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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 116, NO. 18 April 30, 1945

NEWS

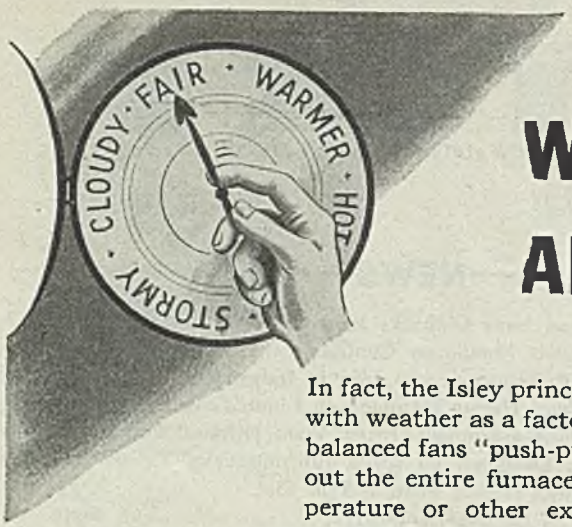
TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

"Auto Plant" Assembly Techniques for Bombers
Improved Tapping Machines Increase Production 180%
Hardenability Behavior of Alloy Steel
Thermodynamic Research for Better and Faster Milling
How To Select and Apply Organic Finishes
Metal Cleaning by New Oxidizing-Reducing Process



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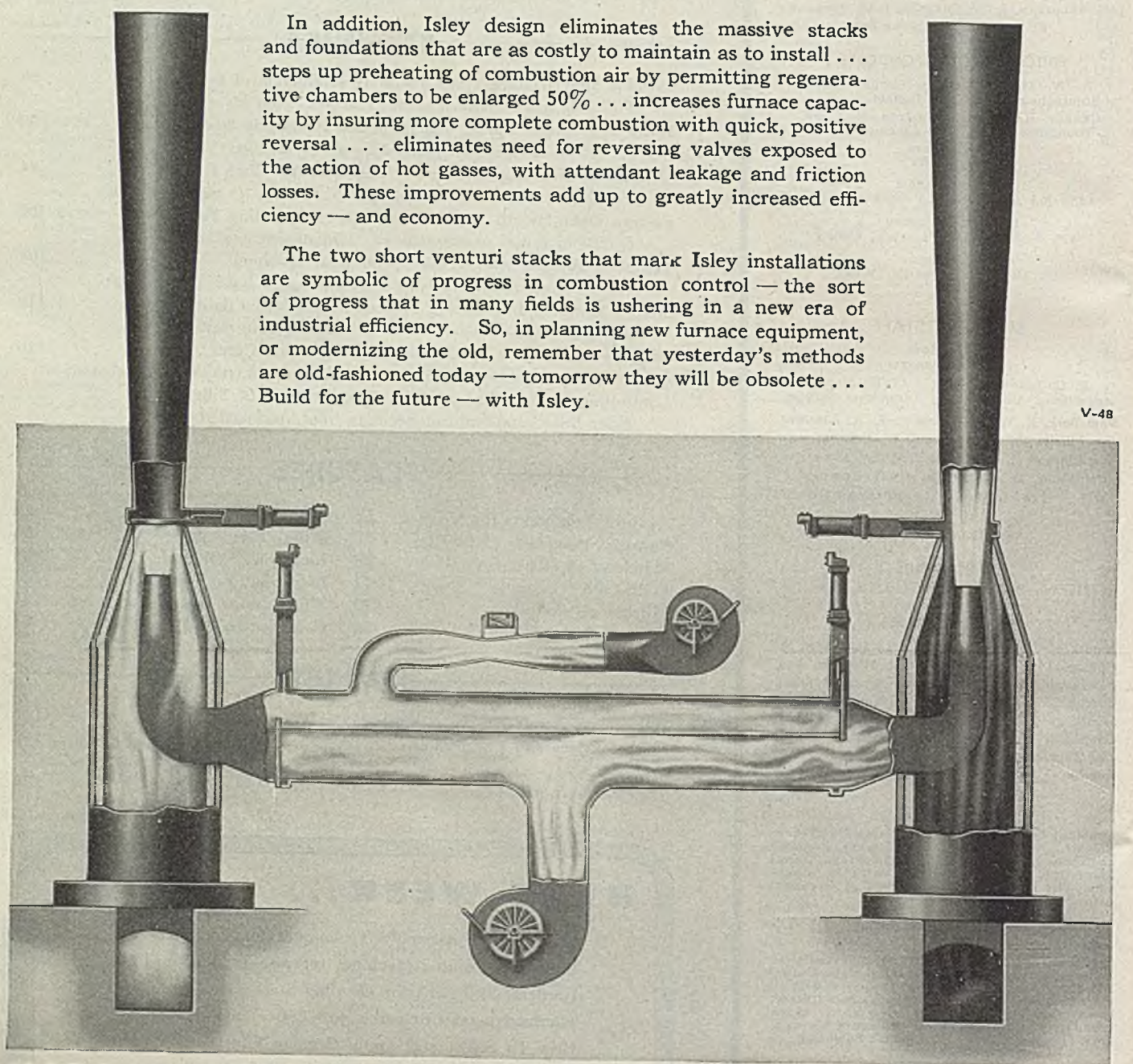
V-48



MORGAN CONSTRUCTION COMPANY, Worcester, Massachusetts

ENGLISH REPRESENTATIVE: INTERNATIONAL CONSTRUCTION CO., 56 KINGSWAY, LONDON, W.C.2, ENGLAND

STEEL
April 30, 1945

Industry's Stake

As this is being written, the eyes of the world are being diverted from sensational events in Germany and continued successes in the Pacific to the opening sessions of the United Nations Conference in San Francisco.

Delegates from 46 nations have heard President Truman's opening address, with its powerful plea for justice and its sober reminder that "if we do not want to die together in war we must learn to live together in peace." They are listening to addresses by Soviet Foreign Commissar Molotov, British Foreign Secretary Anthony Eden and Chinese Foreign Minister T. V. Soong. Soon, with the preliminaries over, they will be getting down to the difficult business of creating a world organization for peace.

Industrialists share with every other element of society the prayerful hope that this conference will be successful. As recently as a quarter-century ago, there existed a widespread impression on the part of the public that industry profited from wars and for this reason was not too sympathetic or enthusiastic toward movements to insure peace. Whether or not this charge ever was fully justified, it is certain that it does not apply today. Following the revelation of the long-drawn out series of disasters resulting from World War I, industrial leaders almost without exception have denounced war as one of the most destructive forces which menace industry. Success at San Francisco would be a godsend to industry in every progressive nation.

No one can calculate the chances for success in this bold bid for peace, but it is heartening to realize that of the more than 2169 million persons in the world, nearly 1750 million, or about eight out of every 10, are represented at San Francisco by the delegates of the 46 nations in attendance. In population these nations range from China, with 430 millions, down to Liberia, whose population of 82,000 approximates that of Sioux City, Iowa. In industrial strength they range from the United States and the Soviet Union, with their tremendous resources, down to Ethiopia, whose industrial facilities are negligible.

Obviously to unite nations of such varying characteristics and such divergent interests in a permanent organization for world security is a stupendous task. But the size of the job is as nothing compared to the cost and waste of another war or to the benefits of a lasting peace and an opportunity to work for stability.

Industry has a tremendous stake in the outcome of this conference.

WARTIME CONTROLS: Industrialists will hail the report on removing wartime controls issued by the research committee of CED.

It recommends that from now until six months after final victory controls should be removed by administrative action only, whenever the need for them no longer exists. Within six months after final victory, the director of reconversion should review all controls and should, not later than six months after victory, remove all remaining controls not clearly necessary beyond that date. Legislative authority should be continued beyond that date only for such controls as may be plainly needed to combat inflation during the remainder of the inflation period. At the end of this period, as determined by Congress, legislative authority for the last of the wartime controls should be ended.

The report stresses the importance of subjecting all controls to review by a definite date and of permitting no control to be continued except by positive decision. This would prevent repetition of mistakes made after World War I when some war controls remained in effect through inaction.

Another point strongly emphasized is for the gov-

(OVER)

ernment to announce its policy on wartime controls as soon as possible, in order to inspire confidence.

These recommendations are timely, important and sound. —p. 68

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WINNERS AND LOSERS: Although volume of sales broke all records, 29 steel producers, representing 88.5 per cent of the nation's steelmaking capacity, in 1944 reported lower earnings than in any year since this country entered the war.

This publication's annual financial analysis of the steel industry shows that the earnings of these 29 companies, after taxes, were only $174 million in 1944, as compared with $183 million in 1943, $260 in 1942 and $277 million in 1941.

Curiously enough, provision for income and excess profits taxes has declined as production has mounted. The industry's tax bill was $555 million in 1942, $421 million in 1943, and $328 in 1944. During this period, payrolls increased steadily.

From the analysis, it is clear that government policy has contrived to increase the employes' "take" from industrial activity at the expense of (1) the owners of the business; (2) the business itself, in reduced funds for future needs; and (3) the public, through sharp reduction in taxes. —p. 66

° ° °

HOW MUCH STEEL? Responses of steel companies to questions asked by the War Contracts Subcommittee of the Senate Military Affairs Committee concerning policies governing the disposal of government-owned steel plants indicate a rather marked divergence of views on some points.

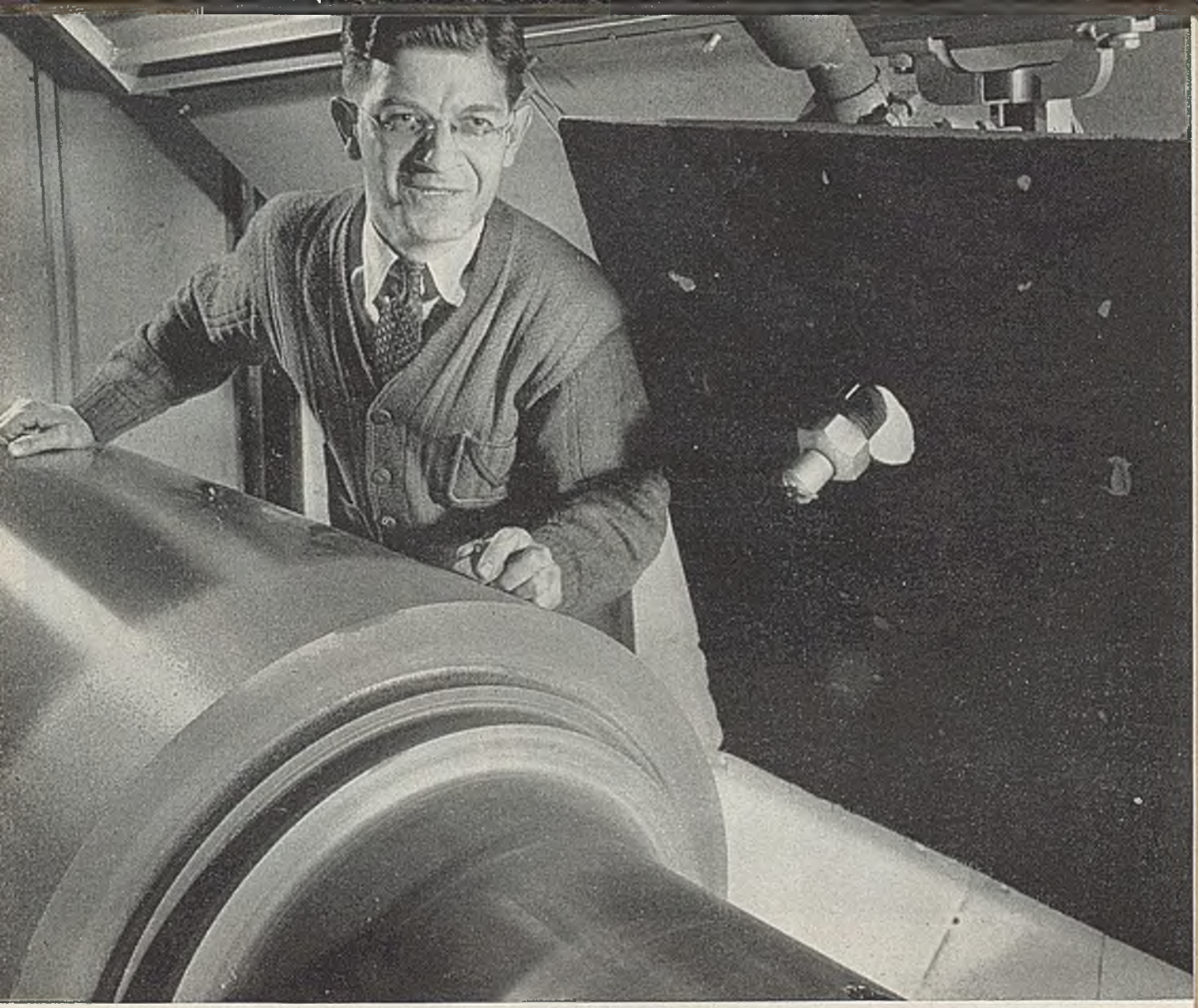
A number of steel companies favor shifting titles to private companies as soon as possible while others suggest that the government retain ownership for varying periods. There is also conflicting opinion as to the merit of leasing plants. The point on which most companies agree is that no one policy will cover all plants and that each major property will have to be considered as a special disposal problem.

Interesting is the estimate by one company that demand for ingot steel will average 54 million tons annually in the 30-year period from 1945 to 1975, with a maximum demand by 1975 of 63 million tons. Another company estimates postwar demand will range between 65 and 70 million tons in "good" years. —p. 63

WARTIME MISCELLANY: Apropos of the statement by the Air Technical Service Command at Wright Field that "bearings are the life blood of the Army Air Forces," American manufacturers now are producing for the armed forces more than 30 million complete bearings per month. It is estimated that during 1945 (p. 80) 100 million complete bearings, plus 35 million balls and 25 million bearings will be produced by the antifriction bearing industry for military aircraft. . . . Westinghouse has changed its name. The corporation, known from 1886 to 1889 as the Westinghouse Electric Co. and from 1889 to early 1945 as the Westinghouse Electric & Mfg. Co., now by action of its stockholders (p. 84) adopts the simpler title of Westinghouse Electric Corp. . . . A traveling crane now being installed in a large metalworking plant (p. 91) has a cylindrical-shaped cab providing full vision for the operator, comfortable sit-down control and air conditioning. . . .. . Interesting to many war contractors should be Brig. Gen. D. N. Hauseman's explanation (p. 64) of how the War Department delegates authority to prime contractors to settle claims of subcontractors under certain conditions. . . . Tests of a hob with tungsten carbide teeth operating at high speed on a modified machine (p. 104) foreshadow possible advances in gear-hobbing practice. . . . A cargo of 5000 tons of prepared steel scrap is being loaded at Pearl Harbor (p. 62) for shipment to Baltimore and another cargo of the same size will go forward later. However, steelmaking scrap from naval operations in the Pacific will continue to be limited because, first, battle damage is less than expected and secondly, the Navy salvages much of the damaged material. . . . Anticipating the time when cutbacks in munitions orders will release substantial numbers of workers (p. 57), local government manpower officials are studying methods of relaxing controls. A few industrial areas already have been graded down from group one to group two. Other steps contemplated are abandonment of referral plans, lifting the 48-hour requirement, and exemption of small employers from manpower controls. . . . . Congratulations to Gleason Works, Rochester, which is observing its eightieth anniversary (p. 85) as a machine tool builder and to Bissett Steel Co., Cleveland, observing its twenty-fifth anniversary (p. 84) in the steel warehouse industry!

E. L. Shaner

EDITOR-IN-CHIEF



Skin rolls, shot blasted in 17 grades of roughness, produce Inland Sheets that are easy to draw. The roll shown above has been ground, then shot blasted on one end to show contrast between ground and shot blasted surfaces.

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that revolutionized deep drawing

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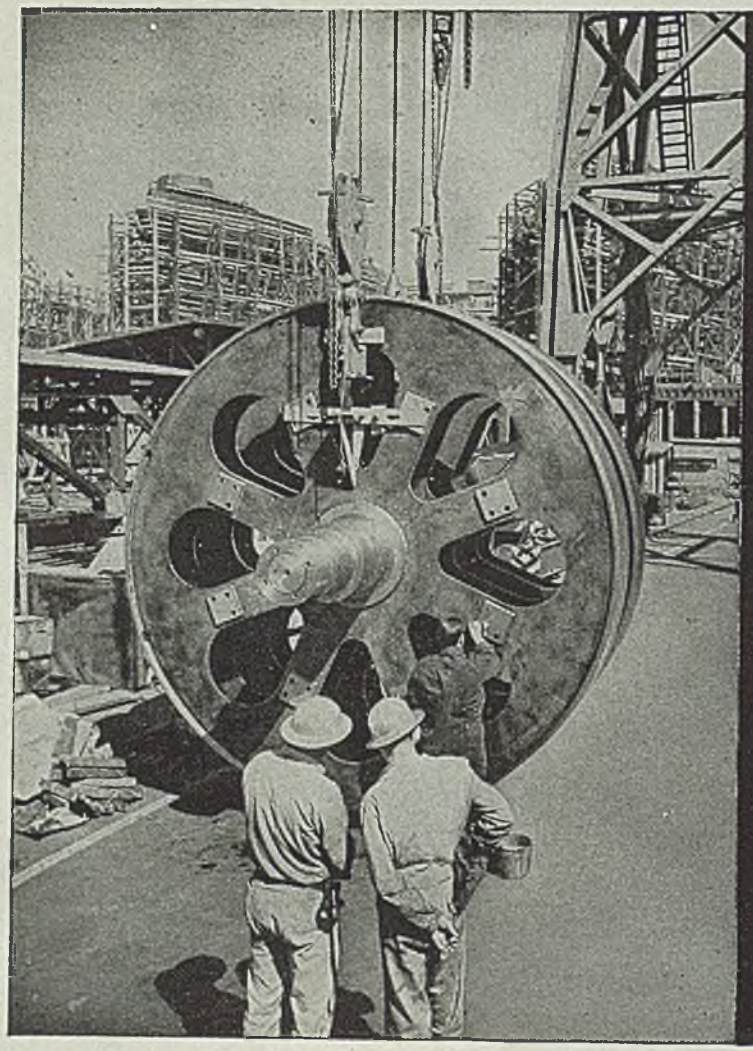

TRIUMPH OF *Know-how*

THE manufacture of reduction gears, as originally designed, seriously threatened to bottleneck Victory ship production. Reason: a scarcity of hobbing machines big enough to handle 128-in. diameters. The difficulty is now overcome by slight design changes . . . decreasing bull gear diameters, for instance, to allow use of available 120-in. hobbers . . . reducing face widths . . . and, in some designs, cutting both helixes simultaneously through use of two hobbing heads . . . all this appreciably shortening hobbing time and increasing hobbing capacity.

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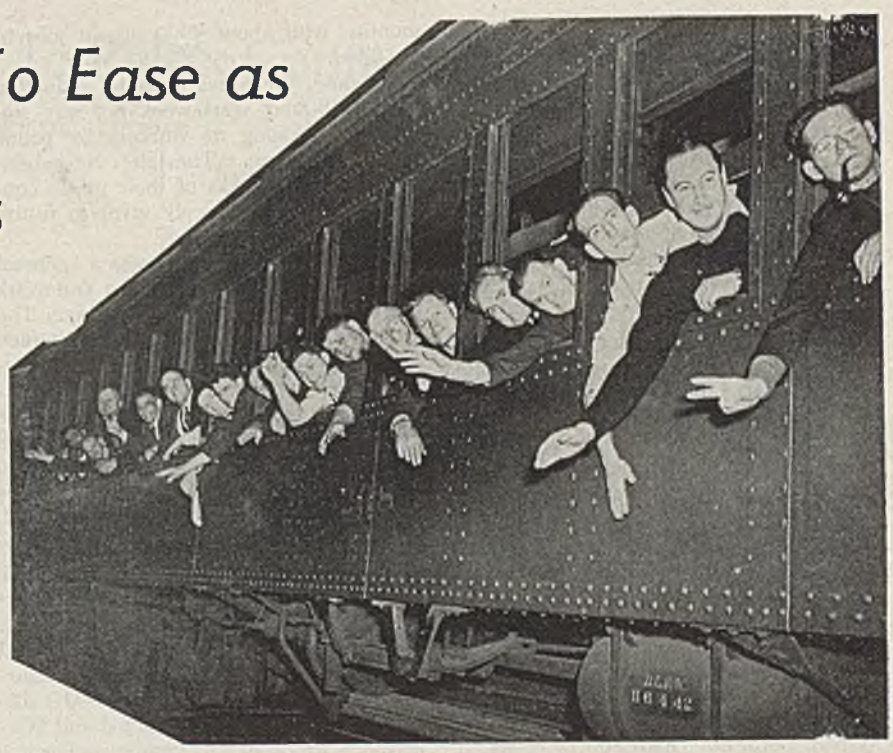
Labor Supply To Ease as Arms Cutbacks Increase

Further cancellations of munitions contracts to be made during next few months. Thousands will be released in prime and subcontractors' plants. Unwinding red tape of manpower controls expected to be difficult



These men, shown leaving New York in 1942 for jobs in West Coast shipyards, may soon face an uncertain future as ship contracts are either completed or canceled. NEA photo

FIRST indications of an easing in the critical manpower situation are appearing in the wake of announcements of actual and impending cutbacks in the munitions program.

Although the relaxation to date is neither general nor great, and although most of the leading war production centers still have a critical scarcity of workers, the shortages are likely to be dissipated as the effects of prime contract cancellations fan out through the subcontractors.

This belief is substantiated by last week's announcement by Chairman J. A. Krug of the War Production Board that military orders will be cut back 12 to 15 per cent over the next three months "no matter how long the bitter process of cleaning up in Europe will take", and the disclosure by the Army that further "substantial" cutbacks will be made in the next 60 to 90 days.

Already a few leading industrial areas have been graded down from group one shortage areas to group two. Local government manpower officials are considering how best to relax controls when the need for them diminishes. Among moves being considered are abandonment of referral plans, lifting of the 48-hour week requirement, blanket exemptions from manpower controls for small firms, and reclassification of areas according to labor shortages. How much of the relaxation can be handled on a local basis and how much will be controlled from Washington remains an open question.

A survey of leading industrial centers by STEEL's editors reveals that while thousands of workers will be displaced by cutbacks already announced most of these will be absorbed for a while in other war industries. As the cutbacks spread, however, many of the displaced war workers will be channeled back to civilian production. Sections which have had a heavy in-migration of workers, such as the West Coast and other shipbuilding and aircraft centers, in most cases will be unable to absorb their wartime workers in peacetime jobs, necessitating out-migrations. Women and marginal workers will be the first affected.

Here is how the situation shapes up in the various districts:

SAN FRANCISCO — Declining shipyard operations and new cutbacks in airplane contracts by the Army are keeping the spotlight on the West Coast's labor problem and are increasing the prospect of serious unemployment conditions in this area before many months elapse.

Heavy reductions in shipyard employment rolls are anticipated by late June, according to P. M. Kenefick, Northern California manpower director. Mr. Kenefick made an unofficial estimate that the layoffs may be as high as 45,000 in all western shipyards by late June. He said the problem of manpower officials largely is one of "redistribution" of these workers into other wartime jobs.

A similar outlook was pointed by F. W. Hunter, of the War Manpower Commission. Mr. Hunter said all of the skilled and most of the unskilled workers in the western states can be used during Period One, but after the war with Japan ends a very serious unemployment problem will be faced.

Mr. Hunter said that total employment in the five westernmost states and Alaska has declined steadily from the August, 1943, peak. He cited the examples of shipyards (including government yards), which had 554,000 workers 20 months ago and now have about 450,000; and of aircraft plants which had 305,600 workers in August, 1943, and now have 124,000 fewer.

The layoff trend probably will continue until the end of the Pacific war, Mr. Hunter believes, but present shortages of essential workers and the changeover of war jobs from one type to another will take care of the terminations, he said.

However, when all war work ends with the fall of Japan, Mr. Hunter thinks the problem will be increased by the fact that many wartime migrants will want to stay on the Coast, and also by the fact that peacetime wage scales probably will be lower than in wartime.

Still another phase of reconversion problems is indicated by an apparent lack of materials and by restrictions on free employment. Combined, these two factors are complicating re-employment of laid-off war workers by peacetime industries. Management and labor are campaigning to relieve the second of the two—they want the San Francisco area to be placed in a nonessential labor classification. Recently, it was reduced from a No. 1, or critical, area to a No. 2, or less-critical, class.

In Oakland, the Maritime Commission reports employment in West Coast private shipyards is down to about 200,000 from a peak of more than 300,000, and would drop to 125,000 by July. In the San Francisco Bay area, where private shipyards employed 133,000 last February, the Maritime Commission predicted there

would be only 40,000 employed in July.

DETROIT—Following the incidence of accelerated cutbacks in aircraft production, Detroit has been changed from a No. 1 to a No. 2 critical labor area, but as of April 30, the area cannot yet be said to have experienced large-scale layoffs. Outlook for the next 60 days is for further net decline of about 10,000 which E. L. Cushman, regional WMC director, describes as relatively minor in comparison with the total working force.

Principal contract reduction thus far has been the decision to suspend production of B-24 Liberator bombers at the Ford Willow Run plant by Aug. 1, which will mean release of 21,000 there, 9000 at other Ford plants, and an estimated 100,000 throughout plants of suppliers and subcontractors, many outside the Michigan area.

Cutbacks in the B-17 Flying Fortress program at Douglas and Lockheed plants, and in the P-38 Lightning fighter plane at Lockheed, has resulted in layoffs at plants of subcontractors in Detroit. Hudson has dismissed 1000; Briggs 250, with 1400 more slated to leave by July 1; Murray Corp. 800, with 800 more slated to leave by July 1. Murray, incidentally, with employment cut back by 50 per cent last fall by P-47 component reductions, is shifting from 48 to 40-hour week.

Immediate cutback of 50 per cent in production of P-51 Mustang fighter planes at North American Aviation doubtless will mean substantial cutbacks in production of Rolls-Royce engines at the Packard plant here, although they have not been announced as yet.

CLEVELAND—This city now is one of the most critical labor areas, due to cutbacks and subsequent easing in the situation in other areas. War Manpower Commission's referral list is currently the largest in the past eight months, with about 4000 urgent jobs to be filled.

To date, there has been no reduction in the 48-hour work-week nor any significant releasing of workers by prime or subcontractors. The latter have been affected by cutbacks of their prime contractors, but this largely involves future production schedules.

WMC officials anticipate a general relaxation of manpower hiring and work week controls soon after V-E Day. The 48-hour week probably will be retained on war work, but for less essential activities a shorter period will be permitted. The present regulation requiring the hiring of employes through the United States Employment Office is expected to be terminated. Maintenance of employment ceilings probably will be retained, as also the regulation requiring a statement of availability for job shifting.

CHICAGO—Recent cutbacks and cancellations in artillery ammunition, tank and airplane engine production have eased only slightly the critical manpower shortage in Chicago and the Sixth WMC district embracing Illinois, Indiana and Wisconsin. Priority war plants in Greater Chicago have immediate needs for 13,000 employes, while overall need of essential industries in the area is 58,400.

Largest layoff of workers has been at the Melrose Park plant of Buick Aviation Engine Division, General Motors Corp., which is releasing 4000 between April 18 and May 1 because of immediate halting of production of engines of one type. This is only a drop in the bucket in comparison with total worker needs here.

Douglas Aircraft Co., Park Ridge, urgently requires over 1400 workers on a No. 2 priority rating, and Dodge Chicago Plant Division, Chrysler Corp., Chicago, is seeking hundreds of new employes. General American Tank Car Corp., East Chicago, Ind., sent out a call for help April 21 to man the new $2,000,000 government-built ordnance plant to turn and grind 90-millimeter shells largely for use in the General Pershing tanks.

To fill these and other top priority war work jobs, USES has been interviewing released Buick workers and transferring them speedily.

NEW YORK — Only in one instance have cutbacks in the munitions program resulted in the abandonment of the workers referral program in New York state, that being at Syracuse, where the plan had been in effect about eight weeks. In general, there is still a need for more workers. Even in the New York metropolitan area, which never was a highly critical area, and which did not inaugurate a program for shifting workers from the less essential to the more essential industries, there is an estimated scarcity of 25,000 workers in industries of varying importance.

BUFFALO—The Niagara Frontier labor market remains tight and it will take more than the end of the European war to ease the situation, according to WMC Area Director Joseph G. Canty. At the present, plants working on "must" contracts alone, are lagging on production because more than 3000 additional workers are needed. Plants working on "critical" items are seeking many additional thousands.

BOSTON—Effect of contract revisions and cutbacks thus far has been confined mostly to shipyards and their suppliers. Yards, including Navy units, are laying off but no material easing in labor demand is apparent.

Foundries and scrap yards are seeking labor with indifferent success. Shipbuilders are not interested in foundry pay rates which although high, are still below cost-plus-fixed-fee ship yard scales.

United States Employment Service offices which were used to channel workers from less essential to critical war jobs soon may be used to route men displaced by war contract cancellations to other employment. NEA photo

WMC Seeks Way To Relax Controls

Reconversion policies mapped as collapse of organized German resistance appears imminent. Hope to avoid "cutback jitters" in ranks of labor

WASHINGTON — Rapid deterioration of the German military and political position under the hammer blows of United Nations' arms and the imminence of substantial enemy collapse in Europe has manpower and production authorities here worried.

What to do in the way of unwinding the red tape in which industrial employment now is enmeshed is a question which soon must be answered and the War Manpower Commission is working out a policy to apply when victory in Europe is achieved. WMC Commissioner Paul McNutt last week submitted to Fred M. Vinson, director of the Office of War Mobilization and Reconversion, a tentative program for relaxation of job controls.

Meanwhile the War Production Board is feverishly shaping its reconversion plans. For instance, it is understood the Steel Division, WPB, within the next few days will submit recommendations with respect to policy governing steel production and allocation.

It is clear from all of the planning going on here that the authorities are highly conscious of the problems they confront. However, whether policies will be fully shaped in time still is a question.

Hope To Avoid "Cutback Jitters"

The most pressing immediate concern of both manpower and production authorities is the elimination of "cutback jitters" in the ranks of labor which appear to be spreading as the result of recent sharp cancellations in airplane and munitions orders. Both WMC and WPB are fearful essential war production employment will be dislocated on a wide scale should war workers, anticipating further sharp war order cancellations, start en masse on a hunt for jobs in civilian industry. Because of this fear, the authorities in shaping policy for the interim reconversion period, will bear in mind the effect of widespread abandonment of war jobs on the production job ahead for the Pacific theater.

Government authorities point out that the order cancellations to date do not justify undue alarm on the part of war workers regarding their war jobs. Except for a few instances, even those plants which have received sharp order cancellations will continue operations for several months, layoffs to be effected gradually.

However, manpower authorities admit the peak in war production employment is about passed. Some weeks ago it was estimated this peak would be reached in June. It was estimated some additional 900,000 workers would be required by that time, bringing total war production employment to around 10 million. It is clear now, however, that no such number of additional workers will be needed. Developments in Europe simply have knocked all previous estimates into the proverbial cocked hat.

After V-E Day (or its equivalent) government employment policy will have to be tied into employment conditions as they then exist. As cutbacks multiply and spread out from prime to subcontractors, more and more workers will be displaced from war jobs and labor surpluses are bound to develop in areas now classed as critical. Unless means are provided to absorb these workers quickly in civilian goods production widespread unemployment will be experienced before many months pass. It is to prevent such a condition that the War Manpower Commission is aiming its policy. The problem, however, while simple on its face, is complicated by the fact its solution is interminably interwoven with the overall interim reconversion job. Whatever action is taken with respect to employment regulations must be with an eye to Japanese war production labor requirements, the materials supply position of civilian industries, and the lifting of production restrictions on civilian goods.

The V-E Day employment problem, consequently, is but one part of a much bigger job. Basically, government employment policy for the transition period must be tied into the other parts of the whole program. Obviously, it is pointed out, the present employment referral plan will have to be maintained so long as there is any question of labor supply for necessary war production which will be on an extensive, though declining scale. However, in those areas where an excess labor supply develops some easing of the regulations can be expected, though not all. Complete lifting of restrictions must await the period when labor supply reaches the point of saturation since some controls must be exercised so long as war production for the Pacific is pressed else war workers looking to V-J Day will be tempted to abandon their jobs too soon for the security of a position in civilian industry. In areas where a surplus of labor develops it is possible the present referral plan will be dropped fairly quickly. The decision, however, will probably rest with the local manpower authorities.

Present, Past and Pending

■ MORE MANUFACTURERS AUTHORIZED TO PRODUCE IRONS

WASHINGTON—Assignment of authorizations to 33 electric iron manufacturers for output of 522,144 irons this quarter has been approved by War Production Board. First quarter authorizations for 521,385 irons were assigned to 29 manufacturers.

■ OPA STEEL PRICE RECOMMENDATIONS EXPECTED MAY 1

NEW YORK—While Office of Price Information is said to have definitely promised to have recommendations on steel price adjustments ready by May 1, there still is uncertainty as to what these adjustments, if any, will be and when effective, according to reports here. OPA's price action will have to be approved by W. H. Davis, director of Office of Economic Stabilization and finally by Fred M. Vinson, director of War Mobilization and Reconversion.

■ RFC INAUGURATES MAGNESIUM METAL RESEARCH PROGRAM

WASHINGTON—Reconstruction Finance Corp. has inaugurated a new research program intended to encourage studies and experiments in magnesium metal and its alloys.

■ BOWLES PRESENTS BROAD RECONVERSION PRICE PROGRAM

WASHINGTON—Broad program for continuing price controls during reconversion, covering new products, firms entering new lines and also those picking up old production lines, as well as procedure for products made throughout the war, has been drafted by OPA Administrator Chester Bowles.

■ PRODUCTION OF MORE ELECTRIC RANGES AUTHORIZED

WASHINGTON—War Production Board has authorized output of 57,816 additional domestic electric ranges during second, third and fourth quarters this year.

■ WAR PRISONERS RELIEVE LABOR SHORTAGE

WASHINGTON—More than $44 million of work was done by war prisoners held in continental United States last quarter, materially relieving manpower shortage.

■ JOBBERS GIVEN AA-2 RATING FOR FARM EQUIPMENT PARTS

WASHINGTON—Distributors of farm machinery repair parts hereafter will be entitled to AA-2 ratings for the purchase of agricultural equipment repair parts.

Seminar Seeks To Adjust Servicemen To Jobs in Industry

By VANCE BELL
Assistant Editor, STEEL

EVERY veteran is not a problem, but he is a potential problem. It's to prevent the potentialities from becoming actualities and to be prepared to deal with problems that do develop that in Cleveland 11 industries and a college have prepared a veterans employment program, as reported in STEEL, April 23, page 64.

The industrial representatives participating in the project are supplementing their practical experience with study and training to fit themselves as co-ordinators who direct and take charge of veterans employment.

Expressing his appreciation for the opportunity to participate in the project, G. R. Knapp, assistant to the personnel director in charge of personal services, White Motor Co., said, "This industrially sponsored round table, under the direction of Fenn College, has given us additional insight and understanding of the magnitude of the veterans' situation. The manual, *Industry and the Veteran*, compiled by this group, may well be used by industry as a guide for organizing company policy and procedure for the handling of returned servicemen."

The study group recommends that a committee be established in the plant to handle special cases, problems, and critical decisions that arise from employment of veterans. Plant supervisors would direct readjustments of the individual and give him proper supervision where necessary. Counselors would provide assistance and guidance not only to the returned veterans but to supervisors as well.

Most ex-servicemen can be handled through a plant's general program and by the supervisor with assistance of the co-ordinator. The study group recognizes, however, that there will be special cases involving vocationally handicapped men, veterans with temporary classification, problems of seniority, transfers, and union agreements. The committee that the study group recommends to handle such cases would consist of a representative from the industrial relations department, medical department, and legal department, and others to sit in with the committee whenever necessary.

Success of veterans readjustment will depend to a considerable extent upon the supervisor's efforts and assistance. Consequently the study group recommends that supervisors be given training to provide them with an adequate background to deal with the problems and a knowledge of principles and techniques.

Considerable counseling will be necessary in carrying out the program, both during the readjustment period and later as the veteran explores the use of his training and welfare rights. The counselors which the study group recommends be selected and trained to handle the counseling needs of the veterans would be under supervision of the co-ordinator and would work closely with supervisors. Counselors, the study group points out, should be thoroughly grounded in company policies, procedures, and resources, as well as provisions of laws pertaining to veterans.

Plant Has Major Responsibility

The guide, prepared by representatives of the 11 industries in conjunction with the department of personnel development of Fenn College, points out relative to a normal readjustment situation that the veterans have been away from their jobs over an extended period of time, that their experiences as soldiers differed in a marked way from that of civilians, and that every veteran will have to undergo readjustment in some degree to civilian life and to his work. The program suggests that a plant's supervisory staff should assume the major responsibilities for assisting the veteran's readjustment on the job.

In dealing with other than the normal situation, the program points out that some of the veterans will indicate maladjustment on the job by poor work habits, distorted attitudes, strong feelings of inferiority, hostility, and resentment of authority. Veterans who show signs of such maladjustment should be referred to a plant's veterans counselor, the guide recommends.

Some problems will require special care in handling. They will arise from questionable re-employment rights, unavailability of a job, refusal by the veteran to return to his old job or a job of like status, unwillingness to co-operate, handicapped vocationally, and requests for extended leave of absence after reinstatement. The guide prepared in the industry-college study project recommends that in such cases the veterans counselor should organize necessary data, prepare a recommendation, and refer the matter to the committee on veterans problems for final disposal.

Most veterans, the study group believes, will accept their former jobs if they are available, or those of like status; some veterans, because of training, experience, or desire, will not want to go back to their old positions; in some cases it may seem inadvisable because of war training and experience to place them on jobs they left to go to war.

The study group recommends that unless a medical report indicates otherwise, the veteran ordinarily should be assigned to his former job if it is available. If it is not available, one of like status should be offered to him. Transfers or promotions, requested or otherwise, should be given consideration after the veteran has been readjusted to work.

In almost every plant, outstanding employes are upgraded into key jobs as a matter of course, more or less informally. There are two reasons why upgrading of veterans will require an organized approach. First is that the veteran should be asked, as he returns to work, to defer any ideas or plans he may have for a better job until he has had an opportunity to adjust himself to civilian employment. Therefore, he will expect action when he is adjusted. The second reason is that he has been away for a considerable period, under different conditions and under circumstances which made it impossible for supervisors to observe or

This is the second of two articles on an industry-college seminar in Cleveland on employment of war veterans.

Participants in Cleveland industry-college study group formulate employment program designed to best utilize physical and mental abilities of returned veterans. Potential problems of maladjustments recognized

Practice in techniques of mechanical testing to place war veterans in the right jobs is provided in an industry-college seminar in Cleveland. Picture at left shows Harold Thomas, personnel department, Warner & Swasey Co., getting such practice by giving a discharged serviceman a manual dexterity test. Practical experience in personnel work is supplemented in the seminar with academic training in counseling of war veterans. Photo at right shows G. R. Knapp, personnel department, White Motor Co., counseling a discharged serviceman, right, while Walter G. Sites, center, of the department of personnel development, Fenn College, sits in as supervisor. Photos by G. W. Birdsall

follow his development. Therefore, the supervisors will not be in a good position to evaluate the veteran's accumulated experience and training.

From the seminar have grown recommendations for spotting, developing, and upgrading outstanding veterans into key jobs. After the veterans of promise have been reinstated, they should be given the necessary counselling and should be followed up to determine whether they are becoming adjusted satisfactorily. It is recommended that the counselor should assemble and summarize essential information, including aptitude test results, and supervisor's rating and performance record. Department heads should review the information and make suggestions, and should be helped in directing and following up on the development of the veteran. When openings occur for which a veteran qualifies the department heads should be notified.

Some positions and employes will be considered as having been temporary. The study group has decided that the following positions are temporary according to laws governing employment of veterans: A position involving a fixed period of time (such as a student hired for vacation period); a position created for completing a specific job (such as a person hired to unload a few coal cars); and a position made vacant by a man granted a military leave. A temporary employe might be defined as a person filling those positions, providing his relationship with the company has not changed before placement on military leave. The following questions, as answered, might normally indicate a temporary position of employe: Is the position still there? (No). Would have the employment of a person continued if he had not entered the service? (No). Is another veteran entitled to the job? (Yes).

As to the position the company should take in classifying positions or employes as temporary, the study group recommends that: 1. Every veteran on military leave should be regarded as permanent unless there is positive proof of his temporary status, because the law has been construed liberally in favor of the veteran. 2. Every case must be determined on the facts and circumstances in that particular case. 3. Every qualified veteran should be re-employed if it is reasonable to do so. If the employer's circumstances are so changed as to make it unreasonable, the veteran should be fitted into his proper seniority position for call back to work as needed.

Under the problem of employment of vocationally handicapped veterans it will be found that a number of the servicemen returning to a plant will have handicaps. Rehabilitation training will be available to many of those men, but time will be required for their claim on the government to be adjudicated. Legally, a company is not required to re-employ a veteran who is not qualified, or unable to do his old job.

The study group recommends that the veteran with vocational handicaps acquired in the armed services be given special consideration by: 1. Placing him, when he returns, temporarily on a job which he can do reasonably well and with a minimum of training and delay. 2. Exploring with him the advantages of the rehabilitation training under public law 16 (which applies to veterans having a 10 per cent or greater service connected disability, and who are adjudged vocationally handicapped because of the disability), or public law 346, the G. I. bill, (which applies to all veterans who served 90 days or more, after Sept. 16, 1940, and prior to termination of hostilities). 3. Making possible his rehabilitation within the company, if such training will be mutually beneficial to both the veteran and the company. If rehabilitation training does not provide the answer to the problem, the veteran would be offered a job or helped to get a job that has both reasonable security and permanency after he has become adjusted.

Should Make Counseling Available

In recognizing that the government has provided the veteran certain educational, financial, and other rights, and that the veteran may need assistance in exploring, interpreting, and making proper use of them, the study group recommends that a company should, upon request, provide adequate counseling on his rights and that the counselor should assist the veteran in outlining a program and encourage him to make full use of his rights.

The industry-college study group realizes that inasmuch as company policy and industrial operations vary from firm to firm that no one program can be followed word for word in all of them. But there are general principles that can be followed, and the study group has suggested five for employment of war veterans. They are: 1. The company will give each one of its returning veterans a job if it is reasonable to do so, and if the veteran so desires.

2. When it is neither reasonable to re-employ nor to the best interest of the veteran to re-employ him, the company will make a reasonable effort to assist in relocating or rehabilitating him.

3. The company will give the returning veteran assistance in readjusting himself to the job and to civilian life.

4. The company will provide counseling to veterans who desire to improve themselves through the use of their rights.

5. In hiring new employes, the company will give preference to veterans, other things being equal.

Small Cargoes Shipped from Pearl Harbor

Navy unlikely to be large supplier of steel scrap from Pacific theaters. Much damaged material is reclaimed and reused

PEARL HARBOR, T. H.

STEEL scrap shipments from the Navy Yard at Pearl Harbor to the continental United States are being resumed on a limited scale. A cargo of about 5000 tons now is in process of being loaded for shipment to Baltimore, and a second cargo of the same size is to be loaded shortly for the same destination. These are the first steel scrap shipments to be made from Pearl Harbor in several months. Previously scrap was shipped to the West Coast but large accumulations on the coast made further shipments there unnecessary.

Navy scrap which accumulates at Pearl Harbor is stored at the nearby Makalapa dump which recently was fitted with equipment for preparing scrap so it may be used on delivery at consuming plants. It has two cranes, two shears and a hydraulic baler, as well as acetylene cutting torches. As a result prepared scrap may be shipped from the Makalapa dump; the cargo now being loaded consists entirely of scrap cut to charging box size.

Up to the present, there is no reason for expecting the Navy to be large supplier of scrap from the Pacific theaters. In the first place, battle damage is yielding less scrap than might have been the case. Secondly, the Navy keeps its scrap pile down by an intensive effort to salvage or reclaim used and damaged materials.

Recently a damaged warship was repaired with steel plates taken out of the scrap pile; this type of salvage is customary procedure at Pearl Harbor. Used oil barrels are made ready for re-use by cleaning them with a caustic soda solution and straightening out dents; only those barrels which have become unfit for further use are put into the baling machine for conversion into scrap. Salvage of this type is the responsibility of the Material Recovery Unit.

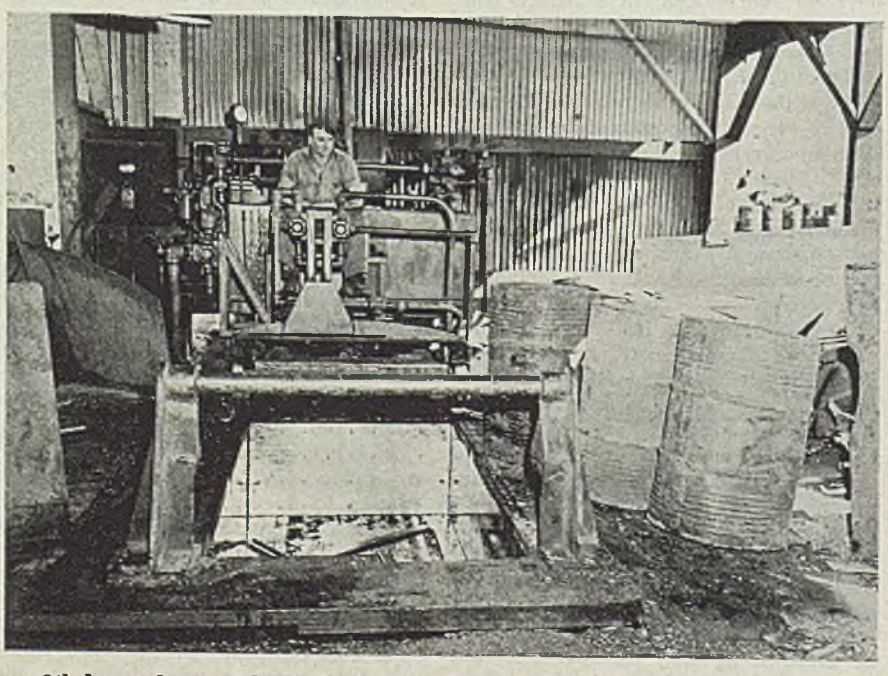
As to just how important a source of scrap Pearl Harbor might be, during the remaining course of the Japanese war, there is no exact means of knowing. But even if ships were freely available to ship all the scrap that becomes available here it would be only a drop in the bucket by comparison with normal consumption in the United States, Naval authorities believe. For example, 1943 shipments came to only 35,000 tons.

Experiments with "22s" Led To Carbide Tip Projectiles

The new armor-piercing carbide-tipped projectiles used by Allied forces on the western front had their prototypes in 22-caliber "long" cartridges developed in 1938 by Philip M. McKenna, president, Kennametal Inc., Latrobe, Pa. The "22s", in which Kennametal replaced the customary steel points, were fired by members of the Kennametal Rifle Club, and to the astonishment of ballistic experts, they penetrated 1/4-inch manganese steel armor plate. Points were recovered, replaced in new cartridges, and fired again with the same results.

Mr. McKenna continued to explore possibilities of carbide-tipped projectiles, and in 1942 the company produced experimental bullets and shell-points for heavier caliber rifles. Soon after Pearl Harbor Mr. McKenna reported results of his experiments to the National Defense Research Committee. Subsequent advances in the technique of powder metallurgy made practicable the volume manufacture of shell cores for larger bore guns.

Kennametal Inc. was one of the first carbide manufacturers to get into successful regular production of these shell cores.



Oil drums damaged beyond repair are shown being briquetted by a hydraulic press at the Naval Supply Depot of the 14th Naval District, Pearl Harbor. Only those containers which cannot be salvaged are assigned to the scrap pile. Generally the drums can be cleaned with a solution of caustic soda, dents straightened and then reused. Official U. S. Navy photo

Basing Point Pricing Hit By U. S. Supreme Court

The fundamental principle of basing point prices was attacked the past week by the U. S. Supreme Court in two cases involving the same issue. The court made it plain that it was not passing on legality of all basing point pricing systems, but only on effects of the system used by the defendants in those two cases.

The cases involved use of basing point pricing systems by the Corn Products Refining Co., New York, and the A. E. Staley Mfg. Co., Decatur, Ill., in marketing glucose.

The Federal Trade Commission, commenting on the decisions, said: "The opinions appear to be a confirmation of the FTC's condemnation of the practice in its famous Pittsburgh-plus case against the United States Steel Corp. and to provide a new instrument for dealing with the problem of monopoly and monopolistic pricing practices."

The Federal Trade Commission which had instituted proceedings against Corn Products and Staley under the Clayton act, charged that petitioners' use of this single basing point system resulted in discriminations in price between different purchasers of the glucose, and charged other discriminations in prices and services rendered "to favored customers."

The Supreme Court got the cases on a challenge of FTC's position by the companies in question.

The court in holding that operation of the system in these two cases is illegal said that a natural effect of the basing point system "is the creation of a favored price zone for the purchase of glucose in Chicago and vicinity which does not extend to other points of manufacture and shipments of glucose."

Steel Producers Differ on Disposal Policies

Answers to questionnaire by Senate committee indicate confidence that postwar steel demand will be greater than prewar. Oppose restrictions on production or price policies in plants sold by government

DIFFERENCES of views on policies to rule in disposing of government-owned steel plants exists among the various steel producing companies, it was disclosed last week in a progress report of the War Contracts Subcommittee of the Senate Military Affairs Committee.

The subcommittee, headed by Sen. J. C. O'Mahoney (Dem., Wyo.), submitted its report preliminary to joint hearings on the disposal of surplus iron and steel plants and facilities to be held by the War Contracts Subcommittee and the Industrial Reorganization Subcommittee of the Special Committee on Economic Policy and Planning.

The position of the steel companies on the various problems involved came out in replies to a questionnaire addressed to more than 100 steel companies, including forge shops and foundries, soliciting their views in preparation for the hearing. The questionnaire posed two lists of questions: 1. As to what economic factors will affect utilization of the additional productive capacity for steel created by war plants and facilities; and 2. what methods of disposal will best assure effective utilization.

Labor Organizations Also Queried

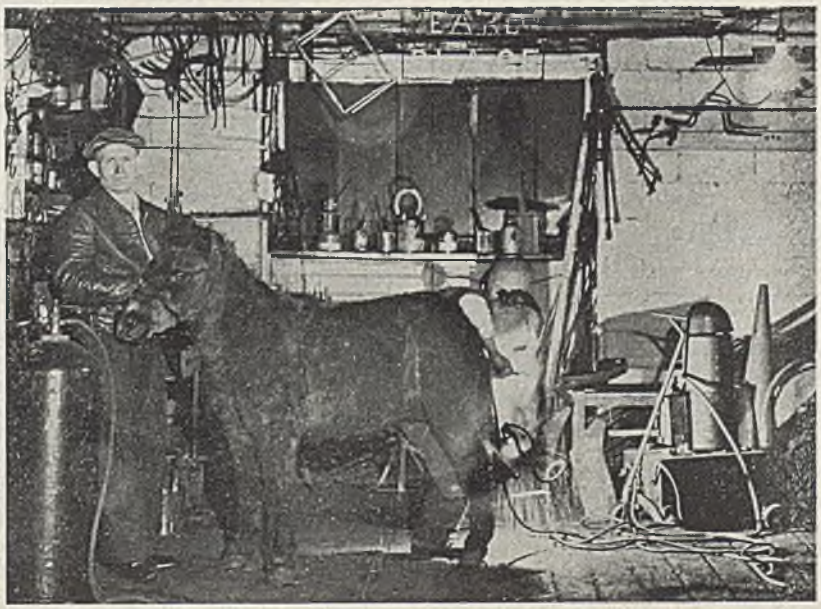
Similar questionnaires were sent to labor organizations and to all departments and agencies of the government which are connected in any way with the functioning of these plants. States and local governments in areas in which the plants are located also were consulted, while approximately 50 railroads were polled for their views as to what relationship exists between railroad freight rates and the postwar utilization of the government-owned steel plants.

Several steel companies told the subcommittee that the government facilities were so varied in character it would be difficult to lay down general rules for their disposal and suggested that the plants and facilities be divided into three or four different classes, roughly: 1. Strictly war purpose facilities installed in or near private plants but not readily adaptable to peacetime use, such as shell forging machinery, and equipment for making cartridge clips, bombs, special tank parts, guns, etc.; 2. facilities installed in or near private plants designed to supplement existing standard facilities and generally described as "scrambled" facilities; 3. all newly built integrated plants, such as Geneva, and those nonintegrated plants which are capable of independent operations.

With respect to the third classification the replies emphasized strongly that no general rules as to disposition and utilization can be made but that it will be necessary to make a study, plant by plant, to identify and separate those which have possibilities for postwar operation.

With respect to postwar prospects for steel demand it is difficult to arrive at definite conclusions from the replies of the steel companies to the questions

(*Please turn to Page* 160)



VILLAGE SMITHY, 1945. Arc welding of worn surfaces of a mine pony's shoes introduces a new idea in horseshoeing, according to Charles H. Chism, blacksmith at Coshocton, O., who is said to be the originator of the idea. He visited the Lincoln Electric Co. plant, Cleveland, where he explained that by using an arc welder to rebuild the toe and caulk of the shoe the need for removal of shoe is eliminated

March Pig Iron Output Best in Year

Pig iron production in March recovered from the low records of several prior months and totaled 5,227,790 net tons, compared with 4,562,744 tons in February and 4,945,018 tons in January, according to the American Iron & Steel Institute, New York. This is the highest output since March, 1944, when 5,434,240 tons were produced, making an all-time high. March production consisted of 5,161,896 tons of pig iron and 65,894 tons of ferromanganese and spiegeleisen. Blast furnaces operated at 91.4 per cent of capacity, compared with 88.4 in February and 86.5 in January. In March last year, when the top record was set, furnaces operated at 96.2 per cent of the capacity then existing.

	Pig iron	Ferro, spiegel	Total March	Total Year to date	Per Cent capacity
Eastern	909,339	31,009	940,348	2,600,787	85.2
Pittsburgh-Youngstown	2,057,602	20,620	2,078,222	5,924,708	94.4
Cleveland-Detroit	556,522	.....	556,522	1,487,146	93.4
Chicago	1,108,841	.....	1,108,841	3,169,379	92.8
Southern	358,441	14,265	372,706	1,058,749	89.1
Western	171,151	.....	171,151	494,783	71.0
Total	5,161,896	65,894	5,227,790	14,735,552	91.4

American Iron and Steel Institute.

Delegations of Authority Designed To Speed Subcontractors' Payments

New decentralization system grants power to prime contractors to make final settlements of claims of $10,000 or less. Aimed at cutting red tape to permit small manufacturers clear plant of war inventory as preliminary to resuming civilian output

By BRIG. GEN. D. N. HAUSEMAN

THE PRIME contractor who holds a direct contract with the War Department for war production, is, I think we are safe in saying, in pretty good shape today to do his part of the job in settling terminations with the War Department and in clearing his plant of termination leftovers. I wish I could say as much about the subcontractor.

Many difficulties increase the complex problem of settling subcontractors' claims. In the first place, the War Department has no contractual relations with subcontractors and in most cases we do not even know who they are or where they live. In the second place, the subcontractor's name is legion; nobody knows just how many there are but everybody knows there are probably ten times more subcontractors than primes.

Subcontractor Must Be Aided

Needless to say, unless the intricate and extended network of subcontractors obtain quick settlement and prompt plant clearance, they can easily dam up the flow of industrial readjustment. And also, needless to say, the progress of the war today and the transition to peace tomorrow depend on the steady, clear and fast flow of this readjustment process. We must do everything we can to help subcontractors keep the feed streams flowing steadily into the main stream, so there will be no damming up at the spring-head.

The most important element in contract settlement and plant clearance is time. Time is worth a great deal more to small contractors because they will not have, nor can they afford, the highly trained legal and accounting staffs to assist them in contract settlement. The small contractor for the most part has got to learn to do the job himself. Every step he can take to save precious time is a step in the right direction.

There are many steps the War Department has taken to help him. Here I want to discuss one group of such measures which in a very general way we can call delegations of authority.

These delegations are of two types: Those to settle contracts and those to clear plants.

To speed settlement so that subcontractors may get their money quickly, the War Department is giving war contractors certain delegations of authority. This grant of power is really awarding a blanket approval to a specific war contractor. Under this grant he can approve subcontractors' claims without being obliged to pass each claim up to the War Department for confirmation.

There are two of these go-ahead permits. The first is the specific $10,000 settlement delegation. To war contractors whose organization is capable of the job, we are giving specific licenses to make final settlements of all their subcontractors' claims of $10,000 or less. Since 90 per cent of all first tier subcontractors' claims will be less than $10,000 each, this delegation should cut a wide swath in the field of delay and greatly reduce the time required to clear the smaller claims. We are urging our contracting officers in the field to take vigorous action in granting these settlement permits to all war contractors who are qualified and able to use them.

Immediate Applications Important

Obviously some war contractors will have no use for such a delegation if they do not have subcontractors. But those who do business with an appreciable number of subcontractors and suppliers should lose no time in making application for such authority. The request must come to the War Department's contracting officers in the field from the contractor, since only he will know whether or not a delegation is needed in his case and can be used effectively.

The second go-sign is the automatic and all-inclusive $1,000 delegation. Under regulation No. 6 of the Office of Contract Settlement all war contractors (whether prime or sub) may make final settlement, on Form 1a, of all termination claims amounting to $1000 or less, which are submitted to them for approval. They need not go for O.K. to the War Department contracting officer on such claims if the contractor making the claim agrees to keep his termination inventory. This permit is granted to all war contractors; no one needs to request it.

Armed with these licenses to settle subcontractors' claims on the spot, there is little reason why war contractors should delay in giving thousands of subcontractors prompt action on their claims. In addition to such delegations of authority to speed decisions, the war contractor can easily and quickly open any needed financing with which to pay his subcontractors' settlements. In spite of these effective tools the War Department has given war contractors, there is still a log-jam of subcontractors who can't seem to get paid promptly. I hope all subcontractors who are in this position will become articulate and make known to their higher tier contractors who are tardy in settling their claims and paying them off, that there is no excuse for this delay.

I believe I am correct in echoing the general feeling in certain segments of industry today that the fiscal needs of contractors upon termination are a small problem compared to the more urgent and greater problem of plant clearance. Most contractors either have sufficient capital or can borrow it, and, therefore, are seldom kept back from engaging in other production on this score.

Plant Space Must Be Cleared

But when we approach the concrete subject of actual operational space and production facilities, we strike a major problem. No matter how well financed a war contractor may be, he cannot start other production lines, even if there is urgent need, if his plant space is clogged with termination inventories and production equipment no longer needed.

The War Department has moved fast to implement the Contract Settlement Act of 1944 which guarantees to the war contractor that his plant will be cleared in 60 days from the time he submits an acceptable list of his termination inventory. There are several go-ahead permits we are giving to hasten the plant clearance process.

First, there is the $10,000 delegation. This gives the contractor a permit to approve his subcontractors' retention or sale of their termination inventory whenever the subcontractor's claim is less than $10,000. This approval (in the absence of fraud) is final and binding on the government. Another important consideration is this: The prime can negotiate with his sub the price of the termination inventory the sub wants to retain, just as he would do if the government were not involved.

This means that a war contractor can lick the problem of plant clearance with his subs by making a quick decision, on his own initiative, and by urging the subs to sell or retain the termination inventory involved.

The second go-ahead authorizes any war contractor, prime or sub, to dispose

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The author of the accompanying article, written especially for STEEL, is brigadier general, General Staff Corps, and director, Readjustment Division. An earlier article by General Hauseman on contract termination appeared in STEEL, April 2, page 86. Another article on the same subject, by Rear Adm. H. L. Merring, deputy chief of the Industrial Readjustment Branch, Office of Procurement and Materiel, Navy Department, appeared in STEEL, April 23, page 71.

of any item of his termination inventory, no matter the size of the claim, if the cost of the item and all substantially similar items in the inventory does not exceed $100. The only condition is this: The aggregate cost of such items must not go above $5000 or 20 per cent of total inventory cost, whichever is less. The contractor needs no further approval for this permit. It is a speedy little tool that will cut out a lot of red tape on odd lots.

Of course, any war contractor (unless we tell him we need the property) may retain or sell any item in his termination inventory at cost without further approval.

Another important field in which there are no complicated price regulations is the pretermination agreement. If the contractor signs a formal pretermination agreement with the War Department (which is binding on both parties upon termination of a contract) the contractor may sell or retain his termination inventory at the best price obtainable.

Contractor Gets Special Powers

To sum up, I should like to put it this way: The effect of these several delegations or grants of power to settle claims and to dispose of property, is to make the war contractor a working partner with the War Department. Actually the contractor agrees to exercise special powers hitherto reserved in the War Department. He is granted such powers because his record and organization show that he is capable of exercising them wisely and in the best public interest, and because it has been clearly demonstrated that this delegation greatly speeds the co-operative task industry has to do with the government. Of course, we must remember that the exercise of these powers is subject to spot-check by the War Department and that they can be withdrawn if there is any evidence of abuse.

To look at it another way, delegation of authority is a new decentralization. Claims can be approved and plants can be cleared out on the industrial front where the contractor lives. The war contractor does not have to go to Washington for decisions. He does not even have to go to the nearest Army district office. Once he obtains the license, he can make his own decisions.

How well has he taken hold of these tools and used them? The answer is, not as well as I hope he will in the future. Up to Jan. 31, 1945, only 2244 specific delegations to settle subcontracts had been given by the War Department and in the month of February only 383. This is a very small percentage of the number possible, as there are, I suspect, thousands of contractors who could expedite the readjustment problem if they would use these special tools. The War Department is making vigorous efforts to see that all contractors learn that these tools are available and that they can be used to good advantage. I hope that in the next few months we shall witness a greater activity in this area.

There is one way in which the activity can become greater: When subcontractors push their primes. I hope that the subs who aren't getting quick settlements and prompt payments will let that fact be known to the next higher tier contractor who is delaying the process. The Contract Settlement Act of 1944 also allows subcontractors who cannot get a reasonably prompt settlement, to go direct to the government's contracting officer and lay their cases before him. If this happens I can predict that they will get action.

The war contractor who now has all the tools he needs to make a prompt settlement with his subs can save himself and the government a lot of time and money by getting busy today and clearing up all pending settlements with his subcontractors and suppliers.

Surplus Equipment Offered To All Industrial Users

Machine tools and production equipment, as fast as they are declared surplus, will be made available to all types of industrial users through public sales, the Reconstruction Finance Corp., a disposal agency designated by the Surplus Property Board, announced.

The Army and Navy have removed all restrictions upon the sale of surplus machine tools and production equipment.

On Dec. 22, 1944, when the War and Navy Departments increased munitions production, the RFC restricted the sale of critical surplus property. All critical government-owned machine tools, including those on the point of being released for non-war production, were held back from sale as surplus until the Inter-Governmental Machine Tool Review Committee screened the items against war production wants. Not until all such proposed sales as surplus had been reviewed was the transfer of surplus equipment permitted into civilian production. This restriction has now been lifted.

Brig. Gen. David N. Hauseman, second from right, director of the Readjustment Division of the General Staff Corps and author of the accompanying article, clarifies a point under discussion at a press conference on the review of methods used to handle termination of war contracts and disposal of surplus property. Listening are, left to right: Lieut. Comm. Sinclair Hatch, USNR; Rear Adm. Harry L. Merring, of the Industrial Readjustment Branch of the Navy's Office of Procurement and Materiel; Maj. Nelson Rose of the Army's Readjustment Division. Official U. S. Navy photograph

Steel Corporation's Order Backlogs Slightly Higher Than at Year's End

Wage concessions to coal miners will cost company $13 million annually, on top of $35 million increase in steelworkers' wages. First quarter earnings lower than in first three months in 1944 but higher than final quarter last year

STEEL demand appears about as heavy as ever, with United States Steel Corp.'s order backlogs at the end of the first quarter slightly higher than on Dec. 31 last, Irving S. Olds, chairman, stated in announcing the corporation's net profit of $15,379,000 for the initial three months this year. However, cutbacks are being received, particularly in second quarter plate requirements, but steel is being diverted to other work.

The corporation has not yet received definite information from the Army and Navy as to the character of cutbacks that may be expected after V-E Day. The services, he indicated, are still in the process of formulating these data.

Through April 18 last the corporation lost 104,000 tons of ingots as result of recent strikes in the coal mines. However, all of the corporation's mines in the Birmingham area are now back in operation.

Mr. Olds estimated that the adjustments in the coal miners contract would add about $13 million annually to the corporation's steelmaking costs. Steel wage increases recently approved by the War Labor Board would cost the corporation around $35 million annually on the basis of present operations.

Manpower situation is still tight with little easing in the overall picture so far. To date the corporation has employed 17,500 returned veterans, of whom 7100 are former employes. Shortage of manpower has had some bearing on the company's reduction in inventories, which last year were down $27 million and are continuing to be reduced.

Since a postwar contingency reserve of $100 million had been established by the close of last year, no additional amount was set aside for this purpose during the first quarter. This resulted in a decrease of $6 million in the costs for the quarter, which was more than offset, however, by increases in other costs, primarily employment.

The corporation's first quarter profit of $15,379,000 equalled $1.04 a common share, compared with $17,028,000, or $1.23 a share, in like 1944 period. Net profit for the final three months last year totaled $10,985,624.

Republic Steel Corp.

First quarter net profit of Republic Steel Corp., Cleveland, totaled $3,084,548, equal to 46 cents a common share, compared with $2,216,611, or 30 cents a share, in like 1944 period. Federal income tax provision last quarter amounted to $11,175,000, against $9,275,000 for comparable period last year.

Youngstown Sheet & Tube Co.

Youngstown Sheet & Tube Co., had first quarter net profit of $1,959,412, compared with $1,636,369 in corresponding period last year. Company has called for redemption May 1 the $10.5 million of series D first mortgage bonds and on June 15 there will mature and be paid $750,000 serial notes, thus reducing funded debt to $41,250,000, against $92 million in 1932.

Sharon Steel Corp.

Net profit of Sharon Steel Corp., Sharon, Pa., totaled $301,760, or 58 cents a common share, last quarter, compared with $166,511, equal to 23 cents a share, in same period a year ago. Company made no provision for postwar contingencies last quarter, in contrast with $75,000 in initial three months last year.

Inland Steel Co.

First quarter net profit of Inland Steel Co., Chicago, totaled $2,472,734, or $1.51 a share on capital stock, compared with $2,512,396, or $1.54 a share, in like 1944 period. Directors declared dividend of $1 per share, payable June 1 to record May 15.

Jones & Laughlin Steel Corp.

First quarter net income of Jones & Laughlin Steel Corp., Pittsburgh, totaled $2,013,489, equal to 80 cents a common share, compared with $1,708,352, or 61 cents a share, in like 1944 period.

Copperweld Steel Co.

Net income of Copperweld Steel Co., Glassport, Pa., totaled $253,631, or 45 cents a common share, in initial three months this year, compared with $242,223, equal to 42 cents per share, in corresponding period last year.

Colorado Fuel & Iron Corp.

Colorado Fuel & Iron Corp., Denver, had net income of $787,839 in initial three months this year, compared with $663,225 in like 1944 quarter. For nine months ended March 31 last company earned $1,824,025, against $1,189,166 for the like period ended March 31, 1944.

Continental Steel Corp.

Continental Steel Corp., Kokomo, Ind., reports first quarter net profit of $151,892, equal to 76 cents a common share, compared with $155,806, or 78 cents a share, for the corresponding 1944 period. Net sales last quarter totaled $5,983,755, compared with $5,378,368 in initial three months last year.

Keystone Steel & Wire Co.

Net profit of Keystone Steel & Wire Co., Peoria, Ill., totaled $336,492 for the three months ended March 31 last, equal to 44 cents a share on capital stock, compared with $269,600, or 35 cents a share, in same 1944 period.

Rustless Iron & Steel Corp.

Rustless Iron & Steel Corp., Baltimore, had net income of $448,914, or 46 cents a common share, last quarter, compared with $544,067, equal to 56 cents a share, in corresponding 1944 period.

Superior Steel Corp.

March quarter net profit of Superior Steel Corp., Pittsburgh, totaled $67,324, equal to 59 cents a share on capital stock.

Bethlehem's Shipwork Backlog Is Lower

Bethlehem Steel Corp., Bethlehem, Pa., earned $7,695,909, equal to $2.03 a common share, last quarter, compared with $16,379,398 in the preceding three months and $6,432,538, or $1.61 a share, in like 1944 period.

Directors declared a dividend of $1.50 a share on common stock. Tax provisions last quarter of $20,880,000, compared with $24,310,000 in like 1944 period.

Order backlogs March 31 last totaled $1,194,000,000, against $1,240,000,000 at the close of last year and $2,394,000,000 on same date in 1942. Completion of shipbuilding contracts account for decline in current orders on hand since Dec. 31 last.

Corporation's ingot operations averaged 98.3 per cent last quarter, against 102.2 in preceding three months and 103.5 per cent in March, 1944, quarter. Output is currently at 104 per cent, compared with 105 per cent a year ago.

Steel Profits Continue To Decline Despite Heavy Sales Volume

DESPITE the steady upward trend in production of steel ingots and finished products during the war period, the steel industry's earnings have declined from about $330 million in 1941 to slightly under $200 million last year.

In the past four years the industry's net sales volume has risen from about $3.8 billion to nearly $7 billion; while steel ingot production increased from 82.8 million net tons to a new all-time record of 89.6 million tons.

Further upturn in steel production costs continued throughout 1944, reflecting more overtime wage disbursements due to the growing labor shortage, revision in shift differential wage rates and vacation pay adjustments, plus continued advance in raw material costs, and changed production emphasis to less profitable items under War Production Board allocations.

Capacity production during the war period has made it possible for the industry to absorb rising materials and labor costs. However, the present breakeven point for the industry is substantially higher than in prewar years. Most observers state that wage or price levels would have to be adjusted should a prolonged substantial drop in production levels occur.

Combined net income of 29 steel producers, representing 88.5 per cent of steelmaking capacity, totaled $174,035,067 during 1944, compared with $183,778,014 in the preceding year. During 1941 and 1940, this same group had net profits of $277,565,532 and $260,309,958, respectively.

Net income per common share for these producers represented $3.47 a share, off slightly from the preceding year's showing of $3.73 on common and was less than half the $7.44 earned per share during 1941. Five companies omitted paying dividends on common stock in 1944. Only two producers increased common stock dividends last year, four paid less and 18 held their dividend rate unchanged during the period.

Total income before dividends and interest on bonds for 28 companies was $199,761,254, compared with $210,200,458 in 1943 and $304,846,259 in 1941. During the past year this group had a return of total income on capitalization of 4.99 per cent, compared with 5.22 per cent in the preceding year and 7.87 and 7.57 during 1941 and 1940, respectively.

Total capitalization for the entire group was off slightly, amounting to $4,020,648,728, compared with $4,047,025,448 in 1943.

A number of steel producers made considerable headway in reducing funded debt during the past year, the total for the entire group aggregating $578,652,684. This compares with $641,369,661 reported at the close of 1943 and $815,769,024 on Dec. 31, 1940 for practically the same group of companies. Current liabilities were also reduced somewhat last year, totaling $925,925,961 at the close of the period, while current assets for these producers rose slightly to $2,518,749,191. The ratio of current assets to current liabilities for the entire group last year was 2.72 to 1, compared with 2.42 to 1 in 1943.

Preferred and common stock valuation for the entire group recorded little change in 1944, although a reduction of about $5 million to a total of $712,969,886 in the aggregate valuation of preferred stock outstanding did occur.

Amount set aside for federal income taxes in 1944 by 28 steel producers totaled $327,695,511, off sharply from the preceding year's tax requirements of $421,585,726. Tax provisions have declined steadily from the peak of $554,990,490 reported by these companies in 1942, reflecting the downward trend in earnings before taxes during the period.

Aggregate payroll costs of 27 companies reporting amounted to $2,661,626,963 in 1944, against $2,604,948,202 in 1943.

STEEL acknowledges with appreciation the co-operation of all the companies which supplied data for the accompanying tabulation. Additional copies may be obtained from Readers' Service Dept., STEEL.

Financial Analysis of the Steel Industry for 1944

Official Returns from Twenty-Nine Producers, Representing 88.5 Per Cent of Steelmaking Capacity

Company	No. Shares Common Stock Outstanding 1944	No. Shares Common Stock Outstanding 1943	Common Stock Valuation 1944	Common Stock Valuation 1943	Preferred Stock Value 1944	Preferred Stock Value 1943	Funded Debt 1944	Funded Debt 1943
United States Steel Corp.	8,703,252	8,703,252	$652,743,900	$652,743,900	$360,281,100	$360,281,100	$92,919,209	$128,993,645
Bethlehem Steel Corp.	2,984,994	2,984,994	283,574,430	283,574,430	93,388,700	93,388,700	162,724,555	156,502,865
Republic Steel Corp.	5,669,922	5,669,922	130,309,141	130,309,141	32,873,600	32,921,000	69,560,877	72,231,523
Jones & Laughlin Steel Corp.	1,602,488	1,602,488	67,373,600	67,373,600	58,682,200	58,682,200	30,242,647	43,878,765
Youngstown Sheet & Tube Co.	1,675,008	1,675,008	105,088,053	105,088,053	15,000,000	15,000,000	51,870,541	60,175,811
National Steel Corp.	2,206,392	2,206,267	55,159,800	55,156,675	None	None	54,826,655	56,345,423
Inland Steel Co.	1,633,105	1,633,105	62,500,000	62,500,000	None	None	32,500,000	34,340,000
American Rolling Mill Co.	2,868,743	2,868,724	71,739,009	71,739,009	44,993,000	44,993,000	14,750,000	17,750,000
Wheeling Steel Corp.	569,559	569,559	28,477,950	28,477,950	36,316,600	36,316,600	31,200,000	32,400,000
Crucible Steel Co. of America	444,698	444,698	11,117,443	11,117,443	31,872,000	32,292,000	12,217,000	12,467,000
Colorado Fuel & Iron Corp.†°	563,620	563,620	5,636,200	5,636,200	None	None	11,035,200	11,035,200
Pittsburgh Steel Co.	508,917	508,917	4,862,190	4,862,190	16,335,740	16,282,500	7,954,000	7,082,864
Wickwire Spencer Steel Co.	483,370	494,752	4,833,697	4,947,524	None	None	None	None
Lukens Steel Co.‡	317,976	317,976	3,179,760	3,179,760	None	None	1,152,000	1,372,000
Granite City Steel Co.	382,488	382,488	8,483,821	8,483,821	None	None	1,750,000	2,125,000
Sharon Steel Corp.	392,331	392,331	3,974,530	3,974,530	5,972,000	5,972,000	1,600,000°°	None
Alan Wood Steel Co.	200,000	200,000	4,388,889	4,388,889	7,182,433	7,182,433	None	None
Midvale Co.	600,000	600,000	10,574,621	10,574,621	None	None	None	None
Allegheny Ludlum Steel Corp.	1,263,000	1,260,130	7,893,298	7,834,139	None	2,833,786	None	None
Continental Steel Corp.	200,561	200,561	5,276,243	5,276,243	None	987,800	800,000	1,000,000
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None	None	750,000	750,000
Central Iron & Steel Co.	224,540	224,540	2,245,400	2,245,400	None	None	None	None
Keystone Steel & Wire Co.	757,632	757,632	3,156,800	3,156,800	None	None	None	None
Follansbee Steel Corp.†§	217,706	217,706	2,177,061	2,177,061	2,547,913	2,547,913	None	193,973
Rustless Iron & Steel Corp.	926,537	926,541	926,499	926,518	1,825,600	1,825,600	None	1,350,000
Barium Steel Corp.	830,319	830,319	830,319	830,319	None	None	None	None
A. M. Byers Co.§°	264,635	264,635	2,646,350	2,646,350	5,624,000	5,639,900	800,000	800,000
Harrisburg Steel Corp.	183,300	183,300	1,150,000	1,150,000	None	None	None	None
Northwestern Steel & Wire Co.§#	163,565	163,565	817,825	817,825	75,000	75,000	None	575,592
Total (or average)	37,044,908	37,053,280	$1,545,261,829	$1,545,313,391	$712,969,886	$717,221,532	$578,652,684	$641,369,661

Company	Surplus 1944	Surplus 1943	Total Capitalization 1944	Total Capitalization 1943	Capitalization Per Ton Ingot Capacity 1944	Capitalization Per Ton Ingot Capacity 1943	Total Income Before Dividends and Interest on Bonds 1944	Total Income Before Dividends and Interest on Bonds 1943	Per Cent Total Income On Capitalization 1944	Per Cent Total Income On Capitalization 1943
United States Steel Corp.	$415,087,778	$414,329,182	$1,523,892,264	$1,559,643,431	$47.17	$47.94	$65,770,956	$68,883,204	4.31	4.42
Bethlehem Steel Corp.	133,342,750	121,344,499	673,030,435	654,810,494	52.17	50.76	43,089,799	37,810,280	6.40	5.77
Republic Steel Corp.	106,207,420	103,720,445	338,951,038	339,182,109	40.45	40.48	14,203,507	15,938,204	4.19	4.70
Jones & Laughlin Steel Corp.	73,720,708	72,336,555	230,019,155	242,271,120	45.78	48.22	9,301,171	11,156,386	4.04	4.61
Youngstown Sheet & Tube Co.	52,189,736	46,306,231	224,148,330	226,570,095	55.45	54.97	10,125,050	10,363,839	4.52	4.57
National Steel Corp.	110,050,345	105,914,377	220,036,800	217,416,475	56.41	55.75	12,389,181	13,451,943	5.63	6.19
Inland Steel Co.	57,088,191	54,283,025	152,088,191	151,123,025	44.73	44.78	11,282,638	12,070,868	7.42	7.99
American Rolling Mill Co.	23,173,547	22,425,278	154,655,556	156,907,287	47.15	48.10	5,631,916	6,999,097	3.64	4.46
Wheeling Steel Corp.	26,806,023	25,091,402	122,800,573	122,285,952	62.65	62.39	5,545,725	5,521,173	4.52	4.51
Crucible Steel Co. of America	24,610,369	23,527,919	79,816,812	79,404,362	57.31	57.02	4,366,426	5,452,124	5.47	6.87
Colorado Fuel & Iron Corp.†°	22,652,067	19,707,740	39,323,467	36,379,140	34.76	32.16	2,223,821	2,034,043	5.66	5.59
Pittsburgh Steel Co.	19,799,656	20,234,036	48,951,586	48,461,590	45.66	45.21	1,152,710	2,177,125	2.35	4.49
Wickwire Spencer Steel Co.	14,544,233	13,501,916	19,377,930	18,449,439	100.93	96.09	1,524,164	1,502,080	7.87	8.14
Lukens Steel Co.‡	8,474,844	8,172,858	12,806,604	12,724,618	20.52	20.39	756,970	1,387,214	5.91	10.90
Granite City Steel Co.	4,762,741	4,721,164	14,996,562	15,329,985	[illegible]1.33	38.02	359,447	633,555	2.40	4.13
Sharon Steel Corp.	8,602,991	8,223,598	20,149,521	18,170,128	[illegible]1.68	28.57	1,108,792	906,567	5.50	4.99
Alan Wood Steel Co.	4,106,373	4,328,502	15,677,695	15,899,824	[illegible]3.50	28.91	136,991	699,230	0.87	4.40
Midvale Co.	7,808,114	7,174,199	18,382,735	17,748,820	[illegible]5.39	36.66	1,832,647	2,475,843	9.97	13.95
Allegheny Ludlum Steel Corp.	23,033,378	22,422,407	30,926,676	33,090,332	[illegible].33	73.04	3,607,814	3,932,898	11.66	11.89
Continental Steel Corp.	6,314,417	6,305,659	12,390,660	13,569,701	[illegible]4.04	37.28	540,910	800,860	4.37	5.90
Laclede Steel Co.	2,116,317	2,065,476	6,991,317	6,940,476	21.44	21.29	331,778	61,023	4.75	0.87
Central Iron & Steel Co.	1,504,843	1,425,001	3,750,243	3,670,401	11.16	10.92	96,744	227,243	2.58	6.20
Keystone Steel & Wire Co.	8,769,405	8,235,419	11,926,205	11,392,219	[illegible]9.44	37.67	1,528,034	1,361,931	12.81	11.95
Follansbee Steel Corp.†§	3,975,697	4,050,542	8,700,671	8,969,489	61.65	63.56	74,845°	491,016	0.86°	5.47
Rustless Iron & Steel Corp.	8,109,312	7,217,740	10,861,411	11,319,858	95.28	99.30	1,922,287	2,337,077	17.70	20.65
Barium Steel Corp.	9,325	330,734§§	839,644	499,585	16.79	17.23	45,444	5,265	5.41	1.05
A. M. Byers Co.§°	8,355,524	8,066,419	17,425,874	17,152,669	[illegible]6.17	158.82	NA	NA	NA	NA
Harrisburg Steel Corp.	2,654,183	2,617,988	3,570,683	3,534,488	[illegible]5.44	35.08	254,886	710,489	7.17	20.10
Northwestern Steel & Wire Co.§#	2,881,777	2,639,919	4,160,090	4,108,336	12.98	12.80	706,291	809,881	16.98	19.71
Total (or average)	$1,180,752,064	$1,140,720,230	$4,020,648,728	$4,047,025,448	[illegible]7.54	$47.87	$199,761,254	$210,200,458	4.99	5.22

Company	Net Sales 1944	Net Sales 1943	Net Profit Margin Per Cent 1944	Net Profit Margin Per Cent 1943	Net Income Before Dividends 1944	Net Income Before Dividends 1943	Preferred Dividend Requirements 1944	Preferred Dividend Requirements 1943
United States Steel Corp.	$2,082,186,895	$1,972,344,751	2.92	3.18	$60,791,281	$62,631,742	$25,219,677	$25,219,677
Bethlehem Steel Corp.	1,746,733,127	1,902,819,720	2.07	1.69	36,167,723	32,124,592	6,537,209	6,522,509
Republic Steel Corp.	527,903,507	549,060,859	1.92	2.19	10,130,296	12,011,057	1,973,046	1,985,420
Jones & Laughlin Steel Corp.	290,087,880	280,676,172	2.59	3.39	7,519,668	9,512,228	2,933,863	2,929,970
Youngstown Sheet & Tube Co.	238,816,965	224,879,404	3.33	3.57	7,944,922	8,037,442	825,000	825,000
National Steel Corp.	252,357,463	256,168,340	4.26	4.57	10,751,369	11,698,362	None	None
Inland Steel Co.	221,161,942	203,680,146	4.63	5.30	10,249,395	10,801,564	None	None
American Rolling Mill Co.	200,818,944	199,266,466	2.52	3.06	5,067,991	6,098,074	2,024,734	2,024,734
Wheeling Steel Corp.	135,144,446	121,359,532	3.24	3.58	4,384,789	4,339,246	1,815,830	1,815,830
Crucible Steel Co. of America	184,536,021	196,646,344	2.13	2.52	3,926,893	4,949,696	1,602,100	1,624,850
†°Colorado Fuel & Iron Corp.	56,192,152	50,273,424	2.98	2.69	1,672,061	1,351,529	None	None
Pittsburgh Steel Co.	59,717,009	66,624,191	1.13	2.60	672,364	1,734,223	863,480	863,216
Wickwire Spencer Steel Co.	25,841,887	24,649,867	5.95	6.15	1,536,991	1,516,613	None	None
‡Lukens Steel Co.	54,743,937	52,338,397	1.25	2.51	682,957	1,317,281	None	None
Granite City Steel Co.	21,733,505	17,224,988	1.12	3.22	242,386	554,271	None	None
Sharon Steel Corp.	35,335,389	39,283,445	3.03	2.27	1,070,323	891,035	298,600	298,600
Alan Wood Steel Co.	28,638,012	30,138,407	0.48	2.32	136,991	699,230	502,768	502,768
Midvale Co.	NA	NA	NA	NA	1,832,647	2,475,843	None	None
Allegheny Ludlum Steel Co.	108,463,163	115,409,177	3.32	3.41	3,607,814	3,932,898	198,380	198,380
Continental Steel Corp.	22,474,066	22,264,078	2.26	3.43	508,660	762,610	None	69,237
Laclede Steel Co.	14,663,022	13,139,003	2.18	0.35	318,966	46,023	None	None
Central Iron & Steel Co.	14,347,396	15,472,201	0.67	1.47	96,744	227,243	None	None
Keystone Steel & Wire Co.	21,594,022	18,056,091	7.08	7.54	1,528,034	1,361,931	None	None
†§Follansbee Steel Corp.	14,524,238	20,366,986	0.52°	2.19	74,845°	445,170	127,395	127,395
Rustless Iron & Steel Corp.	28,274,754	32,996,894	6.48	6.78	1,831,780	2,236,492	91,289	91,290
Barium Steel Corp.	3,125,376	1,814,738	1.45	0.29	45,444	5,265	None	None
§°A. M. Byers Co.	24,332,820	23,395,160	3.65	4.29	888,170	1,004,525	393,927	394,793
Harrisburg Steel Corp.	25,336,710	28,231,340	1.01	2.56	256,155	721,959	None	None
§#Northwestern Steel & Wire Co.	12,283,834	12,493,845	2.01	2.32	247,098	289,870	5,250	5,250
Total (or average)	$6,451,368,482	$6,491,073,961	2.67	2.79	$174,035,067	$183,778,014	$45,412,548	$45,498,919

Company	Earnings Per Common Share 1944	Earnings Per Common Share 1943	Dividends Paid Per Share on Preferred 1944	Dividends Paid Per Share on Preferred 1943	Dividends Paid Per Share on Common 1944	Dividends Paid Per Share on Common 1943	Average Number Employed 1944	Average Number Employed 1943	Total Payrolls 1944	Total Payrolls 1943
United States Steel Corp.	$4.09	$4.30	$7.00	$7.00	$4.00	$4.00	314,888	340,498	$914,341,158	$869,298,853
Bethlehem Steel Corp.	9.93	8.58	7.00	7.00	6.00	6.00	262,133	291,360	848,949,518	897,852,793
Republic Steel Corp.	1.44	1.77	6.00	6.00	1.00	1.00	57,000‡‡	65,700	180,323,772	173,368,823
Jones & Laughlin Steel Corp.	2.86	4.10	5.00	5.00	2.00	2.00	38,412	39,101	116,970,109	105,471,580
Youngstown Sheet & Tube Co.	4.25	4.31	5.50	5.50	2.00	2.00	22,291	23,583	69,181,825	62,599,479
National Steel Corp.	4.87	5.30	None	None	3.00	3.00	21,191	21,203	68,724,131	61,977,015
Inland Steel Co.	6.28	6.61	None	None	4.50	4.50	18,937	19,696	57,452,840	52,342,789
American Rolling Mill Co.	1.06	1.42	4.50	4.50	0.80	1.00	21,835	21,124	64,786,517	56,377,766
Wheeling Steel Corp.	4.51	4.43	5.00	5.00	1.50	1.50	17,474	16,816	51,441,380	45,927,457
Crucible Steel Co. of America	5.23	7.48	5.00	5.00	3.00	3.00	24,710	27,271	74,100,000	74,500,000
Colorado Fuel & Iron Corp.†°	2.97	2.40	None	None	1.00	1.00	9,836	10,915	24,320,682	21,996,129
Pittsburgh Steel Co.	0.38°	1.71	5.50§	17.88§	None	None	7,660	8,260	23,750,066	22,432,643
Wickwire Spencer Steel Co.	3.18	3.30	None	None	1.00	1.00	4,151	4,268	11,621,407	11,308,502
Lukens Steel Co.‡	2.15	4.14	None	None	1.00	1.20	6,166	5,997	18,600,208	17,149,145
Granite City Steel Co.	0.63	1.45	None	None	0.53	0.53	2,018	1,905	5,426,707	4,727,548
Sharon Steel Corp.	1.97	1.51	5.00	5.00	1.00	1.00	3,319	3,698	10,195,710	10,118,932
Alan Wood Steel Co.	1.83°	0.98	5.00	7.00	None	None	2,993	3,187	8,799,428	8,313,205
Midvale Co.	3.05	4.13	None	None	2.00	2.00	7,837	7,905	26,078,731	25,140,691
Allegheny Ludlum Steel Corp.	2.70	2.96	7.00	7.00	2.00	2.00	11,313	12,482	37,329,794	36,361,000
Continental Steel Corp.	2.54	3.46	None	7.00	2.00	2.00	2,804	2,639	8,130,195	7,010,627
Laclede Steel Co.	1.55	0.22	None	None	1.30	1.30	1,561	1,500	4,121,606	3,752,239
Central Iron & Steel Co.	0.43	1.01	None	None	0.10	0.30	1,592	1,757	4,077,549	4,236,380
Keystone Steel & Wire Co.	2.02	1.80	None	None	1.20	1.05	1,735	1,818	6,136,327	5,424,081
Follansbee Steel Corp.†§	0.93°	1.46	None	None	None	None	2,100	2,340	5,264,782	5,835,032
Rustless Iron & Steel Corp.	1.88	2.32	2.50	2.50	0.75	0.75	2,442	2,810	7,382,165	7,808,650
Barium Steel Corp.	0.05	0.01	None	None	None	None	650	700	NA	NA
A. M. Byers Co.§°	1.87	2.30	7.00	18.00	0.25	None	NA	NA	NA	NA
Harrisburg Steel Corp.	1.40	3.94	None	None	1.20	1.50	3,850	3,911	10,929,288	10,378,483
Northwestern Steel & Wire Co.§#	1.48	1.74	7.00	7.00	None	None	1,235	1,435	3,191,068	3,238,360
Total (or average)	$3.47	$3.73	....	....	....	....	872,133	943,879	$2,661,626,963	$2,604,948,202

Company	Rated Ingot Capacity Net Tons 1944	Rated Ingot Capacity Net Tons 1943	Ingot Production Net Tons 1944	Ingot Production Net Tons 1943	Steel Operating Rate Per Cent 1944	Steel Operating Rate Per Cent 1943	Net Income Per Ton Ingot Produced 1944	Net Income Per Ton Ingot Produced 1943	Net Income Per Ton Ingot Capacity 1944	Net Income Per Ton Ingot Capacity 1943
United States Steel Corp.	32,307,000	32,537,000	30,814,648	30,540,427	94.7	97.8	$1.97	$2.05	$1.88	$1.92
Bethlehem Steel Corp.	12,900,000	12,900,000	13,262,348	13,015,755	102.8	100.9	2.73	2.47	2.80	2.49
Republic Steel Corp.	8,380,000	8,378,000	8,400,426	8,651,273	99.8	100.4	1.21	1.39	1.21	1.43
Jones & Laughlin Steel Corp.	5,024,400	5,024,400	5,056,702	5,124,846	100.6	102.0	1.49	1.86	1.50	1.89
Youngstown Sheet & Tube Co.	4,042,000	4,122,000	4,299,527	4,122,501	106.4	100.0	1.85	1.95	1.97	1.95
National Steel Corp.	3,900,000	3,900,000	NA	NA	NA	NA	NA	NA	2.76	3.00
Inland Steel Co.	3,400,000	3,375,000	3,684,147	3,597,975	108.4	106.6	2.78	3.00	3.01	3.20
American Rolling Mill Co.	3,280,000	3,262,000	3,040,014	3,115,410	92.7	95.5	1.67	1.96	1.55	1.87
Wheeling Steel Corp.	1,960,000	1,960,000	2,012,026	1,947,066	102.7	99.3	2.18	2.23	2.24	2.21
Crucible Steel Co. of America	1,392,660	1,392,660	NA	NA	NA	NA	NA	NA	2.82	3.55
Colorado Fuel & Iron Corp.†°	1,131,218	1,131,218	1,294,594	1,141,286	114.4	100.9	1.29	1.18	1.48	1.19
Pittsburgh Steel Co.	1,072,000	1,072,000	919,139	1,011,932	85.7	94.4	0.73	1.71	0.62	1.62
Wickwire Spencer Steel Co.	192,000	192,000	165,753	172,170	86.3	89.7	9.27	8.80	8.01	7.90
Lukens Steel Co.‡	624,000	624,000	646,602	631,093	103.6	101.1	1.06	2.09	1.09	2.11
Granite City Steel Co.	703,200	403,200	488,224	404,243	69.4	100.3	0.50	1.37	0.34	1.37
Sharon Steel Corp.	636,000	636,000	596,758	646,429	93.8	101.6	1.79	1.38	1.68	1.40
Alan Wood Steel Co.	550,000	550,000	534,230	545,500	97.1	99.2	0.26	1.44	0.25	1.42
Midvale Co.	519,370	484,120	314,714	365,719	60.6	75.5	5.82	6.77	3.53	5.11
Allegheny Ludlum Steel Corp.	459,360	453,040	410,194	425,683	89.3	94.0	8.80	9.24	7.85	8.68
Continental Steel Corp.	364,000	364,000	364,578	361,094	100.2	99.2	1.40	2.11	1.40	2.09
Laclede Steel Co.	326,025	326,025	298,836	297,049	91.7	91.1	1.07	0.15	0.98	0.14
Central Iron & Steel Co.	336,000	336,000	270,127	299,363	80.4	89.1	0.36	0.76	0.29	0.68
Keystone Steel & Wire Co.	302,400	302,400	305,060	292,020	100.9	96.6	5.01	4.66	5.05	4.50
Follansbee Steel Corp.†§	141,120	141,120	NA	NA	NA	NA	NA	NA	0.59°	3.15
Rustless Iron & Steel Corp.	114,000	114,000	86,718	102,211	76.1	89.7	21.12	21.88	16.07	19.62
Barium Steel Corp.	50,000	29,000	NA	NA	NA	NA	NA	NA	0.90	0.18
A. M. Byers Co.§°	150,000	108,000	NA	NA	NA	NA	NA	NA	5.92	9.30
Harrisburg Steel Corp.	100,750	100,750	108,095	113,534	107.3	112.7	2.37	6.36	2.54	7.17
Northwestern Steel & Wire Co.§#	321,000	321,000	227,332	216,660	70.8	67.5	1.09	1.34	0.77	0.90
Total (or average)	84,678,503	84,538,933	77,600,792	77,141,239	98.3‡°	97.7‡°	$2.04	$2.15	$2.06	$2.17

Company	Federal Income Taxes 1944	Federal Income Taxes 1943	Total Assets 1944	Total Assets 1943	Current Assets 1944	Current Assets 1943
United States Steel Corp.	$65,000,000	$84,316,804	$2,082,374,183	$2,106,062,459	$887,223,754	$867,289,632
Bethlehem Steel Corp.	112,000,000	129,600,000	1,032,714,197	1,044,869,730	589,654,316	558,544,883
Republic Steel Corp.	31,400,000	39,300,000	397,331,026	394,627,726	174,197,587	154,090,928
Jones & Laughlin Steel Corp.	8,050,000	19,650,000	285,402,277	300,101,719	121,851,623	132,439,006
Youngstown Sheet & Tube Co.	11,375,000	16,833,611	253,933,188	253,606,668	132,909,490	119,042,777
National Steel Corp.	17,200,000	26,350,000	263,881,714	258,132,279	95,641,528	83,756,119
Inland Steel Co.	17,560,000	19,325,000	184,723,979	183,380,847	93,759,506	84,386,469
American Rolling Mill Co.	5,448,738	8,953,073	189,781,318	190,010,021	90,523,081	85,099,328
Wheeling Steel Corp.	4,818,000	3,458,000	135,884,300	132,723,422	59,637,468	53,875,289
Crucible Steel Co. of America	17,865,307	18,232,718	107,568,696	120,698,574	63,064,893	68,720,922
Colorado Fuel & Iron Corp.†°	1,651,820°†	1,266,000°†	54,756,616	53,199,538	23,069,951	20,831,278
Pittsburgh Steel Co.	115,000°#	3,140,000	56,795,235	57,419,494	23,666,667	24,048,590
Wickwire Spencer Steel Co.	810,000	757,092	24,619,756	22,937,694	12,799,080	11,353,766
Lukens Steel Co.‡	440,000#	4,693,649#	23,745,246	33,539,569	13,824,169	22,318,754
Granite City Steel Co.	368,000	387,796	20,636,856	17,800,031	11,629,307	8,133,410
Sharon Steel Corp.	2,250,000	3,863,000	24,729,243	22,913,577	15,767,981	13,155,303
Alan Wood Steel Co.	71,000°#	541,900	18,496,436	19,116,691	8,540,117	8,685,619
Midvale Co.	10,042,500††	14,004,314	34,793,617	35,645,469	26,609,170	27,756,660
Allegheny Ludlum Steel Corp.	9,950,000	11,082,880	44,185,214	45,885,842	26,194,641	26,497,465
Continental Steel Corp.	350,000	414,000	15,561,534	16,140,740	8,082,292	7,474,292
Laclede Steel Co.	312,000	61,088	8,527,892	7,929,076	4,454,790	3,671,641
Central Iron & Steel Co.	73,165	336,299	4,163,022	4,517,657	2,261,056	2,411,041
Keystone Steel & Wire Co.	2,988,078	1,493,126	12,827,800	12,908,888	4,895,555	5,001,086
Follansbee Steel Corp.†§	None	1,223,362	10,374,673	12,062,364	4,567,911	5,815,054
Rustless Iron & Steel Corp.	4,757,000	7,306,393	14,788,785	20,047,385	8,525,465	13,664,874
Barium Steel Corp.	NA	NA	2,552,937	1,133,211	1,402,197	669,752
A. M. Byers Co.§°	1,810,000	2,066,522	19,925,141	20,929,740	6,983,483	7,411,512
Harrisburg Steel Corp.	552,703	2,521,434	7,291,992	9,058,999	4,698,734	6,245,313
Northwestern Steel & Wire Co.§#	437,200	407,665	5,786,745	5,645,602	2,313,379	1,952,081
Total (or average)	$327,695,511	$421,585,726	$5,338,153,618	$5,403,045,012	$2,518,749,191	$2,424,342,844

Company	Current Liabilities 1944	Current Liabilities 1943	Ratio of Current Assets To Current Liabilities 1944	Ratio of Current Assets To Current Liabilities 1943	Postwar Contingencies Reserve 1944	Postwar Contingencies Reserve 1943
United States Steel Corp.	$334,899,136	$348,764,336	2.65—1	2.49—1	$25,000,000	$25,000,000
Bethlehem Steel Corp.	298,068,192	338,037,045	1.98—1	1.65—1	8,000,000	15,000,000
Republic Steel Corp.	43,[illegible]99,318	39,257,005	4.00—1	3.93—1	1,500,000	4,750,000
Jones & Laughlin Steel Corp.	42,[illegible]14,675	46,372,177	2.85—1	2.86—1	1,000,000	2,000,000
Youngstown Sheet & Tube Co.	17,[illegible]88,334	16,986,317	7.47—1	7.01—1	1,600,000	1,650,000
National Steel Corp.	29,648,009	28,864,756	3.23—1	2.90—1	None	750,000
Inland Steel Co.	21,[illegible]53,026	21,644,904	4.29—1	3.90—1	None	1,009,638
American Rolling Mill Co.	26,[illegible]35,867	26,254,257	3.45—1	3.24—1	2,240,000	1,080,000
Wheeling Steel Corp.	10,[illegible]62,944	7,883,996	5.59—1	6.83—1	None	None
Crucible Steel Co. of America	18,[illegible]26,092	28,498,501	3.41—1	2.41—1	2,500,000	1,783,514
†°Colorado Fuel & Iron Corp.	8,[illegible]18,180	8,754,156	2.74—1	2.38—1	None	None
Pittsburgh Steel Co.	6,[illegible]74,504	7,499,379	3.39—1	3.21—1	None	None
Wickwire Spencer Steel Co.	4,605,059	3,468,797	2.78—1	3.27—1	None	None
‡Lukens Steel Co.	8,509,773	17,846,587	1.62—1	1.25—1	None	1,063,000
Granite City Steel Co.	5,[illegible]80,553	2,110,782	2.20—1	3.85—1	None	None
Sharon Steel Corp.	3,654,722	3,818,449	4.31—1	3.45—1	None	600,000
Alan Wood Steel Co.	2,003,910	2,432,548	4.26—1	3.57—1	None	None
Midvale Co.	12,096,402	14,457,418	2.20—1	1.92—1	900,000	473,383
Allegheny Ludlum Steel Co.	12,[illegible]29,004	11,324,204	2.14—1	2.34—1	250,000	600,000
Continental Steel Corp.	2,[illegible]59,982	1,510,091	3.74—1	4.95—1	None	None
Laclede Steel Co.	1,[illegible]26,575	704,151	3.63—1	5.21—1	None	None
Central Iron & Steel Co.	[illegible]37,917	796,294	6.15—1	3.03—1	None	None
Keystone Steel & Wire Co.	[illegible]74,077	1,379,185	6.49—1	3.63—1	None	None
†§Follansbee Steel Corp.	1,571,633	2,875,534	2.91—1	2.02—1	None	None
Rustless Iron & Steel Corp.	3,007,950	7,680,033	2.83—1	1.78—1	640,000	640,000
Barium Steel Corp.	1,708,018	528,978	0.82—1	1.27—1	None	None
§°A. M. Byers Co.	2,317,908	3,443,860	3.02—1	2.15—1	None	None
Harrisburg Steel Corp.	3,521,309	5,321,366	1.33—1	1.17—1	None	100,000
§#Northwestern Steel & Wire Co.	1,522,892	1,666,445	1.52—1	1.17—1	130,000##	##128,151
Total (or average)	$925,[illegible]25,961	$1,000,181,551	2.72—1	2.42—1	$43,760,000	$56,627,686

° Deficit.

°† Includes a provision from income pending a further clarification of the effect of the Revenue Act of 1943, and the results of the hearings before the War Labor Board for increases in wages and other allowances.

§ Payment on 5½ per cent preferred; no payments either year on Class A or B preferred.

No allowance made for postwar refund.

°° Notes payable to banks maturing from 1946 to 1949 inclusive.

°# Tax refund due.

†† Includes provision for renegotiation of war contracts.

§§ Includes allowance for postwar tax refund.

†§ Relating steel ingot output to earnings would be misleading inasmuch as most of company's ingot output is sold in a semifinished state and hot-rolled strip is purchased for production of black plate.

Represents amount set aside to date of the close of the fiscal year, and not amount applicable to current year only.

§# Fiscal year ended July 31.

§° Fiscal year ended Sept. 30.

†° Fiscal year ended June 30.

‡ Fiscal year ended Oct. 7.

‡‡ Total as of Dec. 31, 1944.

‡° Based on year end capacity.

"Net Income Before Dividends" columns and totals do not take into consideration requirements (not actual payments) for preferred dividends. In computing earnings per common share these totals, adjusted for preferred dividend requirements, are used. In arriving at earnings per common share for individual companies the same method is followed.

Boldface type is used under those columns in which figures from all 29 companies were not available.

PER CENT EARNED ON CAPITALIZATION

Year	Per Cent	Year	Per Cent	Year	Per Cent
1927	5.22	1933	0.90°	1939	4.27
1928	6.55	1934	0.36	1940	7.57
1929	9.88	1935	2.09	1941	7.87
1930	4.54	1936	4.40	1942	5.69
1931	0.40	1937	6.07	1943	5.22
1932	°2.85	1938	0.59	1944	4.99

° Loss.

Postwar Poland Industry Seen Much Greater

Industrial importance would be greatly increased should borders be extended westward as projected in recent proposals

IF POLAND'S borders are extended westward, as contemplated by recent proposals, that nation's industrial importance would be more consequential than ever, according to the American Iron and Steel Institute.

If that should happen Poland presumably would get part of Silesia, now occupied by the Russian army. Silesia contains extensive deposits of high-grade coal, zinc, lead, and low-grade iron ore. Just before the war Silesia accounted for around one-third of Germany's coal, about 15 per cent of its coke and 40 per cent of its lead. The district contained numerous German arms factories, foundries, oil refineries and chemical works. Steel production in recent years in Silesia has been variously estimated from 2,000,000 to 5,000,000 tons per year.

Mineral reserves of prewar Poland include coal, limestone, dolomite and lean iron ore. During the World War I, mining in Poland was interrupted, and most of the nation's industrial production facilities were destroyed. By 1926, however, extensive industrial reconstruction and the stabilization of the nation's finances had brought prosperous conditions.

In 1928 Poland occupied twelfth place among the steel producing nations of the world and stood thirteenth in pig iron output. In that year Poland produced 752,192 tons of pig iron and 1,580,751 tons of steel.

In 1938 the coal and iron mines and the steel plants within the Trans-Olzan area of Silesia became incorporated into Poland. It was estimated at the time that the acquisition would increase Poland's pig iron production by 55 per cent, and her steel output by 50 per cent.

Poland, before the war began, was trying to grow more nearly self-sufficient in its production of manufactured goods by putting into production plants for making automobiles and airplanes, machinery, railway rolling stock, munitions and diversified consumer goods.

Commerce Department Gets Job of Surplus Disposal

Disposal of government-owned consumer goods, including automotive vehicles and equipment and construction and agricultural machinery, has been transferred from the Department of the Treasury to the Department of Commerce, the Surplus Property Board announced.

The transfer, effective May 1, affects disposal of the second largest existing category of surplus property available for disposal, including many items in short civilian supply.

Simultaneously, the board issued an order effective May 1 to allow the agencies that have been designated by the board as surplus property disposal agencies sufficient time to organize full-scale disposal activities.

The board said this postponement means no decrease in the rate of disposals, or curtailment of items available for disposal. Agencies designated to dispose of surplus property are required to advise the SPB on June 1 and thereafter on the first of each month of the progress made in assuming responsibility for the care and handling of surpluses.

Wage Increases Granted To Maintenance Employes

A wage increase of five cents an hour to all skilled maintenance employes of five automotive companies has been directed in seven orders by the National War Labor Board to restore a proper rate relationship between skilled maintenance workers and tool and die makers.

Affected are approximately 30,000, or 5 per cent, of the hourly-rated employes in about 150 plants of General Motors Corp., Hudson Motor Car Co., Packard Motor Car Co., Murray Corp. of America, and Chrysler Corp.

Three of the orders involve General Motors and three unions—the United Automobile Workers, the United Electrical, Radio and Machine Workers, and the United Rubber Workers (at Inland Mfg. Division, Dayton, O.), all CIO. The four remaining orders affect the other companies and the UAW-CIO.

The WLB specified that its orders are not to form the basis for any claim of intra-plant inequity for production workers, tool room employes or any other workers in the plants involved.

NAM Represented at San Francisco Conference

The National Association of Manufacturers, New York, is represented at the United Nations Conference on International Organization in San Francisco by a consultant and two associates invited by Secretary of State Edward R. Stettinius Jr. to assist the American delegation.

The consultant is Robert Gaylord, NAM board chairman, and president of Ingersoll Milling Machine Co., Rockford, Ill. He will speak for industry at the conference out of an experience of 34 business years.

Associate consultants are W. W. Cumberland, economist and partner in the investment banking firm of Wellington & Co., New York, and Hugh O'Connor, NAM staff member.

POSTWAR PREVIEWS

VETERANS RE-EMPLOYMENT— Cleveland seminar seeks to adjust returning servicemen to industrial jobs, utilize physical and mental abilities to best advantage. See page 60.

CONTRACT TERMINATION— Authority delegated prime contractors to make some settlements with subcontractors to speed termination procedure and clear plants. See page 64.

CONTROLS— Committee for Economic Development recommends removal of controls as soon as feasible. See page 68.

PUBLIC WORKS— Irrigation projects in arid and semiarid western states expected to give impetus to postwar business. See page 70.

WEST COAST— Survey of government-owned western steel facilities underway for Reconstruction Finance Corp. Engineers study facilities, freight rates, potential markets and probable competition of eastern producers. See page 79.

PORTABLE WELDING GUNS— In number and variety, yokes or heads for portable welding guns used in spotwelding complicated stainless steel assemblies for B-29s are amazing. General adoption of this specially designed equipment for reaching hitherto inaccessible areas appears likely. See page 86.

HOBBING ACHIEVEMENT— Exhaustive tests of composite hob with tungsten carbide strip teeth, operating at high speed on modified machine, foreshadow significant changes in gear-hobbing methods, tools and machinery. Time savings in some operations amount to 80 per cent or more. See page 104.

Removal of Wartime Controls Soon As Emergency Ends Urged by C.E.D.

Selective rather than indiscriminate abandonment of controls recommended. Group suggests that examination of restrictions begin now so that they may be lifted as soon as they become unnecessary

PROMPT REMOVAL of wartime controls as soon as emergency needs have ended has been urged in a statement on national policy by the Committee for Economic Development, New York.

Coupled with this recommendation was a warning against removal of any control at a time when it would "jeopardize any phase of the war effort or a successful transition to a healthy peacetime economy."

The recommendations were made by the research committee of the C.E.D., a nationwide organization of businessmen, working for high-level postwar employment, after more than a year's study of all phases of the problem.

Calling for "selective" rather than indiscriminate abandonment of controls, the statement urges that examination of various controls begin now and that within six months after conclusion of war the director of reconversion recommend removal of all controls that are not "clearly" necessary beyond that date. Legislative authority to reimpose inflation controls, if experience proves they are needed, should remain in the hands of the executive branch until the transition to high-level peacetime employment is safely made. However, the statement emphasizes that no control "should be allowed to persist just because it is there, or because it worked well during the war."

It is likely, the committee pointed out, that there will be four rather sharply defined periods with differing requirements as to the economic controls. First is the period of war against two enemies; next is the period from the defeat of Germany to defeat of Japan; the third is a period of perhaps six months of reconversion; the fourth is a final period of probably two years before the economy fully regains a peacetime pattern.

"For some controls," the report says, "the emergency may end largely with victory in Europe, for others, with victory over Japan; for others, especially anti-inflation measures, it may extend for a considerable period thereafter. Controls of materials should end selectively as each material is released from war use or becomes sufficiently available for civilian use. Manpower controls should be ended area by area as shortages of manpower disappear. The objective should be to time and co-ordinate such action so that our economy can land on its feet, prepared to go places."

Regarding price controls, the committee recommends that "general advances should be resisted, but prompt adjustment should be permitted prices which deter production because they do not bear a reasonable relation to cost at normal levels of production. The objective is a level of prices high enough to induce the required expansion of production and employment, and low enough to maintain the necessary consumption under normal conditions of supply and demand."

Pointing out that some rationing will be necessary while fighting continues anywhere, the committee recommends that formal rationing of consumer goods continue wherever serious shortages exist, and that when shortages cease to be severe, particularly in nonessential products, formal rationing methods give way, in advance of removal of price control, to informal dealer controlled rationing.

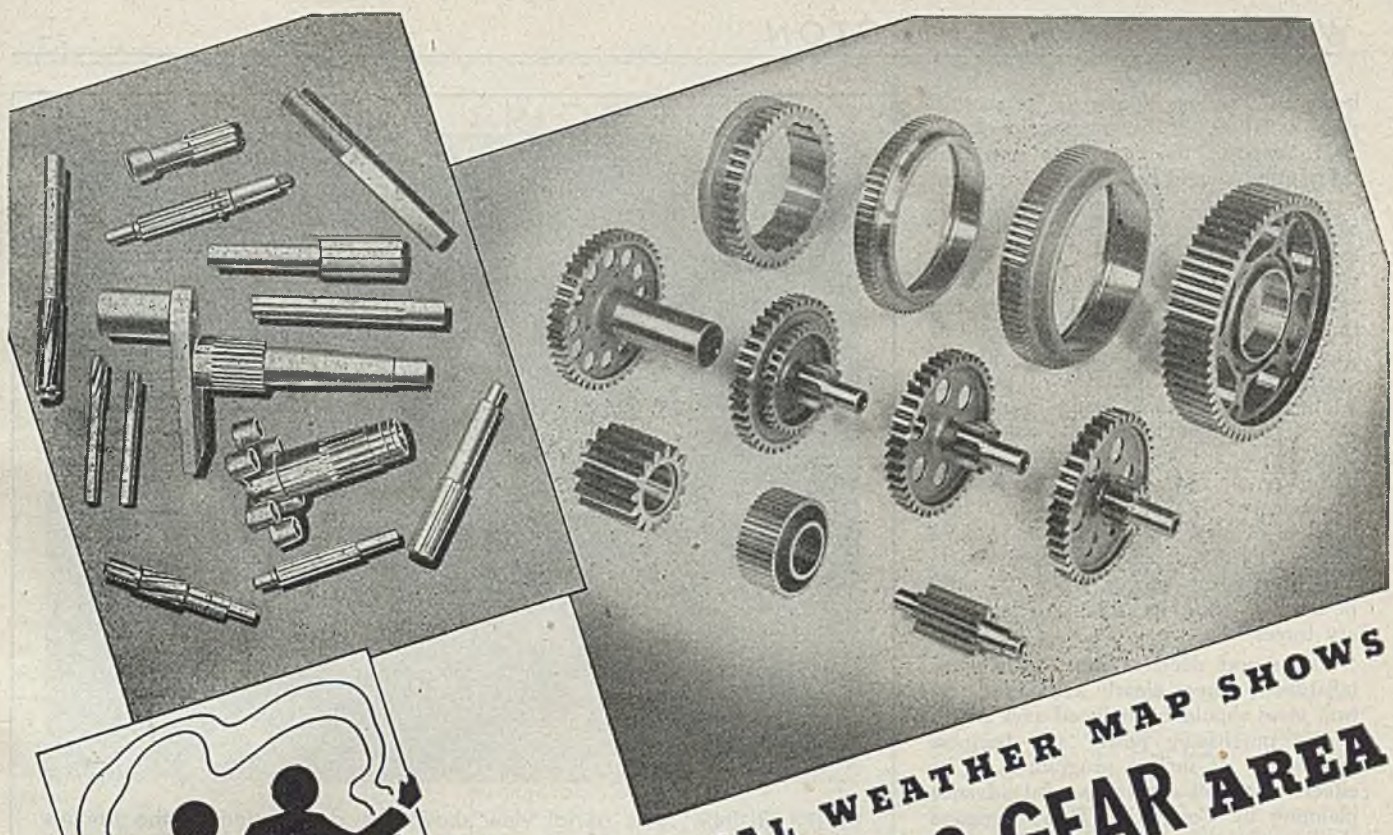
Concerning manpower controls, the committee recommends that indirect methods of compulsion the War Manpower Commission has exercised in absence of a national service act be ended or eased by areas, just as they were established, the action in each case being based on shortage or surplus of labor in the given area.

Wage Problems Will Vary

Relative to wage controls, there will be different problems in the major periods, the committee points out. The committee says that while the United States is engaged in two wars, the War Labor Board should continue to apply hold-the-line standards to requests for wage rate increases; that wherever threat of inflation appears, increases should be refused; that wherever gross inequalities appear, increases should be granted. "Beginning with V-E Day, wage controls should be more flexibly administered. Increased freedom should be provided for independent employer-employe decisions within the framework of a defined government policy. General wage advances should be resisted, but prompt adjustment should be permitted of wage rates which are out of line," the committee recommends. "In the transition period after V-J Day, controls should be tolerated only as needed to make effective such price control as is still retained. Wages in peacetime economy should be determined under conditions of free collective or individual bargaining under peacetime labor laws," the committee believes.

Regarding import and export controls, the committee recommends that these be continued in some form until high production has relieved a domestic shortage of civilian goods. "This country should adopt a generous attitude toward foreign relief and rehabilitation, but the volume and type of such exports should be gauged carefully in relation to domestic supplies and should not be permitted to

SURPLUS PROPERTY: Displayed for examination at the first "fishbowl" sale of surplus property at New York are these materials at a government-owned warehouse. At this type of sale, the public hears bids, sees the property to be sold, watches envelopes with bids drawn from the bid box and sees actual award made. NEA photo



THE INDUSTRIAL WEATHER MAP SHOWS

HIGH PRESSURE in the SPLINE & GEAR AREA

Because we foresee a shortage of spline and gear parts during reconversion, we have established a contract department for this sort of work.

Manufacturers of automotive and aviation units, who find that their own facilities are not capable of supplying their assembly lines, may be certain of production on the newest and finest of our spline and gear grinders by men who understand and appreciate the full possibilities and superiorities of their machines.

Fitchburg planning engineers will cooperate with you without obligation. Write to us as soon as you have blueprints.

FITCHBURG GRINDING MACHINE CORP.

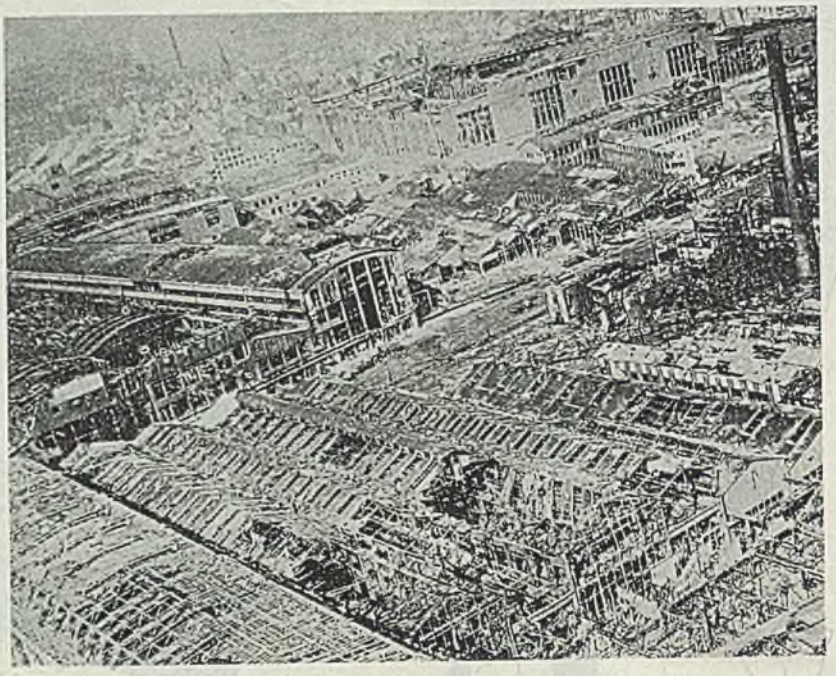
FITCHBURG, MASSACHUSETTS, U. S. A.

Manufacturers of—Bowgage Wheelhead Units. Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders.

become a serious factor in promoting price inflation," the committee declares. As to imports, the committee says that every effort should be made to encourage a revival of the United States' import trade, as a means of checking an inflationary rise in prices.

A continuation of installment credit restrictions is recommended for the transition period. "Installment credit is used mainly to buy consumer durable goods and serious inflationary pressure might result if such credit were permitted to swell total demand while durable goods are still scarce," the committee points out. On the other hand, the release of such credit when production of durable goods has reached substantial proportions could stimulate total purchasing power when it could be most beneficial as a check to deflationary forces, the committee says.

The report declares that "as soon as inflationary forces clearly are under control, taxes should be reduced as a stimulus to purchasing power and business expansion. If such a program is to be effective, it will require careful advance planning by Congress. Thus, Congress should prepare and announce at the earliest possible date a program for postwar federal tax revision," the committee declares.



KRUPP RUINS: This aerial view shows the devastation of the famous Krupp steel and armament works at Essen, Germany, which produced so much of the Nazi war machine. British official photo from NEA

Reclamation Projects in Western States Scheduled for Postwar Era

Twenty-two million acres of tillable land to be irrigated to provide farms for settlement by war veterans and others. Total program calls for expenditure of between $3 and $4 billion; would give impetus to postwar business

AMONG public works programs planned to give impetus to business in the postwar period are those of the Bureau of Reclamation for completing improvements necessary for full utilization of water available to the 17 arid and semiarid states west of the 100th meridian.

In the 750 million acres throughout that area which are tillable, or probably tillable, the water that can be conserved economically is sufficient to irrigate only some 43 million acres. About 21 million acres now are under private and public irrigation as a result of development work that has proceeded gradually since the Mormons first settled Utah in 1847. It is the remaining potential of 22 million with which the bureau's present postwar plant is concerned.

At first glance, this might seem rather a picayune approach on the total problem, for after facilities have been completed for watering a total of 43 million acres, the 17 arid and semiarid states still will have a reserve of more than 700 million tillable acres for which water will be unavailable. Actually, however, the development will be of far-reaching importance to our overall economy. What it will mean may be indicated by stating that in 1943 federal reclamation projects in the western states alone produced potatoes for annual rations of 25 million people, beans for 57 million, and enough alfalfa and grain for beef and dairy herds to supply 11 million people with meat and dairy products for one year. This record can be more fully appreciated when it is explained that of the 21 million acres now under irrigation only a little more than 4 million are served by federal projects.

The immediate goal of the Bureau of Reclamation's postwar program is to provide a total of 135,000 new irrigated farms for settlement by war veterans and others, and to provide needed water to some 150,000 additional farms which do not at present receive enough water. The ultimate goal is much broader. For example, the total program, on the basis of 1940 price levels, calls for an outlay of $3 to $4 billion. The flow of money that would be started by putting this program in motion, however, would come to many times that figure.

"A population of 2½ million persons, including the families in cities and towns who service the irrigation farmers, would eventually be directly benefited by the developments," says Harry M. Bashore, commissioner of the Bureau of Reclamation. "Annual purchasing power of the West for products of the Midwest, East and South would be increased $1¼ billion at prewar prices by the full development of these new farms and the communities that they would serve."

Mr. Bashore points out that while irrigation is the prime purpose of the program, many of the projects involved are of multiple-purpose character. "Many of them will provide hydroelectric power. The projects also provide flood control, stream regulation, municipal water, recreation facilities and fish and wildlife conservation." The multiple-purpose projects, he says, would provide for some 4,300,000 kilowatts of power "to aid in balancing the agricultural development of the West by industrial expansion."

In other words, the program is one that would lead directly to expenditure of many billions of dollars for the improvements themselves, for equipment with which to construct them, for transportation, housing and many related ac-

tivities. It also would have the end-result of creating permanent new markets for all sorts of consumer goods and for many types of industrial equipment and materials that would grow out of the utilization of the planned hydro-electric power in manufacturing activities in new areas.

The program as a whole embraces 236 individual projects and small groups of miscellaneous developments. Largest projects include the Gila river development in Arizona, the Columbia basin in Washington, the Heart Mountain division of the Shoshone project, the Riverton project in Wyoming, the Central Valley in California, the Colorado-Big Thompson in Colorado, the Hungry-Horse-Kalispell development in Montana and various Missouri valley developments. Many of the projects could be placed with contractors at a moment's notice while paper work on the rest of the program could be completed within a year. About one-third of the whole program, in dollar value, already has been authorized by Congress.

Full information about all of the programs may be obtained at the Project Planning Office of the bureau, United States Custom House, Denver.

OPA Studies Effect of Coal Wage Agreement on Prices

Effect on fuel prices of the War Labor Board's ruling that the new bituminous coal wage agreement between the United Mine Workers of America and mine operators is in accord with national wage policy is being studied by the Office of Price Administration.

Even though cleared by WLB, the agreement must be approved by Economic Stabilizer William H. Davis in the event price relief is required by mine operators. The operators, it is understood, have asked OPA to authorize an increase of 25 cents a ton, and in some quarters it was said OPA is inclined to grant the request. If an increase is allowed, however, it was said it would be put into effect by coal districts and that the rise would be greater on some types of fuel than on others.

Describing the new mine contract as a "prudent agreement," War Labor Board Chairman George W. Taylor estimated the average daily wage increase to all mine workers at about $1.01.

Chief concessions under the new contract result from full portal-to-portal pay including full travel time and pay for a 15-minute lunch period. The miners will receive time and a half after seven hours' work a day and 35 hours a week.

Final decision in the matter rests with Economic Stabilizer Davis and late last week it was not clear when he would act on the subject. Expectations are that he will withhold his ruling until he hears from OPA with respect to the effect of the wage increases on prices.

PRIORITIES–ALLOCATIONS–PRICES

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

CMP REGULATIONS

ARMOR PLATE: Provisions of CMP Regulation 10, requiring approval for certain orders for Class A products before they may be placed, does not apply to purchase orders for rolled or forged steel armor plate, regardless of form or shape. Change is made to expedite procurement program for this type material. (Direction 1, CMP Reg. 10).

ALLOTMENTS: Manufacturers of Class B products must use allotments they have received to fill the higher rated orders on their books if they do not receive allotments sufficiently large to fill all their rated orders, or if their allotments are reduced so that they cannot fill all of their rated orders (Interpretation 26, CMP Reg. 1).

INSTRUCTIONS

EXCESS INVENTORIES: Rules governing disposition or use of idle and excess inventories resulting from contract terminations or cutbacks are summarized in Interpretation 14 to PR 1. This calls attention to WPB rules for bringing inventories back to normal following terminations or cutbacks. The interpretation is intended to be a ready reference to rules now in effect. (PR 1).

L ORDERS

MUSICAL INSTRUMENTS: Manufacturers of musical instruments, accessories, and repair and replacement parts who have military or Veterans Administration orders on hand and wish to fill them, under limitation order L-37-a, as amended April 16, may use idle and excess critical materials, subject to certain conditions, irrespective of the general restrictions established in the order. Critical materials restricted under the order are steel, brass, tin contained in solder, and nickel used for plating functional parts. Use of certain other materials still is completely prohibited by the order. These materials are: chromium; copper, except in brass; neoprene; nickel, except for plating functional operating parts; rubber; tin, except in solder; and zinc, except in brass. Methyl methacrylate plastics and phenol formaldehyde plastics, previously prohibited, have been removed from the list in the amended order. (L-37-a amended).

TRACK-LAYING TRACTORS: Dealers who fill authorized orders for tractors from stock may not use purchasers' authorizations to buy stock replacements from producers. They are required to fill authorized purchase orders from stock if they have the tractors on hand. However, if a dealer does not have a tractor in stock, he may order it from the producer using the purchaser's authorization or a certification of the authorization. The restriction is imposed by order L-53 as amended. It also provides that if a customer cancels a purchase order, the dealer must notify the producer immediately. (L-53 amended).

WOODWORKING MACHINERY: Application for authorization to purchase Class I and Class II woodworking machinery may hereafter be made on form WPB-3131. Previously limitation order L-311 required that application for purchase of Class I machinery only be made on this form, a separate application for preference ratings being necessary to obtain machinery in Class II. Under the new procedure form WPB-3131 is used if the prospective purchaser wishes to purchase Class I or both Class I and Class II machinery. It is not used if the purchaser wishes Class II machinery only. Class I woodworking machinery includes all pieces for which the producer's list price on Oct. 15, 1942 was over $350. Class II is that for which the price on the same date was $350 or under. (L-311).

DOMESTIC ICE REFRIGERATORS: Beginning July 1, domestic ice refrigerators may be made to meet military and essential civilian requirements by any manufacturer who has received specific written authorization from the WPB for the production of a specified number of units in any given quarter. (L-7-c, as amended).

SEXTANTS: Limitation order L-58, prohibiting the sale of sextants except to government agencies, purchasers approved by the Coast Guard, dealers and persons authorized by the WPB, has been revoked.

M ORDER

COLLAPSIBLE TUBES: Import controls are applied to collapsible tubes, discs and slugs and other semi-fabricated forms manufactured in whole or in part from lead or lead alloy by an amendment to order M-63. This action was taken in order to conserve further the foreign supply of lead available for war purposes. Jewel bearings have been removed from import controls by the amendment. At the same time raw silk, wild silk and partially manufactured silk and silk noils have been removed from import controls, although order M-63 will control imports of silk waste and cocoons. In addition the amendment moves quartz crystals from List I to List II of the order, thus relieving importers from the necessity of filing form WPB-1039 for authorization to dispose of such materials. (M-63).

PRICE REGULATIONS

CARBON BLACK: Higher than normal costs for rubber grades of channel carbon black may be passed on by producers and their distributors when selling small quantities that they have bought from the Defense Supplies Corp. pool in amendment 4 to supplementary regulation No. 14F to the general maximum price regulation. The action permits an addition to the existing ceiling price of the difference between the price actually charged by DSC for carbon black in covered hopper cars (at present 5 cents a pound) and the normal price of 3.3 cents a pound. (Sup. Reg. 14F to GMPR).

INDUSTRIAL PLANT SERVICES: Time for filing service prices, rates, and rate computing reports with Office of Price Administration by concerns and individuals engaged in performing industrial plant and industrial machinery services now under price control has been extended 30 days. (Amendment 1, MPR 581).

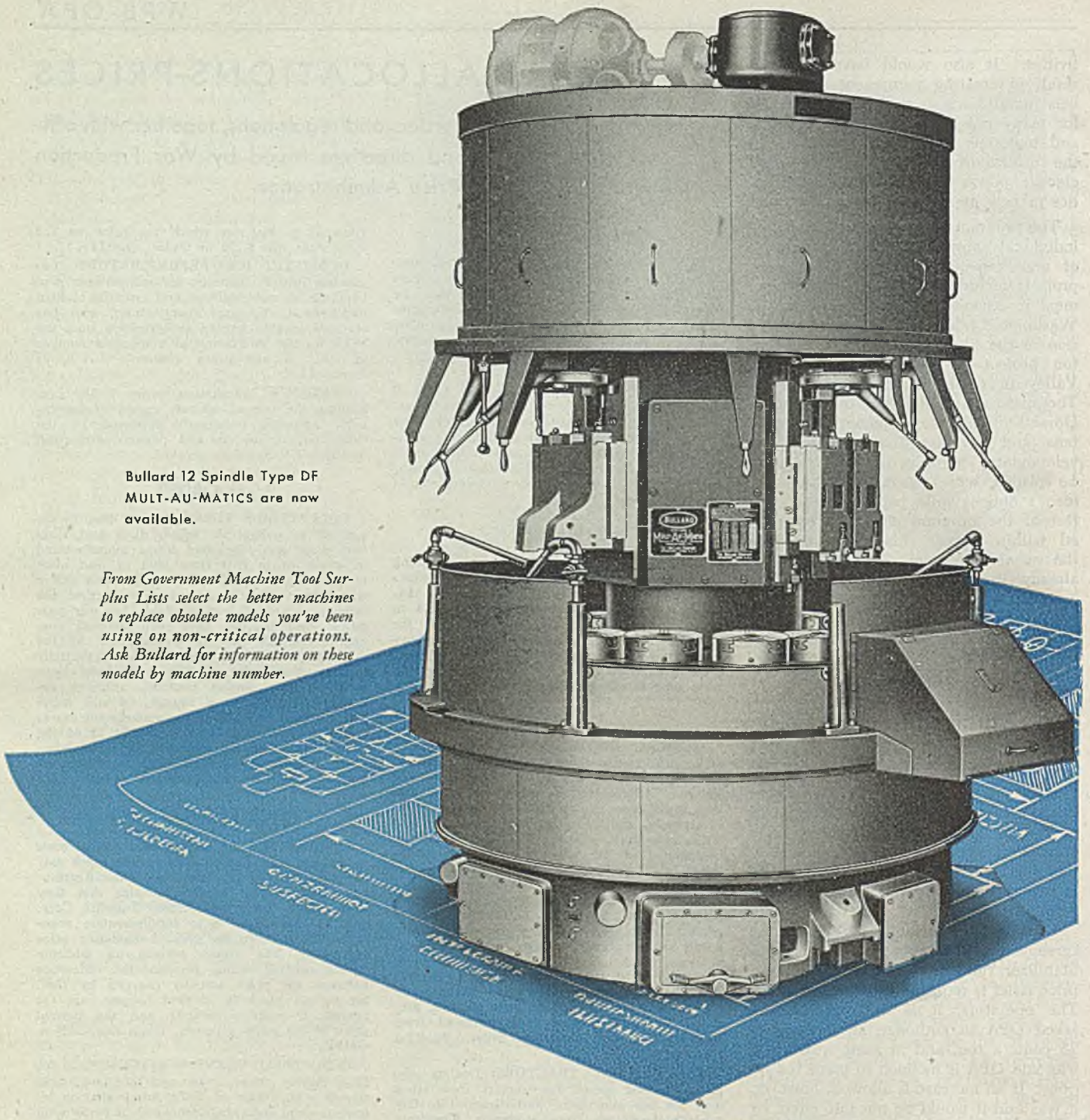
Additional Steel Allotted For Water Transportation

Allocation of 5500 tons of carbon steel for waterways transportation purposes in addition to 14,077 tons previously assigned for the second quarter of 1945 has been made by the War Production Board, the Office of Defense Transportation announced. The steel is to be used in building barges and towboats for private carriers' use on inland waterways.

The new allotment was made on condition that orders be placed with mills equipped to make carbon steel plates, Lawrence C. Turner, director of the ODT Waterways Transport department, said.

Bullard 12 Spindle Type DF MULT-AU-MATICS are now available.

From Government Machine Tool Surplus Lists select the better machines to replace obsolete models you've been using on non-critical operations. Ask Bullard for information on these models by machine number.



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Twin Tooling Doubles Production With Investment Up Only Slightly

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That's lowering unit production costs in earnest . . . a *must* if free enterprise is to increase buying power and preserve full employment.

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BULLARD

CREATES *NEW METHODS*

TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Believes WPB wants to "get out of business as soon as possible and return the job to industry" after victory. General Motors hopes to start building some models in each division as soon as lid is lifted

DETROIT

IN THE WORDS of Carston Tiedeman, regional director of the War Production Board here, following his return from a Washington meeting of WPB officials, it is the established V-E Day policy of the WPB to "get out of business as soon as possible and return the job to industry"—in other words, all ideas of a planned postwar economy have been dropped if in truth they ever were held.

This decision is regarded by many as of particular significance, and indeed it runs contrary to some of the proposals advanced by Paul Hoffman's Committee for Economic Development which has advocated retention of controls over production for a period after the war. Yet the policy appears logical in view of the likelihood of the exodus of WPB personnel once it is definitely established that the supply of materials and components will exceed military requirements.

There are several jobs to be finished, however, before the WPB relinquishes the reins over U. S. industry. As Mr. Tiedeman explains them, they include:

1. Insuring against any letdown in production for the Pacific war.

2. Provision of definite assistance in getting essential civilian production started.

3. Determination of the timing and extent of relaxation of controls and orders. This is under study now, but it is believed nearly one-third of these orders can be revoked at once if a proclamation of V-E Day should come within the next 60 days. After this there will be a so-called "run-out" period of four to five months, during which remaining controls will be lopped off.

4. Provision of aid for small businesses during the reconversion period to prevent their freeze-out.

Local WPB officials seem to reflect an optimistic outlook from their Washington headquarters over the ease of the general industrial reconversion problem. Mr. Krug is quoted as saying in his opinion the actual amount of job shifting will be comparatively small. The automotive picture is well in hand under direction of Henry P. Nelson who brings to his job an enthusiasm and punch which augur well. John Chafee of the Tools Division is digging into the machine tool question with a vim, and reports some machine builders have only two or three weeks' backlog of rated military orders, others 6 to 8 weeks, so they may be able to make an early start on tools needed by the auto industry.

Extension of AA-3 priority on such tools applies not only to the automotive industry but to parts manufacturers and other industries as well. All that is necessary to obtain the rating is to qualify under the provisos listed in STEEL last week, p. 63, and to file WPB form 1319 for certification.

Meanwhile there has been resumption of spot authorization by the WPB for production of civilian goods. In the Detroit area, for example, in the period from January 1 to April 15, authorizations were granted to 33 companies for production of $5,349,000.00 worth of output.

When asked by this writer which of the General Motors divisions is in the best position for resumption of production, C. E. Wilson, General Motors president, replied, "I think the answer is that they are all about the same, because as near as we can analyze the thing, the limiting factor with us is body production, so that it is a question of Fisher making the bodies, and when that is so, it looks to us like the car divisions could match anything that Fisher is likely to be able to achieve."

Queried further about the likelihood of Chevrolet being in production before Cadillac, for example, he continued, "Not if Nick Dreystadt had anything to say about it. The compromise we would try to make on that, quite frankly, is we would start up a model of each line, if they left it up to us, instead of starting the complete line. Say we made coaches, sedans, convertibles, town cars and salesmen's cars and all that kind of thing, we would reduce the models and give each division enough material to start. That would be fair to the people, because you have to consider the folks in our different plants.

"We have to have evidence that this layoff is not going to be too long, and rather than a line of talk, we would like to start something you see, and then we have to consider our dealers. If we built only Chevrolets, the Pontiac and Buick and Cadillac dealers would just raise hell about it. They are independent business men and they have to be treated fairly.

"So, what we doubtless would do, if it is left up to us, is to try to reduce the complications and difficulties of getting started by reducing the number of models at the start, but building something for every division, so that we would have

NAMED VICE PRESIDENTS OF PACKARD MOTOR CAR CO. TO CONSOLIDATE POSTWAR PROGRAM

E. C. HOELZLE
Vice president and comptroller

H. J. FERRY
Vice president and secretary-treasurer

G. C. REIFEL
Vice president in charge of manufacturing

L. W. SLACK
Vice president and general sales manager

work in every plant, and every dealer would start to get some cars. That is the way we would try to do it. If the government asks, that is the way we will do it."

Commenting further on the matter of new passenger car models, Mr. Wilson said, "The first thing we are going to do is try to bring up-to-date our material specifications so we can get the materials that are available. Just take the question of rubber, for instance—engine mounts and various other items. We cannot get the kind of rubber now that we had in 1942, so we have to do a certain amount of experimental work to get the equivalent effect in the automobile. Steel specifications have changed somewhat, so that has to be gone through. Then, to please our sales department and everybody else, we would like to have the cars look just a little different so that they can talk about how many improvements there are in them."

The UAW-CIO has come forth with its own copyrighted plan for the reconversion of the auto industry and its production scheduling for the next five years. Adopted by the executive board of the union in Milwaukee, April 20, it proposed the industry project its production schedules toward a goal of 10 million cars and trucks by 1950 instead of the present figuring which by the most optimistic estimate, might run to 7.5 million. At 10 million units per year, the union says, employment would be provided for something under 1 million or roughly the industry's wartime level of employment.

How. Nothing to it, according to the UAW. Just (1) maintain firm price controls until supplies of consumer goods meet the demand, (2) boost unemployment compensation and social security benefits during the reconversion period, (3) adjust the tax program to protect mass purchasing power, (4) effect immediate and substantial wage increases, (5) establish annual wage in all industries, (6) give full government support to public works to counterbalance downward trends in the postwar business cycle, (7) develop new industries, (8) carry through the United Nations program of world political and economic co-operation, and (9) promote sound industrial relations.

Consulting its official dreambook, the UAW draws up the following schedule of production of motor cars and trucks, for domestic and foreign sale, over the next five years:

	(In Millions)		
Year	Domestic	Foreign	Total
1946	3.1	0.5	3.6
1947	6.4	1.2	7.6
1948	8.3	1.3	9.6
1949	8.5	1.5	10.0
1950	8.8	1.6	10.4

Who is going to buy this outpouring of motor cars and trucks? Easy again. To quote the UAW plan: "Millions of families have moved into income brackets which for the first time allow enough money left over, after the purchase of necessary food, shelter and clothing, for the ownership of an automobile. Our present income, even after adjustment for increased living costs, is sufficient to allow for the ownership of about 40 million passenger cars, if cars were now coming from the assembly lines."

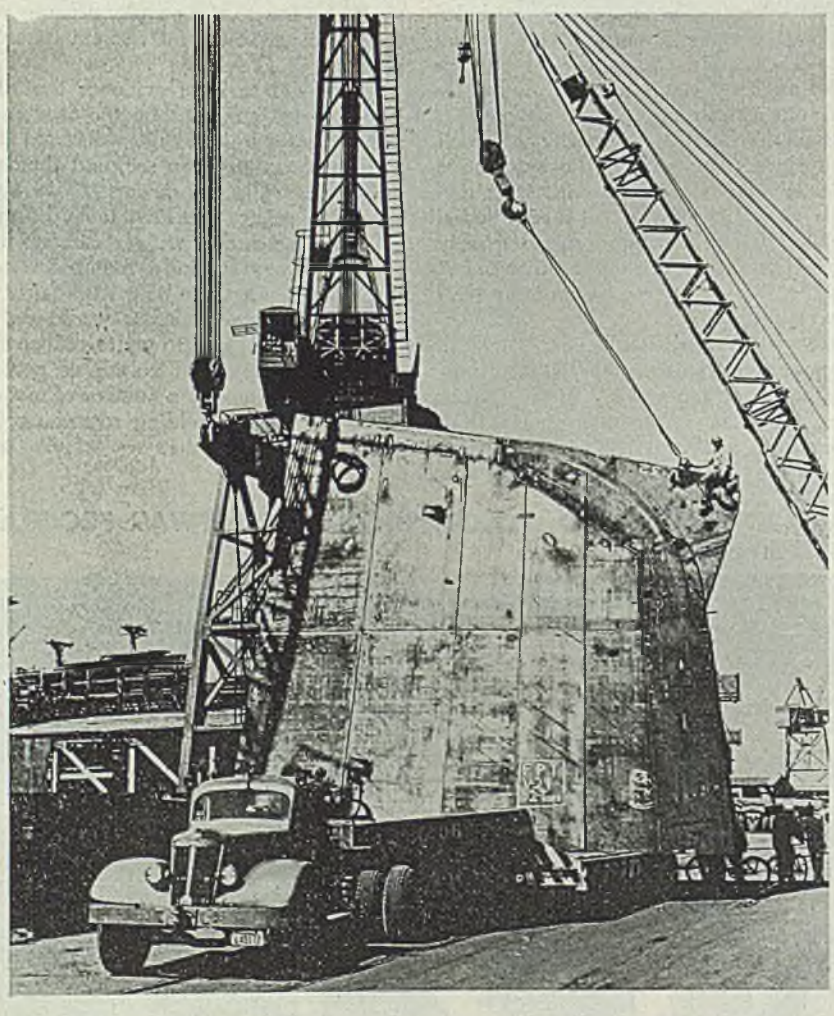
Is this the union explanation for the critical need for "immediate and substantial wage increase"?

Lure for War Veterans

Tacked onto the plan are the standard recommendations the union has been making for the past four years, including the government-industry-labor committees to plan production, the pooling of skilled labor during the reconversion period, wage policies to meet the menace of the deflationary gap in reconversion, abolition of the wage bracket system in favor of the principle of equal pay for equal work. A new one has been added, to lure war veterans—the proposal that industry provide special compensation to veterans in the form of a six-month bonus amounting to 20 per cent of standard rates.

An amusing and true incident is being related concerning a Cleveland manufacturer which was undertaking production of a certain part on a Navy contract. The part did not fit in well with shop schedules or equipment so it was subcontracted to Company A which in turn found the item a little troublesome and subcontracted it to Company B. The latter decided time would be saved by subcontracting to Company C and this contractor concluded the logical place to have the part made was in the plant of the Cleveland manufacturer. As a favor, the latter undertook to make the part and shipments started back around the circle, to Company C, then to Company B and to Company A and finally back to the Cleveland company. Climax of the incident was that the inspection department of the Cleveland manufacturer rejected the part—which had been made in its own shop.

Murray Corp. of America has received WPB approval on a $225,000 addition, 296 x 210 feet, for manufacture of heavy tools, dies and fixtures required in production of cartridge containers, jeep and truck frames and other assemblies.



TRUCKING SHIP SECTIONS: White Motor Co. tractor-trailers are used by the California Shipbuilding Corp. at Wilmington, Calif., to haul 52-ton lower forepeak of a Victory ship. The forepeak is approximately three stories high

Check these Features of VICKERS Variable Delivery PISTON TYPE PUMPS

Among the features indicated below are many of the reasons for the high overall mechanical efficiency and the high volumetric efficiency of Vickers Variable Delivery Piston Type Pumps. Also, the inertia forces of the rotating parts are minimized . . . the cylinders are arranged axially permitting more compact design.

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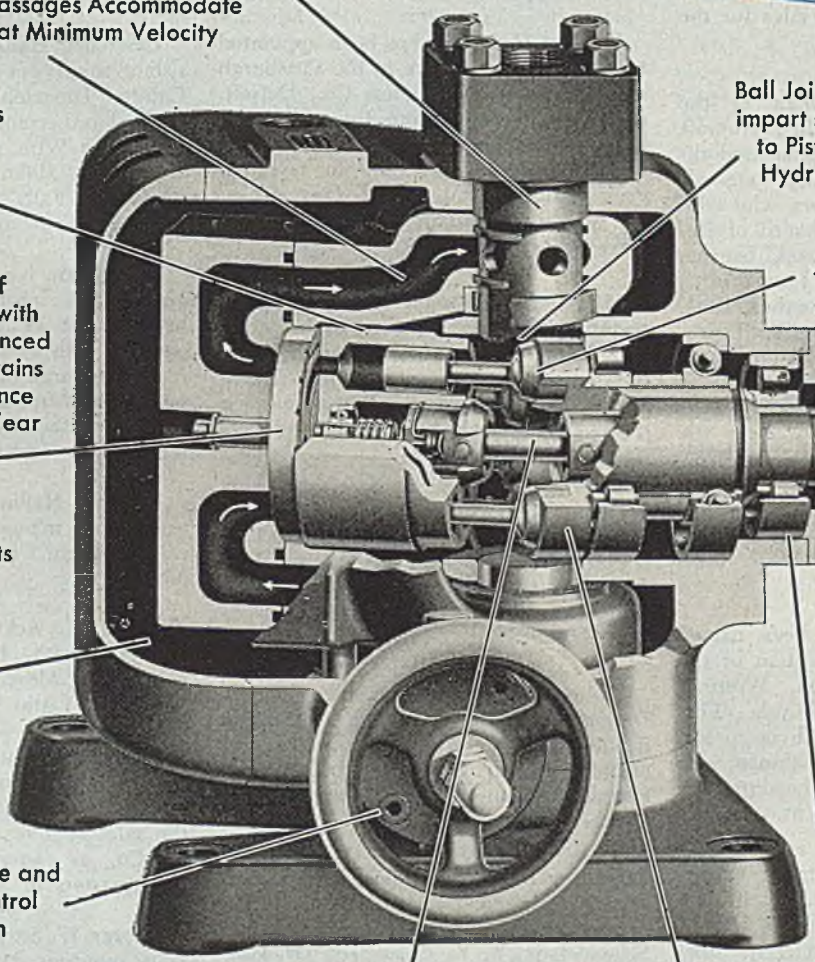

There Are More Than 5,000 Standardized VICKERS Units For Every Hydraulic Power and Control Function

MEN of INDUSTRY

J. D. SULLIVAN

W. H. MARTIN

L. HALLERAN

J. D. Sullivan has been elected vice president, Colorado Fuel & Iron Corp., Denver. Mr. Sullivan will continue in charge of commercial steel sales for the corporation.

—o—

Tom M. Girdler, chairman of the board of Consolidated Vultee Aircraft Corp., has resigned as chairman and director after almost three and one-half years of service. Mr. Girdler, who continues as chairman of the board of Republic Steel Corp., Cleveland, became chairman of the Consolidated and Vultee aircraft corporations in December, 1941, to help accelerate military aircraft production. The companies later were merged.

—o—

W. A. Dawson who is chief master mechanic, De Havilland Aircraft of Canada Ltd., Toronto, has been elected national assistant secretary and treasurer of the American Society of Tool Engineers.

—o—

L. Burton Saunders has been named manager of the statistical section of the Employe Accounts Division, Westinghouse Electric Corp., Pittsburgh. Formerly staff assistant in that division, Mr. Saunders succeeds **M. E. Baughman**, who has been transferred to the headquarters industrial relations department.

—o—

William L. Garner has taken an executive position with Pratt & Letchworth Co. Inc., Buffalo, a company he left 14 years ago to specialize in electric steel casting practice in the Midwest. For the past three years he has been plant superintendent, Calumet Steel Castings Corp., Hammond, Ind.

—o—

Harold W. Rehfeld has been named factory manager of the new government tire plant in Tuscaloosa, Ala., which will be operated by B. F. Goodrich Co., Akron, O. Mr. Rehfeld recently returned from Europe after serving as technical advisor and special consultant to the commanding general of the Army Service Forces.

—o—

William H. Martin has been appointed technical representative in the Pittsburgh area by Harry W. Dietert Co., Detroit. Mr. Martin comes from the company's home office where he has devoted the major portion of his time to research. Prior to his association with Dietert Co., he was chief radiologist with Kelsey-Hayes Wheel Co., Detroit.

—o—

Miss Dorothy Kimmel is managing director of the newly formed export company, Lempco-International, with headquarters in the Citizens building, Cleveland. She has been export manager for the past 15 years with Lempco Products Inc., Bedford, O.

—o—

Glenn A. Dute has been promoted to assistant comptroller of the Ferry Cap & Set Screw Co., Cleveland, and **Dan J. Cantillon** has been elevated to sales engineer with the Industrial Sales Division.

—o—

Philip D. Wagoner, president of the Underwood Corp. (formerly Underwood Elliott Fisher Co.), New York, has been elected chairman of the board, and **Leon C. Stowell**, executive vice president, has been elected president.

—o—

Dudley E. Chambers has been named executive engineer of the research laboratory of the General Electric Co. at Schenectady, N. Y., to succeed **Dr. Laurence A. Hawkins**, who is retiring.

—o—

C. T. Burg, general sales manager, Iron Fireman Mfg. Co., Portland, Oreg., has been made vice president in charge of sales, with headquarters at the company's Cleveland plant. **Frank S. Kecox**, secretary-treasurer, has become vice president and treasurer with headquarters at the company's main plant in Portland, Oreg. **Clifford W. Snider**, controller was named secretary and **Omar C. Spencer**, counsel for the company, was named a director and assistant secretary.

—o—

Lawrence Halleran, until recently assistant superviser of the alloy wire mill, Callite Tungsten Corp., Union City, N. J., has become sales manager of the company's Wire Division. He succeeds **Harold M. Malm**, who has resigned to join Little Falls Alloys, Inc., West Paterson, N. J., in an executive capacity.

—o—

A. A. Hare has been appointed assistant district sales manager of Youngstown Sheet & Tube Co.'s Pittsburgh district, with offices at 902 Gulf building, Pittsburgh 19. Prior to this appointment, Mr. Hare covered upper New Jersey for the company with headquarters in New York.

—o—

Harry J. Haflin has been named general sales manager of General Products Division, United States Rubber Co., New York.

—o—

David E. Acker, chemical engineer, formerly with B. B. Chemical Co., Cambridge, Mass., has joined the staff of Arthur D. Little Inc., Cambridge, Mass.

—o—

Kenneth I. Thompson, formerly western manager, Railroad Department, Ingersoll-Rand Co., New York, has joined the sales staff of Oxweld Railroad Service Co., as eastern sales manager, with headquarters in New York.

—o—

George W. Stout, advertising and publicity manager, Perfect Circle Co., Hagerstown, Ind., has been named a member of the Industrial Advertising Committee of the Association of National Advertisers, New York.

—o—

Harry Bernard has been made director of service and service engineering of Mack Trucks Inc., New York. Mr. Bernard, who joined the company in 1924, prior to his present appointment has been general service manager.

A. M. CAMERON

LIEUT. COL. A. E. R. PETERKA

COL. H. A. TOULMIN Jr.

He will make his headquarters in Mack's Long Island City plant.

—o—

Allan M. Cameron has been appointed general manager of equipment and manufacturing of Continental Can Co., New York, with headquarters there. Mr. Cameron is also president and treasurer of Cameron Can Machinery Co., Chicago, a wholly-owned Continental subsidiary. **W. W. Tomkins** and **G. E. Nelson** have been appointed assistants to Mr. Cameron on technical and administrative matters.

—o—

B. F. Lease, vice president in charge of sales, advertising and service, Athey Truss Wheel Co., Chicago, has been elected to succeed C. Kier Davis who died March 7. Mr. Lease has been associated with the company 13 years.

—o—

Neal Stearns of Inland Steel Co., Chicago, has joined the War Production Board Steel Division as special steel consultant to chief of division.

—o—

N. A. Munning, formerly assistant treasurer has been elected secretary of Hanson-Van Winkle-Munning Co., Matawan, N. J., to succeed **Nelson Todd** who is leaving to go into other fields.

—o—

George E. McLaughlin, War Production Board, Scrap Salvage Division, Philadelphia, has resigned to become affiliated with the New York office of Luria Bros. & Co., 233 Broadway.

—o—

William N. Seese has been appointed sales and service engineer for the Michigan territory of J. S. McCormick Co., Pittsburgh. Mr. Seese was formerly foreman, metallurgical department, Carnegie-Illinois Steel Corp., Johnstown, Pa.

—o—

Thomas Robins Jr. has been elected president, Robins Conveyors Inc., Passaic, N. J. to succeed Thomas Matchett, who has retired. Mr. Robins who has been chairman of the executive committee for the past five years, is also president of Hewitt Rubber Corp., Buffalo, and vice president of Buffalo Chamber of Commerce.

—o—

Lieutenant Colonel A. E. R. Peterka, assistant chief of Re-adjustment Division, Air Technical Service Command, Wright Field, Dayton, O., has been relieved of active duty with reversion to inactive status so that he may serve as consultant to the Defense Plant Corp., subsidiary of Reconstruction Finance Corp., Washington. Colonel Peterka, while executive engineer of Lamson & Sessions Co., Cleveland, was called to active Army duty in 1942 serving as chief of Materiel Distribution Branch until February 1944. He later became chief of the property disposal staff, ATSC, and still later became assistant chief of the Re-adjustment Division. While Colonel Peterka was at Wright Field, he developed a plan for redistribution of surplus aircraft material through regular commercial channels. The "Peterka Plan" is now known as the Metals Reserve Redistribution Program.

—o—

James A. Roach has been appointed factory representative for Hyster Co., of Portland, Oreg. and Peoria, Ill. to cover the Atlantic seaboard states with headquarters at 90 West street, New York. Mr. Roach recently joined Hyster after several years with Mercury Mfg. Co., Chicago.

—o—

John W. Stoutenburg has been appointed sales manager of the Detroit district for Follansbee Steel Corp., Pittsburgh, with offices at 607 Stephenson building.

—o—

Lud Emde has become vice president, general manager and a director of Temprite Products Corp., Detroit, succeeding the late John Wyllie Jr. **P. Fred Lesley**, board member and secretary and treasurer, has become assistant general manager in direct charge of production, purchasing and finance. Since 1938 Mr. Emde has been Detroit district manager with Worthington Pump & Machinery Corp., Harrison, N. J.

—o—

Colonel H. A. Toulmin Jr. has been elected chairman of the board and president of Hydraulic Press Mfg. Co., Mt. Gilead, O. **Howard F. MacMillin**, former president, has been elected president of H-P-M Development Corp., Mt. Gilead, O., a subsidiary of Hydraulic Press. Colonel Toulmin who is a member of Toulmin & Toulmin, attorneys of Dayton, O., and Washington, will continue the practice of law. He recently returned from two and one-half years with the Army where he served as assistant chief of transportation, Transportation Corps. After completing his duties as assistant chief of transportation, he reorganized the Air Service Command of the Army Air Force and its overseas operations, and concluded his service in the Army as a member of the Army Pearl Harbor Board. He wrote the report of that board.

—o—

John Findley Peters, consulting engineer; **J. Walter John**, assistant director, Financial Accounts Division, and **Gustav A. Baeslack**, section engineer, of Westinghouse Electric Corp. have been awarded the Order of Merit. Mr. Peters and Mr. Baeslack are located at East Pittsburgh, Pa., Works; Mr. John's headquarters are in Pittsburgh.

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R. E. Broyles has been appointed commercial manager of new branch office and warehouse of Graybar Electric Co. Inc., New York, located at 1310-12 Agnes street, Corpus Christi, Tex.

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Carl L. Hecker has become general works manager of ACF-Brill Motors Co. plant at Philadelphia. Mr. Hecker's experience during the past 13 years has been in bus production and the application of aircraft manufacturing processes to that branch of the automotive industry. Since 1933 he has been plant super-

intendent for General Motors Truck and Coach Division of General Motors Corp., Pontiac, Mich.

—o—

Robert Sergeson has been appointed chief metallurgical engineer for Rotary Electric Steel Co., Detroit, succeeding **L. L. Ferrall,** vice president in charge of metallurgy and research, who has resigned after six years with the company. Mr. Sergeson has been active with Crucible Steel Co. of America, New York, in metallurgical work for the past seven years. Previously he had been associated with Republic Steel Corp. in the Canton-Massillon district.

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A. W. Taylor has become purchasing agent for Crucible Steel Co. of America, New York, having resigned as purchasing agent for Rotary Electric Steel Co., Detroit. He is succeeded at Rotary by **Herbert W. Arnold,** who has been assistant purchasing agent since the company has been organized.

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W. E. Rutz, vice president and works manager and **W. E. Buchanan** have been named directors of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Mr. Buchanan is president of Appleton Wire Works and also a director of the Chicago & North Western railroad.

—o—

Earl H. Fyler, assistant superintendent of industrial relations at the Gary, Ind., works of Carnegie-Illinois Steel Corp., Chicago, has been promoted to the position of assistant to director of industrial relations, Chicago district. **Arthur H. Kofoed** has been promoted to succeed Mr. Fyler at Gary Steel Works.

M. E. MONTROSE

Who has been elected president and general manager of the Marion Steam Shovel Co., Marion, O., as announced in STEEL, April 16, p. 96.

H. P. LADDS

President, National Screw & Mfg. Co., Cleveland, who has been named president, Cleveland Chamber of Commerce, noted in STEEL, April 23, p. 78.

—o—

Robert E. Cramer has been named chief engineer, American Steel & Wire Co., Cleveland, succeeding E. J. Reardon, who recently resigned. Mr. Cramer's thirty-five years association with U. S. Steel subsidiaries began in 1910 when he was employed as blue print boy at Schoenberger Works of American Steel & Wire Co., at Pittsburgh. Until his recent appointment, Mr. Cramer has been engineer of appropriations and properties in the engineering department of American Steel & Wire Co. He is a member of the Engineers Society of Western Pennsylvania, and Association of Iron & Steel Engineers, Pittsburgh.

—o—

Clifford McKelvey has opened an office of Lakeside Foundry Service Co. at 39 South La Salle street, Chicago, to specialize in sale of nonferrous castings and nonferrous metal fluxes. Mr. McKelvey formerly was associated with Chicago Hardware Foundry Co., North Chicago, Ill., as superintendent of brass and aluminum foundries, and more recently with Western Metals Co., Chicago, as sales manager.

OBITUARIES . . .

William S. Pilling, 88, long prominent in iron and steel circles, died April 23 at his home in Philadelphia. From 1872 until his retirement in 1932, he was actively affiliated with the industry, having served as senior partner in the firm of Pilling & Crane, Philadelphia, and the company's successor, Pilling & Co., which was liquidated when he retired. During that time he also served as president of the Northern Ore Co., Philadelphia, and the Northern Iron Co., Philadelphia. He was chairman of the War Industries Board committee during the first World War, in charge of the allocation of all special irons used in the manufacture of armaments for the Army and Navy.

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Charles Pahl Sander, 40, assistant chief engineer for Ranger Aircraft Engines, division of Fairchild Engines & Airplane Corp., Farmingdale, L. I., died recently at Glen Cove, L. I.

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Harold M. Bowman, 43, secretary and treasurer of Plastic Engineering Inc., and president, Bowman Western Stamping Co., Cleveland, died in that city recently.

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Victor Windett, 78, who is credited with designing and building the first concrete ore docks supported by submarine pilage and grillage for steel mills in South Chicago, died recently in St. Petersburg, Fla.

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Alphonse V. Devak, 23, service engineer, Sciaky Bros., Chicago, died recently in a crash of Pennsylvania Central Airlines transport near Morgantown, W. Va.

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Edwin G. Howell, 55, for the past eight years associated with John T. McEnroe Co., Chicago, died recently in that city.

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Ralph A. Kent, 59, superintendent of coke ovens at Johnstown, Pa. plant of Bethlehem Steel Co., died April 16 at the Blackstone Hotel, Chicago.

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Edson John Noble, chief engineer and secretary of Horsburgh & Scott Co., Cleveland, died March 19 in Cleveland, having been with that company since the last war.

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Harry E. Montgomery, 52, founder and owner of Montgomery Metal Spinning Works, Tulsa, Okla., died recently in that city.

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N. Peter Nelsen, 61, superintendent of Southwest Ornamental Iron Co., Kansas City, Mo., since 1911, died recently there at Trinity Lutheran hospital.

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Frank W. Moore, 62, vice president of the Exolon Co., New York, died April 17.

—o—

George R. Warner, 68, manager of the vessel and dock department of M. A. Hanna Co., Cleveland, died April 19 in that city.

—o—

W. J. Evans, 55, assistant general superintendent, Rotary Electric Steel Co., Detroit, died April 17. Prior to his 10-year association with the company, he had been affiliated with Republic Steel Corp. at Canton, O.

Study of Geneva, Fontana Steel Plants Underway

Engineers to appraise facilities, analyze markets, study freight rates and competition from eastern producers

SAN FRANCISCO

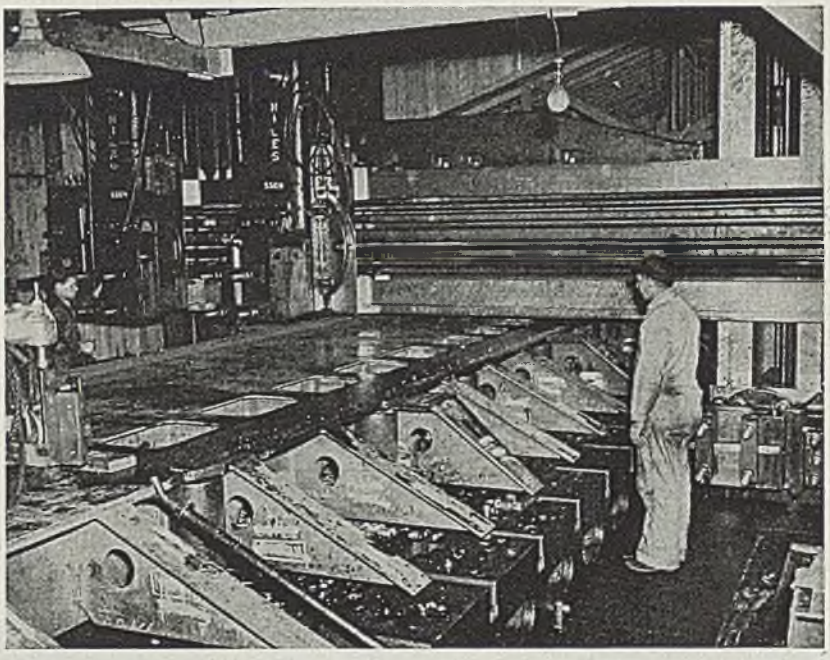
PLANS for postwar operation of the Far West's war-born steel producing facilities rapidly are becoming more concrete.

A recent development in disposal discussions is the appointment of Arthur G. McKee & Co., Cleveland engineering firm, to survey the western steel situation.

The McKee company has been commissioned by the Reconstruction Finance Corp. to study plants at Geneva, Utah, and Fontana, Calif. It will survey the plants and their surroundings, analyze potential markets for products from the plants, assess their position in the West's economy, study freight rates and competition from the East, foreign markets, and view the physical properties of the plants with an aim to propose necessary changes and additions for converting them to peacetime manufacture.

This survey is expected to continue for another three to four months, after which a confidential report on the findings will be made to the RFC, and on the basis of this report it is indicated that prices for the properties will be set.

The RFC would like to see the plants continue in operation during the reconversion period and subsequent peacetime years. No clue to its policy otherwise has been given, with the exception that some quarters have hinted that a lease of the plants may be favored. Whether the facilities will be leased, sold outright, or closed down will probably depend on the results of the McKee survey.



630-TON PLANER: Used for machining armor plate at the U. S. Naval drydocks, Terminal Island, Calif., is this 630-ton machine planer. Its smallest casting weighs more than 70 tons. The planer is so delicately balanced that special housing is required to protect it from changes of temperature which would impair its accuracy. Official U. S. Navy photo

Enters Trade Agreement With Latin American Countries

The Los Angeles Chamber of Commerce has entered into reciprocal trade agreements with 12 national and local chambers in Latin American nations, it was announced here last week by Justin F. Gleichauf, foreign trade analyst on the trade group staff.

The nine countries that will participate in the plan to further mutual trade developments are Panama, Peru, Chile, Argentina, Brazil, Uruguay, Venezuela, Colombia and Cuba.

Basis of the plan is an organized interchange of information as to raw materials, production, demand, sales methods, consumer interest and governmental policies affecting foreign trade.

Points of fact so far crystallized by study of the problems relating to the project were given by W. S. Rosecrans, Los Angeles chamber director:

1. Latin America will not need loans after the war to buy American goods, as huge dollar balances are waiting to be used when war ends. 2. The United States, with its gigantic industrial capacity, is in top position to supply Latin America with needed goods. 3. Plentiful and low-priced American goods will help stem inflation in all South American nations. 4. Since war began greater numbers of Latin Americans have received training in the United States because Europe was closed to them.

West Coast Metal Trades Group Elects Directors

Directors for the current year were elected at the annual general meeting of the California Metal Trades Association held recently. The association represents over 250 companies in the San Francisco Bay area. Directors are:

George F. Bont, president, California Steel Products Co., Richmond; L. W. Delhi, vice president, Western Pipe & Steel Co., San Francisco; D. E. Golden, general manager, Schlage Lock Co., San Francisco; Russell Gowans, president, Western Crown Cork & Seal Corp., San Francisco; J. E. Holland, manager, Pacific Electric Mfg. Corp., San Francisco.

P. A. Hoyt, vice president, Oliver United Filters Inc., Oakland; A. E. McIntyre, general manager, Merco-Nordstrom Division, Pittsburgh Equitable Meter Co., Oakland; Charles E. Moore, president, Joshua Hendy Iron Works, San Francisco; George H. Raitt, president, Steel Tank & Pipe Co., Berkeley; Harold W. Smith, assistant to the president, Grove Regulator Co., Oakland; G. F. Twist, vice president, Atlas Imperial Engine Co., Oakland, Calif.

Postwar Use of Drydocks At Los Angeles Assured

The $60 million naval drydocks installation on Terminal Island in Los Angeles harbor will continue to function until long after the war, Capt. F. M. Earle, commander of the repair unit, told a press conference recently.

The present work force of 15,000 will be increased to 20,000 by July 1 and to 25,000 by end of the year, Captain Earle said. More than 300 war vessels have put in to the docks for major or minor overhauls since start of installation activities two years ago.

Diselosures at the conference indicate that San Diego will continue as a destroyer base, with repair facilities for ships up to and including that size. Plans for postwar storage dockage of destroyers at San Diego, the ships to be virtually encased in newly developed rust-proof compounds, are complete.

WING TIPS

Rapid development of manufacture of bearings has made possible American air power. Thirty million monthly now being produced for armed forces. "Tremendous trifles" produced under closely controlled conditions

UNDER pressure of war production demands, America's bearing industry expanded rapidly, for if any one item can fairly be called indispensable to aerial warfare—to all modern mechanized warfare—it is the antifriction bearing, both ball and roller.

The industry now is manufacturing for the armed forces more than 30 million complete bearings per month. It is estimated that during 1945, based on Army Air Forces requirements, 100 million complete bearings, plus 35 million balls and 25 million rollers will be produced by the antifriction bearing industry for military aircraft.

According to the Air Technical Service Command Headquarters, Wright Field, Dayton, O., "bearings are the life blood of the Army Air Forces." This statement is supported by the bombing in 1943 of Schweinfurt, the heart of Germany's bearing center. It marked the beginning of the downfall of the Luftwaffe and the crippling of Germany's war production.

United States bearing industry represents the peak of precision in American industrial science. Bearings used in aircraft instruments are mass produced at tolerances as fine as one-millionth inch. The bearing that goes into the Norden bombsight is only 2.7 millimeters in diameter, containing three steel balls, each of which measures 1/64 inch in outside diameter. This, it is said, is the world's smallest steel ball of which 7000 can be fitted into a level tablespoonful. In actual size, this ball is smaller than a pin head and is manufactured by microscopic instruments.

Ball and roller bearings are produced under conditions similar to that of the operating room of a hospital. Workers engaged in manufacture and inspection of fine precision bearings wear kid gloves, lint-proof gowns and caps. Moreover, stethoscopes and hypodermic syringes are instruments employed—the former to detect sound indicating imperfections and the latter to place a single drop of oil on a tiny bearing. Furthermore, certain plant departments are dustproof and air conditioned, kept at constant temperature.

All flight navigation instruments contain ball or roller bearings, such as the automatic pilot, the automatic position indicator, the gyroscopic compass and stabilizer, in addition to the automatic firing control on the B-29 Superfortress, radar and bombsight devices. The B-29 contains approximately 3500 antifriction bearings.

The electric turbo-supercharger which gives our airmen that priceless margin of altitude over and beyond that which the enemy can attain contains both ball and roller bearings that operate in temperatures ranging from minus 70 degrees to plus 350 degrees Fahr. This vital mechanical device was made possible by the bearing industry which contributed these bearings in the early development stages permitting an engine's speed of more than 35,000 revolutions per minute.

It is significant that ten months after America's active entry into World War II, the bearing industry produced the smallest bearing in the world, surpassing what the Germans had been able to ac-

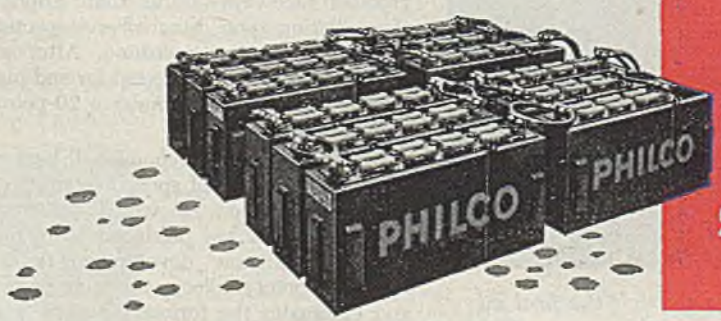
Race rings for propeller bearings for Superforts are made by the thousands by Aetna Ball & Roller Bearing Co., Chicago. Shown left above inspecting a quantity in process are George W. Nordstrom, president, and Col. R. L. Finkenstaedt, commanding officer, Midcentral District, Air Technical Service Command, Chicago

Precisioned to measurements of one millionth inch, the mirror-like steel balls that go into bearings for AAF planes must be spherically perfect and free from scratches and fingerprints. Sixty million balls a month are produced by Strom Steel Ball Co., Chicago. Shown examining a tray of these balls are George A. Strom, president, Robert Strom, and Colonel Finkenstaedt

Locomotive hauls ladle cars away from Blast Furnace after a cast. Photo courtesy of Kaiser Company.

AT KAISER STEEL WORKS, Fontana, California, Philco diesel starting batteries provide dependable starting power for a fleet of 80-Ton G.E. diesel electric switching locomotives. The great advantage of a Philco in such service is its thorough dependability—its extra wallop that always starts a diesel engine immediately. Important, too, are the extra quality features in a Philco, which have widely demonstrated their longer life and lower cost. New Philco Battery catalogs for all services are now available. Write today. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey. *Makers of the famous Philco "Thirty".*

Typical 56-cell Philco Diesel Starting Battery



SPECIFY

PHILCO

STORAGE BATTERIES

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

complish in 35 years' experience.

In view of the recent favorable progress of the war, secrecy which has surrounded the manufacture and applications of anti-friction bearings now is being lifted. To accord to the industry the credit earned through performance, by acquainting the public with the facts, the Midcentral District, Air Technical Service Command, with headquarters in Chicago, arranged with the Anti-Friction Bearing Manufacturer's Association for representatives of the press to be conducted on a tour of three Chicago bearing plants, April 12. By curious coincidence, the day was that on which Allied armies entered Schweinfurt, the German bearing center.

The plants visited were the Aetna Ball & Roller Bearing Co., manufacturer of roller bearings and thrust-type ball bearings; Ahlberg Bearing Co., manufacturer of ball bearings; and Strom Steel Ball Co., maker of balls for bearing manufacturers.

In welcoming the press party, Col. Robert L. Finkenstaedt, who has just been appointed commanding officer of the Midcentral District, ATSC, said: "You will see a phase of modern industry that has received comparatively little public acclaim considering the vital role it plays in hastening the successful conclusion of the war.

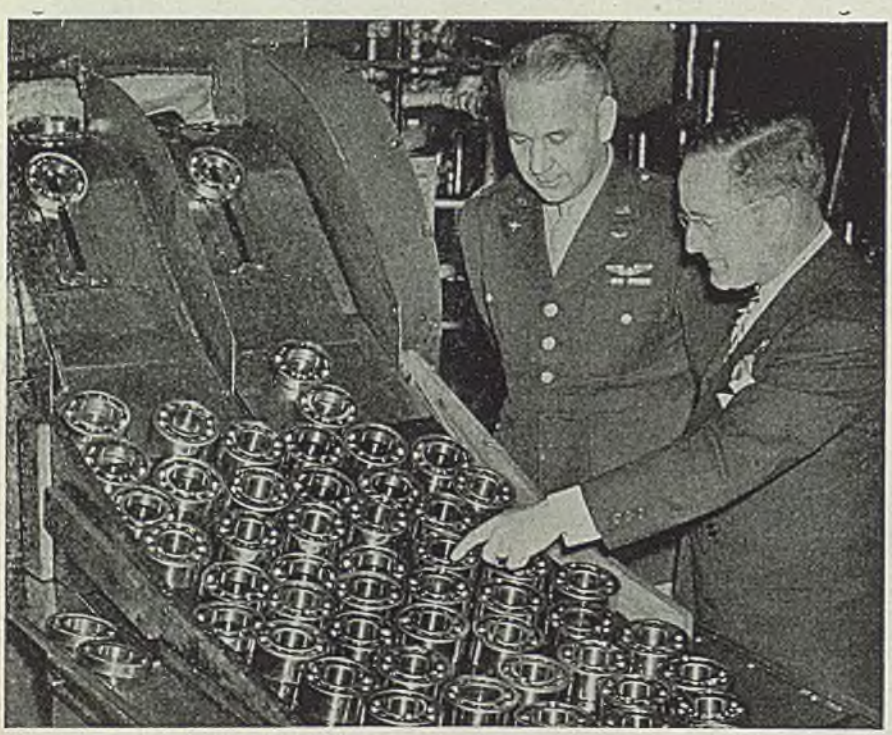
At the plant of Aetna Ball & Roller Bearing Co. the party saw a dramatic demonstration of usefulness to aircraft in a propeller blade retention bearing. This bearing, whose races measure 7¼ inches outside diameter, is made to withstand 170,000 pounds pressure. It is assembled on the shaft of the propeller blade, and makes it possible to adjust the blade's pitch under the enormous centrifugal pressure created by the propeller revolving at high speed.

Rollers are cut from rods by automatic machines. After roughnesses are removed the rollers are heat treated, cleaned, then ground and polished—several operations with an inspection after each. Finished rollers flow through an automatic size selector at the rate of 5000 per hour.

The super-hard matched races are of high alloy steel with approximately 7 per cent each of chromium and tungsten. Individual rings are cut from sleeve-type forgings. The rough sliced rings are first machined, inspected, then heat treated for hardening, and carefully quenched and cooled. After heat treatment come a series of grinding operations, followed by a 100 per cent inspection to check size, parallelism and flatness.

Now comes the first Magnaflux inspection where every ring is magnetized and dipped into a 2 per cent iron oxide colloidal suspension, to reveal any defects, then demagnetized. Final grinding and polishing operations are followed by inspection of each ring. Having passed final inspection, including the magnetic particle test, rings are etched by electric pencil, then segregated by 0.0005-inch variations in size, matched, oiled and wrapped.

Rollers are assembled in brass retainers in semicircular form, two for each bearing. The two rings are assembled on the propeller blade during manufacture. The hub is then heated and a flange is upset on the end, making the rings integral parts of the blades. Thus the bearing races can be removed from the blade only by cutting them free.



Ball bearings for the Packard-Merlin aircraft engine go through the final oil washing process at plant of Ahlberg Bearing Co., Chicago. Shown inspecting them are Colonel Finkenstaedt and Fred O. Burkholder, company president

Equally a useful servant of aviation is the ball bearing, and the steel balls that enable it to conquer friction. Strom Steel Ball Co. makes balls exclusively—supplying them for all industrial and military purposes and furnishing large quantities to manufacturers of complete bearings—a total of more than 60 million steel balls a month. Ball diameter is held to a tolerance of within 50 millionths inch, approximately 1/60th the diameter of a human hair.

First step in making the ball is to heat a steel rod and feed it into the header, a machine which cuts off a portion of the bar, squeezes it in a die and ejects it. The ball is now in form of a rough sphere. Next process is called flashing—a rough grinding to remove gross imperfections such as the rim around the middle of the ball. Grinding carries the process further and brings the ball to approximate size. Then comes the soft lap—for smaller sizes only—a polish grinding operation for extreme accuracy in dimension and finest polish. After the soft lap—or after grinding in the case of larger balls—comes heat treating to give them proper hardness.

In two more lapping operations the balls are run at high speed with a lapping compound through the multiple grooves of the lapping machines and are continuously inspected for finish and size. After the finish lap, the balls are cleaned and given the final inspection. Sphericity is held to 25 millionths inch and diameters to plus or minus 50 millionths.

Production of Races Is Interesting

At the Ahlberg Bearing Co. plant is manufactured the propeller thrust ball bearing used on the Rolls Royce engine. Operations of interest are those by which the inner and outer races are produced.

First come the forming operations on the automatic machines which perform the rough shaping cuts. Following these come inspection and grinding. After another inspection, the races are heat treated in a conveyor-type furnace, electrically heated and under precise atmospheric control to prevent oxidation of the metal. The outer race—made in two rings and known as a split outer race—is held in a hydraulic fixture for its oil quench to prevent warpage. Following a hardness test for each race comes a series of grinding operations. Of interest are the grinding wheels shaped to the contours of the grooved raceways—faster than grinders of oscillating type. Magnaflux inspection is performed after polishing. After assembly, each bearing is tested for end play of 0.003 to 0.004-inch under a 20-pound reversing load.

In the case of one type of ball bearing made in this plant, of special interest is a grinding operation by which the inner and outer races are produced to mating tolerances, a new development which from that point on keeps the races paired, and eliminates the former laborious gaging of hundreds of races to match up pairs.

EASTERN STAINLESS offers a Sheet Mill Finish for Every Need!

Producing Stainless Steels exclusively, Eastern Stainless offers you an extensive range of desirable sheet mill finishes—three of which are illustrated here.

The full range extends from a superbly polished and highly reflective Eastern Stainless No. 7 Finish—polished one or both sides as specified—to various ground or cold rolled surface conditions and finally to the dull but dense pickled Eastern Stainless No. 1 Finish. Such variety is certain to meet any specific requirements, including exceptional corrosion resistance, ease of cleaning, architectural beauty and highest performance in fabrication.

Eastern Stainless possesses unusually desirable combinations of cold forming and drawing properties, strength, ductility and weldability in addition to these surface finishes. Available in twelve standard and additional grades as required, Eastern Stainless now is specified for an extensive number of applications in widely diversified industries.

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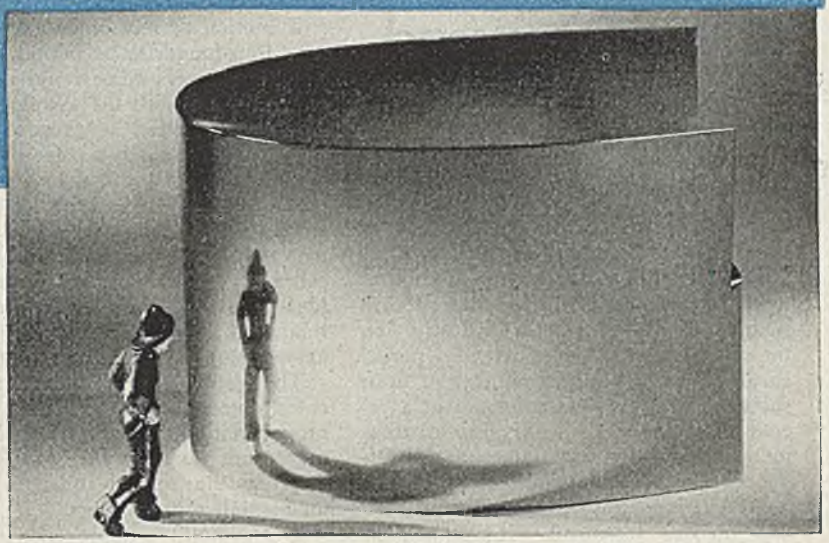
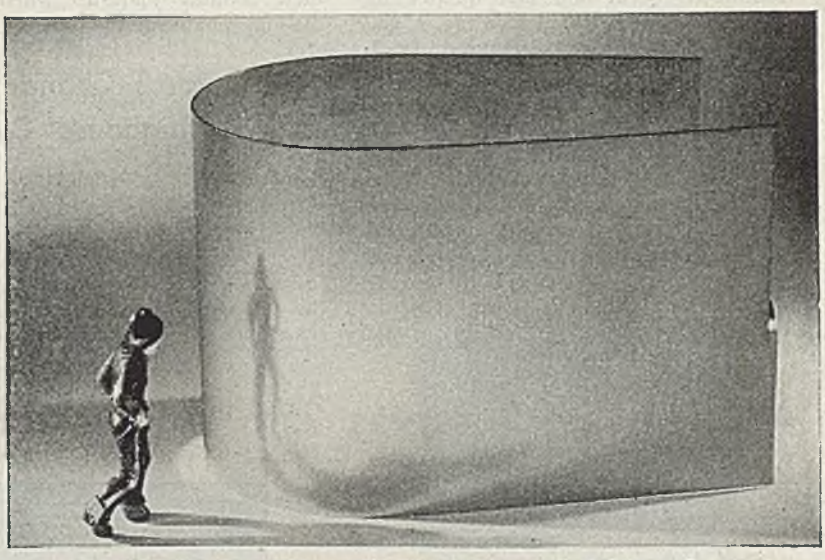
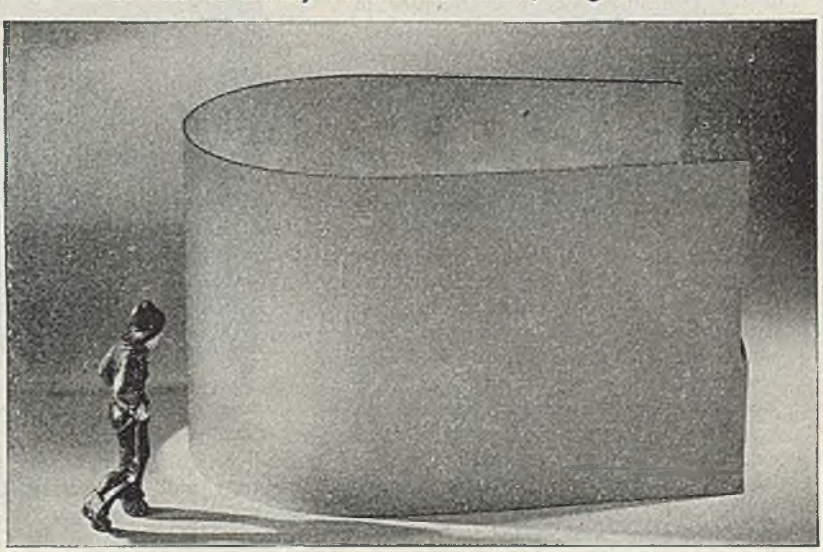


No. 4 Finish—Highly reflective, possesses a silvery appearance.



No. 2B Finish—Is mildly reflective, dense, bright and lustrous.



No. 1 Finish—A pickled surface, not reflective but bright, dense.

Increase of Gray Iron Castings Prices Discussed

Earnings of gray iron founders decline, with large number of firms showing losses, OPA is informed

EARNINGS of gray iron foundries tended downward during the fourth quarter of 1944 and the industry "on the average," was "near its base period earnings," with a larger number of firms showing losses, it was disclosed at a recent meeting of the gray iron castings industry advisory committee to the Office of Price Administration.

OPA proposed that it obtain 1945 first quarter statement as promptly as possible to determine, on the basis of combined fourth and first quarter figures, whether a general increase in gray iron castings prices is required, H. L. Edinger of Irvington, N. J., chairman of the committee, reports in a summary of the meeting distributed by the Gray Iron Founders' Society.

There was general sentiment in favor of applying any increase to base period maximum prices, according to Mr. Edinger. The committee also recommended a later formula pricing date, he says.

The effect on foundry earnings of the recent increase in pig iron prices and of the tendency of the "National War Labor Board to raise wages in foundries and the tendency of the Office of Economic Stabilization to approve fringe increases" were brought to the attention of OPA by the committee.

A motion to recommend to OPA that gray iron foundries be permitted to raise prices to buyers who would certify that they would absorb the increase was lost.

OPA submitted a proposed amendment to the industry's price order which would permit flat prices to be put under the formula if the type of work for which the flat price was set has changed materially and caused hardship to the seller. The committee "approved the idea involved" but decided to do further work on the draft of the proposed amendment, Mr. Edinger reports.

The price control agency also indicated need of an amendment to the recomputation paragraph of MPR 244 to permit and require recomputation prior to the second order in cases of long-running first orders.

The committee approved a suggestion that foundries not be permitted to use their formula mark-up when reselling castings produced by others.

Stockholders Change Name Of Westinghouse Company

For simplicity, the name of the Westinghouse Electric & Mfg. Co., Pittsburgh, has been changed to Westinghouse Electric Corp.

Stockholders have voted also to split the company's stock on the basis of four shares for one to broaden the base of Westinghouse ownership by making stock available at a lower price. Reclassification of the stock will not change the preferences or relative rights of the stockholders and there will be no change in the terms of either the preferred or the common stock. The reclassification makes no change in the capital structure, surplus or other accounts.

Termination Committee Formed at Pittsburgh

A Termination Co-ordination Committee, composed of representatives of government procurement agencies concerned with termination of war contracts and disposal of property, has been established for the Pittsburgh area, with headquarters at Pittsburgh. The committee is similar to those established in various other industrial areas.

Chairman of the Pittsburgh committee is Col. Robert C. Downie, district chief, Pittsburgh ordnance district. Lieut. Col. Ralph L. Dunckel is vice chairman, and John T. Conner is secretary. The Pittsburgh area includes all of western Pennsylvania, West Virginia, and parts of Ohio and Maryland.

The committee is to co-ordinate activities of agencies in termination of war contracts and disposal of property, and to aid war contractors solve their termination problems.

Wire Association Elects Officers for 1945 Term

The Wire Association has elected officers for the 1945 term.

They are: President, D. D. Buchanan, manager of operations, Union Drawn Steel Division, Republic Steel Corp., Massillon, O.; vice president, R. M. Hussey, superintendent, wire department, Jones & Laughlin Steel Corp., Aliquippa, Pa.; second vice president, E. W. Gundstrom, assistant plant manager, Rome Cable Corp., Rome, N. Y.; and executive secretary, Richard E. Brown, publisher, *Wire and Wire Products*, Stamford, Conn.

Plans are being made for the association's convention to be held Oct. 15 in Chicago if government approval for it is received.

Group Will Survey Field Of Business Statistics

A broad survey of business statistics in an attempt to determine to what extent government should participate in business reporting and how much reporting and dissemination of facts business should conduct will be made by a new committee of the Chamber of Commerce of the United States, Washington. The committee will be headed by Herman Steinkraus, president, Bridgeport Brass Co., Bridgeport Conn.

Warehouse Observes 25th Anniversary

THE BISSETT Steel Co., Cleveland, is observing its twenty-fifth anniversary in the steel warehouse industry.

George Bissett, president, opened one of the first independent warehouses in the middlewest in 1920. Manufacturers then were just learning advantages of obtaining small quantities of steel on prompt delivery from a warehouse, and were not yet aware of the various additional services which a warehouse can provide to speed production.

In those early days, Mr. Bissett made a connection with the Arthur Balfour Co Ltd., and pioneered the use of high speed tool steels, of which Sir Arthur Balfour was one of the earliest manufacturers. Later the company obtained a franchise to handle turned, ground and polished bars made by the Cumberland Steel Co. Since then, the Bissett Steel Co. has become well known for its various lines of steel specialties, which have enabled it to ship not only throughout the United States but to South America, Hawaii, Canada and Mexico, as well as for its standard lines of steel in all analyses.

Mr. Bissett is a practical metallurgist,

GEORGE BISSETT

and all of his key men have training in metallurgy and engineering. Other officials of the company are Pfc. George Bissett Jr., U. S. Army Air Corps, vice president; William Hassink Jr., secretary; and A. J. Gillman, sales manager.

BRIEFS . . . .

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

Aluminum Co. of America, Pittsburgh, has granted $200,000 to the endowment fund of Carnegie Institute of Technology to establish a professorship of light metals in the institute's department of metallurgical engineering.

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Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating equipment and supplies, will receive this year a golden anniversary certificate from the National Association of Manufacturers, as a founding company which has been outstanding in contributing to industrial progress.

—o—

Firth-Sterling Steel Co., McKeesport, Pa., is the newest addition to the list of steel mills producing Mo-Max molybdenum-tungsten high speed steels. That company will market Mo-Max steels under the trade names "Hi-Mo" and "Super Hi-Mo."

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Luria Steel & Trading Corp., New York, has established an office in Philadelphia, with Harry D. Noch in charge. Mr. Noch formerly was associated with Luria Bros. & Co. for 27 years. The Philadelphia office is located in the Fidelity-Philadelphia Trust building.

—o—

General Electric Co., New York, has established an air conditioning department as one of its six major departments. Operations pertaining to air conditioning previously have been a responsibility of the appliance and merchandise department. The new department will have its headquarters at Bloomfield, N. J., with George R. Prout as general manager.

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Surface Combustion Corp., Toledo, O., will consolidate on May 1 all of its New York City offices at 315 Transportation building, 225 Broadway, New York 7.

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Cleveland Twist Drill Co., Cleveland, has issued a fifth and revised edition of the Mo-Max handbook which includes details on standard and special analyses of Mo-Max, as well as other helpful information.

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Industrial Research Institute, New York, has issued a booklet, "Research, Invention, and Patents," which reviews the findings and conclusions of the National Patent Planning Commission. Author of the booklet is A. A. Potter, dean of engineering, Purdue University, and executive director of the commission.

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Delta Mfg. Co., Milwaukee, announced that T/5 Paul R. Leonard, Transportation Corps Detachment, Brooklyn Army Base, Brooklyn, N. Y., won the $1000 first prize in a contest to determine the best design for home workshops.

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The Black Mfg. Co., Baltimore, organized recently and acquired the business of the Alexander Milburn Co., Baltimore, manufacturer of welding and cutting torches, air and gas regulators, and paint spray equipment.

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Doehler-Jarvis Corp. is constructing at Grand Rapids, Mich., for Defense Plant Corp. a $2,600,000 war plant which Doehler-Jarvis will operate.

—o—

M. & B. Machine Co., Baltimore, has moved to Pulaski highway and Ridge road.

—o—

Baltimore Foundry & Machine Corp. will transfer to its recently enlarged Baltimore plant the equipment of the Harrison Bolt & Nut Co., Harrison, N. J., and the Aetna Forge & Rivet Co., Pittsburgh. Trade names of the latter two firms will be retained. The Baltimore company was known as the Kennedy Corp. until last fall when it was acquired by McConway & Torley Corp., Pittsburgh.

—o—

George Rahmann & Co. Inc., New York, manufacturer of leather machinery belting, recently observed its fiftieth anniversary.

—o—

Landis Tool Co., Waynesboro, Pa., has opened offices in the Singer building, 149 Broadway, New York 6, with Walter P. Lotz, newly appointed eastern sales manager, in charge.

—o—

Caterpillar Tractor Co., Peoria, Ill, has issued an illustrated booklet entitled "Back on the Job" which discusses the company's veterans rehabilitation program.

—o—

Babcock & Wilcox Co., New York, announced that frequency and severity of the accident rate at its steam generating equipment plant at Barberton, O., was below the national average for boiler makers during the past year.

—o—

Pratt & Whitney Aircraft Corp., East Hartford, Conn., is sponsoring 20 fellowships at $1200 each at the University of Illinois for study for positions of engineering aides with the company.

80th Year Observed by Gleason Works

EIGHTIETH anniversary of its founding is being observed by Gleason Works, Rochester, builder of bevel gear machinery.

In its early years the firm built a general line of machine tools, but by 1900, production had turned entirely to bevel gear machines. The company has grown from an employer of 50 people to an employer of 1800. In the past five years the plant has been expanded one-third in size. Today the Gleason Works covers nearly 24 acres, and uses 425,887 square feet of floor space. A complete manufacturing plant, it consists of a number of integrated units, including foundry, machine shops, assembly departments, and other divisions.

An anniversary celebration recently attracted more than 7000 Rochester residents and out-of-town guests, including Army and Navy officers, and leading machine tool builders.

James E. Gleason has been president of Gleason Works since 1922. He is the son of William Gleason, founder of the company. E. Blakeney Gleason is vice president, treasurer, and general manager.

At an anniversary luncheon, Tell Berna, general manager, National Tool Builders Association, said that machine tool builders are never satisfied, never finished, and that they are continually improving their products, thus increasing production and bettering the standard of living for all. He declared that the machine tool builders' prospects after the war would be excellent and that the United States could go on to a higher standard of living for everyone if the old machine tools were scrapped and replaced by the surplus of excellent machine tools built during the war.

JAMES E. GLEASON

In connection with its anniversary, the company issued a 76-page illustrated book on its history and activities.

Portable WELDING "GUNS"

. . . . do important work at DeSoto plant in fabricating stainless steel sections for B-29's. Twenty different types of guns facilitate spot welding in otherwise inaccessible places in these intricate sheet metal assemblies

By G. W. BIRDSALL
Associate Editor, STEEL

UNTIL one actually sees it being done, it is difficult to understand how some of the extremely intricate and complicated stainless steel sheet metal assemblies for B-29's could ever be spot welded. However, ingenious portable welding guns permit spot welding in almost impossible points in the assemblies at the Chrysler De Soto plant in Detroit.

The visitor at this plant is immediately impressed with the large number and wide variety of yokes or heads employed on these portable welding guns. At least 20 different types of yokes are required to reach the different points to be welded. More than 100 guns serve some 150 welding fixtures.

The reason for these tremendous production facilities lies in the fabrication requirements. In the accompanying illustration are shown various operations in fabricating engine cowls for B-29's. Instead of using a heavy framework carrying a thin covering, the skin itself is reinforced by innumerable braces, ribs and cross connections so that it can carry the full structural load.

Nor are any heavy sections employed in thus reinforcing the skin. All the material is half-hard or annealed stainless steel, but the thickest is only 0.064-inch. A considerable number of parts are made from 0.031 and 0.020 stainless. The skin is 0.016-inch thick, for the most part, with the heavier stock forming longitudinal and transverse reinforcing ribs. The intermediate thicknesses are found in the interconnecting and backing structure.

With the equipment and procedure used here, spot welds in stainless steel can be relied upon to form high-strength joints, it has been found. This method of assembling the parts is therefore widely employed, taking advantage of the speed of spot welding as a fabricating process.

Equally significant is the fact that with the gun welder heads described here, welded joints are made where riveting would be extremely difficult if not impossible. More than 400 different gun designs have been developed to handle almost any conceivable type of fabrication. In spite of the apparent size of some of these portable welding heads, they are all counterbalanced and rigged so that girls can and do operate most of them regularly.

Welding Sequence: All the illustrations here show various operations on the engine and cowl sections for the B-29. These cowls have a large streamlined ventilator built into their lower portion. In Figs. 1 and 2, this ventilator section begins to take form. In Fig. 3, the cowl ring assembly is being built up. In Fig. 4 additional parts are being assembled into the ventilator.

In Fig. 11, more sections of the cowl are being added. Figs. 8, 9, and 10 show other steps in making the final assembly. There are also many jigs and fixtures not shown into which the assembly goes at various stages of fabrication.

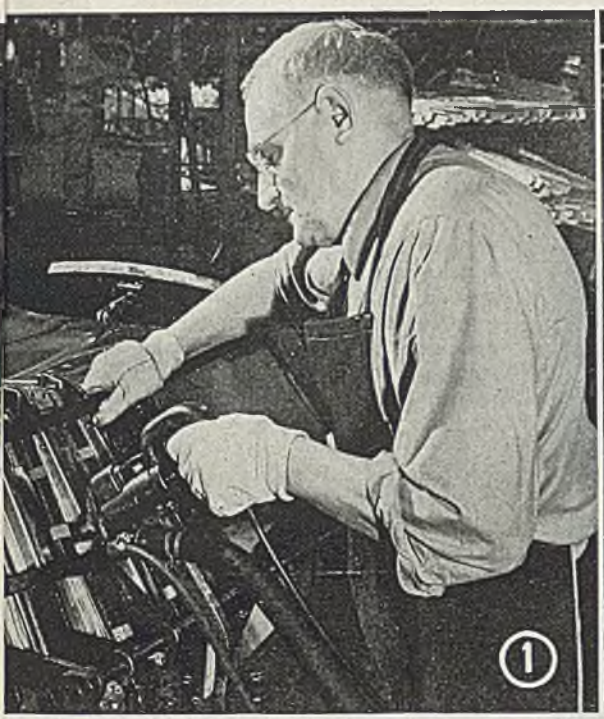
Hung From Ceiling: All the portable welding equipment is suspended from overhead supports, thus freeing the entire floor area for jigs and fixtures. Each welding gun is served by its own welding transformer, and controls. The gun or welding head itself is connected to the transformer and controls through 6-8 feet of flexible connections which include the main concentric welding cables, hose connections to conduct circulating cooling water (refrigeration by Chrysler Airtemp) to and away from the welding tips, a hydraulic line to the operating cylinder on the head, and various electric connections to control switches and push-buttons mounted at the operator's fingertips.

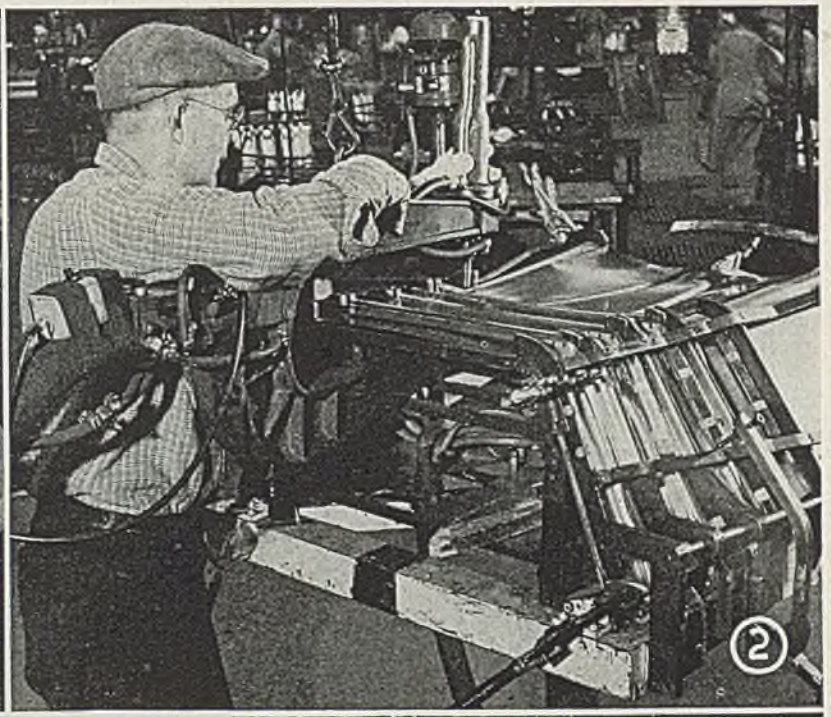
Each transformer and associated controls are hung on one end of a balance arm, the other end of which supports the head as shown in Fig. 11. Thus the weight of the transformer is employed to counterbalance the weight of the head so the operator merely need swing the head into position, not support it.

The balance arm is connected to a swivel which permits the assembly to be swung freely through 360 degrees, thus facilitating correct positioning of the head. Too, the swivel is hung from a trolley running on an overhead monorail bridge which travels on a series of rails extending throughout the working area. Thus it is possible to move the welding equipment freely over considerable areas. It is this system which enables one welder to serve all portions of two or more large fixtures. Part of this overhead monorail bridge and rail system can be seen in Fig. 11, as well as some of the main fixtures.

Tacking Air Ducts: Fig. 1 shows start of the engine cowl assembly. Here three U-shaped channel sections made from 0.030-inch thick half-hard stainless have been formed to fit the contour of the air duct by bending them at two points. The three channels are held against a formed sheet of 0.020-inch stainless by the fixture shown in Figs. 1 and 2. Speed clamps are employed throughout all fixtures to shorten assembly time.

First operation is to tack weld the end of each rib at two points along the





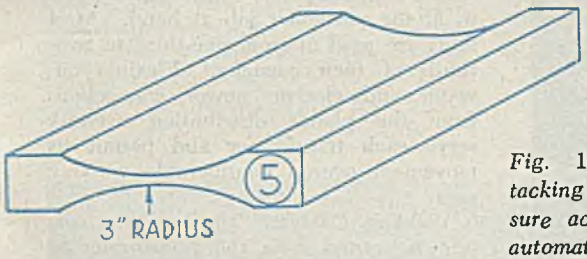


Fig. 1—Fast gun for tacking employs pressure actuated switch to automatically trip controls when proper pressure is exerted by operator. Copper backup bars complete circuit

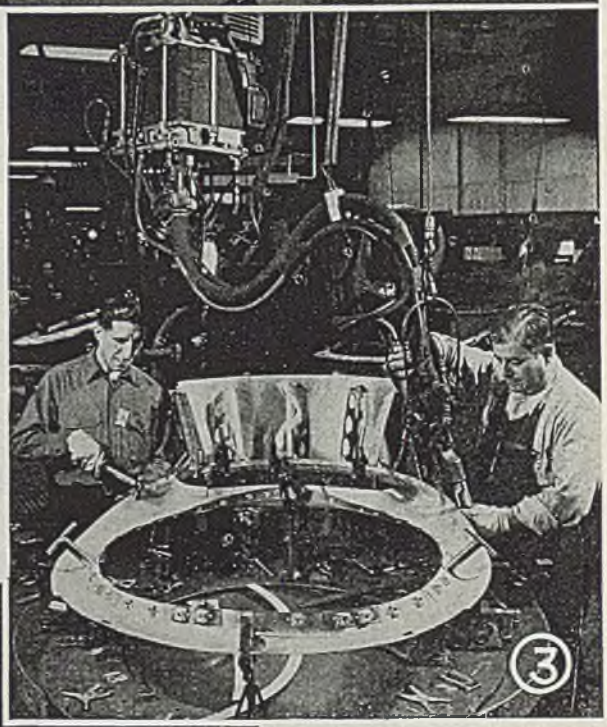


Fig. 2—Large yoke is required on this gun to reach around underneath work in tacking

sloping side as shown in Fig. 1. For this work, one side of the welding circuit is connected to copper back-up bars in the fixture, against which the work is clamped. The welding cable with leads to these bars can be seen in the lower portion of Fig. 2 which shows another operation in this same fixture. The other side of the circuit is connected to a small hand gun which is quickly moved about the work.

This gun has a spring firing switch actuated by the electrode tip. As the operator pushes the tip against the work, pressure builds up to compress the spring. At a certain point calibrated to correspond to the desired electrode tip pressure, the movement against the spring trips a switch. This causes the electronic controls to "fire" the gun, sending a pulse of welding current through the work for the required interval of time and automatically shutting off the flow of current at end of that period.

This control system enables the operator to tack weld with great speed and precision. He merely places his electrode tip where the weld is to be and pushes. The adjustable tension control is set so the gun does not fire until required tip pressure has been attained, and then it fires automatically. This gun is small and light as shown in Fig. 1 and is easily manipulated with one hand.

The welds across the top of the subassembly are now made with the gun shown in Fig. 2. This welding head

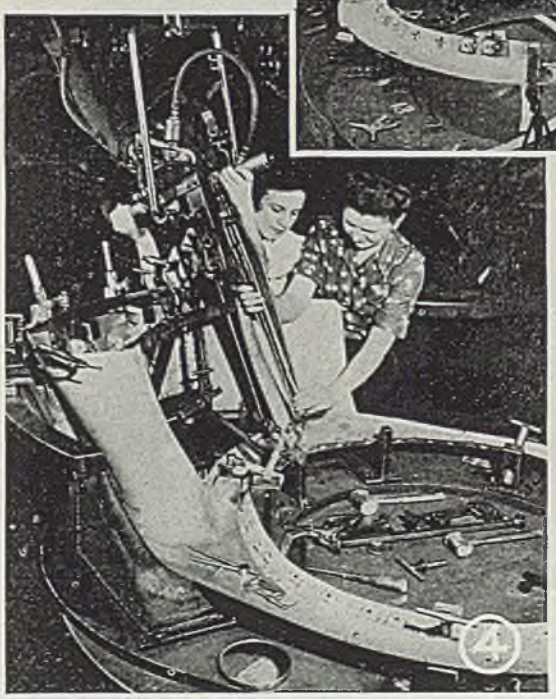
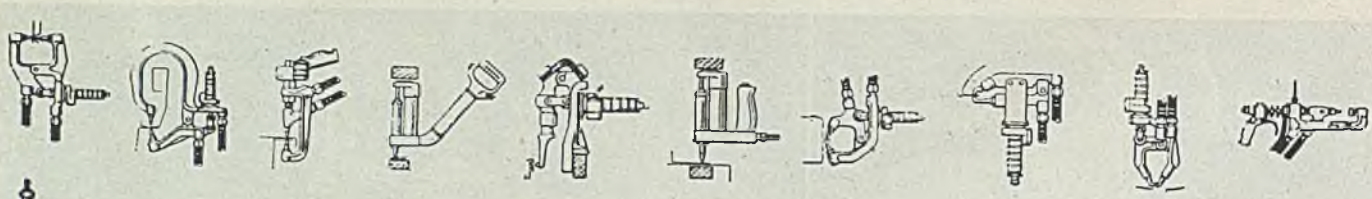
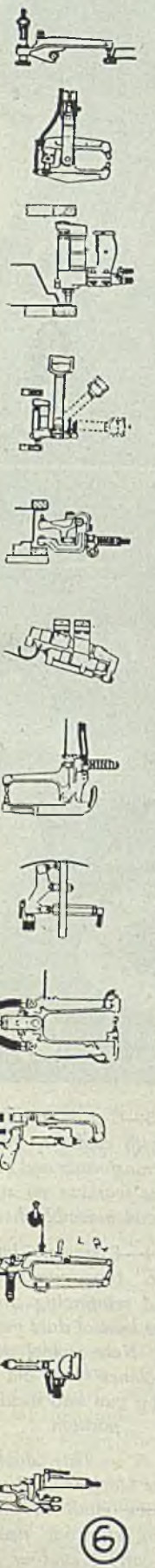


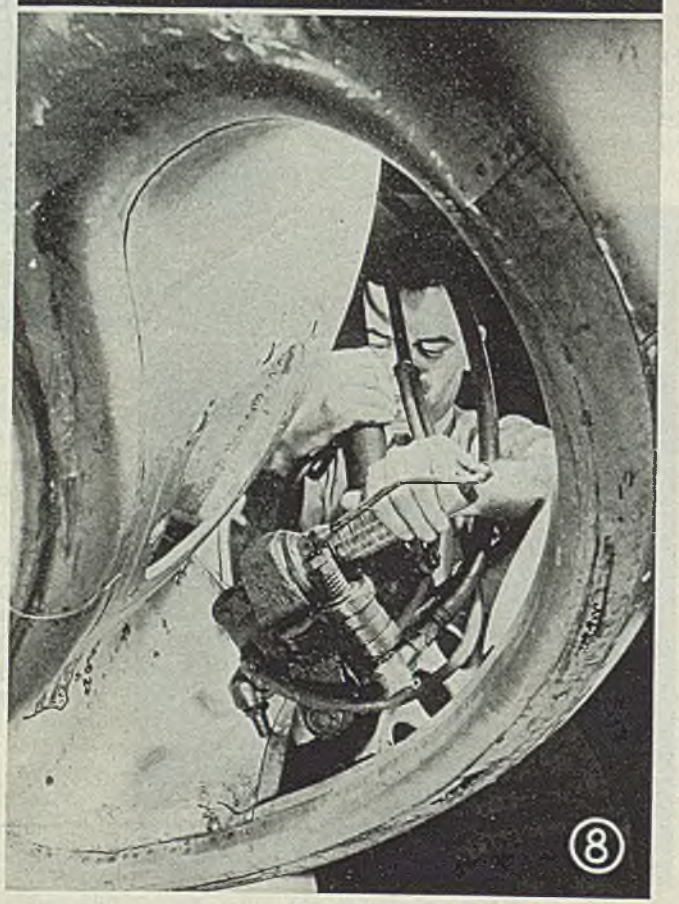
Fig. 3—C-type welding gun with cables to overhead transformer and controls is working on start of cowl assembly here

Fig. 4—Extremely large "pinch" type gun welds around reinforcing structure to base of duct members. Note swivel yoke to balance and aid in moving gun into welding position

Fig. 5 — This double-radius block is used with abrasive cloth in maintaining electrode tips at correct contour







or "gun" employs a heavy yoke through which the required electrode pressure is applied, since an operator would find it extremely awkward to use the hand gun shown in Fig. 1 to make these welds across the top. With ample clearance underneath the places to be welded here, there is no need for this yoke to be hinged. Movement of the welding electrode itself is sufficient to clear the work and allow the yoke to be moved into position.

Before we proceed to the main assembly fixtures, let's take a look at the welding equipment being used.

Transformers: Only two sizes of transformers are employed—50 and 75 kilovolt amperes. Of course, taps on the windings make it possible to adjust the output throughout a considerable range to fit the particular job at hand. Most units are used at from one-third to two-thirds of their capacity. Flexible air, water and electric power connections from the plant's distribution network serve each transformer and permit its movement over a considerable working area.

Welding Cables: The welding current is carried from the transformer to the welding head or gun by means of a concentric cable; that is, one conduc-

Fig. 6—Here are 33 of the more than 400 different welding guns available for work like that described. Courtesy Progressive Welder Co., Detroit

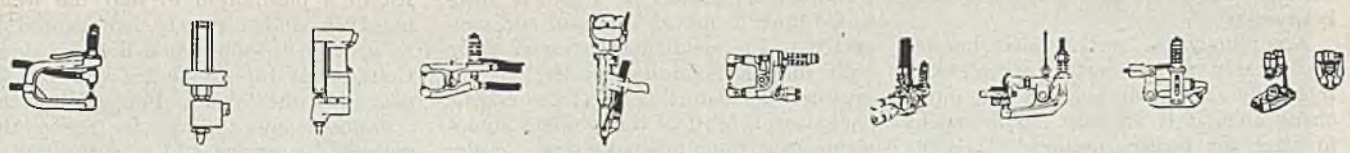
Fig. 7—Test specimens are welded on each gun every hour and pulled to destruction here

Fig. 8—Small, highly flexible pinch type gun gets into the most difficult locations easily

Fig. 9—Offset electrode at right in this large gun is on a pivot which permits it to be swung open to allow positioning the gun around large reinforcing structures as shown here

Fig. 10—Small pinch type gun easily makes large number of finish welds quickly. All guns are water cooled, have interchangeable hydraulic actuating cylinders, finger tip controls

Fig. 11—Showing overhead monorail structure supporting welding transformers and accessories, leaving floor free for jigs and fixtures. Note counterbalance system on this large C-gun



tor is surrounded by the other conductor. The concentric cables thus are in the form of a flexible tube with one conductor as the core, the other as the sheath, proper insulation being provided to separate them electrically, of course.

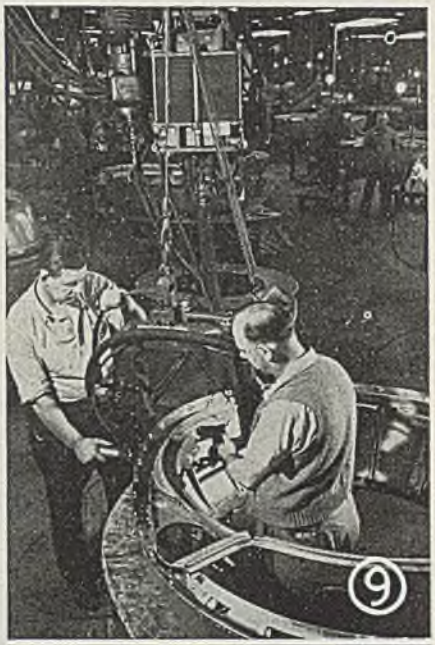
This arrangement does away entirely with electrical reaction between conductors which would set up large mechanical forces if two parallel conductors were employed, and thus result in a tendency to make the guns and cables "jump" at each shot of current. Cooling water also flows through the cable.

In addition to preventing cable "kick," the concentric cable makes for greater flexibility and easier gun handling.

Cooling Circuit: All the large guns have provision for a continuous flow of cooling water to and away from the welding tips, thus keeping down their temperature regardless of continuous use. This is important because cool tips are not likely to "stick" to the work, and the welds produced will have better appearance and higher physical characteristics.

Air-Hydraulic System: Welding pressures up to 1100 pounds are applied to the welding tips by hydraulically actuated pistons on the guns moving the tips directly or through mechanical linkages. Hydraulic pressures are obtained from the plant air supply by means of "hydro-booster" cylinders which use air to compress the oil. Each welding head, with its transformer and controls is equipped with its own air-hydraulic system. Regulators hooked into the air side of the booster control pressures applied at the gun tips.

It works like this: Suppose, for example, that for a certain welding job, a pressure of 900 pounds is wanted at the electrode tips. Since all hydraulic cylinders on the guns are the same size, different tip pressures are obtained by selecting different sizes of boosters and employing different air pressures. Thus for a tip pressure of 900 pounds, a cer-



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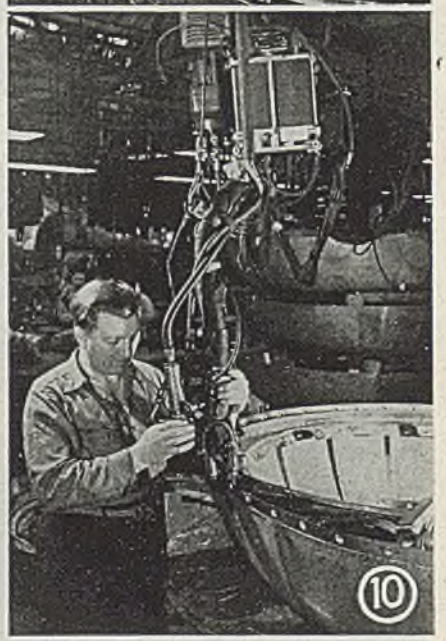

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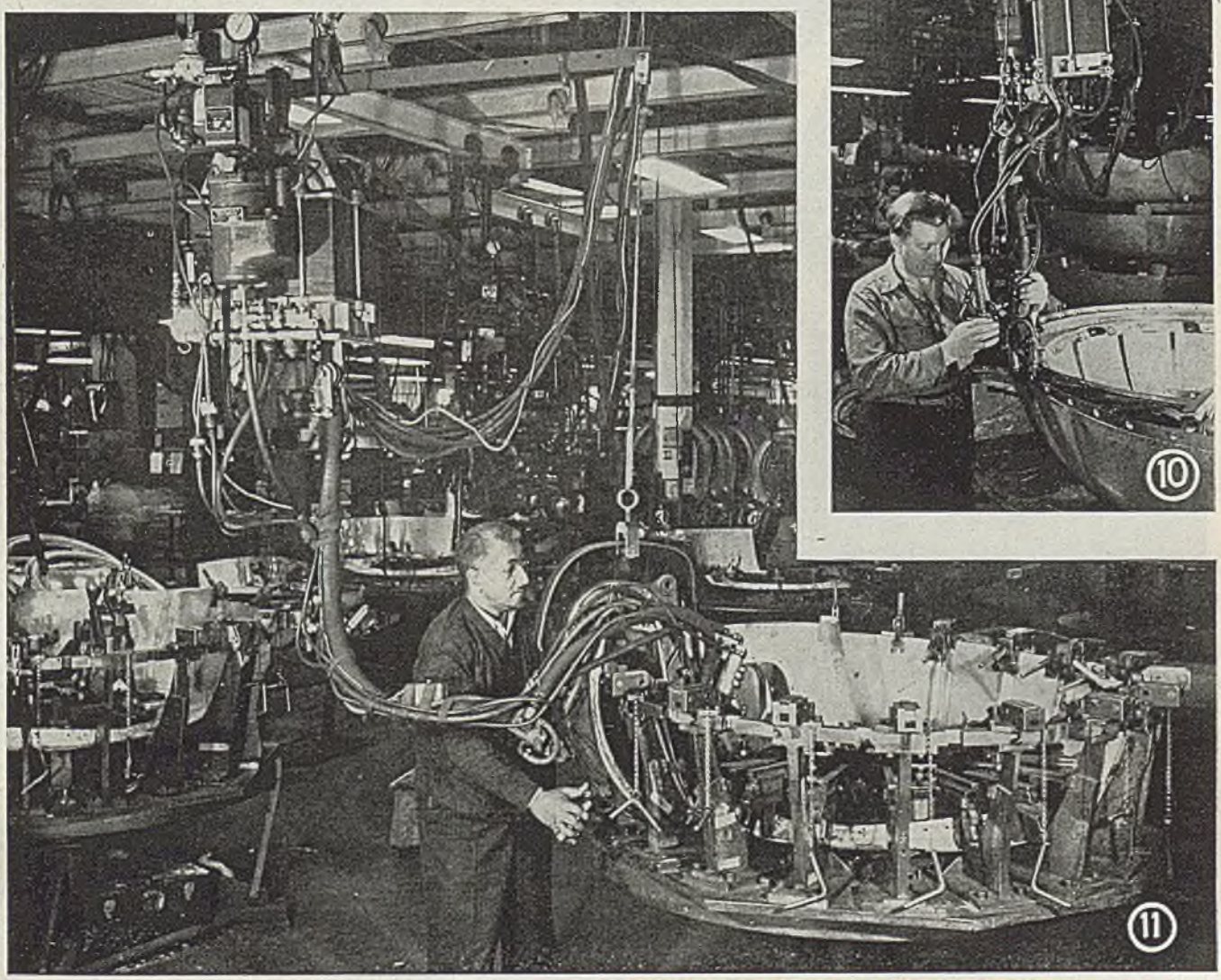

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tain oil pressure in the hydraulic system is necessary.

Accordingly, a certain size booster is indicated and a certain air pressure required. Since all boosters are interchangeable, it is an easy job to mount in place the booster needed. Then air pressure wanted is set on the regulator in the line from the plant compressed air systems. Perhaps a value of 100 p.s.i. will be used. See Fig. 13.

Tip Pressures: Total pressure required between the tips for welding may be anything from 800 to 1800 pounds. These are about three times the tip pressures normally used for spot welding but are required here due to the nature of the material being welded—stainless steel.

By changing the setting of the regulator in the air line feeding the booster, tip pressure can be adjusted from maximum down to 5 per cent of the capacity of the particular booster being used. For tip pressures above or below this range, a different size booster is employed.

Electronic Timers: The length of time the welding current is applied is controlled by means of a simple electronic timer mounted overhead and connected to the welding transformer along with the air-hydraulic booster, the air pressure regulators and other control equipment. Most of the welding equipments have their timers set for 4 cycles of the 60-cycle per second timing wave. Welding period thus is 4/60 or 1/15th-second, on the average. Some work is done at longer periods, up to 11 cycles, or a little over 1/6th-second. However, at 11 cycles and longer, discoloration of the stainless sheet is likely to be encountered so long periods are avoided.

Most welding consists in joining 0.016-inch to 0.016, to 0.020 or to 0.064-inch stock (all stainless). Some 0.031 is welded to 0.064-inch. Typical set of welding conditions for joining two thicknesses of 0.016-inch stock involve about 4750 amperes welding current, 800 pounds tip pressure, 3-cycle timing. For two thicknesses of 0.020-inch stock, the values are 5700 amperes, 1000 pounds, 4 cycles; for two thicknesses of 0.030-inch stainless—7200 amperes, 1100 pounds, 4 cycles.

Controls at the welding head consist of a pushbutton to start the welding cycle and a switch that is used to reduce tip pressure when dressing tips. Connections for this latter will be explained further along. For welding, the operator simply positions the tips at the point to be welded and trips the button which is located on the handle of the gun where it is easily operated by one finger.

Tripping the button operates a solenoid valve which applies air to the booster, in turn setting up pressure in the hydraulic system, and closing the welding tips. As hydraulic pressure builds up to the desired value, a pressure operated switch in the line actuates the electronic timer which then applies welding current for the desired period and cuts it off automatically. As the operator releases the "weld" button, tip pressure is released and tips open to permit placing at next point to be welded. The entire cycle of operations is extremely fast.

Assembly Sequence: Various parts and subassemblies are tack welded before going into the final assembly, eight tacking stations like that shown in Figs. 1 and 2 being employed in joining some 22 different parts with a total of about 120 tack welds. All this is done with gun type welders.

After these subassemblies have been tack welded in fixtures, finish welding is done without fixtures using pedestal type welders. Enough tack welds are applied while in the tacking fixtures to hold the parts in position so no jigs or fixtures are necessary during final welding. This facilitates reaching all points of the subassembly when on the pedestal welders, as shown in Fig. 12. Note the work is suspended from an overhead counterbalance to aid in holding and positioning.

Main Assembly Fixtures: Subassemblies now are joined together in sequence to build up the engine cowl rings, starting with the "nose" or foremost part of the ring as shown in Fig. 3. Here the ring subassembly in Fig. 12 is being built up by adding part of the ventilator section at rear, and other parts.

The welding gun used here employs a C-type yoke or head; that is, the stationary electrode is carried on the far end of a C-shaped yoke which is here shown under the work. The upper or moving electrode is in line with the gun cylinder which here is parallel to the cable in proximity to the operator's right hand.

Note that the gun is suspended from a counterbalance through a suspension

(*Please turn to Page* 134)

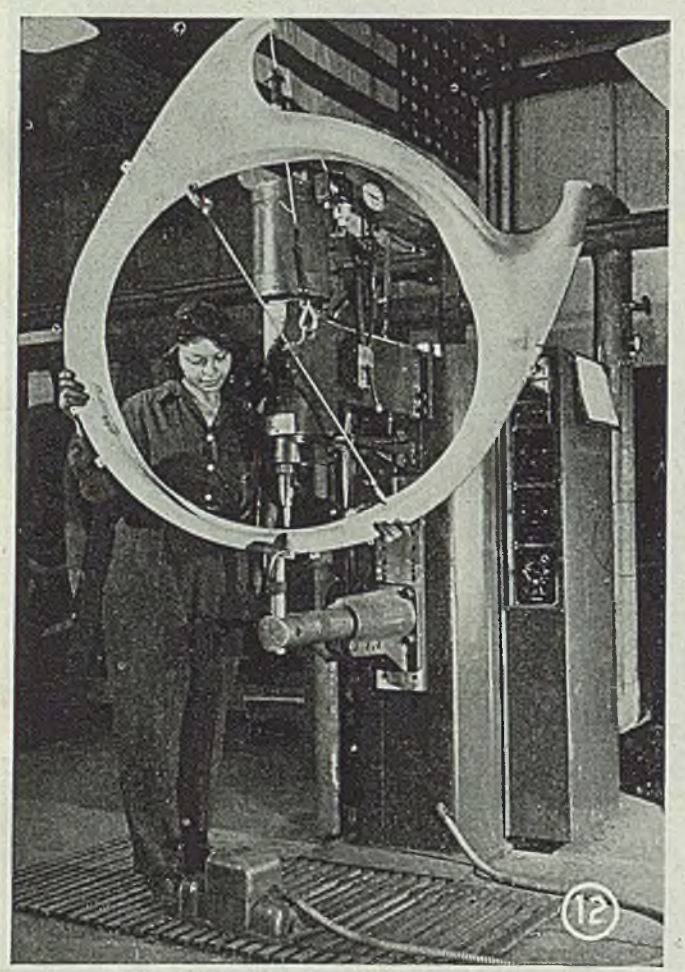
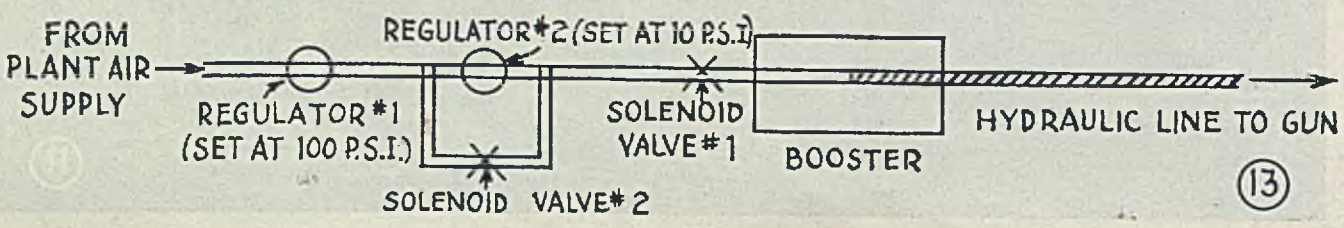
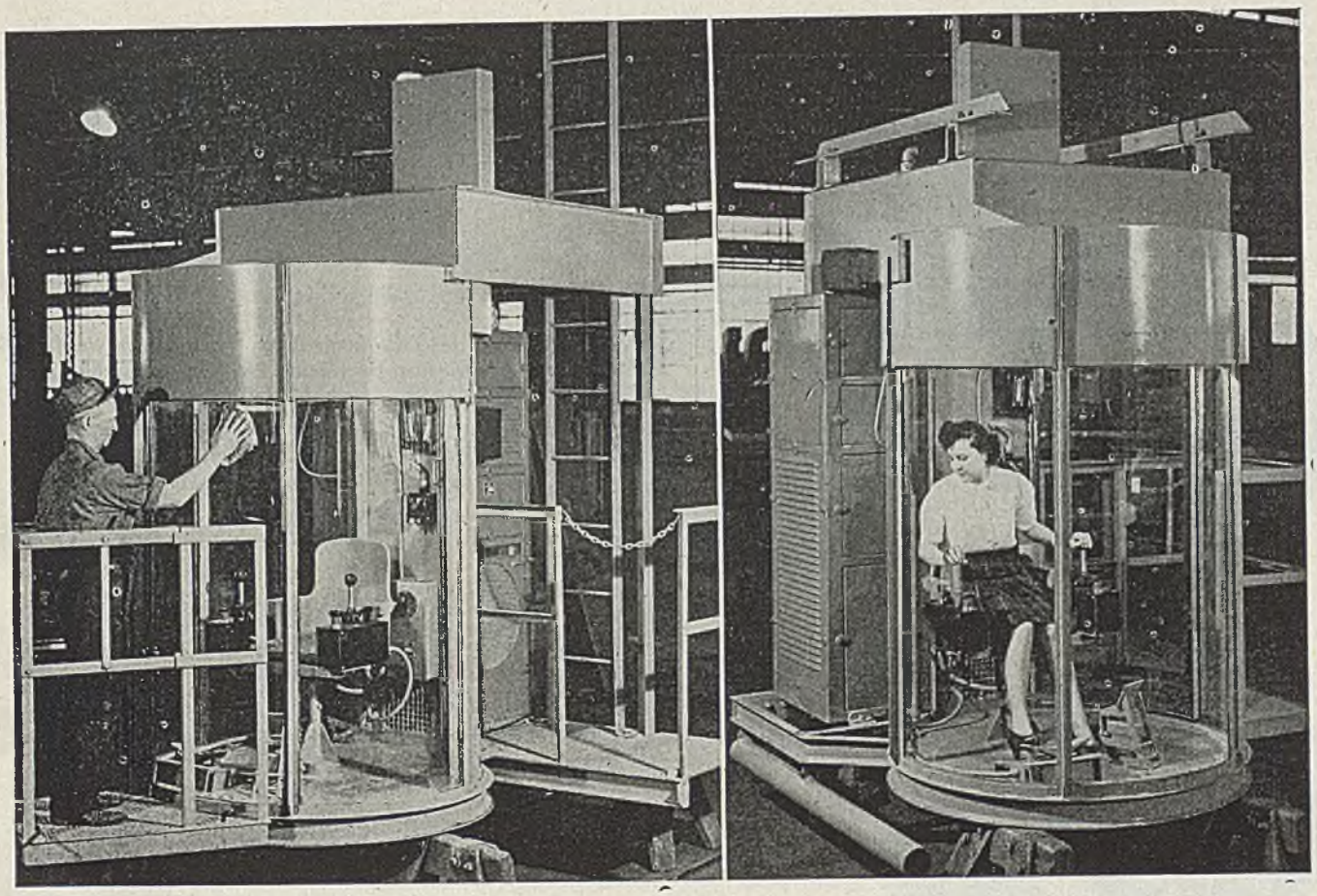


Fig. 12 — Many subassemblies are completed in pedestal type welders after tacking

Fig. 13—Line diagram of air-hydraulic system employed. Each gun has its own complete system





Air Conditioned CRANE CAB

features sit-down control and full vision for operator

ONE of the most radical innovations in many years in cab design for overhead traveling cranes is depicted in the accompanying pictures. This cab, now being installed in a large metalworking plant, provides full vision for the operator, comfortable sit-down control and air conditioning.

Developed by the Cleveland Crane & Engineering Co., Wickliffe, O., the cab probably represents the greatest forward step in crane design since the advent of all-welded crane construction, also attributed to Cleveland Crane.

Its cylindrical shape not only provides modern, streamlined appearance but eliminates corners and blind spots. The transparent enclosure panels extend to the floor permitting maximum vision in every direction over the area covered by the crane. The panels are of a new plastic which is shatter proof and impervious to certain gasses common in many plants that may be injurious to glass.

With this cab, crane operation becomes an easy, sit-down job. Master switches especially designed for magnetic control are conveniently located. Hoist and trolley switches are attached to the right and left arms of the chair. The bridge switch is on the floor and controlled with the right foot. Thus, there is a definite control job for each of the operator's hands and feet, but none of his limbs need serve a double duty as in most conventional cabs.

An air-cooled, air-conditioning unit, especially designed for this cab provides fresh, clean air at any normal temperature desired and gives protection against objectionable gasses, dusts and fumes. The unit attached to the cab shown here is for use where temperatures do not exceed 140 degrees Fahr. Adequate sealing and insulation is provided to assure against excessive losses.

A novel feature is the traveling platform which serves both as vestibule to the cab and a means for easy access to the entire exterior side of the window for cleaning purposes. Safety locks on both platform and cab door prevent operation of either except when platform is in proper position.

The new cab may be used with any new crane employing magnetic control and with existing cranes of any make. The cab is 6 feet 6 inches high by 4 feet 6 inches in diameter and equipped with Electric Controller & Mfg. Co. master switches and Lintern Aire-Rectifier.

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A fork type industrial truck has been developed by Elwell-Parker Electric Co., Cleveland, to propel four bulky raw material containers from warehouse storage to manufacture. Large cans, mounted on casters, hold 400 pounds of material and formerly were pushed individually by hand. Four of them chained together are moved faster by the power truck equipped with special pusher attachment.

HARDENING and

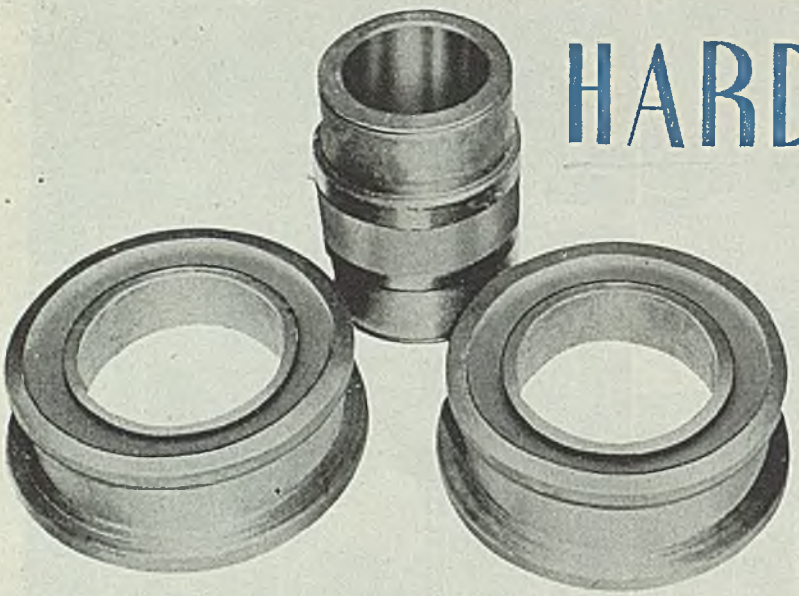


Fig. 1—Two-flange track roller assemblies for track type tractors. Roller comprises three pieces shown at left, the rims being forgings and the hub cast iron. American Car & Foundry Co. hardens and shrink fits the roller rims onto the hub through the use of induction heating treatment in 4 minutes plus

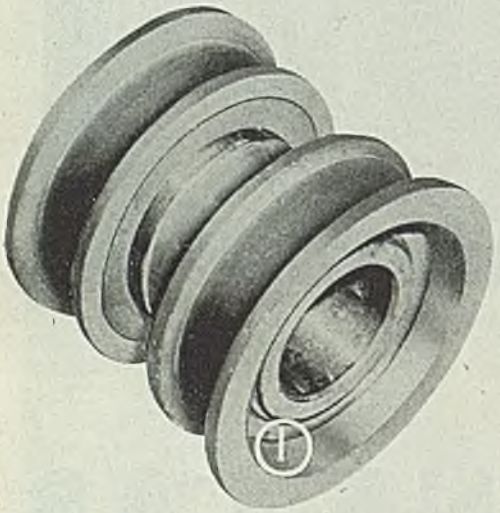
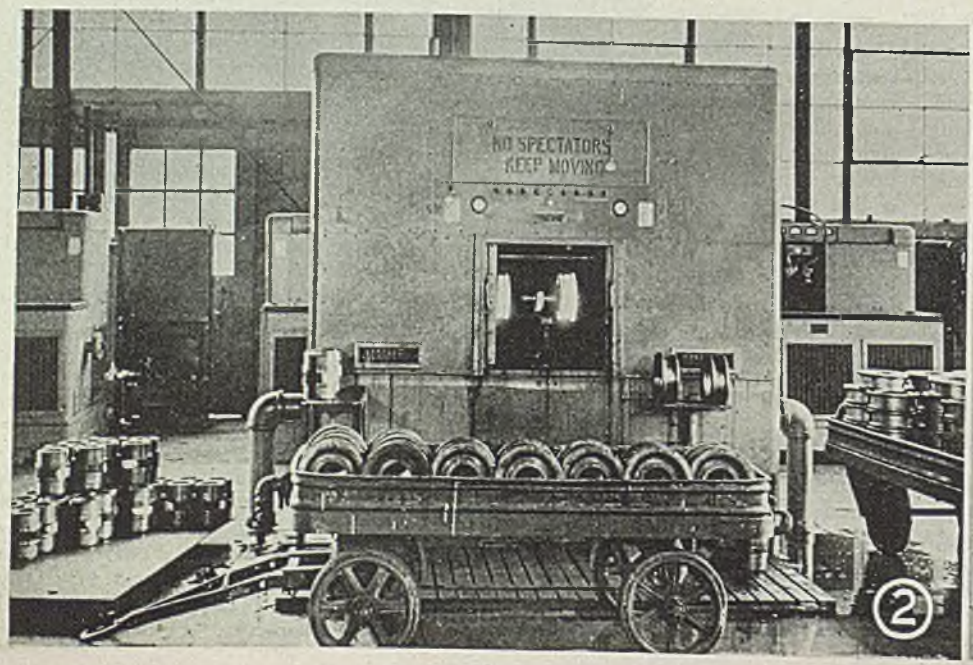


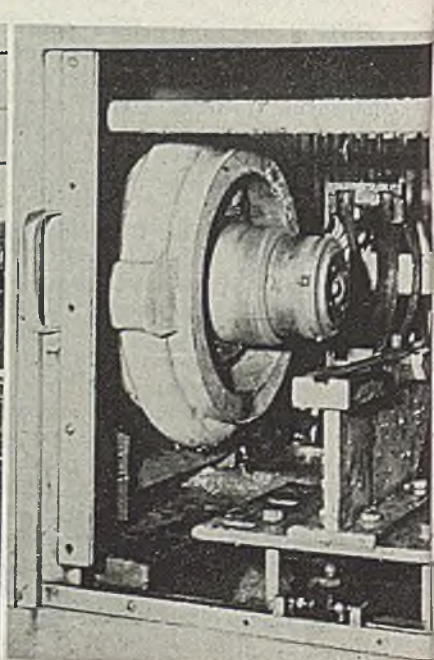
Fig. 2—The three roller parts shown in Fig. 1 are assembled and hardened in this induction heating unit. Shown are two rollers heated and being pressed onto the hub resting between them. Quenching follows immediately. Ordinarily, the doors of the work chamber are closed

Fig. 3—Interior view of work chamber. In center is fixture for holding the hub. A slight depression in the rear of the fixture prevents the hub from rolling. At left, spindle is shown at loading position and a quench ring at neutral. Behind the spindle is one of the two semicircular inductors. Visible are the spring mounted pins that hold the rollers firmly to the spindle. Chamber is about 28 inches square

Fig. 4—Here, rims heated to 1650 degrees Fahr. are shown being pressed on to the hub. Quench rings are moving into position over the heated rollers

Fig. 5—This is an unorthodox view of the quenching operation. Normally, the doors are closed. Observe that quench rings are very close together during this operation. Pressure of spray is 35 p.s.i. Quench lasts for 19 seconds. The SAE-1045 rims are hardened to 58 rockwell C





SHRINK FITTING

. . . . operations are performed simultaneously with induction heating in assembling 3-piece track rollers

WHEN a production record for Army bulldozer tractors was set last December in the plants of the American Car & Foundry Co., a large share of the credit for the achievement was attributed by Army officials to the ingenious use of high frequency induction heating.

This is an all-in-one automatic operation that induction heats two single or double flange roller rims of a three-piece track roller assembly (Fig. 1), puts the rollers onto the hub of the unit and then quenches for hardening and at the same time shrinks the rollers securely to the hub. It is now possible for one man to turn out 15 completed assemblies per hour and eight former steps once required have been reduced to one. The entire operation, floor to floor, consumes only 4 and a fraction minutes.

The drift heat resulting from the heating of the rims for hardening causes the bore of the roller rim to expand so that the rollers can be pressed onto the hub. The shrinking follows the quenching of the rims for hardness.

This "shrink-fit" process developed by the Tocco Division of the Ohio Crankshaft Co.,Cleveland, is one of six different induction heat treatment operations in use at A C F in the manufacture of Army tractors and tanks. A total of 1325 kw supply these particular applications which, beside the track roller assembly, include hardening two sections on track carrier roller shafts, 13 3/16 inches long, in 12 seconds; hardening track carrier roller shaft collars, eight collars at a time in 1 minute and 34 seconds; progressively hardening track pins 1 3/4 inch diameter by 9 7/8 inch length, one pin every 16¼ seconds; and hardening two 13-tooth tank drive sprockets in 6½ minutes and hardening several miscellaneous tractor items as well.

High frequency induction creates a powerful magnetic field within a localized section of a metal part by exposing that part and section to the field of an inductor or electrical conductor through which there is flowing alternating current of some magnitude.

The conductor acts as a primary in a transformer circuit and induces current to flow in the piece that it surrounds thus making that piece a secondary in the circuit. All conductors can be heated in this way inasmuch as they possess an electrical resistance (R) to this flow of current (I) and develop I^2R losses which are dissipated as heat.

In addition, on heating magnetic materials another electrical effect known as "hysteresis loss" adds to the I^2R heating effect. This hysteresis loss results from molecular friction created by the molecules of a magnetic piece trying to align themselves with the rapidly changing polarity of the field.

Actually, a modified form of resistance heating wherein the current has been induced to flow by electro-magnetic forces rather than caused to flow by connection with the power source, is experienced. However, underlying all induction surface hardening applications is the fact that the flow of the current is confined to the surface of the conductor carrying it. This is "skin effect," a function of the frequency.

All things being equal, the higher the frequency the shallower is the depth of penetration and the electrical resistance of the surface layers increases with temperature and the rate of temperature rise falls off during the heating time—a matter of a few seconds.

Because the induction process heats only that section of the piece requiring treatment, it minimizes distortion and creates no scale. Localizing the heat and confining it to surface layers only preserves the original physical properties of the treated piece while the short heating cycle prevents decarburizing of the work.

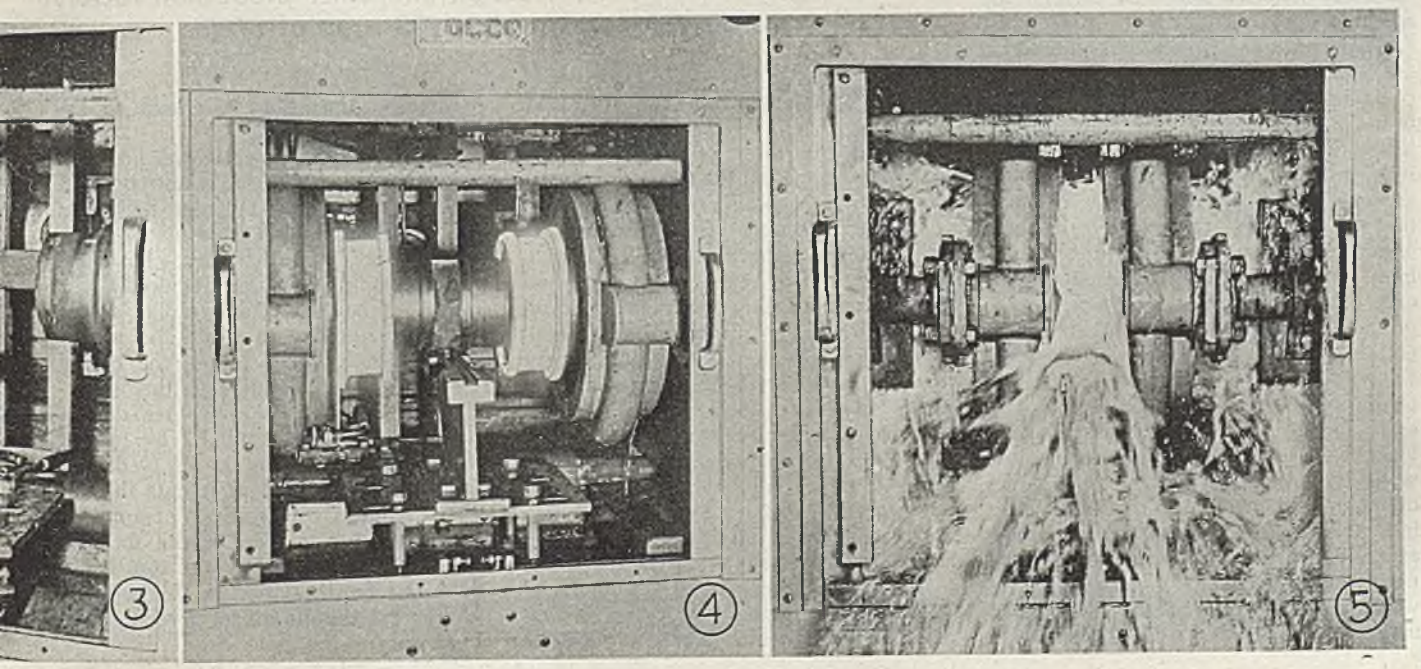
Assembly of Track Rollers

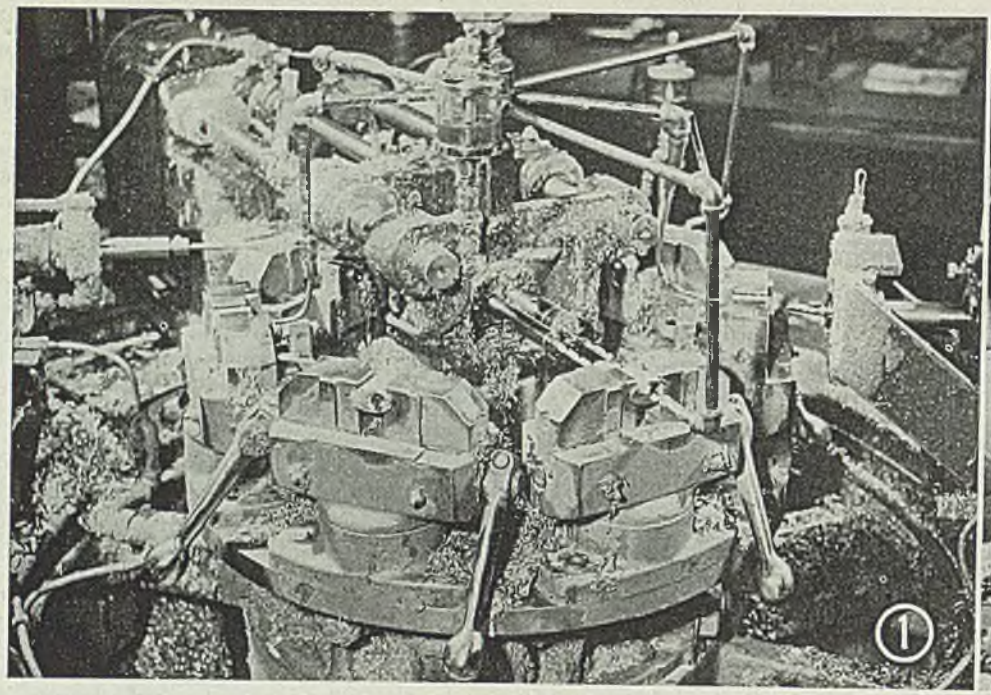
Treatment of the track rollers at A C F takes place in two huge machines (Fig. 2), box-like in appearance and measuring 8 x 8 x 5 feet, designed with an ample margin of strength because of the bulk of the assemblies. Once the roller parts are positioned by the operator hardening and assembly proceed automatically.

These interesting track roller operations are performed in a work area some 28 inches square located in the front of the machine (Fig. 3). The two rims are placed on hydraulic spindles or arbors located in line with each other on opposite sides of the work chamber. A special cradle-like fixture set center holds the hub during operations. Two semicircular, water-cooled inductors and two quench rings are also found within the chamber. Sliding doors close off the area during heating.

Today, after the operator loads the machine he closes the doors, pushes a button, waits three and a fraction minutes, opens the door and removes a finished assembly free of distortion and scale. The heating cycle comprises 1

(*Please turn to Page* 128)





Machining Finishing and Testing DIE CASTINGS

By H. E. NAGLE
Superintendent of Methods
Yale & Towne Mfg. Co.
Stamford, Conn.

Second of two articles on production of die castings describes various tooling setups used in Yale & Towne's Stamford plant, as well as methods for applying organic finishes and testing castings for quality. Die design and other production factors were discussed in the April 23 issue of STEEL

GATES of zinc die castings produced in the Yale & Towne Mfg. Co.'s Stamford, Conn., plant are broken up into their component parts with the aid of special fixtures and chutes so that the die cast parts automatically are separated in tote boxes. The sprues, gate bindings, and rejected gates are also carefully collected and sent back to the melting department.

Most trimming operations are done on fast single-purpose machines equipped, in most cases, with a single tool or a single spindle. But many of the broaching operations are done with multiple tools.

Some Machining Required: Although the die castings themselves are held within remarkable close dimensional limits, some machining is required, not only to remove flash and burrs but to produce undercuts and other shapes at certain points where the die or core cannot form them, and also to hold still closer limits than are feasible in the as-cast product. Since some parts of many locks have to be made, literally, with watch-like precision, a very high grade of tooling for machining is essential, yet it is necessary to perform the machining at a rapid rate. Furthermore, it is often necessary to employ, as in other war work, inexperienced help. These facts make the tooling as well as certain of the machine operations of exceptional interest.

Among the most interesting of the machine setups is that on a 7-station Kingsbury machine for substantially complete machining padlock bodies. In the particular job illustrated in Fig. 1, only five of the seven stations are required for machining operations. Nevertheless, by reason of the excellent tooling and of the inherent economy of this type of machine, the five sets of operations illustrated, some of them with multiple tools, are performed on as many as 5000 padlock bodies during each 7½-hour shift. All but one of the tools have carbide tips. Although such tips are by no means essential for machining zinc alloy, they have the great advantage that many thousands of die castings can be machined without stopping to regrind and reset tools. At the same time, of course, dimensions are held to the close limits required.

In the Kingsbury setup, the first tool spot faces the end and counterbores a recess in the cored cylinder hole. At the second station, a hole at an angle to the bore is drilled, the head, of course, being set at the required angle instead of having its axis radial, as for the other heads. To make the undercut slot at the next station, the boring bar is fed in to depth with the bit retracted. Then, as the bar remains at that depth, a cam, actuated by further inward motion of the head, feeds the retracted bit outward as it cuts the annular groove. A spring, compressed on the forward motion of the tool retracts the bit just before the tool backs out. The fourth station in this setup is dead except that an air jet is set to blow chips out of the hole.

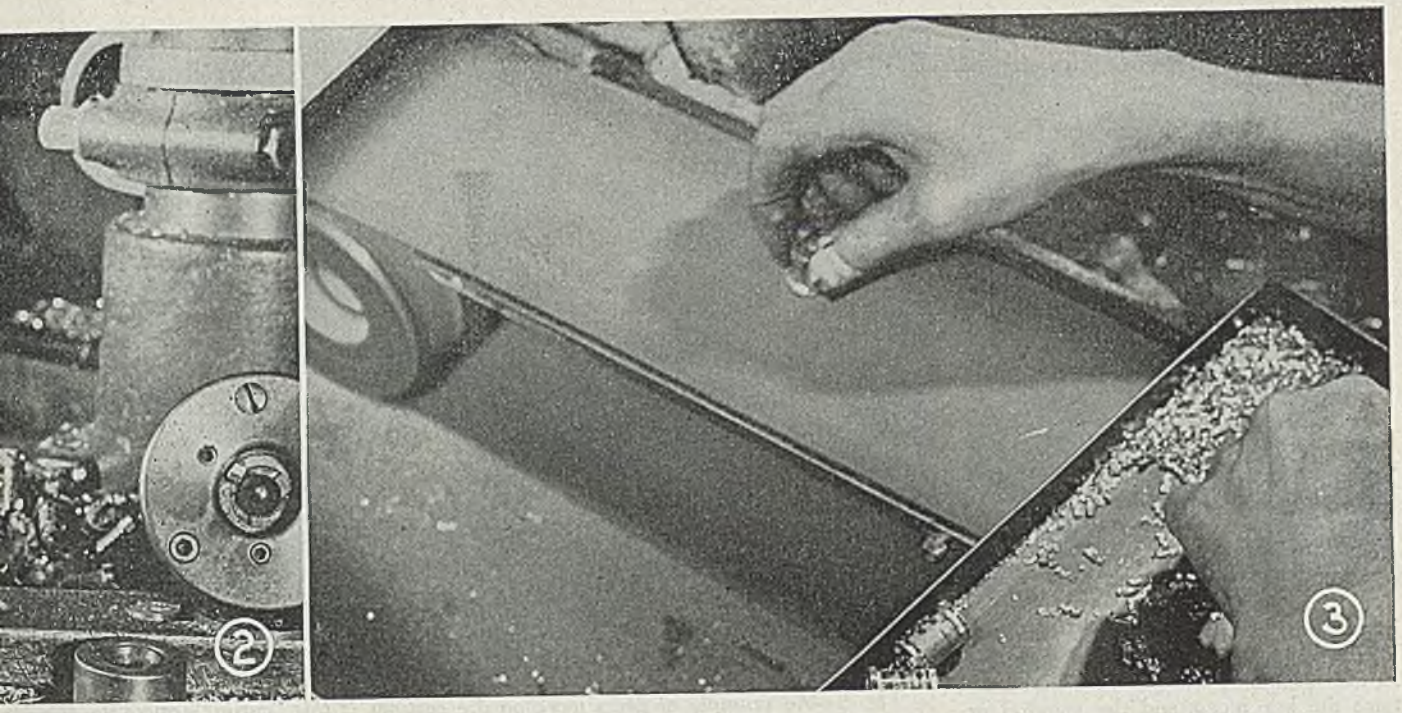


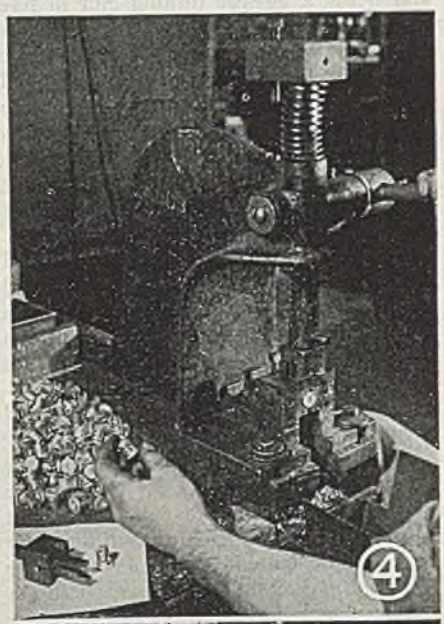
Fig. 1—About 5000 padlock bodies are machined during each 7½-hour shift on this 7-station Kingsbury machine. Only 5 stations are used in this particular setup. Loading station is at left center.

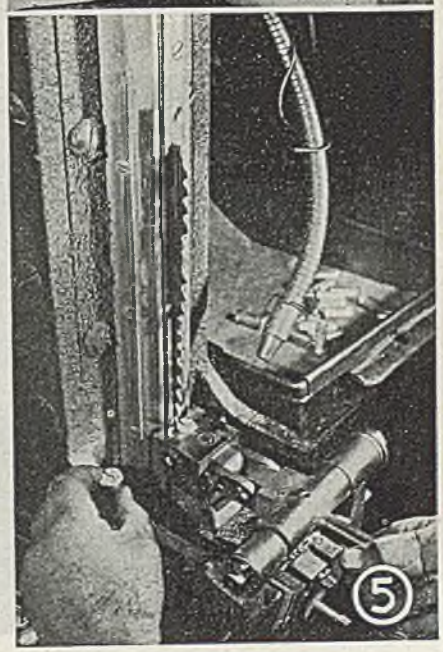
Fig. 2—This operator is loading a cylinder plug on a mandrel under the hollow milling tool which shaves the diameter and turns the edge of the flange forming the head

Fig. 3—Operator can face 1500 lock plugs per hour with this horizontal belt sander. On completion of operation, operator releases grip on piece and the belt throws it into a chute leading to a tote box

Fig. 4—With the aid of specially designed work-holding, quick-acting fixtures, this arbor press is set up to broach off the flashings from 5 cored slots for plate tumbler locks. Slot walls are only 0.02-inch thick. Five broaches are carried in a holder as shown at lower left. A spring which is compressed when the broaches are inserted automatically ejects the plug when the broaches are raised

Fig. 5—A split, toggle-operated fixture having a vertical hole, half of which is in a slotted plate through which the broach runs, and half in a lock block joined by links to a toggle lever, is used to broach rapidly the flash from cored, longitudinal key sections of plugs for pin tumbler lock. Toggle fixture is opened and locked by right hand and loading is done with left hand

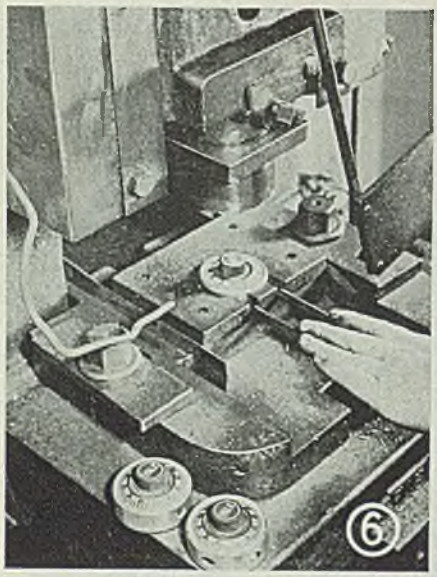




In the fifth position, an end cutting tool faces the bottom of the recess (inner end of cored cylinder hole) and a second tool on the same shank cuts a clearance at a step diameter at the outer end of the bore. All the foregoing operations are at the outer end of the piece as it is carried around a circular path in the holding fixtures, the tools being moved inward, all but one radially. It is necessary at the final station, however, to ream two shackle holes at the opposite (inner end) of the piece. This necessitates the use of rods forming ways that bridge the fixtures and the work and carry a geared two-spindle head. Each spindle has a reamer and the tools move outward (parallel to a radius) as the head is advanced and the holes are reamed.

At the seventh or loading position, where the operator stands, he unloads a finished piece and drops it into a chute and loads a new one, using a lever handle to open and close the fixture jaws. He then trips an air valve which causes the machine to index, each part being advanced to the next station. There, each tool is automatically advanced by its respective head and the operations are performed simultaneously at all five working stations. An interlock prevents the operator from tripping the indexing mechanism until all the tools have completed their strokes and are returned to indexing positions. This whole setup constitutes a fine example of excellent and highly efficient tooling.

Use Hollow Milling: Multiple tools are also employed in hollow milling, for example, where they facilitate the operation. The type of hollow mill employed is used in a drill press, (Fig. 2), primarily for shaving (or lightly turning) the outside diameter of die cast cylinder "plug." This has a stepped



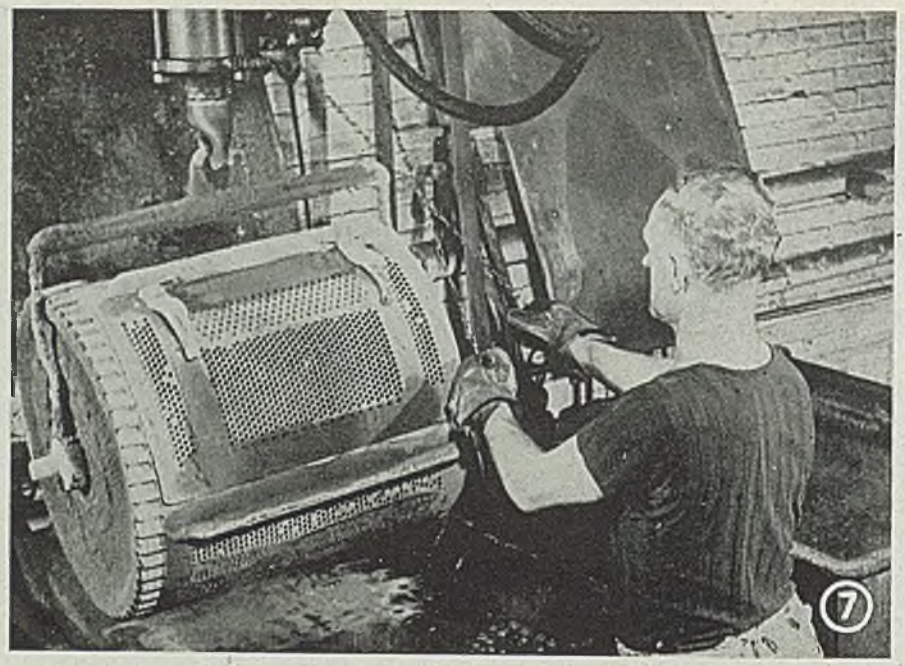


Fig. 6—An example of press work on die castings is this "curling" operation. The press punch closes in the lip at the top of the cylindrical, combination padlock, after the dial cover is set in place. Two ends of a shackle are placed in the cored cross holes so that the blow of the punch will not close the holes

Fig. 7—Die castings are dipped in a phosphate solution for 3 minutes and rinsed in the tank at the right, prior to finishing

diameter constituting a flange or head at the outer end, with the lower end in the machining setup. This end contains the key recess and the mandrel or fixture boss, which positions the piece and holds it against turning and in line with the spindle and tool, has a short extension which fits into the key slot.

Loading in this simple fixture, clamped to the bed of the drill press, is far more rapid than for a lathe setup and, when the hollow mill is fed down, its teeth act as a pilot hole, centering the plug perfectly as its surface is shaved. At the bottom of the stroke, a single-point, carbide-tipped tool comes into play and trues the outside diameter of the head so that it is perfectly concentric with the shaved plug, as required. In such work, as many as 900 plugs can be handled an hour, evenly by relatively inexperienced help, yet high dimensional accuracy is attained.

All cylinder lock plugs have either a key slot or cross holes for tumblers or both. One or the other is cored, but some slotting, broaching, drilling or reaming, or combinations of these, are required, usually to remove flash or burrs where holes intersect or come through a surface. All these operations are done with extraordinary rapidity, though often with the simplest of tooling. Nevertheless, a high degree of precision is attained even where relatively unskilled labor must be used.

Typical of one such operation is that shown in Fig. 3 for use on a type of plug that has five cross slots for plate-type tumblers. The walls between slots in these tumblers are only 0.020-inch thick, but the slots must be cleaned of flash and held to close limits on size and spacing. The job is done with five broaches arranged to float on a pin in a yoke attached to the ram of a small arbor press. To insure correct spacing of the broaches, they are piloted in holes in a plate above the fixture which is attached to the base of the press. The fixture is loaded by pressing the die cast plug into a cross hole of the fixture against a light spring. When the plug seats against its flanged head, the broaches are lowered, as then the slots register with those in the hardened plate. An extra set of broaches in a yoke is seen in the lower left corner of Fig. 4. When the broaches are withdrawn, the spring compressed in loading ejects the part and it falls into a tray, freeing the fixture for reloading.

Plugs that have a key slot of sinuous section cored longitudinally almost from end to end have the flash and any burrs removed from the slot by a broach, in a special machine built for this operation. It is essential that the work be correctly located, of course, and this is done (Fig. 5) by a split, toggle-operated fixture having a vertical hole, half of which is in a slotted plate, through which the saw runs, and half in a lock block joined by links to a toggle lever, pivoted to the machine. Lifting the lever draws the block back away from the saw while the piece is rested in the half-hole recess. When the lever is lowered, the piece is locked in broaching position. The operator times the work so that loading and unloading are done while the broach is well above the fixture, at and near the upper end of its stroke. Parts are thus handled at rate

Fig. 8—Contrasting colored letters and decorative lines are wiped into padlock case after the finish has been applied to the depressed areas and dried in infra-red ovens

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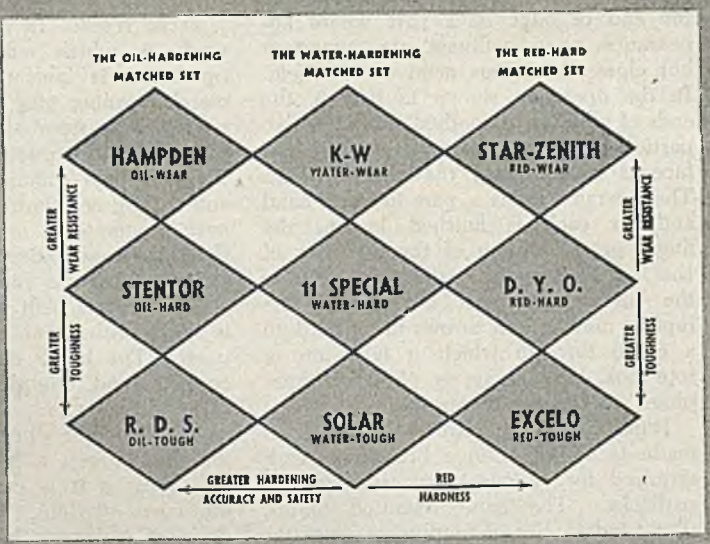

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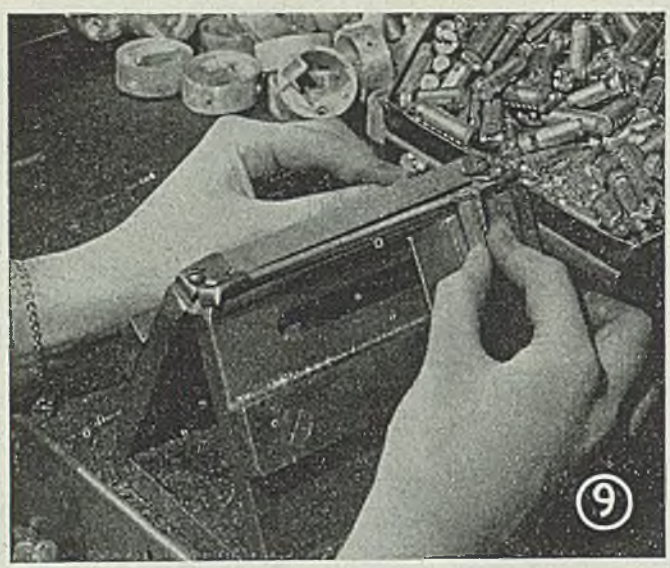


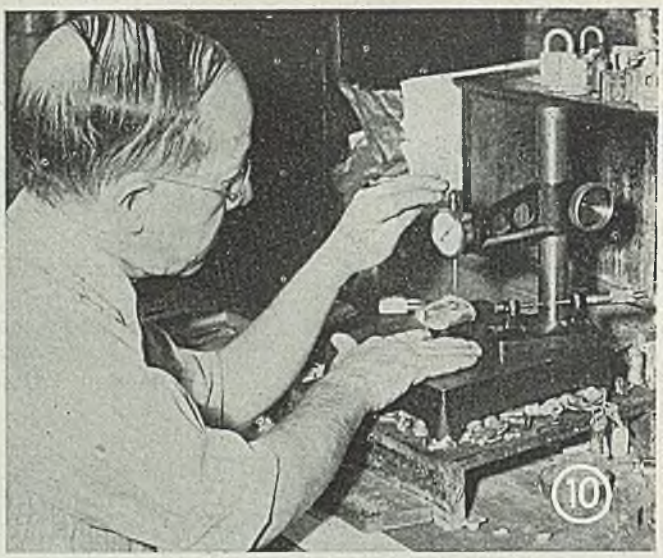


Fig. 9—With this simple fixture, an operator can file off the burrs from underneath the heads of 1800 lock plugs per hour. Holders are returned to starting position by springs

Fig. 10—Locks are checked at intervals on this sensitive gage to make certain thickness is held within specified limit of 0.003-inch

of 1500 an hour and perfect slots result.

Small horizontal belt sanders are effectively employed, as in Fig. 3, for such jobs as polishing the small flat face of a plug, in removing flash at some point on a casting or perhaps rounding the end or edge of a part where appearance or smoothness are important but close dimensions need not be held. In the operation shown in Fig. 3, the ends of plugs are smoothed and any small particles of flash removed as the end face is held against the abrasive belt. The operator holds a part in each hand and, as each is finished loosens the finger grip. Motion of the top face of the belt is away from the operator, and the instant the part is released the rapidly moving belt throws the piece into a chute through which it falls into a tote box. As many as 1500 of these plugs can be faced per hour.

Hand operated fixtures have been made to fit the unique broaching work required for various parts of locks and padlocks. The hand operated fixture illustrated in Fig. 9 permits an operator to file off the burrs from under the head of a plug for a pin tumbler lock, at the rate of 1800 per hour.

Press Work: In addition to machine work—in which some form of cutting operation is performed—many other metals forming jobs (in which no metal is removed from the piece) are performed on the ductile zinc alloy used. These include spinning, riveting, staking and curling or "closing" operations. One such operation on a cylindrically shaped "combination" or keyless padlock is shown in Fig. 6.

The work is held in a die recess, and is struck with a punch in the ram of the press. The lower end of the punch is cupped, and slightly larger than the piece, from which a thin lip extends. At the diameter where the punch strikes the lip, there is a fillet over which the lip slides as it is curled in place over the cover portion. The latter is also die cast and rests between the curled-in lip and a counterbore or shoulder of the cylindrical casting, permitting the cover to be rotated but not pulled out. This cover has depressed figures and graduations cast in (debossed), and they are filled in after the cover, the combination dial, has received its black finish. An operator closes in about 375 padlocks per hour.

Machine operations described above are, of course, only a few out of hundreds performed on die cast parts. They are, however, typical of the work accomplished.

Finishing: The zinc die casting is gray in color and its milky surface finish requires little buffing to produce a high satin gloss. The surface lends itself easily to electroplating or organic finishes. Baked enamel finishes also are excellent.

Because a large proportion of the many millions of die castings employed annually in making some of its locks require an enduring applied finish, Yale & Towne has given finishing procedures exhaustive study. Methods employed are not only examples of good practice, but also result in finishes that withstand hard use under a variety of severe conditions, including outdoor exposure, in different climates. In this article only nonmetallic finishing procedure is outlined.

Yale & Towne pioneered (a dozen years ago) the application of the Parkerizing treatment on die castings which provides an excellent surface for paint adherence and also adds extra resistance to corrosion. The corrosion-

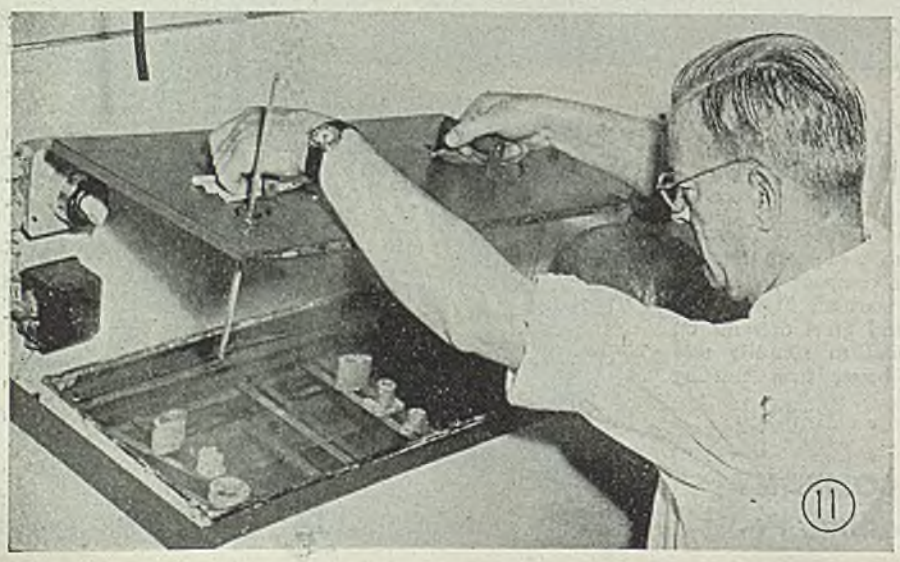
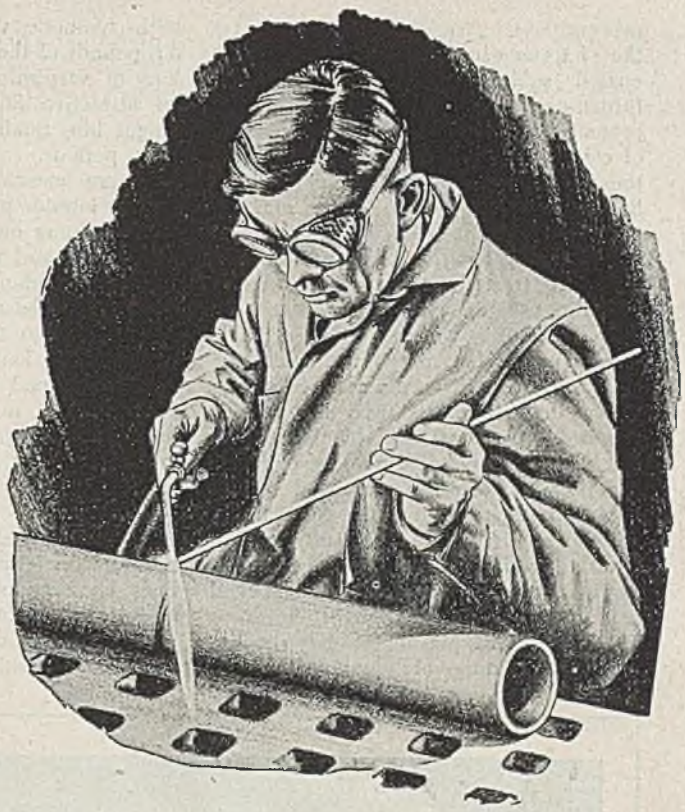


Fig. 11—R. E. Hicks, chief chemist, is lifting the cover from this accelerated-aging apparatus in which sample die castings are exposed to water vapor at 203 degrees Fahr. for 10 days to determine their chemical stability

Magnesium alloys are easily joined by every common method



Riveting—gas, arc, spot and flash welding all do the job

Matchless lightness has earned for magnesium an industry-wide reputation. It's when you come to build this lightness into your product that you first fully appreciate magnesium's many important fabrication advantages.

Easy joining is a major one. Magnesium readily lends itself to every joining method in common use, including riveting and gas, arc, spot, and flash welding. Procedures are very similar to those employed with other metals.

Riveting is the method most widely used for joining magnesium sheet and extrusions, and various Dowmetal Magnesium Alloys in these forms—as well as sand castings—can also be gas and arc welded. Spot and flash welding each serve definite fabrication requirements.

Dow has taken active part in the development of these techniques, and the resultant data is now available to you. The nearest Dow office will give you technical assistance in the best procedures to use in your own product.

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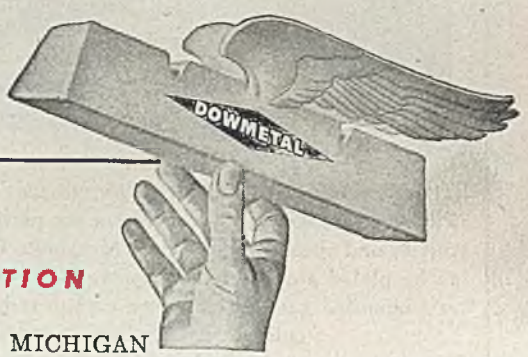

MAGNESIUM DIVISION, THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

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preventive is particularly important for the interior surfaces which are not coated subsequently, thus preventing formation of any white oxides in the presence of moisture. This is true also, of course, of coated surfaces from which the enamel is scratched or chipped by handling which is too severe for any organic coating to resist.

Parkerizing has the advantage that the parts are treated merely by immersion in bulk, using a perforated sheet steel cylinder (Fig. 7) which is given a single turn by a ratchet mechanism while the cylinder and parts are immersed. The phosphate solution is used hot and it requires only three minutes to treat a batch of parts that half fills the cylinder.

All organic finishes employed are of the synthetic type and are sprayed on. An exception is in the case of wiped-in lettering which is done by hand brushing after the base coat has been baked in. Yale's distinctive silver finish is obtained by baking in, at 400 degrees Fahr., a mixture of aluminum power with synthetic varnish in the ratio of 3.6 pounds of the flake pigment to 5 gallons of varnish. This not only affords an attractive finish, it also makes for longer life, retaining its brightness over long periods.

Where masking is not required to protect interior machined parts, the castings are hung on racks, sprayed at various angles, and placed on an oven conveyor for baking. Thus the castings are not touched until the finish has been baked hard so they cannot be marked by fingers in handling. A procedure has been developed so that a single spray operator and a helper handle several hundred castings an hour. Thus the labor cost per casting is exceedingly low.

Advantage is also taken of the ease with which die castings may be embossed with letters, figures or decorative lines on outside surfaces, both to embellish and identify the product. Such depressions are later filled or "wiped-in" with a contrasting color consisting of enamel fixed with naphtha or other thinner to make it flow easily. Application is with a brush, as this puts the color where it is wanted. Work of this kind is done at bench through the center of which a conveyor belt runs. Locks or parts laid on the belt after brushing are carried through a short oven equipped with infra-red heater lamps that help to set the color. Before the color is completely dry, the parts issue from the oven and are removed from the belt by girls who wipe off any excess color that has flowed onto the high surfaces. See Fig. 8. This is done by passing the part over paper slightly moistened with naphtha. In so doing, only the high surfaces are touched and wiped clean, the color consequently remaining in depressions, as desired, giving sharp outlines.

Parts are then stowed in the tote boxes for transfer to assembly departments after the enamel in the recesses has been hardened by air drying. The enamel in the recesses is not easily abraded or chipped in subsequent service. And the "wiping-in" process has no effect upon the base coat since this was baked hard before the contrasting color was applied.

Interior moving parts are given a graphite coating by means of tumbling. This coating acts as a dry lubricant and tends to prevent any tendency of parts to stick or wear away by friction (gall).

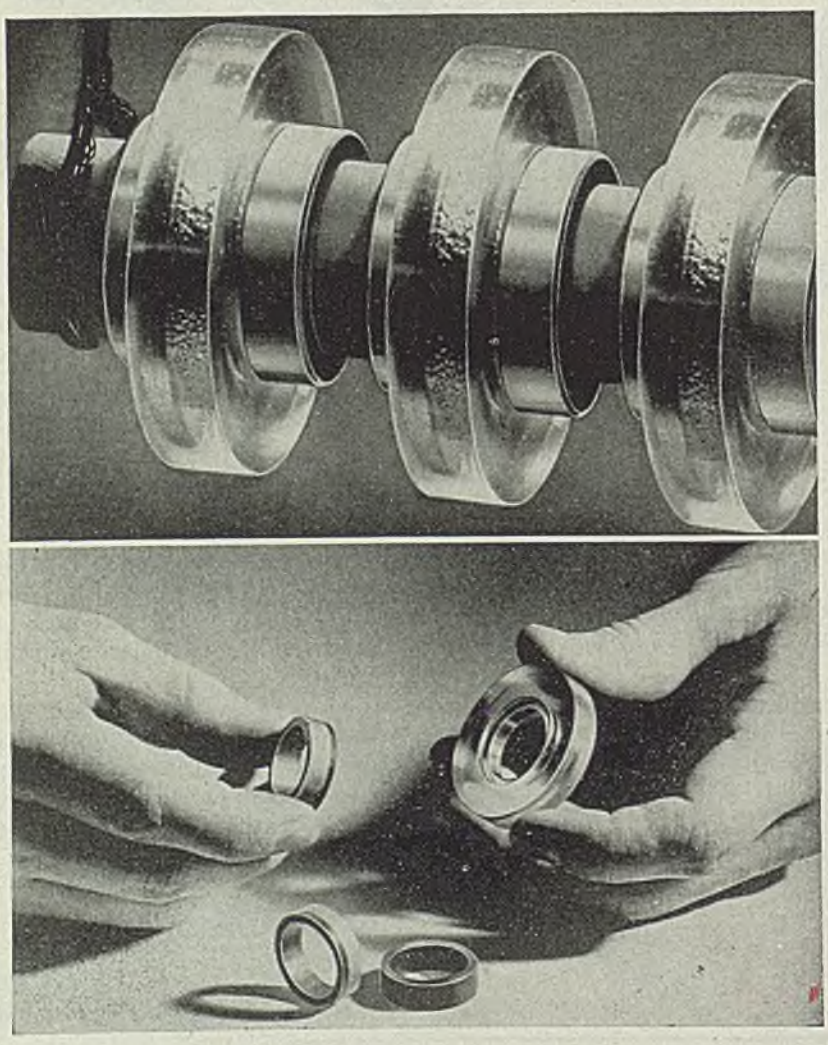
Inspection Control: Samples of die castings are regularly taken from the output of the die casting machines and measured with gages and indicators (Fig. 10) to insure that they are being held to the specified tolerances.

In addition, samples are periodically given a chemical analysis in the Yale laboratory. This includes an accelerated "aging test" to determine how well the castings will hold their dimensions under severe conditions. The principal factor in the test is exposure to water vapor at 203 degrees Fahr. for ten days. See Fig. 11. In this way, the stability of castings from each melt is assured.

To test their strength and ductility, sample die cast bars, shot as a part of a regular gate of castings, are tested in a special testing machine under varying loads. This machine determines whether the physical characteristics—such as tensile strength, per cent of elongation, elastic limit, and reduction of area—are within the limits set by the American Society for Testing Materials.

Millings taken from these sample castings are also sent to an independent, commercial metallurgical laboratory for a spectrographic analysis. An unusually high purity of alloy has been reported in these periodic analyses of Yale's die castings.

Thus through stringent laboratory and inspection controls, accurate dimensional accuracy, and chemical and physical quality are maintained. These inspection controls, by searching out whatever "hidden defects" may exist, prevent assembly of defective parts in locks and padlocks.



MASKING JIGS: Machinability, dimensional stability and light weight of Plexiglass masking jigs used in copper plating of carbon rings serve to reduce rejects and speed production at Morganite Co., Long Island City, N. Y. Rings to be plated are inserted in grooves 1/64-inch wide on either side of jig rings and mounted gang fashion on a carbon rod. Electrodes then are attached and entire assembly is suspended in plating solution

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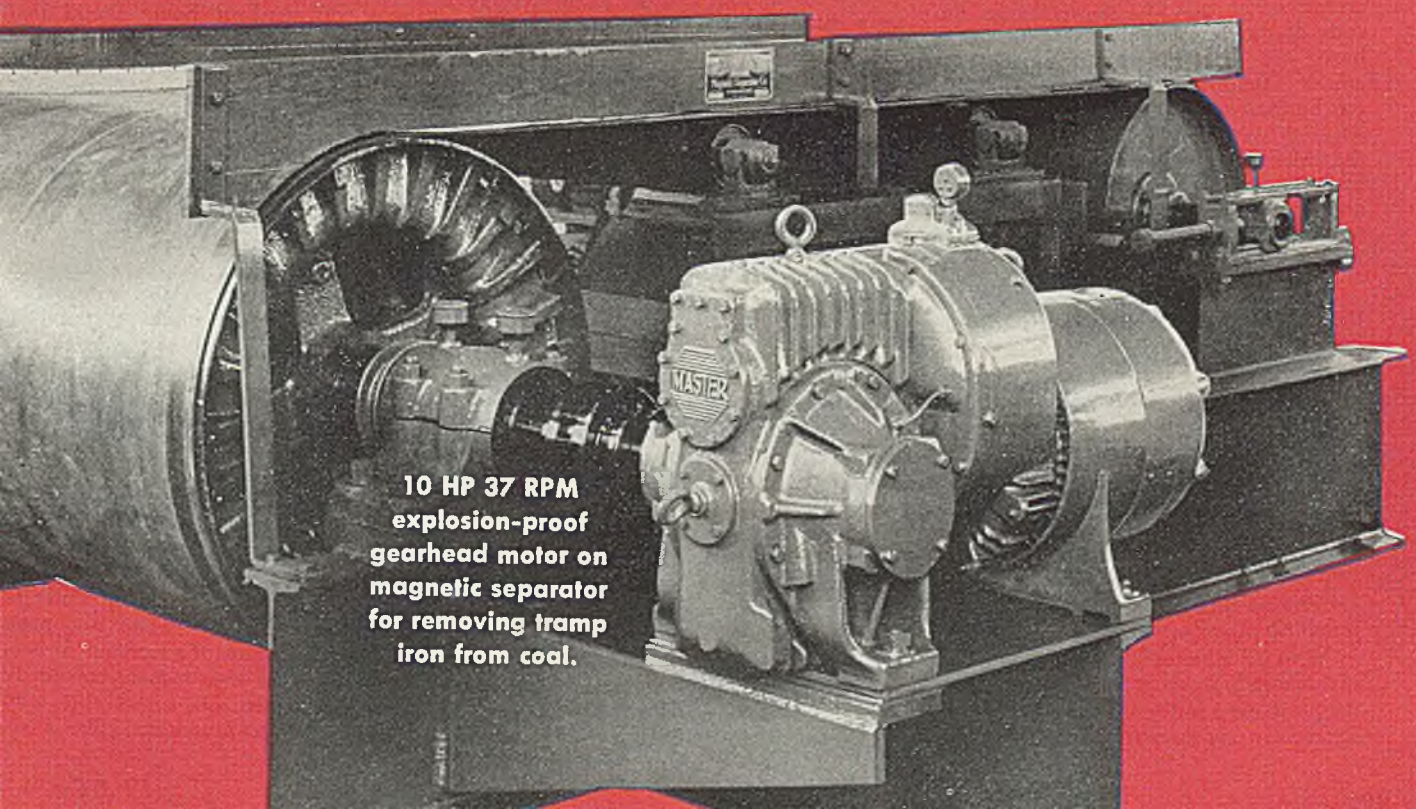


10 HP 37 RPM explosion-proof gearhead motor on magnetic separator for removing tramp iron from coal.

By CARLTON A. SHEFFIELD
Industrial Research Department
Joshua Hendy Iron Works
Sunnyvale, Calif.

HOBBING OPERATION

is accomplished at high speed on modified machine, using flywheel and composite cutter equipped with tungsten carbide strip teeth

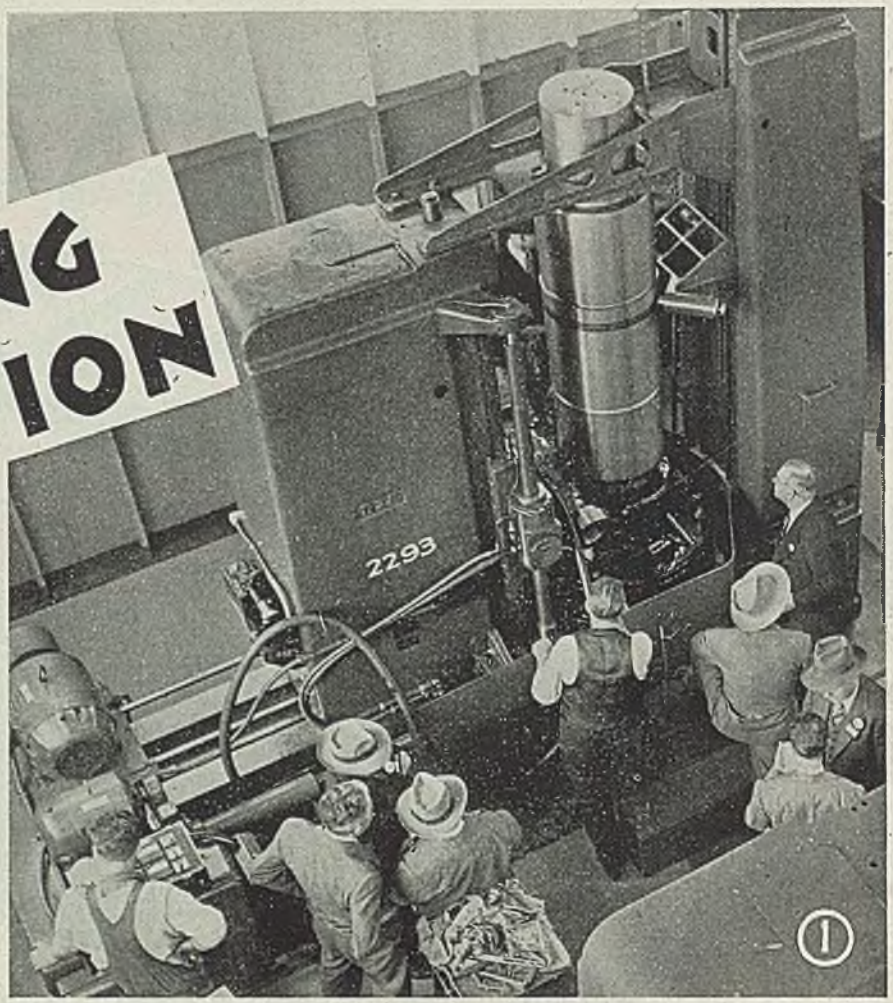


Fig. 1—Overall view of modified hobber with work in position, at beginning of demonstration. Note overarm support and tie member which has been added at top of frame, also steady rest unit at control point on work. Operator—lower left, watches electric control instruments as cut gets underway

IMPORTANT changes in gear-hobbing methods, tools, and machinery will probably be made very soon, in the opinion of representatives of the gear and machine tool industry as the result of a new series of exhaustive operational tests of a composite hob fitted with tungsten-carbide strip teeth.

Points established by the tests are:

1—Carbide-tipped hobs, operating at surface speeds up to 300 feet per minute (with higher speeds in prospect) will cut gears satisfactorily with time savings of 80 per cent or more on both roughing and light finishing cuts.

2.—Standard Gould & Eberhardt hobbers may be readily rebuilt for high-speed operation.

3.—Use of carbide-tipped hobs permits harder steels in gear blanks.

The general principles of cutting with composite hobs at high speeds were satisfactorily established in July, 1944, at the Joshua Hendy Iron Works, when Bureau of Ships representatives, together with representatives of all parts of the gear and machine tool industry, tested two specially constructed hobs with mechanically held strip teeth, one of high-speed steel, and one with Kennametal K-4H cemented carbide teeth. Results were satisfactory when a specially adjusted 72-inch Gould & Eberhardt hobber was run at 100 r.p.m., feed up, rotation down, climb hobbing.

With the principle proved, study of the compiled data was continued in Washington while at the Hendy plant, the hobbing machine was rebuilt to enable more than double speed previously possible, or approximately 224 r.p.m.

This time a tougher sintered carbide (Kennametal K-3-H) was used for the roughing cut, which was performed at 133 r.p.m. with a climb feed of 0.040-inch and a peripheral speed of 200 feet per minute. Near the end of the cut, the hob was damaged, but not until the principles of design and operation had been satisfactorily proved. The hob, created only for experiments, had not been held within normal operational tolerances, and was subjected to what amounted to a "destruction test" so that its capacities and operating range might be established. Failure of the hob revealed the necessity for certain changes in design features and in the grade selection of the carbide cutting edges which would not have been discovered if the tool had not been pushed beyond its limits.

It was reliably computed, however, that a working tool held to proper tolerances would rough-cut a pinion for a C-3 8500-hp turbine in 5 hours and 40 minutes, as compared to the normal time of 27 to 30 hours on a standard machine with a conventional high-speed steel hob operating at 35-40 r.p.m.

Important also was the fact that the blank used for the experiment was of steel some 50 per cent harder than that used for pinions in standard methods of cutting.

After the above cut, another blank, already roughed, was set up and a light cut of 0.030-inch depth, simulating a finish cut, was taken, using a left-hand hob with K-4H teeth operating at 174 r.p.m. 0.090-inch climb feed and 261 feet per minute peripheral speed. It completed the blank in just under 2 hours, as compared to the 23 hours required normally on a standard machine. Tooth marks could be seen but not felt, and the helix angle checked within 0.0002-inch.

Following this finish cut, a second C-3 pinion of approximately 284 brinell was set up, and the left-hand K-4H hob was used to rough out one helix. Since this test was to determine the roughing qualities of the K-4H hob, it was decided to vary feeds and speeds to ascertain all operating characteristics.

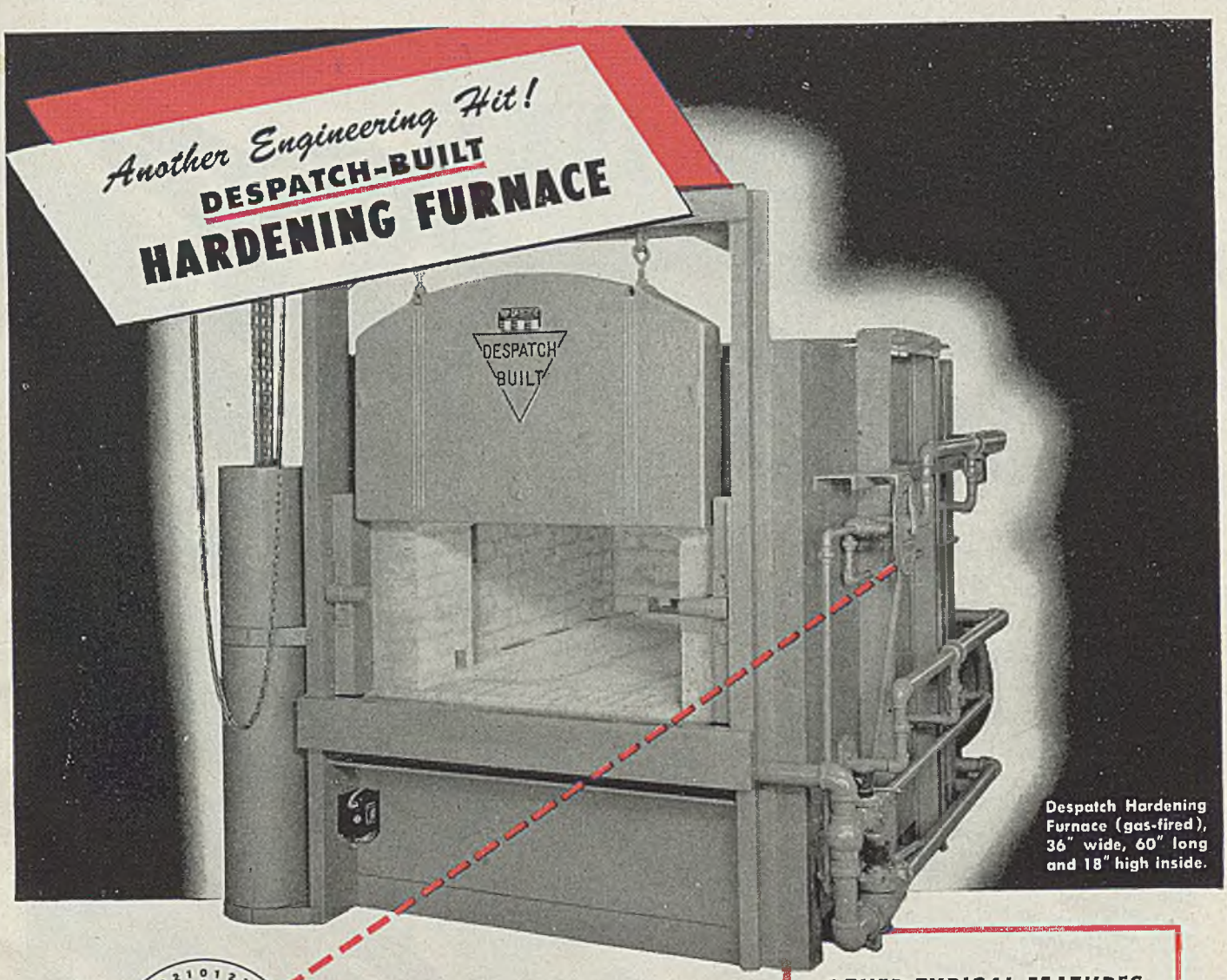
A peripheral speed of 261 feet per minute with 0.030-inch feed was used to cut the first 7 inches of the helix. The hob performed excellently and required the removal of only 0.005-inch from face of teeth when resharpened.

Another 7 inches was cut with this K-4H hob, using a speed of 336 feet per minute and 0.030-inch feed, and this likewise cut very smoothly with no

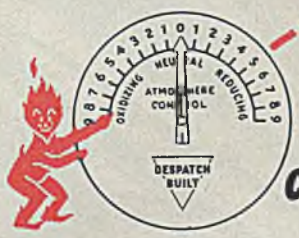
Another Engineering Hit!

DESPATCH-BUILT

HARDENING FURNACE



Despatch Hardening Furnace (gas-fired), 36" wide, 60" long and 18" high inside.



with Dial COMBUSTION CONTROL

Just turn this dial! It's as simple as that to control combustion in this new Despatch-engineered Hardening Furnace. You get *reducing, neutral* or *oxidizing* atmospheres by moving the indicator on a large graduated dial which is connected to a special metering valve.

MAKES IT EASY TO DUPLICATE TREATMENT

Developed by Despatch engineers, this valuable feature eliminates the slow, ticklish job of readjusting air-gas proportional mixers for different heat treatment processes. Now you can easily and quickly duplicate *any* previous combustion condition right on the nose.

Added to the many *other* important features which make Despatch Hardening Furnaces engineering *hits*, this simple control means boosted output, more efficient processing, easier operation and lower heat treatment costs. *Available in all popular sizes.*

OTHER TYPICAL FEATURES

UNIFORM HEATING results from an efficient combustion system with multiple burners manifolded to mixer. Burners are staggered and mounted under and over hearth; vents are at hearth-level. This assures fast, uniform heating and more complete combustion. No flame impingement.

•

KINETIC FLAME CURTAIN is promptly thrown across door opening to form effective heat and air seal. Prevents air infiltration.

•

POSITIVE DOOR SEAL. Heavy, non-warping counterbalanced door descends below hearth level and snugly seals door opening on all 4 sides. Easy-working with Despatch "roller-rest" door locks.

•

RUGGED CONSTRUCTION of extra heavy steel.

WRITE FOR DETAILS

DESPATCH OVEN COMPANY MINNEAPOLIS 14 MINNESOTA, U.S.A.

BORING MILL *Tools*

Save setup and production time by making your Boring Mills more versatile . . . Scully-Jones Standard Boring Mill Tools and Adapters can be interchanged or used independently on several kinds of machines. Check the following list to see how these tools will permit more operations being performed on your equipment. Consult us for further information, recommendations and prompt quotations.

- BORING BARS
- ADAPTERS FOR END MILLS
- ARBORS FOR SHELL END MILLS
- COLLET CHUCK ADAPTERS
- COLLETS AND COLLET HOLDERS
- FACE MILL ADAPTERS
- CENTERING ARBORS
- FACE PLATE CONVERSION ADAPTERS
- SPINDLE TYPE CONVERSION ADAPTERS
- EXTENSION SOCKETS
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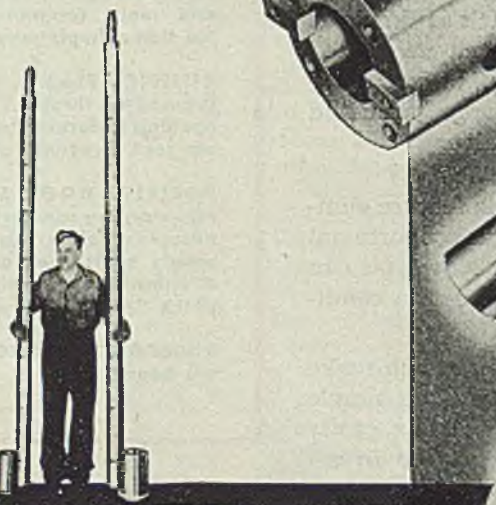
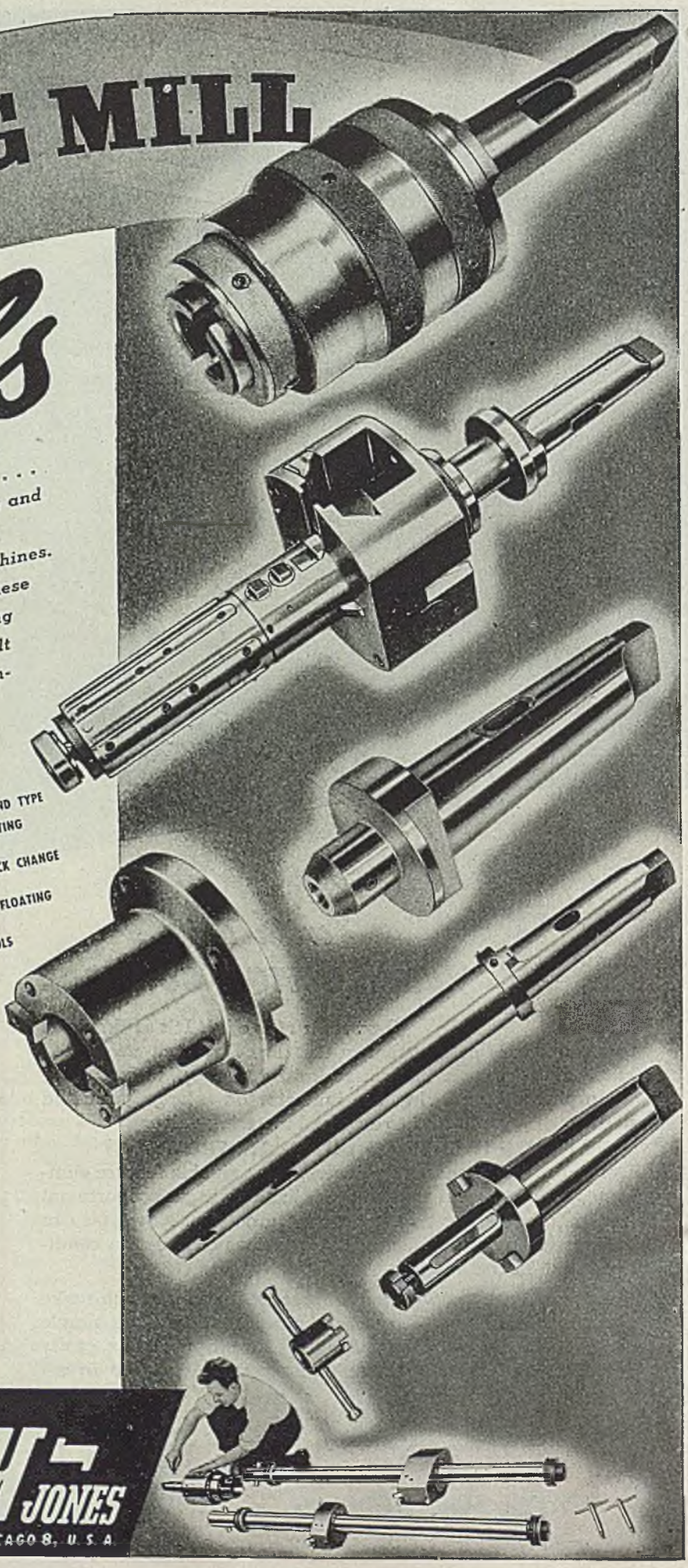
- TOOL BITS— SQUARE OR ROUND TYPE
- HEAVY DUTY FLOATING HOLDERS
- MAGIC TYPE QUICK CHANGE CHUCKS
- QUICK CHANGE FLOATING HOLDERS
- RECESSING TOOLS





Scully-Jones AND COMPANY

1901 SOUTH ROCKWELL STREET ★ CHICAGO 8, U. S. A.

Fig. 2—This rear view of roughing operation shows force-feed lubrication on system for the hob spindle bearings

Fig. 3—This marine pinion is being rough cut at the rate of 133 r.p.m. with "climb milling" feed of 0.04-inch and peripheral speed of 200 feet per minute, using a sintered carbide tipped hob. Note heavy flywheel on outer end of hob spindle

appreciable amount of dulling or chipping. It is interesting that during this operation the machine had been set up for its top speed of 215 r.p.m., but a tachometer reading showed that the spindle actually was turning over at 224 r.p.m., giving 336 feet per minute surface speed.

Although not conclusive, these latter two runs would seem to indicate that higher speeds and lighter feeds will give the best cutting results. In this connection, the trend when using single-point carbide tools has been toward slower speeds and heavier feeds, primarily to stiffen up the chip and facilitate its breaking in short curls. Since the hobbing operation is a series of interrupted cuts with no opportunity for chips to "string out," it appears that high speed and light feed will give the best results.

Adaptation of the hobber for higher speeds involved no major changes in design and was accomplished without serious difficulties. The modifications consisted of the following:

1—Change of the gearing ratio at the swivel head from 8 to 1 ratio to 6 to 1 ratio, thus affording higher spindle speeds with a moderate speed at the long driving shafts.

2—The main spindle bearing was equipped with a bronze bushing replacing the original steel bushing. The intermediate and end arbor bearings were likewise equipped with bronze bushings.

3—All the bearings on the swivel head, swivel-head slide, and drive shafts (bearings normally equipped with grease cups), were supplied from a "Bijur" high-pressure oiling pump through a system of pipes and metering valves.

4—The hob-drive 90 degree-angle gear box on the lower end of the stanchion and the one on the swivel slide were connected with the oil pump at the main gear box to circulate oil for lubricating and cooling both bevel-gear boxes. After circulating through both small gear boxes, the oil returns to the main gear box.

5—To add rigidity to the set-up, the gear hobber was equipped with a hob arbor 2½ inches in diameter, thus matching the diameter of the composite-hob bore. The machine was likewise equipped with an over-

Fig. 4—Magnified close-up of composite hob showing method of holding sintered carbide strip teeth. Dark areas in background are spaces between another row of teeth

arm tying the work-support column to the stanchion, thus giving the hobber added rigidity. This arm also carries a three-point steady rest for the work.

6—A 10-inch diameter, 73-pound flywheel was mounted at the free end of the hob arbor to add stability to the spindle in maintaining uniform angular velocity.

The consensus of those witnessing the experiments was that there would be a rapid utilization of the methods and techniques very soon. They agreed generally that the principles established would, before very long, result in widespread benefits to the gear-cutting industry at large, especially since it has been proved that hobbing machines may be operated successfully at speeds far above any ever attempted before and with no appreciable variation in accuracy or efficiency. As for practical application, it was revealed that contracts have already been let with the Illinois Tool Works, Chicago, for the construction of a number of the new composite hobs.

Among the collateral results of the experiments was evidence that certain changes in coolants (cutting oils) will bring about improvements in the performance of cutting tools; and modifications in the coolants used will be tested in future experiments.

Also of significance was the successful use of much-harder steel in the blanks, as enabled by the carbide tools. The holes were 6 inches in diameter with 2½-inch bore, five-pitch single thread.

Engineering NOTES

Electronics Control Machine

Electronic controls on postwar textile mill machinery will be a prominent development and are already in service on some units. Shears built by Curtis & Marble Machine Co., Worcester, Mass., have an electronic device for precision cutting of cotton and rayon fabrics to width. Motors powering shear automatically halt and reverse when a seam in the roll of goods being cut appears. When the seam is clear the shear automatically resumes.

★ ★ ★

Use Stainless in Flash Boilers

Problem of finding a suitable steel for use in welded tubing of aircraft flash boilers which must resist corrosive action of engine exhaust at temperature of around 1750 degrees Fahr. was answered by use of type 446 stainless steel, containing about 27 per cent chromium, 1 per cent manganese and 1 per cent silicon, with carbon 0.20-0.35. Highly successful in this application, the steel is claimed to be scale resistant up to 2000 degrees Fahr.

★ ★ ★

Armor-Piercing Shell

The Army's solution for penetrating the heavy armor of German Tiger and Panther tanks is an armor-piercing shell with head of Carboloy — extremely tough tungsten carbide. The new type of shell is said to weigh only 9 pounds, compared with 15 for the old type. Its "super toughness" permits it to penetrate tanks or pillboxes where the main body of the shell explodes, spreading lethal particles in all directions. Frontline reports state that enemy tanks have been stopped by a single shot at 3000 yards by these projectiles. Earlier in the war, the German Army was said to be using a similar head on its armor-piercing shell.

★ ★ ★

Nitrogen in Metallurgy

When engineers began drawing up specifications for equipment required in the new high-octane gasoline fractionating plants, the need arose for a strong steel which would resist alternate 20-minute cycles of highly oxidizing and then reducing atmospheres at temperatures of around 1400 degrees Fahr. Type 446 stainless (27 per cent chromium) was the choice of metallurgists, but it did not prove successful until research work resulted in a modified analysis in which nitrogen content was raised from 0.05 per cent to 0.137 per cent (probably by the use of high-nitrogen ferrochrome). Nitrogen acts as a grain refiner in alloy steels, and is given the full credit for making type 446 stainless suitable in this application. A metallurgical precept coming into general acceptance is that nitrogen is bad in carbon steels, good in alloy steels. Much more will be heard of nitrogen in tomorrow's metallurgy.

★ ★ ★

All-Year Air Conditioning

The home builder after the war will have available a completely self-contained unit for all-year air conditioning unit. It has a gas-fired steam boiler which delivers steam to a heating coil within the fan section of the unit in winter. The same boiler also supplies steam in summer to an absorption refrigeration unit also contained within the assembly, the cool air being circulated by the fan. The entire unit is controlled by a thermostat and a 3-way switch with "heating", "refrigeration" and "off" positions. The unit was engineered by Servel Inc., Evansville, Ind.

★ ★ ★

Shellac For Drawing Tubing

Difficulty of cold drawing stainless steel tubing without galling of the material in the draw die and resultant scratching of the tube has been a tough nut to crack. One leading manufacturer of this material conceived the idea of coating the hot-rolled tube with an adhesive which would remain on the surface during the drawing operation. Adhesive finally developed is ordinary shellac, mixed in the ratio of 1 part in 5 with alcohol, to which lithopone is added in suspension. Tubes are dipped in this mixture, then baked to dry, and drawn. The successful development of this adhesive has permitted much greater reductions in the draw and much faster drawing.

★ ★ ★

Metallurgy Cuts Weight

The 75-millimeter gun of World War I weighed 1015 pounds, as compared with the 410 pounds of the 75-millimeter gun of today—a direct measure of improved metallurgy.

★ ★ ★

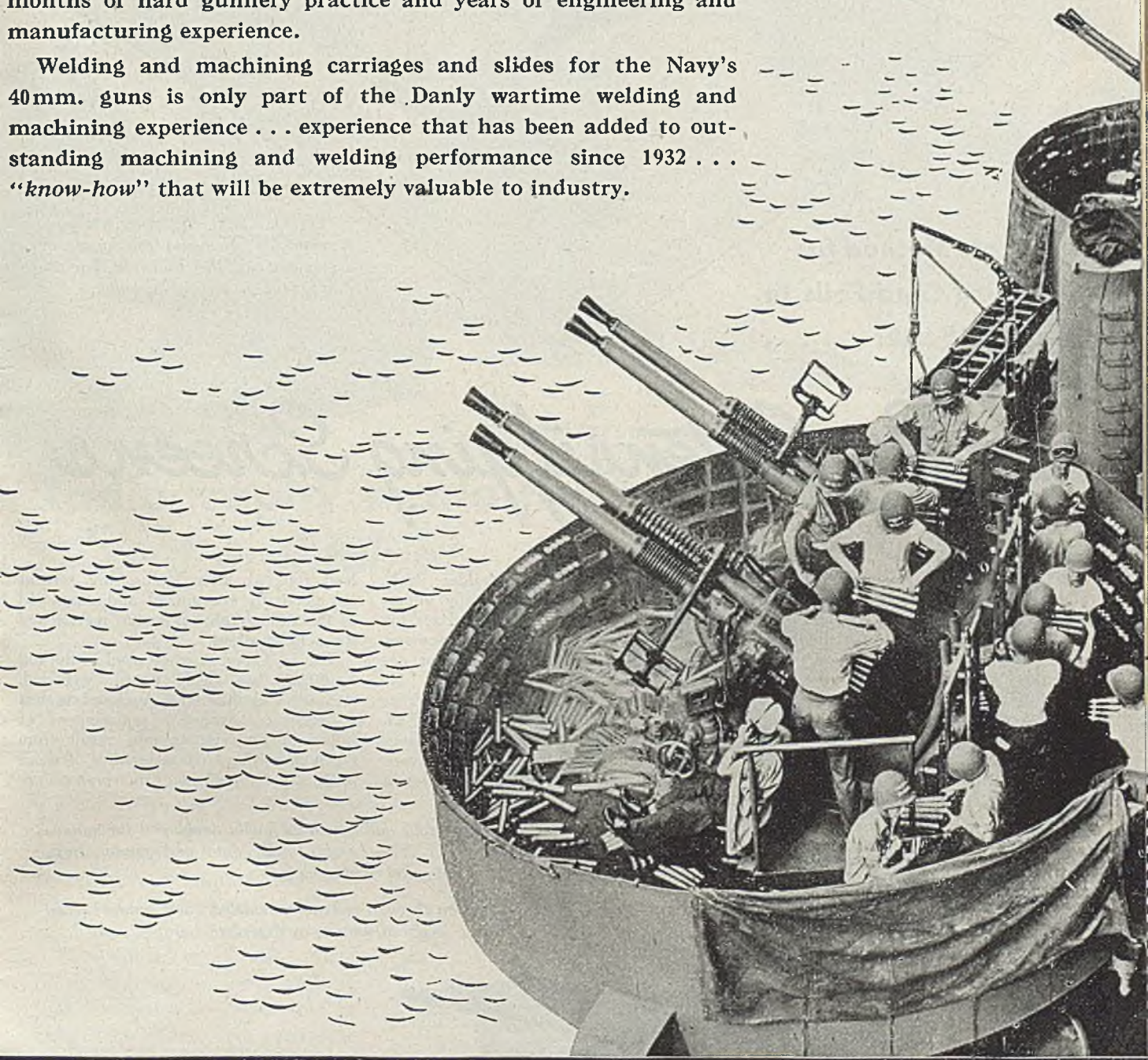
Hose-Type Heater

Ceramics and steel are employed in an electric heater that looks like hose and coils like hose. Inclosed in a wire-wound casing, it is available in varying lengths and diameters and in capacities from 15 to 20 watts per lineal inch. Temperatures up to 1000 degrees Fahr. are said to be maintained without damage to the element. Heat may be applied either direct or through the medium of clips and fixtures. Developed primarily for heating pipes, melting pots, molds and equipment of oddly shaped contours around which it can be laid as close together as necessary, the unit may be left exposed, coated with insulating cement or sealed into an assembly.

"KNOW-HOW" *Doesn't Come Overnight*

The amazing precision of gun and crew of the Navy's 40mm. Bofors is not a result of a short training period. Behind this precision are months of hard gunnery practice and years of engineering and manufacturing experience.

Welding and machining carriages and slides for the Navy's 40mm. guns is only part of the Danly wartime welding and machining experience . . . experience that has been added to outstanding machining and welding performance since 1932 . . . "*know-how*" that will be extremely valuable to industry.



"OFFICIAL U. S. NAVY PHOTOGRAPH"

DANLY MACHINE SPECIALTIES, INC., 2100 South 52nd Ave., Chicago 50, Ill.

DANLYWELD

Danly Die Sets • Die Makers' Supplies • Welded Steel Fabrication

By JOHN DELISA
X-Ray Laboratory
General Electric Co.
Schenectady, N. Y.

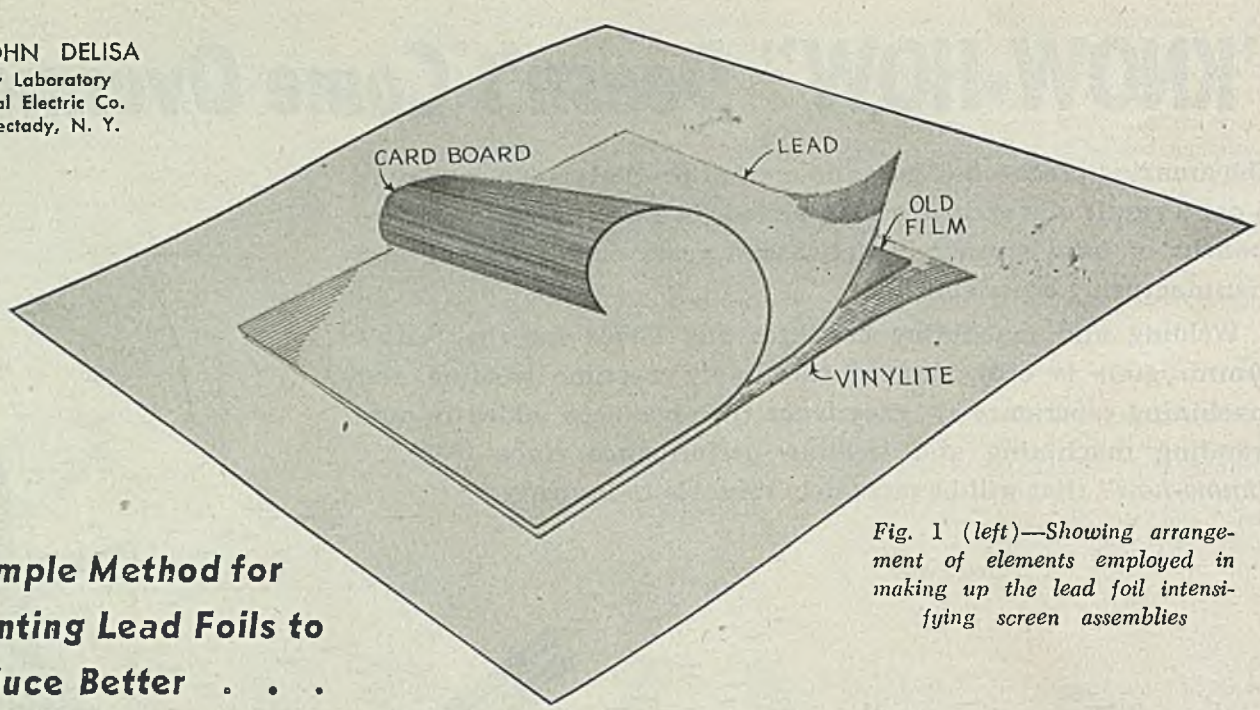


Fig. 1 (left)—Showing arrangement of elements employed in making up the lead foil intensifying screen assemblies

A Simple Method for Mounting Lead Foils to Produce Better . . .

X-Ray Intensifying Screens

IN TIMES past, calcium tungstate and similar fluorescent intensifying screens were a very important and necessary auxiliary accessory to the then available industrial X-ray equipment. Present day high-voltage X-ray machines eliminate the need for high intensifying fluorescent screens. Because of the tremendous penetrating ability of the million volt radiation, the need for high intensification of fluorescent screens has given way to the lead filter-intensifying screens, commonly referred to as lead screens.

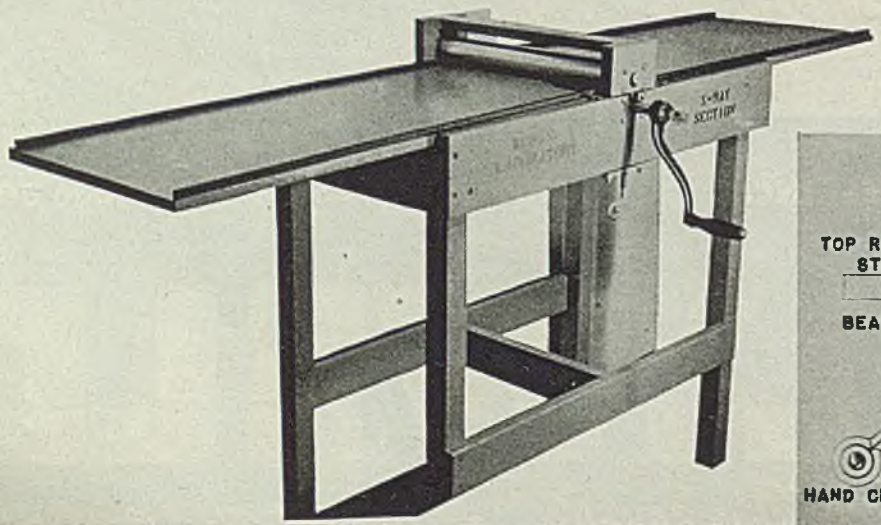
When used, the lead screen has an intensification factor of three as compared with no screens at all. They also filter out and absorb all of the scattered radiation from the film holder itself. The lead foils do not have any granular appearance such as characterizes the chemically coated fluorescent screens. This results in a sharper and finer detailed finished radiograph.

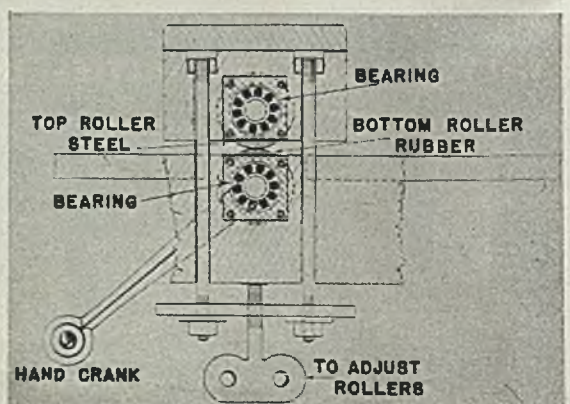
The ability to bend the foils allows the use of flexible film holders which can be wrapped around circular or irregular objects. These among other advantages of using 0.005 and 0.010-inch lead foils as filter intensifying screens are generally recognized and employed in the radiography of heavy metals and some light alloys.

The lead screens when used in the foil conditions are easily pitted, wrinkled, creased, and otherwise rendered useless as screens. Frequent replacement of foils and poor radiographs result from the poor physical characteristics of these screens. *Radiographic interpreters are*

Fig. 2 (left, below)—View of rolls and bench as finally developed for mounting the lead foil screens into the assembly. All data and photos from "Industrial Radiography"

Fig. 3 (right, below)—Section through rolls of remodeled hand wringer fitted to process the lead foil mounts as described here





. . . but for one foundryman Radiography made the impossible *possible* . . . *and profitable!*

He made a series of castings . . . x-rayed each . . . got a step-by-step picture of what was wrong . . . perfected his technic . . . and delivered a sound casting.

SHRINKAGE REVEALED in the exhaust port of one of the experimental castings.

SHRINKAGE ELIMINATED as result of step-by-step development of casting technic.

RECENTLY a motor manufacturer designed a radically different type of crankcase. It was simpler and lighter than conventional designs and could be machined fast and economically.

Four foundrymen were called in to do the job. Two refused, said it would be impossible to cast. The other two agreed to try, but one gave up at the end of three weeks, said it couldn't be done. The other was meeting with success. He was x-raying each pilot casting, making a step-by-step analysis of shrinkage difficulties, eliminating them as they developed. Result? He developed a trouble-free casting technic that enabled him to supply *all* the crankcases originally scheduled for the job from the four foundries.

This is just another one of the many valuable ways radiography is serving industry. In addition to doing an outstanding job of non-destructive inspection, radiography is pointing the way to designers in reducing weight, safely . . . to engineers in specifying more efficient alloys and manufacturing methods, with assurance . . . and to fabricators in the use of new assembly technics of proved merit.

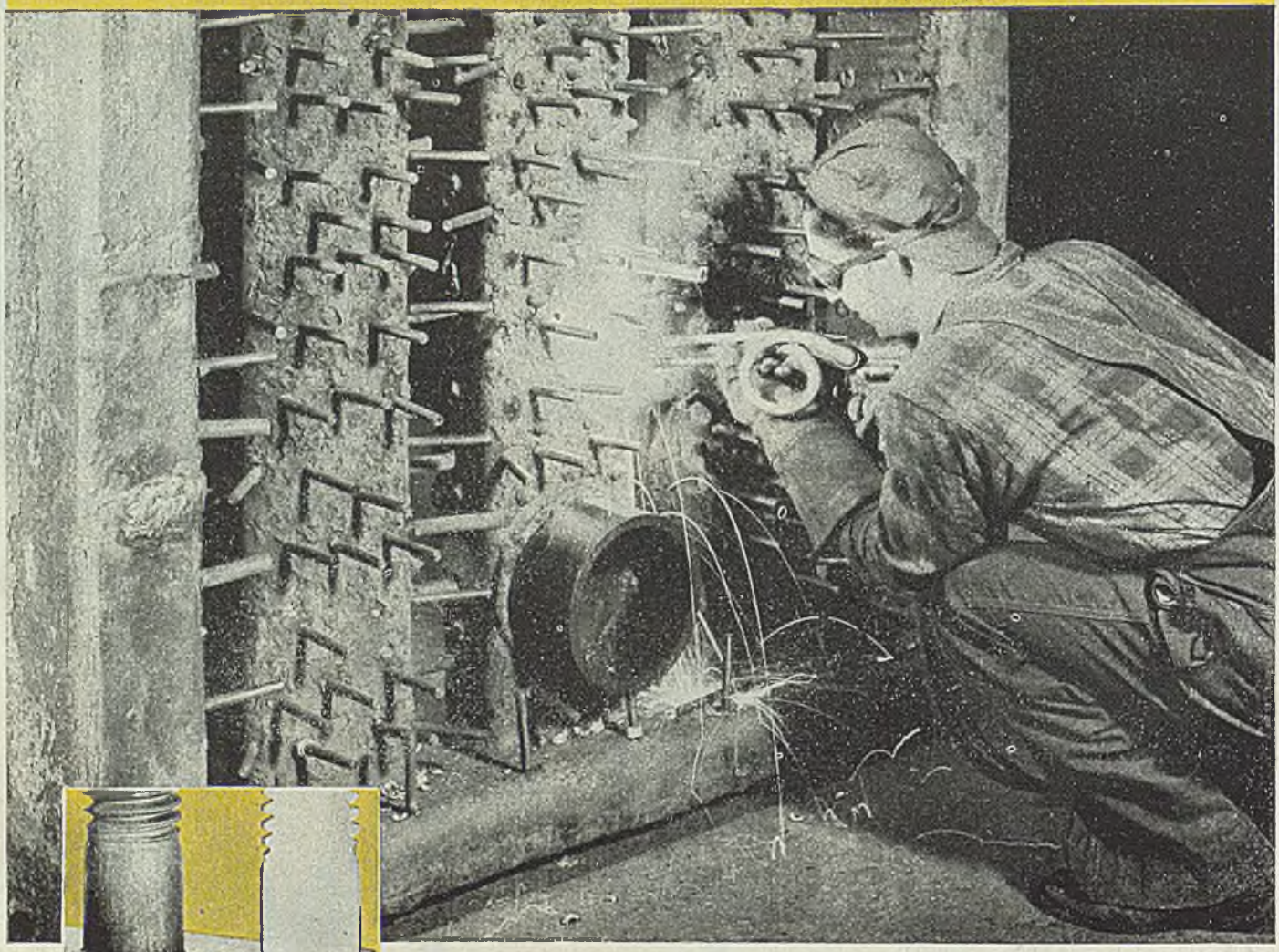
The increase in quality, lowering of cost, and speeding up of production, resulting from the increased use of radiography, will be particularly important in meeting tomorrow's opportunities. Eastman Kodak Company, X-ray Division, Rochester 4, N. Y.

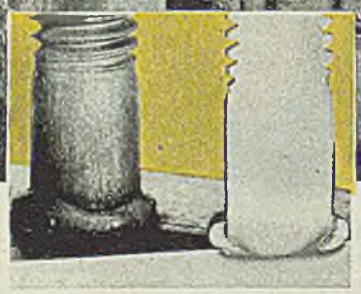
RADIOGRAPHY

Analyzes . . . Instructs . . . Corrects . . . Improves

Koda

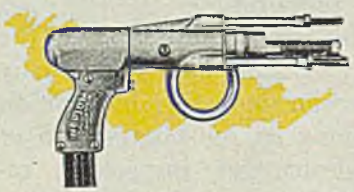
Stud welded in ½ second to Open-Hearth Door!





To increase the life of open-hearth doors—to cut repair time—steel manufacturers are now using this *automatic* means of end-welding studs to metal. The studs are rapidly installed by a welding gun, and their complete fusion to the metal door is increasing door life as much as 150 heats or more without restudding.

The stud is inserted in the Nelson Stud Welder and the trigger pulled. Instantly the stud lifts, allowing the hot welding arc to fly from the end of the stud to the door. The stud is then automatically plunged into the molten metal and is fused to the door. These Nelson stud welds are as strong as any hand method. Welds are consistent with full fillet.



The Nelson Stud Welder is used with a standard generator and an automatic timer control unit which regulates the time the welding current flows. Consistent welds are assured.

No previous welding experience is necessary. Operators are welding as many as 500 to 1000 studs per shift.

Now thousands of stud welders are being used in more than 650 industrial plants and shipyards. *Write for complete information, catalog, and report "Stud Welding Open-Hearth Doors":*

NELSON SPECIALTY WELDING EQUIPMENT CORP.
Dept. T, 440 Peralta Avenue
San Leandro, Calif.

Eastern Rep.: Camden Stud Welding Corp. Dept. 122, 1416 So. Sixth St., Camden, N. J.

NELSON STUD WELDING

very chagrined when what was thought to be a crack or gas porosity in otherwise sound castings turns out to be no more than a wrinkle or crease in the lead foil screen. It is readily seen that sound castings can be rejected as being defective because of poor lead foils. With the advent of very fine grain film, super-sensitive to surface imperfections of the lead foils, it became evident that improvements had to be made in the lead screens.

The X-ray Section of the Schenectady Works Laboratory, General Electric Co., has worked for some time with the idea of improving the lead screens. This was brought about by mounting lead foil on a suitable base material, retaining all of the advantages of the lead foil and at the same time elminating the poor physical characteristics of the foil. The foil was mounted on a cardboard sheet which gave us a very good screen. Recently scrap film from our record files was substituted in place of cardboard. This was found to be much superior to our cardboard mounted screens. The cardboard after some use would crease and crack. These creases and cracks carried through to the foil, thus reproducing themselves, to appear as cracks on the radiographs.

Screens Are Flexible

The flexibility of the film base and its ability to withstand the sharp bending without creasing or wrinkling eliminates the trouble experienced with cardboard backing and also makes the screens far superior to any we have so far used. They last much longer and give less trouble in handling. The radiographer can appreciate the desire to have screens as nearly perfect as possible when working with the newer, fine grain, high contrast films which are very sensitive to the surface imperfections of the screens.

Material used in making the mounted screens is 14 x 17-inch scrap film, 14½ x 17½ inches lead foil either 0.005 or 0.010-inch thick, Vulcalock cement, and Linetite thinner. Equipment used in making the mounted screens includes Vinylite sheet (16 x 19 inches), cardboard sheet of same size; and a hand wringer with stainless steel top roller, gear removed, ball bearings added, hand crank driven bottom rubber roll (see Figs. 2 and 3); spraying booth and spray gun.

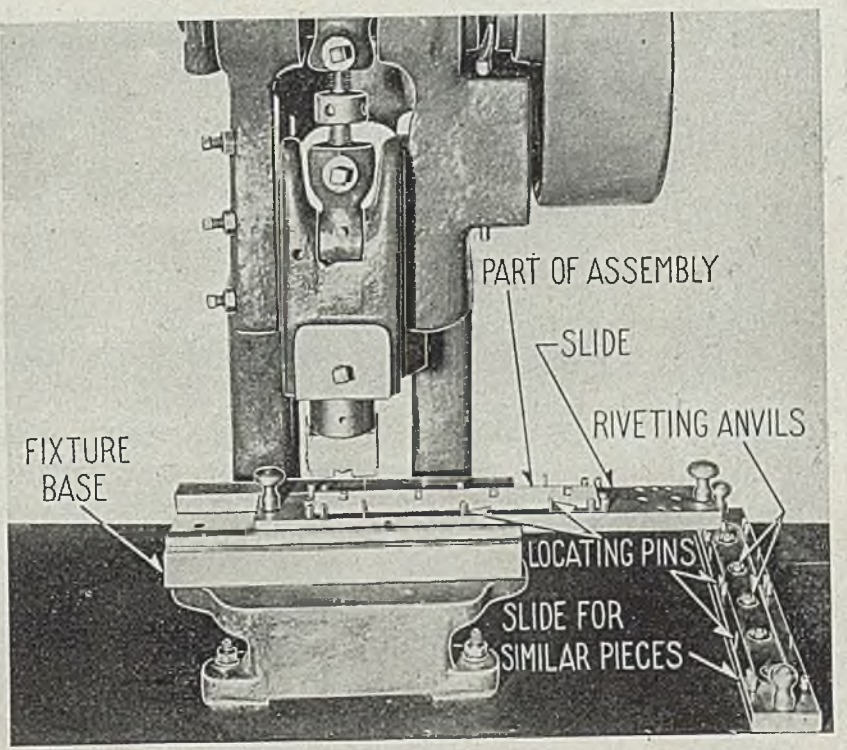
The scrap film is sprayed with a mixture of Vulcalock cement and Linetite thinner. Approximately three parts of thinner to two parts of cement will give the proper spraying mixture. This might vary, depending on various working conditions, spraying equipment and technique employed by the operator. The primary coat is sprayed very thin and evenly over the surface of the film and allowed to dry. A second coat is then applied, and while still tacky, the lead foil is dropped onto the sprayed film.

The film and foil are then sandwiched in between two sheets, a bottom vinylite sheet and a top cardboard sheet. See Fig. 1. This is immediately run through the rolls of the hand wringer with little or no pressure on the rolls. The screen is then trimmed to the 14 x 17 inches film size by cutting off the overlapping foil, which was 14½ x 17½ inches to start. The screen is then ready to use as is or cut down to any desirable size.

The degree of success in making the screens depends on the spraying process. Difficulty in obtaining satisfactory screens was experienced in our first attempts because of a poor, unevenly sprayed surface. This has been overcome by using experienced and careful control in the spraying process.

Riveting Fixture

. . . . Simplifies location of rivets on common center line. Punch press, serving as mount, presses parts of assembly together for tight fit, then heads rivets



RIVETING fixture, mounted on a bench type punch press as shown in the accompanying illustration, facilitates assembly when many rivets are to be located in various positions on a common center line. The base of the fixture is fixed on the press table. Nested in the base, directly under the center of the punch, is a ball bearing backed up by a spring. The bottom side of the slide is counterbored under each rivet location so that as the slide is moved the ball bearing rises into a counterbore and locates the assembly in a riveting position. A riveting anvil is mounted on the slide at each rivet position. Locating pins on the slide position the pieces to be riveted.

The operator makes the assembly and places it in the fixture. As the assembly is moved towards the left, it is located in the first riveting position by the ball bearing rising into the counterbore. The press is then operated and the rivet is headed; this is repeated until the assembly is completely riveted.

The punch serves a twofold purpose—it presses the parts of the assembly together before riveting to insure a tight fit, and then it heads the rivet.

In the lower righthand corner of the photograph is shown a slide made for parts similar to the one in the press, devised at the Sunbury Plant of Westinghouse Electric & Mfg. Co. A complete fixture need not be built for each job because slides for various jobs may be built for use in a common base.

Carl J. Malloy, roller,
28 years with J&L

MANY STEEL PROBLEMS SOLVED ON J&L-DESIGNED BAR MILL

The versatility of steel—its adaptability and usefulness in countless fields and unnumbered ways in war and peace—is exemplified to a marked degree in this continuous, variable-speed bar mill.

Since this J&L designed mill was put into operation it has produced more than 3,000 different special sizes, weights and designs of steel shapes, including a number of exclusive J&L products that save weight and add strength in all manner of construction projects.

Throughout the war, this mill has been rolling night and day, converting the white-hot billets of steel into shapes useful to the Army, Navy and Maritime services and doing it with the speed and precision that have solved many critical and urgent problems of procurement and supply.

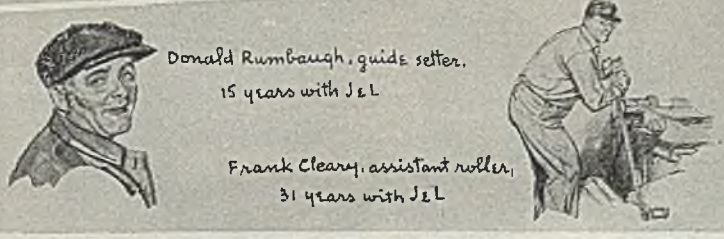
Ready for war, without the costly delays of conversion, this mill is ready for peace, when tank steel will be fashioned into road machinery, LST steel into South Seas traders.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

CONTROLLED QUALITY STEEL FOR WAR AND PEACE



FROM AN ORIGINAL DRAWING AND SKETCHES MADE AT J&L ALIQUIPPA WORKS BY ORISON MACPHERSON

J&L "JUNIORS"

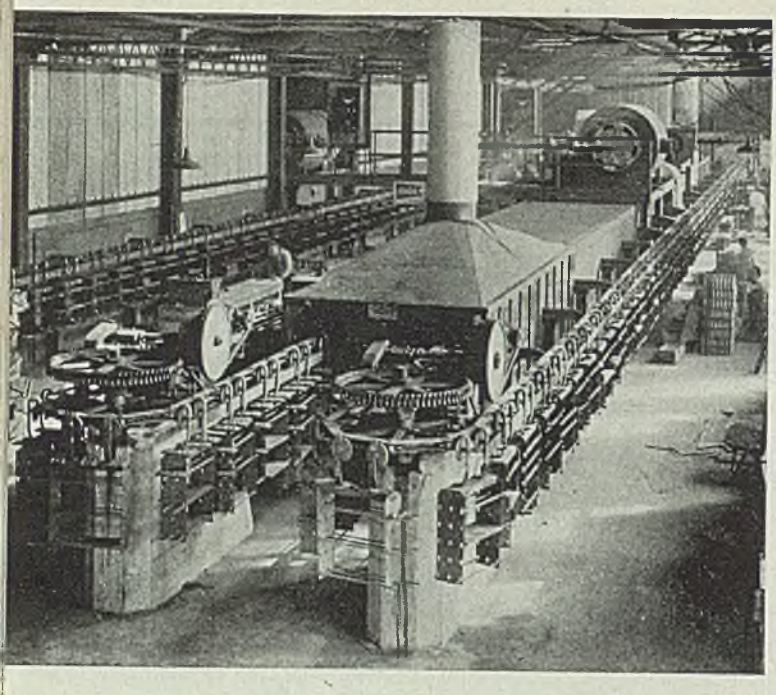
Jr. beams and channels are patented products of the Jones & Laughlin Steel Corporation. They are structural steel sections literally "Junior" to the well-known heavy structural members. Rolled on the versatile J&L bar mill (see illustration), they afford strength with minimum weight. They are not bent or fabricated, but rolled like their big brothers and are adapted to a great many applications not feasible for the heavier beams. Slit into "T's", they are used extensively by welding to decks and bulkheads as stiffeners in Navy ships, submarines, landing craft and are even utilized in the construction of pontoons by the Seabees. Peacetime use includes service in floors, roofs and stairways of apartments, dwellings, schools and skyscrapers.

Pontoons, "avenues of invasion," the war's most effective unloading apparatus, were devised by U. S. Navy to bridge gap between ships and shores. Built by Seabees, the pontoons were "unveiled" at Sicily, have now spread to every amphibious front. The pontoons are 5 x 7 x 5 ft. cubes. The frame is J&L Junior beams slit into "T's" and covered with steel plates, welded watertight. Pontoon units are used to form causeways, docks and seagoing vehicles. Interlocked as "rhinoferries," and pushed by outboard motors, they ply back and forth, unloading men and material. They are used as unloading docks, as lighters, as ramps, and even as water tanks for troop showers and sprinkling carts in airfield construction.

"Tear drop" steel sections, especially designed by Army Ordnance to form bullet deflectors on tank ventilators, are rolled on this J&L bar mill.

Ships—by initials. If you are confused by invasion dispatches which mention various types of landing ships, here is a partial list of official initials by which these ships are known: LSD Landing Ship, Dock; LST Landing Ship, Tank; LCI (L) Landing Craft, Infantry (Large); LCVP Landing Craft, Vehicle, Personnel; LCM (3) Landing Craft, Mechanized (Mark III); LCT Landing Craft, Tank; LCT (5) Landing Craft, Tank (Mark V); LCT (6) Landing Craft, Tank (Mark VI); LVT Landing Vehicle, Tracked (Unarmored); LCS (S) Landing Craft Support, Small; LSM Landing Ship, Medium; LCR Landing Craft, Rocket. Practically all these types of war craft utilize Junior steel sections rolled on the J&L 14" bar mill.

"Big Boy of the Jungle" is what our troops in the Pacific have named that 20-ton, snorting, clanking, pushing, pulling, never-stopping monster of steel that crashes through the tangle of the jungle to break trails, build roads, construct air fields, haul guns and trucks to the front, the Yankee-invented caterpillar "bulldozer." The Japs hold them in awe. Several steel components of the bulldozer are rolled on the J&L 14" bar mill.



Core Making

. . . . is speeded up considerably by conveyor ovens which cut much handling work, produce cores with greater impact and tensile strength, make 32 per cent saving over previous methods, handle 7500 pounds of cores per hour

WHEN the Pittsburgh Valve & Fitting Co. decided to streamline core production in its Barberton, O. plant, it started by rearranging the entire core department around the three-zone automatic double conveyor oven shown above. That this move was sound has since been proved by these facts:

Baking times have been reduced 30 to 40 per cent. The cycle is 60 minutes, regardless of core size, due to controlled temperature variation.

Cores have greater impact resistance and show a tensile strength increase of 15 per cent, with rejects cut to less than half of 1 per cent of total production.

Preheating of cores in initial oven zone uses cooling zone exhaust as make-up air for the heating system. Careful oven engineering of the entire project results in approximately 32 per cent saving over cost of previous methods.

Conveyors travel past coremakers' benches, eliminating use of auxiliary trucking and cutting loading time and labor materially.

The oven comes to temperature in 20 minutes, and is started when coremakers come to work, thus eliminating the need for a watchman or fireman to start oven in the early morning.

In addition to the double conveyor oven, a single conveyor oven of the same type is included in this installation. Both ovens are 120 feet long, carrying work directly into the core storage room. Capacities are 5000 and 2500 pounds of cores per hour, respectively—plus weight of plates, conveyor, chain and racks.

Cores treated in this plant vary from a few ounces to 30 pounds each, and are dried together without overbaking small ones or underbaking large ones. Maximum temperature is 600 degrees Fahr. controlled at two points within the system, and heat input is automatically proportioned according to the temperature drop in primary zone and baking zone proper.

The primary oxidation zone, which preheats cores with exhaust air from the baking zone, is a new departure in core oven design. In the baking zone, the distance from supply duct to recirculation duct is nowhere greater than 2 feet, assuring a very low temperature drop.

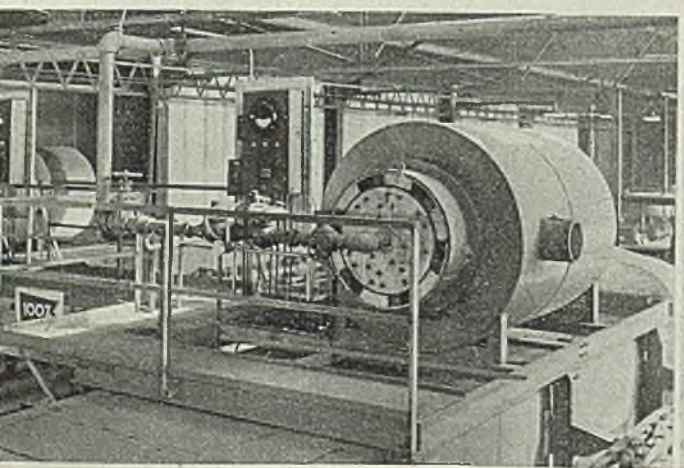
Photo at left shows air heater for double-conveyor oven. Its gas capacity is 4000 cubic feet per hour. Heating equipment is housed in a steel plate casing insulated with magnesium blocks and 1600 degrees insulating brick. The main recirculating fan is built to withstand 1000 degrees Fahr. The burner is of the multi-jet, forced inspirator type, arranged for 12-1 turn-down ratio for minimum and maximum heat loads in the handling of a volume of small or large cores.

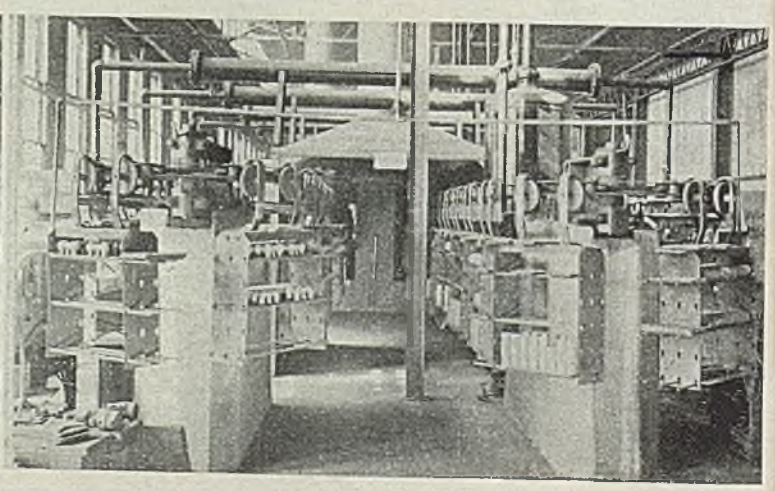
Baking ovens were designed and installed by Industrial Oven Engineering Co., Cleveland.

Top—Overall view of double conveyor oven. Note conveyors loop out beyond oven past coremakers' benches to eliminate many handling operations

Left—Closeup of air heater mounted on top of oven near center. It has a capacity of 4000 cubic feet per hour. Photos from Industrial Oven Engineering Co., Cleveland

Right—Closeup of entrance end of double conveyor core baking oven. Conveyor carriers use three to five shelves upon which the cores are placed. Carriers are moved along through oven by large links forming continuous chain. Weight of carriers is supported from stationary rails built into furnace, wheels on top of carriers riding on these rails. Driving chain carries no vertical load





TANK FOR PICKLING STEEL

Typical construction of tanks used by "The Nation's largest hot-dip-galvanizing shop."

When steel plates are pickled, prior to galvanizing, in 10% sulphuric acid at 180° F., corrosive action is severe. The tank shown above is lined with a double course acid-brick, laid entirely with Penchlor Acid-Proof Cement, which gives corrosion protection and also withstands the physical abuse resulting from submerging and withdrawing steel plates in this solution.

PENCHLOR

Reg. U. S. Pat. Off.

Acid-Proof Cement

... sets quickly, reducing construction delays. It is a self-hardening sodium silicate type cement and has exceptionally long life, as proved in hard service and under severe acid conditions. It is unaffected by *all acids*—hot or cold—dilute or concentrated—except hydrofluoric acid.

Penchlor Acid-Proof Cement, used as a mortar, adheres strongly to brick, steel, glass, lead, rubber, and asphalt. Write today for further information.

OUR LONG EXPERIENCE WITH CORROSION PROBLEMS QUALIFIES US TO OFFER OUR RECOMMENDATIONS IN A WIDE VARIETY OF CONSTRUCTIONS. WRITE US ABOUT YOUR PROBLEM—NO OBLIGATION!

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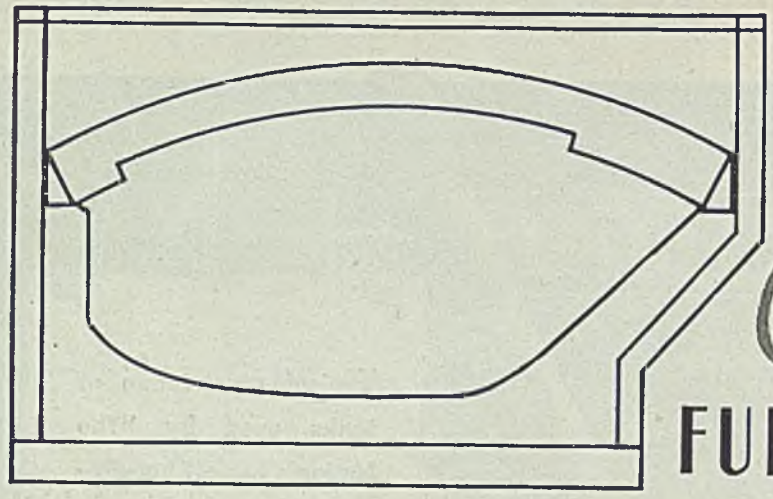


By EDWIN N. HOWER
General Masonry Foreman
Homestead Steel Works
Carnegie-Illinois Steel Corp.
Munhall, Pa.

Controlling FURNACE EROSION

Fig. 1 (above)—Cross section of an open-hearth furnace employing drop sections front and rear

Drop sections of silica brick along open-hearth skewback help to prolong roof life. Basic brick found advantageous in making front and backwall repairs. Masonry crews trained in the art of hot patching roofs has been found highly beneficial in many open-hearth shops

PRESENT demand for increased tonnage from existing steel melting furnaces makes it necessary to reduce the time for furnace repairs to a minimum and to increase as far as possible the time between repairs. Scheduled furnace repairs and the use of mechanical tear-down equipment have done much to reduce the length of time for furnace repairs. To increase the time between repairs, use must be made of improved refractory materials and construction methods to combat the progressive destruction of the furnace lining, thus tending to achieve a balance between life of furnace brickwork and the cost of maintaining it in workable condition.

The first and probably most important cause of refractory destruction is erosion resulting from the mechanical abrasion and fluxing by hot, oxide-laden furnace gases.

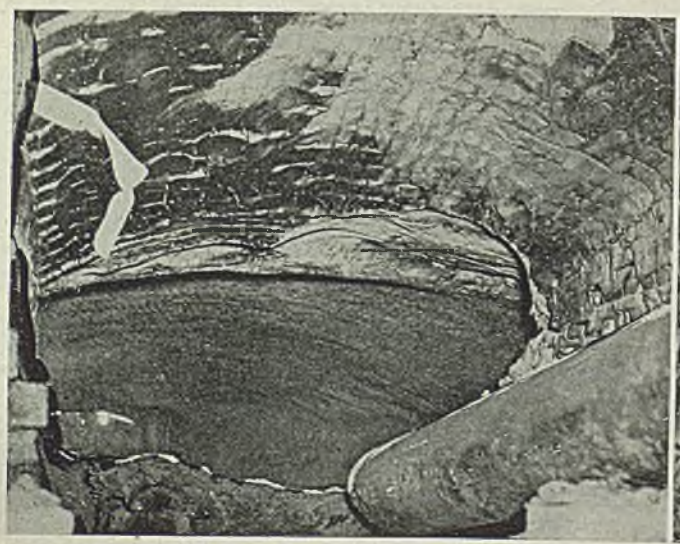
Erosion is generally greatest in the body or combustion chamber of the furnace and becomes progressively less from the body down through the wells, the fantails and checkers, and out the flues to the stack. This is true because along this path of falling temperature there is a corresponding decrease in the softening tendencies of the refractories and in the rate at which they are destroyed through penetration and attack by slags and fluxes, with subsequent vitrification, spalling, bursting, or plain melting.

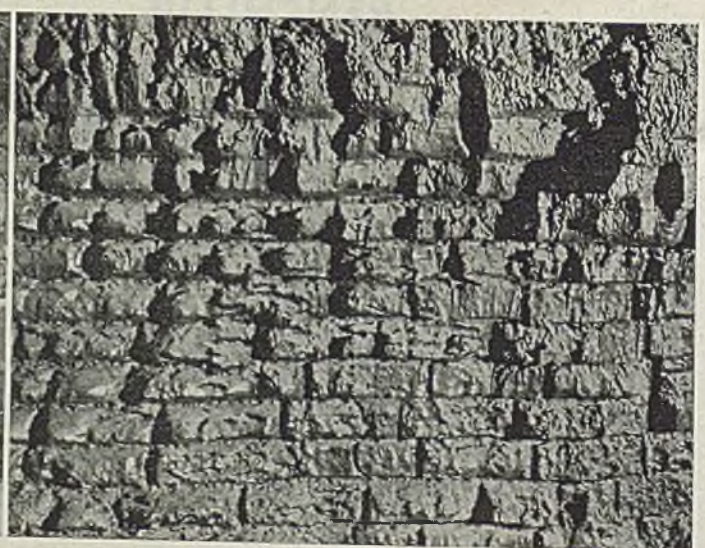
Secondary causes of destruction of open-hearth brickwork included such items as charging machine abuse, movement of walls and arches due to insufficient allowance for thermal expansion, pure thermal spalling, and various minor items such as water leakage, improper bricklaying practices, excessive vibration of the furnace structure, etc. These items are generally easily recognized, and the means for their elimination is rather obvious.

Areas of most severe erosion in the open-hearth brickwork include such shop and sometimes even from furnace to furnace in the same shop; however, the erosion is generally most serious in the roof. This is an important consideration, as the roof is practically the only section of the furnace above floor level which cannot be replaced without a rather lengthy shutdown. Fig. 2 shows a typical case of roof erosion above the back corner. In this view, taken from the endwall looking towards the body of a tar fired furnace, small erosion areas in the uptake roof are visible, with severe erosion in the main roof just beyond the back corner plainly shown. In other furnaces the erosion area may be along the rear skewback channel, over the taphole or hunch hole, or along the front skewback channel, while an occasional roof will fail first in the center.

When the burner is adjusted with respect to uptake and port areas and

Fig. 2 (left)—Typical erosion of brickwork in open-hearth furnace roof
Fig. 3 (right)—Erosion of brickwork in a hot metal mixer



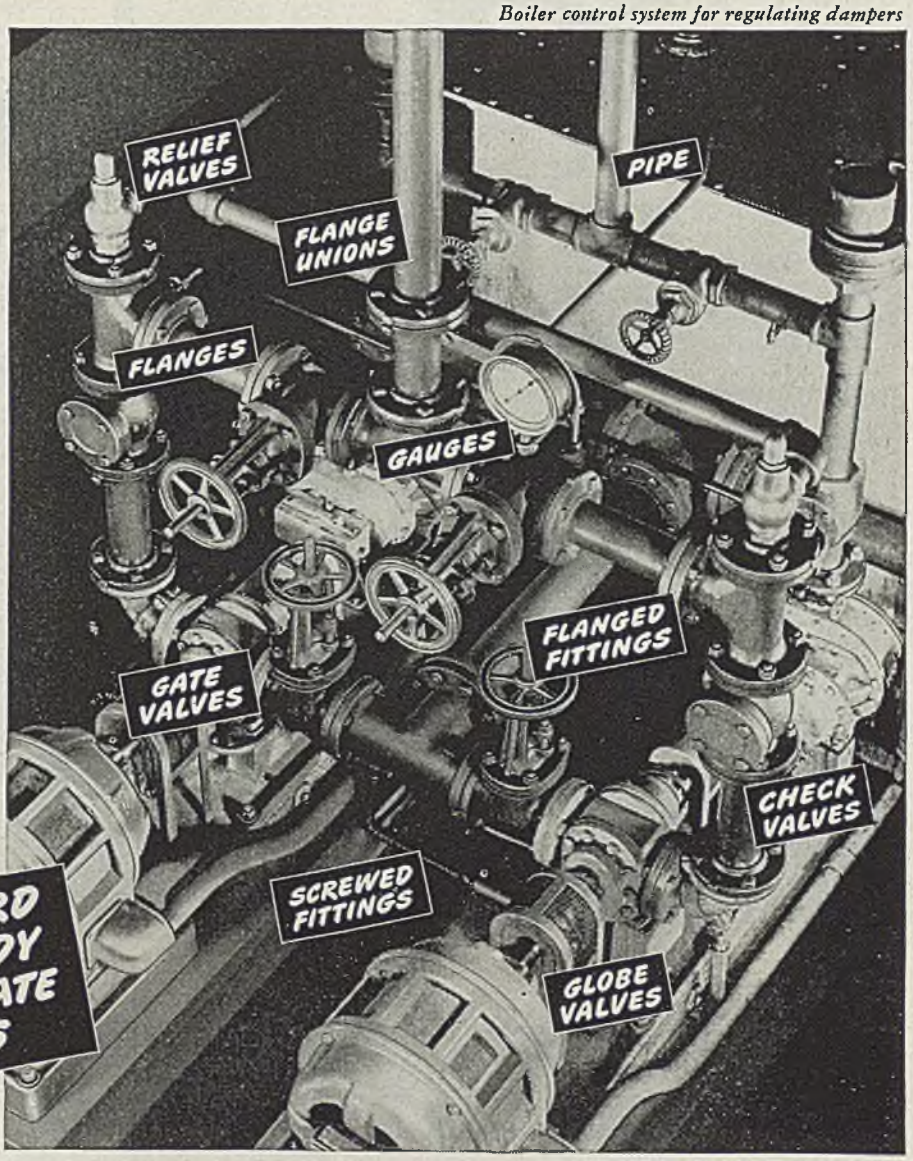


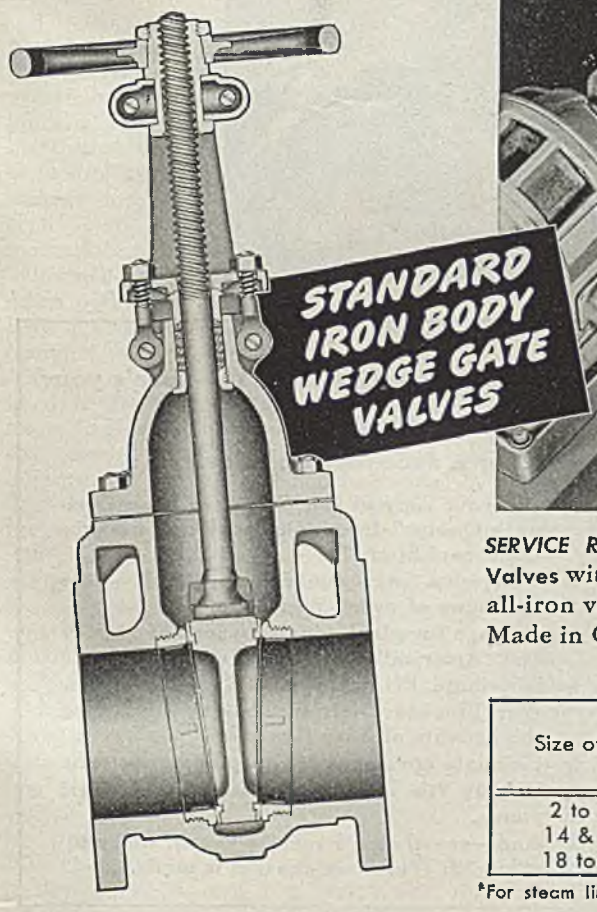
DEPEND ON CRANE . . . WHEN IT'S PIPING EQUIPMENT YOU NEED

ONE SOURCE OF SUPPLY • ONE RESPONSIBILITY FOR ALL PARTS • ONE STANDARD OF QUALITY

To keep piping at its best, to simplify and speed up deferred replacements—call on the Crane line. You choose from the world's greatest selection of piping materials—in brass, iron and steel. One source—your Crane Branch or Wholesaler—supplies on one order all your requirements. Every part is uniform in quality, backed by a single responsibility. Your whole task from ordering of parts to installing them is simplified—and at the same time you are benefiting by Crane Co.'s 90-year leadership in the field of piping materials. Below is an example of Crane complete lines—in Standard Iron Body Wedge Gate Valves.

Boiler control system for regulating dampers





SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-rising Stem patterns.

Working Pressures

Size of Valve	Screwed or flanged end valves		Hub end valves
	Saturated Steam	Cold water, oil or gas, non-shock	Cold water or gas, non-shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 & 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150 pound Cast Steel Gate Valves are recommended. (For sizes under 2 in., use Crane Clamp Gate Valves.)

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Plant your flag on top, too!

This year we've got to make 2=3!

This year we've got to make 2=3! We've got to lend Uncle Sam in 2 chunks almost as much as we lent last year in 3. Which means that, in the approaching 7th War Loan, each of us is expected to buy a BIGGER share of extra bonds.

The 27 million smart Americans on the Payroll Savings Plan are getting a headstart! Starting right now they are boosting their allotments for April, May and June—so that they can buy *more* bonds, and spread their buying over *more* pay checks.

Our Marines went over-the-top at Iwo Jima in the greatest, and hardest, battle in the Corps' history. Now it's *your* turn! Your quota in the 7th is needed to help finish this war, sidetrack inflation, build prosperity. So, captains of industry, plant your flag on top—like the Marines at Iwo Jima!

★

CAPTAINS of INDUSTRY—here's your *Check List* for a successful plant drive:

- ★ Get your copy of the "7th War Loan Company Quotas" from your local War Finance Chairman. Study it!
- ★ Determine *your* quota in E Bonds — the backbone of every War Loan.
- ★ Arrange for plant-wide showings of "Mr. & Mrs. America"—the new Treasury film.
- ★ Distribute "How to Get There"—a new War Finance Division booklet explaining the benefits of War Bonds.
- ★ Circulate envelopes for keeping bonds safe.
- ★ Display 7th War Loan posters at strategic points.
- ★ And—see that a bench-to-bench, office-to-office 7th War Loan canvass is made.

★

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

bridgewalls to provide for relatively stable combustion conditions, there are precautions which may be taken to combat roof erosion and thus lengthen roof life and minimize repairs.

The first, and perhaps simplest remedy is the use of drop sections of silica brick along skewbacks if the most severe erosion occurs in this location. Fig. 1 illustrates the typical use of drop sections at the front and rear skew of an open-hearth furnace. Such drop sections are usually helpful in prolonging roof life at these points but their location and extent must be established and checked experimentally. Occasionally the installation of a drop section will affect combustion conditions to such an extent that the erosion area is shifted. Constant checking and trial are required to find the proper combination of thick and thin sections of the roof.

In case the silica drop sections fail to improve conditions, the usual practice is to make a trial of basic roof sections, generally along the skewbacks. These basic sections have proven successful in many roofs in balancing erosion and eliminating costly hot repairs. If the silica drop sections or the basic sections fail to give the desired results, attempts may be made to correct conditions by changes in burners, fuel, draft, charge, etc.

The rapid advance of the all-basic furnace in recent months gives promise of an entirely new concept of open-hearth operation with extremely long furnace life, low slag removal costs, and possibly higher temperatures with resultant shorter time of heat. A silica brick with extremely low alumina content has recently found favor in some shops as a means to combat roof erosion.

Roof life must be balanced with the other portions of the furnace, particularly the slag pockets. For example, an operator who is getting a roof life of 250 heats, and finds his slag pockets filled at the end of this time, would be foolish to increase the thickness or cost of a roof, without a corresponding improvement in slag pocket capacity or life. He should, of course, try to reduce the number or extent of his hot repairs.

Frontwalls, backwalls, corners, and bridgewalls may be considered as a group. If trouble is encountered at these points, some type of basic brick will usually solve the problem. There is a wide selection of basic brick, among which are chrome magnesite or combinations of the two, burned and unburned, and with or without steel binding plates. The application of these various types of basic refractories must be reviewed frequently, as changing furnace conditions may reduce the effectiveness of one type and thus render another more suitable. During the past year or two a few shops have shown higher average roof life, but generally a lower roof life has been reported. This has been the subject of much discussion, with the causes variously described as the drive for greater tonnages, shortage of personnel, lower quality of raw materials, etc. Until these factors have been evaluated and controlled it will be necessary for the furnace operator to study and use all available materials and methods in his attempt to hold his costs and delays to a minimum.

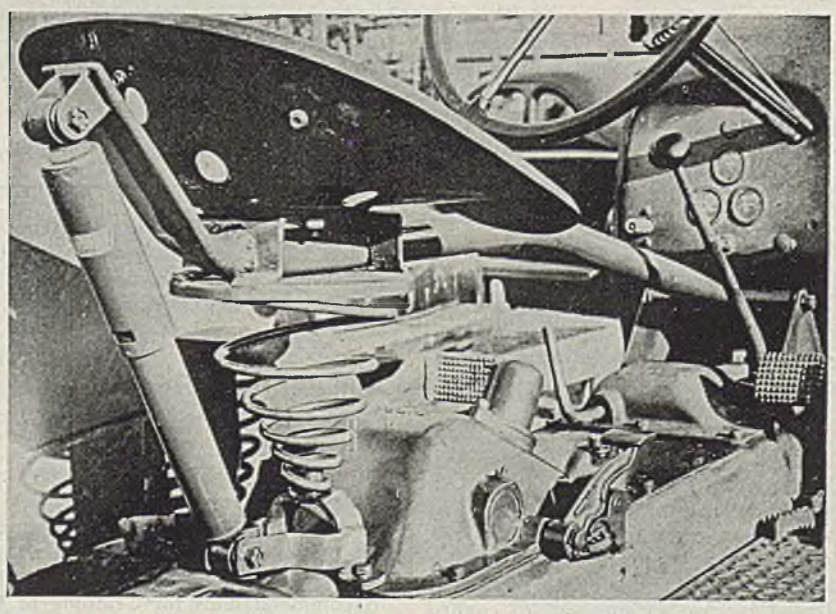
Water cooling of furnace brickwork removes heat from a furnace and naturally increases fuel requirements. It is doubtful if most users know the actual cost of their water cooling. Furnaces should be periodically re-examined with respect to water cooling. Frequently its removal may help, while in other cases the introduction of some water cooling at a particular location may eliminate a constant source of trouble and actually show a net fuel saving when delay and repair time are considered. Shops having extensive endwall repairs may find the use of a small water-cooled box helpful in providing a foundation for patches.

Patching Not Recommended

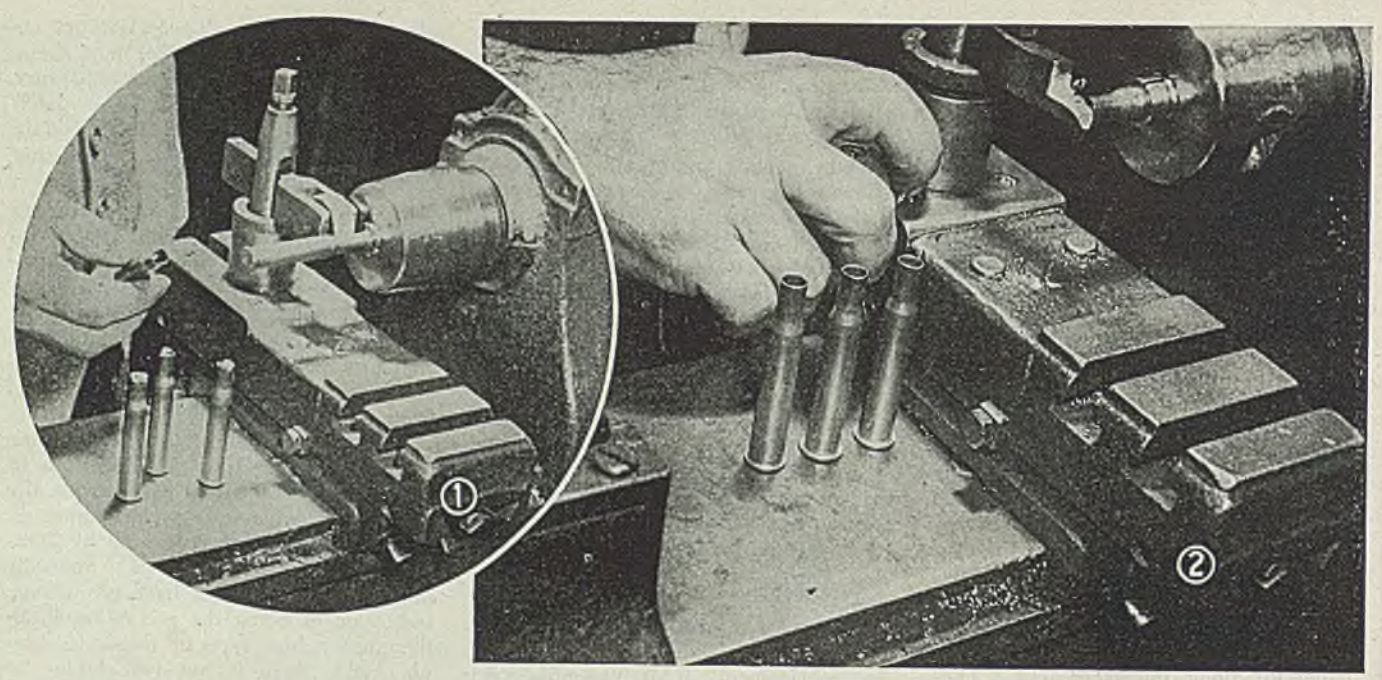
Except when roofs are "plugged" to hold for a few heats before going down for replacement, it is generally poor economy to save time in roof patching at the expense of good workmanship. Open-hearth roof patching is an art and should be given at least as much care and attention as the installation of the original roof. Here is an excellent place for the individual shop to review its methods. No two shops are alike, yet almost all of them use only one method for all their patches. Wooden saddle frames, corrugated sheets, curved sheets, pipe, tapping rods, chain, wire, special metal forms, and special brick shapes are but a few of the appliances and means employed to patch roofs. The best method for a large patch is not necessarily the best for a small one nor will an efficient means of patching a straight section give optimum results when working on a slope. Without attempting a complete change, most shops would benefit by training their masonry crews in the use of several hot patch methods so that their working procedure may be varied to best meet the existing conditions.

Erosion of hot metal mixer linings presents a constant problem to the operator. Here erosion is caused by physical contact with molten iron and slag. Various types of basic brick, clay brick, and mica-schist are used by different operators with varying degrees of success. In nearly all cases failure results from severe erosion at the joints between the brick. In this service the problem is to find that combination of mortar and brick which will provide the maximum volume stability, maximum resistance to mechanical washing by molten metal, and to slag attack. Specially burned superduty brick have given some indication of being the proper brick, although the best type of mortar to employ with them is not yet clearly indicated. Fig. 3 shows a typical case of joint erosion in a metal mixer lined with blast furnace clay brick. It is apparent that the brick have been eroded very little in comparison with the joints between the brick.

Many important economies can be effected by proper attention to furnace brickwork. Technical studies may be necessary in some instances, but frequently the answer may be found by applying old principles which have been allowed to fall into disuse. An old idea may solve a new problem just as a new idea may prove to be the answer to an old one. The man in charge of furnace brickwork, therefore, must keep reviewing his problems and solutions if he expects to keep abreast of conditions.



SMOOTH RIDING: Utilizing a variable rate coil spring that reacts equally to light or heavy passengers, this steel tractor seat has a double-action hydraulic shock absorber which retards spring action, leveling off the ride regardless of chassis jolting. The stabilizer bar passing under the center eliminates side sway in this seat made by Monroe Auto Equipment Co., Chicago



Rehabilitating Cartridge Cases

with special roller-forming and soft-metal shaving tools

IF Fred Masotta, ammunition maker and sub-foreman at Winchester Repeating Arms Division of Olin Industries Inc., New Haven, Conn., had not become interested in finding the means to salvage defective rifle and machine-gun cartridge cases from the scrap pile, that pile might have been augmented by an additional 11 million rejects. Moreover, 26,500 man-hours would have been required to create an equivalent stock of new, acceptable cases, embracing the remelting and fabrication of over 500,000 pounds of brass in 440 million operations and 44 million inspections.

Until the Masotta salvage plan was developed, 30-caliber cases that were too long or those which had bent mouths were scrapped and later remelted. The cases were acceptable except for these minor faults which occurred during final stages of manufacture. Now special tools shave soft brass necks without distorting them and rollers reshape crooked mouths into perfectly circular shape.

At center, in Fig. 2, are three cartridge cases with over-long necks as a result of being softened in annealing. If trimmed in conventional machines, the cases would be distorted; but when held one at a time in the special arbor at right and turned against the special shaving tool shown, they are re-formed to original specifications.

Placed on the unusual arbor of the same screw machine, Fig. 1, cartridge cases with bent or flared mouths are pressed against a roller mounted on cross-slide. The roller, revolving on the arbor, works the cartridge back into correct shape, in final operation.

Performance of Oil Circuit Breaker Improved

A high-voltage, high speed oil circuit breaker to meet 3-cycle interrupting performance of 3,500,000 kilovolt-amperes at 138 kilovolts and reclosing time of less than 20 cycles has been developed by General Electric Co., Schenectady 5, N. Y. Performance of breaker in opening, closing, and reclosing on short circuits approximating 3500 million-volt-amperes under actual operating conditions is said to justify assigned breaker ratings and to confirm testing laboratory procedures. Laboratory test results up to 3500 million-volt-amperes provide foundation for development of 5000-million-volt-ampere breakers. Although laboratory test interruption at 23,000 amperes corresponds to approximately 5500 million-volt-amperes at 138 kilovolts, final design of a 5000-million-volt-ampere breaker would require further development.

Cincinnati Book Explains Carbide Cutter Grinding

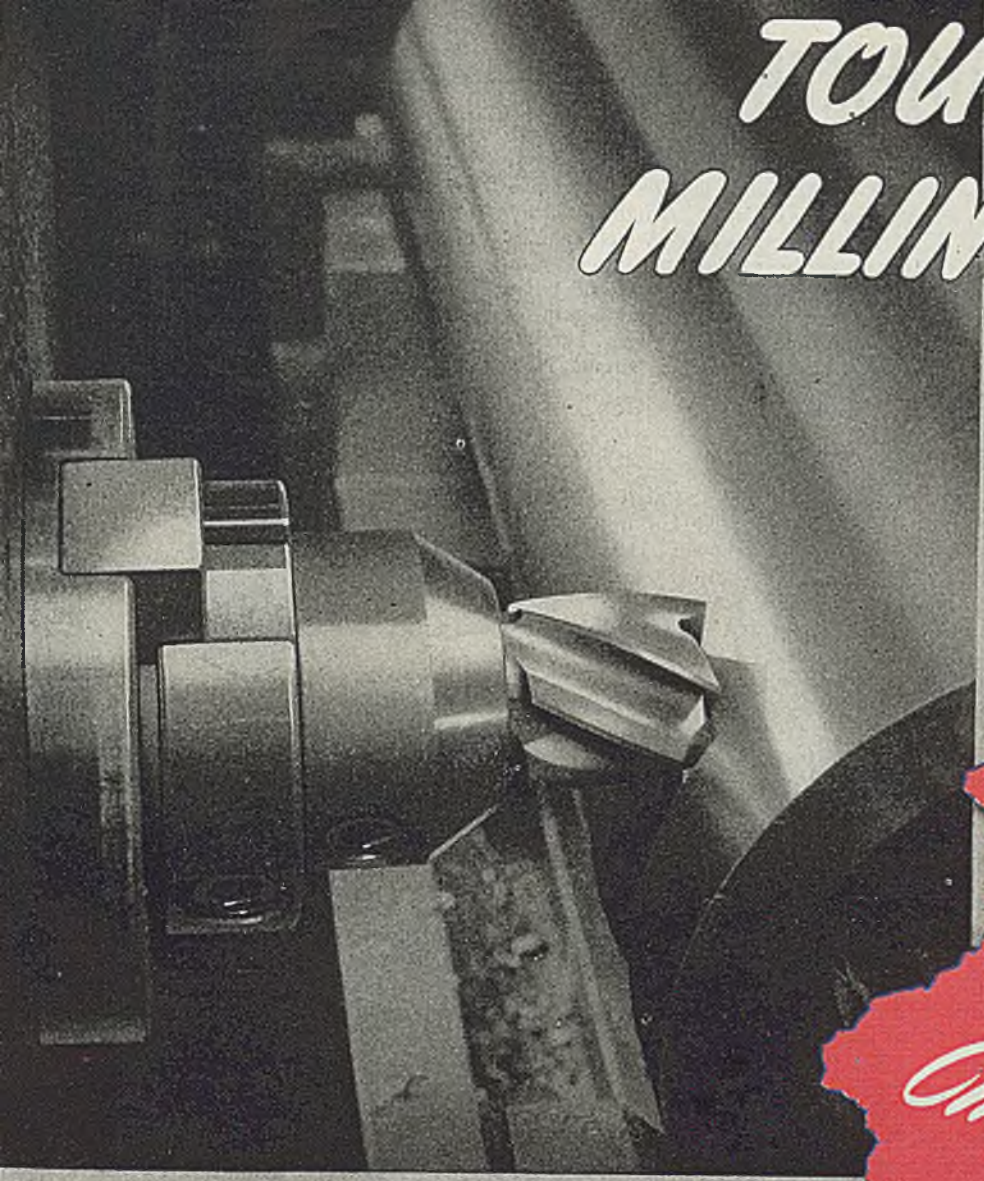
Cincinnati Milling Machine Co., Oakley, Cincinnati 9, has prepared for the benefit of tool engineers, production men and others interested in the latest milling technique a textbook entitled, "Recommendations for Grinding of Cutters for High Speed Carbide Milling".

The reason for this book is indicated in its opening paragraph, which reads as follows: "At the beginning of our high speed milling program, it became apparent that the grinding of carbide cutters was the most important factor for the success of any carbide job. It was found necessary to divorce the grinding of carbide from that of other tools, and to exercise a careful control of grinding. Effective and consistent methods of grinding had to be developed."

This book sets forth, under seven headings, the gist of the company's experience in such matters as: Setting up the grinding department; storing and handling carbide cutters; marking for identifications; selection of operators; equipment required; and specific instructions for grinding. Tables and diagrams re-enforce the text.

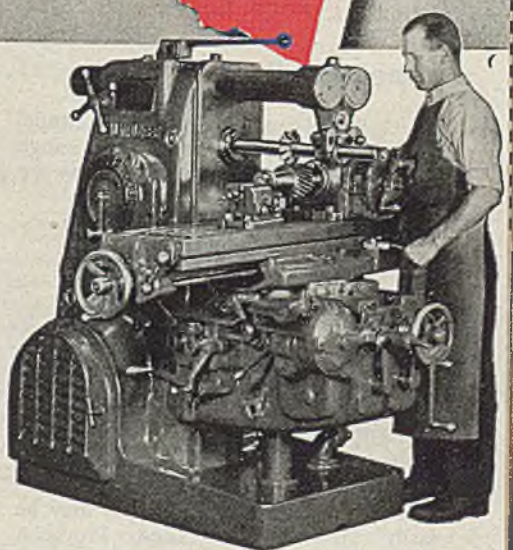
Copies of this brochure will be mailed free of charge to responsible people in industry who make formal applications on their company's letterheads.

TOUGH MILLING JOB?



NOT IF YOU "PUT IT ON A Milwaukee"

A 6 lip end mill is used in this operation on a Milwaukee 2 H Milling Machine to mill a 3.750 slot in a spindle quill.



The range—power—precision of Milwaukee Milling Machines —their exceptional ability to handle a wide variety of intricate, difficult milling operations at the most effective speeds and feeds — has made them the first choice of experienced purchasers.

"Put it on a Milwaukee" and you know the job will be done *right* — and with the least time and trouble.

Year after year you can be sure of sustained precision performance because every Milwaukee Milling Machine—is engineered and built in proper relation to its motor power — powerated!

Milwaukee Machine Tools

KEARNEY & TRECKER CORPORATION

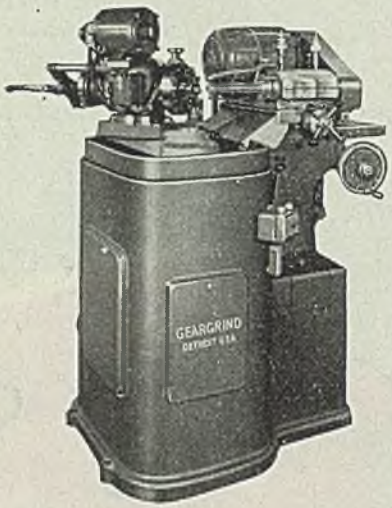
MILWAUKEE 14, WISCONSIN

INDUSTRIAL EQUIPMENT

Chucking Grinder

Geargrind univeral chucking grinder is designed to handle external and internal cylindrical and conical surfaces and generated or formed annular surfaces, such as ball bearing races and fillets.

In addition, it grinds combinations



of the above in a single setup, assuring both accuracy and perfect blending of curved with straight surfaces. The construction incorporates many features that result in accurate, fine finish and low production cost—heavy, vibration-free base; precision preloaded bearings for vertical oscillating spindle, work head spindle and grinding wheel spindles, grinding spindles dynamically balanced; quick acting clamping attachments for collets or diaphragm chucks; micrometer feed screws for work head setup and grinding wheel spindle; adjustable diamond wheel trueing device.

This unit is manufactured by Gear Grinding Machine Co., 3901 Christopher, Detroit 11.

Inspection Device

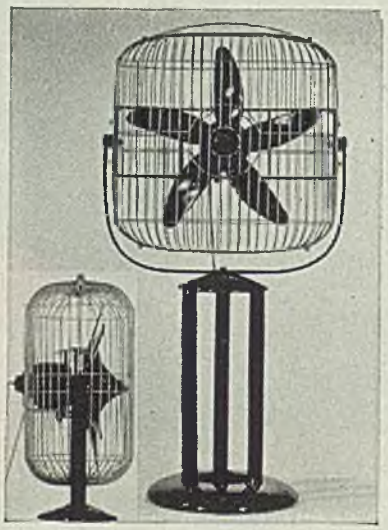
The recently developed CML Model 1200 stroboscope increases the range through which moving objects may be

examined. Now rotary speeds from 600 to 600,000 r.p.m. or vibrations from 10 to 10,000 c.p.s. can be "stopped" and studied. Since the light source is mounted in a small probe at the end of a 5-foot flexible cable, small objects may be easily viewed at close range. Provision is made to operate the unit from external tuning fork or crystal standards, where extreme accuracy is required. The motion of objects that are moving at irregular speeds may also be "stopped".

An accurate repetitive pulse rate is obtained as the pulses are derived from a stable audio oscillator. A light intensity control switch is provided which enables the user to control both the intensity of the light and the duration of the pulse length. The unit is manufactured by Communication Measurements Laboratory, 120-24 Greenwich street, New York.

Circulating Fan

Roto-Beam unit No. 130 is a 24-inch, five blade, two speed fan operated by a fractional horsepower 110 volt, 60 cycle motor. Entirely enclosed by guard, it can be positioned 360 degrees on horizontal axis and 360 degrees on vertical axis. Fan and guard are 30 inches wide and 18 inches deep. The fan is provided with floor standard to



provide heights of 30 or 58 inches overall. It can be installed in any position on floor, wall, ceiling, pillar; also on bench or in ducts, exhaust, intake and air radiator heaters. This unit is available from Davis & Murphy, Davis building, 5252 Broadway, Chicago 40.

Punch Press

Adaptable to a wide range of small punch press work, a new open face punch press is available from Maxant Button & Supply Co., 117 South Morgan street, Chicago 7. It works well on metal, cloth, rubber, wood, synthetics and plastics. It has a large crosshead; construction is open face to permit quick change of dies for fast set-up; ram is adjustable for distance of stroke; number of strokes per minute can be adjusted.

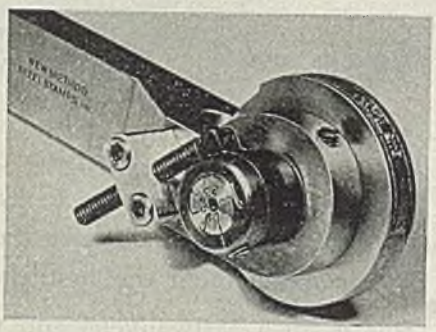
The body is reinforced without unnecessary weight. Slides are designed for maximum wear and can be provided in various lengths to change working distance above bed. Pilot bars are solid ground alloy steel. Automatic wick-oilers for guide-rod lubrication are featured. The shaft is a hammered steel forging. Clutch is positive and made of heat treated alloy steel. Flywheel

is solid metal, grooved for V-belt drive and balanced for smooth operations and maximum power. The motor driven V-belt drive operates smoothly. Speed of operation can be quickly changed.

Automatic Roll Marker

An improved automatic roll marker for imprinting serrations, calibration lines, letters, etc., on finished metal parts is available from New Method Steel Stamps Inc., 147 Jos. Campau, Detroit 7. This marker is equipped with a device for adjusting the tension of the automatic spring return for the marking roll marker. Designed primarily for use on automatic screw machines where large quantities of parts must receive identical markings, this device can also be used on lathes, shapers, etc.

Adjustment of the tension on the



automatic spring return can be made to suit requirements, when marking parts with different size roller marking dies. It also permits adjusting the "return speed" of the roller to correspond to machine cycle timing. Calibrations stamped on spring housing of the marker aid in setting correct tension on return device. The spring return is fully enclosed.

Although the holder shown in the accompanying photograph is equipped with a solid "type" roll, interchangeable

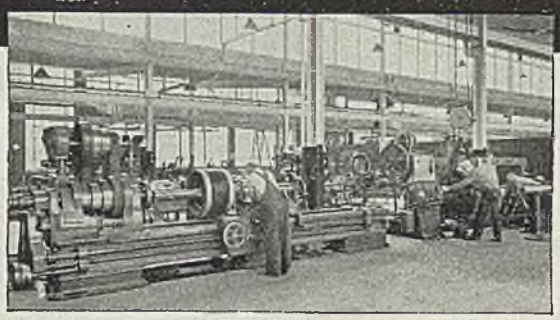
(All claims are those of the manufacturer of the equipment being described.)

MEMO
TO THE STEEL INDUSTRY

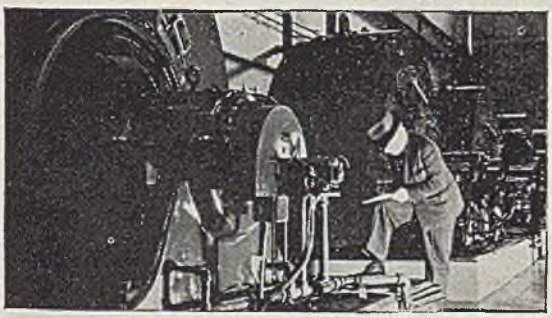
When vital electrical equipment needs reconditioning or repair... Call for

FACTORY PROVED

MAINTENANCE SERVICE



34 MODERN REPAIR PLANTS—These plants are fully equipped to handle repairs on any electrical equipment, which is not too large to be moved. Equipment includes special apparatus for High Frequency Testing, Dynamic Balancing, Metal Spraying, Phos-Copper Brazing, etc.



12 ENGINEERING AND SERVICE OFFICES—Factory-trained engineers are available to diagnose trouble, and work with your own engineers to speed up repairs. Portable field equipment assures accurate results.

17 RENEWAL PARTS WAREHOUSES — Conveniently located warehouses can give you prompt service on genuine Westinghouse renewal parts. A Maintenance Engineer is available to discuss any of these problems with you.

A Local Service for the Steel Industry

Whenever you need major electrical repairs in your plant—or repair and overhaul of equipment outside your plant—call Westinghouse. A nationwide maintenance organization, with local branches as close as your telephone, is ready to help you get apparatus back on the job in the shortest possible time.

This service offers 3-way flexibility to meet your needs: (1) *A Local Repair Plant*—completely equipped to handle repair and reconditioning of motors, generators, controls, transformers, etc. (2) *Field Engineering and Service* to handle major repair or overhaul jobs right in your plant. (3) *Renewal Parts Warehouses* to give you prompt service on genuine Westinghouse replacement parts.

To obtain any of these services, just phone your nearest Westinghouse Sales Office for a Maintenance Engineer.

J-96005-1

WHAT "FACTORY-PROVED" MAINTENANCE MEANS

This tag, attached to every repair job handled by Westinghouse, means that the work has been handled according to rigid factory standards. "Factory-Proved" methods and materials have been employed; the apparatus has been tested according to factory specifications; repairs on the apparatus carry the standard Westinghouse guarantee. This means better, longer-lasting repairs.

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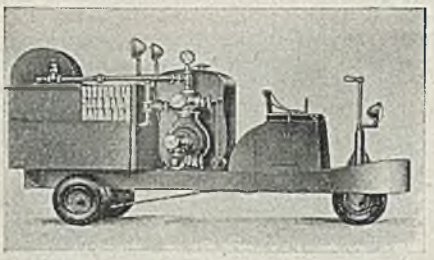
roll markers are also available. These devices are standardized as to general design, with shanks to permit mounting in conventional tool holders, but are custom made in detail to meet specific marking requirements.

Fire Extinguisher

Designed to travel down narrow aisles and to reach ordinarily inaccessible fires, a mobile fire extinguisher, Model FF Chore Boy, is manufactured by Buda Co., Harvey, Ill. This gasoline powered truck has a 1-ton capacity; 79-inch wheel base; dual rear wheels; deck space of approximately 20 square

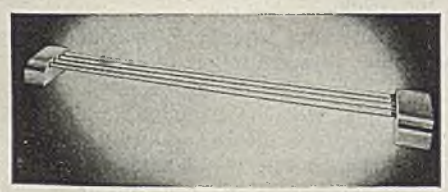


feet; and speeds up to 15 miles per hour.

With its own water supply tank and 200 feet of hose, this unit can smother flames before they become of conflagratory size. While its own water supply is being used, the 1½-inch fire hose can be connected to a hydrant. Its combination fog or straight-stream nozzle provides for using "fog" for smothering fires with a minimum of water damage. One hand control is provided for the steering mechanism.

Lighting Fixture

A new commercial lighting fixture employing 93-inch fluorescent cold cathode low voltage lamps is now available from General Luminescent Corp., 638 South

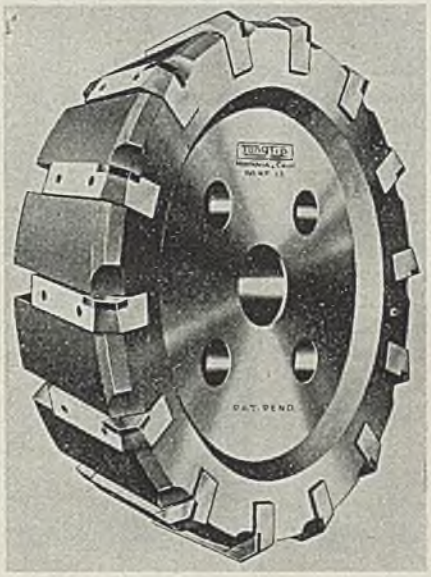


Federal street, Chicago 5. The units are equipped with the 10,000 hour Colovolt lamps which are instantaneous in starting and do not flicker.

Milling Cutters

Special milling cutters of tungsten carbide have been developed by Tungtip Tools Division of Lowell & Grayson, Monrovia, Calif. Inserted tooth cutters are available in face mill and half-side mill styles. The alloy steel body of the face mill is accurately counterbored in the back of the cutter providing a ground surface for accurate location on the outside of the spindle nose of the milling machine. Half-side mills are provided with a precision ground arbor hole and hub faces for accurate alignment for straddle milling operations. Both types are available with carbide teeth ground with corner angle or may be had with inserts ground to 90 degree corner for milling to a shoulder.

The inserted tooth milling cutter consists of carbide-tipped inserted teeth locked into the tool body without extraneous parts. These carbide-tipped tool steel inserts are provided with a precision flat back and serrated front face which assures uniform clamping pressure over the entire length of the



insert. This rigid locking maintains the blade in correct position regardless of cutting pressure.

An adjusting screw mechanism provides for precise adjustment of the insert to within 0.003-inch. Replacement inserts are provided with the face of the carbide finish ground and the cutting edges rough ground to reduce maintenance cost.

Electronic Inspector

To eliminate the human element in checking piston rings, Sheffield Corp., Dayton, O., has designed an electronic piston ring inspector. The instrument automatically inspects the trueness of periphery and the width of gap of a specific size of piston ring.

The piston ring to be checked is inserted inside a master ring of correct dimensional quality which is placed on the instrument table and rotated by a power driven roller. The gaging functions are performed by scanning beams of light directed on photo-electric cells which energize electronic circuits to illuminate three signal lights. As the ring revolves, one beam of light is projected on the periphery of the piston ring. A clearance between it and the master ring will result from any out-of-round condition of the ring, permitting part of the light beam to fall on the photo-electric cell. This cell is set to actuate a red rejection signal should an excessive amount of light indicate that piston ring being checked is out-of-round beyond an acceptable point.

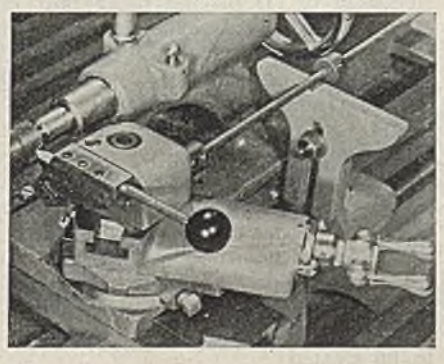
Should the periphery be within tolerance limits, a green signal will flash on at the end of one complete revolution provided the width of gap is also within tolerance, or a yellow signal will show if the gap is undersize. The beam of light is interrupted by a mechanical shutter arrangement at the time the gap is passing this point. Another beam

of light scans the width of gap, the photo-electric cell being set to actuate a yellow signal should gap be undersize. A third beam of light energizes another photo-electric cell set to illuminate the red rejection signal should width of gap be oversize.

Master piston rings of known dimensional quality are used in adjusting the instrument for desired tolerances. The instrument can be adapted to various nominal sizes, gaps of varying width and also for variations on allowable out-of-roundness of the periphery. Trueness of periphery can be determined within a tolerance of 0.001-inch.

Lathe Attachment

A new lathe tool holding attachment which snaps a turning, chasing, or boring tool out of either internal or external lathe cuts at any predetermined point is announced by Foulk Engineering Co., 4208 Airport road, Cincinnati 26. Designated as Retract-A-Tool, the attachment increases the possible speed of turning or chasing operations, parti-



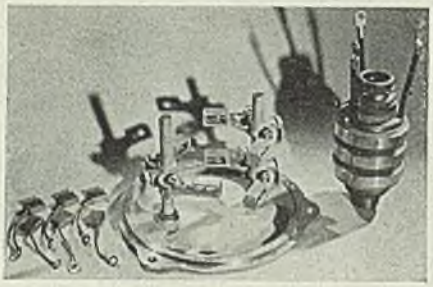
cularly in blind holes or close to shoulders. As the retraction of the tool point is positive and instantaneous, the operator need only to return the carriage to its starting point after the retraction occurs. Resetting the tool point is accomplished by lifting the ball-end lever.

When turning or chasing up to shoulder, the attachment's action makes it

unnecessary to neck the work; and because no cross-slide movement is needed, the gib may be tightened on production runs to give increased rigidity. The device is made in two sizes which encompass the full range of standard bench and engine lathes and is also applicable to many turret lathes.

Collector Rings

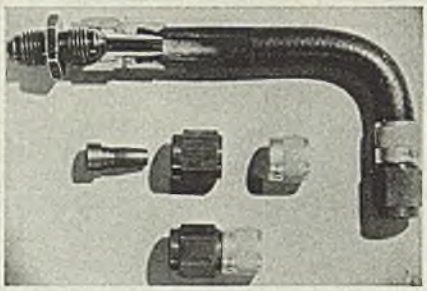
B. A. Wesche Electric Co., Cincinnati, O., is now marketing "custom built" collector rings. These rings are manu-



factured to meet the special requirements of any electrical application.

Detachable Hose Fitting

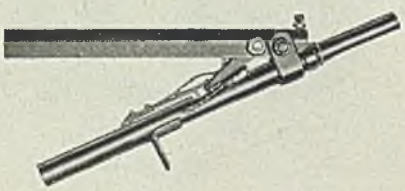
Detachable, reusable hose fittings for use with low pressure hose are available from Aeroquip Corp., Jackson, Mich. All parts of the fitting assembly are removable and reusable individually. The fitting may be assembled and disassembled with a wrench. The assembly requires no tightening, adjusting or continued future servicing. It has a small bending radius with length of socket at a minimum and no nipple or stem projecting into the hose, bending radius



starts near point of attachment and eliminates possible damage of inner tube due to vibration or flexing.

Rivet Gun

Designated as G-35, a new, compact, lightweight rivet gun is announced by Cherry Rivet Co., 231 Winston street, Los Angeles 13. Designed for installing blind rivets in hard-to-get-at blind spots, it is operated with one hand and



installs the rivets from one side of the job with a pulling force. It is recommended for installing blind rivets in sheet metal, plywood, rubber, plastics and almost all soft or brittle material.

The gun measures 11½ inches in length and weighs approximately 1½ pounds. The pulling head is notched so that is snaps on or off the gun quickly and easily, allowing gun flexibility, quicker head interchange. Pulling heads are interchangeable for any standard blind rivet, aluminum, copper or steel.

Portable Amplifier

Walker-Jamieson Inc., 311 South Western avenue, Chicago 12, are producing amplifier unit embodying principles of modern design. This distortionless, humless 30-watt amplifier, which operates on 110 volts, 60 cycle alternating current, is outstanding for

its power and tone quality. Its two mike inputs and one phono input make it useful in the majority of applications. Output impedances of 4, 6, 7, and 500 ohms may be selected at will. Frequency response is 50-10,000 cycles. The record gain is 69 db. and the mike gain 116 db.

Hardening, Shrink Fitting

(*Continued from Page* 93)

minute for loading, 2 minutes 45 seconds for heating, 7 seconds for delay, 19 seconds for quenching and 10 seconds for unloading.

The former methods, manually performed, were considerably involved, consisting of (1) placing roller rims in a rotary furnace, (2) removing a heated roller from furnace with tongs, (3) placing one heated roller on hub, (4) quenching that end of the unit, (5) removing from quench and turning unit over, (6) positioning second roller onto hub (7) quenching second roller, and (8) removing assembled track roller from quench. It was impossible to prevent the entire piece from being heated to hardening temperature which is in contrast to induction heating wherein the heat is restricted to the specified areas to be treated.

As the roller rims are heated to 1650 degrees Fahr. (Fig. 4) the bore is heated to 1100 degrees Fahr. by thermal conduction which is sufficient for expansion. After quenching, surface hardness of the treated rim and flanges is 58 rockwell C with a hardness that decreases to not less than 50 rockwell C at a depth of 1/8-inch.

The track roller rims are forged from 1045 SAE steel having an overall OD of 10¼ inches and a width of 3-3/8 inches. Diameter of the roller rim at the track surface is 8 3/4 inches while that of the bore is 5.675 inches. The hub, made of cast iron, is 7 3/4 inches long having a diameter of 5.718 inches, a shade larger than the roller bore to insure rigid fit upon shrinkage.

Machine Operation

Power is supplied by two standard 200 kw, 3000 cycle Tocco motor generator units operating in parallel on a 440 volt, 3 phase, 60 cycle supply line. Together with control panels these units are located directly behind the heating machines (Fig. 5).

Current is fed into the two water-cooled, semicircular inductors (Fig. 3) which are made of rectangular copper tubing and shaped to conform to the outline of the roller rim. Current flows through the side loops of the inductors in one direction and back through the center inductor in another, with the amount of current passing through the outer loops being equal to that which flows through the center. There is one inductor for each roller designed to cover one half its circumference. These inductors which are supplied by a 19 to 1 water-cooled transformer have no more than 42 volts on them.

Starting power for the treating of the double flange-type roller is 310 kw which rises to 380 kw, then drops to 170 kw. On the single-flange roller initial power is 265 kw with a maximum of 310 kw after 30 seconds and a minimum of 160 kw during remainder of the cycle.

Upon energizing the machine, the spindles with the rollers in position move from the center of the chamber to the rear line with the inductors, a distance of some 12 inches. During heating the arbors rotate at 14 r.p.m. to insure uniformity of treatment of the rims which are held firmly by pressure from spring mounted pins that are set in the arbors.

This cycle completed, the work carriage returns automatically to the loading position where it presses the expanded rollers onto the hub as a central tapered plug at each end of the spindle enters the corresponding bore in the hub to lift the hub to the shrink-fit assembly position. This takes 7 seconds.

Next the quench rings advance quickly from the neutral position, surround the heated rollers and water quench them at a pressure of 60 pounds per square inch, shrinking the rims onto the hubs as the surface area is hardened (Fig. 6). The quench rings which are 13 inches in diameter with a 5-inch face, contain

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Hall's enclosed-oven design offers substantial savings over open-type equipment. POSITIVE VENTILATION CONTROL equalizes oven temperatures, removes objectionable fumes and moisture — PRODUCES UNIFORM, FASTER FINISHING.

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Any one of the above advantages alone is important enough to warrant consideration—combined, they represent heating economies and efficiencies which cannot be ignored. Yet, it must be kept in mind, that maximum time-and-money-saving benefits are obtained *only by the correct application of infra-red*, either in conjunction with present heating equipment, replacing present heating equipment, or when engineered to do a specific job of speeding up production processing.

This basic principle of correct usage governs the *productioneered* application of all C. M. Hall RADIAIR ovens. Radiant heating equipment as engineered for production by Hall is proving to be the new answer to many old unsolved problems in the field of heat transfer.

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1800 PCS. PER HR.
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1186 one-sixteenth orifices insuring even distribution of the quench.

As the quench rings withdraw, the spindles also return to the neutral position leaving the completed roller assembly resting on the fixture ready for removal. At this moment the rollers have a temperature of approximately 400 degrees Fahr. Union of the assemblies is so tight that they stand a pull-off test of 90,000 pounds average.

Quench rings are removed by hydraulic cylinders through rack and gear while an electric ratio motor located above the work chamber and connected to a jack shaft by chain drive rotates the spindles. Leading off from this shaft are two lateral chain drives for rotating the arbor heads in any position including heating and quenching.

Action of all parts of the induction unit are so correlated that arbors and quench rings move uniformly with no lag and each slide arrives in position exactly in time with the other.

Controls allow for manual operations during setup periods as well as full automatic control during production. Great economies in time and labor have been experienced by the American Car and Foundry Co., for skilled labor is not required to operate the unit. Compared to former methods the induction operation is much cleaner and cooler while the product itself leaves the machine ready for assembly.

Silicone Grease Serves in Electrical Installations

A translucent silicone grease of petrolatum-like consistency has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for use as a lubricant for ignition cables to reduce cutting of insulation by electrical overcharges and to permit easy wiring of ignition harnesses. It is said to be heat stable and to retain its consistency from minus 40 degrees Fahr. to 400 degrees Fahr. Material is inert and oxidation resistant, has no solvent effect on synthetic insulations or rubber and tends to prevent hardening of these materials when heated in contact with air, according to the company.

Booklet Discusses Resin Glues

A 12-page illustrated booklet entitled "Bakelite Urea Resin Glues," manufactured by Bakelite Corp., 30 East 42nd, New York 17, discusses low cost, wet strength and adaptability of these resins for plywood and densified wood. Types of equipment used and purposes for which glues are best suited are covered. A chapter is devoted to potential developments of urea glues. Also case histories of experiences of some of the company's customers with these resins are cited. Book is available on request to the editor of "Bakelite Review" at the above address.

HELPFUL LITERATURE

1. Clamshell Buckets

Erie Steel Construction Co.—8-page folder "Choose a Number" presents details of Strayer electric motor driven clamshell buckets and line of nine other types for all types of materials handling. Brief descriptions of each are given and recommended uses are outlined.

2. Rings

Dresser Mfg. Co.—24-page illustrated catalog No. 24 and inserts describe this company's facilities and typical production of large and small blanked, pressed, rolled, formed, forged and stamped rings for industrial purposes. Typical press and upset forgings are also shown.

3. Abrasive Wheels

Eagle Grinding Wheel Co.—20-page illustrated catalog and data book covers types and specifications of small grinding wheels. Standard shapes are shown and recommendations for their use are given. Charts of symbol conversion and grade identification are included.

4. Varnishes

Dow Corning Corp.—8-page booklet describes Silicone products, particularly 993 high temperature Silicone electrical insulating varnish claimed to operate continuously as high as 175 degrees Centigrade when combined with Fiberglas, mica or asbestos. Sample swatches of varnished glass cloth and bonded mica glass cloth are included.

5. Protected Type Motor

Crocker-Wheeler Div., Joshua Hendy Iron Works—4-page illustrated bulletin DL-121 describes design features of motor and shows how protection from metal chips, dripping liquid and other foreign matter is accomplished. Principal applications are pointed out.

6. Powder Metallurgy

Keystone Carbon Co. Inc.—32-page illustrated catalog explains powder metallurgy and presents engineering data for design of parts. Design styles and specifications are given. One section is devoted to Selflube porous bearings of bronze, graphite impregnated brass and iron. Charts and tables of characteristics and sizes are included.

7. Contract Manufacturing

A. B. Equipment Mfg. Co.—16-page illustrated bulletin "Precision Production" outlines facilities for production of metal assemblies, subassemblies and parts on contract. Services of staff of engineers is also available.

8. Oil Concentrate

Hood Refining Co.—12-page illustrated catalog 145, explains use of Gibralter Oil, an additive for lubricating oil, gasoline and diesel fuel for preventing formation of hard carbon, preventing valve sticking and decreasing fuel consumption. When used in cutting oil, it flows freely and reduces temperature of cutting tools.

9. Metal Fluoborates

General Chemical Co.—16-page illustrated technical service bulletin No. 1015-A gives physical properties, methods of using and advantages of metal fluoborates and alkali fluoborates in industry. Rate of deposition tables are included.

10. Fume Exhausters

General Blower Co.—8-page illustrated bulletin CB-103 presents line of high-velocity centrifugal type welding fume exhausters of portable and semiportable type.

11. Electric Furnaces

Cooley Electric Mfg. Corp.—4-page illustrated bulletin No. 50 covers electric furnaces for industrial and laboratory use. Applications, advantages, installation and operation are described. Specifications and prices are given.

12. Water Heater

Coe Mfg. Co.—4-page illustrated bulletin includes dimension table and information on capacities and safety features, and describes operation of Northwestern Safety Water Heater. It is especially designed for washroom use and is available in fourteen sizes from 200 to 3000 gallons per hour capacity.

13. Laboratory Equipment

Gaertner Scientific Corp.—8-page illustrated bulletin 140 and supplement describe dilation measurements for thermal expansions at high temperatures by the interferometer method. Equipment and method of manipulation are covered. Supplement describes the spectrogram microdensitometer.

14. Cranes, Presses & Tramrails

Cleveland Crane & Engineering Co.—8-page illustrated folder, showing applications of cranes, Steelweld presses and tramrail systems in a number of industries. Brief specifications are given for thirty cranes built for new Brazilian steel mill.

15. Alloy Steels

A. Finkl & Sons Co.—90-page pocket-size booklet "MO-LYB-DIE Steels and Products" presents data on chrome-nickel-molybdenum steels for dies for hot working and for commercial forgings. Methods of working are covered. Table of weights is included.

16. High Speed Saw

Continental Machines, Inc.—4-page illustrated bulletin "The World's Fastest High Speed Sawing Machine" gives specifications and applications of the DoALL Zephyr for sawing plastics, plywood, light alloys, sheet metal, synthetic rubber, wood products and other material.

17. Electric Welders

Eisler Engineering Co.—28-page illustrated bulletin No. 93-W-43 covers line of electric spot welders ranging in capacity from ¼ to 500 kilovolt-amperes. These are available in manual, motorized and air operated types, with and without variable speed arrangements, and for floor or bench mounting. Typical installations and uses are shown.

18. Screw Machine Products

Federal Screw Works—27-page illustrated booklet "Focus on Federal Screw" describes manufacturing facilities of company and typical parts produced. They involve all screw machine and secondary operations, heat treating, plating, cold upsetting and thread rolling.

19. Graphic Instruments

Esterline-Angus Co.—4-page illustrated folder No. 242 deals with new applications of graphic instruments. These include recording blasting shocks, traffic density, grinding wheels and streamliner performance, adjusting bearings, synchronizing flying shears and checking thermostats.

20. Spring Lock Washers

George K. Garrett Co.—2-page illustrated bulletin 109 describes Diamond double coil spring lock washers applicable to grading, bulldozing and agricultural equipment, in addition to wide general usage.

21. Electric Hoist

Coffing Hoist Co.—4-page illustrated bulletin No. E-2 includes price list and covers features of Quick-Lift electric hoists. Operating on standard light circuits, these hoists have wide range of applications in industrial plants.

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22. Materials Handling

Factory Service Co.—20-page illustrated catalog deals with Turner system of materials handling which features standardization and interchangeability of parts. Covers transports, jimmies, bin sections, boxes, racks, stacking units, pallets, platforms and other units.

23. Machine & Cutting Tools

Ex-Cell-O Corp.—20-page illustrated bulletin No. 27132 discusses thread grinders; boring, turning and facing machines; carbide tool grinders, grinding spindles; lapping machines; cutting tools and other equipment.

24. Thermocouples

Elematic Equipment Corp.—8-page illustrated bulletin No. 500 gives data on thermocouples, thermocouple wire, refractory beads, connector blocks, protecting heads, protection tubes for molten metals and fixtures for molten aluminum and copper alloys.

25. Hard Surfacing

Dymonhard Corp. of America—16-page circular "Armor for Industry" deals with application of protective coating to parts subject to abrasion, shock, heat and corrosion. Lists alloys for arc and gas applications for variety of problems.

26. Engines

Hercules Motors Corp.—42-page illustrated booklet "Hercules and the War" by Lowell Thomas traces role played by this concern in producing gasoline and diesel engines for many different types of implements for the war. Engines range in size from 4 to 300 horsepower and line includes 62 models. Text relates story of company and outlines its facilities.

27. Dynamometer

W. C. Dillon & Co.—4-page illustrated bulletin entitled "The Dillon Dynamometer" contains specifications and uses for this testing instrument for use in communication, aviation and public utility applications. Calibrated to accuracy of plus or minus 2 per cent, instrument is constructed for laboratory or field service.

28. Welding Accessories

General Electric Co.—36-page illustrated bulletin GEA-2704C presents complete line of arc-welding accessories for men and women operators. Chrome-leather, asbestos and flameproofed-duck protective clothing ranging from complete ensembles to gloves and sleevelets are described. Complete data on ventilated helmets and head protectors, observation shields, electrode holders, slag chippers and gages are given.

29. Wheels & Casters

French & Hecht, Inc.—4-page illustrated bulletin entitled "Wheels for Industry" and one-page data sheet describe complete line of spoke, pressed and cast steel wheels for trucks, barrows, portable welders, generators and compressors and acetylene carts. Swivel and rigid forge-welded casters are fully covered.

30. Tool Steel

Cleveland Twist Drill Co.—60-page illustrated handbook entitled "The Molybdenum-Tungsten High Speed Steels Marketed Under the General Trade Name Mo-Max" describes composition, applications, annealing, welding, brazing, hardening, quenching and tempering of high speed steels which are used in manufacture of reamers, drills, saws, dies, taps and milling cutters.

31. Coolant Systems

Gray-Mills Co.—6-page illustrated leaflet discusses fractional horsepower pumps, portable coolant systems and industrial fluid refrigerating systems. Specifications and cross-section diagrams of typical installations are shown. Parts cleaning and portable wet cutting systems, coolants and coolant system accessories are briefly described.

32. Bellows

Cook Electric Co.—42-page illustrated catalog BG-2-15, describes "Spring-life" custom-built and high and low pressure bellows and covers typical and recommended applications. Plant engineering and production facilities are shown. Pressure detector switches are also presented.

33. Stainless Steel

Crucible Steel Co. of America—Folder chart entitled "Characteristics of Rezistal Stainless Steels" covers such subjects as type; analysis; physical, electrical and mechanical properties, as well as heat treatment and heat resistance.

34. Hydraulic Press

Denison Engineering Co.—8-page illustrated bulletin No. 115 contains complete information on self-contained bench-type hydraulic machine, known as HydrOILic Multipress, together with accessories such as standard benches, extension tables and bolster plates.

35. Bearings

New Departure Div.—112-page illustrated handbook entitled "Why Anti-Friction Bearings" discusses fundamental reasons responsible for increased use of modern rolling bearings. Sixteen-page illustrated pocket-size booklet entitled "Making Them Round" explains production and use of steel balls.

36. Drill Jigs

Siewek Tool Div., Domestic Industries, Inc.—34-page illustrated catalog No. 5A presents complete line of rapid clamping drill jigs and automatic fixture locks. Also included is 8-page price list No. 8 for drill jigs, bushing plates and fixture locks.

37. Rubber

B. F. Goodrich Co.—28-page illustrated booklet entitled "Typical Examples of B. F. Goodrich Development in Rubber" contains reproductions of 26 advertisements covering wide variety of industrial rubber product applications and explains how rubber has solved many problems.

38. Steel Storage Tanks

Graver Tank & Mfg. Co.—24-page illustrated bulletin C-101 describes fabrication of steel storage tanks and steel plate equipment. Data on spheres, bullets, gas holders, cone roof tanks and code vessels as well as weldments and water conditioning equipment are given.

39. Electron Tubes

General Electronics, Inc.—50-page illustrated booklet entitled "General Electronic Tubes" presents characteristics of various electron tubes for military equipment as well as broadcasting stations, industrial heating and control units, electronic medical and short wave transmitting equipment.

40. Muffle Furnaces

Claud S. Gordon Co.—4-page illustrated bulletin SP44 presents line of muffle furnaces and Hevi Duty hot plates. Uses, temperature ranges, control, operation, construction, voltages and specifications are listed.

41. Steel

Harrisburg Steel Corp.—98-page illustrated plastic-bound catalog describes national service for users of alloy and carbon steels and seamless and drop forged steel products. Specifications of carbon and alloy steels such as nickel, nickel-chromium, molybdenum, chromium, chromium-vanadium, tungsten and silicon-manganese steels are listed. Among products produced by this company are bends, billets, coils, couplings, cylinders, flanges, heaters, liners and munitions.

42. Caster Trailer

Electric Wheel Co.—2-page illustrated leaf A-694 describes 4000-pound capacity trailer which has unit-welded steel frame. It can be moved by hand when fully loaded or coupled into trains.

43. Crucible Metals

Crucible Manufacturers Association—20-page illustrated booklet entitled "Crucible Melters' Handbook" is treatise on crucible furnaces and on storing, handling and use of crucibles. Tables are included covering sizes and dimensions of crucibles, melting points, composition and physical properties of various metals and alloys.

STEEL 4-30-45

1213 West Third St., Cleveland 13, Ohio

1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	46
7	17	27	37	47
8	18	28	38	48
9	19	29	39	49
10	20	30	40	50

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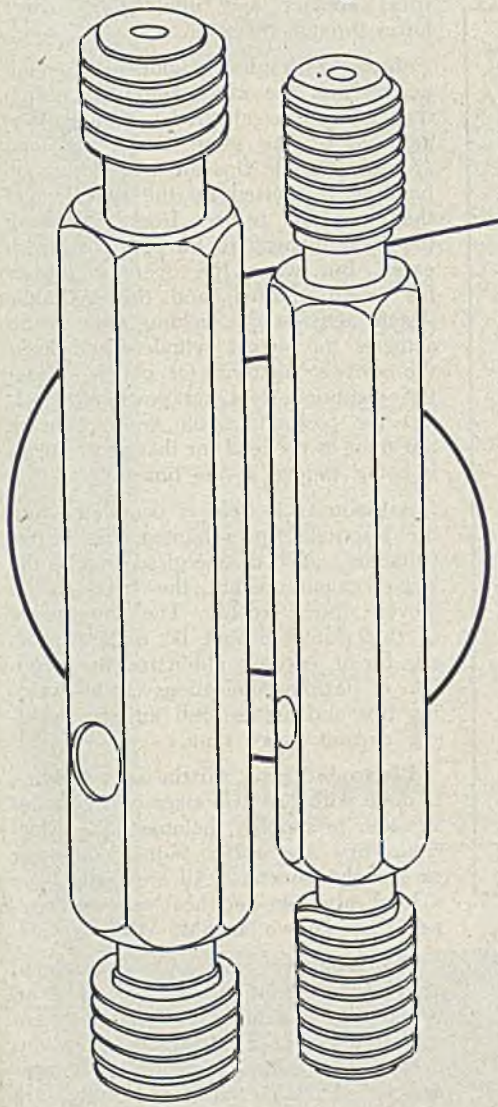

A FACT!.....
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It is a well established fact that thread gages faced with rotary welded stellite give you more economy, longer life and higher quality precision inspection.

Redford Engineering Co. gages are faced with Stellite Rotary Welded on a steel core. These Redford gages are extremely resistant to abrasion. They have an unusually low coefficient of friction since they are basically different from the materials to be inspected.

Therefore it is readily apparent that the inspection operation can be completed with less drag on the gages. Their efficiency is not affected by shop temperature changes.

Redford Rotary Welded gages in constant use outlive steel gages from 5 to 20 times. Increased life substantially reduces daily gaging costs. Longer positive gaging is in direct relation to these lasting qualities.

Write us today for further information regarding these highly efficient gages. Your inquiries will be given prompt attention.

Redford ENGINEERING CO.
21200 W. 8 MILE ROAD
DETROIT 19, MICHIGAN

Portable Welding Guns

(*Continued from Page* 90)

yoke which permits adjusting the vertical angle of the gun for reaching easily the different locations to be welded. Another spring support helps counterbalance the cable near the center of its length.

Six different type major fixtures are employed in the building-up sequence of welding operations. Many of the subassemblies require the use of two different fixtures for welding them into the assembly because a single fixture would not permit access to all portions. The result is that considerable floor area in this section of the plant is filled with large assembly fixtures like those shown in Figs. 3, 4 and 11.

C-Type Guns: The 20 or more differenet types of guns or welding heads can be roughly divided into two main classes—C-type and "pinch" type. The C-type employs a heavily designed yoke or curved beam structure to reach around the work to the back side. And the gun cylinder is directly in line with the moveable electrode. Where only small clearances are involved as in Fig. 2, this type of head is quite a simple structure. But where large clearances are required as in finish welding certain assemblies, a swivel or hinged section is incorporated in the yoke to permit positioning the gun back of thick built-up sections as shown in Fig. 9.

The stationary electrode on this gun is being handled by the operator at the right. It has a swiveled section permitting it to be swung out of the way to clear the work when positioning the gun. This particular gun is also fitted with an offset tip that allows welding back of flanged reinforcing ribs and in hard-to-get-at points.

Fig. 11 shows one of the largest C-type guns. Here the work has progressed from the fixture in Fig. 3 to that in Fig. 4 and now is having additional skin sections and reinforcing members added. In Fig. 11 the two nearest sections have not been put in the fixture in order to permit a better view.

The yoke on this gun must reach from inside at the base of the fixture clear up, out and down the outside. In order to facilitate positioning, the counterweight supporting the welding head is connected through a swivel and roller which is free to move on a curved member just above the gun in Fig. 11. This curved member and roller are so designed that tilting the welding head automatically shifts the point of support so the suspension retains any degree of tilt readily with little effort on the part of the operator.

Such a scheme is important when working with such heavy guns as this one because the extended "reach" that the yoke must include requires extremely heavy construction to obtain the necessary rigidity.

"Pinch" Type Guns: This type of gun employs no yoke but instead has a movement of the two electrodes resembling that of your thumb and forefinger, hence the name. Pressure is developed at the electrode tips by the hydraulic cylinder acting through a mechanical linkage system that may take one of several different forms. "Pinch" type guns can make welds in what would otherwise be extremely difficult locations.

For instance, the two girls in Fig. 4 are employing one of the larger pinch type guns to make welds around the base of the sheet where it connects into the main ring structure, reaching around some 16-18 inches of structure as shown. With this gun, the operators will make a complete series of welds all around this base with very little clearance for the gun.

AIDS ELECTRONIC TUBE PRODUCTION: Anode and grid caps are sealed to bulb of 833A transmitter tube at Dobbs Ferry plant of North American Philips Co. Inc. High frequency coil heats metal by means of induction, and bell jar is filled with nitrogen to reduce oxidation of metal

Fig. 8 shows another difficult welding job being done with a versatile small pinch type gun. Note the extremely close quarters.

Fig. 10 shows yet another type of small pinch-action gun. Here a large number of finish welds are made rapidly and easily by means of this small unit shown making a double row of spot welds to fasten a mounting ring into the engine cowl assembly. When the parts are assembled in the main fixtures, just enough welds are made to assure permanent accurate mounting. Then many of the remaining welds are made after removal from the fixtures where maximum accessibility facilitates making finishing welds.

Swivel Cable Connections: Many of these guns contain swivels and rotating connections that allow the welding head to be turned nearly 360 degrees both in a vertical and horizontal plane. This affords great flexibility and is accountable in large measure for the amazing ability of these guns to reach into almost inaccessible locations, such as that pictured in Fig. 8.

However, these swivel connections must carry full welding current, which may reach nearly 10,000 amperes on certain work. To avoid serious power losses in traversing these joints, special hydraulic cylinders are mounted along their axes in such a manner as to force the two mating surfaces together under great pressure, thus assuring good electrical contact and minimizing power losses through the joint.

These hydraulic cylinders are connected into the same hydraulic system that closes the electrodes and is thus actuated at the same time. As long as the electrode tips are not closed, no pressure is exerted on the swivels and they can be turned freely, allowing the welding head to be positioned with ease. But when the operator presses his "weld" button, and the hydraulic system actuates the welding tips, it also actuates the swivel cylinders and locks the swivels tightly. Of course, under this condition it is not possible to adjust the position of the welding head, but there is no need for that as the work is being welded at the time.

As soon as a weld is completed and the electrode tips retracted, the swivel cylinders are de-energized and the swivels again permit the head to be moved about freely. The importance of this system cannot be underestimated, for it entirely elminates the problem of flexible connections to the welding tips and assures full uniform welding current every time.

Electrode Tips: All the spot welding is done with just two sizes of electrodes in order to simplify maintenance. Electrode tips are either ⅝-inch diameter or ½-inch diameter. All are made from a hard, abrasion and heat resistant copper alloy known as SMS-W5.

Tip Dressing: All tips are dressed after mounting in the welding head on which they will be used. And they are redressed by the operator himself whenever his inspection indicates it is necessary. Dressing and redressing are greatly simplified at De Soto by adoption of a uniform tip contour and a particularly easy method of obtaining such a contour.

The contacting point or welding surface of all tips is given a 3-inch radius by use of a steel form block shown in Fig. 5. Over this block, 240-grit cloth is wrapped. Then the block is clamped between the two tips of the gun and rotated, thus dressing the tip surfaces and bringing them to a 3-inch radius—both tips at the same time.

Each welding head has an extra switch or a manual control which closes a


USE THESE RACO ELECTRODES
FOR SUPERIOR WELDING OF CORROSION- AND HEAT-RESISTING STEELS
RACOLLOY 18-8
For fine performance on these classes of steel: Unstabilized 18-8, Types 301, 302, 304, 306, 308. These electrodes are used for parts intended to resist relatively mild corrosive conditions in service, or for parts that can be heat treated after welding. For example, dairy, distillery and restaurant equipment, and chemical tanks.
WELDING CODES—Racolloy 18-8 electrodes meet requirements of U. S. Navy Bureau of Ships Specification 46E4 (INT) Grade I.
RACOLLOY 18-8Cb
These electrodes containing columbium are used with exceptional success for all-position welding of Types 321 and 347. Applications include welding stainless steel pressure vessels for continuous service in the temperature range of 700° —1600° F. These uses include chemical plant, oil refinery equipment and aircraft exhaust collector systems.
WELDING CODES—Racolloy 18-8Cb electrodes meet the requirements of U. S. Navy Specification 46E4 (INT) Grade II.
The REID-AVERY COMPANY
INCORPORATED
DUNDALK BALTIMORE 22 MARYLAND

by-passing valve, causing the air supply to the booster to go through another pressure regulator. This unit may be set for a low value such as 10 p.s.i. contrasted to 100 p.s.i. which may be used for welding. This lower value exerts just enough pressure to clamp the electric faces against the form block for proper dressing. Full welding pressure of course would be so great that it would be difficult to move the block between the tips.

This arrangement is diagrammed schematically in Fig. 13. Full tip pressure for welding is obtained by opening both electric solenoid valve No. 1 and valve No. 2. Then air pressure governed by regulator No. 1, here set at 100 p.s.i., acts on the booster and produces full hydraulic pressure in the cylinder operating the electrode tips.

When dressing tips, valve No. 2 is left closed so only valve No. 1 is actuated. Then air reaching the booster must also pass through regulator No. 2 which is set for only 10 p.s.i., resulting in only 1/10th welding pressure being applied at the electrode tips. This is about 80-100 pounds, ample for dressing the tips. Note that all pressures are predetermined by regulator settings. This does away with variations from changing air line pressures, etc.

Weld Samples Checked: An important check on all conditions entering into production of good sound welds is had by making test welds every hour on every welder in the shop. These test coupons are then pulled to destruction on a small tensile machine as shown in Fig. 7.

This testing is done near the welding machines themselves. Poor adhesion reveals any deviation from proper welding practice, enabling any wrong adjustments to be readily detected and quickly corrected before rejects can occur. Since a single spot weld is made between overlapping ends of the two samples, pulling in the unit shown in Fig. 7 determines values under a combination of shear failure and tearing. Most normal failures occur in shear as well as a type of tear caused by deformation of the overlapping ends. Some of this bending-tearing action can be seen in Fig. 7 but the weld has not yet begun to fail as tensile values were still rising when the picture was taken.

What happens as the operator stretches the test coupon is that the gage first shows a rapidly rising tension value, which levels off and then gradually falls as failure occurs. Any deviation in proper welding conditions shows up immediately in lowered maximum value in the test. By thus checking performance of every welder hourly, it is possible to keep rejected work down to a small fraction of a per cent and to be sure that every weld made has full strength.

Such efficient production methods go a long way to make available needed war equipment in ample volume and with proper performance assured.

Advertisement

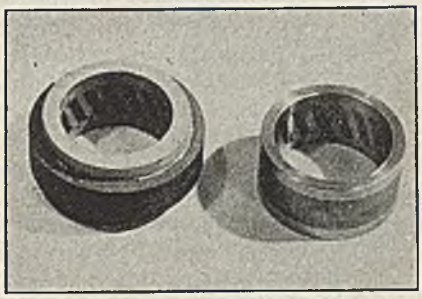
DIECASTING DIGEST

VII—Rotors Now Made by Die Casting

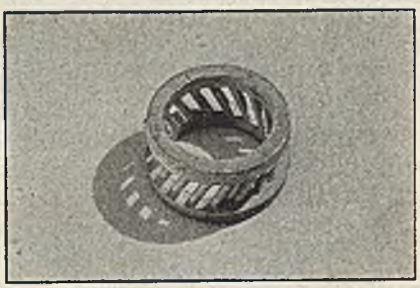
Attempts to die cast rotor bars for electric motors have usually proved unsuccessful in the past, but recent production with the Lester-Phoenix pre-fill injection system indicates that the die casting of pure aluminum into rotors is not only feasible, but results in great savings of time and money as well as improved electrical performance.

The rotor shown on this page, made by the Sperry Gyroscope Company for use in precision military equipment, must pass exceptionally rigid tests for porosity, which reduces electrical conductivity. It is made by stacking 36 circular laminations of electrical iron, each .008" thick, so that the 17 slots around the inner circumference of the laminations are aligned to form oblique channels, then placing them on an arbor to be used as an insert in the die. It is die cast in a single cavity die at the rate of 100 to 125 per hour; there are very few rejections.

In casting aluminum through the insert, the hot metal must be forced through the 17 channels in such a way that there is no volume of gas or air trapped within the aluminum. Failures in the past resulted from insufficient pressure to pack the metal solidly into every channel; and the usual high injection speeds created turbulence and air bubbles in the narrow passages.



Top left: Rotor casting as it comes from the die. Right: finished rotor, with excess iron and aluminum machined off, ground inside and out. Bottom: actual aluminum casting with the iron laminations dissolved out. Rotors can also be die cast with integral fan blades for air cooling.

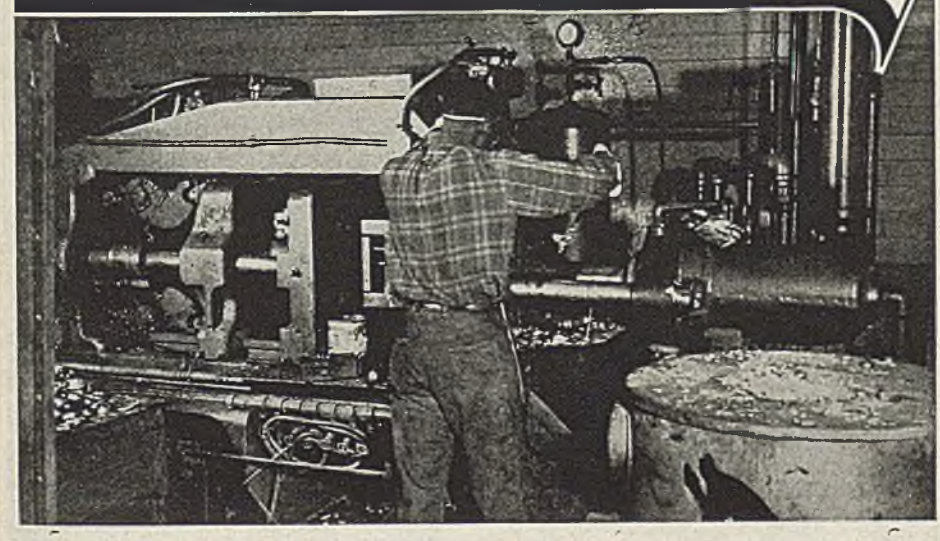


The part shown is made in a Lester-Phoenix die casting machine equipped with a pre-fill injection system, which squeezes the metal slowly, gently into the die, then applies maximum pressure (up to 33,000 psi) to the casting as it chills. This "slow-squeeze" method of injection eliminates the two sources of porosity in die castings—gas pockets and shrinkage voids.

Complete Facts Now Available

Write for "Die Casting Precision Parts" reprinted from STEEL. It contains interesting case histories of the savings resulting from the use of die castings at the Sperry Gyroscope Company. Lester-Phoenix, Inc. 2629 Church Ave., Cleveland 13, Ohio

Slow-squeeze Injection Packs Metal Into Die; Prevents Forming of Gas Pockets, Shrinkage Voids



Shown above is one of the four Lester-Phoenix HHP-3X-S die casting machines in the Nassau Plant of the Sperry Gyroscope Company at Great Neck, Long Island, N. Y. These machines are built to cast aluminum, brass or magnesium, and are equipped with the patented Lester-Phoenix pre-fill injection system, with injection pressures up to 33,000 psi.

To hold and confine such pressures within the dies, where they will be effective, the massive cast steel beam frame of this Lester-Phoenix machine provides a die locking pressure of 600 tons. This and other exclusive Lester-Phoenix features help to produce dense, strong, homogeneous die castings which are replacing forgings, sand castings and permanent mold castings. Write for details.

FREE!

Write for free data on modern die casting methods and equipment.

LESTER-PHOENIX, INC.

2629 CHURCH AVE., CLEVELAND 13, OHIO

LESTER-PHOENIX

DIE CASTING MACHINES

THE BUSINESS TREND

Most War Programs Met Schedules During March

MUNITIONS production turned upward during March to an overall dollar volume of $5 billion, the highest level recorded since last October. Practically all the war programs were on schedule, with ships and communications equipment the only two among the major categories failing to reach projected production goals.

Aircraft output was on schedule last month, registering an 11 per cent gain over February. Ammunition output was 2.5 per cent above schedule; while combat motor vehicle output exceeded the March goal by 2.6 per cent in recording an 8.8 per cent increase over February. Production of guns last month was up 8 per cent and 2.3 per cent ahead of schedule. Combined output for all the other war programs registered a 7 per cent increase over February production, and represented a 1.2 per cent increase over scheduled output.

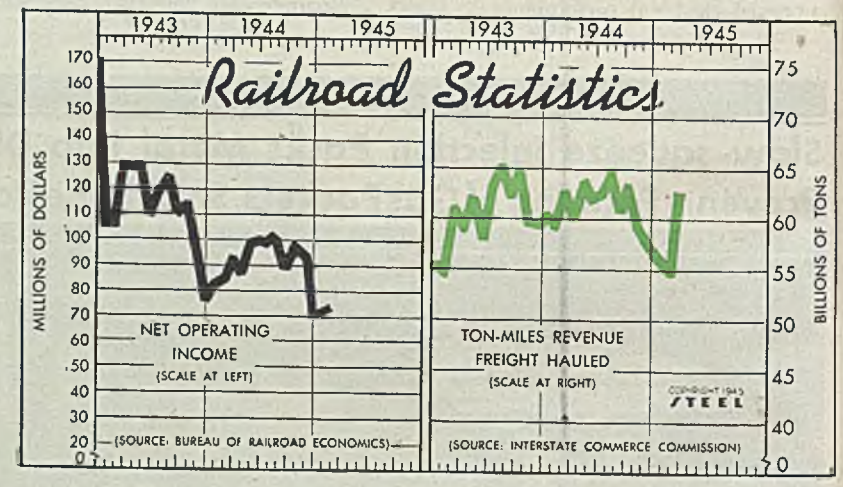
MACHINE TOOLS—March shipments of machine tools increased 9.3 per cent to $39,374,000. Value of net new orders decreased $11,323,000, or 19.5 per cent to $46,701,000. Unfilled orders on March 31 represented an increase of 2.3 per cent over the preceding month to $309,650,000, of which $89,967,000 were unrated. At the close of last month backlogs constituted about eight months' production at the March rate of shipments.

CONSTRUCTION — Existing curbs on construction materials are expected to be eased somewhat after V-E Day. Restriction on repair work will be less rigid and greater latitude is likely to be allowed in undertaking construction work without War Production Board authorization. However, some controls over building activities must be retained because of the shortage of materials, WPB officials state. Up to March 31 last 90,700 specific postwar building projects had been reported to F. W. Dodge Corp. from the 37 eastern states. Estimated total cost is $14.8 billion.

FOREIGN TRADE—United States exports during February continued the decline which has been apparent since the record-breaking total of $1.5 billion was reached in May, 1944. February exports of $886 million were $15 million below the January total due principally to a drop in non-lend-lease exports.

RAILROADS—Freight car builders constructed 12,458 freight cars during last quarter, and an additional 3787 were built in railroad shops. Of the total 2465 were for foreign use. A year ago railroad freight car builders produced 17,423 cars in the initial three months, and railroad shops 2587 units.

Freight traffic handled by Class I railroads in March amounted to 62.9 billion ton-miles, an increase of about 1 per cent over March 1944 freight traffic.



Statistics of Class I Railroads

	Net Operating Income			Ton-Miles Revenue Freight		
	1945	1944	1943	1945	1944	1943
	(millions)			(billions)		
January	$73.0	$84.9	$105.3	56.8	60.5	55.1
February	73.2	84.5	105.8	55.3	59.3	54.4
March	....	92.5	129.7	62.9	62.7	61.2
April	....	87.7	128.7	...	60.4	59.1
May	....	98.5	129.5	...	64.0	62.1
June	....	99.8	109.0	...	62.0	58.0
July	....	98.6	127.8	...	62.8	63.7
August	....	101.4	132.3	...	64.5	65.1
September	....	89.1	110.3	...	61.0	62.5
October	....	97.3	113.1	...	63.5	65.0
November	....	91.6	96.4	...	59.4	59.9
December	....	69.8	76.9	...	57.3	60.6
Average	....	$93.1	$113.5	...	61.5	60.6

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	92.0	94.5	97.0	98.5
Electric Power Distributed (million kilowatt hours)	4,411	4,332	4,402	4,344
Bituminous Coal Production (daily av.—1000 tons)	1,717	1,292	1,992	1,952
Petroleum Production (daily av.—1000 bbls.)	4,798	4,811	4,782	4,427
Construction Volume (ENR—unit $1,000,000)	$22.2	$52.2	$23.6	$51.4
Automobile and Truck Output (Ward's—number units)	20,335	20,470	20,480	16,605

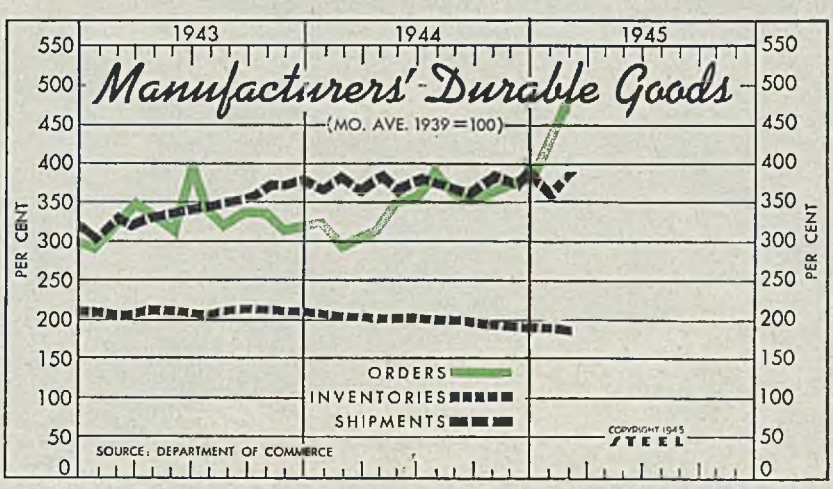
*Dates on request.

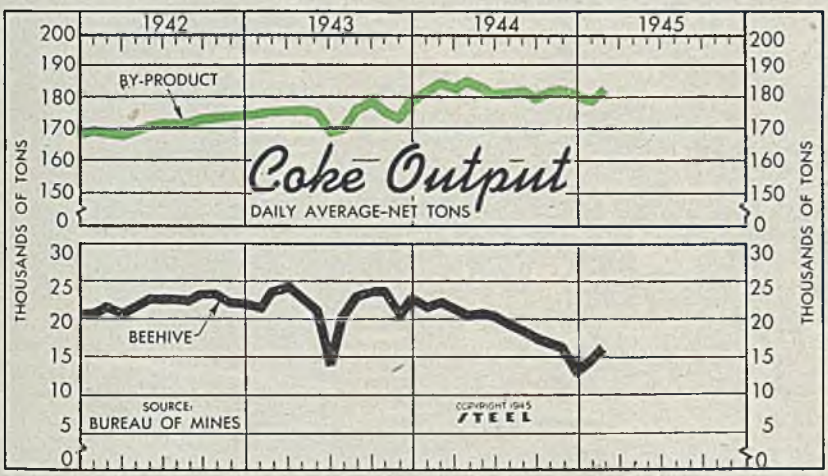
TRADE				
Freight Carloadings (unit—1000 cars)	855†	846	826	840
Business Failures (Dun & Bradstreet, number)	17	23	16	33
Money in Circulation (in millions of dollars)‡	$26,068	$25,939	$25,836	$21,334
Department Store Sales (change from like week a year ago)†	−13%	+8%	+28%	+23%

†Preliminary. ‡Federal Reserve Board.

Index of Manufacturers' Durable Goods
(Mo. Ave. 1939 = 100)

	—Orders—		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
Jan.	431	332	355	364	190	212
Feb.	478	294	390	384	187	209
Mar.	...	310	...	377	...	207
Apr.	...	325	...	389	...	205
May	...	352	...	371	...	204
June	...	359	...	383	...	204
July	...	393	...	373	...	202
Aug.	...	367	...	366	...	201
Sept.	...	350	...	372	...	199
Oct.	...	367	...	380	...	197
Nov.	...	372	...	374	...	195
Dec.	...	378	...	390	...	192
Ave.	...	350	...	377	...	202



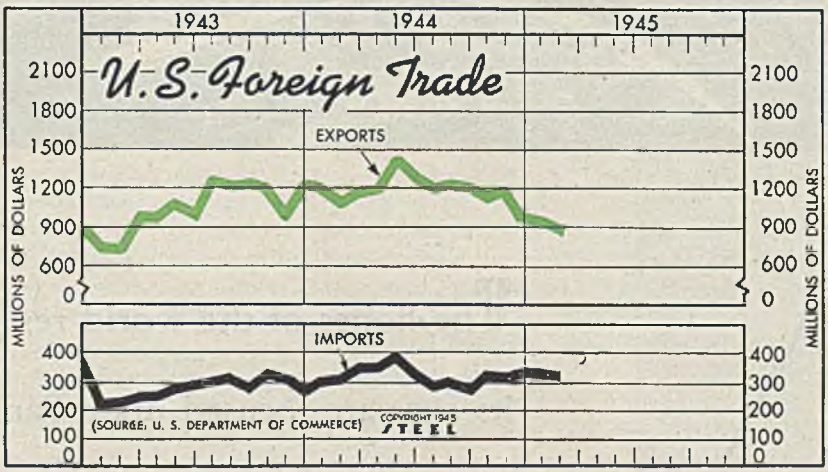


Coke Output
Bureau of Mines
(Daily Average—Net Tons)

	By-Product		Beehive	
	1945	1944	1945	1944
Jan.	179,879	181,501	14,745	21,933
Feb.	180,727	184,384	16,049	22,248
March	.....	183,123	.....	21,529
April	.....	185,259	.....	20,457
May	.....	184,071	.....	20,783
June	.....	181,891	.....	20,472
July	.....	181,506	.....	19,531
Aug.	.....	181,718	.....	18,572
Sept.	.....	179,234	.....	17,305
Oct.	.....	181,772	.....	16,994
Nov.	.....	182,383	.....	16,199
Dec.	.....	180,746	.....	13,066
Ave.	.....	182,359	.....	19,128

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

	Exports			Imports		
	1945	1944	1943	1945	1944	1943
Jan.	901	1,124	730	332	300	228
Feb.	886	1,086	719	321	313	234
Mar.	....	1,158	988	...	359	249
Apr.	....	1,182	980	...	359	258
May	....	1,419	1,085	...	386	281
June	....	1,271	1,002	...	330	295
July	....	1,198	1,262	...	293	300
Aug.	....	1,207	1,204	...	302	315
Sept.	....	1,199	1,235	...	280	285
Oct.	....	1,140	1,195	...	327	329
Nov.	....	1,184	1,074	...	322	317
Dec.	....	934	1,244	...	336	281
Total	....	14,102	12,716	...	3,907	3,369



FINANCE

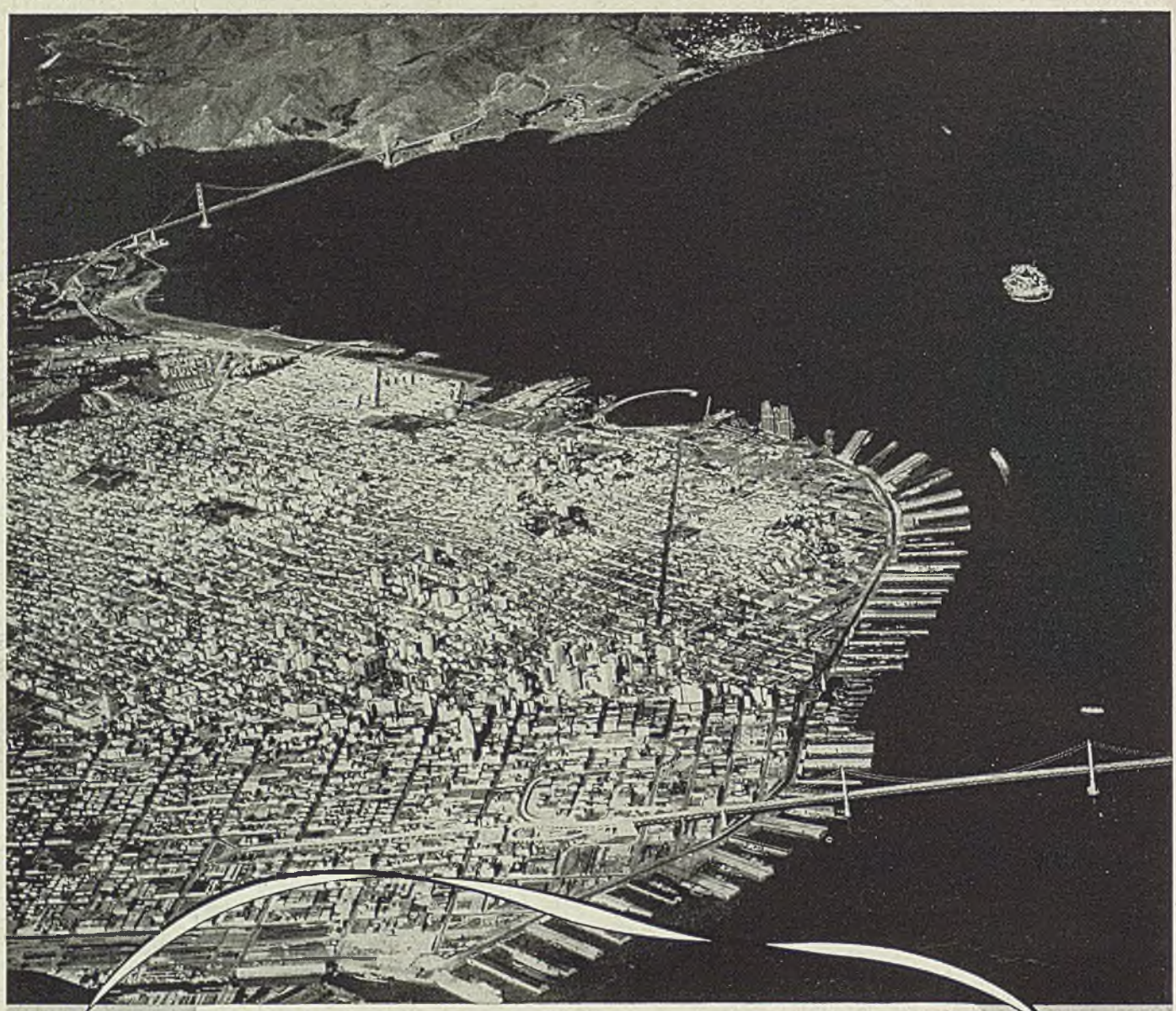
	Latest Period°	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,191	$10,245	$11,261	$9,544
Federal Gross Debt (billions)	$235.5	$235.2	$234.6	$187.0
Bond Volume, NYSE (millions)	$65.5	$39.8	$43.5	$51.4
Stocks Sales, NYSE (thousands)	9,684	5,241	5,291	3,909
Loans and Investments (millions)†	$57.4	$57.3	$58.2	$51.6
United States Gov't. Obligations Held (millions)†	$43,327	$43,286	$43,799	$38,089

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$57.55	$57.55	$57.55	$56.73
All Commodities†	105.5	105.1	105.1	103.8
Industrial Raw Materials†	117.3	116.1	116.3	113.9
Manufactured Products†	102.0	101.9	101.8	100.9

†Bureau of Labor's Index, 1926 = 100.



The hopes of the world rest upon America --
its eyes are focused upon San Francisco.
May the prayers of humanity
be answered by a lasting peace and
freedom from fear.

VICTOR EQUIPMENT COMPANY • SAN FRANCISCO

Steelmakers Await Pattern Of Cutbacks in War Needs

Shell program least likely to be reduced . . . OPA steel price adjustments rumored near completion . . . Steel rate recovers

STEEL producers await with keen interest development of the pattern of cutbacks in war programs, following official prediction of a 15 per cent curtailment within the first three months after V-E Day.

Reduction in requirements for ships and tanks and the more recent cuts in aircraft are fairly well established and particularly with regard to ship construction steel producers believe they can gage future prospects with reasonable assurance. Other programs of less importance also seem to be on the wane, but much room still is left for uncertainty especially with regard to heavy shell work, which now dominates the entire steel program.

A recent cutback in certain types of shells, of about 10 per cent, indicated a leveling of needs, but leaves a tremendously heavy schedule, which, as long as it is maintained, not only will consume large quantities of steel but will have special bearing on certain types of steel products, including bars, seamless tubing, shapes and rails. Definite programs for the future are difficult because of changes in the war situation but it is believed that certain further broad details will be revealed soon. Latest information indicates substantial reduction in pressure for M-4 tanks, some types of artillery and mortar shells.

Evidence is increasing that railroad equipment, agricultural machinery, oil and utilities will benefit first from any appreciable easing in war requirements, with special attention also directed to providing machinery for resumption of at least limited civilian automobile production soon after the end of the European war.

Most recent cut in the ship program, involving cancellation of 30 tankers out of 40 originally considered, has resulted in cancellation of about 120,000 tons of plates and 40,000 tons of shapes and bars, mainly shapes. The greater portion of this tonnage was actually scheduled for shipment in this quarter, with the result some plate capacity is open for May and June, though gaps in May have been practically filled by other needs. Sun Shipbuilding & Dry Dock Co., Chester, Pa., which was to have built 13 of the tankers, requiring 69,000 tons of steel, felt this curtailment most severely.

While Office of Price Administration is said to have promised definitely to have recommendations on steel price adjustments ready by May 1, there still is uncertainty as to what these adjustments will be and when they will be effective. Following their submission by OPA they will require approval of the Office of Price Stabilization and Office of War Mobilization and Reconversion.

Steelworks operations last week recovered 2 points to 94 per cent of capacity as the coal situation improved. Pittsburgh advanced 1 point to 90½ per cent, Cincinnati 2 points to 94, Youngstown 3 points to 94, Cleveland 2½ points to 97 and Birmingham overcame its heavy cut of the previous week to 95 per cent. New England declined 2 points to 90 per cent and eastern Pennsylvania 1 point to 90. Rates were unchanged as follows: Chicago 98½, Wheeling 92½, Buffalo 90½, St. Louis 80 and Detroit 86.

Steel deliveries show little change and in some products are available only late in the year or early next year. Plates can be had in July and August but sheets are sold well toward the end of the year and in some cases as late as January. Bars are also sold into next year by some producers.

Pig iron and scrap supply in general is sufficient, though there are spots where scarcity exists, particularly in basic iron for steelmaking in the East. Some relief in the latter instance was given by supply from a mill tied up in its steelmaking departments by a strike, its iron being distributed to others in need.

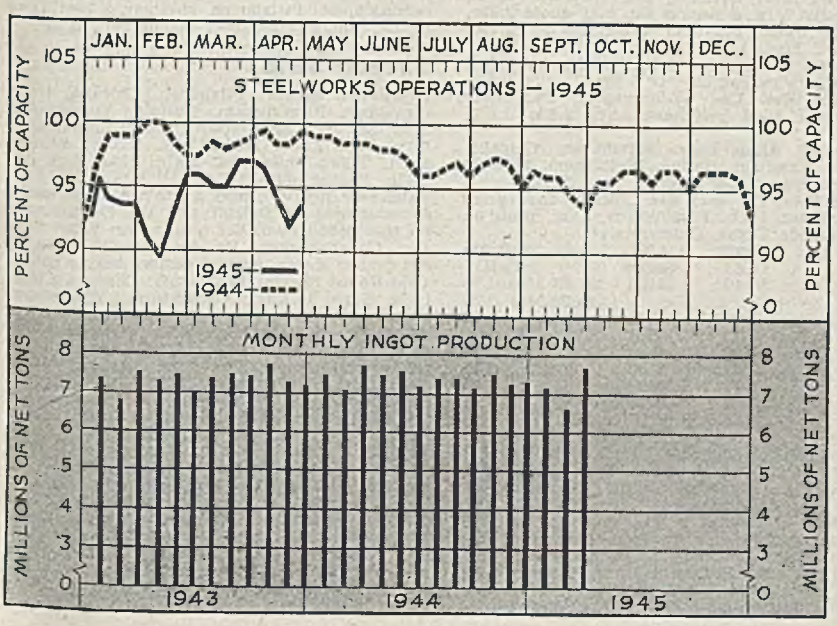
Average composite prices of steel and iron products, based on ceiling prices, are steady at recent levels. Finished steel composite holds at $57.55, semifinished steel at $36, steelmaking pig iron $24.05 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Apr. 28	Change	Same Week 1944	Same Week 1943
Pittsburgh	90.5	+1	94.5	101
Chicago	98.5	None	102.5	99
Eastern Pa.	90	—1	94	94
Youngstown	94	+3	96	95
Wheeling	92.5	None	98	93
Cleveland	97	+2.5	97.5	95
Buffalo	90.5	None	90.5	93
Birmingham	95	+45	95	100
New England	90	—2	85	95
Cincinnati	94	+2	89	91
St. Louis	80	None	77	93
Detroit	86	None	88	96
Estimated national rate	94	+2	°99.5	°99.5

°Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	April 28	April 21	April 14	One Month Ago March., 1945	Three Months Ago Jan. 1945	One Year Ago Apr., 1944	Five Years Ago Apr., 1940
Finished Steel	$57.55	$57.55	$57.55	$57.55	$57.35	$56.73	$56.08
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	16.10

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished 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. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	April 28, 1945	Mar. 1945	Jan. 1945	Apr. 1944
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
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	2.20	2.20	2.15	2.10
Plates, Philadelphia	2.25	2.25	2.225	2.15
Plates, Chicago	2.20	2.20	2.18	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.15	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.65	3.65	3.61	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.18	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.65	3.65	3.61	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.80	2.80	2.70	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Finished Material	April 28, 1945	Mar. 1945	Jan. 1945	Apr. 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$25.19	$25.19
Basic, Valley	24.50	24.50	23.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	25.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	24.69	24.69
No. 2 foundry, Chicago	25.00	25.00	24.00	24.00
Southern No. 2, Birmingham	21.38	21.38	20.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	24.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	25.84	25.84
Malleable, valley	25.00	25.00	24.00	24.00
Malleable, Chicago	25.00	25.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy Melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.00	$7.00	$7.00	$7.00
Connellsville, foundry ovens	7.75	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

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 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual 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, $34; Detroit, del. $36; Duluth (bll) $36; Pac. Ports, (bll) $46. (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, $40. Detroit, del. $42; Duluth, billets, $42; forg. bll. f.o.b. Pac. Ports, $52.
(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, $34. (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.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅝ in. inclusive, per 100 lbs., $2. Do., over ⅝—⅞-in., incl., $2.15; 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, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c. (Calumet Steel Division, Borg Warner Corp., and Joslyn Mfg. & Supply 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., 2.65c; Detroit 2.70c; Toledo 2.80c. (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 freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pitsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c.; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.65c; Granite City, base 3.75c; New York del. 3.89c; Phila. del. 3.82c; Pacific ports 4.20c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.75c; Granite City, base 2.85c; Detroit, del. 2.85c; eastern, Mich. 2.90c; Pacific ports 3.40c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.35c; Detroit del. 3.45c; eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.20c; New York, del. 2.39c; Phila., del. 2.25c; St. Louis, 2.44c; Boston, del. 2.52-77c; Pacific ports, 2.75c; Gulf ports, 2.55c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh; 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.60c
Spring wire 3.20c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.80; galvanized, $2.55; Pac. ports ..... $3.30 and $3.05
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c
Woven fence, 15½ gage and heavier, per base column ..... .67c
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers 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	49.50
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, $43.00.

*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, $43 net ton, base, Standard spikes, 3.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	..	67.00c
1.5	4	1	8.5	54.00c
..	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

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.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **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%, waste-wasters 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., ⅜ 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.
⅞-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
⅞-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 *7.00
Connellsville, foundry 7.50- 8.00
Connellsville, prem. fdry. 7.75- 8.10
New River, foundry 8.50- 8.75
Wise county, foundry 7.25- 7.75

By-Product Foundry

Wise county, furnace 6.75- 7.25
Kearney, N. J., ovens 12.65
Chicago, outside delivered 12.60
Chicago, delivered 13.35
Terre Haute, delivered 13.10
Milwaukee, ovens 13.35
New England, delivered 14.25
St. Louis, delivered ..... †13.35
Birmingham, delivered 10.50
Indianapolis, delivered 13.10
Cincinnati, delivered 12.85
Cleveland, delivered 12.80
Buffalo, delivered 13.00
Detroit, delivered 13.35
Philadelphia, delivered ..... 12.[illegible]

*Operators of hand-drawn ovens using trucked coal may charge $7.75, effective Nov. 29, 1943.
†13.85 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 9400 series
Boston	4.014[1]	3.912[1]	4.012[1]	5.727[1]	3.874[1]	4.106[1]	5.106[1]	5.374[14]	4.744[16]	4.144[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[12]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[12]	4.613[14]	4.103[21]	4.774		
Philadelphia	3.822[1]	3.636[1]	3.705[1]	5.272[1]	3.618[1]	3.922[1]	4.272[1]	5.168[15]	4.872[25]	4.072[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.694[1]	5.252[1]	3.494[1]	3.902[1]	4.252[1]	5.044[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.896[1]	5.341[1]	3.696[1]	4.041[1]	4.391[1]	5.346[17]	4.841[20]	4.041[21]			
Norfolk, Va.	4.065[1]	4.002[1]	4.071[1]	5.465[1]	3.871[1]	4.165[1]	4.515[1]	5.521[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.	3.45[1]	.	.	.	.	.	.	.	.	.....	.....	.....
Claymont, Del.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.73[1]	5.26[1]	3.45[1]	3.819[1]	3.819[1]	4.90[16]	4.40[10]	3.75[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.81[1]	3.50[1]	4.80[15]	4.30[10]	3.65[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.50[1]	5.00[1]	3.45[1]	3.60[1]	3.60[1]	4.90[13]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.50[1]	3.50[1]	4.80[13]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.50[1]	5.188[1]	3.45[1]	3.60[1]	3.60[1]	5.027[12]	4.40[24]	3.75[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.	3.40[1]	.	3.35[1]	3.50[1]	3.50[1]		4.30[24]	3.65[21]	4.35[21]		
Detroit	3.450[1]	3.661[1]	3.709[1]	5.281[1]	3.550[1]	3.700[1]	3.700[1]	5.15[12]	4.500[24]	3.800[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.265[1]	5.765[1]	3.965[1]	4.215[1]	4.215[1]	5.758[19]	5.448[24]	4.448[21]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.165[1]	5.665[1]	3.865[1]	4.115[1]	4.115[1]	5.658[19]					
Cincinnati	3.611[1]	6.391[1]	3.761[1]	5.291[1]	3.525[1]	3.675[1]	3.675[1]	4.975[13]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.55[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	.....	.....	.....	4.80[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.65[1]	5.15[1]	3.35[1]	3.50[1]	3.50[1]	5.381[18]	4.20[24]	3.75[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.787[1]	5.287[1]	3.487[1]	3.737[1]	3.737[1]	5.422[18]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[2]	3.63[1]	3.73[1]	5.23[1]	3.618[1]	3.768[1]	3.768[1]	5.068[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[2]	3.81[2]	3.91[2]	5.41[2]	3.61[2]	3.86[2]	3.86[2]	5.407[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.797[1]	5.297[1]	3.497[1]	3.747[1]	3.747[1]	5.322[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.165[5]	5.78[5]	4.065[2]	4.215[5]	4.215[5]	5.415[15]	4.78[24]	4.33[21]			
Birmingham	3.50[1]	3.55[1]	3.65[1]	5.903[1]	3.55[1]	3.70[1]	3.70[1]	4.90[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	4.00[4]	5.85[4]	4.158[4]	4.20[4]	4.20[4]	5.40[26]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[5]	4.35[3]	5.50[3]	3.863[3]	4.313[3]	4.313[3]	5.463[15]	4.10[10]	3.65[22]			
Los Angeles	4.40[4]	4.65[4]	5.05[4]	7.20[4]	5.10[4]	4.95[4]	6.75[4]	6.15[12]	7.20[8]	5.583[20]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.75[7]	6.35[7]	4.65[7]	4.50[7]	5.75[7]	6.50[15]	7.30[15]	5.333[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.85[27]	6.50[27]	4.75[27]	4.75[27]	6.30[27]	5.90[15]	6.60[15]	5.533[15]	.....	.....	
Tacoma	4.35[6]	4.45[6]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.05[15]	5.783[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.60[15]	5.783[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[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]—500 to 1499 pounds [11]—one bundle to 39,999 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 bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [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	32.80

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	52.80

less $7 freight allowance

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 Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

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 furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10 .15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70 .90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	†21.38	†20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base).....$30.50

6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos, 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

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 Quality

Pa., Mo., Ky. $66.55

First Quality

Pa., Ill., Md., Mo., Ky.	52.85
Alabama, Georgia	52.85
New Jersey	57.70
Ohio	46.35

Second Quality

Pa., Ill., Md., Mo., Ky.	47.90
Alabama, Georgia	39.15
New Jersey	50.50
Ohio	37.10

Malleable Bung Brick

All bases 61.65

Silica Brick

Pennsylvania	52.65
Joliet, E. Chicago	60.65
Birmingham, Ala.	52.85

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	31.95
Wire cut	29.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_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.)

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton; f.o.b. cars, New Orleans, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 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 .65c 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, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

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; .066c, .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. ern, add .5c for c.l., and 2c for c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; **westsilicon,** bulk, c.l., 5.80c, 2000 lbs. to 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 c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract bass, 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 1.15%, net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 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. 1 Bundles	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Machine Shop Turnings	13.75
Mixed Borings, Turnings	10.75-11.75
Machine Shop Turnings	10.75-11.75
No. 2 Busheling	15.50
Billet, Forge Crops	21.25
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 Turning	8.25
Mixed Borings, Turnings	8.25
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.50-12.00
Short Shovel Turnings	13.50-14.00
Mixed Borings, Turnings	11.50-12.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	12.50-13.00
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	8.50
Mixed Borings, Turnings	8.50
Short Shovel, Turnings	11.06*
Chemical Borings	13.06*
Low Phos. Clippings	16.56*
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

*Inland base ceiling; Boston switching district price 99 cents higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	14.00-14.50
Cast Iron Borings	13.00-13.50
Machine Shop Turnings	12.00-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-12.00

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.	16.25-16.75
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	9.00- 9.50
Mix. Borings, Sht. Turn.	12.00-12.50
Short Shovel Turnings	12.00-12.50
Cast Iron Borings	12.00-12.50
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	13.00
Short Shovel, Turnings	15.00
Mixed Borings, Turn.	13.00
Cast Iron Borings	14.00
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	8.75- 9.25
Short Shovel Turnings.	10.75-11.28
Short Turnings	10.75-11.25
Cast Iron Borings	10.00-10.50
Low Phos Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	6.00- 6.50
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.90
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

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: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, 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% 20.40c, 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, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wires and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more: New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 142

No easing has appeared in demand for sheets and strip, with most producers of hot-rolled pickled and cold-rolled sheets sold into next year, with some makers of plain hot-rolled in the same position. However, deliveries on the latter grade can be obtained for November. High-silicon electric sheets are becoming more extended. All-steel shell containers continue to call for large sheet tonnages. Buying is slightly less active, attributed to extended deliveries.

New York — Except for stainless, sheet deliveries are at least being sustained at recent schedules. Most producers of hot-rolled pickled and cold-rolled sheets are quoting delivery early next year and in some instances this is also true in plain hot-rolled sheets, although November can be done in the latter grade.

Electrical sheet deliveries are not holding their own but becoming more extended. A decided jump has been noted recently in high silicon grades. Certain sellers who little more than two or three weeks ago were quoting September are now booked up solidly into November and December. The low silicon grades are being quoted for shipment well into next year. Stainless steel deliveries reflect particularly recent cutbacks in the aircraft program. Some sellers, who recently quoted September, are now offering tonnage in late July and August.

Locally, new demand continues less active and trade leaders anticipate various adjustments in schedules as time goes on. It is fully expected that some of the more essential civilian requirements which had been cut for the current quarter will be reinstated in varying degree in third quarter.

Meanwhile, jobbers continue to show much livelier interest in cold-rolled sheets than in hot-rolled. This is indicated by the fact that some producers are booked up solidly on cold-rolled for jobber account into January, while having space available on hot-rolled as early as July.

Cutbacks in the shell program have not been reflected in any material degree by curtailments in the shell container schedule. This is ascribed to the fact that the all-metal shell container program is well behind shell requirements, for only relatively recently has it been given real impetus.

Boston — Buying of narrow cold-rolled strip and sheets has slackened further, notably in sheets. Cutbacks and tonnage revisions, which include ammunition box needs, and scattered adjustments affecting both products, are minor factors. Although delivery extensions have ceased with numerous producers cold strip deliveries are uniformly better than for hot-rolled, first quarter next year with some integrated mills. Stainless sheets, plain and polished, are in August with some alloy divisions and cold stainless strip in July.

The latter has attracted some large volume on a delivery basis. Hot-rolled carbon strip commitments to cold rollers contribute substantially to extended deliveries to other consumers, in narrow widths especially. While cutbacks in smaller caliber links is imminent Marlin Firearms Co., New Haven, Conn., has a contract from the Springfield ordnance

district for production of ten million 20-mm. links and two hundred thousand 20-mm. end links.

Cincinnati — The situation in sheet supply shows little change though needs for material are likely to be drastically affected by events in Europe. Some cancellations have been entered but so far overall conditions have not been drastically changed. Mills will have a large carryover into May, an indication that supplies are tight. Buying is lighter, discouraged by deferred delivery promises, books being filled for the rest of the year.

St. Louis — Pressure for sheets and strip continues heavy and mills are booked to the end of the year. Cancellations, while not yet heavy, are increasing but have affected only backlogs of specifications not yet in production. Directives still are numerous but mainly affect reassignment of tonnage to fill gaps. Output is improving in spite of continuing labor shortage.

Chicago — Delayed deliveries constitute consumers' chief complaints to sheet mills. Recall by WPB of fairly substantial second quarter allotments has resulted in some cancellations of orders, but these are not heavy. However, it has brought from users requests to mills to adhere as closely as possible to delivery promises, since allotment cutbacks have reduced inventories to dangerously low levels. Hot-rolled strip is not in quite as tight position as recently. Hot-rolled sheets are in November-December delivery, but little is available for balance of this year in hot-rolled pickled and cold-rolled sheets and narrow strip. Army quartermaster, Jeffersonville, Ind., will take bids on portable shelters, 16 x 32 feet, to be required at rate of 30,000 per month and utilizing 26-gage corrugated sheets and 12 and 18-gage supports.

Philadelphia — Some irregularity exists in sheet schedules but the general situation is much the same. One large producer reports easing in plain hot-rolled deliveries, now quoting September on 17-gage and heavier and October on lighter gages, while on cold-rolled he quotes November. Some producers are out of the market entirely for this year on all grades, with others quoting in between, mainly November and December. Extremes still are noted in galvanized, one producer having some tonnage available for October, while another is booked solidly until April. Stainless sheets, reflecting recent cutbacks in aircraft, are being quoted generally for August shipment, with still a little available in July. Electrical sheet schedules, on the other hand, now range from December to late in first quarter, depending largely on grade.

Pittsburgh — Buying is considerably lighter and shipments continue heavy. Current mill schedules are filled, with no tonnage available for the balance of this year, and on most products, for first quarter, 1946. Net result of this situation is a feeling of uncertainty. The reason for uncertainty is the probability that considerable tonnage now on books will be canceled. Reports now current on reconversion of civilian business seem to indicate sheet demand before the first quarter of 1946 from sources not now on steel company books. Manpower shortages in finishing lines continue to hamper sheet and strip production. Current operations on hot mills are slightly better than 70 per cent of capacity, with

cold-rolled and galvanized sheets somewhat less.

Steel Bars . . .

Bar Prices, Page 142

Recent ammunition cancellations have not reduced bar demand materially, though some shifting of tonnage on mill schedules has resulted. Deliveries are little affected and are practically as much deferred as before. Little tonnage can be had for delivery before fourth quarter and hot-top quality bars are generally sold into next year. Buying is easier in some instances.

New York — While there is some shifting of tonnage as a result of recent curtailment in certain types of shells, cancellations of bars have not yet been heavy and in general deliveries are being quoted on about the same basis as recently. Little tonnage can be had before fourth quarter and in the case of hot-top quality steel, most producers are booked solidly into next year. Even electric furnace alloy bars are now being offered generally in fourth quarter, with open-hearth alloys quoted for late November and December.

Cutbacks in the aircraft program apparently are still being more than offset by demands for jet propulsion engines, on which schedules are increasing rapidly. Cold-drawn bars are being quoted for shipment in October and on through into next year. Most sellers of larger cold-drawn rounds are booked tightly over the remainder of this year, due particularly to rocket requirements.

While maritime requirements are easing, they still are heavy, and drop forgers and bolt and nut manufacturers are specifying actively. Railroad equipment requirements are being looked upon to pick up some of the slack once war needs begin to take a sharp slump.

Boston — Although carbon and alloy bar buying has subsided, consumption continues heavy, with pressure for delivery. Cutbacks thus far, for most part, affect third quarter tonnage schedules. Orders for explosive shell contracts are untouched to date and some directives for carbon bars needed for heavy-duty truck forgings for second quarter are forthcoming. Forge shop demand holds heavy, though marine hardware fabricators are taking on other work to maintain a high rate of operations. Range in delivery promises is as wide as ever but the rate of extension has slackened. There are indications an improvement is in the offing in some grades and sizes. Electric furnace hot-rolled alloys and billets are in September. Cold-finished, other than turned, are in October, but turned are into January. Heat-treated stock trails hot-rolled alloys and billets are in September. Cold-finished, other than turned, are in October, with turned running into next year. Heat-treated stock trails hot-rolled by four weeks. Of surplus steel products disposed of in first half of April, carbon steel bars led; RFC agency, Boston, moved 400 tons, most going to Albot Steel Co. and Service Steel Corp., both of New York.

Chicago — Pressure for shell billets continues, which precludes possibility of production increases in quality and alloy bars or semifinished material. One important mill here reports commercial bar deliveries in October, quality bars and shell rounds in December. Drop forgers are operating at a peak, based

on available manpower. Machine tool builders have not experienced the continuous drop in demand predicted.

Philadelphia — Common carbon bars are being quoted from October into next year, with hot-top quality bars in larger sizes falling generally into next year, as late as March and April in one or two cases. Alloy schedules continue to tighten, due probably to the jet propulsion program and notwithstanding cutbacks in certain other types of aircraft. Most sellers are now quoting November on open-hearth alloys and October on electric furnace grades, with at least one large producer quoting September on the latter.

Pittsburgh — There is little change in the bar situation, with current schedules filled and third-quarter gaps created by cutbacks in the shell program rapidly filling up with tonnage originally scheduled for later delivery. Considerable doubt continues among bar sellers that all tonnage now on books represents firm orders. While 100 per cent of the tonnage now placed can fit into the military pattern as it now exists, most mills anticipate substantial cutbacks before actual production starts. This is particularly true in medium to large diameter items where orders are relatively few and in heavy tonnages and where elimination of one or two large orders might open up gaps to fit in a considerable volume of such bar items as might arise from reconverted civilian manufacture.

Steel Plates . . .

Plate Prices, Page 143

General easing in the plate market continues, mainly because of slackening in shipbuilding. Continuous mills are being taken off plates and diverted to sheets and strip as rapidly as labor can be recruited for handling the latter. In spite of lighter buying and cancellations mills are booked well ahead, some into August.

Philadelphia — Miscellaneous plate demand is tapering and there are further jobber cancellations. The overall trend in plates continues decidedly downward. However, some producers are still booked through first half and two leading mills have nothing to offer before August. One eastern mill has lost more than a week's production, due to labor trouble, but still is booking shipments for July.

Pittsburgh — Although shipyard work by the two major producers in this area has now been virtually completed as far as amphibious landing craft is concerned, there has been a renewal of prewar business. Government approval and co-operation have been obtained to channel adequate volume of plate for production of barges and towboats on inland waterways. Dravo Corp., Pittsburgh, reports about 30 barges and a scattering of towboats now booked for future production to augment the Ohio-Mississippi river fleet, which has seen little expansion since the war period. Currently plate deliveries are being promised for late third and early fourth quarters by all producers in almost all sizes and gages.

Boston — Declining volume of orders is accompanied by increasing reductions in employment at shipyards, including navy establishments. Third quarter tonnage will be off sharply from the pres-

ent level, far below peak. While some third quarter orders have been placed against allotments the total is small and new prospective volume is far below tonnage decline. Only flame cutting and weldment requirements are holding relatively well. Buying by warehouses is conservative. July delivery is available but some mills are beyond. Pressure has eased on wide plate units.

St. Louis — Plate demand is still heavy but pressure is expected to ease by the end of June, when most Maritime Commission work will be finished, with some tonnage carried into July. Some plate orders have been canceled but backlogs still are heavy. Production is improving but mills are short of labor.

Chicago — Plate demand continues to taper and further decline is indicated with the Maritime Commission's announcement April 20 of cancellation of construction of 30 tankers. It is understood the latter will involve over 100,000 tons of plates and WPB is seeking equitable mill distribution of this cutback. In some quarters it is predicted rolling of plates on continuous sheet mills will be near an end in June. In some cases, production directives already show reduction in plate tonnage and corresponding increase in hot-rolled sheets. New business on plates can be booked for delivery at midyear and later.

Tubular Goods . . .

Tubular Goods Prices, Page 143

Boston — Mortar shell contracts requiring seamless tubing are going ahead for most part and steel orders are in with tube mills, distributed by War Production Board. Some tonnage has been displaced in schedules, which extend through the remainder of the year. Merchant steel pipe volume with distributors is steady but not heavy and ship needs are smaller. For fire protection equipment demand holds good and the same is true for bearing rings. Boiler tubes are promised for September.

Wire . . .

Wire Prices, Page 143

Pittsburgh — Producers here expect an increase in merchant wire items during third and fourth quarters. Reduction in the aircraft program will result in availability of some wire capacity, although fine wire is still tight with continued heavy demand from the wire rope program. Manpower shortages in mills continue to hamper output at most points. Wire rod shortages have caused some difficulties in nonintegrated plants, but for the most part material is easier to obtain than manpower. Operating rate on plain wire is about 70 per cent of capacity, a virtual ceiling because of the manpower situation, as well as the higher percentage of wire in smaller gages now being produced, which cuts down overall tonnage.

Boston — Order revisions in wire mill schedules are of minor importance as affecting fine specialties. In high-carbon heavy wire production volume under continuing directives is even increased where suitable space and semi-finished are available. Heavy demand for spring material holds, with minor exceptions, while buying of razor blade steel is up to directive capacity. Bessemer screw stock deliveries have moved into fourth quarter. Some sizes excepted, the range in deliveries on wire prod-

ucts is wide. Rods are available from August to indefinite time; drawn wire from September to October; nails in November and December and numerous long process material is scheduled into first quarter. A large volume of wire in many grades and shapes has backed up for civilian goods but a few relaxations in control are developing, one of the first in the appliance field to be electric irons. Kasco Products Corp., Bridgeport, Conn., has resumed production of heating pads. Delivery pressure is still heavy for rope, tire bead and various types of Signal Corps wire.

Chicago — Normal but heavy demand is maintained for all wire products, with competition active in merchant wire. Requirements for poultry netting are particularly heavy, indicating increased emphasis on poultry raising. A recent tornado in the Quincy, Ill., area has brought urgent demands for nails and steel roofing material. In general, most nail consumption is in government use. Jobber and dealer stocks of merchant wire products are practically depleted.

Tin Plate . . .

Tin Plate Prices, Page 143

Pittsburgh—With tin stocks now lowest since the start of the war, estimated by War Production Board at slightly below 70,000 tons, possibility of increasing tin plate production is more cloudy than ever. The manpower situation probably holds the key to tin mill production as it does to tin plate consumption through control of the volume of food which can be prepared for packing. Can companies also report some manpower difficulties, but of the three phases of production, can manufacture and packing, the middle unit is probably in the best situation. Additional labor troubles in tin mills are anticipated since the difficulties which caused original strikes and walkouts have not been removed and the situation is unhealthy. Tin plate operations during April probably were between 50 and 60 per cent of capacity on dipped plate and somewhere around 40 per cent of capacity on electrolytic. Orders now on books are sufficient to maintain tin plate shipments at current levels through the balance of second and third quarters, and it seems probable that there will be no substantial increase in tin plate production above these levels.

Chicago — Better supply of box cars and start of lake transportation is helping tin plate distribution and mills are making good progress in moving material piled up during the recent car shortage. However, manpower shortage still constitutes a brake on production. In one instance, a district tin plate maker has transferred some production to its Pittsburgh district plant because of the labor situation. October is the first month in which openings occur on schedules.

Structural Shapes . . .

Structural Shape Prices, Page 143

Chicago — With structural shapes in deferred delivery, new inquiry is coming out slowly, and some projects are referred to as for postwar. Awards of the past few days have all been for high-priority war projects. Heaviest demand is for light shapes, which are in December delivery on new business, October for medium, and September on

heavy. Illinois state highway commission for the first time in two and a half years has taken bids on a structure requiring more than 100 tons, a grade separation in Kankakee, Ill., involving 137 tons, bids April 20. Curiously, only one fabricator filed a bid.

Philadelphia — Despite easing in maritime work, shape schedules are being well sustained, with two producers quoting August and a third offering September on both standard and wide-flange sections.

Boston — Fabricating shops with few exceptions are on reduced operating schedules and demand for shapes is light. Scattered new work covers some welding but little is appearing in construction to replace lost ship tonnage. Despite the lack of a normal ratio of structural tonnage pressure on mills is unabated and most are in August on delivery and in some sizes in September. Some ship tonnage has been distributed for July delivery but requirements tend downward. Miscellaneous industrial demand for heavy equipment is fair.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 143

Chicago — Recent awards of reinforcing bars in lots of 100 tons and over have amounted to about 2000 tons, with most going into new war plants or expansions. New inquiry is light. Supply of bars is hindering construction projects in many localities because new billet bars can be produced only from discard billets, off heats or reject steel. In some cases the hard grade of bars rolled from shell steel discards is not desirable. Inadequate supply of rerolling rails limits rail bars in making up the new billet deficiency.

Pittsburgh — Although inquiries are fairly light, available steel likewise is quite small. The steel directive on new billets for reinforcing bar production continues on its reduced basis and there is no indication that an increase is in the offing. Rail mills still experience acute shortage of rerolling rail and most rail tonnage is winding up in the production of merchant bars rather than concrete reinforcing steel.

Rails, Cars . . .

Track Material Prices, Page 143

New York — Railroad equipment buying includes the purchase of six 600-horsepower diesel-electric switch engines by the Long Island and three 600-horsepower and two 1000-horsepower diesel-electric switch engines by the Pennsylvania, both orders going to Electro-Motive Division of General Motors Corp., La Grange, Ill.

Car buying includes 250 fifty-ton box cars for the Consolidated Railroads of Cuba, placed with the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 143

Boston — Although some bolt shops are more crowded, other producers can do May and June on numerous sizes and grades. High carbon nuts and ½-inch rivets are promised for July. Fabricators still have substantial backlogs in most cases, although buying lacks earlier steady volume and pressure.

Pig Iron . . .

Pig Iron Prices, Page 145

Pittsburgh — All district blast furnaces slowed down or banked because of the coal strike were in production by the first of last week. Many points have speeded up output of iron through increased charging of scrap, although this has been hampered by inadequate supply of good scrap. Contamination problem in borings and turnings has resulted in rejection of some cars at the blast furnace following discovery of residual alloys in pig iron. Merchant iron shortage, particularly in steelmaking grades, is now considered acute in the area, although production will be increased by the addition of at least one and possibly two furnaces which have been down for repairs and because of lack of adequate manpower to bring them into production. As soon as crews can be provided for these stacks they will be lighted.

New York — With shortage in manpower still pronounced and with the 30-day inventory regulation in effect, district consumers of foundry iron appear to be getting as much tonnage as they require. Cutbacks in certain lines of munitions to date have had little effect on volume of work being handled by local foundries or which could be handled, and little or no influence on the overall supply of labor. Basic iron is generally tight along the eastern seaboard but little of this grade is consumed in the local area.

Boston — Shipping releases on pig iron are closer geared to 30-day inventory limitations, with indications deliveries will be slightly heavier in May. Most consumers will take in iron during that month without much change in melt. There have been scattered suspensions in April and the general situation is more comfortable.

St. Louis — Pig iron available to foundries is tight, though steelmakers have sufficient. Some foundries seek to subcontract some of their castings orders. Furnaces still are pressed for deliveries. Labor shortage continues. Producers feel no effect from war cutbacks and expect civilian demand to make up for any such losses.

Buffalo — While the 30-day inventory limit continues to slow releases of pig iron merchant sellers hope shipments will increase in May. A leading producer continues to pile a small part of its output, expected to be moved next month. If piling continues it means that some shipments will be made later by the barge canal to seaboard consumers. Sellers generally expect the faster rail movement will be used most of the year.

Philadelphia — Suspension of ingot production by Alan Wood Steel Co., due to a strike, permitted diversion of basic iron from the company's No. 1 stack to several other consumers who were hard pressed for iron. One of these consumers, it is understood, would have been forced to suspend operations had it not been for this relief.

Cincinnati—Furnace interests are busy tracing cars to get pig iron supplies adequate for district melters. Deliveries are slow in both northern and southern iron, with furnaces indicating demands must be held close to previous levels. Requests for May shipments are slightly heavier. Lack of labor continues to prevent expansion of the melt, even if more iron were available.

Scrap . . .

Scrap Prices, Page 146

Scrap supply and consumption are fairly well balanced, with sufficient material coming out to meet needs in most cases but somewhat limited by inability of dealers to prepare it, because of labor shortage. Prices are at ceilings except for a few less desirable grades. Dealers and consumers alike seek to avoid too large accumulations.

Chicago — Scrap situation here continues stable with trading closely paralleling consumption. Open-hearth material moves as quickly as offered and except for one or two less desirable grades is at ceiling. Blast furnace material is in only fair demand but holds the $12 to $12.50 price established two weeks ago with a substantial mill purchase. Because of some war plant cutbacks, production of turnings and borings has declined somewhat, but this is a welcome development and helps to support the current price level.

Detroit — Automotive scrap lists, about 10 per cent off in tonnage, closed last week, and the prices they bring will determine the strength of the local market for the next few weeks. Sentiment is mixed between bearishness in borings and turnings and optimism over the fact local mills can use more open-hearth material than they are getting at the moment. While the picture for the next month is somewhat clearer, mills are still exercising considerable caution in scrap commitments.

Boston — Short shoveling turnings are lower at $10.50, f.o.b., easing with machine shop turnings at $8.50. Unprepared scrap at $9.50 to $10 and low phos also tend to soften. On the other hand, good No. 1 heavy melting steel, busheling, alloy-free bundles and cast are at ceilings. Grades in greater supply reflect weakness, including three-way alloys and more consumers are holding to specified analysis. Tonnage from shipyards tends downward.

Cincinnati — Dealers and brokers are busy moving scrap against contracts, and to supply demands of foundries. Hesitancy of mills, however, is shown by absence of new buying and difficulty in placing allocations. Specialties are weaker. Interest in turnings is improved. In the main, greatest strength is shown in heavy grades and cast scrap. Dealers continue to shun material requiring preparation, because of labor scarcity.

St. Louis—Hampered only by labor shortages for rural collection, scrap shipments continue to improve. Many users have reached a 45-day reserve and are allowing orders to run out. Buying in remote territory has ceased almost entirely. Shipments increased last week under dealer anxiety to fill orders before they expire. Scrap supply generally is best in several months. Prices remain at ceilings except a continuing decline in machine shop turnings.

Los Angeles—With considerable scrap from battle zones arriving, dealers are not meeting asking price of the Navy, $13.12 for mixed lots, as dealer sales to consumers still are about $3 under ceiling for No. 1 heavy melting steel. Mill buying is conservative in view of the war situation. General supply is ample.

Buffalo — With slight improvement in local scrap movement and a third cargo of 5000 tons arriving from the Duluth area, leading consumers are in better position. Dealers find no difficulty covering recent commitments. While ceiling prices prevail for prepared scrap the tendency is easier on unprepared material, because of the labor situation. At least 50 per cent of current local shipments are turnings.

New York — Broker buying prices have declined more than $2 per ton on machine shop turnings and mixed borings and turnings, dropping from $10.33 to $8.25 and on short shoveling turnings from $12.33 to $10.25. These prices apply both to Brooklyn and northern New Jersey. With two eastern Pennsylvania consumers still holding up shipments most turnings and borings are going to Sparrows Point. Heavy melting steel continues in good demand, with supply adequate.

Philadelphia — The expected drop in prices of machine shop turnings and mixed borings and turnings has developed, with the decline $2 to $3 a ton, delivered, depending on shipping point. The eastern Pennsylvania market now is at $10.75 to $11.75. Two consumers are still holding up shipments, with much of this material moving to Sparrows Point. Heavy melting steel is moving freely, with prices firm. Cast is still scarce and strong in price.

Pittsburgh — Firm tone continues in scrap with all grades at ceiling. Demand has been slightly heavier for the various turnings grades and supply of miscellaneous scrap moving throughout the district has reportedly increased. Industrial scrap activity continues on the same level with all mills in the market and stocks held by consuming plants far below normal.

Iron Ore . . .

Iron Ore Prices, Page 144

Consumption of Lake Superior iron ore in March totaled 7,082,076 gross tons, according to the Lake Superior Iron Ore Association, Cleveland. This compares with 6,370,504 tons in February and with 7,658,847 tons in March, 1944. For three months this year consumption was 20,435,199 tons, compared with 22,347,842 tons in the comparable period last year.

Ore on hand at furnaces and on Lake Erie docks April 1 totaled 17,303,561 tons, against 21,332,964 tons a year earlier. As of April 1 170 blast furnaces were active in the United States and seven in Canada, with 15 idle in the United States and three in Canada. These are furnaces depending principally on Lake Superior ore. A year ago 177 stacks were operating in the United States and nine were idle, with seven active and three idle in Canada.

Ferroalloys . . .

Ferroalloy Prices, Page 145

New York — Recent cutbacks in the war program are likely to be reflected to some extent in May shipments, ferroalloy producers declare. They have had little influence on April deliveries, although volume will be off slightly from March, when the movement reached an all-time peak for leading sellers of diversified alloys. As a matter of fact, shipments this month will be higher than in either January or February and shipments in these earlier months had reached higher levels than any time previously.

While indicating curtailments in certain types of aircraft will undoubtedly be reflected in ferroalloy shipments, sellers still see a heavy volume of business ahead, especially in needs for the jet propulsion aircraft program, which at the moment is scheduled to reach its peak next February. There may be developments meanwhile which will alter this schedule, but the trend will undoubtedly continue upward for some months, barring early collapse of Japan, which is not now considered likely. Substantial quantities of stainless sheets and alloy castings are required for this work and while it may not offset cancellations in other types of aircraft, it will nevertheless exert a marked bolstering influence, it is believed.

Warehouse . . .

Warehouse Prices, Page 144

Chicago — Warehouses are obliged to turn away considerable business because of depleted inventory. Heavy demand persists from all directions. Instances are cited in which while the distributor is figuring out a suitable substitute for a steel not available the substitute is sold in another transaction. Principal shortages are in carbon bars and sheets. Galvanized sheets are scarcely to be had. So far, warehouses see no reflection in their business of war program cutbacks.

Cincinnati — Warehouses have been exceptionally busy this month, with chances for a record in volume. Conditions were abnormal, in that demand and replacement steel backed up during the Ohio river flood period. Plates, sheets and structurals are particularly active. Labor scarcity plagues jobbers as they push for prompt deliveries.

Los Angeles — With a few cutbacks effective and others looming, peak of war plant scramble for warehouse stocks has been reached. Demand is still heavy and stocks scanty with no rebuilding of inventories. Galvanized sheets are in slightly better supply but stocks are far below average. Shipping schedules are better but below normal.

Boston — Demand still is strong but down slightly on a number of products. Unbalanced inventories contribute to limitation of sales. The replacement outlook has improved slightly although warehouse tonnage still is included in mill carryovers. Orders now being placed center largely in products and volume to balance stocks. Although there are exceptions, most buying is for September and October shipment.

Philadelphia — Notwithstanding the fact that district mill representatives report slackening in new buying, Philadelphia warehouses are experiencing another heavy month in April. From present indications as the month closes April business will be ahead of March, which was the best month on record for some distributors of diversified lines. One sheet distributor, however, has received a substantial cancellation in stainless steel for aircraft, which will at least reduce his dollar volume.

Steel in Europe . . .

London — (*By Radio*) — Demand for

war materials in Great Britain is smaller. Export business awaits resumption of shipping facilities. Plate demand is somewhat improved and rails are more active. Heavy structural sections are dull.

Canada . . .

Toronto, Ont. — General business in the Canadian iron and steel markets shows little change. Despite some cutbacks on United States orders with Canadian companies there has been no slackening in demand for steel in this country and no indications of early easing in supply. New orders placed for ship construction on Canadian and British account have stimulated demand for plates and other materials, but steel placements for this purpose are going through the steel controller, as are most of the other war contracts.

In the hope of early end to hostilities in Europe, when larger tonnages of steel are expected to be made available for production of consumer goods, inquiries and orders for various steel materials have been appearing in better volume on nonwar account, but these are uncertain as to delivery dates and mills are accepting this business on an if and when basis. However, the fresh outpouring of civilian orders is reflected in a sharp jump in mill backlogs which are said to be of record proportions. There has been no slackening in Canadian iron and steel production and output is being maintained to the limit of labor supply.

Leading Canadian steelmakers now report they have only limited capacity available for bars and sheets for the remainder of the year and it is not expected that war contract cancellations that may be expected when Germany is defeated will have much effect on supply of these materials, as any production beyond actual war needs would be absorbed quickly in manufacture of consumer goods. Immediately upon the cessation of hostilities postwar projects involving expenditure of hundreds of millions of dollars will be started and according to programs already announced some of these will extend over periods up to five years. Much of the betterment in civilian production schedules will depend on improvement in supply of bars and sheets, while in addition large tonnages of structural shapes and reinforcing bars also will be involved in the peacetime reconstruction program.

While expansion in Canada's shipbuilding activities has been reflected in some betterment in demand for steel plates, supply of this material is by no means critical and producers are quoting delivery against new orders at the beginning of next quarter. Curtailment in manufacture of agricultural implements, announced in Ottawa last week, will result in some slowing in demand for plates from these consumers, but it is understood that demand is being maintained from locomotive and other rolling stock builders.

Merchant pig iron demand is sustained but lacks special feature. Melters are satisfied to order as demands dictate and only a few have established inventories for second quarter. No shortage is reported and blast furnace operators are giving prompt delivery against new orders. Under steel control regulations melter inventories are being held to the 30-day limit, but most users are not interested in building stock piles. Producers also are discouraging big tonnage buying, which has been aimed at by a few melters who looked for early price advances. However, there are no indications of price change and on all contracts prices will be made known at time of delivery. Pig iron production in Canada is holding at about 67 per cent of capacity.

Argentina Sets Maximum Prices on Scrap

Decree No. 1143 fixes maximum prices on scrap iron in Argentina at 50 pesos per ton for first class quality scrap iron and at 30 pesos per ton for second class quality. The decree also states that scrap iron is considered as critical material and comes under decree No. 29,671, which places critical materials under the control of the Secretariat of Industry and Commerce.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7680 tons, 192 hangars, various locations, for U. S. Engineers, Columbus, O., 42 hangars to Luria Steel & Trading Co., New York; 42 to Utica Structural Steel Inc., Utica, N. Y.; 54 to Butler Mfg. Co., Kansas City, Mo.; 24 to Bristol Steel & Iron Works Inc., Bristol, Va.; and 30 to Snead Architectural Iron Works, Louisville, Ky.

1650 tons, inert storage buildings, McAlester,

Okla., for U. S. Naval Ammunition Depot, to Mosher Steel Co., Houston, Tex.; J. A. Terteling Co., Boise, Idaho, contractor; bids March 27.

1500 tons, inert storage buildings, Naval Ammunition Depot, Crane, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Johnson, Drake & Piper, New York, contractor; bids April 3.

1000 tons, estimated, addition, machine shop building, navy, bureau of yards and docks, Terminal Island, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, storehouse, Philadelphia Navy Yard, to Phoenix Bridge Co., Phoenixville, Pa.

760 tons, sheet piling, power station, Havana, Ill., for Illinois Power Co., to Bethlehem Steel Co., Bethlehem, Pa.

625 tons, Cumberland Warehouse Co., Bridgeton, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

185 tons, Navy Building, Dresden, N.Y., to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, pipe supporting structures, Publicker Commercial Alcohol Co., Philadelphia, to Frank M. Weaver, Philadelphia.

100 tons, warehouse for Pennsylvania railroad, Eleventh avenue, New York, to Phoenix Bridge Co., Phoenixville, Pa., through J. Rich Steers, general contractor.

Unstated tonnage, six bridge crane, navy, bureau of yards and docks, Shumaker, Ark., to Harnischfeger Corp., Milwaukee, $42,906.

STRUCTURAL STEEL PENDING

3000 tons, boiler and turbine room additions, Calumet station, Commonwealth Edison Co., Chicago.

600 tons, east addition to factory building, Pratt & Whitney Aircraft Corp., Kansas City, Mo.; bids April 18.

700 tons, bridge for New York Central at Rochester, N. Y.; general contractors' bids closing May 1.

500 tons, warehouses and building, Joliet, Ill., for Kankakee Ordnance plant; going to wood construction; bids April 4.

350 tons, addition, Blaw Knox Special Ordnance Division, York, Pa.

300 tons, sheet piling, bridge protection, Indiana Harbor, Ind., for New York Central railroad; general contract to Fitz Simons & Connell Dredge & Dock Co., Chicago.

250 tons, plant addition, Electric Hose & Rubber Co., Wilmington, Del.

196 tons, soybean processing plant, Frankfort, Ind., for Swift & Co.; bids April 23.

137 tons, grade separation over Illinois Central railroad, Kankakee, Ill., for state highway commission; Bethlehem Steel Co., Bethlehem, Pa., sole bidder; bids April 20.

100 tons for temporary administration building for Idlewild Airport, New York.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, expansion, U. S. Rubber Co., Eau Claire, Wis., to Ceco Steel Products Corp., Chicago; George A. Fuller Co., Chicago, contractor; bids April 17.

800 tons, inert storage buildings, for Navy, Crane, Ind., to Laclede Steel Co., St. Louis, through Johnson, Drake & Piper, contractors.

500 tons, high octane gasoline plant, Whiting, Ind., for Standard Oil Co. of Indiana; to Laclede Steel Co., St. Louis; M. W. Kellogg Co., contractor.

250 tons, turbine room extension, Rockford, Ill., for Central Illinois Electric & Gas Co., to Joseph T. Ryerson & Son Inc., Chicago; Stone & Webster, Boston, contractor.

120 tons, expansion, Indiana Ordnance Works, Charlestown, Ind., for E. I. du Pont de Nemours & Co. Inc., to Ceco Steel Products Corp., Chicago.

120 tons, administration and cafeteria building, Navy air supply depot, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa., through Ralph S. Herzog.

108 tons, cooler building, Armour & Co., Fargo, N. D., to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, bridge, Route 13, Lawrence County, Ill., for state highway commission, to Laclede Steel Co., St. Louis; Mautz & Oren, Effingham, Ill., contractor; bids Feb. 24.

REINFORCING BARS PENDING

1000 tons, boiler and turbine room addition, Calumet station, Commonwealth Edison Co., Chicago.

530 tons, Armstrong Rubber Co., West Haven, Conn.; Fletcher-Thompson Co., Bridgeport, Conn., architect in charge.

500 tons, building 16, Buick Motor Co., Flint, Mich.

300 tons, expansion, Gopher Ordnance Works, Rosemont, Minn., for E. I. du Pont de Nemours & Co. Inc.; bids April 24.

280 tons, Aquia creek bridge, over Richmond, Fredericksburg & Potomac railroad, near Fredericksburg, Va.

215 tons, state highway project, Lexington, Ky., bids April 27.

168 tons, Algoma Plywood & Veneer Co., Algoma, Wis.; project abandoned.

RAILS, CARS . . .

RAILROAD CARS PLACED

Consolidated Railroads of Cuba, 250 fifty-ton steel box cars, to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

LOCOMOTIVES PLACED

Long Island Railroad, six 600-horsepower diesel-electric switch engines, to Electro Motive Division of General Motors Corp., La Grange, Ill.

Pennsylvania, three 600-horsepower and two 1000-horsepower diesel-electric switch engines, to Electro Motive Division of General Motors Corp., La Grange, Ill.

Steel Producers Differ on Plant Disposal Policies

(*Continued from Page 63*)

posed by the subcommittee. Bethlehem Steel Co., for instance, believes that no reliable statistics are obtainable with respect to most of the questions asked and that any attempt to answer them would be purely guesswork.

On the other hand, Inland Steel Co. believes sound policies with respect to disposition of surplus facilities should be formulated on the basis of sustained demand for steel as distinguished from short-term accelerated needs immediately after the war. This company, from past and anticipated population increases, thinks demand for ingot steel of approximately 54 million net tons will be averaged annually in the 30-year period 1945-1975, with a maximum by 1975 of 63 million tons. As for initial postwar demand it believes the estimate of 65 to 70 million tons by Walter S. Tower, president, American Iron and Steel Institute, is a reasonable estimate.

The United States Steel Corp. estimates postwar demand will be about 65 to 70 million tons of ingot steel in good years. However, it calls attention to the fact that in comparison the country had an ingot capacity on Jan. 1, 1940, in excess of 81 million tons and on Jan. 1, 1945, in excess of 95 million tons.

Summarizing all the replies to the questions as to postwar demand, the subcommittee said that all of the companies anticipate a postwar demand substantially in excess of prewar demand. Immediately following the war demand is expected to be appreciably greater than the average over a long-time period after the war.

With respect to special problems which exist in connection with utilization of plants in areas where previously no steel plants had been located, the replies from the steel companies strongly emphasize the need for a plant-by-plant study of these problems. Careful market analysis will be required to determine the individual plant's adaptability to peacetime production, including marketing possibilities, effect of transportation costs in competition with other facilities, availability of raw materials, etc.

The majority of steel companies answering the questionnaire strongly oppose the granting of any special tax privileges, viewing such as government subsidies which would threaten private competitive enterprise.

Disagree on Plant Disposal

Basic disagreement exists among the various steel companies as to whether government-owned steel plants should be sold outright or leased after the war. Discussing method of plant disposal, the subcommittee points out that replies to its questionnaire showed a wide variance of opinion in the industry. Inland Steel Co. for instance, takes the view that plants should be disposed of by sale only in order to get the government completely out of the business. American Rolling Mill Co. believes the plants should be sold to private enterprise at the best possible price. On the other hand, Copperweld Steel Co. believes that in order to protect the government's interests, new facilities should not be sold, and instead of actual sale, it suggests the plants be leased for 20 years on a tonnage basis.

Other companies replying to the subcommittee's question as to how disposal should be effected, do not feel that any set rules can and should be established as to sale or lease.

National Supply Co. for instance thinks sale would be preferable but that conditions surrounding each transaction should determine the method of disposition.

Atlantic Steel Castings Co. suggests that many companies wishing to acquire capacity are not sufficiently well en-

trenched to risk an undue proportion of their resources in acquisition of the facilities and that such companies should be granted leases on favorable terms with options to purchase at a fair valuation.

Bethlehem Steel Co. advised the subcommittee that purchase of the government-owned facilities at any price would involve an unusual degree of risk. It suggests that the government's interests might best be served by preserving the ownership of the government for future emergencies rather than to sell these facilities for the nominal price which they might bring, since most of them are not readily adaptable to production of commercial steel products. To the extent the facilities can be used, Bethlehem suggested that they be leased, leaving the government in full ownership and control.

The same divergence of views on the question of sale or lease exists with respect to the question of government extension of credit to purchasers or lessees. American Steel Foundries, Inland Steel and Copperweld oppose extension of such credit, the first two feeling that if the venture was sound, private financing should be available, while Copperweld, while opposing credit for such purchase, believes that an extension of credit for operating purposes would be highly desirable in order to maintain high employment. National Supply Co., on the other hand, feels that, while credit might be extended by the government to purchasers, it is doubtful whether credit should be extended to lesees. In any case National insists that credit should be negotiated with the intention that it will be refinanced through private channels in a few years.

Object To Pay Without Work

All of the companies replying to the question with respect to special conditions are opposed to any conditions with respect to the level of operations and employment and steel price policies. They argue no industry could long exist if it is required to pay for services not rendered.

The question whether any company should be preferred with respect to, or excluded from, buying or leasing plants resulted in a variety of answers, some companies stating that no prospective buyer should be excluded, while others held that those companies now leasing or operating the plants should be afforded the first opportunity to acquire or lease them.

Replies from the railroads on the question of freight rates, point out that the freight rate structure is highly complex, so that the problem posed in utilizing these government plants can best be handled as and when specific information is available to the purposes to which individual plants and facilities are to be used, together with information in regard to general areas in which raw materials will originate, and destination territories of the manufactured products.

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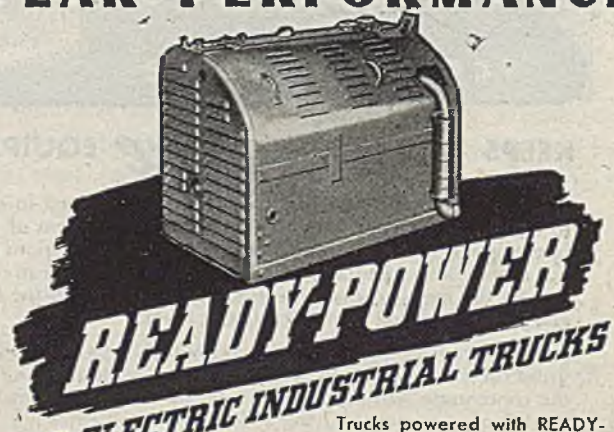

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CONSTRUCTION AND ENTERPRISE

MICHIGAN

DEARBORN, MICH.—Hydraulic Machinery Co., 12825 Ford street, has let contract to Campbell Construction Co., 3255 Goldner avenue, Detroit, for a one-story plant building estimated to cost $100,000. Wright & Wright, 120 Madison avenue, Detroit, are architects.

DETROIT—Murray Corp. of America, 7700 Russell street, has let contract for design and construction of four transmission plant buildings to the Austin Co., 429 Curtis building, to cost about $500,000.

DETROIT—Norman Tool & Machinery Co., 1442 Free Press building, has been incorporated with $21,000 capital to manufacture machines, dies and tools, by Victor L. Ethier, 3493 Montclair street, Detroit.

DETROIT—Plans have been completed by Albert Kahn Associated Architects & Engineers have completed plans for plant building No. 12 at the Flint, Mich., plant of Buick Motor Division of General Motors Corp., on which owner will take bids soon.

DETROIT—Kelsey-Hayes Wheel Co., 3600 Military Road, has let contract to Joseph A. Krausman Co., 1460 East Jefferson avenue, for an assembly building at its Detroit plant.

PONTIAC, MICH.—City, City Hall, has plans under way for postwar rehabilitation of water purification plant, to cost about $350,000. Jones & Henry, Toledo Trust building, Toledo, O., are engineers.

PONTIAC, MICH.—City, City Hall, plans sewage disposal plant, including oil removal equipment, to cost about $75,000. Jones & Henry, Toledo Trust building, Toledo, O., are engineers.

CONNECTICUT

BRIDGEPORT, CONN.—Locke Steel Chain Co., 1085 Connecticut avenue, has let contract to Gellatly Construction Co., 25 Housatonic avenue, for a one-story 40 x 250-foot pickling building and 100 x 200-foot furnace building. Westcott & Mapes Inc., 139 Orange street, New Haven, Conn., are engineers.

FAIRFIELD, CONN.—Town, F. S. Shaw, commissioner, Mill Hill, Fairfield, has plans completed for postwar construction of an incinerator and garage at cost of about $300,000. Keis & Holroyd, 257 Broadway, Troy, N. Y., are consulting engineers.

HAMDEN, CONN.—Connecticut Metal & Finishing Co., Haig street, has plans for a one-story and mezzanine plant 100 x 150 feet, to cost about $75,000. Westcott & Mapes Inc., 139 Orange street, New Haven, Conn., are engineers.

STAMFORD, CONN.—Atlas Powder Co., Delaware Trust building, Wilmington, Del., will let contract soon for brick shops at 269 Ludlow street, to cost about $40,000. J. W. Hanson, Delaware Trust building, is engineer.

NEW JERSEY

BARRINGTON, R. I.—Bristol County Water Co., 553 Hope street, Bristol, R. I., will let contract soon for elevated water tank costing about $26,500.

PENNSYLVANIA

EDDYSTONE, PA.—General Steel Castings Corp., Essington avenue, plans a plant addition costing about $40,000.

FRANKLIN, PA.—Franklin Plastics Division of Robinson Industries Inc., 315 Grant street, plans plant addition for manufacture of ammunition and shells, to cost about $23,000.

MONESSEN, PA.—Pittsburgh Steel Co., J. Anderson, vice president, J. H. Phillips, purchasing agent, will build a truck bead wire plant to cost about $135,000, including equipment.

PHILADELPHIA—Midvale Co., 4320 Wissa-

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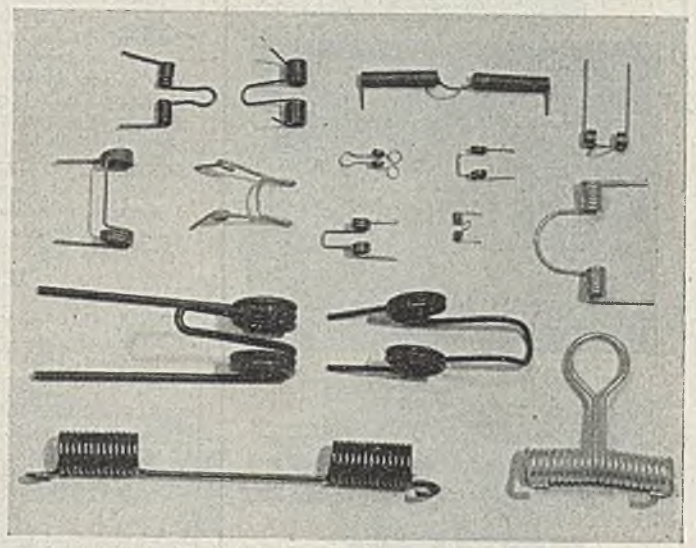

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hickon avenue, is having plans drawn for a billet testing building to cost about $55,000.

OHIO

CLEVELAND—Industrial Designing & Mfg. Co., William G. Drautz, president, 4500 Euclid avenue, has been incorporated with $10,000 capital to manufacture jigs, fixtures, tools, dies and special machinery. Plant is at 14800 Miles avenue.

CLEVELAND—King Industries Inc., 5606 Euclid avenue, operated formerly as King Machine & Engineering Co., has been incorporated with capital of $8000 and 250 shares of $100 par value, for postwar expansion. Products are machines and metal and plastic materials. George King is president and Joseph Iseman, president of Manufacturers' Plating Co., 1960 East Sixty-fifth street, is secretary-treasurer. Company plans to occupy building adjoining Manufacturers' Plating Co., where 25,000 square feet floor space is available. Additional equipment is to be installed.

SANDUSKY, O.—Simplex Radio Corp., West Monroe and Superior streets, John Bechel, manager, is building a one-story 32 x 60-foot plant addition to cost about $20,700.

ILLINOIS

SILVIS, ILL.—City, City Hall, plans sewage treatment plant costing about $60,000. A. R. Boudinot, 1630 Fifth avenue, Moline, Ill., is acting city engineer.

SPRINGFIELD, ILL.—Gothard Mfg. Co. has let contract to R. B. Evans Construction Co. for a one-story plant 50 x 100 feet, for manufacture of electronic devices.

INDIANA

RUSHVILLE, IND.—City plans postwar sewage treatment plant costing $100,000. M. Abercrombie is mayor, C. Berry, city clerk, City Hall. P. White, Muncie, Ind., is consulting engineer.

VIRGINIA

ARLINGTON, VA.—Arlington County, Court House, Arlington, plans postwar construction of two 150-ton incinerators to cost about $350,000 and sewage extensions costing about $1,300,000. Chester Engineers, 210 East Parkway, Philadelphia, are consulting engineers. C. L. Kinnier, Court House, county engineer for both projects.

MISSOURI

INDEPENDENCE, MO.—City plans improvements to municipal light and power plants, including replacement of turbines and boilers, to cost about $300,000. Roger S. Sermon is mayor.

KANSAS CITY, MO.—Panhandle Eastern Pipeline Co., Ninety-ninth and Holmes streets, plans installation of compressor units at Pleasant Hill, Ill.; Greensburg, Haven, Hugoton, Louisburg, and Olpe, Kans.; Centralia and Houstonia, Mo., 30 in number, from 800 to 2400 horsepower.

OKLAHOMA

HARRAH, OKLA.—Oklahoma Gas & Electric Co., 321 North Harvey street, Oklahoma City, Okla., has plans for postwar steam turbine unit addition, including boilers and turbine, to cost over $1 million.

MANGUM, OKLA.—City, City Hall, has plans under way for enlarging city waterworks and electric light systems, bonds being voted for $100,000. Alexander & Pollard, Terminal building, Oklahoma City, Okla., are consulting engineers.

WISCONSIN

APPLETON, WIS.—Concrete Pipe Corp., Menasha, Wis., plans a one-story plant here, 60 x 96 feet.

CUDAHY, WIS.—Zierden Machine & Mfg. Co., tool manufacturer, 3637 South Ellen street, Milwaukee, has bought a plant at 3353 East Layton avenue, Cudahy, which will be equipped to provide additional manufacturing facilities.

GREEN BAY, WIS.—Green Bay Drop Forge Co., 1341 South State street, has let contract to Selmer Co., Northern building, for one-story 40 x 82-foot and 18 x 65-foot steel plant additions. R. E. Surplice, City Center building, is architect.

MADISON, WIS.—Oscar Mayer & Co., meat packers, have let contract to Fritz Construction Co. for fifth and sixth-story addition to canning building, 140 x 200 feet. Henschien, Everds & Crombie, 59 East Van Buren street, Chicago, are engineers.

MENASHA, WIS.—Menasha Woodenware Co. has let contract to Fluor Bros. Construction Co., Oshkosh, Wis., for two one-story plant additions, 32 x 367 and 120 x 132 feet.

WAUKESHA, WIS.—Waukesha Motor Co. plans three-story assembly plant 66 x 365 feet. Perce G. Schley, Milwaukee is architect.

WAUSAU, WIS.—Marathon Battery Co., 840 Henrietta street, has let contract to J. P. Doheny, 918 Kickbusch street, for a one-story 70 x 100-foot and 40 x 120-foot plant addition. G. Foster Jr., 327 Third street, is architect.

WEST ALLIS, WIS.—Allis-Chalmers Mfg. Co., 1126 South Seventieth street, has let contract to Meredith Bros. Inc., 121 East Washington street, Milwaukee 4, for a one-story 60 x 502-foot pattern shop addition and steel foundry and pattern shop office alterations, to cost about $98,000. C. E. Meyer, care owner, is architect.

MINNESOTA

ST. PAUL—Seeger Refrigerator Co., Walter G. Seeger, president, has bought assets of the Sunbeam Electric Mfg. Co., Evansville, Ind., and the new firm will be known as Seeger-Sunbeam Corp.

ST. PAUL—Plastics Inc., 224 Ryan avenue, has let contract to Eric V. Fridholm Inc. for a one-story plant building 50 x 60 feet.

WINONA, MINN.—Donovan Mfg. Co. plans immediate construction of a large foundry and machine shop for postwar construction at cost of about $150,000.

KANSAS

HUTCHINSON, KANS.—Krause Mfg. Co., manufacturer of plows, etc., is building a one-story plant addition.

TEXAS

GONZALEZ, TEX.—City, City Hall, has plans under way for postwar sewage disposal plant costing $60,000. Garrett Engineering Co., 1806 Milam street, Houston, Tex., is consulting engineer.

HOUSTON, TEX.—Peden Iron & Steel Co., 70 North San Jacinto street, has plans under way for postwar steel plant unit to cost about $150,000.

MISSION, TEX.—City, City Hall, has voted $170,000 bonds for postwar waterworks improvements, including 500,000-gallon elevated water tank and enlarging pumping plant. H. H. Ewing, Mission, is consulting engineer.

NEBRASKA

SIDNEY, NEB.—Nelson Mfg. & Supply Co., manufacturer of galvanized tanks, plans a one-story plant 50 x 100 feet.

BLAIR, NEB.—Peterson & Lytle Co. is building a shipyard, with switch track and electric hoist.

IOWA

DUBUQUE, IOWA—A. Y. McDonald Mfg. Co., manufacturer of plumbing and heating supplies and oil equipment, plans new plant and installation of new equipment as soon as materials are available. New lines are to be added.

MUSCATINE, IOWA—H. J. Heinz Co., Pittsburgh, will let contract soon for one-story plant costing more than $50,000.

IDAHO

WENDELL, IDAHO—Gates Bros. Machine Shop has let contract for a machine shop addition and tools have been ordered. Products will be gasoline and oil tanks and some types of agricultural implements.

CALIFORNIA

ALAMEDA, CALIF.—United Engineering Co. Ltd., Main street, has plans by J. Hudspeth, 2104 Addison street, Berkeley, Calif., for boiler house and boiler, to cost about $60,000.

LOS ANGELES—California Cornice Steel & Supply Co., 1620 North Main street, is having plans drawn for a steel frame storage building at 1601 Naud street, 100 x 130 feet and 50 x 120 feet, with two five-ton cranes.

LOS ANGELES—Rich Steel Co. has been formed by Gustav R. Rich and associates and has established operations at 223 East Regent street, Inglewood, a suburb.

LOS ANGELES—Ruckstell Engine Co. has been organized by Maude Eastman and is conducting its operations at 6915 North Figueroa street.

WASHINGTON

SEATTLE—Seattle Light Department plans a $450,000 expansion project, including $253,000 for substation construction and $175,000 for overhead transmission.

SPOKANE, WASH.—City, City Hall, is planning postwar construction of a sewage disposal plant with nine miles of sewers, to cost over $2 million. E. S. Butler, City Hall, is city engineer.

SUNNYSIDE, WASH.—Bids will be called for proposed municipal sewage disposal plant, second unit of a general sewage project. Gerald D. Holt, Kakima, Wash., is engineer.

TACOMA, WASH.—City has $175,000 available for power line extension and construction of two substations.

TOPPENISH, WASH.—Idaho Sugar Co. has priorities for a $150,000 addition to local plant, including beet pulp drying machinery, stoker-fired furnace, steel drying drum, conveyors and pipe. Will be three stories, 33 x 137 feet. Stearns-Rogers Co., Denver, has the general contract.

DPC Authorizes Plant Expansion, Equipment

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

Commonwealth Aircraft Inc., Kansas City, Mo., $80,000 increase in contract to provide equipment at plants there and in Kansas City, Kan., making overall commitment $220,000.

Mathieson Alkali Works, New York, $80,000 increase in contract to provide additional facilities at Lake Charles, La., making overall commitment $13,880,000.

Rheem Mfg. Co., South Gate, Calif., $525,000 increase in contract to provide additional facilities at South Gate, making overall commitment $900,000.

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