aspect, will be the increase in the number of war contractors' facilities that will require servicing in order to clear plants for reconversion to peacetime production within the shortest possible time.

"The Air Technical Service Command is prepared to meet the plant clearance workload resulting from the end of the war on the basis of current procedures and policies, and with the current staff of plant clearance personnel and other available qualified personnel now engaged in other activities of the Command," General Rawlings said.

The activities of the Readjustment Division are decentralized throughout the nation, with contract termination teams from three ATSC districts and scores of regional offices working directly with AAF contractors at their establishments. These teams are composed of a contracting officer and plant clearance, auditor, legal and administrative personnel.

Seeks Efficient Reconversion

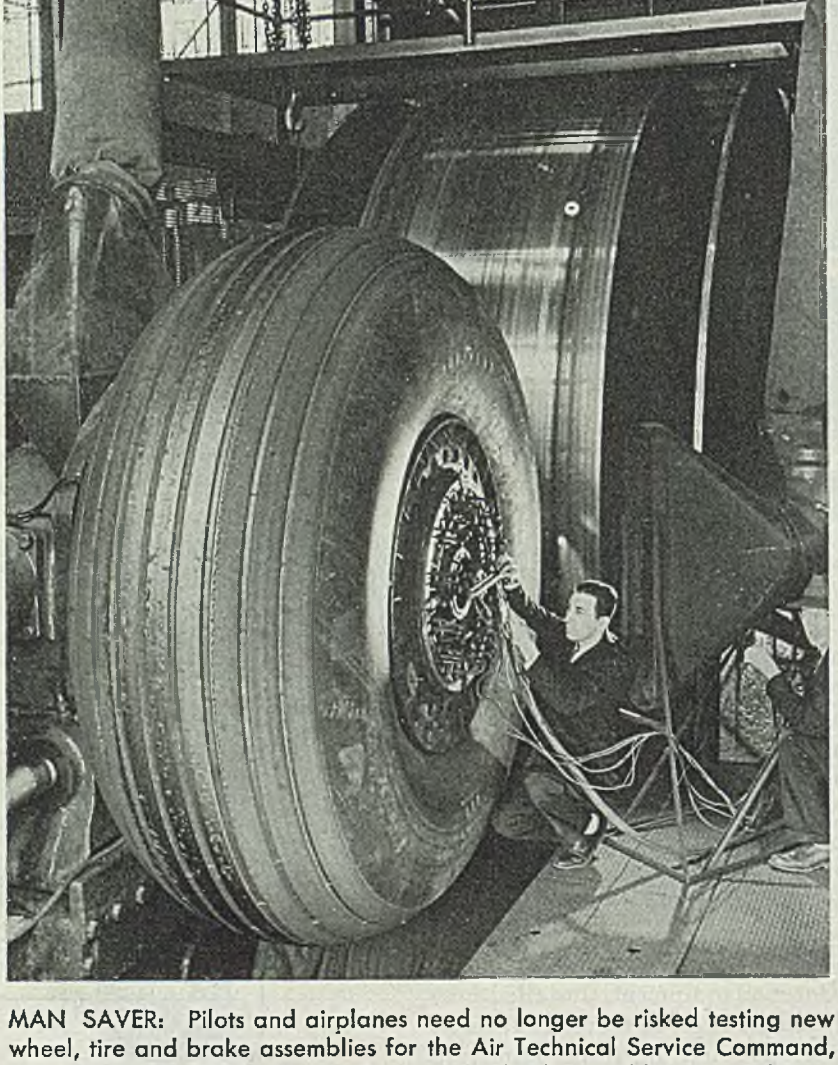
Activity of the AAF termination teams is aimed at prompt clearance of war plants for the production of civilian goods and the provision of ample financing for the war contractor during the transition period. This results in cushioning the shock of sudden contract terminations by supplying the machinery for efficient reconversion to normal pursuits.

An Air Technical Service Command "redeployment center" for aircraft engines — the only one in the country — has been established at South Bend, Ind., at the 820th AAF Specialized Depot. Purpose of this AAF "redeployment center," will be to store engines returned from overseas until they are recalled for military use or released to civilian buyers.

Until released to the Defense Plant Corp. engines will be provided storage, maintenance by the Fairfield Air Technical Service Command, Patterson Field, O., of which the South Bend depot is a subordinate station.

The engines, which still are serviceable for many flying hours, will be run along a processing line, conveyed to an infrared pre-heating oven and heated to a mass temperature of 180° F, then moved along to a tank containing corrosion preventative compound heated to temperatures from 200 to 250° F, where the engine is dipped, allowed to drain, and finally is reassembled and crated.

Engines no longer needed by the AAF will be made available for civilian use through the Defense Plant Corp.

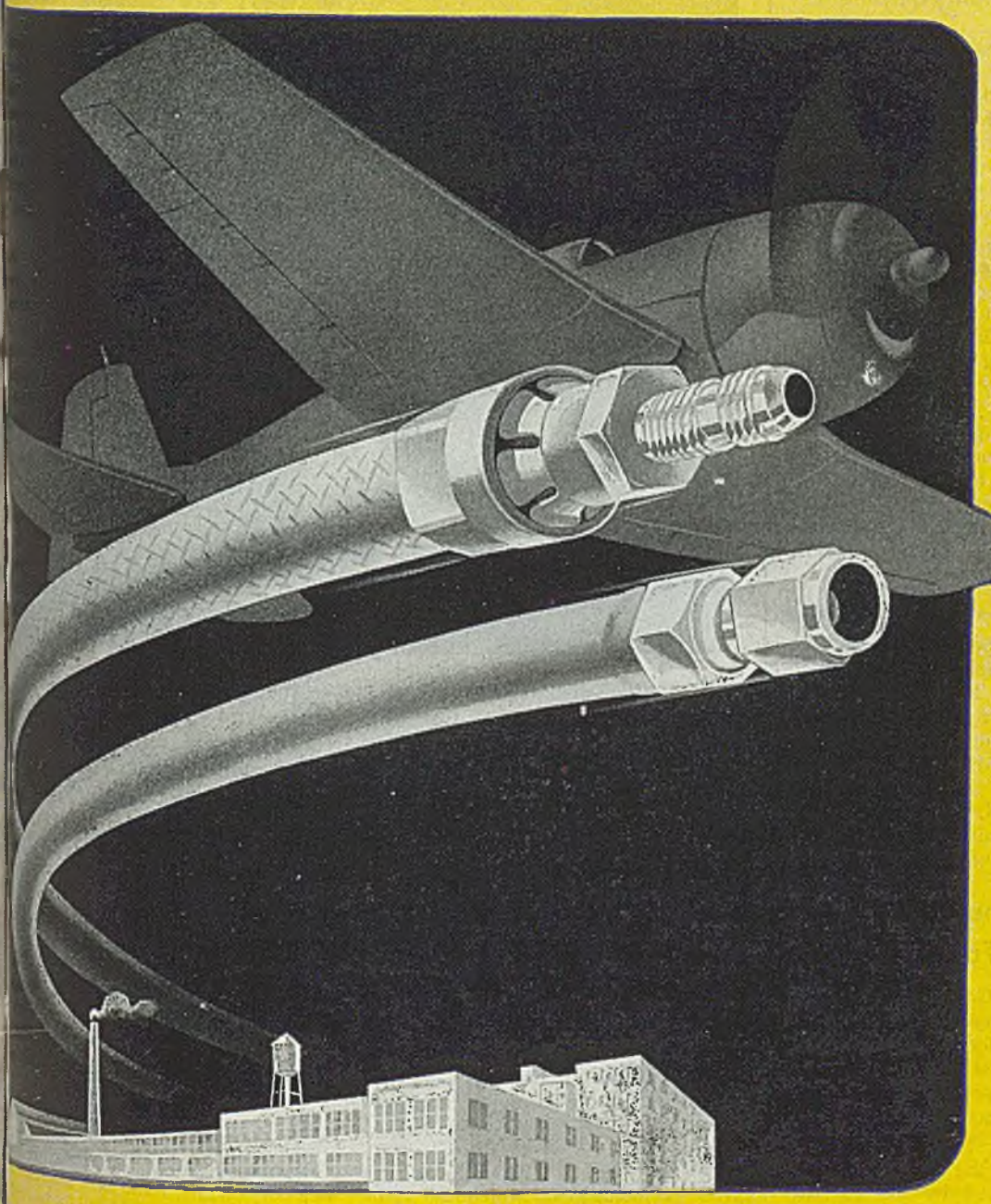


MAN SAVER: Pilots and airplanes need no longer be risked testing new wheel, tire and brake assemblies for the Air Technical Service Command, which uses this 110-inch smooth contour wheel assembly mounted in a huge inertia brake testing machine to duplicate actual airplane landing conditions. While the large assembly shown above is cooling, a smaller wheel and tire can be tested on the other side of the flywheel

Improved

QUICK-ATTACHABLE HOSE FITTINGS

Because Weatherhead quick-attachable (Q-A) hose fittings can be easily installed as either original equipment or replacement work, service-men and mechanics have stated overwhelming preference for them. They are available in two types for low pressure or for medium and medium-high pressure lines. Write or phone any Weatherhead branch office for our new Aviation Catalog. It's free!



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1. No special tools required
2. Cuts installation time in half
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6. Adjustable to prevent seepage

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Worthington To Convert Holyoke Ordnance Plant

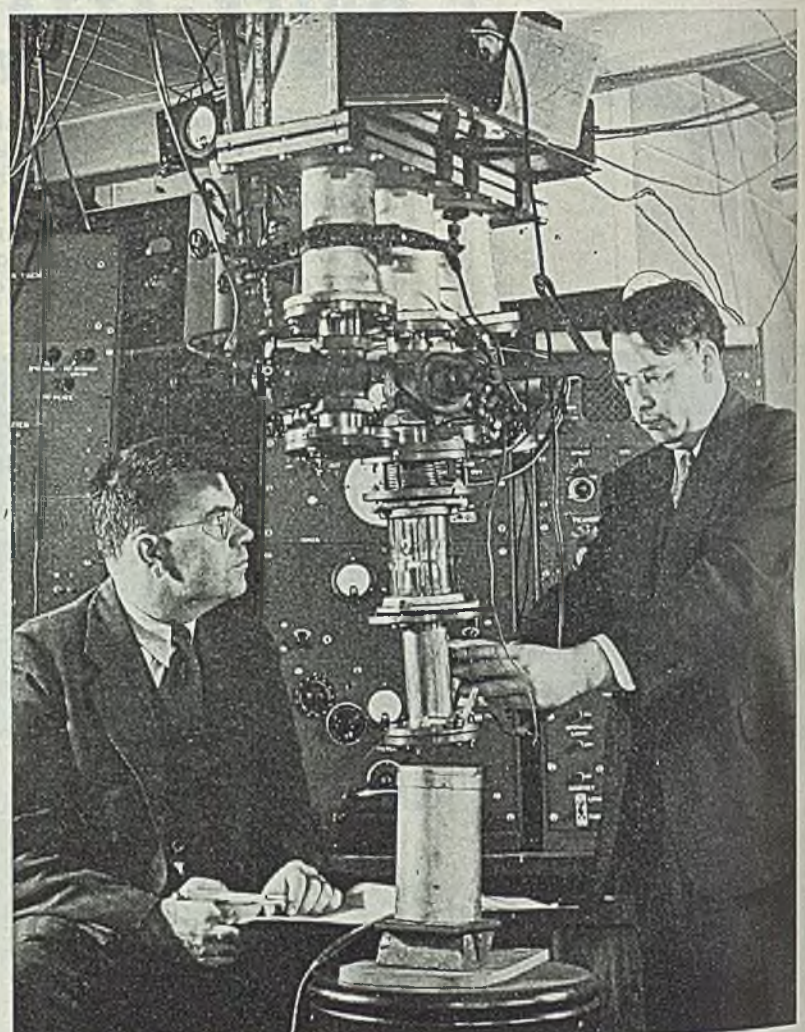
Large part of heavy ordnance facilities to be turned to production of air-conditioning and refrigeration equipment

PLANS are now complete to turn a large part of the heavy ordnance manufacturing facilities of the Worthington Pump & Machinery Corp.'s plant in Holyoke, Mass., to production of air conditioning and refrigeration equipment. Facilities for the operation have been moved there from the corporation's plant in Harrison, N. J.

Engineers are concluding designs for a new line of Freon-12 refrigerating compressors. Also to be produced at Holyoke will be a line of air handling equipment including air conditioning units, shower condensers, product coolers, and evaporative coolers in a wide range of sizes and capacities.

Fred J. Riedel, chief engineer, has installed a complete test laboratory for refrigeration equipment. Assembly line methods have been set up in the same shop where thousands of 90 mm anti-aircraft guns were formerly produced.

Sales headquarters will be located in Holyoke, with W. F. Bishop, assistant manager of the division, in charge. The heavy industrial equipment is still being made in Harrison. The company's air conditioning and refrigeration operation is under the management of C. E. Wilson, vice president, and M. M. Lawler, manager of the division. Mr. Riedel will be assisted by J. Neuhoff, engineer in charge of air conditioning units design, and L. J. Hall, engineer in charge of application.



ATOM-SMASHER: Target end of the Westinghouse 90-ton atom-smasher is examined by Dr. E. U. Condon, left, associate director, Westinghouse Research Laboratories, and Dr. Jerald E. Hill, research physicist. Early discoveries made on this first industrial atom-smasher, built in 1937, contributed to the general knowledge which made the atomic bomb possible

Cooper-Bessemer Denies Ohio Plant is For Sale

Cooper-Bessemer Corp., manufacturer of diesel and gas engines and compressors, last week denied its Mt. Vernon, O., plant is up for sale by the government as surplus property as reported in a release by the Reconstruction Finance Corp.

"The only part of the company's Ohio plant which is owned by the government is a core shop which the government built on property deeded to it by the company two years ago," Z. E. Taylor, secretary and treasurer of Cooper-Bessemer, declared. All other buildings which are part of the plant are owned by the company, he said.

Mr. Taylor added that the core shop is a very small part of the Mt. Vernon plant.

BRIEFS . . . .

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

Firecraft Door Corp., Chicago, has changed its name to Firecraft Corp., as new facilities have made the former name too restrictive.

—o—

Carpenter Steel Co., Reading, Pa., has moved its Indianapolis warehouse from 633 Fulton Street to new quarters at 1618 West Washington Street, Indianapolis 8.

—o—

Food Machinery Corp., Peerless Pump Division, San Jose, Calif., has named the following men to head rearranged sales districts: Warner G. Vaughan, Ardmore, Pa., Atlantic district; Charles E. Tierney, Decatur, Ga., Southeastern district; Edward W. Pierce, Canton, O., Central district; William E. Griffin, Plainview, Tex., Southwestern district; and B. A. Tucker, Los Angeles, Pacific district.

—o—

Instrument Society of America, in conjunction with Carnegie Institute of Technology, will hold an educational conference on instrumentation Oct. 16, 17, and 18.

—o—

Association of American Railroads, Washington, estimates on preliminary reports from 87 class I railroads, whose revenues represent 80.2 per cent of total operating revenues, that railroad operating revenues in July, 1945, decreased

3 per cent under the same month of 1944.

—o—

John N. Thorp, who recently was appointed by the Cleveland Pneumatic Tool Co., Cleveland, as representative of its newly formed Railway Division with headquarters at 50 Church Street, New York, also continues as president of the John N. Thorp Co., well known eastern distributor of construction equipment, machinery and railway supplies.

—o—

Labor Department's Safety and Health Division and its National Committee for the Conservation of Manpower have laid plans to bring the Southeast an intensive accident prevention drive in the fabricated steel industry.

—o—

Isthmian Steamship Co., San Francisco, is resuming operations between California ports and the Philippine Islands which were suspended December 1941. First sailing is scheduled from San Francisco with loading to start Sept. 15 at Los Angeles.

—o—

Airplane Parts Development Corp., Summit, N. J., is changing its name to Hungerford Research Corp. President Dan C. Hungerford also announces that the organization is moving to its new laboratory building in Murray Hill, N. J.

—o—

Arco Co., Cleveland, has developed a new group of all-synthetic, hi-bake enamels designed to endure heavy usage, especially on household appliances.

—o—

L. Burmeister Co., Milwaukee 14, has moved to a new office and factory at 4535 West Mitchell Street.

—o—

Briggs Clarifier Co., Washington, has appointed Diesel Equipment Co., Memphis, Tenn., its distributor in western Tennessee, northeastern Arkansas, southeastern Missouri, and southern portions of Illinois, Indiana and Kentucky.

Massey-Harris Reconverting but Also Is Building New M-41 Tanks, Just Unveiled

END of the war has resulted in the building of a new powerful artillery weapon—the M-41 or 155-mm howitzer carriage, which up to this time has been a closely-guarded military secret. The weapon is said to be the first Army vehicle which combines the light tank chassis with a major field artillery piece.

Carrying a five-man crew, the 19-ton M-41 can achieve a speed of 35 miles per hour. It is powered with twin V-8 engines. The vehicle mounts a 155-mm howitzer capable of hurling a 95-pound shell at targets more than 9 miles distant. Because of its light weight, high speed, and tremendous fire power, the M-41 is ideal for supporting rapidly moving armored vehicles with both direct and indirect fire.

Built by the Massey-Harris Co., Racine, Wis., manufacturer of farm machinery, the M-41 was the latest of a sizable succession of tanks produced by its Tank Division after a contract was assigned early in the war. With end of the war on Aug. 14, the Tank Division received its death notice, but before the end of the week that portion of the contract dealing with the M-41 was reinstated. Thirty of the new tanks have been built and production will continue at 30 a month for the next six months.

Forbidden model of the Massey-Harris Tank Division was the light M-15 tank, followed by the reconditioned M-36 tank destroyer, the new M-24 light tank which replaced the M-5, and finally the M-41. The company just completed its 3,000th tank and plans to continue until the present contract expires.

Reconversion does not pose much of a problem to the company. The Tractor Division continues at top speed producing farm machinery. The Tank Division shortly will share its production of the M-41 tanks with an expanding tractor manufacturing program.

The company has carefully laid plans to move a major portion of its tractor production in the present 11-acre factory to the 33-acre plant which was purchased from Nash Motors in 1942 when it assumed the tank contract. Some of the moves will accelerate the manufacture of peacetime products since the space vacated at the Tractor Division will permit needed elbow room for increased production. Export shipping, which represented a big share of the company's business, has already moved to the tank premises. Certain of the light tooling operations will follow, with the heavy machining remaining to the last to eliminate excessive trucking of cumbersome parts between the two divisions during changeover. Before long, tractors and tanks will be filing out of the same factory.

The new plant will have a capacity for about 100 tractors a day, in addition to tractor-mounted implements, including bedders, listers, cultivators and planters. Two new implements — a forage harvester and a self-propelled corn picker—will be manufactured. Plans also embrace possible utilization of Racine as a central warehouse from which products of the company's various factories would be shipped by water on the Great Lakes and the Mississippi river, using wartime LST boats as carriers.

Chicago Area's Industry Shows Big Expansion

Value of facilities in district up 45 per cent since 1939. Output of goods almost trebled in 1944

WITH a 45 per cent increase in dollar value of its industrial facilities since 1939, the Chicago industrial area almost trebled its output of goods which rose to $11.9 billion in 1944. Production in the area was running at an annual rate of $11.1 billion when the Japanese asked for peace. This was a drop in the annual rate of but $800 million from the 1944 record high.

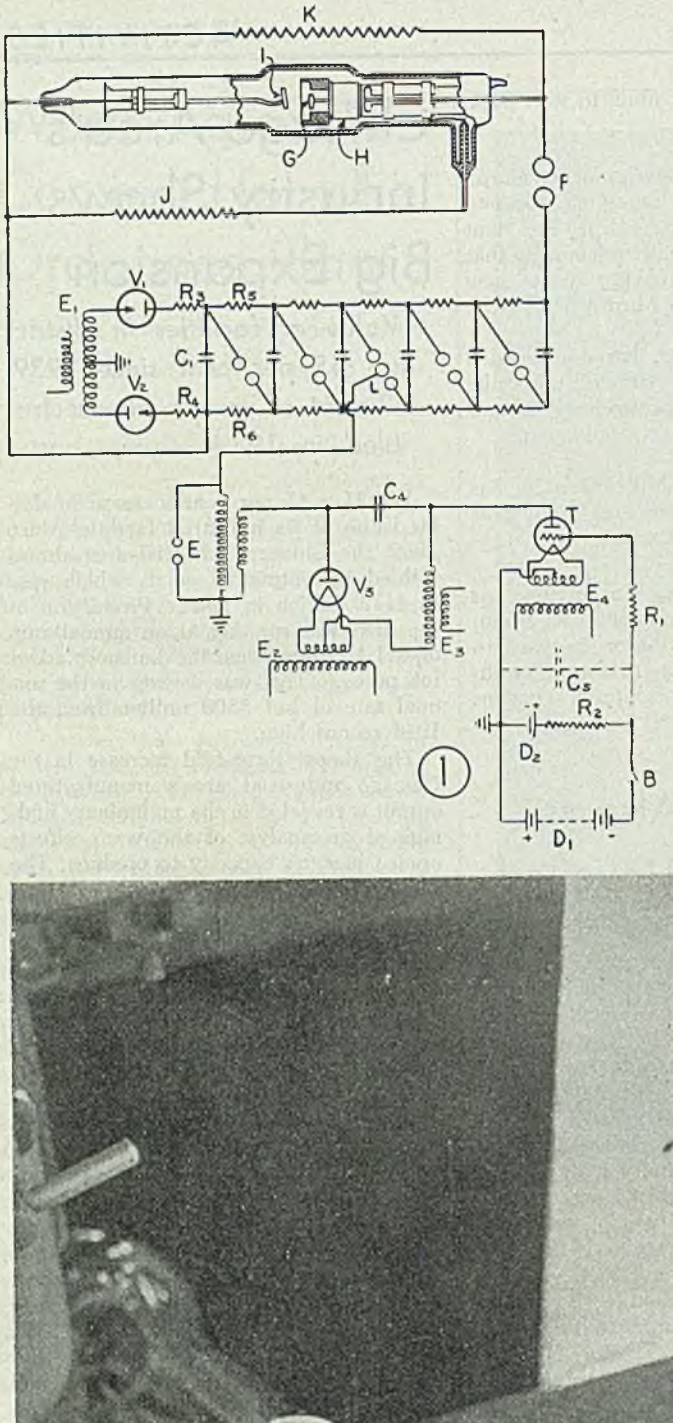
The almost three-fold increase in the Chicago industrial area's manufactured output is revealed in the preliminary findings of an analyst of the war's effects upon Chicago's capacity to produce. The analysis is part of a study of the wartime economic changes in the area and their postwar implications jointly sponsored by the Federal Reserve Bank of Chicago, Chicago Association of Commerce, and the Chicago Committee of the Committee for Economic Development.

When Japan surrendered, the electrical machinery industry, which includes electronics, had effected the largest increase in output. Manufacture of transportation equipment showed the next largest gain, this expansion being principally accounted for by the development of a huge new industry making aviation engines and parts and equipment. Food production showed the third largest gain. Production of ordnance materials advanced from a negligible level in 1939 to $850 million, for fourth place. Following closely behind in fifth place was the iron and steel industry whose production jumped to $1.7 billion from $917 million.

The six Chicago industries in which the largest additional plant investments were made since June, 1940, follow: Transportation equipment, $450 million; iron and steel, $350 million; ordnance, $175 million; chemicals and chemical products, $110 million; nonferrous metal and products, $95 million; and nonelectrical machinery, $60 million.

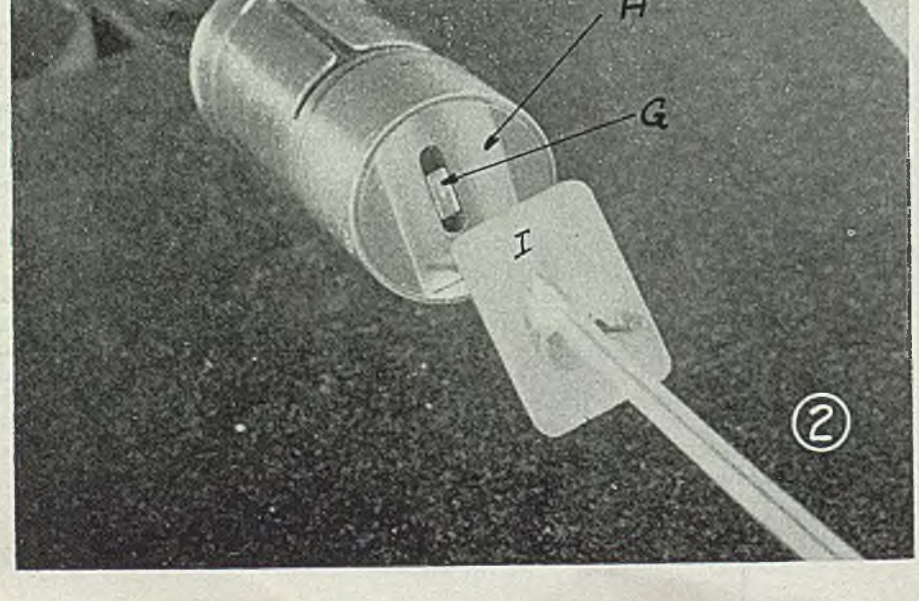
Drum Reclaiming Program Saves 65,000 Tons of Steel

Conservation of more than 65,000 tons of heavy gage steel and cash savings of $4,555,000 were realized from the Quartermaster Corps' program of reclaiming 55-gallon oil and gasoline drums during the first half of 1945.



High-

. . . by field emission eliminate need for long exposures, making X-rays useful for investigation of mechanical and metallurgical phenomena. First of two articles presents history of tube and circuit development. Practical use of technique will be described in next week's STEEL

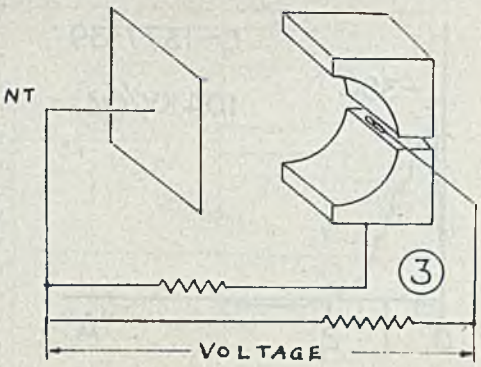


IN TAKING a radiograph, the time of exposure at any given voltage is determined by the intensity of the X-ray beam which in turn is dependent on the magnitude of the current passing through the tube. Using the normal tube current of several milliamperes, the exposure will range from a few seconds to perhaps minutes in duration. It is obvious, therefore, that if it is desired to make an exposure of 1/1,000,000-sec, it will be necessary to pass about a million times the usual current, or some thousands of amperes through the tube. Since it is not practicable to obtain currents of this magnitude from a heated tungsten filament, it becomes necessary to seek some other source of electrons.

The first really successful step in this direction was taken by Max Steenbeck, who in 1938 built a rather simple tube consisting of two pools of mercury enclosed in glass and connected by a glass capillary. When a condenser is discharged across such a tube, a cathode hot spot is formed, and the space charge being relieved by the positive mercury ions, heavy currents will flow. However, the current generally is uncontrollable because at ordinary temperatures the discharge has a negative characteristic. Therefore, in order to obtain X-rays it is necessary to cool the tube to reduce the mercury vapor pressure to the rather critical range in which the tube is operable. The desired temperature is in the range of zero degrees C. A further disadvantage of this construction is the necessity of operating the tube in the upright position, yet Steenbeck succeeded in taking pictures of low-velocity bullets in free flight, passing through wood.

About this same time and independently of Steenbeck, Kingdon and Tanis constructed a mercury discharge X-ra

peed X-Rays



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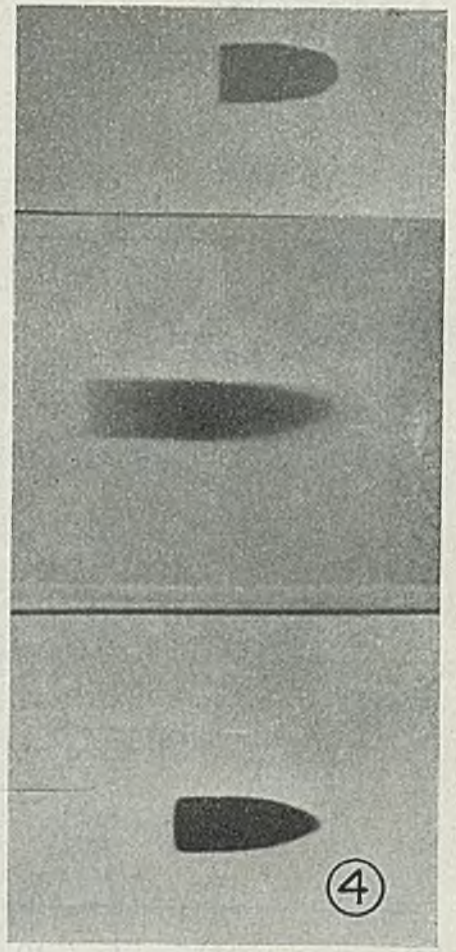
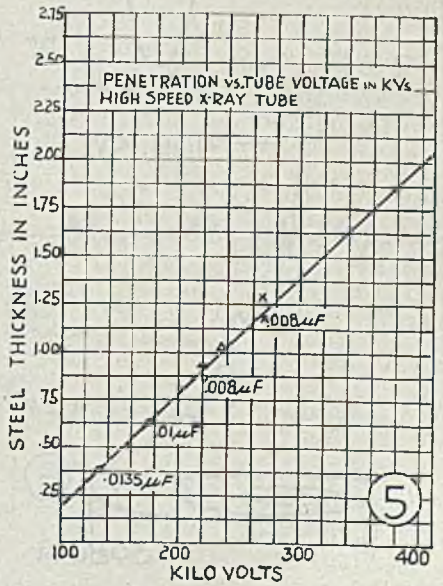




for the purpose of testing the re-ocity law in killing bacteria. The was similar in operation to that Steenbeck but had a tungsten target. effort was made to focus the elec- stream and consequently the tube not suitable for radiography, al-gh the X-ray output was sufficient simple exposures of a few micro-ds duration. This tube was sub- to same limitations as Steenbeck's. fore passing to a description of the stinghouse cold cathode X-ray tube generator, it may be of interest to der some of the factors which led its development. If we consider a ple two-electrode tube filled with at or above atmospheric pressure, find that the voltage required to duce a discharge is quite large. As e pressure is reduced, the voltage also creases until a certain minimum ue is reached, after which further crease in pressure causes the voltage rise again, following Paschen's law. the high vacuum portion of the ve is approached, the slope becomes steep and the indications are that e voltage should reach infinity at emely low pressures. It also is well own that the old gas X-ray tubes rated at higher and higher voltages the vacuum improved. Reasoning ese lines, it has generally been cluded that when a tube fails to thstand high voltage it is because e vacuum has become impaired, and e tube is said to be "gassy".

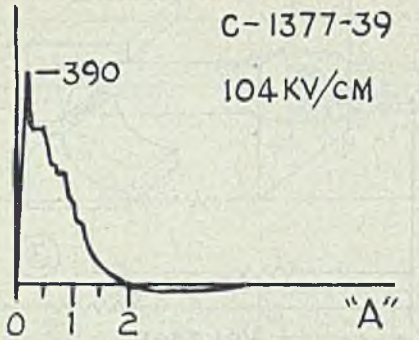
It is now recognized by most physi-sts that irregularities in operation often cur in the highest of vacuums and gas, or at least volume gas, is not sponsible for the phenomenon. As illustration of this fact, the following periment may be of interest:

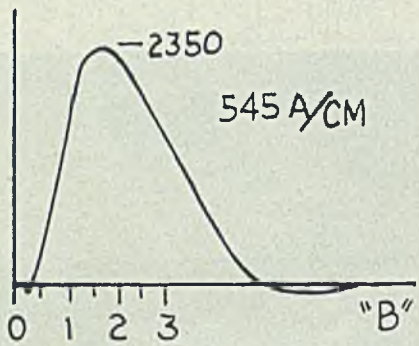
A deep therapy X-ray tube was pro-ded with an ionization gage and sealed off with a gas content of 3 microns of neon. The tube operated satisfactorily for some hundreds of hours, and when irregularities in operation usually attributed to gas did develop, actual pressure as indicated by the ionization gage was less than 0.01-micron. Erratic behavior of tubes referred to as "gassy" apparently is not due to the gas content of the tube, but to the emission of electrons under the influence of high electric fields which exist at points other than the heated cathode.

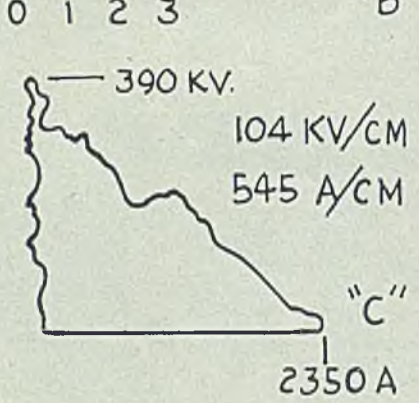
The existence of sharp corners and points on the tube parts tends to accentuate the voltage gradients and the presence of impurities or occluded gas tends to lower the work function of the surface and make it easier for the electrons to escape. Such bursts of cold emission occur at voltages far lower than those calculated to be necessary to produce them from pure metals. This condition is not limited to X-ray tubes but applies to all high vacuum electronic tubes and is the cause of a large part of the irregularities which exist in such tubes, particularly in cases where the voltage rating is exceeded.

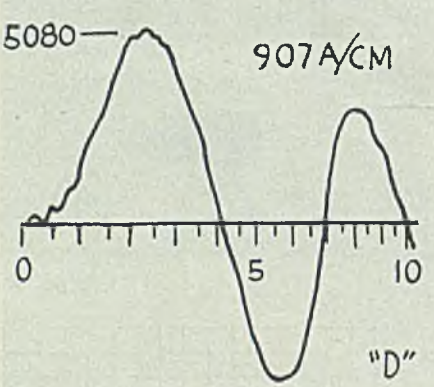
Tube and Circuit Development: While investigating this phenomenon of "spitting" or "backfiring", with a condenser discharge machine, it was found that the magnitude of such bursts of current was surprisingly large, perhaps on the order of several amperes. As the effect was so large in tubes designed especially to avoid it, the possibility of increasing it to the point where some useful purpose might be served presented itself. As a first step, a sharply etched tungsten wire point was placed close to a flat plate. Discharges of a condenser across this combination with the point negative produced enormous currents with the best obtainable vacuum conditions.

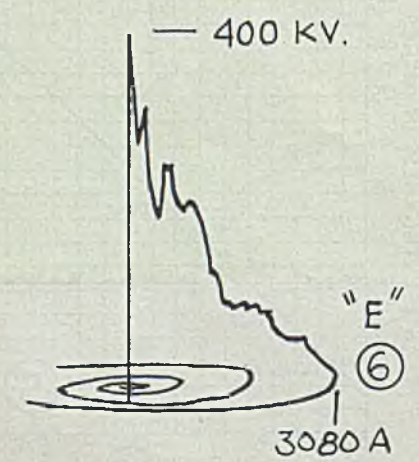
Production of very large currents in











vacuum at high voltage, of course, is just what we need for intense X-ray outputs which will permit making radiographs in a very short time. Practical limitation of the tungsten filament X-ray tube is about 1 amp of current due to the temperature and space charge limitations of the cathode. Here, however, was a source of extremely high currents running into a thousand amperes or more. The problem of controlling these currents so that the electron stream would strike a suitable anode with the necessary velocity to produce X-rays was next considered. Addition of a control electrode, placed in close proximity to a sharp edge gave promise of fulfilling the necessary conditions. Further development of this idea resulted in the design illustrated in Fig. 3. In Fig. 2 a sharpened electrode, G, is placed in a trough-shaped auxiliary electrode, H. By this means, a semblance of a rectangular focal spot can be obtained on target I.

Energy of the impacting electrons is dissipated in four different ways:

1. In the production of X-rays. This accounts for a fraction of 1 per cent of the energy.
2. Light and heat radiated from the focal spot account for 1 to 5 per cent of the energy depending on the exposure time.
3. Vaporization of the tungsten target accounts for perhaps 3 per cent of the energy.
4. Heating of the tungsten target at and near the focal spot absorbs from 90 to 98 per cent of the total energy.

It is obvious from these considerations that conduction of heat from the focal spot area to the surrounding tungsten must be relied on to play the major role in heat dissipation. As the amount of heat conducted from a given area depends on time and the difference in temperature it can easily be seen that the heat dissipating ability of a focal spot will decrease as exposure time decreases, so that one would expect it to be quite small for exposure times of about a microsecond such as those considered here. It is fortunate that heat dissipated varies with the square root of the exposure time according to the following formula:

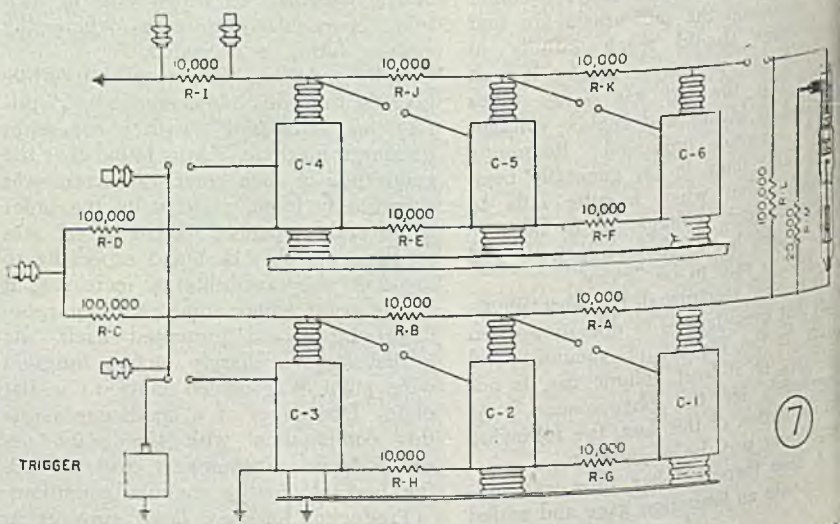
$$W_m = T_m \sqrt{\frac{Kct}{2}}$$

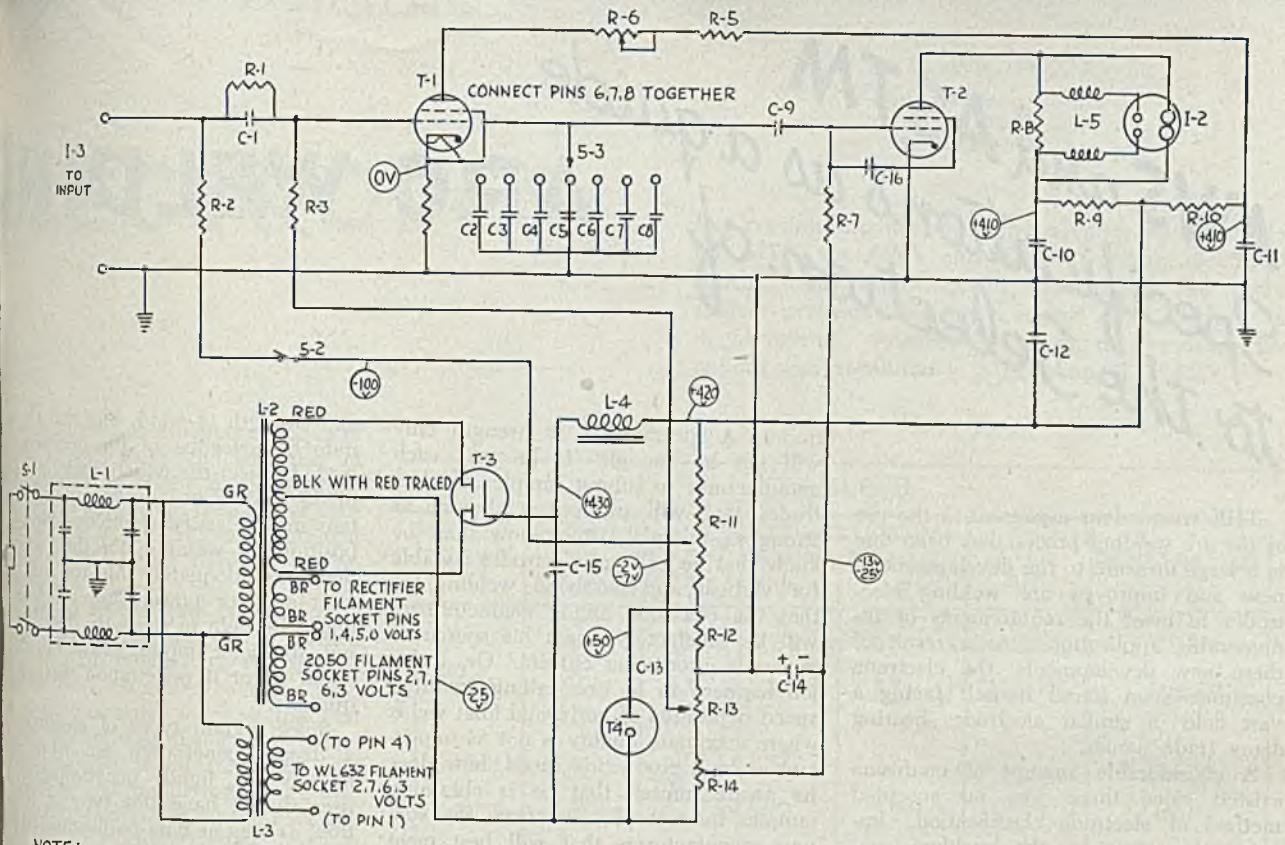
When: W_m equals loading in total energy permitted per unit area to raise surface to temperature T_m; K equals thermal conductivity of anode material; c equals heat capacity of anode material; t equals time of exposure; T_m equals temperature.

Calculated on this basis, using a condenser of 0.02-microfarad charged to 100 kv, and assuming a discharge time of 1 microsecond, a focal spot area of approximately 16 sq cm would be required to dissipate the energy of the electrons without vaporizing the tungsten target. It has been found that focal areas of from one-eighth to one-quarter of the calculated values are sufficient in practice and that while some vaporization does occur, several thousand exposures can be made before the tungsten deposit becomes sufficiently thick to absorb the X-ray appreciably. Failure of the formula to hold in this case is probably due to a number of causes, the most important of which are as follows:

1. Total discharge time of the condenser may be several times that of the X-ray exposure as intensity of the X-ray falls off rapidly with decreasing voltage.
2. A considerable portion of the electrons may be deflected from the target and give up their energy elsewhere.
3. The discharge degenerates into a low voltage arc passing very high currents with little energy loss in tube.
4. Time is so short that even with a high rate of evaporation total material loss per exposure is small.

These conditions indicate that the focal spot and hence the obtainable definition can never be made as fine in a tube operating at these extremely short exposure times as they may be in tubes operating in the conventional manner. However, adequate definition for most purposes is easily obtained, and rather fine definition can be obtained in one





NOTE:
ALL GROUND CONNECTIONS TO BE MADE TO COMMON BUS WIRE
CONDENSERS WITH POLARITIES INDICATED ARE ELECTROLYTICS
CAUTION — OBSERVE POLARITIES

CIRCLED VALUES ARE APPROX. VOLTAGES FROM GROUND (VACUM TUBE VOLTOMETER)

(8)

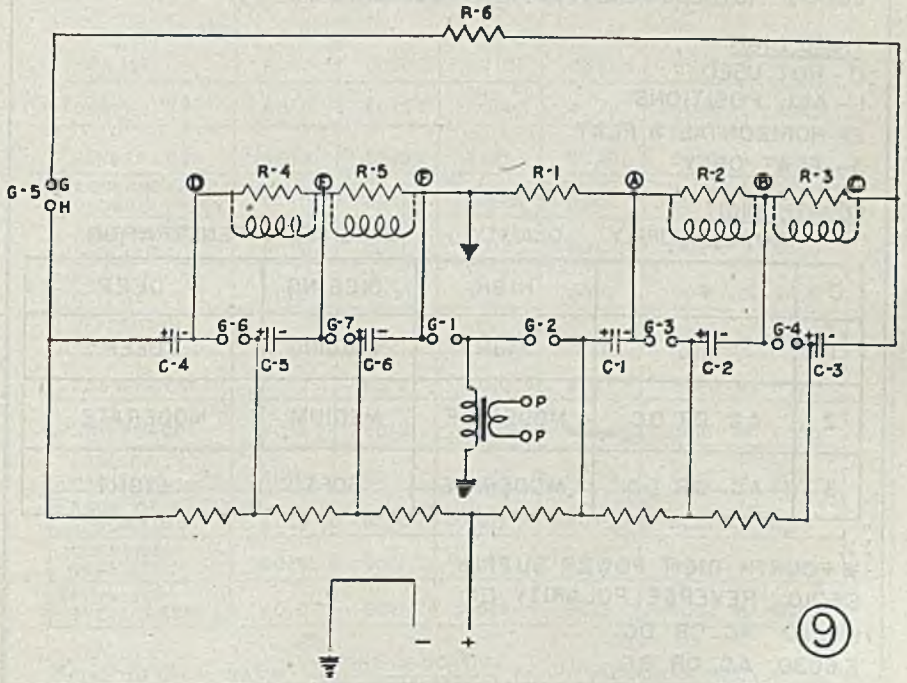
PARTS LIST

.....	10 Meg—1 w	IRC BT-1
.....	5000 Ohm—1 w	IRC BT-1
.....	.1 Meg—1 w	IRC BT-1
.....	1 Meg—12	IRC BT-1
.....	4000 Ohm—1 w	IRC BT-1
R-9.....	10,000 Ohm Pot	Gen Radio 314
.....	.5 Meg—1 w	IRC BT-1
.....	.1 Meg—1 w	IRC BT-1
.....	20,000 Ohm—100 w	Ohmite
.....	6000 Ohm—1 w	IRC BT-1
.....	1000 Ohm—2 w	IRC Type W1000
.....	2000 Ohm—2 w	IRC Type W2000
...sitors	10,000 Ohms	IRC BT-1
.....	.01 Mfd—600 v	C D Cat DT-651
.....	.002 Mfd—600 v	C D Cat DT-602
.....	.006 Mfd—600 v	C D Cat DT-206
.....	.02 Mfd—600 v	C D Cat DT-652
.....	.06 Mfd—600 v	C D Cat DT-656
.....	.2 Mfd—600 v (2, .1 Mfd Sections of an Aerovox Cat 671; 3 x .1 Mfd)	
C-7	.6 Mfd—600 v (1 .1 Mfd Section of C-6 plus an Aerovox Cat 671; 5 Mfd)	
C-8	2 Mfd—600 v	Aerovox Cat 640
C-9	.25 Mfd—600 v	C D Cat DT-6P25
C-10	.2 Mfd—1000 v	C D Cat TJU-10020
C-11	40 Mfd—500 v	Aerovox Type AEP
C-12, C-15.....	4 Mfd—1000 v	C D Cat TJU-10040
C-13	25 Mfd—25 v	BR-252A
C-16	.001 Mfd—400 v	
C-14	25 Mfd—50 v	Aerovox Type PR50
Tubes		
T-1	RCA	Type 2050
T-2	GE	Type FG 95
T-3	RCA	Type 83 V
T-4	RCA	Type VR 75
I.-1	Line Filter	
L-2	Power Transformer	
L-3	Filament Transformer	
L-4	Filter Choke	
L-5	Air Core Chokes	

...ation by taking X-rays off the target ...r grazing incidence.

The manner of operation of the tube ...ay best be seen by referring to the ...ematic circuit diagram of the surge ...erator as applied to the high speed ...See, Fig. 1. The condensers are charged ...the transformer E_1 through the recti... ...s V, V_2 to a voltage somewhat less ...an that required to break down the ...ak gap L. Simultaneously, condenser ... is charged to about 1000 v. When the ...rcuit is broken at B, the charge on the ...id of thyraton T leaks off, permit... ...g C_4 to discharge through the primary ...f the induction coil E, which gives a ...scient impulse to the high voltage ...rcuit to cause the gap L to flash over. ...is causes the surge generator gaps to ...eak down, which impresses a high ...oltage between G and H. Field elec-

(Please turn to Page 150)



(9)

AWS and ASTM Specifications as a guide to the Selection of ARC WELDING

THE tremendous expansion in the use of the arc welding process has been due in a large measure to the development of new and improved arc welding electrodes to meet the requirements of innumerable applications. As a result of these new developments, the electrode consumer soon found himself facing a vast field of similar electrodes bearing many trade names.

A considerable amount of confusion existed since there was no accepted method of electrode classification. Imagine, for example, the problem confronting a user desiring to select an electrode for high quality vertical and overhead work requiring deep penetration and suitable for operation on alternating current. There are approximately 20 electrode manufacturers in the field, each making about 10 different types of electrodes. A specification of strength only will not be enough. If he asks each manufacturer to submit samples of electrodes that will produce a deposit as strong as the plate stock how does he know that he will get electrodes suitable for vertical and overhead welding, or that the electrode arcing characteristics will be satisfactory when his source of power is alternating current? Or, if his job happens to be one calling for high speed deposition of horizontal fillet welds where maximum quality is not as important as high production speed, how does he assure himself that he is obtaining samples for test purposes from the various manufacturers that will best meet his requirements? Obviously, the situation is confusing unless an accepted method of electrode classification is available.

It is interesting to note that the classification system must not only assure the user that he is getting the proper quality and strength of weld, but also (to facilitate his selection of the optimum electrode to meet the widely varying requirements existing in industry today) the system must classify electrodes for various positions of welding, for their ability to penetrate adequately into the root of the joint and for power supply. A deposit might be high in strength, ductility, etc., but the joint might easily fail due to notch effect if penetration was not adequate.

Since certain types of electrode have a deeply penetrating arc while others have a soft, lightly penetrating arc, the user should have this type of information, as well as data on mechanical properties. As some users have direct current equipment, others alternating current equipment, they should have definite assurance that electrodes are suitable for operation on the power supply they have available and a ready means for determining the particular class of electrode that best complies with their requirements.

Tentative Specifications in Effect

This confusing situation is rapidly being remedied by joint action of the AWS and ASTM. Tentative specifications A-233 have been in effect for some time and are the most widely accepted device for separating and classifying electrodes for mild and low alloy steel fabrication. In this specification, a series of classifications is defined within which it is possible to place over 90 per cent of the electrodes produced today. These classification numbers are being used very extensively by both consumers and producers instead of the trade names previously used.

In this manner, order has been brought out of confusion, for all of the electrodes, regardless of make or trade name, which meet all of the requirements of any AWS-ASTM class may be expected to have major characteristics which are very similar, if not identical. Since the electrodes within a class are very similar, the consumer can, after determining the class best fulfilling his application requirements as to position of welding, type of power available, quality of deposit, etc., then limit his selection of available brands of electrodes to those within that classification. Furthermore, after qualification of a welding procedure under AWS with one brand of electrodes, the user can change to any other brand of electrode of the same class without the necessity of requalifying his procedure. It is there-

TABLE I

E=ELECTRIC WELDING
FIRST TWO DIGITS = TENSILE ST. (STRESS RELIEVED)
THIRD DIGIT = POSITIONS OF WELDING
FOURTH DIGIT = POWER SUPPLY, QUALITY, TYPE ARC & PENETRATION

ILLUSTRATION E 60 SERIES
1ST. & 2ND. DIGITS
60000 # (STRESS RELIEVED) MIN. REQ. TEN. ST.

THIRD DIGIT
0- NOT USED
1- ALL POSITIONS
2- HORIZONTAL & FLAT
3- FLAT ONLY

FOURTH DIGIT

	POWER SUPPLY	QUALITY	TYPE ARC	PENETRATION
0	*	HIGH	DIGGING	DEEP
1	A.C.	HIGH	DIGGING	DEEP
2	A.C. OR D.C.	MODERATE	MEDIUM	MODERATE
3	A.C. OR D.C.	MODERATE	SOFT	LIGHT

* FOURTH DIGIT POWER SUPPLY
E 6010 REVERSE POLARITY D.C.
E 6020 A.C. OR D.C.
E 6030 A.C. OR D.C.

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ELECTRODES

Mr. Westendarp prepared the accompanying article for STEEL on AWS and ASTM welding electrode specifications following an address on the same subject presented before a recent AWS conference in Cleveland. Another discussion on these specifications was published in STEEL Aug. 6, 1945.

e extremely important that the user of elding have a clear understanding of e various classes of the AWS specifica-, as such knowledge should save con-erable time in selecting the particular es of electrode best fulfilling his re-irements.

The A-233 specification covering mild d low alloy steel electrodes is divided o six strength groups. We will discuss detail the E-60 series covering mild el, since this series involves the vast jority of electrodes being used today, d it should be noted that the E-60 ies pattern and numbering system also ply to the other classifications covering ily coated electrodes. The number-g system used is quite simple and is fined in Table I. It will be noted that e significance of the fourth digit 0 es as to power supply as indicated. l other data are consistent.

Having learned the significance of the ious digits used in the classification, s relatively simple to use and under-d this method. For example, an 010 electrode would have the follow-major characteristics:

1) The following tensile strength requirement in the stress relieved condition is 8,000 psi.
2) It is an all-position electrode.
3) It operates satisfactorily only on reverse polarity, direct current.

The above numbering system immeely tells the user of welding the ten-strength (stress relieved), the posi-in which the electrode can be used, the power supply and polarity that uld be employed. As a further guide the selection of electrodes, the various sses are described in greater detail by e following outline of electrode char-teristics peculiar to each of them. As icated in Table II, the E-60 series ntains six classifications, all requiring same minimum tensile and yield point ength, but separating electrodes de-ned for vertical and overhead welding m those designed for horizontal and position welding, and by their ability operate on either direct or alternat-g current. It will also be noted that e electrodes designed for welding in positions are broken down by classi-ations to separate the high quality types ving highest ductility and deep pene-tion from the "easy to use" types hav-medium ductility and penetration. To give the user assurance that elec-des listed in a given classification com-

(Please turn to Page 165)

TABLE II

CLASS	POSITION OF WELDING	POWER SUPPLY	ELONGATION IN 2" MIN. PER CENT AW	SR	TYPE ARC	PENETRATION
E6010	ALL	D.C. R.P.	22	27	DIGGING	DEEP
E6011	ALL	A.C.	22	27	DIGGING	DEEP
E6012	ALL	A.C. OR D.C. S.P.	17	22	MEDIUM	MODERATE
E6013	ALL	A.C. OR D.C. S.P.	17	22	SOFT	LIGHT
E6020	H&F	A.C. OR D.C.	25	30	DIGGING	DEEP
E6030	F	A.C. OR D.C.	25	30	DIGGING	DEEP

ALL CLASSES	AW	SR
TENSILE ST. P.S.I. MIN	62000	60000
YIELD PT P.S.I. MIN	52000	47000

TABLE III

A.W.S. SPECIFICATIONS

RELATIONSHIP OF USABILITY - PERFORMANCE - QUALITY, CHARACTERISTICS

	INCREASING VALUES →					
TEN. ST.	6030	6020	6010	6011	6013	6012
DUCTILITY	6012	6013	6010	6011	6020	6030
PENETRATION	6013	6012	6011	6010	6020 & 6030	
ABSENCE OF UNDERCUTTING	6010 & 6011		6020 & 6030		6012	6013
ABSENCE OF SPATTER	6010	6011	6012	6013	6020 & 6030	
DEPOSITION EFFICIENCY	6020 & 6030		6011	6010	6012 & 6013	
DEPOSITION RATE	6010	6011	6013	6012	6020 & 6030	
SOUNDNESS	6012	6013	6010	6011	6020 & 6030	
ARC FORCE	6013	6012	6011	6010	6020 & 6030	
EASE OF HANDLING	6010	6011	6020 & 6030		6012	6013
EASE OF RESTRIKING	6020 & 6030		6011	6010	6012	6013
CURRENT CAPACITY	6010 & 6011		6013	6012	6020 & 6030	
*FLUX TO STEEL RATIO	6010	6011	6012	6013	6020 & 6030	

*FLUX TO STEEL RATIO = $\frac{\text{WEIGHT OF COATING}}{\text{WEIGHT OF STEEL}}$ AND IS USUALLY IN PROPORTION TO COATING THICKNESS.

Theory of heating and quenching as a means for obtaining ultimate desired physicals in the majority of carbon and alloy steels is reviewed here in the first of five articles. Covered in detail are hardenability vs. hardness, effect of various rates of heating and cooling, construction and interpretation of S-curves

Modern HEAT TREATIN

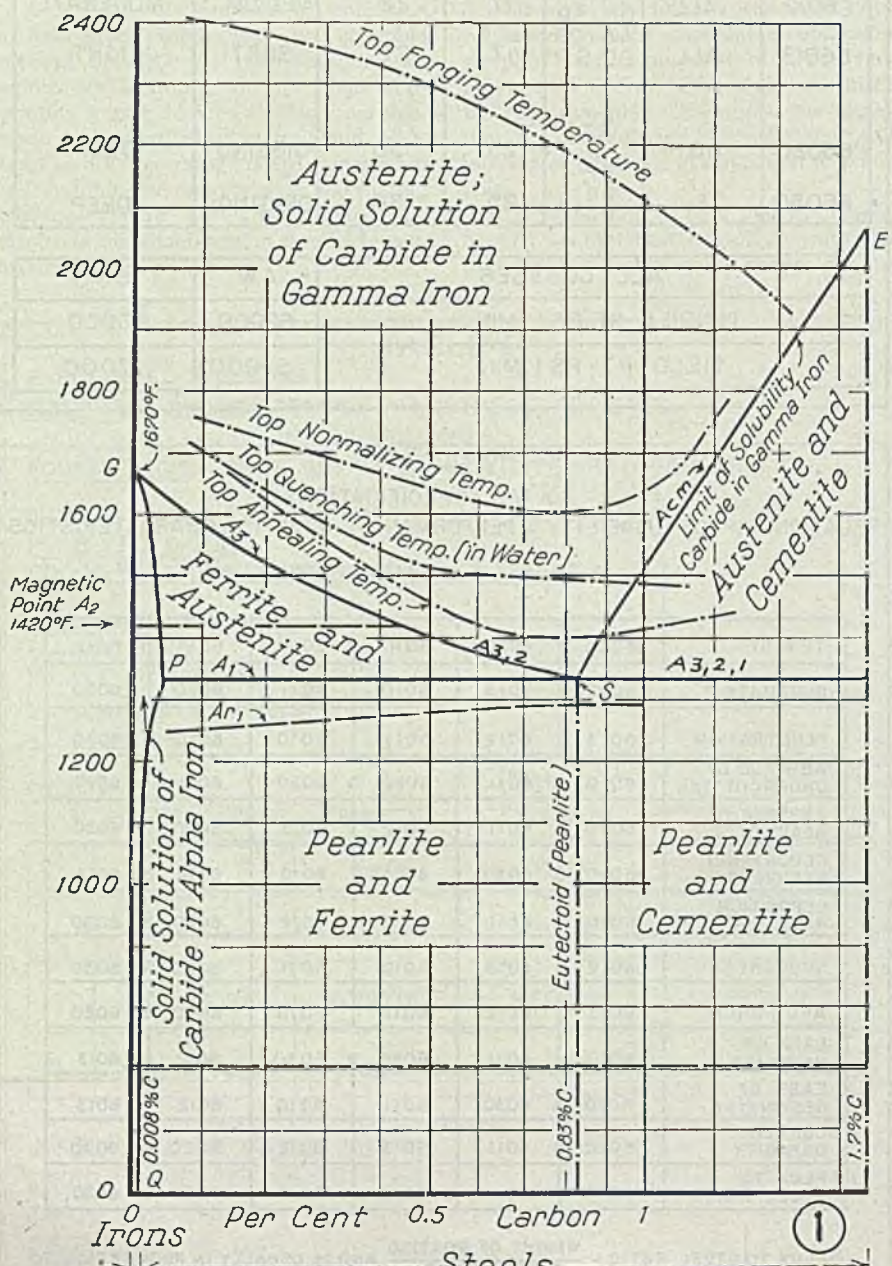
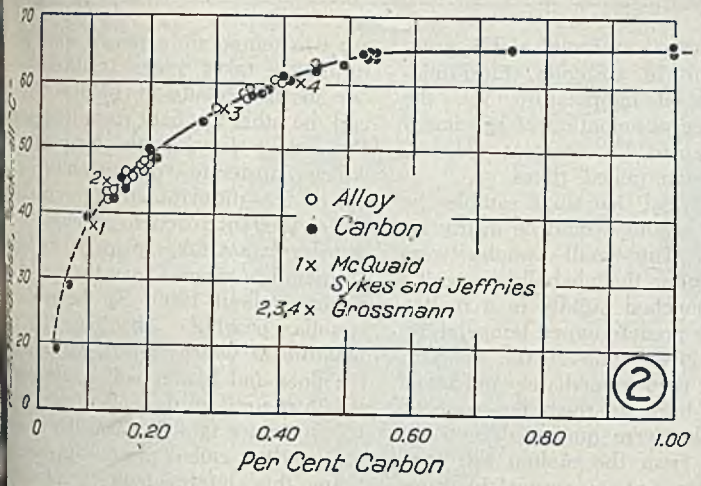


Fig. 1—*Iron-carbon constitution diagram*

TODAY, engineers are demanding more and more from structural materials. It is their aim to increase the load and life, and at the same time decrease the weight of material. This is an age of iron and steel and will continue to be for many years. The lighter materials such as aluminum and magnesium and their alloys will be adopted for many parts, but iron and its alloys will continue as the major structural material. Engineers are going to require soft steels for deep drawing, steels with high hardness that can be used for machining other steels; steels that will retain high strength at high temperatures; steels with high fatigue and impact value; steels to resist abrasion, and many other requirements. Few steels possess these properties in the "as rolled" state so they must be given suitable thermal treatment.

Unfortunately, too often the engineer has the authority to specify the physical properties needed, and the grades and chemical analysis of the steel and the method of heat treating. Often the procedure is to specify the physical properties, select the grade of steel, and then leave it up to the heat treater to develop some method of heat treating to get the required properties. Many errors could be avoided and better properties could be obtained if the engineer would specify the properties required and then let the heat treater decide which heat treating method will best attain the desired result. *The steel best suited for a preferred method of heat treatment can then be selected.*

The reason for the use of alloy steels in the construction of automobiles, railroad equipment and the like is their greater strength. It is important to observe that this greater strength is due to



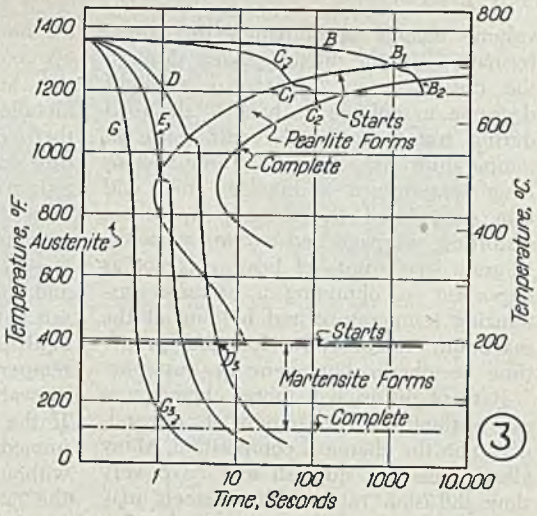


Fig. 2—Maximum hardness vs. carbon content

Fig. 3—Cooling curves for various operations from furnace anneal to iced brine quench are shown in relation to those portions of the S-curve that locate formation of pearlite and martensite. (Grossman)

Practice

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ability of alloy steels to be quenched hardened in greater thickness. In sections such as ¼-in., carbon steel may be quenched to fully as great strength and hardness as any alloy steel in the same size; but in larger sections, such as 1-in. or greater thickness, carbon steel cannot be hardened through the cross-section, so that the core remains unhardened and therefore not very strong.

Many alloy steels can be hardened in 1-in. sections, some of them very much deeper. Thus it is important in selecting alloy steels for constructional purposes, to consider the depth to which they will harden in quenching.

Maximum hardness is a function of the carbon content. When steels are quenched from a cooling speed exceeding the critical cooling rate, the effect of the carbon content upon martensitic hardness is so marked that it is considered as the fundamental element in determining the hardness properties of martensite. (Fig. 2). Small additions of carbon to low-carbon steel are relatively more effective than the same additions to a higher carbon concentration. With low or medium carbon steels containing less than 5 per cent alloy, the alloy does not significantly affect the maximum hardness.

Hardenability and Hardness

Hardenability may be defined as susceptibility to hardening by quenching. To illustrate the difference between hardenability and hardness, consider the two steels SAE 1040 and 4140, in 1-in. round. If these two steels are quenched in the same manner, so result would be that the surface hardness is the same, the center hardness of the SAE 4140 would be much greater than the 1040 steel. The two steels can be quenched to the same hardness, but the 4140 has much better hardenability because of the alloy additions. Then if you quench a 1040 and a 1090 steel in the same manner, the result would be that the 1090 steel would have a higher hardness and greater depth of hardness, which shows that the 1090 steel has greater maximum hardness and somewhat greater hardenability.

The hardenability of carbon steels is known to vary with the chemical composition, grain size, and detail of manufacture. Increase of carbon from 0.20 to 0.83 per cent (eutectoid) increases the maximum hardness and the hardenability. With increase in carbon above 0.83 per cent, the hardenability decreases slightly. Addition of certain alloys greatly affects the hardenability of the steel, while some others, such as vanadium, have very little effect. The common alloying elements, such as nickel, manganese, molybdenum and chromium increase the hardenability.

Plain carbon steel, while containing manganese, phosphorus, sulphur and silicon and traces of other elements, is generally considered as an iron-carbon alloy. The carbon content is usually between 0.05 and 1.45 per cent; when in excess of 0.20 per cent, the steel is considered commercially hardenable. Carbon occurs as a carbide of iron (Fe_3C) uniting with the iron to form a mechanical mixture called pearlite. An 0.83 per cent carbon consists of 100 per cent pearlite, termed eutectoid steel. Below this percentage the steel is composed of pearlite and free ferrite, termed hypo-eutectoid; above this percentage of carbon, we find pearlite and free carbide termed hyper-eutectoid.

When carbon steel consisting of 100 per cent pearlite is heated to about 1333° F, the carbide is dissolved in the ferrite, forming a new structure of 100 per cent austenite. (Fig. 1). This temperature is termed the critical temperature. If the carbon content is higher or lower than 0.83 per cent, the temperature of 1333° F is called the lower critical or A_1 or $A_{e_2,1}$ point because the individual pearlite grains in the steel transform to austenite regardless of the original carbon content. The free ferrite or carbide still is not in solution.

When the carbon content is lower than 0.83 per cent, the free ferrite is absorbed progressively by the austenite as the temperature is increased. Finally, all of the ferrite is dissolved. The temperature necessary to cause 100-per-cent solution is called the upper critical or A_{e_2} temperature. Hypo-eutectoid steel must be heated at least to the upper critical to obtain homogeneous austenite before it is ready to quench. When the carbon content is above 0.83 per cent, similar action takes place, with the free carbide gradually dissolving with increase in temperature. It is not always desired to heat hypo-eutectoid steel to the upper critical. For example, tool steels are heated just above the lower critical then quenched to harden the former pearlitic structure, retaining free carbide.

Gamma Condition Essential

Heating of the steel to some temperature either in or above the critical or transformation range in order to put the steel in the gamma or austenitic condition is an exceedingly important step in any process of hardening or heat treating, one which in some instances probably has not had sufficient consideration. It is essential that the carbon and other alloy elements be dissolved in solid solution of the gamma or austenitic condition. This solution of elements may be either complete or partial.

During this heating cycle there are definite dimensional and microstructural changes taking place at the critical temperature. As steel is heated, thermal expansion takes place as the temperature increases until the critical is reached; a

volume change accompanies the transformation as the metal passes through the critical range. There is a slight decrease in volume as heat is absorbed during transformation. A difference in temperature rise, or nonuniform austenizing temperature, as between thick and thin sections of the same part, causes distortion, warpage and varying austenitic grain size. Rate of heating is not as important as obtaining a uniform austenizing temperature and holding at the maximum temperature for the proper time to obtain homogeneous austenite.

Rate of diffusion to obtain homogeneous austenite varies somewhat, depending upon the chemical composition. Many alloy steels are sluggish and have very slow diffusion rates. These steels may require a longer soaking time at the austenizing temperature, and often the temperature may be raised to accelerate diffusion. The actual heating temperature should be somewhat above the A_{3}, or upper critical temperature to assure homogeneous austenite. When exposed too long after complete diffusion occurs, an increase in the austenitic grain size may result. A higher temperature than necessary has the same effect, although with fine-grain steels this is less dangerous than too low a temperature. When in doubt as to the correct austenizing temperature, the heat treater should consult a standard reference book or request this information from the source of material. Uniform austenite places the steel in proper condition to respond to cooling. It is now ready to quench.

Construction of S-Curve

To understand what occurs when steel is cooled and the effect of different cooling rates, it is necessary to know the time and temperature required for decomposition of austenite and the resulting constituent. This can best be summarized by the S-curve often referred to as the TTT curve (time-temperature-transformation).

Method of study used by Bain and Davenport to construct an S-curve (See Fig. 6), now generally accepted as one of the most practical examples of the process and result of austenite transformation at constant temperature, was the metallographic examination of specimens that have been held at constant temperature for predetermined times.

It was essential that small samples be used so that cooling would be nearly instantaneous. The small samples were heated to render them wholly austenitic and then quenched rapidly in a molten salt bath to a predetermined temperature, held for a given time at the constant temperature, then immediately quenched in water or brine to room temperature. If the samples were quenched in water immediately from the molten salt bath without the lapse of any appreciable time, the sample would still consist of austenite and this would transform to martensite, in its entirety.

If, on the other hand, the samples were held in the molten salt bath for a sufficient length of time, then some other structure would form while holding at this constant temperature. This other structure would be either ferrite or bainite. For example, a eutectoid steel was quenched from an austenizing temperature in a molten salt bath at a temperature of 700° F for 8, 10, 100 and 200 sec and then immediately quenched in brine. If each sample were examined under the microscope, the resultant structure would be as shown in Table I. These data show that isothermal transformation of this grade of steel at 700° F begins at 10 sec and is completed in 200 sec. By conducting similar tests at various temperatures, the S-curve can be constructed for any steel.

Transformation is not instantaneous. The S-curve predicts the time required at any constant temperature for transformation to begin and be completed. There are two temperature ranges where transformation takes place relatively fast—one in the vicinity of 1000 to 1100° F and the other at about room temperature. Depending on the time-temperature at which austenite decomposition takes place, the ultimate structure results in three different reaction products. If the transformation takes place in the higher temperature range above the nose of the S-curve (about 1000° F), the product is lamellar pearlite. The lower the temperature at which transformation occurs, the finer and harder will be the pearlite structure until, at the nose of the S-curve, the structure is a fine lamellar or nodular pearlite, called primary troosite.

In the intermediate transformation range, if the method of the quench causes transformation to take place between the temperature of the nose of the S-curve and the temperature at which martensite starts forming (M_s point), austenite decomposes to an acicular structure named bainite (named after Dr. Bain). The lower the temperature at which transformation takes place, the finer and harder will be the acicular structure. Austempering is a controlled time quench in this intermediate temperature range.

Contrary to former belief, austenite transforms to martensite while cooling

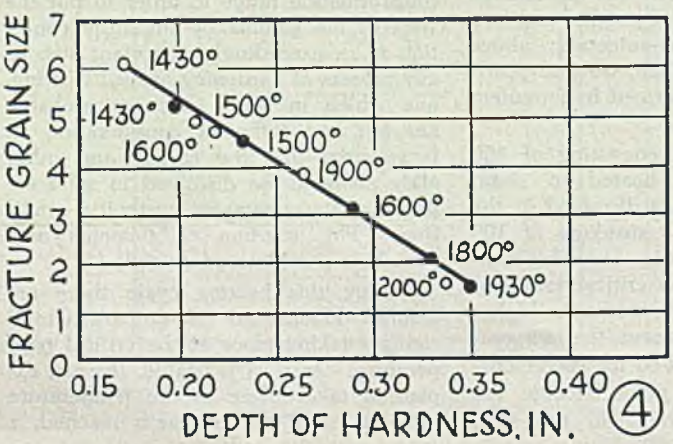
(*Please turn to Page 176*)

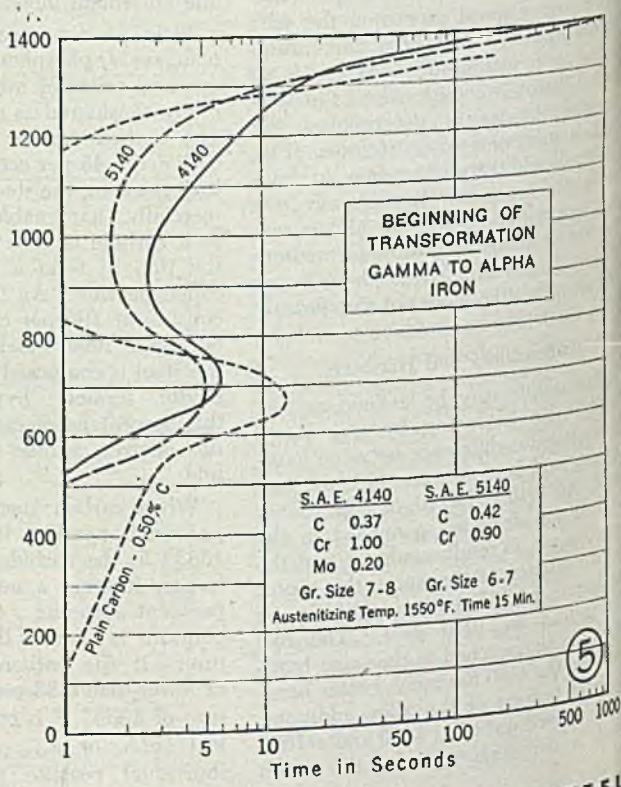
TABLE I

QUENCH IN SALT Seconds	RESULTS
8	100% martensite
10	Trace of bainite, nearly 100% martensite
100	50% bainite 50% martensite
200	100% bainite

Fig. 4—Depth of hardness plotted against fracture grain size for results obtained from a typical heat

Fig. 5—Comparative initial transformation curves for three steels





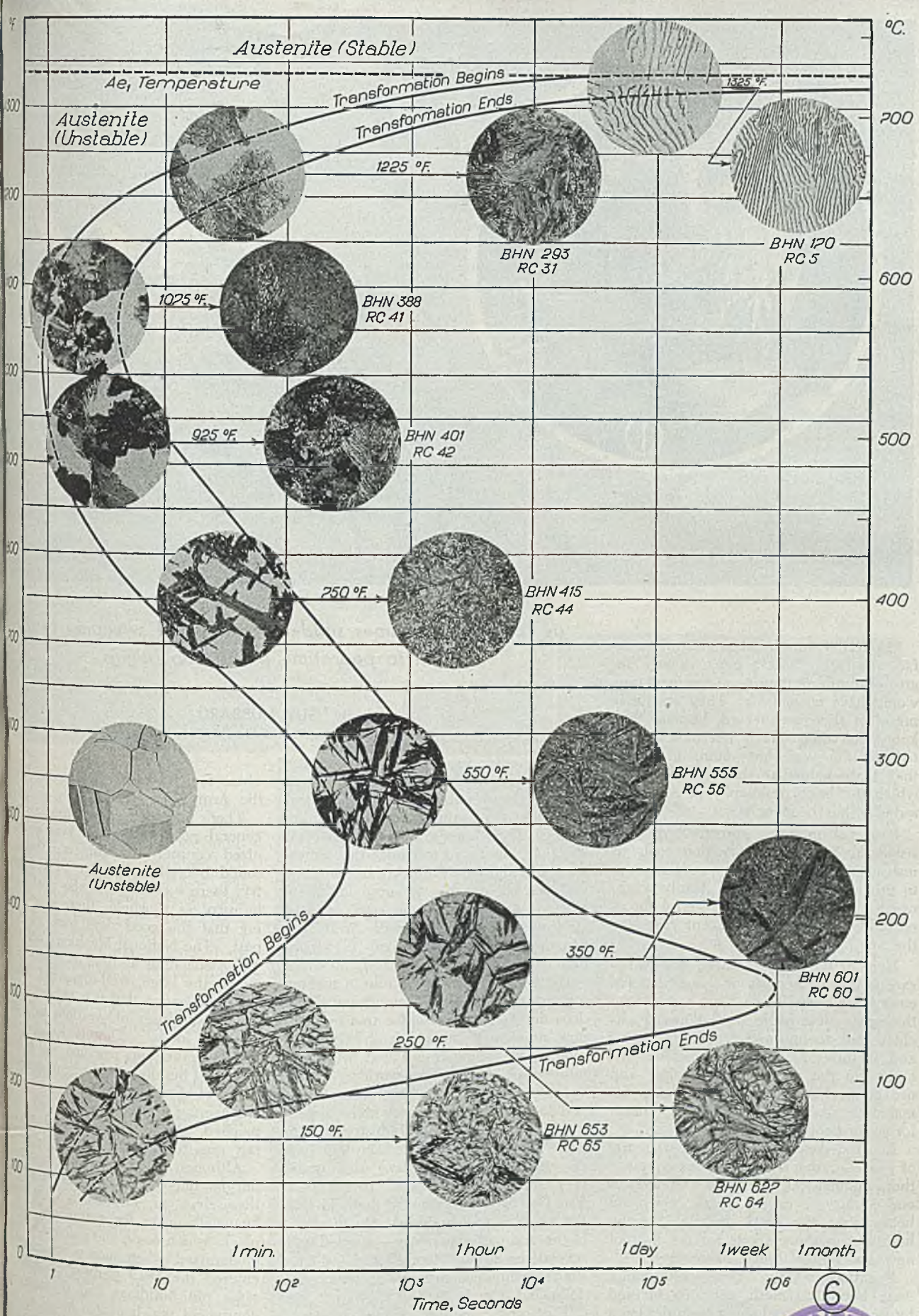


Fig. 6—S-curve for 0.89 per cent carbon steel showing transformation of austenite at constant sub-critical temperature. Courtesy of U. S. Steel Corp. Research Laboratory and American Society for Metals

Machine Tool FACES Challenges and Opportunities

as "postwar" becomes sudden reality, and sweeping conversion to peacetime production begins

By GUY HUBBARD
Machine Tool Editor, STEEL

MACHINE tool builders generally now face the future with a much greater degree of optimism than some commentators would have us believe. They are justly proud of their war record, because they know that their efforts not only helped to win the war, but—more important than that—helped to shorten this war in which the basic philosophy of American industry has been at stake.

Powerful interests abroad have persisted in considering machine tools as instruments whose primary purpose it is to provide more and more deadly weapons for larger and more powerful forces on land, at sea and—of recent years—in the air.

Here in the United States, however—except during periods of great national emergency such as we have just passed through—our capable and influential machine tool, tooling and production brains and facilities have been dedicated primarily to the manufacture, tooling and use of machine tools as instruments for making available "more and better things for more people."

In so dedicating industry to the arts of peace—rather than to the art of war—there automatically have been created in our country, over the years, more and better jobs for more people, thereby building up the markets for the host of new and better things.

Eventually these two philosophies were bound to clash, the one favored by the Axis powers having been designed to seize by supposedly irresistible force the good things of life created and developed in America and in other countries which have preferred the arts of peace to the art of war. Axis leaders underestimated Great Britain's and China's dogged determination to "hang on" and Russia's ability to withstand and ultimately to return terrific military blows. Their biggest mistake, however, was that they failed to realize that America could and would quickly become one vast arsenal, capable of supplying these allies as well as the huge land, sea and air forces which a supposedly "soft" democracy raised and trained in record time.

Having played a major role in making America the Arsenal of Democracy, where does the American machine tool industry now stand in its new task of helping to rebuild the bombed out and worn out industries of a war-torn world?

In connection with the compilation and interpretation of our widely distributed "Special Report to Industry on Machine Tools," (summarized in the June 25, 1945, issue of STEEL) this writer spent most of the critical period from V-E Day to V-J Day out in the field with the machine tool builders. On the basis of this and past experience—coupled with revelations in our "Report" itself—I have drawn many conclusions—of which the following may be typical.

First and foremost, I am convinced that the American machine tool industry is in far better physical and "mental" condition that it was at the end of the first World War. I recall vividly the condition of things which I encountered in 1919 when I came back into the machine tool business after having been in the Army.

There prevailed at that time a state of general pessimism; there was no recognized counsel and guidance, based on sound overall knowledge of the industry; there was no particular goal for the industry as a whole; there was a feeling that the good days were all in the past. The National Machine Tool Builders' Association at that time was by no means the large, well-organized, influential organization that it is today. Uncontrolled surpluses of wartime tools were "on the loose." Despite the fact that in 1919 numerous machine tool builders were still building 1914 or earlier models, many of them thought that the peak of engineering development had been reached. What a wrong conclusion that last one turned out to be!

Although big profits had been made during that war, many companies found themselves in surprisingly poor shape financially after the war ended. Many plants which could and should have been modernized when money was plentiful, entered the 1919 postwar era with the same old buildings and the same old equipment which existed before the war—and when I say "old," I do mean *old*.

On recent visits to machine tool plants—visits ranging all the way from Boston to Rockford and from Cincinnati to Canada—I have found quite a different state of affairs than I encountered back in the

ndustry
VEW

Fig. 1—Chip removal by "central station" vacuum system as applied to battery of Gisholt automatic lathes machining cast iron dry. Big volume of chips, by-product of latest machining techniques, makes continuous removal a "must" on many new machines. Customer interest runs above 62 per cent. Builders have developed various methods for ejecting chips. They say it is up to plant engineers to carry on from there

Fig. 2—Here is an example of scientific coloration of machine tools as tried out with demonstrated success at the Westinghouse plant in East Pittsburgh. Ivory enamel is applied where its light-reflecting property is desirable. STEEL's *survey indicates that 67.2 per cent of machine tool users now are interested in such use of "colors contributing to safety and lighting of work areas"*

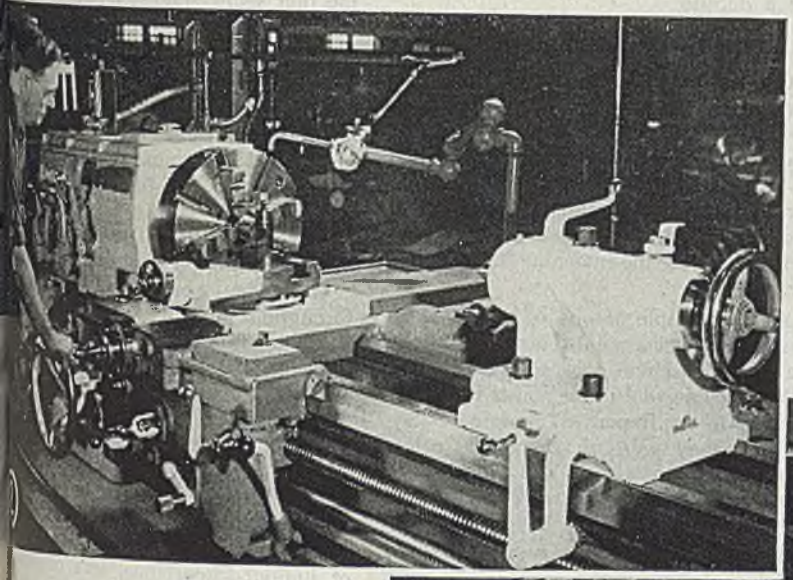
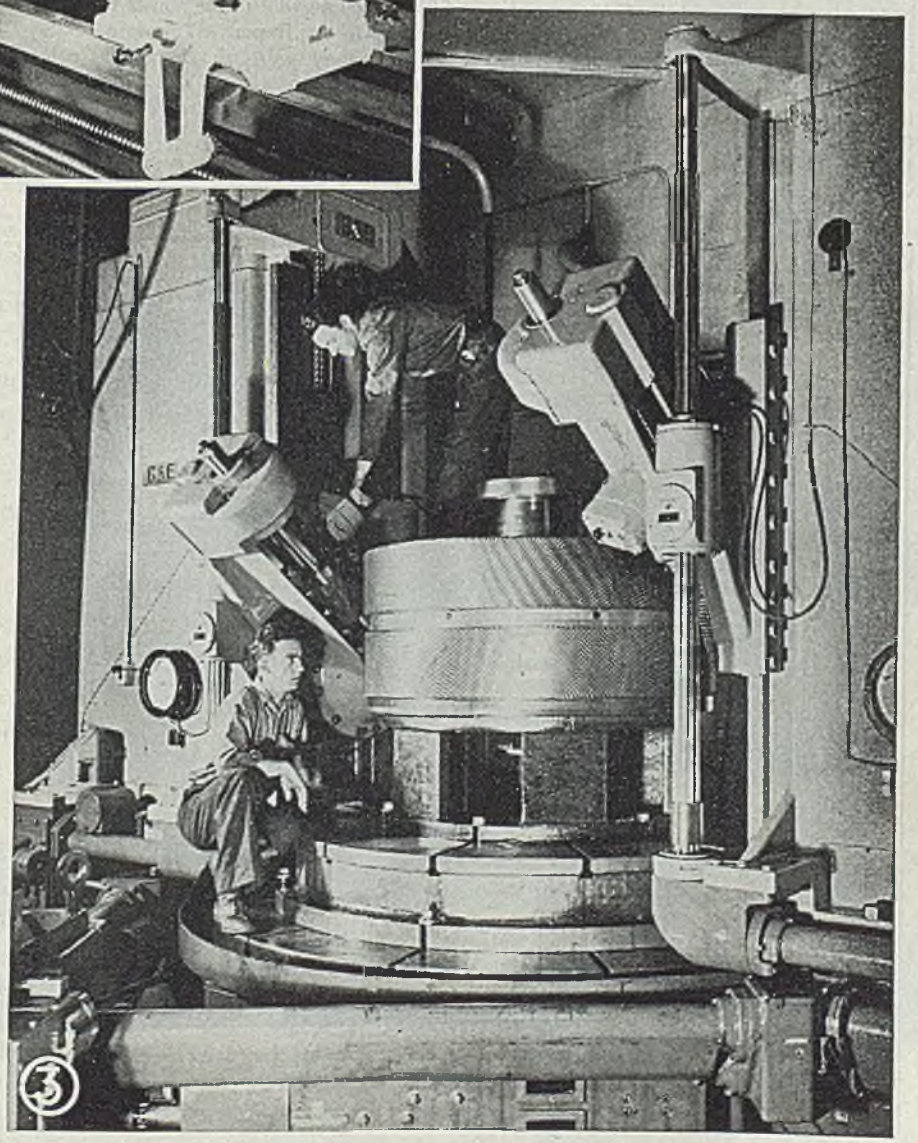


Fig. 3—With continued tightening of limits to the point where temperature variations during machining can cause spoiling of work, temperature control will extend even beyond refrigeration of coolant in which 20.7 per cent of users already are interested. Westinghouse at South Philadelphia has had to "air condition" this entire machine to hold accuracy during hobbing of marine drive gears



g of 1919. My associates and I—
the occasion of these recent visits—
gone over in detail with the build-
ur definite, up-to-date information
what the management of 2358 out
,000 production metalworking plants
e United States desire and expect
e new postwar machine tools, in
machines 71.7 per cent of these
panies have expressed buying inter-

a number of instances we have
d that the builders already have an-
ated many of these things. In some
they already are prepared to meet
expectations. In other cases they
be as soon as critically needed engi-
ng talent is released from the armed
es. Incidentally, for one of the truly
industries in the war production
gram, the machine tool industry has
n and is very seriously handicapped
the drains made by the draft in its
nical staffs and highly skilled tech-
ns.

The situation just mentioned, plus im-
sion on the industry early last year
difficult "non-machine tool" contract
subcontract work, plus the sudden
on postwar planning touched off by
Runstedt's breakthrough last win-
has left the industry somewhat less
ared for the sudden ending of the
than it otherwise would have been.

However, this should be considered in the light of the industry's constant effort to obey to the letter all government decrees. Now that restrictions—good and not-so-good—are removed, the lost conversion time rapidly is being made up by an industry which certainly does emerge from the war with a clean record in every respect, as proved by its amazing number of heavily bestarred Army-Navy "E" flags.

Up until now, no better machine tools ever have been built than were built by the American machine tool industry during the second World War. The somewhat rough exterior finish imposed by wartime shortages of "filler" and manpower belies the high quality of everything else. However, the fact remains that many of these wartime-built machines basically are of 1935, or in a limited number of cases of 1939, design vintage.

In the period between the two World Wars, major changes in design throughout the industry were inclined to "bunch up" at the time of the widely attended Machine Tool Exhibitions held at Cleveland under the sponsorship of the National Machine Tool Builders' Association. The one held in the Fall of 1935 emphasized tremendous advances over pre-depression machine tools. I for one have always believed that it gave the industry its first boost out of the doldrums of the early 1930's.

Another and bigger National Exhibition was scheduled for the Fall of 1939. On the eve of its opening, however, Hitler invaded Poland, and the whole thing was hastily called off. Some of the hundreds of 1939 pilot models which were to have been exhibited were put into production. Others, however, were "put on ice," where many of them by now have become obsolete. With demand developing like a rising flood after the outbreak of hostilities, the industry had to concentrate all of its talent and all of its facilities upon building and tooling of unprecedented numbers of machines of existing, time-tried design. The industry has continued to be so occupied 24 hours a day, six or seven days a week, until quite recently. In the meantime there have been important technical developments, but most of them perforce have been confined to tooling. Hence this perpetuation of 1935 models throughout a decade.

Reactions to User Expectations

Of the many points which STEEL has covered in its "Special Report to Industry on Machine Tools," we have found that some of the builders are inclined to consider certain ones as a bit controversial; others as of limited importance; and still others as only in part the responsibility of the machine tool industry.

As an example of one of the more or less controversial points, let me cite the matter of machine tool colors. Of the 2358 machine tool using plants who contributed to our Report, 67.2 per cent stated that they were in favor of "colors contributing to safety and lighting of work areas" in the new machines which they intend to buy.

This indicates a strong swing toward systems of finishing in connection with which such terms as "dynamic color-tion," and "three-dimensional seeing," are being used by paint manufacturers, industrial designers and lighting specialists. An example of this technique, as tried out and approved by Westinghouse at East Pittsburgh, is shown in Fig. 2, in which certain parts of the lathe are finished in ivory enamel.

Certain large installations which I have seen lately feature machine tools painted a light and restful green, with ivory reflecting surfaces and with "hot" control levers, wheels and buttons in bright red. These departments certainly are unusually bright and cheerful. Machine operators report that they like the idea, although one husky fellow did tell me that some prankster had embarrassed him by placing a vase of flowers on his machine.

I do agree with my machine tool friends that, if and when this sort of coloration becomes general, there must be general agreement on a color scheme. Otherwise, as one of them put it, "The overall impression given by the next National Machine Tool Exhibition will be that of Joseph's coat of many colors."

Color does seem to be on the march throughout industry, so it probably will be impossible for machine tool builders to avoid this issue for any great length of time. As a matter of plain common sense, however, the builders cannot be expected to keep paint guns loaded with all the colors of the rainbow to meet the whims of every individual customer.

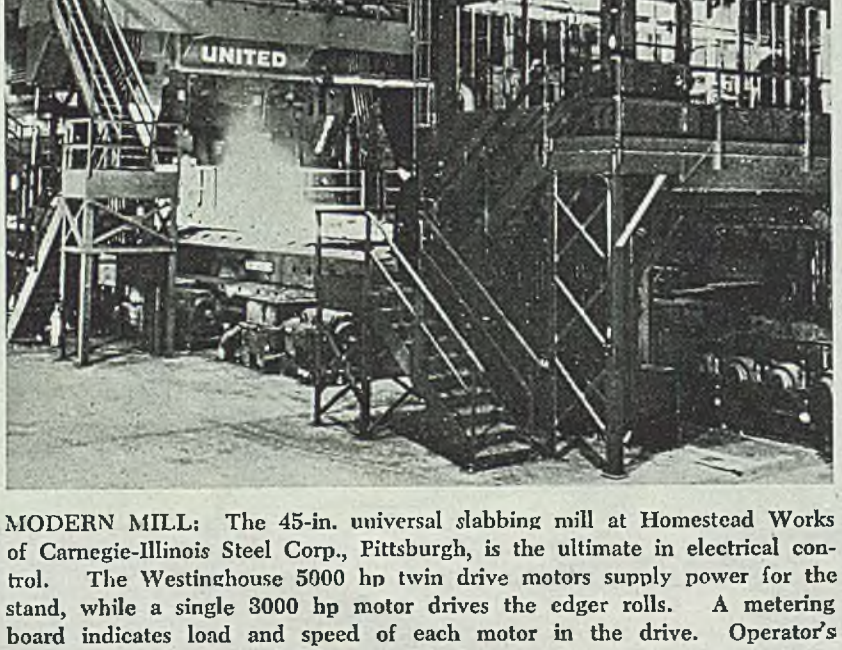
As an example of what I myself, along with many of the builders, thought of as of limited importance, let's consider for a moment the matter of "refrigerating units for cutting oils." When the returns came in, it was discovered that 20.7 per cent of machine tool users are interested in this feature—in many cases to a much broader extent than we had in mind when the questionnaire was prepared. At that time we were thinking primarily of thread grinding.

A good example of the broader interpretation of this subject is furnished by the big hobbing machine installation, Fig. 3. Here the Westinghouse engineers at South Philadelphia have found it necessary to temperature control the entire machine by housing it in an insulated, air-conditioned cubicle, in order to insure satisfactory results in the production of precision gears for marine drives.

The writer has been shown other installations, one in connection with automatic screw machines, another in connection with production milling machines, where coolant refrigeration is employed to keep down temperature of tools and to prevent fumes—rather than as a matter of size control of the work. It looks as though the refrigerating unit may take its place along with the coolant filter or centrifuge, as a desirable adjunct to many heavy duty production machines.

Finally, let me cite an example of one of the important problems which the

(*Please turn to Page 184*)



MODERN MILL: The 45-in. universal slabbing mill at Homestead Works of Carnegie-Illinois Steel Corp., Pittsburgh, is the ultimate in electrical control. The Westinghouse 5000 hp twin drive motors supply power for the stand, while a single 3000 hp motor drives the edger rolls. A metering board indicates load and speed of each motor in the drive. Operator's pulpit is in right foreground

YOU GET CORROSION RESISTANCE

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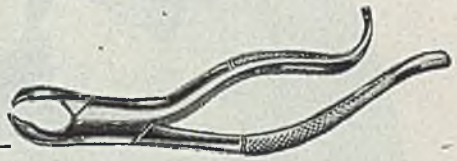

POSITIVE PROTECTION against corrosion to withstand the effects of repeated sterilization, plus the required strength and hardness, made Stainless a natural choice for this forged dental instrument. Clean, flawless Stainless forging bars reduced rejects, increased output.

rejects run high when forging
Stainless, it's time to check all along the
ine. Many factors must be controlled right in the
rge shop. But to eliminate trouble and secure best
sults you must be sure that your forging bars are sound,
lean and free from injurious surface defects. Such forging
rs assure easiest forging operations and lowest produc-
n costs.

Carpenter, Stainless Steels are made in a tool steel mill
tool steel quality standards. Stainless billets are disc-
spected to assure soundness and homogenity—and are then
achine-turned to remove all surface imperfections. By
s painstaking process we end up with Stainless bars that,
t after lot, assure economical, trouble-free forgings.

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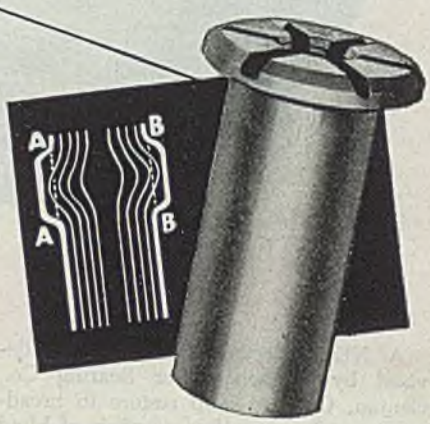
ny letterhead, indicating your title.



LONGER LIFE. In spite of tremendous pressures and highly abrasive conditions in service—forged knuckle pins like this stay on the job longer because they are made from Carpenter Stainless. And note in the diagram that forging produced an even grain flow throughout, thus strengthening the thin sections at points AA and BB.

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

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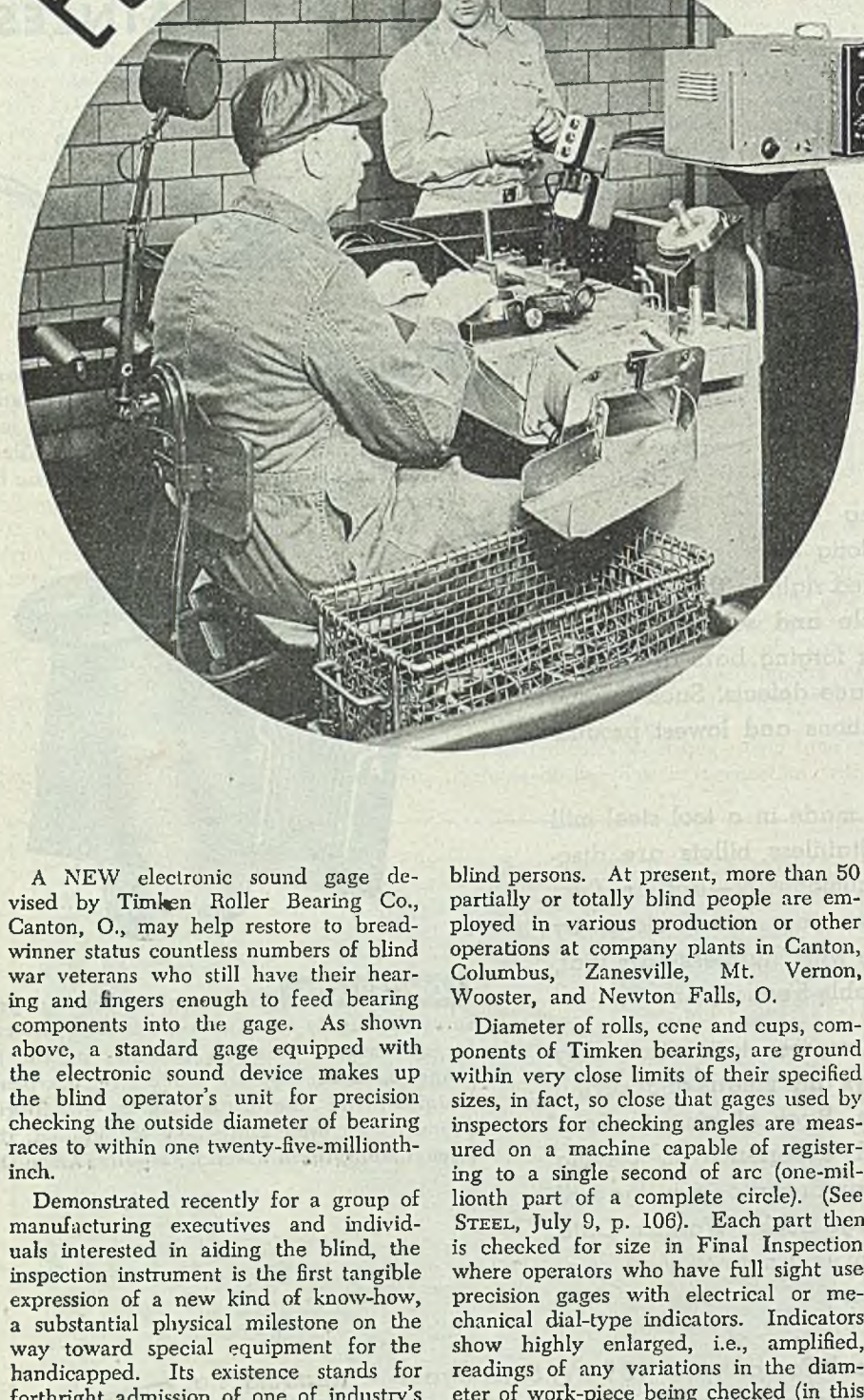
ELECTRONIC GAGE for BLIND OPERATORS



. . . permits precision checking the outside diameter of bearing races to within one twenty-five-millionth-inch

A NEW electronic sound gage devised by Timken Roller Bearing Co., Canton, O., may help restore to breadwinner status countless numbers of blind war veterans who still have their hearing and fingers enough to feed bearing components into the gage. As shown above, a standard gage equipped with the electronic sound device makes up the blind operator's unit for precision checking the outside diameter of bearing races to within one twenty-five-millionth-inch.

Demonstrated recently for a group of manufacturing executives and individuals interested in aiding the blind, the inspection instrument is the first tangible expression of a new kind of know-how, a substantial physical milestone on the way toward special equipment for the handicapped. Its existence stands for forthright admission of one of industry's great problems, the reabsorption and training of war cripples for tasks requiring high accuracy. Its presence can be taken as a measure of the willingness and ability of industry to solve this problem, for the unit can be adapted to actual production jobs and, where necessary, become foot-operated.

Timken is said to be the first industrial employer in Ohio, and one of the first in the United States, to employ blind persons. At present, more than 50 partially or totally blind people are employed in various production or other operations at company plants in Canton, Columbus, Zanesville, Mt. Vernon, Wooster, and Newton Falls, O.

Diameter of rolls, cone and cups, components of Timken bearings, are ground within very close limits of their specified sizes, in fact, so close that gages used by inspectors for checking angles are measured on a machine capable of registering to a single second of arc (one-millionth part of a complete circle). (See STEEL, July 9, p. 106). Each part then is checked for size in Final Inspection where operators who have full sight use precision gages with electrical or mechanical dial-type indicators. Indicators show highly enlarged, i.e., amplified, readings of any variations in the diameter of work-piece being checked (in this case, a bearing part). Parts with diameters over or under the specified size limit, or those out of round, are readily detected and removed.

To enable a blind operator to do this work with the same accuracy, a sound indicator is used on the same type of gage. There is a small, cone-type speaker mounted on the back of the operator's chair and connected with the electronic device, as seen in photo. The operator hears three different notes issuing from the loud-speaker. An article that is normal or within the size limit is indicated to the blind operator by the sound of the middle note. This means the article may be passed as meeting the rigid Timken standards. The high note indicates the article is over-size, while the low note indicates that it is undersize. At the sound of either of these notes, the operator rejects the article under inspection.

The three notes are produced by an electronic oscillator which is controlled by relays connected to the three indicator lights of the electronic gaging system. Diagram on p. 130 shows oscillator and sound circuit. The red, green and orange indicator lights correspond to the three notes of the sound device, the red being high, the green is low and the orange middle. Chief purpose of the indicator lights is to give the lineman (who sets up each gage) a quick visual check on the gage's efficiency. The gage is originally set and is adjusted to a master gage and can be made to give both visual and sound indication as close as one five-millionth of an inch over or under a specified diameter tolerance.

Timken engineers spent almost [illegible] years in experimenting with various gages before a satisfactory one was found. First gage to be developed was a "braille" gage. With this model, the article to be gaged was pushed between two points (representing the proper diam-

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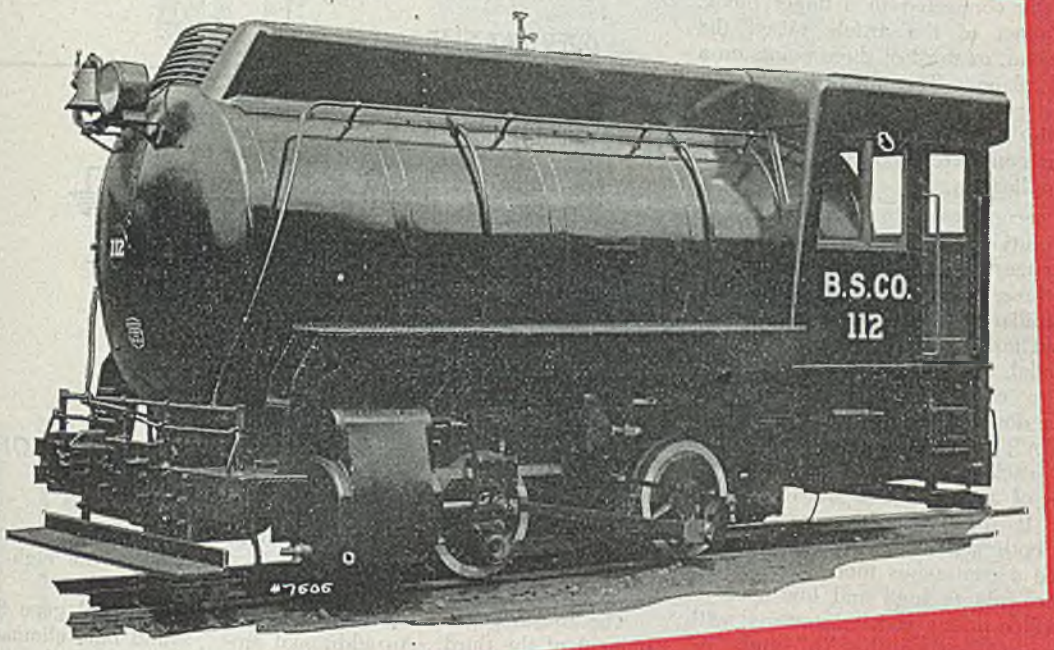

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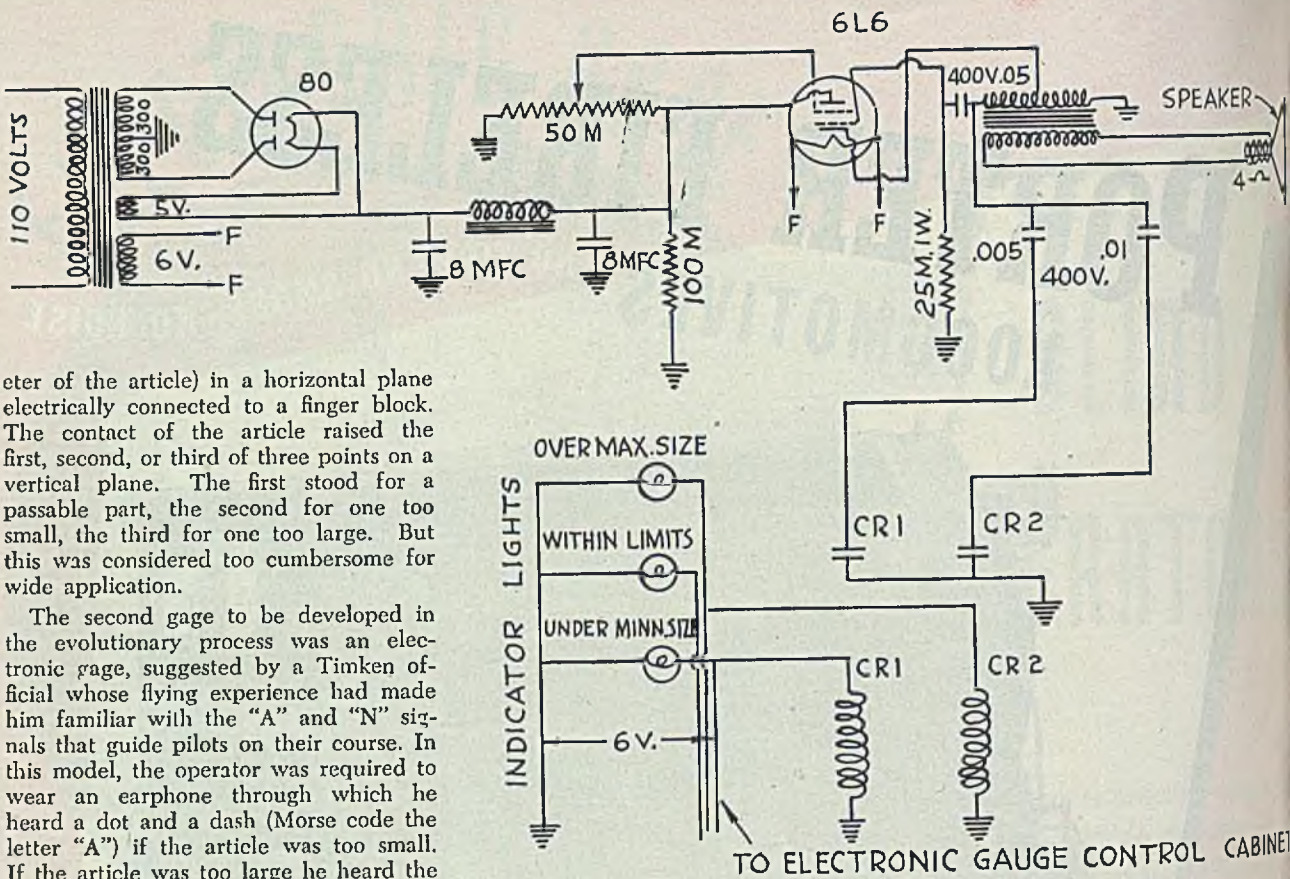


eter of the article) in a horizontal plane electrically connected to a finger block. The contact of the article raised the first, second, or third of three points on a vertical plane. The first stood for a passable part, the second for one too small, the third for one too large. But this was considered too cumbersome for wide application.

The second gage to be developed in the evolutionary process was an electronic gage, suggested by a Timken official whose flying experience had made him familiar with the "A" and "N" signals that guide pilots on their course. In this model, the operator was required to wear an earphone through which he heard a dot and a dash (Morse code the letter "A") if the article was too small. If the article was too large he heard the reverse of a dash and a dot (Morse for "N"). If the article was passable he heard both signals and they joined to produce a continuous tone. But in this instance, minute high and low spots in the surface of the article interfered with the transmission of the "A" and "N" signals and the gage had to be abandoned.

The third gage was also an electronic one with the indicator continuously sounding at a hi h, low, and normal pitch into earphones. After a few days, the experimental operator objected to the constant sound in his ears. To overcome this, a photoelectric cell was installed which cast a beam of light across the gage block—the one on which the piece being gaged is placed—so that when no work was in the gage the sound was cut off. But again the operator objected because the earphones deprived him of any outside sound, making him feel closed-in and helpless.

The fourth gage was a further development of the third. An additional amplifier tube was placed in the electronic system to facilitate the operation of a loud-speaker, which was fixed on the back of the operator's chair above his head. The sound system operated on the same principle as before, except that the sounds were amplified rather than transmitted through earphones. This model met with the operator's complete satisfaction. Then the lineman, whose job it is to set up the gage with a master and to check it for accuracy as often as necessary objected to the new model because, without a visual indicator, it required two masters to set up and check one for the high limit and one for the low.

A visual gage then was added to the sound one, eliminating the need for two masters. And—since the device was becoming too complicated—the photoelectric cell was also eliminated by the addition of a snap-switch to the back-stop of the gage so that the sound could be shut off when the gage was not in operation.

This final model proved satisfactory to the operator and the lineman and is the one now in operation.

Manufacturing details of the device will be released without charge to any interested manufacturer, according to Timken officials.

Production Resumed on Fire Extinguishers

Production of copper finish soda-acid and foam type fire extinguishers is being resumed by General Detroit Corp., 2270 East Jefferson avenue, Detroit 7. Red Star soda-acid extinguishers are made of cold rolled copper lined with corrosion-resistant alloy. Features are said to include superior seam strength through use of the company's Sure Sweat process, heat resisting bottle, sturdy bottle cage, and double strength wheel cap. It is inspected and approved for class A fires of wood, textiles, paper, rubbish, etc., with A-1 Underwriters' Classification.

Floafome foam type extinguishers are similar to Red Star in construction, and produce approximately 22 gal of foam. Recommended for use on fires of gasoline, oil, paint, chemicals, textiles, and grease, they are classified by Underwriters' Laboratories A-1, B-1.

Descriptive literature on both types may be obtained from the company.

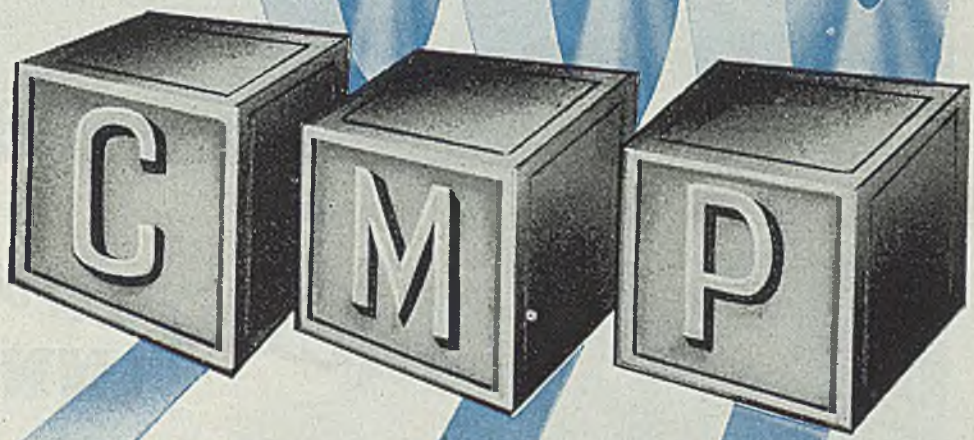
Cutting Rod Increases Metal Machining Speed

Made of oxygen-free high conductivity copper containing a small amount of tellurium, a free cutting rod has been added to products of Revere Copper & Brass Inc., 230 Park avenue, New York 17. It is said to increase speed with which metal can be machined, to make possible close tolerances, and to improve the finish of completed parts. This copper machines to brittle chips which break readily and clear from the tools. Rod is available in all sizes up to 2 in. diameter and in usual shapes. It is said to meet demands of the radar, electronic and similar fields, as well as those of the electrical industry and welding equipment and screw machinery manufacturers.

—o—

Samples of hard-facing rods are available without cost from Dymonah Corp. of America, 407 Park Square building, Boston 16, Mass. They are designed to aid in solving various wear, abrasion and corrosion problems. Company requests information concerning individual problems to determine the proper rods for various applications.

primary to better production



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When you consider light gauge cold rolled strip steel for your production, remember what CMP PRECISION offers you: steel processed to your exact requirements by this modern specialty mill whose entire organization is directed to the production of only this one product and whose facilities and equipment regularly produce Thinsteel to standards of uniformity and accuracy which can give you more finished parts per ton. You will find here a background of years of specialty experience and friendly assistance which can be helpful in planning your cold rolled strip steel needs.

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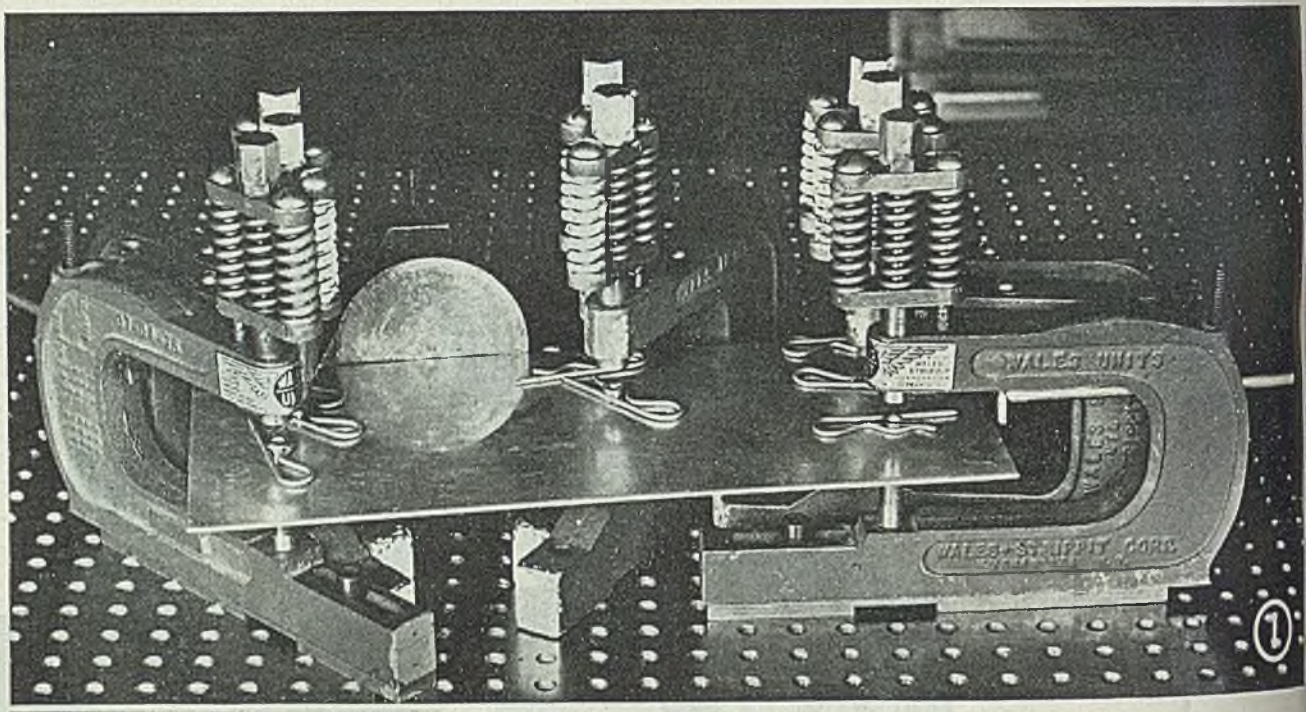
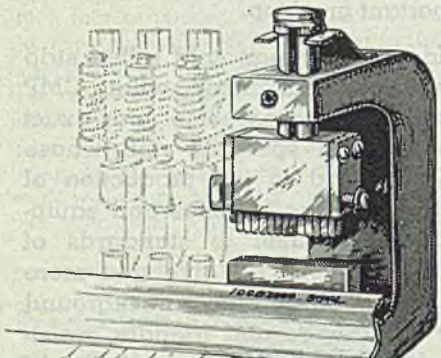


Multipunch INNOVATIONS

Special templates and a new numbering device used in conjunction with multipunch presses speed production



A NEW-TYPE numbering device and special templates have greatly increased the number of jobs for which multipunch presses, similar to those shown in Fig. 2, can be used at Consolidated Vultee Aircraft Corp., San Diego, Calif. The numbering device, shown in Fig. 3, is simply an attachment which can be set up in connection with a press brake like a Wales-Strippit punch frame. Its function is to stamp part numbers as holes are punched, thus eliminating subsequent numbering operations. Its mechanism includes a positive adjustment for various thicknesses of material.

Multipunch templates are made from 0.064-in. steel or dural plate, and shaped like the parts which are to be produced so as to minimize the chances for errors in the setting of stock stops. They eliminate the need for drill templates in temporary tooling setups, and their function is to provide drilled holes which will properly locate hole-piercing units in the multipunch.

Sizes of locating holes are clearly stamped on each template, and a color code also is used so that setup men can select the required dies with a minimum of difficulty.

A multipunch die may be altered to permit use of the new templates by grinding two grooves (each with a diam eter of 1.080-in. and a depth of 0.06 in.) around its top. The upper groov should be located 0.104-in. from the to of the die, so that approximately 0.06 in. of material can be removed in the process of sharpening, and the lowe groove should be 0.064-in. below th first groove.

Each job is set up outside of the mul tipunch on special plates in order to re duce the shut-down time on the press. The setup plates are 12 x 12 in., 12 x 2 in., and 24 x 36-in. steel sheets wit 5/16-18 holes at 1-in. intervals.

Punches should be attached to the plates so that their stock stops can be used to position parts, and at the begin ning of each setup one punch should be fastened to the plate for the purpose o insuring maximum ease in loading and unloading parts.

A pin lock is placed in the lowe groove of the multipunch die, and ove this a hole in the multipunch template positioned. Then a second pin lock placed in the top groove of the die hold the template in place.

Only two or three hole-punching uni must be fastened to the setup plate, all of the remaining punches will b

(*Please turn to Page 186*)

LOCATING HOLE SIZES AND COLOR CODE FOR MULTIPUNCH TEMPLATES

Nominal Size	Decimal Size	Template Hole Size	Color
#39	0.099	0.372	Red
#30	0.128	0.372	White
#26	0.147	0.372	Orange
#20	0.161	0.372	Yellow
#18	0.169	0.372	Gray
#10	0.191	0.372	Blue
I	0.228	0.495	Black
F	0.257	0.495	Green
K	0.281	0.620	Pink
5/16	0.312	0.620	Silver

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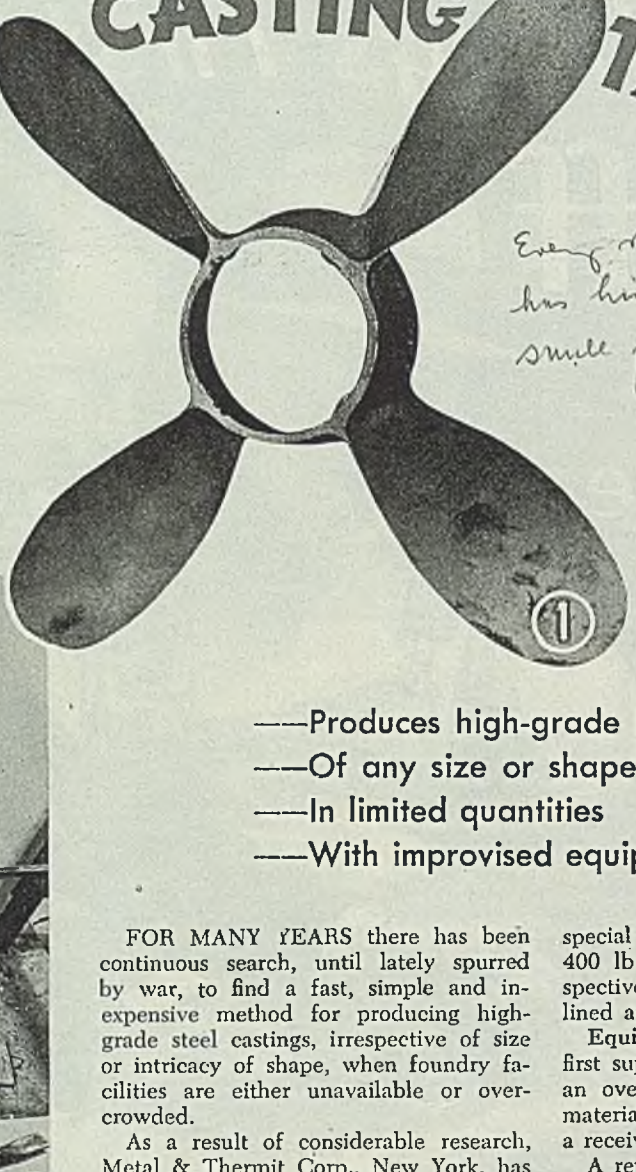
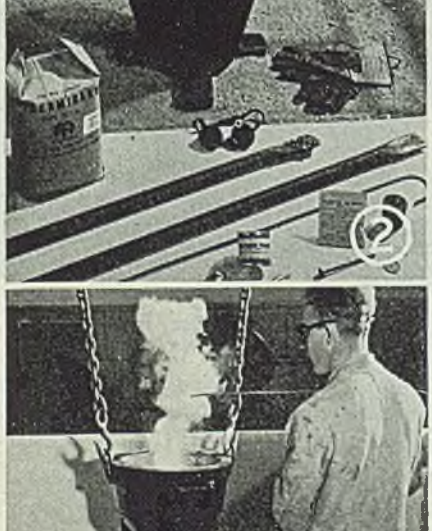


By R. T. BROWN
Metal & Thermit Corp.
New York



——Produces high-grade steel castings
——Of any size or shape
——In limited quantities
——With improvised equipment

FOR MANY YEARS there has been continuous search, until lately spurred by war, to find a fast, simple and inexpensive method for producing high-grade steel castings, irrespective of size or intricacy of shape, when foundry facilities are either unavailable or overcrowded.

As a result of considerable research, Metal & Thermit Corp., New York, has developed a special type of material, called Thermicast, for making cast steel repair parts and similar uses.

The new process is based upon the well-known reaction of thermit, and requires neither fuel nor a source of electrical power to produce the castings. Most of the equipment can be improvised, and production of steel castings by the new method requires little experience. The steel produced with Thermicast meets the tensile strength requirements for U. S. Navy Class "B" steel for castings, as evidenced by the torpedo propeller, Fig. I.

The thermit reaction is carried out in a conical-shaped crucible which consists simply of a sheet-steel shell lined with a refractory material. Two sizes of crucibles have been developed for this special casting work, holding 75 and 400 lb gross weight of Thermicast, respectively. Crucibles are completely lined and ready to use.

Fig. 1—Torpedo propeller made by Thermicasting

Fig. 2—Equipment required for the new process

Fig. 3—Starting the reaction

Equipment: The reaction crucible is first supported by a tripod, platform, or an overhead crane so that the molten material from it will pour directly into a receiving ladle. See Fig. 2.

A replaceable refractory orifice is next inserted in the crucible stone and plugged with a tapping pin, the whole then being covered with a level quantity of plugging material. The crucible now is charged with the Thermicast material.

Reaction: Thermit reaction is based on the well-known ability of aluminum to combine with the oxide of the metal present to form a slag and reduce the oxide to the metal in a highly exothermic reaction. After ignition (Fig. 3) the exothermic reaction propagates rapidly throughout the mixture with an average temperature of 4000°F. Due to the difference in specific gravity between the slag and the steel, the lack of mutual solubility and the low viscosity of the metal, there is a rapid separation of the products into a bottom layer of molten steel and floating layer of molten alumina (slag). The crucible then is tapped (Fig. 4) and the steel starts to pour from the reaction crucible.

The procedure in pouring Thermicast steel for casting work is somewhat different from standard foundry practice because of the necessity for reducing the temperature of the steel several hundred

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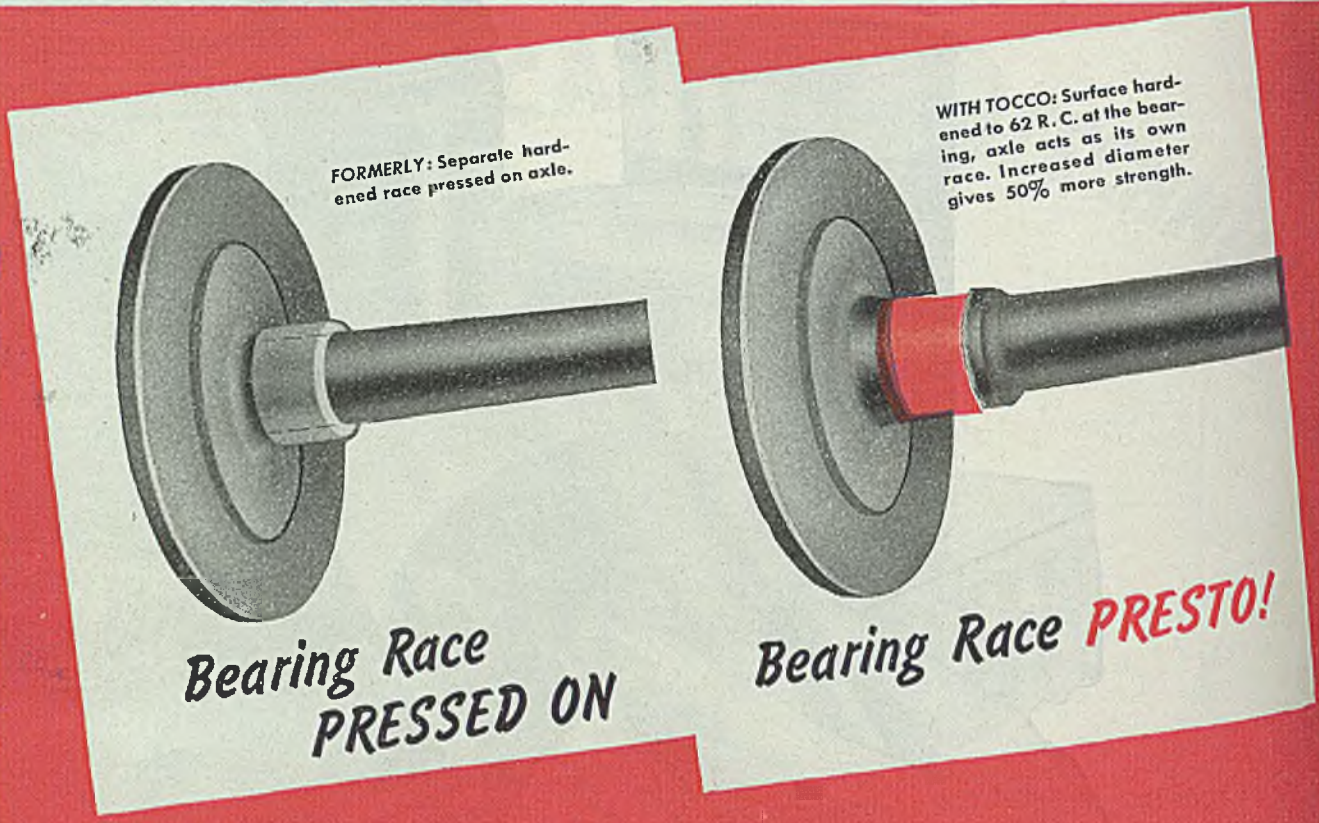
PITTSBURGH 30, PENNSYLVANIA



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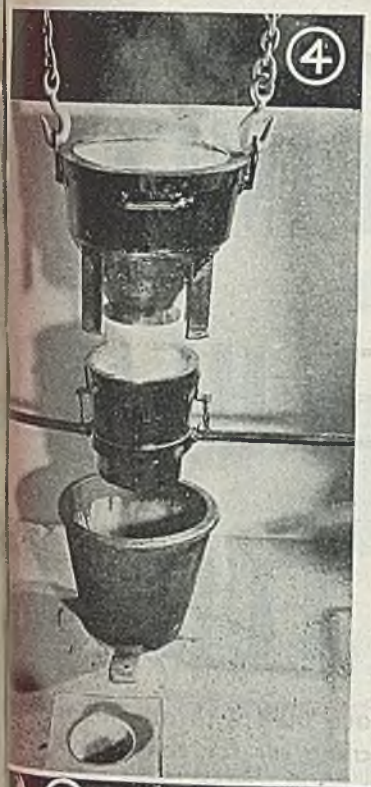


TYPICAL SIEVE ANALYSIS OF SAND

Percentage, According to Screen Size

On 40	On 50	On 70	On 100	On 140	On 200	On 270	On Pan	Total
0.2	4.0	20.2	42.4	23.6	7.8	0.8	1.0	100.0

degrees before pouring it into a mold.

Temperature Control: There are several alternative procedures for temperature control, the most effective being the so-called single-transfer method. With this method, the reaction crucible is tapped and, due to its greater specific gravity, the steel issues first, followed in turn by the slag. The juncture between the steel and the slag pour is usually pretty well defined and when viewed through the conventional welder's glasses, is readily recognized after two or three pours. The steel pour is usually found to be somewhat ragged and spluttery. With the advent of the slag, the physical characteristics of the pour change and resemble a smooth glass rod. Some users prefer to watch the pour in the receiving ladle and determine the break-point by the change in color when the slag enters.

Alternative Procedures: At this point, the operator either can swing the reaction crucible out of the way and direct the pour into a slag collecting basin or, preferably, by means of a conventional double-handled crucible foundry shank, remove the receiving ladle from the pouring stream, as in Fig. 5. The slag on top of the steel (due to the unavoidable time lag in moving the ladle)

(*Please turn to Page* 188)

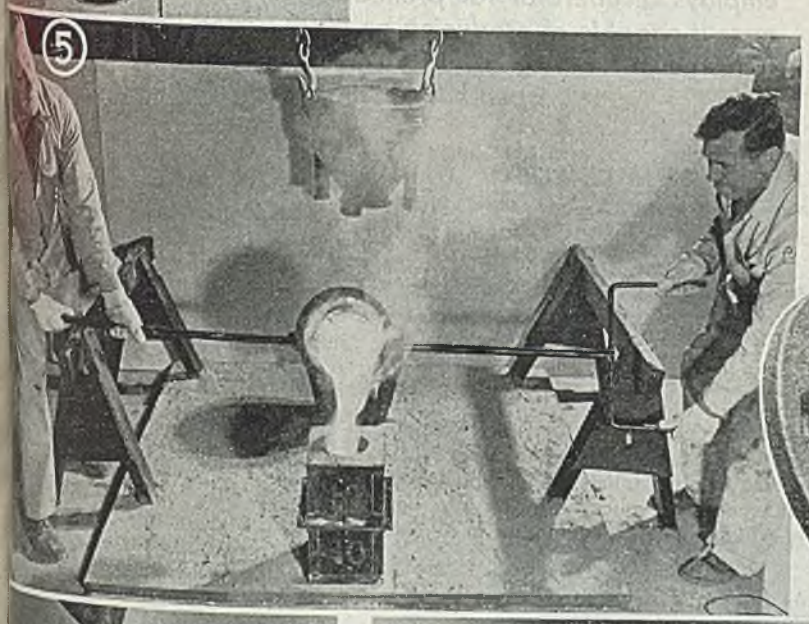
Fig. 4—Pouring steel into ladle

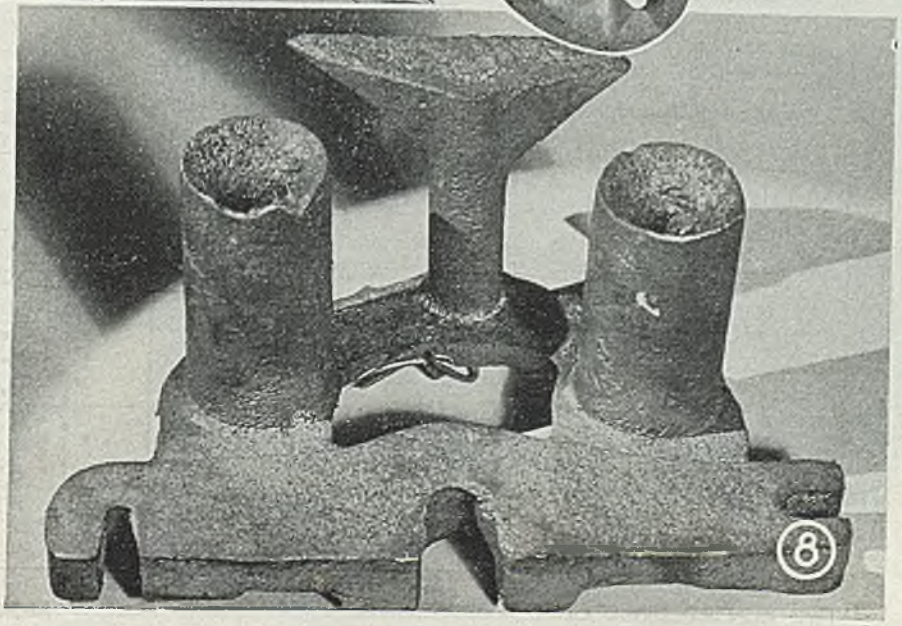
Fig. 5—Pouring Thermicast steel into mold

Fig. 6—Valve wheel handle cast by process

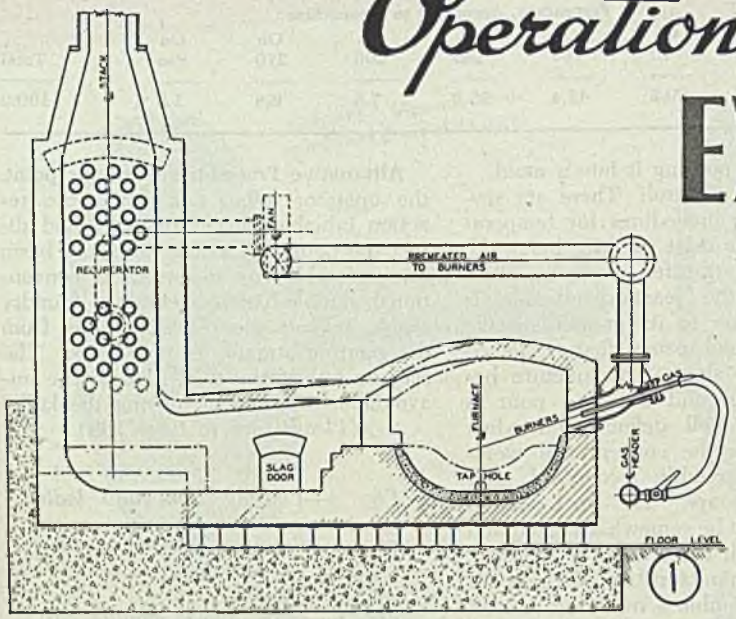
Fig. 7—Gear box and cover cast by process

Fig. 8—Casting made by using broken original as pattern





Operation of an EXPERIMENTAL OPEN-HEARTH FURNACE



Continuous one-way fired furnace built with an all-basic roof employs recuperator for preheating air for combustion. Furnace is capable of producing an 8000-pound ingot. Procedure followed in working a heat is much the same as conventional open-hearth shop practice

By H. K. WORK
Manager, Research & Development Division
and
W. R. WEBB
Research Engineer, Research & Development Division
Jones & Laughlin Steel Corp.
Pittsburgh

SINCE May 1938, over 600 heats ranging from 1000 to 8900 lb and representing 2100 tons of steel, have been produced in an experimental 4-ton open-hearth furnace installed in the research and development laboratory of the Jones & Laughlin Steel Corp., Pittsburgh—each with a special composition, as part of a particular investigation.[1] The furnace is shown in Fig. 1.

In order to control the quality of the steel produced in these experimental investigations, it is desirable to have complete information about the raw materials charged. Hence the scrap consists of billets rolled from open-hearth or bessemer steels. It is carefully selected and is marked by heat numbers and chemical composition. Pig iron of different grades is stored separately according to analysis.

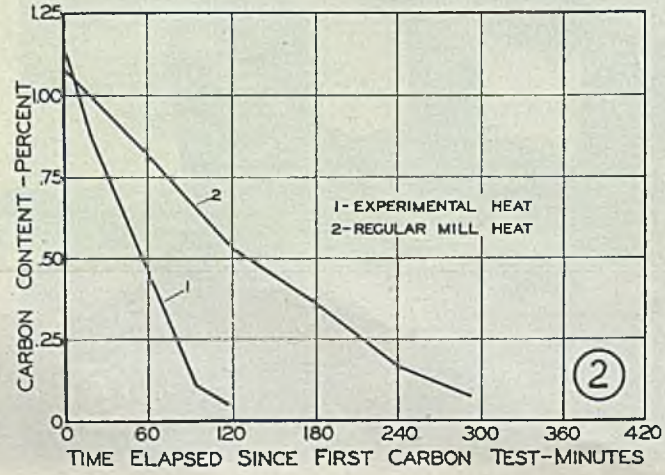
Characteristics of the heat to be made determine the type of raw materials employed. For example, when a heat of low residual nickel, chromium, molybdenum, copper or tin is ordered, a charge consisting of steel billets from duplex heats and special low-phosphorus pig iron, both of which contain low amounts of alloying elements, is employed. Since the prac-tice used in the experimental furnace i to catch the carbon on the way down, it is necessary to proportion the charge in such a way that a suitable carbon content is obtained at meltdown, thereby permitting the proper working of the heat. A survey of heats made in the furnace shows that for those blocked at high carbon the ratio of pig iron to scrap is about 1.12, and for heats blocked at low carbon, this ratio is about 0.9.

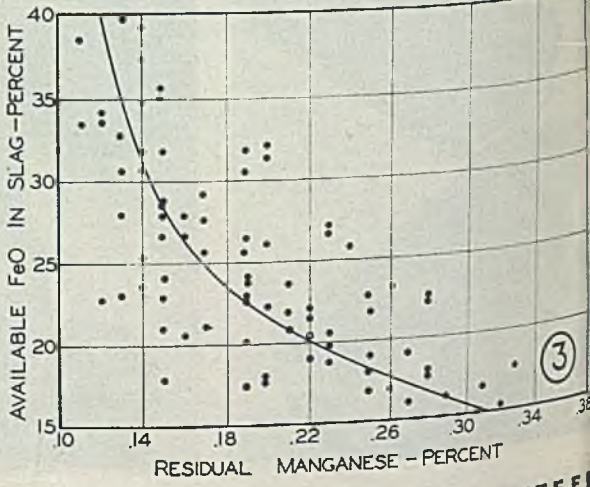
Fluxes: Slag control, as employed in the experimental furnace consists, principally of controlling the flux charge so that sufficient lime is present to more than take care of the silica in the metallic charge. Since the removal of impurities is related to the control of the carbon content

Fig. 1—Experimental open hearth showing present and original (broken lines) contour

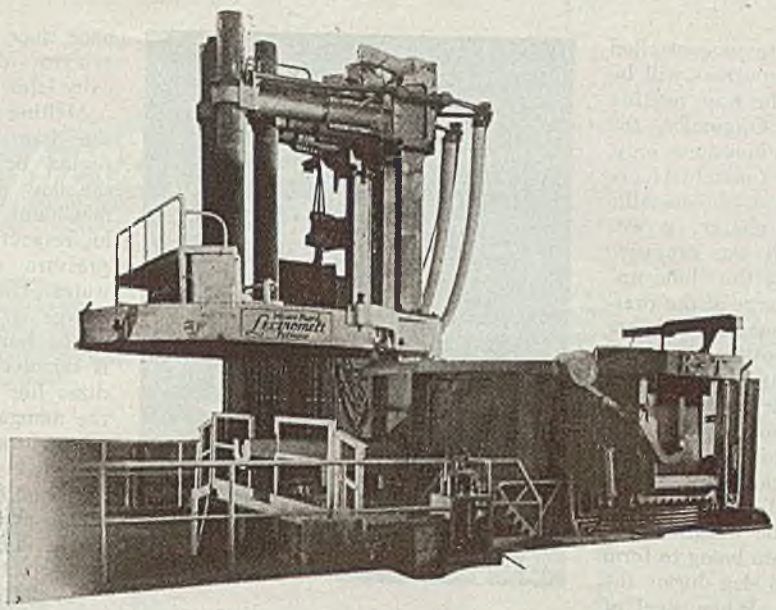
Fig. 2—Graph showing rate of carbon elimination

Fig. 3—Effect of available iron oxide content of slag upon residual manganese





[1] All references presented at end of article



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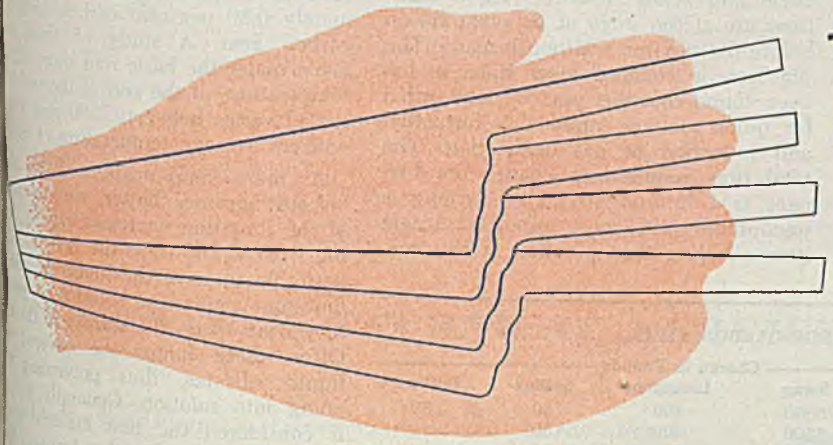

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the slag characteristics are so controlled at this period that the impurities will be sufficiently oxidized by the time melting approaches completion. Originally, the flux charge consisted of limestone only, which amounted to approximately 11 per cent of the total weight of the metallic charge. Using this flux charge, it was found that the lime boil was excessive and the time required for the "lime up" was too long. The flux charge at the present time consists of from 6 to 8 per cent limestone and approximately 1 per cent of burnt lime for a total of 7 to 9 per cent of the metallic charge.

The ratio of lime to silica in the slag at the end of the lime boil period should be about 2.5. Any deficiency in lime is added as necessary, based on the slag and bath conditions during the working period of the heat, the purpose being to form a high lime to silica ratio slag during the final stages of the heat. When steel of fairly low-phosphorus content is desired, an amount of Staflux, equivalent to about 0.75 per cent of the metallic charge, is added to raise the iron oxide content of the slag. This increases the ability of the slag to remove phosphorus. Fifty pounds of roll scale are charged with the Staflux for higher carbon heats. Typical examples of furnace charges for various grades of steel are given in the accompanying table and Fig. 4 shows the furnace materials for one of these steels ready to be charged.

Charging Practice: The furnace is intermittently operated and to avoid an exceptionally long meltdown period due to a cold hearth, the furnace temperature is gradually raised to about 3050°F before the charging operation is started. The furnace is drained and then flushed with an air hose. This chills the exposed surface of the hearth and helps prevent the heat from melting soft. The tap hole then is sealed and the initial charge of stone and scrap is made. These additions are at the stage of incipient fusion before the pig iron addition is made. The pig iron is charged level since it has been found that this practice is essential for quick melting, rapid slag formation and reduction of gas oxidization. The total time required to charge the furnace is 1 hr and 40 min. Charging is undoubtedly the most important single item affecting the operation of this furnace since deviations from the foregoing practice almost always result in difficulty later on in the heat.

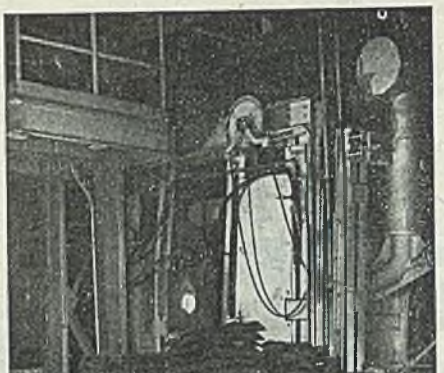


Fig. 4—Typical furnace charge of scrap, pig iron, limestone and burnt lime

Melting Period: Upon completion of the iron charge, the final meltdown period begins. Throughout this period the flow of gas and air are kept at a maximum of 4900 and 54,000 cu ft per hr, respectively, under a positive furnace pressure of approximately 0.09-in of water. The iron oxide formed while the charge is melting by the excess oxygen of the burned gases oxidizing the scrap, is dissolved gradually and in turn oxidizes the silicon and the major part of the manganese in the bath. Some of the silica formed combines with the lime and some with the oxides of manganese and iron. If the basic elements are insufficient to combine with the silica, the slag will be glassy. This condition can be corrected by additions of burnt lime.

As the passage for the gases, over the hearth, becomes larger and larger due to the melting of the charge, the furnace pressure decreases until a constant value of 0.06-in. of water is reached. At this stage of the heat the charge is melted level. The average heat generally melts down level in about 3 hr, and it is desirable to have a meltdown carbon at this point, in the neighborhood of 1.20 per cent for a high-carbon heat and approximately 0.80 per cent carbon for a low-carbon heat. A study of those heats made under the basic roof show that the temperature, at the end of the meltdown period varies between 2980 and 3080°F with an average temperature of 3050°F.

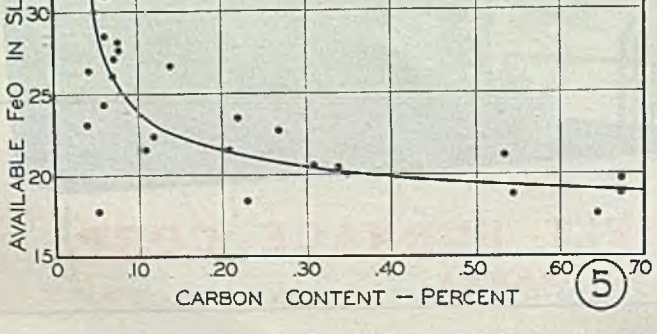
As more scrap melts, and the hearth bottom becomes hotter, the calcination of the limestone increases rapidly, starting what is known as the lime boil. It is desirable to have the lumps of calcined limestone enter into solution as soon as they float up on the surface of the bath. Often these lumps are covered with liquid silicates, thus preventing their going into solution. Generally fluorspar is considered the best material to cut these lumps, but in this furnace, fluorspar causes excess foaming of the slag, therefore sand or scale is preferred. The choice between sand and roll scale depends on the condition of the slag and bath. The amount of sand or scale used for each application is 4 or 14 lb, respectively. When fluorspar is necessary,

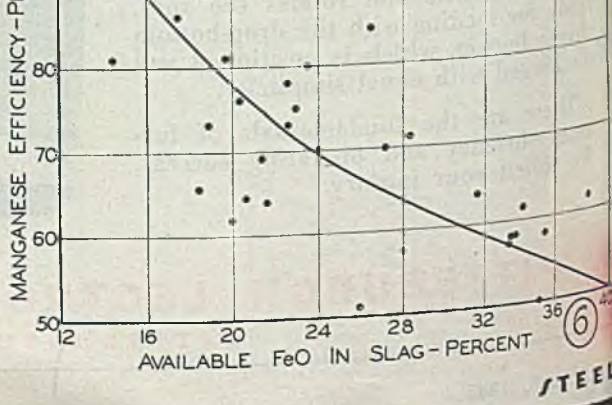
TYPICAL CHARGES FOR CARBON STEELS

Heat No.	Carbon at block, %	Charge in Pounds				
		Pig iron	Scrap	Limestone	Staflux	Roll scale
1	0.55	3700	3300	400	50	50
2	0.17	3500	3500	400	50	..
3	0.10	3400	3600	400	50	..
4	0.06	3300	3700	400	..	..

Fig. 5—Relationship between carbon content of bath and available iron oxide in slag

Fig. 6—Influence of iron oxide in tapping slag upon manganese efficiencies of steels

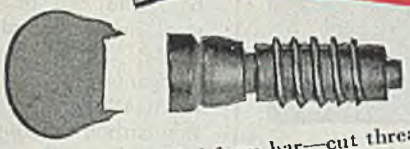




One part

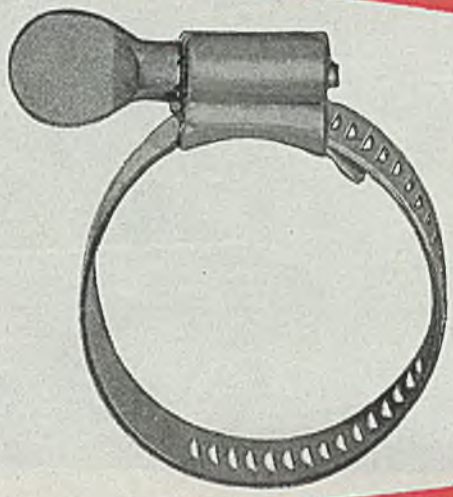
One piece upset—rolled thread

replaces two



Stamping

Milled from bar—cut thread



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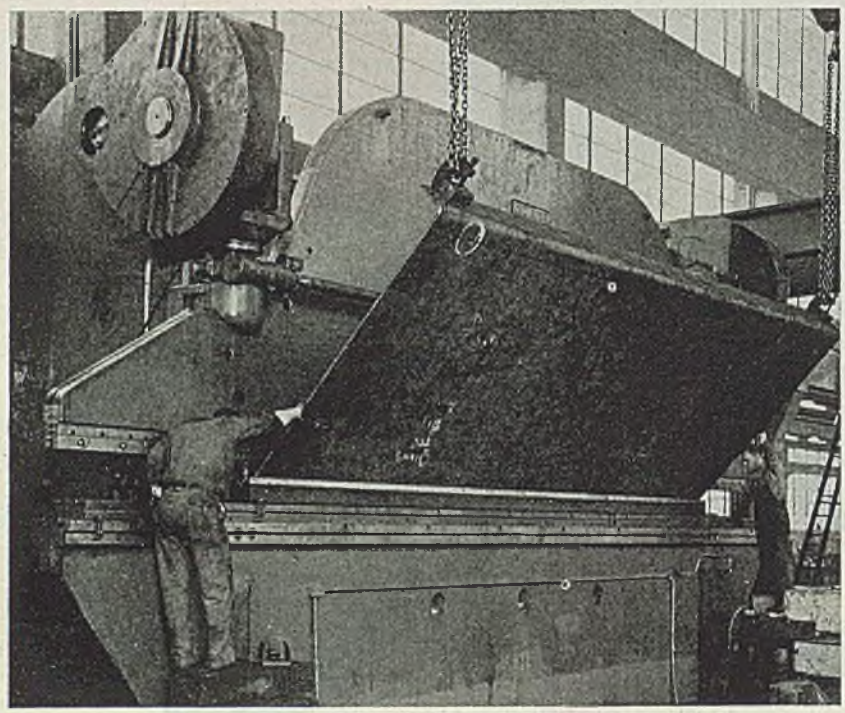

SUPER PRESS BRAKE: Capable of exerting a pressure of 1000 tons, this press brake has a clear span of 20 ft between housings, and an overall die or bending surface of 30 ft. Its four main members—bed, ram and two housings—produced by Lukens Steel Co., are believed to be the largest rolled steel plates in the world. Dead weight of this machine, built by Cincinnati Shaper Co., is about 250,000 lb. It is shown here cold-bending 20 ft of ¾-in. steel

it is limited to 3 lb at any one time.

At the end of the boil, careful attention must be paid to working the heat, because the rate of carbon elimination in the experimental furnace is much more rapid than that of a conventional open hearth. In a large open hearth when a heat melts soft a "jigger" of molten iron is used to bring the carbon up again; this permits the reworking of the heat in the regular procedure. Such an operation is not practical in the experimental furnace since the bath will tend to freeze over and then melt soft again; rather the type of raw materials and the method of charging are used to control the meltdown carbon.

No slag runoff arrangement is provided at present for the experimental furnace, therefore the only way to remove phosphorus from the bath is to increase the basicity and iron oxide percentage of the slag. This stabilizes the phosphorus (P_2O_5) in the slag. To do this 20 lb of Stafflux or a combination of 15 lb of burnt lime and 8 lb of roll scale are added while the heat is being worked, until the desired slag condition is obtained. The amount of iron oxide in the slag is controlled within certain limits, as determined by the grade of steel produced. When the iron oxide content of the slag approaches the desired percentage only burnt lime is added. Finally, the phosphorus content of the bath is reduced to slightly less than that specified, to allow for a phosphorus pickup from the ferromanganese addition and phosphorus reversion during the deoxidation of the bath. The rather hot heats made in the experimental furnace favor phosphorus reversion, and to compensate for this, the slags are kept highly basic. The ratios of lime to silica of the final slag are around 3.5. Since the bath is maintained at a high temperature, the slag will never have the proper fluidity throughout the heat.

The bath of the experimental furnace is rather shallow and the ratio of its hearth bottom area to its bath volume of metal is approximately 2.8. For the conventional 100 to 150-ton open hearth, this ratio is about 1. Since the carbon monoxide formed by the reaction between the carbon and the iron oxide in the bath is largely generated in the form of bubbles and released to the bath at the hearth bottom, a most influential factor affecting the rate of carbon elimination is this ratio of hearth bottom area to the bath volume of metal. Fig. 2 gives a diagram of the rate of carbon elimination of a typical low-carbon heat made in the experimental furnace. For comparison, the rate of carbon drop for a heat made in a 150-ton open-hearth furnace is also included. Generally, the overall rate of carbon elimination for the laboratory furnace is around 60 points of carbon per hour, while the rate of carbon drop for a conventional furnace is considerably less. For heats to be finished at low carbon, ore is added, if necessary, to hasten the carbon elimination. For this purpose, 3 to 4-in. wet lump ore is preferable. These lumps of ore sink through the slag and react directly with the metal without the danger of being held by the basic slag.

Metal Sampling: Ordinarily, standard fracture test samples are taken from the bath for preliminary chemical analysis periodically throughout the refining period. In this furnace, the rate of carbon drop is so rapid it is necessary to employ a method of rapid sampling, called "plate sampling" particularly for high-carbon steels which cannot be drilled conveniently. A steel sample taken from the bath with an ordinary sampling spoon, is poured on the upper part of a cold steel plate sloped at an angle of about 15° to the vertical. The liquid steel solidifies in long thin strips as it flows down the face of the sloping plate.

These thin strips of metal are immediately quenched in cold water, dried and cleaned with an air blast. Since the steel is high in carbon, the quenched test is hard and can be crushed in a special steel mortar by means of a pneumatic pestle. This method is satisfactory for manganese, phosphorus and sulphur determinations. In the case of a combustion carbon determination, it is necessary to kill the steel sample with aluminum in the sampling spoon. After the bath becomes "soft", the plate sample is no longer used and the standard test sample must be employed till the heat is tapped.

Sulphur generally is considered the most difficult element of the common impurities to remove in the basic open-hearth charge. In the experimental furnace, however, about 50 per cent of the original sulphur content of the raw materials is removed. The average sulphur content of the metallic charge is around 0.030 per cent, while the sulphur in the finished steel is approximately 0.015 per cent. This sulphur reduction is partly due to the favorable slag condition and the fact that the fuel used for firing the furnace is natural gas, which is low in sulphur.

Finishing and Deoxidizing: These practices have been, in general, similar to those employed in the regular mill furnaces. Ferrosilicon (silicon pig iron) of approximately 11 per cent silicon is generally used for deoxidation of the bath in the experimental furnace. The weight of this deoxidizer applied to the bath, ranges from 50 to 85 lb depending upon the size of the charge and the carbon content of the bath at the time the deoxidizer is added. Ferrosilicon of 11 per cent silicon is not an ideal deoxidizer for large open-hearth furnaces, because the deoxidation products are not sufficiently fluid to coalesce into larger drops and ascend to the slag, consequently a finished steel with numerous nonmetallic inclusions is obtained. In the experimental furnace with its shallow bath and relatively high temperature, the ferrosilicon has proved satisfactory.

If the particle size of the deoxidizer is too small, it is trapped in the slag thus reducing the phosphorus (P_2O_5) in the slag and causing the phosphorus to revert back into the bath. To prevent

(*Please turn to Page 192*)

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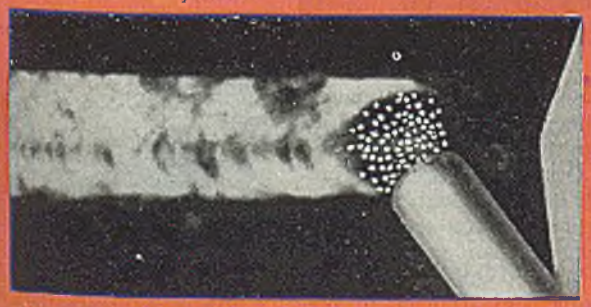

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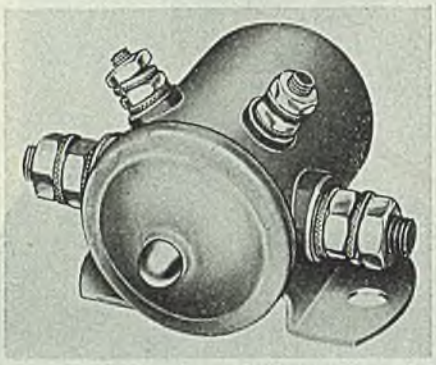

iron case, with cap spun over, to provide complete protection against dirt, moisture and other destructive elements. All metal parts are plated.

The unit is available with single pole, normally open, double break contacts, rated at 100 amp continuous; 300 amp in-rush at 32 v dc and below. It has continuous duty magnet coil with insulated coil terminals. Copper contacts are standard though special alloys are available. Unit is approximately 3½ in. wide, 3 in. deep and 2½ in. high.

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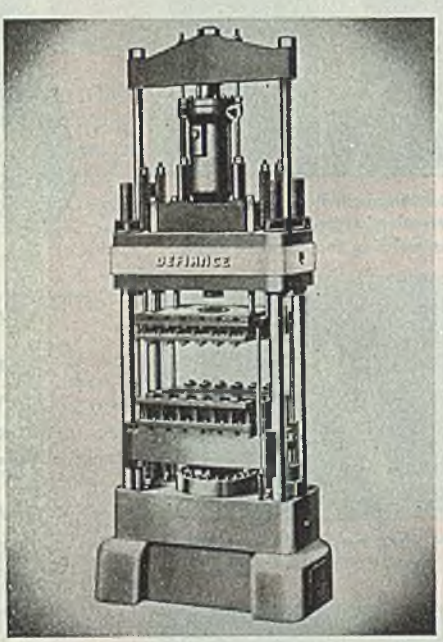
Paul Henry Co., 2037 South La Cienega boulevard, Los Angeles 34, announces a complete line of control devices embodying a snap action arrangement which lends itself to accurate

control of temperature, pressure, humidity and mechanical displacement. Other features are double break contacts; applicable range from minus 100 to plus 600° F; enclosed contacts; single pole single throw, single pole double throw or independent circuit double throw; resistant to vibration; low thermal lag; adaptability to any mounting; contact openings from 0.010 to 0.060-in.; operating parts in balance thermally as well as geometrically, accuracy of calibration not affected by under heat or over heat condition.

Known as Cam-Stat, these temperature controls are fully adjustable over a wide range and are provided with operating differentials running down to as low as 1° F. Model C thermostat, shown here, weighs less than 1 oz and is rated at 10 amp, 115 v ac or 26 v dc. Other models can be obtained to suit any thermal control problems.

Molding Press

A new plastic transfer molding press, No. 152, is announced by Defiance Machine Works Inc., Defiance, O. The press has a box-type ribbed, cast steel head or upper platen; heat-treated alloy steel tie rods to provide open construction for mold accessibility and steam



lines, and heavily ribbed mold supports to insure positive closing of molds. Cast steel and high test cast iron are used throughout. Generous flanges are provided on all cylinders with adequate bolting to assure positive sealing. Cylinders are cast of close grained metal ground and honed. All packings are readily accessible and arranged to prevent material contamination from seepage.

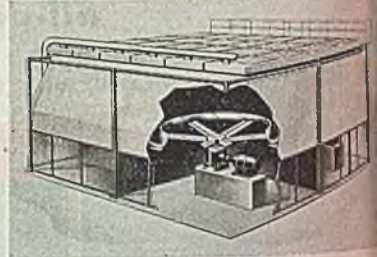
Maximum working pressure of 3000 psi exerts a mold clamping pressure of 170 tons through the main ram. A transfer pressure of 42 tons (at 3000 psi) is exerted through the transfer cylinder.

Maximum mold width is 18 in., length 26 in., minimum working space between platens is 15 in. and can be increased in 2 in. increments up to 23 in. The length of the platen stroke is 15 in.

Pots and plungers can be supplied in four different diameters of bore, from 3¼ in. to 4¾ in. to use from 3 in. to 4½ in. diameter preforms. The full capacity of the press can be served with a 4¾ in. diameter pot.

Cooling Unit

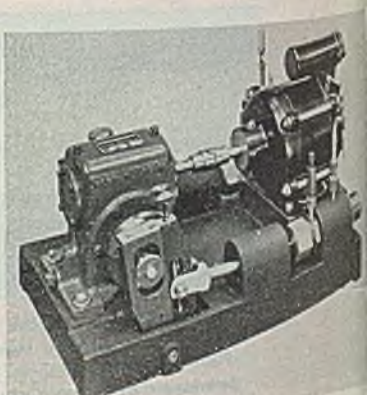
Cooling sections using K-fin tube construction are cooled by forced draft fed by air from the cooler layer at ground level and supplied by fans with variable pitch blades and with variable speed



drive in the new fin fan cooling unit offered by Fluor Corp. Ltd., 2500 South Atlantic boulevard, Los Angeles 22. Vertical air flow against static head assumes even air distribution over cooling surfaces. The units are designed for pressures to 5000 psi and temperatures to 1500° F. Coils are located to provide sufficient static head for pump suction. Tubes can be removed and replaced quickly and all mechanical equipment is accessible from the ground. There is no vibration as fans, gears and motors are supported by structure.

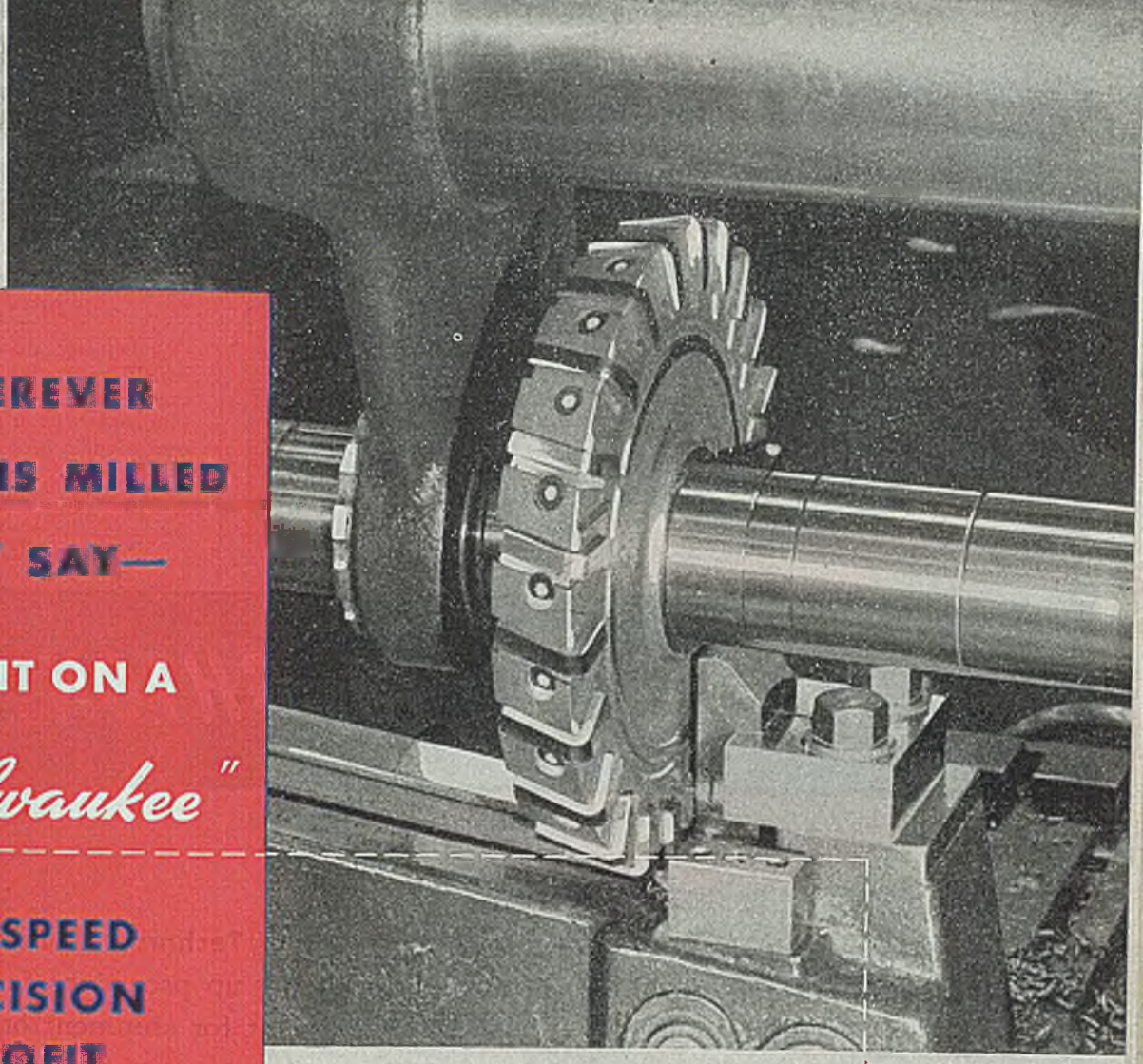
High Pressure Pump

Developed in collaboration with Universal Oil Products Co., the Precision-U.O.P. duplex high pressure pump, variable stroke is announced by Preci-



sion Scientific Co., 1754 North Spring field avenue, Chicago 47, for use in pilot plant operations, experimental pressure work and other industrial applications. The pump is of duplex type with individual cylinders permitting two different types of liquids to be pumped simultaneously, or where increased volume is desired above the capacity

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



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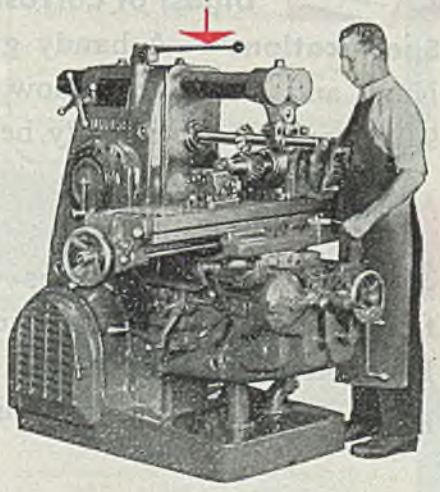

Standard models — horizontal, vertical and bed types — in motor ranges 3 to 25 hp; C.S.M. (Carbide Steel Milling) machines 20 to 50 hp; special machines in a wide range of sizes, types, motor hp. *Write for complete information.*

es — wherever metal is milled in the tool-room or experimental boratory, on the production line — Milwaukees rank "tops" the performers — the machines that get the work done with peed — precision — and profit. In fact when the job is a bit fficult or involved experienced machine-shop men usually say: Put it on a Milwaukee"!

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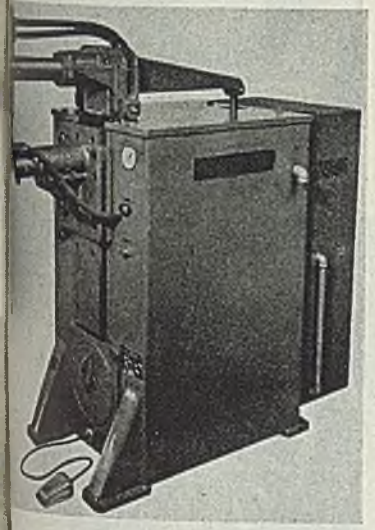
f a single cylinder, both cylinders can e piped in parallel. Because of com- act design, these units are adaptable most applications where space is at premium. Design of duplex pump ermits continuous operation and will aintain a given flow rate continuously, livering full rated output at maximum ted pressure.

Air Operated Welder

A new rocker arm air operated spot lder is announced by Precision Welder Machine Co., English and Neave ets, Cincinnati 4. The welder features t construction and accessibility to keep



intenance at a minimum. Air terminal cks increase speed of operation to r 200 spots per minute and keep pip- to a minimum. Solenoid air valve can removed without disconnecting piping wiring. All water, air, and heat ad- ments and gages are mounted on face achine for visual observation.

Use of electrical terminal block per- combining power and control cir- simplifying field installation. Timer contactor mounting on hinged rear el saves the user floor space at the of the machine.

Frame is box type fabrication with re- vable top member. Maximum vertical stment is in excess of 2 ft with a imum of 6 in. Use of socket head screws permits all adjustments with wrenches.

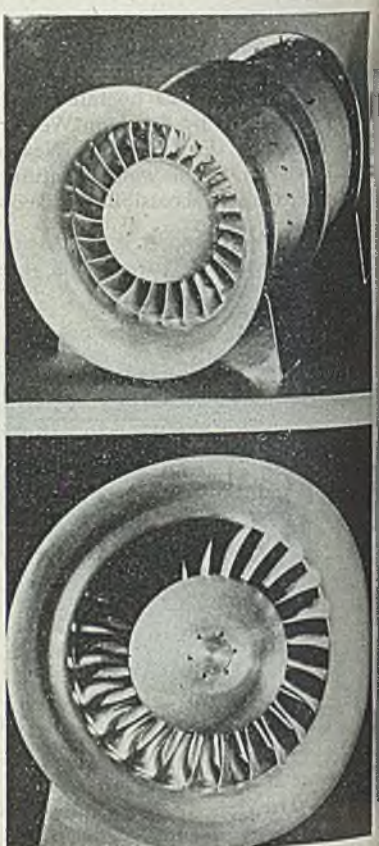
Compressors and Blowers

Buffalo Turbine Corp., 2165 Bailey nue, Buffalo 11, N.Y., announces a new e of Axial-Flow compressors, blowers fans. Using new design methods, it been possible to develop compressors, owers and fans having superior pressure flow characteristics and at the same e maintain high efficiencies.

Due to the high capacity and small e of many of these units, it has been essary to design special motors, having gh horsepower and small diameters. The corporation of these motors has made ssible equipment having an over-all eight of only 30 per cent of conventional

equipment. Typical is the 14-in. diameter blower shown, which delivers 8,000 cfm and 10 in. S.P., turning 3450 rpm. It is driven by an 8 in. diameter 20 hp motor. The complete unit weighs 180 lb.

The line is to include a wide range of direct driven units with air pressures from



⅜ to 100 in. of water at synchronous motor speeds. Also direct connected turbine driven units up to 100 psi and 100,000 cfm will be available.

These units can be installed in accordance with the requirements of conventional duct systems, either floor, ceiling or wall mounted or suspended in the duct.

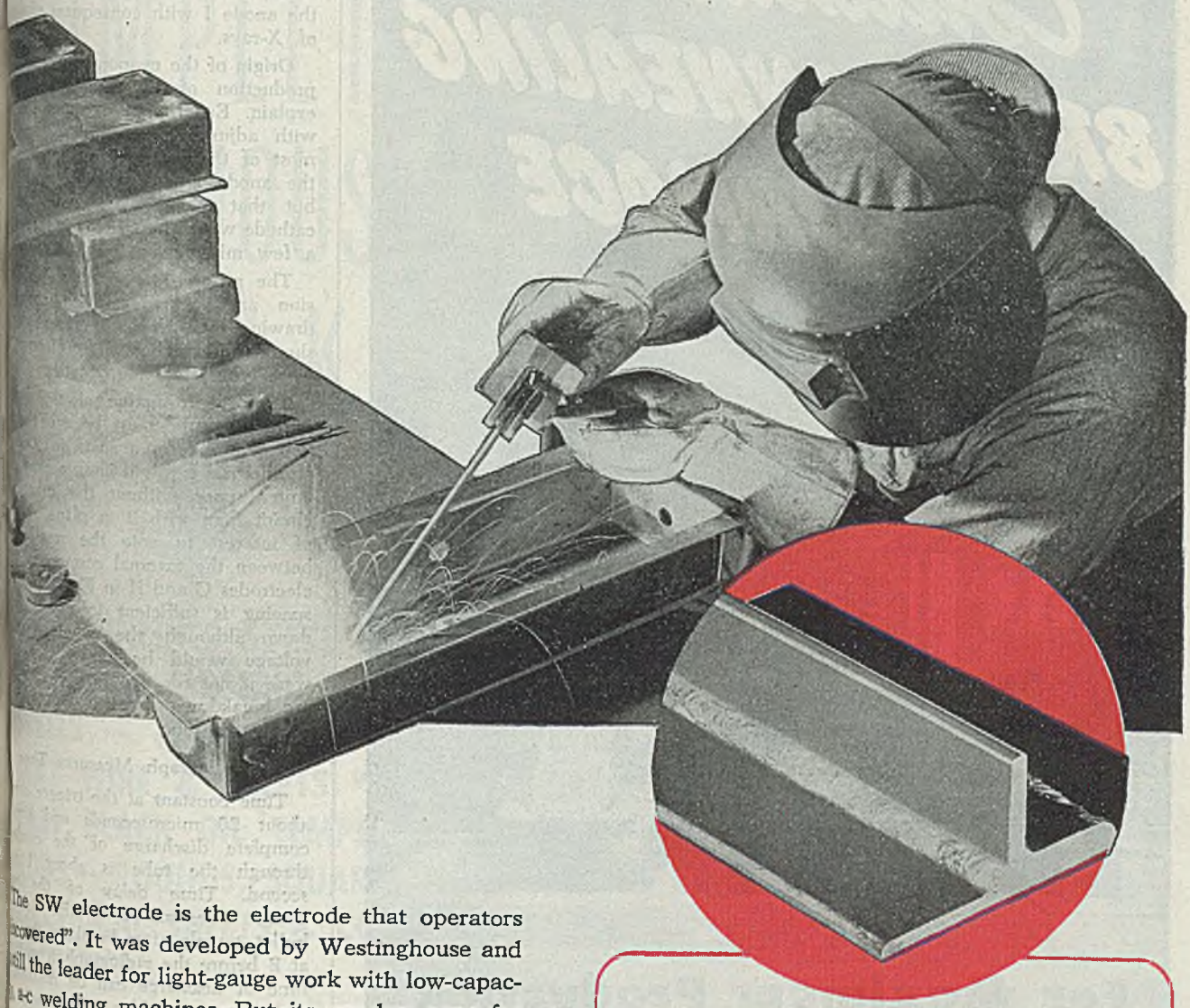
Welding Electrode

For welding in all positions and with ac and dc reverse polarity Westinghouse Electric Corp., Pittsburgh 30, is offering the new ACP electrode. This electrode is available in seven diameters, from $\frac{1}{16}$ to $\frac{3}{32}$-in.

The heavily coated electrode, recommended for work which is not easily positioned, forms a light, porous slag which is removed from each pass by light brushing. The tensile strength and ductility of welds made with ACP indicate this rod is suited for heavy plate fabrication, shipyard, pressure piping, pressure vessels, and general structural steel work.

It is said that ACP produces excellent results in making horizontal fillet welds and lap joints on all low and medium carbon steels, as well as on low alloy and cast steels.

SMOOTH, UNIFORM METAL TRANSFER WITH Flexarc SW electrodes



The SW electrode is the electrode that operators discovered". It was developed by Westinghouse and is still the leader for light-gauge work with low-capacity a-c welding machines. But its use has gone far beyond this because of the excellent results obtained with a-c or d-c machines on general-purpose work.

With either type of current, beads are clean, smooth and flat. Uniform metal transfer makes the SW electrode outstanding for production of sound welds in flat, overhead and vertical positions, and with special equipment this electrode is unexcelled for underwater cutting and welding. It covers the general field of mild steel welding and you can expect excellent results when used with any of the following metals: low and medium-carbon steel; low alloy, high-strength steel; copper-bearing steel; wrought iron; low and medium-carbon cast steel.

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- Free from slag interference, when welding vertically down

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

FLEXARC SW ELECTRODES

High-Speed X-Rays

(*Continued from Page* 117)

trons are drawn from G and this initia discharge evolves into a metallic arc between G and H which spreads out into the focusing cup and becomes a virtua cathode of apparently unlimited curren carrying capacity. Due to the action o resistance J, the discharge transfers to the anode I with consequent production of X-rays.

Origin of the evaporated metal for the production of the arc is difficult to explain. Experiments conducted in tubes with adjustable electrodes show that most of the material is vaporized from the anode when the spacing is close but that it all may come from the cathode when the spacing is greater than a few millimeters.

The properties of such a "field emission arc" cathode which permit the drawing of such high current densities should find application to electronic de vices other than X-ray tubes.

Time of formation of the discharg inside the tube must be even less than that required for a spark in air since a parallel rod gap will jump a considerably larger space without the tube in the circuit than with it in place. It is also of interest to note the small spacing between the external connections to the electrodes G and H in Fig. 1. This small spacing is sufficient to prevent breakdown although the whole condenser voltage would be across these points were it not for the rapid field emission arc breakdown between these electrodes within the tube.

Radiograph Measures Time

Time constant at the trigger circuit is about 20 microseconds and time for complete discharge of the condenser through the tube is about 1 microsecond. Time delay of the trigger circuit is estimated by the distance a bullet travels after breaking the circuit at B before the radiograph is made, and time of discharge can be measured by the amount of blur in the radiograph of a bullet traveling at a known velocity. The time delay may be increased to any desired value by adding capacity or increasing the value of the grid leak of thyratron T.

Fig. 4 shows bullets in free flight which demonstrates our first method of timing the length of exposures. The top picture shows a 22-caliber long bullet which travels 1200 fps with no perceptible blur. The center picture is a 220-caliber bullet traveling 4400 fps with the tube operated under low voltage conditions in an attempt to increase the discharge time. The bottom picture shows a normal view of a 220-caliber bullet, indicating a blur of somewhat less than 1 mm which represents an exposure time of considerably less than 1 microsecond.

Extremely short time exposure with which it is possible to take X-ray pictures, normally equaling or even better

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ing that of the flash techniques using light, demands further explanation. When a condenser is discharged through a gas filled lamp, the quality of light emitted does not change until the condenser is completely discharged, so that it is not possible to shorten the exposure time by the use of filters. In the case of X-rays, however, the penetrating power of the X-rays depends upon the voltage at which they are produced, so that when a picture is taken through an appreciable amount of material only those X-rays generated at high voltage as indicated in the left of the figure will reach the film.

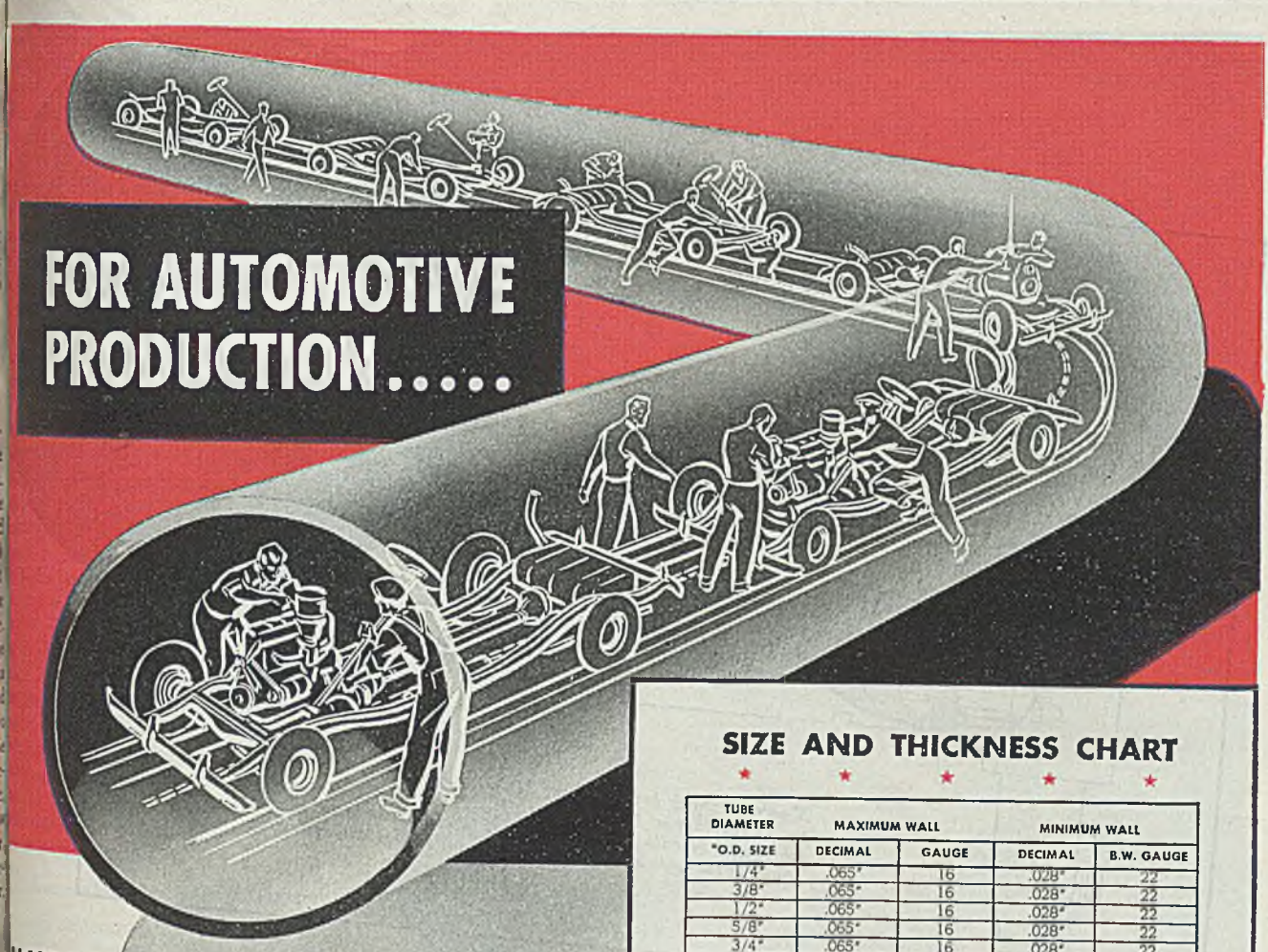
Because of this fact, we have an automatic device for shortening the exposure time which is not available with light. Also, this field emission arc discharge which originates in the cathode and serves as a source for the electrons which generate the X-rays, tends to spread out and encompass the region between the anode and cathode of the X-ray tube. When this happens, the main discharge degenerates into a low voltage arc in a manner similar to that which occurs very much more rapidly between the two closely connected electrodes in the cathode. When this main discharge degenerates into such a metallic arc tremendous currents are allowed to flow at low voltage in the tube and no further X-rays are produced, thus effectively shortening exposure time still further.

Comparison of Output

These facts are further verified by comparing the output of such a tube with an ordinary filament tube through which a condenser is discharged slowly. In such a case, X-ray outputs of two types of discharge will be equivalent when filtered through ½-in. or more of steel, but an unfiltered measurement shows that a much greater quantity of soft or nonpenetrating X-ray radiation is given off by the slower discharge, indicating generation of X-rays at the lower voltage end of the discharge.

Fig. 5 indicates the increase in penetrating power through iron as voltage is increased and shows a reasonably straight line relationship. Data has been taken up to as high as 750 kv, but the curve falls off badly above about 500 kv, and so far it has not been possible to obtain an appreciable increase in penetrating power or output above this value. Plans are under way to analyze the nature of the discharge in this region to determine the cause of the effect. It is now assumed to be a more rapid disintegration of the discharge into the low voltage arc as mentioned previously; however, increasing electrode spacing which in turn should increase the time of formation of such an arc, does not seem to overcome the difficulty.

Fig. 6 shows oscillograms of surge generator discharges through a high-speed X-ray tube. These were made with a Norinder high voltage cathode ray oscillograph commonly used for lightning studies. Curve A, kilovolts vs micro-



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SIZE AND THICKNESS CHART

TUBE DIAMETER	MAXIMUM WALL		MINIMUM WALL	
*O.D. SIZE	DECIMAL	GAUGE	DECIMAL	B.W. GAUGE
1/4"	.065"	16	.028"	22
3/8"	.065"	16	.028"	22
1/2"	.065"	16	.028"	22
5/8"	.065"	16	.028"	22
3/4"	.065"	16	.028"	22
7/8"	.065"	16	.028"	22
1"	.095"	13	.028"	22
1-1/8"	.083"	14	.028"	22
1-1/4"	.095"	13	.028"	22
1-3/8"	.095"	13	.035"	20
1-1/2"	.109"	12	.035"	20
1-5/8"	.120"	11	.035"	20
1-3/4"	.120"	11	.035"	20
1-7/8"	.120"	11	.035"	20
2"	.165"	8	.035"	20
2-1/4"	.180"	7	.035"	20
2-1/2"	.203"	6	.035"	20
2-3/4"	.203"	6	.049"	18
3"	.220"	5	.049"	18
3-1/4"	.220"	5	.065"	16
3-1/2"	.238"	4	.065"	16
3-3/4"	.238"	4	.065"	16
4"	.250"	3	.065"	16
4-1/4"	.250"	3	.065"	16
4-1/2"	.250"	3	.065"	16
4-3/4"	.250"	3	.065"	16
5-1/2"	.134"	10	.083"	14

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

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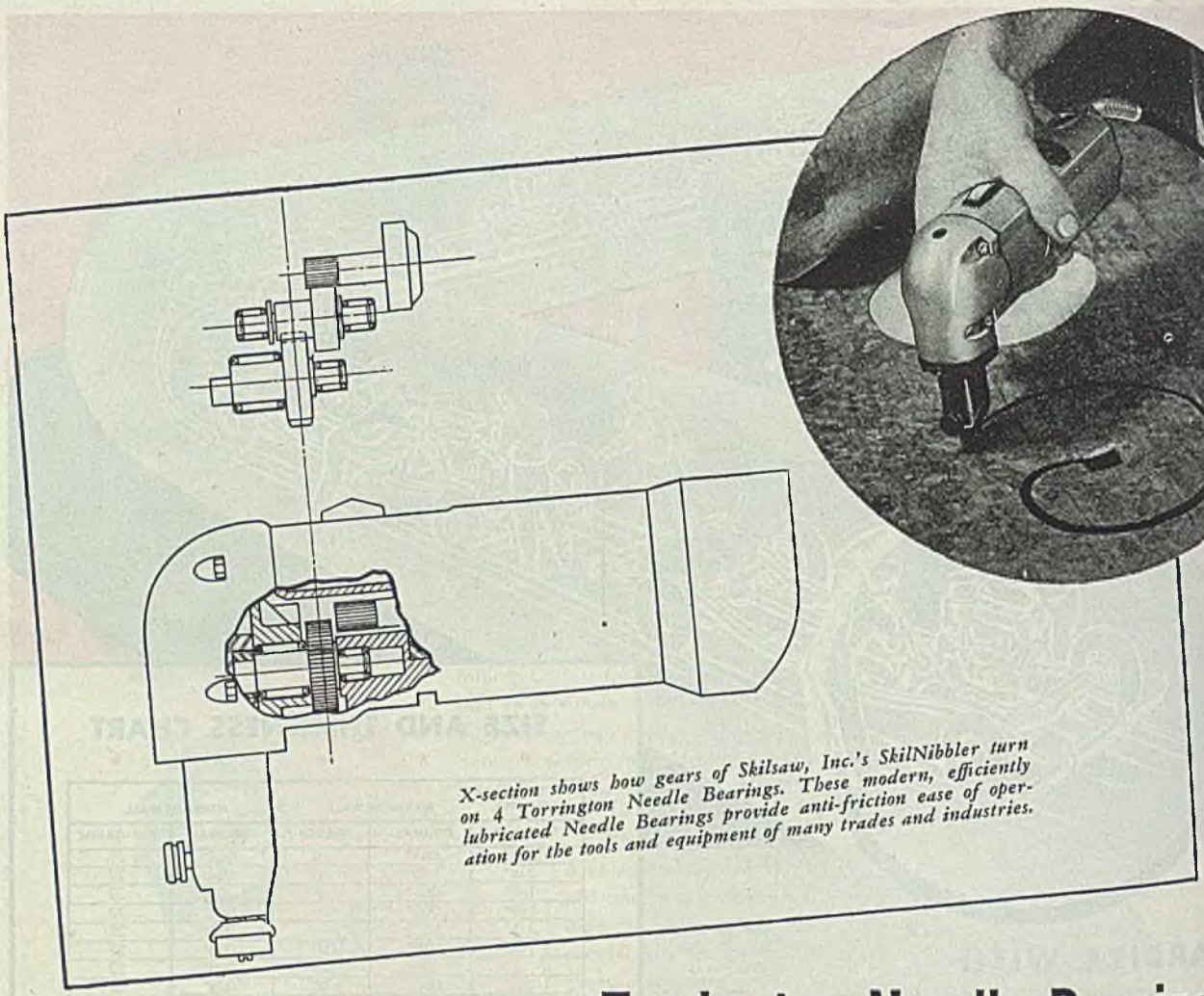

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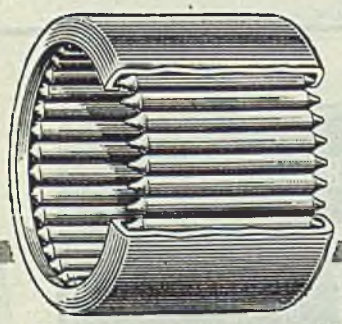

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London, England

TORRINGTON NEEDLE BEARINGS

onds, shows that the voltage rises to 30 kv, although condensers are only charged to 300 kv, and falls to 0 in about 2 microseconds. Curve B, amperes microseconds, shows a similar picture the current rise vs time, though not the same discharge for which the rge curve was taken. Curve C, kilo- vs amperes, shows the relation- between current and voltage with- a time axis and indicates that only mall current flows at the peak of the rge, and over 2000 amp are passed the voltage reaches zero. The X- generating region would be from to about 200 kv; at which point is something over 1000 amp pass- through the tube.

Curve D in Fig. 6 shows current vs with oscillatory discharge. This another type of current wave that it possible to get through the tube, in ch the current reverses itself and es almost as high a value in the osite direction. This indicates an in the tube which persists long gh for the current to pass in both ections. Curve E, kilovolts vs peres, for an oscillatory discharge, nstrates the voltage and current such a discharge occurs and it will oted that there is no appreciable ge across the tube when inverse ent is flowing.

Generator Operates X-Ray Tube

surge generator has been built to ate the high speed X-ray tube. Six mf condensers are arranged in a circuit substantially as illustrated in 7. The exceedingly rapid break- of the X-ray tube has permitted spacing of condensers than would ally be the case so that a relatively pact design has been achieved. Con- ers have been broken down into groups, three condensers being ted on the lower platform of the , and three condensers being lo- on the upper platform. Con- ers may be charged to a potential 50 kv, thereby resulting in an out- potential of 300 kv across the tube. stabilizing resistor is added across the ay tube to facilitate consistent firing. ondensers are arranged to be charged rallel through resistors. irst condenser is connected directly the anode of the X-ray tube. Con- ser C_0 is connected to the cathode the X-ray tube through a sphere gap. is grounded and the cans of con- sers C_2 and C_1 are connected to each er through series resistors. Similarly, cans of C_4, C_5, and C_6 are connected ether through resistors and connect the positive input potential from the h tension transformer. The upper are linked together and are ad- stable by means of a special micro- eter adjustment which is operable from front panel of the generator. The er two gaps are connected in a simi- fashion, and may be adjusted by a ilar micrometer adjustment. The on the first condenser, C_3, is made adjustable and serves as the trigger-

ing gap for the surge generator. The output of the trigger potential transformer is connected between this gap and ground. The high tension cable power source connects to the upper lead of condenser C_3 and to the can of condenser C_4. Connections between the input potential and the can of C_4 and the insulated lead of C_3 are made through 100,000 ohm resistors. When the condensers have been fully charged operation of the unit is as follows:

In Fig. 7, the triggering transformer is connected between ground and the gap which connects to condenser C_4. If the lower gap is broken down, voltage between the gap of condenser C_4 and ground rises until the gap on condenser C_4 breaks down. This results in immediate discharge of all condensers. The voltage across the X-ray tube will then be equal to approximately six times the charging voltage on the individual condensers.

Breakdown of the surge generator once the triggering gap has been fired is considered next. In order to initiate the firing cycle, the thyratron of the timing circuit shown in Fig. 8 must be made conducting. When the tube fires, a condenser in the interval timer is discharged through the primary of the triggering transformer.

High Voltage Induced

As a result of the surge current in the primary of the triggering transformer, a high voltage is induced in the secondary. The induced voltage is of sufficient magnitude to break down the triggering gap G-1, shown in the schematic diagram of the surge generator in Fig. 9.

In order to maintain consistent breakdown characteristics, gap G-2 is irradiated with a Sterilamp. When gap G-1 breaks down gap G-2 will become conductive due to the effects of the added secondary voltage from the triggering transformer. With gap G-2 broken down, gap G-1 will sustain, thereby shorting out the secondary of the triggering transformer. This eliminates any impedance in the circuit of the main gap G-2.

When gap G-2 breaks down, point A, i.e., the negative plates of capacitor C_4, assume a charge of 50 kv with respect to ground. Due to the effective inductance of resistor R_1, point A will sustain a potential difference of 50 kv with respect to ground. If gap G-3 were set for approximately 150 kv, capacitor C_4 would continue to discharge through R_1, until it were discharged, but as gap G-3 is set slightly higher than 50 kv, gap G-3 will immediately break down.

Gap G-3 breaks down because of a potential difference of approximately 100 kv across this gap. As outlined above, when gap G-2 became conducting, point A assumed a potential of 50 kv with respect to ground. Because of inductance in resistor R_1, point A still remains at ground potential even though point A is 50 kv above ground. This enables 100 kv to be impressed

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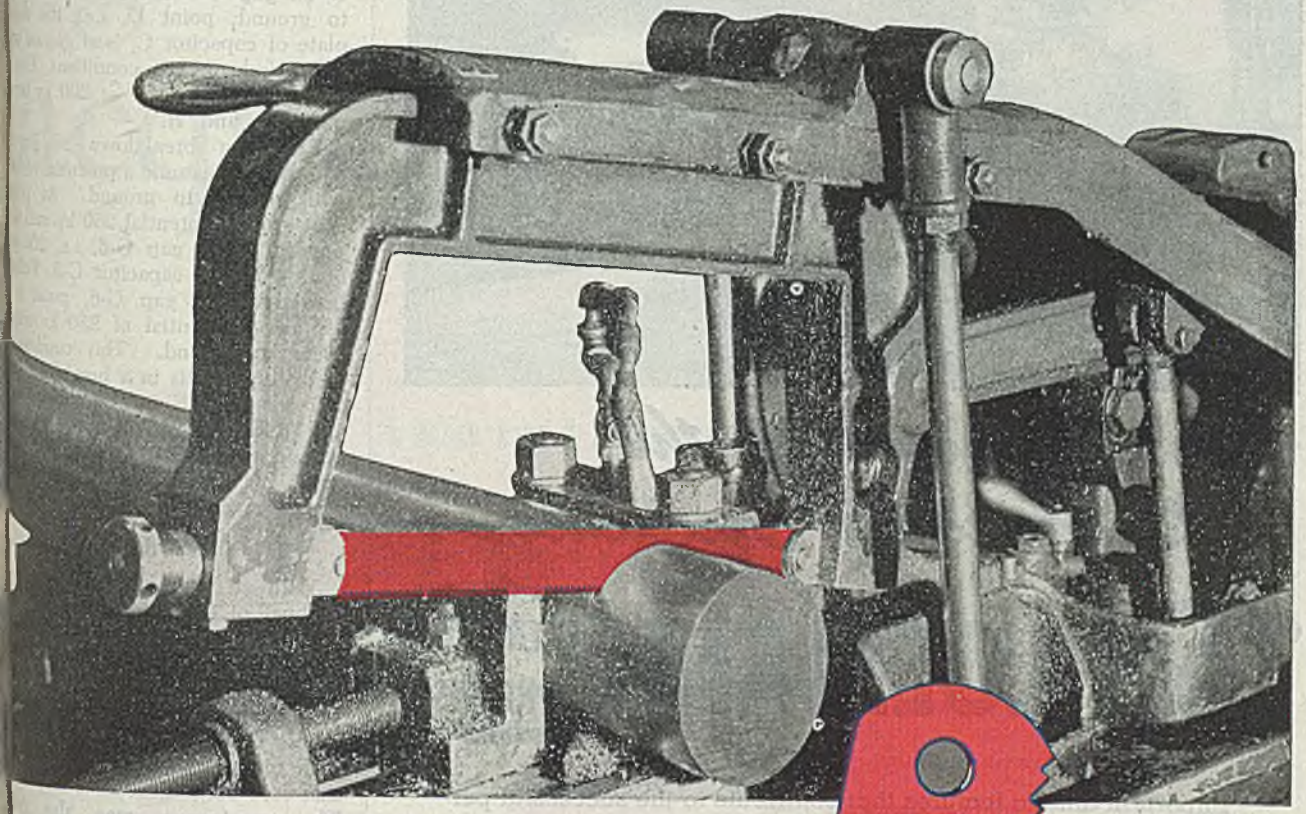

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SEE SIMONDS NEW SOUND FILM, 16 mm in full color, showing how to choose the right "Red End" Blade for each job, and how to get the most out of it *on the job.* Have your dealer arrange to show it to *your* operators, in your own shop, without cost or obligation.

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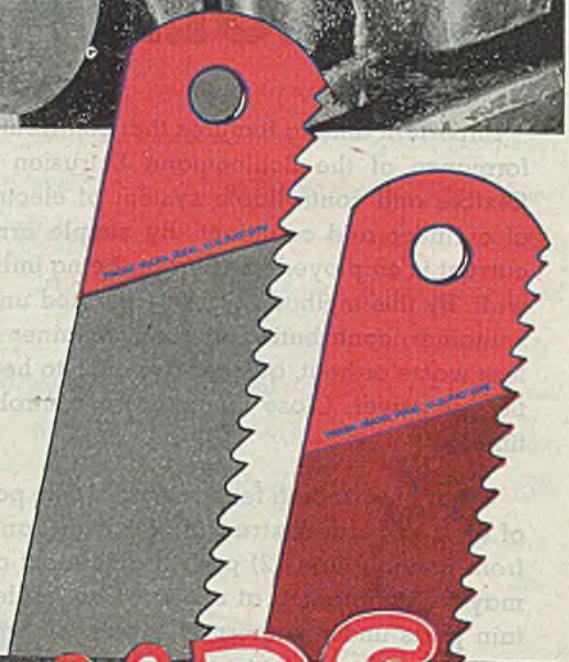

PRODUCTION TOOLS FOR CUTTING METAL, WOOD, PAPER, PLASTICS

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASSACHUSETTS

across gap G-2, i.e., 50 kv in capacitor C_1 + 50 kv in capacitor C_2.

With gap G-3 conducting, point E now assumed a charge of 100 kv with respect to ground. Point C remains at ground potential due to inductance in resistor R_3. Under these conditions, approximately 150 kv appear across gap G-4, and it in turn breaks down. With gap G-4 conducting, gap G-5 breaks down in the following manner: Point G on gap G-5 is 150 kv with respect to ground; point D, i.e., the negative plate of capacitor C_4 is at ground potential. Under these conditions, Gap G-5 will have 150 + 50 = 200 kv between points G and H.

Following breakdown of gap G-5 point D will assume a potential of 200 kv with respect to ground. As point F is at ground potential 250 kv mill be impressed across gap G-6, i.e. 200 kv + 50 kv due to capacitor C-5. Following breakdown of gap G-6, point E will assume a potential of 250 kv mith respect to ground. This condition immediately results in a breakdown of gap G-7 as point F is at ground potential and point E, 250 kv mith respect to ground. Gap G-7 will then be broken down by 300 kv, i.e., 250 kv + 50 kv due to capacitor C-6.

Impedance At Zero

With all gaps broken down, the impedance of the discharge circuit is practically zero, and the full 300 kv will appear across R-6. As the X-ray tube is connected across R-6, full voltage will appear across the tube.

The charging transformer is provided with four high tension cable sockets so that four surge generators may be used. The transformer case also contains two rectifiers, filament transformers, a grounding relay and two grounding resistors. The high tension secondary winding has been split and the center grounded. Under these conditions the milliammeter is at ground potential.

In most practical applications of this unit, it is desirable to fire the surge generator at a given time interval after a certain reference point has been reached by the object under observation. In order to facilitate accurate firing of the surge generator, a special interval timer has been designed. The interval timer is essentially a thyratron timer. Main timing elements of this unit (Fig. 6) are composed of a Type 2050 thyratron and a F. G. 95 thyratron. In normal operation, the F. G. 95 thyratron tube is connected to the primary of a spark transformer which triggers the surge generator. A capacitor is connected between the plate of this tube and ground through the primary of the high tension triggering transformer. When thyratron T_2 is made conductive, condenser C-1 is discharged through the primary of the triggering transformer, through the thyratron tube to ground. This pulse is of sufficient magnitude to break down the trigger gap and thereby initiate the breakdown of the entire surge generator. Power is taken from a standard 110-

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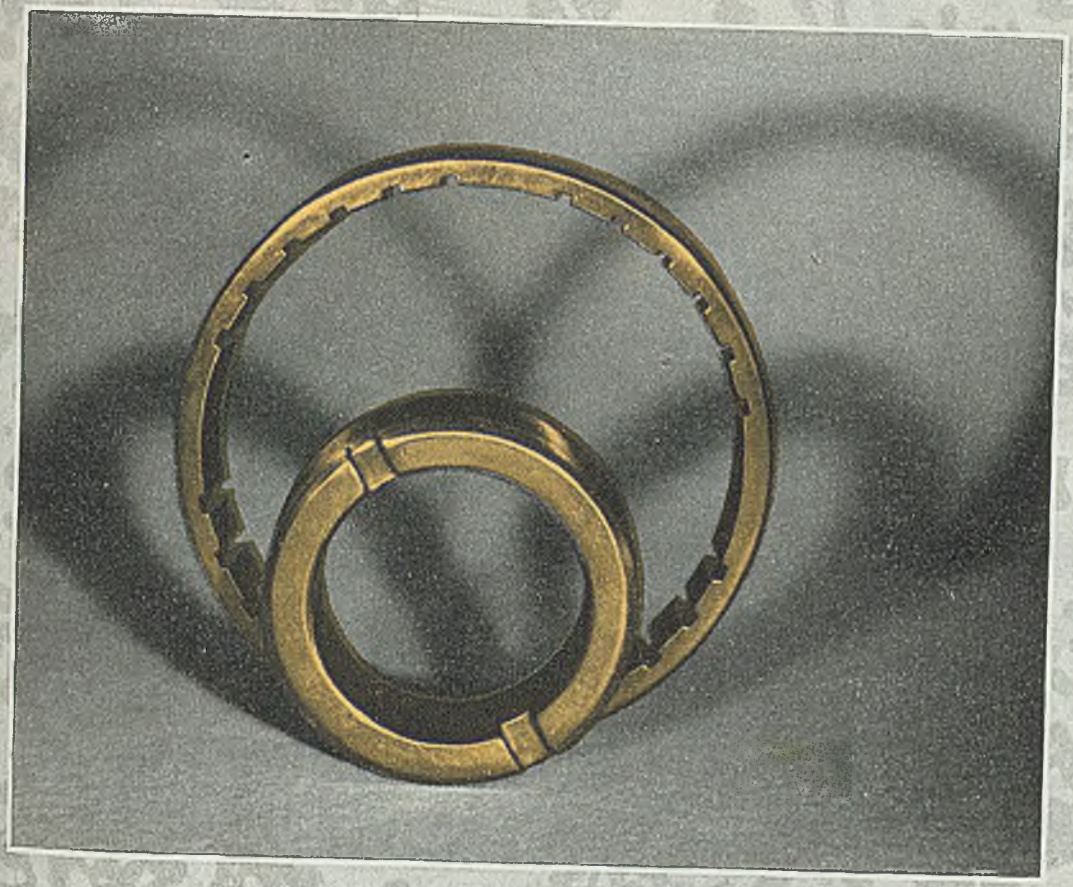
line and fed through a toggle switch to a line filter whose purpose it is to prevent external surges from entering the timer power supply circuit.

Power then is fed to transformers L_1 and L_3. Transformer L_2 provides the high voltage supply for the timer. It also provides power for the filament of the 2050 thyratron tube. Transformer L_4 is provided to furnish power for the F. G. 95 thyratron. A full-wave rectifier and condenser input filter circuit is contained within the timer itself. Bias supply for both tubes is obtained through the center tap lead of the full-wave rectifier. The bias voltage is kept constant by means of a VR75. This tube maintains a constant bias supply for both tubes, thereby insuring constant bias and in turn consistent timing characteristics. Two types of operation are possible with this timer; "make" and "break" operation. In "break" operation, the timing sequence is initiated when a conducting piece of lead is broken by means of the projectile under study. In "make" operation, timing is initiated when the two input leads are shorted. A toggle switch is provided on the timer from panel to enable choice of either type of operation.

"Break" Operation

Let us briefly investigate "break" operation. In "break" operation, a low positive potential is applied to the grid circuit of the first thyratron tube through resistor R_2. The shorting strip is then connected between the two input terminals grounding out this positive supply. Under normal operating conditions, a negative potential of sufficient magnitude is applied to thyratron 2050 to prevent it from firing. This is obtained through the bias supply previously outlined and through resistor R_1. When the conducting strip is broken, a positive potential of sufficient magnitude to cause the thyratron to fire immediately is impressed on the grid of thyratron T_1. When thyratron T_1 becomes conducting, positive potential is applied in the time delay capacitors in the cathode circuit of this tube. A rotary selector switch has been provided to enable selection of the following capacitors: 0.002-microfarad, 0.006-mf, 0.02-mf, 0.06-mf, 0.2-mf, 0.6-mf, and 2 mf.

These condensers constitute the coarse time adjustment for the timer. The fine time adjustment is obtained by means of a 10,000-ohm potentiometer in the plate circuit of the tube. When the tube is conducting the cathode capacitor immediately undergoes charging. When the potential across this capacitor reaches a critical voltage value — that is, a value great enough to fire thyratron T_2, which is normally held at a high negative bias by means of the bias supply, thyratron T_2 conducts and discharges C through the primary of the trigger transformer. The timing circuit in the interval timer is capable of producing a time interval varying from 20 mic



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seconds to several thousands micro-seconds.

The FG-95 has been chosen because of the shield grid construction, and a desire to eliminate effects of external conditions on the firing of this tube.

The chokes, L_5 have been added to the plate circuit of the FG-95 tube to prevent firing of this tube where sequence firing is being attempted.

(*Continued next week*)

Closer Chemistry Control Improves Surface of Steel

O. Pearson of Gary Works, Carnegie-Illinois Steel Corp., revealed at a meeting of American Institute of Mining and Metallurgical Engineers that the difficulties in producing the high surface quality necessary for cold-drawing the SAE-1020 silicon-killed grade of steel have been eliminated. The factors which resulted in unsatisfactory surface quality were determined to be essentially (1) Improper mold design, (2) carbon and silicon of approximately equal contents, (3) high sulphur, (4) sub-surface porosity, (5) variant soaking pit practices.

Molds designed to embody a maximum 2-in. corner radii and fluted contours of ½-in. maximum depth have lowered the residual stresses and lessened corner cracking in rolling. Bottom poured ingots gave a better surface quality than did the top poured product—to the extent that 70 per cent of the former required no conditioning in the semi-finished form whereas all of the top poured needed conditioning.

Observations showed that when the silicon content specifications were raised from 0.10 per cent maximum to 0.15-0.2 per cent, the rejections dropped approximately 60 per cent.

Surface rejections of SAE-1020 were 7½ times as great with sulphur contents of 0.036 and over than when the sulphur content was not permitted to exceed 0.036 per cent.

Deoxidation with small amounts of aluminum reduced sub-surface porosity of the billet product.

At Gary Works, the SAE-1020 silicon-killed steel gave best surface quality when track times were close to the established standard of 3½ hr (start tap to charge in soaking pits). The ingots, made in 23 x 23-in. inverted hot top molds, were charged into the pits butt end up and well soaked in normal pit time without portmarking or washing.

—o—

Aluminum Co. of America, Pittsburgh, announces a number of 16 mm and 8 mm sound-movies which may be borrowed by employers. Among the films available are: "General Sheet Metal Practice"; "Piercing and Blanking"; "Drawing, Stretching, and Stamping"; "Tube and Shape Bending"; "Spinning"; "How to Machine Aluminum"; "How to Rivet Aluminum"; and "How to Weld Aluminum".

Production Advantages Like These
forecast the increasing post-war use of

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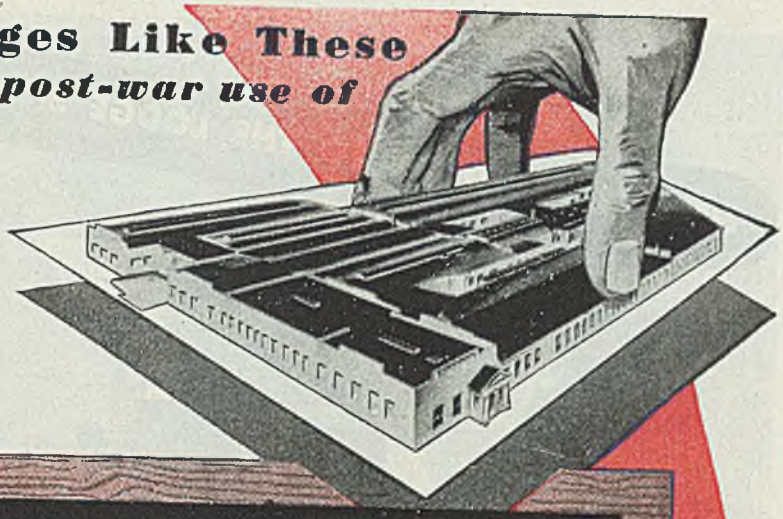

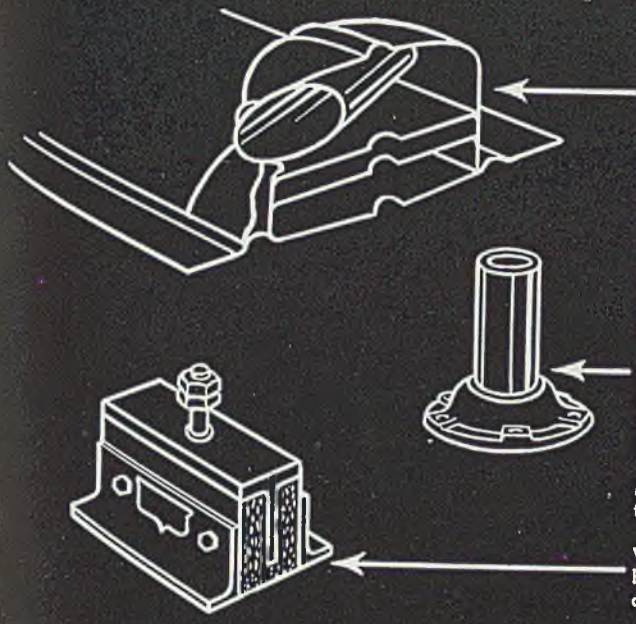

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Makes possible the joining together of aluminum to aluminum and aluminum to steel.

Where rubber is to be applied to metal assemblies, Hydrogen Copper Brazing has many advantages.

Together with Complete Facilities for the Production of Entire Parts or Assemblies, Burgess-Norton Hydrogen Copper Brazing will make possible *Better Parts at Lower Costs.*

From Burgess-Norton, in the post-war, may be had all the advantages of the most advanced techniques in Hydrogen Copper Brazing . . . *plus* the facilities which for so many years have been producing parts for leading manufacturers in automotive, farm implement, washing machine and lawn mower industries. These facilities, now greatly augmented, include those required for the production of steel stampings, heat treated and ground steel products, piston pins and non-precision ball bearings. OUR ENGINEERING AND EXPERIMENTAL FACILITIES CAN FIT INTO YOUR POST-WAR PLANNING. Write Burgess-Norton Mfg. Co., 200 Peyton St., Geneva, Illinois.

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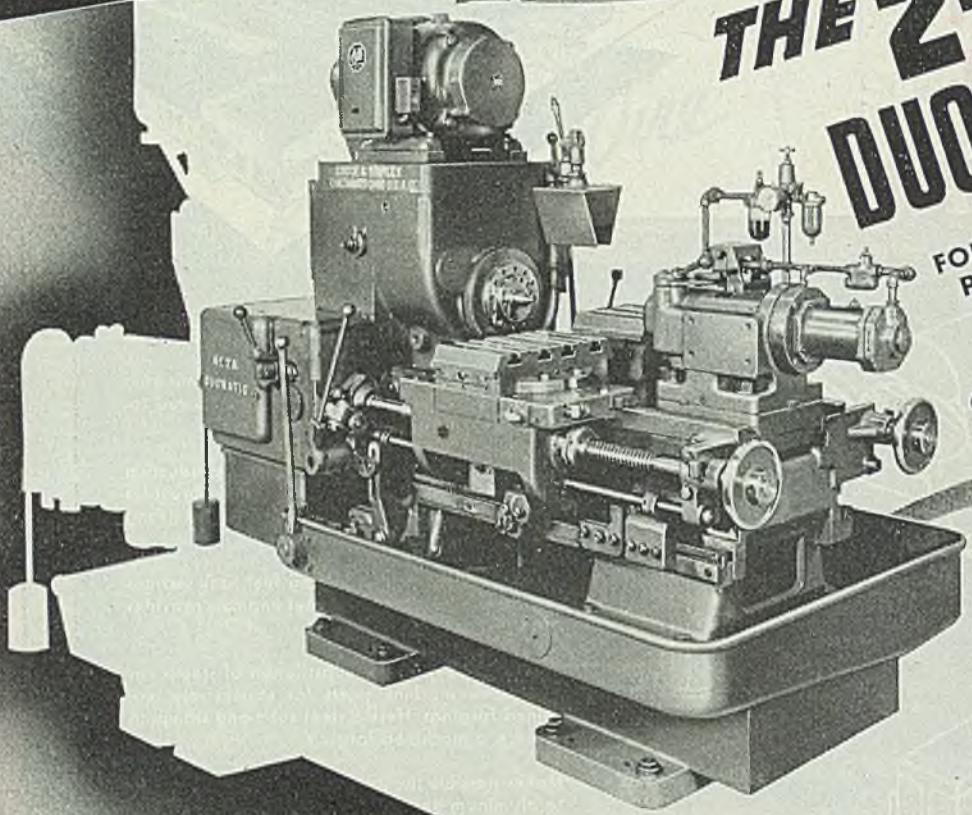

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L & S LATHES

STEE

Arc Welding Electrodes

(*Continued from Page* 119)

with requirements as to mechanical properties of deposit weld metal, the S-ASTM specifications have defini- welding procedure in order to elim- possible variables which affect chanical properties of deposited weld al. For example, the so-called "hot procedure" is used which fixes passes temperatures of welding the le test plates. The size of test plate, ion and number of passes, and the relieving procedure are specified the same reason. The hot water pro- consists of 5 min immersion in g water (212° F), welding, then ing the assembly to cool in still 10 min, then immersion in boiling for 5 min and repeat until welding pleted.

Definition of Classes

further clarification of each AWS a guide to the specifications is be- ued by AWS to producers and which will be essentially in accord- with the following description of elding characteristics applying to arious AWS classes of the E-60

S Class E-6010: These electrodes signed for welding in all positions rect current reverse polarity. They digging arc resulting in deep pen- and a high quality deposit. Cov- hickness is kept at a minimum to e welding in the vertical and d positions, but sufficient to de- shielding necessary for required of deposit.

forceful, deep penetrating arc re- skillful manipulation by the op- to minimize spatter and the ten- to undercut that is present in this electrode. A light friable slag readily removable is produced. fillet welds is relatively flat and ave a rather coarse ripple.

class of electrode sometimes is with two covering thicknesses 5/16-in. diameter size. Both cov- hicknesses in this size can be used tical and overhead welding, but ner covering is usually preferred ably where production speed is rtance, since the slightly thinner facilitates welding in the ver- and overhead positions. Welding should be kept within recom- ranges, which are somewhat er than other classes. Radio- properties of this class are ex-

S Class E-6011: This class of elec- has the same operating characteris- arc behavior as AWS Class electrode, except that it is de- primarily for operation in all posi- on alternating current. In many these electrodes are also satisfactory peration on reverse polarity direct

These electrodes are characterized by d digging arc resulting in deep ration and require skillful manip-

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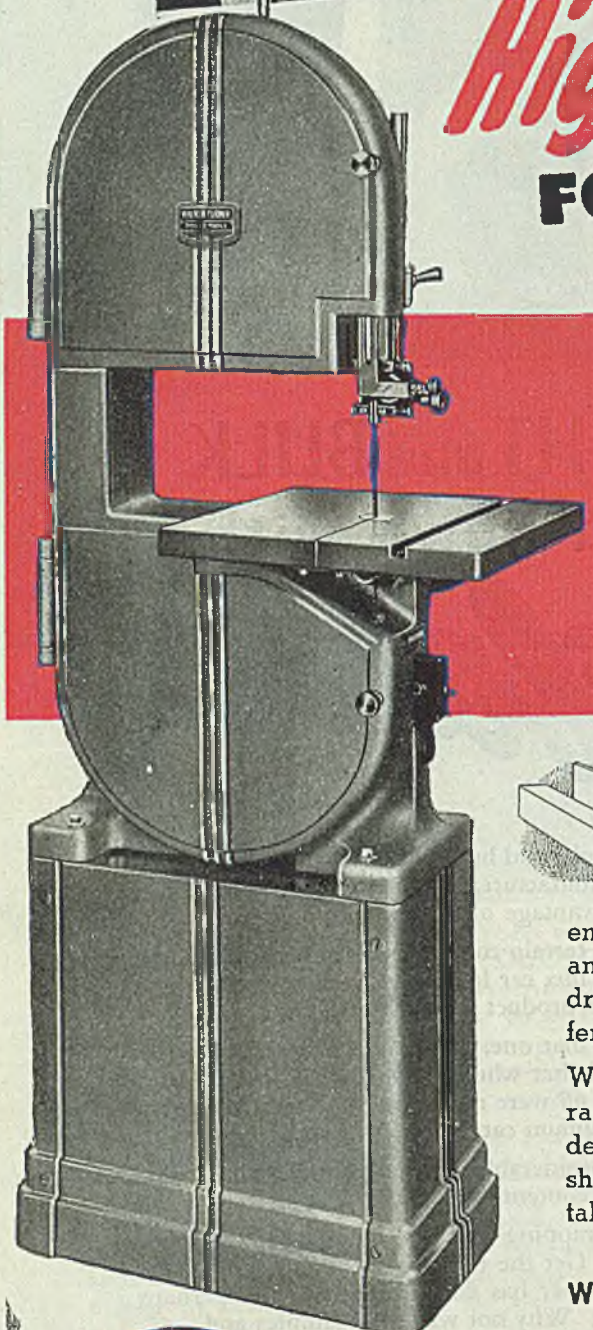

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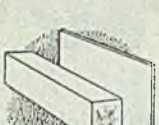

Walker-Turner 14" and 16" Band Saws are equipped with back-gearing and cone pulley. This enables the operator to select correct low speeds for metal-working. By simply throwing a lever and engaging a pin, the gear train is disconnected and the Band Saw converted into a direct drive machine—with higher speeds for non-ferrous metals, plastics and wood.

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Abrasive Segments

...on Co.—24-page illustrated pamphlet ...ive Segments Used in Chucks" gives list ...s for vitrified, silicate, shellac and resinoid ...ed segments. Specifications are presented ...gments employed in chuck assemblies of ...s manufacturers.

Heat Exchangers

...ical Carbon Co. — 12-page illustrated ...n section No. M-8804 describes Karbate ...and bayonet heat exchangers for heating ...ing corrosive solutions in all types of ...s vessels without contamination.

Cleaning for Welding

...ce Products, Inc.—12-page illustrated ...ue No. 7 presents details of Process K-1-B ...paring aluminum for spot welding. Bul... discusses full cycle of chemical baths and ...which precede production line spot weld...

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...igan Seamless Tube Co.—14-page book... tables on round seamless steel tub... Formulas for determining average and ...m wall weight of tube are included.

Rubber Products

...ustman Rubber Mfg. Div., Raybestos-...an, Inc.—20-page illustrated catalog ...ffer. Rubber Products for Industry" con... on various types of belts, hose, pack...ded goods, friction material, rubber ...abrasive wheels and other mechanical ...products.

Rust Preventive

...n & Jennings Co.—12-page illus...Bulletin No. R-181 "Rusta Restor, The ...(i. e. Electrical) Rust Preventive" ...electrical equipment that prevents ...of all types of metallic water tanks. ...ion costs are shown.

Storage Batteries

...e Corp., Storage Battery Div.—170-...k "Philco Storage Batteries" is com...pecification manual for all storage bat...dustrial applications. Contents are ...r motive power batteries, stationary ...and battery maintenance and export ...ations.

Surface Hardening

...ield Steels, Inc.—8-page pamphlet ...dustrial Process' for Surface Hardening ...Steel Parts" explains process and ...properties, wear and abrasion resistance, ...ounting or wire drawing, corrosion ...surface and dimensional characteris... stainless steel after treatment.

Safety Shoes

...ty Div., International Shoe Co.—64-...ustrated safety manual "Let's Use Our ...Have Our Feet" discusses methods of ...g foot injuries. Message is directed to ...sors and others responsible for safety ...Suggestions and information on ...ts are included.

Brazing Furnace

...ace Engineering Co.—8-page illustrated ...No. 301 describes furnaces for all types ...utilizing hydryzing atmosphere for ...low temperature brazing, sintering, ...and hardening; precombusted gas ...for silver and copper brazing and ...of powder metals; and dry hydrogen ...for annealing electric metals, sin... and bright annealing of steel.

Gear Shaper

...ne Tool Co.—4-page illustrated fol...No. 3644-44 describes Shear-Speed gear ...designed for rough and semifinish ...gears up to 4 inches in diameter and ...to face width. Operation, controls, ...details and specifications are covered.

12. Arc Welding

Lincoln Electric Co.—20-page illustrated bulletin No. 412 discusses Shield-Arc welder with self-indicating dual continuous control. Applications, advantages and methods of welding are covered.

13. Centrifugal Pumps

Brady Pump Co.—6-page illustrated bulletin "Machine Tool Coolant Pumps For Every Factory Purpose" and 2-page insert give specifications and prices of line and accessories. Applications are discussed.

14. Steel Treating

Wesley Steel Treating Co.—16-page full-color illustrated booklet "Wesley of Wisconsin" shows facilities of company for heat treating of steel with work in progress.

15. Elevators

Montgomery Elevator Co.—4-page illustrated folder "Interesting Facts About Montgomery" lists companies served by Montgomery elevators, shows buildings using them and covers manufacturing facilities.

16. Milling Machines

Kearney & Trecker Corp.—20-page illustrated catalog No. B-20 presents 1200 and 1800 series Milwaukee Simplex and Duplex milling machines. Unit construction, automatic cycles of table movement and typical installations are covered. Specifications, capacity diagrams and floor plan dimensions are included.

17. Variable Speed Transmission

Lewellen Mfg. Co.—48-page illustrated catalog No. 45 gives complete information on variable speed transmission and controlling devices, specifications, dimension tables, recommended applications and typical installations.

18. Penetrating Oil

Kano Laboratories—Technical bulletin No. 146 gives information on uses of Kano Kroil for loosening metal parts that are "frozen" because of gum, rust or corrosion. Typical uses are related and price list is included. Other industrial and automotive chemicals are described briefly and uses are set forth.

19. Compressed Air Purifier

Logan Engineering Co.—12-page illustrated bulletin No. 445 explains operating principle of Aridifier unit for purging air and gas lines of moisture, oil, dirt, rust and fine scale. Various applications are shown and charts indicate capacity of various models.

20. Bronze Bushings & Bearings

Johnson Bronze Co. — 76-page illustrated stock catalog No. 410 lists all types of bronze bushings and bearings, bar bronze and babbitt, as well as special services available from warehouses. Graphite bearings, self-oiling bearings and standard electric motor bearings are included.

21. Heat Treating

A. F. Holden Co.—4-page illustrated folder on heat treating baths and furnaces presents specification, operating data and other information on type 230 combination tool steel and high speed hardening unit. Properties of heat treating baths for ferrous and nonferrous metals in operating range of 300 to 2350 degrees Fahr. are listed.

22. Cylindrical Furnace

Mahr Mfg. Co.—4-page illustrated folder No. 360 describes vertical, convection heated, recirculating type, cylindrical furnace for heat treating operations from 300 to 1300 degrees Fahr. Either gas or oil can be used for fuel.

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23. Wire Rope

R. G. Le Tourneau, Inc.—17x22-in. wall chart No. N-104 gives cable requirements for all LeTourneau equipment. Prepared for operators and maintenance men, it stresses service angle and gives practical tips on how to get longer service from wire rope.

24. Clad Steels

Lukens Steel Co.—36-page illustrated booklet "Lukens Clad Steels" and price list present details on nickel-clad, Inconel-clad and Monel-clad steels. Information is given on permanence of bond, corrosion-resistance, finish, standards, properties, fabrication, applications, sizes and weights.

25. Temperature Control

Leeds & Northrup Co.—16-page illustrated bulletin No. N-33B-643 (1) describes system of open hearth roof temperature control using Micromax electric control. Models S and R controllers are covered in this application.

26. Heat Treating Furnaces

Lansing Engineering Co.—4-page illustrated bulletin No. 410 describes Hurri-Temp furnace for rapid heat penetration of work. Schematic illustration shows construction and operation. Other types of Lansing industrial furnaces are also shown.

27. Cutting Alloy

Jessop Steel Co.—12-page bulletin No. 79939 presents T and V cutting alloy available in rounds, flats and squares for cutting tools. Cutting efficiency and low breakage at higher than normal speeds are characteristics. Cutting speed reference chart and tables of available sizes are included. Grinding wheel recommendations are also given.

28. Visible Index System

LeFebure Corp.—24-page illustrated bulletin No. 756 describes Speedex Visible Index System, points out outstanding features and shows several typical filing setups. Both permanent and portable filing equipment are shown.

29. Malleable Iron

Jackson Iron & Steel Co.—8-page pamphlet "Essentials for the Production of Duplex Malleable Iron" by Wilfred H. White, metallurgist, discusses equipment and metallurgy of Jisco silvery pig iron in duplex malleable iron processing.

30. Refractories

Harbison-Walker Refractories Co.—14-page illustrated bulletin entitled "Fire Insulating Brick of Prime Importance to Refractories Users" describes and lists properties and applications of insulating fire brick for temperatures ranging from 1600 to 2800 degrees Fahr. Typical applications are shown.

31. Live Centers

Ideal Commutator Dresser Co.—Illustrated folder No. LCS-1043 presents information on Triple Duty live centers featuring three inserts to be used interchangeably, depending upon type of work to be held. Other machine tool accessories, such as metal etcher, demagnetizer, grinding wheel dresser, electric tachometer and magnetic chuck are also described.

32. Welding Electrodes & Rods

Page Steel & Wire Div.—38-page illustrated digest No. DH 821 presents pertinent facts about company's complete line of electrodes and gas welding rods. Selection data, weld metal characteristics, physical properties and other data are given.

33. Stainless-Clad Steels

Ingersoll Steel & Disc Div., Borg-Warner Corp.—8-page bulletin "Ingaclad Stainless-Clad Steels" gives base prices and standard classification of extras. Weights, tolerances and size limits are given.

34. Tool Grinder

K. O. Lee Co.—8-page illustrated loose leaf insert bulletin No. CTG-43 describes Knock-Out universal carbide tool grinder and covers features and types of work for which it is recommended. Specifications are included.

35. Batch Cleaning

Optimus Equipment Co.—4-page illustrate folder No. 4 E 2 describes portable machine of dip agitating type, single and double loa and spray type. These can be used for clea ing, washing, paint stripping, rust prevention rustproofing, rinsing, chemical treatment a coating.

36. Aluminum Castings

Permold Co.—20-page illustrated referen data bulletin No. 45 PMC points out advan tages of use of permanent mold aluminum cas ings and offers suggestions to facilitate desig ing of parts for this process. Four tables gi nominal composition and physical properties Permold aluminum base alloys.

37. Broaching Machines

Oilgear Co.—16-page illustrated bulletin N 20000B presents data on line of fluid pow variable speed horizontal broaching machin for high speed, pull type internal and exter broaching. Specifications and dimensional d tails are covered.

38. Ventilating & Heating

Herman Nelson Corp.—12-page illustra booklet "Yesterday, Today and Tomorro discusses peacetime and wartime products, p duction facilities and distribution system company. Products include heaters, venti tors, fans and blowers.

39. Oil Reclaiming

Honan-Crane Corp.—10-page illustrated co pany publication "Clean Oil" is publish regularly and distributed to those concern with oil purification. Engineering developme and installations of equipment in this fi are described. Details are presented on reclaiming equipment.

40. Clutches

Hilliard Corp.—Three illustrated Bulle Nos. OR-1, MP-1 and CE-1 give details a application information on over-running clut es, friction clutches and centrifugal clutch Typical applications of these units to vario types of equipment are shown.

41. Electrode Holder

Harworth Mfg. Co.—4-page illustrated fol outlines construction, design, grip, insulat and operation of Har-Worth welding electro holder.

42. X-Ray Unit

Picker X-Ray Corp.—8-page illustrated b letin No. 1444 discusses Picker 50-KV indu trial x-ray unit consisting of x-ray tube, hig voltage transformer, control unit, enclosing ca inet and retractable hood. Dimensional d and applications are included.

43. Arc Furnace Equipment

General Electric Co.—20-page illustrated b letin No. GEA-4246 is entitled "Comple Electric Equipment for Arc Furnaces." I tails are given on controls, switchgear a transformers designed especially for this ty of service.

44. Vibration Control

Korfund Co.—12-page illustrated catalog N H-600 describes method of vibration cont for drop hammers, punch presses and oth impact machinery. Advantages of vibrati control and methods of installation of syst are discussed.

45. Clad Steel Plate

International Nickel Co.—12-page illustra bulletin No. T-4 "Methods for the Fabrication Clad Steel Plate" covers nickel-clad, Monel-cl and Inconel-clad steels. This technical bul tin covers all phases of fabrication and work and gives information on mechanical prop ties and other helpful information.

46. Cleaning Materials

Klem Chemical Works — 8-page bull "Klem Kleaners" lists and describes industr cleaning materials for rust removal, m cleaning and degreasing, metal preparation finishing, soldering and pickling and indust maintenance. Engineering service is offe

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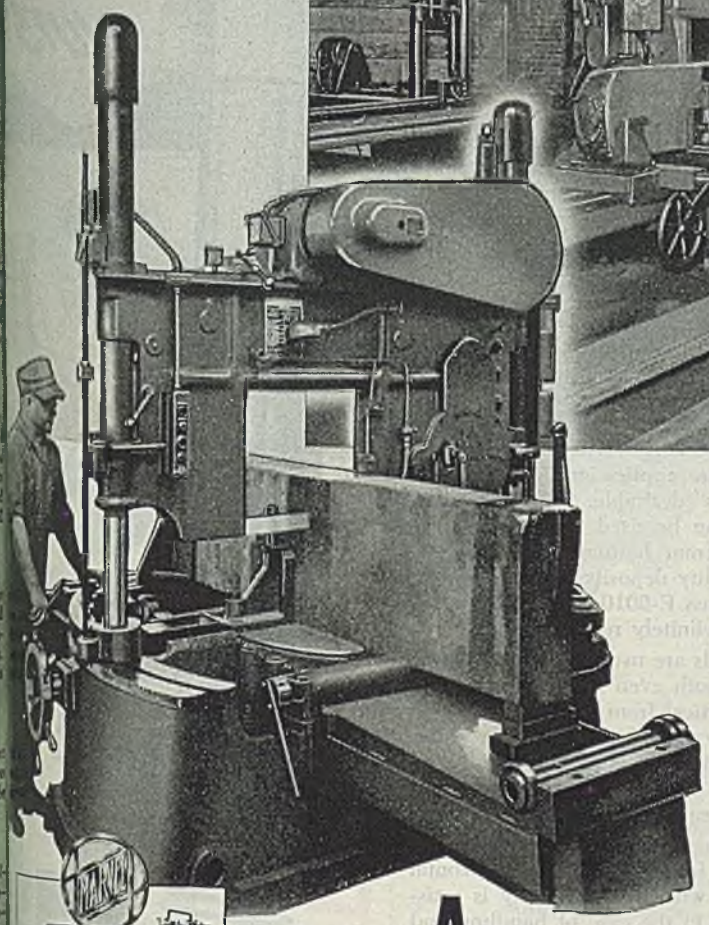

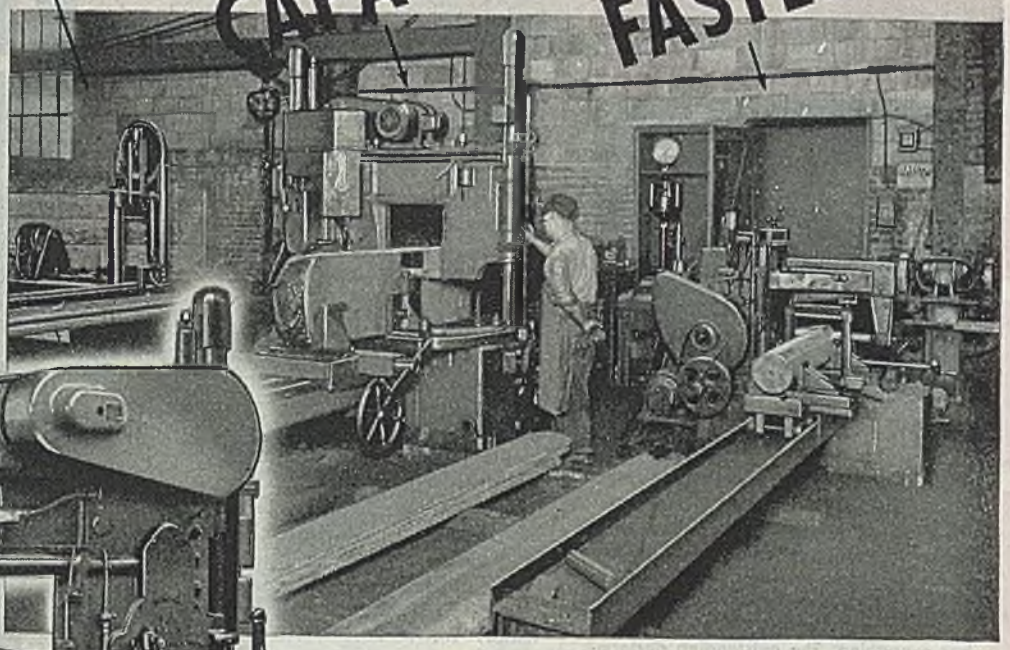

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ulation by the operator to minimize spatter and the tendency to undercut that is present in this class of electrode.

Covering thickness of this class is usually slightly greater than E-6010 electrode. A light friable slag is produced that is readily removed. Profile of fillet welds is relatively flat and beads have a rather coarse ripple. Welding current should be kept within recommended ranges, which are somewhat narrower than other classes. Radiographic properties of this class are excellent.

AWS Class E-6012: These electrodes are designed for general purpose welding in all positions with either alternating current or direct current and are characterized by a rather quiet type of arc having medium penetration and low spatter. Slag coverage is complete and is readily removable. Where single pass welds may meet radiographic requirements multi-pass welds usually contain a considerable quantity of generally scattered porosity. Due to the highly stabilized quiet type of arc, the production of welds of excellent appearance free from undercut can be made with relative ease. This class of electrode is used widely for making vertical welds from top down on applications where such technique is desirable. Class E-6012 electrodes can be used for making vertical welds from bottom up. However, for high quality deposits in the V and O positions, Class E-6010 and E-6011 electrodes are definitely recommended.

Fillet welds are usually convex in profile of a smooth even ripple in the horizontal or vertical from top down position and a widely spaced convex ripple in the vertical position welding up. Profile of fillet welds made vertically from top down in concave.

E-6012 electrodes are specifically recommended for single pass, horizontal fillet welds, where weld quality is satisfactory, due to the ease of handling and ability of this class of electrode covering to withstand high welding current. This class of electrode is probably the most satisfactory for welding work having poor fit up.

AWS Class E-6013: These electrodes are designed for welding in all positions with alternating or direct current. They are similar to the E-6012 electrode but possess some notable differences. Slag removal is somewhat better and arc stabilization is exceptionally high, facilitating striking and maintaining the arc with very small diameters (1/16-in., 5/64-in. and 3/32-in.). This indicates the obvious application of this class of electrode to relatively thin metals for which it is specifically recommended. However, the larger diameters are being generally used on innumerable applications. E-6013 electrodes have very soft arc and very light penetration, particularly in the smaller sizes. Sizes 1/8-in. diameter and larger have about the same arc force and penetration qualities as the E-6012 type.

Welds can be made in all positions (including vertical from top down) that are outstanding in appearance and have a minimum of spatter and tendency to

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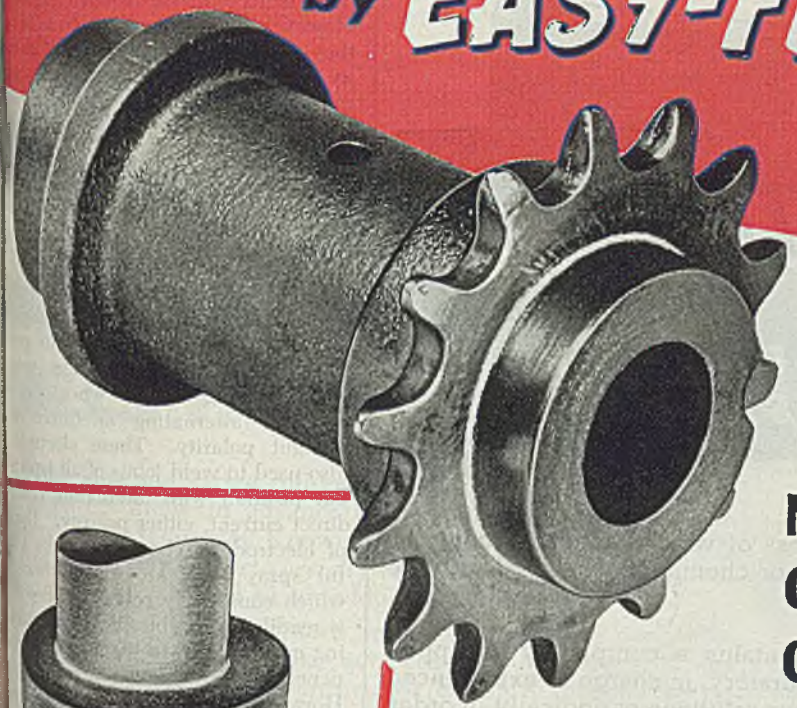

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undercut. Beads have smooth grain ripple and are polished in appearance (Exception: Vertical welds made from bottom up have coarse ripple.) Fillet welds are convex except those made vertically from top down, which are concave.

Mechanical properties of E-6013 electrodes are usually slightly better than E-6012, and in some cases meet the requirements of classes E-6010 and E-6011. However, because of their softer arc they are not recommended for high quality vertical and overhead welds which require the E-6010 or E-6011 classification to assure adequate penetration into the root of the joint.

Radiographic properties of this class are usually better than E-6012 electrodes, but contain slightly more porosity than is present in classes E-6010 or E-6011.

AWS Class E-6020: Electrodes of this classification are designed to produce high quality horizontal fillet welds at high welding speeds when used with either alternating or direct current straight polarity. These electrodes are also used to weld joints of all types in the flat position with alternating current or direct current, either polarity. This class of electrode is characterized by a forceful spray type arc and a heavy slag which completely covers the deposit and is readily removable. When normal welding currents and technique are employed penetration is considered to be medium. However, this class of electrode is widely used for operation at high current and high travel speed, which results in deep penetration.

Fillet welds are of exceptional appearance and have a flat or slightly concave profile and a smooth even ripple. They are characterized by minimum spatter and tendency to undercut. Radiographic properties are excellent.

AWS Class E-6030: These electrodes produce high quality welds in the flat position. They are similar to E-6020 electrodes, having forceful spray type arc and suitable for operation on alternating or direct current, either polarity. They have somewhat less slag than E-6020 electrodes, which facilitates welding in confined U-grooves. Slag coverage is complete and slag removal is easy. Appearance of deposit is outstanding, concave fillet or groove welds made in flat position washing smoothly into sides of joint with minimum tendency to undercut. Spatter loss is exceptionally low. E-6030 electrodes are recommended for welding all types of joints in the flat position with the possible exception of the finish pass on grooves or butt welds where slag coverage may not be adequate to obtain optimum appearance. For finish pass, E-6020 electrodes are generally recommended as they develop greater slag coverage and improve appearance of finish pass. Table III is presented to correlate the deposit characteristics of the various AWS classifications.

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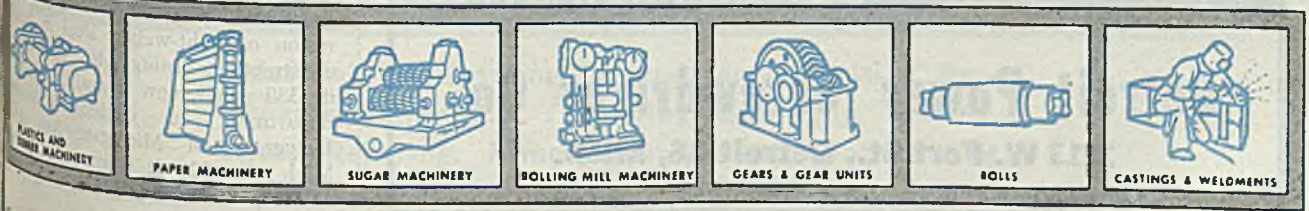
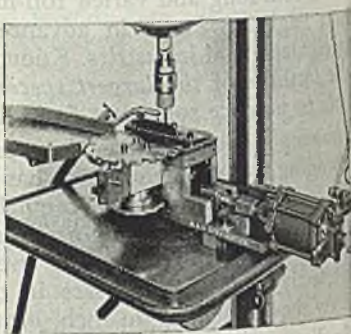


the development of the A-233 specifica tions. They fill an urgent need for suc classifications. The user of welding shoul have a thorough knowledge of the sp cifications. Such knowledge will not onl dispel much of the mystery that h shrouded the welding industry, but wi save the user's time and give him assu ance that he is using the right electro for the job.

Machining Problem Solved With Air-Operated Fixture

Development of a more efficient a operated holding fixture has been a nounced by K M & H Corp., Fort Wayn Ind. Originally designed to elimina difficulties encountered in tapping hea treated aircraft parts, the same tec nique is also being effectively appli to various other machining operatio such as drilling, reaming, counter sin ing and milling.

In tapping operations the fixtu works entirely from the "A" surface the nut, holding it square to the axis



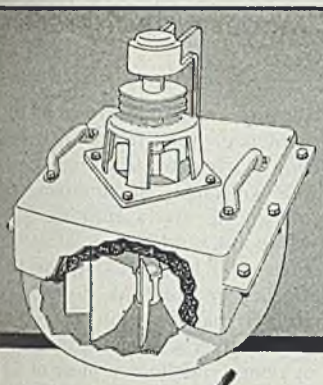
the tap to within 0.001 or less total ind cator reading. The entire assembly co sists of a double action air cylinde a plunger which is made hollow permit effective disposal of chips, pawl and indexing mechanism cam a seat mounted on a suitable frame. coolant pump supplies a flow of cutti oil to the tap, and also serves as an e fective means of removing the chips.

Successful operation on 35 to 40 line pressure is obtained by use of a to 1 ratio cam operated by an air c linder having a 4.9 to 1 power increa over regular factory air line pressur The index mechanism is operated b the return stroke of the double acti cylinder.

This fixture enables one operator tap over 18,000 ¼-28NF3 aircraft nu in an 8-hr shift.

—o—

A digest of information and bibl graphy relating to the atmospheric co rosion of light-weight steel in buildi construction, listing 1467 references its 333 pages, now is available from t department of engineering researc University of Michigan, Ann Arb Mich., for $2. It is known as Bulle No. 30.



This shows circulating fan assembly which may be removed in one unit by unscrewing 6 bolts.

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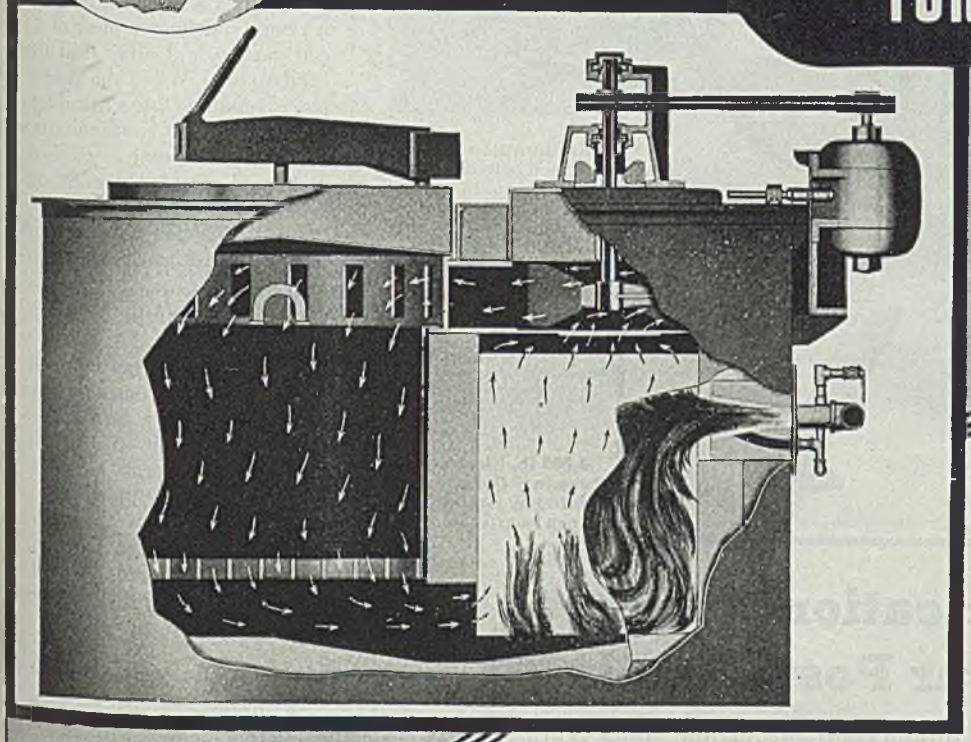

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Modern Heat Treating

(*Continued from Page 122*)

through a temporary range. For co venience, this range has been term the martensite transformation range, the A_r range; the temperature at wh martensite starts forming is termed M_s point, and the point at which tra formation is finished is the M_f point. Carpenter and J. M. Robertson's work shown that austenite transforms to m tensite over a range of temperature wh is characteristic for most of the comm cial carbon and alloy heat treated str tural steels. When the steel is quench by exceeding the critical cooling r transformation of austenite is suppres until the M_s point is reached, then f mation of martensite starts and contin as cooling progresses. When the point is reached, the austenite is co pletely transformed to martensite.

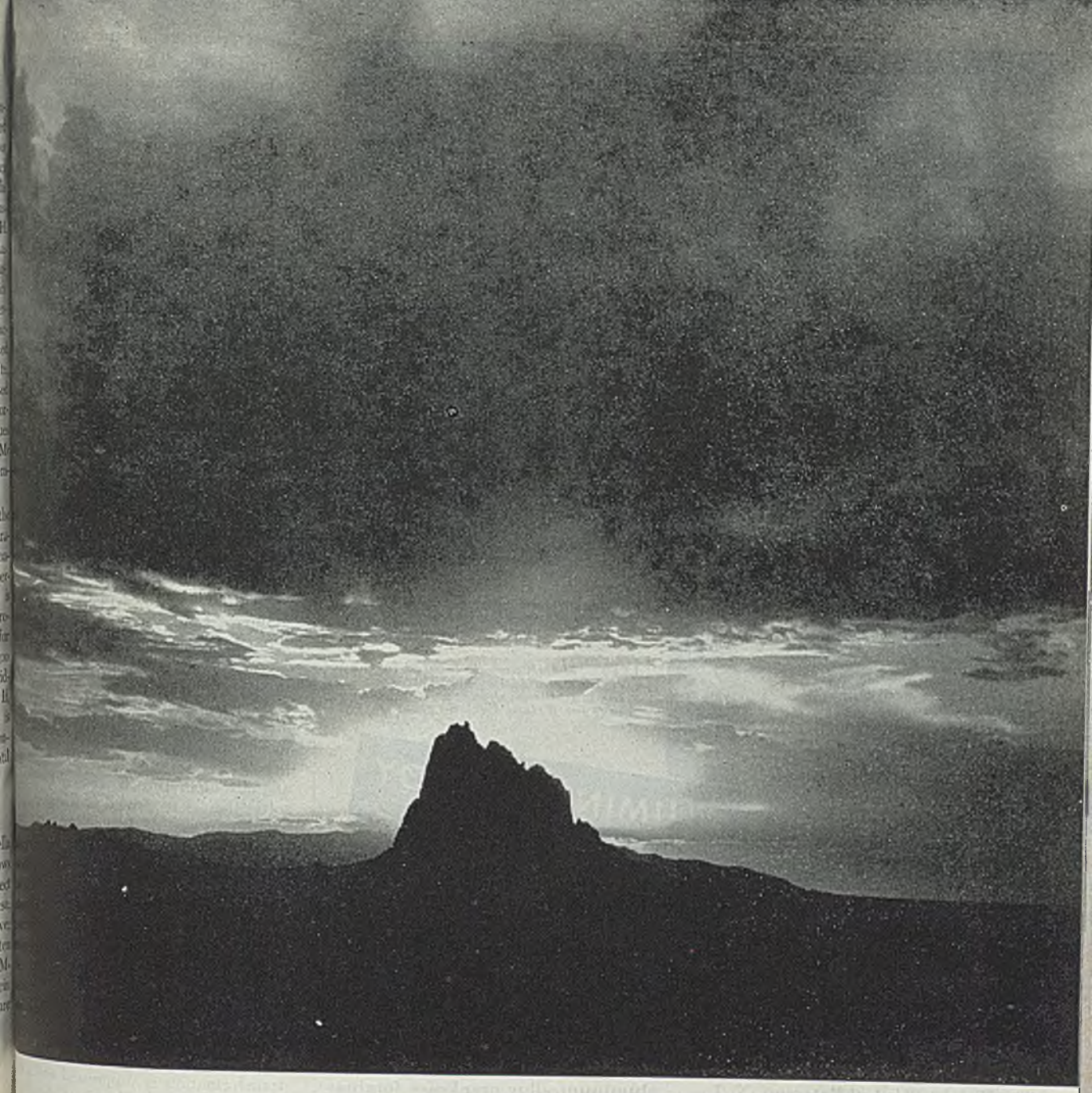
If, in the process of quenching, cooling is interrupted at some tempe ture within the martensitic transfor tion range, then transformation is int rupted. If a constant temperature held, isothermal transformation will p gress slowly; but the time required complete transformation would take long to be of any practical use or cons eration in commercial heat treating. after interrupting the quench, cooling then continued, austenite will again c tinue to transform to martensite u completed.

Carapella Formula

A formula devised by Louis Carap to determine the M_s point of a steel sho that carbon has by far the greatest eff in depressing the M_s point; mangane chromium and nickel are less effecti and silicon, molybdenum and tungs are least effective. This formula is 925 F x f_c x f_{Mn} x f_{Si} x f_{Ni} . . . wher the factors for the various elements computed as follows:

f_c	1—0.620 per cent carbon
f_{Mn}	1—0.092 per cent manganese
f_{Si}	1—0.033 per cent silicon
f_{Ni}	1—0.045 per cent nickel
f_{Cr}	1—0.070 per cent chromium
f_{Mo}	1—0.029 per cent molybdenum
f_W	1—0.013 per cent tungsten
f_{Co}	1—0.120 per cent cobalt

It provides means for determining M_s point which is the most es ential in termining temperatures for the interru ed quench, but very little work has b contributed whereby we might determ the M_f point, when the transformat is completed. For most commercial st this point is above room temperatu however, there are a number of high loy steels, such as carburized AISI S series, and high speed tool steels w which the M_f point is lower than atm phere temperatures. The theory of tra formation taking place through a t perature range still applies, and in or to obtain complete transformation these steels which have a low M_f poin often necessitates cooling to some s



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This is the dawn after a long night of unholy death . . . in which decent men without hate had to cloak themselves in hatred and die in the crushing of those who fostered hate.

Let us then, as individuals and as partners in the proud American enterprise, be humbly and eternally grateful to those who sacrificed their lives and to their comrades who, thank God, will return to us.

Let us resolve to make this Tomorrow for which we have prayed so long worthy of their travail.

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zero temperature in the cold chamber.

Steels cooled by the usual quench method are transformed during the cooling. They do not transform uniformly as compared to holding at a constant temperature permitting isothermal transformation. It has been found that transformation during continuous cooling and isothermal transformation have a definite relation which can be evaluated. If transformation curves for continuous cooling and constant temperature be superimposed, the beginning and end curves for the continuous cooling curve will be somewhat below and to the right of the constant temperature or isothermal curve. Since it has been determined that there is a definite relationship between the two types of cooling, the isothermal diagrams, which are available for a number of steels, can be used with a reasonable degree of accuracy to predict the time-temperature and resulting product.

Interpretation of the various cooling rates in regard to time-temperature and the resulting products can be illustrated by the schematic Fig. 3. The S curve indicates what takes place while steel is cooling. For example, steel cooled at a very slow rate, as in annealing, is indicated by the curve B. When the steel reaches the temperature at B_1, transformation to pearlite begins; and as cooling proceeds, transformation continues. When the temperature reaches B_2, the transformation is completed. Pearlite formed at the temperature B_1 will be coarser and softer than that formed at temperature B_2. The hump part of the cooling curve shows that a certain amount of heat is liberated due to the transformation.

A more rapid rate of cooling, as in normalizing, or air cooling, is indicated by curve C. The formation of pearlite is similar to that in curve B, but the pearlite which is formed at C_1 will be finer and somewhat harder. The pearlite formed at C_2 will be still finer and harder. With a still faster rate of cooling, indicated by curve D, the start of the austenite transformation is suppressed and a slight heat evolution is noticed at about 1000°F; at this point partial transformation takes place into a constituent of nodular pearlite, often termed primary troosite. The remaining austenite is suppressed from transformation until the temperature falls to the M_s point, when martensite begins to form in a process which is completed at the M_f point or at about room temperature. The resulting product will be a mixture of pearlite and martensite The product from cooling curve E will be somewhat similar to that from curve D, except that more martensite and less pearlite is formed. With an accelerated cooling curve G which exceeds the critical cooling rate, the transformation will be detected as beginning at the M_s point and completed at the M_f point. This results in the formation of a martensitic structure, or maximum hardness.

As pointed out, there is a minimum rate of cooling at which maximum hardness in any given steel can be attained

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This rate of cooling, passing in front of the nose of an S-curve, is termed the critical cooling rate. Critical cooling rate of carbon steels is known to vary with the chemical composition, grain size and the details of manufacture. Increase of carbon content from 0.20 per cent to 0.83 per cent lowers the critical cooling rate. With increase in carbon content above 0.83 per cent, the critical rate increases slightly.

Addition of certain alloys greatly affects the critical cooling rate of the steel, while others such as vanadium have very little effect. However, most of the common alloying elements, such as nickel, manganese, molybdenum and chromium, lower the speed of cooling required for full hardening. Fig. 5 shows the comparative initial transformation of plain carbon 0.50 per cent, SAE 5140 and 4140 steels. As alloying elements are added to increase the hardenability the position of the S-curve is moved to the right, lowering the critical cooling rate. Full hardness requires a critical cooling rate of approximately 2 sec for SAE 5140 steel with 0.90 per cent chromium, nearly 3 sec for SAE 4140 steel with 1.00 per cent chromium and 0.2 per cent molybdenum. This well illustrates the fact that if the hardenability is increased, the position of the S-curve is moved to the right and the critical cooling speed is slower. There is, therefore, a definite relation between the position of the S-curve and hardenability.

The slow critical cooling rate of alloy steels has many advantages, since maximum hardness can be obtained with slower cooling rate; larger pieces may be quenched to full hardness, higher fatigue and tensile strength and greater deformation are obtained.

Influence of section continually must be borne in mind during the consideration of any heat treating process. The structure produced is in a large measure directly related to the rate of cooling and it is evident that under any condition large sections will cool at a lower rate than thin sections. Equivalent structure can be produced only by using a faster quenching medium to neutralize the effect of the larger sections, or by changing to a material which has a lower critical cooling rate. Size of section and the severity of the quench have an influence in the occurrence of the common quench crack and the less familiar microscopic cracks. Each crack lowers the ductility and fatigue life of the part, resulting in early failure. Martensitic cracks are caused by internal cooling strains and are often accompanied by warpage or distortion. Martempering, austempering and the interrupted quenches eliminate these "gremlins" in heat treatment.

Increases in grain size are known to increase the hardenability of the steel. A coarser grain size shows slower transformation in the S-curve, also reduces affects any of the hardenability factors. The mention of coarse grain should not be confused with the steel producer's practice of classifying heats of steel

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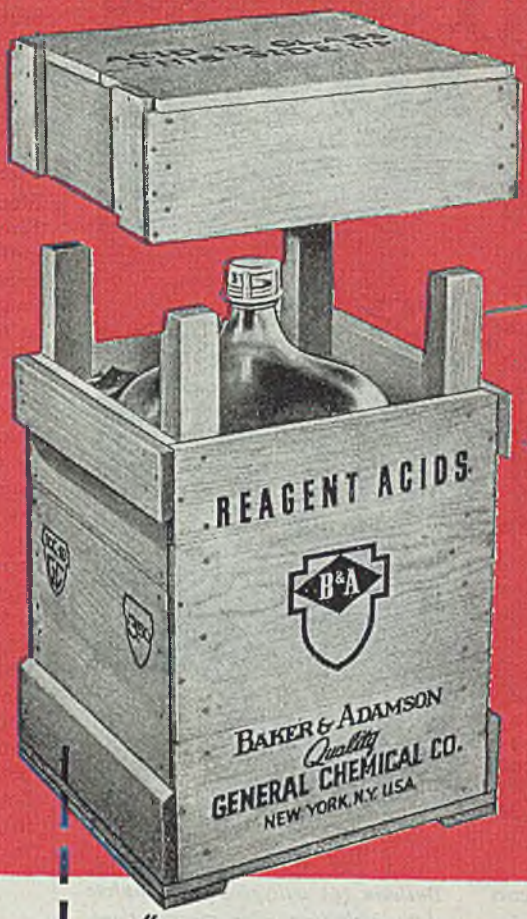

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In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver

either coarse or fine by a grain size test run at 1700° F. When a heat is classified as coarse or fine-grain steel, it indicates that the heat is fine or coarse-grained at the temperature of 1700° F. This means that the fine-grain heat will have a finer inherent austenitic grain size at the usual heat treating temperature and a coarsening temperature above 1700° F, whereas the coarse-grain steel will be coarsest at heat treating temperature and will start coarsening at a lower temperature than will fine-grain steel.

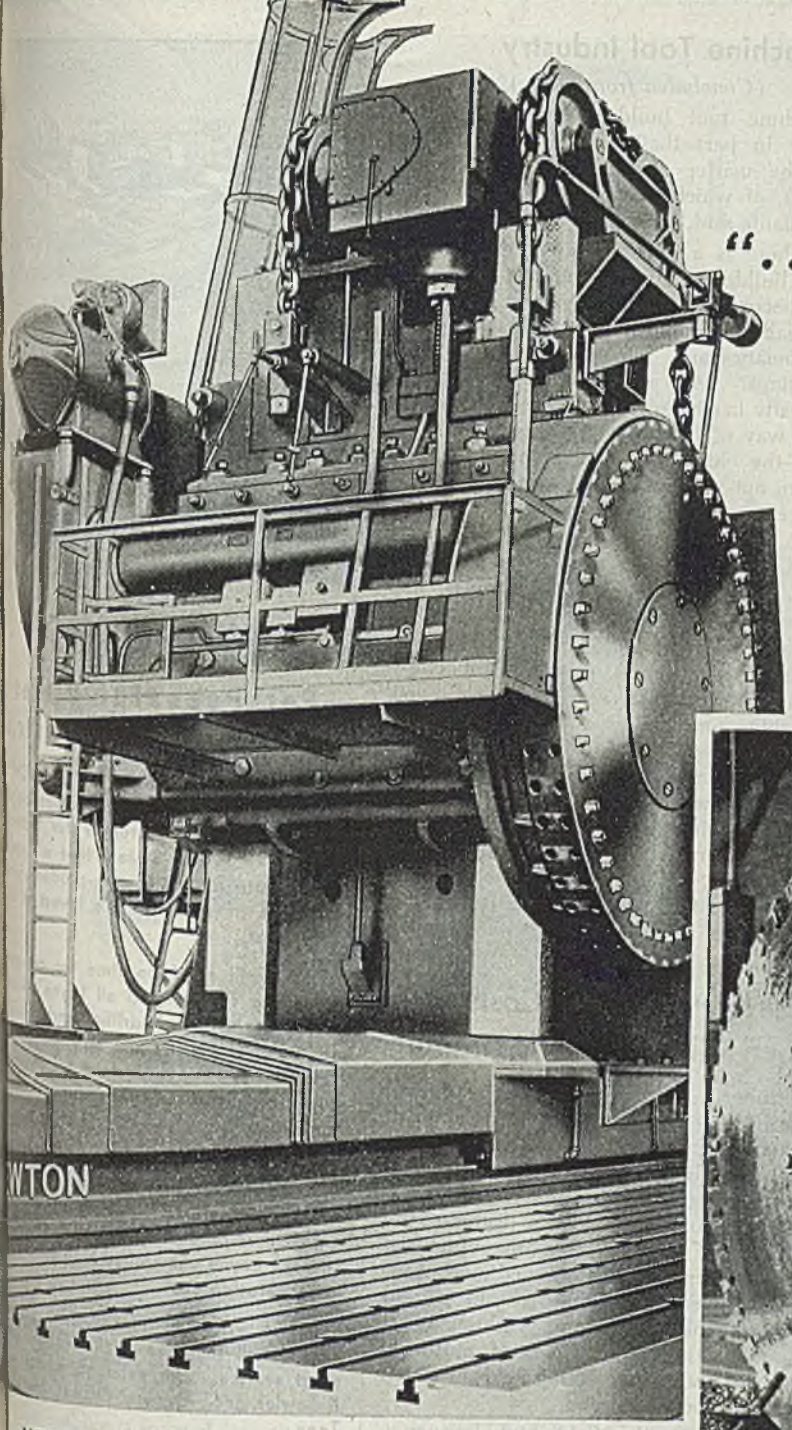
G. V. Cash, T. W. Merril and R. L. Stephenson in 1940 presented a paper before the American Society for Metals entitled "Effect of Deoxidation on Hardenability". Their work showed that hardenability was a function of the grain size at the heat treating temperature, and the relation of hardenability to grain size was found to be independent of the method of deoxidation. In order to obtain both coarse and fine-grain steels for this investigation and at the same time eliminate as many other variables as possible enough aluminum was added to one ingot of each of several coarse-grain heats to make that ingot "fine grain" in the McQuaid-Ehn sense. In addition to the coarse and fine-grain heats produced by deoxidation in the mold, two heats of matched analysis, one made coarse and the other fine by regular ladle deoxidation, were selected. Typical results from one of the heats of the depth of hardness plotted against fracture grain size for both fine and coarse grains were as shown in Fig. 4.

(*Continued next week*)

Test Code for Evaluating Bearing Greases Advocated

A test code, evolved from laboratory performance tests duplicating severe service conditions, has been suggested for evaluating ball and roller bearing greases for electric motors. H. A. McConville, engineer of the General Electric Co., Schenectady, said that many ordinary grades of grease are satisfactory for about 95 per cent of the bearing applications, but the 5 per cent of bearings which operate under unfavorable conditions such as extremely high speeds, high or low temperatures, etc., are the ones that cause trouble. The selection of a grease that will give satisfactory lubrication over all ranges of conditions is the aim of most grease consumers.

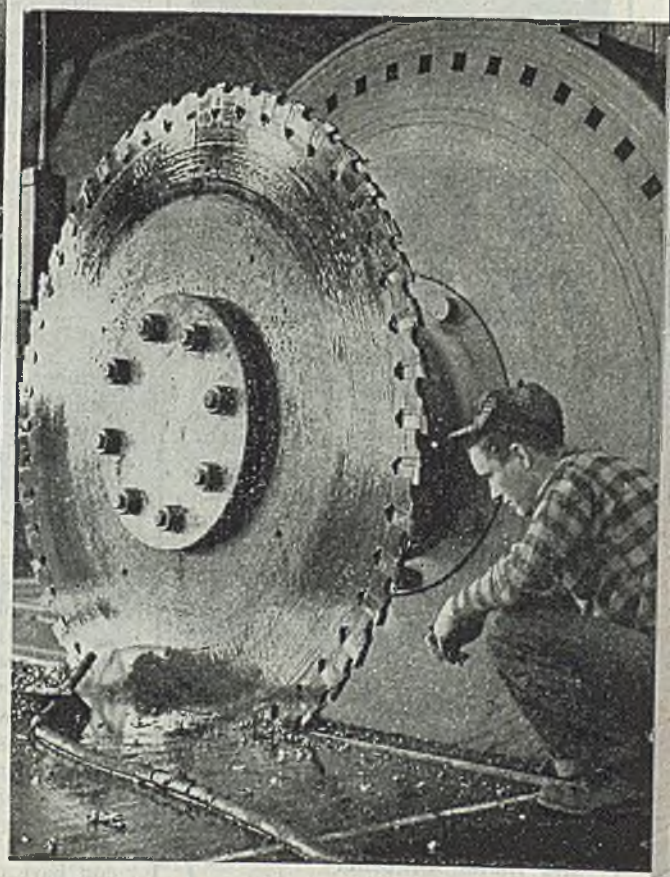
Mr. McConville outlined the test procedure used by General Electric in the hope that it might be of value to industry. At the conclusion of the laboratory test run, the bearings are inspected for noise and wear and the grease for changes in properties which occur as the result of service. These may include increase in acidity, lowering of dropping point, change of consistency, separation of free oil, and leakage or formation of gums and resins. A check is also made for the presence of foreign particles.



NEWTON COMBINATION COLD SAW AND 106" ROTARY PLANER

"... like a knife through cheese"

CUTTING HEAVY BATTLE-SHIP ARMOR PLATE



This Newton Combination Cold Saw and Rotary Planer, designed for cutting and machining tough steel plates, is but one of the many types of giant machines built by Consolidated. Other Newton Hydraulic Cold Saw Machines are built in a design range for handling all types of work in ferrous or non-ferrous metals. Built in sizes to accommodate blades from 32" to 120" diameter.

BETTS • BETTS-BRIDGEFORD • NEWTON • COLBURN • HILLES & JONES • MODER

CONSOLIDATED MACHINE TOOLS

CONSOLIDATED

MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK

Machine Tool Industry

(*Concluded from Page* 126)

machine tool builders consider to be only in part their responsibility. This is the matter of built-in chip disposal units, of which 62.4 per cent of our informants said, "Yes, we want them."

There is a general agreement among the builders that equipment of this kind is becoming increasingly necessary, especially in connection with high speed automatics and "superspeed" milling operations. As a matter-of-fact, much already has been done by the industry in the way of built-in conveyors, "sluicing" out the chips with coolant, and sucking them out with "vacuum cleaner" devices. An example of the latter is presented by Fig. 1, which shows one of a battery of Gisholt automatics on a dry cast iron job, with vacuum exhaust around the chuck area.

"Certainly, we have perfected a system for continuous expulsion of chips from the beds of our machines," one machine tool builder told me, "but into what are we to 'pump' them? We find ourselves in about the same position as a group which developed a successful system of indoor plumbing facilities before community sewage systems were established. We do get the chips out. It is up to the plant engineers to handle them from there on."

Lower Production Costs Seen With Dielectric Heating

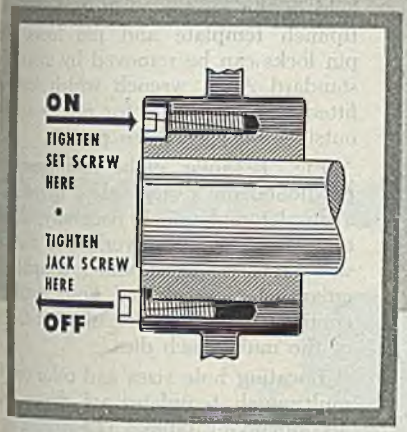
Proper industrial application of dielectric heating can increase production two to ten times that obtained by other methods, according to Carl J. Madsen, electronics engineer of the Westinghouse Electric Corp., as well as decrease the number of rejects of a manufactured item and result in an improved final product. Dielectric heating is said to aid in curing plastics, setting synthetic binders in making large sheets of multi-ply plywood and in many other fields in which it is now being applied.

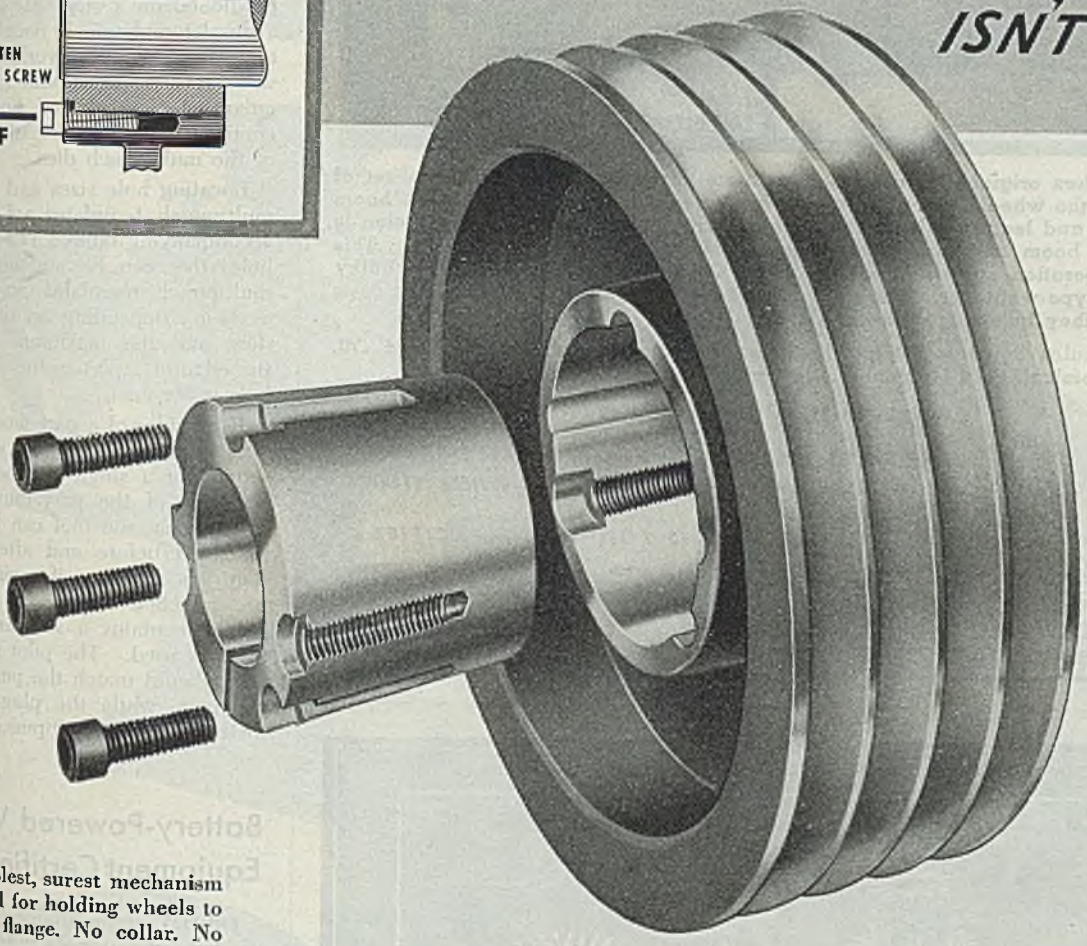
In the inductive field, high frequency heating has found wide applications in case hardening of gear teeth and bearings, in brazing, soldering and heat-treating. In heat-treating, savings amounting to 20 per cent of time and cost have often been realized, according to Mr. Madsen.

Another application of induction heating is the case hardening of vital airplane parts for purposes of special protection. By varying the frequency and time, the depth of the case may be controlled to within a few hundredths of an inch.

Mirror-smooth tin plate, applied in a continuous process line at speeds over 1000 fpm, has produced a two-thirds saving of our war-scarce tin by this new electronic development. Mr. Madsen predicts a wide application of high-frequency heating in industry, with improved production at much less cost.

Simple, ISN'T IT?





- The simplest, surest mechanism ever devised for holding wheels to shafts! No flange. No collar. No protruding parts.
- The Taperlock Sheave mounts as a complete unit. Slip it on, line it up and tighten *while sighting*. It's in place on the first try!
- The bushing is wedged into the sheave by means of set screws—with a firmness equivalent to a drunk-on fit—whether the shaft is standard or normally undersize.
- The Taperlock runs *true*. The bushing extends the entire length of the hub; it provides a *full* bearing surface.
- Close mountings are made possible. No flange nor collar nor other device is required at either end of the sheave hub.
- The Taperlock "unlocks" with less effort than any other sheave—due to its special taper.
- Taperlock Sheaves will be stocked by Dodge Transmissioneers in principal cities—and will be available in ALL stock sizes.

New TAPER-LOCK *Sheave*

PATENT APPLIED FOR

Easy on—easy off—locks fast to the shaft! ALL the advantages you've ever dreamed about in a sheave are *here*—in the simplest, quickest acting mechanism ever developed for the purpose!

For full details call your local Dodge Transmissioneer. You'll find his name listed under "Power Transmission Equipment" in your classified telephone directory. Or write

DODGE MANUFACTURING CORPORATION, MISHAWAKA, INDIANA

DODGE
MISHAWAKA

SIGN OF THE DODGE TRANSMISSIONEER
There are 257 Dodge factory graduate Transmissioneers, located in principal cities, to show you NEW and BETTER ways of transmitting power. See your local classified telephone directory.

Multipunch Innovations

(*Concluded from Page 132*)

held in the proper positions by the multipunch template and pin locks. The pin locks can be removed by means of a standard Allen wrench which has been fitted with a handle for insertion in the outside loops of these parts.

Fig. 1 shows eight multipunch dies positioned on a steel plate by means of a dural template. If necessary, old drill templates can be reworked so that they will serve as multipunch templates by enlarging their drilled holes until they conform with the dimensions of the tops of the multipunch dies.

Locating hole sizes and color code for multipunch templates are shown in the accompanying table. The spacing of the holes that can be punched while using multipunch templates may be as little as ¾-in., depending on the sizes of the dies, and the maximum distance from the edge of a part to the center line of a hole is 8½ in.

If all sides of a part must be punched it is necessary to make two multipunch setups for a single job because at least one side of the part must be open or free so that the tool can be loaded and unloaded before and after each operation. In addition, if a single part must be punched twice, a locating plug (which contains a standard counterbore pilot) is used. The pilot in the locating plug should match the punched holes in the part, while the plug shank should match holes in multipunch template.

Battery-Powered Welding Equipment Certified by Army

Official certification of dependability of battery-powered resistance welding equipment for spot welding aluminum sheet has been issued by the Army Air Forces Air Technical Service Command to Progressive Welder Co., 3050 East Outer Drive, Detroit 12. Tests were conducted on welding of 24 ST Alclad in gage combinations of 0.051 to 0.051 in. and 0.051 to 0.063 to 0.051-in. Welding tests also were performed on a rocker arm type aluminum welding machine powered by a standard 16-cell storage battery power-pack. Consistent shear strength above the minimum required by specifications was obtained. Radiographic checks of all test welds also showed no apparent defects, and welds showed good symmetry and uniformity under microscopic examination.

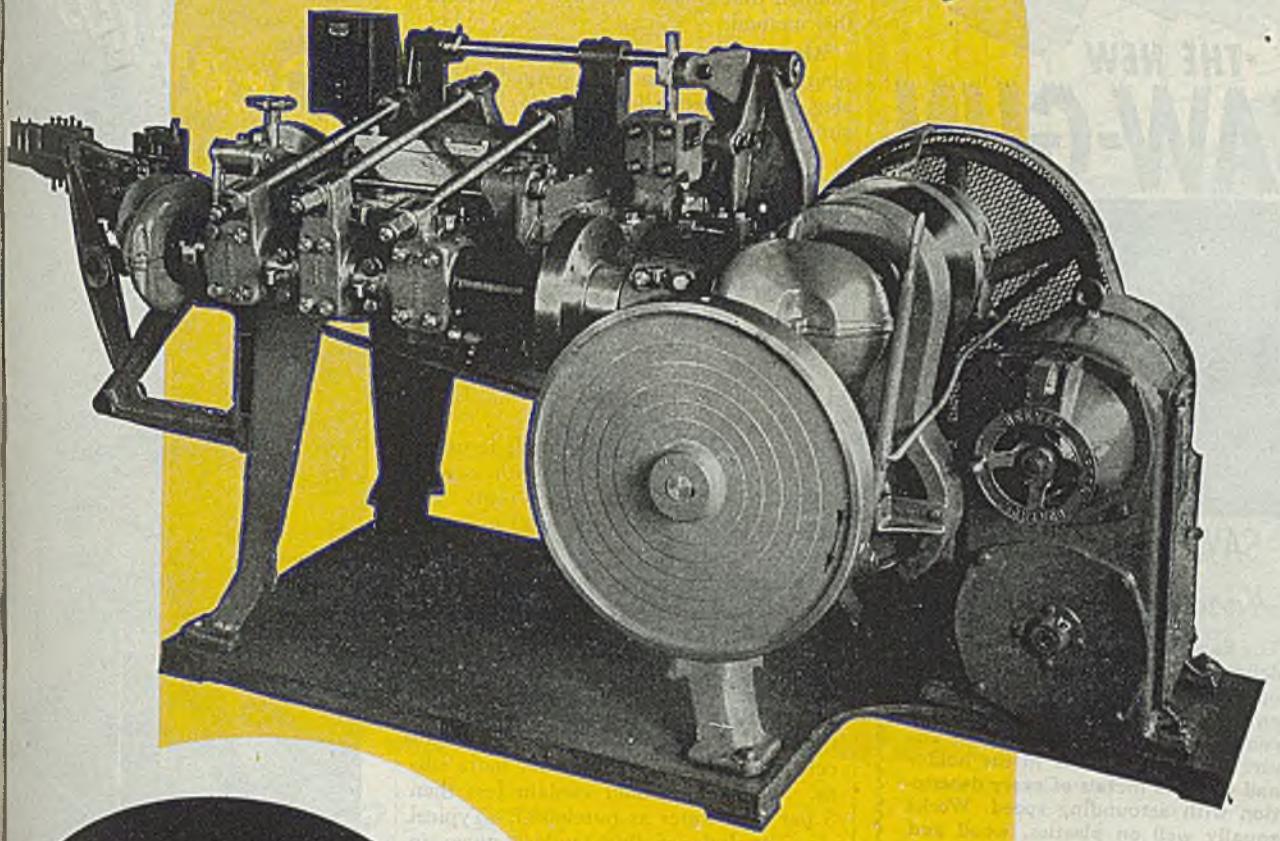
Certification (No. RW-185-P-2) was issued in connection with authorization to use the equipment for assembly welding of wing flaps for P-38's on battery-powered welding machines.

—o—

Some bronze alloys now are produced by a continuous casting process in long length rods of superior quality. They are adapted to fabrication on automatic screw machines.

NILSON

automatic metal wire forming machine



The Nilson line includes machines for forming paper clips, buckles, gate hooks, coat and hat hooks, ceiling hooks, wire ears, cable rings, screw eyes, sash chains, automobile slide chains, flat open link chains, staples, cotter pins, hose clamps, etc. Nilson also makes wire straighteners, wire reels, frame bending machines and special presses.

The machine pictured here is a simple and ingenious contrivance. Sturdy, solid, compact, requiring little space, it is a highly efficient and practical machine for forming wire and punching patterns from ribbon stock. Various patented features and extra attachments make it a necessary factor in reducing the manufacturing cost of your product. The Nilson automatic metal wire forming machine turns out the work faithfully, accurately and speedily—and it functions a long, long time free from repairs and replacements.

THE A. H. NILSON MACHINE COMPANY
BRIDGEPORT, CONN.

Thermit Casting Technique

(*Continued from Page* 137)

then is skimmed off with a skimmer and poured into the casting molds. If desired, a small amount of dry silicon sand may be spread over the metal and slag in the pouring ladle to thicken any remaining slag and to facilitate skimming. Some prefer to use two receiving ladles, the slag first being skimmed in one ladle and the steel into the other and again skimmed of any residual slag. It is claimed that cleaner castings result from this method.

After the steel is reduced to a proper pouring temperature and purged of all slag, the material is cast into the desired shapes.

Molds, risers, and cores used for Thermicast castings are the same as those usually recommended for steel castings produced by conventional methods. Provided a transfer pour method is used, it has been found that green sand molds, air skin-dried, are satisfactory.

A type of synthetic molding material which has enjoyed considerable success in the production of castings from Thermicast is as follows:

Bentonite: Western, ground, foundry grade, 2½ to 3½ per cent, with a recommended first try at 3 per cent. Its specification as to fineness is 95 per cent through a No. 200 mesh screen.

Dextrine: Foundry dextrine, such as Globe #152 (Corn Products Refining Co.) 1.2 to 1.5 per cent, with a first try at 1.3 per cent.

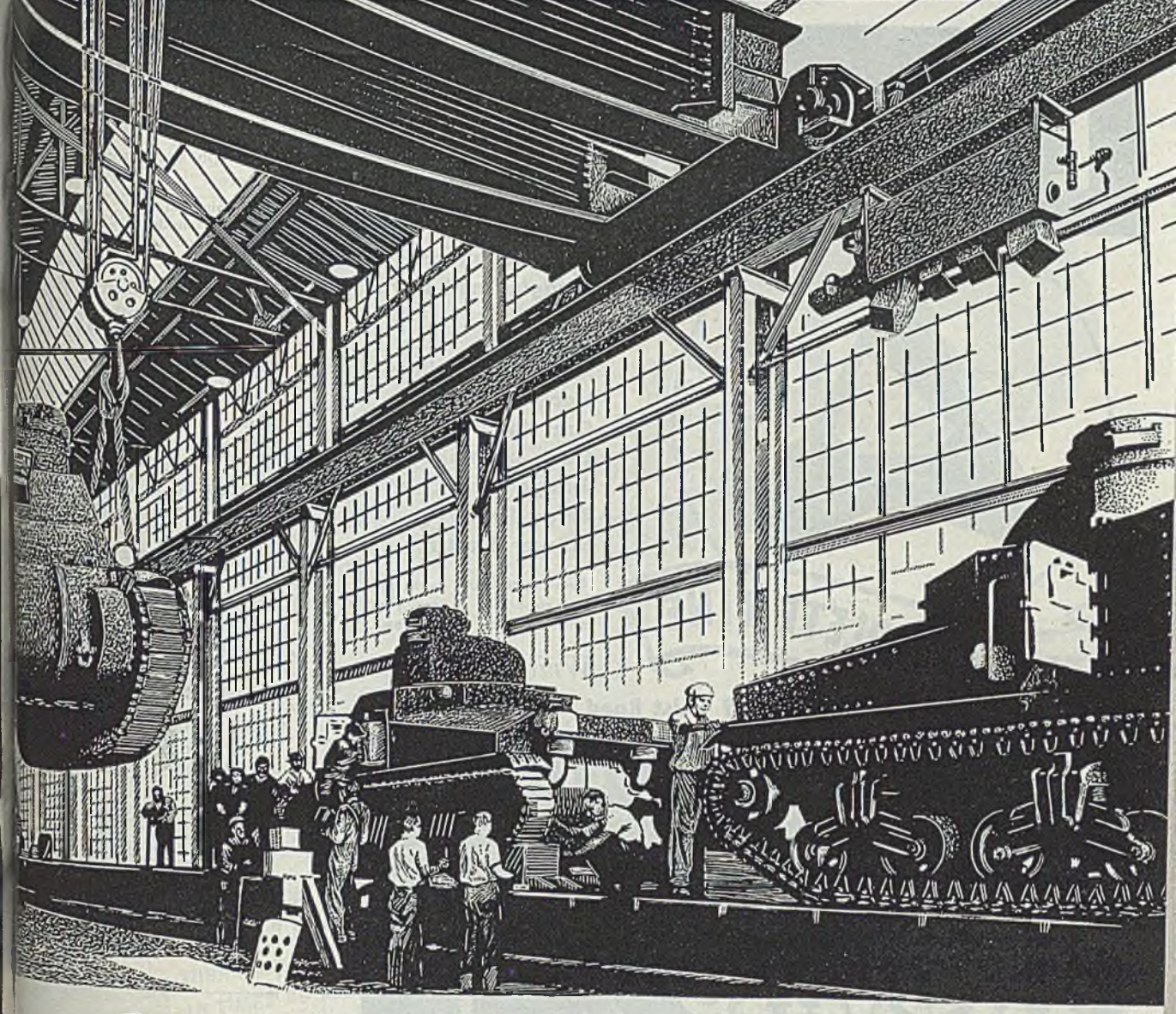
Sand: Washed and graded silica having an AFA grain fineness number between 60 and 80, with less than 1.0 per cent clay and 98.5 per cent or more silica. The sand should contain less than 3 per cent water as purchased. Typical sieve analysis of this sand is given in accompanying table.

Water: 3.0 to 4.0 per cent, with a recommended figure of 3.5 per cent. These percentages are by weight, exclusive of the water.

Using standard mixers, the sand and binders are first mixed dry for 1 min and after the water is added, mixing is continued for an additional 5 min.

As a first mix, the recommended percentage of each of the ingredients are first to be tried. Bentonite increases the green sand strength. If the sand is too stiff, the bentonite content should be decreased; conversely, if too weak, the bentonite should be increased. Corn flour is added to give the mixture a soft texture and, incidentally, it slightly increases the green strength. If the sand is too spongy, the corn flour should be decreased. When dextrine is added, improved dried strength and surface hardness result. If the sand can be rubbed off the mold too readily, dextrine should be increased. Again, if the molds are so strong as to be difficult to shake out after they are poured, the dextrine can be decreased or the water content of the backing sand reduced.

A typical chemical analysis of the steel



Welded Crane Rails SMOOTH THE WAY FOR MULTI-TON LOADS

Crane runway rails are generally a source of high maintenance costs due to the constant pounding absorbed by mechanical rail joints. The crane and structure are also subjected to repeated shock and vibration, resulting in broken wheels and added maintenance of fixtures and electrical systems.

Operators of heavy cranes have found the answer in Thermit welding of rail joints which transforms the rails into continuous ribbons of steel over which the cranes glide without a jolt or a jar.

Thermit welded joints are good for the life of the track. The welding may be done on the runway or on the ground by your own crew under the supervision of an M & T engineer. Send for new booklet, "Thermit Welding of Crane Runway Rail" which describes the process in detail. Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

Thermit Welding

produced from Thermicast material is as follows:

C	0.25	Al	0.60
Mn	0.68	S	0.02 to 0.04
Si	0.11	P	0.02 to 0.04

Typical physical properties of the steel as cast are:

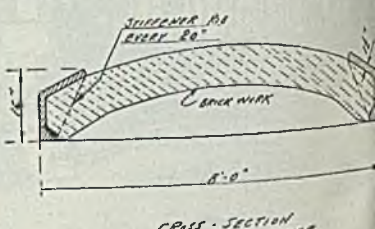
Yield Point, psi	39,250
Tensile Strength, psi	70,200
% Elongation in 2 in.	23.3
% Reduction of Area	31.8

The Thermicast mixture is put up in bags of 41 lb gross weight, each of which produces approximately 25 lb of steel.

Adaptability of the process to a variety of designs is demonstrated by products shown in Figs. 1, 6, 7 and 8. Torpedo propeller casting in Fig. 1 indicates that sharp edges may be obtained readily. Fig. 8 shows how Thermicast process can be used to duplicate parts. Here the original broken part became the pattern for a new casting. Valve wheel handle, and gear box and cover Figs. 6 and 7, respectively, are other products showing versatility.

Meehanite Castings Used for Soaking Pit Covers

A new application for Meehanite castings is in construction of soaking pit covers. As steel castings were unobtainable, engineers at Pohlman Foundry Co. constructed pit covers for side beams



CROSS-SECTION SOAKING PIT COVER

end beams and center brace, from Meehanite castings. Overall dimensions of covers were 13 x 8 ft, as shown in the accompanying illustration. Ten complete covers were cast and eight put into immediate service. Also, base plates upon which furnaces were supported during construction were cast in Meehanite.

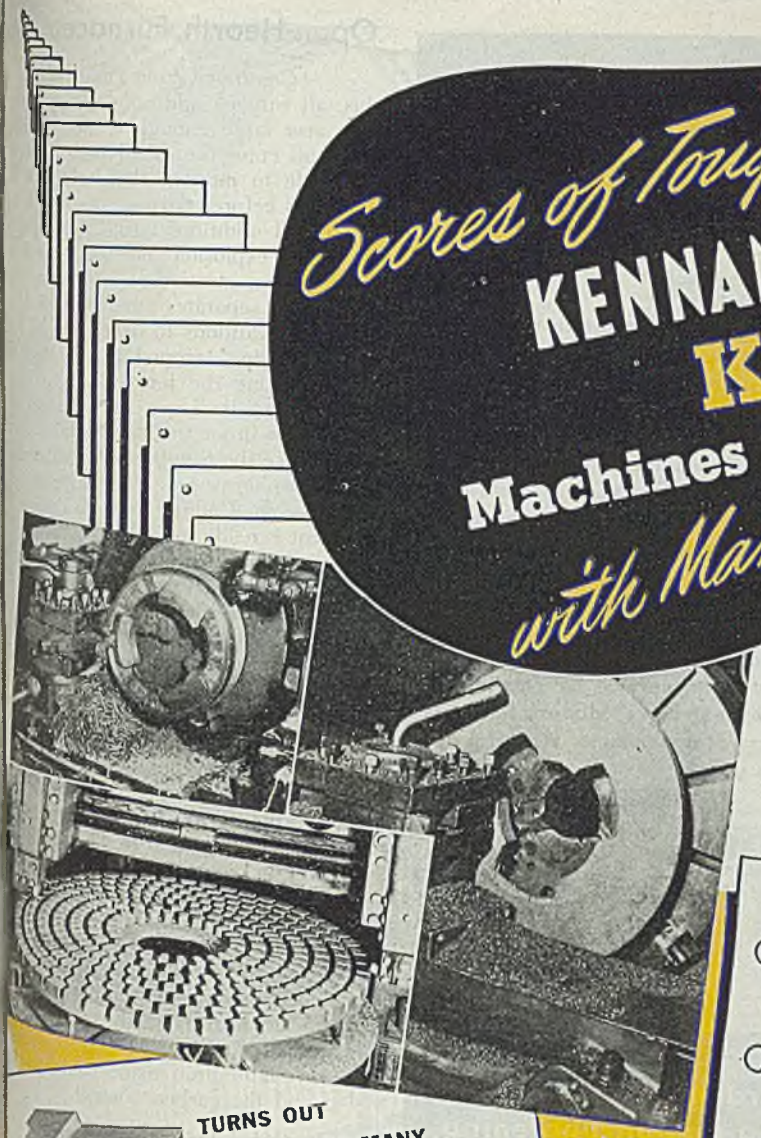
Simplified Carbon Brush List Now Available

Printed copies of Simplified Practice Recommendation R120-45, Carbon-Brush Terminals (Electric), and Miscellaneous Publication No. 180, Guide-chart for Carbon-Brush Terminals (Electric), are now available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 5 cents.

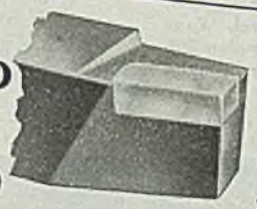
This illustrated recommendation, effective since July 15, 1945, has a practicable simplified list of stock sizes, types and varieties of carbon-brush terminals to satisfy normal requirements for rotating electric apparatus.

Miscellaneous Publication No. 180 is a 16 x 19 in. paperboard replica of the chart in the recommendation suitable for display in shops and workrooms.

Scores of Tough Jobs Prove KENNAMETAL K6 Machines CAST IRON with Maximum Economy



Kennametal Grade K6 is one of the most useful and needed recent developments in tool materials for machining cast iron and non-ferrous metals. It is an improved tungsten carbide having unusual strength in combination with exceptional abrasion-resistance and high hardness. The four performance studies outlined below are typical of scores of comparative service results that clearly show the superior properties of K6 for interrupted and continuous cutting on cast iron.



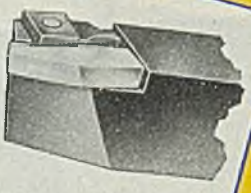
REMOVES TONS OF METAL FROM CHILLED CAST IRON PARTS, AT TOOL COST OF 74¢ PER TON

Style 12 Tool with K6 tip turns 1½ lineal miles between grinds! Other makes of carbide failed at all speeds and feeds. After 10 regrinds K6 tip is used on lighter jobs. Operation—turning cast iron piston trunks, 21½" diameter, having six 3" or 4" ports (interrupted cut). Chilled around port holes. Very sandy surface. Feed—.0937S". Depth of cut —½". SFM-120.

TURNS OUT 10 TIMES AS MANY PIECES, ON ROUGH CASTING, BETWEEN REGRINDS

One to four pieces between grinds was the best performance recorded by other carbides on machining a webbed flange of inferior grade cast iron, having hard spots, and sand pockets. K6 turns out more than 40! Operation—turning outside diameter and facing both sides of hub and rim. Feed —.032" Depth of cut 1/16" to 3/8". SFM-280.

MULTIPLIES OUTPUT, ON FACING OPERATION, ON SANDY IRON CASTING



Replacing another make of carbide with a Style 11HD Tool having a clamped-on, advanceable K6 tip, made possible tripling the feed, doubling the cutting speed, and facing 8 times as many pieces per regrind. Operation—facing sandy iron castings. Feed—.036". Depth of cut—⅛" to 3/16" SFM-150 at start, 320 after tool entered cut.

CUTS 35 PIECES (on Abrasive Electric Iron) AS AGAINST 3 FOR CARBIDE PREVIOUSLY USED

This unique tool, tipped with Kennametal K6, turns out 11½ times as much work between grinds as the carbide tool previously used. Operation—finish trepanning cut on electric iron part. Feed—.003". SFM-210. Accurate tolerances and good finish required, and produced.

The best way to prove that K6 makes possible faster, easier machining on cast iron, at lower tool costs, is to try it in your own shop—then compare tool performance and overall costs. Order a few Kennametal blanks, or complete tools, now—and ask our district field engineer, who is fully acquainted with the properties of K6, to help you get maximum results from this *new* and *improved* tungsten carbide—Kennametal Grade K6.

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

Open-Hearth Furnace

(*Continued from Page 142*)

this, all furnace additions are preferably of a size large enough to penetrate the slag and enter the metal bath. It is also advisable to moisten the surface of the additions before charging. As soon as the moistened additions strike the hot slag, a slight explosion occurs, caused by the sudden generation of steam. This explosion separates the slag and allows the additions to drop into the bath without being trapped in the slag. Before charging the ferrosilicon, about 30 lb of burnt lime are shoveled into the furnace in order to thicken the slag and to increase the free lime, thus minimizing the phosphorus reversion. Five minutes after the final additions have been made the heat is ready to be tapped.

For the production of rimming steels, a regular mill furnace practice is employed. When the slag composition has reached the desired consistency and the elements present in the metal are within the desired specifications, the heat is tapped.

Manganese Addition: This is made in either the bath or the ladle. When amounts greater than 60 lb are required, the ferromanganese is added to the bath (lumps of 3 to 4-in. are preferable). This assures a thorough distribution of the element in the metal. For amounts less than 60 lb, particles of ferromanganese about ¾-in., placed in paper bags of 5 lb each are added to the ladle. The manganese content of the bath, when the heat is ready to be blocked, is estimated, based on earlier analyses, the available iron oxide content of the slag and the carbon content.

Curve Depicts Relationship

The curve plotted from data obtained from a series of experimental heats, as shown in Fig. 3, is intended to illustrate the relationship between the residual manganese content of the bath and the available iron oxide in the slag. Generally, this trend depends to a large extent on the total manganese content present in the charge, the carbon content of the bath and the basicity of the slag. Further indications of metal-slag relations can be noted from Fig. 5, which shows the carbon content of the bath and its relation to the available iron oxide in the slag and Fig. 6 which illustrates the general relationship between the manganese efficiency of the furnace additions and the available iron oxide content of the slag. Under normal furnace conditions, these trends are true as shown but it should perhaps be pointed out that these curves should be used with discretion for, as in all slag-metal relations, certain factors in the furnace such as type of charge, lack of lime, boils, ore additions and slag fluidity, must influence individual readings considerably.

The efficiencies of the alloying materials used for both furnace and ladle additions are based on a ratio of product to furnace charge of 91 per cent. This is in line with that obtained in mill size

RAILROADS own and operate thousands of pieces of heavy-duty equipment for which Preformed wire rope provides the muscle. Thus, Preformed is found on power shovels, cranes, derricks, hoists, winches—on car pullers, car retarders, dumpers—on loaders, unloaders, slings.

Railroads—like other industries—choose Preformed because it is *economical*, *safe*, and *saves wear* on equipment.

Its *economy* comes from longer life, due chiefly to lack of internal stress. It is *safer* for workmen because its wires lie flat when cut or broken, and because preforming relaxes wire rope and makes it flexible . . . It *saves wear* on expensive equipment because it reduces rotation on sheaves and spools evenly on drums.

Executives in *all* industries recognize the better service offered by Preformed.

ASK YOUR OWN SUPPLIER FOR PREFORMED WIRE ROPE

Grinding Questions Answered

By ALLEN STEELE
Manager, Dayton Grinding Wheel Division
SIMONDS WORDEN WHITE COMPANY

Presented as a practical aid in the solution of many common grinding problems. Readers are invited to send in their own grinding questions, without obligation. All questions will be answered by mail or in this column.

Continued from Previous Issues

26 **Q.** *"Can you give me the reason why grinding oils are preferable to ordinary coolants on thread grinding jobs?"*

A. The chief advantages of using a grinding oil in preference to an ordinary coolant on thread grinding jobs are: (1) the wheel cuts more freely without breaking down; (2) permits the use of a much finer grain or grit; (3) temperature of the work is more easily maintained at a low point.

27 **Q.** *"We have a small cylindrical grinder using an 8 x 1/2 x 1 wheel. We have a number of high speed steel shafts to grind ranging in diameter from 3/8" to 5/8". Up to the present time, we have not been able to do a very good grinding job on these shafts. Do you think you have a wheel that will give us the performance we want?*

A. We are presently supplying Dayton wheels to a number of plants which are doing work similar to yours. We would like very much to have you try our 8A-60-L-15-V-25 (old marking 860-L-1-V).

28 **Q.** *"In setting up a centerless machine for infeed grinding at what angle should the regulating wheel be set?"*

A. The recommended angle for the regulating wheel in infeed grinding is approximately one-half degree to the grinding wheel.

furnaces using cold scrap and iron in their practices.

Carbon: As stated previously, the practice followed in the experimental open hearth is to catch the carbon on the way down. At times the carbon drops below that desired and it is therefore necessary to recarborize the heat. Since experimental heats cannot be recarborized by "jiggering" to any great extent, the analysis is adjusted when necessary by coal additions to the ladle. These additions enter the metal at approximately 50 per cent efficiency in terms of pure carbon. The carbon recovery from other carbon bearing additions, such as ferromanganese and Chrome-X, is in the neighborhood of 95 per cent.

Silicon: This is added to the ladle as a deoxidizer for killed steels and to meet chemical specification. Ferrosilicon of 50 and 90 per cent silicon and alsifer, containing about 44 per cent silicon, are two of the most common deoxidizers used in the ladle.

Molybdenum: This is introduced into the metal bath in powdered form known as molybdenum trioxide (MoO_3), containing 60 per cent molybdenum by weight. Approximately 95 per cent of the weight of the molybdenum addition enters the molten metal. The molybdenum containers are charged directly into the bath and worked under the surface. For heats finishing at 0.04 to 0.15 per cent carbon the molybdenum is added when the carbon drops to about 0.025 per cent. For high-carbon steels, the molybdenum is added when the carbon content is about 30 points above the blocking point.

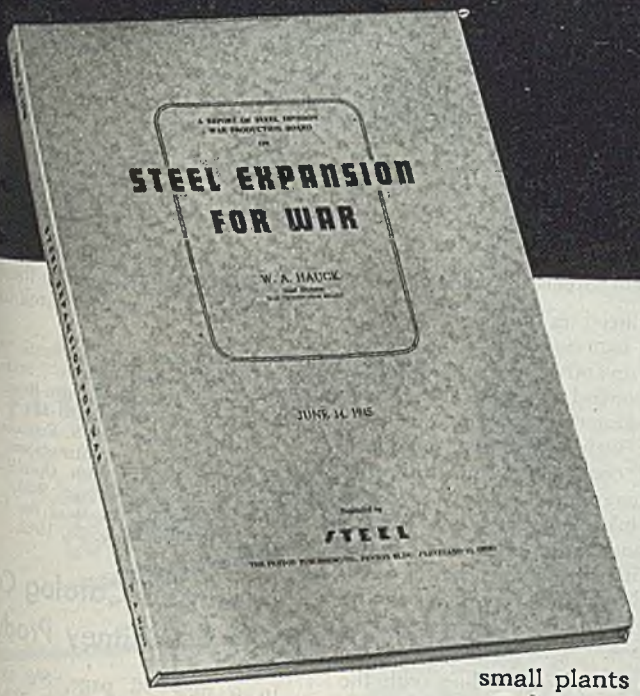
Aluminum: For the manufacturing of fine grained steel, shot aluminum is added to the ladle, and the amount added depends upon the percentage of silicon and manganese per ton of steel and the final carbon content. Usually the amount varies from 0.8 to 1.3 lb per ton of steel.

Personnel: One of the most important factors in the successful functioning of any open-hearth furnace is its operating personnel. This pilot furnace is no exception. At the time the furnace was to be first lighted, the mills were working short turns. The general superintendent of the Pittsburgh Works therefore suggested that the assistance of one of the mill open-hearth superintendents and his crew of melters be obtained. These men went to work on the furnace and were responsible to a large degree for its successful operation. Through them, it was possible for the research metallurgists to obtain the practical experience necessary for operating the furnace. Today the furnace crew consists entirely of research laboratory personnel and includes metallurgists and other engineers as well as certain selected helpers to take care of refractories, crane operation, maintenance and other special activities, but the original training obtained from the mill personnel has to a large extent accounted for their effectiveness.

Types of steel produced in this furnace include plain, medium and high-carbon steels, free cutting steels and high-alloy

FACTS AND FIGURES ON NEW AND EXPANDED FACILITIES OF THE STEEL INDUSTRY ARE NOW REVEALED IN . . .

"Steel Expansion for War"



By W. A. HAUCK

[An official report by Mr. Hauck for the War Production Board]

192 pages of pertinent data on both industry and government financed projects. Detailed schedules on capacities, location and cost. Including 148 photographs.

• Mr. Hauck has been with the Steel Division since its inception in June, 1940, then under the National Defense Advisory Commission (predecessor to WPB). Assigned to the task of expanding and balancing steel capacity for war, Mr. Hauck has inspected both large and small plants all over the United States. He prepared several official reports which lead to the addition of 10,000,000 tons of integrated steel capacity, plus over 5,000,000 tons of capacity by the expansion of existing facilities.

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steels and the quality of the products is considered good. These experimental steels have been rolled, forged, cold reduced, pierced, machined, upset, drawn and fabricated under actual mill conditions and the results have been most favorable.

While there are more nonmetallic inclusions present in this steel, both laboratory and mill tests on the steel indicate that it is substantially equivalent or slightly superior to regular open-hearth steel of similar grades. It generally has comparable tensile, impact, and yield strengths, somewhat better elongation and reduction of area, is somewhat less sensitive to cold work and has aging characteristics that are slightly better than those of mill produced steel. These improved characteristics are attributed to the close control of raw materials and furnace operation along with certain features of furnace design.

Important Steels Developed

Steels produced in this furnace were primarily for experimental purposes and resulted in several important developments which have had practical use such as; (1) a superior deep drawing steel, (2) a controlled nitrogen duplex practice[2], (3) a special composition for drill pipe steel, (4) ordnance steels such as; a widely used alloy tank plate, an alloy welding rod wire, manganese-molybdenum bullet core, shell, bomb and gas bottle steel. Practically all the major products of the corporation today have been produced in this furnace.

An interesting phase dealing with the investigation of improved ordnance steels was the development of the manganese-molybdenum tank plate.[3] During a conference in Washington with the Tank Division of the Army Ordnance Department, the idea was conceived of producing armor plate from steels other than those containing relatively large amounts of nickel and chromium. Since the matter was of prime urgency and the range of chemical compositions was so wide, a specific investigational program was therefore undertaken and, as a part of this study, a series of 8000-lb heats were made in the laboratory furnace. The heats were teemed in 12 x 30-in. big-end-up molds with hot tops, charged into soaking pits and ultimately rolled and heat treated. Test specimens were cut from the plates for physical tests. Finally ballistic tests were made on the finished plates at the Aberdeen proving grounds operated by the government.

These experimental heats had a double function: Practices developed in making these heats were of considerable value to the mill during the making of full-sized mill heats and, sufficient steel was available to permit processing, heat treating and testing each heat on a substantially full scale basis without involving excessive waste. It was possible for these reasons to investigate a series of compositions, some of which fell outside normal ranges and thus to establish limits beyond which it would be undesirable to conduct further experiments. The results of the ballistic and physical tests showed the steel was satisfactory for tank armo plate and large quantities have bee produced.

Summary and Conclusions

1. More than 600 heats have been ma in this basic experimental open-hear furnace. They covered a wide range chemical compositions and furnace co ditions and give a representative pictu of what this type of furnace can do.

2. The furnace operation has be satisfactory and steels have been pr duced to the same chemical limitatio as are required for regular mill hea

3. Temperature, composition and qua ty of the metal, composition and cons tency of the slag, and to a certain ext the furnace time per heat are control in much the same way as in a mill f nace.

4. The recuperator and basic r have been used successfully on the h nace and indicate possibilities for l units.

5. A number of developments ha been made in this furnace thereby in cating its value as a research tool.

---

(1) H. K. Work and H. M. Banta, "An Exp mental Open-Hearth Furnace", STEEL, June 1939, p. 62; also 22nd Open-Hearth Proce *ings* A.I.M.E. 1939, pp. 161-174.

(2) H. B. Emerick and S. Feigenbaum, " plex Process for the Manufacture of B Open-Hearth Steel", 25th Open-Hearth *ceedings* A.I.M.E. 1942, pp. 9-23.

(3) C. T. Lucey, "Smashing the Axis", N Syndicate Column, Nov. 20, 1942.

Condensed Catalog Cover Pratt & Whitney Products

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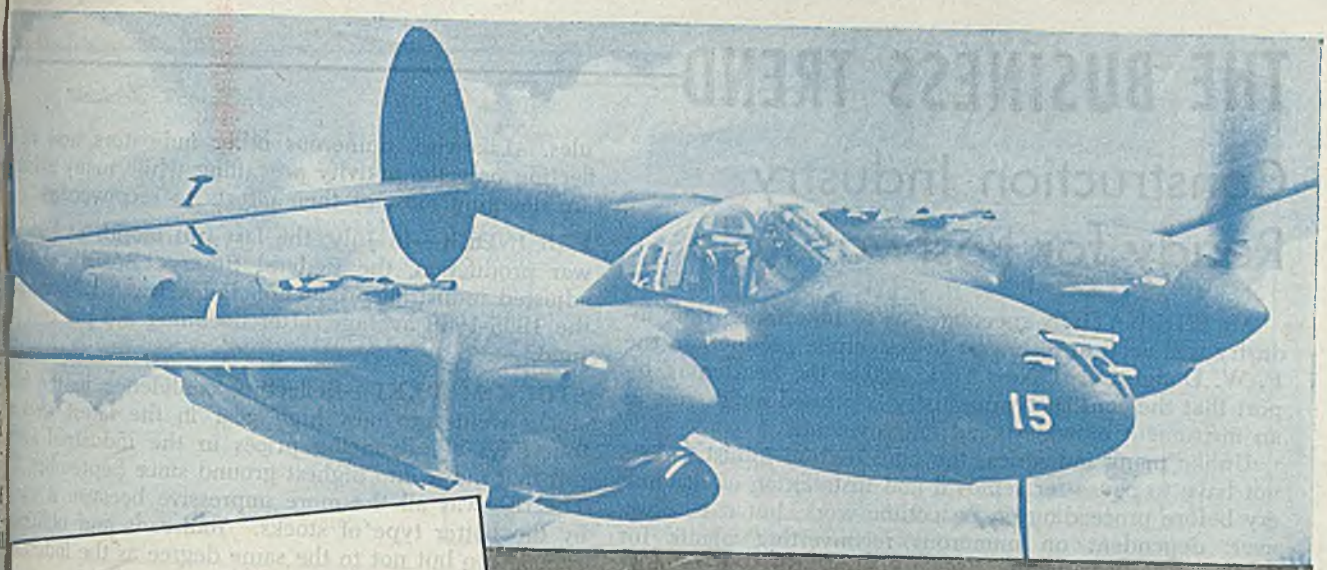
The continuing trend toward gre dimensional accuracy and finer surf finish in metal products is reflec throughout the book by equipment s as tool room and bench lathes, borers, thread millers, gear to grinders, etc., once thought of prima as "tool room machines", but now wi applied on high grade production w The same is true of items such as cision gage blocks, bench microme and measuring machines. A consi able section is devoted to autom gages and comparators which en rigid inspection to keep pace with dern production.

Copies of this book are available of charge to industrial executives so identify themselves by requests their companies' letterheads.



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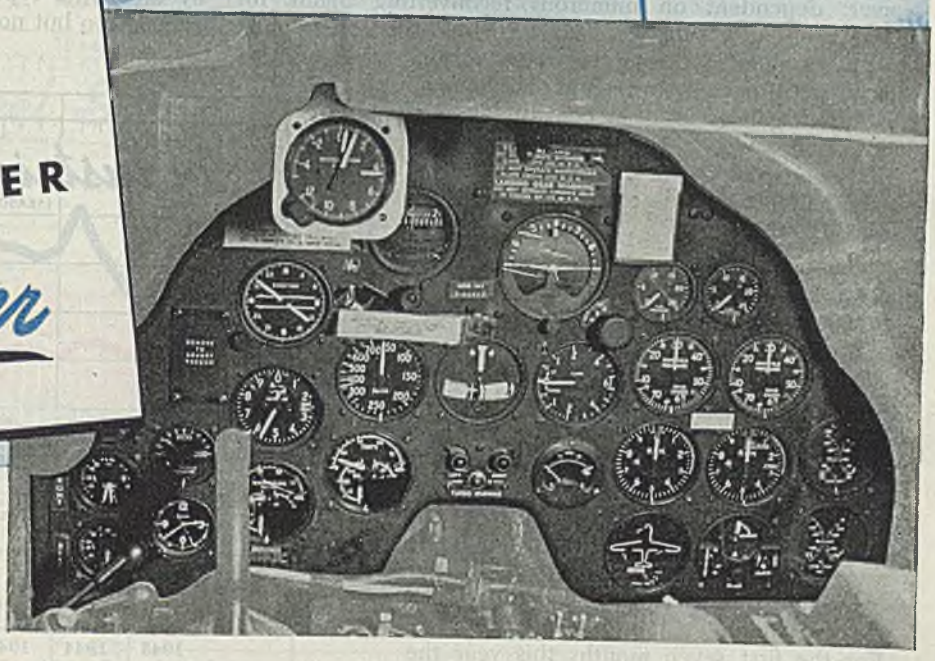

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THE BUSINESS TREND

Construction Industry Ready for Postwar Role

AS THE NATION speculates as to how much time industry will need to reconvert to peacetime production, the F. W. Dodge Corp., New York, makes the heartening report that the construction industry is primed for its role as an instrument of widespread employment.

Unlike many industries, the construction industry does not have to pause for removal and installation of machinery before proceeding on peacetime work, but it is, however, dependent on numerous reconverting plants for equipment and supplies. Nevertheless, the construction industry does not look on reconversion problems, especially those regarding manufactured articles used in construction, as insurmountable. The fact that it takes this view would seem to indicate that it is confident other lines of industry will reconvert rapidly.

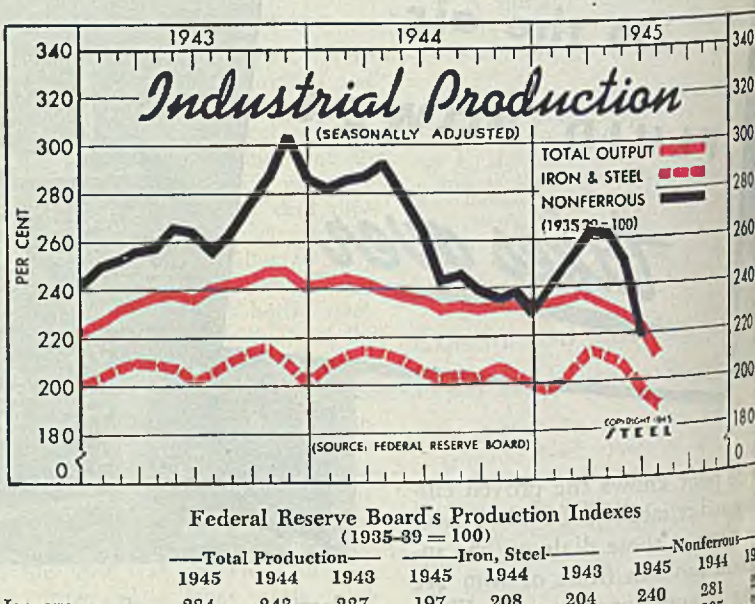
Removal in the next few weeks of all controls will aid the construction industry to move quickly toward attaining in the next decade an average annual volume exceeding $13 billion at March, 1945, price levels, compared with $3,550,543,000 in 1939.

The construction industry already is demonstrating its readiness to launch into its peacetime role, for during July in the 37 eastern states construction contracts awarded totaled $257,691,000, a 35 per cent increase over July of last year and 13 per cent more than in June of this year. For the first seven months this year the value of all contracts awarded in the 37 eastern states amounted to $1,740,090,000, a 51 per cent increase over the same period of last year.

STEEL PRODUCTION—In the meantime, steel ingot output has risen from the low mark of the recent victory holiday week but it does not yet fully indicate possibilities for peacetime operations, for the industry still is adjusting its schedules. Likewise, numerous other indicators now are reflecting only the activity prevailing while many industries are devoting most of their efforts to reconversion.

FRB INDEX—In July, the last full month of high level war production, the Federal Reserve Board's seasonally adjusted industrial production index was 212 per cent of the 1935-1939 average, after declining 3.6 per cent from June.

STOCK MARKET—Reflecting confidence in the future, stocks went into new high gear in the latest week as four days of advancing prices in the industrial average put that index into highest ground since September, 1939. The rise was all the more impressive because it was led by the better type of stocks. Railroads and utilities advanced too but not to the same degree as the industrials.



Federal Reserve Board's Production Indexes
(1935-39 = 100)

	Total Production			Iron, Steel			Nonferrous	
	1945	1944	1943	1945	1944	1943	1945	1944
January	234	243	227	197	208	204	240	281
February	236	244	232	202	212	208	257	285
March	235	242	235	210	214	210	265	286
April	231	239	237	206	213	209	264	292
May	226	237	238	204	210	208	251	279
June	220	235	236	192	204	201	219	264
July	212	231	240	188	202	204	...	243
August	...	232	242	...	203	210	...	245
September	...	231	244	...	202	214	...	239
October	...	232	247	...	206	215	...	236
November	...	232	247	...	201	209	...	239
December	...	232	241	...	198	200	...	229
Average	...	236	239	...	206	208	...	260

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	70	60	90.5	99
Electric Power Distributed (million kilowatt hours)	4,116	3,939	4,435	4,418
Bituminous Coal Production (daily av.—1000 tons)	1,157	1,923	1,930	1,995
Petroleum Production (daily av.—1000 bbls.)	4,892	4,934	4,930	4,667
Construction Volume (ENR—Unit $1,000,000)	$23.1	$49.1	$41.1	$37.5
Automobile and Truck Output (Ward's—number units)	14,880	11,205	16,105	19,853

*Dates on request.

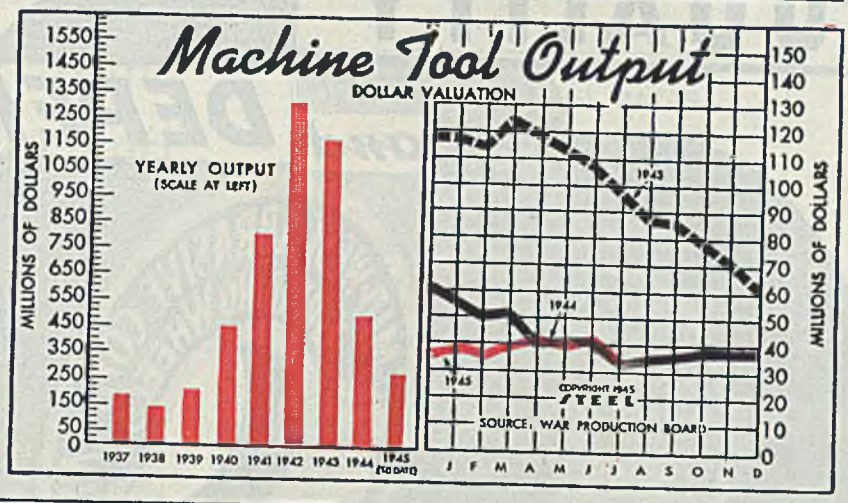
TRADE				
Freight Carloadings (unit—1000 cars)	737†	653	886	90
Business Failures (Dun & Bradstreet, number)	16	5	22	2
Money in Circulation (in millions of dollars)‡	$27,506	$27,351	$26,926	$23,04
Department Store Sales (change from like week a year ago)‡	−17%	+18%	+14%	+

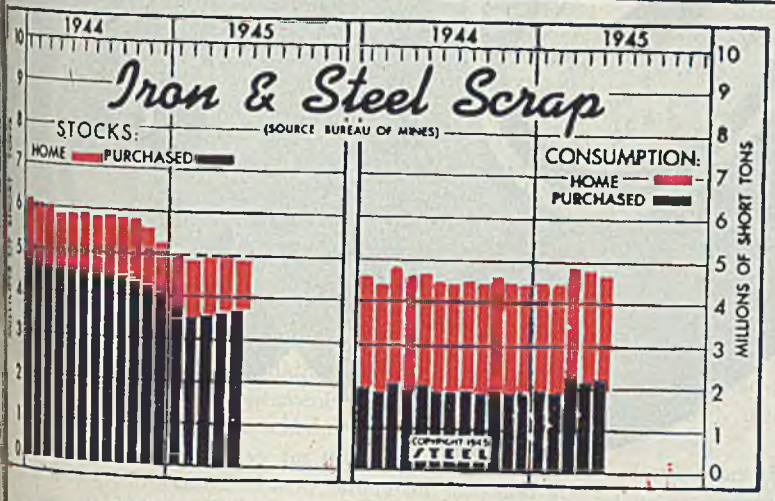
†Preliminary. ‡Federal Reserve Board.

Machine Tool Output

(000 omitted)

	1945	1944	1943	1942
Jan.	$37,498	$56,363	$117,384	$83,547
Feb.	36,018	50,127	114,594	84,432
Mar.	39,374	51,907	125,445	98,358
Apr.	40,331	41,370	118,024	103,364
May	39,825	41,819	113,859	107,297
June	41,040	41,471	108,736	111,090
July	32,521	32,753	97,428	113,596
Aug.	.....	35,177	87,405	117,342
Sept.	.....	35,876	85,842	119,883
Oct.	.....	37,516	78,300	130,008
Nov.	.....	36,277	71,811	120,871
Dec.	.....	36,782	60,861	131,960
Year 1944	.....			497,438
1943	.....			1,179,689
1942	.....			1,321,748
1941	.....			812,462
1940	.....			450,000





Iron and Steel Scrap

Bureau of Mines

(Gross Tons—000 omitted)

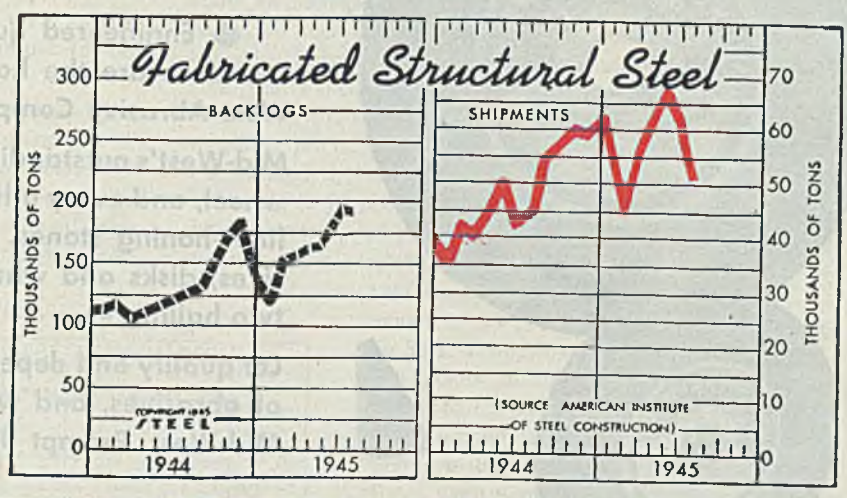
	Consumers' Stocks			Total Consumption		
	1945	1944	1943	1945	1944	1943
Jan.	5,023	6,214	6,877	4,507	4,616	4,492
Feb.	4,901	6,134	6,871	4,209	4,414	4,178
Mar.	4,873	6,027	6,850	4,889	4,827	4,787
Apr.	4,907	5,932	6,918	4,668	4,629	4,642
May	4,902	5,966	6,905	4,774	4,683	4,723
June	....	5,991	6,916	....	4,460	4,493
July	....	5,909	6,860	....	4,423	4,670
Aug.	....	5,975	6,778	....	4,533	4,686
Sept.	....	5,953	6,613	....	4,471	4,657
Oct.	....	5,832	6,456	....	4,684	4,830
Nov.	....	5,624	6,391	....	4,527	4,581
Dec.	....	5,335	6,448	....	4,487	4,449
Mo. Ave.	....	5,908	6,740	....	4,563	4,599

Fabricated Structural Steel

(1000 tons)

Shipments			Backlogs		
1945	1944	1943	1945	1944	1943
55.0	35.2	91.9	124.4	113.1	339.1
47.8	42.9	90.8	151.6	117.6	321.0
58.4	41.4	94.0	153.3	106.3	299.8
59.2	44.5	86.6	162.5	111.2	272.5
66.9	50.7	78.9	165.7	116.3	220.6
62.5	43.0	68.4	195.2	122.7	207.1
51.5	45.3	56.8	194.0	125.4	201.8
....	55.2	50.2	....	130.4	195.6
....	57.5	51.8	....	151.1	208.1
....	61.6	80.1	....	174.4	274.0
....	59.4	42.7	....	184.2	134.6
....	61.3	39.6	....	142.5	113.0

Source: American Institute of Steel Construction. Figures represent members' reports



NANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$9,055	$7,865	$10,552	$8,793
Federal Gross Debt (billions)	$263.2	$263.0	$262.0	$210.9
Bond Volume, NYSE (millions)	$42.9	$18.1	$25.0	$28.5
Stocks Sales, NYSE (thousands)	5,756	3,096	4,374	3,792
Loans and Investments (billions)†	$63.1	$63.1	$64.0	$56.4
United States Gov't. Obligations Held (millions)†	$46,770	$46,771	$47,267	$42,229

†Member banks, Federal Reserve System.

ICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.5	105.7	105.6	103.6
Industrial Raw Materials†	116.9	117.7	117.7	112.8
Manufactured Products†	102.1	102.0	101.9	101.1

†Bureau of Labor Statistics Index, 1926 = 100.

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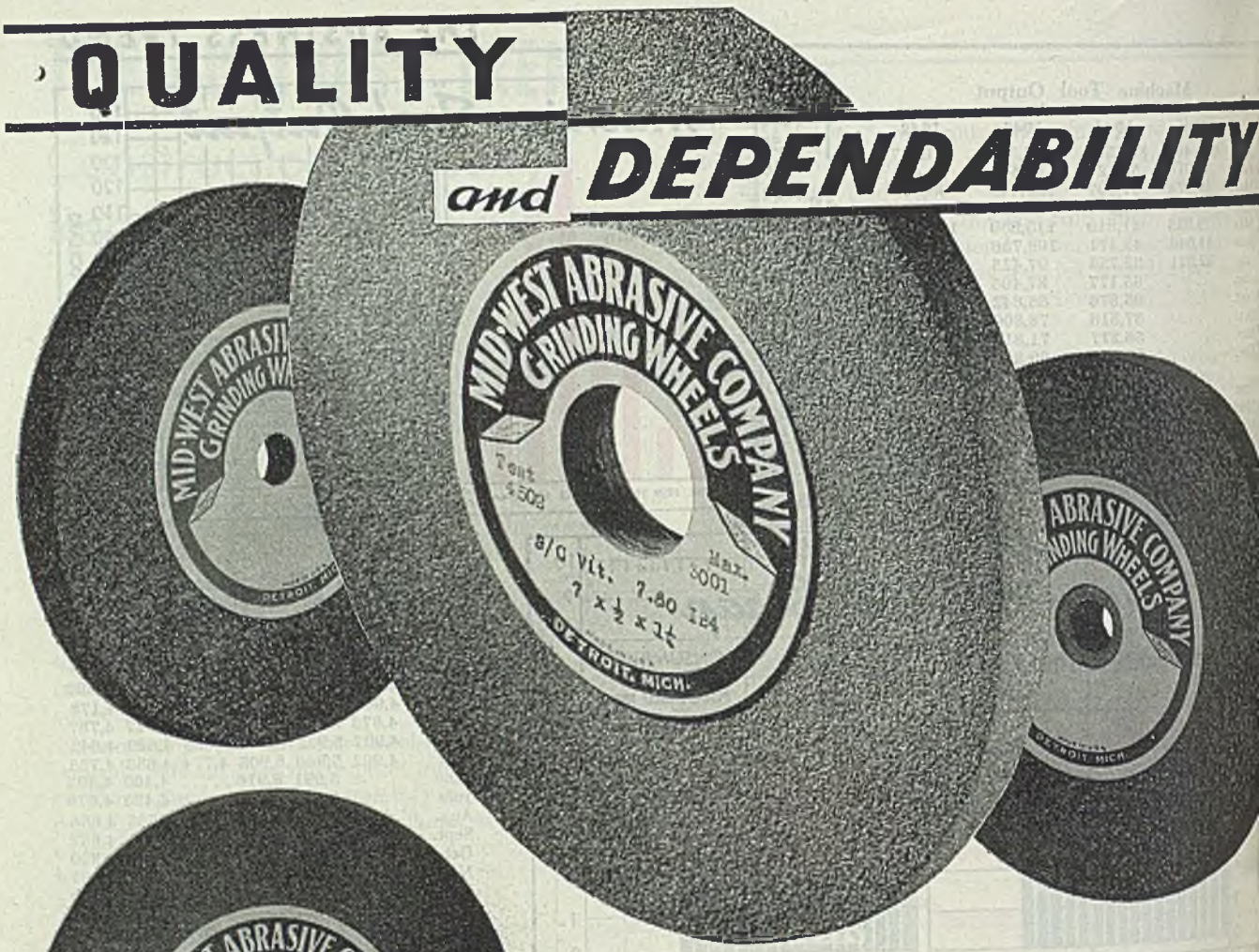

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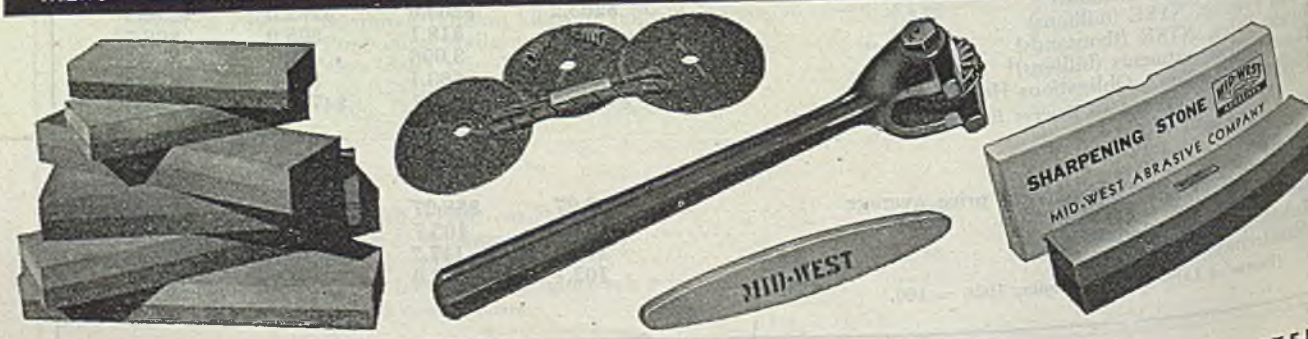


Steel Climbing Back from Sharp Tumble at War End

Buying exceeds cancellations and mill books are filling . . . Quickest recovery is in light materials. . . . Higher steel prices asked

REVERSING the recent trend, steel orders are well in ex- of cancellations, hastened by the fact that producers again reaching the point where they can make fairly definite de- promises and many consumers have been able to know what they want and when they want it.

had been expected, greatest emphasis is on light products, , strip, some wire products, tin plate, small bars and angles ilar goods. Not much in current demand is noted to take place of shell and gun forgings and other heavy ordnance and ships, which contributed particularly to pressure on ingot production during the war. Full replacement of such products is not in prospect and it is mainly for that rea- that the industry does not expect peak wartime steel pro- to be equaled, even though as high as 90 per cent opera- may be reached within the next few months.

ever, some improvement is noted in demand for heavy , from railroads and the building industry, in particular. building construction requirements should not reach full much before spring, shape schedules are tightening. Rail will be exceptionally heavy for this season of the year. is a substantial accumulation of orders for rails and at one large producer will be able to devote more capacity this fall than in a long time. The rail outlook for next bright.

estic car and locomotive requirements also will be in- d, although expansion in freight car construction, the al tonnage item, should be reasonably moderate. Ex- g export requirements, while still difficult to gage, will heavy as well as light steel. Ship and railroad trans- n needs, and building construction requirements, all a part of the rehabilitation pattern abroad, will require heavy steel.

Producers of hot and cold-rolled sheets will be able to enter fairly substantial tonnage for fourth quarter. However, demand is heavy and it would appear that as soon as sellers are able to move freely in accepting new orders positions over the remainder of the year will be filled rapidly. Some galvanized sheets also will be available in fourth quarter, but these will be covered quickly. Electrical sheets will be difficult to obtain before next year.

Steelmakers are importuning Office of Price Administration to allow an increase in steel prices of about $7 per ton. This is based on increased production costs and expectation that a lower level of operations will increase unit costs. Loss of profitable war tonnage is a factor which is viewed as seriously threatening the industry's earnings position at the present level of ceiling prices.

Estimated national rate of steel production gained 5 points last week, to 70 per cent of capacity, a moderate step up from the low point reached while the confusion following the war end was being resolved. Seven districts made gains, with only two declining slightly. Pittsburgh rose 15 points to 65 per cent, Cleveland 6½ points to 83½, Youngstown 4 points to 76, Buffalo 2½ points to 65, eastern Pennsylvania 2 points to 72, Detroit 8 points to 89 and Chicago ½-point to 81. Cincinnati dropped 6 points to 80 and Wheeling 5 points to 91. Rates were unchanged as follows: Birmingham 95, St. Louis 65, and New England 78.

Scrap is holding at ceiling in spite of expectation that the lower steel production rate would cause weakening in prices. Important users are covering by large purchases at ceilings. Scrap is scarce although yards have considerable unprepared material which they are unable to put in shape for shipment, on account of labor shortage. Mills have only moderate reserves and need more in preparation for winter.

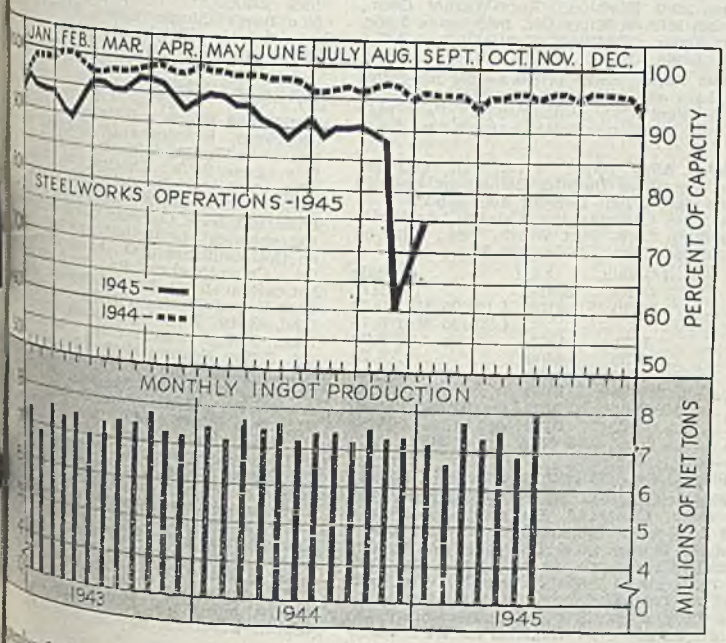
Steel and iron composite prices are unchanged, finished steel at $58.27, semi-finished steel $37.80, steelmaking pig iron $24.05 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Sept. 1	Change	Same Week 1944	Same Week 1943
Pittsburgh	65	15	91	99.5
Chicago	81	+0.5	98.5	99.5
Eastern Pa.	72	+2	95	95
Youngstown	76	+4	93	98
Wheeling	91	—5	92	98
Cleveland	83.5	+6.5	92	94
Buffalo	65	+2.5	90.5	90.5
Birmingham	95	None	95	95
New England	78	None	85	92
Cincinnati	80	—6	92	94
St. Louis	65	None	87	73
Detroit	89	+8	89	90
Average	75	+5	96.5	99.0

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	Sept. 1	Aug. 25	Aug. 18	One Month Ago Aug., 1945	Three Months Ago June, 1945	One Year Ago Aug., 1944	Five Years Ago Aug., 194
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$56.73	$56.7
Semifinished Steel	37.80	37.80	37.80	37.80	36.45	36.00	36.0
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	24.05	23.05	22.0
Steelmaking Scrap	19.17	19.17	19.17	19.07	19.07	19.17	18.8

Se inished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelwo Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; othe

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material	Sept. 1, 1945	Aug., 1945	June, 1945	Sept., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.17	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.25	2.10
Plates, Philadelphia	2.30	2.30	2.30	2.15
Plates, Chicago	2.25	2.25	2.25	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron	Sept. 1, 1945	Aug., 1945	June, 1945	Sep 194
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.
Basic, Valley	24.50	24.50	24.50	23.
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.
No. 2 foundry, Chicago	25.00	25.00	25.00	24.
Southern No. 2, Birmingham	21.38	21.38	21.38	20.
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.
No. 2 fdry., del. Philadelphia	26.84	26.84	26.84	25.
Malleable, Valley	25.00	25.00	25.00	24.
Malleable, Chicago	25.00	25.00	25.00	24.
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$19
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.45	16
Heavy melting steel, Chicago	18.75	18.75	18.75	18
Rails for rolling, Chicago	22.25	22.25	22.25	20
No. 1 cast, Chicago	20.00	20.00	20.00	20

Coke				
Connellsville, furnace, ovens	$7.50	$7.50	$7.50	$7
Connellsville, foundry ovens	8.25	8.25	8.25	8
Chicago, by-product fdry., del.	13.35	13.67	13.35	13

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel prod and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding etc., although only principal es lished basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to vidual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34. Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.ob. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—$\frac{23}{32}$ in. inclusive, per 100 lbs., $2.15 Do., over $\frac{23}{32}$—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3 : Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division. Borg-Warner Corp., and Joslyn Mfg. & Suply Co., may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100	(.15-.25 Mo) 0.70
			(.20-.30 Mo) 0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus fre on hot-rolled bars from Buffalo to Mansfie

Cold-Finished Alloy Bars: Pittsburgh, Chic Gary, Cleveland, Buffalo, base 3.35c; Det del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsbu Chicago, Gary, Cleveland, Birmingham, S rows Point, Buffalo, Youngstown, base 2. Detroit del. 2.25c; Eastern Mich. and To 2.30c; Gulf ports, dock 2.50c; Pacific p dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, cago, Gary, Cleveland, Birmingham, You town, Buffalo base 2.15c; Detroit, del. Eastern Mich. and Toledo 2.30c; Gulf p dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; d refined 5.40c; Pittsburgh, staybolt, 5.75c; Haute, single ref., 5.00, double ref., 6.25c

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Birmingham, Buffalo, Youngst Sparrows Pt., Middletown, base 2.20c; Gr City, base 2.30c; Detroit del. 2.30c; Ea Mich. 2.35c; Phila. del. 2.37c; New York 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled s for shipment to Detroit and the Detroit on the Middletown, O., base; Alan Wood Co., Conshohocken, Pa., may quote 2.35 hot carbon sheets, nearest eastern basing

Cold-Rolled Sheets: Pittsburgh, Chicago, land, Gary, Buffalo, Youngstown, Middle base, 3.05c; Granite City, base 3.15c; D del. 3.15c; Eastern Mich. 3.20c; New York 3.39c; Phila. del. 3.37c; Pacific ports

Galvanized Sheets, No. 24: Pittsburgh, cago, Gary, Birmingham, Buffalo, Youngs Sparrows Point, Middletown, base 3.70c; ite City, base 3.80c; New York del. Phila. del. 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galva sheets 3.75c at established basing poin

Corrugated Galv. Sheets: Pittsburgh, Ch Gary, Birmingham, 29 gage, per square

Culvert Sheets: Pittsburgh, Chicago, Birmingham, 16 gage not corrugated, c alloy 3.60c; Granite City 3.70c; Pacific 4.25c; copper iron, 3.90c; pure iron 3.95c; coated, hot-dipped, heat-treated, No. 24, burgh, 4.25c.

Sheets: 10-gage; Pittsburgh, Chi- Gary, Cleveland, Youngstown, Middle- base, 2.85c; Granite City, base 2.95c; del. 2.95c; eastern, Mich. 3.00c; Pa- ports 3.50c; 20-gage; Pittsburgh, Chicago, Cleveland, Youngstown, Middletown, 3.45c; Detroit del. 3.55c; eastern Mich. Pacific ports 4.10c.

Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
grade	3.30c	4.05c	3.30c
ature	3.65c	4.40c	3.75c
rical	4.15c	4.90c	4.25c
	5.05c	5.80c	5.15c
mo	5.75c	6.50c	5.85c
sformer			
	6.25c	7.00c	.....
	7.25c	8.00c	.....
	7.75c	8.50c	.....
	8.55c	9.30c	.....

Rolled Strip: Pittsburgh, Chicago, Gary, land, Birmingham, Youngstown, Middle- base 1 ton and over, 12 inches wide less 2.10c; Detroit del. 2.20c; Eastern 2.25c; Pacific ports 2.75c (Joslyn Mfg. may quote 2.30c, Chicago base.)

Rolled Strip: Pittsburgh, Cleveland, stown, 0.25 carbon and less 2.80c; Chi- base 2.90c; Detroit, del. 2.90c; Eastern 2.95c; Worcester base 3.00c.

C. R. Strip: Pittsburgh, Cleveland stown, base 3 tons and over, 2.95c; 3.05c; Detroit del. 3.05c; Eastern 3.10c; Worcester base 3.35c.

Finished Spring Steel: Pittsburgh, Cleve- base, add 20c for Worcester; .26-.50 2.80c; .51-.75 Carb., 4.30c; .76-1.00 6.15c; over 1.00 Carb., 8.35c.

Terne Plate

Plate: Pittsburgh, Chicago, Gary, 100-lb. box, $5.00; Granite City $5.10.

Tin Plate: Pittsburgh, Gary, 100- base box, 0.50 lb. tin, $4.50; 0.75 lb. tin

Black Plate: Pittsburgh, Chicago, base 29 gage and lighter, 3.05c; Granite 3.15c; Pacific ports, boxed 4.05c.

Ternes: Pittsburgh, Chicago, Gary, No. assorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pitts- Chicago, Gary, 100-base box $4.30; City $4.40.

Ternes: Pittsburgh base per pack- 112 sheets: 20 x 28 in., coating I.C. 8-lb. 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; $17.25; 40-lb. $19.50.

Plates

Steel Plates: Pittsburgh, Chicago, Cleveland, Birmingham, Youngstown, Point, Coatesville, Claymont, 2.25c; York, del. 2.44c; Phila., del. 2.30c; 2.49c; Boston, del. 2.57-82c; Pacific 2.80c; Gulf ports, 2.60c.

City Steel Co. may quote carbon 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Iron & Steel Co. 2.50c f.o.b. basing Geneva Steel Co., Provo, Utah, 3.20c, Pac. ports.)

Plates: Pittsburgh, Chicago, 3.50c; ports, 4.15c.

Hearth Alloy Plates: Pittsburgh, Chi- Coatesville, 3.50c; Gulf ports 3.95c; ports 4.15c.

Iron Plates: Pittsburgh, 3.80c.

Shapes

Shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, 2.10c; New 2.27c; Phila., del. 2.215c; Pacific 2.75c.

Iron Co., Phoenixville, Pa., may carbon steel shapes at 2.35c at estab- basing points and 2.50c, Phoenixville, Sheffield Steel Corp., 2.55c f.o.b. Geneva Steel Co., 3.25c, Pac. ports; Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Piling: Pittsburgh, Chicago, Buf- 2.40c.

Wire Products, Nails

Pittsburgh, Chicago, Cleveland, Birm- (except spring wire) to manufac- carloads (add $2 for Worcester, $1 ...th).

basic, bessemer wire 2.75c

wire 3.35c

(Pittsburgh Steel Co., 0.20c higher.)

Products to the Trade:

and Cement-coated wire nails, staples, 100-lb. keg, Pittsburgh, Birmingham, Cleveland, Du- $2.90; galvanized, $2.55; Pac. .... $3.40 and $3.05

fence wire, 100-lb., Pittsburgh, Cleveland 3.20c

fence wire, 100 lb., Pitts- Chicago, Cleveland 3.55c

fence, 15½ gage and heavier, per column .... .67c

wire, 80-rod spool, Pittsburgh, Chicago, Birmingham, column 70; twisted wire, column 70.

Tubular Goods

Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½,3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c, extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
..	4	2	8	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302...	24.00c	27.00c	34.00c	21.50c	28.00c
303...	26.00	29.00	36.00	27.00	33.00
304...	25.00	29.00	36.00	23.50	30.00
308...	29.00	34.00	41.00	28.50	35.00
309...	36.00	40.00	47.00	37.00	47.00
310...	49.00	52.00	53.00	48.75	56.00
312...	36.00	40.00	49.00	.....	.....
*316...	40.00	44.00	48.00	40.00	48.00
†321...	29.00	34.00	41.00	29.25	38.00
‡347...	33.00	38.00	45.00	33.00	42.00
431...	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403..	21.50	24.50	29.50	21.25	27.00
**410..	18.50	21.50	26.50	17.00	22.00
416..	19.00	22.00	27.00	18.25	23.50
††420..	24.00	28.50	33.50	23.75	36.50
430..	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A.	24.00	28.50	33.50	23.75	36.50
442..	22.50	25.50	32.50	24.00	32.00
443..	22.50	25.50	32.50	24.00	32.00
446..	27.50	30.50	36.50	35.00	52.00
501..	8.00	12.00	15.75	12.00	17.00
502..	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304..	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, wastewasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller	65½ off
Do., 7/16 and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
7/16-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
7/16-inch and under	65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945. †14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[11]	4.715	6.012[23]	6.01[2]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[2]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[16]	4.872[26]	4.172[21]	4.772	5.816[23]	5.86[2]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[26]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.598[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.669	5.60[23]	5.75[2]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[2]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.85[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.75[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.85[21]	4.45[21]	5.60[23]	5.85[2]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.900[21]	4.659	5.93[23]	5.93[2]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.543[13]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[22]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	5.75[23]	5.85[2]
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.85[21]	4.65	5.987[23]	6.08[2]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.987[21]	4.787	6.08[23]	6.18[2]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	.....	6.19[2]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]	6.23[2]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	.....
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.96[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[20]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[20]	4.10[10]	3.75[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.689[22]	5.613	5.85[23]	5.95[2]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[21]	7.333	8.304[23]	8.46[2]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.683[15]	.....	.....	8.00[2]
Tacoma	4.35[9]	4.45[9]	4.75[9]	6.50[9]	4.65[9]	4.25[9]	5.45[9]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[2]
Seattle	4.35[9]	4.45[9]	4.75[9]	6.50[9]	4.65[9]	4.25[9]	5.45[9]	5.95[15]	7.05[15]	5.883[21]	.....	.....	.....

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside abo cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—one bundle to 39,999 pounds; [11]—150 to 1499 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundl [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 poun [21]—1500 to 39,999 pounds; [22]—1000 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 poun [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, ba [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.50
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1 less $7 freight allowance	52.80

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueble, Co 91.0c; prices include duty on ported ore and are subject to miums, penalties and other pro sions of amended M.P.R. No. 9 effective as of May 15. Price basing points which are also poi of discharge of imported man nese ore is f.o.b. cars, shipside, dock most favorable to the buy

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furn Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Bil per
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$2
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	2
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	2
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.30	2
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.15	2
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.60	2
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.55	3
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	3
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00		

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross to semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices qu on vanadium alloy.

STEE

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 11, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Birdsboro, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Buffalo, N. Y., del.	28.50	.....	.....	29.00
Canton, Pa., base	26.00	25.50	27.00	26.50
Chamberlain, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Buffalo, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Toledo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Erie, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Ashland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Sharpsville, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Alabama, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Troy, N. Y., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Alton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Rock Island, Pa., base	25.00	24.50	25.50	25.00
Pittsburgh, del.				
Birdsboro, No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Steelton, Pa., base	25.00	24.50	25.50	25.00
Swedeland, Pa., base	26.00	25.50	.....	.....
Swedeland, Pa., base	26.99	.....	.....	.....
Swedeland, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Portsmouth, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Youngstown, O., del.	26.94	26.44	27.44	26.94

‡Grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For Buffalo Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela, Charleroi, Clairton, Donora, Midland, Pa., .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Silicon differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)			$30.50
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$34.00
Chicago, del.	37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$24.50
Valley base	24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases	63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	32.90
Wire cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Manganese (standard) 78-82% gross ton, duty paid, $135; add for packed c.l., $10 for ton, less-ton, f.o.b. cars, Baltimore, Philadelphia or New York. Buyer is most favorable to buy-Carondelet or Rockwood, Tenn.; Tennessee Products Co. is at Birmingham, Ala., where Sheffield Steel & Iron Co. quotes $1.70 for each 1%, or part contained manganese over 78%; delivered Pittsburgh 340.33.

Manganese (Low and Medium cents per lb. contained manganese, eastern zone, low carbon, c.l., 23c; 2000 lb. to c.l., medium, 14.50c and 15.20c; low carbon, bulk, c.l., 2000 lb. to c.l., 24.40c; 14.80c and 16.20c; western carbon, bulk, c.l., 24.50c, to c.l., 25.40c; medium, and 17.20c; f.o.b. shipping freight allowed.

Briquets: 19-21% carlots per lb. Palmerton, Pa., $36; 16-18%.

Electrolytic Manganese: 99.9% plus, carlots, per lb. 37.6 cents.

Manganese Metal: 97% min. chromium, 2% max. carbon, eastern carlots, per lb. contained chromium c.l., 79.50c, 2000 lb. to c.l. 81c and 82.50c; western, 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Metallic Columbium: 50-60%, per lb. contained columbium in gross ton lots, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrocarbon: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.35c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%. and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75. packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1,329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125 $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066 .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 36.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.1[illegible] net ton to carload, 8c lb. Lo[illegible] Suspension Bridge, N. Y., frt. [illegible] lowed same as high-carbon fer[illegible] titanium.

Bortam: Boron 1.5-1.9%, ton l[illegible] 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contr[illegible] basis, per lb. contained vanadiu[illegible] f.o.b. producers plant with us[illegible] freight allowances; open-ma[illegible] grade $2.70; special grade $2.[illegible] highly-special grade $2.90.

Zirconium Alloys: 12-15%, per [illegible] of alloy, eastern contract, carl[illegible] bulk, 4.60c, packed 4.80c, ton [illegible] 4.80c, less tons 5c, carloads b[illegible] per gross ton $102.50; pac[illegible] $107.50; ton lots $108; less-ton [illegible] $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, East[illegible] contract basis, carloads in bulk[illegible] package, per lb. of alloy 14.0[illegible] gross ton lots 15.00c; less-ton [illegible] 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminu[illegible] 40% silicon, 40% iron) contract [illegible] sis f.o.b. Niagara Falls, N. Y., [illegible] lb. 5.75c; ton lots 6.50c. Spot [illegible] cent higher.

Simanal: (Approx. 20% each [illegible] Mn., Al.) Contract, frt. all. not [illegible] St. Louis rate, per lb. alloy; [illegible] lots 8c; ton lots 8.75c; less ton [illegible] 9.25c.

Borosil: 3 to 4% boron, 40 to [illegible] Si., $6.25 lb. cont. Bo., f.o.b. Pi[illegible] O., freight not exceeding St. L[illegible] rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRA

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page [illegible] of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No 1 R.R. Hvy. Melt	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	18.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	[illegible]
Shoveling Turnings	[illegible]
Rerolling Rails	21.50-2[illegible]
Steel Car Axles	[illegible]
Steel Rails, 3 ft.	[illegible]
Steel Angle Bars	[illegible]
Cast Iron Wheels	[illegible]
No. 1 Machinery Cast	[illegible]
Railroad Malleable	[illegible]
Breakable Cast	[illegible]
Stove Plate	[illegible]
Grate Bars	[illegible]
Brake Shoes	[illegible]
(Cast grades f.o.b. shipping p[illegible]	
Stove Plate	[illegible]

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	[illegible]
No. 2 Heavy Melt. Steel	[illegible]
No. 1 Comp. Bundles	[illegible]
No. 2 Comp. Bundles	9.50-[illegible]
Machine Turnings	11.50-[illegible]
Shoveling Turnings	11.00-[illegible]
Cast Iron Borings	10.50-[illegible]
Mixed Borings, Turnings	[illegible]
No. 1 Cupola Cast	[illegible]
Breakable Cast	21.00-[illegible]
Low Phosphorus	20.50-[illegible]
Scrap Rails	16.00-[illegible]
Stove Plate	[illegible]

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	[illegible]
No. 2 Heavy Melt. Steel	[illegible]
No. 1, 2 Deal. Bundles	[illegible]
Machine Turnings	[illegible]
Mixed Borings Turnings	[illegible]
No. 1 Cast	[illegible]

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	[illegible]
No. 2 Heavy Melt. Steel	[illegible]
No. 1 Busheling	[illegible]
No. 1, No. 2 Bundles	[illegible]
No. 3 Bundles	[illegible]
Machine Turnings	[illegible]
Billet, Forge Crops	[illegible]
Bar Crops, Plate	[illegible]
Cast Steel	[illegible]
Cut Structural, Plate, 1", under	[illegible]
Alloy-free Turnings	[illegible]
Tin Can Bundles	[illegible]
No. 2 Steel Wheels	[illegible]
Iron, Steel Axles	[illegible]
No. 2 Cast Steel	[illegible]
Uncut Frogs, Switches	[illegible]
Scrap Rails	[illegible]
Locomotive Tires	[illegible]

STE[illegible]

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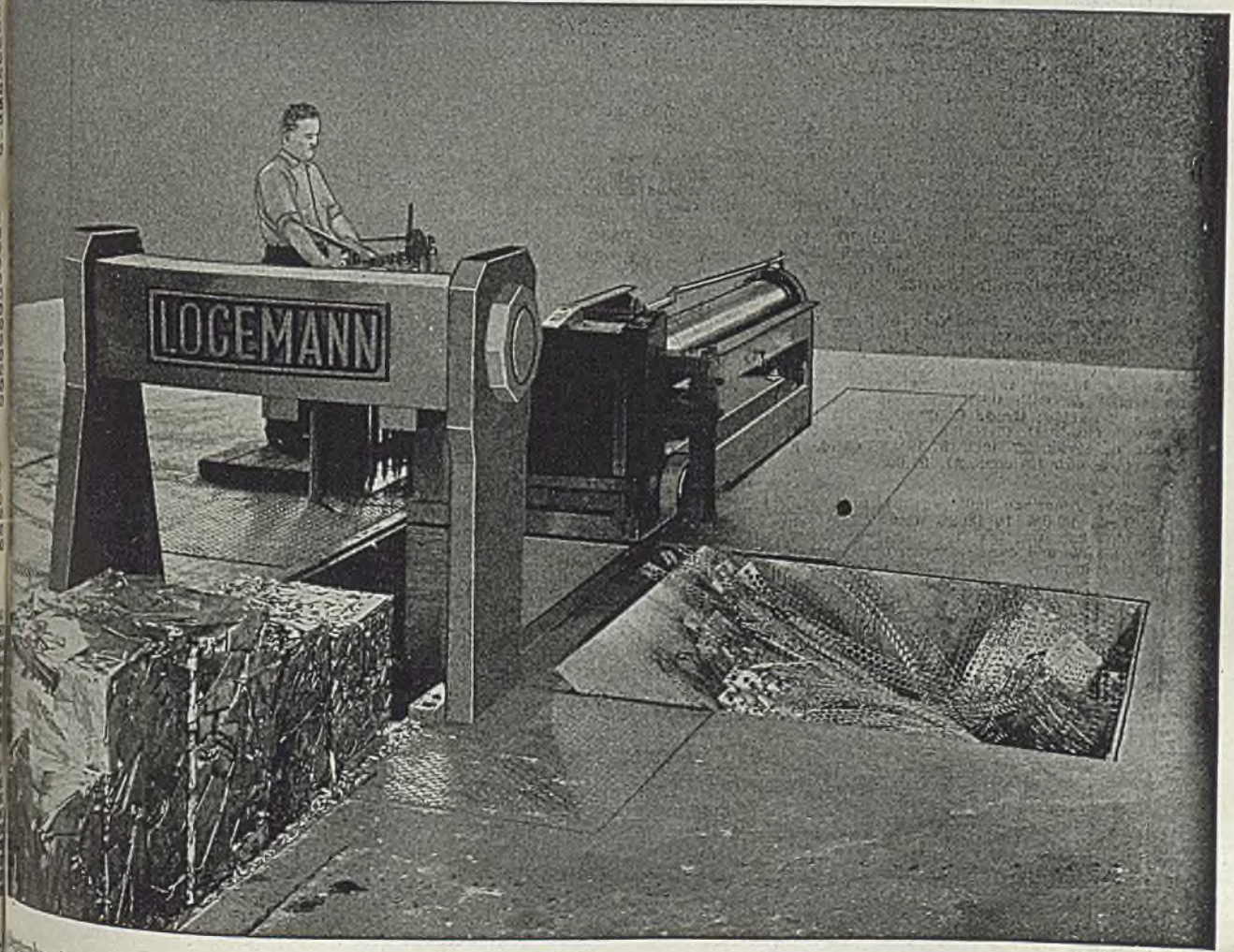


NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, nominal, $125 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.46c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c 10,000-lb. lots 13.00c f.o.b. Niagara Falls,

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarize 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbl 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del. 500-999 59.00c; 200-499 59.50c; 100-199 61.00

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Gra selli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50 del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.0 f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less th 15,000 lbs. f.o.b. shipping point. Add ¾c f 15,000-40,000 lbs.; 1c for 40,000 lbs. or mo

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnin
Copper	10.250	10.250	9.50
Tinned Copper	9.625	9.625	9.37
Yellow Brass	8.625	8.375	7.87
Commercial bronze 90%	9.375	9.125	8.62
Commercial bronze 95%	9.500	9.250	8.75
Red Brass, 85%	9.125	8.875	8.37
Red Brass, 80%	9.125	8.875	8.37
Muntz metal	8.000	7.750	7.25
Nickel Sil, 5%	9.250	9.000	8.62
Phos. br., A, B, 5%	11.000	10.750	9.75
Herculoy, Everdur or equivalent	10.250	10.000	9.25
Naval brass	8.250	8.000	7.50
Mang. bronze	8.250	3.000	7.50

Other than Brass Mill Scrap: Prices apply material not meeting brass mill specificatio and are f.o.b. shipping point; add ¾c shipment of 60,000 lbs. of one group and for 20,000 lbs. of second group shipped same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, 1 tinned copper, copper borings 9.75c; No copper wire and mixed heavy copper, cop tuyeres 8.75c.

(Group 2) soft red brass and borings, alu num bronze 9.00c; copper-nickel and bori 9.25c; car boxes, cocks and faucets 7.75c; metal 15.50c; babbit-lined brass bushi 13.00c.

(Group 3) zincy bronze borings, Admira condenser tubes, brass pipe 7.50c; Muntz m condenser tubes 7.00c; yellow brass 6.2 manganese bronze (lead 0.00%-0.40%) 7.0 (lead 0.41%-1.0%) 6.25c; manganese bro borings (lead 0.00-0.40%) 6.50c, (lead 0. 1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of sh ment, truckloads of 5000 pounds or over; S regated solids, 2S, 3S, 5c lb., 11, 14, etc. to 3.50c lb. All other high-grade alloys lb. Segregated borings and turnings, wro alloys, 2, 2.50c lb. Other high-grade al 3.50, 4.00c lb. Mixed plant scrap, all so 2, 2.50c lb. borings and turnings one cent than segregated.

Lead Scrap: Prices f.o.b. point of shipm For soft and hard lead, including cable l deduct 0.55c from basing point prices for fined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5 f.o.b. point of shipment; add ½-cent for 10 lbs. or more. New die-cast scrap, radi grilles 4.95c, add ½c 20,000 or more. Unsw zinc dross, die cast slab 5.80c any quan

Nickel, Monel Scrap: Prices f.o.b. point shipment; add ½c for 2000 lbs. or mor nickel or cupro-nickel shipped at one time 20,000 lbs. or more of Monel. Conve (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over copper 26.00c; 90-98% nickel, 26.00c pe nickel contained.

Cupro-nickel: 90% or more combined n and copper 26.00c per lb. contained ni plus 8.00c per lb. contained copper; less 90% combined nickel and copper 26.00c contained nickel only.

Monel: No. 1 castings, turnings 15.00c; clipping 20.00c; soldered sheet 18.00c.

STE

Sheets, Strip . . .

Sheet & Strip Prices, Page 202

Sheetmakers find cancellations have reduced backlogs as much as had expected and schedules now being formed will extend well through the year. Much rated tonnage was for other than war purposes and remains on books, with unrated tonnage now being fed into gaps left by loss of war material. Galvanized and silicon sheets show little effect of reduced programs. Renewed buying is expected to come about when deliveries can be promised with some certainty.

New York—Most leading sheet sellers believe that they will be in position to resume scheduling of hot and cold-rolled sheets within another week or so. At present mills are still clearing schedules of canceled tonnage; and some cancellations continue to come through, but most of what may be expected is over.

In some grades, such as galvanized and silicon sheet, cancellations have been relatively light. In the case of silicon sheets leading consumers can use their military requirements for civilian work, such as in the case of transformers, for instance. Practically all sellers of silicon sheets are booked solidly into next year; in certain instances into the second quarter.

In galvanized sheets there have been some navy and army cancellations, but as new military bases are still being established and as military occupation requirements will be substantial, much of the galvanized tonnage on order by the armed forces is likely to be used. Meanwhile, there is domestic demand for virtually every pound available, particularly from jobbers.

Demand for hot and cold sheets is receding from the temporary lull that came with V-J Day. Inquiry is substantial and as soon as mills are again able to specify definite delivery dates actual booking will undergo further increase.

Cleveland — Sheet producers are in a much better position than they believed could be possible after the recent flood of cancellations. A large percentage of their forward commitments on which actual work had been started. Some cancelled orders were in process but most of these, as well as completed orders, were immediately transferred to other customers or to other programs of the same customer.

Due to limited capacity of the industry which was not expanded during the war, demand is far from being fully met. As a matter of fact, capacity probably is below the prewar level since many sheet mills were scrapped during the last few years. Producers expect to expand facilities soon, especially in annealing and similar departments.

Available tonnages are being allocated as equitably as possible. Demand is rapidly shifting from hot-rolled to cold-rolled and coated sheets. Enameling mills are especially tight. While producers are still pressed for delivery, demand is checked somewhat by continued restrictions on inventories, now incorporated in a new WPB priorities regulation, No. 32.

Boston—Volume of new orders for narrow cold-rolled strip for delivery before November is relatively light. While re-scheduling is not complete or production cycles synchronized, enough tonnage in process or moved forward in sequence of booking is sufficient to fill major schedules for the next few weeks or well into October. This includes some former uncanceled rated orders. Confusion and impact of contract cutbacks among consumers is reflected by drop in inquiry; uncertainty as to prices of finished products and plant changes are factors. First postwar output of washing machines in Connecticut, expected to reach 5000 a month next quarter, are going into warehouse pending ruling on a 15 per cent price increase. While scattered substantial inventories of war tonnage are left by cancellations, stocks in specifications suitable for most civilian production are generally limited. One of the deepest cuts among New England fabricators has been with Casco Products Corp., Bridgeport, Conn., nearly $18,500,000. Although ratio of rated orders of stainless sheets and strip are maintained over the average, in some instances steel will be available for reconversion within four weeks.

Chicago—With war cancellations believed near an end, sheetmakers are surprised to find they have not been relieved of as much tonnage as had been anticipated. Reason for this is that much of the business on books was rated tonnage for other than direct war uses and has remained on schedules. Among such end uses are washing machines, railroad cars, farm implement and electrical appliances. As a result, sheetmakers here are booked solidly for two or three months. Because only limited tonnages of all grades of sheets will be available in fourth quarter, producers are expected to allot quantities to customers to assure them of fair share. Auto makers are not likely to get sizable tonnages from this district before yearend.

St. Louis — Sheet and strip demand continues heavy, with an estimated 15 per cent of bookings involved in war cancellation, which was replaced immediately by civilian needs. Most producers refuse to sell as far ahead as formerly. Only such new business is being booked as will fill gaps from cancellations. Automobiles, farm machinery and stampings are putting pressure on strip and deliveries are at least two months deferred. Little is being promised now before January. Light sheets are in heaviest demand. Return of youths to school is depleting labor. Gate hiring gives rapid turnover but a better grade is being obtained. Hot-rolled sheets are promised for March; cold-rolled for June and later; tin plate for February and later; electrical sheets for August and later, with a little July tonnage open; heavy galvanized for February and light for January and February.

Cincinnati — Sheet mills, despite an energetic attack on the problem, still face a big task in readjustment of schedules upset by V-J Day cancellations. All buying of unrated sheets discloses the ambitious programs which foreshadow demand beyond supply. The backed-up needs for galvanized are adjudged tremendous. Complaints are heard on OPA pricing, the loudest concerning low-silicon sheets. Until the scheduling situation is further clarified, data on backlogs will be unavailable.

Buffalo—Confusion prevails in sheets and strip as many expected cancellations are delayed in reaching mills. As a result producers can not promise deliveries with certainty. Currently deliveries are in December. While substantial backlogs of civilian business assure future production some concern is expressed over the fact that automobile orders are not heavier.

Birmingham—Sheet production is being pushed to the limit of available labor with demand increasing, especially from agricultural users.

Pittsburgh — Tonnage booked the past week has rebounded sharply from the abrupt curtailment immediately following the announcement of Japan's surrender, and further gains are indicated as civilian goods production gains momentum. Number of individual orders nearly matches wartime volume, although overall tonnage is considerably below that level. New business includes substantial tonnage for specialties, notably electrical, enameling and stainless items. Automotive, refrigerator, stove and other civilian goods industries have been particularly active in placing tonnages. These interests also have been active in buying up excess items developing out of war contract cancellations. Large steel requirements from drum manufacturers are indicated, for practically all military orders for steel shipping containers will remain unchanged through the remainder of the year. Most cancellations apply on forward deliveries for many consumers are able to use tonnage already specified for civilian goods production. Substantial volume of unrated orders, estimated to have totaled 40 per cent of backlogs at end of the war, have been fitted into rolling schedules. The present confused delivery situation is not expected to be clarified for the large integrated producers until early this week. However, as rescheduling nears completion openings in rolling schedules are apparent for shipment in October, although deliveries on most items are expected to be extended into late November and beyond, particularly for galvanized. Rolling mill schedules are back to near capacity, although strikes and manpower shortages still are retarding factors. Over 10,000 tons of hot-rolled strip were lost last week at the Irvin works of Carnegie-Illinois Steel Corp., due to a strike resulting from grievances over new scheduling necessitating fewer working hours as mills reverted to the prewar 40-hour work-week basis.

Cancellations and cutbacks of stainless steel orders have been heavy. Leading producers report aircraft tonnage has been reduced over 85 per cent, while military orders for shipbuilding, stoves, mess gear, specialty items for hospitals, etc., have been reduced to a fraction of previous commitments. However, practically all cancellations are now in and sellers report deliveries still extended well into October on most items, particularly polished sheets and strip. New business is developing in encouraging volume and is expected to climb to near record levels toward the close of this year. Postwar demand for stainless steel is considered to be exceptionally good, with new applications expected to swell overall requirements. In addition to the entry next March of Washington Steel Corp., Washington, Pa., into the stainless steel production field, a Detroit concern also is expected to commence output of stainless sheets and strip soon.

Steel Bars . . .

Bar Prices, Page 102

Much unrated carbon bar business on mill books was for other than war purposes and backlogs have been reduced less than was expected, leaving deliveries relatively little changed. Some producers are sold for the year and are using a system of allocation to divide their tonnage among users. Hot-rolled carbon bars in a wide range of sizes can be obtained for October delivery from some mills. In cold-finished bars November is an average delivery date, with new business extending this steadily.

New York—Bar schedules are becoming better organized and it appears, with most cancellations out of the way, that buyers will have little difficulty obtaining hot carbon bars in a rather wide range of sizes for October delivery. Certain producers doubt if they will be in as good shape, asserting that anything they may have for shipment in that month will be confined to few sizes. However, the general situation is easing temporarily.

This also applies to cold-drawn carbon bars, but here recovery is expected to be fairly rapid. For instance, one producer asserts that he already has enough civilian work on hand to fill his schedules for the remainder of the year, once the mill has cleared away all canceled tonnage and is in a position to go ahead. Others assert they have sufficient work in prospect to provide substantial backlogs. November appears to be the indicated position for most cold drawers at the moment.

Alloy bars are being offered for shipment in six to eight weeks, which shows little change from the general picture shortly before the end of the war.

Philadelphia — As a result of cu backs in ordnance, schedules on hot-r bars have shrunk appreciably and no are on a level with ordinary quality ca bon bars. While producers do not k know where they stand, promises are b coming more prevalent for October a November shipment, with delivery on larger sizes easier than on the small Hot alloy bars also are being offer for October and November, the relati between these and the carbon grades ing closer than in many months.

Chicago—Although considerable st steel was canceled after the war end carbon bar cancellations were surp ingly light. It is not anticipated t cancellations from this point on will in any volume. It now develops t most carbon tonnage on mill books for other than direct war and munitio uses, consequenlty remained in force included such end uses as agricultu implements, railroad cars, washing chines, and the like, which carried ings. A few barmakers are sold out balance of the year and may have to their own system of allocations to ass customers their proportionate share. alloy situation is definitely easier, September and October delivery pr ble. One mill has curtailed bar ou because lack of fuel has forced a h furnace out of production.

Boston — Specification revisions to hamper clarification of bar mill sch ules. Unrated orders are frequently vised, notably in alloys. Deliveries carbon bars have improved materi October for new orders on more s Forge shops are getting into automo parts production in heavier volume. pact of cancellations with aircraft en plants is staggering. Operations of & Whitney division, United Air Corp., will be centered at East Hartf Conn., closing branch plants. Pro ers of sporting firearms are gene well along on reconversion, but ha quirements are much under wartime in most cases. Among bar consu there is some evidence of confusion reconversion needs portending app cation of CC ratings later for steel though employment of this rating be sparingly permitted, purchasing urge such authorization for prefe be given wide publicity by regional offices who grant the priority.

St. Louis — All lines of steel bar cept reinforcing are sold to the en the year. Many cancellations have received but unrated orders have brought forward to fill gaps, leavin overall production situation uncha Pressure for civilian use is strong, cially for agricultural implements bed and automobile manufacturers ers expect to catch up on delivery ises made for July and August by ber and reach a current basis by th of that month. Two open hearth banked at one bar mill, to resume a fortnight. All Army contracts been canceled and only a few rem force for the Navy.

Buffalo — Despite war cancel

ppears likely full bar mill schedules be maintained for the remainder of e year. Deliveries still are quoted January. An important producer one mill down last week because of ability to schedule orders, but all bar ills have resumed at full capacity.

Pittsburgh — Merchant bar mill schedles are filled through October and little ace is available in November except a few larger sizes which can be promed for September and October by some ther mills. Alloys are available in ptember. Cancellations have fallen onsiderably, but more are scheduled each mill level soon. Mills are still rtain about status of fourth quarter rth mill allotments of further recon-ion tonnage which has in the past en set aside in much the same manner the warehouse load directive, but an individual company basis. Some ers believe that fourth quarter further nversion tonnage remains a definite ation. New demand has improved ntially the past ten days, particu- from automotive, farm implement railroad equipment industries. Forge s have been hard hit by contract llations, but cold-rollers report sub-tial order backlogs and are main-ng active operations.

el Plates . . .

Plate Prices, Page 203

ate buying is light and mills have e in backlogs, some current buying anding September delivery. Some et business is developing, but not of cent volume to keep mills busy. e shipbuilding is still coming out and is helping platemakers in some sec-

iladelphia — Plate buying continues ng, with some tonnage still avail-for this month. However, most of-s are for October. Some export g is noticed, especially for Norway Sweden. The latter recently has ed plates, shapes and bars for 20 chant ships, most going to one east-producer. However, such demand is of importance, compared with avail-capacity for plates. Eastern plate now are going on a 40-hour week, with the general trend of the industry.

hicago — Because platemakers lost derable tonnage through cancella-of war contracts, schedules currently for the next few weeks are not heav-burdened. The problem is one of ing mill turns fully engaged and pro-ng at an economical level. Some many elapse before normal volume ate business returns, for in recent s most output has gone into ships, ns, bombs, and direct war uses. sion — Resumption of passenger car ng by Pullman-Standard Car Mfg. Worcester, Mass., is still several s away, probably early next year; then trolley buses will be construct-Plate buying is at low ebb, with tonnage meager. In spots miscel-eous industrial inquiry shows signs ival with deliveries in October or before. Flanged and dished heads, pressed and spun, are available in four weeks. Heads at no time ever e as extended as plates. Produc-of torpedoes at Newport, R. I., sta-will be halted and transferred to Park, Ill. Since 1911 torpedoes have been manufactured at Newport. Both east and west yards of New England Shipbuilding Co., Portland, Me., have been declared surplus property.

Birmingham — Plate production currently is estimated at slightly better than 80 per cent of capacity as compared to more than rated capacity output prevalent in this district for many months. Mills report considerable holding off in plate orders from scattered sources, although shipbuilding continues to account for a large tonnage.

Tubular Goods . . .

Tubular Goods Prices, Page 203

Pittsburgh — Increased demand for alloy and steel pipe, estimated at 20 per cent over the 1939-40 average by some trade leaders, is indicated for the early postwar years. Most future requirements are expected to originate from export markets, rubber, chemical and oil industries, public utilities and new industrial plants. Of particular importance in the immediate outlook are the unusually low inventories of pipe distributors, while lifting of WPB controls on new oil exploration should substantially increase requirements for oil well casings. Pipe fabricators have practically no reconversion problem and therefore have maintained operations with relatively little disruption during the early reconversion period. Recent cancellations have been light, with contracts most affected involving tubing require-

ments for aircraft, shipbuilding needs and seamless requirements for mortar shells and bomb casings.

New York — Fast-growing demand for line pipe is cushioning the drop in backlogs on large seamless pipe, resulting from cancellations of shells, bombs and rockets. One large producer reports schedules running into next year. Line pipe tonnage involves few relatively large projects. Few run over 100 miles and most run much less. A heavy volume of this work accumulated during war when oil company requirements were limited to relatively few pipe lines of special urgency, and to barest maintenance requirements. A considerable export demand for line pipe also is developing.

The situation in mechanical tubing has eased as a result of cutbacks in the aircraft, tank and truck programs in particular. However, some leading producers are still quoting deliveries of two and three months on hot-finished and cold-drawn tubing. Alloy tubing schedules are not much better, ranging around 8 to 10 weeks in at least one case. Notwithstanding navy cuts schedules for boiler tubing are fairly sustained, with November offered by some sellers. Considerable industrial and public utility work is being figured.

Meanwhile there is strong demand for merchant pipe, with leading mills still behind on deliveries. Notwithstanding the fact that new construction will probably not get in full swing for another six months or so, there is considerable increase in maintenance and repairs. Most producers are now quoting shipments late in the year, and beyond the very earliest appears to be Novem ber.

Pipe fabricators will have a postwa production 18 to 20 per cent above th 1939-40 average, R. K. Hanson, pres dent-commissioner, Pipe Fabrication In stitute, Pittsburgh, predicted at a re cent regional meeting in New York Ci He pointed out that the annual war pi duction of the industry rose to a pe of $42 million and indicated that, wi some minor set backs, the volume in t postwar period may approximate $ million, a figure 18 to 20 per cent abo prewar.

The biggest demand will come fr utilities, oil companies and natural g producers, and for repairs and main nance on existing plants. He fores a heavy export demand.

Seattle — Increased inquiry for c iron pipe is noted as priorities are ea and an accumulated backlog of ord makes its appearance. Hillsboro, Ore has bought more than 6000 feet of inch pipe, 300 tons or more, from H. Purcell, Seattle, and has awarded installation contract at $10,944, the f unit of a $700,000 project involving miles of pipe. Bids are in at Ever Wash., for a large tonnage of 6 and inch cast pipe. Ephrata, Wash., awarded a contract at $58,750 for a c crete reservoir and $13,343 for pipe li Seattle has called bids for Sept. 13 a steel tank and tower and 16,000 f of water mains for the West Myrtle project, in which $500,000 will be sp

Wire . . .

Wire Prices, Page 203

Pittsburgh — Order cancellations wire and wire products have been re tively light, with sellers' order back extended through November on ma facturers' wire items and into next y on merchant wire. With the general ing in raw steel supply, prospects good for increased production of rods. However, no substantial inc in output of wire and wire product indicated for about 90 days. Produ are attempting to increase output, production schedules cannot be quately determined for full impact cancellations has not reached mill le while manpower shortages also tinue to hamper operations. Export mand has been steadily increasing recent months, with mills unable to cept all tonnage offered.

Cleveland — Termination of the and heavy cancellations of orders not altered the tight wire situation. O ings on schedules were quickly with unrated orders. Chief concer wire mills has been to halt produc of material having a chemical an no longer desired and to make equi distribution of available tonnages. erally, products now are the sam those at the war peak. In additi heavy demand from domestic consu export demand is rising steadily.

Chicago — Because of pent-u mand which could not be satisfied pressure of war requirements for the future will likely see consid

...ss come out. This holds for rail- ... and public utilities, coal mining ... oil drilling. Rural power systems ... known to have a tremendous pro- ... set up for the next five to seven ... Several months probably will ... however, before road building de- ... to require heavy tonnages of ... wire fabric.

...ningham — Wire products show ... output in this district, with ... ability of additional ingots for civil- ... goods. Farm demand for fencing ... nails is heavy and has not been ... in past months.

...w York — Depending on the prod- ... wire mill backlogs have been low- ... about 20 per cent by the wave of ... ellations, now about complete. Rat- ... and directive tonnage is most severely ... ted. Production schedules are be- ... revised with assurance substantially ... wire will be available for recon- ... to civilian products next quarter. ... is notably true in high carbon rounds, ... wire and space opened by aircraft ... ks. There are curtailments and ... gs in wire rope departments. In- ... for civilian tonnage is heavier. Re- ... ling is prompting some changes ... equipment for changed specifications ... emphasizes in some directions over- ... built up to meet war needs, wire ... signal wire, steel strapping. There ... cancellations in camouflage material ... steel wool producers, but few, if ... wire allotments, the tonnage to ... verted back to wool. In the main, if ... conversion problems exist, consum- ... ll with allotments carry on with ... for production of normal products ... steel wool. To a certain extent ... applies to wire drawers as regards

...ston—Rescheduling permits fourth ... delivery of open-end orders in ... volume. As the cancellation ... is unwound, earlier capacity is ... for a broader range of sizes and ..., inquiry for reconversion steel ... Validated tonnage remaining ... logs will shortly be processed and ... schedules will be heavy with former ... orders. Openings created by ... rope directives, aircraft ... and scores of other war ... are filling, but not with- ... confusion. Revised specifications ... factors and while the great ... cancellations are in, some from ... contractors continue to filter through. ... slackening in semifinished opera- ... will follow, but impact will not ... great as in finishing. Pressure for ... ment is somewhat stronger from pro- ... of civilian goods, notably auto- ... builders. Large lots of music ... wire are available in surplus and ... attractive lots, near 250 tons, have ... bought by one producer in this area ... possible reprocessing.

Semifinished Steel . . .

Semifinished Prices, Page 202

...burgh — The tight balance in ... steel supply and demand is ... to be relieved substantially by ... contract cancellations. However, ... the status of steel producers' order ... is clarified no specific schedul- ... new business is possible. Volume ... orders is encouraging, some of ... has been tentatively promised for delivery this quarter. Heavy demand for sheet bars is particularly in evidence, while unusually large tonnages for Belgium and France are being scheduled for shipment late this quarter and next. Cancellation of the shell programs and most plates for ship construction has freed considerable tonnage of raw steel for production of sheets and strip, reinforcing and merchant bars, wire and other steel products for which a heavy demand is anticipated in the early reconversion period.

Structural Shapes . . .

Structural Shape Prices, Page 203

Chicago — Structural fabricators in this district have more work than they can handle. Shortage of manpower in estimating and drafting departments as well as the shops, forces discrimination in jobs that can be taken on. General feeling is that obtaining plain shapes from mills will be no obstacle. Within the past week or ten days, new projects involving several thousand tons have been put out for figures, this being the aftermath of WPB releasing the brakes on industrial construction.

Seattle—Washington State Bridge Com Commission is preparing plans for a second Narrows bridge near Tacoma, replacing one destroyed by wind in November, 1940. C. E. Andrews is chief consulting engineer. Proposed structure will be

wider than its predecessor and will incorporate features designed to overcome weaknesses. Cost is estimated at $7 million. Bids may be asked in January.

Boston — Small bridge inquiry is more active, several hundred tons for Maine and Massachusetts; latter closes Sept. 11 on two spans at Templeton, one a stringer. Most industrial construction, including an addition for Atlas-Ansonia Co., New Haven, Conn., takes lots under 100 tons. An exception is 500 tons for a paper mill addition, Rochester, N. H. While some producers are in November on small sizes, October delivery is possible on most.

Birmingham — Shape schedules continue fairly full. Demand is consistent and fabricators report little slackening due to the end of hostilities. Production is estimated at close to 80 per cent.

Philadelphia — Shape producers now are generally quoting November, and one producer of wide-flange sections has capacity available for October, due to recent shell cutbacks, but will soon be out of the market for this position, it appears. Structural inquiry is improving, although still confined principally to relatively small projects. Another month or so should see considerable larger work being actively figured.

Rails, Cars . . .

Track Material Prices, Page 203

New York — While specifications have not yet been issued the New York Central plans to open bids for rails Sept. 11. The Pennsylvania is in the market for crossing frogs and structurals, bids Sept. 12. Meanwhile the Delaware & Hudson has placed more than 10,000 tons of rails with the Bethlehem Steel Co., Bethlehem, Pa. Car demand is light but builders expect resumption of inquiry soon and look for the Chesapeake & Ohio to place orders soon for 1995 open-top hoppers and 200 covered hoppers.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 203

Pittsburgh — Reinforcing bar producers are confident that more space soon will be granted them on merchant bar mills, but how much output will be increased cannot be determined until the heavy volume of contract cancellations on merchant bars subsides. The situation at the moment still is marked with confusion, for not all the expected order cancellations in merchant bars have been passed down to mill level, while the paper work in rescheduling deliveries has been tremendous. Reinforcing bars are practically the only steel product not affected by contract cancellations, most bookings in recent months involving postwar expansion programs. Producers east of the Rocky Mountains booked 93,000 tons during July, compared with 58,000 tons last May. For the first two weeks of August bookings matched the July rate. Prior to the close of the Japanese war sellers were booked through the balance of this year, but it is hoped that deliveries can be shortened considerably through increased production over the next few months.

Chicago — Reinforcing interests are being fairly deluged with new construction work involving from a few ton upwards. For the first time in many months, suppliers are selecting the jobs they wish to bid, being forced to this course because of inadequate estimating and drafting room personnel. For some time, supply of bars may not be abundant and operations must be maintained within reasonable limits.

New York — Reinforcing bar inquiry includes more than 100 tons for a repair shop for the Borough of Queens fire department. Considerable work is in prospect but at the moment inquiry is confined chiefly to small jobs. Much road work and other public projects are being planned.

Pig Iron . . .

Pig Iron Prices, Page 205

End of the war has had little effect on demand for pig iron, as foundries have had little reconversion difficulty as plenty of civilian business is offering. Deliveries now are practically unchanged from recent months. As labor becomes more plentiful more iron will be required. Melters also desire to increase inventories for winter, but are prevented by the 30-day rule, still in effect.

Cleveland — End of the war has had practically no effect on pig iron. Production is high, although at least one blast furnace in this district which has been active under war pressure longer than normal will be down for relining soon.

The WPB 30-day limitation on inventories holds down sales, with foundries buying on a hand-to-mouth basis. Foundries plan a substantial increase in output, some looking for a 75 per cent gain. Shortage of skilled workers checks expansion but a few molders and coremakers have returned from war plants since mid-August. It is expected in the trade that a substantial number of skilled foundrymen will return after a short vacation taken with benefit of unemployment insurance.

New York—September specifications for foundry iron are developing in good volume, and it is believed the melt for the month at most district foundries will be at least comparable with August. Many foundries anticipate increasing production as autumn gets under way and prospects for obtaining more labor improve.

While the pig iron situation is reported as still tight in certain midwestern districts, supply in the East appears adequate to meet all demands now in sight. Curtailment in basic demand is the principal factor. At the same time this situation may tighten as export demand expands. Substantial tonnages are therefore the market now awaiting only definite scheduling.

Cincinnati—Requisitions for September pig iron probably will hold to recent levels. Most melters will press for expansion, however, as soon as capable labor is obtained and other adjustments completed. Also, they want larger stocks of pig iron when restrictions are lifted. Deliveries on northern foundry iron should be easier soon. A strike in the South has held up some deliveries and shutdowns here for lack of iron have been avoided.

Chicago — Demand for pig iron

ctered somewhat during the past week some foundries have been able to ef- reconversion to peacetime castings. this conversion continues requirements a and will build up to the point where pliers will be hard put to make de- ries. While foundries are picking a few additional men, they still are dermanned. Two more blast furnaces operating this week, making 32 of district's 41 active currently. Inland el Co. has returned the last of the fur- es made idle during its recent strike, d Carnegie-Illinois Steel Corp. has wind on No. 1 at South Works, one veral banked for the end of the war day.

Birmingham — Pig iron production tinues to suffer, with 14 furnaces ac- . All four of Sloss-Sheffield Steel & Co.'s blast furnaces here remain at the start of the second week of rike of blast furnace and by-product ers that has completely deprived the pany of power.

Philadelphia — The pig iron situation he East is generally comfortable, be- e of the drop in basic requirements. eastern producer has taken off a fur- within the past week. Foundry de- is strong, however, and another days may clarify the situation with ect to some substantial export ton- particularly for France. The prin- foreign buyer over recent weeks has Sweden, although schedules are ntative, pending final word from ington. Discussions with producers pig iron exports were held in Wash- n late last week.

Boston — Pig iron consumers are ac- delivery on all tonnage ordered n some instances seek slightly heav- ipments. Foundry grades are not- ighi, and while basic has eased in directions the effect is not signifi- among district consumers. Bridge- continues to get iron from Buffalo ater. By next quarter some surplus steelworks furnaces is thought like- Manpower deficiency continues at ries despite labor displacements and ntracting by several larger melters widespread. Lifting of inventory ctions would sharply increase de- for iron against winter require-

ep . . .

Scrap Prices, Page 206

pite of relatively low steel produc- the scrap market is holding well, ceiling prices applying on steel- ng grades. While some decline has expected it has not developed yet. important eastern steelmaker has a large tonnage at ceiling and reinstated a canceled tonnage. Mill tories are low and dealers stocks small in view of the expected in- se in steel production when the sit- clears.

Pittsburgh — With mills out of the except for an occasional purchase n needs, scrap prices are largely al. Most overdue orders have been ed, but no deferment of shipments ncellations have been noted on cur- contracts although consumers are more rigidly to specifications. It en likely the market will not ex- ence any real test until new contracts ered into shortly after Labor Day. time a more accurate trend in probable mill production schedules through the remainder of this year will be possible. A break in scrap prices is of course a definite possibility, but relatively low consumers' and dealers' inventories, growing scarcity of production scrap due to cancellations of war contracts, indicated slowness in getting civilian goods production under way with consequent lag in production scrap from these sources and likelihood that steel operations will soon climb to 80 to 85 per cent of capacity largely offset the possibility of a substantial break in prices.

Boston—For heavy melting steel there is resumption of buying at ceiling prices by an eastern Pennsylvania consumer, but others hold off. Unprepared in open sales, including 500 tons from Boston navy yard, brought $10.78 compared with $9.26 previously at Watertown arsenal; borings and turnings brought $8.27, dealer bid, and flashings $14.52. The boring and turning price compares with $10.05 Boston ceiling. Turnings, production of which has slumped, are therefore less steady than heavy melting.

Birmingham — The scrap market is quiet, with no current buying and no cancellations. Both suppliers and consumers are waiting for developments before committing themselves. Supply is sufficient for present needs and there is no pressure for further tonnage.

Buffalo — Expectation of lower prices for steel and iron scrap were stopped last week by the leading consumer paying ceiling prices for 10,000 tons of

heavy melting steel and reinstating 6500 tons on overdue contracts previously canceled. The mill stipulated it would accept no turnings but no sales of those grades have been made to establish the market. Buying of low phos for electric furnaces has been done at ceiling, and cast scrap continues tight. Two cargoes aggregating 10,000 tons have arrived by lake and about 2000 tons has come by canal. Extended curtailment in ingot output is enabling consumers to build up reserves from the arrivals by water.

Cleveland — There is no scrap buying in this district but dealers continue shipments on contracts, which are accepted freely. Scrap is scarce, especially in blast furnace grades and brokers have difficulty in obtaining sufficient for their customers.

New York — Scrap dealers are in receipt of substantial orders for heavy melting steel for eastern Pennsylvania, Sparrows Point and Lackawanna, all at ceilings. This is the first new buying since the end of the war and the fact that there has been no break in prices comes as a surprise to many, although others regard it as logical in view of scarcity of labor at yards for preparing material.

Philadelphia — Despite the easier tone in scrap which developed on word of Japan's surrender new orders for heavy melting steel are beginning to appear at ceiling prices, reflecting confidence in the steel outlook over the next several months. One factor for strength is continued lack of labor at scrap yards. Supply of unprepared scrap is fairly substantial, but there is not sufficient manpower to prepare it for consumption. This fall should see improvement in manpower. Among recent buyers at ceilings is Bethlehem Steel Co., which is covering particularly for Sparrows Point and Lackawanna. Cast grades continue strong, with postwar demolition work not likely to get under way for several months, in the opinion of some trade leaders.

Chicago — Steel mills have bought no scrap since the war's end, but are accepting deliveries of material on contracts. New business is not looked for until after the Labor Day holiday. From the supply and demand angle, a strong situation seems likely for several weeks. Steelmaking operations currently are at 81 per cent or only 12 per cent below the level just before the Jap surrender, and good operations are assured for balance of the year. All prices hold at ceiling in absence of new transactions.

Scrap Brokers Set Up Chemical Laboratories

Unusually high proportion of alloy scrap, resulting from war steel production, presents a serious problem in scrap segregation for steel for automotive and other civilian goods. To help facilitate proper handling of alloy scrap, Luria Bros. & Co. have awarded contracts for the construction of a laboratory near the municipal airport in Reading, Pa., where scrap samples will be analyzed. This indicates the need for a scientific approach to problem of properly segregating alloy scrap. The Pittsburgh and other offices of the company will send samples to the laboratory by air express.

Charles Dreifus Co., Philadelphia, another large scrap broker, has completed a laboratory at its turnings crushing plant at Briquette, Pa. All machine shop turnings shipped this plant will be analyzed for chemical content. The laboratory also will serve shippers in analyzing other grades of scrap, a service which becomes of increasing importance as mixed lots of war scrap of undetermined alloy content appear on the market.

Warehouse . . .

Warehouse Prices, Page 204

Philadelphia — Warehouse business in August was off somewhat from July. Business was well sustained in sheet specialties and even some general line jobbers, especially those who go in fairly well for building requirements, experienced little decline. However, some others were off as much as 15 per cent. The outlook for September is for sustained volume, with the trend this fall likely upward.

Boston—Warehouse volume has slackened, with a moderate rebound indicated for reconversion tonnage in light products. There are some terminations and revision of orders with mills, but relatively few outright cancellations. In the Connecticut area especially, impact of aircraft cancellations is such, a large void in outlet for a wide range of quality specialties and alloys is created. Not only prime, but scores of subcontractors are affected, many warehouse customers. Indications are nails and wire products will continue tight for some weeks with civilian and export demand heavy. The same holds for sheets, notably galvanized.

New York—Slower demand for steel from warehouse is especially notable in alloys. Distributors are revising order programs with mills to meet specification changes and there are some cancellations in carbon bars and plates. Confusion continues to restrict buying and there are terminations, some involving tonnage already shipped. Replacements are not improved and sheet requirements for reconversion are not likely to ease deliveries to warehouses at least through next quarter.

Nonferrous Metals . . .

Nonferrous Prices, Page 208

New York—Government-owned stockpile of copper, mostly foreign produced, approximates 400,000 tons; fabricators have about 380,000 tons and refiners 70,000 tons. First move in the modification of foreign purchasing policy is seen in month-to-month commitments instead of quarterly. Reports are that delivery of no copper from Chile or Peru will be taken in November.

Copper imports during the war are estimated at about 3,000,000 tons. With military requirements now small, industry is confronted with gearing to civilian needs with a heavy over-supply, largely held by this country. Approximately 30 per cent of copper imported was purchased at ceiling prices, 12 cents a pound. Higher price paid for the balance brings the level up to 12.4 cents a pound. Under the present import duty foreign producers, with the end of government purchases, would have to pay four cents. Copper contained in military scrap, if available or returned, will contribute heavily toward postwar supplies. Disposition of surplus copper and a fixed policy by the government as to stockpiles and reserves is the major problem confronting the industry.

Swing toward civilian production involving copper, to take up slack in military cutbacks, is moderate. Domestic consumption of refined copper declined 37,753 tons in July, to 79,739 tons, lowest for any month since 1940. The peak was in March, 1945, at 171,558 tons. Deliveries in July totaled 88,661 tons, in excess of consumption. Fabricators' stocks of refined copper Aug. 1 stood at 387,008 tons, an increase of nearly 9000 tons. All allotments for fourth quarter and beyond have been canceled. Controls and the priority system terminate Sept. 30. Military orders will be assigned a special MM band and a second rating designated as CC will be used sparingly to break any serious shortages but in general no priority assistance will be given.

Steel in Europe . . .

London — (*By Radio*) — The fuel position in Great Britain is causing anxiety. The shortage limits expansion of pig iron output, which is greatly needed by the industry. Steel export bookings are substantial. Rail mills are working to capacity to supply peacetime needs. Sheets are in active demand.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

500 tons, factory building, Elgin, Ill., for Majestic Radio & Television Corp., to Joseph T. Ryerson & Son Inc., Chicago; bids Aug. 14.

500 tons, paper mill addition, Rochester, N. H., to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, fertilizer plant, Prairie du Chien, Wis., for Wisconsin Co-operative Farm Plan Foods, to Joseph T. Ryerson & Son Inc., Chicago; Joseph J. Duffy Co., Chicago, contractor.

200 tons, warehouse for York Corp., York, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

184 tons, repairs to bridge No. 203-B, Medora, Ill., for Atchison, Topeka & Santa Fe railroad, to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.; bids Aug. 13.

180 tons, three bridges for the Reading Co., to Phoenix Bridge Co., Phoenixville, Pa.

Unstated tonnage, addition, Atlas-Ansonia Co., New Haven, Conn., to New England Iron Works, New Haven; Leo F. Caproni, New Haven, engineer.

Unstated tonnage, plant addition, Humason Mfg. Co., Bristol, Conn., to Berlin Construction Co. Berlin Conn.; Westcott & Mapes Inc., New Haven, engineers.

STRUCTURAL STEEL PENDING

1500 tons, aero coach plant, East Chicago, Ind., for General American Transportation Corp.

1400 tons, research department building, Hammond, Ind., for Standard Oil Co.; bids Aug. 27.

1000 tons, tumor hospital, Hines, Ill., for U. S. Veterans Administration; bids postponed from Sept. 4 to Sept. 11.

500 tons, can factory and warehouse, Sacramento, Calif., for Continental Can Co.

500 tons, addition for American Car & Foundry Co. at Berwick, Pa.

340 tons, heat treating building, Chicago, for Ingersoll Steel & Disc Division, Borg-Warner Corp.; revised plans out, with bids Sept. 1.

180 tons, addition for Sylvania Corp., Fr

ericksburg, Va.

Unstated, one million gallon steel tank and tower, West Myrtle St. improvement, Seattle; bids Sept. 13.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, plant No. 4, Frigidaire division, General Motors Corp., Dayton, O., to Pollak Steel Co., Cincinnati.

340 tons, carton building, Elkhart, Ind., for American Coating Mills Inc., to Olney J. Dean Steel Co., Chicago; George Sollitt Construction Co., Chicago, contractor.

200 tons, Yellow Truck & Coach Mfg. Co., division of General Motors Corp., Pontiac, Mich., to Truscon Steel Co., Youngstown, O., through Cunningham-Rudy Co., Detroit.

100 tons, grain elevator, Gibson City, Ill., for Central Soya Co., to Ceco Steel Products Corp., Chicago; James Stewart Corp., Chicago, contractor.

REINFORCING BARS PENDING

500 tons, sewer, Cleveland.

200 tons, tuberculosis insane patients hospital, Mount Vernon, O.

100 tons, grading and drainage, Project 101, Prince Georges county, Maryland; R. B. Jaggard Engineering Co., Westmont, N. J., contractor.

PIPE . . .

CAST IRON PIPE PLACED

300 tons or more, 18-inch pipe, for Hillsboro, Oreg., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.; first unit of proposed $700,000 system project.

CAST IRON PIPE PENDING

Unstated, 6 and 8 inch, for Everett, Wash.; bids in.

Unstated, West Myrtle St. improvement, Seattle, 16,000 feet of pipe; bids Sept. 13.

Formulas Designed To Keep Prices Near 1942 Levels

(*Concluded from Page* 89)

3.2 per cent; small electrical appliances 4.9; sporting goods 3.1; miscellaneous nonferrous metal products 5.2; other miscellaneous durable products 3.6; other wood products 3.6.

At this writing, the only industry-wide reconversion price increases that have been announced are those on aluminum cooking utensils, radio cabinets and on washing machines and ironers. Manufacturers of aluminum cooking utensils fabricated from sheets may increase their 1941 prices to wholesalers and retailers by 10 per cent, while manufacturers of cast aluminum kitchenware may increase prices by 3 per cent. Wholesalers and retailers are asked to absorb the increases so that there will be no change in the present 1942-based prices to consumers—at least for the present; under the setup wholesalers and retailers are expected to earn at least 30 per cent on sales and any of them who are dissatisfied may ask the OPA for relief. In the same way, washing machine and ironer manufacturers may increase their prices by 5.2 per cent over their 1941 prices and consumer ceilings must remain at the 1942 level.

Because cost information is highly confidential among automobile manufacturers, the OPA dealt with each manufacturer in private, and has not disclosed what basis was arrived at for determining the markups for each producer. But Chester Bowles' announcement made it clear that the basic OPA reconversion price method had been followed in connection with the new automobiles. The ceiling prices are based on costs in the last period of normal production, 1941, to which "increases in basic wage rate schedules and in materials costs plus a normal peacetime margin of profit" are added. The profit factor will be either the manufacturer's own 1936-39 margin, or one-half the industry average for that period, whichever is higher.

The Bowles announcement was interesting for a number of reasons:

1—It expressed the opinion that the permitted markups would bring the new automobiles out at about the level of 1942 model prices which, Mr. Bowles pointed out, were all the way from 10 to 19 per cent above the 1941 model prices. The ultimate price should be even lower than 1942 model prices because dealers were permitted to make charges to cover added costs resulting from car rationing.

2—If there is a general increase in car prices, contrary to the present expectation, the next step would be to see whether all or part of the increase could reasonably be absorbed by dealers. In preparation, the OPA already is conducting a study of automobile dealer margins.

3—In case manufacturers incur higher or lower costs due to instituting substantial changes from their 1942 models, the OPA will provide for increases or decreases in ceilings, and any increases caused by such model changes would not have to be absorbed by dealers.

4—Reason for granting individual company markups instead of an industry-wide markup was that an industry-wide markup might cause serious disadvantage to some smaller companies, also because it would take a number of weeks to compile an industry-wide markup and thus delay companies who are prepared to return to production immediately.

5—The OPA, to permit greater flexibility in parts purchasing, suspended ceiling prices on most automobile parts when sold as original equipment for automobiles. This action was taken to prevent delay that would have resulted from determining reconversion pricing formulas for parts, and also because many parts manufacturers have excess capacity because of the ending of the war and, in the opinion of the OPA, will not charge higher prices for these products on the average than the OPA would allow under ceiling prices. At the same time, not to take too much for granted, all parts manufacturers are required to file their price increases over prewar levels for the general information of the OPA. The order stipulated that the suspension of prices applied only when the parts were sold for use as original equipment in automobiles. In other words, automobile replacement parts will remain under existing ceilings for the present.

The OPA already has begun to drop price controls. "To ease the pressure and enable many small manufacturers to get under way," it has suspended price control on mercury, primary and secondary and scrap magnesium, magnesium castings, and aluminum in the form of ingots and pigs, die castings and sand castings. These are basic raw materials that now are in plentiful supply, the OPA says. OPA also has removed controls on some 250 miscellaneous consumers' items.

CONSTRUCTION AND ENTERPRISE

OHIO

ALLIANCE, O.—Alliance Automatic Window Screen Co. has been incorporated with $500 capital and 150 shares no par value, to conduct a general machine shop, by Earl D. Blair, agent, 604 Alliance Bank Bldg., and associates.

CINCINNATI—Electric Auto Light Co., C. L. Patterson, general manager, 4890 Spring Grove Ave., has let contract to Frank Messer & Son, 2515 Burnet Ave., for a 300 x 800-foot plant.

CLEVELAND—White Motor Co., care Ray Ishee, St. Clair Ave., and East 79th St., has priorities for a one-story 84 x 300 x 24-foot plant building to cost about $45,000.

CLEVELAND—Parma Stamping & Die Co., 5265 West 130th St., formerly Van-Zak Machine Co., 13000 Athens Ave., has been incorporated to manufacture dies and stampings for automotive parts and novelties, by Oscar L. Doyle, 2000 West Fourteenth St., and associates.

CLEVELAND—Faxfilm Co. has been organized to manufacture a plastic film used for study of surfaces, with 1000 shares $100 par value and 4000 shares no par value, by Hal W. Griswold, agent, 1128 Standard Bldg., and associates.

DAYTON, O.—City, J. F. Hale, Municipal Bldg., city engineer, plans waterworks plant expansion to cost about $8,280,000.

MANSFIELD, O.—Westinghouse Electric Co. plans new buildings, rearrangement of present plant and additions, to cost about $153,000.

MIDDLETOWN, O.—United Welding Co. let contract to Ferro Concrete Construct Co., Third and Elm Sts., Cincinnati, for one-story plant to cost about $50,000.

NAPOLEON, O.—City, L. L. Gibson, ma City Hall, has plans under way for improvements to municipal water-softening pl to cost about $200,000. Froelich & Em Second National Bank building, Toledo, are consulting engineers.

NILES, O.—Niles Aluminum Casting Co. build a foundry on site at foot of W street. Charles M. Hunt, Cleveland is ager and John B. Lane, Niles, in charg operations.

WARREN, O.—City, W. S. Harvey, City city engineer, plans elevated water tan cost about $80,000.

WILLOUGHBY, O.—Ohio Rubber Co., Charles Feeley, Willoughby, is buildi one-story addition 100 x 540 feet, house 90 x 200 feet costing about $35 and one-story boiler house addition 44 feet and accessories, costing about $19

MASSACHUSETTS

FITCHBURG, MASS.—Kingsbury Machine Co., has let contract to the Austin

16112 Euclid Ave., Cleveland, for a foundry pattern shop and office building on Benson St., to cost about $300,000.

FRAMINGHAM, MASS.—Worcester Gas Light Co., 240 Main St., has let contract to Theodore Laranger & Sons, 234 Phillips Ave., New Bedford, Mass., for a boiler plant to cost about $75,000.

INDIAN ORCHARD, MASS.—Monsanto Chemical Co., Monsanto Ave., plans a two-story plastics plant and power plant addition, to cost about $250,000.

CONNECTICUT

NEW BRITAIN, CONN.—Stanley Works, 195 Lake St., has let contract to Hasson & Downes, 55 West Main St., for a one-story 180 x 260-foot plant building to cost about $165,000.

NORWALK, CONN.—Yankee Metal Products Corp., William Berk, 31 Grand St., is having sketches prepared for a plant building to cost about $40,000.

NEW YORK

BAYSHORE, N. Y.—Long Island Lighting Co., Old Country Rd., Mineola, L. I., will build gas generating house, pressure house, compressor, storage tanks and pump house.

GENEVA, N. Y.—Geneva Forging Co. will let contract soon for a one-story 400 x 600-foot forging plant addition. A. Epstein, 2001 West Pershing Rd., Chicago, is engineer.

ROCHESTER, N. Y.—Stromberg Carlson Co., 100 Carlson Rd., has let contract to John B. Pike & Son Inc., 1 Circle St., for a one-story 161 x 363-foot radio and television set manufacturing plant.

PENNSYLVANIA

LANGELOTH, PA.—Climax Molybdenum Co., W. M. Murphy, superintendent, has let contract to Rust Engineering Co., Clark Bldg. Pittsburgh, for plant additions and alterations costing about $75,000.

PHILADELPHIA—Bridgeport Brass Co., 30 Grand St., has let contract to Walter Kidde Constructors Inc., 140 Cedar St., New York, for a warehouse and office building to cost about $50,000.

PITTSBURGH—Pittsburgh Melting Co., C. A. Collins, president, Herrs Island, has let contract to George Seaman, 6388 Penn Ave., for a two-story factory to cost about $50,000. Prack & Prack, 517 Martin Bldg., are architects.

PITTSBURGH—Renkin Pattern Works, S. A. Renkin, 809 Penn Ave., has let contract to Adam Phillip & Sons, 3122 Brighton Rd., for a one-story 40 x 100-foot shop building to cost about $40,000.

SHARON, PA.—Mercer Tube & Mfg. Co., D. V. Sawhill, president, has let contract to Joseph Bucheit & Son, 819 Mahoning Ave., Youngstown, for a one-story 70 x 175-foot plant addition.

WARREN, PA.—C. G. Greene Metal Products Co., Pennsylvania Ave., West Warren, Pa., has let contract to Ludwig Peterson, North Irvine St., for a one-story 100 x 100-foot plant addition costing about $50,000.

WARREN, PA.—Sylvania Electric Products Co., Emporium, Pa., has let contract to Ludwig Peterson, North Irvine St., for a one-story 40 x 80-foot plant addition on East St., to cost about $40,000.

MICHIGAN

DETROIT—Carboloy Corp., Eight Mile Rd., plans a plant addition to cost $587,000.

DETROIT—Edward G. Budd Mfg. Co., 12141 Charlevoix Ave., has let contract to F. H. Martin Construction Co., 955 East Jefferson Ave., for a one-story press shop addition to cost about $100,000.

ILLINOIS

CHICAGO—Zenith Radio Corp., 6001 West Dickens St., plans factory and power plant costing $700,000. Company has let contract to E. H. Marhoefer Jr. Co., 222 North Bank Dr., for a one-story 60 x 600-foot building, estimated to cost $250,000. Alschuler & Friedman, 28 East Jackson Blvd., are architects.

CHICAGO—Clearing Machine Corp., 6499 West 65th St., has let contract to Ragnar Benson Co., 4744 West Rice St., for a 117 x 450-foot addition. V. Charn, same address, is architect.

INDIANA

BLUFFTON, IND.—Centrifugal Castings Co., Bluffton, plans 120 x 125-foot plant and office, machine shop and fabrication department buildings, to cost $150,000 or more, with equipment.

ELKHART, IND.—General Electric Co., River road, Schenectady, N. Y., plans a one-story plant here to cost about $5 million.

LA PORTE, IND.—Allis-Chalmers Co., 1126 South 70th St., West Allis, Wis., plans a one-story plant addition to cost about $5 million.

SOUTH BEND, IND.—Studebaker Corp. has let contract to S. N. Nielsen, 3059 West Augusta St., Chicago, for a 100 x 635-foot truck manufacturing plant, to cost about $2,500,000. Giffels & Vallet, 1000 Marquette Bldg., Detroit, are engineers.

DELAWARE

WILMINGTON, DEL.—E. I. duPont de Nemours & Co., Arnold E. Pitcher, general manager of plastics department, is exercising options on 400 acres at Washington, near Parkersburg, W. Va., to provide plant space for expansion of facilities for plastics manufacture. First units will be for production of nylon, lucite and polythene, construction to start as soon as materials and labor are available.

MARYLAND

BALTIMORE—Joseph O. Danko, owner of Danko Pattern & Mfg. Co., 31 East Lee St., is building initial unit of aluminum foundry at 4810 East Wabash Ave., Arlington. Plant will be 68 x 272 feet. Foundry will be operated as an independent company, name not yet determined.

BALTIMORE—United States Industrial Chemicals Inc., Curtis Bay, Md., has let contract for a boiler house addition 60 x 100 feet, two to five stories, to cost about $100,000.

BALTIMORE—Bendix Radio Division of Bendix Aviation Corp. has announced postwar expansion for its Towson, Md., plant, to cost $225,000 to $300,000, for manufacture of home radios, communication systems and other radio products.

BALTIMORE—American Can Co., 2400 Boston St., has let contract for a 4000-square foot manufacturing addition. Prewar production has been expanded 150 per cent.

BALTIMORE—Rustless Iron & Steel Corp., 3400 East Chase St., is building a one-story plant 90 x 560 feet for relocation of rolling mill facilities, a one-story wire mill 100 x 320 feet and a two-story substation addition. Company also has under construction a $340,000 addition to its South plant.

BALTIMORE—Crown Cork & Seal Co., Eastern Ave. and Cresson St., proposes postwar expansion to include additional machine shop facilities here as well as additional closure and bottle cap facilities at Atlanta, Ga., and San Francisco.

BALTIMORE—Eastern Stainless Steel Corp., Rolling Mill Ave., will double cold-rolling capacity and increase polishing facilities 150 per cent. New pickling equipment now being installed will increase that department 100 per cent.

WISCONSIN

MILWAUKEE—Koehring Co., 3026 West Concordia Ave., has let contract to Lupinski Inc., 4150 North First street, for a one-story 185 x 250-foot plant addition to cost about $200,000.

MILWAUKEE—Western Metal Specialty Co., 3043 West 30th St., has plans by H. I. Messmer, 231 West Wisconsin Ave., for a one-story 200 x 425-foot plant.

MINNESOTA

BEMIDJI MINN.—Harry F. Pihl has let contracts for a one-story machine shop 60 x 100 feet.

DEER RIVER, MINN.—Chippewa Wood Processing Association Inc., George H. Herrick, president, plans wood processing plant, including sawmill, fiber mill, drag mill and other departments.

GRAND RAPIDS, MINN.—W. C. Chalberg & Co. plans one-story wood products plant 80 x 130 feet. A. E. Melander, Alworth Bldg., Duluth, is architect.

MINNEAPOLIS—J. R. Clark Co., Second and Aldrich Ave. North, manufacturer of ladders and woodenware products, plans two-story addition. Magnev, Tusler & Setter, Foshay Tower, are architects.

MOORHEAD, MINN.—Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak., manufacturer of soldering equipment, vacuum cleaners, etc., is moving operations to Moorhead where contracts have been let for part one-story 60 x 150-foot and part two-story 60 x 120-foot foundry and machine shop costing about $500,000, with capacity of 25 tons of castings daily. O. G. Schmidt is proprietor.

ST. CLOUD, MINN.—Hole Webway Co. is having plans made for a one-story plant 80 x 80 feet.

IOWA

CEDAR RAPIDS, IOWA—Fruehauf Trailer Co. will build one-story addition 100 x [illegible] feet. R. A. Bilton is general manager.

CEDAR RAPIDS, IOWA—Rapids Equipment Co. has let contracts for a one-story plant addition 30 x 70 feet.

DAVENPORT, IOWA—Davenport Besler Corp., manufacturer of locomotives, snow plows and road machinery, has let contracts to Priester Construction Co. for a one-story structural and boiler shop 120 x 200 feet.

DECORAH, IOWA—Midland Mfg. Co. has bought site for one-story plant 50 x 100 feet.

FORT MADISON, IOWA—International Harvester Co. has bought 320 acres near Mississippi river for new manufacturing plant to employ about 2500 men.

WATERLOO, IOWA—John Deere Tractor Co. is having plans made for a foundry plant to cost about $3 million.

MONTANA

HELENA, MONT.—Northern Pacific railway has let contract to Al. Johnson Construction Co. at $450,000 for a 16-stall roundhouse and 135-foot turntable.

OREGON

PORTLAND, OREG.—Sunset Electric Co. let contract to Jolivette & Reimers for $100,000 plant, 200 x 200 feet at 14th and Lovejoy Sts.

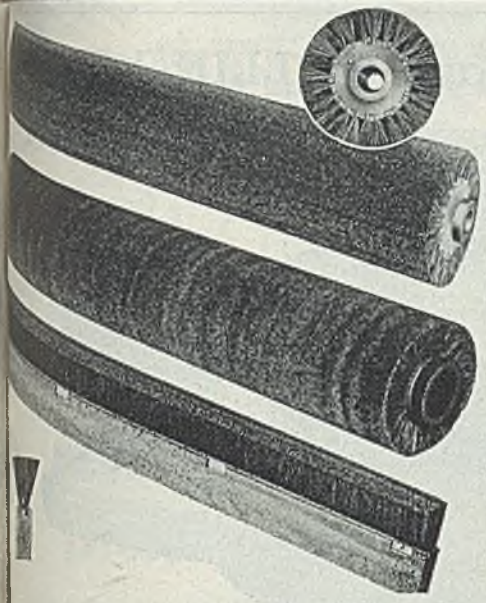
PORTLAND, OREG.—Iron Fireman Mfg. Co., Harry Banfield, president, will rebuild boiler shop and other facilities recently burned with loss of $80,000.

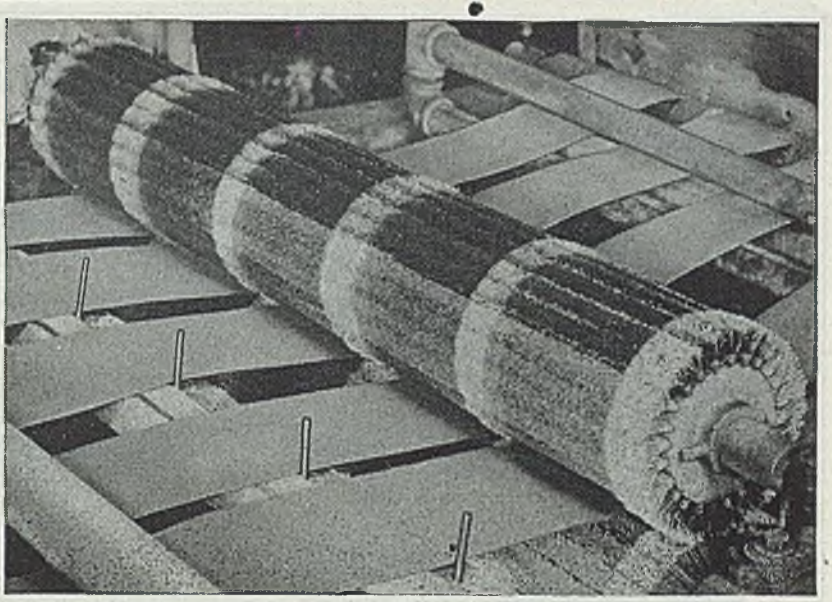
WASHINGTON

OLYMPIA, WASH.—Jensvold Mfg. Co. has been incorporated with $25,000 capital by B. B. Jensvold and associates, to fabricate metal products and furniture.

SEATTLE—Detlefsen Machine Works has plans for a machine shop 32 x 52 feet, to be erected at 4107 Airport Way.

SEATTLE—Bowers Machine Co., 416 Johnson, plans erection of a machine shop 46 x 60 [illegible]





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