STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 7 AUG. 13, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Gear "Rolling"—for Simple, Fast Checking in Production
A New Method of Evaluating Grain Size
Scheduling Spare Parts at Dodge Chicago
Improved Techniques for Producing Stainless Clad Steel
Gas Flow and Coke Consumption in the Blast Furnace
Jig Grinders Tackle Production Problems

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STEEL
August 13, 1945

Our Grave Responsibility

Where in the annals of life on this planet will one find events occurring in the brief span of a week which can match in significance those of the first week of August, 1945!

Aug. 2—In a communique issued after the conclusion of the Potsdam conference, the Big Three announced decisions which will transform Germany, once a leading industrial nation, into a third-rate power dependent upon agriculture and light manufactures.

Aug. 6—The crew of an American B-29 bomber dropped an atomic bomb on Hiroshima, killing in split seconds more persons than the United States forces lost by deaths in the 19 months of World War I.

Aug. 8—Russia declared war on Japan, which act, coupled with the advent of atomic bombing, virtually assures the capitulation of the enemy at an early date.

Of the three events, the most significant in the long range view is the development and devastating application of the atomic bomb. It goes without saying that if man can harness the atom for purposes of destruction, he can ultimately adapt it to constructive uses. At the moment, however, the atomic development must be considered as a weapon of war—a weapon so powerful and so awe-inspiring in its potentialities for good or evil that one shudders at the grave responsibilities it imposes upon its custodians.

This new power, built by Anglo-American collaboration on the foundation of knowledge contributed by scores of physicists of many nationalities, places the United States and Great Britain in the position of world dictators, subject to fear and suspicion on the part of all other peoples lest this terrifying power be abused. Even if the secret of atomic bombing eventually is entrusted to the custody of the United Nations, the responsibility will be diffused only slightly. The world at large will remember that the atomic bomb was developed in the United States and that our armed forces were the first to use it in war. Our country, more than any other, will bear the curse or enjoy the credit for whatever the future may hold for atomic fission.

This fact alone should sweep away all lingering reluctance to America's wholehearted participation in world affairs. We have been catapulted into circumstances which make it more important for us than for any other nation to seek and maintain harmony throughout the world. Ours is the chief responsibility for seeing to it that the weapon created so secretly within our borders does not become a Frankenstein.

NEW PROBLEMS LOOM: With the early surrender of Japan now a probability rather than a possibility, the nation is face to face with difficult new problems at home and abroad.

Almost shocking is the unpreparedness for reconversion that would be revealed if the Japanese war were to end suddenly. To play safe, the government has been co-ordinating controls on the assumption the war would run into 1946. The stepdown from two-war industrial activity since V-E Day has been only moderate. An early V-J Day would almost wipe out the cushion that had been anticipated when it was assumed V-J would come a year or more after V-E. As a result, government agencies now are working frantically to speed reconversion and to ease the shock of adjustment.

Text of the Potsdam communique indicates the difficulties that will attend the deflating of German economy to that of a nation of agriculture and light manufacture. It also forecasts a similar problem of smaller scope in Japan. Shifting much of the enemy's industrial plant, equipment and inventory

(OVER)

to a victor's country as reparations is a new experience and one with unforeseen complications. Adjusting the affairs of the ravished states of Europe to the economic vacuum that once was Germany will tax the resourcefulness of the United Nations for years. —pp. 73, 78, 82

° ° °

TRY AGAIN FOR PEACE! Senator Vandenberg's proposal for a conference of representatives of management, labor and government to map plans for maintaining industrial peace seems to be receiving more favorable reaction than did the Johnston-Green-Murray plan of a few months ago. Secretary of Labor Schwellenbach favors the idea and will recommend it to the President. Eric Johnston of the Chamber of Commerce of the United States, Ira Mosher of NAM and William Green of AFL have spoken favorably of the plan.

The Michigan senator compares the proposed united industrial peace conference with the recent United Nations conference at San Francisco. If representatives of 50 nations, holding widely divergent views, could come to agreement as they did—reasons the senator—why cannot management, labor and government resolve their differences?

The answer is that they should and can provided the conference is sponsored and conducted properly. If each interested party is convinced he will get a square deal, he will respond; otherwise the conference will fail. —p. 77

° ° °

NO LONGER A TARGET: United States Steel Corp. has notified the DPC that it will take no further action to acquire the Geneva steelworks, constructed and operated by the corporation at the request of the government without charge. Instead, U. S. Steel will go ahead with its plans for expanding Columbia Steel's facilities at Pittsburg and Torrance, Calif.. It will install cold reducing equipment at Pittsburg having an annual capacity of 325,000 tons of sheets and tin plate. It offers to buy hot rolled coils from the purchaser or operator of Geneva, if possible.

This is a smart and at the same time a constructive and generous move on the part of U. S. Steel. Politics and other considerations had led the government to stack the cards against the corporation in acquiring Geneva. Now U. S. Steel no longer can be a target for abuse. Instead it is a potential customer, whose purchases could help Geneva tremendously. —p. 81

SIGNS OF THE TIMES: WPB reports stockpiles of industrial diamonds will be exhausted early in 1946 (p. 89) after which world consumption will be limited to current production. . . . Airplane output in July totaled 4784 planes accepted—243 short of the scheduled goal of 5207. This is the first time plane production has fallen below 4800 a month since October, 1942 (p. 98) and July was the second consecutive month in which output was below schedule.. The deficit is attributed to manpower and rework difficulties. . . . Department of Commerce predicts that disbursements for wages and salaries during the last half of 1945 will be 7 per cent below those of the first half (p. 180), due to unemployment, reductions in overtime pay and the shifts of workers from high income war jobs . . . Dow Chemical Co., Carnegie-Illinois Steel Corp. and International Nickel Co. are conducting extensive tests on the corrosion resistance of iron, steel and nonferrous metals (p. 110) at a proving ground at Kure Beach, N. C. With 200 other companies and a few engineering societies participating, the project probably constitutes the most ambitious study of corrosion resistance yet undertaken by the metal industries. . . . Elliott Co., Jeanette, Pa., in co-operation with the U. S. Navy, has completed a 2500 hp gas turbine (p. 116), which soon will be installed in a naval vessel. . . . OPA's forthcoming decision on prices for 1946 automobiles will have important repercussions. If the increase of from 15 to 25 per cent over 1942 prices—no doubt justified on the basis of increased costs—is granted (p. 91), this may be a signal for increases in other products and certainly will help labor's campaign for sharply increased wages. On the other hand, should OPA rule that 1942 prices prevail on 1946 models, how much of a stabilizing effect will this have upon the prices of other manufactured articles and upon wages? . . . A radiographic technique perfected to measure the wall thickness of hollow steel propeller blades (p. 114) may find other applications, including plate, tubing and strip. . . . Iron and steel warehousemen are pondering OPA form 674-2493, which "implements amendment 32 to price schedule 49." Jobbers (p. 88) say it will take weeks to gather the information requested. The numbers alone—674-2493, amendment 32, schedule 49—connote excessive red tape. . . . Steel ingot operating rate in July (p. 83) was the lowest in five years.

E. L. Shaner

EDITOR-IN-CHIEF

Every Order Must First Pass Metallurgical Control

The Inland metallurgists in charge of control are real critics and every order sent to the mill must first pass them before steel can be processed. They take one order at a time, check to see if it is similar to a previous order; if not, they examine blueprints of the part, and may even call at the customer's plant to study the method and equipment for fabrication. After they have thoroughly studied an order they designate what type of steel is to be furnished, and how it is to be processed.

Metallurgical control is another of the many methods Inland uses to assure the right quality steel for each order entered by a customer. Inland Steel Company, 38 South Dearborn Street, Chicago 3, Illinois.

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INLAND STEEL

How Ryerson Alloys
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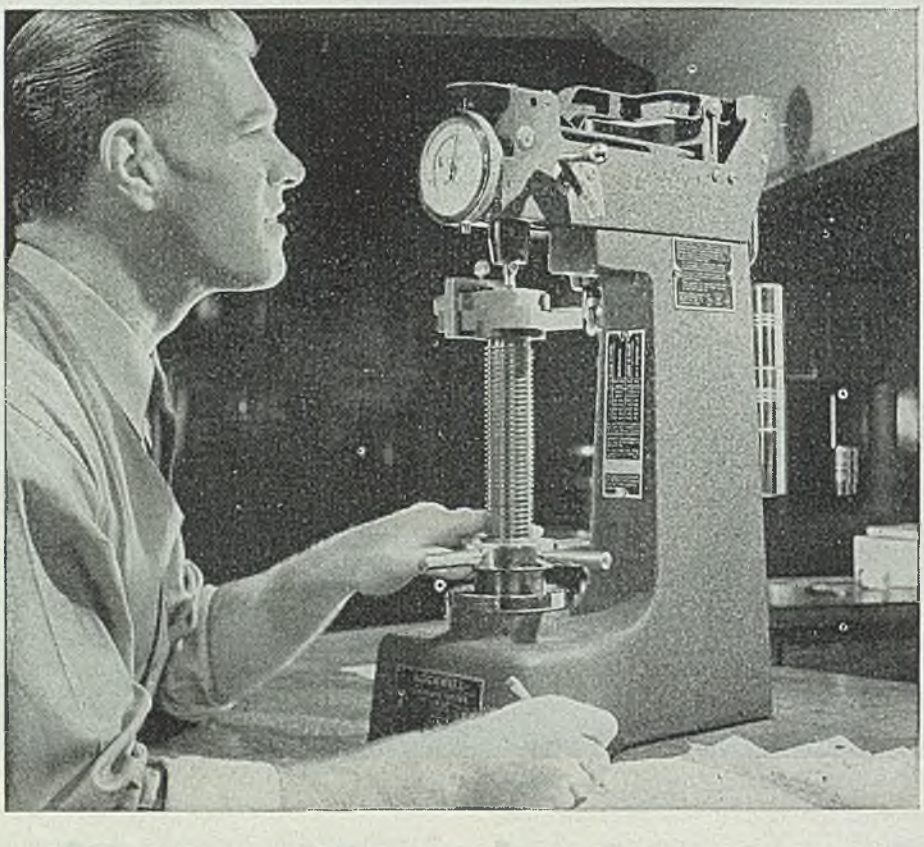

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As a part of the Ryerson Certified Steel Plan, this data is developed from actual laboratory tests. In addition to mill tests for chemical analysis and physical characteristics, Ryerson subjects samples from each alloy heat to four end-quench hardenability tests. From hardness readings of the test samples we interpret obtainable physical properties for various size rounds in the as-quenched condition and when quenched and drawn at 1000°, 1100° and 1200° F.

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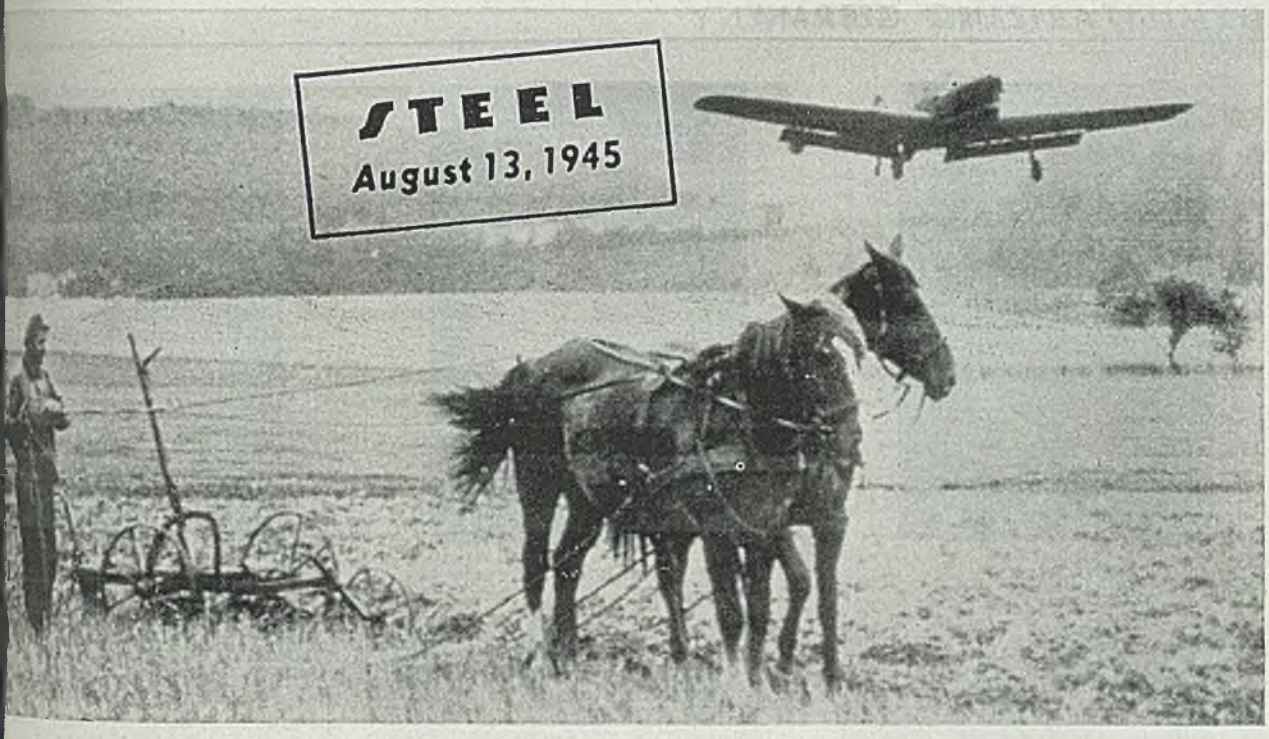
STEEL
August 13, 1945



With announcement that Germany is to be stripped of her war industries and be converted to primarily an agrarian country, this picture of contrasts becomes symbolic. Here a German farmer using age-old methods tills the soil, while overhead flies a modern machine of war—non-German. NEA photo

Germany To Be Reduced to Third-Rate Industrial Power by Allies

Big Three decrees Reich shall be primarily agrarian state, with only peacetime industries. Substantial portion of capital equipment in metallurgical, machinery and chemical plants to go to Russia as reparations

CISION to reduce conquered Ger- to a third-rate industrial power, at the Potsdam conferences, has aching implications to the world's working industries.

der the Potsdam pact, Germany's otential would either be eliminated ought under rigid Allied control many years to come, and the Reich ld be reduced to a primarily agrarian with only enough industry to rt a peaceful domestic economy.

is means that Germany's steel in- y, which before the war was second to that of the United States, will removed as a factor in international as well as a potential in rebuild- Germany's armaments.

e Reich's machine tool industry, prewar, according to Foreign Eco- Administration, was greater than of the United States, will be drasti- restricted, and a large share of Ger- 's huge inventory of machine tools be exported to other countries in form of reparations. The victors not likely to permit the German ine shop to continue by producing etime tools for export and thus be ained as a war potential.

rmany's other large war potentials, as her electrical equipment, hetic petroleum, dyes and chemicals, light metals, synthetic rubber, antifriction bearings, precision and optical instruments, and other industries supporting her basic armament industry will be removed or rigidly restricted.

During peacetime, the Germans built these war potentials to great strength by manufacturing peacetime products for export to other countries. These markets formerly held by Germany must now be satisfied by other manufacturing countries.

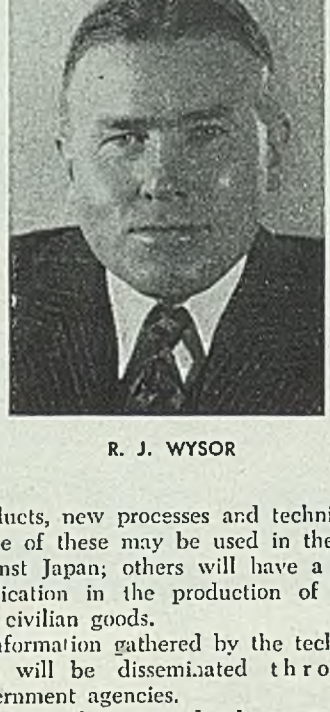
The Potsdam pact confirmed what has been widely predicted for Germany — a future as a land of agriculture and light manufactures, but with her heavy industry destroyed or suppressed. Already scores of American businessmen and other representatives of the Allies are in Germany studying how the Reich should be demilitarized and how her heavy industries should be controlled or eliminated.

These men, working under Lt. Gen. Lucius D. Clay, deputy military governor of Germany, represent practically every branch of industry. They will recommend which plants are to be destroyed and which plants are to be permitted to operate for the support of the civilian economy. They will dole out materials, issue directives, and generally keep an eye on the German operators.

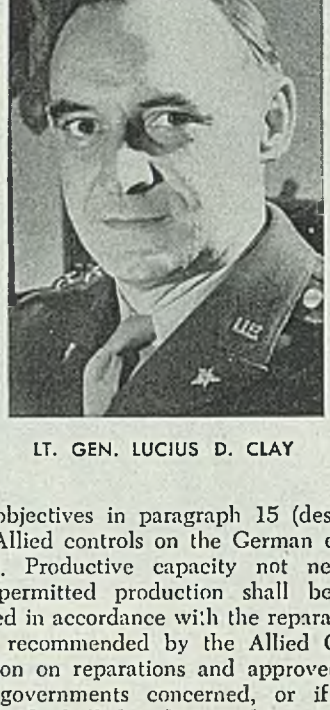
Typical of the Americans on the control commission is Rufus J. Wysor, former president of Republic Steel Corp., Cleveland. Mr. Wysor has direction over all German metallurgical plants in the American zone of occupation.

Chief of the economic division of the commission is Brig. Gen. William Draper Jr., formerly of Dillon, Read & Co., New York. Several hundred others either are in Germany or have been selected to join the commission. They will work with representatives of the other Allies in trimming Germany's industrial might down to the size indicated in the Potsdam pact.

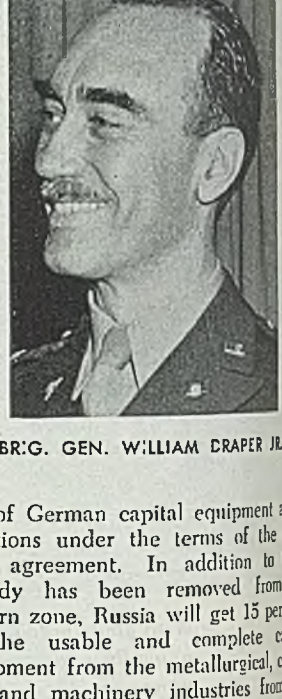
They also are investigating Germany's technical industrial secrets, covering new



R. J. WYSOR



LT. GEN. LUCIUS D. CLAY



BRIG. GEN. WILLIAM DRAPER JR.

products, new processes and techniques. Some of these may be used in the war against Japan; others will have a wide application in the production of postwar civilian goods.

Information gathered by the technical men will be disseminated through government agencies.

Among the new developments uncovered so far are: Process for welding side seams on tin cans by machine instead of by hand, as in this country; flexible high-tension cables that withstand double the voltage of American-made cables of the same size; tungsten substitutes for use in the manufacture of armor-piercing shells and cutting tools for machining metals; information on high-temperature alloys unknown in the United States; power circuit-breakers with construction details unfamiliar in the United States; a plane with a ceiling several thousand feet higher than that of any American plane; new applications of radiation devices in fields not heretofore explored in this country; new and improved X-ray tubes for cancer therapy and industrial purposes; new data in the fields of acetylene, electrochemistry and plastics; and new processing methods in the fields of synthetic rubber, liquid fuels and lubricants.

The demilitarization machinery was in motion before the Potsdam conferences and the effect of the communique has been to unify and make official the Allied policy toward the conquered country.

Specifically the Potsdam communique stipulated "the complete disarmament and demilitarization of Germany and the elimination or control of all German industry that could be used for military production.

"To eliminate Germany's war potential, the production of arms, ammunition and implements of war as well as all types of aircraft and seagoing ships shall be prohibited and prevented. Production of metals, chemicals, machinery and other items that are directly necessary to a war economy shall be rigidly controlled and restricted to Germany's approved postwar peacetime needs to meet the objectives in paragraph 15 (describing Allied controls on the German economy). Productive capacity not needed for permitted production shall be removed in accordance with the reparations plan recommended by the Allied Commission on reparations and approved by the governments concerned, or if not removed shall be destroyed.

"At the earliest practicable date the German economy shall be decentralized for the purpose of eliminating the present excessive concentration of economic power as exemplified in particular by cartels, syndicates, trusts and other monopolistic arrangements.

"In organizing the German economy, primary emphasis shall be given to the development of agriculture and peaceful domestic industries."

Russia will receive substantial quanti-

FEW PLANTS OPERATE

Survey by the Production Control Branch, G-4 Division, United States forces in the European theater, indicate only 637 of the approximately 12,800 industrial plants in the American zone of occupation in Germany, or about 5 per cent, are in operation. The nearly complete stoppage is attributed not only to destruction of facilities by bombing but also to disruption of communications and transportation, shortage of coal and lack of skilled manpower.

The 12,800 plants in the American zone represent about 25 per cent of the total industrial capacity of Germany in 1937 before it took over Austria and annexed Czechoslovakia.

In appraising the industrial stoppage, American officers point out that it should be remembered many of the idle plants are war plants which are not permitted to reopen.

ties of German capital equipment as reparations under the terms of the Potsdam agreement. In addition to what already has been removed from the eastern zone, Russia will get 15 per cent of the usable and complete capital equipment from the metallurgical, chemical and machinery industries from the western zones in exchange for an equivalent value of food and other raw materials. Russia also will be given an additional 10 per cent of such capital equipment as reparations and for which no repayment of any kind will be made.

This program for the demilitarization and deindustrialization of Germany was being formulated long before V-E Day. A series of studies of Germany's industrial system and of how the country rearmed for World War II was made under the direction of the Foreign Economic Administration. Results of these surveys were reported to a subcommittee of the Senate Military Affairs Committee by Leo Crowley, FEA head. Mr. Crowley emphasized that despite the destruction wrought by Allied bombing German industrial production reached an all-time high in 1944, and that if Germany were left to her own devices, the country in five years could be far better prepared to wage war than she was in 1939.

Summarizing the status of the key war potentials in Germany today, Mr. Crowley said that practically all of the great iron and steel furnaces are ready for operation or can be put in operation with minor repairs. Germany in 1941 produced more than 19 million tons of steel and had capacity for 25 million tons. "Germany," says Mr. Crowley, "could not utilize a capacity of 25 million tons of steel except for war. The mere continued existence of such capacity is an invitation to war."

The Reich just before the war had a greater machine tool inventory and greater machine tool building capacity than the United States with nearly twice as large a population and a more highly mechanized civilian economy, the FEA surveys show. German overall holding

machine tools compared with those the United States in 1939 were: Two l per capita of population; 3.2 to 1 per of steel capacity; 3.4 to 1 of produc- of civilian machinery; and 16 to 1 automobile produced.

This disproportion in Germany's hold- of machine tools is even more strik- in relation to other European tries. The German nation had eloped manufacturing industries far and her own consumption needs. e industries exported to and dominat- iddle Europe. In addition Germany the main source of supply of these -German areas for the machinery and ine tools they did use. Thus the sion of all this manufacturing and producing capacity within Germany a large subtraction from the de- potential of other European coun-

A estimates that Germany today, making allowance for damage and escence, has more than 4 million of machine tools, and except for United States, is the outstanding ment machine shop in the world.

ermany has one dye plant that can out as much dye in a year as all the plants in the United States.

The Reich's coke ovens, which provide the coal by-products necessary for explosives, produced 2,228,000 tons of coal tar in 1937, only 115,000 tons less than the ovens of the United States.

German synthetic rubber capacity is estimated at more than 100,000 tons annually.

Rayon factories have capacity for at least 450,000 tons, and need no longer fear overseas supplies of cotton being cut off during war.

Synthetic oil production in 1944 was about 5½ million tons; natural petroleum output was about 1 million tons.

Aluminum capacity is estimated at 250,000 tons.

Coal production in prewar years amounted to 187 million tons and is not believed to have dropped much below this figure until closing days of the war. In addition, the country has large supplies of "brown coal," which can be scooped from open pits and which is used to provide a considerable portion of the electric power, to meet requirements of the retail trade, to make briquettes and as a material for the manufacture of liquid fuel.

Present, Past and Pending

WICKWIRE SPENCER TO EXPAND TONAWANDA FACILITIES

FALO—Wickwire Spencer Steel Co.'s River Road plant will be expanded at least per cent by a $1,500,000 program, the company announced last week. Principal ts are: $246,500 for wire drawing facilities, $190,000 for 60-cycle rectifiers, 000 for pulverized coal equipment, $120,000 for a stainless steel department, 000 for a straight-line cleaning wire department, $60,000 for a fine mesh welded department, and $55,000 for additional annealing equipment.

RST HALF STEEL PAYROLLS INCREASED SHARPLY

YORK—Steel payrolls in the first six months of 1945 amounted to $888,731,000, ared with $849,465,000 in comparable 1944 period. Employment averaged 000, compared with 576,000 in first six months of 1944.

AILROADS ALLOTTED 1,470,485 TONS OF STEEL

SHINGTON—Since the beginning of CMP in 1943, WPB has allocated a total of 17 on short tons of steel for railway equipment, against a requested 23 million tons. ith quarter allotments for transportation equipment total 1,470,485 tons of carbon against a requested 1,648,623 tons.

SHIP DELIVERIES DROP TO NOVEMBER, 1942, LEVEL

SHINGTON—Merchant ship deliveries in July dropped to 97 vessels of 895,185 eight tons, the smallest number since November, 1942. The peak was ed in December, 1943, when 219 ships of 2,058,893 tons were delivered.

COMMISSION TO STUDY STRIKE AT YOUNGSTOWN MILL

NGSTOWN—A three-man commission will be named by Philip Murray, president, ed Steelworkers of America, to study the work stoppage which shut down gstown Sheet & Tube Co.'s Brier Hill works last week. The strike caused a of over 3000 tons of steel output daily.

TIME LIMIT ON GOVERNMENT CONTROLS PROPOSED

YORK—National Association of Manufacturers last week recommended that wage and rationing controls be lifted six months after munitions production declined two-thirds below the level prevailing in April, 1945.

WAGE SCALE FOR CERTAIN METAL TRADES RAISED

BURGH—Upward revisions in stabilized wage rates for the metal trades in- ries have been approved by the third regional War Labor Board office, covering sylvania, Delaware, northern New Jersey, and District of Columbia.

Labor-Industry Peace Parley Plan Welcomed

Secretary of Labor plans to recommend Senator Vandenberg's suggestion to President Truman at once

RECENT suggestion of Sen. Arthur H. Vandenberg (Rep., Mich.) that a conference be called to map plans for ending labor strife and maintaining industrial peace, has been favorably received in government, business and labor circles. Last week, it was reported Secretary of Labor Schwellenbach, to whom Senator Vandenberg made the suggestion, was so favorably impressed with the idea he planned to recommend it to President Truman at once.

At the same time Eric A. Johnston, president of the Chamber of Commerce of the United States; Ira Mosher, president of the National Association of Manufacturers; and William Green, president, American Federation of Labor, all expressed favor for the plan.

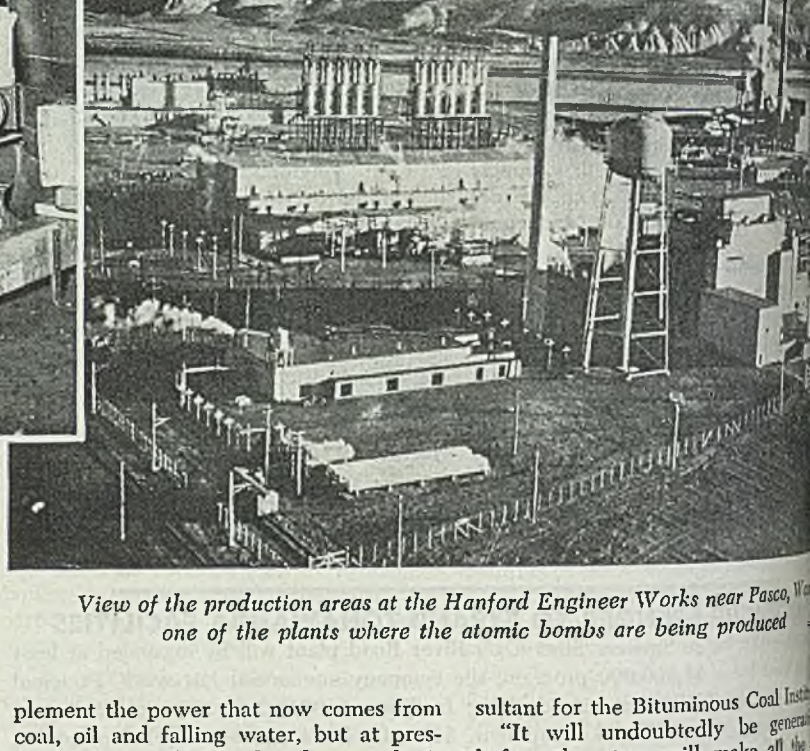
Senator Vandenberg, in a letter to Secretary Schwellenbach, compared his proposed "united industrial peace conference" with the United Nations Conference on International Organization at San Francisco. In his letter he said he doubted whether industrial peace at home could be attained "by summary legislation (except as a last resort)." He noted that at the San Francisco conference delegates from 50 nations met with ideas miles apart in many instances, but eventually reached agreement, and he reasoned that the same principle could be applied to labor-management-government relations.

"Responsible management knows that free collective bargaining is here to stay," wrote Senator Vandenberg. "Responsible labor leadership knows that irresponsible strikes and subversive attacks upon essential production are the gravest threat to the permanent success of labor's bill of rights."

Mr. Johnston, commenting on the proposal, said the Chamber of Commerce of the United States welcomes the suggestion, agreeing that legislation will not end labor-management unrest and that a voluntary conference method between industry and labor is "in the best American tradition."

Mr. Mosher said Secretary Schwellenbach's indorsement of the suggestion for an industrial peace conference is encouraging, declaring that any step in that direction is forward and that the N.A.M. will gladly participate in a movement that has its origin in an atmosphere of free give and take.

Atomic Energy See



Cyclotrons, or atom smashers, aided in the discoveries leading to the release of atomic energy. Above, Dr. John R. Dunning, leader of a research team in developing U-235, principal raw material for the atomic bomb, is shown with cyclotron at Columbia University. NEA photos

View of the production areas at the Hanford Engineer Works near Pasco, Wa one of the plants where the atomic bombs are being produced

ASSESSING last week's revelation of the cosmic or atomic bomb, observers in the power, fuel and metalworking fields believe that harnessing of atomic energy opens a revolutionary source of power for industry, but that actual utilization of this power still is remote.

While the fantastic development monopolized conversation wherever men met, information on it was scant. So remarkably kept secret was the $2 billion program to release the atom's energy that even high executives in many companies which had been supplying machinery and equipment for the development were not aware of it.

Most immediate interest, of course, was in the military aspects. The fact that one atomic bomb contained more power than 20,000 tons of TNT and had more explosive power than 2000 of the Grand Slam bombs, heaviest heretofore used, and the realization of the bomb's destructive possibilities astounded people everywhere.

More than a hint of the peacetime potentialities of the development was contained in President Truman's announcement. "The fact that we can release atomic energy ushers in a new era in man's understanding of nature's forces. Atomic energy may in the future supplement the power that now comes from coal, oil and falling water, but at present it cannot be produced on a basis to compete with them commercially. Before that comes there must be a long period of intensive research."

Mr. Truman indicated this new source of power will be given a government-regulated public utility status. He will recommend to Congress establishment of a special commission to control the production and use of atomic power.

How long will be required for research and development to convert atomic energy into useful power for peacetime applications cannot yet be predicted, although all who have taken part in the project agree it will be a period of many years. Furthermore, many economic considerations must be taken into account before the extent to which this power can supplant or supplement coal, oil and water as fundamental power sources in industry can be determined.

Spokesmen for industries most likely to be affected by the harnessing of cosmic energy freely predict that we may be on the threshold of a new power age. However, they place the effective utilization of this energy at some time in the future.

Atomic energy "probably will have little effect" on the use of coal during the lifetime of present adults, according to Dr. M. Lelyn Branin, technical consultant for the Bituminous Coal Insti

"It will undoubtedly be generat before the atom will make all the tion's steel, power the nation's loco tives, generate the electricity or fue the billions of hours of industrial ho power that coal does now, let a heat the nation's homes," Dr. Br opines.

Peaceful application of atomic will not destroy entirely the mark petroleum products, according to p leum engineers. They point out about half of petroleum productio used for purposes other than powe would not be affected by any ev adaptation of atomic energy.

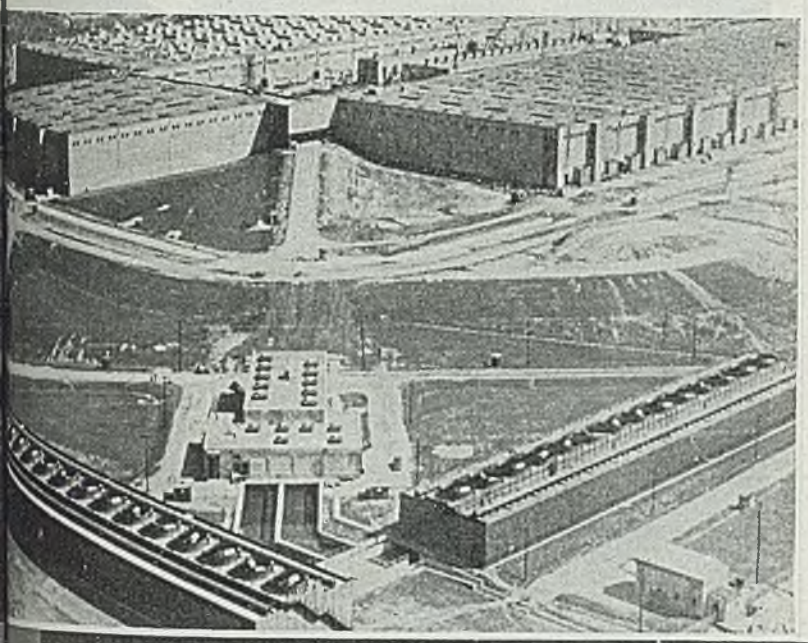
"Atomic power, as an economic competitive substitute for gasoline ships, planes, cars and other vehi still appears to be on a long road ah says Dr. Gustav Egloff, chief ch for the Universal Oil Products Co.

Atomic engines for aircraft are a tant possibility" which will require years of research and development cording to spokesmen for the Nat Advisory Committee for Aeronau Eventually they may assist in attai speeds up to 2000 miles an hou ward which aviation scientists are ing.

One of the first jobs will be to a measure for control of atomic reac so that atomic energy can be conver into engine horsepower, NACA sp

s Future Source of Industrial Power

Years of research and development will be required before fantastic new discovery supplants or supplements coal, oil and water for producing heat and power. Development is tremendous achievement for organized science



Top, one of the giant plants of the Clinton Engineer Works at Oak Ridge, Tenn., one of the secret projects for atomic bomb development. Immediately above, several of the scientists who participated in the project are shown here in consultation with Maj. Gen. Leslie R. Groves, Army officer in charge of the program. From left to right, they are: Sir James Chadwick of Great Britain; General Groves; Dr. Richard C. Tolman, Office of Research and Development, on leave as dean of the Graduate School of the California Institute of Technology; Dr. H. D. Smyth, Princeton University and consultant to the Manhattan Engineer District, "cover" name for the entire atomic bomb development program

aid. Assuming, however, that such
can be devised, aviation scien-
visualize the time when a block
el no larger than a brick may be
ent to power an airplane on many
around the world.

he story of the development of the
e bomb is the story of tremendous achievement by organized science. The task was so vast, the need for speed so urgent and the need of secrecy so imperative that the entire project was organized under Army direction and enlisted the aid of scores of top-ranking scientists and literally thousands of industrial companies. So compartmentalized was the work that while many thousands were associated with the program no one was given more information than was absolutely necessary to perform his job. As a result only a few highly placed persons in government and science knew the entire story. It has

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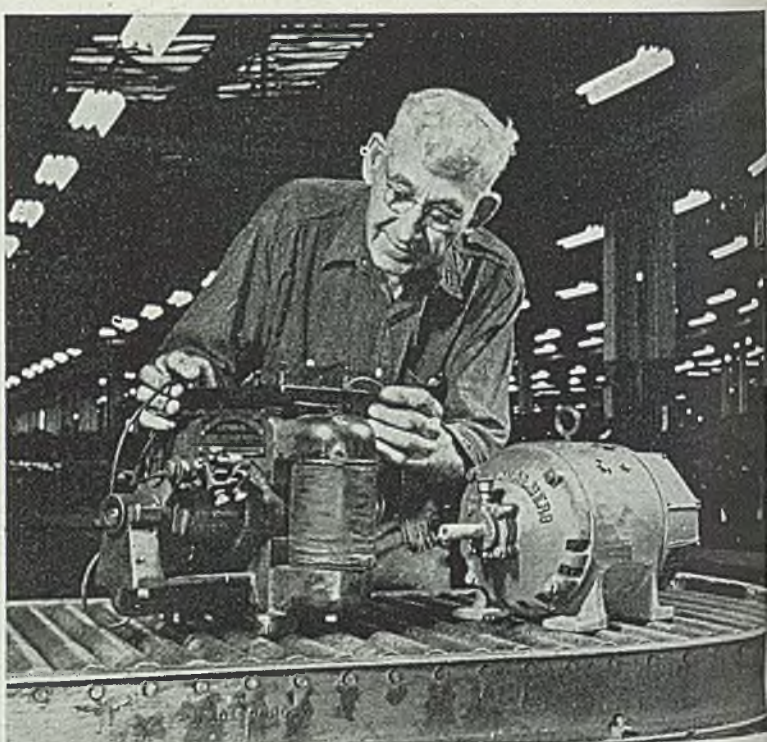
OPA Pressing Study of Steel Extra

Far-reaching effects on industry's price structure seen resulting from investigation of extra cards by 10 product committees

FAR-REACHING effects on finished steel prices, not only during the remainder of the war but in the permanent peacetime period ahead, should materialize in the near future from the study of extras which the Office of Price Administration now has under way.

The work is being done in co-operation with ten specially appointed subcommittees of the General Steel Products Advisory Committee. Eight of these so far have held their initial meetings with OPA officials; these are the subcommittees on bars and semifinished steel, structurals, plates, railway track and railway track materials, concrete reinforcing bars, rods and wire, sheets, and strip. Subcommittees scheduled to hold their first meetings in the near future are those on tin mill products and steel tubular products.

At present the individual steel companies are studying their costs of producing their various products with a view to determining what sizes or gages they can make at lowest cost, and what are the cost differentials for other sizes and gages. Later on the study will be extended to include costs for variations in chemistry, for annealing, heat treating, length, machine straightening, quantity, etc.



PROGRESS: Half a century of craftsmanship is represented by this veteran Allis-Chalmers Mfg. Co. motor-builder and the two products of his skill. Affectionately he examines the ½-horsepower motor at the left which, as an armature winder's helper, he helped construct in 1894 for a predecessor company. More than 50 years later he applied his skill as a slotter to help produce the modern 1-horsepower motor at right

Uniform Measuring Techniques

Intensive work over a period of several months more will be required, it is expected, before this cost data will have accumulated to an extent sufficient to guide the OPA in setting extras that will have a direct relation to cost. The OPA proposes to work with the industry in developing techniques of measuring cost of performing particular operations. OPA is using a system of plus and minus factors as a substitute for actual figures so that the problem can be discussed openly without revealing the basic cost information of the industry or of any particular company.

The current study was undertaken after OPA officials had come to the conclusion that further adjustments in steel prices, if found necessary, could not in all cases be satisfactory to all parties concerned if confined to base prices alone. Cost studies had revealed that the extras which are so important in calculating the delivered price of steel products in many instances were not in line with actual costs. It was determined that a revision of extras all along the line might be necessary in order to set up a sound steel price structure. This, it was believed, was necessary not only to prevent penalties on certain producers which frequently result from adjustments in base prices alone, but also to provide equitable price treatment to consumers.

The thinking which actuated the present study of steel extras was revealed some months ago when F. Russell Widmer, chief of OPA's Steel Mill Products Section, delivered an address on the subject before the steel industry panel of the Controllers Institute of America.

"I have heard it stated time and time again that something should be done about these things (inequity of extras)—but the only way anyone has ever seen for their correction is by agreement between competitors on a give-and-take basis—and you can't do that legally," he said.

But, he continued, "the OPA is charged by the price law with the establishment of prices that are fair to both buyer and seller. The present extra book is certainly not fair to either the buyer or the seller. And, if we go into the reconversion period with the present load of maladjusted prices there will be constant friction between [illegible] and the industry.

"A price which has little relation to cost is an open invitation to trouble," he declared. "Look back to the so-called normal years 1936 to 1939, [illegible] quarter the industry followed the [illegible] and published a list of base prices [illegible] the coming quarter. That base price plus extras plus a freight factor [illegible] the hope but seldom the realization of the industry. The actual price of [illegible] was always something less than the published total price."

And, went on Mr. Widmer, the [illegible] all price for steel varied with the operating rate—not with cost. "An increasing operating rate lowered cost and increased price. A declining operating rate increased costs and lowered prices. Profits fluctuated out of all proportion to the change in production."

Maladjustments in the extra [illegible] ism, said Mr. Widmer, contribute materially to the violence of price and production swings far beyond the movement dictated by the working of the law of supply and demand.

"In the coming months stability is essential," he continued. "We know

operating rate will decline with cancellation of war contracts. Our ary job in government and industry limit the extent of that decline thereafter bring about recovery to stained high level. OPA does not a 50 per cent rate in the fall, a 90 cent rate in the spring and a 50 per rate in the summer."

the normal steel market, said Mr. ner, when some customers are pay- the market price, and when most tomers are receiving some conces- and a few customers are receiving concessions, the base price and mechanism of pricing is nothing than a springboard. "But when ase and extras are the actual price uring the period of ceiling prices), the maladjustments we have been with come out from under the and climb in.

an illustration, consider the pric- of hot-rolled sheets 18-gage and er—a bread and butter item for the industry generally. In the spring 944 the OPA conducted a general y of costs and prices on carbon steel ts. A careful analysis of the fig- for 18-gage and heavier hot-rolled shows: Weighted average realiza- $46.77; range around the average ation $14.82; weighted average $47.35; range around average cost ; weighted gross margin $1.58 with the low company at $14.93 and the high producer at $6.52

at is, the weighted average loss $1.58—but one company made a of $6.52 and one company lost — the rest spread between. ed average cost was $47.35 but read in cost was $29.57."

ventory Accumulation Boom

examination of the individual ay returns, Mr. Widmer continued, ched the conclusion that the mills light gages make more profit than lls rolling heavy gages. Clearly, the extra card on sheets requires ment based on cost of producing ious gages. This is especially im- with the reconversion demand If the OPA ceiling prices then removed, and the mills were free ume their old practice of selling cessions while at the same time ing the published price by a mean- $10 or so a ton, they will touch inventory accumulation boom. he said, suppose the price control ued in effect and the OPA were ted to increase prices on hot-rolled because of the loss in overall ton- and war sweeteners. Say that the y then is showing a weighted av- loss of $2 a ton on hot-rolled . "Suppose we ignore the malad- ent in the extra card and work only the base price; we increase the base cover the average loss and, say, $2 to provide a profit. The man who

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U. S. Steel Not To Seek Geneva; Plans West Coast Expansion

Directors decide against acquisition after study of problems involved in adapting plant to peacetime operations. President Benjamin Fairless states corporation plans expansion of facilities on Coast

DIRECTORS of the United States Steel Corp. have decided that no further action will be taken by the corporation to acquire the government-owned steel plant at Geneva, Utah, Benjamin F. Fairless, president, announced last week. This action, he said, was taken after full consideration of the situation, including the various problems involved in attempting to establish the plant as a sound and successful commercial enterprise after the war.

Simultaneously, Mr. Fairless disclosed that the Steel corporation had authorized

BENJAMIN F. FAIRLESS

a further step in the modernization program of its subsidiary, Columbia Steel Co., through the installation at Pittsburg, Calif., as soon as equipment is available, of modern cold reduction facilities having annual capacity of more than 325,000 tons of cold reduced sheets and tin plates.

The new cold reduction facilities at Pittsburg, will constitute a substantial additional investment by U. S. Steel in the Far West, Mr. Fairless said. This is the first modern cold reduction mill to be authorized for erection on the Pacific Coast. It will produce sheets and tin plate comparable in quality to those manufactured anywhere in the country. A study also is being made looking to modernization of Columbia's facilities at Torrance, Calif., near Los Angeles.

Mr. Fairless added that if Defense Plant Corp. or the future operators of the Geneva steel plant decided to manufacture hot rolled coils there, United States Steel would be glad to negotiate for the purchase of a substantial amount of these coils to be used in producing cold reduced products at Pittsburg, Calif., provided that determination is made in sufficient time to insure that the coils will be produced at Geneva concurrently with completion of Columbia's new cold reduction facilities.

Sam H. Husbands, president, Defense Plant Corp., was informed of the decision of United States Steel Corp. in a letter from Mr. Fairless. Reviewing the history of the Geneva plant in his letter to Mr. Husbands, Mr. Fairless said: "In 1941 the government decided on its own initiative that it was necessary in the national interest to construct a steel plant at Geneva, Utah, to produce plates and structural steel for its huge shipbuilding program on the Pacific Coast. The plant was constructed strictly as a war or defense facility, and, so far as we know, with little regard for its postwar use. We were requested by the government to construct, and later to operate the plant, and we did so without charge or fee. We devoted to the work the best talent in the corporation.

"Last January," Mr. Fairless wrote, "I advised Defense Plant Corp. that, when the disposal of the Geneva mill might be under consideration, we would be interested in discussing with your representatives a possible basis for the purchase or lease of the plant for operation as a part of Columbia Steel Co., to the extent the Geneva mill might be utilized in lieu of Columbia's postwar program. Our representatives then undertook a thorough study of the various factors which might have a bearing on such a purchase or lease.

"In our preliminary discussion with Defense Plant Corp. on June 13, 1945, which followed almost immediately the completion of our study, you advised us that in your opinion a sale of the plant at this time is not practical and that Defense Plant Corp. under the provisions of the Surplus Property Act has authority only to lease the Geneva mill for not exceeding five years, without an option to the lessee to purchase at the expiration of the lease. We then told you that it would be necessary for us to give the matter further consideration.

"The report of Attorney General Biddle to the Congress under the War Mobilization & Reconversion Act made on June 28, 1945, the policy for the disposal of

(*Please turn to Page* 202)

Reconversion Planning Energized By Possible Early Jap Collapse

Government agencies reported whipping programs into shape to cushion economic shock should war end suddenly. Steel buyers move slowly pending review of munitions procurement picture in light of recent war developments

PLANS are reported being frantically prepared by government agencies to prepare the nation for the economic shock which would accompany sudden ending of the war with Japan.

Dramatic and sensational developments in the war last week, that is, dropping of the new atomic bombs on the Japanese homeland, and the entrance of Russia into the war, have instilled new life into the reconversion program with the view being expressed on every side that Japanese surrender now possibly may be only a matter of days or weeks away.

War Production Board last week was reported preparing a special report on material and production controls it will lift when Japan surrenders.

Chairman Krug of WPB commenting on a letter from President Truman outlining an orderly transition from war production to civilian output last week said: "The President's letter outlines the reconversion program already underway in the War Production Board and requests the War Production Board to see the reconversion job through because it is the only government agency having extensive experience with industrial production. The War Production Board will stay on the job as long as there is any need for its services, following out the President's basic instruction that controls should be lifted as soon as they are no longer necessary."

As a general thing industry is not prepared to change over quickly from war to peacetime production. Some reconversion of facilities has been effected since V-E Day, and certain government controls on production and supplies have been dropped, but the reconversion program at the moment still is only just beyond its initial stages.

Indications now are that WPB controls will be dropped far more speedily than since the end of the war in Europe, but still not too abruptly. CMP may fade rapidly, even before its scheduled termination at the end of this year, should Japan collapse in the early future, but the MM ratings will likely be retained for several months.

Certain new phases of war procurement are coming in for temporary delay, pending review in the light of the recent developments, and, while prospects of full peacetime production have been brought closer, civilian consumers of steel are disposed to move slowly for the moment until influences of the stupendous events of the past week can be better appraised.

When the war ends contract cancellations will be sweeping, amounting to possibly as much as 90 per cent within a relatively short time, on the basis of some Washington predictions earlier in the summer.

As a matter of fact, many manufacturers whose postwar programs have been sufficiently advanced, have long since placed orders, and, interestingly, one aspect of this situation is that when the end of the war does come, there may be many cancellations of even these purely civilian orders, for the reason there are apparently a number of duplications.

Events of the past week came suddenly at a time when the War Production Board was engaged in setting up allocations for the fourth quarter, and had decided to continue CMP controls on through the end of the year. Earlier indications pointed to around 2,000,000 tons of unrated steel for the fourth quarter, although later it was believed in some quarters that more than 3,000,000 tons would be made available, even assuming a continuation of the war throughout that period, and assuming, too, that labor disturbances in the industry do not become worse.

There are estimates that unrated steel tonnage in the current quarter will run around 800,000 tons, but some t leaders are skeptical. There are mates also that unrated productio sheets and strip in the present qu will run 175,000 tons, despite the mitted pressure for these products.

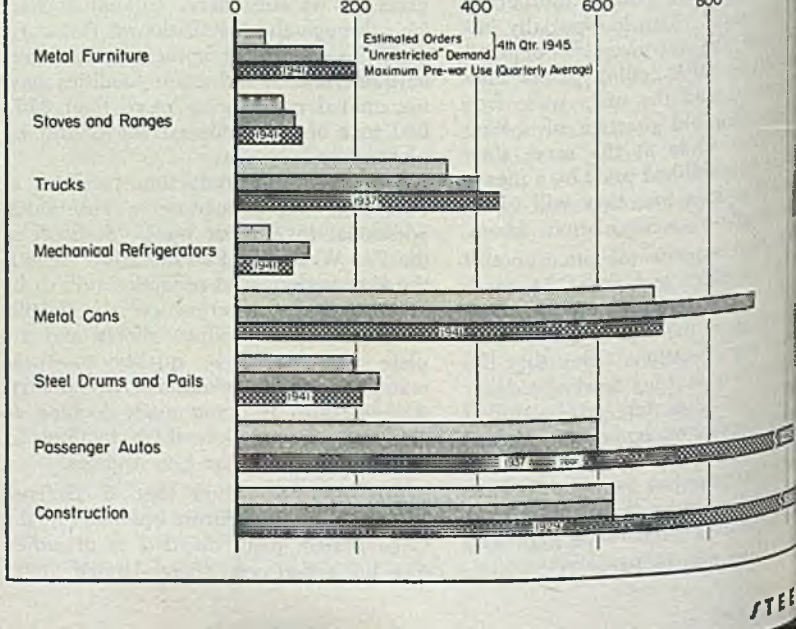
On the basis of present calculat invalidated tonnage in the current q ter will be made up principally of pl heavy sheets, reinforcing bars, co wire products and alloy bars, (some bon bars but certainly not as muc might be suggested from talk of cancellations). Other products wi represented but in smaller degree.

Munitions production is schedu continue downward to less than $12 lions in the third quarter and $10.5 lions in the fourth quarter, thereaf leveling off at just below $10 bil quarterly, WPB said last week in view of current and future military civilian production problems.

Cutbacks in munitions programs said, are large enough to free for civ use all the copper and aluminum industry is likely to demand. In case of steel, however, the amounts leased for non-military productio the cutbacks are proportionately than in nonferrous metals. Total supply is expected to decline slight the third and fourth quarters bec not all of the facilities released by tary cutbacks will be adaptable to products which will be in demand non-military use, but the amount of carbon and alloy steel rolled prod available for all except direct mil orders will increase from less than 9 lion tons in the first quarter of this to about 11,700,000 tons in fourth q ter.

This latter tonnage, WPB points is greater than the 10,650,000 tons quarter used for all purposes in 1937 top year of the pre-war boom.

STEEL DEMAND FOR SELECTED ITEMS



...s not mean there will be plenty of ...l for all uses, WPB emphasizes, for ...e reason that a substantial amount of ...must go to production of "B" product ...mponents and subcomponents which ...tually will become parts of military-...quired end-items. In the second place, ...re steel must be devoted to the war-...porting industries than those same in-...stries used for peacetime purposes in ...ll, such as the railroads, petroleum ...dustry, farm implement manufacturing, ...ilway transportation, and exports to ...ield devastated areas. WPB says ...t if these demands are met there con-...equently will be less steel available for ...rmal civilian uses than in 1937. Fur-...r, it declares, that if no restrictions ...re placed on nonmilitary steel con-...mption, total demand for such uses in ...e fourth quarter would be some 15 ...r cent above prospective supply and ...ver cent above 1937 shipments.

...Representatives of the industry have ...ld WPB that unless the present coal ...tuage is remedied and the current ...ge uncertainties dispelled, the agency's ...ticipated increase in sheet and strip ...l production for fourth quarter will ...t materialize.

...e big factor which is expected to ...ake the steel supply situation is the ...easingly heavy impact of V-E war ...ntract cutbacks. Data released by ...B last week reveal that schedules for ...ust were slashed about $1206 million, ...ore than half of the $2 billion reduc-...ns during the preceding four months. ...e cuts in contracts, including those ...e before the final collapse of German ...mance, total about $15 billion, of ...ich $3509 million affect 1945 schedules ...d $8725 million affect 1946 schedules. ...ese figures cover gross cutbacks and ...ke no allowance for new contracts or ...creases in production resulting from ...scheduling. Because about three-fourths ...the total cutbacks take effect in the ...ve months of this year, there has ...en time for the release of primary ...terials in important quantities.

Schedules Issued

...Schedules of stop-work points for cer-...in products in the iron and steel in-...stry were issued last week by WPB ...d the Office of Contract Settlement. ...e schedules represent recommenda-...ns by WPB's Industry Divisions to the ...ce of Contract Settlement of the ...nts to which fabrication or processing ...ould best be carried in the event a con-...act is canceled. This will speed settle-...nt of terminated contracts.

...The nation's reconversion program ...ll gather momentum only as rapidly ...critical materials, components and ...ilities are released from war and war-...porting activities. Although limited ...antities of sewing machines, vacuum ...eaners, domestic washing machines and ...ectric irons are being produced, vol-...me production of these and other prod-...cts of consumer interest is not expected ...be attained until the summer of 1946.

July Steel Output Up but Ingot Rate Is Lowest in Past 5 Years

STEEL production in July was greater than in June, because of one more working day, but the industry's percentage rate of operation in July was the lowest for five years, according to the American Iron & Steel Institute, New York.

Total output of steel ingots and steel for castings was 6,999,625 net tons in July, against 6,842,290 tons in June and 7,498,387 tons in July, 1944. July operating rate was 86.5 per cent of capacity, compared with 87.1 per cent in June and 94.3 per cent during July, 1944.

In July, 1940, the operating rate was 83 per cent and two months later it crossed 90 per cent and remained above that level from that time until January this year when it dropped to 88.8 per cent, mainly because of adverse weather conditions.

Calculated weekly production in July was 1,583,626 tons, compared with 1,594,939 tons weekly in June and 1,696,468 tons in July, 1944.

STEEL INGOT PRODUCTION STATISTICS

	Estimated Production—All Companies								Calculated weekly production, all companies Net tons	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.		
Based on reports by companies which in 1944 made 97.9% of the open hearth, 100% of the bessemer and 86.7% of the electric ingot and steel for castings production										
1945										
Jan.	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88 8	1,626,687	4.43
Feb.	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90 8	1,663,617	4.00
Mar.	6,927,377	96.9	398,351	79 8	382,237	82.4	7,707,965	95 0	1,739,947	4.43
1st qtr.	19,364,034	93.3	1,124,640	77.6	1,080,103	80.2	21,568,777	91.6	1,677,199	12.86
Apr.	6,541,097	94.4	372,952	77 2	377,877	81.4	7,291,926	92 8	1,699,750	4 29
May	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4.43
June	6,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,591,939	4.29
2nd qtr.	19,333,940	92.1	1,154,859	78.8	1,097,169	80.6	21,585,968	90.6	1,659,183	13.01
1st hlf.	38,697,974	92.7	2,279,499	78.2	2,177,272	80.4	43,151,745	91.1	1,668,139	25.87
July	6,330,052	88.7	381,857	76.7	287,716	62.2	6,999,625	86.5	1,583,626	4.42

For 1945 percentages are calculated on weekly capacities of 1,614,338 net tons of open hearth, 112,658 tons of bessemer and 104,640 tons of electric ingots and steel for castings, total 1,831,636 tons; based on annual capacities as of Jan. 1, 1945 as follows: Open hearth 84,171,590 net tons, bessemer 5,874,000 tons, electric 5,455,890 tons.

TRANSITION TOPICS

REMAKING GERMANY— American and Allied experts in Germany study rebuilding of Reich into a primarily agrarian country in line with decisions of Big Three at Potsdam. Heavy industry to be removed or rigidly controlled. See page 75.

ATOMIC ENERGY—Development of atomic bomb reveals potential source of industrial power. Years of research and development still necessary before it can compete with present power sources. See page 78.

STEEL PRICES—OPA presses study of extras. Far-reaching effects on industry's price structure may result. See page 80.

GENEVA STEEL— United States Steel Corp. informs government it will not seek to acquire Utah works. Will expand other facilities on West Coast See page 81.

POSTWAR JOBS— Full employment bill receives strong backing in Congress. Measure would provide peacetime counterpart of War Production Board. See page 84.

FLAME CUTTING— Problem of cutting tough stainless steel alloys with oxyacetylene torch has been solved by introduction of flux-injection system adaptable to standard flame cutting machines. See page 107.

METAL DRAWING LUBRICATION— New data based on original research at Frankford Arsenal will prove useful in solving lubrication problems in the drawing of copper-base alloys. See page 108.

PACKAGED POWER— Gas turbines with 2500-horsepower rating developed for Naval and Maritime service have high operating efficiency of 29 per cent, and point way toward use of smaller "packaged power" units for industrial use. See page 116.

Full Employment Bill Receives Strong Backing in Congress

Measure would inject something new into peacetime economy, in a sense providing for a permanent counterpart of the wartime War Production Board. Ranks as a major matter on Congress' calendar after summer recess

ONE of the major matters to come before Congress immediately after it reconvenes in October is the Full Employment bill—S. 380 in the Senate and H. R. 2202 in the House. At the present writing the bill appears slated for quick approval; it is supported not only by the so-called New Dealers but by many Republicans and old-line Democrats.

The bill was introduced in the Senate last January by Sen. James E. Murray (Dem., Mont.) with unusual backing; his co-sponsors were Senators Robert F. Wagner (Dem., N. Y.), Elbert D. Thomas (Dem., Utah), and Joseph C. O'Mahoney (Dem., Wyo.). Subsequently numerous other senators went on record as supporting the bill, including such Republican leaders as Charles W. Tobey of New Hampshire, George D. Aiken of Vermont and Wayne Morse of Oregon.

Immediately after Wright Patman (Dem., Tex.) introduced the bill in the House, more than 100 other members joined with him as co-sponsors. They included such Republicans as Clare Booth Luce of Connecticut, Walter Brehm, George Bender and Homer Ramey of Ohio, Alvin O'Konski of Wisconsin, Richard J. Walsh of California, C. A. Wolverton of New Jersey and Charles L. Gerlach of Pennsylvania.

Peacetime Counterpart of WPB

The Full Employment bill would inject something new into the nation's permanent peacetime economy. In brief, it provides for a permanent peacetime counterpart of the wartime War Production Board. The bill springs from an idea contained in the late President Roosevelt's message to Congress on the state of the union in January, 1944. In outlining an "economic bill of rights," Mr. Roosevelt declared that every man and woman in the country who is able and willing to work has the right to a job. This was the message in which he mentioned a 60-million-job goal.

Mulling over this proposal, Senator Murray and a number of his associates in the Senate, including President Truman who then still was a senator from Missouri, came to the conclusion full production, full employment and full consumption may be maintained in this country, but only if these joint objectives are set up as goals for the nation as a whole. Wartime experience, they concluded, had demonstrated not only that these goals can be reached, but it demonstrated the methods by which they can be attained. The bill they wrote, therefore, was a rather simple one. It provided for permanent retention of such wartime controls as are believed necessary to create and maintain full employment after the war.

Sponsors of the Full Employment bill had hoped to get the measure enacted before the summer adjournment, but were forced to a postponement when, to arm President Truman for his dealings with other United Nations powers, the Senate gave the right-of-way to such measures as the Trade Agreements Act extension, the Bretton Woods bill and the Charter bill. But they did hold two important hearings at which, before the Senate Banking and Currency Committee, they told why they had written and introduced the Full Employment bill. Senator Wagner, who appeared not only as one of the bill's sponsors, but as chairman of the Banking and Currency Committee, went so far as to say that the Full Employment bill is important a proposal as any before Congress within our memory."

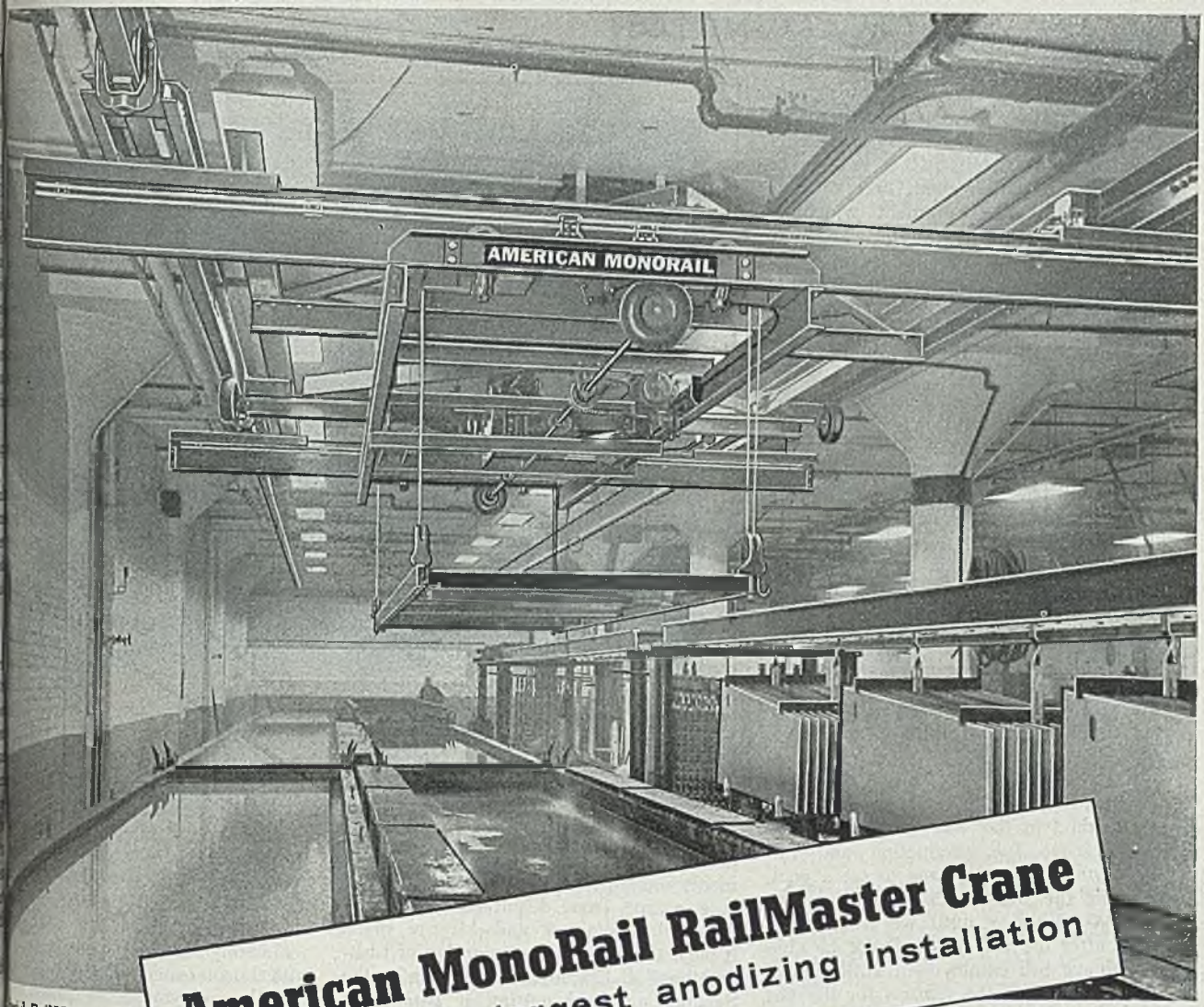
Senator Wagner summed up employment needs after the war. At least million more people will need than in the banner year 1929, he We will have to absorb "an almost believable increase in our product capacity; in our more advanced industries two men now can do the work three did before the war." At the time, he said, we will have to make an average postwar income almost that of 1929.

"We shall have to do all those and more, in the face of the release 20 million or more able-bodied from the armed forces and from immediate war production. We shall to do that in the face of a drop in mand for war goods and services runs up to $100 billion a year.

"Even to contemplate failure this task is unthinkable. Two million, or even 15 million or millions unemployed in postwar America would spell disaster. Mass employment would drive us both economic isolationism and nomic imperialism—economic isolationism in the vain hope of providing in America by excluding the products of other nations; economic imperialism in the vain hope of creating markets abroad for American products at threat of the sword."

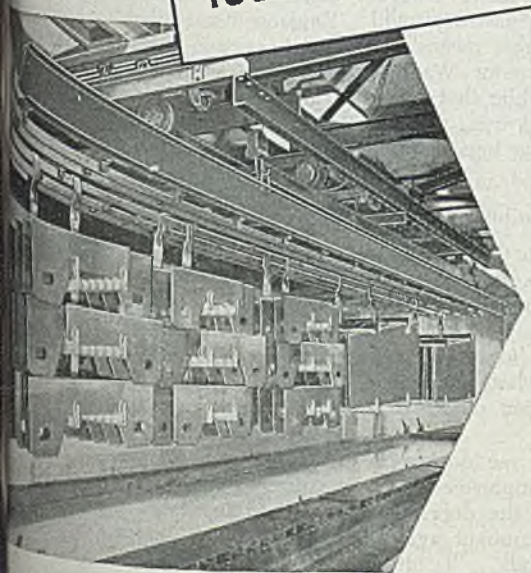
The senator cited the results of

SEN. ROBERT F. WAGNER



American MonoRail RailMaster Crane feeds nation's largest anodizing installation

...ail RailMaster 35' ... with 2-way trac- ...tor drive.



Loaded rack on crane ready for anodizing.

AN American MonoRail two-way drive Rail-Master Crane operates over six tanks that make up one of the world's largest anodizing installations. Special racks loaded with parts are lifted from one to another of five cleansing and rinsing tanks and then deposited into a chromic acid tank where the actual anodizing takes place. Some of the loads weigh as much as 3 tons.

American MonoRail Railmaster Cranes of extremely simple design are developed for handling loads up to 5 tons by manual operation or propelled by rubber wheel drive.

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recent elections in which the British people proved "they were not satisfied that the government in power was sufficiently resolute in its determination to achieve postwar full employment, and so they elected another government which is pledged to that purpose. The war-weary people of Britain want no future wars. They know that the basis of international tranquility is economic tranquility and economic tranquility rests upon full employment—with all the social gains that full employment means."

Faith in the potential efficacy of the Full Employment bill, Senator Wagner continued, is not based on any lessons learned in fighting the great depression. Despite all efforts, he said, that problem was not solved to our satisfaction.

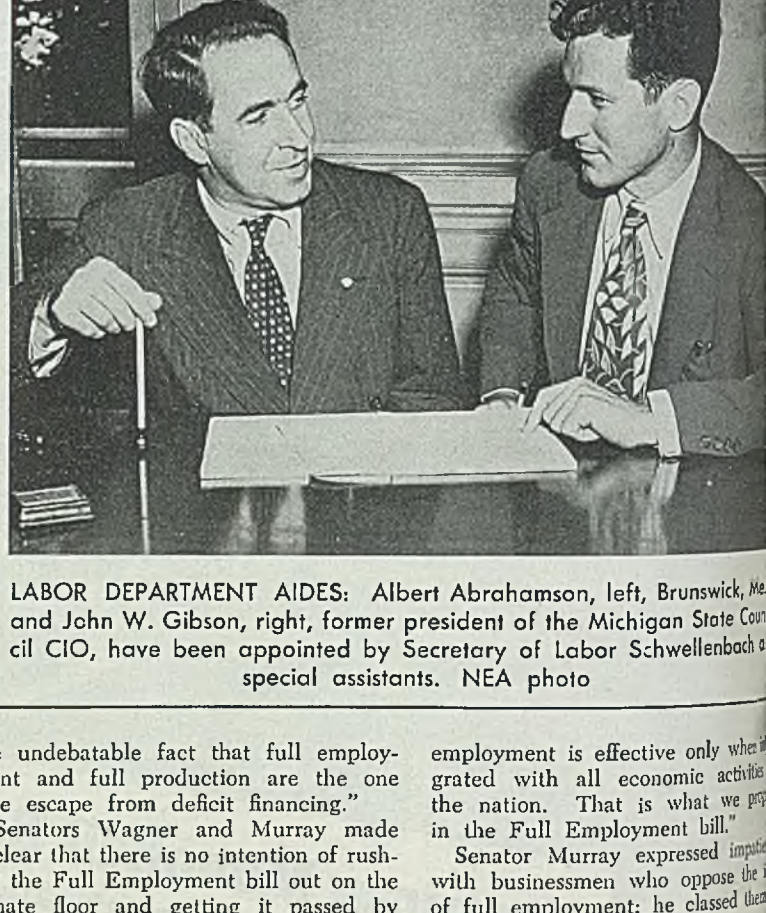
"The bare truth is this: While unemployment was cut almost in half between 1933 and 1937, it was not reduced much below 7 million, and it rose considerably above that figure between 1937 and the beginning of the defense program. No thinking person can fail to shrink from the results that would follow if we do not better this record in the future."

High Goals Must Be Set

This faith, he said, is based on a lesson we learned in the war—that before we can achieve full production and full employment we will have to set a goal. "During the war we could not produce 100,000 airplanes until we first had a goal; after the war we shall not be able to achieve full employment until we set a goal. One of the reasons for the sad fact that Congress has done too little and been too late in acting on matters of reconversion and postwar economic affairs is that we have had no overall budget of what needs to be done. We have no full perspective, and consequently we have not set sufficiently high goals. By giving us the perspective, and setting the goals, the Full Employment bill will make it vastly more practical to enact specific measures."

No one would suggest that we should retain in the postwar period, the degree of centralization and controls that have been necessary during the war, said Senator Wagner, "but the war has taught us what the indispensable minimum requirements are for maintaining full production and full employment. These indispensable minimum requirements—and these alone—are incorporated in the Full Employment bill."

The bill, he said, is in accord with American policies. "It firmly rejects the proposition that public employment is the main avenue toward full employment," he said. "It rejects the proposition that full employment requires continued deficit spending. It embraces the idea that co-operation between enterprise and government, guided by an annual inventory of the economic problems with which both must deal, will lead to increasingly high levels of employment in private enterprise. It is founded upon the undebatable fact that full employment and full production are the one sure escape from deficit financing."



LABOR DEPARTMENT AIDES: Albert Abrahamson, left, Brunswick, Me., and John W. Gibson, right, former president of the Michigan State Council CIO, have been appointed by Secretary of Labor Schwellenbach as special assistants. NEA photo

Senators Wagner and Murray made it clear that there is no intention of rushing the Full Employment bill out on the Senate floor and getting it passed by strong-arm tactics. A number of amendments have been suggested, said Mr. Murray, and these will receive careful attention. Further open hearings will be held as soon as Congress reconvenes in October and, said Senator Wagner, "I want to assure the public that every interested party, pro and con, will be fully and fairly heard; we hope to improve the bill."

Pleads Against "Quibbling"

In the meantime, Senator Wagner added, "let us not be distracted by those who quibble as to the meaning of the words 'full employment.' Certainly, we need facts. But let us not hold back until all the statisticians agree whether full employment means 60 million or 57 million jobs."

Senator Wagner could see no reason why the failure of the Employment Stabilization Act to prevent the depression of the 30s is a valid argument against the Full Employment bill. "I introduced the Employment Stabilization Act in 1928 but unfortunately it was not enacted until 1931, and even then not made effective," he said. "Shortly after, economic conditions became so bad that it was too late for the ounce of prevention. Furthermore, the Employment Stabilization Act dealt only with public works, whereas we have learned during the war that federal action to stabilize employment is effective only when integrated with all economic activities of the nation. That is what we propose in the Full Employment bill."

Senator Murray expressed impatience with businessmen who oppose the bill of full employment; he classed them as "reactionaries and Tories who are as blind to the dangers that threaten our country as the reactionaries and Tories in England who failed to heed the social and economic signals of our time and they were overwhelmingly defeated and thrown out of control by the people of their country who could no longer accept a system which offered so little in happiness, opportunity and security."

Senator Murray reminded opponents of the bill that it is intended "above all to strengthen and preserve our free enterprise system. It is based upon the theory that no single group in this country can by itself assure the expanding markets necessary for full production and full employment. It recognizes the fact that only the government, acting in co-operation with industry, labor, agriculture, and states and localities, can assure a continuing level of demand sufficient to absorb the goods and services produced under our modern economic conditions . . . The bill does not in any way undertake to regiment our economy. It is based upon the principle that we cannot have full employment without full production, and that the key to maintaining full production is full consumption."

Senator O'Mahoney showed by statistics that every war in history has been followed first by a boom and then by a disastrous slump. Building increases

seven years after the Civil War and seven years after the First World but then in each case receded ply; decline of construction in 1926 shadowed the big depression of the Farm prices rose to peaks in 1864 1919 and, said the senator, "the to- ars of 1868 to 1871 and of 1920 to show what lies ahead unless ake thought now to maintain pur- g power by maintaining full em- ent.

we drift and see what happens this war, instead of enacting legis- of the order of the Full Employ- bill, we are headed for another and slump," he said.

produced a chart to prove that the wealthy but the rank and file ation provides the best markets in ountry. This showed that people ng less than $2000 annually in had a total income of $45.7 billion most twice the aggregate income billion) of those receiving $5000 re annually.

w-Income Bracket Is Best Market

to those receiving under $2000 ly we add those who receive we have a total income at the of the scale of $89.7 billion. this consider the plain fact that high-bracket income recipients, those who had a taxable income ,000,000 or more down to and in- those who received more than received only a total of $34.5

ere is more profit for the shoe- in selling one pair of shoes to each $47 billion low-bracket individ- e went on, "than in selling three each of the $34 billion high- individuals at the top. That every business, as Henry Ford when he began to make the T. It goes for agriculture which t rid of surpluses much more ly and profitably by selling them g customers than by ploughing nder for compensation in deficit s."

goal of full employment, there- said Senator O'Mahoney, is one that good to all groups in that it will business opportunities which will provide jobs but at the time yield profits.

means opportunities for farmers achers, to produce and sell agri- al commodities; it means oppor- ies for manufacturers to make and dustrial goods, for railroad and operators to transport such goods; octors, lawyers, teachers, barbers eauticians to serve people; it means tunities for individuals, firms, asso- s, corporations and all the other ations which men form, to do things they want to do," he said. we fail to have a Full Employment as we go into the postwar period, Senator O'Mahoney, these groups will be faced with heavy financial losses instead of the opportunity to earn profits. "The sales which business lost during the depression of the 30s," he said, "totaled $355 billion, far in excess of the total national debt. Business lost far more because of unemployment than the cost of the war. Farmers lost $24 billion. Unincorporated proprietors saw $37 billion of income fly out the window. Corporate profits were lost to the amount of $69 billion and, finally, wages and salaries were diminished in the sum of $175 billion . . . These figures do not take into consideration the human casualties that accompanied the financial loss."

Fiscal experts and economists agree that we can safely carry the national debt if the national income remains at or near the high point it has reached, said Senator O'Mahoney. But almost 50 per cent of the national income of late has been derived from war expenditures. That is the big point, he said; new income must be developed to take the place of war expenditures. Inability to carry the debt, he said, "is a disaster we cannot afford to court," and it is a disaster that will not occur if we enact a full employment policy.

Senator Thomas sought to prove that full employment is not something new but already is an established part of our national policy. He pointed out that a full employment clause was written into the Surplus Property Act, and we were among 50 nations to approve full employment resolutions at the international labor conference held in Philadelphia last year.

Production and Employment Budget

The Full Employment bill as it stands today would require the President to submit to Congress at the beginning of each regular session a "National Production and Employment Budget" setting forth for the ensuing year, or a longer period if the President elects, 1—the estimated size of the labor force, 2—the estimated amount of private and government investment and expenditure required to provide jobs for the entire labor force, and 3—the estimated total of investment and expenditure from private and government sources during the period.

The extent to which item 2, above, was greater than item 3 would be known as the "prospective deficiency in the national budget," and the President would be required to set forth a program of additional public work to fill part of this deficiency. The rest of the deficiency, so far as possible, would be filled by encouraging greater activity on the part of private enterprise; that is, the President would ask Congress for legislation intended to improve the position of business.

Conversely, if item 3, above, were greater than item 2 the President would recommend a reduction in government spending so as to prevent inflationary economic dislocations.

The national budget, the bill provides, would be prepared under the President's personal direction and supervision, right in the executive offices. He would consult with members of his cabinet and other heads of government departments and agencies. He would appoint and consult an advisory board composed of representatives of industry, agriculture, labor and state and local governments, and others. There is nothing in the bill as it stands from preventing permanent retention of the present War Production Board.

To cope effectively with this situation, Congress would appoint a joint committee on the national budget whose membership would comprise, among others, the chairmen and ranking minority members of existing committees concerned with appropriations, taxation and fiscal matters. The joint committee would study the President's program and recommendations, and report to Congress. The joint committee would have power to subpoena witnesses and documents, engage expert technicians and other consultants and otherwise incur expenses.

President Would Recommend Action

From the standpoint of American business, perhaps the most significant feature of the bill is that portion instructing the President in regard to recommending a course of congressional action deemed necessary to stimulate private business. Its provisions are so broad as to enable the President to make recommendations without limit. It reads:

"Such program may include, but need not be limited to, current and projected federal policies and activities with reference to banking and currency, monopoly and competition, wages and working conditions, foreign trade and investment, agriculture, taxation, social security, the development of natural resources, and such other matters as may directly or indirectly affect the level of non-federal investment and expenditure."

The bill carries a number of safeguards against use of any of its provisions to stimulate regimentation in the United States. In fact, it starts out with this declaration:

"It is the policy of the United States to foster free competitive enterprise and the investment of private capital in trade and commerce and in the development of the natural resources of the United States."

And it closes with the flat statement that "nothing contained herein shall be construed as calling for or authorizing (a) the operation of plants, factories, or other productive facilities by the federal government; (b) the use of compulsory measures of any type whatsoever in determining the allocation or distribution of manpower."

Vast Amount of Data Required of Warehouses Seeking Price Relief

Compiling information to execute application form 674-2493 involves several weeks work in most instances, jobbers say. Industry sees little hope for relief of individual seller unless zone-wide price adjustment is authorized

VAST amount of information is required of iron and steel warehouse operators to execute form 674-2493 in applying to the Office of Price Administration for an upward adjustment in their ceiling prices. This form, just made available to the trade, implements amendment 32 to price schedule 49 issued late last month. (See STEEL, July 30, p. 51).

One of the chief difficulties encountered by an individual seller in seeking price relief, it is said, is the gathering of the exhaustive information required by OPA's form 674-2493. Interests in the industry say it would take weeks in most instances to compile the required data.

The form is divided into four main sections with various subdivisions and requires answers to about 75 questions. In addition, as a part of the application, the warehouse must supply for each year from 1936 to 1939, inclusive, and for the warehouse's most recent fiscal year a balance sheet and profit and loss statement on OPA financial reporting form A, or in the form regularly prepared by the warehouse, providing such data have not already been submitted to the OPA on form A.

Four Pages of Instructions

As an indication of the intricacy of the form, it is accompanied by four pages of instructions. Some members of the trade claim the services of company auditors or trained accountants will be required to execute the form with accuracy.

In the trade it is pointed out that amendment 32 affords little hope for relief for the individual seller unless the majority of warehouses in the same zone appeal for relief and zone-wide price adjustment is authorized. Even though an individual seller is granted price relief, warehouse men say it would be impossible for a jobber to charge higher prices in a competitive market than the maximum ceiling prices being quoted by other sellers in the same market.

Amendment 32 provides that an upward price adjustment may be granted to an individual seller only if warehouse margins fall below 18.5 per cent when an industry-wide increase is granted to steel producers on a product or product line. Margin is defined as the ratio between gross spread and selling price, based upon average material cost and average sales revenue. Any adjustment allowed by OPA on warehouse prices may not exceed the amount of the mill increase and may be only sufficient to bring the seller's margin up to 18.5 per cent. The adjusted margin must not exceed the percentage ratio of the seller's operating expense to his total sales in his most recent accounting period and must not exceed the percentage margin experienced by the seller during 1940.

Warehouse executives point out that the margin at which individual sellers may operate profitably varies widely. However, a few years ago before recent advances occurred in labor and material costs it was generally held in the industry that a margin of about 22 to 25 per cent was necessary for profitable operations.

Termination Accounting Practices Unified by OCS

Office of Contract Settlement has issued six new termination cost memorandums, dealing with the following costs in termination settlements: No. 10, engineering and development, special tooling, and preparatory expenses; No. 11, settlement expenses and costs of protection and disposition of property; No. 12, depreciation; No. 13, advertising expense; No. 14, general experimental and research expenses; No. 15 cash discounts on purchases.

WMC Reports Manpower Shortage Eases Further

Number of labor market areas classified by the War Manpower Commission as acute as of Aug. 1 has dropped to 46, representing a net decline of 7 in July and 27 from the V-E Day total of 73.

The following seven areas dropped from the acute classification to that of slight shortage or approaching balance: Adrian and Benton Harbor, Mich.; Logansport, Ind.; Madison-Merrimac, Wis.; Muncie, Ind.; Peoria, Ill.; Paterson, N. J. The following areas have experienced an easing off in labor market demands and are now classified in group III (approximate supply-demand balance): Dayton-Springfield, O.; Lansing, Mich.; Minneapolis-St. Paul; Pontiac, Mich.

Substantial surplus of workers is reported or is expected in the follo new areas: Des Moines, Iowa; I Belding-Greenville, Mich; Talladega.

Two areas, Jacksonville and Pa City, Fla., were raised from group group III when shortages in work curred. Ships are constructed in areas and extensive ship repairs als made in Jacksonville.

Government Accounts for 40% of Purchases Abroa

Government agencies spent $1 million abroad during the period July 1, 1940, through March 31, and received $3257 million exclu purchases and sales of gold, Fo Economic Administration reported cently. These government disburse have amounted to about 40 per cent private payments to about 60 per of total payments abroad since July,

Coal-Mining Machinery o Production Urgency List

Production of coal-mining mach has been placed on the National Pro tion Urgency List, War Production has announced. The action is to production of new machines, ha machines, mine locomotives, shuttle mine cars, duckbills, electric drills conveyors. Makers of these items assured of manpower assistance e to that given the producers of war materials.

War Construction Drops Munitions Output Rises

Government-financed war construc which reached its peak of $12,727 in 1942, has shown a steady and decline in the following years de the continuous rises in overall govern expenditures during the war years analysis by the War Production B shows.

The construction figure, which in industrial construction with ma and equipment, nonindustrial (ma war housing and community fa and service construction, declined $8457 million in 1943 and to only $ million in 1944, representing a de more than 65 per cent in the latter compared with 1943.

In contrast to this, production of materials has shown a steady rise. duction of munitions (including ex nition, guns, fire control, aircraft, combat and motor vehicles, comm cations and electronic equipment) rose military clothing and equipage) rose $8399 million in 1941 to $31,229 mi in 1942, $55,185 million in 1943 $59,926 million in 1944.

Some comparisons in the breakdown these figures between the years 19

...s war construction hit its peak, and ...4 when war production reached a ...ng, reveals how completely their ...ar value curves reversed each other, ...s said. Industrial construction (in...ing machinery and equipment) in ...2 totaled $6,414 million and in 1944 ...tapered off to $1,723 million. Non...ustrial (military) construction totaled ...00 million in 1942 and in 1944 was ...to $720 million.

...o contrast to these figures, produc...of aircraft rose sharply from $6,095 ...n in 1942 to $16,046 million in ... The production of ships, which ...$7,322 in 1942, had nearly doubled ...44; that of ammunition, $2,998 in ... had more than doubled by 1944 ...almost the same ratio held good ...er categories.

...pointments-Resignations

...rge F. Buskie has been appointed ... executive director, Office of Sur... Property, Reconstruction Finance ... Francis J. O'Hara Jr. has been ...ed executive director, Office of De... Plants, RFC. These offices recent...ere vacated by Hans A. Klagsbrunn ...signed to become deputy director, ...e of War Mobilization and Recon...n.

° ° °

...M. Joffe has been appointed di... Division of Administrative Man...ent, National War Labor Board, to ...d William R. Little who has re...d to accept a position with the Sur...roperty Board, Office of War Mo...ion and Reconversion. Mrs. Ruth ...son has been appointed assistant ...r of the division.

° ° °

...an E. Karns has been appointed ..., Radio and Radar Division, War ...ion Board, succeeding Louis J. ... who has returned to private ...try. Mr. Karns was previously as... director of the division.

° ° °

...ey M. Crim has been appointed ...g director, Service Equipment Di... Equipment Bureau, War Pro... Board. Orval A. Slater, former ...n director, is returning to private ...try.

° ° °

...illiam E. Walker, special assistant to ... Krug, chairman, War Production ... has been appointed the agency's ... officer in veterans' affairs with ... government agencies. He will be ...ted by Dwight L. Hoopingarner, ...ant to Harold Boeschenstein, opera... vice chairman, in contacts with WPB ...try decisions on the subject of ...ans' affairs.

° ° °

...o S. Beyer has been named labor ...ions adviser to the United States ...time Commission and the War Ship... Administration.

...ust 13, 1945

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

CHROMIUM: Orders M-18-a and M-18-a-1, which controlled production and distribution of high-carbon ferrochrome, have been revoked. Controls over low-carbon ferrochrome and chrome metal have been transferred to order M-21. (M-18-a, M-18-a-1)

IRIDIUM: Order M-49, which controlled distribution and end uses of iridium metal, has been revoked. (M-49)

CMP ORDERS

SHEET AND STRIP STEEL: In the case of allocation of steel for conversion into carbon and electrical sheet and strip, allocations may be made, where necessary, to cover the total order book pattern of the producer, including orders with the symbol Z-3 and unrated orders. Direction 71 to CMP regulation No. 1 originally provided that allocations of conversion material would be made only to meet the requirements of authorized controlled material orders carrying a symbol other than Z-3. (CMP-1)

EXPERIMENTAL MODELS: Provisions of CMP regulation No. 1 that permit a controlled material producer to accept "V-9" orders for steel or aluminum for the manufacture of experimental models of products have been expanded to include Z-3 (deferred) orders. A controlled material producer may accept any amount of "V-9" orders for one ton of steel or less or any quantity of aluminum placed under order P-43 (laboratories), Z-3 orders and unrated orders without regard to productive capacity limitations of CMP regulation 1. Z-3 is the allotment symbol that may be used by persons qualifying to operate under PR-27, governing priorities assistance to small manufacturers; V-9 is symbol used for orders for materials to make experimental models. (CMP-1)

M ORDERS

IRON AND STEEL: Production and distribution of chrome metal and low-carbon ferrochrome are now controlled by order M-21. Direction 7 to the order defines chromium to include low-carbon ferrochrome of the two maximum-carbon grades of 0.06 per cent and 0.1 per cent. (M-21)

LEAD CHEMICALS: All restrictions on use of lead chemicals for rubber compounding and gasoline refining have been removed. Third quarter quotas have been increased from 30 to 40 per cent on red lead for paints and from 8 to 12.5 per cent for white lead for paints. Since manufacturers are allowed to use during that quarter the indicated percentage of base-period (first half of 1944) consumption, actual quotas per quarter are about double the amount indicated in the order; thus, the red lead quota is about 80 per cent per quarter and the white lead quota, 25 per cent per quarter. Amount of pig lead permitted for use in production of white lead has been increased from 15 to 20 per cent. Quotas of 25 per cent for the third quarter have been assigned for production of decorative ceramics and decorative leaded glassware. Use of lead for these purposes was previously prohibited. (M-384)

PRIORITIES REGULATIONS

RAILROAD BRAKE SHOES: A producer of railroad brake shoes on orders rated AA-1 may distribute his available supply among his customers regardless of the sequence in which the rated orders were received, so as to obtain a fair and equitable distribution. All orders rated AA-1, however, must be accorded preference over lower rated and unrated orders. (PR-1)

PRICE REGULATIONS

INDUSTRIAL SERVICES: Industrial services supplied under war contracts or subcontracts in connection with fabrication of aircraft, ammunition and other military items have been exempted again from price control. These services were inadvertently placed under coverage of regulation No. 581 when that regulation was issued last March.

Administration of price control for sales of tools, dies, jigs, etc. by manufacturers of special tooling equipment has been transferred to regulation No. 581 from No. 136. The language of order No. 581 has been changed to clearly state that the regulation's provisions are applicable to the repair and maintenance of products as well as their fabrication. (Nos. 136, 581)

Screw Machine Industry Lacks Adequate Supplies

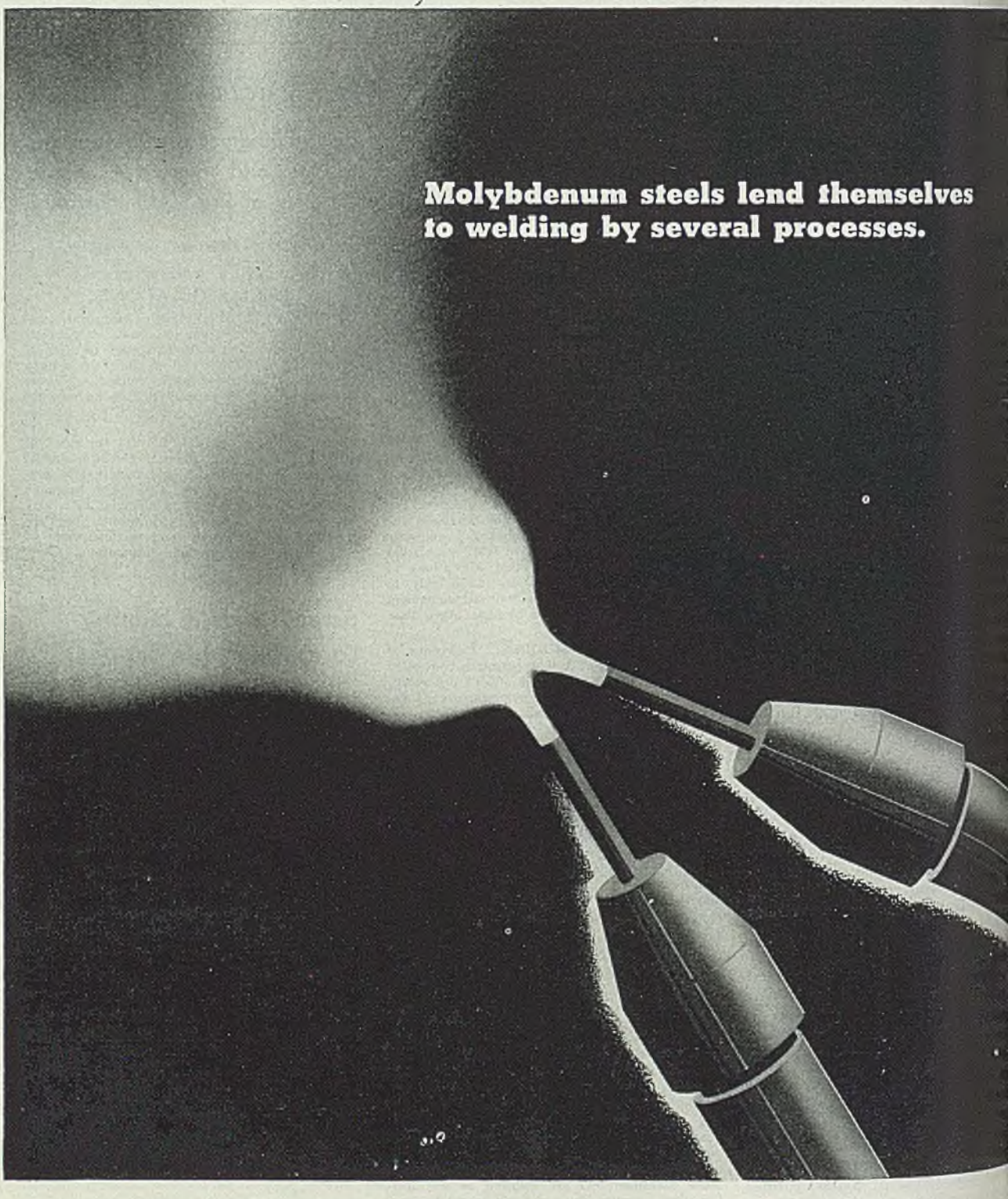
Chief problem confronting the screw machine industry is its inability to set delivery dates on orders to fill requirements for items that do not have definite allotments of materials, War Production Board reported recently.

The industry's production is almost entirely for military items and for civilian programs that carry firm allotments of materials and components. The automobile industry, normally the largest user of screw machine products, wants to place orders to meet its requirements for its civilian program but the latter carries no priorities assistance or allotments for materials. The present supply situation for materials needed in making screw machine products makes it difficult to establish definite delivery dates.

Production cannot be expanded beyond present levels because of lack of materials and skilled workers. The industry is running at about 70 to 75 per cent of capacity.

Industrial Diamonds and Powder Reserves Dwindle

World stockpiles of diamond powder (crushed bort) will be virtually exhausted by 1947 as consumption is running about 35 per cent in excess of the current available supply, War Production Board announced recently. Production of crushed bort increased 50 per cent in 1944 over 1943, but demand still continues far in excess of supply. Industrial diamonds for drills are in a somewhat similar position with demand exceeding supply. Beginning in 1946, stockpiles of industrial diamonds will be exhausted and world consumption will be limited to current production.



CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANN
FERROMOLYBDENUM • "CALCIUM MOLYBD

Climax Molybdenum Compan

MOLY

500 Fifth Avenue · New York City

J. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Office of Price Administration may deny automakers' appeals for higher prices on 1946 models. English interest in American cars keen. Ford produced 359 passenger cars during July. Fisher Body to reconvert St. Louis assembly plant

DETROIT

EPORTS were current here last week be effect the OPA shortly will deny als from passenger car manufactur- for higher prices on 1946 models, will require the maintaining of 1942 s except on a few models which not participate in increases of 1942 es over those of 1941. Manufactur- had asked for "substantially" higher s, taken to mean anywhere from per cent over the 1942 level. There no confirmation of the reported OPA ion, but obviously it drew plenty of ent.

oking at the matter from the view- of manufacturers, they are un- edly entitled to higher selling s. Labor rates are higher, labor uctivity is lower, material costs are higher or tending higher. How- there is a larger view, that of the nal economy, which suggests the ered reaffirmation of 1942 prices ld be a good thing.

might serve to put the brakes on flation which is tending to get out rol, not so much an inflation of levels themselves but the attendant oration of quality and service h in the end means the same thing. where the dangerous rise must Possibly if automobile prices held e 1942 level, a contagious spirit develop among other suppliers of goods and services, and they follow suit. It would obviously appreciable operating losses for ilders, but they would have these y under the limited volume of ction possible for the next few . In any event, such losses could disastrous after six years of profit- operations. After all, the auto in- lost money in 1932 and 1933, was not wiped out. The contribu- to a more stable economy would salutary.

Might Improve Labor Relations

ther, it might vitiate the insistent ands of union labor for more wage eases which would gain popular gation in the face of, say, 25 per higher prices on automobiles. The knows from sad experience of its that you cannot pay out more ey if it is not coming into the till, so ices are to be reaffirmed, then wage s, too, would be reaffirmed and more eful labor relations might ensue.

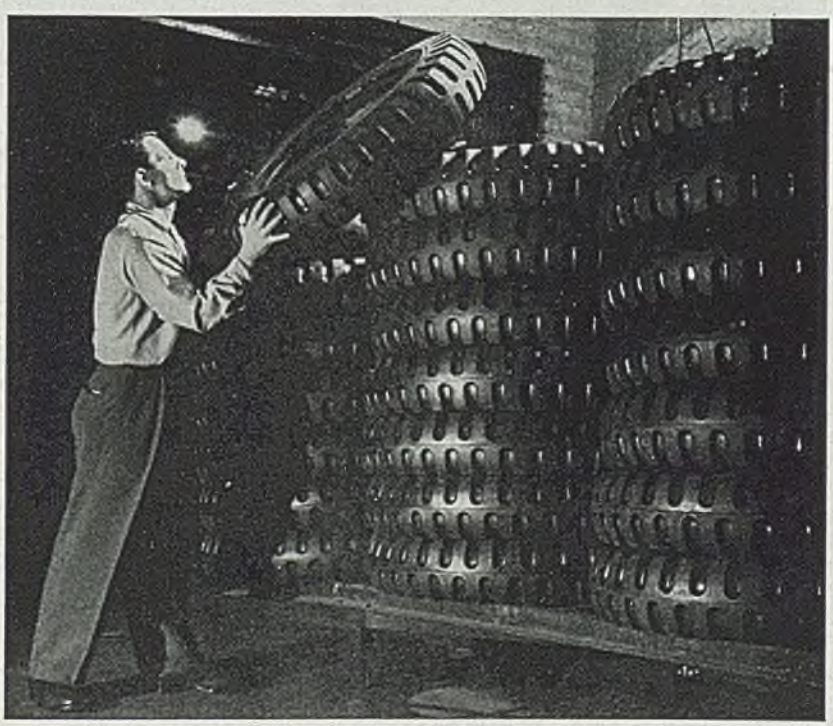
t returned from a visit to England, h J. Ferry, vice president and secre- treasurer of Packard, says English est in American cars is keen, and s for production of British cars are well advanced. A new Austin model is already on display and delivery in the U. S. by October indicated. Packard facilities there, erected in 1929, were partially demolished in the blitz of 1940, and after rebuilding were completely wiped out in March of this year by a direct hit from a V-2 bomb. The shops were being used for war production work and also for storage of Packard Rolls-Royce engine parts used by British torpedo boats. Rebuilding will be started this month.

Ford assembled 359 passenger cars in July, along with 5889 trucks. Schedules call for 4000 passenger cars this month, and over 11,000 trucks, while the September planning calls for a boost to 7000 passenger cars, as outside assembly plants come into production. Edgewater, N. J., plant will start Aug. 13, Louisville, Aug. 16, Dallas, Aug. 20 and Buffalo, Sept. 1. The plan to ship a consignment of new Fords to the West Coast by air did not materialize because the loading door on the airliner was a few inches too narrow to accommodate the vehicles. Instead a shipment of ten Willys Jeeps was made.

Fisher Body will resume operation of its St. Louis assembly plant as soon as it can be converted, assembling bodies for Chevrolet. Bernard H. Sweeney has been reappointed resident manager. Meanwhile, Fisher Body has received contracts to produce more than 80,000 universal jettison fuel tanks for Army and Navy aircraft. The tanks and kits for them will be fabricated at the division's Detroit Stamping and Fleetwood units, first shipments starting in August.

More than 3600 Army trucks used for training American troops have been renovated for battle service in the past six months at the Chrysler-operated Evansville, Ind., ordnance plant. The plant will continue to produce grouser assemblies for tank treads until November when enough units will have been produced to outfit 4000 tanks; and also will continue on contract for incendiary bombs.

Ford-Ferguson tractors are now being assembled at the Ford Highland Park plant, marking the transfer of offices and plant of Harry Ferguson Inc., coproducer, from the Ford Rouge plant where it has been located since 1939. Cost of moving necessary machinery is said to have amounted to $1,750,000, and output is now on virtually an unlimited basis, increasing daily. Last year 43,443 of these tractors were built by Ford. Ferguson officials have been quoted as saying they are aiming at production of 1,000,000 units a year, priced in the $500-$600 range. Exten-



SYNTHETIC TIRES: Military tires comprise the bulk of output at United States Rubber Co.'s Detroit tire plant, recently taken over by the Army after a strike had halted production

POWDERED METAL: Tipping the scale at 228.7 pounds, this piece of self-lubricating Oilite bronze bar stock made from powdered metals weighs about 85 pounds more than the largest piece previously made by Chrysler Corp.'s Amplex Division. The material will be machined into spherical bearings for dynometers on high torque aircraft engine test applications

sive export market, especially in South America, is envisioned.

Total production of trucks and truck-tractors for the first half of 1945 was 410,094, according to the WPB. The figure compares with 398,951 for the second half of 1944 and includes both military and civilian output, the latter amounting to about 78 per cent. In the same period of this year, 97,816 motor truck trailers were built.

Latest word from the Kaiser-Frazer Corp. is that a third new model has been added to the company's forthcoming line of passenger cars. It is to be called the Stout, in honor of its designer, W. B. Stout, now working with KFC on loan. Reportedly a rear-engine medium-priced model, it is hoped to get production started late next spring, after the Kaiser and Frazer are underway.

Reports received here from Washington last week were to the effect the War Production Board in the near future will approve plans of the automotive industry to construct $150 million in new plants and additions. Requests for construction authority have come in a steady stream to WPB since a meeting of the industry advisory committee early in July. It is estimated that proposed additional facilities might increase the productive capacity of the industry up to 6 million cars a year.

All employees of the Monroe Auto Equipment Co., Monroe, Mich., who have been discharged from service are back with the firm. Twenty-one former employees, some with serious disabilities, have jobs equal to or better than those they left.

In addition, 26 other war veterans who worked elsewhere before putting on their uniforms are also helping to turn out shock absorbers for tanks and trucks, tank se and other equipment for the armed forc

The company has announced a pol of guaranteeing jobs to former employ any time within six months of their d charge from the service—double t period required by law.

Increased production is reflected in greater earnings of the White Motor C Cleveland, for the first half of 1945. C solidated balance sheet for this pe shows a net profit of $1,301,040 a provision of $4,100,000 for income excess profits taxes. This compares w a net profit of $866,519 in the first months of 1944 when provision for f eral taxes was $2,605,000.

Earnings this year amount to $2.0 share as against $1.38 a share for same period of 1944. Total sales for first six months of 1945 were $61,766, compared to net sales of $54,027,68 the first half of 1944.

At the recent meeting in Washing of the Surplus Property Board automo staff with the Motor Truck Manufactu Industry Advisory Committee, the c mittee was informed that a substan supply of parts for combat vehicles w be available from future surplus dec ations.

Members of the commitee said m parts had been made and delivere the government in quantities sufficien serve the life of these combat vehic Several millions of dollars worth of p have already been declared surplus will be offered on a "spot sale" basi qualified service garage dealers, distr tors, jobbers and manufacturers in a se of sales throughout the country.

Seventy-four per cent of truck prod tion in the first half of 1945 was grammed for domestic use, accordin the War Production Board. Percent of actual production so programmed categories are given by WPB as fol

	Actual production first half 1945	Dome prod percen
Light	17,658	8
Medium	68,655	7
Light-heavy	21,056	5
Heavy-heavy highway	3,400	9
Off highway	550	7
Total	111,319	7

Reconversion aid in the procureme materials valued at approximately million has been granted passenger tomobile producers by the War duction Board.

Actual rated figures as of Aug. 3

Construction	$54,827,7
Equipment	$54,067,1
Machine tools	$41,461,6

Under the WPB reconversion prog priority ratings of AA-3 are granted obtaining tools and equipment for conversion purposes. Similar assistanc given, under Direction 5 of L-41, for c struction.

DESIGNING FOR DIE CASTING

PLAIN FLAT SURFACES

In designing die castings, plain flat surfaces of any considerable area should be avoided, especially if the casting is to be exposed to view. Here's why:

1. *It is difficult to hold true flatness, and efforts to subsequently true the surface may be unsuccessful.*
2. *Slight irregularities in flat areas are apt to show up prominently, particularly if the surface is polished, plated, or receives a glossy finish.*
3. *Some waviness may occur in flat surfaces, due to unequal shrinkage stress.*

For these reasons, a curved or slightly crowned surface is more desirable. Another alternative is to "break up" the surface by shallow steps, beads, stippling or some form of low relief.

The illustrated zinc alloy die cast base for a microphone is a good example of avoiding plain flat surfaces. In this instance, the die casting is given a glossy enamel finish and, because of the curved surfaces, there are no irregularities to mar the eye-catching highlights. The result is a smart and pleasing appearance.

For more detailed information on this and many other design considerations which will enable you to get the most for your die casting dollar, ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting."

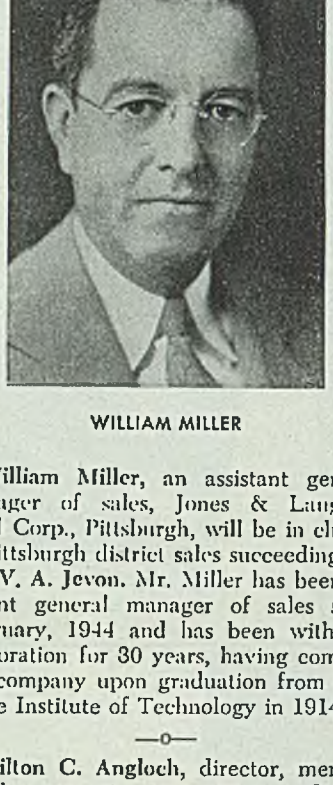
ZINC
FOR DIE CASTING ALLOYS

The New Jersey Zinc Company, 160 Front St., New York 7, N. Y.

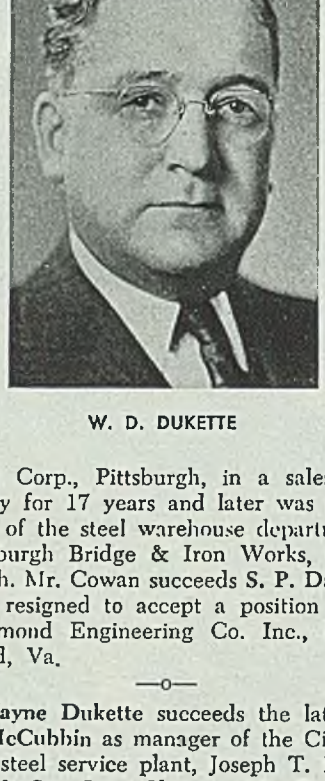
Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

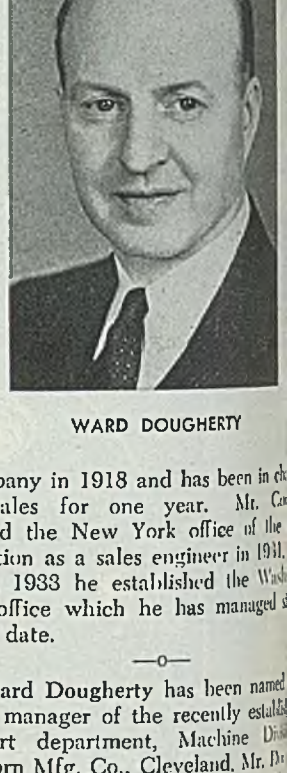
MEN of INDUSTRY



WILLIAM MILLER



W. D. DUKETTE



WARD DOUGHERTY

William Miller, an assistant general manager of sales, Jones & Laughlin Steel Corp., Pittsburgh, will be in charge of Pittsburgh district sales succeeding the late V. A. Jevon. Mr. Miller has been assistant general manager of sales since February, 1944 and has been with the corporation for 30 years, having come to the company upon graduation from Carnegie Institute of Technology in 1914.

—o—

Milton C. Angloch, director, member of the executive committee and vice president in charge of raw materials, Jones & Laughlin Steel Corp., Pittsburgh, has resigned, effective Sept. 30 after 45 years' service with Jones & Laughlin interests. **Carl C. Henning**, who has been general metallurgist of the corporation, has been appointed manager of raw materials, effective Aug. 1. **David T. Rogers**, who has been assistant metallurgist at the Otis works of the corporation, has been appointed general metallurgist succeeding Mr. Henning. **Frederick H. Lewis** has been appointed manager of orders succeeding **F. E. Jamieson**, retired.

—o—

J. W. Hacker has been appointed executive assistant, operating department, National Tube Co., Pittsburgh. Mr. Hacker, who has been general superintendent of the Christy Park Works, McKeesport, Pa., will be succeeded by **L. V. Johnson**, assistant general superintendent of that plant.

—o—

Lloyd R. Clowes, Pittsburgh district sales manager, Firth-Sterling Steel Co., McKeesport, Pa., has been appointed assistant general sales manager.

—o—

Robert C. Cowan has been appointed district manager of sales in Philadelphia for Columbia Steel & Shafting Co., Pittsburgh. Mr. Cowan has been Philadelphia manager for the past four years for Edgar T. Ward's Sons Co. and Summerill Tubing Co., both affiliated with Columbia Steel & Shafting Co. He previously was affiliated with Jones & Laughlin Steel Corp., Pittsburgh, in a sales capacity for 17 years and later was manager of the steel warehouse department, Pittsburgh Bridge & Iron Works, Pittsburgh. Mr. Cowan succeeds **S. P. Davies**, who resigned to accept a position with Richmond Engineering Co. Inc., Richmond, Va.

—o—

Wayne Dukette succeeds the late **D. L. McCubbin** as manager of the Cincinnati steel service plant, Joseph T. Ryerson & Son Inc., Chicago. Mr. Dukette has been associated with the Ryerson company for 31 years and for the past two years has been manager of the railroad sales department.

—o—

H. B. Kraut has resigned as president and general manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and has been appointed chairman of the board, a newly created position. **Ralph J. Kraut**, recently released from active duty with the United States Army where he served as a lieutenant colonel, has been appointed president and general manager succeeding his father.

—o—

Ralph K. Carson has been appointed sales engineer, Detroit branch, Heppenstall Co., Pittsburgh. For several years Mr. Carson has been a member of the engineering department, Kelsey-Hayes Wheel Co., Detroit. He succeeds **James C. Patton Jr.** who recently became district sales representative for the company in Chicago.

—o—

Harry J. Billica has been appointed Pacific district manager, Copperweld Steel Co., Glassport, Pa. Mr. Billica will make his headquarters in San Francisco.

—o—

Stanley E. Johnson, general sales manager, Cooper-Bessemer Corp., Mt. Vernon, O., has been elected a vice president and member of the board of directors, and **Charles G. Cooper**, manager of the company's Washington office has been elected a member of the board. Mr. Johnson became connected with the company in 1918 and has been in ch of sales for one year. Mr. Co joined the New York office of the poration as a sales engineer in 193 July, 1933 he established the Was ton office which he has managed s that date.

—o—

Ward Dougherty has been named port manager of the recently establis export department, Machine Divi Osborn Mfg. Co., Cleveland. Mr. Do erty, who has served 25 years with company, formerly was manager of Machine Division contract department

—o—

Clifford S. Stephens has joined Co Iron Works Co., Minneapolis, as s manager. Since 1940 Mr. Stephens been a consulting engineer in Wash ton.

—o—

Menno Felber has been named wo manager at Milwaukee, Internati Harvester Co., Chicago. Mr. Felber ceeds **R. E. Bloye** who has been pointed assistant manager of manu turing, Industrial Power Division, which the Milwaukee works is a p Mr. Bloye will be located at the co pany's general offices in Chicago. J **Obernesser** has been appointed gen superintendent of the Milwaukee wo succeeding Mr. Felber, and William **Brice** has been named assistant gen superintendent.

—o—

W. D. Turnbull has been named ge al sales manager, Kennametal Inc., trobe, Pa. Mr. Turnbull has served Westinghouse Electric Corp., Pittsbu and for four years was vice president charge of sales, Pomona Pump Co., P mona, Calif.

—o—

B. Vere Nutt, former executive v president, Moline Iron Works, Moli Ill., has been elected chairman of board, succeeding his father, L. E. Nu The new chairman has been associa with the company for 24 years and been in charge of production for

OSCAR C. SCHMITT

HARVEY A. MYLANDER

ast ten years. Other officers elected in- ude: Merle C. Nutt, president; L. E. st, vice president; William J. Dowsett, asurer; Wallace A. Hall, secretary; and in M. Vehmier, assistant secretary.

—o—

Frank E. Farrell, former district mana- for Howell Electric Motors Co., well, Mich., has been named assistant the director of automotive sales, dix Products Division, Bendix Avia- Corp., and will make his head- rters at South Bend, Ind. Roy C. s and L. F. Freiburg, who have been ng temporarily with the company's th Division in Detroit, will resume ction of Stromberg automotive car- tor sales. Mr. Allan, sales manager, make his headquarters in Detroit, Mr. Freiburg, assistant sales mana- will have his headquarters at the o, Mich. plant.

—o—

rvey Picker, recently returned to in- e status by the Navy following se as a lieutenant, has been elected dent, Picker X-Ray Corp., New Mr. Picker was executive vice dent of the company until May, when he went on active duty with Navy. His father, James Picker, ded the company and is chairman e board.

—o—

Edward Pendray, for the past nine assistant to George H. Bucher, dent, Westinghouse Electric Corp., burgh, and in charge of public re- and education, recently opened wn office as counselor in manage- public relations and education. inghouse retains Mr. Pendray's ser- as advisor in that field.

—o—

F. Baldwin has been appointed sident in charge of sales and a of the Milton Mfg. Co., Milton, ceeding O. H. Reinhart, retired. Baldwin served previously with the rican Locomotive Co., New York.

—o—

d W. Sherman, formerly of the ssed Tank Division, Pressed Steel Co., Pittsburgh, has been appointed ager of purchases, Domestic Indus- Inc. Service Caster & Truck Di- , Albion, Mich.

—o—

ald Hoelzel has been appointed prod- ed sales engineer, Hupp Motor Car n, Cleveland and Detroit. Mr. zel formerly was connected with the ago Motor Car Co., in manufactur- sales activities and as an industrial neer.

—o—

C. Salzman, vice president, Robins eyors Inc., Passaic, N. J., is now in e of all export operations for that pany. J. F. Meissner, vice president, rly of the Chicago office, now has ge of engineering sales and field en- rs concerned with designing and dling materials handling proj- and plants. Equipment sales sec- tion is under A. E. Conover, formerly manager, Vibrating Machinery Division. He will also direct those of the field engineering staff who sell equipment where little engineering is involved. T. Webster Matchett, secretary, will direct sales research and training; advertising and sales promotion remain under E. M. Perrin.

—o—

Oscar C. Schmitt has been elected president, Emerson Electric Mfg. Co., St. Louis. He succeeds W. Stuart Symington, who is now serving as chairman of the Surplus Property Board, Washington. Starting in the advertising department in 1910, Mr. Schmitt has successively held posts in sales promotion, sales and executive management and in 1940 was elected executive vice president of the company.

—o—

H. E. Simi, bus engineer, has joined the staff of Kenworth Motor Truck Corp., Seattle, to take charge of bus engineering and production. Mr. Simi was chief engineer, Twin Coach Co., Kent, O., for 16 years and for the past two years has been with the Timken-Detroit Axle Co., Detroit.

—o—

L. R. Burr has been promoted to chief engineer, Kold-Hold Mfg. Co., Lansing, Mich., succeeding H. W. Whitmore.

—o—

Robinson Ord has been appointed general manager of sales, Organic Division, Monsanto Chemical Co., St. Louis, succeeding the late Fred C. Renner. Arthur P. Kroeger has been appointed an assistant general manager of Organic Division sales, and Charles H. Sommer Jr., will assume responsibility for sales of intermediates as well as plasticizers and resins.

—o—

Ampco Metal Inc., Milwaukee, has announced the following changes in its sales personnel: S. C. Lawson, formerly central divisional manager has been appointed assistant general sales manager in charge of field operations; Phillip F. Erlandson has been appointed eastern zone manager with headquarters in Newark, N. J., his territory to include Hartford, Conn., Newark, Philadelphia, and Washington; William J. De Muth has been transferred from Buffalo to Newark, as district manager; W. T. Peterson has been named central zone manager in charge of offices at Detroit, Cleveland, Pittsburgh and Buffalo, and he will have his offices in Detroit; Emil Svoboda is district manager of the Cleveland and Pittsburgh offices with headquarters in Cleveland; John C. Kemp, formerly of the engineering department, Milwaukee, has been named field engineer at Cleveland; Baxter Schroeder becomes field engineer at Buffalo, transferring from Cincinnati; midwestern zone manager is W. B. McKenzie whose headquarters are in Chicago, and who will be in charge of Ampco offices in Chicago, Indianapolis, St. Louis and Cincinnati; Jack Bybee becomes district manager, Milwaukee, and J. W. Nebel is district field engineer.

—o—

Harvey A. Mylander has been appointed Pacific Coast manager, American Hoist & Derrick Co., St. Paul. Mr. Mylander replaces John E. Carroll who has resigned to become manager, Construction Machinery Division, Harron, Rickard & McCone Co. of Southern California. Mr. Mylander will maintain his headquarters in San Francisco.

—o—

J. J. Anderson has been named assistant service manager, Electric Appliance Division, Mansfield, O., of the Westinghouse Electric Corp. H. B. Leidy has been appointed manager of the Middle Atlantic district, manufacturing and repair department. R. J. Miller, who had been acting manager of the department has been transferred to Emeryville, Calif., as assistant manager for the Pacific Coast district, and H. E. MacArthur has been made manager of the Huntington, W. Va., branch.

—o—

John L. Cummings, vice president and general sales manager, Laclede-Christy Clay Products Co., St. Louis, has been

JOHN C. SYKORA

Who is vice president and director of sales, Portable Products Corp., Pittsburgh, as noted in STEEL, Aug. 6 issue, p. 102.

ROBERT H. GARDNER

Who has been named general manager of sales, A. M. Byers Co., Pittsburgh, as noted in STEEL, Aug. 6 issue, p. 102.

J. M. SCHLENDORF

Who has been elected vice president in c of sales, Republic Steel Corp., Clevelan noted in STEEL, Aug. 6 issue, p. 102

named vice president and director of sales; **Julius A. Kayser** has been named vice president and general sales manager. **Harvey R. Hiller**, formerly district manager of the Chicago territory, has been named an assistant vice president and his territory has been enlarged to include Wisconsin, Michigan, northern Illinois, and Indiana. **John W. Rogers** has been named an assistant vice president and he will continue as sales manager of the company's Glass Refractories Division.

—o—

Stewart M. Lowry has become affiliated with the Methods Engineering Council, Pittsburgh, as vice president.

—o—

Edward Van der Pyl has been appointed superintendent of the Norbide plant, Norton Co., Worcester, Mass. He has been with the company for the past 30 years.

—o—

Dr. Lauchlin M. Currie, Cleveland, recently was elected vice president in charge of research, National Carbon Co. Inc., a unit of Union Carbide & Carbon Corp., New York. Dr. Currie has been acting director of research since 1942, except for 15 months during which he was associate director, Division of War Research, Columbia University, New York. **H. M. Warren**, New York, was elected vice president in charge of advertising and sales promotion.

—o—

Henry F. Dever has been elected president, Brown Instrument Co., Philadelphia, subsidiary of Minneapolis-Honeywell Regulator Co., Minneapolis. Mr. Dever succeeds **Charles B. Sweatt** and also assumes responsibilities of **E. B. Evleth**, general manager. Mr. Sweatt continues as vice president and director of Minneapolis-Honeywell and supervises the sales activities of that company and its subsidiaries. **W. J. McGoldrick**, vice president in charge of aeronautical engineering, will direct the engineering activities of the parent company.

—o—

J. J. Kraus has been appointed sales vice president, Detroit Seamless Steel Tubes Co., Detroit. Mr. Kraus recently was released from active military service and prior to going into service had been connected with the Detroit o Sharon Steel Corp., Sharon, Pa.

—o—

Robert L. Klein has become affil with the Massachusetts Pressed Pow Metal Corp., Worcester, Mass., as velopment engineer.

—o—

Richard T. Nalle, for the past 20 y vice president in charge of opera Henry Disston & Sons Inc., Philadel has been elected executive vice p dent, Midvale Co., Philadelphia, effe Oct. 1. He also was elected a direct the company effective immediately. Nalle has resigned his post with Disston company but will contin serve as a director.

—o—

Charles R. Fleishman has been el president, A. J. Bayer Co., Los An succeeding the late Alfred J. Bay

—o—

Dan W. Moll, vice president, H McCanna Co., Chicago, recently wa pointed as the Magnesium Associa representative on the executive co tee, American Foundrymen's Associ

OBITUARIES . . .

George D. Hartley, consultant, Worcester, Mass., died recently in that city. Mr. Hartley served for many years as treasurer, general manager and sales manager of Sleeper & Hartley, Worcester, a company he helped organize. In 1938 he opened offices in Worcester as a consultant on engineering and management problems.

—o—

Robert L. Riggs, 70, manager at Glendale for the Mine & Mill Machinery Co., Los Angeles, died recently.

—o—

Edgar P. Reynolds, 73, formerly head of the Edgar P. Reynolds Iron Works, New York, died recently in New Rochelle, N. Y. The iron works company was dissolved in 1925.

—o—

J. Russell Garrison, 49, president and general manager, Garrison Machine Works Inc., Dayton, O., died recently at his home in that city.

—o—

George H. Hesselink, 64, former operator of the Wahl-Hesselink Plating Works, Rochester, N. Y., died recently.

—o—

William F. Costello, 57, vice president and director, New Britain Machine Co., New Britain, Conn., died recently.

—o—

John L. Crawford, 83, prominent in the iron and steel industry in the D when he was secretary of the Cha Iron & Steel Co., New Castle, Pa., Aug. 4 at Lenox, Mass.

—o—

Michael J. Sasgen, 72, president, G Specialties Co., and Sasgen Derrick Chicago, died recently.

—o—

Ernest N. van Billiard, 44, vice p dent and treasurer, Progressive Fou Works Inc., Rochester, N. Y., died cently.

—o—

Edward J. Morisse, 82, South Mil kee, Wis., died July 30 in that city. Morisse had been associated with foundry industry for 60 years.

ostwar Housing Needs Piling Up With Labor and Materials Scarce

California survey indicates state requirements will call for twice as many new homes in first five years after the war than in five-year period 1935-1940. Beginning of program depends on relaxation of wartime restrictions

OSTWAR housing needs of the Pa- Coast continue to pile up as labor materials remain scarce.

California it is estimated there be a demand for twice as many homes in the first five years after war as in the five-year period be- 1935 and 1940.

ent survey by the State Recon- & Re-employment Commission the potential number at a maxi- of 625,000 for the five years. Brok- own into classes, the requirement is like this:

eded to meet increased population California: 250,000 housing units. ed to replace temporary war hous- 75,000 units. Needed for 50 per replacement of substantial pre- dwellings: 180,000. Needed to ain 5 per cent vacancy reserve: 00.

the total of 625,000, it is indicated southern California's share is 300,- with 325,000 for southern California. e commission recommends broad local planning be undertaken for unity development. It urges that developers be encouraged to lay out subdivisions now so that building can be started as soon as conditions permit.

The commission believes that for the immediate future, traditional designs, materials and equipment probably will be used primarily.

A beginning on postwar home construction depends entirely on relaxation of war-scarce supplies and manpower.

How difficult it is to build under current conditions is being demonstrated on the Pacific Coast now. For example, federal housing agencies in southern California a couple of months ago issued several thousand permits to civilians granting the permit-holders priorities to obtain building materials.

However, up to the present time, only about 25 per cent of the priority holders have been able to obtain enough material to begin construction. Lumber continues the chief bottleneck.

The situation is complicated, moreover, by continued influx of people into California. There are more in-migrants coming to the state temporarily than there are laid-off war workers leaving. The result is increasing housing congestion in an already badly congested area.

Notwithstanding this new immigration and the consequent crowding of populated areas, real estate values on existing homes have tended to reach a plateau and in some cases show a decline in recent months.

This paradoxical situation is explainable like this: The temporary population is not in the market for new homes. Such people are looking for places to rent; and vacant rental property is nearly non-existent. On the other hand the people who are in the market to buy a house now are inclined to wait until they have a chance to build.

Coast Yards Awarded Navy Orders for Steel Barges

Substantial contracts for construction of steel barges of a reportedly new but undisclosed type have been awarded to Pacific Coast shipyards by the Navy.

Contracts have gone to California Shipbuilding Corp. at Los Angeles, the Kaiser yards at Richmond, Cal., Marinship Corp. and Moore Dry Dock, also in the San Francisco area, and to Kaiser yards in Oregon.

One major effect of the new awards will be in manpower. Most of the yards getting the new work were nearing or had completed their shipbuilding programs and had planned to lay off large numbers of workers within a month or so. How many men will be required for the additional work is not known, but indications are that a large proportion of those facing dismissal now will continue in their jobs for several months at least.

CO-OPERATION: Labor and management working together are credited with the tanker-building record of Marinship Corp. at Sausalito, Calif. Representatives of the co-operating firm are shown here at the launching of the Huntington Hills. Left to right: William E. Waste, vice president and general manager of Marinship; K. K. Bechtel, president of Marinship; Andrew Chioino, secretary-treasurer of Shipyard Workers Local 9 of San Francisco; William Buckley, secretary-treasurer of the International Brotherhood of Boilermakers; Ed Medley, president of Boilermakers Local 6 of San Francisco; Edward Rainbow, business agent of Boilermakers Local 6; John F. O'Connell, labor relations co-ordinator for Marinship; Charles J. MacGowan, president of the International Brotherhood of Boilermakers; Mario Grosetti, business manager of Local 9, and Stephen D. Bechtel, vice president of Marinship

WING TIPS

Aircraft production misses schedule in July, first month since October, 1942, that output fell below 4800 planes. Lag attributed to manpower troubles and production and rework difficulties

EXPRESSING concern over the alarming labor turnover in aircraft plants, J. A. Krug, chairman of the Aircraft Production Board, last week reported that in spite of a much reduced schedule, aircraft production for July missed the mark by 243 planes, with 4784 aircraft accepted as against a schedule calling for 5207 planes.

July, according to Mr. Krug, marked the first time since October, 1942, that aircraft production was less than 4800 planes per month, and it was the second consecutive month that production fell below schedule.

Much of the deficit of 243 planes last month was attributed by Mr. Krug to two companies producing fighters and twin-engine bombers for the Navy who were affected by manpower troubles, and production or rework difficulties.

In terms of airframe weight, excluding spares, 53.6 million pounds were produced in July compared to 65.3 million pounds in June, a reduction of 18 per cent. Similarly, the average work day rate of production for July was 184 planes, considerably less than the 223 plane average daily rate produced during June.

The one bright spot in the picture was the fact that all plants producing the long range B-29 bomber were on schedule, Mr. Krug said.

Broken down into primary classes, production in July was as follows:

	Acceptances	Schedule	Ahead or Behind Schedule Per Cent
Bombers	1542	1588	—2.9
Fighters and Naval Reconnaissance	2193	2413	—9.1
Transports	523	526	—0.6
Trainers	110	110	....
Communication and Special Purpose	416	390	+6.7

Mr. Krug pointed out that workers are quitting their jobs at such a rate as to seriously threaten production schedules in coming months.

"Because aircraft is such a vital fighting weapon, I personally urge all workers to stay on their jobs and keep the airplanes rolling off the production lines until the day of final victory," the board chairman said.

Curtiss-Wright Subsidiary Announces Expansion Plans

L. G. S. Spring Clutch Corp., wholly owned subsidiary of Curtiss-Wright Corp., recently announced an expansion program which includes the purchase of the 3-story Mars Hill plant, Indianapo... operated by the Allison Division, G... eral Motors Corp. W. W. Gleeson ... been elected president of the Spr... Clutch firm. He had been vice presi... and general manager.

All machinery facilities of the L. G... plant will be moved to the newly p... chased plant as soon as the building ... be released by Allison which oper... it as a school and service division. ... single-story building now operated ... L. G. S. Spring Clutch Corp. will ... turned back to the Truscon Field D... which it was leased.

Surplus Planes, Equipment Made Available to Schoo...

Army Air Forces made $32,897... worth of obsolete and surplus aircr... instruments, engines and complete ... planes available to schools throug... the country between Oct. 1, 1944, ... June, this year, according to the Sur... Division of the Air Technical Ser... Command, Wright Field, O.

Issuance of equipment for scho... has been transferred from the Office ... the Disposal Section, Supply Divi... ATSC, to the Educational Disposal ... tion 63 of the Reconstruction Fi... Corp., Washington.

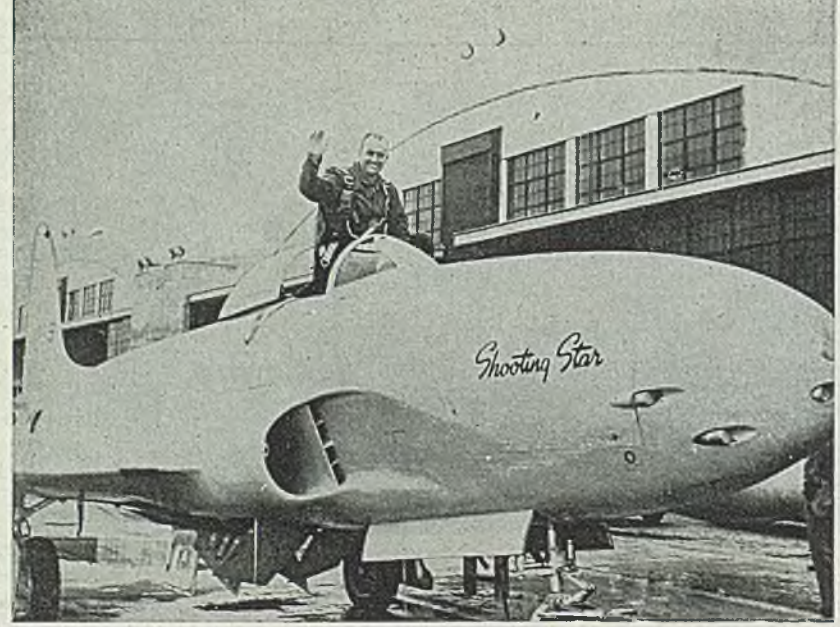
Many high schools and colleges ... the AAF-acquired equipment to sup... ment vocational training and aeron... cal engineering courses. Elemen... schools have utilized some of the ... terial for exhibition purposes in con... ion with geographical and world ... studies which attach new emphasis ... the role of aviation in the postwar w...

Helium Used To Inflate Plane Tires; Saves Weigh...

Helium instead of air is now be... used successfully to inflate large airp... tires. According to Goodyear Tire ... Rubber Co. technicians, use of hel... in airplane tires will reduce ma... plane weight, automatically increas... range and useful loads. Postwar, it ... do the same for commercial ships, a... ing passenger and freight revenues ... the major airlines.

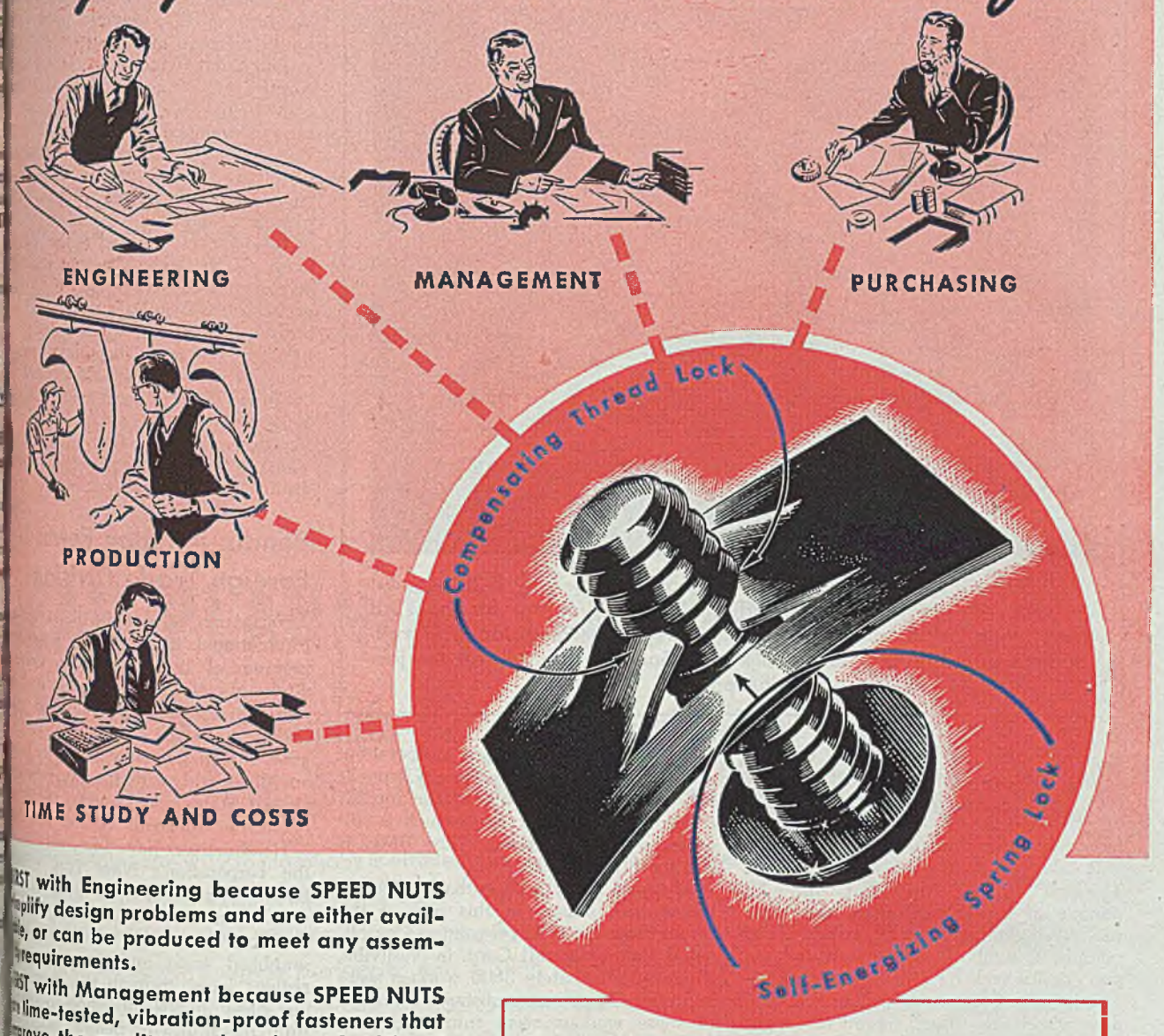
At Akron, O., airport, plane tires ... been filled with helium, using Good... solution 100 pump to extract the air ... inflate with helium. The evacuation ... all air on initial inflation had been ... of the difficulties incident to the use ... helium. Recent tests have proved th... the air in a large aircraft tire can ... evacuated in a matter of a few min... through use of the pump.

Chief objection to the use of heli... that of its rapid diffusion through rub... has been overcome partially by use ... butyl rubber tubes. Helium diffu... through natural rubber two and o... half times faster than air. By us... butyl rubber the rate of diffusion is ...



555 MILES, 62 MINUTES: Confirming claims that the jet-propelled P-80 Shooting Star was capable of speeds of 550 miles an hour, this plane traveled from Dayton, O., to New York in 62 minutes. The pilot, Col. William H. Council, shown above, said he didn't try to push the plane to its greatest speed. NEA photo

Why Speed Nuts are FIRST with all five



IRST with Engineering because SPEED NUTS mplify design problems and are either avail-le, or can be produced to meet any assem-requirements.

IRST with Management because SPEED NUTS e time-tested, vibration-proof fasteners that mprove the quality, and prolong the life of e finished product.

IRST with Purchasing because SPEED NUTS ower inventory costs, reduce stocking prob-ms, and are DELIVERED on time. Production nd service facilities are unlimited.

IRST with Production because SPEED NUTS minate extra handling of production parts, e applied faster and easier, and compensate r a wider range of commercial tolerances.

IRST with Time Study and Cost because PEED NUTS slash total net assembly costs to fraction of other assembly methods.

vestigation will prove that SPEED NUTS hould be YOUR first choice, too. Write for nformation today.

NOTHING LOCKS LIKE A SPEED NUT

TWO distinct forces are exerted on the screw, as a SPEED NUT is tightened.

First, a compensating thread lock, as the two arched prongs move inward to lock against the root of the screw thread. These free-acting prongs compensate for screw thread tolerance variations.

Second, a self-energizing spring lock, created by the compression of the arch in both the prongs and base. The combined forces of the thread lock and spring lock definitely prevent vibration loosening

INNERMAN PRODUCTS, INC. • 2039 Fulton Road, Cleveland 13, Ohio

Speed Nuts*

PATENTED

*Trade Mark Reg. U. S. Pat. Off.

ASTEST THING IN FASTENINGS . . . OVER 3000 SHAPES AND SIZES

YANKEE INGENUITY: The 4000-pound bombs carried by B-29s against the Japanese homeland posed difficult loading problems for the 73rd Bomb Wing at Saipan until ground crew men utilized Japanese railroad tracks and wheels salvaged from a Saipan sugar mill for the job. NEA photo

one-fourth as fast as helium through natural rubber. Net result of this is that the diffusion of helium through the butyl rubber tube is only 67 per cent as fast as air through natural rubber.

It takes 92 pounds of air to inflate a 110-inch airplane tire, but only 13 pounds of helium to inflate the same tire. Weight saved on each tire is 79 pounds, a total of 158 pounds for the two main wheels on each plane, plus the weight saved by using helium in the nose wheel tire. Each pound of weight saved in commercial transport operation is worth about $100 annually in added passenger and freight revenues.

Southeastern War Plants Need Skilled Workers

Skilled workers are needed by war plants in the southeastern states to meet production schedules for Army Air Forces aircraft and equipment. The end of the European war made little change in the manpower situation in the southeast because production there had been geared already toward the war against Japan.

The Warner Robins Air Technical Service Command, Robins Field, Ga., is responsible for the AAF procurement in the southeastern states.

Bell Aircraft in Marietta, Ga., B-29 producer, together with the Fisher-Memphis Aircraft Corp., Memphis, and McDonnell Aircraft Corp., Memphis, which are producing B-29 assemblies and parts, expect little slackening of production until V-J Day.

The Birmingham, Ala., Modification Center, the country's largest in operation, operated by Bechtol-McCone Corp., is still under high pressure in the modification of B-29s an activity which is still expected to be retained. The BMC is also modifying A-26s.

The only major AAF cutback affecting the aircraft idustry in this part of the country was the P-38 program at Consolidated Vultee Aircraft Corp. in Nashville, where approximately 3800 workers were laid off. However, a substantial number of these workers went into other war facilities, primarily aircraft, in the southeast and many others were absorbed in plants in the Nashville area.

The end of the war in Europe resulted only in cutbacks of approximately 8 per cent of the total number of AAF prime contracts in the southern states.

Use Exhaust Heat To Prevent Plane Icing

Aeronautical engineers seeking to combat the formation of ice on airplanes have harnessed heat to warm the surfaces of the Army's giant new cargo plane, the C-82 Packet.

Hot air, heated by the plane's engine exhausts, is distributed to all parts of the wings and to the tail assembly through non-metallic ducts. Traveling at high velocity, it is dissipated to the outer surfaces, raising the outside temperature to 130 degrees.

The exhaust heat is piped directly from the plane's two 2100-horsepower engines into four cross-flow heat exchangers, two mounted in each engine nacelle. Air is brought in from the o side, heated in the exchangers to a t perature of 350 degrees, then car under pressure to all parts of the pla

The ducts which carry the heat constructed of fire-resistant glass fab combined with synthetic rubber and ins. Developed and produced by United States Rubber Co., they are s plied in a wide variety of sizes shapes to follow the contour of plane's interior.

The Packet, built by the Fairc Corp., is the Army's newest cargo s It carries a maximum load of nine t cruises at 200 miles an hour and h maximum range of 4000 miles. W used as a transport for airborne infan men, it can carry 42 soldiers f equipped. It has 93 per cent of the c capacity of a box car and is desig for transporting armored tanks, tr and similar heavy equipment over l distances in the Pacific theatre.

Bendix Aviation Forms Ne Foreign Trade Division

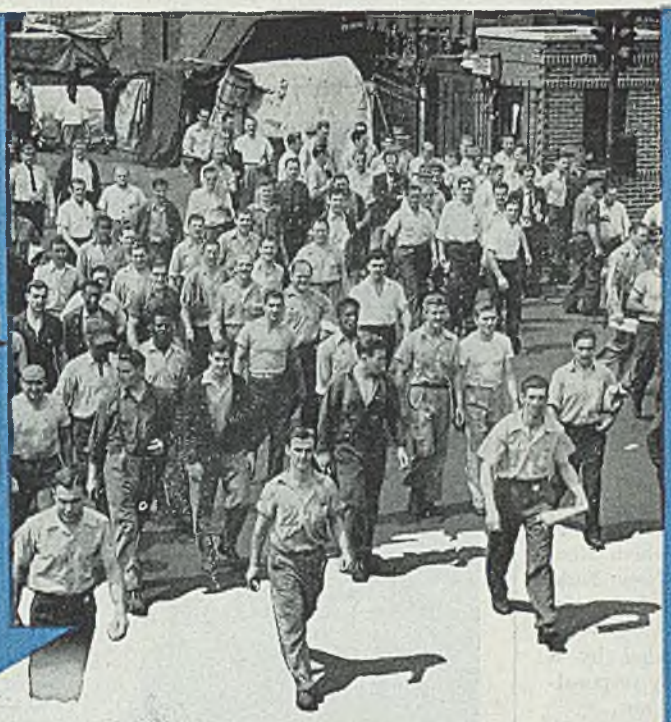
Formation of a new division, Ben International, to handle the foreign tr program of Bendix Aviation Corp. disclosed last week by Ernest R. Bre president. Bendix International wi under direction of Charles T. Za general manager. It will handle throu out the world, with the exception of United States and Canada, the produ of the 17 divisions of the corporat

Headquarters have been establishe the corporation's New York office, Rockefeller Plaza.

"During these war years," said Breech, "the people of many large g graphical areas and densely popula regions have, through the operation our Army and Navy, come to appre fully the utility of planes, trucks, je and ships and of the many Bendix pr ucts with which they are equipp

The broad policies which have be established for Bendix International w explained by Mr. Zaoral, who emph sized that the company's activities wo be developed abroad through three ma channels, as determined by the situati in the various foreign countries. They be, he said, export sale of products ma the company manufactures here; ma facture by Bendix of its products abro and licensing of foreign manufacture to manufacture Bendix products abro

Other appointments to the new di sion, in addition to Mr. Zaoral, incl F. A. Stanton, foreign patent counse who represented Bendix in Paris f many years and who will make his hea quarters in New York; L. B. Cou division comptroller, formerly of th central staff; Paul Moss, sales manage Harold McEnness, assistant sales ma ager. Fernando Jose Cardenas, former with Westinghouse, General Electr and Sylvania, is manager of Central a South American territories.



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- Atmosphere Control Box Hardening Furnaces
- Various Types of Air-Draw Batch Type Furnaces
- Gas Carburize Furnaces
- Box Carburize Furnaces
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- Nitriding Furnaces
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- Single Spindle Automatic Screw Machines
- Hand Screw Machines
- Centerless Grinders
- Single and Multiple Spindle Drilling Equipment
- Plain O.D. Grinders
- Plain I.D. Grinders
- Milling Machines
- Broaching Machines
- Precision Thread Grinders
- Precision Boring Machines
- Lapping Machines
- Special High Production Equipment

UNIT ASSEMBLIES

For many years Ex-Cell-O has supplied large and small manufacturers with parts and has also supplied many parts in unit assemblies after machining, heat treating and grinding.

INSPECTION

Ex-Cell-O has always maintained that quality in a product is not the result of accident; that quality is built into a product by rigid adherence to accepted quality standards . . . standards that are upheld at Ex-Cell-O by efficient inspection at every step of the machining process.

Bethlehem Sets Up New Plan For Shipyards

Steel company groups all of its shipbuilding and repair yards into districts headed by general managers

A NEW basic management organization under which shipbuilding and ship repair yards of the Bethlehem Steel Co.'s Shipbuilding Division, New York, are grouped in four districts has been effected.

Each district will be headed by a general manager who will be responsible for local sales and operations.

Districts and their general managers are: New York district, consisting of the Staten Island, Hoboken, and two Brooklyn yards—A. Hiltebrant. Boston district, comprised of the Quincy, Hingham and Boston (Simpson and Atlantic) yards—W. H. Collins. Baltimore district, consisting of the Sparrows Point, Baltimore and Fairfield yards—J. M. Willis. Pacific Coast district, comprised of the San Francisco, Alameda, Bethlehem-Alameda and San Pedro yards—W. M. Laughton.

Superintendent to co-ordinate all ship repair sales is L. S. Sparrell, and superintendent of miscellaneous product sales, not handled by yards locally, is J. W. Hendry.

D. D. Strohmeier will continue as assistant to the vice president and other staff organizations will continue to function as at present. J. E. Burkhardt remains as technical manager, W. W. Watson as manager of contracts, and E. M. Burke as construction engineer.

Operations of the various yards will be directed by the following managers: Quincy yard, J. T. Wiseman; Hingham yard, S. Wakeman; Boston yards, T. S. Andrews; Staten Island yard, C. N. Boylan; Hoboken and Brooklyn 56th Street yards, George Brown; Brooklyn 27th Street yard, W. D. Crane; Sparrows Point yard, F. A. Hodge; Baltimore and Fairfield yards, W. C. Reynolds; San Francisco and Bethlehem-Alameda yards, T. C. Ingersoll; Alameda yard, F. S. McGuigan; and San Pedro yard, E. C. Rechtin.

Production of Motor Truck Trailers Increases

Production of motor truck trailers rose to 97,816 during the first six months of 1945 compared with 77,669 trailers produced in the second half of 1944, a gain of 20,147.

STUDIES GERMAN INSTRUMENTS: W. S. Jack, president, Jack & Heintz Inc., Cleveland, compares a German-made airplane directional compass, in foreground, with a more compact directional gyro indicator made by his own company. Mr. Jack collected some 4000 pounds of German-made flight instruments during a tour through Europe recently

BRIEFS . . . .

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

United Chromium Inc., New York, has opened district offices in Dayton, O., and Chicago. In addition to its laboratories and offices at Waterbury, Conn., the company is equipping a new plant at Carteret, N. J.

—o—

Westinghouse Electric Corp., Pittsburgh, is producing the new M 163 bomb nose fuses, used on all bombs carried by the B-29s in their systematic bombing of Japan.

—o—

Dow Chemical Co., Midland, Mich., has leased a portion of the Defense Plant Corp. plant at Ludington, Mich., to be used for producing lime and magnesium chloride liquor.

—o—

Rigid-Tex Corp., Buffalo, has announced appointment of direct mill representatives as follows: New England district, E. C. Akerly Co., Boston; New York district, Ferro Fabricating Associates, New York city; Philadelphia district, Stainless Steel Products, Philadelphia; Buffalo district, John J. Lambert, Buffalo.

—o—

Cleveland Pneumatic Tool Co., Cleveland, has announced formation of a Railway Division with eastern headquarters at 50 Church Street, New York, to be headed by John N. Thorp, formerly with the John N. Thorp Co., New York.

—o—

James I. Barnes Construction Co., Santa Monica, Calif., has begun work on a $1,381,000 addition to the machine shop at the Terminal Island dry dock, to be completed about Feb. 1.

—o—

Ampco Metal Inc., Milwaukee, has organized an export sales department headed by Fred H. Opitz.

—o—

Wheel Trueing Tool Co., Detroit, has acquired the Adamant Tool Co., Bloomfield, N. J. Personnel of the latter firm will remain unchanged but the name will be changed to the Adamant Tool Co., Eastern Division, Wheel Trueing Tool Co.

—o—

Piezo Mfg. Corp., New York, has become exclusive manufacturer of all remote control equipment formerly produced by Piezoelectric Corp., New York.

—o—

Caterpillar Tractor Co., Peoria, Ill., has announced creation of a new Production Division, to be headed by Wil-

...s Naumann. The reorganization will ...ce inventory control, factory burden, ...rk scheduling and related activities ...der one control.

—o—

National Steel Co., Chicago, is in...stigating the postwar possibilities of ...tablishing an additional warehouse for ...elling steel products in Michigan.

—o—

...Lear Inc., Piqua, O., has moved its ...ecutive offices and accounting depart...nts to Grand Rapids, Mich.

—o—

...Panhandle Producing & Refining Co. ...or York, is building a structural steel ...ocating plant in Lubbock, Tex.

—o—

...Bendix Aviation Corp.'s Radio Division, ...more, has appointed the following ...tributors: A. B. Gray Co., Ft. Wayne, ..., for northern Indiana and north...rn Ohio; and Van Deren Hardware ... Lexington, Ky., for eastern Ken...ky.

—o—

...Alloy Metal Co., Baltimore, has start...a sheet metal and welding shop ...e at 2128 Annapolis Road. George ...evogt and Dorothy Dinges are part...s in the enterprise.

...ant for Producing Studs ...Be Opened at Lorain, O.

...Nelson Specialty Welding Corp., whose ...west division headquarters are in ...ago, will open a plant at Lorain, O., ...concentrate production of flux-filled ... The plant will be located in a ...r grocery warehouse building, and ...ufacturing will start by Sept. 15. ...chinery for the Lorain plant will ... from Camden, N. J., where the Nel...company operated the Camden Stud ...ing Corp. The Nelson firm's tool ...ice and research and development ...rtments will remain at San Leandro, ...

...Employment will be provided at the ...rain plant for 400 to 500 people, 35 ...cent of them women, it is reported.

...ittsburgh Firm Constructs ...ge Wind Tunnels for Army

...The world's largest supersonic wind ...nels, for testing ordnance material in ... velocities exceeding the 750 mph ...ed of sound, have been built for the ...S. Army Ordnance Department at ...rdeen Proving Ground, Aberdeen, ..., by Pittsburgh-Des Moines Steel Co., ...sburgh.

...Supersonic speeds are necessary to ...asure the flight of projectiles, which ...an in ordinary artillery weapons often ...vel more than 1800 mph. The new ...nd tunnels now produce equivalent ... velocities up to 1300 mph, and ...uivalent velocities of more than 3000 ...ph will be obtained soon.

...Although the supersonic tunnels were developed primarily for war purposes, Aberdeen research experts believe they have great peacetime possiblities, such as developing superior airplanes, especially the jet propelled type.

First tests in the tunnels far more than repaid costs of the tunnels, it is said. A new bomb design, for which an urgent frontline call had been received, was found by a test in the tunnels to require changes. In less than a day the tunnels proved the bomb design would not be successful, and within two days, more tunnel tests revealed modifications of the initial design that would make it highly successful. Formerly, the only way to determine whether such a weapon would do its job was to tool a factory, make several bombs and try them in actual tests. Even then, field tests might not disclose all the shortcomings.

Mansfield, O., Firm Buys Plant in Expansion Program

Purchase of a plant in New Washington, O., has been made by Mansfield Brass Foundry Inc., Mansfield, O., as part of an expansion program. New name of the Mansfield firm is Mansfield Brass & Aluminum Corp.

The newly acquired plant, which has not been used for four years, will provide 15,000 additional square feet of floor space and will be devoted solely to production of aluminum castings. Production is expected to start Sept 1 and will employ approximately 30 people.

The Mansfield plant will concentrate on bronze and brass castings, plain and machined, although aluminum products still will be manufactured.

Westinghouse Electric Buys Boston Company

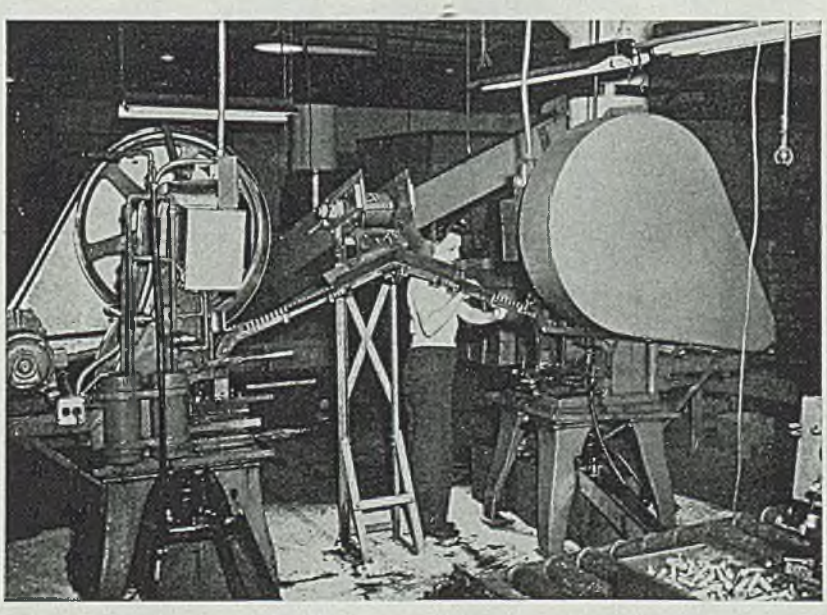
B. F. Sturtevant Co., maker of air handling equipment, acquired in preparing for postwar business

PREPARING to meet postwar expansion in the air conditioning and related fields, Westinghouse Electric Corp., Pittsburgh, has acquired the B. F. Sturtevant Co., Boston, pioneer in the design and manufacture of air handling and processing equipment.

The Sturtevant company becomes a wholly-owned Westinghouse subsidiary and will operate as B. F. Sturtevant Co., division of Westinghouse Electric Corp. Management of the Sturtevant company will be assumed by Westinghouse about Sept. 1.

The Sturtevant company's products cover a wide range in the fan and blower field, heating, cooling and air conditioning apparatus, including application and design of complete air handling and processing systems for industry.

Headquarters of the expanded Westinghouse air conditioning activities will be at Boston. However, heavy-duty and industrial refrigeration manufacture will continue at Jersey City, N. J., along with production of electronic air cleaners.

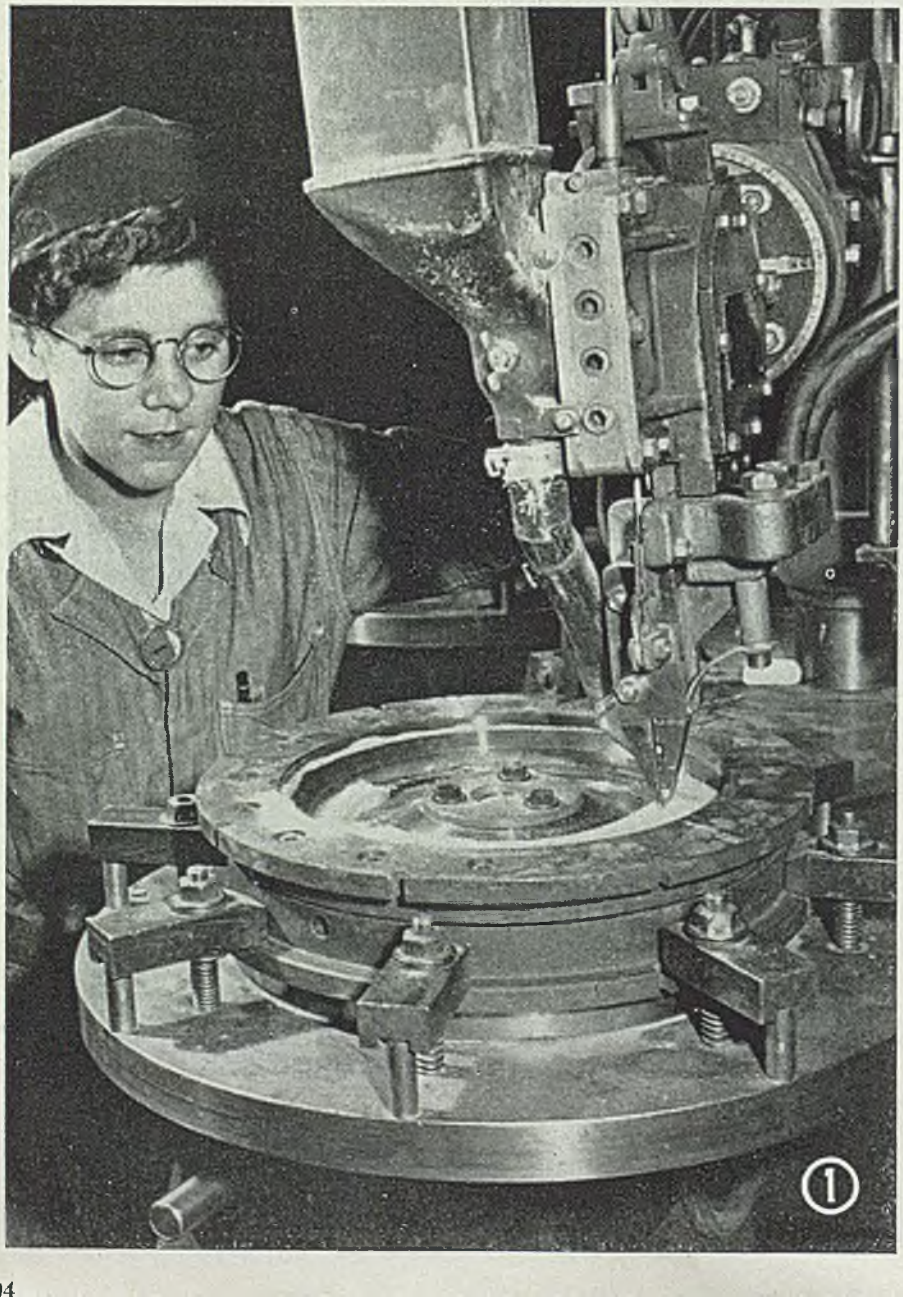


SPEEDS TRACER PRODUCTION: Two operators now do work which formerly required 18 as the result of this new broaching machine developed by Electric Auto-Lite Co.'s plant in Long Island City, N. Y. Machine has capacity of 4800 tracer bodies an hour

By G. W. BIRDSALL
Associate Editor, STEEL

Welding... Supercharger Turbine Wheels

Submerged arc welding, well known for its wide use in fabrication of welded steel ships, exhibits its versatility by meeting the extremely rigid specifications involved in joining cast Vitallium turbine buckets to a stainless steel disk to form the turbine wheel for aircraft turbosuperchargers



OXYGEN molecules in the air a farther apart at high altitudes than at s level where the weight of the air abo packs them close together. That, turn, means less oxygen is available p cubic inch of air fed into an aircra engine, reduced combustion, lower horsepower output.

Without a supercharger, more air supply the needed oxygen is not ava able at high altitudes because atmospher pressure is so low that it simply will n push into the engine all the air it require Thus the supercharger is one of the mo important accessories of the aircra engine. With higher and higher a titudes being traversed daily, super charger development has been pushe ahead rapidly, two and even three sta units now being in operation.

Significance of such developments that the requirements of high mechanic strength at elevated temperatures ha resulted in metallurgical and fabricat advances that in turn are being employe in developing the gas turbine—one o the most promising new sources o power. New alloys employed in turbin buckets are also important in rocket de velopment where high strength hea resisting materials are also needed.

Metallurgy Difficult: The article "Casting Supercharger Buckets", STEEL Jan. 29, 1945, p. 72, detailed the probl-

Fig. 1 — Closeup of automatic welding head and work clamped on revolving table. Spout discharges melt powder so weld is "smothered", no arc or flash is visible. Circular bead 1 in. wide, ⅜-in. deep, 9 in. diameter is deposited in 2 min 35 sec using 14 ft of ⅛-in. diameter stainless steel wire with 360-400 amp welding current being employed

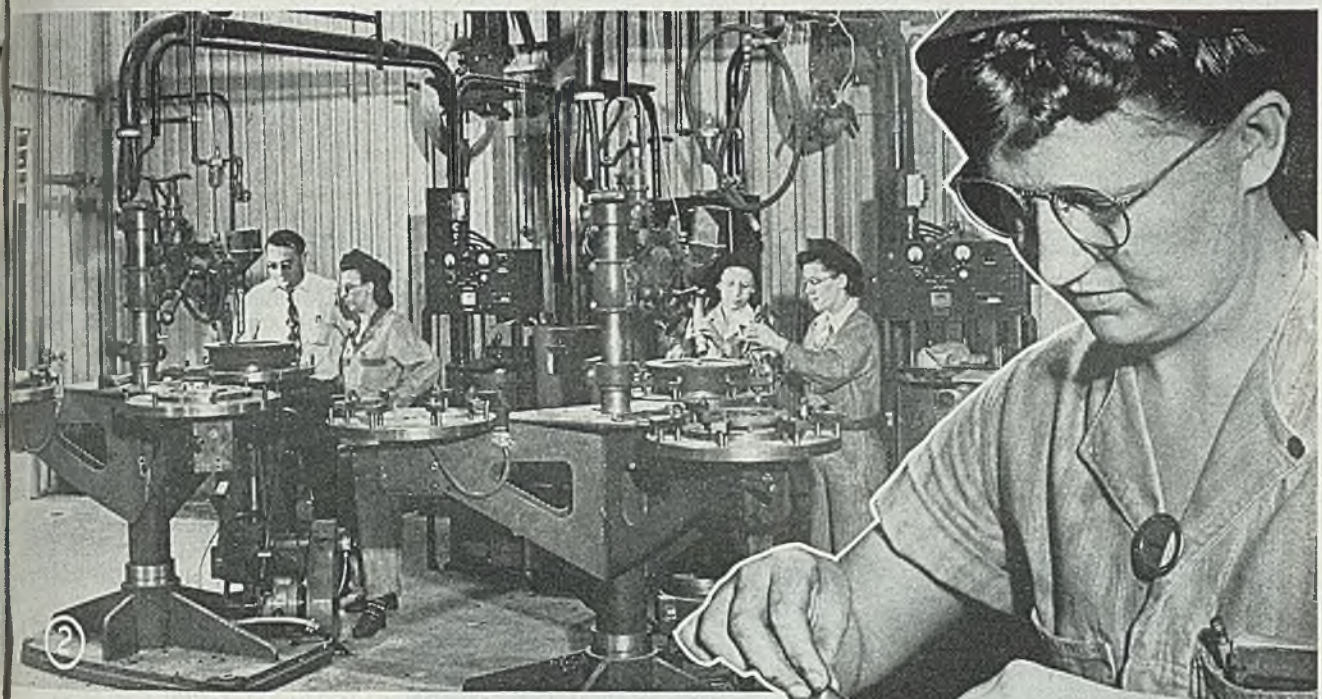


Fig. 2—*Pair of automatic welding machines: Right hand unit welds first side; second unit completes weld on other side. Both machines move work progressively under the automatic welding head*

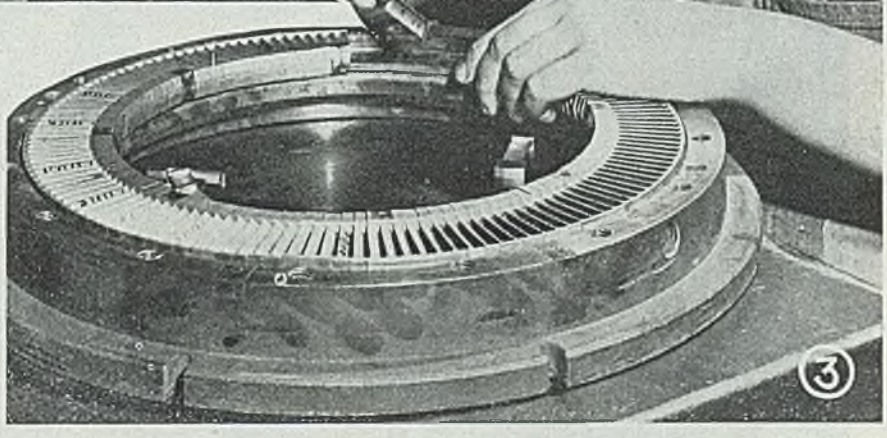


Fig. 3—*First step is assembling buckets into lower ring fixture. Operator inspects each bucket carefully at this stage. Row of buckets is made tight by addition of slightly oversize or undersize units as needed. All photos from Allis-Chalmers Mfg. Co.*

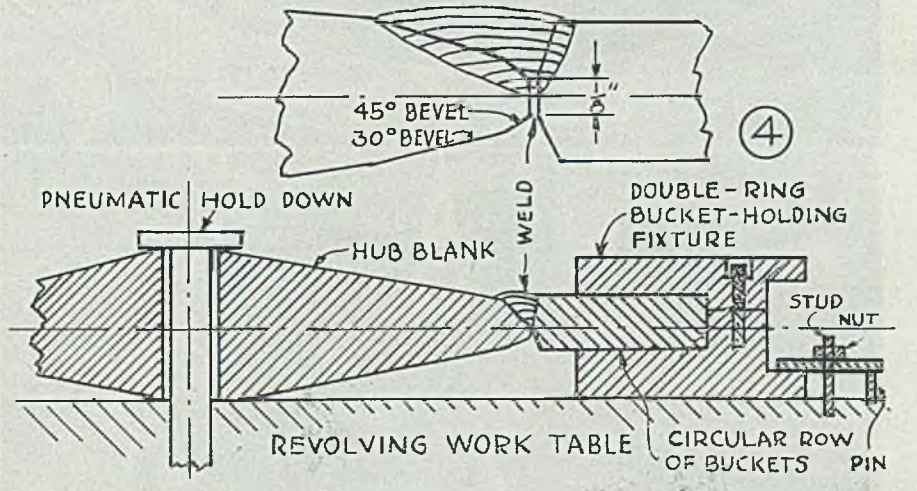


Fig. 4—*Section through work and fixtures showing details of arrangement for welding turbine buckets to wheel disk. Note enlarged section at weld revealing how joint is prepared for welding. Not to scale*

obtaining sufficient mechanical strength to withstand the enormous centrifugal forces developed at speeds up to 25,000 rpm when operating at temperatures up to 1600° F.

This hot strength requirement can be met only by a few alloys, namely that type employing cobalt as a base with chromium and molybdenum (or tungsten) as the other principal constituents. One (45-55 per cent cobalt, 30-35 per cent chromium, 12-17 per cent tungsten) is one of these alloys well known for its high hardness at elevated temperatures. After using other materials, including Stellops alloy 17W, buckets were cast from Vitallium, an alloy developed and patented by Austenal Laboratories Inc., New York. It contains approximately 60 per cent cobalt with 30 per cent chromium and 5 per cent molybdenum. Melting point is about 2500° F.

Keyed Buckets: When this material was first used, it was cast in the form of buckets with a dovetail for keying the base into the rim of the turbine wheel, the same method of fastening that had been developed for forged buckets. Since Vitallium is extremely hard and can be machined only by use of abrasive wheels, casting it to the same tolerances used in the forged and machined buckets proved costly and time consuming when quantities began to run in the millions.

So the buckets were redesigned for welding the bucket base directly to the rim of the turbine wheel. The technique employed for this welding has been developed to the point where the work is done automatically on special machine setups that save tremendous amounts of time and labor. Too, the automatic machines largely eliminate the variables from the human element, for all factors are precisely controlled.

Result is an important contribution to the war effort, combined with experience that promises to be of great value in connection with postwar production of gas turbines and similar equipment

that must work at high temperatures. As mentioned previously success of the gas turbine, a promising new power source, was contingent upon finding materials that would operate at temperatures of 1400-1600° F.

Preparation for Welding: The Vitallium buckets are precision cast by an investment casting or "lost" wax process in a series of unusual operations described in STEEL, Jan. 29, 1945, p. 72.

Both casting and welding described here are at Allis-Chalmers' supercharger plant, Milwaukee.

Final operations in bucket production involve cutting the buckets off of the runners at tip and base, followed by tumbling and blasting to clean and get surface finish desired, ending with grinding the tip to an exact dimension which then is used to locate the bucket in the assembly fixture shown in Fig. 3.

Massive Fixtures: The operator in Fig. 3 is assembling buckets into the base of the heavy clamping fixture employed in the welding operation. As can be seen, this lower portion of the fixture is a steel ring several inches thick and somewhat larger in circumference than the turbine wheel. It contains a recess into which 144 turbine buckets are assembled.

George Kleiner, foreman, welding department, explains that in making this assembly the workers match every bucket for "blending"; that is, to see if they are same size and shape as buckets on each side so all blade tips and shoulder bases line up smoothly in the assembly. Only a few rejects occur at this stage, he points out, because the buckets are accurately cast; tolerances being held to 0.003-0.010-in.

To allow for slight variations in thickness of individual buckets which may become cumulative as the 144 are assembled into the fixture, a few buckets are available that are slightly oversize and some slightly undersize. These are substituted for standard buckets at intervals around the circumference as they may be needed to make the assembly tight. The ring of buckets must fit together tightly, a maximum of 0.010-in. "play" being allowed.

Several such "equalizers" or "spacers" can be identified in Fig. 5 by their colored bases. In this view, the top section of the fixture has been secured to the lower section by 16 hollow-head 1-in. capscrews, placing the buckets under considerable pressure.

Grinding to Fit: The fixture in Fig. 5 is shown in place in the special grinding machine employed to produce the exact inside diameter of the ring of buckets so it will fit the hub blank, a disk forming the central portion of the turbine wheel. Each individual hub blank is first "miked" to accurately determine its size and then the inside diameter of the ring of buckets is carefully ground to 0.000-0.004-in. less than the blank, making a matched pair.

The reason the bucket ring diameter is smaller is that the blank does not expand as much as the ring of buckets during the preheating operation that comes next before the welding takes place.

Grinder in Fig. 5 is fitted with a hinged sheet metal cover with a window allowing the operator to view the operation yet protecting her from flying particles. This machine is precalibrated so that it is only necessary to set the diameter wanted on the controls and the desired dimension is produced automatically. The cover also permits use of an air blast to remove particles from the work after the grinding has been completed without their flying around the working area.

Preheating: Prior to welding, the fixture and hub blank are preheated in a roller-hearth continuous furnace shown in Fig. 6. This is a 250-kw electrically heated unit 50 ft long with the working area 4 ft wide. Unit is automatica-

(Please turn to Page 142)

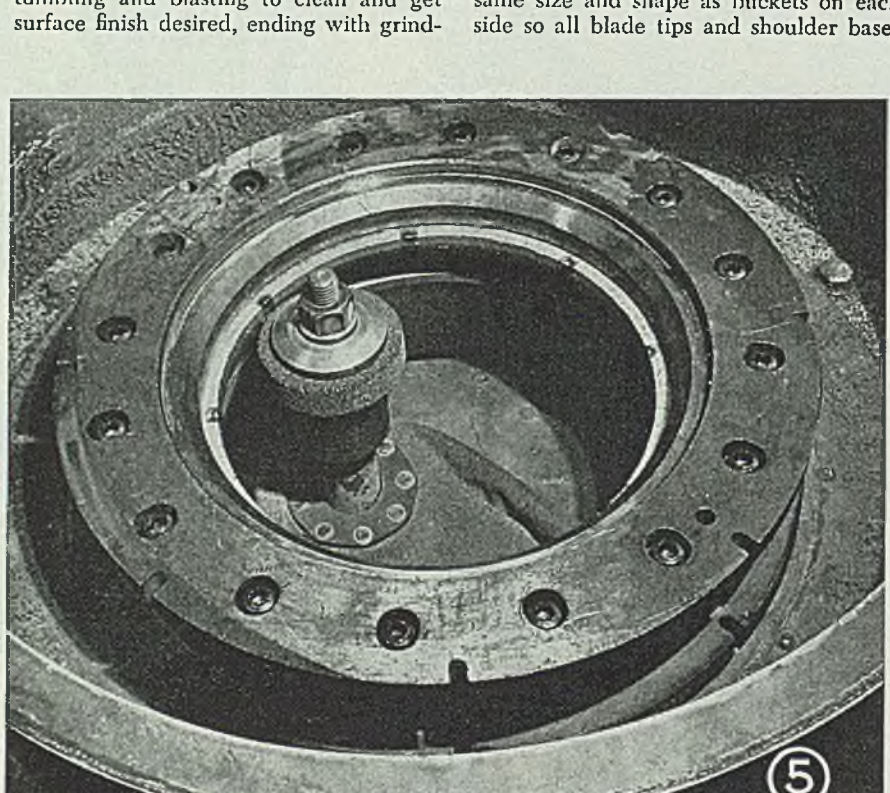


Fig. 5—When assembled in lower ring, upper half of fixture is placed and assembly clamped by 16 hollow-head capscrews. Then inside diameter of bucket row is ground uniform on special internal grinder shown here

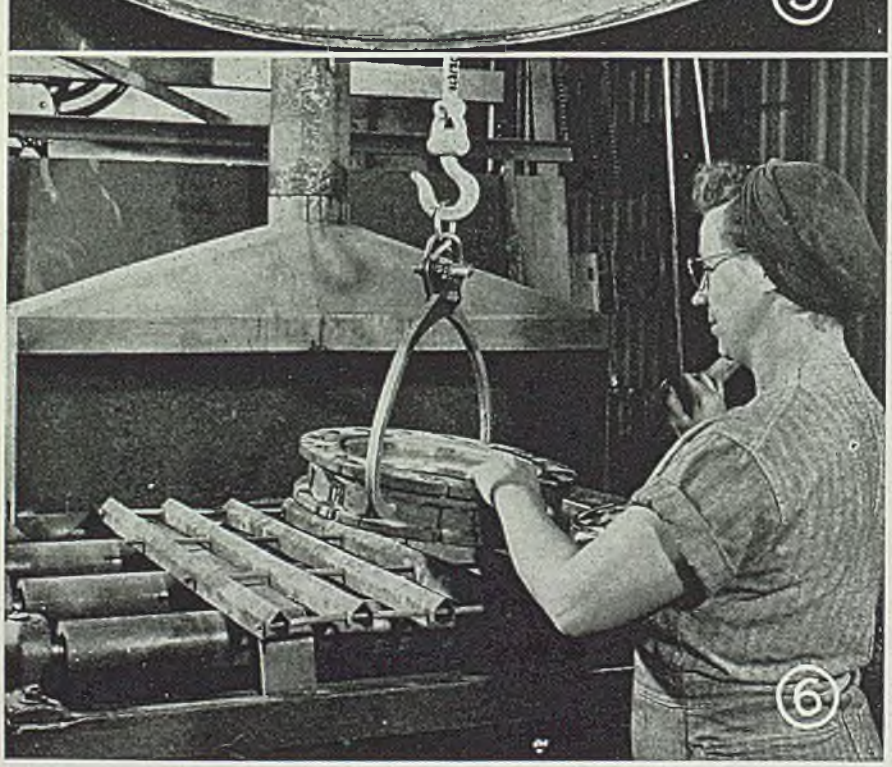


Fig. 6—After grinding to fit periphery of wheel, buckets and fixture are preheated. Note "ice tong" lifting hooks and hoist on monorail to facilitate loading

Method is developed for flame cutting

STAINLESS STEEL

CUTTING of stainless steels on a quantity, production basis, a problem which has baffled engineers and research men for many years, has been worked out successfully by the Air Reduction Co., New York, and the Rustless Iron and Steel Corp., Baltimore. The work was carried out in the Jersey City, N. J., laboratories of the former company.

Up to this time, one of the limiting factors in the economical fabrication of stainless steels has been an efficient production method of cutting these alloys with the oxyacetylene torch. The very elements which give stainless steels their desirable properties produce oxides when attempts are made to cut them with conventional oxyacetylene cutting equipment, reducing the process to a slow, melting-away procedure.

Problem involved is indicated by the fact that iron oxide has a melting point of only about 2200° F as compared with a melting point in the neighborhood of 3500° for chromium oxide, the element which offers the principal hindrance to the cutting of the stainless steels by the usual oxyacetylene method. The nickel content constitutes no particular problem. In molybdenum-bearing stainless steel, the molybdenum content is not sufficient to complicate the problem to any great extent.

With the introduction of the flux-injection system, it is possible to flame-cut stainless steels with alloying elements

(*Please turn to Page* 152)

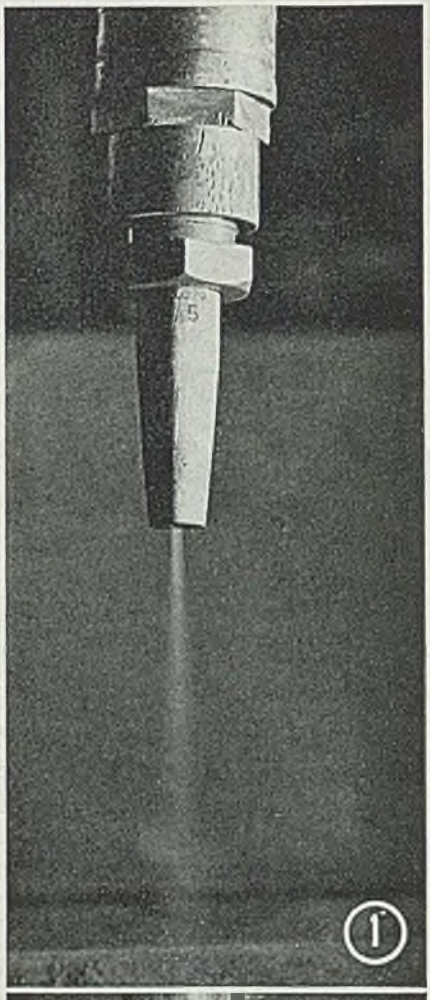


Fig. 1—*Shown here is the flux-injection stream prior to starting the flame cutting of stainless steel*

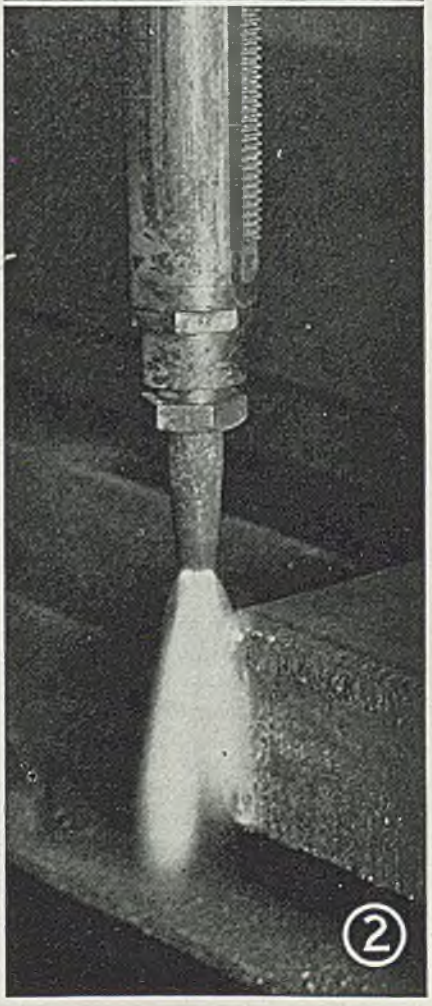


Fig. 2—*Here the cut has been started and is progressing well into the section. Standard radiagraph with a modified conventional torch and standard tip was used. Operating conditions are about the same as for cutting ordinary steel*

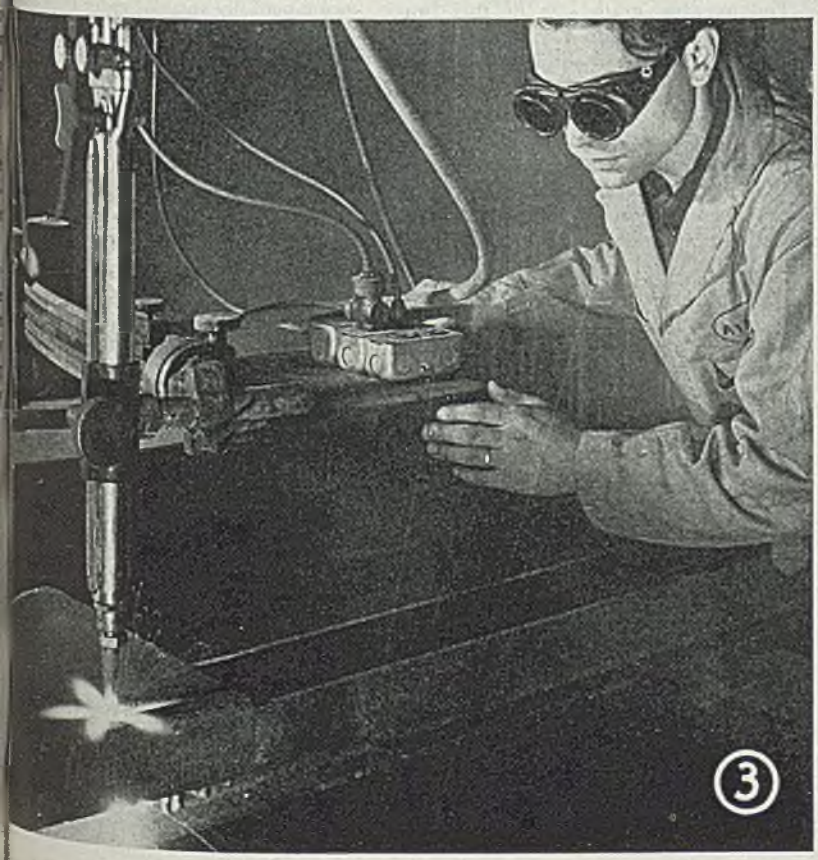


Fig. 3—*This 2½-in. thick by 10½-in. long section of hot rolled scaled mill surface 18-8 stainless steel was cut in total elapsed time of 3 min. Note quality of cut. Quality cuts can be made in material up to 3 in. thick and rough cuts in considerably heavier sections up to 6 in. on a production basis*

By SAMUEL SPRING
Chemist
Frankford Arsenal
Philadelphia

LUBRICATION ... in the Drawing of Metals

In the first of a 2-part article, Mr. Spring presents new data based upon original research at Frankford Arsenal which will prove useful in solving lubrication problems in the drawing of copper-base alloys. Additional data were set forth by the author in STEEL, March 19, 26, April 2, 16

BRASS is widely used for the fabrication by drawing of wire, sheet, tubing, ornamental objects, cartridge cases etc. because of its high ductility, bright appearance, and good physical properties in the cold-worked state. The properties that brass should have for optimum drawability and the difficulties that may occur during or after drawing have been well discussed by Jevons[1].

A most severe drawing operation is involved in the manufacture of cartridge cases because of the large amount of "ironing" or flow of metal between tools that takes place. This makes lubrication during drawing operations an important problem in this application, which has assumed immense proportions because of the war. The general theory of drawing lubrication, which serves as a background for these investigations, has been published previously[2]. In this paper there are presented some experimental data accumulated in connection with the development of lubricants for drawing brass cartridge cases. Although most of the data were obtained in connection with the drawing of 0.30 caliber cartridge cases, the conclusions have been found to apply equally well, in many instances, to artillery cases and it is probable that when suitably interpreted they may be applied to most brass drawing applications, including brasses other than cartridge brass.

General Experimental Method: The fourth draw (Fig. 1) of the 0.30 caliber cartridge case, made of 70:30 brass, was used in these experiments.

The average grain size of this brass was 0.20-0.040 mm. For the drawing operations, there was employed a tensile testing machine (20,000 lb capacity) in which the rate of draw was 3 inches/minute° and the forces required for the draw were recorded while using this machine in compression (Fig. 2). The forces necessary for the draw were recorded autographically (Fig. 3) at first, but since it soon became apparent that the shape of the curves was characteristic, the expedient was adopted of recording three points on the curve. These points were the first maximum, first minimum and second maximum forces (Fig. 3), the sum of which was considered an over-all estimate of drawing force and was called the Lubrication Index.

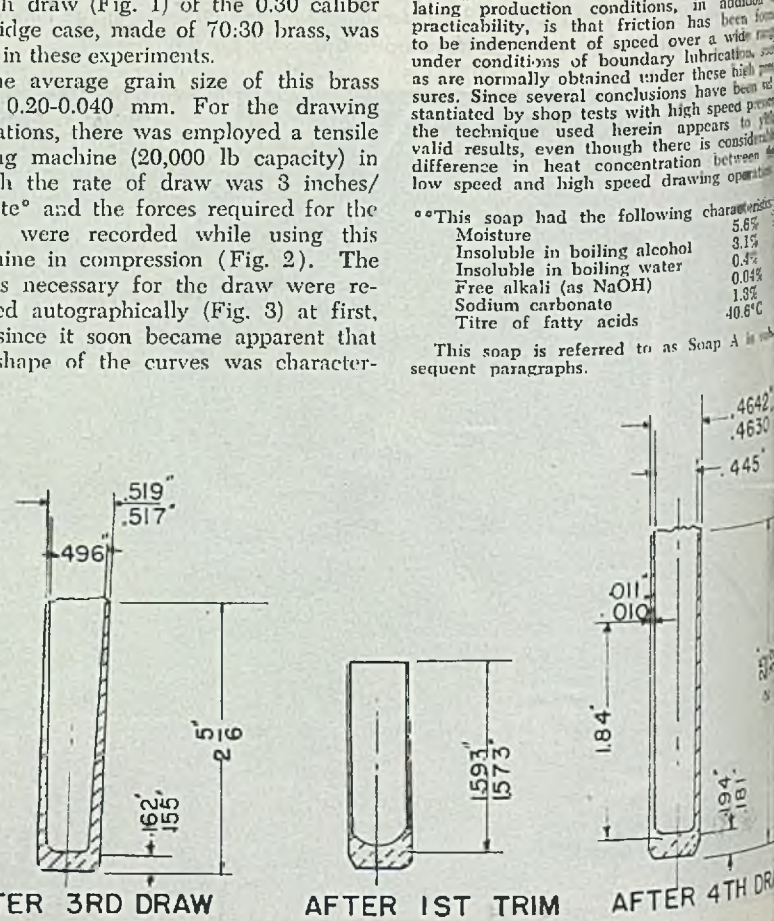
It is probable that the first maximum represents the force required to deform the head, the first minimum represents the force required for "sinking" the bottom third of the piece, and the second maximum represents the force required to "iron" the wall of the case piece. In considering data in which pieces were drawn with soap solution as the in-

°One important justification for utilizing low speed draw instead of more closely simulating production conditions, in addition to practicability, is that friction has been found to be independent of speed over a wide range under conditions of boundary lubrication, such as are normally obtained under these high pressures. Since several conclusions have been substantiated by shop tests with high speed presses the technique used herein appears to yield valid results, even though there is considerable difference in heat concentration between the low speed and high speed drawing operations.

°°This soap had the following characteristics:

Moisture	5.6%
Insoluble in boiling alcohol	3.1%
Insoluble in boiling water	0.4%
Free alkali (as NaOH)	0.04%
Sodium carbonate	1.3%
Titre of fatty acids	40.6°C

This soap is referred to as Soap A in subsequent paragraphs.



(Left to right)
Fig. 1—Most of the data on lubrication were obtained in working with 70:30 cartridge brass but may be applied to other types of brasses

Fig. 2—A 20,000-lb Riehle tensile testing machine was used in drawing pieces for the 0.30 caliber cartridge case

Fig. 3—Forces necessary for drawing were recorded at three points on the curve. Sum of the three forces was called Lubrication Index

...ast, a statistical analysis indicated that ...differences of 5 per cent in the mean of ...ten results were significant. Since the ...ces required were somewhat different ...r different tools and lots of pieces, a ...per cent dispersion of a sodium soap ...f beef tallow°° was used as a standard, ...ed a comparative test with this lubri...nt was made for each group of experi...ents. A few pieces were drawn through ...e die, using the standard soap lubri...nt, prior to each group of experiments ...insure removal from the tools of ...es of unknown composition.

The forces required for the drawing ...eration are made up of three main ...mponents:

1. The force required for elastic and ...astic deformation of the metal.

2. The force required to break welds ...tween the metal being worked and ...e tools.

3. The force required to deform the ...icant in order to cause relative mo... between the surfaces.

The last two components are the fric...al resistance forces. The forces re...ed for the first component vary some...at from piece to piece because of the ...voidable tolerance in wall thickness etc. ...is is probably the cause of most of the ...ttering of individual results. The two ...rtional forces are not differentiated ...this test and consequently interpreta... of changes in friction must be based ...the general theory of boundary and ...drene pressure lubrication as applied ...drawing lubrication.

...summary, the prime requisite of a ...wing lubricant is a component that ...es films of a stable chemical com...d on the metal surfaces, which are ...stant to displacement by the shearing ...ces at the drawing die. These films ...uld separate the metal surfaces to ...an extent that the forces of inter...ular attraction are reduced to a ...gible quantity and, as a conse...ce, welding is prevented. The second ...ite of a good drawing lubricant is ...mponent possessing weak linkages ...the lubricant so that resistance to ...n within the lubricant is small.

Effect of Oxide in Drawing Lubrica... Since it was shop experience that

(*Please turn to Page* 154)

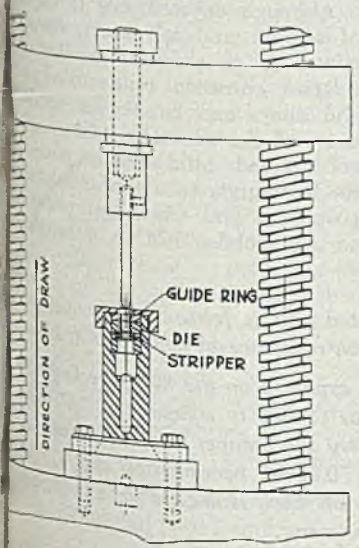


TABLE I—FACTORS AFFECTING FRACTURE OF DRAW PIECES
Special Draw Die and 2% Soap Dispersion
Lubricant Used in All Cases

	No. of Pieces Drawn	No. of Fractures	First Max. Force (lb)	Second Max. Force (lb)
1. Non-treated pieces°	110	0	2570	1950
2. Pieces treated with boiling CCl_4 + C_2H_5OH for 40 min.	35	25	2650	2040
3. Pieces treated with boiling 3% sulfuric acid for 5 min.	32	18	2670	2020
4. Pieces treated as in 2, and coated with thick stearic acid films.	30	0	2280	1780
5. Pieces treated as in 3, and coated with thick stearic acid films.	20	0	2320	1680
6. Pieces treated in 3, and immersed in warm 4% H_2O_2 for 30 sec.	5	0	2690	2060

°Stored for 2-3 weeks prior to drawing so that this may be considered the normal oxide-coated condition

TABLE II EFFECT OF SURFACE ROUGHNESS OF DIE ON FRACTURES AND THE PREVENTION OF FRACTURES DUE TO THIS CAUSE
2% Tallow Soda Soap Dispersion Used As Lubricant in All Cases

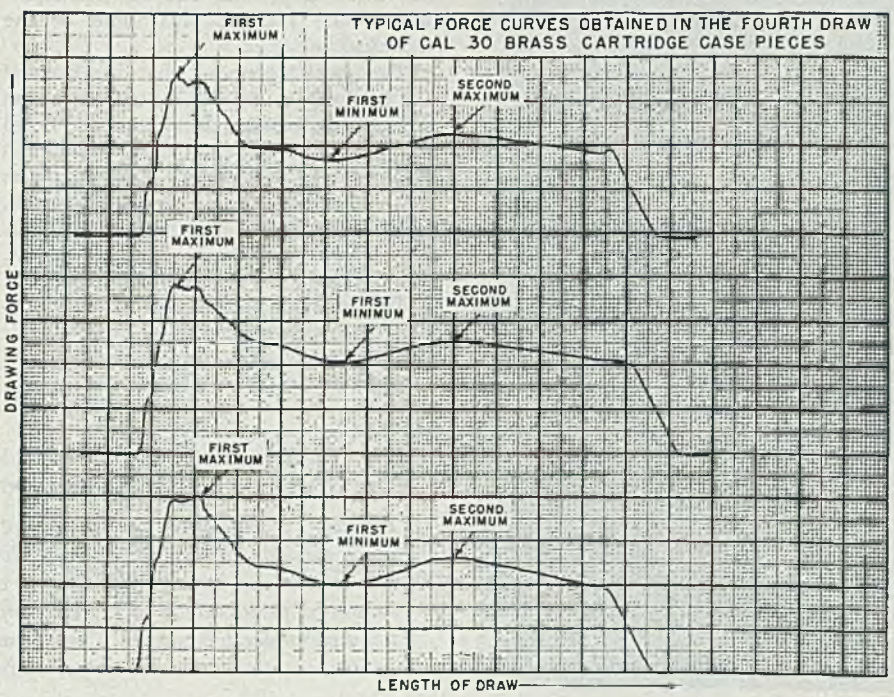
	Die° No.	No. of Pieces Drawn	No. of Fractures	First Max Force lb.
1a) Pieces treated with boiling CCl_4 + C_2H_5OH for 20 min.	B	11	11	5470
b) Pieces treated as in 1(a) and coated with thick stearic acid fims	B	7	0	5010
c) Non-treated pieces°°	B	5	0	5250
2a) Pieces treated as in 1 (a)	C	2	2	6680
b) Pieces treated as in 1 (b)	C	3	0	5040
3a) Pieces treated as in 1 (a)	D	3	3	6720
b) Pieces treated as in 1 (b)	D	5	0	5200

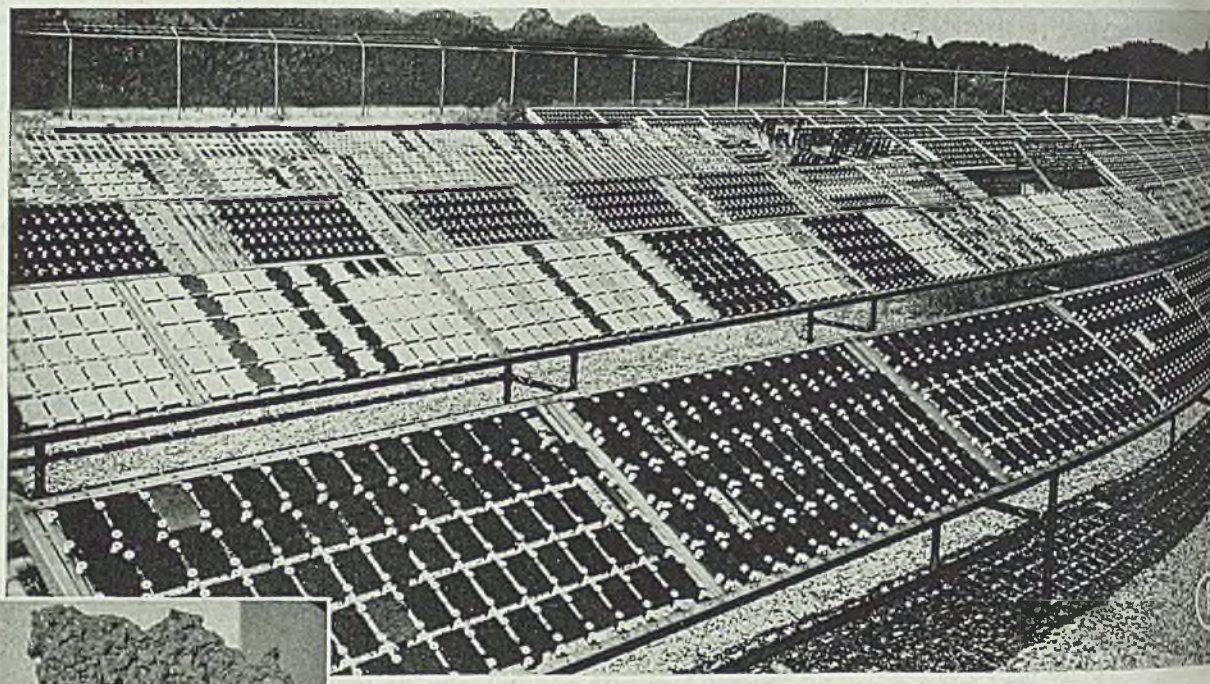
° These dies had slightly different contours but were all alike in that they had surfaces roughened with a #80 emery wheel. The dies were maintained in their roughened condition.
°° Stored in laboratory atmosphere for two or three weeks and, consequently, may be considered as in the normal oxide-coated conditions.

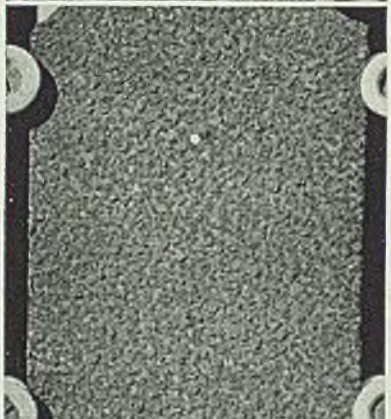
TABLE III—EFFECT OF OXIDES ON FRACTURE OF DRAW PIECES
Special Die and 2% Soap Dispersion Used in All Cases

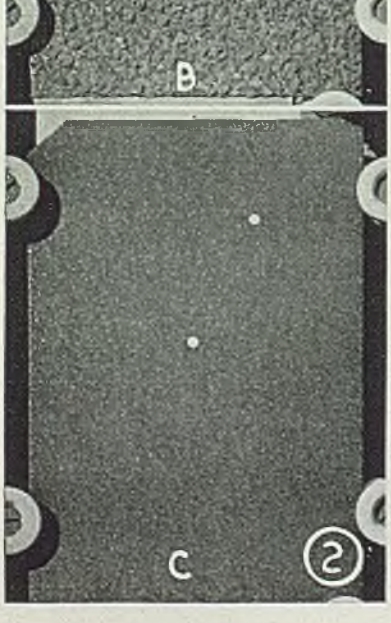
	Days Stored 0	2	4	6	9
1. Pieces treated with boiling CCl_4 and C_2H_5OH and stored in vacuo					
No. of Pieces Drawn	4	2	4	3	5
No. of Fractures	4	2	3	2	1
2. Pieces treated as in 1 and stored in laboratory atmosphere					
No. of Pieces Drawn		5	5	5	9°
No. of Fractures		3	1	0	0
3. Pieces treated as in 1 and stored in moistened air					
No. of Pieces Drawn		10°°	10°°°		5
No. of Fractures		0	2		0

° First max. draw force 2540 lbs. Second max draw force 1880 lbs.
°° First max. draw force 2920 lbs. Second max. draw force 2200 lbs.
°°° First max. draw force 2890 lbs. Second max. draw force 1950 lbs.









Future Metal

By IRWIN H. SUCH
Engineering Editor, STEEL

WHAT is probably the most extensive proving ground in the world for measuring the corrosion resistance of iron and steel and the nonferrous metals is being conducted by The Dow Chemical Co., the Carnegie-Illinois Steel Corp. and the International Nickel Co. Inc. on Cape Fear, N. C. at Kure Beach, about 20 miles from Wilmington, N. C. About 200 other companies also are participating in the project, plus some of the technical societies.

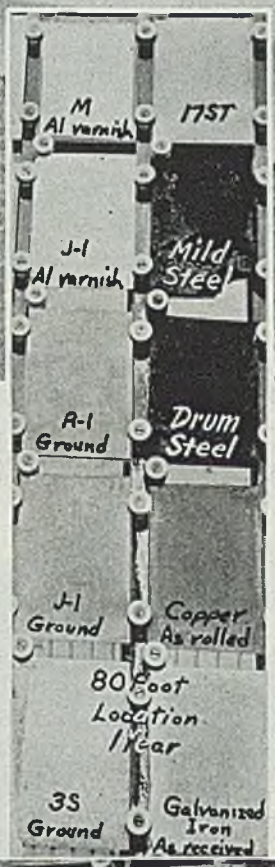
The work is under the direction of F. L. LaQue, in charge of corrosion engineering section, International Nickel Co. Inc.; J. A. Peloubet, Development Engineering, Magnesium Division, The Dow Chemical Co.; Ewart S. Taylerson, Research Engineer, Carnegie-Illinois Steel Corp. and W. F. Clapp, Wm. F. Clapp Laboratories, Duxbury, Mass.

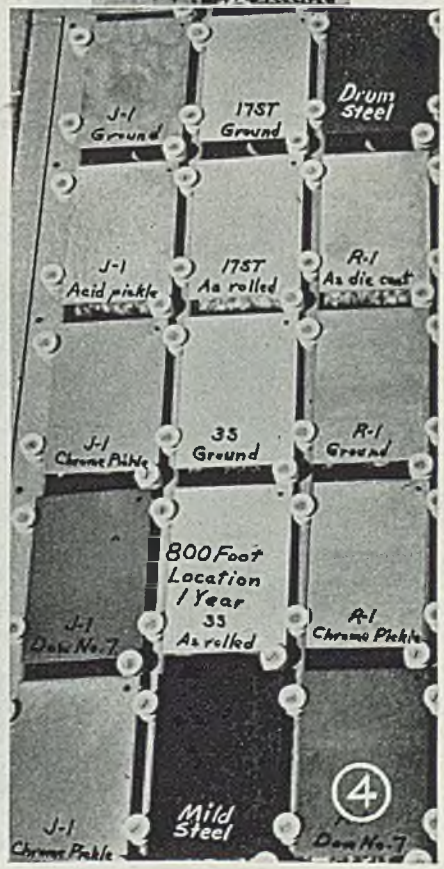
The tests are conducted at four locations on the property of the Ethyl-Dow Chemical Co. which has a plant for processing large quantities of ocean water. Atmospheric corrosion tests conducted 80 and 800 ft from Atlantic Ocean and sea water test the exit end of a reservoir supply the Dow plant. Water flows past water-exposed specimens at the rate 2 ft per second. In addition, the effe of salt water on steel piling and iron tunnels at the oceanside pumping st tion are studied.

Although devoted only to the effe of sea air and salt water, the stud constitute an excellent measure of t relative corrosion resistance of meta and alloys and finishes for metals, b cause of the unusually severe conditio encountered. Mild steel test pieces beg to disintegrate in a few months on t posure to air. Chromium plated pa on automobiles rust in 6 months a

Fig. 1—General view of the racks located 800 ft from the Atlantic Ocean at Cape Fear, N. C. for testing corrosion resistance of metals and finishes

Fig. 2—Typical specimens of steel after exposure on the 800 ft racks for 2½ years showing differences in rust films as related to composition. "A" shows coarse rust and severe corrosion of a very low copper (0.014%) steel; "B" improved performance of higher copper (0.02%) bearing steel and "C" fine textured protective rust on 5 per cent nickel steel. Holes are for identification of the specimens





■ are given "Test Runs" at Cape Fear, N. C. proving ound operated by Dow, Carnegie-Illinois and Interna- onal Nickel for measuring corrosion resistance

m metal parts in enclosed buildings reveal the effects of the humid, laden air. Accelerated corrosion actually are conducted under ral conditions, supplementing the l salt spray and other tests con- ed in the laboratory.

Many alloys of the future now are ving their "test runs" at Kure Beach. are exposed under the same con- ns as metals and alloys now in and some are displaying surprisingly corrosion resistance which makes ppear likely that they will be offered commercial use. No conclusions are upon short-term tests. Many of samples have been exposed for as as 10 years and no data are taken tests of less than 6 months' duration.

Fig. 1 shows the atmospheric test lot up in 1940 about 800 ft from the an. It is 1 acre in area and has m for 40 racks, each of which will port from 700 to 900 specimens. present, about 15,000 specimens are osed. The expense of preparing the cimens for test and caring for them kes the total investment in this one about $150,000. The racks face South and the specimen frames are set at a slope of 30° from the horizontal.

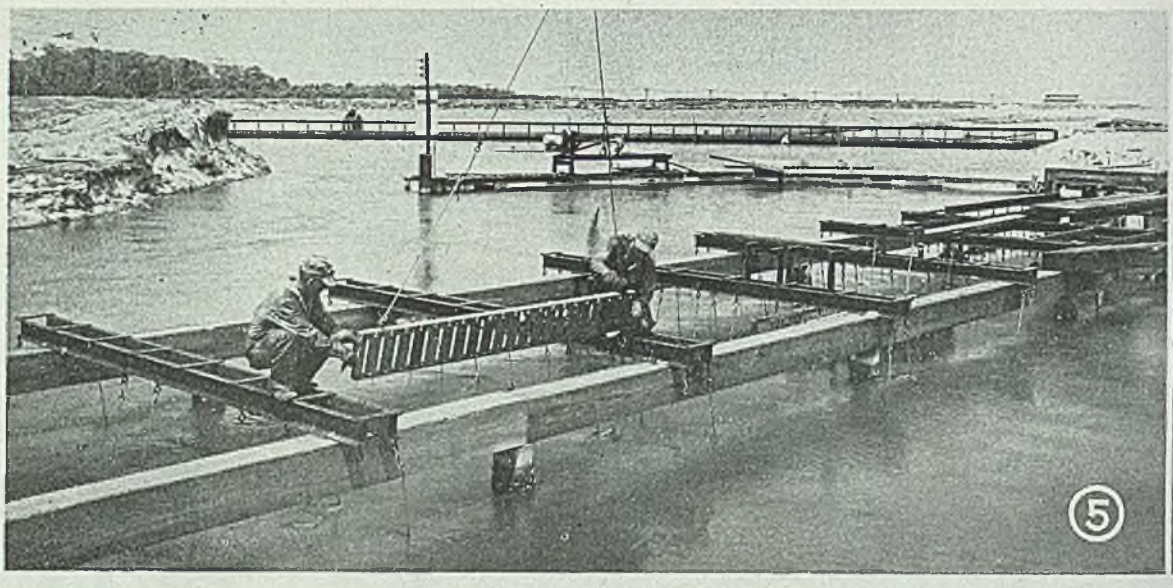
The effects of atmospheric corrosion are measured by visual observation and by determination of weight loss, changes in mechanical properties or both. Insulators used for mounting may be arranged to accommodate several types and sizes of specimens. Usually a sufficient number of specimens are exposed originally to permit their withdrawals in groups of 2 to 5 after various time intervals so as to permit observation of changes in corrosion rates.

New specimens of certain key materials are placed on the racks each time a large group is removed, or a new group installed. These key specimens provide information on the changes in corrosivity of the atmosphere itself from year to year which assists in the interpretation of the results of tests made over different periods of time.

Studies made so far indicate that only three or four metals are effective in combating corrosion when alloyed with iron. These are copper, nickel and chromium. Copper and nickel are more effective together than singly and it also

Fig. 3—This test stand is operated by the Dow Chemical Co. only 80 ft from the ocean. Specimens often are sprayed by salt water as well as being surrounded by a continual salt spray mist

Fig. 4—Typical magnesium, aluminum and steel specimens exposed for 1 year at the 800 and 80 ft locations. Note more severe corrosion nearer the ocean



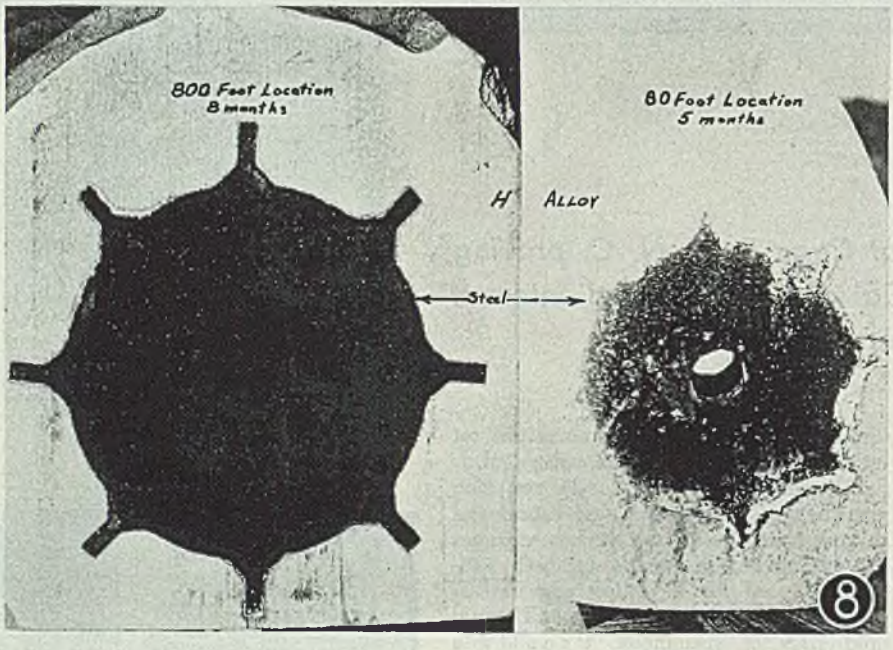


Fig. 5—Photograph taken with water at normal level shows method of supporting specimens

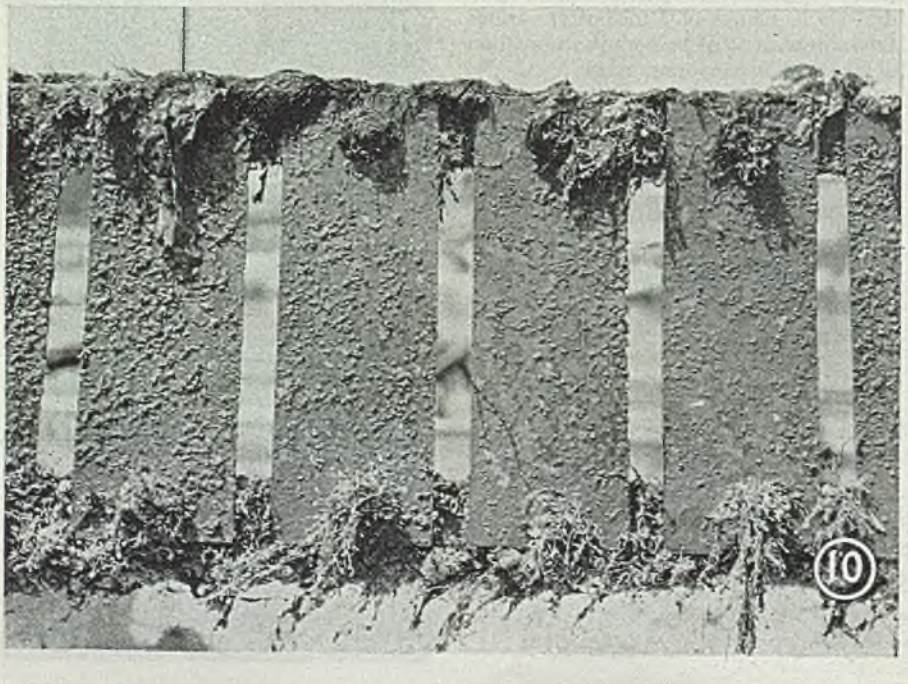
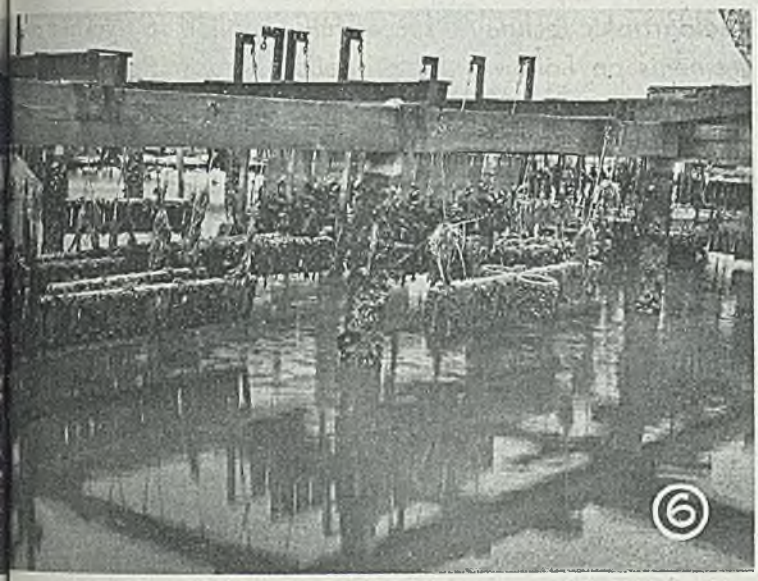


Fig. 6—Salt water tests are made in the channel leading to the Ethyl-Dow plant. This photograph was taken when the channel was drained temporarily. Ordinarily, the water flows by the marine-growth encrusted specimens at the rate of 2 ft per second

Fig. 7—This disk is used to mount specimens, such as condenser tube alloys, and whirl them through the stream of sea water at velocities up to 30 ft per second

Fig. 8—Steel inserts cast into magnesium alloy show the effects of galvanic action where the two metals make contact. This action is accelerated at the 80-ft location



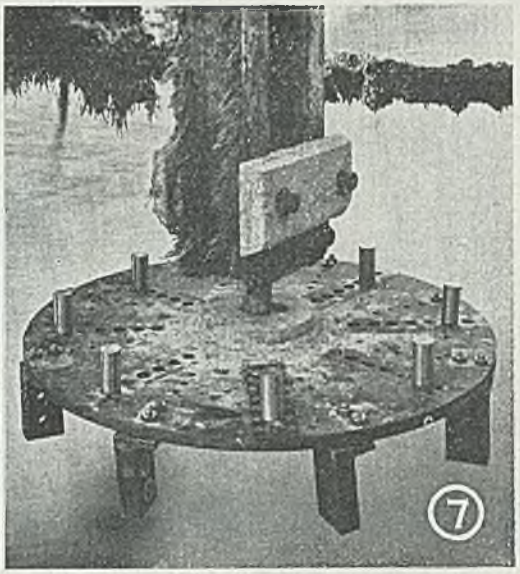


Fig. 9—A study was carried out to determine the effect of sea water on welds in ship steel made with electrodes of three different compositions. "A" shows welds made with 25-20 chromium-nickel electrodes; "B" welds made with 2.5 per cent nickel steel and "C" welds made with carbon steel. Note absence of localized corrosion alongside edges of austenitic alloy welds and protection provided nickel steel weld by its galvanic contact with the carbon steel plate. All three were immersed 11 months

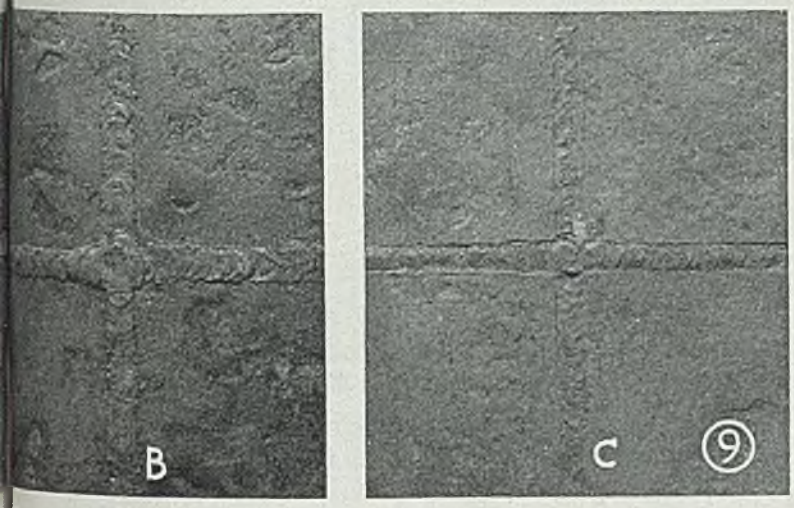


Fig. 10—This group of experimental copper-nickel alloys has just been removed from the water after exposure of 2 years

been noted that phosphorus is helpwhen added with one or more of three elements.

steel bearing 0.007 per cent copper showed severe corrosion after exposure only one year. Steels with 0.01, 0.02 and 0.03 copper, respectively, showed progressively improved resistance. Additions of more than 0.05 copper had relatively little further effect. For further improvement in corrosion resistance, it is necessary to add nickel and chromium. Steel with 0.01 copper and 1.5 nickel, as an example, held up well.

Fig. 2 shows three typical steel specimens after exposure for 2½ years. The plain low copper-bearing steel shows heavy rust and severe corrosion. A steel with slightly higher copper content (0.02%) shows better performance, while one with 5 per cent nickel content displays fine-textured, protective rust.

In the straight chromium series, it is observed that at least 15 per cent chromium content is necessary to prevent rusting. Chromium-nickel 18—8 stainless steel, of course, maintains its bright appearance, even after long exposure.

As might be expected, copper sheet holds up extremely well, showing only a splotchy brown or green film formation. Monel metal holds up equally well and, in fact, was used in constructing the racks for holding the specimens.

Magnesium alloys are highly corrosion resistant, Dowmental J-1h sheet and extrusions and 0-1 extrusions displaying no visible attack. Both were coated with a light gray film. Aluminum 3S alloy sheet subjected to the same exposure had the same light gray film but was slightly etched. Aluminum 17S alloy sheet was visibly corroded but clad 24ST sheet was brighter than the magnesium alloys.

Dowmetal M alloy sheet and extrusion specimens in the same test were dark gray in color and were slightly pitted. FS-1 alloy appeared to be smooth and had a light gray color. Sand-cast H alloy showed small corrosion pits which were less prominent in H-1 alloy. R-1 alloy is one of the most corrosion resistant in the magnesium group whether die or sand cast. G-1 alloy is equally good.

The Dow Chemical Co. also maintains a test stand only 80 ft from the ocean (Fig. 3) where the specimens are surrounded by a continual mist of salt spray and often are splashed with salt water kicked up by the breakers. Fig. 4 shows a number of samples exposed at the 800 ft location for one year and similar samples at the 80-ft rack for the same length of time. Mild steel ⅛-in. plate on the latter rack disintegrated in 6 months to a year and the rate of corrosion of other materials was accelerated.

Hot dip aluminum coatings on steel at the 800-ft location are holding up well after exposure for 4 years. Tests of lead coatings are being conducted and on the basis of studies to date, it appears that about 0.002-in. is necessary to protect steel. For commercial purposes, 1½-oz hot dip galvanized sheets appear to be adequate for most purposes, although 2 oz afford added protection if the customer is willing to pay the added cost. Sprayed coatings of aluminum, zinc and lead appear to be practicable. Baked phenolic resins provide excellent protection for steel and paints applied over phosphate type coatings hold up well for slightly more than 2 years.

The Dow Chemical Co. finds that a

(*Please turn to Page* 158)

Radiographic technique successfully applied to thickness measurements on hollow steel propeller blades. Possible applications include plate, tubing and strip

Metal Thicknesses DETERMINED BY X-RAY

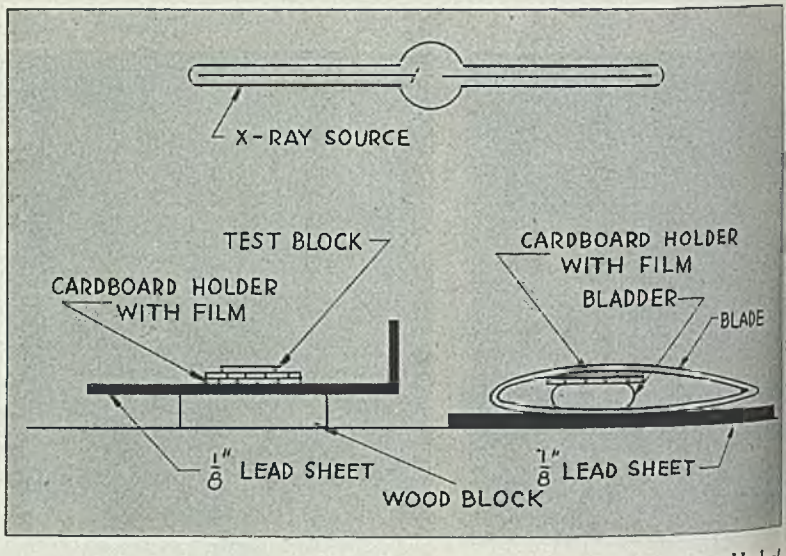
IT IS doubtful that the fact X-rays penetrate various metal thicknesses with intensity more or less directly proportional to metal thickness could have escaped the notice of those examining the first industrial radiographic films produced.

The progression of events and development of equipment in the various lines of scientific work invariably have led to new methods of accomplishing results. In many instances the so-called "new method" of any particular application is in reality merely the adapting to a specific job the accumulated knowledge and improved equipment available, resulting from the work of the field in general.

This is the reason given by H. P. Moyer and P. L. Kline of American Propeller Corp., Toledo, O., for development of a method for measuring metal thicknesses by radiographic means. This development first was discussed before members of the American Industrial Radium and X-Ray Society late last year.

In the manufacture of hollow steel propeller blades, it is of primary importance that thickness of the metal plate be held to very close tolerances, mainly because strength of the whole blade is dependent upon strength of any blade cross section composed of leading and trailing edges, thrust plate and camber plate. Thinnest section in many blade designs occurs at center of the thrust and camber plates; therefore, it is a decided advantage to be able to demonstrate at any time the thickness of any particular area.

Previous to development of this technique of X-ray measurement, the only method of determining plate thickness of 75 per cent of the area of a finished blade was by sectioning the blade, a destructive method. However, Moyer and Kline point out that it must not be inferred that the method of radiographically determining metal thicknesses is applicable only to propeller blades. Plate, tubing, or strip would respond satisfactorily to this treatment, and techniques used would warrant investigation in many problems involving metal thickness determinations.



Setup for the measurement of propeller wall thickness employing a test block of known thickness

In the process of manufacturing blades at American Propeller Corp., steel tubing is worked by both hot and cold processes to produce the finished article. While the blade is in the tubular form, measurements of plate thicknesses can be accomplished easily by mechanical means. Also bulk of machining operations are performed while blade is in this form, thus permitting accurate measurement and control of thicknesses. But once blade is in airfoil shape, such measurement becomes limited in accuracy. The plate then can be measured only by inserting one prong of a deep-throated caliper through the open shank and placing the other on the outside of blade. Deflection becomes greater and accuracy less as distance from shank is increased until, at the outboard stations, mechanical determination of plate thickness becomes quite difficult.

To provide a suitable solution to the problem, Moyer and Kline turned their attention to X-ray analysis. Basic premise upon which they proceeded is as follows:

A given source of X-radiation of suitable wave length will, under controlled conditions, penetrate the plate with certain intensity, this intensity being a definite function of plate thickness involved. Further, if intensity of X-ray penetration through plate of known thickness is studied, results can be applied to similar action on plate of unknown thickness; hence, the unknown then becomes predictable. Therefore if a set of blocks of known thickness are X-rayed simultaneously with the object whose thickness was unknown, data derived from known blocks can be applied to the object in question.

These fundamentals are principles of radiography, and the accuracy attained by the method becomes largely the result of the precision of equipment used and care with which process is carried out. Setup devised by Moyer and Kline employing known test block is shown

(*Please turn to Page 162*)

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AN "INSIDE TRACK" FOR MANUFACTURERS

Many manufacturers may not have to wait for the green light of Victory. Perhaps *you* may be able to start now, with the help of Revere Custom Specialties made of materials that are currently available. Revere magnesium alloys, for instance, are now restricted only to the extent that war requirements have first claim on production schedules. Revere electric welded steel tube, copper, brass, bronze and aluminum alloys may also be available for approved uses.

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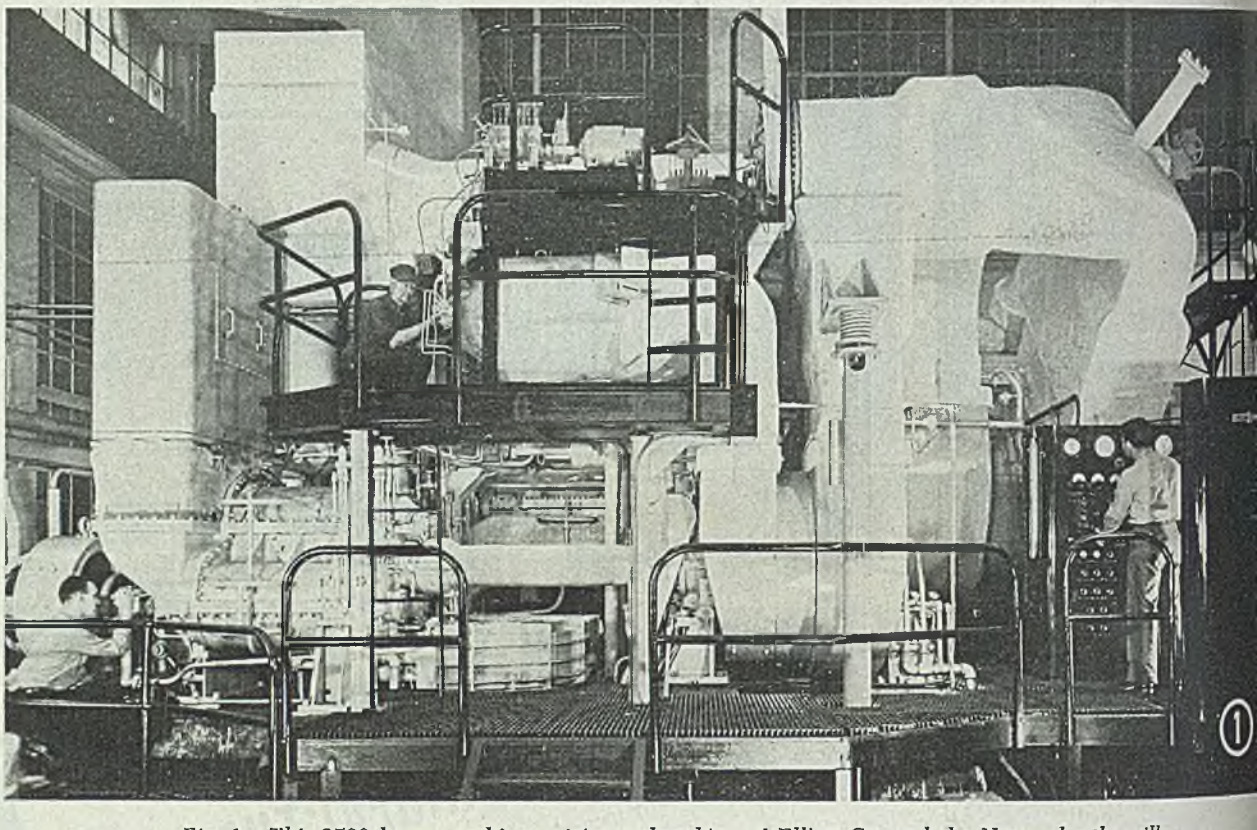


Fig. 1—This 2500 hp gas turbine, a joint undertaking of Elliott Co. and the Navy, shortly will be tried out in a Naval vessel. It has overall efficiency of 29 per cent

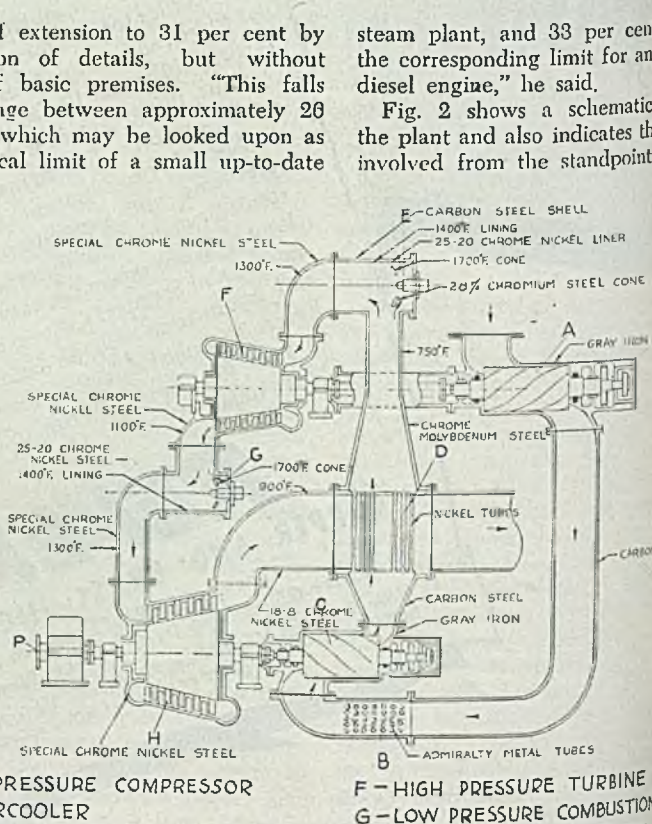
Gas Turbine

with 2500 hp rating developed by Elliott and U. S. Navy has overall efficiency of 29 cent. Many postwar uses seen. Metals requi to withstand high temperatures

THAT the gas turbine is definitely taking its place as the fourth member of family of prime movers along with the steam engine, steam turbine and internal combustion engine was adequately demonstrated by the Elliott Co. at a forum and preview of its 2500 hp unit held recently for power plant engineers and editors of leading technical journals. The 2500 hp unit shortly will be installed in a naval vessel and, according to W. A. Elliott, executive vice president, three additional units now are on order, one of which will be for the U. S. Maritime Commission for installation in a cargo vessel. At least two of the new units will be completed within the next 9 months.

The 2500 hp gas turbine (Fig. 1) which was put through its paces at the company's plant in Jeannette, Pa. has been under development for the past 2 years and is a joint undertaking of Elliott research engineers and the U. S. Navy's Bureau of Ships. According to C. Richard Soderberg, consulting engineer, the plant has an overall efficiency of about 29 per cent which is probably capable of extension to 31 per cent by modification of details, but without change of basic premises. "This falls in the range between approximately 26 per cent, which may be looked upon as the practical limit of a small up-to-date steam plant, and 33 per cent, whic the corresponding limit for an up-to- diesel engine," he said.

Fig. 2 shows a schematic layou the plant and also indicates the prob involved from the standpoint of fu



A—LOW PRESSURE COMPRESSOR
B—INTERCOOLER
C—HIGH PRESSURE COMPRESSOR
D—REGENERATOR
E—HIGH PRESSURE COMBUSTION CHAMBER
F—HIGH PRESSURE TURBINE
G—LOW PRESSURE COMBUSTION CHAM
H—LOW PRESSURE TURBINE
P—PROPELLER

Fig. 2—This schematic layout of the gas turbine also indicates the problems involved in finding suitable materials

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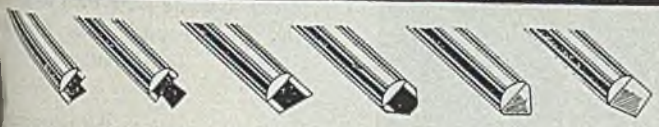

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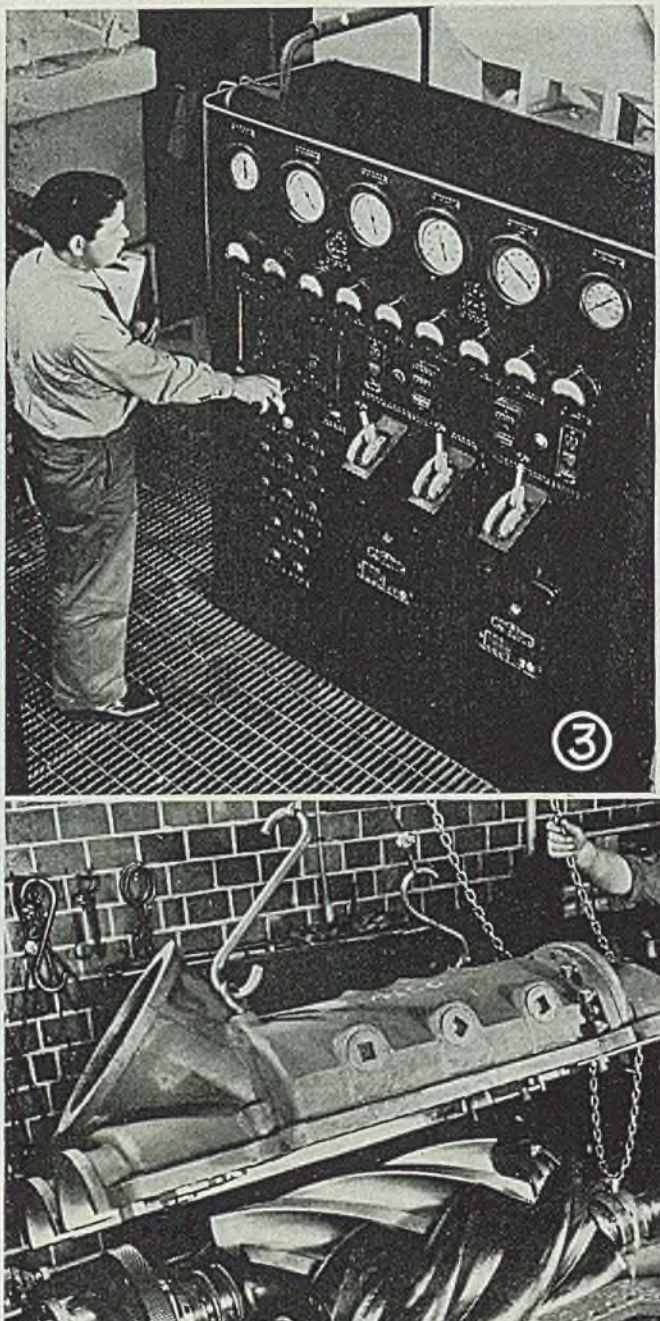


Fig. 3—The turbine may be operated by one man stationed at this control panel

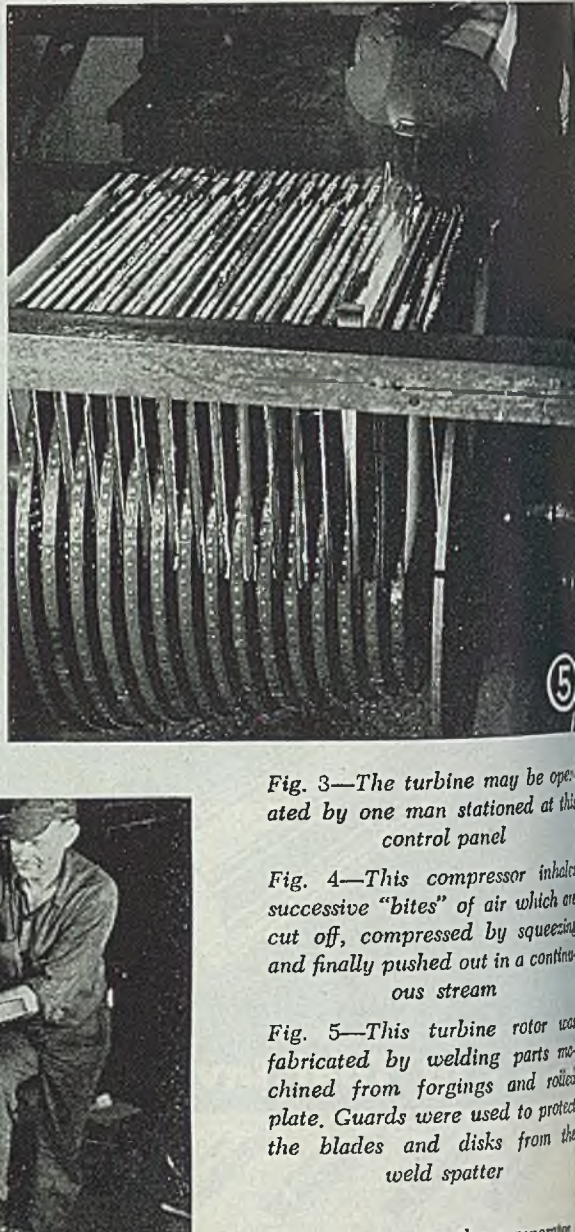


Fig. 4—This compressor inhales successive "bites" of air which are cut off, compressed by squeezing and finally pushed out in a continuous stream

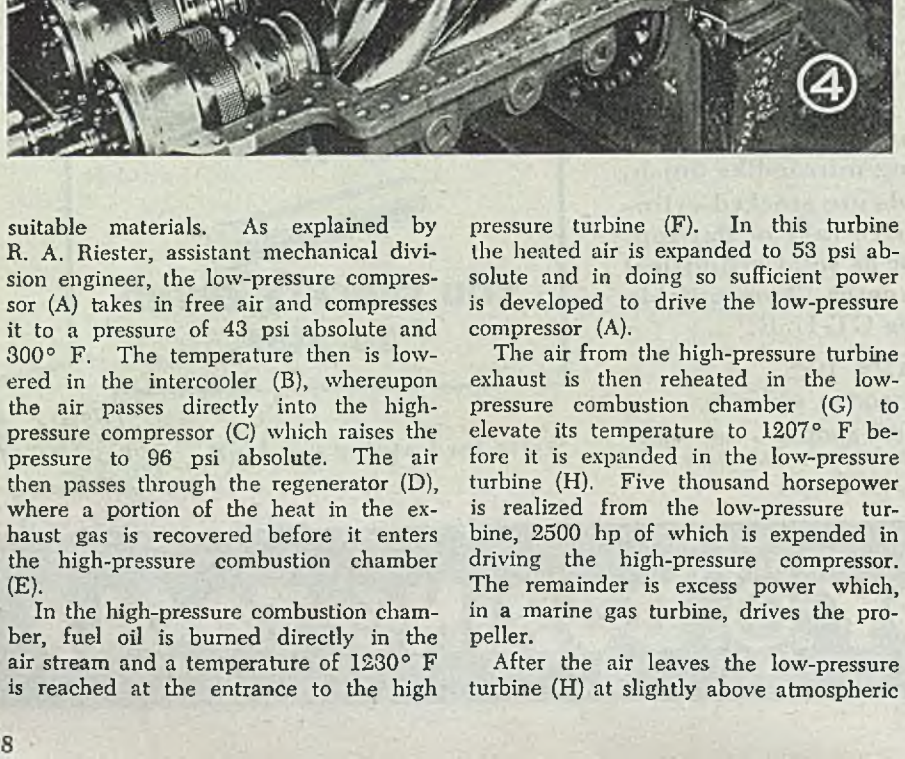


Fig. 5—This turbine rotor was fabricated by welding parts machined from forgings and rolled plate. Guards were used to protect the blades and disks from the weld spatter

suitable materials. As explained by R. A. Riester, assistant mechanical division engineer, the low-pressure compressor (A) takes in free air and compresses it to a pressure of 43 psi absolute and 300° F. The temperature then is lowered in the intercooler (B), whereupon the air passes directly into the high-pressure compressor (C) which raises the pressure to 96 psi absolute. The air then passes through the regenerator (D), where a portion of the heat in the exhaust gas is recovered before it enters the high-pressure combustion chamber (E).

In the high-pressure combustion chamber, fuel oil is burned directly in the air stream and a temperature of 1230° F is reached at the entrance to the high pressure turbine (F). In this turbine the heated air is expanded to 53 psi absolute and in doing so sufficient power is developed to drive the low-pressure compressor (A).

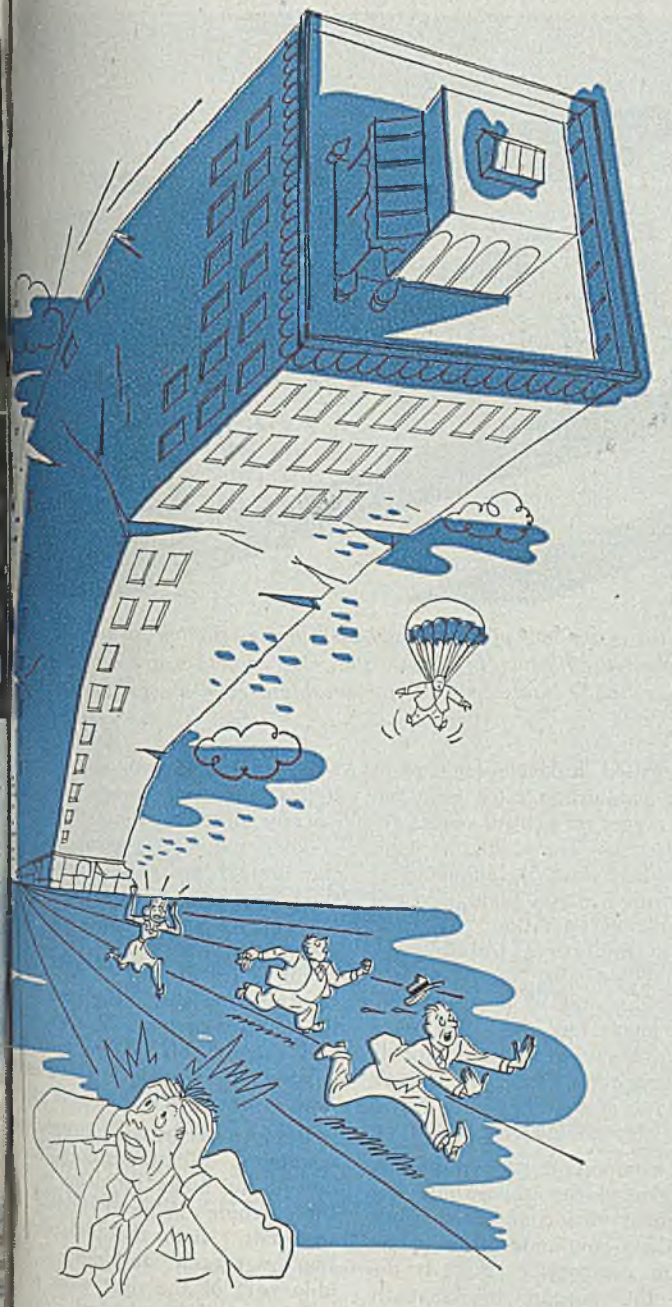
The air from the high-pressure turbine exhaust is then reheated in the low-pressure combustion chamber (G) to elevate its temperature to 1207° F before it is expanded in the low-pressure turbine (H). Five thousand horsepower is realized from the low-pressure turbine, 2500 hp of which is expended in driving the high-pressure compressor. The remainder is excess power which, in a marine gas turbine, drives the propeller.

After the air leaves the low-pressure turbine (H) at slightly above atmospheric pressure, it passes to the regenerator where it preheats the fresh compressed air from the high pressure compressor (C). The exhaust gas passes up the stack at a temperature of 400° F and is discharged to atmosphere.

Complete control of the turbine is obtained by regulating the fuel flow to the turbine driving the first-stage compressor. Since the amount of air which enters the system is controlled by the first compressor, it is apparent that this control feature can produce ease of control and, at the same time, permit efficient operation of the main power turbine at full temperature.

The turbine plant is operated by one man stationed at a central control panel (Fig. 3). Instruments show at a glance temperatures, speeds, and pressure. Fuel flow to the two combustion chambers is controlled by airplane type hydraulic levers.

The plant is placed in operation by energizing the electric starting motor which drives the low-pressure compressor (A) and lighting one burner in the high pressure combustion chamber. When the high-pressure turbine has been brought up to operating temperature



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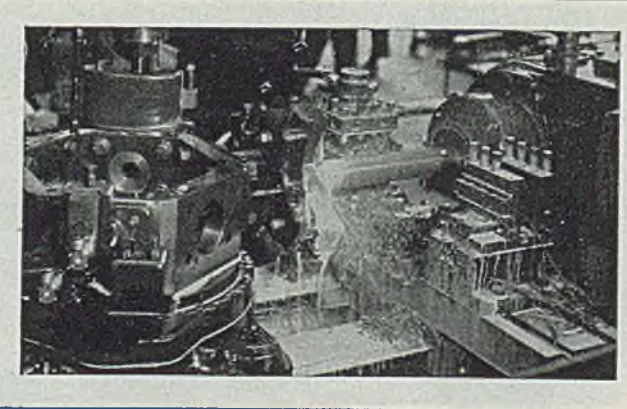

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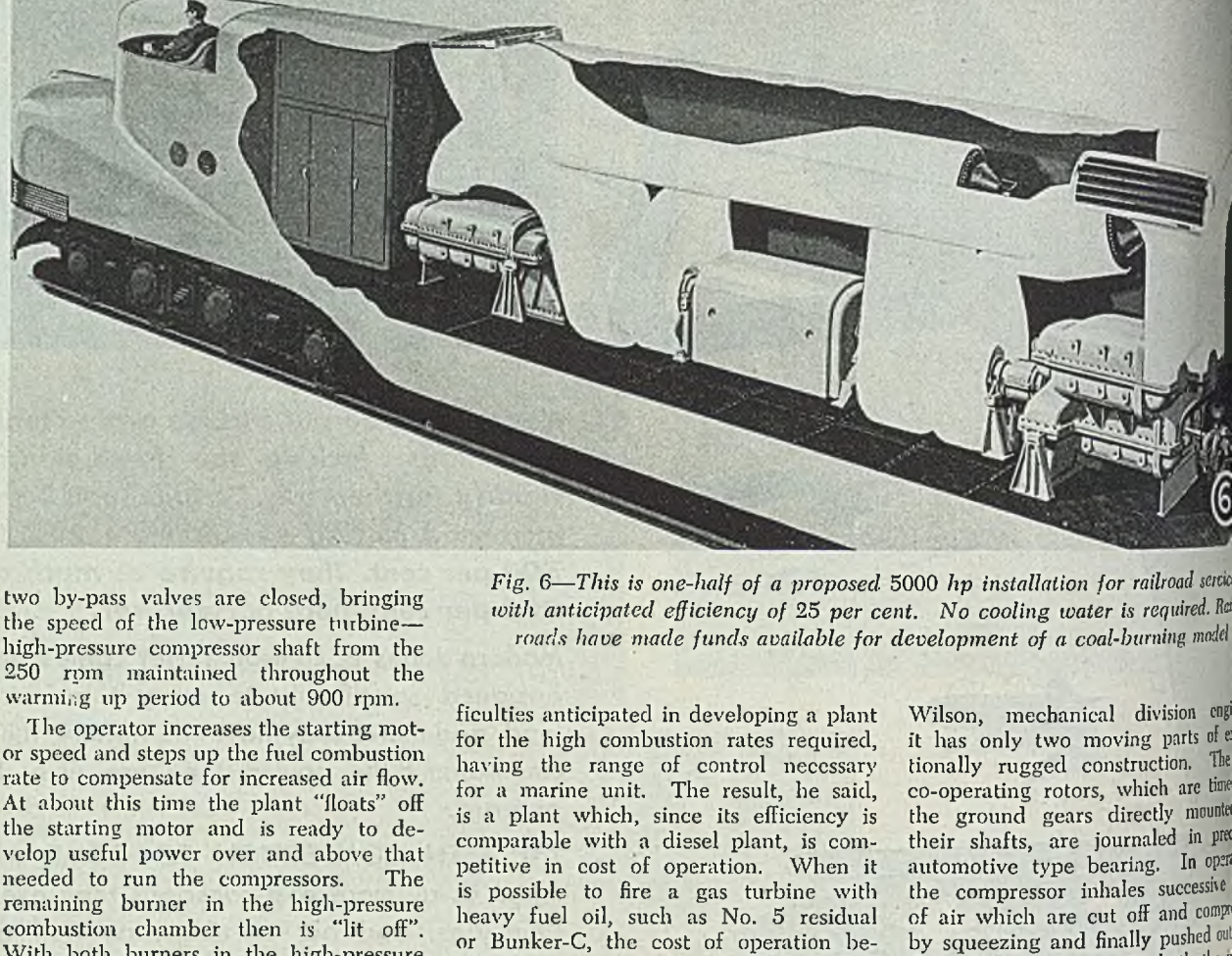

Fig. 6—This is one-half of a proposed 5000 hp installation for railroad servic with anticipated efficiency of 25 per cent. No cooling water is required. Ra roads have made funds available for development of a coal-burning model

two by-pass valves are closed, bringing the speed of the low-pressure turbine—high-pressure compressor shaft from the 250 rpm maintained throughout the warming up period to about 900 rpm.

The operator increases the starting motor speed and steps up the fuel combustion rate to compensate for increased air flow. At about this time the plant "floats" off the starting motor and is ready to develop useful power over and above that needed to run the compressors. The remaining burner in the high-pressure combustion chamber then is "lit off". With both burners in the high-pressure chamber going at full rate and the low-pressure chamber "secured" entirely, an output of 2000 hp can be obtained, according to Lieut. J. H. Gray of the Navy Department. Lighting of the burner in the low-pressure chamber brings the plant up to useful power output of 2500 hp.

The plant was built for firing with a high-grade, distillate diesel fuel. This was done, M. A. Mayers, process division engineer said, to minimize the difficulties anticipated in developing a plant for the high combustion rates required, having the range of control necessary for a marine unit. The result, he said, is a plant which, since its efficiency is comparable with a diesel plant, is competitive in cost of operation. When it is possible to fire a gas turbine with heavy fuel oil, such as No. 5 residual or Bunker-C, the cost of operation becomes very much less than that of a diesel plant. Some experience already has been gained in firing in experimental combustion chamber with No. 5 fuel oil, Mr. Mayers said.

One of the important prerequisites in the construction of the gas turbine was the development of a compressor which would provide a continuous flow of air. The Lysholm compressor (Fig. 4) developed for this purpose is essentially very simple. As described by W. A. Wilson, mechanical division engi it has only two moving parts of e tionally rugged construction. The co-operating rotors, which are time the ground gears directly mounte their shafts, are journaled in prec automotive type bearing. In opera the compressor inhales successive of air which are cut off and compr by squeezing and finally pushed out the exhaust system. At both the i and exhaust, Mr. Wilson said, the cessive bites overlap so that a contin flow is obtained.

Because of the high temperature countered, Elliott engineers found one of the major problems in desi the turbine involved finding su materials. Both the high-pressure the low-pressure turbines and com able part of the duct work operat red heat. "The physical characte of metals at these high temperatur a problem in itself," said J. F. Cum ham Jr., manufacturing division neer. "Not only is the strength of metal reduced at high temperatures, also the phenomenon known as 'c becomes apparent when exposure to temperature is prolonged."

"Because of creep it is certain after some period of operation, the bine rotors will grow, the flat ducts will bulge and the round will grow too large and too thin. the designer's problem to choose terials and loadings of such chara that these changes will not be obser before a certain definite time in t of hours of operation. The present is designed for 10 years of service.

Fig. 2 shows the materials and

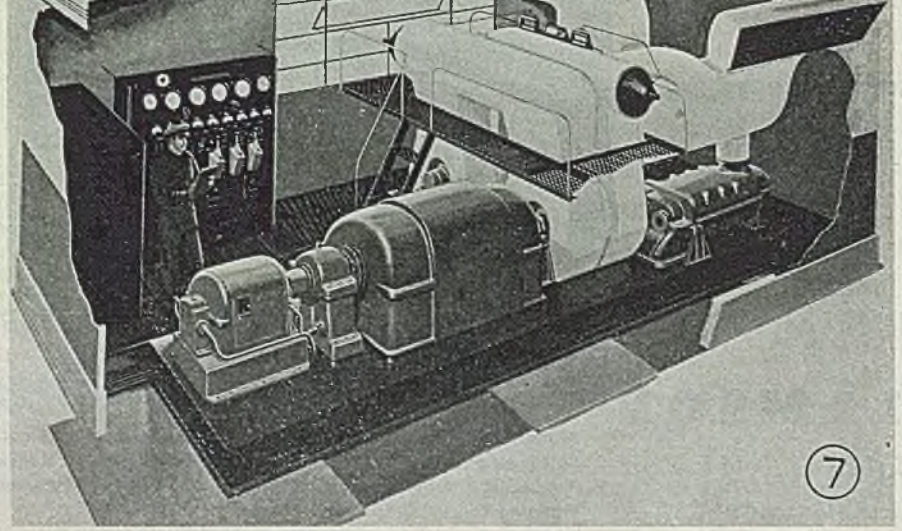

Fig. 7—"Packaged" power unit like this are contemplated which could be moved on skids and placed in operation immediately

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ating temperatures in all major parts. It will be noted that materials range from carbon steel and gray iron to 25-20 chromium-nickel and 28 per cent chromium steels. The torroidal joints in the high-pressure combustion chamber (E) inlet posed an interesting problem. This duct is made of chromium molybdenum steel to operate at 1000° F. The torroidal joints are spinnings 0.025-in. thick. Chromium-molybdenum steel in this application is subject to scaling, Mr. Cunningham said. Austenitic stainless steels have a higher co-efficient of expansion than the chromium-molybdenum steel, which would cause intolerable differential stresses; ferritic stainless steel cannot be spun successfully; and copper alloys have high coefficients of expansion and poor high temperature properties. The problem was solved by using "L" nickel which has carbon content of only 0.02 per cent max. and which may be spun readily.

Elliott engineers found that one of the best overall solutions to the problem of building the machine was the use of rolled plate and arc welding so that many pieces could be joined into one permanent assembly. This method was used in all of the duct work and combustion chambers, although some problems were involved. For instance, the SAE-4130 chromium molybdenum steel is of the air hardening variety and there is danger of a hard, brittle zone directly adjacent to the weld. As a result, it was necessary to check prior to making each weld and determine whether preheating was required.

Welding of the special chromium nickel 19-9 WMo steel was a completely new problem. The material had not been welded previously and it was necessary to develop a new welding electrode.

In designing the rotors of the Lysholm compressors, it was necessary to use steel shafts but steel could not be used for the rotors themselves. This set up the problem of attaching steel stub shafts to cast iron rotors. Finally, a low-temperature silver brazing procedure was set up although it had not been previously applied to such large parts.

In making the regenerator, it was necessary to have a large number of joints which would transmit heat from the tubes to the fins, Mr. Cunningham said, and remain strong at a temperature exceeding 1000° F. Following considerable testing and numerous changes, a method was developed for building the regenerator from nickel tubing and sheets by the copper brazing pro
More than 8½ miles of tubing
required.

Probably the most unusual weldin
in the whole turbine plant was
fabrication of the turbine rotors from
machined from forgings and ro
plate. The rotor disks were comp
machined and the blades attached
to assembly of the rotor. The
shaft for the inlet end of the roto
set up in a framework and the firs
was heated in hot water and place
the shaft. The disk was held firm
position and upon cooling was s
securely to the shaft. Succeeding
were attached in the same manner.

When the rotor was completel
sembled in a vertical position, four
welds were made in each welding g
to hold the parts together and
tension in an axial direction. A
point, rollers were applied to hol
rotor and the whole frame laid ov
its side. A pulley then was att
to one end of the rotor and conn
to a belt by a variable speed drive,
would rotate the rotor at welding s
Fig. 5 shows the rotor with g
in place to protect the blading and
from weld spatter, and the we

(*Please turn to Page 166*)

Silver Soldering Machine

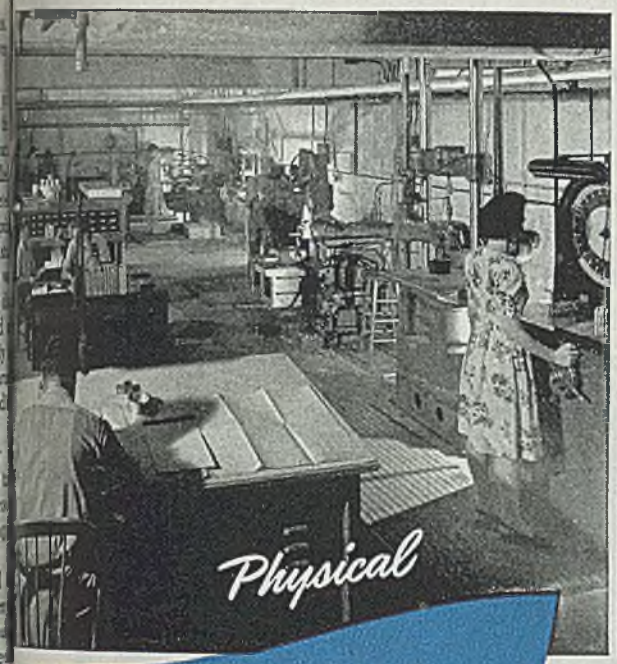
. . . rotates parts on motorized turn table to achieve uniform and controlled heating on all surface

UNIFORM and controlled heating of the work pieces in silver soldering operations is accomplished by the use of the rotating work table shown in the accompanying illustration, at Smith Welding Equipment Corp., Minneapolis. The machine is operated by two electric motors. One motor, with variable speed, operates the turn-table which passes pieces to be silver soldered through the various flames. A second motor rotates the pieces in the holders at a fixed speed so that heating is uniform on all surfaces. Adjustment of turn-table speed further provides for a uniform and gradual rate of heating to soldering temperature. Flux thus is brought to the right temperature at the right time, without being overheated.

The turn-table rotates in a counter-clockwise direction, and soldering is done by an operator seated at right. The operator, standing, removes the piece after it has been soldered and puts an unsoldered piece in its place. In the illustration, tubes are being soldered into the head of Smith-made cutting assemblies.

Actually, two silver soldering operations are being performed at the same time, one a manual operation and the other automatic. One of the inserted tubes encloses a smaller tube which carries oxygen for the preheating flame. This preheating oxygen tube is screwed into the head and a small ring of silver solder is fitted around where the joint is going to be. Then the joint is fluxed with Superior Flux Co.'s No. 6 solder flux, and the outer tube is screwed into place. This same procedure is followed when the tubes are soldered into the butt, except that the tubes are not screwed but pressed into place. Silver solder is applied to the two outside joints in the form of a wire fed continuously i
hand, while the inner joint is heated by conduction so th
the joint is automatically soldered.

The small tube, which carries the preheating oxygen insi
of the larger tube, is of copper. The larger tube is of Mon
metal, except in cases when it is necessary to use drawn
brass. The oxygen tube at the top of the cutting assembl
is a drawn brass tube. Heads and butts are bronze forging



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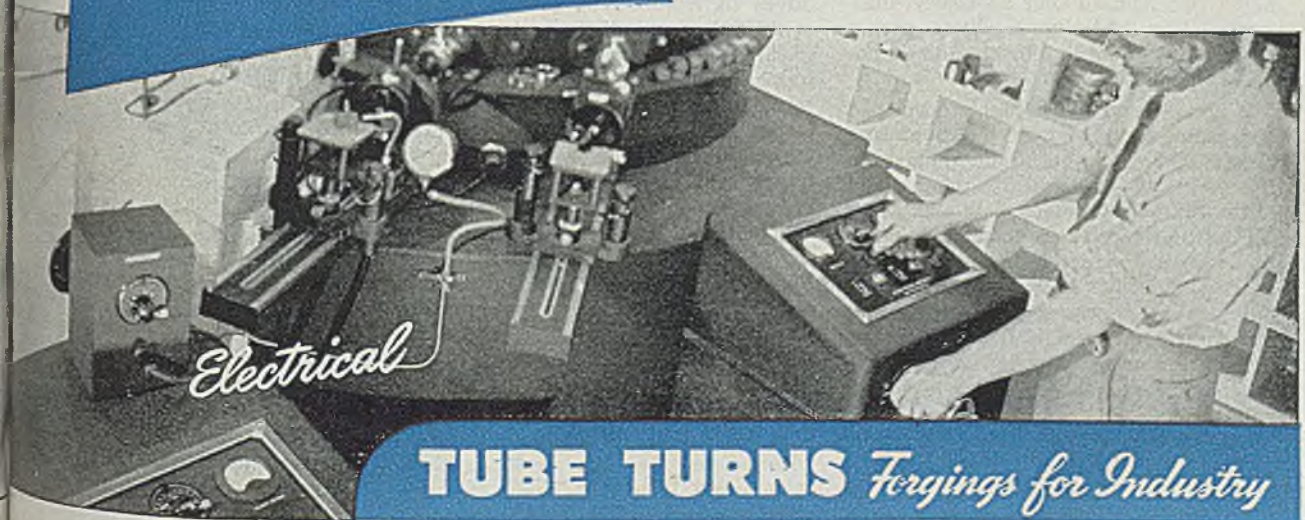


TUBE TURNS *Forgings for Industry*

Automatic Screwdown Control

Preset control applied to 132-in. reversing universal plate roughing mill at Geneva, Utah, is arranged to automatically move the screws to preselected settings for each pass in the rolling schedule. Speed of screwdown drive is reduced as it approaches selected pass position to effect accurate stop at selected position. Equipment described and method of operation explained in detail

By A. F. KENYON and W. G. COOK

Steel Mill Engineer
Westinghouse Electric Corp.
East Pittsburgh, Pa.

District Engineer
Westinghouse Electric Corp.
Pittsburgh

Fig. 1—Master control benchboard and preset pass selector plug boards for the reversing universal rougher

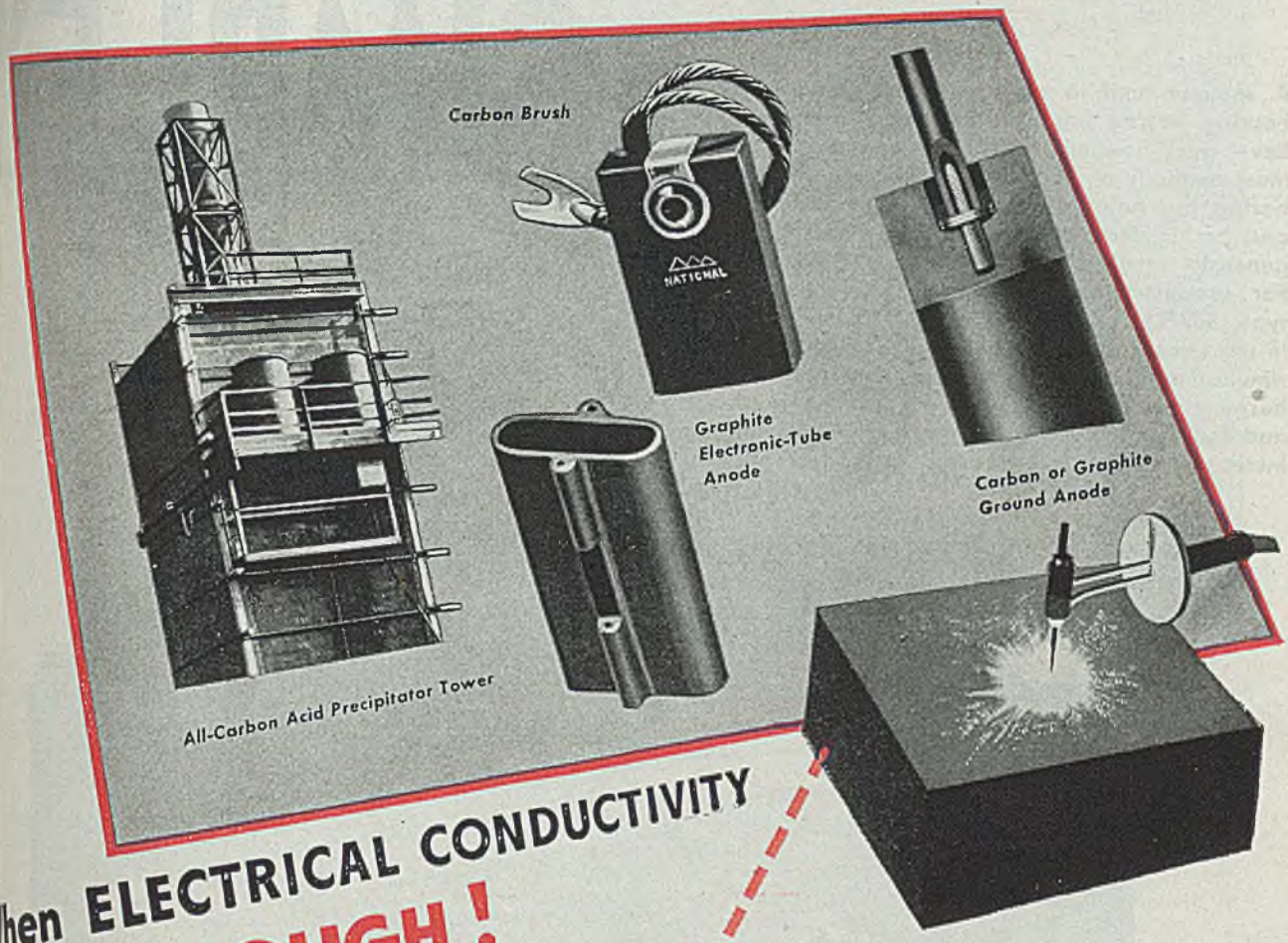
FULLY integrated steelworks and rolling mills at Geneva, Utah, operated for the government by the Geneva Steel Co., provide annual capacity of approximately 900,000 tons of finished plate and structural steel, vital for the war-expanded West Coast ship-building industry. With minor exceptions the plant equipment is of modern design; operations are highly mechanized and as nearly automatic as possible, to facilitate proper control and to aid in efficient and economical operations.

A notable example of highly developed automatic equipment is the automatic preset screwdown control, applied to the reversing universal roughing stand of the 132-in. continuous plate mill. This control is arranged to automatically move the screws to preselected settings for each pass of the rolling schedule, thus relieving the operator of the strain of manual control, and also assuring consistently accurate screwdown settings in minimum time, and reducing electrical and mechanical maintenance by virtue of the smooth variable voltage operation.

The 132-in. plate mill, having a rated annual capacity of 700,000 tons of finished plate, is of the semicontinuous type, consisting of six 4-high reducing roll stands, and two auxiliary 2-high scale breaking stands, arranged in a straight line. Slabs may come either directly from the slabbing mill without reheating, or from slab reheating furnaces. The 36 x 70-in. 2-high No. 1 scale breaking stand, and the 42 and 56 x 132-in. 4-high spreading stand are driven by wound rotor induction motors of 1250 hp, and 4500 hp capacity, respecitively. The main horizontal working rolls of the 38 and 56 x 132-in. 4-high reversing universal roughing mill, are driven by a 7000-hp, 25/60 rpm direct-current reversing motor, and the vertical edging rolls on the entry side by a 650-hp reversing motor. The continuous finishing mill consists of a 25½ x 132-in. 2-high No. 2 scale breaking stand, and four 30 and 59 x 132-in. 4-high finishing stands. A 500-hp motor drives the No. 2 scale breaker, and each of the four finishing stands is driven by a 5000-hp dc adjustable-speed motor.

The mill is designed for the large scale production of all types of steel plate, within the range of 36 to 128 in. wide and 3/16 to 2 in. thick. Slabs are usually from 4 to 8 in. thick, but the mill can handle slabs up to 12 in. thick w required to produce heavy plates of length. Slabs are 60 in. wide maxim and are spread to the required width by cross rolling in the spread stand. The spreading stand is nonrev ing, and hence in usual practice wo make only one spreading pass. H ever, on the Geneva mill, spreading the wider plate widths may require or occasionally three spreading pas and the equipment is arranged so that rolls may be separated and the pushed back through the mill when necessary to make more than one spre ing pass.

Fig. 2 is a closeup view of the 38 56 x 132-in. 4-high reversing univer plate roughing mill, with a slab wh has already been rolled in the No scale breaking stand and spreading st on the entry table ready for further ing in the reversing roughing mill. most schedules five or seven passes made in this reversing roughing m and automatic control is provided the screwdown so that the screws moved automatically to preselected tings for each pass, thus expediting rolling by minimizing the time for



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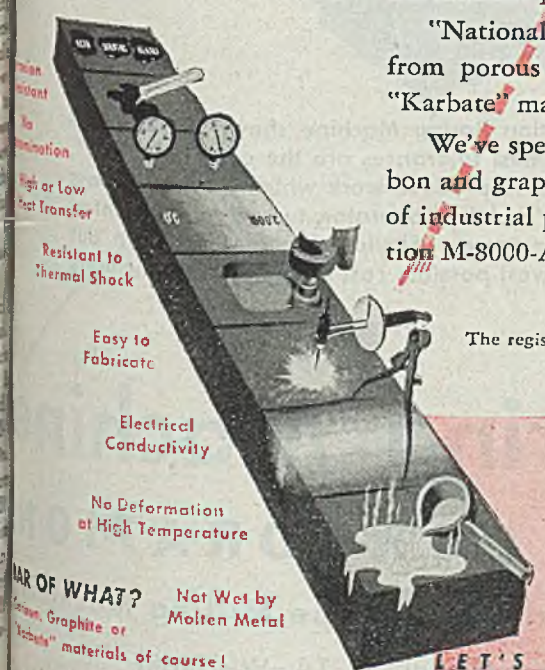

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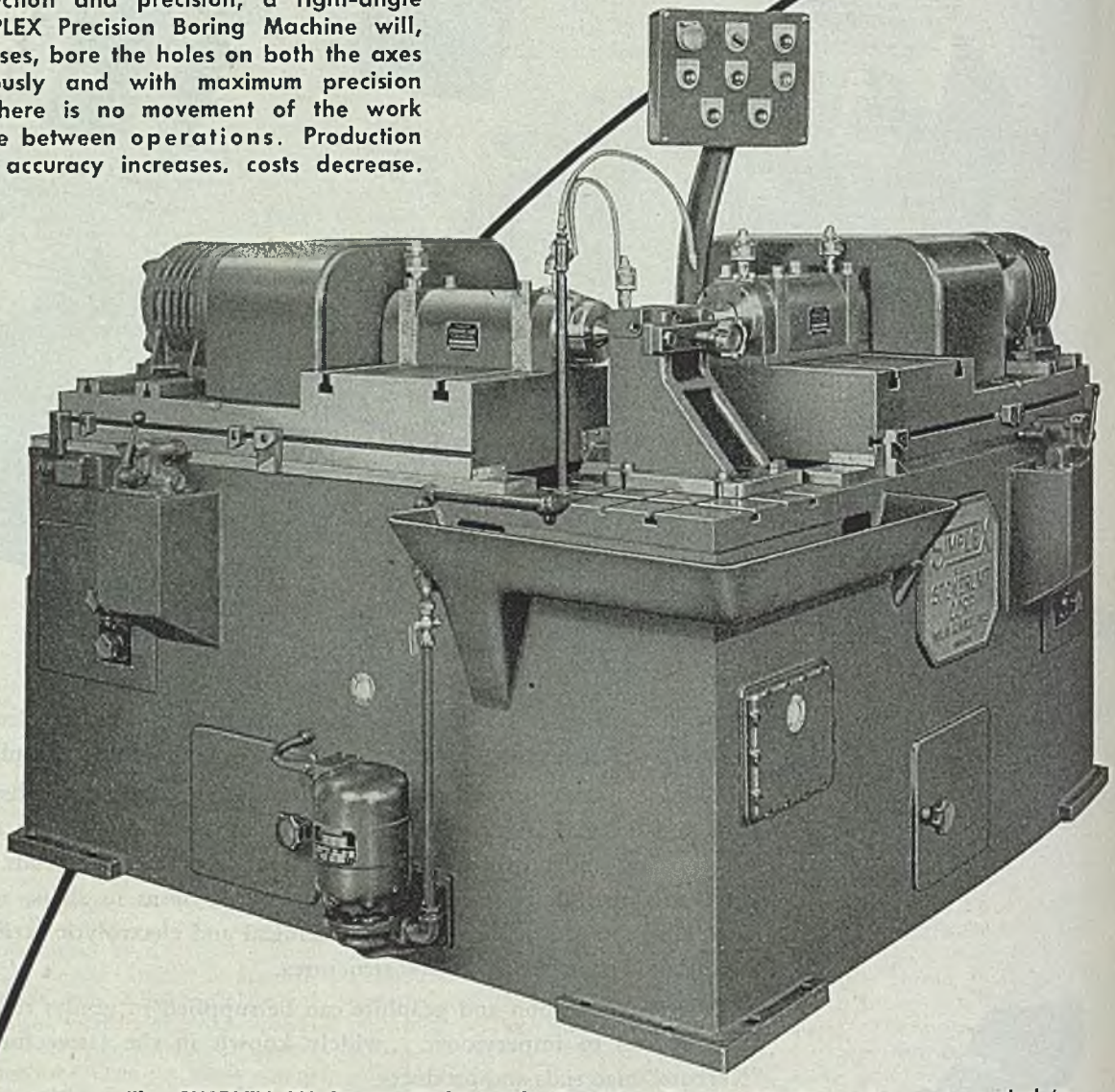

The SIMPLEX 2U 2-way Right-angle Precision Boring Machine shown is tooled to bore a die-cast worm gear housing where most tolerances are the order of .0002". The slightest shift in the work or fixture would produce work which would not pass inspection, yet this machine, handled by an unskilled operator, turned out uncounted thousands of units needed by our fighting forces. Similar machines will turn out civilian products of a high quality at the lowest possible cost for those manufacturers who plan their future production today.

Precision Boring Machine

STOKERUNIT CORPORATION

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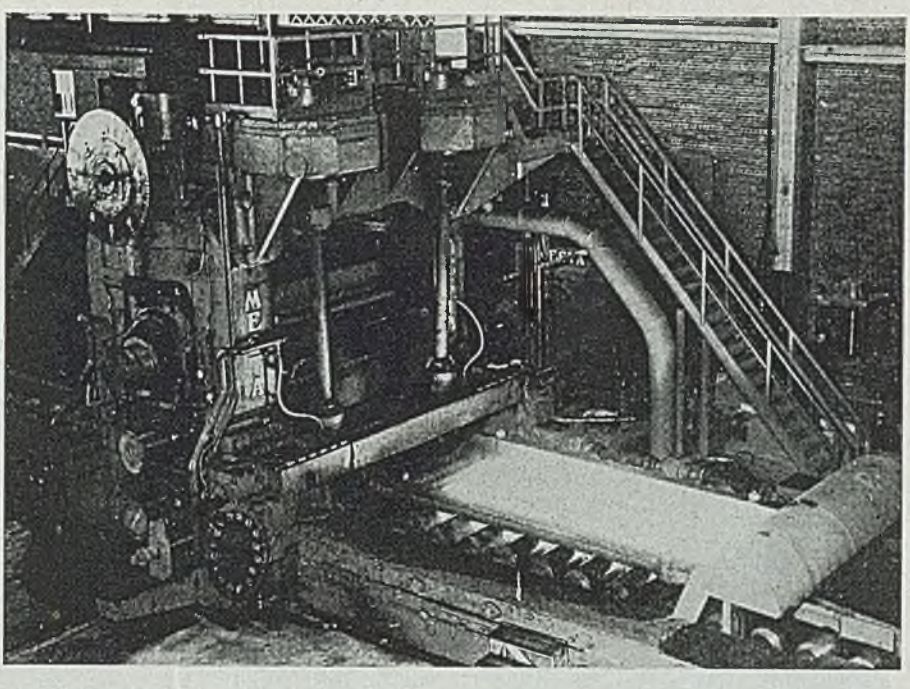


Fig. 2—Four-high reversing universal roughing plate mill equipped with automatic screwdown control

...s movements between passes, as well ...suring uniformly accurate drafting of ...succeeding plate. All operations ...the reversing roughing mill are con...led by one operator from a master ...rol benchboard located in the second ...r of No. 5 control house along the ...building wall approximately opposite ...mill. Fig. 1 shows the operator at ...master control benchboard.

...sketch of the schematic arrangement ...the 132-in. reversing universal plate ...ging mill screwdown drive and the ...matic preset limit switch control is ...n in Fig. 3. The front and back ...ws are driven by two 100-hp, frame ...16-MC, 485 rpm, shunt wound, mill ...dc, mill motors, through worm ...drives of 16.75:1 ratio, so that ...screw movement corresponds to ...revolutions of the screwdown mo... Variable voltage power is sup... by two 100 kw generators, which ...be operated up to about 400 v maxi..., to provide screw speeds up to 50 ... The screwdown generators are ...of a 7-unit synchronous motor-gen...r set which also includes the vari...voltage generators for the front and ...main table motors and the vertical ...motor.

...normal operation the magnetic ...between the two screwdown motors ...ged, and the two screws are oper... and controlled together to raise or ...both ends of the upper rolls. ...son is also made so that the clutch ...be disengaged and either screw ...ed alone to level up the mill and ...mate for variations in bearing ...bearing wear, roll temperature, etc. ...indicators, operated by synchro..., are provided on the operator's ...benchboard to show the posi... the front and back screws.

Principal parts of the automatic preset control for the reversing mill screwdown are (a) the limit switch, (b) 2-pass selector plug boards, (c) necessary master control devices on the operator's control benchboard, and (d) schedule and pass selector control panels and variable-voltage controller.

Figs. 4 and 5 are front and rear views, respectively, of the limit switch, which is installed in the first floor of No. 5 control house, directly below the operator's control benchboard and pass selector plug boards. As seen in Fig. 5, the contact arm of the limit switch is driven through suitable gearing by a synchro-tie receiver which is electrically connected to a similar synchro-tie transmitter driven by the screwdown motors, so that the contact arm follows the movements of the screwdown. Roller contacts on the rotating arm make contact with stationary contacts which are arranged spirally on the limit switch faceplate. Gear ratios are selected so that 1 in. travel of the screws corresponds to one revolution of the contact arm, and in the 8-in. total screw travel the contact arm moves over the eight turns of spirally arranged stationary contacts. Thus each set of stationary contacts corresponds to a particular screw position or opening between the upper and lower mill rolls.

The 2-pass selector plug boards are seen in Fig. 1, adjacent to the operator's control benchboard, one at the left and the other at the right of the operator as he sits before the benchboard. On each plug board there are provided 139 plug receptacles whose terminals are connected through cabled leads to the stationary contacts of the limit switch. Thus each plug receptacle corresponds to a particular screw position or opening between the upper and lower mill rolls, the same as each set of stationary contacts on the limit switch. The 8-in. total screw travel is not uniformly divided over the 138 steps, but is proportioned in large increments when the roll opening is large and progressively smaller increments as the opening is reduced, as indicated in the following tabulation:

Steps No.	Inches Roll gap, inches
8	0.200-8.600 to 7.000
40	0.100-7.000 to 3.000
20	0.050-3.000 to 2.000
70	0.020-2.000 to 0.600

Along the bottom of each plug board are 11 cable jumpers, terminating in contact plugs which may be inserted in any of the receptacles. The plugs are numbered from 1 to 11, corresponding to the numbers of the passes of a rolling schedule, so that a rolling schedule for not more than 11 passes may be set up by inserting the No. 1 plug in the re-

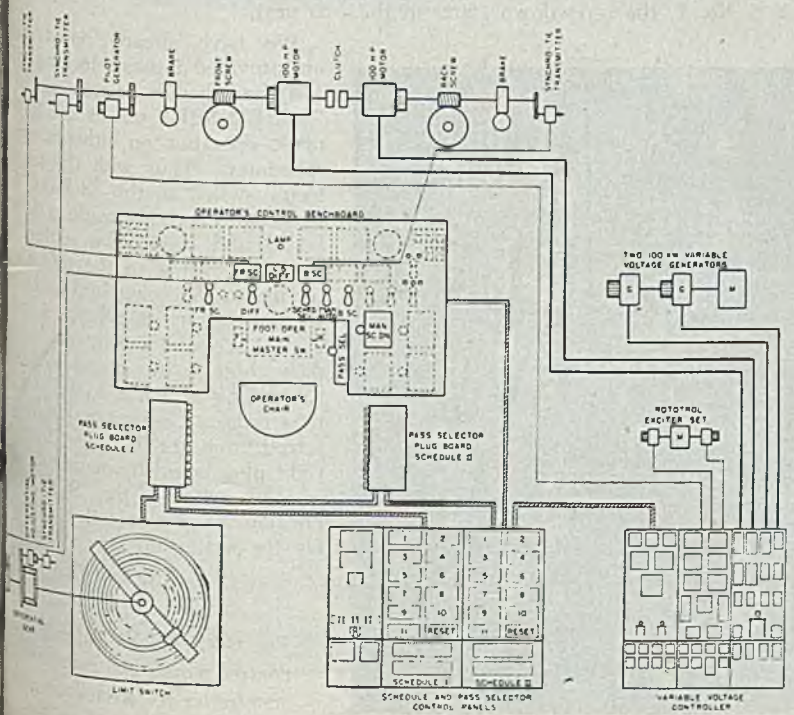
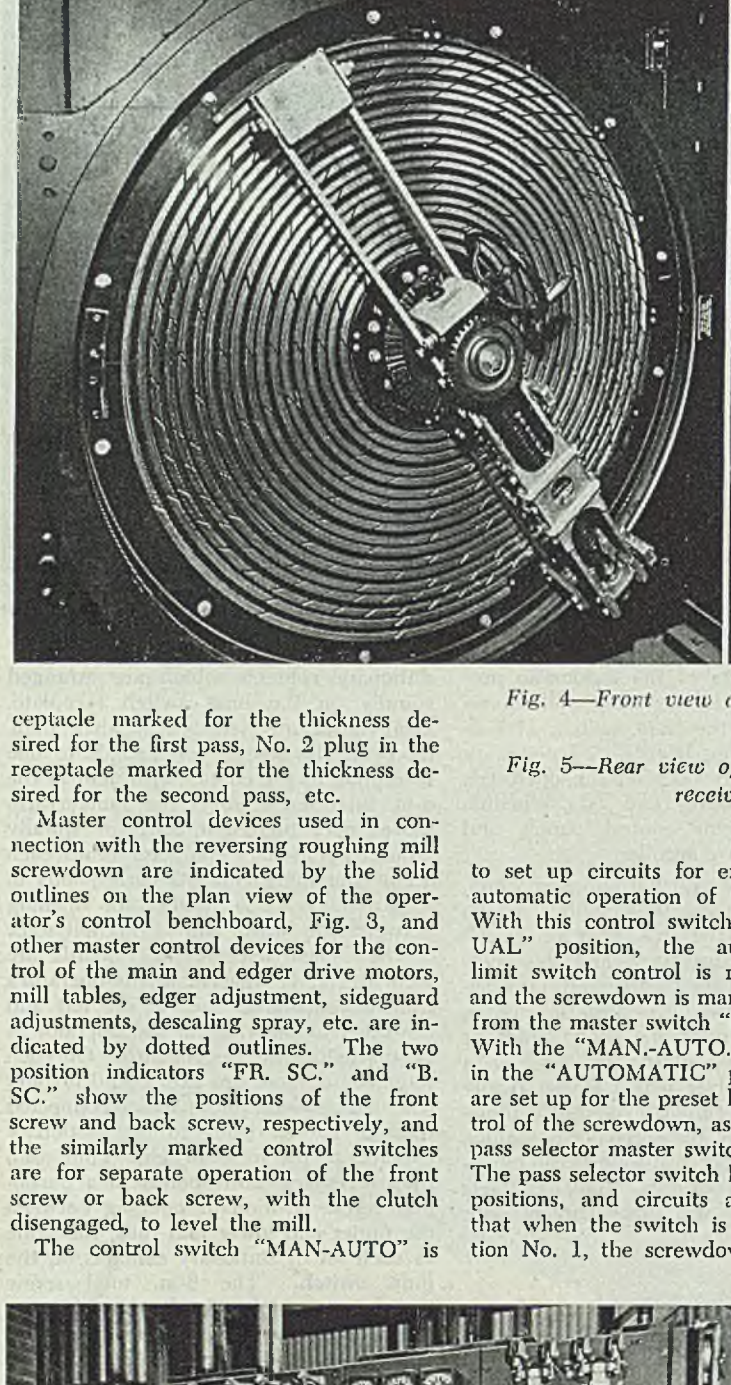


Fig. 3—Schematic arrangement of automatic preset limit switch control serving the 132-in. continuous plate mill



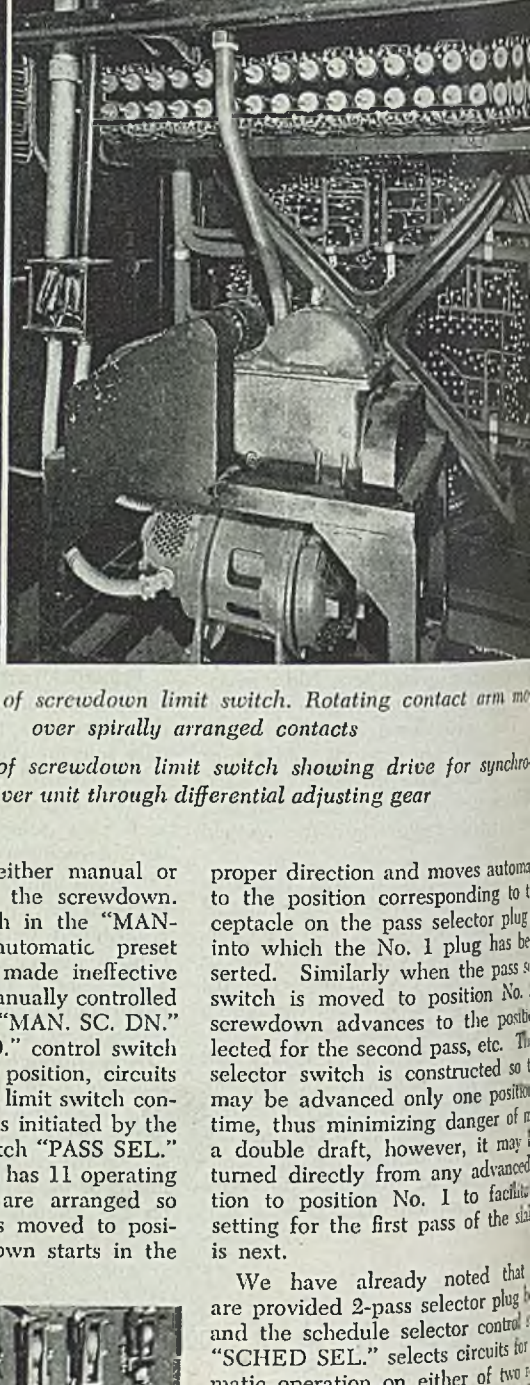


Fig. 4—Front view of screwdown limit switch. Rotating contact arm mo over spirally arranged contacts

Fig. 5—Rear view of screwdown limit switch showing drive for synchro receiver unit through differential adjusting gear

ceptacle marked for the thickness desired for the first pass, No. 2 plug in the receptacle marked for the thickness desired for the second pass, etc.

Master control devices used in connection with the reversing roughing mill screwdown are indicated by the solid outlines on the plan view of the operator's control benchboard, Fig. 3, and other master control devices for the control of the main and edger drive motors, mill tables, edger adjustment, sideguard adjustments, descaling spray, etc. are indicated by dotted outlines. The two position indicators "FR. SC." and "B. SC." show the positions of the front screw and back screw, respectively, and the similarly marked control switches are for separate operation of the front screw or back screw, with the clutch disengaged, to level the mill.

The control switch "MAN-AUTO" is to set up circuits for either manual or automatic operation of the screwdown. With this control switch in the "MANUAL" position, the automatic preset limit switch control is made ineffective and the screwdown is manually controlled from the master switch "MAN. SC. DN." With the "MAN.-AUTO." control switch in the "AUTOMATIC" position, circuits are set up for the preset limit switch control of the screwdown, as initiated by the pass selector master switch "PASS SEL." The pass selector switch has 11 operating positions, and circuits are arranged so that when the switch is moved to position No. 1, the screwdown starts in the proper direction and moves automa to the position corresponding to t ceptacle on the pass selector plug into which the No. 1 plug has be serted. Similarly when the pass s switch is moved to position No. screwdown advances to the positi lected for the second pass, etc. Th selector switch is constructed so t may be advanced only one positio time, thus minimizing danger of m a double draft, however, it may turned directly from any advanced tion to position No. 1 to facilit setting for the first pass of the sla is next.

We have already noted that are provided 2-pass selector plug b and the schedule selector control "SCHED SEL." selects circuits for matic operation on either of two schedules. Thus with the schedu lector switch in the "Schedule I" tion connections are made to the left board and screwdown settings w made according to the rolling sch set up on that plug board. During time the right plug board is ineff and the operator may arrange fo pass plugs in the proper receptacl the rolling schedule to be used fo next order. Connections are then ferred from the left plug board t right plug board by moving the sch selector switch to the "SCHEDULE position, thus eliminating any delay for setting up new rolling sch

(*Please turn to Page 170*)

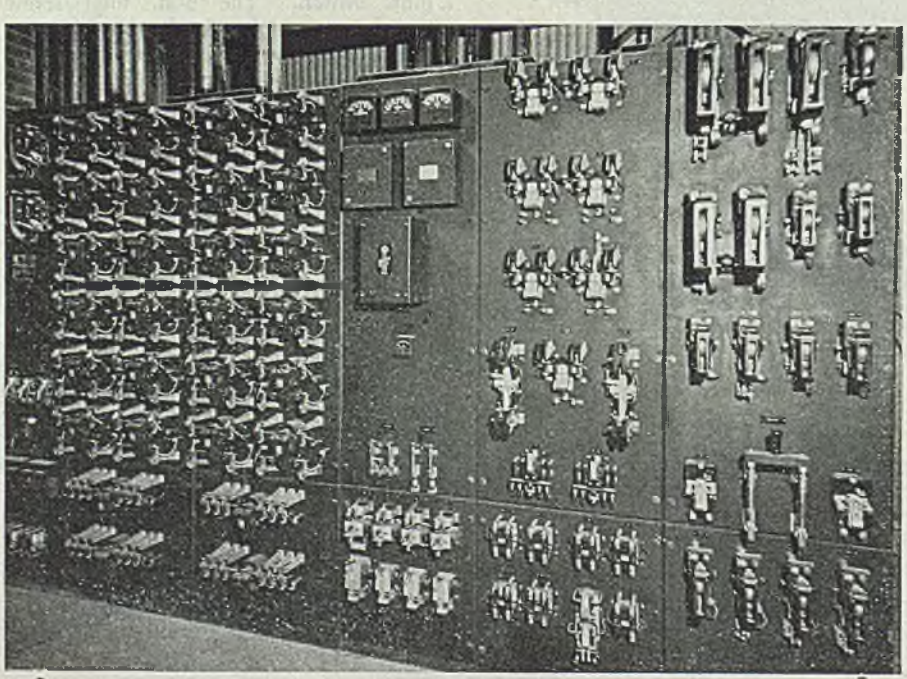


Fig. 6—Schedule and pass selecto control panels and variable-voltag controller for screwdown control

Otiscoloy—the lighter, stronger, high-
sile J&L Steel—cuts structural weight with
loss of structural strength—lends itself
both hot and cold working—has ade-
ate ductility and a high degree of weld-
ity—resists abrasion and corrosion.

LIGHTER YET STRONGER

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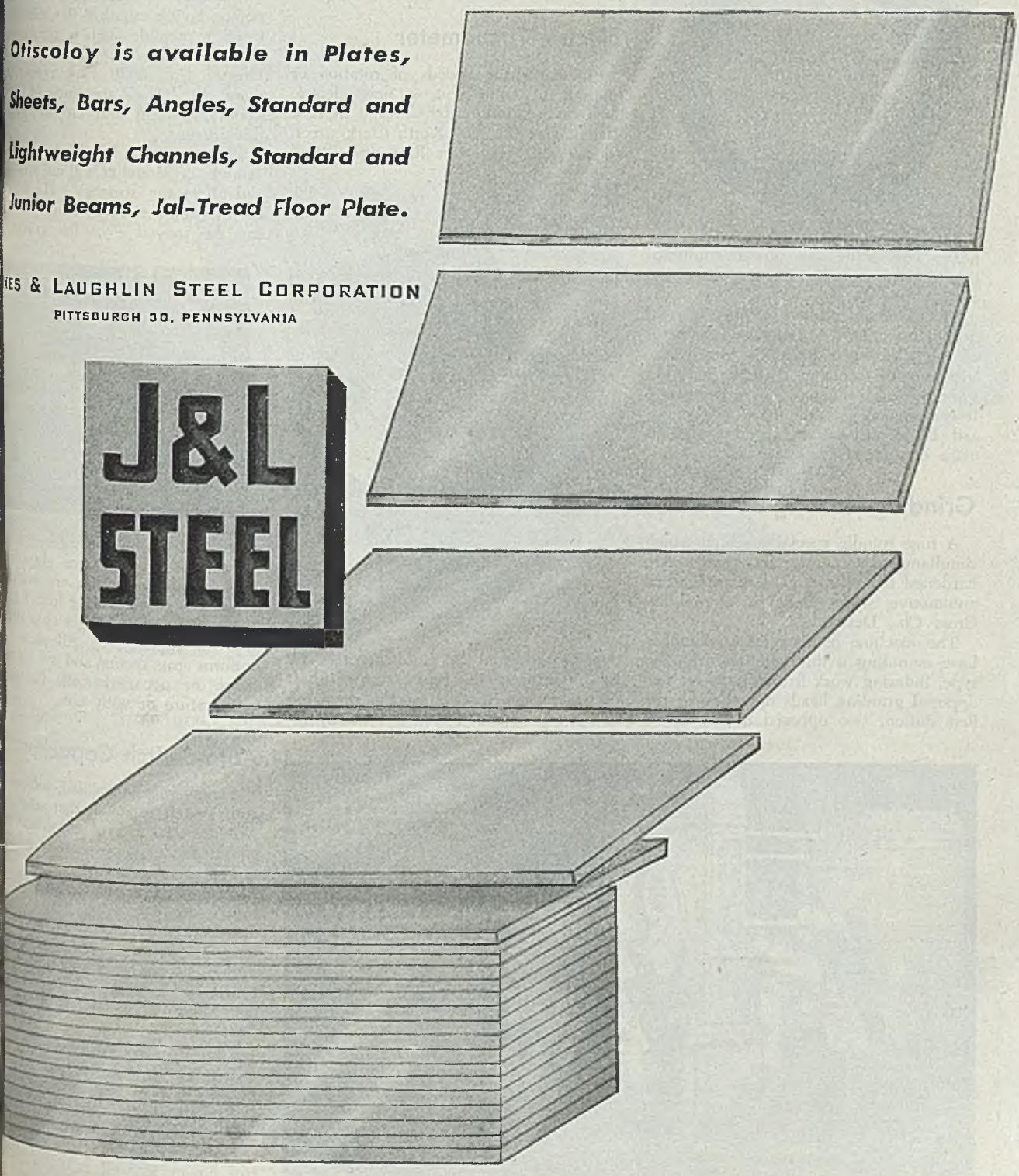
Otiscoloy is available in Plates, Sheets, Bars, Angles, Standard and Lightweight Channels, Standard and Junior Beams, Jal-Tread Floor Plate.



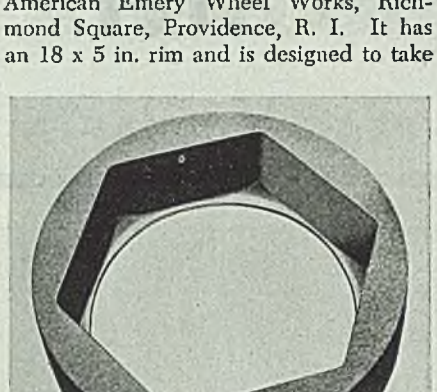
VES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

J&L STEEL

INDUSTRIAL EQUIPMENT

Grinding Wheel

Known as Hexilinder, a new cylinder type grinding wheel with hexagon hole or inside diameter, is announced by American Emery Wheel Works, Richmond Square, Providence, R. I. It has an 18 x 5 in. rim and is designed to take



heavy cuts with low power consumption due to the shearing action of the cutting face.

The grinding wheel functions on steel or cast iron, the hexagon inside diameter of the wheel providing for proper distribution of coolant, thereby reducing grinding heat generated to a minimum. It is designed for mounting on a standard Blanchard surface grinder without extra equipment.

Grinding, Honing Machine

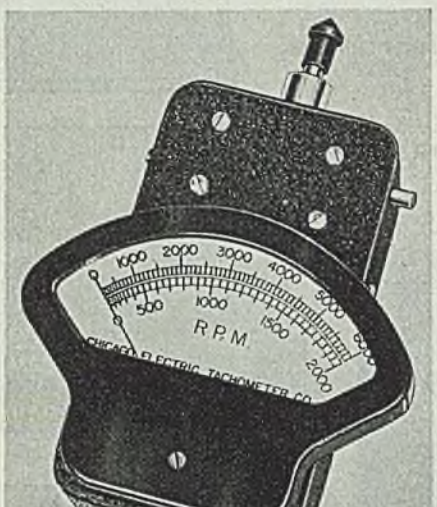
A four spindle special machine which simultaneously grinds and hones two hardened taper bearings, cast integral in automotive wheel hubs is offered by Cross Co., Detroit.

The machine consists essentially of a base mounting a three station, trunnion type, indexing work fixture between two opposed grinding heads operating at the first station; two opposed honing heads at the second station and a third station for loading and unloading the workpieces. All elements of the machine are hydraulically actuated and automatically controlled by electric pushbuttons.

In the automatic cycle, trunnion indexes to bring work into position at each station. While grinding heads rough-grind, retract, dress and finish-grind both taper bearings in opposite ends of the hub, previously ground bearings in another hub are being honed. Grinding coolant is automatically flushed from the hub as it indexes to honing station.

Electric Tachometer

For measuring speeds of rotation or motions of equipment, a new electric tachometer is offered by Chicago Electric Tachometer Co., 800 North Clark street, Chicago 10. It is small, compact and



can be operated in close quarters by lightly pressing the rubber tipped shaft of the tachometer against the revolving or moving object. Speed is instantly indicated in revolutions per minute o scale over 3 in. long.

Model 5-E, illustrated here, is signed and constructed so that no machine vibrations do not interfere the accurate readings. There is no ternal gearing of any kind. Side b is depressed to change ranges. It ca provided with wheel for measuring face speeds.

Surface Plates

Accuracy to 0.0001-in. when ga points, laying out drill jigs, dies an tures is possible with a granite su plate introduced by Ideal Commu Dresser Co., 5076 Park avenue, S more, Ill. They are made of Ver granite, ground and lapped to pr tolerances.

Plates cannot be damaged seri as nicks or scratches will not raise a and affect the accuracy. Having a coefficient of friction, tools and fix can be moved over the granite

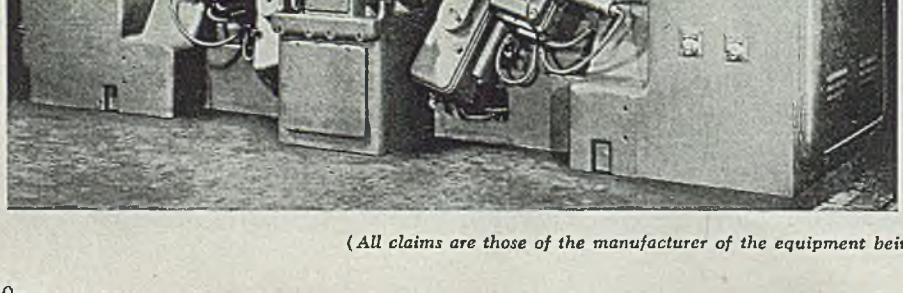
ease. They are nonmagnetic and not attract and hold iron chips or

These surface plates are availabl a range of sizes varying from 8 x 1 to 30 x 72 in. and larger sizes are a able on application. All plates ar uniform cross section and will not ch shape or accuracy with variation temperature or with age.

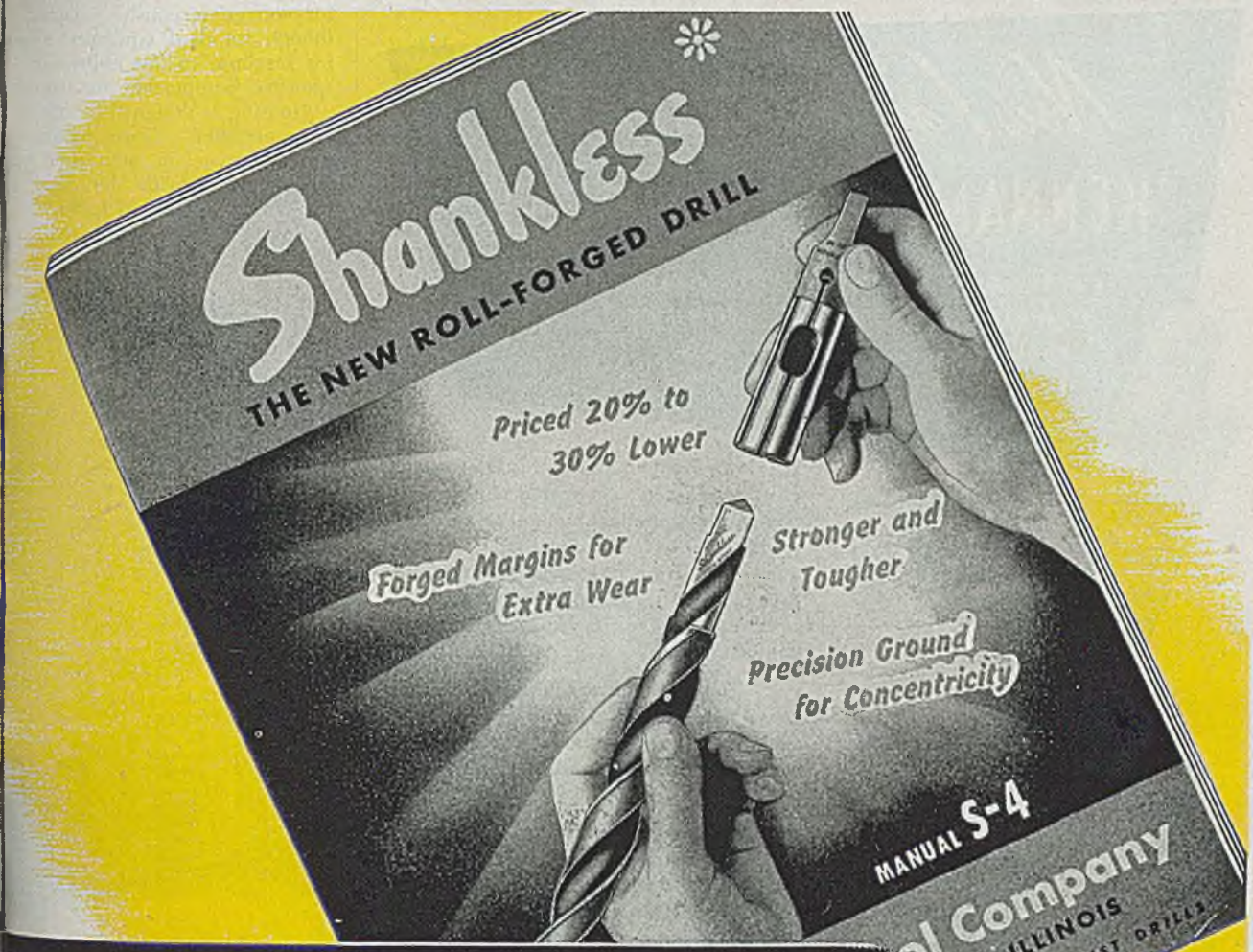
Auto-Switch Capacitor

A new metal enclosed, self-cont auto switch capacitor that automati switches 180 kva of capacitance o off the feeder in response to voltage quirements, is announced by Ge Electric Co., Schenectady, N. Y. signed for improving power facto distribution circuits at periods of load, capacitor is automatically nected in circuit when increased causes a drop in voltage and is connected when voltage increases light load.

Equipment consists of a 180 kva, v delta or 4160 v, 4 wire or Gr Y, phase group of Pyranol capacitor a 3-pole solenoid-operated switch, matic voltage control devices and potential transformer for supplying trol power as well as control pote



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



IF YOU USE DRILLS

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• This is not just another drill catalog. It is more than that. It is a book of complete and detailed information about a new way to reduce drilling costs. It tells how one of the world's largest and most progressive manufacturing organizations developed this new kind of drill—has standardized on it for the past six years. If you are using drills, here is a way for you to cut production costs. The first step is to send for this book.

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WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF TWIST DRILLS

Now! an IMPROVED KENNAMETAL LATHE FILE

- CUTS STEEL NO ORDINARY FILE CAN TOUCH
- PERMITS FILING SPEEDS 3 TO 10 TIMES THOSE POSSIBLE WITH STEEL FILES!
- OUTLASTS MILL CUT FILES 50 TO 200 TIMES

This new Kennametal Lathe File retains all the time-and cost-saving characteristics of previous designs—*cuts steel up to 62 Rockwell C hardness; does outstanding job on cast iron and non-ferrous materials; permits filing operations at carbide tool turning speeds; produces superior finish.*

And now, in addition, it provides these new features—*longer filing surface; quick, easy blade replacement; greater handling convenience.*

The filing surface comprises two 4" long Kennametal blanks which have cylindrical nuts brazed to them, and are attached to the aluminum alloy handle by screws. After long service (up to 200 times that obtained from steel files) the blanks can be readily replaced.

The handle grip has a thumb rest and knuckle guard. An extension of the handle beyond the filing surface provides a secure finger hold. A hole in this extension permits the file to be hung up.

On the first production run, a Kennametal Lathe File usually saves its cost many times over. Order one—let it demonstrate to you an astonishingly low filing cost-per-piece.

Features

REPLACEABLE BLANKS

Kennametal blanks are attached by Phillips head screws. Two types are available: fine (30 teeth per inch); and coarse (20 teeth per inch).

LIGHT WEIGHT

Weighs less than one pound. Can be handled with ease, and used for long periods of time with minimum expenditure of energy.

HAND-FITTING GRIP

Handle is comfortable—it fits the hand; provides secure grip. Opposite end of file provides convenient finger hold.

KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc., LATROBE, PA.

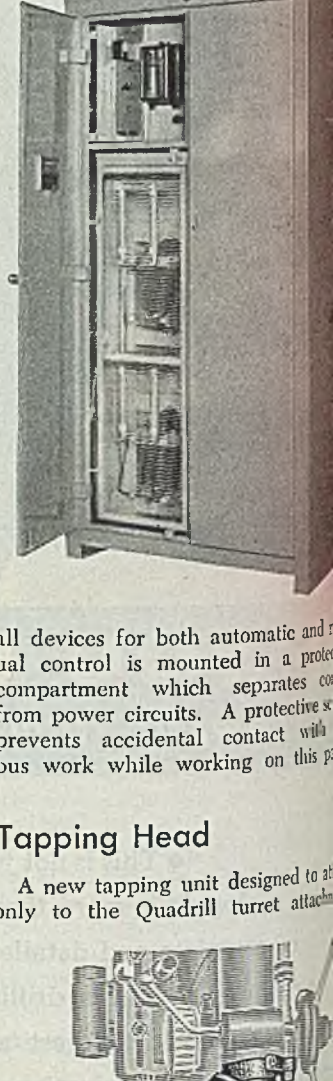
SPECIFICATIONS AND PRICES

COMPLETE FILE		FILE BLANK—2 REQUIRED		
CAT. No.	PRICE EACH	CAT. No.	TEETH/ INCH	PRICE EACH
F-45*	$18.50	F-453	30	$7.50
		F-452	20	7.50

* Furnished with blanks having 30 teeth/inch unless otherwise specified.

for voltage responsive equipments. ... though standard equipment is desig... for response to line voltage, current... sponsive equipments are also availa...

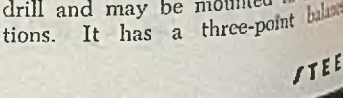
Housing is designed for base or ce... arm mounting. Cover bushings of ... process procelain with clamp term... connectors provide for connection ... the line. A hinged panel, contai...



all devices for both automatic and m... ual control is mounted in a protec... compartment which separates co... from power circuits. A protective s... prevents accidental contact with ... bus work while working on this p...

Tapping Head

A new tapping unit designed to at... only to the Quadrill turret attach...



for drill presses is announced by Chic... Drillet Corp., 919 North Michigan ... Chicago 11. Tapping head is h... speed, self-reversing with a capacity ... ¼-in. It is interchangeable with any ... the four spindle assemblies of the Q... drill and may be mounted in four p... tions. It has a three-point balanc...

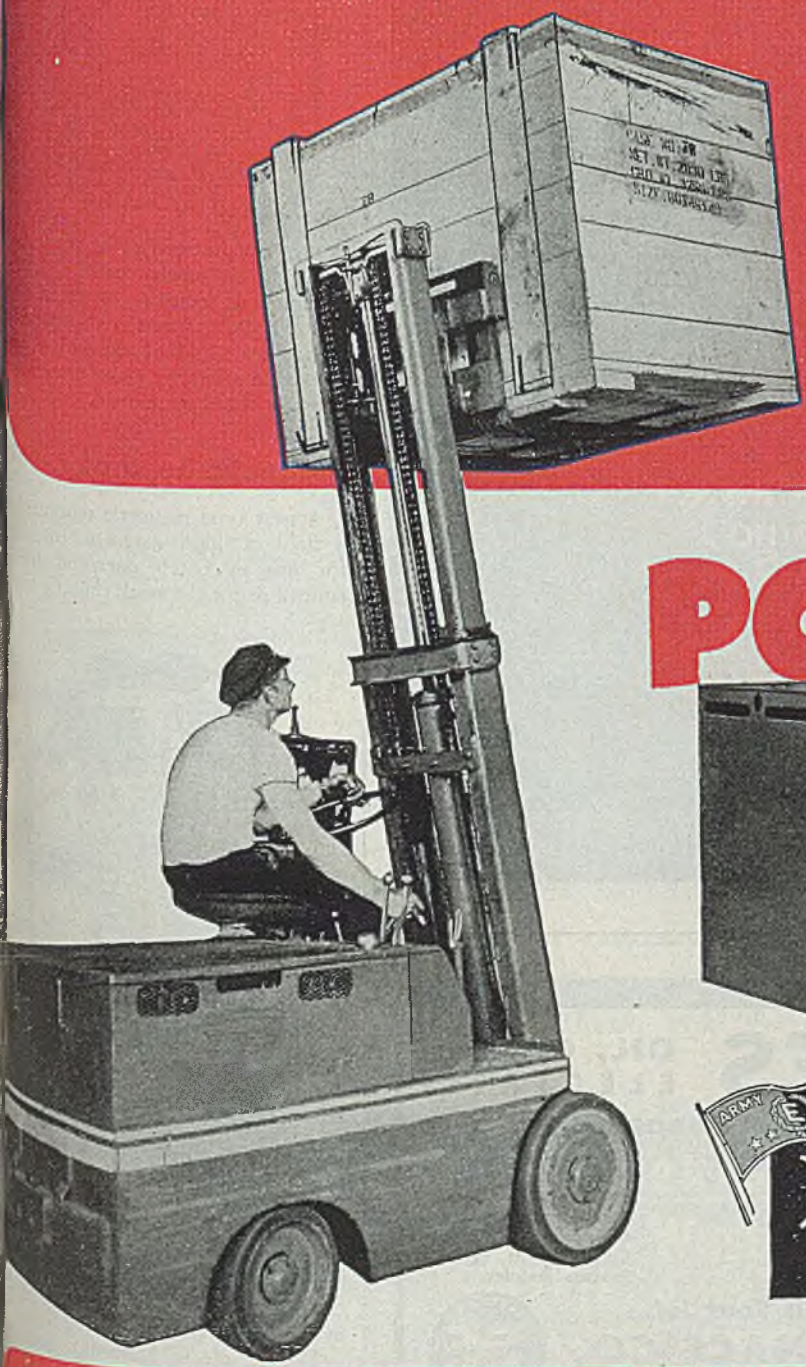
EXIDE POWER ASSURES STEADY, DAYLONG SERVICE

The exceptionally fine performance of electric industrial trucks reaches its peak when the motive power is Exide. Lifting, hauling and stacking of unit loads progress readily all day long, speeding up production, cutting handling costs, and enabling limited manpower to achieve full crew results.

Exides have long been the preferred battery for this important job because they have the extra power needed to meet today's heavier strain. Their ample reserves assure sustained speeds throughout each shift; and their rugged construction keeps them on the job. You can always count on Exide Batteries for dependability, long-life and ease of maintenance.

Write us for a FREE copy of the bulletin "Unit Loads," prepared by The Electric Industrial Truck Association. It tells how to cut handling costs up to 50% ...covers latest developments in materials handling . . . and includes actual case histories.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
Exide Batteries of Canada, Limited, Toronto



POWER

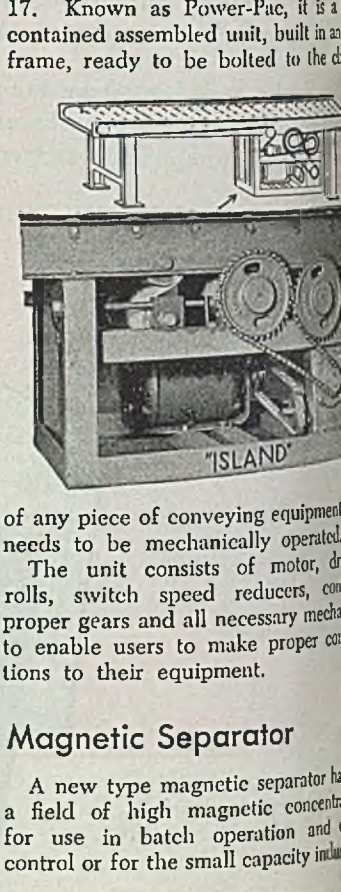
ARMY E NAVY

Exide
BATTERIES

heat treated gear reversing mech which distributes the pull through intermediate gears. Reverse spe twice the forward speed. Tap id tapping direction.

Conveyor Drive

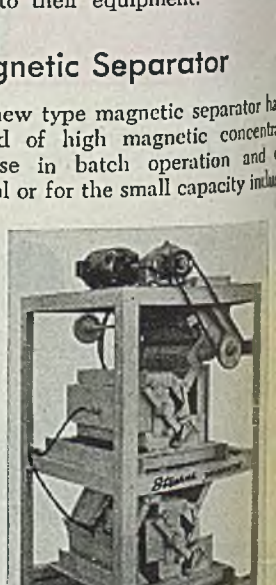
A power unit for motorizing conv equipment is introduced by Island E ment Corp., 101 Park avenue, New 17. Known as Power-Pac, it is a contained assembled unit, built in an frame, ready to be bolted to the c



of any piece of conveying equipment needs to be mechanically operated. The unit consists of motor, d rolls, switch speed reducers, co proper gears and all necessary mecha to enable users to make proper co tions to their equipment.

Magnetic Separator

A new type magnetic separator h a field of high magnetic concentr for use in batch operation and control or for the small capacity ind



problems, is offered by Stearns Mag Mfg. Co., Milwaukee 4. Type KB is commended for removing detrim iron specks from powdered enamel and similar material. It embodies electrically operated vibrating feeder distributing materials in a uniform even layer to magnetic field.

Unified electrical control, push-b operation with magnetic field and f regulation, is provided, permitting

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STERLING GRINDING WHEEL DIVISION
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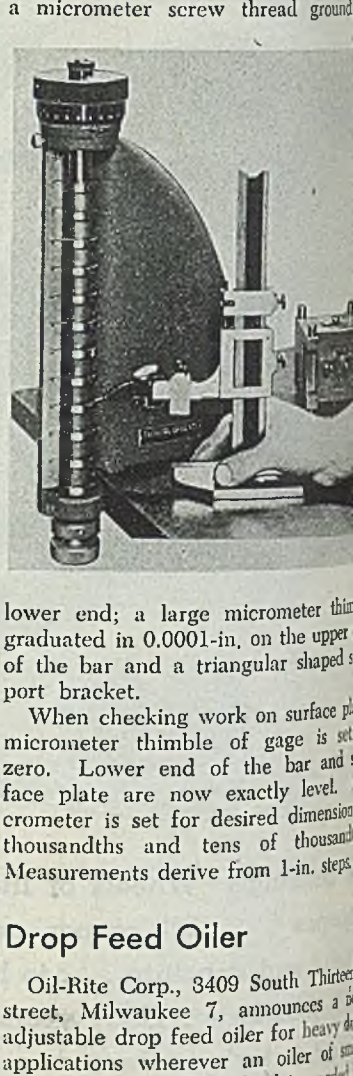
THE WHEELS OF INDUSTRY

stant and simultaneous control of e and every detail of operation. Separa can be wound for any direct current to 300 v and in the absence of di current, a motor generator set or re fier can be provided.

Gage for Surface

Pla-Chek, a new gage for sur plate work, has been developed by C illac Gage Co., 20316 Hoover road, troit 5. It is guaranteed accurate f 0.00005-in. for any size from 0.001 to in. from the surface of the plate. I made from a hardened steel bar w 12 steps spaced exactly 1 in. apart a micrometer screw thread ground



lower end; a large micrometer thim graduated in 0.0001-in. on the upper of the bar and a triangular shaped s port bracket.

When checking work on surface pl micrometer thimble of gage is set zero. Lower end of the bar and s face plate are now exactly level. crometer is set for desired dimension thousandths and tens of thousandt Measurements derive from 1-in. steps.

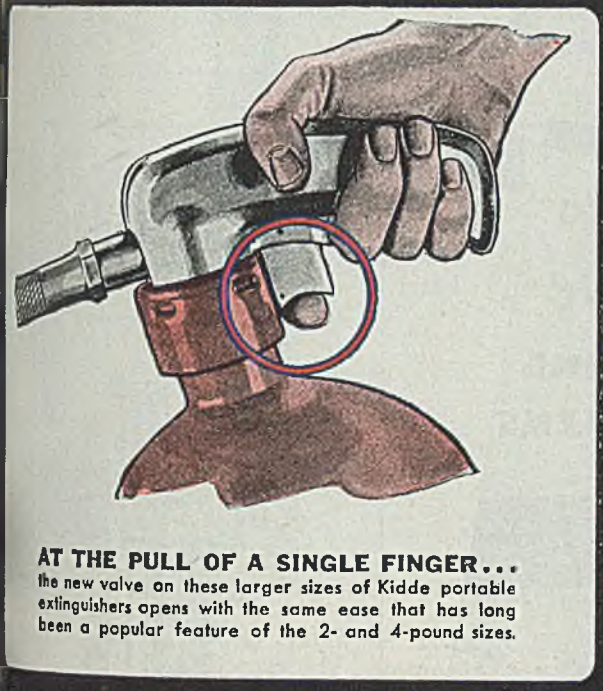
Drop Feed Oiler

Oil-Rite Corp., 3409 South Thirteen street, Milwaukee 7, announces a p adjustable drop feed oiler for heavy d applications wherever an oiler of sm capacity feeding filtered oil is needed. is suitable for very slow or medium fe for continuous operating machines.

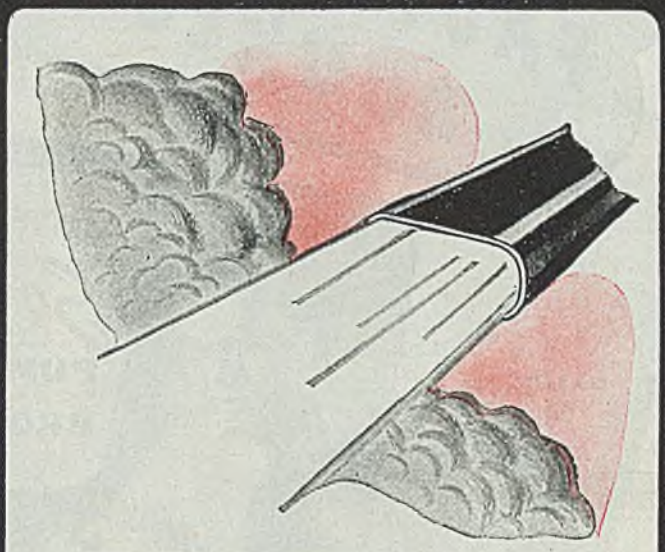
Oil is fed by gravity through an port which can be adjusted within wide range. Rate of feed remains pra tically constant regardless of oil le To adjust oil flow, hinge lid is held op and a standard hexagonal key is plac through hollow lock screw into the screw and adjusted. To lock desired s ting, key is partly withdrawn until engages only lock screw, then it tightened. The combination of a hollo lock screw and a set screw provides positive means of locking, retaining an desired setting even under vibration.

Base is made of brass and reservoir

Announcing TRIGGER-FINGER Control for 10, 15, and 20-lb. fire-fighters



AT THE PULL OF A SINGLE FINGER...
the new valve on these larger sizes of Kidde portable extinguishers opens with the same ease that has long been a popular feature of the 2- and 4-pound sizes.



THE FULL FIRE-FIGHTING FORCE . . .
of the carbon dioxide discharge goes into action *at once*—no half-way measures with this new valve. When trigger is released, shut-off is complete and instantaneous.

And here are the PLUS features of this Revolutionary Development

1. Lock-open control is simple and sure. A slight forward movement of the trigger finger latches trigger open—no danger of fouling.

2. No replacement parts are needed for recharging.

3. Hydrostatic testing can be carried out without devalving. No devalving for repairs either.

4. Recoil outlet is of improved design.

5. Balanced handle design and low center of gravity make it easier to carry these bigger sizes of extinguishers.

6. Intermittent or continuous control is provided for.

7. The locking pin *cannot jam*. It seats in blind holes — there are no projecting ends to get bent over.

8. Streamlined design improves appearance.

9. Seal wire is fully visible for quick inspection.

10. Valve design is simple, fool-proof. The natural way's the right way to operate it—even a novice can't make a mistake!

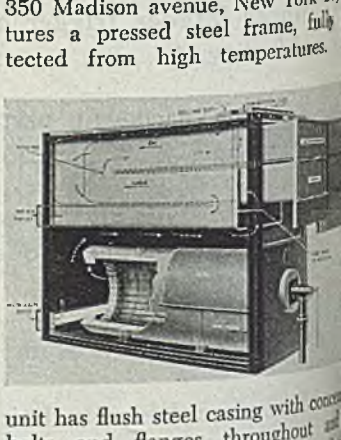
10-, 15- and 20-pound extinguishers equipped with this new valve will be ready for delivery October 1. Place your order now.

of unbreakable transparent plastic. V
ible oil supply indicates when a refi
needed. A self-closing hinge lid on
of reservoir which can be opened w

an oil can spout makes filling easy.
can be taken apart for cleaning by
screwing reservoir from base. Stan
capacities have been selected at ⅛,
and 1 oz having ⅛ or ¼-in. pipe th

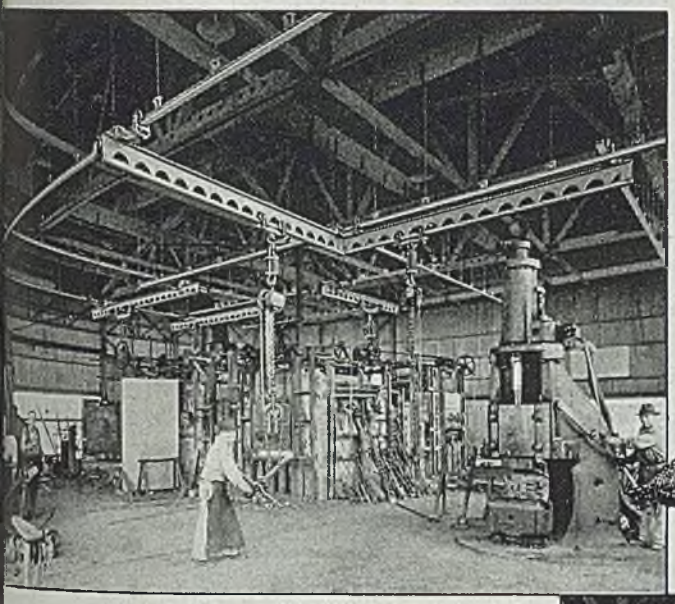
Recirculating Air Heater

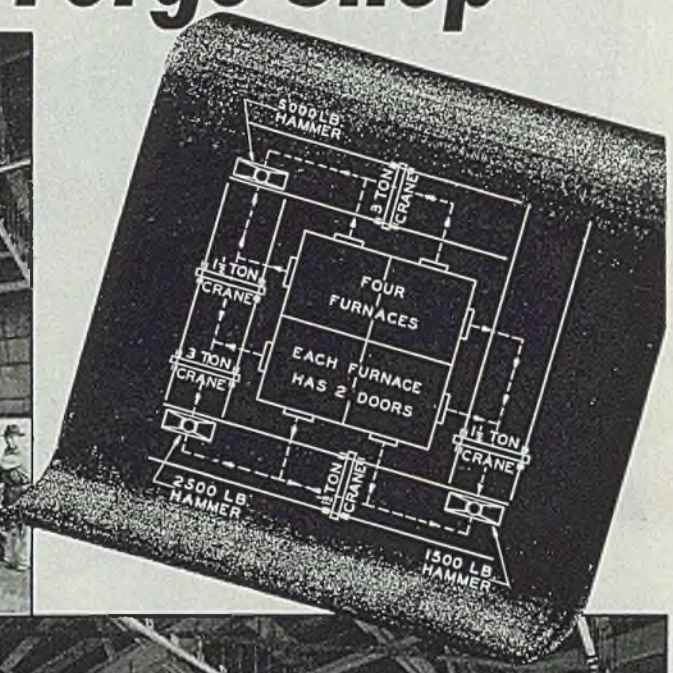
A new recirculating air heater, i
duced by J. O. Ross Engineering C
350 Madison avenue, New York 17,
tures a pressed steel frame, fully
tected from high temperatures.



unit has flush steel casing with concea
bolts and flanges throughout and
heavily insulated. The horizontal
pass, return bend type of interchan
consists of flat rectangular steel tu
beaded and welded into a tube sheet
terchanger can be inspected, cleaned
removed through access door with
disturbing any ducts or other portions
heater. The steel, airtight housing

Unusual Crane Installation Aids Forge Shop . . .

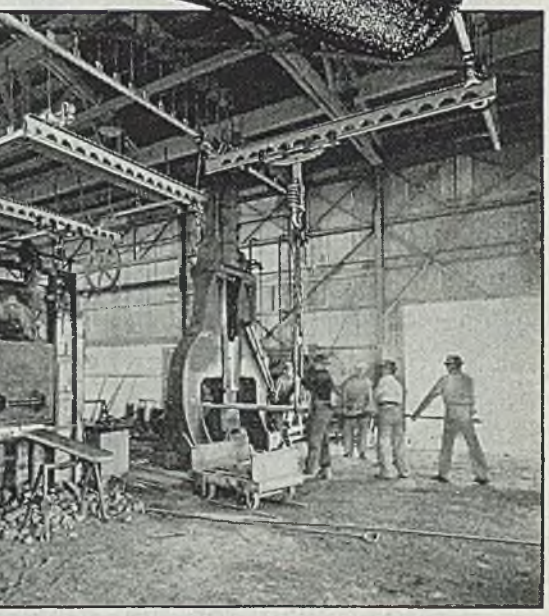




Instead of customary jib cranes for handling ging stock from furnace to hammer, the egheny-Ludlum Steel Corporation (formerly ulter-Sibbett & Burke Forging Shop), Los geles, have a unique arrangement of four eland Tramrail runways, each with one or hand-propelled cranes that serve four fures located in the center of the building as wn in sketch.

ough each hammer is served by two cranes is no possibility of the operators interfering each other. The cranes provide materials lling coverage for large areas of the building, er than for only small circular sections with jib cranes.

use severe strains are transmitted to the cranes the crushing hammer action, the flexible susion of Cleveland Tramrail runways is of reme importance. Preloading and crystallizan characteristics found in rigid crane structures eliminated by standard Cleveland Tramrail ll and socket connections on the runway pports, and heavy springs on the carriers.



Because of the flexible construction of Cleveland Tramrail equipment, heavy hammer shocks are absorbed without damage.

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THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283rd ST. WICKLIFFE, OHIO.

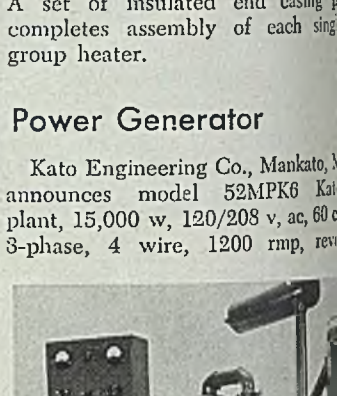
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

suspended from top rails of scr frame. Rollers in this housing sup the interchanger. Baffles form air sages to direct flow of air along t

Refractory lined combustion cha assures complete combustion of fue passage between top of combu chamber and bottom of housing ducts heating gases from combu chamber outlet to inlet of heating face at front of heater, allowing app mately 5 ft travel for thorough m and tempering. An air passage i the housing and under tubes con heated air, after making two passes tube surface, to outlet at rear of h A set of insulated end casing p completes assembly of each sing group heater.

Power Generator

Kato Engineering Co., Mankato, announces model 52MPK6 Kat plant, 15,000 w, 120/208 v, ac, 60 c 3-phase, 4 wire, 1200 rmp, rev



field type generator powered by T-118 Chrysler six cylinder watercooled engine.

It is 70 in. long 49¼ in. high a 3/8 in. wide and weighs approxi 1860 lb. The unit can be pro with weatherproof housing if de

Lock Clamp

Known as De-Sta-Co Model 6 new toggle clamp which can be co ed from "push" to "pull" action, c versa, by relocating one of the h

bolts, is introduced by Detroit Sta Co., 359 Midland avenue, Detro Weighing 1½ lb and with an o length of 6⅜ in. (open position heavy duty model has a plunge travel of 1½ in. Rod is tapped t ceive a ⅜-in.-16 standard threaded providing adjustment to work ha

CHICAGO CUT-OFF WHEELS

From the swift era of war production comes another modern miracle, the cut-off wheel—man power and man hour saver—for the fastest, smoothest method of cutting tubing, wire, steel and brass sheets, glass, porcelain, Stellite, tungsten, plastics, laminates and other hard-to-slice materials.

When RT, the special formula bond was developed, it put the cool-running CHICAGOS 'way out in front in real performance records.

Available in rubber or resinoid—a full range of styles and sizes. 3 bond types—for every operation.

WANT TO TRY ONE? Tell us what you have to cut, grinder you use and size wheel you'd like. We'll send a test wheel promptly. *Write for Circular.*

CHICAGO WHEEL & MFG. CO.

Originators of the famous Chicago Soft Rubber Polishing Wheels

1101 W. Monroe St., Dept ST, Chicago 7, Illinois

MADE WITH RT

THE NEW BOND THAT HOLDS ITS OWN . . . GIVES ONLY WHEN IT MUST!

Send CIRCULAR____ SEND TEST WHEEL____ SIZE____ TO CUT____

NAME_____

ADDRESS_____

CITY_____ STATE_____

Welding Turbine Wheels

(*Continued from Page 106*)

held at the temperature wanted means of thermocouple operated trollers. Atmosphere is controlle prevent scaling of work and fixture

Work is gradually brought up to F, the temperature at which it moved. It takes about an hour fixture and hub blank to go th but capacity of unit is such that a and blank are discharged every 6 m

Mechanical Handling Aids: shows operator loading a skeleton entry end of furnace. Since all operations are done by women, chanical handling aids are employ move heavy fixtures which weig proximately 300 lb each. An ov monorail extends down the line of ment serving all stations. An hoist fitted with an "ice tong" ty tachment makes it easy to mov place the heavy fixtures.

Joint Design: Fig. 4 illustrates proximate joint dimensions and th both the bucket bases and hub are prepared for making the welde Outer rim of the hub blank has a ⅛-in. wide that abuts against th of bucket bases. On each side nose there is first a 45° bevel and 30° bevel, as shown at the enlarge section in Fig. 4.

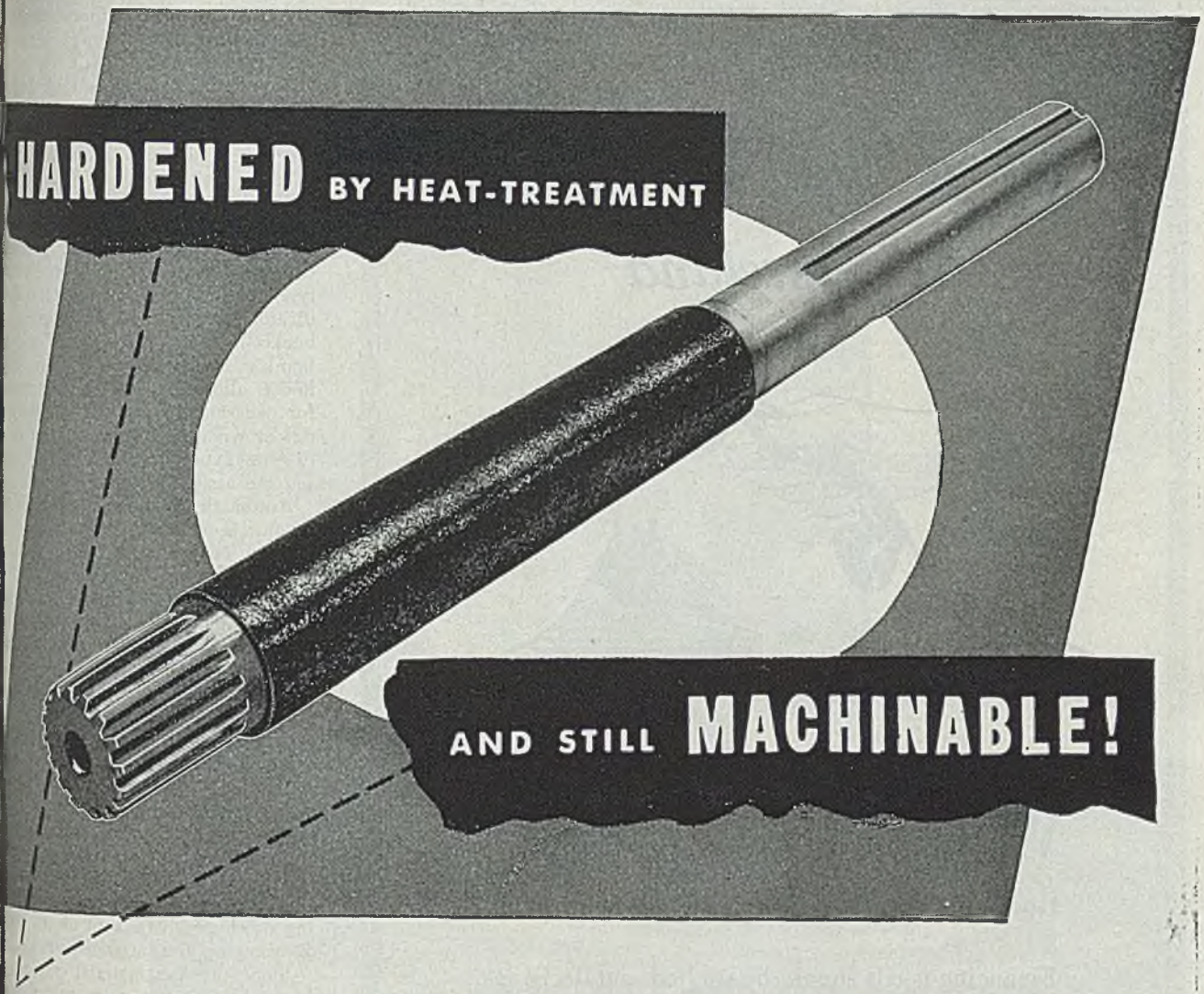
Bucket bases themselves are perfectly flat and uniform at the opposite the nose of the hub blan they also slant back away from th face slightly, as indicated in the di

Three-Station Welding Machine welding is done by an automatic mounted on the vertical central of the special 3-station welding m shown in Fig. 2. Built up from plates and tubing by arc welding, machines provide for movement three welding tables about the column to index the work. First is the loading position; second is the welding head; third is unl position.

On the base under the weldi tion is a variable speed drive uni is coupled into the revolving work when it is indexed to that station unit revolves the work table to with the hub blank and double bucket-holding fixture, in turn ta the entire length of joint underneat automatic welding head at the spee sired.

Positioning For Welding: First preheated hub blank is placed o work table and the pneumatic hoist engaged to fasten the blank securel the table under about 2000 lb pr

Now a ring fixture with its r buckets is moved from the disch end of the preheating furnace by s of an arrangement like that show Fig. 6, employing tongs to engage fixture and an electric hoist on an head monorail to serve the welding chines. Fixture is fastened to tab holddown clamps shown in Fig. 1. clamps are slotted so they can be



BECAUSE IT'S SULFITE-TREATED STEEL

THIS AXLE was heat-treated to make it as hard as rock. It has to be hard to resist wear —and strong to stand torque and strain. You see it carries a tractor!

But it must then be machined with great care and precision. Sounds difficult, doesn't it?

Yet it is simple to machine axles like this—when they're made from Sulfite-Treated Steel. That's because sulfite-treatment adds something to steel that keeps it from becoming "stubborn." Instead of being nearly impossible to machine when it gets very hard, Sulfite-Treated Steel is easily worked.

This steel is a metallurgical achievement. Through constant research our technicians developed this machinable metal and then carefully controlled its production. Here is another example of the uniform excellence of alloy and special steels made by Wisconsin Steel.

Sulfite-Treated Steel has solved a lot of machining problems and it will solve a great many more. New applications are constantly being found. And this is only the beginning.

Let Wisconsin's sales and metallurgical staffs introduce you to Sulfite-Treated Steel—the steel that licks machining problems.

WISCONSIN STEEL COMPANY
Affiliate of International Harvester Company
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN SULFITE-TREATED STEEL

outward radially a sufficient distance avoid interference when placing the ture on the table. Then they are in toward the fixture to engage the lo shoulder. A spring slipped over threaded stud holds the clamp up aga the nut, facilitating this operation.

Since position of ring fixture and tral disk at this point determines the lation of the buckets to the rim of turbine wheel, the mount is care checked before welding proceeds. type or saddle gage carrying two dia dicators is employed, being placed bucket-holding ring fixture and blank. Maximum of 0.020-in. ou line is allowed. This check is nece for occasionally some of the flux rial or weld slag will get under the or ring fixture to tilt it slightly, th ing the assembly out of alignment.

Automatic Welding Equipment: automatic welding head is mounted vertical central post on each mac It is moved up and down on this by means of a rack and pinion ge controlled by a small hand wheel. is tilted about 20-25° from the ve to feed into the weld better, this ti ing adjustable by means of a worm and pinion, the small control whee pearing at extreme upper right, F Graduated dial showing tilt can al seen there.

Connection from the welding chines to the controls and the we transformers mounted nearby on wall is through large overhead co that permits working area around ing machines to be kept clear. See 2, showing this arrangement.

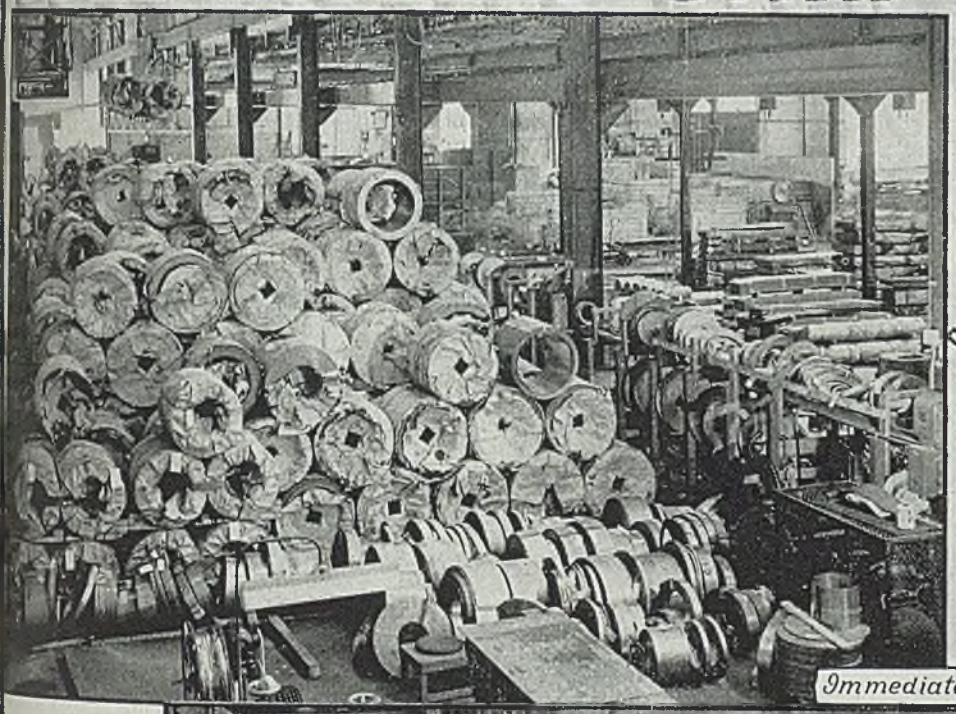
Since the flux material employed like the covering on a coated we rod, bare wire can be used. This is stainless steel, ⅛-in. in diameter rolled from large coils which are m ed nearby on the wall on a reel feeds the welding head. Moun reel is carried on vertical rails on wall which permits the reel to be l at floor level, then hoisted up out o way to save floor space. See Fig.

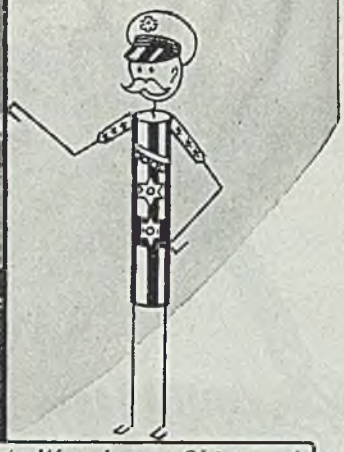
Automatic Control: Wire is fe the weld through the automatic hea a variable speed electric motor. the voltage drop across the weld main factor influencing the welding voltage is employed to control the at which wire is fed into the weld. if the voltage across the weld ca held constant at the correct valu good uniform weld is assured.

To do this, the control system em Thyratron tubes actuated by the arc age to vary the motor speed by chan the voltage applied to the armat Control is housed in a box near seen in the rear of Fig. 2. The co panel contains meters to show arc age and welding current, a dial s the voltage desired, and an adjus to control speed of wire feed. The ing transformer incorporates its means of varying the welding curr

A small 3 x 5-in. control box mou on the welding head within conve reach of the operator houses three switches—one for changing direct

COLD ROLLED STRIP STEEL

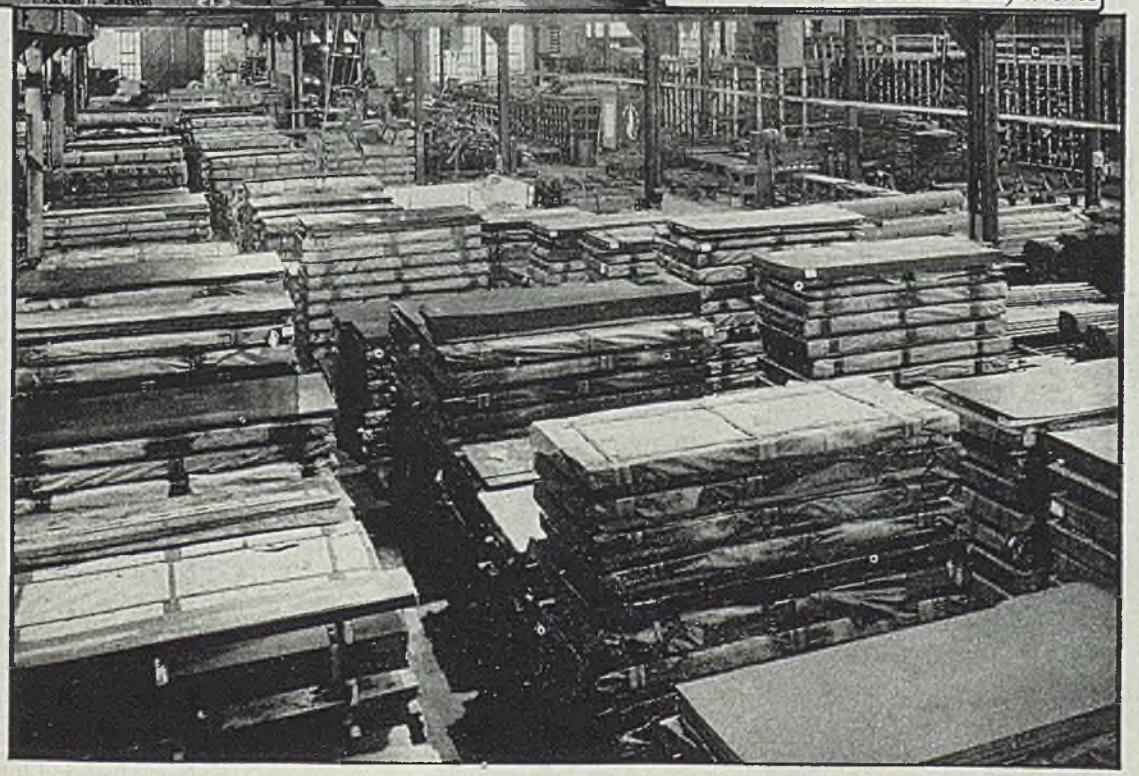




Immediate Warehouse Shipments

COILS AND STRAIGHT LENGTHS

ALL GAUGES AND TEMPERS



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COLD ROLLED SHIM STEEL • SHEET STEEL • ROUND EDGE FLAT WIRE • FEELER GAUGE
TEMPERED AND ANNEALED SPRING STEEL • ROUND WIRES • DRILL ROD

wire feed (in-feed or reverse), a sec to start the welding current, a third c trolling the motor revolving the w table. A pushbutton also permits "j ging" the wire feed when setting up work for welding.

Granulated Flux: Like other "s merged arc" welding systems, the Un melt method employed here uses a q tity of granulated welding flux or "m to cover the arc during the welding eration. This material not only ca various elements which combine w the melted metal to improve the w deposit but it also forms a protec atmosphere about the molten weld al to avoid pickup of undesirable ments from the air. Too, it is desig to produce a slag that is easy to move.

Melt material is dumped into a ho carried on the welding head, show top center, Fig. 1. This hopper l into a tube that discharges the flux the weld area just ahead of the wel tip (seen just back of the tip in Fi since the work here revolves in a cl wise direction under the head). material is also placed underneath joint when the work is being set up

Operation: Once the work has clamped to the table and alignm checked, the operator lowers the till the wire tip is about ¾-in. from bottom of the joint. Wire is aime feed toward center and bottom of as shown in Fig. 1. Contact tips g ing the wire are pointed to facil this positioning.

Next, the operator places a small of steel wool between the end of welding wire and the work. This as a fuze to start the arc when wel current is turned on.

Tube carrying flux is now opened lowing melt material to be deposited around weld area. Height of bottom tube is adjusted so flow of flux s when desired amount has been dep ed. As work turns under the head, ditional flux flows out as needed.

By snapping both toggle switches trolling current and table movement arc is started at the same time the w begins to revolve under the head. automatic control now takes over action and holds the arc constant w the weld is completed. Arc voltage held at some point between 25 and 3 Current is 360-400 amp.

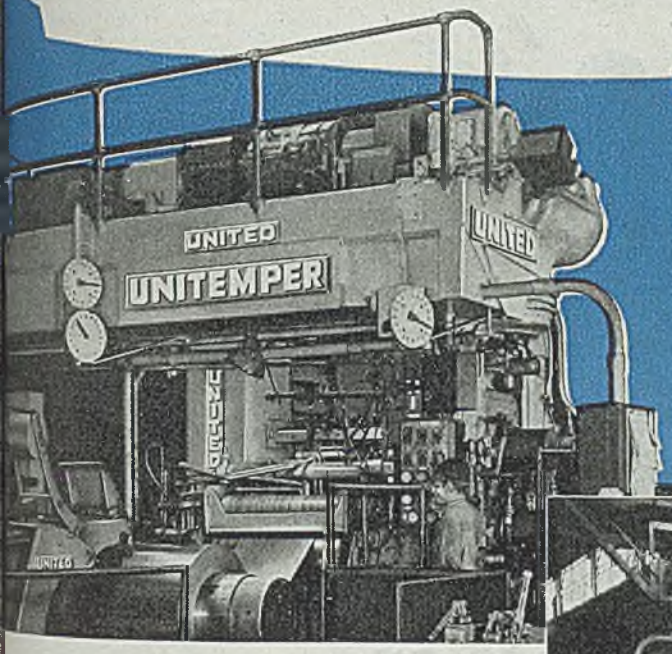
This first weld is made in 2 min sec, depositing a circular bead 1 in. w ⅝-in. deep and 9 in. in diameter. Al 14 ft of ⅛-in. diameter stainless s wire is melted into the weld.

Opposite Side Welded: Now were unclamped from the table, turned o and the joint welded from the oppos side in the same manner as the first w except that this second weld is made another machine set up to give the de sired welding conditions. This weld completed in 2 min, 30 sec, using 35 v at the arc and 410-420 amp.

Any tendency toward distortion is m imized by making the second weld the same direction around the wheel the first weld, allowing stresses produ

UNITED

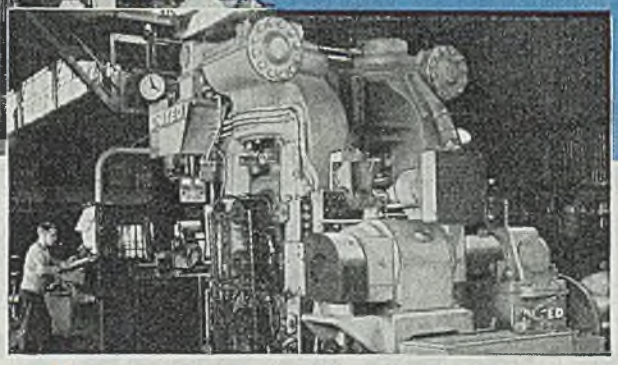
UNITEMPER MILL*



Delivery Side of United Unitemper Mill

A New Mill... A New Process... A New Product

- ★ **Simplest Mill Arrangement to Produce All Commercial Degrees of Temper Hardness.**
- ★ **Permits Standardization of Ingot Analysis.**
- ★ **Produces a Flatter Strip with Better Cold Forming Properties.**
- ★ **Produces at Lower Costs.**



Entry Side of United Unitemper Mill

This mill resembles somewhat in appearance a conventional 4-high mill. It employs in a single housing two pairs of processing roller and tensioning units disposed vertically with respect to one another and between which the strip is processed by stretching, the strip passing in a continuous path around these units. This stretching is accomplished by regulation of the differential in speed between the upper and lower roller tension units. In the mill the strip is reduced continuously in a sequence of operations consisting of rolling, stretching, and again rolling, the major portion of the reduction being accomplished by stretching and the processing being varied as required to secure different degrees of hardness.

The UNITED UNITEMPER MILL utilizes the principle of **work-hardening or tempering by continuous stretching.** The resultant product, uniformly cold-worked throughout its entire thickness, conclusively shows superior cold-forming properties and meets as well, all accepted physical standards.

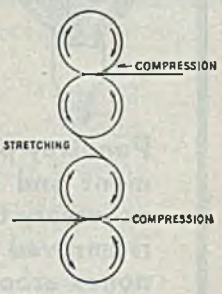
All commercial degrees of hardness can be made with one pass through the UNITEMPER MILL, using one grade of rimming steel. Standardization of ingot analysis, with its attendant economies, is therefore possible.

The UNITEMPER process, which embodies all of the essentials of continuous stretcher leveling, produces an **extremely flat product.**

Very low rolling pressures, as compared with conventional 4-High Temper Mills, permit use of UNITED Alloy Iron Rolls instead of more expensive forged steel rolls. This, plus savings resulting from **standardization of ingot analysis,** and savings due to a **simpler installation,** make the UNITEMPER process extremely attractive from a manufacturing standpoint.

To manufacturers of tinplate, autobody sheets, furniture stock, stainless steel panels and other specialties, in anticipation of demands for hard-rolled steel with better cold-forming properties for many fabrications, the revolutionary advantages of UNITEMPER will be apparent.

UNITED engineers will gladly furnish complete information including data based on mill production records.



**Process and apparatus patents pending.*

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

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by first weld to be offset by the
the second.

Preparation for Machining: Fr
welding machines, the fixtures g
hydraulic lift table which holds t
a convenient height for chipping
slag. Fixture is disassembled,
power wrenches (air driven) for u
ing the studs. Rings from a fix
carefully kept in pairs so each t
is always used with the same
ring. When cooled, fixtures are
complete checkup before using
again. They expand about 0.06
the outside diameter during pr
and welding.

Now the welded turbine whee
nealed for 12 to 14 hours at a t
ture of 1400° F to eliminate any
up stresses from the welding op
This is followed by rough mach

X-Ray Examination: At this p
weld is examined for any slag in
cracks or other defects by X-ray
turbine wheel. This is done a
of about one a minute by set
wheels in a 20-ft diameter circle
a million volt X-ray tube. Set
shooting time totals 40 min for 36
an exposure of 3 min being suff
produce a negative with a densit
—a rather dense negative but p
because it shows up defects so w

An ingenious device that saves
on every setup is a serial nu
gadget with five wheels revolv
tween lead guard plates that all
one number to show on each whe
speeds setting up the serial nu
each turbine wheel so it rec
the negative during the exposur
consuming method formerly e
was to assemble individual le
merals on a piece of tape that w
fastened to the negative holder.

Any slag inclusions or other
found are ground out and the
welded at that point. Most de
the form of small slag pockets o
cracks. Rewelding is done by h
ing 3/32 or ⅛-in. stainless steel r
a direct current of 110-125 amp

X-ray tube is operated in a
shielded by heavy lead plates.
the door carries a 1½-in. thick
lead. Steel bolts holding door
are covered with lead caps to
radiation through the bolts. Door
17,500 lb, is interlocked with pow
cuits so machine cannot be opera
less door is closed.

Replacing Defective Buckets: Although each bucket is carefully
before being welded into a
wheel, the final examination occa
discloses defective buckets, due
machining intersecting minute inc
These are removed from the
wheel by drilling into the weld
side of the base of the defective
using a Carboloy tool. Then the
is easily removed by twisting it si

New bucket is slightly longer
standard to allow grinding to fin
after insertion. It is first tack we
each side at the base. This is do
hand, using the atomic hydroge

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...ding process with a 1/16-in. diameter ...nless steel rod, welding current be... 125-150 amp.

Then the hole at the base made in re...oving the defective bucket is enlarged ... grinding, at the same time the base ... the new bucket is ground to "blend" ...th the surrounding metal. Now the ... is finished by welding up the hole ... a 3/32 or ⅛-in. stainless steel rod ... hand, using about 110-125 amp.

After annealing again those wheels ... have been rewelded, the turbine ...el is ready for finish machining, fol...ed by static and dynamic balancing, ...d assembly into the supercharger.

There are many other interesting op...ions involved in production of turbo...rchargers at Allis-Chalmers. Some of ...ost interesting include straddle mill... the blades of the forged aluminum ...ressor impellers, bending the im... blades to shape in a hydraulic ..., stamping housing in one operation ...d of three, final hot gas test of ...eted unit in excess of 25,000 rpm ...many others that make a trip through ... plant one long to be remembered.

...pid X-Ray Inspection ...ds Production

...litary applications of industrial ..., now providing superior arms and ...pment for our armed forces, will ...available to postwar manufacturers ...lp make better peacetime products ...wered production costs, according to ...inghouse Electric Corp., Pitts...

...e of these X-ray machines, called ...Microflex, makes a picture in one ...millionth of a second. This device is ... literally stop a projectile in flight ... a gun barrel or as it pierces armor ... enabling ordnance experts to study ...cteristics of ammunition and de... qualities of armor with a thor...ness never before possible.

...other recent development is minia...radiography, a process whereby ...shadow-picture of a normal X-ray ...tion is photographed on a very ... film with an automatic camera. ...aid to make possible X-ray inspec... at production-line speed with an ...mount saving in film cost.

—o—

...ools for carbon paper rolls used on ...ness machines, made from continu... extruded lengths of Tenite plastic, ...oduct of Tennessee Eastman Corp., ...sport, Tenn., are said to reduce the ...ost of material used and to cut ... production time and cost. Spool ...truded in tubular form by Extruded ...ucts Inc., Norwalk, Conn., and has ... spines on the inner surface to grip ...mandril and hold it in place. Plastic ...lightweight, tough, is uniform in ...ture, and does not split or crack. A ...ature of the spools is their use of four ...ors, gray, green, orange, and white, ...dentifying four grades of carbon paper.

Flame Cutting Steel

(*Concluded from Page 107*)

totaling as much as 50 per cent as r
ly as cutting the ordinary carbon
with conventional oxyacetylene met
Quality of the cut also is about the
as for ordinary steel.

Secret of the new process is the
velopment of a non-combustible
white, powder flux which is introd
into the flame and which com
chemically with the oxides prod
and causes them to slough off. The
injection unit may be used with sta
flame cutting machines equipped
a modified conventional machine cu
torch and a standard tip or a mo
hand torch.

The unit consists principally
cylindrical container from which th
is fed into the lines in predeter
amounts by a motor-driven screw
mechanism. The container has a
city of 35 lb of flux or enough
about 5 hours of continuous oper
This is sufficient to satisfy the av
requirements of one shift. Cons
tion is approximately 1 oz per mi
cutting thickness ranging from 1
in. Flow of the flux can be regu
by the operator through a simple
arrangement. The entire unit w
about 75 lb and may be moved re
from one job to another when nece

The modified hand torch was
to provide necessary flux control and
be used with the same flux unit des
for standard flame cutting mac
This hand torch is designed for cu
risers and for occasional cutting
quirements. Both machine and
torches are similar to standard
but have been adapted to permit
flow of oxygen and the powder flux
varied operating conditions.

A number of the more popular
less steels have been cut success
these including 18-8, 18-8-3, 18
and 25-12. Quality cuts have
made in material up to 3 in. thick
rough cuts in considerably heavier p
up to 6 in. thick. As for cutting sp
1-in. material may be machine cut re
at the rate of 8 to 9 in. per min.
normal preheat, the same as for stan
cutting operations, is required.

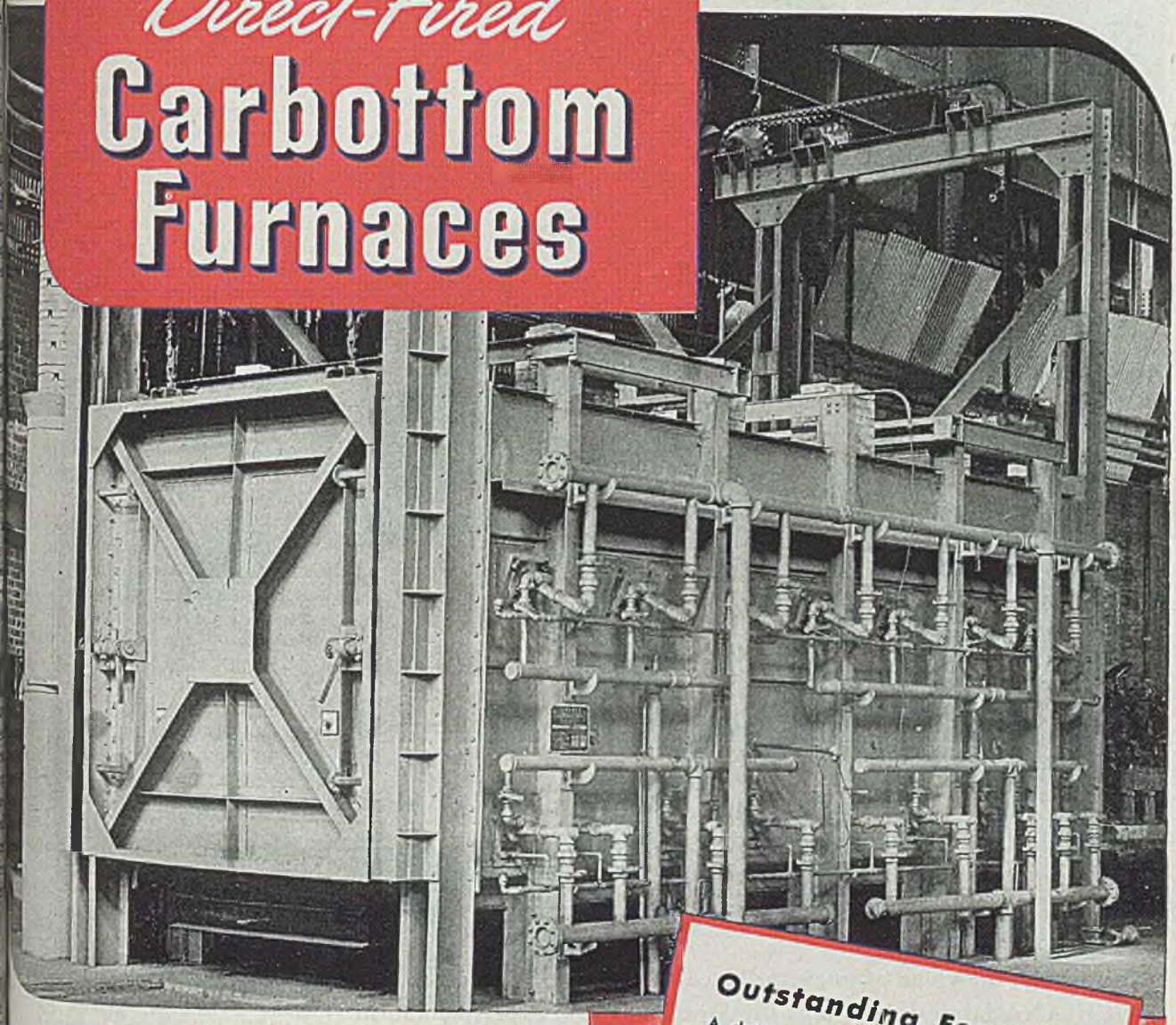
Platinum Thermocouple Asemblies Improved

Improvements in platinum the
couple assemblies used with two-
silica blocks for glass tank crowns
been made by Brown Instrument
Philadelphia, and will become effec
on orders after July 1.

Improvements are to consist of repl
with heat resisting stainless steel the
ondary protecting tube previously m
of ordinary steel, thus reducing o
tion to a minimum, eliminating free
of tube, and permitting its removal
inspection.

Modern 'Surface' Direct-Fired Carbottom Furnaces

Double-door car-bottom direct-fired furnace for annealing cast armor. Capacity 24,000 net pounds. Gas-fired, utilizing 'Surface' Low Pressure Velocity Burners for over and under firing.



'Surface' Carbottom Furnaces are a popular choice ere miscellaneous, bulky, or heavy work must be t treated and where different heat-treating operations st be performed in the same furnace.

This wide variety of uses demands close operating trol and maximum flexibility in operation.

'Surface' pioneering in industrial furnace design and search in refractories and alloys, plus a wide selection burner equipment for firing systems meets the need modern car-bottom furnace design.

Outstanding Features:

A choice of 50 types of 'Surface' burners in 500 sizes with which to design a firing-system most applicable to the specific use, or—

●

A combination of burner types to provide firing systems of great flexibility for general heat-treating purposes, and—

●

Proved furnace designs to assure temperature uniformity in the processing of large or small production—

●

All contribute to the overall efficiency and economy of 'Surface' carbottoms.

'Surface'

STANDARD AND SPECIAL INDUSTRIAL FURNACE EQUIPMENT FOR:

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SURFACE COMBUSTION CORPORATION · TOLEDO 1, OHIO

Deep Drawing Lubricatio

(*Continued from Page 109*)

considerable difficulty is experienc drawing brass unless there is a w period between pickling and dr operations, it was decided to inves the role of oxides as brass drawin bricants.

It had been observed that when test pieces were treated with a b mixture of carbon tetrachloride and alcohol for 20 to 30 min the became yellow and bright, indicati efficient pickling action. When pieces were drawn through a s die (Table I), 70 per cent of the fractured. Pieces pickled in boil per cent sulfuric acid for 5 min tured to the extent of 55 per cent drawn through this same die, soap cation being used in each case. pieces that were pickled in this m and then immersed in warm 4 pe hydrogen peroxide for 30 sec darkened and did not fracture drawn through this die, again with lubrication (Table I).

Pieces pickled in the boiling c tetrachloride and ethyl alcohol m and stored in a vacuum desiccator major proportion of fractures (Tab during a six day storage period. I this period the desiccator was o for about a half hour each day move samples. After 9 days' s the percentage of fractures decr probably because an oxide film o ficient thickness was formed due troduction of air into the desiccator samples were removed.

Pieces, pickled as above, and s in a normal laboratory atmosphere a much more rapid decrease in pe age of fractures than those stored i vacuum dessicator and after 6 none of the pieces fractured. The required for the draw were the sa those required normally. Pieces s under a bell jar, with a beaker f water, darkened after only a few and were quite dark after 2 storage. The percentage of fractures sharply reduced even after 2 storage. However, the forces req for the draw were markedly incre because more work was required t form or displace the less ductile deposit.

These data indicate that a thin fi oxide is desirable to prevent we between work and tools, which freq ly results in fractures during the dra operation, but the oxide film should be too thick.

While storage in slightly moist (normal atmosphere) is effective in viding this oxide coating, it has found possible to do this more eq by a short alkaline wash in a solutio an alkaline silicate, at moderately vated temperatures. Although suffic oxide is probably obtained by "cut try" adjustment of production sched so that brass is not drawn too soon pickling operations, information on

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mechanism permits more logical e
of the oxidization procedure.

It might be well to discuss the f
tion of fractures at this point. Fra
of the draw pieces apparently is t
sult of a tensile failure of the meta
to retardance of movement of the
at the die whereas the unrestricted
of the punch is transmitted to th
tom of the brass cup. The retarda
the die is caused by the large n
of welds due to lubrication that
proper.

Solid Stearic Acid as a Drawing
cant: Pieces that were treated wi
pickling reagents, so that a majo
portion fractured upon being
through the special die, were coate
a relatively thick film of stearic a
immersion in 5 per cent stearic a
petroleum ether followed by ev
tion of the solvent. These pieces d
fracture upon being drawn throu
special die using soap lubricant
dition to the stearic acid. This in
that the thick film of stearic acid
complishing the same purpose
oxide so far as weld prevention i
cerned (Table I). In addition, the
required for the draw were reduc
about 12 per cent, indicating th
lubricant friction is considerably le
that for the oxide deposit. Sim
better reductions in friction were a
tained in using solid stearic acid
soap.

Die Contours Tested

While pickled pieces fractured
being drawn through the speci
mentioned above, this did not occu
in 100 pieces with several other
Several die contours were tested
termine the characteristics causin
fracturing effect and it was finally
that one factor that could cause
fect was rough die surface. Thus
that were rough-ground with a r
ately coarse emery wheel caused p
fracture when pickled and drawn
soap lubrication. However, non-f
pieces or pieces covered with rol
thick films of stearic acid did no
ture (Table II). In these experime
was necessary to keep the surface
die rough by dissolving the bras
posited on the roughened die by
of warm ammonia water.

The compensation for rough su
afforded by the use of thicker wel
ventive films is an interesting
and provides confirmatory evidenc
the lubrication mechanism of s
separation. In line with this, it wa
observed that in the instances in
inadequate lubrication resulted in
ture of the pieces, the die was ba
In the instances in which the lub
prevented fracture, the dies were
brassed.

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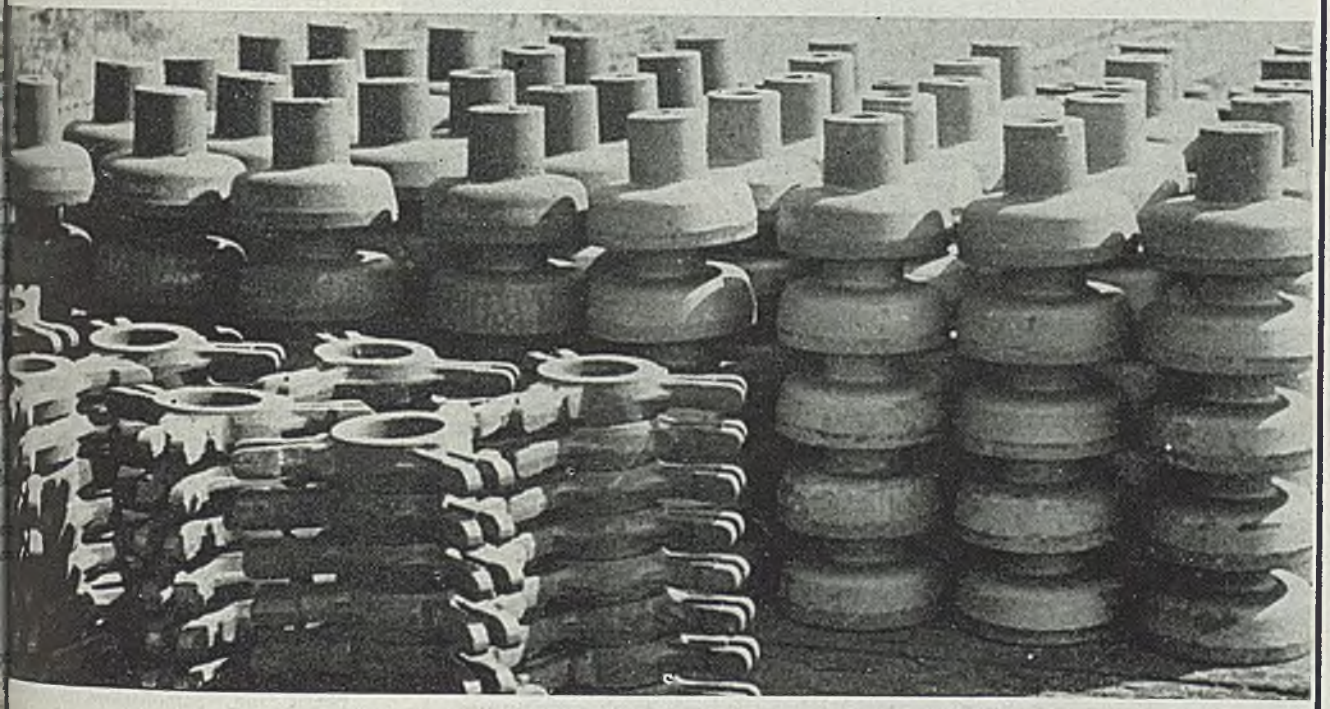
[1]Jevons, J. D., The Metallurgy of Dee
ing and Pressing, J. Wiley and Son (19

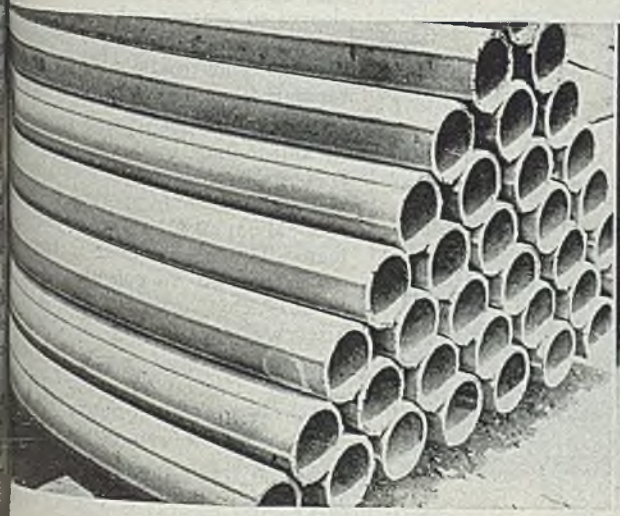
[2]Spring, S., STEEL (1945), Vol. 116, N
p. 112; No. 13, p. 100; No. 14, p. 109; N
p. 114.

[3]Swift, H. W., *The Iron Age*, June 6, (

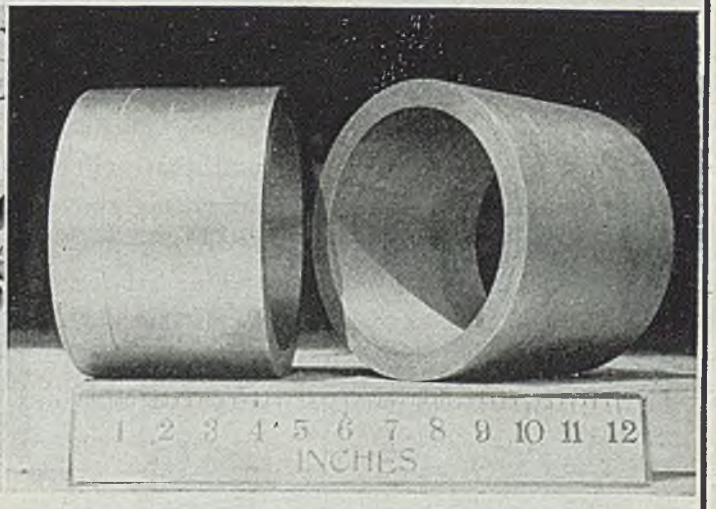
Centrifugally Cast TUBES and PARTS *of* ACIPCO STEEL



Carbon Steel Tractor Parts



Fluted Tubes. To be cut to short lengths and used as electric motor stators.



Bearing Backs. Produced from Type 1015 steel tubes, centrifugally cast in 16-ft. lengths.

ACIPCO Electric Furnace Steels, plain carbon as well as heat- and corrosion-resistant alloys, are manufactured under rigid metallurgical control.

Write for Catalog

AMERICAN CAST IRON PIPE COMPANY

Birmingham 2, Alabama

Future Metals

(*Continued from Page 118*)

dichromate treatment provides the paint undercoating for Dowmetal and J-1 alloys and a galvanic-anod for M alloy. Aluminum pigm varnish applied over a zinc chr primer stands up better than lacquers or enamels.

Studies also were made of me metal contacts. Fig. 8 shows ste serts cast into Dowmetal H alloy exposed for 1 year. Through ga action, the steel causes a narrow (⅛-in.) of corrosion product in the nesium. Balance of the H alloy same as if exposed alone. A port the steel adjacent to the magnesi cathodically protected but the b of the steel has rusted as it wo exposed alone. Corrosion prog more rapidly at the 80-ft location

Tests of various types of rivets s that 56S aluminum is definitely th for joining magnesium alloys. metals, joined by rivets, bolts and ing, are on test to determine the binations least subject to galvani rosion.

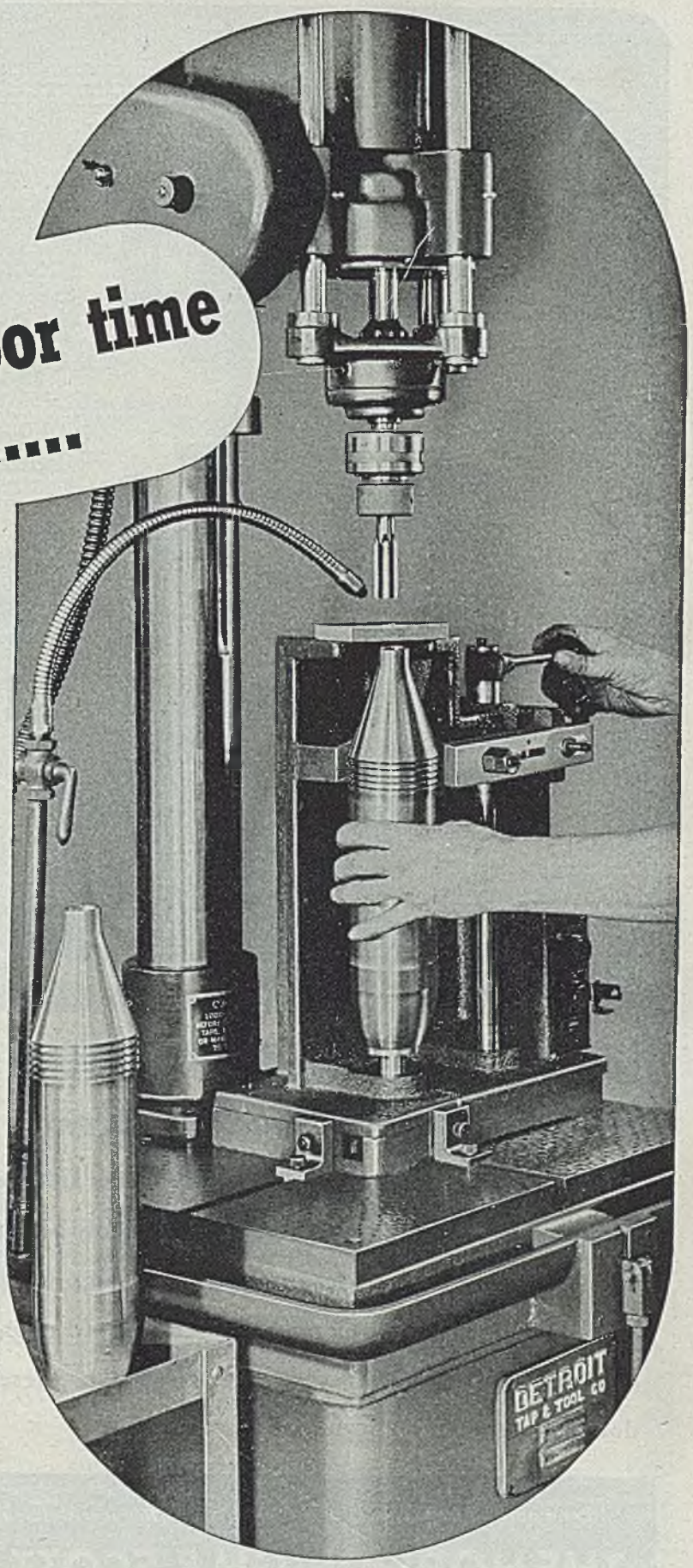
In the sea water tests, most specimens are exposed on racks co ously immersed at a depth of f to 4 ft. The photograph, sec was taken during a brief period the channel leading from the re to the plant was drained. Fig. 6 the water at normal level and fl past the specimens at the rate o per second. Samples are fastened machine screws to Monel metal and insulated by means of ba sleeves to prevent galvanic action. studies include about 1500 metals, plastics and coatings with exp ranging from 6 months to 8 years

Copper has been found most res to anti-fouling by marine growth keep itself clean, copper or any c alloy must corrode at some limiting over about 0.001-in. per year. inert alloy in sea water is Hastell which showed no corrosion at the of 2217 days' exposure.

As reference to Fig. 6 shows, materials become encrusted in va degree. Carbon steel becomes f and eroded in a comparatively short Panels of Dowmetal H, C, J-1 an submerged for 6 months were c with marine growth but the amou etching was so small that the test extended to 12 months. A grou experimental copper-nickel alloys posed for nearly 2 years, shown in 10, resisted fouling and corrosive e especially well and some of these be offered commercially.

One extremely valuable study carried out to determine the effe sea water on welds in ship steel with electrodes of three different positions. It will be observed by r ring to Fig. 9 that no corrosion at margin is evident where the welds made with 25-20 chromium nickel

..cut floor-to-floor time to 12 seconds.....



Tapping an .800-16 Class-3 fit
read to a critical depth of exactly
8 inch from the nose of a smoke
ell and concentric with the bourrelet
the shell, in 12 seconds each, floor
floor, is the job being done by the
troit Tap & Tool Company engi-
ered installation shown here.

Taking advantage of the light
ght of the shell, permitting its
dling with one hand, "Detroit" en-
ers designed a simple fixture which
ges and clamps the smoke shell both
centrically with the tap spindle
to exact height of the shell nose—
but a single movement of one lever.

Thus, loading and unloading time
cut to the minimum possible, tak-
maximum advantage of the ability
the Detroit LTM lead-screw type
ping machine to turn out more
rate work in greater production.
drive to the tap in these machines
the base of the lead-screw, elim-
ing wind-up and permitting fast
rn with greater thread accuracy.

further details, ask for Bulletin LTM-44.

BUY U.S. BONDS STAMPS

DETROIT
TAP & TOOL CO.

8432 BUTLER
DETROIT 11,
MICH., U.S.A.

trodes. Nickel steel rivets hold up
than carbon steel rivets in carbon
plate. The latter wear faster tha
base metal.

A number of tests of metals in
bination also are under way, su
70-30 copper-nickel and stainless
Since the copper-nickel alloy is a
it corrodes at an accelerated rate.
nel, in combination with stainl
only slightly affected. Type 316
less steel (chromium-nickel-molybd
panels not in contact with other
resisted both fouling and erosion.
are relatively unaffected by salt
although they are subject to
fouling.

Need for more precise informat
the ability of alloys to withstan
severe erosive effects associated
such uses as condenser tubes, pu
pellers, propellers and other shi
led to the construction of the ap
shown in Fig. 7, taken when the
was drained. The essential parts
device are a large Monel disk,
Monel shaft to which it is fasten
a motor and gears to drive it.

Specimens are fastened to th
and whirled through the stream
water at velocities up to 30 ft per
As the disk revolves, salt water
through tubular test pieces unde
ditions of great turbulence so
result in erosive effects as sev
any likely to be encountered in
In fact, a piece under test fo
months encounters as much eros
tion as in two years under o
service conditions.

For condenser service, 70-30
nickel holds up well, Admiralty
not so well in comparison. Some
under test with 12.5 per cent nic
balance copper, modified by ad
of aluminum or iron, look pro
For service where especially hig
cities are involved, Monel m
favored; for lower velocities 70-3
per-nickel.

At the oceanside pumping
36-ft specimens of sheet pilin
I-beams have been driven 20
the ocean bottom, with the rem
16 ft partly in the water and
in the air, for the purpose of ch
the merits of carbon and alloy
for bulkheads and the like.
of corrosion is determined by
measurement of the decrease in the
ness of the steel.

While the low alloy steels corro
than the carbon steels, their use
particularly advantageous where
structure involved is entirely
water. Where the structure is
out of the water, however, the resi
of these alloys to atmospheric co
comes into play.

—o—

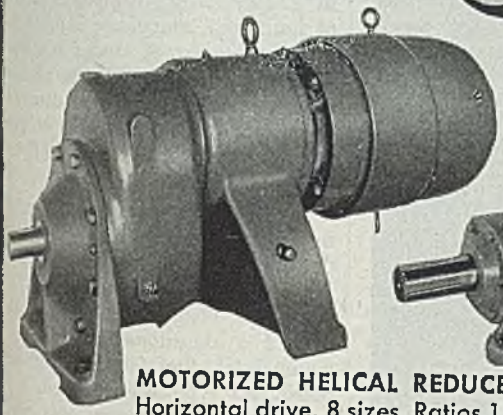
Pentaerythritol, long utilized as
per-high explosive, now serves as
tant ingredient of harder and qu
drying finishes. According to the
trial Bulletin of Arthur D. Little
improves both oils and resins for
coatings.

Established 1888

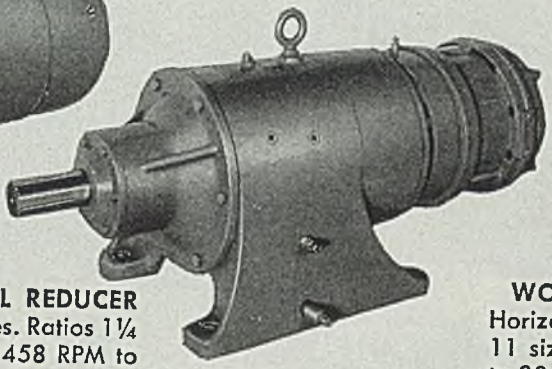
D.O.James

MOTORIZED

SPEED REDUCERS



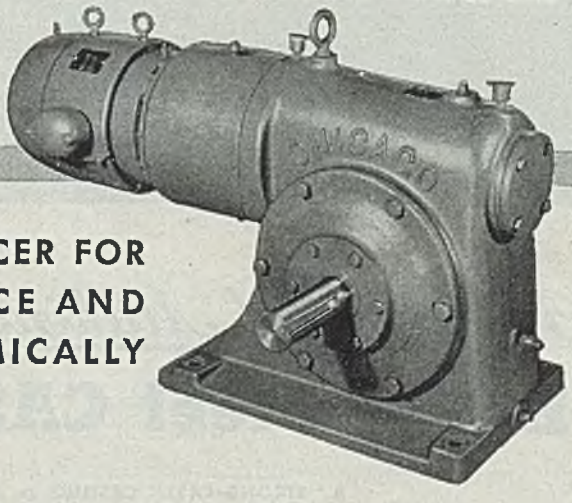
MOTORIZED HELICAL REDUCER
Horizontal drive. 8 sizes. Ratios 1¼ to 9:1. ¾ to 50 HP. 1458 RPM to 128 RPM.



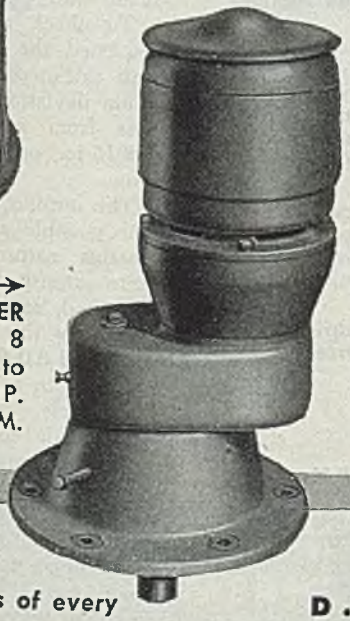
MOTORIZED PLANETARY REDUCER
Horizontal drive. 35 sizes. Ratios 10 to 1200:1. ¾ to 75 HP. 172 RPM to 74 RPM.

MOTORIZED WORM GEAR REDUCER
Horizontal and vertical drive. 11 sizes. Ratios 6 to 65:1. ⅛ to 30 HP. 310 RPM to 25 RPM.

MOTORIZED PLANETARY REDUCER
Vertical drive. 35 sizes. Ratios 10 to 1200:1. ¾ to 75 H.P.
← 172 RPM to 74 RPM.



THE IDEAL GEAR REDUCER FOR LIMITED FLOOR SPACE AND IS OPERATED ECONOMICALLY



MOTORIZED → HELICAL REDUCER
Vertical drive. 8 sizes. Ratios 1¼ to 9:1. ¾ to 50 HP. 1458 to 128 RPM.

The design and manufacture of D.O.James motorized reducers embodies all the high quality of construction of our standard gear reducers. In addition to this in-built quality you have many advantages — such as compactness, lower cost and elimination of separate supports, thereby saving valuable floor space. D.O.James Motorized Reducers are manufactured to drive up, down, horizontally or at an angle.

D.O.James

er 57 years makers of every pe of gear and gear reducer.

D. O. JAMES MANUFACTURING CO.
1140 W. MONROE STREET, CHICAGO, ILL.

Metal Thicknesses

(*Continued from Page 114*)

in accompanying illustration. Gener
under a standard set of conditions,
thicker the plate, the more the X-
will be absorbed in the plate and
less the X-ray negative will be affec
by rays passing through the materia

Preliminary shots were made by
two investigators with 1-in. square
steel (SAE X4330) used in propo
manufacture, ground in 0.020-in. s
over the range of thickness encount
in propeller design. Range of stock
with was approximately 0.060 to 0.
in. thick. X-ray techniques used
of minimum kilovoltage capable of
etrating the stock under considera
This was done in order to produce
maximum change of film density f
given change in thickness of mat
as higher kilovoltages tend to flatten
the contrasts.

All film densities were determine
means of a direct-reading transmi
densitometer. It was found desirab
use a film having high contrast, al
maximum change in density. Du
use of a densitometer, a fine gra
commercial film of the high-con
nonscreen type was selected. A 0.
in. lead backing strip was used
mediately behind the film in orde
minimize back scatter and a 0.00
lead filter was used immediately in
of film in order to eliminate comp
the effects of secondary rays and
provide an intensifying effect.

Densitometer Used for Checkin

Radiographs of the known blocks
of the unknown blade wall were ch
for density on the densitometer.
thickness-density graph of the kn
blocks then was prepared. After
thickness-density curve of known b
had been established, density of
unknown blade wall was marked on
graph and the predicted thickness
blade wall was established.

To check results, Moyer and
sectioned the blade and measured
wall thickness with micrometers.
imum deviation of predicted wall th
ness from actual wall thickness
0.0015-in., or between 1 and 2 per
error.

The authors of the method point
that possible applications for a pro
of this nature conceivably could
quite extensive. In the application
described, extreme accuracies are no
sary. By this is meant that errors
0.001 and 0.002-in. are, in certain ran
sufficient to necessitate the scrapping
the article. However, if concessi
were made to allow for a somew
larger percentage of error, number
applications would increase. For exa
ple, it has been shown that the m
thickness-density curve follows a
finite slope for any particular set
conditions. Therefore, determination
any density point on the slope fro
known thickness would fix the loca

ACCO-LOC SAFETY SPLICE

A SAFER, MORE RELIABLE METHOD FOR MAKING WIRE ROPE ENDINGS

The revolutionary ACCO-LOC Safety Splice makes hand-tuck splicing obsolete and unnecessary. Neat, compact, flexible to the terminal, it always develops 100% rope strength. It can be used with any standard fitting. Send today for literature.

ACCO-LOC Safety Splice offers many advantages, any one of which might easily justify its use.

1. It is safe. No wire ends to barb. It is easy to handle.
2. Does not distort the rope structure. Maintains equalized stresses in all strands.
3. It is neat, compact. Has no seizings to loosen and get in the way. Applies load stress in direct line with the pull of the load.
4. **ACCO-LOC Safety Splice** is extremely flexible—clear to the terminal, thus permitting close snubbing.
5. Easy to inspect at all times.
6. It may be used with any standard fitting (hook, ring, shackle, thimble, etc.). Upon retirement, fittings may be salvaged and re-used.
7. **ACCO-LOC Safety Splice** is made of preformed wire rope—the safe, kink-resisting, easy-to-handle type of wire rope.

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AMERICAN CHAIN & CABLE

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of the curve, thereby making it possib to interpret other density variations.

As an example of radiography appli to commercial products, thickness me surement of a welded pressure ves was taken. Either by graphic means by mathematical tables, any dens variations on the X-ray film can be terpreted in terms of metal thickn variation.

Bar Feed Reduces Stock Length Rejections

Made in seven sizes to take bar s from 6 to 11-ft lengths, a bar feed, cluding stands, seamless tube, pres regulator and piston, is available f Newton Mfg. Co., 215 West Seve street, Los Angeles. Airline connect pressure regulator, which delivers the sired pressure to far end of the s tube and actuates the piston, pus stock into the lathe and against stock stop under uniform pressure. Le rejections caused by pressure variat inherent in mechanical and hand-fee of stock are said to be eliminated. P sure regulator, in full sight of opera may be adjusted for various stock weig Only a small amount of line pressur necessary for stock feed.

Noiseless stock feeding is accomplis by the piston, forward end of which of inverted cone shape mounted on e thrust ball bearings, centering stock turning with it, thus holding it away f feeder tube. Piston has carbon-impr nated Neoprene rubber rings which dom require renewal to retain satis tory air pressure in feeder tube.

Operator, without moving away fr lathe, releases the tube lock by a t of the hand knob, swings tube over slide bracket, inserts the bar st returns tube to beginning position locks it.

Ground Thawing Process Aids Mining Operations

One-inch water hose, developed Goodyear Tire & Rubber Co., Akron O., to resist damage from the actio rays of sunlight, kinking and low tempe tures, is said to make possible recove of large quantities of gold and co minerals in an unusual mining operati It is claimed to be suitable for explorin gold and other mineral deposits to dep of nearly 40 ft in Alaska and the Can dian Yukon.

To prepare ground for mining oper tions, pipes with water outlets are drive to depth of proposed operations. The to or surface ends of pipe are linked b hose to a supply of cold water, which pumped into the frozen ground. Usual in 10 or 15 days the frozen ground softened sufficiently to be workable Cold water fed into the ground throug hose and pipes retains enough calor heat to thaw the ground for mining operations.

Galvanizing Protects Hundreds of Ship Parts

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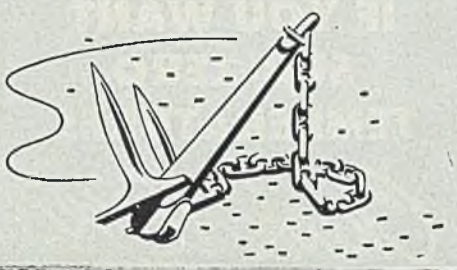

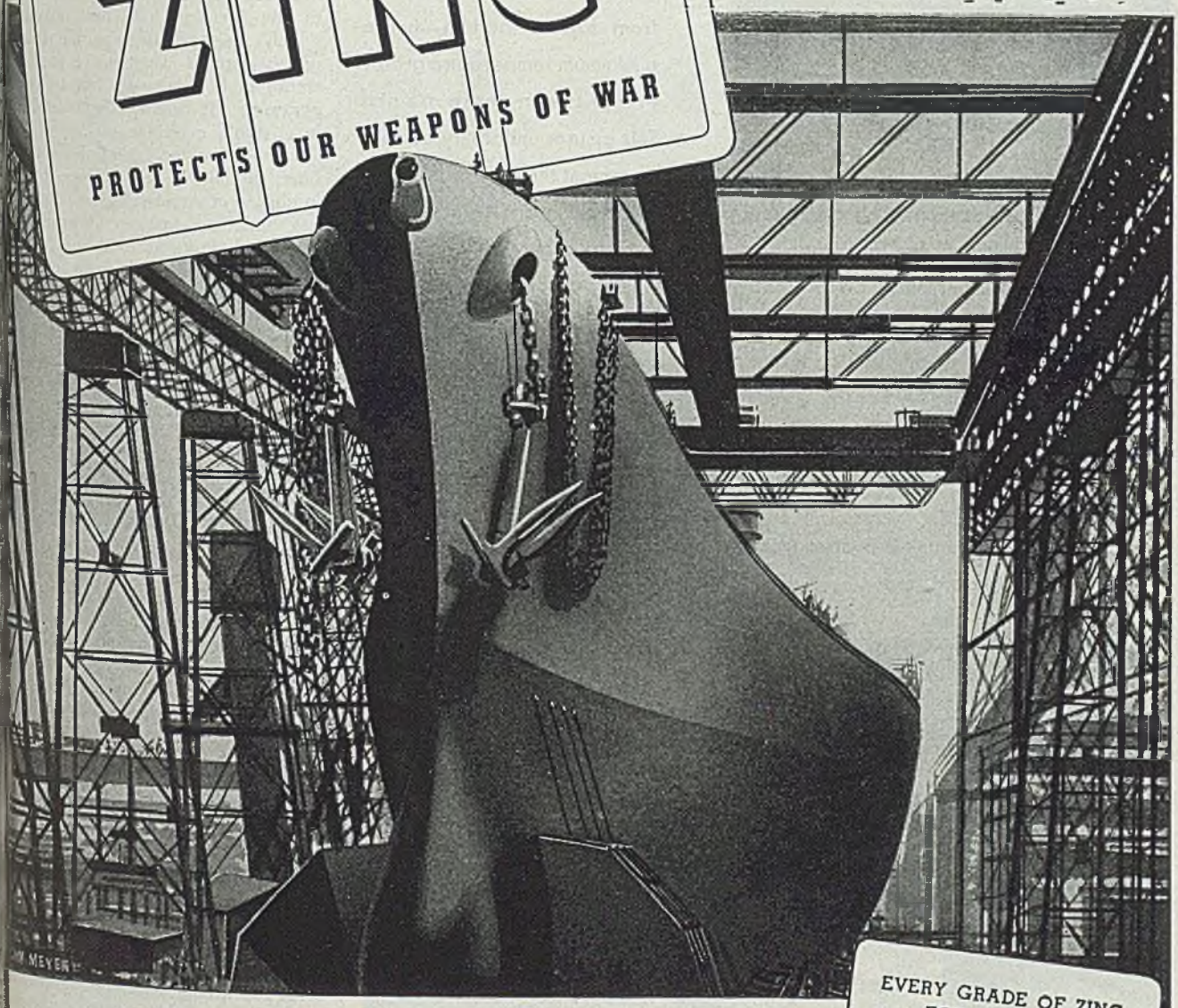

★ On every ship there are miles of galvanized pipe and conduit, innumerable items of galvanized hardware, cans and cases formed of galvanized sheets. For coating with zinc is the most effective method of protecting all ferrous metal against rust and corrosion. And tomorrow zinc will serve equally well in the protection of America's peace-time products.

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COLUMBUS, OHIO CHICAGO ST. LOUIS NEW YORK

Gas Turbine

(*Continued from Page 122*)

operation in progress. Welds were mad in a set sequence.

The finished rotor was removed fro the frame, and placed in a furnace whe it could be rotated at slow speed an heated to 1400° F. This temperatu was maintained for 16 hr and the rot permitted to cool. Some rough machi ing then was done and the unit return to the furnace for "heat indicatio which involved bringing the assemb up to a point where there was no crease in bending with increase in te perature. It then was considered "se in a stable condition.

In viewing the future of the gas t bine, Ronald B. Smith, vice preside in charge of engineering, said that Elli has built gas turbines as small as hp and as large as 2500 hp. "While is fairly certain that units of grea than 2500 hp capacity are practical," said, "there is reasonable doubt t either the very small, or very large t bine power plants will be commonpla within our time." He said he thoug however, that the gas turbine, witho displacing other forms of prime move has advantages that will win for it wide sphere of influence.

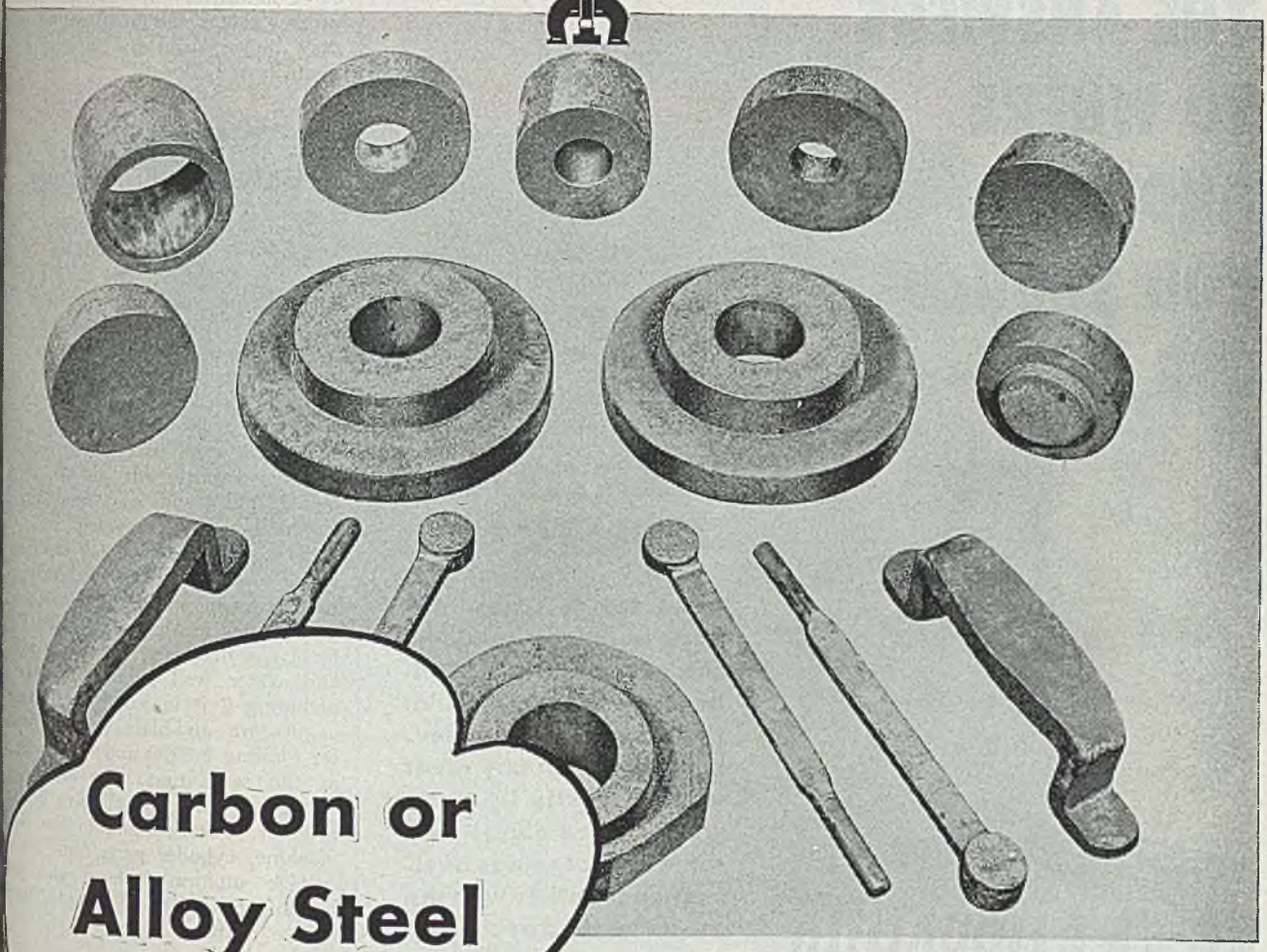
Coal-fired Turbine Locomotives

Mr. Smith pointed out that the new fighter aircraft are propelled by turbi jet units, similar units are being a plied to bombers and plans are und way for combination propeller and j units for airplanes of the future. F marine use, a 2500 hp unit can be d signed for installation in a space 16 x x 12 ft, corresponding to less than cubic foot per horsepower. Total m chine weight will be less than 20 lb/h A variable pitch propeller would provi added flexibility.

One of the most widely discusse future uses is for railroad service. M Smith said that an oil burning loco motive, such as illustrated in Fig. could be developed immediately. Th unit is one-half of a 5000-hp installatio with the arrangement contemplating t use of two turbines, two compressor one stage of reheating and about 5 per cent regeneration. No cooling wate would be required and an efficiency o the coupling of about 25 per cent can be anticipated. Plants of this type would be well adapted to the burning of re sidual, rather than distillate-type fuel and at anticipated operating expens less than that of present diesel loco motives and materially less than coal-burning reciprocating locomotives. Seve eral of the major railroads have made available development funds for the crea tion of a coal burning gas turbine, Mr. Smith said and Elliott is experimenting in this direction at present.

Another future possibility seen by Mr. Smith is the development of "packaged" power units (Fig. 7), capable of being transported on skids and of being se

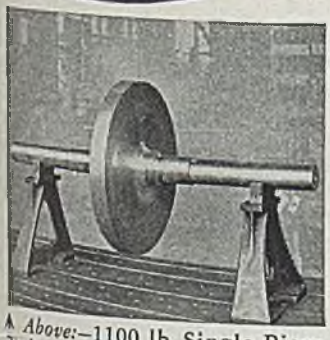
JOHNSTON & JENNINGS HAMMERED FORGINGS



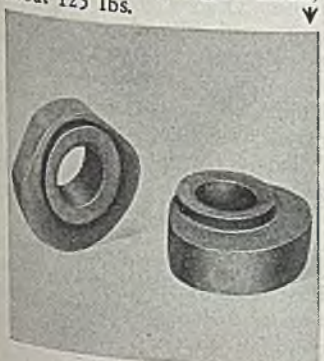
Carbon or Alloy Steel

● Hammered from carbon steel, alloy steel, tool steel, nitralloy, ingot iron, stainless iron, stainless steel, copper, bronze, aluminum, etc., Johnston & Jennings forgings meet a wide variety of industrial uses.

Years of experience in forging many different steels and alloys enables us to assist purchasers in selecting the material best suited for a given duty, and to suggest changes in design that will improve the service and the quality of the finished piece. Our demonstrated ingenuity in designing special tools frequently enables us to produce hammered forgings that closely approximate drop-die forgings for finish and tolerance, thus reducing to a minimum the time—and cost—of final machining operations. Send for Bulletin No. 421—It gives full details—and "Check with J & J" on your next forging job.



Above:—1100 lb. Single Piece Turbine Rotor and Shaft Forged from Ni-Cr-Mo Steel. *Below:*—Alloy Steel Cams Forged with Integral Hubs. Weight Each, About 125 lbs.



THE JOHNSTON & JENNINGS CO.

905 Addison Road • Cleveland 14, Ohio

HAMMERED FORGINGS, HOLLOW BORING AND ALLIED SERVICES

up and operated immediately upon arrival at the site. This unit would require no cooling water or foundations. For industrial applications requiring process steam, the air to gas regenerator may be replaced by an even smaller waste heat boiler.

Iron Well-Cylinders Supply Rust-Free Water

Well cylinders, with plunger cage and connections are made of iron and steel by Clayton Mark Co., Evanston, Ill., by a process which enables cylinders to supply rust-free water. A high corrosion-resistant plastic coating known as Dur-a-kote is baked on all iron parts. Multiple coatings are so thin that they are applied by air brush to the entire surface of each part before assembling, directly over threads and all, resulting in a cylinder with each component part completely plastic covered.

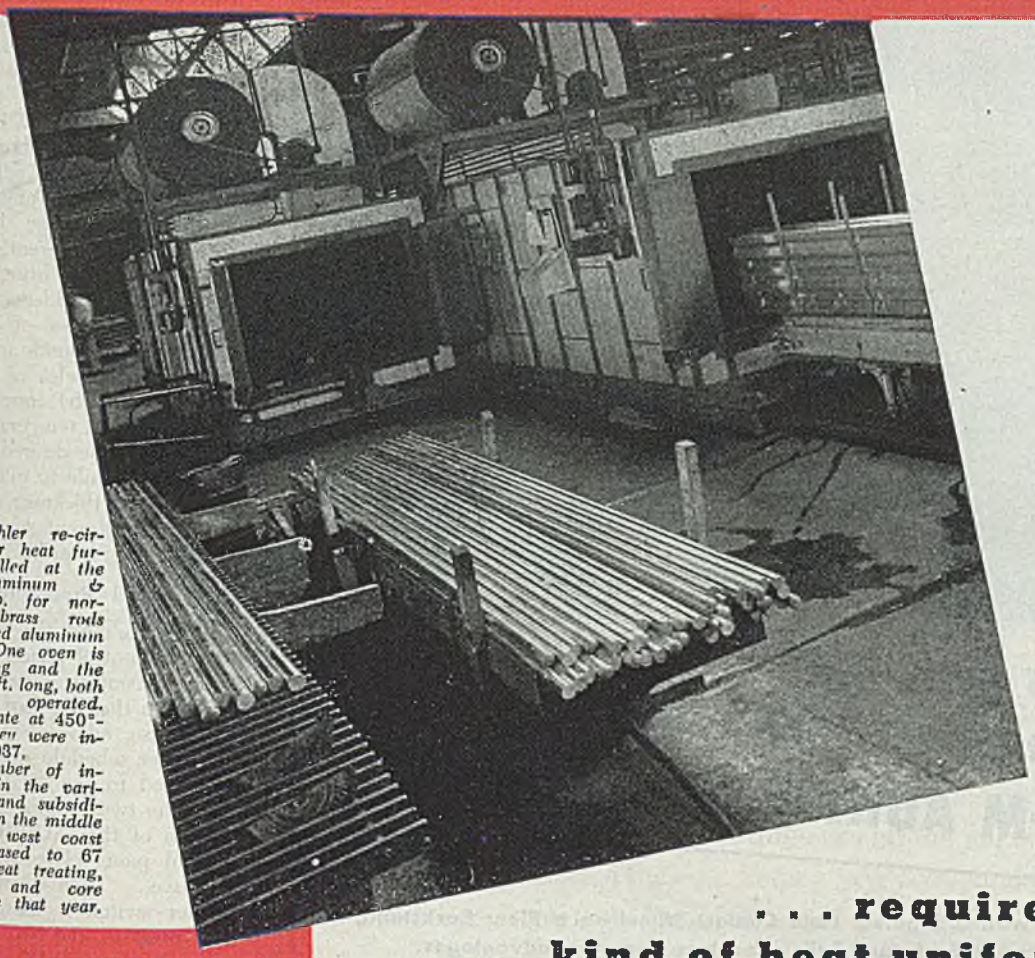
To provide the absolutely clean, etched metal surface required for bonding plastic, all parts are subjected to abrasive grit blasting in American Foundry Equipment Co. machines. Hydraulic cylinders and water well cylinders, up to and including 6 ft in length, are blasted in a pressure air blast cabinet, designed for blasting interior and exterior surfaces at the same time. Air at 80 psi is applied to force the abrasive inside the cylinder. After 3 min in the blasting machine, cylinder parts come out with surface uniformly clean, and perfect bonding is said to be provided for protective coating.

Power Shovels Offer Improved Service Operation

A line of power shovels, including more than a dozen models ranging in capacity from ⅜ to 2¼ cu yd, will become available when civilian production is authorized, according to Osgood Co., Marion, O. Several units are improved versions of prewar shovels, but most models embody new principles of design, construction and operation. Among new types developed are: A lightweight shovel with ⅜-yd capacity, built of weight-saving materials, and crawler-mounted; a 1-yd capacity shovel of medium weight; a slightly heavier machine with a new type of crawler mounting and 1¾-yd capacity; a 2-yd machine to replace Osgood Model 90; and type 100 unit, with 2½-yd capacity, in three models, standard unit with a manganese dipper, a 25½-ft boom and an 18-ft handle, the same unit with a longer crawler mounting and a boom up to 85 ft long for a dragline, and a 2-yd manganese dipper, a high boom stripping shovel equipped with a 45-ft boom and a 35-ft handle.

The company plans to produce at least four models of Osgood Mobil-cranes, including a unit of interest to materials handling, industrial, and logging companies.

Heat Treating today's metals



Two Maehler re-circulating air heat furnaces installed at the Bohn Aluminum & Brass Corp. for normalizing brass rods and extruded aluminum shapes. One oven is 41 ft. long and the other is 21 ft. long, both are truck operated. Ovens operate at 450°-600°F. They were installed in 1937.

The number of installations in the various Bohn and subsidiary plants in the middle west and west coast have increased to 67 units of heat treating, processing and core ovens since that year.

. . . requires the kind of heat uniformity provided by MAEHLER Furnaces

Maximum efficiency in the heat treating of magnesium and aluminum calls for *virtually perfect* uniformity of temperature. Maehler re-circulating air heat furnaces provide this kind of heat uniformity to give you increased output, a better job and lower operating costs on all types of heat treating. Maehler furnaces for aging, normalizing, stress relieving, annealing, bluing, drawing, tempering, etc. are available in units which will handle temperatures up to 1300° F. . . . gas fired, oil fired or electrically heated!

Bring your heat treating problem to Maehler — write today!

Temperature Variations of not over 5°!

A west coast plant stress-relieving 105 mm. shell cases in a Maehler oven found that with a full load at 500° F. temperature, there was a variation of temperature of only 5°! At 525° the temperature variation was less than the specified 10°.

Maehler air-heat furnaces are providing this type of efficiency for hundreds of top-flight companies.

93.6%

OF MAEHLER'S PRODUCTION IS DEVOTED TO REPEAT ORDER!

. . . There is no better proof of the superiority of Maehler Ovens and Furnaces.

MAEHLER

Industrial Ovens and Furnaces for Normalizing, Stress-relieving, Bluing, Aging, Tempering, Annealing, Drawing, etc.

THE PAUL MAEHLER COMPANY
2208 W. Lake Street, Chicago 22, Illinois

Automatic Control

(*Continued from Page 128*)

for successive orders for different thickness plate.

A differential gear is provided between the synchro-tie receiver unit and the limit switch shaft, with a small dc adjusting motor, so that the position of the limit switch contact arm may be shifted with respect to the position of the screws. The control switch "DIFF." and position indicator "L.S. DIFF." on the operator's control benchboard affords control of the differential adjustment, and indicates the extent of the relative movement between the limit switch and screws. The differential adjustment may be used to (a) bring the limit switch into exact coincidence with the screws after roll changes, etc., so that the roll opening corresponds to the designation on the receptacles of the pass selector plug boards, (b) correct for mill spring, roll wear, slab temperature, etc. in order to finish to the desired thickness, or (c) change schedule to roll to slightly different finished thickness without having to set up a different schedule on the pass selector plug board.

Panel Procedure Described

Fig. 6 shows the schedule and pass selector control panels, and the variable voltage control panels, which are installed in the first floor of the No. 5 control house, adjacent to the limit switch. When the schedule selector control switch is moved to the "SCHEDULE I" position, the two multipole contactors at the bottom of the "SCHEDULE I" selector control panel close to make that panel effective. Then when the pass selector master switch is moved to the No. 1 pass position, the No. 1 contactor at the upper left corner of the panel closes, completing circuits to the No. 1 pass plug on the left pass selector plug board. This initiates the movement of the screwdown and it runs until the limit switch contact arm makes contact with the set of stationary contacts which are connected to the plug board receptacle into which the No. 1 pass plug is inserted. Advancing the pass selector switch to the No. 2 position picks up the No. 2 contactor at the upper right corner of the "SCHEDULE I" selector control panel, completing circuits to the No. 2 pass plug on the left pass selector plug board, and causing the screwdown to move until the limit switch contact arm makes contact with the stationary contacts which are connected to the plug board receptacle into which the No. 2 pass plug is inserted. This operation continues for as many passes as required for the particular rolling schedule. Similarly when the schedule selector control switch is moved to the "SCHEDULE II" position the multipole contactors at the bottom of the "SCHEDULE II" selector control panel close, making that panel effective, and causing screwdown settings to be made according to the rolling schedule set up on the right pass selector plug board.

In addition to the 11 operating pass positions, the pass selector master switch

WAR STORY *You* Should Know

One of the greatest stories of the war is one you will not see in the daily headlines. It is the story of the tremendous job done by American business papers in helping organize America's mighty war effort.

Long before Pearl Harbor hurtled us headlong into combat, American business papers were helping you and thousands of other business and industrial men prepare for your part in the threatening conflagration. Always skillful at presenting the facts about business and industry—always delving deeply into their fields to find quick and practical solutions to big and small problems, American business papers, *like the one you are reading now,* went to work on war problems and the job business papers did helped shorten the war, helped save lives, and helped keep the home front from possible panic and demoralization.

Hitler said it would take America ten years to organize for war, but Hitler had very poor information on American know-how and probably no information at all on the effectiveness of the voice of American know-how, the business press.

Yes, the story of business papers in the war is another of the long and growing list of achievements which make business papers one of the greatest informational services the world has ever known. No wonder that, as never before, American business men are flocking to subscribe to their business papers. They know that the business paper reader is a better business man.

One of a series of messages prepared by the Business and Industry Department of St. Joseph's of Indiana, college for men, at Collegeville, Indiana.

has a "RESET" position, whose contacts are connected to the "RESET" contactors on the selector control panels. The "RESET" contactors are permanently connected to a particular set of stationary contacts on the limit switch, so that when the pass selector switch is moved to the "RESET" position, the screwdown is always moved to the same position of the limit switch. Then when preparing to change mill rolls or making other major adjustments, the screwdown is run to the "RESET" position. The synchro-transmitter and receiver units are then de-energized, and the screwdown transferred from "AUTOMATIC" to "MANUAL" control, enabling manual control of the screwdown without moving the limit switch away from the "RESET" position. Then after completing the roll change or other adjustment, the screwdown is operated under manual control to make the actual roll opening correspond to the "RESET" position of the limit switch, and the synchro ties are again energized, re-establishing coincidence between the screwdown and the limit switch control.

Reduces Speed of Drive

A unique feature of the automatic limit switch screwdown control is the provision to reduce the speed of the screwdown drive as it approaches the selected pass position so that it will stop accurately at the selected position. It is of course essential that all screw movements be made in the shortest possible time, (hence at the maximum possible average speed), in order to expedite operation of the mill. Therefore, the control equipment is arranged to form the acceleration and deceleration at maximum rates within the capacity of the screwdown motors and supply generators. Naturally on short movements the attained speed will be low, while on long movements the screwdown drive will accelerate and run at the full rated speed. A longer time is required to decelerate from high running speed than from a lower running speed, hence the point at which the deceleration must start is dependent upon the speed at which the drive is operating.

A series of resistors connected to contacts on the stationary contacts on the limit switch provides a measure of the distance that the screws are away from the position selected for the next pass, while the pilot generator geared to the screwdown drive gives an indication of the speed. These two quantities are matched in a regulating system, which controls the excitation and voltage of the 100 kw generators so that the screwdown speed is limited in proportion to the distance away from the selected stopping point. In this way the screw movement for every pass setting is made at the maximum possible speed, and the speed is reduced as the screws approach the stopping position, thus stopping with the same accuracy at the end of long movements at high speed as at the end of short movements at low speed.

The automatic screwdown control is interconnected with the control for the vertical edger adjustment, from side-

...l adjustment, and back sideguard ...ustment, to afford partially automatic ...ation of these auxiliary adjustments. ...-called "short stroke" limit switch is ...ided for each of these adjustments, ...nected to the drive by a magnetic ..., and made effective after the edger ...sideguard adjustments have been set ...e width plate to be rolled. These ...rt stroke" limit switches provide for ...vement of about 4 in. from the plate ...h to plate width plus 4 in. Con... are arranged so that when the ... selector master switch is set on any ...sscambered pass position, the front ...guard adjustment and the edger ad...ment move to the "in" position to ...d the slab as it enters the mill, and ... back sideguard adjustment moves ...e "out" position so that the slab will ...e the sideguards as it is delivered ...the mill. Conversely, when the pass ...or master switch is set on any even...ered pass position, the back side... adjustment moves to the "in" posi... to guide the slab as it is returned ...the mill, and the edger adjustment ...front sideguard adjustment move to ..."out" position.

...th this partially automatic control ...e edger and sideguard adjustments, ...operator is enabled to control the ... and back main tables with his left ..., the main roll and edger drives with ...feet, and the main screwdown, and ...r and sideguard adjustment with ...ight hand, with consequent co-ordi... control of overall operation of mill.

...ell Boosters Deburred by ...wer Brush System

...moval of sharp edges and burrs and ...ing threads on artillery shell boost... at the rate of two million a month ...ccomplished with power brushing, ...rding to Osborn Mfg. Co., Cleve... One manufacturer is said to ob...best results with the company's No. ... brush, using 0.0095-in. wire and ...ating at 3450 rpm from a ½-hp mo... Work is applied to brushes in a ...-sweeping motion, causing brushes ...ontact the part on an angle, a meth... claimed to be faster and more effec... than previous methods.

...ated Abrasives Are ...bject of Booklet

...echanics, engineers, shop men, and ...other users and buyers of coated ...asives are offered a copy of the new ...ebook "Coated Abrasives", said to ... first of its kind ever published. ...tten by E. B. Gallagher, engineering ...sultant, the 36-page illustrated book ...ks impartially with the entire subject ...m manufacture to use and storage. ...ncluded is up-to-date, authoritative in...rmation about abrasives in use, dif...rence between technical and non...chnical abrasives, the several kinds of ...kings, coatings, grain sizes, and on ...ich jobs each should be employed. ...pies may be obtained by writing to ...ehner Mfg. Co., Norwalk, Conn.

Labeling of Hazardous Chemicals Standardized

A committee of chemists, toxicologists, packaging engineers, physicians, and lawyers, appointed by the Manufacturing Chemists' Association of the United States, with headquarters in Washington, D. C., has completed a study for standardizing labeling of hazardous chemicals. Results have been published in a manual entitled "A Guide for the Preparation of Warning Labels for Hazardous Chemicals." An objective of the work is to discourage depending upon code labels which leave the user with no information about the product. The manual outlines the principles that should govern preparation of precautionary labels, with emphasis on protecting users, handlers, repackers, jobbers, and distributors of chemical products or others who may be less familiar with them than the manufacturers. It contains detailed definitions of terminology and a classification of hazards, offers recommendations for label cautions to be used with each hazard, suggests labels for experimental samples, and gives specimen labels to show how the principles developed in the manual should be applied.

Principles are being adopted by leading chemical manufacturers in the United States. Resulting standardization is expected to lead to a more exact understanding of terminology and specific hazards by users of industrial chemicals, as well as producers.

Manual Contains Cautions

A companion manual contains label cautions for approximately 70 representative types of chemical products, cautions and precautionary measures for which are based on principles developed by the committee. The association expects to supplement these from time to time, and it is believed that any product not found among the 70 specific examples now can be labeled adequately by utilizing the principles presented in the new manual.

Basic considerations in preparing a precautionary label are: Determination of hazards present in chemical; selection of appropriate statements for each hazard; and arrangement of statements in order of importance. Manual lists the following principles to be considered first in preparing any precautionary label: Each chemical product, including mixtures, presents a distinct problem and must be treated individually; care should be exercised in choice of terminology—statements should be brief and simple; on labels for different products, uniformity in language to indicate the same hazards is important to gain greater understanding through standardization; precautionary statement must be accurate and selectively chosen; chemical names should be those recommended by the American Chemical Society; use of a nondescriptive code designation or trade name as the only identification of

...rous chemical should be avoided; ...ical name, signal word, "'Danger," ...ing," or "Caution," designating ...e of hazard, affirmative statement ...hazard," and precautionary measures ...ng actions to be followed or ...ld should be included on pre-...tory label.

...each chemical must be treated ...ually, the manual presents a com-...sive list of statements indicating ...rning, cautions, and first aid ...ent to be applied, depending on ...ific hazards inherent in the product. ...ification of hazards adopted is as ...ws:

...Flammable liquids and oxidizing ...gents supporting combustion. (a. ...Flash point 20° F or below; b. ...lash point above 20° to 80° F ...clusive; and c. flash point above ...0° F.)

...Flammable solids and oxidizing ...gents as classified by the ICC.

...Vapors immediately toxic or ex-...tremely irritating even on exposure ...for a short time or to low concen-...trations.

...Vapors hazardous from prolonged ...or repeated exposures, or exposure ...to higher concentrations.

...Vapors physiologically inert.

...Harmful dusts.

...Skin irritants—corrosive.

...Materials causing skin irritations ...after repeated or continued contact.

...Materials toxic through vapor in-...halations or skin absorption.

...Toxic if taken internally. Applies ...to materials covered by statutory ...definition of poison liable to be ...destructive of human adults in ...doses of 60 grains or less (4 g) or ...any material toxic in amounts ...likely to be taken internally through ...easily anticipated errors.

...h Temperature Alloys ...ed by Special Machine

...gh temperature alloys, used in steam ...ines, jet propulsion units, and other ...temperature machines, are checked ...machines which obtain in one month ...what formerly required 5 or 6 years ...determination. The test piece is ...ted in a furnace maintaining the ...h temperature. A stress is applied ...times per second through clamping ...ure by two stator coils connected ...two-phase 60-cycle supply line. The ...system is mechanically tuned to ...ance at this frequency to minimize ...riving force necessary.

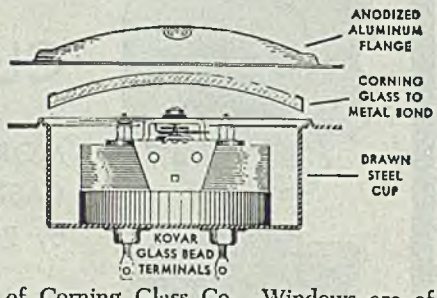
...Research engineers may see the speci-...after the first tiny crack occurs, not ...complete failure of the sample, and ...accurately determine the factors of ...ure. A sample may be placed in the ...heated to desired temperature, and ...test started and allowed to run day ...night without attention for weeks or ...until failure begins, when the ...automatically stops without continu-

ing until evidence of the mechanism of failure is destroyed. Tests of high temperature alloys up to a billion applications of stress have been made in 100 days, according to the Research Laboratories of Westinghouse Electric Corp., Pittsburgh. The special advantages of this controlled method of testing metal alloys for high temperature installations are expected to prove useful in many research projects in the future.

Hermetically Sealed Meters Resist Moisture

Hermetically sealed electrical indicating instruments of the type illustrated are being built into a protective cup-like frame and glass cover sealed to metal rim. Positive sealing of the mechanism into its case is effected with a minimum number of seals. The instruments, manufactured by Marion Electrical Instrument Co., Manchester, N. J., in 2½ and 3½-in. sizes, have passed tests of immersion in boiling brine solution for extended periods and of freezing at minus 40° F without any indications of seal deterioration.

The window sealing process was developed in co-operation with engineers



of Corning Glass Co. Windows are of double thickness tempered glass, processed for solder sealing, and are shock resistant. Before each case is sealed, the instrument is dehydrated and filled with dry air at sea level pressure. Another innovation is the crowned crystal face which permits greater scale length, reduces shadows and improves visibility. Magnetic shielding is said to make possible interchangeability on any type of panel without affecting calibration. Drawn steel case has a special phosphate finish, meeting the 200-hr salt spray anti-corrosion test. Anodized aluminum flange fastens securely over the glass to metal bond with screws.

Precision Attachment Simplifies Taper Boring

Attachment that simplifies boring of tapers and profile holes with turret lathes and hand screw machines can be set so precisely that it does away with trial-and-error methods of producing the right taper. When the device is set for a certain taper, the first piece bored will have the taper specified. Size and taper at the face of the stock are held the same from piece to piece, regardless of variations in length of stock.

To set attachment to required dia-

...nd taper takes only 1 min, and ...tapered or straight holes can be ...without making any change in ...-up except for moving back the ...ide. On the average job, because ...speed with which it can be set ...cause it entirely eliminates check-...ring boring, this attachment re-...production time 25 to 50 per cent,

...ing to Artisan Tool & Cutter Co., ...sler street, Ferndale 20, Mich.

...bore a hole oversize or out-of-taper ...ctically impossible, because, once ...a hole of accurately specified size ...per, the attachment controls boring ...ions. Operator simply maintains ...ne dial setting, which remains con-...regardless of variations in length ...k. Attachment is mounted easily ...y hand screw machine or turret ...without interfering with other tools ...e turret. It also is adaptable to ...chucking machines.

...l Product May Be ...dled with White Gloves

...new plant for manufacturing a ...ed anthracite and bituminous coal ...t known as "white glove packaged ...will be operated in Philadelphia ...ow-Knox Co., Pittsburgh. First ...ale production is being sponsored ...Solid Fuels Administration. Prod-...sists of six 3-in. cubes wrapped ...ge paper and is said to be so ...that it literally may be handled ...hite gloves. It can be stacked be-...aces, stoves or furnaces without ...al attendant coal dirt.

...processing the fuel, anthracite and ...ous coal lumps are passed sepa-...through a huge revolving cylinder ...hot air removes all traces of ...e. Remaining dust is removed, ...clean, dry coal is crushed to exact ...required for final processing. Coal ...blended in proper proportion to ...a slow, hot and practically ...ess fuel. Blend is heated, mixed ...binder and given final shape. The ...cubes are cooled, wrapped sealed, ...abeled at each end, and are ready ...consumer. The fuel gives a ...um amount of heat, burns to a ...um of fine white ash, and does ...form clinkers, according to the com-...

—o—

...passenger loading platform, made ...Aircraft Mechanics Inc., Colorado ...gs, Colo., for Continental and ...r airlines, combines durability and ...handling. Its cost makes it prac-...for both small and large air ter-...

James F. Lincoln Suggests Simplified Standards for Welding Electrodes

INDUSTRY in general, and the welding industry in particular, are and have been greatly handicapped by the lack of a real technical standard covering electrodes. True it is, there has been in existence for some years a so-called standard which actually might be termed a "buyers' guide." This, known as "Tentative Specifications," is published by the American Welding Society. However, even in this long and complicated "buyers' guide" there are so many discrepancies with ambiguous and contradictory statements that it is rendered entirely unsatisfactory. Let me cite a few examples.

To qualify an electrode for any classification, the tests are so complicated and so costly as to render them useless in manufacturing practice. They are too costly to be repeated periodically as a check on manufacturing standards. Tests are required on all sizes of 5/32-in. and above, but note—no tests are required on ⅛-in. and smaller. So, why have tests on *each* larger size?

A manufacturer cannot use the same electrode for two or more classifications; this in spite of the fact that the ideal electrode, of course, is one which would fulfill all classifications. Then there are specifications as to the electrical resistance of the coating, which certainly has nothing to do with the performance of the electrode.

Also it says: "The coating shall not have scabs, blisters, abnormal pockmarks, bruises, or other surface defects that shall be injurious."

Just what is injurious?

These are only a few of the idiosyncracies of this "buyers' guide." Therefore, it readily can be seen that what is needed is a simple, easily understandable standard which would enable a manufacturer to manufacture to such standards consistently and would enable the purch to readily and easily test the electro if he wished to do so, to see if the ma facturer was conforming to the standa

As there is no need for a weld stro or better than the materials to be wel I suggest for mild steel, which cover per cent of the requirements, a sim standard, something as follows:

The electrode shall be of such c acteristics that it will withstand the lowing tests to be made any time a b might desire:

(a) A weld made in ⅜ or ½-in. p of mild steel, planed to the same thick as the parent metal, must break out of the weld when pulled in a stan tension machine.

(b) On a section from the same mentioned in (a), welds to be be any way desired and elongation of 2 cent in the outside fibers must show fracture.

It is quite evident that an elect which will perform as indicated in t two tests will give a weld equal in phy qualities to the plate. With such a w the matter of porosity obviously is o consequence. However, if it should desired to cover the question of poro a simple test could be made as foll

A fracture shall be made through weld. On a straight line through the tured weld there shall be voids o more than 5 per cent cumulatively.

There is no question but that an e trode which will withstand the above simple tests will be satisfactory in w ing mild steel, so why complicate mat

It seems to me that this is a ques which the Filler Metal Committee the American Welding Society sho give proper attention.

—J. F. LINCOLN, Pres
Lincoln Electric Co., Cleve

Program Begun for Combating Eye Accidents

A research program has been initiated at Battelle Institute, Columbus, O., under sponsorship of the American Society of Safety Engineers, Engineering Section of the National Safety Council, to provide information to be used by safety experts and eye-protector manufacturers to help in combating the some 75,000 disabling eye injuries and several hundred thousand nondisabling injuries occurring annually in American industry. Investigation will apply particularly to evaluation of performance requirements and specifications of satisfactory plastic eye protectors.

Program will include both laboratory and statistical investigations. A field survey of present experience with various types of plastic eyepieces will be made study the types of devices in use, nat of hazards, protection experience, dence of eye strain, acceptance and by workmen, and other evidences of vantages or disadvantages. Proceeding the same time will be physical and tical tests to determine adequacy of tection, design, light transmission, strain and fatigue, and other factors. combined data will be used by protector manufacturers for setting dards for their products and in for specifying desirable types of tectors.

—o—

A reprint of an article entitled "Fung Proofing Procedure" by R. Prosk vice president of Insl-x Co. Inc., Meeker, Brooklyn 22, is available fr the company upon request.

Formed Easily by Method

method for forming dies, die-cast- and Bakelite or permanent with irregular contour without special machines has been de- by the Turchan Follower Ma- Co., 8259 Livernois, Detroit 4. an ordinary milling machine, with a hydraulic attachment. the accompanying illustration, shape can be reproduced from soft of plaster or wood in less time lower equipment cost than for- Three-dimensional control, one vertical and two in the horizontal

permits forming irregular shapes as machining plain surfaces, heavy or light cuts, and elimi- all hand work but the final sur- shing. Manufacturer also claims method is equally applicable to mills for performing the same work.

ulator Solves lems in Electronics

allel-resistance and series-capaci- calculator, available from Allied Corp., 833 West Jackson boule- Chicago 7, for 25 cents each, is rule device designed to provide and accurate means of deter- the reciprocal of the sum of two ants as expressed by the formula

$$\frac{1}{x} = \frac{1}{a} + \frac{1}{b}$$

the setting of slide automatically all pairs of a and b values satis- the equation for any given value Calculator indicates in one setting numerous pairs of resistances which be connected in parallel, or capaci- in series, to provide any required ance or capacitance value. Calcu- is equally useful in solving prob- involving inductance in parallel, ed inductance, numerical magni- of impedance, parallel reactance,

THE BUSINESS TREND

Decline of 7 Per Cent Seen in Wages, Salaries

TRANSITION from a full war economy toward a peacetime basis is expected to cut total national disbursements for wages and salaries in the second half of this year 7 per cent below those of the first half.

In predicting this, the U. S. Department of Commerce said that about half of this drop will come from increased unemployment, while the rest will reflect elimination of some overtime pay, and movement out of high income war occupations.

The major decline in total wages and salaries will be in manufacturers' payrolls, while slight decreases in wage payments in the federal government, mining, and transportation are expected to be offset by increases in construction, trade, and the service industries.

Downtrend in average weekly earnings in factories began in March and continued through May, the last month for which a report is available. The expected continuation of the decline likely will stimulate labor's demands for guaranteed annual wages.

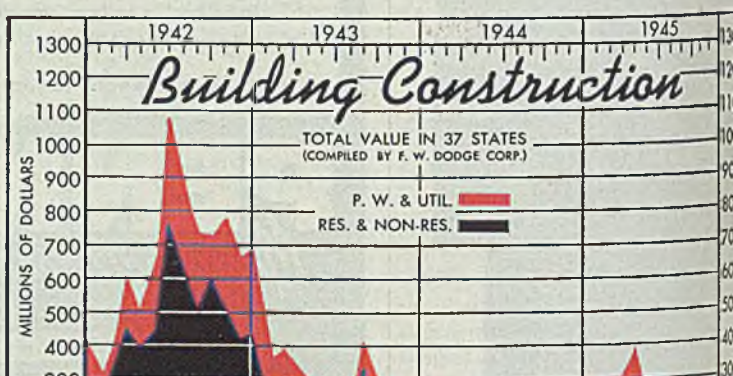
STEEL PRODUCTION—Meanwhile, industrial activity remains strong in the latest week, although steel ingot output recently has been adversely affected by work stoppages.

AUTOMOBILES—The reconverting automobile industry produced in the latest reported week 18,690 units, highest point since manufacture of civilian cars was resumed July 1.

CONSTRUCTION—Awards for construction reached $76,351,000 in the week ended Aug. 2, highest weekly volume recorded since July 15, 1943. Private work tops all weekly totals reported since Nov. 11, 1943, and public construction is the highest since Oct. 12, 1944. Construction materials are being produced on an increasing scale but several months may elapse before increased supplies actually appear on shel and in yards of distributors.

FORGINGS, CASTINGS—Shipments of steel forging May decreased 3 per cent from April but increased per cent over May, 1944. Unfilled orders at the en May, 1945, were 23 per cent less than unfilled or on April 30, 1945, but 8 per cent higher than Ma the previous year. Shipments of gray iron castings, cluding soil and pressure pipe, during May increase per cent over April but decreased 1 per cent from 1944. Unfilled orders for gray iron castings at the of May, 1945, amounted to 2,602,986 short tons, pared with 2,640,642 short tons on April 30, 1945.

COKE—Production of coke in June decreased 5382 daily compared with the May rate, the decline resu from a slow-down at by-product plants.



Construction Valuation In 37 States

(Unit—$1,000,000)

	Total		Public Works-Utilities			Residential and Non-Res dentia	
	1945	1944	1945	1944	1943	1945	1944
January	140.9	159 2	39.8	50.3	85.8	101.2	108.9
February	117 0	137.2	32.0	55.1	112.9	115.0	62.1
March	328.9	176.4	90.6	61.3	123.0	238.3	115.1
April	395.8	179.3	111.9	72.0	127.7	283.9	107.3
May	242.5	144.2	107.9	55.8	95.8	134.6	88.4
June	227.3	163.9	95.0	70.7	73.8	132.3	93.1
July	....	190.5	....	80.5	50.0	....	110.0
August	....	169.3	....	69.4	73.4	....	99.9
September	....	175.7	....	64.1	175.1	....	111.6
October	....	144.8	....	52.2	63.5	....	92.6
November	....	164.9	....	48.0	59.0	....	116.9
December	....	188.5	....	66.6	67.4	....	121.8
Total	....	1,993.9	....	746.0	1,106.9	....	1,247.2

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago
Steel Ingot Output (per cent of capacity)	89.5	90.5	88.5
Electric Power Distributed (million kilowatt hours)	4,432	4,435	3,978
Bituminous Coal Production (daily av.—1000 tons)	1,985	1,930	1,992
Petroleum Production (daily av.—1000 bbls.)	4,922	4,930	4,886
Construction Volume (ENR—Unit $1,000,000)	$76.4	$41.1	$30.8
Automobile and Truck Output (Ward's—number units)	18,690	16,105	14,365

*Dates on request.

TRADE			
Freight Carloadings (unit—1000 cars)	851†	886	726
Business Failures (Dun & Bradstreet, number)	18	22	9
Money in Circulation (in millions of dollars)‡	$27,130	$26,926	$26,834
Department Store Sales (change from like week a year ago)‡	+15%	+14%	+16%

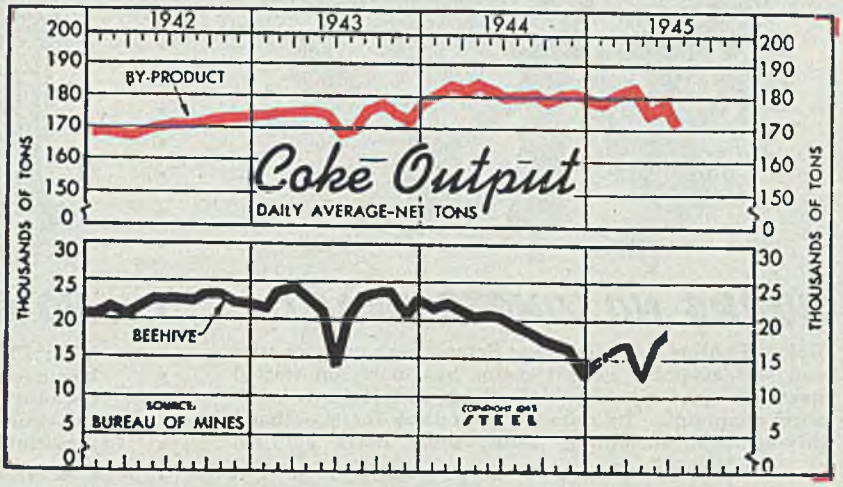
†Preliminary. ‡Federal Reserve Board.

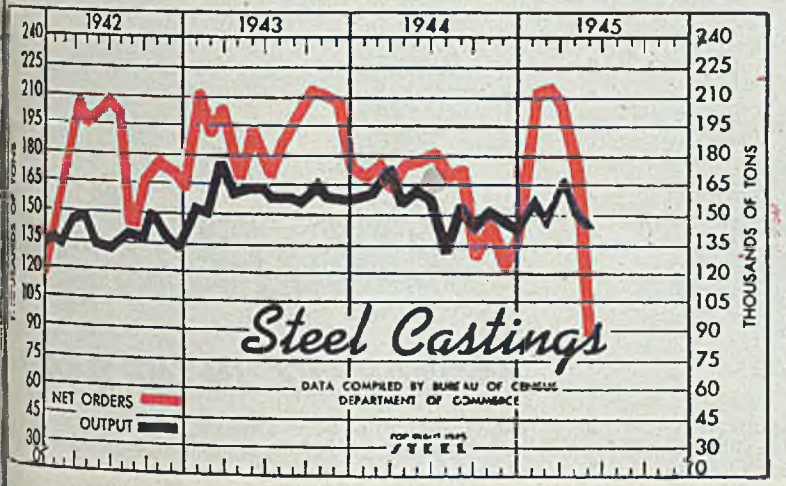
Coke Output

Bureau of Mines

(Daily Average—Net Tons)

	By-Product 1945	By-Product 1944	Beehive 1945	Beehive 1944
Jan.	179,879	181,501	14,745	21,933
Feb.	180,727	184,384	16,210	22,218
March	182,120	182,442	17,115	21,529
April	171,239	185,259	12,554	20,457
May	178,338	181,071	17,963	20,783
June	172,201	181,891	18,718	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





Commercial Steel Castings†

(Net tons in thousands)

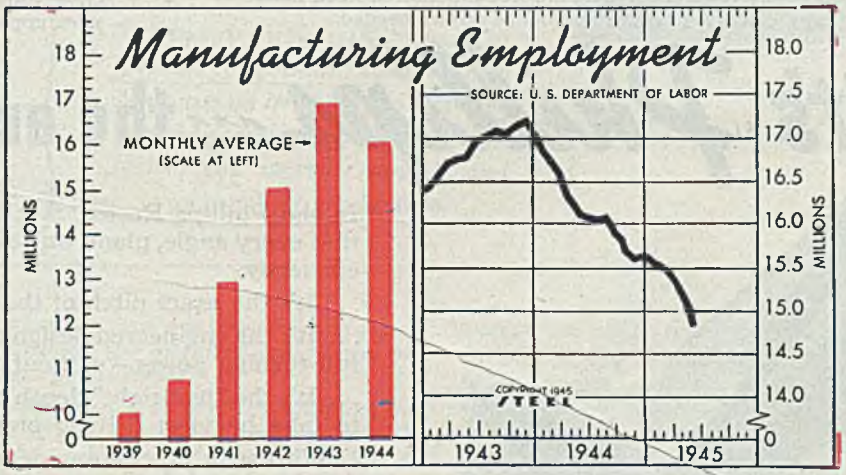
	Orders 1945	Orders 1944	Production 1945	Production 1944
Jan.	210.2	167.7	157.2	159.8
Feb.	211.4	173.6	146.2	161.4
Mar.	203.2	162.6	166.9	174.6
Apr.	177.7	175.1	150.3	155.8
May	89.8	177.0	145.1	161.8
June	....	181.8	....	157.4
July	....	169.9	....	131.9
Aug.	....	171.3	....	151.9
Sept.	....	129.8	....	144.5
Oct.	....	146.1	....	150.7
Nov.	....	120.7	....	146.4
Dec.	....	138.7	....	144.2
Total	....	159.5	....	153.6

† For sale.

Factory Employment

(000 omitted)

	1945	1944	1943
January	15,555	16,825	16,423
February	15,517	16,735	16,599
March	15,368	16,559	16,747
April	15,102	16,309	16,774
May	14,853	16,122	16,753
June	.....	16,093	16,908
July	.....	16,013	17,059
August	.....	16,023	17,182
September	.....	15,843	17,136
October	.....	15,692	17,194
November	.....	15,607	17,238
December	.....	15,632	17,080
Monthly Ave.	.....	16,121	16,924



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,477	$10,552	$10,604	$9,943
Federal Gross Debt (billions)	$262.5	$262.0	$259.1	$210.1
Bond Volume, NYSE (millions)	$19.6	$25.0	$20.3	$36.0
Stocks Sales, NYSE (thousands)	3,541	4,374	4,115	4,504
Loans and Investments (billions)†	$63.9	$64.0	$63.5	$57.1
United States Gov't. Obligations Held (millions)†	$47,312	$47,267	$46,543	$42,460

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.8	105.6	105.9	103.9
Industrial Raw Materials†	118.5	117.7	118.7	113.8
Manufactured Products†	101.9	101.9	102.0	101.1

†Bureau of Labor Statistics Index, 1926 = 100.

BURRS NO LONGER SNAG!

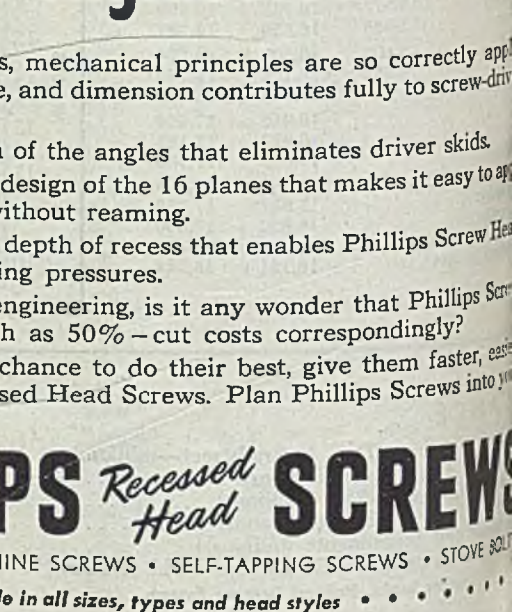
Before Phillips Recessed Head Screws were used for trim and seat assembly in this motor bus, burrs on slotted screws snagged passengers' clothing, caused many nuisance complaints. In spite of extra time for slow hand driving, and smoothing heads, some burrs got by.

NO ASSEMBLY LAG!

With Phillips Screws, burr-trouble ended, and savin began – as much as 40% in assembly time and lab because power driving became practical. Also saved w the time formerly wasted disassembling, refinishing, a reassembling parts scarred by driver skids.

PLANS GET O.K. TAG!

Because Phillips Recessed Head Screws take heavier driving pressures without danger of burring, driver skids, or slant driving, fastenings are stronger, more rigid than with slotted screws. Designers are freed of slotted head handicaps, can often reduce number of screws needed.



APPROVAL'S "IN THE BAG"!

Burr-free Phillips Screws are not only kind to clothing the Recessed Head on exposed surfaces looks bett blends with the practical smartness of modern desig Give your product this cost-trimming, customer pleasi sales appeal!

It's Phillips ... the engineered recess

In the Phillips Recess, mechanical principles are so correctly appl that every angle, plane, and dimension contributes fully to screw-driv efficiency.

. . . It's the exact pitch of the angles that eliminates driver skids.

. . . It's the engineered design of the 16 planes that makes it easy to ap full turning power – without reaming.

. . . It's the "just-right" depth of recess that enables Phillips Screw Hea to take heaviest driving pressures.

With such precise engineering, is it any wonder that Phillips Scre speed driving as much as 50% – cut costs correspondingly?

To give workers a chance to do their best, give them faster, easie driving Phillips Recessed Head Screws. Plan Phillips Screws into yo product now.

PHILLIPS Recessed Head SCREWS

WOOD SCREWS • MACHINE SCREWS • SELF-TAPPING SCREWS • STOVE BOLT

Made in all sizes, types and head styles

25 SOURCES

American Screw Co., Providence, R. I.
Atlantic Screw Works, Hartford, Conn.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
General Screw Mfg. Co., Chicago, Ill.
The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
Manufacturers Screw Products, Chicago, Ill.
Milford Rivet and Machine Co., Milford, Conn.
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Reading Screw Co., Norristown, Pa.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
The Steel Company of Canada Ltd., Hamilton, Canada
Wolverine Bolt Co., Detroit, Mich.

Packard Motor Car Company now makes use of Color Dynamics!

Color Dynamics

Pittsburgh's new scientific use of ENERGY IN COLOR *continues to demonstrate its ability to improve working conditions, reduce absenteeism and increase quality and quantity of production!*

WITHIN a year's time Pittsburgh's new and unusual science of COLOR DYNAMICS has won significant comments from many industries such as the following:

"We had several purposes in mind when we decided to apply COLOR DYNAMICS", writes Mr. K. R. Parker, of the Packard Motor Car Company, of Detroit, Mich.

"We wished to improve working conditions. We are aware of the need of reducing eye fatigue which contributes so greatly to physical fatigue, 'nerves', depression and other ailments that often cause absenteeism. We desired further to safeguard our people against accidents. And of course, we were interested in improving the quantity and quality of our production!"

Pittsburgh has received comments like this from hundreds of other industrial plants where COLOR DYNAMICS has been applied. In practically every instance, *more work per man-hour and more man-hours per man have been the result!*

The principles of COLOR DYNAMICS are derived from the natural influence of the energy which colors exert upon normal human beings.

Pittsburgh has worked out purposeful uses of this *energy in color* for every paintable surface in the factory—on machines, floors, walls, ceilings and mobile equipment of all types.

You can readily test these principles in your plant—and at little cost to you. Apply these principles to one or two machines—or in one department. See the difference—in improved morale, efficiency and output.

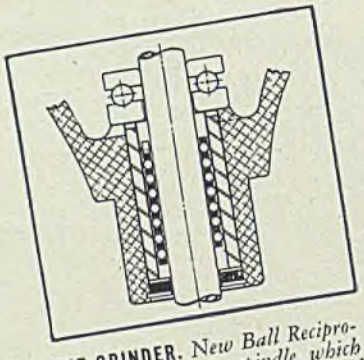
For a complete explanation of what COLOR DYNAMICS is and how it works, get a free copy of our book on this subject. Write Pittsburgh Plate Glass Company, Paint Division, Dept. ST-8, Pittsburgh 22, Pennsylvania.

PPG

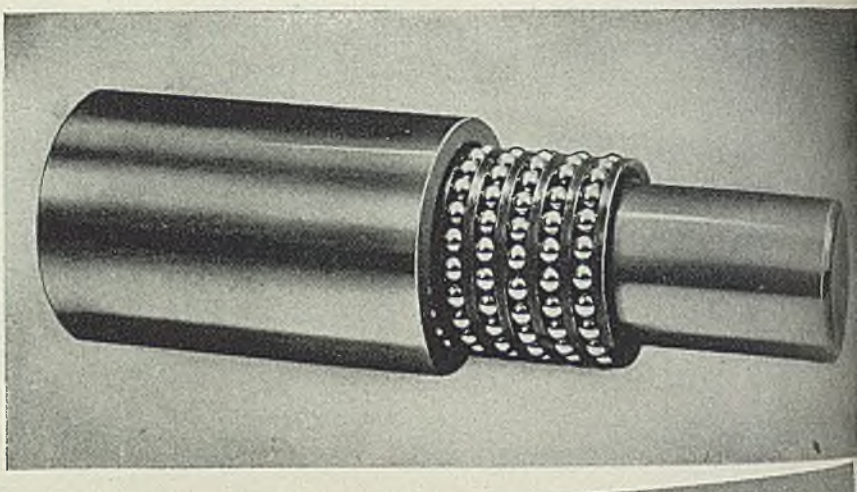
PITTSBURGH PAINTS

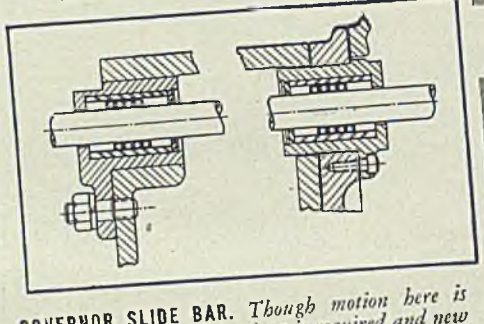
PITTSBURGH PLATE GLASS COMPANY, PITTSBURGH, PA.

PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS



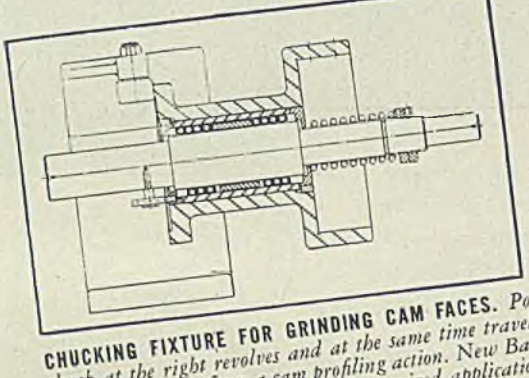
VALVE SEAT GRINDER. *New Ball Reciprocating Bearing here carries spindle, which not only revolves but also travels in axial direction to relieve contact intermittently.*



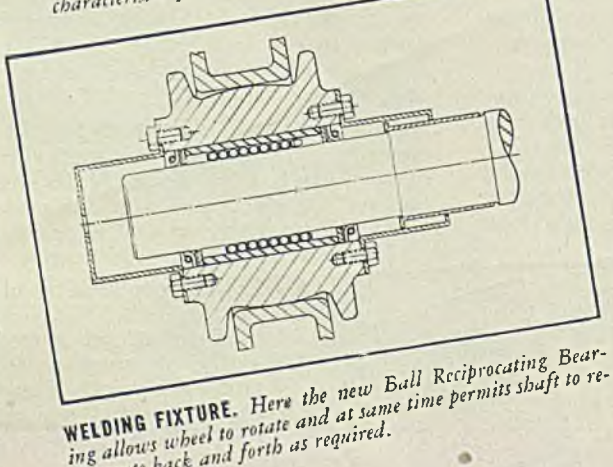


GOVERNOR SLIDE BAR. *Though motion here is axial only, freedom from drag is required and new Ball Reciprocating Bearing accomplishes this with outstanding efficiency.*

RECIPROCATING BEARING FINDS WIDE APPLICATION



CHUCKING FIXTURE FOR GRINDING CAM FACES. *Pot chuck at the right revolves and at the same time travels horizontally to perform a cam profiling action. New Ball Reciprocating Bearing provides the required application characteristics for the best results possible.*



WELDING FIXTURE. *Here the new Ball Reciprocating Bearing allows wheel to rotate and at same time permits shaft to reciprocate back and forth as required.*

Because it allows free axial as well as radial motion... combined with unusually high anti-friction capacity ... Torrington's new Ball Reciprocating Bearing is finding wide use wherever ball bearing anti-friction qualities are desired in rotation, reciprocation, oscillation or combinations thereof.

Designed by the engineers of Torrington's Bantam Bearings Division, this modern and efficient unit employs a helix to separate the balls and retain them. This permits the use of *approximately twice as many balls* as the conventional sleeve type retainer, with corresponding increase in anti-friction efficiency. In addition, the unit has the traditional Torrington advantages of compactness, simplicity in design, and built-in long life.

Shown on this page are just a few of the many applications where the new bearing is helping modern equipment do a better job. Would you like to know how it can improve the efficiency of *your* equipment? Write for a copy of Bulletin 105, which gives full engineering and application data. And feel free to bring your anti-friction problems, routine or unusual, to Torrington's Bantam Bearings Division.

THE TORRINGTON COMPANY · BANTAM BEARINGS DIVISION
SOUTH BEND 21, INDIANA

TORRINGTON BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL
STEEL

ıp War Developments Put ıeck on Steel Buying

Sweeping cancellations expected to follow victory . . . Some free third quarter tonnage . . . July ingot output lowest in five years

ıff the end of the war in the Pacific hastened by entry ıia and use of the atomic bomb, steel demand has eased, ıew phases of war procurement meeting temporary delay, ıg review in the light of recent developments.

ı though prospects of full civilian production are coming consumers are disposed to move slowly at the moment current influences can be appraised. When the war's ıes cancellations will be sweeping, amounting possibly ıuch as 90 per cent of war contracts, according to some ıgton estimates. This causes a tendency on the part of ıcturing consumers to specify lightly for the present.

ıdated orders are still being received by mills, with ıal specifications for war work, as there are advantages ıined in scheduling when war pressure is off, but volume ıy is definitely down. Many manufacturers with postwar ıas sufficiently advanced placed orders many weeks ago. ıture of this situation is that at the war's end there may ıy cancellations of even these purely civilian orders, as ıdy there are a number of duplications.

ıe prospect for sudden termination of fighting came last ıe War Production Board was setting up allocations for ıuarter and it had been decided to continue CMP con- ıe end of the year. Earlier indications were that about ıı tons of unrated tonnage would be available for fourth later revised to 3 million tons, even assuming continua- the war through the year and that the labor situation ıot become worse.

ıre estimates that unrated tonnage during third quar- ıe about 800,000 tons, with some trade leaders skeptical. ıes of unrated sheets and strip for third quarter are for 75,000 tons, based in part on surplus of heavy-gage sheet capacity caused by landing mat cancellations. Current predictions for unrated sheets and strip for fourth quarter are for about a million tons. Sheet and strip carryover at the end of this quarter is expected to be about 300,000 tons, down more than half of the 660,000 tons at the end of second quarter.

Meanwhile War Production Board and other war agencies are endeavoring as far as possible to translate general policies into specific actions for guide when the war ends. Indications are that WPB controls will be dropped much more speedily than since the end of the war in Europe, but still not too abruptly. CMP may fade rapidly when Japan collapses but MM ratings are likely to remain for several months to supply armies of occupation. CMP tickets probably would be honored over the remainder of the year should this plan be abandoned meanwhile, it is believed.

Estimated national rate of steel production last week declined 1 point to 88½ per cent of capacity on reductions at several important centers, with few increases to offset. Pittsburgh dropped 1½ points to 86, Chicago 1½ points to 93, Buffalo 2 points to 81½, Cincinnati 7 points to 87 and Youngstown 10 points to 80. Cleveland advanced 16½ points to 92 per cent as a strike was ended, Detroit rose 6 points to 89 and Wheeling 5 points to 96½. Other districts were unchanged, as follows: Eastern Pennsylvania 87, Birmingham 95, New England 86 and St. Louis 68.

Steel ingot output in July was 6,999,625 net tons, at 86.5 per cent of capacity, slightly above June tonnage but the lowest operating rate for five years, during which the industry operated above 90 per cent.

Scrap supply shows no improvement and melters find it difficult to build reserves, though stocks are unusually low in many instances. Reduction of war products and slowness of reconversion limits tonnage of production scrap.

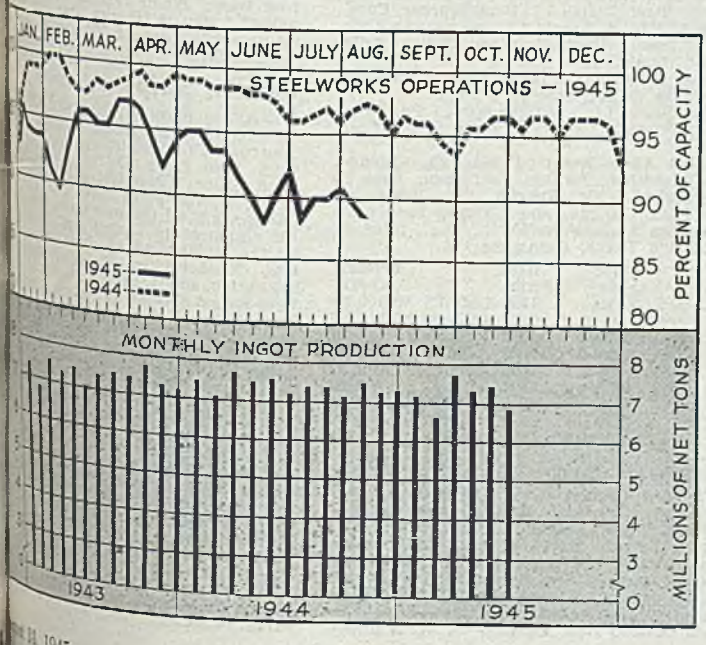
Average composite prices of steel and iron products continue at ceilings, finished steel composite at $58.27, semifinished steel at $37.80, steelmaking pig iron $24.05 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Aug. 11	Change	Same Week 1944	Same Week 1943
Pittsburgh	86	—1.5	91	100.5
Chicago	93	—1.5	100.5	99.5
Eastern Pa.	87	None	95	95
Youngstown	80	—10	95	98
Wheeling	96.5	+5	96	94
Cleveland	92	+16.5	92	92.5
Buffalo	81.5	—2	90.5	90.5
Birmingham	95	None	95	95
New England	86	None	80	97
Cincinnati	87	—7	87	87
St. Louis	68	None	87	89
Detroit	89	+6	89	90
Average	88.5	—1	97.5	98.5

*Based on steelmaking capacities as of these dates.



COMPOSIT MARKET AVERAGES

	Aug. 11	Aug. 4	July 28	One Month Ago July, 1945	Three Months Ago May, 1945	One Year Ago Aug., 1944	Fi Years Aug.,
Finished steel	$58.27	$58.27	$58.27	$58.27	$57.73	$56.73	$
Semifinished Steel	37.80	37.80	37.80	37.80	36.45	36.00	
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	24.05	23.05	
Steelmaking Scrap	19.17	19.17	19.17	19.07	19.13	19.17	

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Compos Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steel Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Aug. 11, 1945	July, 1945	May, 1945	Aug., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.20c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.49	2.47
Steel bars, Chicago	2.25	2.25	2.17	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.22	2.10
Plates, Philadelphia	2.30	2.30	2.26	2.15
Plates, Chicago	2.25	2.25	2.22	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.64	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.82	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$34.50	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	34.50	34.00
Rerolling billets, Pittsburgh	36.00	36.00	34.50	34.00
Wire rods, No. 5 to 9/32-inch, Pitts.	2.15	2.15	2.05	2.00

Pig Iron	Aug. 11, 1945	July, 1945	May, 1945
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19
Basic, Valley	24.50	24.50	24.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69
No. 2 foundry, Chicago	25.00	25.00	25.00
Southern No. 2, Birmingham	21.38	21.38	21.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30
No. 2 fdry., del. Phila.	26.84	26.84	26.84
Malleable, Valley	25.00	25.00	25.00
Malleable, Chicago	25.00	25.00	25.00
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33

Scrap			
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.56
Heavy melting steel, Chicago	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00

Coke			
Connellsville, furnace, ovens	$7.50	$7.50	$7.00
Connellsville, foundry ovens	8.25	8.25	7.75
Chicago, by-product fdry., del.	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, Feb. 4, 1942 and M 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel p and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding etc., although only principal lished basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying vidual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/16 in. inclusive, per 100 lbs., $2.15 Do., over 5/16—47/64-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 higher.)

Bars

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & 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
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus on hot-rolled bars from Buffalo to Ma
Cold-Finished Alloy Bars: Pittsburgh, C Gary, Cleveland, Buffalo, base 3.35c; del. 3.45c; Eastern Mich. 3.50c.
Reinforcing Bars (New Billet): Pitt Chicago, Gary, Cleveland, Birmingham rows Point, Buffalo, Youngstown, base Detroit del. 2.25c; Eastern Mich. and 2.30c; Gulf ports, dock 2.50c; Pacific dock 2.55c.
Reinforcing Bars (Rail Steel): Pittsburg cago, Gary, Cleveland, Birmingham, town, Buffalo base 2.15c; Detroit, del. Eastern Mich. and Toledo 2.30c; Gulf dock 2.50c.
Iron Bars: Single refined, Pitts. 4.40c; refined 5.40c; Pittsburgh, staybolt, 5.75c Haute, single ref., 5.00, double ref., 6.

Sheets, Strip

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Birmingham, Buffalo, Youngs Sparrows Pt., Middletown, base 2.20c; City, base 2.30c; Detroit del. 2.30c; Mich. 2.35c; Phila. del. 2.37c; New Yo 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled for shipment to Detroit and the Detroit on the Middletown, O., base; Alan Wood Co., Conshohocken, Pa., may quote 2.3 hot carbon sheets, nearest eastern basing
Cold-Rolled Sheets: Pittsburgh, Chicago land, Gary, Buffalo, Youngstown, Middletown base, 3.05c; Granite City, base 3.15c; del. 3.15c; Eastern Mich. 3.20c; New Yo 3.39c; Phila. del. 3.37c; Pacific ports
Galvanized Sheets, No. 24: Pittsburgh, cago, Gary, Birmingham, Buffalo, Youngs Sparrows Point, Middletown, base 3.70c; ite City, base 3.80c; New York del. Phila. del. 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galv sheets 3.75c at established basing points
Corrugated Galv. Sheets: Pittsburgh, C Gary, Birmingham, 29 gage, per square
Culvert Sheets: Pittsburgh, Chicago, Birmingham, 16 gage not corrugated, Pacific alloy 3.60c; Granite City 3.70c; Pacific 4.25c; copper iron, 3.90c; pure iron 3.95c; coated, hot-dipped, heat-treated, No. 24, burgh, 4.25c.

Galvanneal Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Transformer	5.75c	6.50c	5.85c
[illegible]	6.25c	7.00c	.....
[illegible]	7.25c	8.00c	.....
[illegible]	7.75c	8.50c	.....
[illegible]	8.55c	9.30c	.....

Cold-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. 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 carbon, 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.30c; over 1.00 Carb., 8.35c.

Plate, Terne Plate

Boiler Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Commercial Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin [illegible]

Open Hearth 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. 1 assorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Short Ternes: Pittsburgh base per package (112 sheets; 20 x 28 in., coating I.C. 8-lb. 20; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30; $17.25; 40-lb. $19.50.

Plates

Alloy Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Colorado Iron & Steel Co. 2.50c f.o.b. basing Geneva Steel Co., Provo, Utah, 3.20c, Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Gulf ports, 4.15c.

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; Newport, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

Wrought Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, Sheffield Steel Corp., 2.55c f.o.b. St. Louis, Geneva Steel Co., 3.25c, Pac. ports; Lone Star Steel Co., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Bright Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Common basic, bessemer wire 2.75c

Cleveland wire 3.35c

(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, base staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports .....

Woven fence wire, 100-lb., Pittsburgh, Chicago, Cleveland .....$3.40 and $3.05

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.20c

Woven fence, 15½ gage and heavier, per rod 3.55c

Fence staples, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbed wire, column 70.

Tubular Goods

Standard 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
2½"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
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., ⅞ 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	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945.
†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls., to jobbers	8.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[11]	4.715	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.172[21]	4.772	5.816[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.152[21]	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....
Bethlehem, Pa.[o]	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.[o]	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.[o]	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.669	5.60[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[12]	4.40[24]	3.85[21]	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.30[24]	3.75[21]	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.85[21]	4.45[21]	5.60[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.900[21]	4.659	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.543[12]	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.111[21]	4.711	6.10
Youngstown, O.[o]	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....
Middletown, O.[o]	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[10]	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[13]	4.20[24]	3.85[21]	4.65	5.75[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[13]	4.337[24]	3.987[21]	4.787	5.987[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[13]	4.568[24]	4.08[21]	4.78	6.08[23]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[16]	4.347[24]	4.131[21]	4.931	6.131[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.43[21]	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[20]	5.079[10]	4.70[21]	5.429	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[9]	3.763[3]	4.313[6]	4.313[3]	5.313[20]	4.10[10]	3.75[22]	.....	.....
Los Angeles	4.40[8]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[0]	5.683[22]	5.613	5.85[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[22]	7.333	8.304[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.883[22]	.....	.....
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.883[22]	.....	.....

[o]Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed py Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside 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 1999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 39,999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds; [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	18.00

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 less $7 freight allowance	52.80

Manganese Ore

Sales prices of Metals Reservev 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, 91.0c; prices include duty on ported ore and are subject to miums, penalties and other sions of amended M.F.R. No. effective as of May 15. Pri basing points which are also of discharge of imported nese ore is f.o.b. cars, shipsid dock most favorable to the b

Molybdenum

Sulphide conc., lb., Mo. cont., mines	

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 fe Bars per 100 lb.	Billets per GT	Bars per 100 lb.
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.30
NE 9413	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.30
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.15
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.80
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.55
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	

Extras are in addition to a base price of 2.70c, pe r pound on finished products and $54 per gross to semifinished steel major basing points and are in cent s per pound and dollars per gross ton. No prices qu on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. ... effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated ... footnotes. Base prices bold face, delivered light face. Federal tax ... freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
...ehem, Pa., base	$26.00	$25.50	$27.00	$26.50
...werick, N. J., del.	27.53	27.03	28.53	28.03
...ooklyn, N. Y., del.	28.50	.....	.....	29.00
...ebron, Pa., base	26.00	25.50	27.00	26.50
...ckingham, base	†21.38	†20.00	26.00	.....
...lmington, del.	26.61	.....	.....	.....
...con, del.	26.12	.....	.....	.....
...con, del.	25.22	.....	.....	.....
...Connell, del.	25.06	23.68	.....	.....
...eveland, del.	25.12	24.24	.....	.....
...ewark, N. J., del.	27.15	.....	.....	.....
...iladelphia, del.	26.46	25.96	.....	.....
...t Louis, del.	25.12	24.24	.....	.....
...dia, base	25.00	24.00	26.00	25.50
...ston, del.	26.50	26.00	27.50	27.00
...chester, del.	26.53	.....	27.53	27.03
...cinnes, del.	27.08	.....	28.08	27.58
...go, base	25.00	24.50	25.50	25.00
...waukee, del.	26.10	25.60	26.60	26.10
...skegon, Mich., del.	28.19	.....	.....	28.19
...ngfield, base	25.00	24.50	25.50	25.00
...ton, Canton, O., del.	26.39	25.89	26.89	26.39
...ton, base	25.00	24.50	25.50	25.00
...ginaw, Mich., del.	27.31	26.81	27.81	27.31
...ah, base	25.50	25.00	26.00	25.50
...Paul, del.	27.63	27.13	28.13	27.63
...Pa., base	25.00	24.50	26.00	25.50
...ton, Mass., base	26.00	25.50	27.00	26.50
...ton, del.	26.50	26.00	27.50	27.00
...ke City, Ill., base	25.00	24.50	25.50	25.00
...Louis, del.	25.50	25.00	.....	25.50
...ston, O., base	25.00	24.50	.....	25.00
...Connell, del.	25.44	25.61	.....	26.11
...n Island, Pa., base	25.00	24.50	25.50	25.00
...sburgh, del.				
...No. & So. sides	25.69	25.19	26.19	25.69
...t, Utah, base	23.00	22.50	.....	.....
...ville, Pa., base	25.00	24.50	25.50	25.00
...ers Point, base	26.00	25.50	.....	.....
...more, del.	26.99	.....	.....	.....
...e, Pa., base	.....	25.50	.....	26.50
...mond, Pa., base	26.00	25.50	27.00	26.50
...delphia, del.	26.84	26.34	.....	27.34
...n, O., base	25.00	24.50	25.50	25.00
...stown, O., base	25.00	24.50	25.50	25.00
...efield, O., del.	26.94	26.44	27.44	26.94

...grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% ... or portion thereof; deduct 50 cents for silicon below 1.75% on ... iron. †For phosphorus 0.70% or over deduct 38 cents. §For ... Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Home-... McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monon-... City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

... Add 50 cents per ton for each 0.50% manganese or portion ... over 1.00%.

... differentials: Under 0.50%, no extra; 0.50% to 4.74% incl., $2 ... for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	$30.50		
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	32.90
Wire cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

...anese (standard) 78-82% ... ton, duty paid, $135; add ... packed c.l., $10 for ton, ...ss-ton, f.o.b. cars, Balti-... Philadelphia or New York, ... is most favorable to buy-...dale or Rockwood, Tenn.; ... Tennessee Products Co. is ... Birmingham, Ala., where ...field Steel & Iron Co. ... $1.70 for each 1%, or ... contained manganese over ... under 78%; delivered Pitts-... 140.33.

...anese (Low and Medium ... per lb. contained man-... eastern zone, low carbon, ...c.l., 23c; 2000 lb. to c.l., ...edium, 14.50c and 15.20c; ... low carbon, bulk, c.l., ... 2000 lb. to c.l., 24.40c; ... 14.80c and 16.20c; west-... carbon, bulk, c.l., 24.50c, ... to c.l., 25.40c; medium, ...nd 17.20c; f.o.b. shipping ...eight allowed.

...ogen: 19-21% carlots per ...n. Palmerton, Pa., $36; 16-... 55.

...ese Manganese: 99.9% plus, ...ots, per lb. 37.6 cents.

...um Metal: 97% min. chromi-...um, .50% carbon, eastern ... per lb. contained chromium ...c.l. 79.50c, 2000 lb. to c.l. ...neral, 81c and 82.50c; west-...rn, 82 and 84.75c; f.o.b. ship-...ers, freight allowed.

...columbium: 50-60%, per lb. ...ntained columbium in gross ton ...ntract basis, R.R. freight ...to eastern zone, $2.25; less-...n-ton lots $2.30. Spot prices 10 cents ...gher.

...ese: High carbon, eastern ...ne, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c 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 8 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: Vanalium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 36.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $160; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.10% net ton to carload, 8c lb. L. Suspension Bridge, N. Y., freight 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 freight allowances; open-hearth grade $2.70; special grade $2.75; 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 $102.50 per gross ton $102.50; ton lots $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, per lb. of alloy in package, per lb. of alloy 1 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 ¼ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. allowed to 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. Niagara 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 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	
Shoveling Turnings	
Rerolling Rails	21.5
Steel Car Axles	
Steel Rails, 3 ft.	
Steel Angle Bars	
Cast Iron Wheels	
No. 1 Machinery Cast	
Railroad Malleable	
Breakable Cast	
Stove Plate	
Grate Bars	
Brake Shoes	
(Cast grades f.o.b. shipping	
Stove Plate	

CINCINNATI:

(Delivered consumer's pla

No. 1 Heavy Melt. Steel	
No. 2 Heavy Melt. Steel	
No. 1 Comp. Bundles	
No. 2 Comp. Bundles	
Machine Turnings	9.5
Shoveling Turnings	11.5
Cast Iron Borings	11.0
Mixed Borings, Turnings	10.5
No. 1 Cupola Cast	
Breakable Cast	21.0
Low Phosphorus	20.5
Scrap Rails	16.0
Stove Plate	

LOS ANGELES:

(Delivered consumer's pl

No. 1 Heavy Melt. Steel	
No. 2 Heavy Melt. Steel	
No. 1, 2 Deal. Bundles	
Machine Turnings	
Mixed Borings Turnings	
No. 1 Cast	

SAN FRANCISCO:

(Delivered consumer's pl

No. 1 Heavy Melt. Steel	
No. 2 Heavy Melt. Steel	
No. 1 Busheling	
No. 1, No. 2 Bundles	
No. 3 Bundles	
Machine Turnings	
Billet, Forge Crops	
Bar Crops, Plate	
Cast Steel	
Cut Structural, Plate, 1", under	
Alloy-free Turnings	
Tin Can Bundles	
No. 2 Steel Wheels	
Iron, Steel Axles	
No. 2 Cast Steel	
Uncut Frogs, Switches	
Scrap Rails	
Locomotive Tires	

NONFERROUS METAL PRICES

...per: Electrolytic or Lake from producers in ...ots 12.00c, Del. Conn., less carlots 12.12½c, ...ther; dealers may add ¾c for 5000 lbs. to ...ad: 1000-4999 lbs. 1c; 500-999 1½c; 0-499 ...k casting, 11.75c, refinery for 20,000 lbs., or ...ure, 12.00c less than 20,000 lbs.

...ss Ingot: Carlot prices, including 25 cents ...hundred freight allowance; add ¼c for ...than 20 tons; 85-5-5-5 (No. 115) 13.00c; ...5-7 (No. 215) 16.50c; 80-10-10 (No. 305) ...c Navy G (No. 225) 16.75c; Navy M ...(No. 245) 14.75c; No. 1 yellow (No. 405) ...ic manganese bronze (No. 420) 12.75c.

...ze: Prime western 8.25c, select 8.35c, brass ...ard 8.50c, intermediate 8.75c, E. St. Louis, ...carlots. For 20,000 lbs. to carlots add ...c 10,000-20,000 0.25c; 2000-10,000 0.40c; ...than 2000 0.50c.

...el: Common 6.35c, chemical, 6.40c, corrod- ...6.45c, E. St. Louis for carloads; add 5 ...c for Chicago, Minneapolis-St. Paul, Mil- ...ukee-Kenosha districts; add 15 points for ...eland-Akron-Detroit area, New Jersey ...York state, Texas, Pacific Coast, Rich- ...Indianapolis-Kokomo; add 20 points for ...ingham, Connecticut, Boston-Worcester, ...mouth, New Hampshire, Rhode Island.

...ary Aluminum: 99% plus, ingots 15.00c ...ds 14.00c del.; metallurgical 94% min. ...c del. Base 10,000 lbs. and over; add ½c ...9999 lbs.; 1c less through 2000 lbs.

...dary Aluminum: All grades 12.50c per lb. ...ot as follows: Low grade piston alloy (No. ...type) 10.50c; No. 12 foundry alloy (No. ...ade) 10.50c; chemical warfare service ...c (92½% plus) 10.00c; steel deoxidizers ...notch bars, granulated or shot, Grade 1 ...½%) 11.00c, Grade 2 (92-95%) 9.50c to ...Grade 3 (90-92%) 8.50c to 8.75c, Grade ...-90%) 7.50c to 8.00c; any other ingot ...ining over 1% iron, except PM 754 and ...ass 12.00c. Above prices for 30,000 lb. ...ers; add ¼c 10,000-30,000 lb.; ½c 1000- ...0 lbs.; 1c less than 1000 lbs. Prices in- ...freight at carload rate up to 75 cents ...ndred.

...esium: Commercially pure (99.8%) stand- ...ingots (4-notch, 17 lbs.), 20.50c lb., add ...or special shapes and sizes. Alloy ingots, ...dary bomb alloy, 23.40c; 50-50 mag- ...m-aluminum, 23.75c; ASTM B93-41T, ...2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, ...5X, 17X, 25.00c; ASTM B-107-41T, or ...-41T, No. 8X, 23.00c; No. 18, 23.50c; No. ...25.00c. Selected magnesium crystals, ...ot and muffs, including all packing ...ials, barreling, handling, and other ...ization charges, 23.50c. Prices for 100 ...or more; for 25-100 lbs., add 10c; for ...than 25 lbs., 20c. Incendiary bomb alloy, ...plant, any quantity; carload freight al- ...all other alloys for 500 lbs. or more.

...Prices ex-dock, New York in 5-ton lots, ...cent for 2240-11,199 lbs., 1½c 1000-2239. ...900-999, 3c under 500. Grade A, 99.8% ...ner (includes Straits), 52.00c; Grade B, ...% or higher, not meeting specifications ...Grade A, with 0.05 per cent maximum ...c, 51.87½c; Grade C, 99.65-99.79% incl. ...c; Grade D, 99.50-99.64% incl., 51.50c; ...e E, 99-99.49% incl. 51.12½c; Grade F, ...00% (for tin content), 51.00c.

...ury: American bulk carlots f.o.b. La- ...ex., 99.0% to 99.8% and 99.8% and ...but not meeting specifications below, ...; 99.8% and over (arsenic, 0.05%, max. ...other impurities, 0.1%, max.) 15.00c. On ...smaller sales add ¼c for less than carload ...,000 lb.; ½c for 9999-224 lb.; and 2c for ...and less; on sales by dealers, distribu- ...ent jobbers add ½c, 1c, and 3c, respec-

...el: Electrolytic cathodes, 99.5%, f.o.b. ...y 35.00c lb.; pig and shot produced from ...olytic cathodes 36.00c; "F" nickel shot ...ort for additions to cast iron, 34.00c; ...c shot 28.00c.

...ium: OPA ceiling prices per 76-lb. flask ...m point of shipment or entry. Domestic ...uced in Calif., Oreg., Wash., Idaho, Nev., ...191; produced in Texas, Ark. $193. ...ce, produced in Mexico, duty paid, $193. ...arket, spot, New York, nominal for 50 ...lb flasks; $158 to $163 in smaller quantities.

...oxide: Prime, white, 99%, carlots, 4.00c lb.

...hosphor-Copper: 3.75-4.25% Be., $17 lb. con- ...ed Pe.

...Tungsten: Bars, ingots, pencils, pigs, plates, ...slabs, sticks, and all other "regular"

...August 13, 1945

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% 20.49c, 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; weather-proof, 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 5c 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	3.000	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 wire 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, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

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 7.25c, old zinc 5.25c 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 186

While demand for sheets and strip continues active, mills believe the recent carryover of more than 600,000 tons can be cut more than half by the end of this quarter. There also seems likelihood that perhaps as much as 175,000 tons of sheets and strip may be furnished on unrated orders during third quarter, partly the result of earlier cancellations of heavy-gage sheets for landing mats. Deliveries have not improved markedly, most now being promised for early next year, though some plain hot-rolled sheets may be obtained for November shipment.

New York — Although demand is still active sheet mills may be able to reduce their quarterly carryover at the end of this period to around 300,000 tons. At least this prediction is now being made in some usually well informed quarters. This would represent a drop of more than half from the 660,000 tons carried over at the end of June.

At the same time it is also reliably estimated that in this quarter approximately 175,000 tons of unrated sheets and strip will be shipped. This is ascribed in part to the fact that some heavy gage sheets are available, due primarily to cutbacks in the landing mat program, and in part to other openings which cannot be readily filled with rated tonnage and still provide economical operation.

Further, Washington apparent not now insisting that rated tonnag used to fill gaps regardless of wh tonnage would be rolled economic In any event, the estimate now is 175,000 tons or so of free tonnage ably will be rolled before third qu is over. The outlook for fourth qu is for substantial betterment in thi gard, even assuming that the war Japan continues over the end of the but most trade leaders hesitate in ing firm predictions.

Meanwhile, most producers are quoting shipments well into next on hot-rolled pickled sheets; also mills are quoting cold-rolled sheet shipment next year. On the other plain hot sheets are available in quarters for delivery as early as N ber and certain mills are also qu cold-rolled sheets for shipment a that time.

Galvanized sheet schedules co well extended into next year, Marc April in some cases. Electrical shipments now fall generally into year. On the heavier silicon grades uary and February are being quot some producers and several week yond that on lighter silicon grades others are quoting both heavy and silicon sheets for shipment fairly ea 1946. Stainless steel sheet deli fall around November in some cas though a little better can be do others.

Pittsburgh — Unrated tonnage being accepted in large volume, alth a slight tapering in inquiries is n due probably to the continued tigh livery situation on most sheet items portion of unrated orders to total ings represents about 40 per cent a most producers. Some headway been made against carryover sheet strip tonnage, but this factor sti mains larger than sellers had expe due to failure of cancellations to de on the scale anticipated. On the of present rated order backlogs, motive and other civilian goods lines get little sheet and strip tonnage late this year. Leading producers booked into next year on hot-r pickled sheets and through Decemb plain hot and cold-rolled items. D eries on electrical and galvanized extended through first quarter in instances. Further increase in de for stainless items is noted, mos which is on an unrated basis. How sellers are booked through the year polished items and into late Oct and November on unpolished.

Boston — Shipments of narrow rolled strip are in excess of incom rated volume, but not to an extent mitting noteworthy inroads on rated log. Limited unrated tonnage is tatively placed in late fourth qua schedules, but firm position on cancellations and flow of valid orders during the next 30 days. Can lations are not yet heavy. Fewer ings are given tonnage which first peared as unrated inquiry, indicati tightening in priority assistance. Th is minimum evidence that reconversi in any instance is being retarded lack of steel and overall pressure unrated delivery has subsided. Inqu for stainless is moderately heavier, with melting schedules and end still regulated, open ending has

ased schedules. Stainless strip and bars ave been placed on Reading, Pa., f.o.b. ills by one producer. Sheet buying is ntarded by extended deliveries, although quiry for stainless, electrical and enam- ing grades is slightly more active re- ecting reconversion trends. Progress also noted in reduction of carryover s quarter. For war needs, demand for cendiary bombs continues heavy which also tightened the already peak or- s for steel strapping. Small lots of ot-rolled strip steel from Sweden, first several years, have arrived on this

Philadelphia — Army cutbacks recent- opened some fairly substantial ton- ges in galvanized sheets for this fall. e leading seller was able to accept ness for delivery in late September, ober and November, although these adules now are virtually closed again, s promises generally well extended next year. Shipments of cold-rolled ets can be had in November, though st sellers quote delivery beyond the of the year. Hot-rolled pickled ets are generally quoted for shipment year, in some cases as late as March. hot-rolled can be had for fairly ply in heavy gages, but in the lighter November and December in some and well beyond in others. Some ternes in lighter gages are offered early shipment, due to spot openings. istrict auto body maker has shifted very of several thousand tons of cold- and hot-rolled pickled sheets for for one automobile builder from iladelphia plant to Detroit. Another ct automotive interest has acquired ional property near his present for postwar expanson, including, understood, an increase in stamping ations.

veland — Sheetmakers make little gress in working down heavy back- with tonnage now on books suffi- to carry well beyond this year on orders and much pressure for un- business to be accepted. In case den end of the war in the Pacific d of suspensions is expected, fol- by some cancellations. The pe- of readjustment and reconversion eacetime business is expected to be lt.

icago — New rated orders and al- no cancellations operate to keep and strip in their tight situation. ue mill, strip mill size sheets, for- March of next year, are now Octo- virtue of a recent substantial cut- in a military item. Hot-rolled and led pickled, and galvanized sheets ot available before March; cold- are in December. Wide and nar- strip and hot-rolled strip are in mber, but hot-rolled pickled holds ebruary, 1946. Warehouses are aining about delay in their sheet s, deliveries being far behind. It orted that Bureau of Yards and U. S. Navy, is preparing to place with established fabricators an ional 27,000 pontoons for delivery ween May and August next year.

ncinnati — Reduction in volume of rated orders and cancellations seems reflect a more stable sheet demand less confusion in this respect than in weeks immediately following the Dec. shift. However, sheet mill s have not been eased in marked . Only a meager tonnage is be- ing shipped on unrated orders. Reconversion orders are in great volume and mills have not yet tried to solve the problem of priority in deliveries. Buying in this category has dropped off.

St. Louis — Sheets continue under heavy pressure, with production far below capacity because of lack of labor. Workers laid off in other industries do not fill the gap, preferring to remain idle. Some delivery schedules have been extended 15 to 30 days further but with adequate labor could be rolled back two months. Hot-rolled are promised for February, cold-rolled in April, tin mill products in February, light galvanized in June and heavy galvanized in December. All sheet capacity is under rated orders, unrated orders coming in at moderate pace, without encouragement.

Steel Bars . . .

Bar Prices, Page 186

Steel bar demand continues to gain and deliveries are further extended. On hot-rolled carbon grades most sellers are booked through the year and on larger sizes as far as February. Cancellations have not been as heavy as expected. Hot-topped quality steel deliveries now are well into next year, in some cases as far as April. Cold-finished steel bars are promised for November and December, with occasional promise for October.

Pittsburgh — Cancellations of mill orders have been below expectations, due

to fact cutbacks in certain war programs have been below former estimates and fact many contractors are slow in canceling orders. Most sellers are booked through the remainder of this year on hot-rolled bars, for the larger sizes through February. One interest reports a particularly tight delivery situation on its 14-inch mill, rolling stock of 1 1/3-inch up to 3 inches. Deliveries on alloy bars are somewhat more extended, but are in substantially better shipment position than carbon bars, with October delivery available in some instances. Except for alloy bars little unrated tonnage stands a chance for shipment until late this year. Mills continue to report heavy volume of orders on an unrated basis seeking early position on schedules, despite extended deliveries on rated tonnage for most items.

New York — In spite of shell cutbacks of past weeks, bar schedules are still tight. Relatively little free steel will be available in current quarter; in fact, some trade leaders believe there will be less free bar steel in this period than in sheets and strip, which are admittedly tight. There are some spot openings in bars and some processed tonnage has been made available as a result of acceptance of cancellations where it was clear the steel could be readily diverted elsewhere. Nevertheless, trade opinion here is that aggregate tonnage of this character is relatively small.

At the same time, there still appea to be considerable work coming ou for certain types of shells and other pro jectiles. Some large producers contin to be booked well into next year on h top quality steel, as late as April o larger rounds in the case of one impo tant mill.

Common commercial bar deliver are fairly extended. Apart from consi eration of spot openings and the l shipments can be had in November a December, although some producers a sert they have little or no capac left for this year.

Chicago — A few barmakers ha their books filled for the remainder the year on regular carbon grades, others still have openings in Decemb February of next year is about the b that can be done on quality car bars. Alloys are relatively easier w tonnages to be had in September a December, depending upon analysis size. The acceptance of unrated all for September delivery has been of c siderable assistance to some consum Numerous favorable comments have b heard on lifting of restrictions on sta ard SAE alloys. Despite this, howe it is reported that the automotive ind try, now experienced in the use of 8600, is planning to continue use this series, but order to hardenabi bands.

Boston — Most bar consumers not unduly concerned as to prospects obtaining stock for reconversion, tially reflected in slight pressure in rated inquiry. This is particularly of alloys, hot-rolled, which are in S tember, although cold-drawn and h treated are November. Substantial nu ber of carbon bar sizes wanted are October at least, with earlier openi offered. Warehouse replacements of loys are improving. So sharp has b reduction in war requirements, noted much smaller production of plant sc current volume of new buying appe disproportionately light.

St. Louis — Steel bar production steady at about 15 per cent below pacity because of labor shortage. new cutbacks have been received cently. Inquiries for unrated civi purposes are increasing but not all being acceptetd, because of uncer delivery, those on which delivery can be made before December being reject

Philadelphia — The lag in heavy fo ings has extended to lighter forgings, in spite of some cutbacks in shell w bar deliveries continue tight, as a va of miscellaneous work is still coming Some larger producers have little to o with any degree of assurance before this year and in hot-top quality st deliveries generally run well into year.

Cleveland — Bar buying is heavy this product is assuming nearly crowded position as sheets. In gener mills are sold through the year, thou there are some openings late in fou quarter. A few cancellations appear when tonnage is lost for one purpose gap usually is filled at once for anoth

Steel Plates . . .

Plate Prices, Page 187

Decline in plate demand and produ tion continues, though at a slower r than expected. Output of close to

tons is indicated for third quarter, not far below first and second quarters. A factor sustaining plate mills is recent placing of considerable tonnage by the Navy, for immediate rolling. Most mills have little to offer for delivery this year while others can promise October, depending on size and grade. Some rated plates have been scheduled for August, contingent on rated requirements.

New York — Current quarter plate shipments will not fall much below 2,000,000 tons, according to latest estimates. Some trade leaders look for the monthly average to run around 650,000 tons, or 1,950,000 for the quarter. This would compare with approximately 2,100,000 tons in second quarter and 2,350,000 tons in first quarter. The downward trend is developing much as predicted earlier in the year, notwithstanding the fact that certain producers several weeks ago thought there might be a steeper decline in third quarter than indicated.

Most producers, because of rated and preferred orders, now have little left for delivery before Oct. 1. Some are now quoting late October. On the other hand, occasional spot openings permit prompt shipments. But they are the exception and the tonnage that can be placed is usually small.

The Maritime Commission work is shrinking fast. In fact, probably not more than 100,000 tons will be rolled for the Commission in the current quarter, compared with 660,000 tons in second quarter. Soon it will largely be a matter of repairs and maintenance work so far as the Maritime Commission is concerned, and this may run around 9000 to 10,000 tons per month. At the same time foreign ship work is reported, Ingalls Iron Works, Birmingham, having just announced booking of seven 12,000-deadweight ton ships for Norway.

Production of strip plate is running between 50,000 and 70,000 tons per month. As strip mills even in normal times will possibly as much as 30,000 tons a month, turned out principally by the four mills, it is clear that the average plate load on strip mills is disappearing. The load would be even lighter and would have shrunk even more were it not for shortage of labor needed for doing the extra processing necessary.

Pittsburgh — Although a minor tonnage of unvalidated orders has been booked for delivery this month, mills are fully booked through first half of October on rated tonnage. A steady decline in plate production is indicated. Current output on plate mills is off about 15 per cent from earlier peaks. Contracts have been awarded for four dry docks for repair of naval vessels. Two will be constructed by Dravo Corp. at its Neville Island yard and two will be built by the Pittsburgh-Des Moines Steel Co. Each will be 750 feet long, 97 feet wide and 45 feet high. The Dravo Corp. has also been awarded a contract for two whirler type derrick cranes, the hulls of which will be 200 feet long, 70 feet wide and 12½ feet deep. Stockholders of Pressed Steel Tank Co., Inc. have authorized the company to manufacture and deal in household appliances, heating equipment, air conditioning and refrigeration equipment. This marks a sharp departure from freight car construction, but officials point out that this will permit utilization of the company's new plant at Hegewisch, Ill., which has been used for manufacture of tanks, and later to convert a part of its McKees Rocks plant to the same purpose.

Chicago — New urgent requirements for plates continue to hold this product in a much tighter position than had been predicted for third and fourth quarter. An example is the 80,000 tons which the Navy placed by directive two weeks ago for shipment to the Pacific, with deliveries to be made before Sept. 1. Another factor is the steady demand for bomb plate. Some mills have no openings for the balance of the year unless cancellations occur; some others can supply both wide and narrow sheared plates in October and universal in September. The latter can accommodate a small tonnage of unrated business.

Boston — With two shipyards, Hingham and Providence, down to maintenance personnel and other major yards less active and drawing on inventory, demand for plates continues to contract. Minor unrated tonnage is being placed for October delivery. Prospective requirements for railroad passenger car building are brighter, but railroads continue to order sparingly. Flame-cutting and weldment shops are less active, but

retain more miscellaneous than shipbuilding volume.

Wire . . .

Wire Prices, Page 187

Chicago—Although deliveries of fence and barbed wire are heavy, demand continues strong. Situation for fence posts is acute, the available supply falling far short of meeting requirements. This year's hay crop is a bumper and wiremakers find themselves unable to supply even a normal tonnage of bale ties. The number of inquiries for rails indicates continuation of the shortage of small nails. Output of galvanized and painted nails has been increased considerably.

Boston — Swedish rods are arriving in small lots, first since 1941, when after several years of decline only 118 tons were imported; total in 1939 was slightly under 11,000 tons, but reached 15,000 tons in 1936 and 1937. To what extent Swedish mills recover their market for quality high carbon steel is problematical. That they will make strenuous efforts is seen by acceptance of automobile unrated tonnage, high carbon flat wire, valve flap material for October delivery compared with December promised for domestic steel. In nearly four years, since the war when Swedish imports halted, noteworthy metallurgical and rolling mill progress has been made, permitting satisfactory replacement of Swedish steel for most purposes under severe wartime conditions.

Although on some products, mills are making some, but slight inroads on rated backlogs, tightness in fine wire cialties is not easing, with new about in balance with shipments. cation of unrated orders, while d to pin down, is thought to be su tial, full effect of which may ma confusion when scheduling sta stride on this type of volume.

St. Louis — Wire orders under are declining and considerable c is being shifted to smaller gages. light wire is going to manufactu hospital beds, hospital trains and Rated delivery schedules are i tember and later.

New York — Wire mills are mild inroads in rated backlogs wi orders approximately balancing volume. Minor openings are filled and while some third quar validated tonnage is in process volume delivered this quarter small and uncertain; mills for th part are accepting unrated order contingent basis. With severa contracts terminated or cut back, wire backlogs are lower and ti wire has eased, attributed to st rubber plants. On the other han large processor of signal wire operating on inventory, has re- for prompt delivery, crowding g vanized at one mill. There are cutbacks in cable armoring wire, ings filled by moving rated orde ward. Demand for spring wire bedding and furniture industry is cess of supply and some substitut higher grades at increased cost are

Tubular Goods . . .

Tubular Goods Prices, Page 18

New York — Deliveries on pi now more extended than on tub quoted by some of the larger pro Normally the situation is the oth around. One leading producer is ing butt-weld and seamless pipe vember delivery, whereas the run of hot-finished carbon and drawn tubing is being quoted interest for October. An excep cold-drawn tubing of over 1½ outside diameter, heavier than 10 and over 2 inches, lighter than 10 which is being quoted in April year. Presumably much of this miscellaneous Navy work.

Demand for pipe locally is misc ous, with distributors pressing for eries from mills. This is true, the fact that building requirem being confined principally to repa maintenance.

Seamless pipe mills report heavy logs of shell work, notwithsta various cutbacks of the last several One mill reports that while back shell work are not quite as he they were, there is nevertheless co able new shell work of one desc or another. This is engaging sizes 4 inches up.

Structural Shapes . . .

Structural Shape Prices, Page 18

Chicago — Demand for stru shapes for essential war use op as a hold-down to numerous bu construction projects in the drawing or inquiry stage. While WPB grants approval for these jobs, it so with the stipulation that steel

obtained without benefit of priority. few structural mills have no openings the remainder of the year; others take tonnage for December. A nth ago, September delivery could made. Part of this tightening came the Navy by directive a couple weeks ago placed orders for nearly 00 tons of shapes to be rolled by t. 1 and shipped to the Pacific. Last the Navy increased the figure by 00 tons, this also to be rolled in

g Iron . . .

Pig Iron Prices, Page 189

lers are taking all pig iron of- and some have difficulty main- inventory at the 30-day level. are accumulating no stocks. me areas need for iron for steel- is restricting production of mer- iron. Additional furnaces are ready to resume production, which id the situation. Export demand ng in but is not being entertained. do — Tighter conditions prevail erchant iron as a result of two lead- producers confining production for their own use. Car supply to normal and accumulations the recent shortage now have been . Some civilian business is be- ed by foundries where no recon- problem is involved.

cinnati — Pig iron shipments are foundry requirements but few are able to maintain 30-day in- . The melt is being held to sly established levels despite demand for castings and foun- foresee little chance for expan- until manpower is easier. Coke are easy, and some melters are to enlarge stocks as a hedge coal and shipping shortages later year.

York — Pig iron melt in this is expected to continue about on with July. Substantial quantity k is available, but foundries are ited by manpower and at present hot weather and vacation influ- In general the supply situation a shade easier, but little if any is accumulating.

burgh — August pig iron require- will absorb all of current near output, with the result that both furnace interests and consumers ntinue to operate on a restricted y basis. While low coking coal is not a major factor in limiting pig duction at this time, a critical e of coal may develop over the months. Average mill stocks of coal in this district are about 10 contrast with normal inven- of nearly a month. Rate of pig put here remains at near capacity, 50 of 54 units active. All units S. Steel Corp.'s Edgar Thomson Duquesne works are now back in ion, following the strike at these ten days ago. No decision has been reached on the sale of Pitts- Steel Co.'s DPC blast furnace at sen, Pa. Export inquiries in- over 200,000 tons have yet to cluded.

icago — Despite the fact that the of 2000 workers in 39 foundries the city and the Fox River valley is ing into its third week, thereby

holding down foundry melt, demand for pig iron has tightened considerably. Output of iron in this and nearby districts has shrunk because of blast furnaces out of repair, and the strike-bound plants are principally the smaller foundries. War cutbacks have affected demand for castings in only a minor degree, and operating foundries are producing up to the limit of their still inadequate manpower.

Boston — Consumers are not so much concerned as to immediate pig iron supply but more are anxious about next winter under the present setup. Buffalo continues to carry a heavy New England load and is supplying about all the iron possible. Some have hope for help from steel works furnaces later this year. Unless the district furnace has a reserve, as it did last winter, the pinch will be severe without steelworks iron.

Philadelphia — District pig iron sellers expect continued good demand for foundry iron should the war end soon, but expect a drop in basic requirements. However, substantial export tonnages can be counted on to cushion whatever drop may develop. Most export demand, especially that from Sweden, is for bessemer grades.

Scrap . . .

Scrap Prices, Page 190

Conditions continue tight in the scrap market, though possibility of sudden end of the Pacific war is injecting a note of caution. Prices continue at ceiling and springboards and commissions are paid. Supply is short and melters are unable to build up reserves. This condition is likely to change suddenly at the end

of the war, following widespread cancellations of war contracts.

Cleveland — Scrap supply continues tight, considering current conditions, though sudden end of the Japanese war would turn the situation over immediately, converting a present 30-day inventory into supply for a much longer period. Prices are at ceiling, with springboard and commission being paid. Shipments are being made against contracts but difficulty is being experienced in meeting all needs. Yards appear to be in slightly better condition as to labor, though much is still to be desired. In case of the war's end observers believe the market would reverse quickly, with 90 to 120 days at least intervening before peacetime reconversion would take up the slack.

A plan is being formulated by the government to stockpile alloy steel scrap. Under this arrangement on termination of contracts all scrap of alloy content will be offered for bids and sold if ceiling is obtained. If not sold at ceiling it will be stockpiled for future use. This will have considerable effect on future scrap markets if accumulations of material of this kind are held off the market.

Buffalo — All standard scrap grades now are at ceiling. Strength dominates the market as a sale of about 15,000 tons of turnings, machine shop and short shoveling was reported at ceiling. Allocation of 1000 tons of railroad material has been made to a leading consumer whose supply had become low. Improvement in movement of local material has aided the mill somewhat but its reserves still are low. A leading dealer states his labor situation is the worst since the war started.

Pittsburgh — Supply of heavy melting steel scrap and turnings has not made much improvement here in recent weeks, despite efforts by some mills to obtain material from outside normal sources. At least one interest is paying as high as $1.50 springboard. Increasing number of cutbacks in war programs is further drying up movement of scrap to consuming points, and this condition is expected to become gradually more critical until reconversion to civilian goods production is well under way. Mills are buying all tonnage offered. Brokers and dealers have difficulty filling contract obligations. All prices remain firm at ceiling. No improvement is noted in cast scrap, forcing many foundries to use a higher proportion of pig iron.

St. Louis — Scrap shipments are smaller, due to hot weather and small labor supply, estimated at 25 per cent less than a year ago. Local mills have comfortable reserves but are concerned as to the future and are re-entering the market. Brokers are slow to accept offered September orders, in view of short supply. Yards are practically empty, one reporting less than 500 tons in its 22-acre yard. Deliveries average 30 to 45 days late. Heavy melting grades are under greatest pressure. Machine and short shoveling turnings remain at ceiling.

Cincinnati — Demand for iron and steel scrap has steadily gained in the last few weeks, following a lull in buying and consumer interest. Some major melters show desire to expand stocks, and at a time when supplies are shrinking, due to three factors, shortage of manpower in collection and yards, less

production scrap where cutbacks have taken effect, and allocations of tonnage to other districts from sources which might have normally sent the material there. Some borings and turnings have been shipped to nearby districts. Prices on these grades are up $1.

Los Angeles — War Production Board allotments of No. 1 heavy melting steel again are moving east, indicating supply in this area is more than sufficient for local needs. Prices $2 to $3 below ceiling also reflect this condition. Mills are still supplied from dealer stocks and have made no demand for higher grade material in government hands.

Detroit — All grades of scrap continue at ceiling, with dealers and brokers agreeing the market is the strongest at any time during the war, principally because of lack of sufficient material from manufacturing plants. A sudden end to the Japanese war would have only a brief psychologically depressing effect, it is felt, since, at least in this area, steel mills have ample nonrated orders to continue operations uninterruptedly, even if allocated business should be cut off sharply. There is also a growing feeling that a large part of the present allocated steel tonnage will never be used by the military, since enough supplies are already stockpiled to fight three more years of war against Japan. Despite this, scrap brokers continue firm in a long position.

Chicago — With all grades of scrap at the ceiling, and demand having developed considerable strength, brokers and dealers are hard put to find supplies to meet orders. Shipments are heavy and mills buy freely, but all sources of material have to be combed to maintain the flow. Dealers' yards are kept relatively clear in spite of limited manpower, for supplies are not coming in at the rate recently. A growing proportion of consumer intake is by allocation.

Boston—Demand for scrap is unabated; blast, shipyard and unprepared material is coming out in smaller volume, further lessening supply of steelmaking grades. Several shipyard lots are allocated, while other mills are bidding direct. Heavy melting quality required by district steel mills is notably scarce. Prices are at ceiling except port differentials for low grades, but foundries pay top for that grade. Few machines are being scrapped except from surplus or old tools for which replacements are bought. As replacement of textile and shoe machinery gathers momentum more equipment will be scrapped, but that time is not yet and material continues scarce and in good demand.

Philadelphia — Recent military developments have not been greatly reflected as yet in the scrap market. Prices continue at ceiling and various consumers are still placing tonnage. However, there is not the long-range buying interest that there was and some consumers appear to be satisfied with what they now have on order.

Warehouse . . .

Warehouse Prices, Page 188

Cleveland — Local warehouses find demand steady at a good rate and in general inventory is good. Mill deliveries of sheets have not improved but are fairly good at the moment. Alloys are in better supply. Indications are for larger

inventory later in the year in most lines. Unrated orders are not being accepted unless sellers are sure they can replace tonnage from mills. The percentage of unrated orders to rated is small percentagewise.

New York — Demand for steel from warehouse has slackened moderately, most apparent in hot-rolled products, with shapes only slightly affected. With few exceptions, including plates and heavier gage sheets, replacements have not improved. Light flat-rolled products are tight with demand heavy; most unrated inquiry is centered in these. Aggregate volume of unrated, however, is less than expected, as low as five per cent with some distributors. Most of this tonnage offered is being filled. Distributors of nails are short of stock.

Los Angeles — Demand for steel from stock continues good, with sellers appreciative of OPA permission to pass on increased mill prices. Most sheet grades continue in short supply. Skilled labor for processing of warehouse material continues scarce, as is other labor.

Metallurgical Coke . . .

Coke Prices, Page 187

Washington — An increase of 40 cents per net ton in ceiling prices of by-product and retort gas coke, to compensate producers for increased coal and labor costs has been announced by Office of Price Administration, effective Aug. 7. The higher price is required under OPA's overall earnings standard. Sellers at all levels of distribution are allowed to pass on the increase to customers.

Iron Ore . . .

Iron Ore Prices, Page 188

Jones & Laughlin Steel Corp., Pittsburgh, through its ore subsidiary, has made two shipments of ore from its Star Lake development near Gouverneur, N. Y., to Cleveland via the St. Lawrence river and Great Lakes route. The ore was sent by rail to Clayton, N. Y., where it was transferred to lake carriers.

Canada . . .

Toronto, Ont. — Buying continues slow in the Canadian steel markets and in the Toronto area business came to a standstill from Friday afternoon until Tuesday as a result of the weekend civic holiday. Interest in steel supply, however, has not declined and consumers are seeking materials in an effort to speed up civilian production. Mills continue to report full booking to the end of this year, with large carryover into 1946, but there are possibilities for further cancellations of war steel which may soon swell volume going to non-war consumers.

Announcement has just been made of rescinding of all restrictions on sale of stainless steels, and these again are available to civilian users if they can obtain delivery. Practically all orders relating to government control of iron and steel now have been canceled and consumers can deal direct with producers. Despite rescinding in control orders there has been little easing in supply, although it is expected that larger quantities of steel soon will flow into civilian channels and producers of consumer goods are hopeful of sharply increasing output of their various products before the year end.

Steel bars, both alloy and carbon, are in short supply and mills are fully booked on all lines to the year-end, while few producers still have unfilled capacity on some of the lighter sizes.

Iron and steel production in June showed only minor change from the preceding month. While pig iron output increased 3472 tons over May to 159,0 net tons, production of steel ingots and castings dropped 10,528 tons to 25 115 tons for June. Of the total st output, 244,792 tons were ingots a 12,323 tons castings. Following is comparative production totals in tons:

	Steel ingots, castings	Pig iron	Fe all
June, 1945 . . .	257,112	159,016	18
May, 1945	263,643	155,574	19
June, 1944 . . .	240,750	161,899	17
6 Mos., 1945 . .	1,595,618	941,963	98
6 Mos., 1944 . .	1,512,583	949,523	91
6 Mos., 1943 . .	1,499,153	867,789	111

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

900 tons, plant addition for Delco Division General Motors Corp. at Linden, N. J. Bethlehem Steel Co., Bethlehem, Pa., thro Wigton-Abbott, Plainfield, N. J.

540 tons, three 100-foot deckplate girder sp Gallup, N. M., for Atchison, Topeka & S Fe Railroad, to American Bridge Co., P burgh; bids July 26.

250 tons, factory building, Elkhart, Ind., Adams & Westlake Co., to Midland St tural Steel Co., Chicago; bids July 18.

250 tons, addition to warehouse build Waukegan, Ill., for Johns-Manville, to Am can Bridge Co., Pittsburgh.

215 tons, factory building, Herrin, Ill., Norge Division, Borg-Warner Corp., to lumbia Iron Works, St. Louis; Gamble C struction Co., St. Louis, contractor; June 9.

100 tons or more, storage shed for Bethle Steel Co., Seattle, to Isaacson Iron Wo Seattle.

Unstated tonnage, steel frame and metal de ing, shipfitters and boilermakers shop, Bu of Yards and Docks, Navy Departm Hunters Point, Calif., to Columbia Steel San Francisco, $618,500.

Unstated, unnamed number of Navy barge Oregon Shipbuilding Co., Portland, Oreg.

STRUCTURAL STEEL PENDING

6000 tons, closures for pontoons, for Bur of Yards and Docks, U. S. Navy, Chica bids Aug. 16.

1300 tons, hinge bars for pontoons, for Bur of Yards and Docks, U. S. Navy, Chica bids Aug. 10.

1220 tons, warehouse and enameling build St. Louis, for American Stove Co.; Gam Construction Co., St. Louis, awarded gen contract.

500 tons, pilot building, Argo, Ill., for C Products Refining Co.; bids Aug. 14.

500 tons or more, including plates, five ste lers for Pacific Explorations Co., Seat bids in to H. C. Hanson, Seattle, naval arc tect.

400 tons, warehouse, St. Marys, Ga., for St Marys Kraft Corp.

350 tons, factory building, Portland, Oreg., Beall Pipe & Tank Corp.

200 tons, factory and office building, Fact Wis., for Modine Mfg. Co.; bids Aug. 6.

200 tons, mill buildings, De Ridder, La., Crosby Naval Stores Inc.

Unstated, redecking 11th street bridge, Tacom Cascade Construction Co., Seattle, l $139,809.

REINFORCING BARS . . .

REINFORCING BARS PLACED

00 tons, expansion, Calumet power station, Commonwealth Edison Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; bids April 25.

0 tons, nurses home, Mt. Sinai Hospital, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; bids July 9.

0 tons or more, engineering building, University of Washington, to Bethlehem Steel Co. Seattle.

0 tons, plant expansion by Remington-Rand Inc. at Norwalk, Conn., to Fireproof Products Co., New York.

REINFORCING BARS PENDING

0 tons, welded wire mesh, FA route 5 Sec. 1-R, Logan County, Ill., for state highway commission; O'Connor Construction Co., Springfield, Ill., low on general contract; bids Aug. 3.

tons, welded wire mesh, SBI route 5 Sec. R, Kendall and DeKalb counties, Ill.; Powers Thompson Construction Co., Joliet, low on general contract; bids July 20.

PE . . .

CAST IRON PIPE PENDING

tons, Fourth avenue N.E., improvement, Seattle; M. Moschetti, Seattle, low, $59,892.

tons, 7200 ft. 12-inch; bids Aug. 9 to chasing agent, Spokane, Wash.

tons, 6-inch for Helena, Mont.; bids to clerk, Aug. 8.

ed, pipe and water system materials for Orchard, Wash.; bids to F. H. P. A., ttle, Aug. 7.

ed, $300,000 irrigation project for Ord Irrigation Co., The Dalles, Oregon; C. Miller, president; bids probably in tember.

TES . . .

PLATES PLACED

ons, 24 spheres, for Eaton Metal Products p., Denver, to Commercial Shearing & mping Co., Youngstown, O.

PLATES PENDING

tons, top plates for pontoons, for Bureau Yards and Docks, U. S. Navy, Chicago; Aug. 17.

ILS, CARS . . .

RAILROAD CARS PLACED

ore & Ohio, 2000 steel hoppers, 1000 to lehem Steel Co., Bethlehem, Pa., 500 to ton Steel Car Co., Columbus, O. and to Pressed Steel Car Co., Pittsburgh; inquiring for 350 seventy-ton hoppers.

go & Alton, 40 caboose cars, to American & Foundry Co., New York.

ville & Nashville, 400 fifty-ton steel box and 200 steel automobile cars, to erican Car & Foundry Co., New York, 400 steel fifty-ton box cars to Mt. Ver- Car Mfg. Co., Mt. Vernon, Ill.

Marquette, 100 seventy-ton steel covered ers, to Greenville Steel Car Co., Green- e, Pa. 200 fifty-ton, 50-foot 6-inch steel omobile cars, to Ralston Steel Car Co., lumbus, O.

Louis Southwestern, 250 fifty-ton steel box rs, to Mt. Vernon Car Mfg. Co., Mt. Ver- n, Ill.

RAILROAD CARS PENDING

adian National, 300 fifty-ton refrigerators.

icago & North-Western, 800 fifty-ton box, 200 fifty-ton auto box, 400 fifty-ton flats.

ver & Rio Grande Western, 200 seventy- ton ballast cars and 25 seventy-ton hoppers.

Louis-San Francisco, 300 fifty-ton auto ers and 100 seventy-five-ton covered hoppers.

Atomic Energy May Prove Industrial Power Source

(*Concluded from Page 79*)

been one of the best, if not the best, kept secret of the war.

The chain of scientific events which led to the atomic bomb began at the turn of the century when radio-activity was discovered. Until 1939 work in this field was world-wide, being carried on particularly in the United States, United Kingdom, Germany, France, Italy and Denmark. In the late 1930s, cyclotrons, or atom smashers, were constructed (STEEL, Aug. 31, p. 17, 1936; Oct. 17, p. 21, 1938; Aug. 19, p. 33, 1940; March 17, p. 40, 1941; Sept. 1, p. 29, 1941).

When the lights went out in Europe in 1939, the exchange of scientific information was stopped, and when the United States became involved in the war in 1941 experiments here were shrouded in secrecy although research was greatly integrated and intensified.

Late in 1939 the possibility of using atomic energy for military purposes was brought to the attention of the President who appointed a committee to survey the problem. By June, 1942, sufficient progress had been made to warrant a great expansion of the project and the assumption of the direction by the War Department with Maj. Gen. Leslie R. Groves in charge. By December of that year a decision had been reached to proceed with plant construction on a large scale. Two of these are located at the Clinton Engineer Works on a 59,000-acre site in Tennessee, near Knoxville, and a third at the Hanford Engineer Works, on a 450,000-acre tract near Pasca, Wash. A special laboratory to deal with the many technical problems involved was located in an isolated area in the vicinity of Santa Fe, N. Mex. As high as 125,000 people have been employed on the project and about 65,000 are working on it at present. Up to June 30, 1945, Congress had appropriated $1950 million for the program.

Gigantic Projects Built Rapidly

These projects were built up to gigantic size rapidly and included highways, housing, schools, churches, shopping facilities, etc. for the hundreds of thousands of workers on the projects in addition to the huge chemical plants.

The magnitude of the construction job is indicated by the following figures for the Hanford project in Washington, selected at random: Excluding rails and special steels, about 40,000 tons of steel went into building construction; more than 8500 major pieces of construction equipment were used; 345 miles of permanent plant roads were constructed; excavation amounted to 25 million cubic yards of earth; 40,000 carloads of material were received on the site, equivalent to a train 333 miles long; more than 780,000 cubic yards of concrete were placed and about 1,500,000 concrete blocks plus 750,000 cement bricks were used in the construction job.

The finished chemical plants at the Hanford works are large rectangular structures 800 feet long. They handle enormous quantities of materials through successive processes with no human eye ever seeing actually what goes on, except through a complicated series of dials and panels that enable the operators to maintain perfect control of every operation at all times.

On July 16 this year the project was ready for its first test of a finished atomic bomb.

Uranium, apparently the chief raw material used in producing the atomic bomb, is a radioactive element of chromium group, found in combination with pitchblend and certain other rare minerals. It is found in the United States, Canada, middle Europe, Russia and the Belgian Congo. Before the war it was used primarily for coloring pottery and glass.

While the War Department pays tribute to the thousands of industrial firms which contributed to the project, it singles out only a few for special mention in an official announcement.

"The *du Pont de Nemours Company* designed and constructed the Hanford installations in Washington and operate them. A special subsidiary of the *M. W. Kellogg Co.* of New York designed one of the plants at Clinton, which was constructed by the *J. A. Jones Co.* and is operated by the *Union Carbide & Carbon Co.* The second plant at Clinton was designed and constructed by the *Stone & Webster Engineering Corp.*, Boston and is operated by the *Tennessee Eastman Co.* Equipment was supplied by almost all of the important firms in the United States, including *Allis-Chalmers Mfg. Co., Chrysler Corp., General Electric Co.*, and *Westinghouse Electric Corp.* These are only a few of the literally thousands of firms, both large and small, which have contributed to the success of the program.

Study of Steel Extras Being Pressed by OPA

(*Concluded from Page 81*)

is rolling light gages now is making $5 to $6 a ton profit. The man making heavy gages is covering manufacturing costs but certainly is earning no profit. We would unleash a mad scramble on the part of everyone for the profitable product; no one would be happy. We would probably wind up with sharp concessions on the profitable products — which as usual would spread to the unprofitable products. Where would we go from there?

"Let's consider a third possibility. Supposing at the time that the industry earnings drop to a point where price increases are indicated we consider as a part of that program a sound revision of extras on the basis of average industry costs. Instead of flat increases in the base price we increase the heavy-gage extras to reflect the true cost of rolling those gages. If after making changes indicated there is still need a higher price, the base price can be creased. I believe that price adj ments made in this manner will cont ute more to the economic health of steel industry and its customers than any single action which is within scope of OPA authority."

U. S. Steel Decides Not To Acquire Geneva Plan

(*Concluded from Page 81*)

war plants announced by the S Property Board on July 4, 1945, t ported statements of Col. Edwa Heller and Gov. Robert A. Hurley, members of that board, in San Fra on July 11, 1945, and the reported ment of W. Stuart Symington, rec appointed chairman of the board, o 19, 1945, appear to us in practical to rule out United States Steel Co a prospective lessee or purchaser Geneva plant, although Mr. Sym has since been quoted as saying bid from us will be considered.

"Under the provisions of the S Property Act, the Surplus Property has general supervision over the di tion of surplus properties and is powered to prescribe regulations to g disposal of such property, and the at general is required to give advice board regarding the proposed disp of certain surplus properties. We ha disposition to engage in any contra with these officials or to contravene determinations or regulations. Ho we deny their allegations or infer of monopolistic control, and we qu the accuracy of the premises on some of their statements appear to been based."

In the light of recent widely pub statements that western financial ests should be connected with the panies which are to supply the Fa with steel in the postwar period, Steel Corp. announced that as of 31, 1945, it had more than 17,000 holders of record in the eleven far w states. These stockholders then own aggregate of 586,923 shares of co stock and 181,088 shares of pre stock, the present market value of is in excess of $66,000,000. More two-thirds of these stockholders California.

"Pacific Coast users of sheet a plate may expect even better s from Columbia Steel Co. after the a result of the further step in Colu modernization program, William A president of U. S. Steel's West subsidiary, said.

"These new finishing facilities at burg, Calif., and the contemplated ernization of our plant at Torrance, should greatly increase our ability to the western steel market, and create tional jobs on the Pacific Coast. A present time, Columbia Steel employ proximately 6000 people in its v operations."

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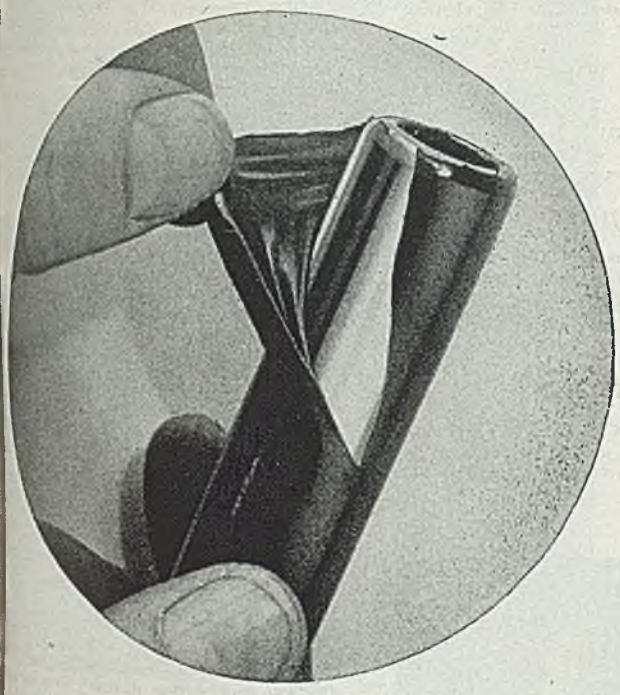

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* *Plasto-Pak can also be sprayed.*

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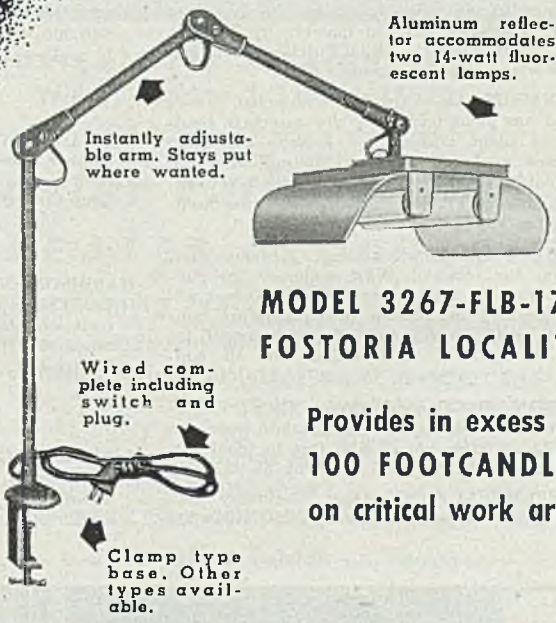

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CONSTRUCTION AND ENTERPRISE

OHIO

CANTON, O.—Timken Roller Bearing Co., 1835 Deuber avenue, will build an electric repair shop at its Dearing plant, to cost about $131,000. Priority has been granted.

CLEVELAND—Manufacturers' Machine Shop Inc., 2801 St. Clair avenue, will build a one-story machine shop 124 x 141 feet, at 1367 East 49th street, to cost about $6000.

CLEVELAND—City Enameling Co. has been incorporated with 500 shares no par value to manufacture enameled products, by Edward V. Cain, 400 Guardian building, agent.

CLEVELAND—Speed Selector Inc., has been incorporated with $500 capital and 1500 shares no par value to design and manufacture machines and equipment, by William M. Schweickart, 800 Fidelity building, Cleveland, who is agent.

COLUMBUS, O.—City has completed survey and has plans under way for a sewage treatment plant addition at Jackson pike and Frank road, to cost $2 to $3 million. P. A. Uhlman, 2901 North High street, is consulting engineer. P. W. Maetzel, Municipal building, is city engineer.

DAYTON, O.—Chrysler Corp., Airtemp division, has received WPB authority for construction of a one-story 360 x 640-foot addition and installation of temperature controls, drill presses and other equipment for manufacture of refrigeration and air conditioning equipment, to cost $3,113,745.

DAYTON, O.—General Motors Corp., Frigidaire division, has WPB authorization to build an extension of 880 feet to plant No. 4 at Moraine City, O., to cost $1,632,036.

INDEPENDENCE, O.—Ohio Machinery Co., E. Sidney Snyder, engineer, 3960 Elmwood road, Cleveland, will let contract soon for a 150 x 200-foot plant to cost over $50,000.

CONNECTICUT

ANSONIA, CONN.—City plans postwar construction of a sewage disposal plant to cost about $250,000.

BRISTOL, CONN.—Humanson Mfg. Co., Strafford avenue, Forestville, Bristol, has let contract to Torrington Building Co. Inc., 187 Church street, Torrington, Mass., for a one-story plant addition to cost about $50,000. Westcott & Mapes Inc., 109 Church street, New Haven, is engineer.

NEW HAVEN, CONN.—Atlas-Ansonia Co., 54 Grant street, plans construction of a one-story 65 x 130-foot factory building, to cost about $40,000. Leo F. Caproni, 1221 Chapel street, is engineer.

NEW YORK

NIAGARA FALLS, N. Y.—Goodyear Tire & Rubber Co. will build a vinyl plastic plant here for manufacture of plastics from acetylene derived from lime and coke.

NEW JERSEY

HARRISON, N. J.—American Gas & Chemical Co., Fourth and Warren streets, will let contract soon for a factory building. E. B. Torrance, 319 Chestnut street, Arlington, N. J., is architect.

PENNSYLVANIA

GREENSBURG, PA.—City plans postwar construction of sewage disposal system costing about $663,000, incinerator, $60,000 and additional sewers.

LOGANS FERRY, PA.—Allegheny. Pittsburgh Coal Co., Pittsburgh, has received WPB authorization for a one-story machine shop addition 42 x 50 feet, to cost $33,393.

PHILADELPHIA—Link-Belt Co., 2045 Hunting Park avenue, has let contract to Lardi Construction Co., 112 South 16th street, for plant additions, to cost about $70,000. Bollinger Co., 845 North 19th street, architect.

MICHIGAN

DETROIT—H & A Tool & Die Co., 773 West Fort street, has been incorporated with $25,000 capital to manufacture tools and dies, by Andrew Herkommer, same address.

DETROIT—Rapid Plating Co., 1250 Pencoscot building, has been incorporated with $50,000 capital to do electroplating of metals, by David I. Rosin, same address.

DETROIT—Electronics Co. of America, 83 Woodward avenue, has been incorporated with $1000 to deal in electronic devices, Pear, Campbell Lange & Tyler, attorneys Dime building, Detroit.

DETROIT—Michigan Designing & Engineering Co., 3445 West Fort street, has been incorporated with $50,000 capital to manufacture tools, dies and machines, by Frank H. Miller, 620 West Saratoga street, Ferndale, Mich.

ILLINOIS

ARGO, ILL.—Corn Products Refining Co. plans laboratory to cost about $2,500,000 and pilot and administration building to cost about $1,250,000.

CALUMET CITY, ILL.—Sherwin-Williams Co., manufacturer of paints, etc., has plans for $1,500,000 power plant. Schmidt, Garden & Erickson, 104 South Michigan avenue, Chicago, are architects.

MEREDOSIA, ILL.—Central Illinois Public Service Co. has received WPB approval for construction of power plant to cost about $10 million, including 50,000-kw turbine and 138,000-volt transmission line.

INDIANA

COLUMBUS, IND.—City plans postwar construction of a sewage disposal plant to cost about $250,000. J. M. Botz Engineering Corp., Merchants Bank building, Indianapolis, is consulting engineer.

ALABAMA

MOBILE, ALA.—Linde Air Products Co., 30 East 42nd street, New York, plans an acetylene plant here to cost about $50,000. S. J. Donnellon, care owner, is consulting engineer.

FLORIDA

JACKSONVILLE, FLA.—Southeast Wheel & Rim Co., 927 West Forsythe street, has let contract to D. O. Foshee, 1993 Largo road, for a one-story 105 x 105-foot addition to its three-story plant, to cost about $45,000. A. C. Hopkins, 409 West Adams street, architect.

OKLAHOMA

OKLAHOMA CITY, OKLA.—L. S. Crowe plans a one-story machine shop 50 x 60 feet, 1730 Northwest Fifth street.

TULSA, OKLA.—Dowell Inc. has let contract for a one-story truck assembly building 100 x 200 feet.

TULSA, OKLA.—Macnick Machine Shop, 53 Lansing street, plans a two-story machine shop addition 50 x 110 feet.

WISCONSIN

ALGOMA, WIS.—Algoma Foundry & Machine Co. has let contract to J. C. Basten, 183 Main street, Green Bay, Wis., for a one-story 70 x 87-foot foundry addition.

APPLETON, WIS.—Lieber Lumber & Mfg.

work Co. plans a one-story addition 40 x 90 feet.

APPLETON, WIS.—Miller Electric Mfg. Co. Inc., has let contract for a one-story plant 60 x 208 feet, to cost about $75,000.

APPLETON, WIS.—Miller Electric Mfg. Co. Inc., 905 Meade street, has let contract to Theo. Utchig, 400 West Parkway, for a one-story 60 x 208-foot, two-story 24 x 50-foot, and two one-story 16 x 60-foot plant buildings to cost about $75,000.

BURLINGTON, WIS.—Reliable Rubber & Engineering Works has been organized by Albert Westphal, until recently president of Maywood & Machine Co., Maywood, Ill. Buildings have been leased and are being equipped for manufacture of rubber parts and appliances.

FORT ATKINSON, WIS.—Moe Bros. Mfg. Co. has let contract to T. S. Willis, Janesville, Wis., for a one-story plant 150 x 296 feet. Grassold & Johnson, 734 North Jefferson street, Milwaukee, are architects.

GILLETT, WIS.—Norcor Mfg. Co., manufacturer of sheet metal stampings, has let contract to Selmer Co., Green Bay, Wis., for a one-story plant addition.

JEFFERSON, WIS.—Perplies Brewing Co. has let contract for a one-story addition to its plant. Arthur Kuenzi, Watertown, Wis., is engineer.

KIEL, WIS.—H. G. Weber Co., manufacturer of paper bag machinery, will soon let contract for a one-story plant addition.

MEDFORD, WIS.—Harvey Mfg. Co., manufacturer of hampers, has let contract for a one-story plant 60 x 210 feet.

MILWAUKEE — American Brass Co., 1420 Sixty-third street, Kenosha, Wis., has let contract to Selzer-Ornst Co., 6222 West State street, Wauwatosa, Wis., for a 1½-story warehouse building 120 x 173 feet, to cost about $175,000.

MILWAUKEE—Oilgear Co., 1403 West Bruce street, has let contract to Selzer-Ornst Co., 6222 West State street, Wauwatosa, Wis., for a one-story 72 x 120-foot plant addition, to cost about $125,000.

MILWAUKEE—Carbide Tool Co., 3445 North 35th street, has let contract for a one-story plant.

MILWAUKEE—Sermax Mfg. Co., 3457 North Holton street, has let contract to Peters Construction Co. for a one-story plant 60 x 90 feet.

MILWAUKEE—Taylor Mfg. Co., 3056 West Meinecke avenue, manufacturer of shaft couplings, dynamometers, etc., has let contract to Peters Construction Co. for a plant addition.

RACINE, WIS.—Modine Mfg. Co., manufacturer of automobile radiators and air-conditioning equipment, plans a one-story plant addition 185 x 280 feet. Graham, Anderson, Probst & White, 80 East Jackson boulevard, Chicago, are architects.

SHEBOYGAN, WIS. — Vollrath Nonferrous Metal Foundry has been incorporated by Andrew J. Vollrath III, R. C. Knabel and E. E. Vollrath.

TWO RIVERS, WIS.—Hamilton Mfg. Co., manufacturer of metal and wood printers' equipment, has let contracts for a one-story plant addition and dry kilns.

LOUISIANA

BELLE CHASSE, LA.—Niagara Sprayer & Chemical Co., Middleport, N. Y., plans 80 x 120-foot plant. N. J. Bedell Co., 504 Pan American building, New Orleans, La., is engineer.

MINNESOTA

MINNEAPOLIS—Lull Mfg. Co., 3612 Eas 44th street, manufacturer of highway s special machinery, plans a one-story machi shop addition 73 x 74 feet.

MINNEAPOLIS—Despatch Oven Co., 6 Ninth street SE, manufacturer of industri furnaces and ovens, has let contract for one-story addition and alterations to pres plant.

NEBRASKA

GERING, NEBR.—Lockwood Grader C manufacturer of grading machines, is bui ing a one-story plant addition.

IOWA

GLENWOOD, IOWA—Bond issue for $24 000 has been approved for a municipal li and power plant. Buell & Winter Engine ing Co., Insurance Exchange building, Si City, Iowa, are engineers.

SIBLEY, IOWA—City plans expansion municipal power plant, including boiler turbo-generator.

IDAHO

BOISE, IDAHO—Idaho Power Co., C. Strike, president, plans construction of 13,5 kw hydro-generating plant in Snake r canyon, substation and 138,000-volt tra mission line.

CALIFORNIA

BURBANK, CALIF.—Lockheed Aircraft Co has building permit for construction of st bins, at cost of $50,000.

FRESNO, CALIF.—Valley Pipe & Supply C has been organized by Arthur L. Moss a Clayton Long and has opened its plant 507 Broadway.

LOS ANGELES—Albert R. Oberwegner, 59 Woodlawn avenue, is building an additi to his machine shop, to cost $3000.

LOS ANGELES—Plans will be complet about Sept. 1 for a steel warehouse a office for Joseph T. Ryerson & Son In Chicago, on Bandini road, Bandini distri warehouse 400 x 600 feet and office, pa one and part two stories. Warehouse w have central craneway of 110-foot span a side spans of 55 feet each. Cost is estimat at $500,000. A. C. Martin, 233 Higgi building, Los Angeles, is architect.

LOS ANGELES—Republic Supply Co., pi and oilfield supplies, has let contract Buttress & McClellan, 1013 East Eigh street, for a warehouse 140 x 300 feet, cost $110,000, at 5022 Anaheim-Telegra road. Jack McDonald, 1013 East Eigh street, Los Angeles, is architect.

LOS ANGELES—Sierra Engineering Co. h been incorporated with 5000 shares no p value. Wright & Milliken, 111 West Se enth street, are representatives.

LOS ANGELES—H. B. Tool & Engineer Co. has been formed by Frank M. Hube and Fred Bauernfeind to conduct a manu facturing business and maintenance of ca bide cutting tools, at 4566 Pickford stree

SAN DIEGO, CALIF.—Allied Engineering Equipment Co. has been formed by Elm E. Johnson and Jack R. Garber and h established operations at 4391 Montal street.

VENICE, CALIF.—D. F. Tool & Machi Works, 753 La Cienga boulevard, Los An geles, will build a machine shop at 973 Vicksburg avenue, Venice, 60 x 100 fee to cost $15,000.

WHITTIER, CALIF.—Dietz Tool Co. has be incorporated with $25,000 capital. John A Whalen, 156 North Greenleaf avenue, agent.

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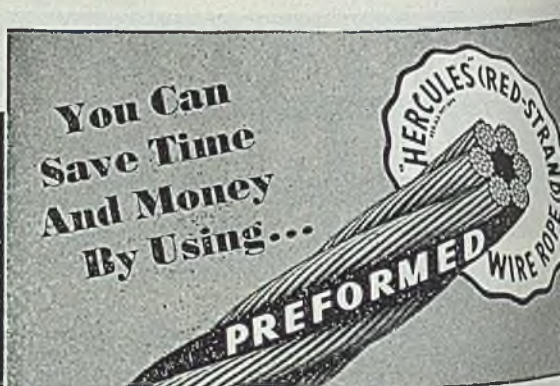

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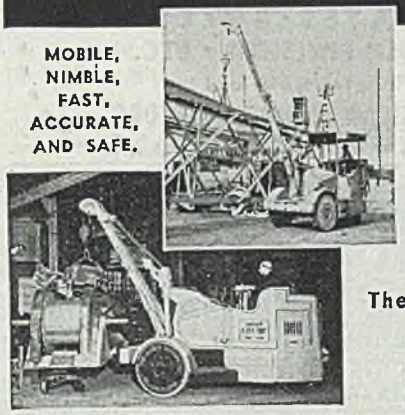

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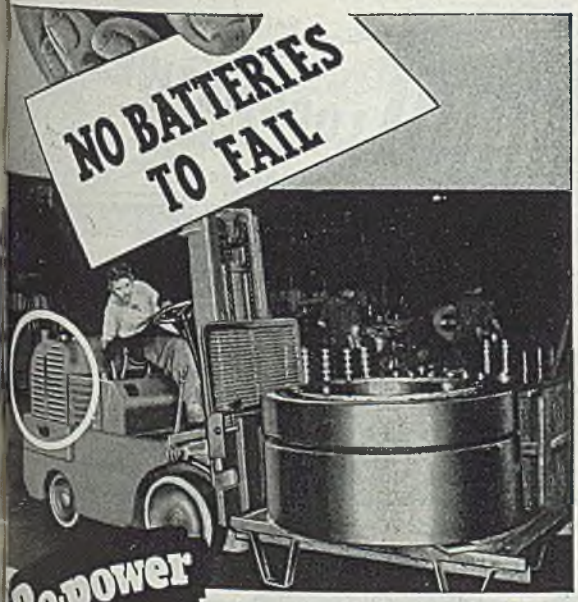

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DRAFTSMEN

Men who are capable of carrying the responsibilities involved in the creation, design, development and production of new postwar products consisting chiefly of HEAVY AND LIGHT INDUSTRIAL MACHINERY for absorption of the expanded manufacturing facilities of our plants, now engaged in the production of Army tanks, tank parts, power units, resistance welders, etc. Only persons with well founded practical and technical experience should apply. Permanent positions at good salaries and opportunities for advancement in a growing organization are possible to those who qualify. All replies confidential. Address J. F. Joy, Vice President—Engineering. The Federal Machine and Welder Company, Warren, Ohio.

Wanted
CHIEF INSPECTOR

Man experienced in inspection of all types of precision gears. Must be familiar with all types of checking equipment and well grounded in gear cutting. Write fully giving details of experience, education and salary requirements.

Address Box 136
STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER

Must be familiar with Steel Plate Work and Pressure Vessels. To represent a modern fabricating plant in Virginia, serving the oil, chemical and similar industries. Give full experiences, references and salary expected. Address Box 112, STEEL, Penton Bldg., Cleveland 13, O.

DESIGNER, DRAFTSMAN AND ESTIMATOR WANTED

Must have full knowledge of construction of all types pressure vessels, storage tanks, general steel plate construction. Plant located in Alabama. Statement of availability required and prefer young engineer. Address Box 998, STEEL, Penton Bldg., Cleveland 13, O.

LONG ESTABLISHED NEW JERSEY MAchinery Manufacturer wants two Regional Managers; one for Eastern Area; one for Central Area, to call on established distributors and customers. Experience in selling welding equipment preferable, but not essential. Excellent Post War possibilities. In replying give experience and statement of availability. Address Box 138, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

MECHANICAL ENGINEER

Experienced on the design of light Rolling Mill Machinery or similar equipment—Capable of assuming responsible charge of work and supervising the work of others.

Call for personal interview or give full information in first letter of reply including salary expected. Address J. F. Stadelman.

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McKees Rocks (Pittsburgh District) Pa.

WESTINGHOUSE ELECTRIC CORPORATION

needs two experienced plant planning and materials handling engineers. Adequate salary and assured future for the right man. Wire or write Supervisor, Technical Employment, 306 Fourth Avenue, Pittsburgh 30, Pa. for application.

ENGINEERING DRAFTSMEN

Excellent opportunities for engineering draftsmen with progressive well established company specializing in powder metallurgy and fabrication of refractory metals. We are interested only in applicants seeking positions for present and post-war era. Give full details on training and experience.

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WANTED: SALESMAN BY LARGE TUBING manufacturer, both seamless and welded steels in carbon, alloy and stainless grades. Must have Mechanical Engineering or Metallurgical Engineering degree, or suitable alloy steel field sales experience. Give full details with application. Apply Box 132, STEEL, Penton Bldg., Cleveland 13, O.

MECHANICAL ENGINEER

Well established old company producing small parts. In addition to engineering ability must be capable of organizing and supervising a small engineering department. Productive tools and processes experience necessary. Address Box 121, STEEL, Penton Bldg., Cleveland 13, O.

SHOP SUPERINTENDENT WANTED BY sheet steel pipe and plate fabricating plant located in California, normally employing around 40 men. Man with engineering education and experience in steel plate shopwork preferred. Permanent position. Address Box 107, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

Wanted
ESTIMATING ENGINEER

By large and long-established, out-of-to tank and equipment manufacturer. Pr a man with engineering and fabrica experience. Estimating experience ferred but not essential. In reply, s salary desired and detail of past perience. Excellent postwar opportun for right man. Certificate of availab required. Reply to Box 135, STEEL, Pe Bldg., Cleveland 13, O.

Wanted
ASSISTANT GENERAL MANAG

Man experienced in all phases precision gear cutting in small w equipped plant. Excellent opportun for man with all-around gear perience. Write fully giving detail experience, education and salary quirements.

Address Box 137
STEEL, Penton Bldg., Cleveland 13

DRAFTSMEN

Large steel company in Pittsburgh area several opportunities for draftsmen with school or college education and experi in the following areas: design of steel and steel foundry products; railroad t accessories; layout and design of steel blast furnaces, open hearth furnaces, power plants; design of fabricated con bars; layout of electric power and co equipment; general mechanical design layout. Please submit details, statemen experience and education, inexpensive ph graph, and required minimum earn Address Box 142, STEEL, Penton B Cleveland 13, O.

WANTED
FOREMAN

For a Structural Steel and Plate Fabrici Shop employing fifty people. An old e lished Company located in the Midwe the Mississippi River.

Address Box 133
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WANTED—CARBIDE TECHNICIAN, known eastern company with establishe outlet has excellent opportunity for Chief nician to develop carbide line, especia wear resistant applications. Fundamental ing equipment installed. Company also in in cast tool developments, precision and c gal castings, with particular reference to heat resisting applications, such as gas t State age, education, experience, salary and draft status. Address Box 908, STEE ton Bldg., Cleveland 13, O.

MANAGER WANTED FOR REINFO steel department of Baltimore steel plant have selling experience and be capable of sign and detail of reinforcing steel and e ability to handle drawing room requirem production facilities. Give full qualifica your application. Address Box 119, S Penton Bldg., Cleveland 13, O.

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Representatives Wanted

WANTED
Steel Sales Representatives

Steel warehouse distributor specializing in sheet, strip, and tin mill products and equipped with complete shearing and slitting facilities desires qualified sales representatives in following areas: New England, New York City, Western New York State, Buffalo, Erie—Jamestown, Cleveland, Toledo, Detroit, Ohio, Cincinnati, and Indiana. Reply to Box 122, STEEL, Penton Bldg., Cleveland 13, O.

REPRESENTATIVE WANTED

COLD DRAWN SEAMLESS STEEL TUBE MANUFACTURER REQUIRES SERVICES OF EXPERIENCED REPRESENTATIVE NOW CALLING ON USERS OF TUBING. ADVISE OTHER LINES HANDLED. COMMISSION ARRANGEMENT. ADDRESS BOX 128, STEEL, PENTON BLDG., CLEVELAND 13, O.

Wanted
SALES REPRESENTATIVES

Reputable company with over fifty years experience in the manufacturing of High Grade Tool Steels and Forgings, desires Sales Representation in Detroit, Cleveland, Cincinnati, Buffalo and Philadelphia districts. Address Box 134, STEEL, Penton Bldg., Cleveland 13, O.

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Opportunities

Opportunities

WANTED

Will buy or lease building and facilities tool and die shop in small town or city located within 150 miles of Chicago. Must be well equipped to produce high grade dies, tools and small stampings. Must have assured following of ten or more skilled die makers and production personnel.

ADDRESS BOX 109,
STEEL • PENTON BLDG. • CLEVELAND 13, O.

Positions Wanted

SEASONED ENGINEER — GRADUATE — CAPABLE executive with 12 years shop and organization experience in industrial plants. Worked as Chief Production Engineer, Welding Engineer, Metallurgist, Consultant, Tooling Superintendent, also Asst. to Works Manager covering: Manufacturing Methods, Production Engineering and Control, Factory Costs, and Labor Relations. Address Box 118, STEEL, Penton Bldg., Cleveland 13, O.

DEVELOPMENT ENGINEER (M.E.) FIVE years in research department large industrial concern developing new automatic production machinery, additional five years development work on mechanical and hydraulic presses and automatic container machinery. Experienced in supervision and shop methods. Analysis and theory a specialty. Responsibility essential. Age 33. Address Box 103, STEEL, Penton Bldg., Cleveland 13, O.

METALLURGIST — YOUNG, GOOD SALES personality, fully experienced in ferrous metallurgy, production, machining, specifications, heat treatment, metallography, desires connection as metallurgist or sales engineer with progressive firm with definite postwar advancement. Minimum salary $7,000.00. Address Box 120, STEEL, Penton Bldg., Cleveland 13, O.

PRODUCTION MANAGER. EXPERIENCED IN planning, scheduling, machine loading and inventory control and small lot production. Machine shop and sheet metal experience also. Address Box 145, STEEL, Penton Bldg., Cleveland 13, O.

SALES REPRESENTATIVE WITH MACHINE Tool background and industrial sales experience in Northern Ohio, desires position as salesman or representative for manufacturers of high speed and carbide tools. Address Box 114, STEEL, Penton Bldg., Cleveland 13, O.

Accounts Wanted

ENGINEER-EXECUTIVE

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MANUFACTURERS REPRESENTATIVE—DETROIT, Michigan. Well established with personal acquaintance most manufacturing plants. Wants full line machine screws, stove bolts, cap and set screws, studs, carriage bolts, hexagon nuts. Address Box 131, STEEL, Penton Bldg., Cleveland 13, O.

WOULD LIKE TO HEAR FROM RELIABLE established firms desiring representation in the Northwest. Am experienced in Industrial, Milling, Logging and Railroad supplies. Write Chas. P. Krueger, 1901 Bigelow Ave. N., Seattle 9, Wash.

Position Wanted

PURCHASING AGENT. 44, HAVING 15 YEARS' experience purchasing for an industrial organization with fully equipped machine shop and bronze foundry. Would like to form new connection with a progressive concern having good postwar prospects. Eastern location preferred. Address Box 111, STEEL, Penton Bldg., Cleveland 13, O.

MANAGER, PURCHASING AGENT. WITH wide successful experience automobile and parts manufacturing. Can organize and produce. Desires position with established manufacturer. References. Address Box 130, STEEL, Penton Bldg., Cleveland 13, O.

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