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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 119, NO. 24 DECEMBER 9, 1946

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TECHNICAL

FEATURES

MARKETS

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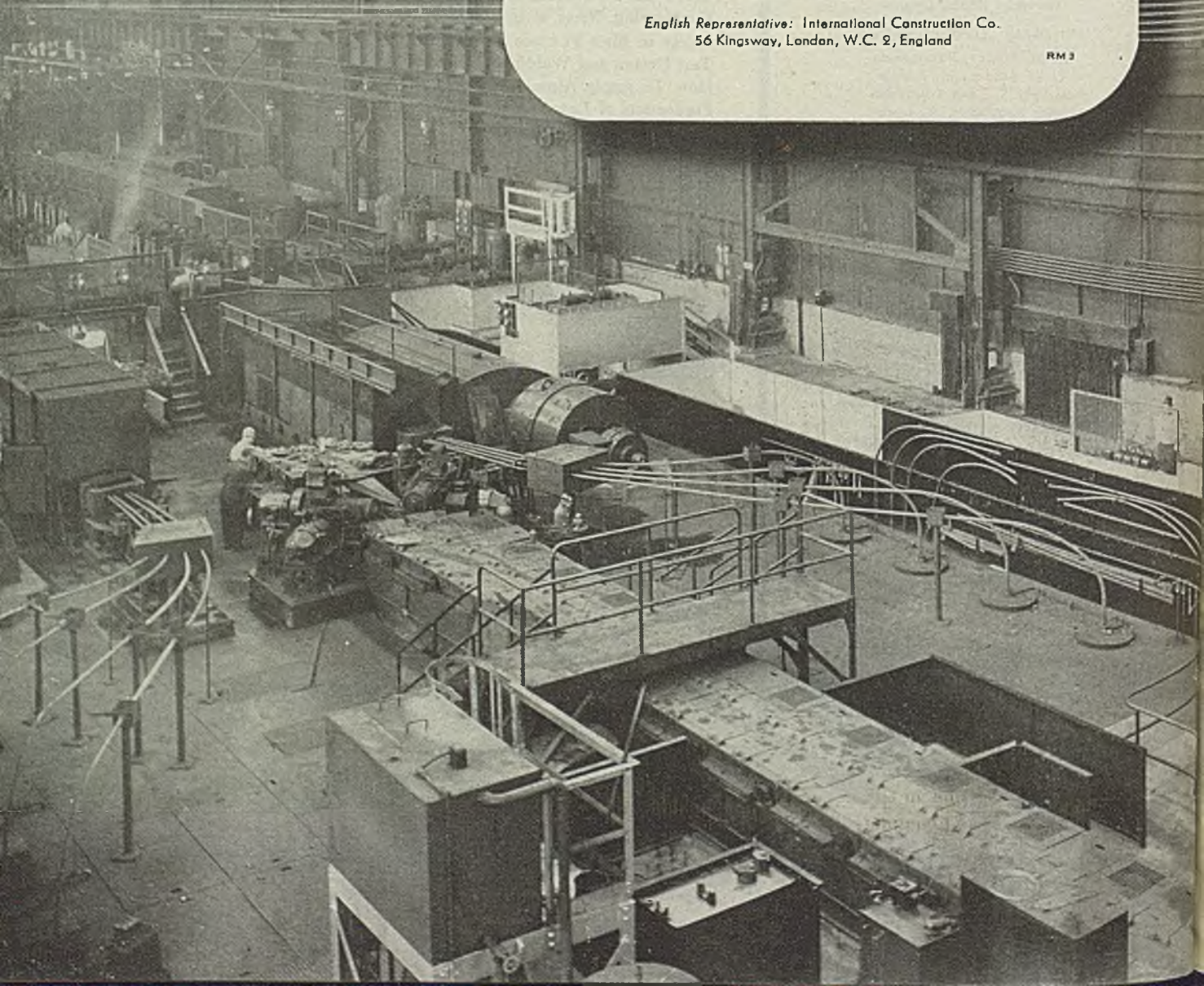
Wheels and Compounds for Buffing and Polishing
Lubricating Hot Strip Mills—Part II
A User Looks at Hydraulics
Considerations in Size Distribution of Clay Firebrick



As the EDITOR VIEWS the NEWS

Formula for Peace

At the Congress of American Industry, held in New York last week under the sponsorship of the National Association of Manufacturers, Clarence B. Randall of Inland Steel, as chairman of the industrial relations program committee of the association, declared that American employers must be prepared to exercise the same high degree of leadership which they demand of Congress. Such leadership, he said, would involve, first, payment of wages as high as productivity will justify, with incentives to encourage superior performance and output; second, maintenance of working conditions that safeguard the health, dignity and self-respect of workers; third, stabilization of employment to the greatest degree possible through an intelligent direction of all factors lying within management's control; and fourth, promotion of a spirit of co-operation through friendly explanation to employees of the policies, problems and prospects of the company.

This is a constructive statement of policy which calls for an equally frank utterance by spokesmen of the unions. Now would be an opportune time for some progressive union leader to come forth with a proposal for increased productivity and greater sense of responsibility on the part of workers. The union chief who rises to this great opportunity may well take his text from the letter sent by Walter W. Cenerazzo, head of the Watch Workers Union, to union members in the Hamilton, Elgin and Waltham plants.

In this letter, Mr. Cenerazzo points out that union members have received large increases in wages since 1941, have lost no pay through strikes, have been granted holidays and vacations with pay, sickness and accident benefits, pensions, better working conditions and greater job security. In return, he urges union members to help their employers increase efficiency of operations, assist them in meeting the competition of imported watches produced by cheap labor, support their efforts to preserve the private enterprise system and strive to make profits for stockholders.

This kind of union attitude must become more prevalent in America if this nation is to enjoy industrial peace. There is abundant evidence that the technic of waging class warfare, practiced by many unions with the aid of government during the past decade or more, is not the answer to the nation's labor problem.

The real solution, and the only one that will free the public from Lewis and Petrillo Frankensteins, is a formula of co-operation between employer and employee that will promote their common interests. It is high time we realized that class war is as destructive as war between nations.

SLOW STRANGULATION: To date about 23 billion tons of bituminous coal have been mined in the United States. In recent decades, production has not kept pace with the increase in population or with the expansion of industry. In fact, output in 1945 was only slightly in excess of that of 1920.

The failure of soft coal mining to match progress with other activities in this highly industrialized nation will be further aggravated by the present strike. The coal that is being saved by substituting oil burners in power plants, by brownouts and blackouts, by shipments by truck and plane instead of trains, by diesel-powered generators in stores and shops and by many other expedients is coal that never will be mined. It represents lost wages and profits that never can be recovered.

In this respect John Lewis is risking for soft coal the same fate that befell anthracite. In 1920 almost 90 million tons of hard coal were mined. Since that time annual output has averaged about 55 million tons. The industry never has regained markets it

(OVER)

lost through union and operator high-handedness and bull-headedness.

In view of this record it is difficult to believe that the sentimental loyalty of miners to Lewis will long withstand the realization that his tactics are slowly strangling the source of their livelihood. —p. 57

• • •

ACCENT ON SERVICE: In this issue is the fascinating story of how a North Canton, O., manufacturer of leather goods took the crude idea of a disgruntled janitor and built it into a business that has manufactured and sold more than 6 million vacuum cleaners in the past 38 years.

Officers of this enterprise, the Hoover Co., believe a successful formula for manufacturing in a keenly competitive field must include first, constant and progressive research and engineering; second, aggressive sales promotion and organization; third, efficient manufacturing; and fourth, managerial policies to co-ordinate and balance the first three.

The Hoover formula also places heavy emphasis on service. When World War II halted the manufacture of new sweepers, the company froze all sweepers manufactured and unsold into a reservoir from which new units could be parceled out to old customers whose sweepers wore out during the war.

Such devotion to customer convenience could be practiced with profit by many companies in the industrial field. —p. 70

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TIME IS RUNNING OUT: General Motors has sent a message to stockholders explaining why the expectations of capacity operations with attendant heavy employment, high payrolls and good earnings in the automobile industry have not been realized.

While there may be various opinions as to why reconversion has lagged so lamentably, the authors of the GM letter place great emphasis on the government's pronouncement of national economic policy on Oct. 30, 1945, which decreed that "wage increases are imperative" and that "we must above all hold the line on prices."

Experience has shown that this two-point policy was unsound. Most industrialists will agree with General Motors that pursuit of this fallacious policy by the government over an extended period has been responsible for many of our present ills.

The problem now is to repair the damage without subjecting the nation to a sharp, short recession. This will be difficult, but if the co-operation of feuding elements can be won in time, there is a chance it can be done. —p. 73

SIGNS OF THE TIMES: Veterans of World War II will hold seven seats in the Senate and 60 in the House (p. 68) of the eightieth Congress which will convene in January. . . . Export of 8141 automobiles from the United Kingdom in October set a new record (p. 69) and was an important factor in increasing exports of all commodities in that month to a total that is 17 per cent higher than the monthly average for 1938. . . . Los Angeles Chamber of Commerce estimates that business losses suffered because of the maritime strikes (p. 79) have amounted to $53 million in the Los Angeles area. . . . Carl Hinshaw, congressman from California, told members of the American Society of Mechanical Engineers that the importance of engineering in national affairs should be reflected by more active participation of engineers in local, state and federal government. He cited as favorable trends in this direction (p. 62) the election to the United States Senate of Ralph E. Flanders, machine tool builder of Vermont and of George W. Malone, civil and metallurgical engineer of Nevada. . . . Higher speeds of hot strip mills have emphasized the importance of lubrication under high temperature and water and scale contamination conditions. One way of coping with the problem (p. 90) is to provide two separate oiling systems—one for the lower speed roughing stands and one for the higher speed finishing stands. . . . Labor union leaders are urging the Bureau of Labor Statistics to develop statistics that will measure the efficiency of workers, management and capital. They mince no words in stating that they want these statistics (p. 66) for the purpose of winning concessions from employers that will provide workers with increased income, increased purchasing power and better living. . . . An Illinois manufacturer of shelving, lockers, cabinets and similar sheet metal products has been able to augment its stocks of hard-to-get sheet steel by inaugurating a national campaign of barter and exchange. Customers are invited (p. 98) to furnish steel the manufacturer can use in exchange for its finished products. . . . Infra-red drying equipment now is available for drying abrasive polishing wheels after setting up. A polishing wheel can be removed from the machine (p. 86), new abrasive applied, adhesive dried by infra-red rays and the wheel returned to actual service all in less than an hour. This system also has possibilities in connection with setting of animal glue coatings on polishing wheels.

E. C. Shane

EDITOR-IN-CHIEF

How You Can Get More Freight Cars

With today's railroad freight car shortage continuing, it is imperative that we all again review our use of cars and determine what we can do to speed up the movement of freight.

Doing everything they can, American railroads have been unable to meet the demands. Actually, average miles traveled per car per day dropped from 51 in the second quarter of 1945 to 38.6 in the same quarter of 1946.

The railroads are making a serious effort to speed up switching and hauling time. We, the shippers and receivers, can also help by speeding up loading and unloading of cars . . . reduce waiting time at our sidings. If your plant is operating on a five day week, why not do your freight car loading and unloading on a six day basis and release those cars one day early.

If the average time of handling a car can be reduced a single day, the additional freight that can be hauled will be the equivalent of 100,000 extra railroad freight cars. You can also make your freight cars do *more* if you will ship *full carload* instead of *partial car loads.*

For example, in accordance with the Office of Defense Transportation's request we have succeeded in increasing the load in each car by 20% with a consequent 20% reduction in car requirements. As a supplier to the railroads and car building industry, we are furnishing our share of steel for new car construction, though we realize full well that it is not enough.

American manufacturers proved conclusively during the war that we can work in close cooperation. Today, we face another critical period when this same cooperation is needed. Let's all work with the railroads to keep cars moving; reap the benefits of extra shipping space, and speed up our national economy.

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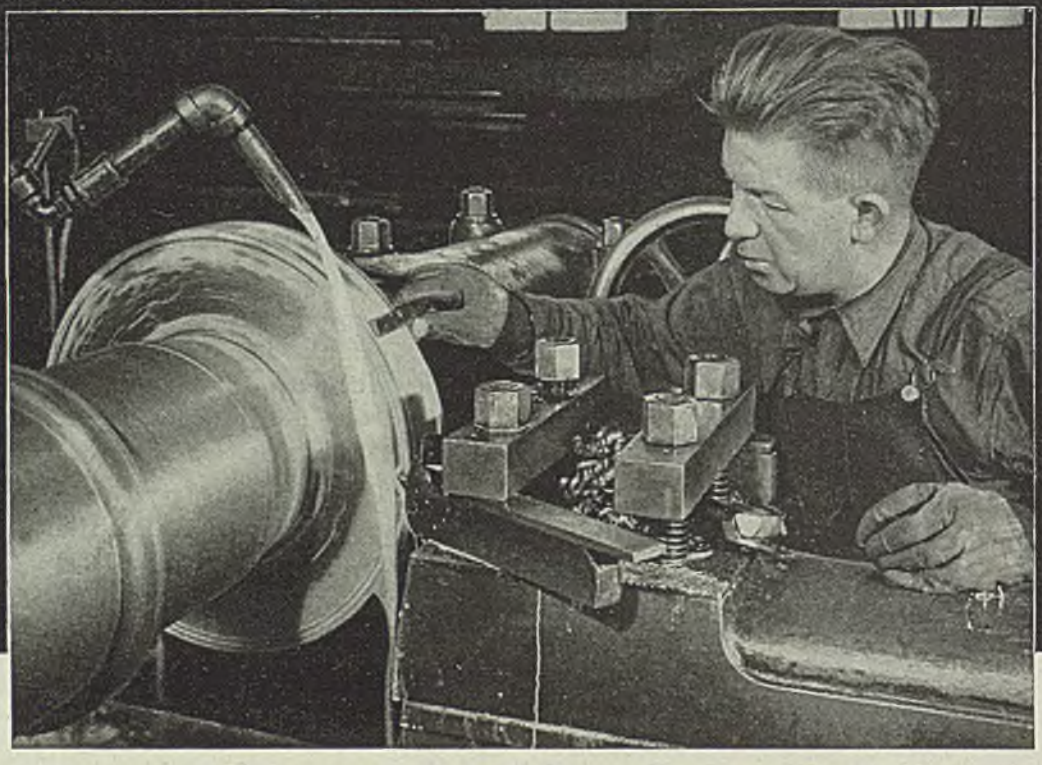

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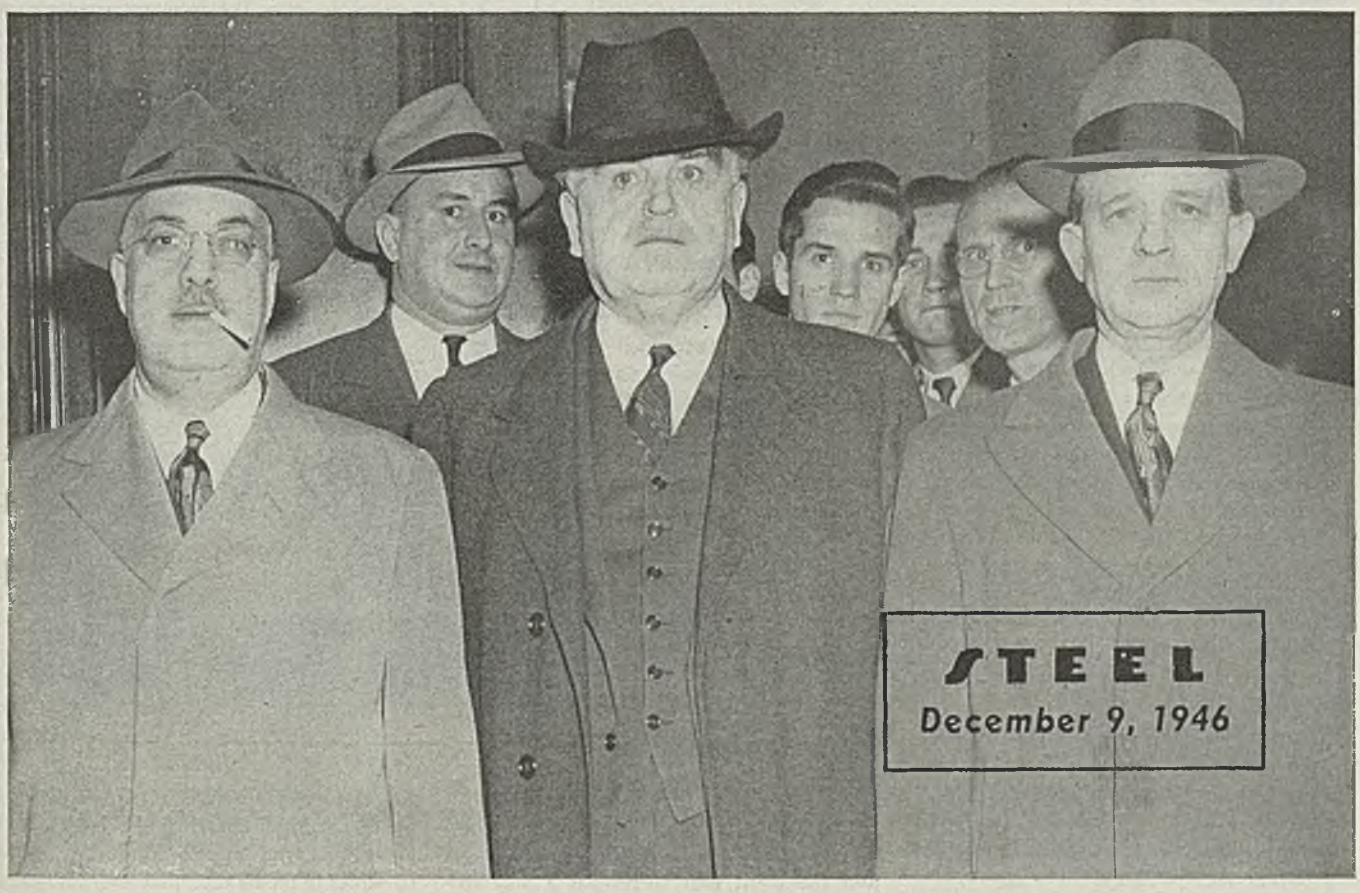


Final disposition of legal action against John L. Lewis and the United Mine Workers rests with higher courts. Above, Lewis, center, is shown leaving federal court in company with his attorneys, Joseph A. Padway, left, and Welly K. Hopkins, right. NEA photo

Rail Embargo Hits Manufacturing

Widespread unemployment threatened in manufacturing industries as result of freight embargo. Drastic cut in activity looms as corollary of coal strike. Steel operations continue to fall. Hope persists for early strike settlement

FULL effects of the strike of bituminous coal miners on the nation's economy will begin to be felt this week.

With production of basic commodities, such as steel, sharply curtailed in the first two weeks of the mine stoppage general manufacturing operations throughout the country this week face drastic cutbacks over a wide area, as the movement of materials into and out of plants is slowed to a snail's pace by the drastic freight embargo ordered as of midnight, Friday, Dec. 6.

Last week the only hope for averting widespread economic stagnation and unemployment rested upon the slim chance that a settlement of the strike would be quickly effected.

Despite rumors that behind-the-scenes moves were being made toward effecting such settlement, all of these were unconfirmed and so far as could be determined there appeared little prospect the miners would return to the pits at least until the legal issue raised by John L. Lewis' action was adjudicated by the United States Supreme Court. How long this would take was uncertain, but the view was expressed in informed circles that a decision might be possible before the end of this week.

Thousands of workers, in addition to the 400,000 miners, were idled in the first two weeks of the strike, it being estimated between 50,000 and 70,000 steelworkers alone had been laid off as blast furnace, steelworks and coke oven operations were drastically cut. This week indications pointed to additional thousands being idled as manufacturers put curtailment plans into effect. One survey indicated that nearly 2 million workers had been slated for layoffs at the end of last week as the freight embargo struck the mass employment industries, such as automobiles. Further thousands will be similarly affected should the strike continue beyond this week.

In the steel industry proper, additional curtailments are scheduled for this week. Last week ingot rate fell five points to 60.5 per cent of capacity, bringing the decline in operations to 31 points since the beginning of the coal strike on Nov. 21. In addition sharp cutbacks in schedules have been effected in blast furnace, coke oven and finishing mill operations, overall activity at some plants being estimated as low as 35 per cent of manufacturing capacity. With the freight embargo complicating the situation producers are planning additional shutdowns which might otherwise have been delayed. Steelmakers are seeking as far as possible to cushion the effect of the shutdowns on employees by taking the occasion to utilize the workers displaced from their jobs in repair work.

Steel producers are conserving coal supplies as far as possible though up to the time the freight embargo was effected some plants had been maintained

in full production. When the strike broke out it was estimated steel company coal stocks varied between eight and 30 days among the separate plants. In the two weeks of the strike, these stocks have been reduced though not as much as normally since drastic curtailment of production was effected at many points in the first week of the walkout.

Production of bituminous coal during the week ended Nov. 23, the first week of the strike, was estimated at 6,400,000 tons, about half the amount produced in the preceding week. In several coal fields the miners did not report for work on Nov. 18, 19 or 20. During the comparable week of 1945, the output of coal was 10,340,000 tons. Cumulative production during the calendar year through Nov. 23 approximated 483,086,000 tons, which was a decrease of 6.9 per cent below the 518,625,000 tons mined in the comparable period of last year.

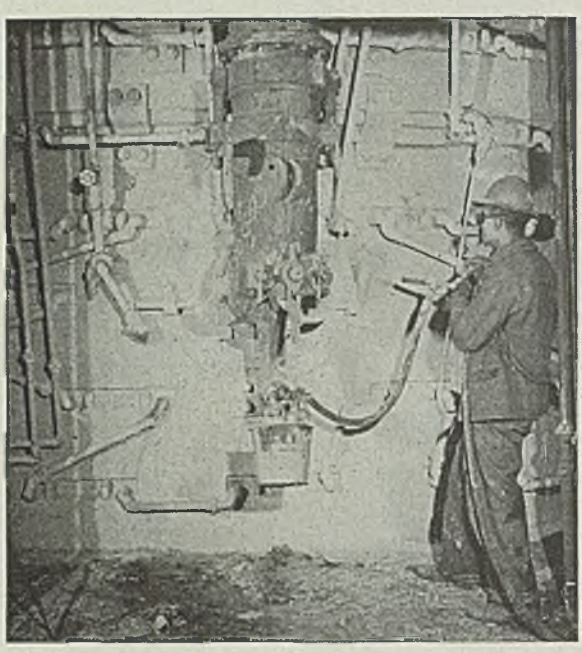
Coal stocks frozen by the government in the Pittsburgh district last week were estimated down to about 70,000 tons, and only a dribble of fuel is coming from small pits and strip mines still operating. At the same time the coal-saving resulting from the dimout of cities, in use of electricity in coal burning states is reported pitifully small by the Edison Electric Institute. Of the 316 million decline in kilowatt hours for the week ended Nov. 30 in comparison with the like week a year ago, only 27 million kwh is traceable to the dimout. This represents only about 1 per cent of output in states affected by the government's dimout order. The remaining 289 million kwh of the decline is attributable to observance of the Thanksgiving holiday.

Effect of Fines Uncertain

Considerable speculation—and it was only speculation—existed as to what turn events will take with John L. Lewis carrying the legal issue to the higher courts. Fining of Lewis $10,000 and the mine workers union $3,500,000 for being in contempt of court up to late last week had not materially changed the situation. As a matter of fact, it was said in authoritative circles that the situation at the close of the trial in Federal Judge Goldsborough's court found the situation more nearly at an impasse than before the fines were levied. One authority said that prior to the levying of the fines the Department of Justice offered to accept a suspended sentence if Lewis would call off the strike. The union representatives are then said to have countered with an offer to compromise their demands with the government. This was refused, it was said, a point that was hinted at in Judge Goldsborough's court, when the AFL General Counsel Joseph Padway told the court that there was a way to end the strike but that the government did not see fit to accept it.

Late last week a group of railroad unions suggested that Lewis and the government call off their legal battle, the points at issue in the strike being put up to a Presidential commission to settle. The Railway Labor Executives Association proposed that the decision of the federal court be held in abeyance, that the miners agree to return to work immediately, that the President appoint a commission to inquire into the complaints of the miners and make recommendations within 30 days, that all parties agree to accept the recommendations, and that pending court proceedings be vacated and dismissed. In some quarters this move was viewed as

(*Please turn to Page* 178)



FURNACE SEALED: In closing down a blast furnace because of a fuel shortage resulting from the coal miners' strike, a workman at the Carnegie-Illinois Steel Corp.'s plant at South Chicago, Ill., sprays silica soda to seal all cracks. NEA photo

New Congress May Give Labor Legislation Right-of-way if Coal Strike Is Prolonged

WASHINGTON

WHEREAS leading Republicans who will sit in the eightieth Congress had hoped to postpone overhauling the country's labor laws and policies, many of them now fear the rising public demand may make it the first order of business.

Every day of the coal strike is building up pressure for labor legislation. The leaders are hoping that something will happen to get coal production resumed without further undue delay, so that the eightieth Congress will not be stampeded into passing "tough" bills which some of its members—like Senator George A. Wilson (Rep., Iowa)—now are writing.

The attitude of the Republican leadership is well expressed by Senator Joseph H. Ball (Rep., Minn.) who for the moment, as chairman of the labor legislation subcommittee appointed by the Senate Republican Steering Committee, is the chief congressional spokesman on the subject. Whereas Senator Ball used to be very positive on the need for reforming the labor laws when he was a member of the minority party in the seventy-ninth Congress, he now views new labor legislation as a delicate matter whose solution will be better achieved through careful, calm procedure rather than hastily under the urge of emotion.

Even on the basis of a calm, studious approach, he said in a speech before members of the National Press Club, it will be difficult to draft and enact the desired laws. There are many shades of opinion in Congress, he said, and by no means all of the members of the eightieth Congress can be counted on to help reform the labor laws. The first thing he proposes to do, he declared, is to introduce a bill to outlaw the closed shop.

"Such a bill," he said, "will inspire a lot of opposition. Yet I think that in the end it will be a popular bill and will be

approved for it will cover matters that everybody can understand—the rights of the individual and the monopoly inherent in the principle of the closed shop. The alternative would be to try to cover all union procedures by law—and that would be unworkable; for one thing it would necessitate setting up a big new bureaucracy."

Alluding to the coal situation as an "insurrection" rather than a strike, Senator Ball said the No. 1 problem is that of preventing industry shutdowns. That cannot be solved merely by passing a law loaded with jail penalties and fines. He still is thinking about compulsory arbitration, and he thinks there is something in the idea, again renewed by Senators Ferguson and Fulbright, for a federal system of special labor courts. But he fears it might take months, even years, to gain acceptance of such a program. Compulsory arbitration, for example, might develop into "a completely arbitrary proceeding" without careful legislative spadework. "I am very sure," he added, "that government seizure and operation is a bad answer." As to Senator Fulbright's proposal to break up industry unions by voting them illegal monopolies, Senator Ball thought that was easier to say than to do.

If the eightieth Congress is forced to draft and pass labor legislation quickly, as a result of aroused public opinion, Senator Ball thought, the program should be limited largely to what the Truman-vetoed Case bill provided.

"We could go ahead and strengthen the federal mediation procedure, make unions suable for breach of contract, outlaw the formation of unions of supervisory employees, outlaw the secondary boycott, and provide for proper management of safety and welfare funds. But to correct the situation as a whole—and particularly to provide the badly needed amendments of the Wagner Act—will take considerable time."

Republican plans for the eightieth Congress' first session still give fiscal affairs the No. 1 spot. In one important respect the immediate post-election program is undergoing a shift. One of the first post-election Republican promises was that individual income taxes were to be cut 20 per cent. Some Republican leaders now feel that the emphasis should be on cutting down government expenses drastically and providing for a sharp reduction in the national debt.

"After that," a Republican spokesman told STEEL, "tax reduction, if any, can be discussed. The only way to retire the debt is to collect money through taxation, and the best time to collect taxes is when business is good—as it promises to be over the next two or three years."

The second item in importance on the Republican agenda, as it now stands, is a thorough investigation of the controls of various kinds which the federal government now exercises over private business. Aside from such immediate matters as rent control, there are some 300 federal controls over business. Present plans are to hand this assignment to the Senate Judiciary Committee and the Senate Banking & Currency Committee. The third item on the program for the first session is the matter of providing for the Presidential succession on future occasions when a vice president has succeeded to the Presidency.

Unless spot labor disputes demand hasty action, the new Senate Committee on Labor & Welfare, of which Senator Taft is slated to be chairman, will institute a series of hearings to get answers from all representative shades of opinion to these questions: What is a fair wage? What are fair working conditions? That series, to begin about Feb. 1, is expected to develop much of the fundamental information on which subsequent labor bills will be based.

The present Republican plan calls for deferment until the second session of legislation in regard to public health, public housing and social security.

Present, Past and Pending

■ AUTO BUILDERS CONTINUE PLANS FOR 1947 MODELS

DETROIT—Cancellation by General Motors Corp. of die orders for 1948 Chevrolet, Pontiac and Oldsmobile cars does not affect plans for introducing 1947 models in January embodying changes identifying them from 1946 models, the company said.

■ JOHN D. SMALL RESIGNS AS CPA ADMINISTRATOR

WASHINGTON—John D. Small resigned last week from the post of administrator of the Civilian Production Administration to return to private business. Appointment of a successor was expected momentarily.

■ BARIUM STEEL ACQUIRES BAYONNE BOLT CORP.

NEW YORK—Barium Steel Corp., New York, has purchased all of the capital stock of Bayonne Bolt Corp., Bayonne, N. J. Arthur D. Morris will continue as president and director of the Bayonne company, and William H. Miller, vice president, Erie Bolt & Nut Co., Erie, Pa., another Barium subsidiary, will be vice president and general manager of both subsidiaries.

■ COKE OVEN DEPARTMENT EMPLOYEES GET PAY BOOST

BIRMINGHAM—Twelve hundred employees of the by-product coke oven departments of Alabama By-Products Corp., Woodward Iron Co., and Sloss-Sheffield Steel & Iron Co. have accepted a wage increase of 5 cents an hour after threatening a strike to support their demands for a 20-cent increase.

■ VIRGINIA BRIDGE CO. TO BUILD $3 MILLION PLANT

BIRMINGHAM—Virginia Bridge Co., subsidiary of U. S. Steel Corp., has received Civilian Production Administration approval for construction of a $3 million plant adjacent to its present plant here.

■ INTERAGENCY FEUD CLIMAXED BY WYATT'S RESIGNATION

WASHINGTON—Resignation last week of Wilson W. Wyatt as national housing expediter after President Truman refused to go along with his broad emergency program to push homes for veterans climaxed Mr. Wyatt's feud with other government agencies.

■ GM PRODUCTION HITS NEW POSTWAR MONTHLY PEAK

DETROIT—General Motors Corp.'s passenger car production reached a new postwar monthly peak in November of 127,167 cars, compared with 126,450 in October.

■ STEEL PAYROLLS SET PEACETIME MONTHLY RECORD

NEW YORK—Steel industry payrolls of $150,637,500 in October set a new peacetime monthly record, which was topped in only two wartime months.

■ REPORT ON LONG-TIME AVERAGE STEEL OUTPUT ISSUED

NEW YORK—Despite record tonnages of steel produced during the war when output exceeded 7 million tons monthly, the steel industry's monthly output of ingots and steel for castings during 17 years, 1929 to 1945, inclusive, averaged only 4,584,696 tons, equivalent to operations at only 59 per cent of present monthly capacity.

■ STEEL PLANTS' COST OF UPKEEP RISES TO NEW HIGH

NEW YORK—Cost of keeping steel plants and their equipment in running order rose in 1945 to a record high of slightly more than $542 million, a $3 million rise over 1944.

Focus Attention on Labor Relations

Speakers at Congress of American Industry stress need for development of practical program. Leading industrialists, economists, jurists and statesmen participate in discussions

NEW YORK

MOUNTING chaos in industry as a result of the soft coal issue lent impelling emphasis to the appeal of Clarence B. Randall in New York City last week for the establishment of a federal labor policy in which "the public interest must transcend that of any special group."

Speaking as chairman of the industrial relations program committee of the National Association of Manufacturers, Mr. Randall, vice president, Inland Steel Co., Chicago, declared: "We shall not propose to the American people a specific program of legislation. We do not seek a labor policy that shall serve the special interest of manufacturers. We ask only that there shall be a labor policy so conceived and so executed that the well being of all the people will be best served."

He spoke at a session of the fifty-first annual Congress of American Industry, Dec. 4-6, at the Waldorf-Astoria, sponsored by the NAM. More than 4000 manufacturers, representing every major industry and all geographical areas, attended the three-day session.

"Now—Let's Build America" was the theme of the meeting, which was addressed by prominent statesmen, industrialists, jurists, economists and others.

In view of the incessant interruptions to production, especially pronounced at this time, much attention was focused on the development of a practical labor relations program, with a committee of manufacturers and industrial relations specialists presenting conclusions of an intensive study of the subject.

A feature of labor relations discussions was a session held Thursday evening, with Dr. Leo Wolman, professor of economics, Columbia University, New York, Ralph Monk, industrial relations director, Caterpillar Tractor Co., Peoria, Ill., and Raymond Smethurst, NAM counsel, among the participants.

Concluding the industrial congress, Friday evening, was the annual banquet at which Field Marshal Smuts, prime minister, Union of South Africa, spoke n "Ideology and World Peace," and Dr. Edmund Day, president, Cornell University, Ithaca, N. Y., on "Training in Democratic Ideals."

Discussing the outlook for steel, Charles R. Hook, president, American Rolling Mill Co., Middletown, O., declared that "the need for steel indicates the steel industry's capacity would be fully occupied through 1947 at least." He pointed to a great need for steel all over the world for reconstruction and for filling the vacuum created during the war.

With the American steel industry having a capacity of approximately 92,000,000 tons of ingots a year, which equals the capacity of all other nations in the world combined, the speaker declared "one would have to be unusually optimistic to believe this large tonnage will not take care of our needs when the shortages as a result of the war have been overcome." However, there is a pressing current need and the industry, he asserted, is spending millions of dollars for additional processing capacity in order to get greater efficiency and lower costs. In the year now ending the steel companies will have spent more than $325 million, it is estimated, for modernization and expansion and will spend many millions more in 1947.

Sheet steel is in heaviest demand in relation to supply. During the war ingot capacity was increased, but wartime needs did not permit an increase in sheet and strip facilities. This situation is now being remedied as rapidly as possible, he declared, and when the new sheet equipment is installed this capacity will have been increased over 20 per cent to approximately 20 million tons a year of flat rolled steel.

While need for steel is evident, he continued, pent-up demand must be accomplished by ability and desire of consumers to purchase, and he thought that in that respect, too, prospects were encouraging. National income this year will probably be close to $165 billion—more than double the last peacetime year. Even reconciling the price rises it is still more than 50 per cent higher. It is estimated, he said, next year's national income may reach approximately $175 billion.

Commenting further, Mr. Hook said there are two closely interwoven factors that might seriously affect steel production and that if steel production is hampered almost all industry will be affected also.

First, there is a possibility that steel production will be curtailed by strikes which may be called because of inability to reach an agreement on wages. Second, if wages are increased without a corresponding increase in production per man hour, cost will increase and necessarily selling prices will advance. This

ROBERT M. GAYLORD

CLARENCE B. RANDALL

CHARLES R. HOOK

would reduce purchasing power and volume.

"Unreasonable demands," he said, "will play havoc in spite of most urgent need for steel."

Mr. Randall, in discussing the establishment of a federal labor policy, declared that the country now has no federal labor policy. "At no time has there been a co-ordinated effort by congressional action to establish one policy to govern labor relations," he added. "Such statutes as we have are passed from time to time to meet special emergencies. Most of them are passed in response to great partisan pressures."

The laws—and the executive decrees which supplement them—clearly do not constitute a sound labor policy, Mr. Randall asserted. He pointed out that in the 11-year period preceding 1935 there were 12,000 industrial disputes, involving 6 million workers, while in the 11 years since 1935 there have been 38,000 strikes, involving more than 19 million workers.

The public is entitled to freedom from any harmful force from monopoly whether by business or by powerful union leaders, he declared. American employers must be prepared to exercise in their own field the same high degree of leadership which they ask of Congress.

Such leadership would involve (1) payment of wages as high as productivity will justify, with incentives to encourage superior performance and output, (2) maintenance of working conditions that safeguard the health, dignity and self respect of workers, (3) stabilization of employment to the greatest degree possible through an intelligent direction of all factors lying within management's control, and (4) promotion of a spirit of co-operation through friendly explanation to employees of the policies, problems and prospects of the company.

Buck Trend to Collectivism

Walter B. Weisenburger, executive vice president, NAM, declared that this country "is bucking a world trend of collectivism. Here we are turning to free enterprise while the rest of the world continues to go left. The tide of national thinking plainly throws the gauntlet to private hands to do the job better the voluntary way."

Commenting on the machine tool situation, Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., said current dollar volume of shipments—between $325 and $350 million—indicates roughly that present production is approximately 40 per cent greater than before the war and somewhat less than a quarter of peak war production.

By and large, he said the industry is in good position, having a reasonable backlog of unfilled orders and an opportunity for building up a large potential market.

Discussing the potentialities, Mr. Gaylord pointed out that the immense purchases of mechanical equipment during the war did not modernize peacetime production facilities. They only opened up vistas into the future. Fifty-four per cent of all machine tool equipment in private hands is over ten years of age—new tools can do the work done by the great majority of this 54 per cent at an estimated minimum saving at 15 per cent on investment costs. However, competition is active and a sellers' market no longer exists.

He commented on the underlying fundamentals of the "boom and bust" faults of the competitive economy, stating that if industry's annual depreciation reserves were spent yearly, the country's economy would "tend to have less boom and bust, and more opportunity for a high level of employment."

Pointing out the economic fallacies in the so-called guaranteed annual wage, Ira Mosher, NAM board chairman and head of Ira Mosher Associates Inc., New York, said that the association was tackling the problem from the "practical and realistic planning of stabilized employment so that steady pay and the workers' goal for security will be the natural consequences."

William Averell Harriman, secretary of commerce, Washington, stated that the power of labor leaders has grown to a point where it seems evident that in the coming session of Congress measures will be proposed with the object of clarifying the relationship between the rights of labor unions and their responsibilities to the public.

Robert R. Wason, president of NAM, condemned "the combinations of labor unions and politicians" and asked that President Truman tell the miners and the American people that the coal strike be settled "without concessions of any kind."

The eightieth Congress will make substantial changes in national labor relations policy, Senator Joseph H. Ball (Rep., Minn.) predicted in an address at a luncheon session. He laid down three basic principles which should govern Congress as it seeks to revise national policy. They are: 1—All disputes between employers and employees should be settled through free collective bargaining; 2—the federal government should intervene in labor-management relations only when the rights of individuals as defined in law are involved

(*Please turn to Page* 180)

Utilization of New Alloy Steels in Power Plant Equipment Demonstrated at Exhibit

UTILIZATION of new alloy steel and metals in the redesign of power plant equipment for higher efficiency and output, operating at temperature and stress peaks heretofore impossible, was demonstrated concretely in exhibits at the Seventeenth National Exposition of Power and Mechanical Engineering, New York, Dec. 2-6.

Employment of higher operating temperatures not only in power units, including steam and gas turbines, but also in re-designed conventional plants has stepped up performance to greater output per unit of fuel consumed and this is made possible, with further improvement indicated, by development of alloys growing out of war requirements and research.

Completely packaged steam generators were shown, ranging in capacity from 15 hp upward, and suitable for working pressures of from 15 lb to 125 lb steam pressure. Boiler and oil or gas burner are engineered together as one efficient combustion unit, with automatic regulating and control devices.

Exhibits also included models and demonstration samples of new types of electric lift trucks, electronic devices for combustion and smoke control, and supply and equipment products ranging from materials and metals to oil burners, coal stokers, boilers, engines, turbines and power plant auxiliaries.

Most large power equipment was shown by scale models. One showed an installation of a community central boiler plant at Reno, Nev., that heats homes for $31 per year and returns an earning of 13 per cent on the investment. Another represented a central light and power station complete with steam generator and 500 kilowatt turbo-generator. Special interest was noted in another scale model of the first 500 kilowatt gas turbine designed, and to be constructed, for central station operation.

Delivery dates quoted on the packaged steam generators range from a minimum of six to ten months. They have automatic safety features for protection against low water, excess pressure or other dangers, and are compact in design dimensions so they can be readily installed in apartment buildings, laundries, chemical plants, bakeries and other industrial applications.

Engineers' Responsibility to Public Is Keynote of ASME Meeting

Importance of engineering in national and international affairs emphasized by speakers. Several convention sessions devoted to machine shop practice. Eugene W. O'Brien, southern business paper publisher, elected new president of society

EUGENE W. O'BRIEN

DESPITE the growing uncertainties of travel, registration at the sixty-seventh annual meeting, American Society of Mechanical Engineers at Hotel Pennsylvania, New York, Dec. 2 through 6, amounted to well over 6000, including many from foreign countries.

Importance of engineering thinking in national as well as international affairs was emphasized by the announcement by Clarence E. Davies, secretary, ASME, of participation of American engineers in a permanent world engineering conference with headquarters in Paris. This world technical body will have an active working contact with the United Nations organization. Chairman of the American group is Malcolm Pirnie, and secretary is Stewart E. Reimel.

Importance of engineering in national affairs should be reflected by more active participation of engineers in our government — city, state and national. This was the theme of a talk by Carl Hinshaw, member of the House of Representatives from the twentieth California district, and himself an engineer.

Congressman Hinshaw pointed out that a sign of the times is the election to the United States Senate of two public spirited engineers. One of these is Ralph Edward Flanders of Vermont, machine tool builder, and economist. The other is George Wilson Malone of Nevada, civil and metallurgical engineer.

Integrity of Engineers Stressed

Commenting on the character of these men and of engineers in general, Congressman Hinshaw said: "In the unique synthesis of qualities so desirable in positions of public leadership, the engineer has a strong quality inherent in him, namely, integrity. The engineer basically is a man of high integrity because his every professional act must be subject to proof—to verification of basic facts and final proof in the test of service. From the day he first studies geometry his motto is 'quod erat demonstrandum,' and that is his taskmaster to the end of his days."

The tremendous scope of the mechanical engineering profession as organized in this postwar world is reflected by the 104-page program of this five-day ASME meeting. The number of authors listed is 279. There were 89 sessions. They were concerned with a variety of subjects ranging all the way from simple machining techniques to the mysteries of jet propulsion, gas turbines and the molecular structure of metals.

As usual for the past several years considerable attention was given to metalworking, both cutting and plastic forming of metals. There was a strong tendency on the part of several speakers literally to "get below the surface" of metals to discover the influence of molecular structure on the machinability and forming properties.

No fewer than six full sessions were devoted to machine shop practice. They featured speakers of the caliber of O. W. Boston and W. W. Gilbert of the University of Michigan, M. E. Merchant and Norman Zlatin of the Cincinnati Milling Machine Co., A. O. Schmidt and A. G. Barkow of the Kearney & Trecker Corp., Walter Mikelson of General Electric Co., W. H. Funk of Lukens Steel Co., E. J. Abbott of Physicists Research Co., D. E. Williamson of Lincoln Park Industries and William Oldacre of the D. A. Stuart Oil Co.

Machinability Problems Discussed

It is evident that two things in particular are in the minds of machining authorities. One is to get a satisfactory definition of machinability. The other is to establish definite standards of machined surface quality. The tremendous number of variables affecting machinability make both its definition and determination major problems—but progress is being made. As far as surface quality is concerned, a number of tentative standards are being considered. There may be something definite coming out of all this in the not far distant future. It will be a major factor in quality control of all high grade metal products.

New officers of ASME for 1946-1947 are as follows: President, Eugene W. O'Brien, vice president of W. R. C. Smith Publishing Co., Atlanta, Ga., publisher of *Southern Power & Industry;* regional vice presidents, Alton C. Chick, assistant vice president of Manufacturers Mutual Fire Insurance Co., Providence, R. I.; A. R. Mumford, development engineer with Combustion Engineering Co., New York; Nevin E. Funk, vice president of Philadelphia Electric Co., Philadelphia; E. E. Williams, general superintendent of steam plants, Duke Power Co., Charlotte, N. C.; T. S. McEwan, vice president, McClure, Hadden & Ortman Inc., Chicago; Prof. Linn Helander, head of the department of mechanical engineering, Kansas State College, Manhattan, Kansas.

Directors-at-large: Frederick S. Blackall Jr., president and treasurer of Taft-Peirce Mfg. Co., Woonsocket, R. I.; L. F. Moody, professor of hydraulic engineering, Princeton University, Princeton, N. J.; W. A. Carter, technical engineer of power plants, Detroit Edison Co., Detroit.

At the annual dinner on Wednesday, Dec. 4, honorary memberships were conferred upon Alexander G. Christie of Baltimore and Lewis G. Sillcox of Watertown, N. Y. Norman R. Gibson of Buffalo received the Holley Medal, Morris E. Leeds of Philadelphia the ASME Medal, and Air Commodore Frank Whittle, Royal Air Force, Great Britain, was awarded the Daniel Guggenheim Medal "for pioneering the development of turbojet propulsion of aircraft."

Removal of All Controls From Housing Advocated

The best way to speed up housing construction and reduce costs is to remove all remaining controls immediately, according to the Construction Industry Advisory Council in its report to the American Legion's national committee on veterans' housing, which held a two-day conference in Washington recently. Controls which should be removed, the council believed, include not only priorities, but also subsidies, market guarantees and rents.

Auto Industry Continues To Lead As Consumer of Finished Steel

Construction industry and container making remain in second and third places, respectively, in receipts of steel. Warehouses get same percentage of total shipments in July as in June, report by American Iron & Steel Institute shows

THE AUTOMOTIVE industry continued in first place in July in receipts of finished steel, according to figures compiled by the American Iron & Steel Institute, New York. In that month that industry, not including tractor producers, received 515,997 net tons, or 11.8 per cent of the total July shipments of 4,357,985 tons of all grades of steel.

Remaining in second place in July was construction which received 423,602 tons, and continuing in third place was the container industry which received 355,724 tons. In fourth place was rail transportation, which received 340,075 tons in July.

Warehouses received in July the same percentage of total steel shipments as in June. July shipments to warehouses aggregated 744,614 tons, or 17 per cent of the total shipments that month. During the first seven months of 1946, warehouses received 4,655,996 tons, or 18.8 per cent of the total shipments.

For the first seven months of the year, consuming industries rank in order of tonnage taken: 1—Automotive; 2—construction and maintenance; 3—containers; 4—rail transportation; 5—machinery, industrial equipment, and tools; 6—contractors' products; 7—domestic and commercial equipment other than appliances, utensils and cutlery; 8—appliances, utensils and cutlery; 9—electrical machinery and equipment; 10—agricultural equipment; 11—shipbuilding; 12—oil and gas drilling; 13—mining, quarrying and lumbering; 14 — ordnance and other military; and 15—aircraft.

These 15 classifications do not include shipments to warehouses, to converters and processors, and exports.

The steel industry has been shipping its output as equitably as possible, the American Iron & Steel Institute points out. During the first half of 1946, the industry's shipments of steel, largely on a voluntary basis, compared favorably with the 1941 distribution pattern when record prewar production of numerous durable goods was achieved.

Practically all of the major groups using steel received a larger ratio of total shipments in the first half of 1946 than they did in 1941. Among those receiving a larger share of steel, the institute said, were the automotive industry, container manufacturers, jobbers, dealers and distributors, steel converters and processors, makers of machinery, industrial equipment and tools, manufacturers of electrical machinery and equipment, builders of railroad equipment, the branches of the pressing, forming and stamping industry making consumer durable products, and agricultural users.

The favorable treatment of these groups was made possible by reduced requirements this year for military needs in contrast to 1941, when ordnance and military purposes, war construction, shipbuilding and the aircraft industry took larger shares of steel shipments.

Steel Distribution, Seven Months, 1946

(Leading products of all grades, including alloy and stainless)

Market Classification	Net Total (All Products) in net tons
Converting and Processing	2,011,174
Jobbers, Dealers, Distributors	4,655,996
Construction, Maintenance	2,303,965
Contractors' Products	751,725
Automotive, excl. Tractors	2,646,145
Rail Transportation	1,807,300
Shipbuilding	138,119
Aircraft	12,307
Oil, Gas Drilling	111,881
Mining, Quarrying, Lumbering	92,179
Agricultural	517,209
Machinery, Industrial Equip., Tools	1,112,729
Elect. Mach., Equip.	564,035
Appliances, Utensils, Cutlery	642,309
Other Domestic, Commercial Equipment	692,796
Containers	2,257,502
Ordnance, Other Military	23,702
Unclassified	2,884,061
Export	1,418,709
Total	24,643,838

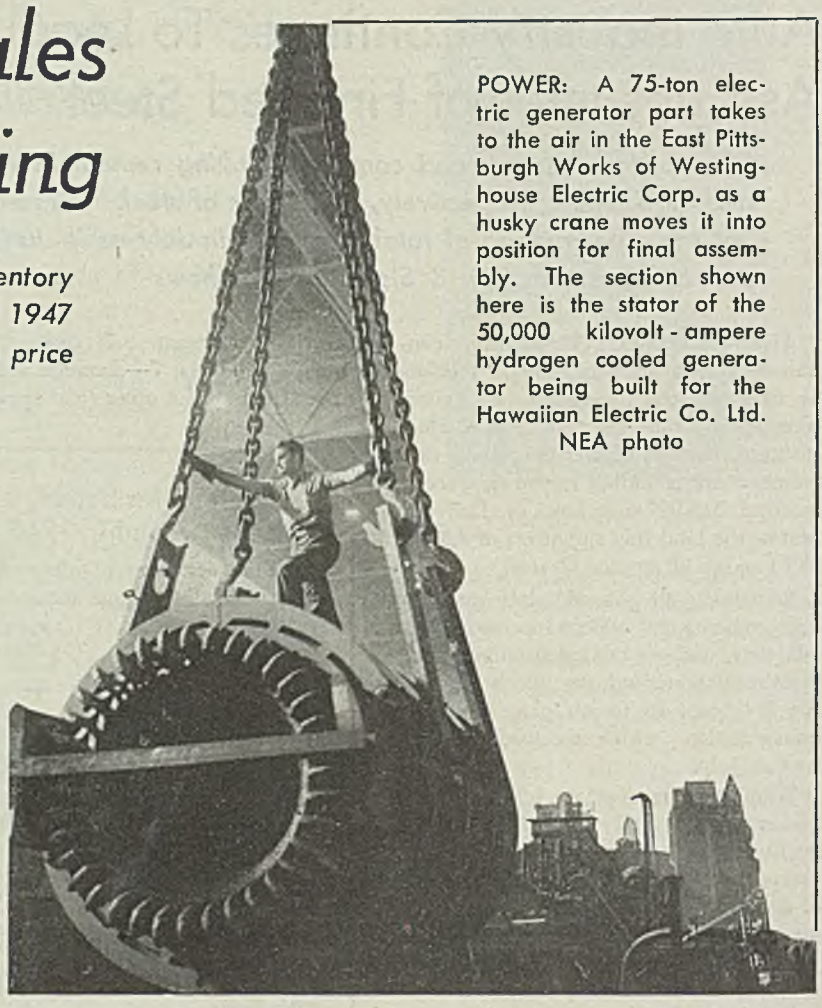
Distribution of Steel Products—July, 1946

(In net tons of leading products of all grades of steel, including alloy and stainless)

Market Classification	Shapes	Plates	Hot-Rolled Bars	Cold-Finished Bars	Seamless Tubing	Drawn Wire	Hot-Rolled Sheets	Cold-Rolled Sheets	Coated Sheets	Hot-Rolled Strip	Cold-Rolled Strip	Net Total (All Products)
Converting and Processing	2,409	25,349	165,637	10,864	8,979	55,538	56,549	1,707	491	24,393	6,270	364,298
Jobbers, Dealers, Distributors	67,180	65,071	89,370	38,041	74,696	11,571	69,150	35,115	43,158	7,700	2,565	744,614
Construction, Maintenance	143,638	87,717	24,971	372	16,556	1,448	20,792	4,703	15,622	6,832	1,082	423,602
Contractors' Products	1,202	8,208	13,688	544	5,065	2,005	45,594	19,944	21,591	4,519	3,965	136,801
Automotive, excl. Tractors	3,089	22,142	110,021	20,014	669	15,303	107,938	155,324	6,784	36,579	18,551	515,997
Rail Transportation	30,329	55,905	31,224	225	961	229	14,251	1,229	3,715	3,397	674	340,075
Shipbuilding	5,023	17,908	1,571	112	310	107	1,143	140	747	174	.....	27,510
Aircraft	.....	340	57	266	238	16	235	38	55	132	64	1,981
Oil, Gas Drilling	1,927	4,059	4,347	872	[illegible]	5	511	32	18	19	10	20,164
Mining, Quarrying, Lumbering	829	3,850	4,565	118	1,117	146	819	361	79	143	.....	18,847
Agricultural	2,985	5,583	34,937	6,356	210	1,773	9,169	2,698	10,797	6,731	1,972	87,773
Machinery, Indus. Equip., Tools	14,379	53,532	49,460	22,225	10,977	6,140	19,759	2,963	984	6,311	3,986	211,508
Elect. Mach., Equip.	1,504	9,840	8,000	3,402	116	2,681	18,677	6,697	1,645	3,945	3,277	93,647
Appliances, Utensils, Cutlery	62	420	1,132	3,421	407	2,025	14,552	32,504	7,368	3,236	5,996	88,411
Other Domestic, Commercial Equipment	1,500	8,229	6,895	4,464	25	17,007	20,075	26,310	4,472	5,906	9,261	113,806
Containers	252	14,373	3,386	.....	5	5,129	52,389	19,253	2,770	11,553	5,689	355,724
Ordnance, Other Military	14	47	241	40	58	52	165	121	5	.....	12	1,708
Unclassified	21,864	12,994	86,143	17,938	37,594	37,248	45,006	45,543	5,271	6,155	27,609	531,940
Export	14,914	32,826	21,569	1,489	15,872	2,098	15,136	7,995	5,607	3,930	1,144	279,579
Total	313,100	428,393	657,214	130,763	177,730	160,521	511,910	360,677	131,179	131,655	92,127	4,357,985

Surplus Tool Sales Reported Gaining

WAA expects bulk of remaining inventory will be disposed of by early summer of 1947 if present sales pace continues. Fixed price policy held as stimulating sales



POWER: A 75-ton electric generator part takes to the air in the East Pittsburgh Works of Westinghouse Electric Corp. as a husky crane moves it into position for final assembly. The section shown here is the stator of the 50,000 kilovolt - ampere hydrogen cooled generator being built for the Hawaiian Electric Co. Ltd. NEA photo

IF THE War Assets Administration continues to sell at the present rate, it will have disposed of the "bulk" of the remaining inventory of surplus, government-owned machine tools by early summer of 1947, report WAA spokesmen.

Recently the WAA adopted a new price policy. Under this the Clayton formula applies only to machine tools in short supply, all other machines being sold either at fixed prices or by competitive bidding. The fixed price policy applies to standard, general-purpose machine tools in long supply, and also on "hard-to-sell" tools. The competitive bidding method applies to "over-age" tools manufactured prior to 1921, also to many special and single-purpose tools.

The fixed price policy on standard general-purpose tools is producing the best results, according to WAA. While this policy became operative only in the closing days of October, all previous sales records are being broken. One Chicago approved dealer ascribes a 400-500 per cent spurt in sales to the fixed price policy, and one of the WAA regional offices gives this policy credit for a 300 per cent increase in sales in November.

Army-Navy Plans Big Order

Another reason for the increased disposal of surplus inventory is an arrangement under which the Army and Navy Munitions Board will buy 65,000 to 70,000 machine tools from WAA. These tools, to be placed in the war reserve for later allocation in accordance with the needs of the armed services, are in addition to the tools which the services already have placed, or have decided to place, in standby. Included in the latter classification are some 12,500 set aside by the Army Air Forces, some 12,000 by Army Ordnance and a number, large but still indefinite, by the Navy.

In general, fixed prices average about 25 per cent lower than Clayton formula prices. Under the Clayton formula the average machine tool brings about 48 per cent of the price originally paid by the government. Under the fixed price policy the average recovery is between 27 and 28 per cent. Incidentally, the fixed price policy applies to machine tools representing an original outlay of about $350 million which is some 60 per cent of the WAA's remaining machine tool inventory.

The method of selling by competitive bidding is to be used in disposing of equipment which originally cost the government some $75 million. There was some debate as to whether the special, over-age, and single-purpose tools which it covers should be disposed of as scrap. Prices being realized through competitive sales are considerably higher than the level that would rule for scrap. Buyers are not asked to sign a scrap warranty. They can do anything they want with the machines after purchasing them. So far only two sales have been held on the basis of competitive bidding—and each resulted in disposition of all equipment included. Now 18 more such sales have been scheduled and still more are being readied.

WAA officials are not entirely pleased with the present "approved dealer" set-up. While there now are 3027 approved dealers, only about 25 per cent of them are really working on the sale of surplus government-owned machine tools. This 25 per cent accounts for 60 per cent of all surplus tool sales, so that ways and means of arousing the other 75 per cent of the dealers are being studied.

The WAA is encouraging approved dealers to sell surplus tools in the Latin American countries and is backing them up by running advertising in Spanish and Portuguese language papers distributed in those countries. It still is too early to judge results. WAA expects to sell large quantities of surplus tools to foreign countries through government purchasing missions in the United States. It is figuring on lists which, on the basis of current prices on new machine tools as quoted by the manufacturers, involve values of $20 million for France, $1 million for Poland and $500,000, to be increased subsequently, for the Netherlands government.

There are numerous angles in the current pricing policy. For example, when a fixed price once has been set on a tool, that is the final price, and no lower offers will be considered now or at any later date, according to WAA. Another is that useless tooling and accessories on a tool sold at a fixed price are billed

for their scrap value. All WAA regional offices, and all approved dealers, are informed about such details.

WAA officials are driving on machine tools in particular because of the high cost of storing and handling. The machine tool costs of late have been equivalent to about 20 per cent of the entire WAA budget. With an economy-minded Congress soon to convene, the WAA is anxious to cut down on this item as effectively and as speedily as possible.

Large Number of Surplus Tools Offered at Chicago

Chicago—War Assets Administration on Dec. 4 began sale of approximately 2800 surplus machine tools, valued at $25 million, from the Dodge Chicago plant, which Chrysler Corp. operated during the war.

Machines offered include rotary surface grinders, small radial drills, single and multiple-spindle drill presses, polishing lathes, vertical turret lathes, cutter grinders, gear chuckers and gear generators.

According to Stanley B. Adams, WAA regional director, "no interest or market for these machines by priority groups has been determined. The machines are in sufficient quantity to satisfy any claims by priority groups. The sale will be open to all interested buyers."

Pointing out that the machines offered represent only a part of the total to be sold from the giant plant, Mr. Adams states that short supply tools at the location will be offered later to priority holders, including World War II veterans. All machines on sale have been screened for possible use by the Tucker Corp., which had leased the plant.

Cross Co. Buys Detroit Plant; Foundry Offered

A government-owned machinery and machine tool manufacturing facility adjoining a plant owned by the Cross Co., Bellevue Ave., Detroit, has been sold to the Cross Co. for $175,000.

A $1 million steel foundry in Crum Lynne, Pa., which has a rated capacity of 6000 tons a year is offered for sale by WAA. The plant, operated during the war by the Atlantic Steel Casting Co., has been under lease since December, 1945, to the Chester Electric Steel Co., which is voluntarily discontinuing operations due to unforeseen financial readjustments. The plant also is suitable to conversion for production of gray iron castings. Specific data and engineering reports are available at the Philadelphia regional office of WAA.

Suit Discloses Legal Struggle For Large Western Ore Deposit

LOS ANGELES

BEHIND-the-scenes struggle for control of the largest iron-ore deposit west of the Mesabi Range in Minnesota, and upon which may hinge development of a permanent multimillion-dollar western steel industry supplementing steelmaking already centered here, broke into the open last week with filing of a suit in Superior Court in Los Angeles.

The ore deposit, known as Iron Chief, is on 2700 acres in the Eagle Mountains 60 miles east of Indio, near Desert Center. It is estimated to contain more than 100 million tons of iron ore, enough for 50 to 75 years' production.

Through use of petroleum coke from southern California oil, coupled with electric smelting furnace operations, the field could become a source for pig iron and steel ingots, it was said.

Back of last week's action, a cross complaint, is Harstan H. Bradt, mining engineer, and the Riverside Iron & Steel Co. Bradt's suit, directed against Edward T. Foley, is aimed at halting a proposal whereby Foley, Bradt's partner, sold the leasehold on the Iron Chief to Kaiser steel interests for $1,132,811.

Bradt bases his action upon a recent estimate which places the real value of the deposit at more than $9 million, a value brought about by the rapid industrial growth of the West and consequent demand for steel, linked with expanding technological processes which have lifted oil cokes to the front as substitutes for coal cokes in electric smelting furnaces.

The counter move by Bradt is an answer to a suit Foley brought last October in which he sought to validate his purported sale to the Kaiser Co. Foley said the price sought was fair.

Not until the war gave impetus to steelmaking in the West, with the subsequent financing of the Kaiser mill at Fontana and expansion of existing eastern company plants in the area, did the Iron Chief come into its own as a pivotal center of the mounting industrial activity sweeping the West.

Interim Report Favors Guaranteed Annual Wage Tied to Unemployment Compensation

GUARANTEED annual wages for workers can help stabilize the economy and point the way to enduring prosperity, it is maintained in an interim report submitted to the Office of War Mobilization & Reconversion Advisory Board by Murray Latimer, director of its guaranteed wage study staff.

Despite an original decision not to publicize the report, it has been released with the understanding it is entirely of a preliminary character.

Mr. Latimer reported that even in most seasonal industries, wage guarantees can be granted without increasing costs to employers by more than 6 per cent, if co-ordinated with the existing system of state unemployment compensation, he found. Hence, a broadening of the present unemployment compensation benefits, with extension of special tax exemptions, would encourage more widespread acceptance of guaranteed wage plans.

"The study has recognized that the guaranteed wage system is not a panacea for insecurity of our economic system, that it cannot in and of itself eliminate the fluctuations in the economic system," the report states. "On the other hand, it is quite clear that widespread wage guarantees can make a substantial contribution to the stabilization of the economy through the stabilization of wage-earner income and hence of consumer expenditures."

Reserves in the state unemployment compensation funds are large enough, Mr. Latimer found, to warrant increasing the benefits to jobless workers. He suggests $25 to $30 a week for 26 to 30 weeks. At present employees out of work who are covered under guaranteed wage systems are ineligible for unemployment compensation payments. Mr. Latimer thinks the federal government should urge the states to remove this prohibition. In fact, he feels that employers paying out guaranteed wages should be allowed to calculate the unemployment compensation benefits as part of their wage guarantees.

Mr. Latimer proposes that Congress amend the tax laws to allow firms to accumulate tax-free trust funds against future costs of guaranteed wage plans. He reported that at least 196 guaranteed wage plans were in operation in early 1946. The majority of them pledge payment of full pay for a year.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Bureau of Labor Statistics pressed for productivity indices. Labor unions want data they can use in collective bargaining. Desire figures for use in determining how fruits of increased productivity should be apportioned

OFFICIALS of the Bureau of Labor Statistics used to lead a quiet and pleasant existence but that all changed when the labor unions began to make demands on them during the war. The labor leaders wanted statistics they could use in bargaining for wages, and they were especially indignant because the BLS cost-of-living index did not help them to shatter the Little Steel wage formula. This dissatisfaction prevented the elevation of A. F. Hinrichs to the post of commissioner and eventually drove him out of the bureau.

Now, as a result of observing what went on during the recent "Conference on Productivity," it appears the heat is being directed at the new commissioner, Ewan Clague. Primarily, the meeting was one of economists who felt the time had come to set up a new concept of the term "productivity." The big thing around which our economy revolves, they pointed out, is production; the larger the production, the better the scale of living of our people. Production depends upon productivity. Therefore, they agreed, the thing to do is find out what makes productivity click and what tends to hold it back.

What the discussion simmered down to can be summarized as follows: Productivity must be broken down into its components of "output" and "input," and means must be devised to measure each component precisely. The components of "input" are of especial importance. They include such factors as hours and pay, use of machinery, worker efficiency, management efficiency and the utilization of various energies as labor, capital, power, and various "national resources."

"Let's decide what terms to use, what these terms mean, and what factors to measure," said one government speaker. "This is necessary to afford a basis for sound governmental decisions. "Through this approach," he went on, "it will be easier to work toward the objective of high production and full employment. Such a study would help in various ways; it should develop working tools for preventing technological unemployment caused by the introduction of new processes and improved machinery which increases the productivity of the individual worker."

It was at this point that the labor spokesmen put in their oar. What they want, they declared, is productivity indices that they can use in collective bargaining. They did not think it sufficient just to aim at productivity data that will help to raise the plane of living by producing more goods at less cost. What they want is statistical information which will be useful in determining how the fruits of increased productivity should be apportioned to capital, labor, management and the consumer.

Yes, the labor people said, they want statistics that will measure worker efficiency. But they also want statistics that will measure the efficiency of management and of capital. They minced no words in making it clear that they want statistics from which labor can benefit in terms of increased income, increased purchasing power, and better living. They want BLS statistics which they can use in winning concessions from employers.

Need for Information Recognized

The conference was conducted in gentlemanly fashion but the labor representatives, particularly those from the CIO, conveyed the impression that the Bureau of Labor Statistics will have to deliver this sort of statistical information—"or else." They did get assurance from government spokesmen that the need for information that will be useful in the collective bargaining process now is quite apparent, but they were told that before the new yardsticks can be set up there will have to be much study. The task of conducting and directing this study was assigned to a committee headed by Solomon Fabricant, of the National Bureau of Economic Research, an organization composed of representatives of government, business, labor and academic bodies.

Whether Dr. Fabricant's committee will recommend a program that will rescue the BLS from the current heavy pressure which conceivably might lead to the adoption of productivity indices that could turn into loaded dice at collective bargaining jousts of the future remains to be seen. Under the circumstances, therefore, the representatives of management on this committee bear an important responsibility. They are: Henry B. Arthur, Swift & Co.; D. H. Holmes,

NEW ADMINISTRATOR: Max L. McCullough, right, of Dallas, Tex., became acting administrator of the Office of Price Administration upon resignation last week of Administrator Paul Porter, left. Mr. McCullough has been with OPA since 1942. NEA photo

It is reported that . . . . . .

Westinghouse calls its new steel encased motor the most revolutionary change in construction in 58 years and states that it delivers up to 134% more power per pound than previous motors.

get ready with CONE for tomorrow

Federal Telephone and Radio Corporation will conduct experiments with television, FM and radar in a building at Nutley, N.J., which will be completely shielded from atmospheric electricity.

be ready with CONE for today

Called the world's largest, a spot welder that can make 48 welds at a single stroke is in use at Pullman-Standard Car Manufacturing Co.

get ready with CONE for tomorrow

A division of Reynolds Metals Company has a new line of all-aluminum bicycles and scooters.

be ready with CONE for today

Raytheon Mfg. Co. has an electronic kitchen range. The food is put in a disposable dish and quickly cooked by the energy from a magnetron tube.

get ready with CONE for tomorrow

Bell Telephone Laboratories report that they have developed a tube that will send a hundred million words per minute by telegraph.

be ready with CONE for today

The Army Air Force has contracted with Fairchild Engine and Airplane Co. for fundamental research in the use of atomic energy in aircraft.

get ready with CONE for tomorrow

Aluminum Co. of America has recently supplied a 100-foot all-aluminum span for a railroad bridge at Massena, New York.

The Souhegan Mills of Wilton, N. H., believes that its molded board, made of shavings, can compete in price and utility with plywood or lumber.

be ready with CONE for today

The U. S. Bureau of Mines finds that Freon II is more effective in fighting gasoline fires than any of the other gases tested.

get ready with CONE for tomorrow

Patent 2,404,206 has been granted for a method of mining practically pure copper by dissolving it chemically and accumulating it electrolytically.

be ready with CONE for today

Nylon drive ropes are said by Plymouth Cordage Company to reduce machine shut-downs.

The behavior of piston rings and oil films has been studied by the National Advisory Committee for Aeronautics by using a glass engine cylinder.

get ready with CONE for tomorrow

When their new 2-million volt machine is installed, Babcock and Wilcox Co. will have 12 X-ray machines in use for checking steam generating equipment.

be ready with CONE for today

Blaw-Knox has built two 23-cubic yard clamshell buckets for unloading coal on Lake Superior. They weigh nearly 14 tons apiece and are believed to be the largest of their kind.

get ready with CONE for tomorrow

Scientific American prophesies that the use of silicones will bring about a revolution in surface finishes comparable to that resulting from the development of nitrocellulose lacquers.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

Westinghouse Electric Corp.; Ernst Swanson, United States Chamber of Commerce; and Charles E. Young, who left Westinghouse Electric Corp. on Nov. 1 to become identified with the Econometric Institute.

Plan Antarctic Expedition

Location and preliminary exploration of mineral deposits in the 4 million square miles of territory known as Antarctica is one of the prime purposes of the expedition which the Navy will send south early in December. Rear Admiral Richard Byrd, who will have technical command of the party, believes there is a big "purse" of untold resources to be uncovered. On previous trips, he states, "we found enough coal within 150 miles of the South Pole to supply this country for 30 to 40 years."

Admiral Byrd denies the expedition is in a "uranium race," saying that the expedition was planned before the importance of uranium in the development of atomic energy was realized. When Vice Admiral Forrest Sherman, deputy chief of naval operations, was reminded at a press conference that the British are active in antarctic exploration at present, he said, "we expect to co-operate with British parties if encountered." He added that he knew of Russian plans to send an expedition but said he did not have much information about it.

"Any effects these operations might have on the balance of conflicting claims to territories will be incidental only," said Admiral Sherman, adding that "this nation doesn't recognize any claims down there, and hasn't made any itself."

In addition to discovering mineral deposits, the expedition will conduct studies in connection with the use of naval personnel and equipment in frigid zones. It also will seek to amplify existing knowledge about the antarctic regions. Personnel of the expedition will number about 4000 of whom 300 will be engaged primarily in polar research. The latter group will include about 25 civilian scientists and some 35 Navy research men.

Change of Attitude

Appointment by President Truman of a Temporary Committee on Employee Loyalty marks a distinct change in the administration attitude toward Communists in the employ of the government. During the Roosevelt term, Communists had the run of Washington, and the administration frequently went out of its way to discredit the work of Martin Dies' un-American committee in exposing the activities of Communists.

Mr. Truman's action is a belated response to a recommendation of the House Civil Service Committee for the appointment of an investigative body; the committee reported that the country's security was threatened by the presence of persons of "questioned loyalty" on the federal payroll.

WILSON WYATT

National Housing Expediter Wyatt is shown leaving the White House after a reported "show-down" conference with President Truman on issues in the veterans housing program. Sources close to the housing chief said he gave Mr. Truman a virtual ultimatum either to give him a free hand in solving the veterans housing problem or to accept his resignation. NEA photo

The Temporary Committee on Employee Loyalty is to determine standards for judging loyalty of federal employees, and study procedures for removing "any disloyal or subversive person" from the payroll. It is to report back to the President by next Feb. 1, and the President is to relay to the Congress any recommendations for the enactment of needed legislation.

Other signs that Communists no longer are in style are the proposal by Charles Michelson, unofficial "ghost" of the New Deal, that Communists be given the same treatment in the United States as Americans receive in Russia; and the CIO resolution by which that organization decided to "resent and reject" efforts of the Communists to interfere in its affairs.

The finishing touches in getting rid of the Communists are expected to be applied in the eightieth Congress by the House un-American Activities Committee whose prospective new chairman, Rep. J. Parnell Thomas (Rep., N. J.), promises to investigate Communism in the government, in labor unions and in Hollywood. Then, there will be various side-shows on the subject; the House Appropriations Committee, for example, proposes to find out how the State Department has been spending money abroad on its cultural relations program.

A related movement is that started by the Daughters of the American Revolution and the American Legion. These groups want an investigation of evasion of the immigration laws which has permitted a flood of aliens, many of an undesirable type, to flow into the United States in the past few years.

Atomic Energy Literature

The literature on atomic energy which received its first major postwar contribution in the form of the famous report on "Atomic Energy for Military Purposes" by H. D. Smyth is growing rapidly. Nearly 500 papers, containing about 2 million words, have been cleared for publication by the Manhattan District Declassification and Publications Office set up at Oak Ridge, Tenn., in April of 1946.

Many of these papers have been presented at meetings of technical societies. The June meeting of the American Physical Society was notable in this respect; it programmed 46 papers on atomic developments. Many of these and other papers are being placed on sale by the Office of Technical Services, Commerce Building, Washington 25, D. C. They are listed by title and price in the OTS Bibliography of Scientific and Industrial Reports.

The library of the Manhattan Project will include not only the papers published by the OTS, and those read before numerous technical and scientific societies, but many that have not yet been released because of their military significance. The material which the Manhattan Project has on hand and in process is sufficient to fill about 100 volumes of average size.

Companies and individuals interested in publicizing information relating to atomic developments—and that includes copy for advertising space—can get quick action in having it censored. Lt. Col. W. S. Hutchinson Jr., declassification officer at Oak Ridge, states that clearance of such material usually can be arranged in less than two weeks.

Veterans Well Represented

A tabulation made by *Army and Navy Bulletin* reveals that the veterans of World War II will exert a powerful influence in the eightieth Congress. Of the 35 new senators elected in November seven are veterans. They range from 38 to 44 years of age and all are Republicans. Of the new members of the House, 60 are veterans of World War II. As learned so far, the range in age is from 26 to 42.

British Automobile Exports Hit Highest Monthly Mark on Record

October car shipments figure prominently in boosting United Kingdom's total export in month 17 per cent above the 1938 monthly average. Nationalization of industry temporarily in background

BIRMINGHAM, ENGLAND

VOLUME of October exports from the United Kingdom was 117 per cent of the 1938 monthly average. Comparable figure for the third quarter of 1946 was 104 per cent.

In this upward trend of exports the automobile manufacturing industry has played a leading part. Automobile exports, for example, are the highest on record at 8141, while car chassis, at 2494 are the largest since the start of the war. Commercial vehicle exports at 2416 were a quarter lower than the high September figure, though still more than eight times the 1938 average.

Iron and steel goods exports were 172,000 tons, or one quarter below those in July, and the reduction was shared by all the principal descriptions, except tin plate and wrought tubes. Exports of metal goods in October valued at £41,-300,000 were 5 per cent higher than in July, machinery, now the largest group, rising by £2 million to nearly £13 million or about a seventh of the export total.

The question of nationalization appears to have faded into the background temporarily since there was no reference to it in the King's speech at the opening of parliament recently. Meanwhile, Prime Minister Attlee in a speech to the National Union of Manufacturers gave as the chief reason for the retention of controls the existence of shortages, sometimes as bad as anything during the war, or even worse.

The call for steel, he pointed out, was on an abnormally high scale and would remain so. Steel production this year has been maintained well above the 1934-38 average.

Before the war, the United Steel Companies Ltd. spent each year between £1 million and £3 million on development. With its widespread interests there was always a large amount of work to be done either by way of replacement of plant or installation of new machinery. During the war years only work of a special nature could be undertaken, so that the company now plans to put in hand as soon as possible special programs of improvement and expansion involving heavy expenditures. A start has been made on several, and they will all be completed by the end of 1948 at a cost of £7,500,000.

Steel producers are concentrating upon production of material for home use rather than for export as was the case earlier in the year. Every effort is being made to reduce backlogs, particularly in the delivery of steel for the automotive and housing industries.

British builders of locomotives and railroad wagons have made good progress since the end of the war. From January to August of this year a total of 11,400 wagons were built, of which 6400 were mineral wagons for use in Britain and 5000 were of various types for export. Locomotives are being built at the rate of 700 a year and this rate is expected to be maintained for a number of years. Current emphasis is on overseas business and amounts to as much as 85 per cent of total output.

The table below shows pig iron and steel production in the United Kingdom in October, 1946, with previous figures for comparison. Pig iron output during October was 623,200 tons, a rate of 8,-101,600 tons a year, compared with 584,-400 tons, an annual rate of 7,598,200 tons for the same month last year.

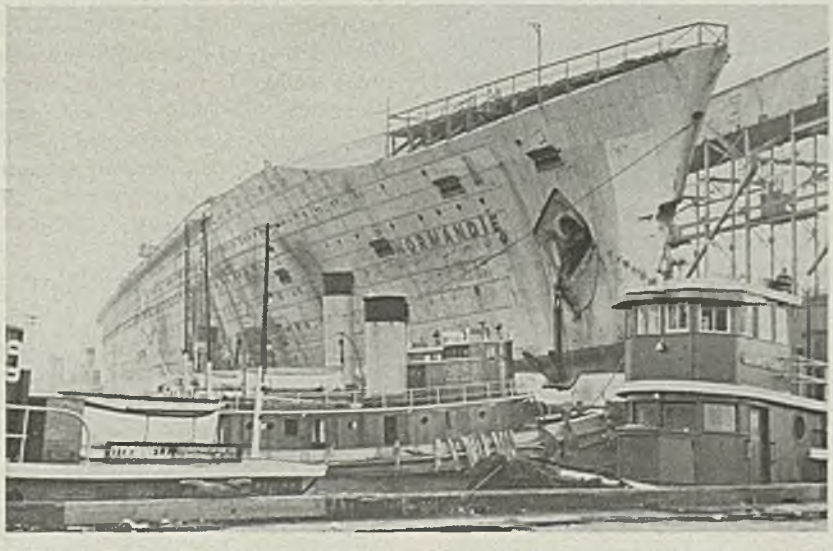
Steel production during October, in spite of fuel difficulties and limitation of transport, was 1,017,200 tons, a rate of 13,226,000 tons a year, compared with 972,800 tons, an annual rate of 12,648,000 tons for October, 1945.

PIG IRON
(Tons)

	1945		1946	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
1st Quarter	134,500	6,992,000	145,500	7,566,000
2nd Quarter	132,600	6,894,000	150,500	7,827,000
3rd Quarter	132,600	6,893,000	146,600	7,622,000
September	139,300	7,224,000	147,300	7,660,000
October	146,100	7,598,000	155,800	8,102,000

STEEL INGOTS AND CASTINGS

	1945		1946	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
1st Quarter	233,200	12,126,000	242,600	12,617,000
2nd Quarter	227,200	11,814,000	252,100	13,111,000
3rd Quarter	211,300	10,988,000	230,000	11,953,000
September	240,700	12,514,000	238,500	12,402,000
October	243,200	12,648,000	254,300	13,226,000



TO BE SCRAPPED: Hulk of the former French liner, *Normandie*, which on Feb. 9, 1942, burned, turned over and sank at her pier on the Hudson river in New York, is pictured at her berth in Brooklyn, N. Y., awaiting 12 tugs that were to tow her to Newark, N. J., for disposal as scrap. The *Normandie* will be scrapped by Lipsett Inc., New York, which purchased the hulk for $161,680 from the Maritime Commission. NEA photo

Janitor's Idea Outmodes the Broom

Modern portable electric vacuum cleaner dates to crude device introduced 40 years ago. Hoover Co., North Canton, O., developed and refined unit and in past 38 years has sold more than 6 million cleaners

By W. J. CAMPBELL
Associate Editor, STEEL

FORTY years ago in a Canton, O., department store an asthmatic janitor despaired of continuing his job. The clouds of dust raised by his broom were making him gasp and wheeze insufferably. He was a poor man, but it looked as if he would have to give up his job. But how would he and his family live?

The janitor, J. Murray Spangler, pondered his problem as he rested in the store basement. If it weren't for the agony caused by the dust raised by his broom, he could continue. Necessity mothered an idea.

Spangler took a carpet sweeper, installed an electric fan above it, enclosed the contraption in a wood box, attached a pillow case to the handle to catch the dust, and a portable electric vacuum cleaner was born.

The device, crude as it was, worked. Spangler recognized its possibilities. He started to manufacture the cleaners on a small scale, but lacked the capital to handle the project.

The inventor carried his idea to a boyhood friend, W. H. Hoover, and his son, H. W. Hoover, manufacturers of leather goods in North Canton. The Hoovers also saw the possibilities of the cleaner and organized the Hoover Suction Sweeper Co. in 1908.

This was the beginning of the Hoover Co., which in the past 38 years has marketed more than 6 million electric cleaners in the United States, and which has manufacturing divisions in Canada and England and sales branches over most of the world. In more recent years, the Hoover Co. has entered the commercial zinc and aluminum die casting field and last year acquired a company producing fractional horsepower motors. The Hoover cleaner, however, continues its principal product.

Until the start of the first world war, Hoover made the cleaners as a kind of sideline to its leather goods business. Sales resistance to the new cleaner was heavy and many women clung to the idea that nothing could beat a broom for cleaning purposes.

A national magazine advertising campaign was started in 1908 and the *Saturday Evening Post* carried space telling all about "The Hoover Electric Suction Sweeper—For All Houses Wired for Electricity, $70; Extra Attachments, $15 per set"

By 1919, the first year after World War I, the broom began losing ground to the vacuum cleaner rapidly. The easy money abounding in that year helped lessen sales resistance to electric vacuum cleaners and demand for the Hoover product became so great that the company devoted all its factory space to cleaner manufacture. Production of jig saddles, horse collars and other leather goods was abandoned; it had been hard hit by the growing acceptance of the automobile anyway.

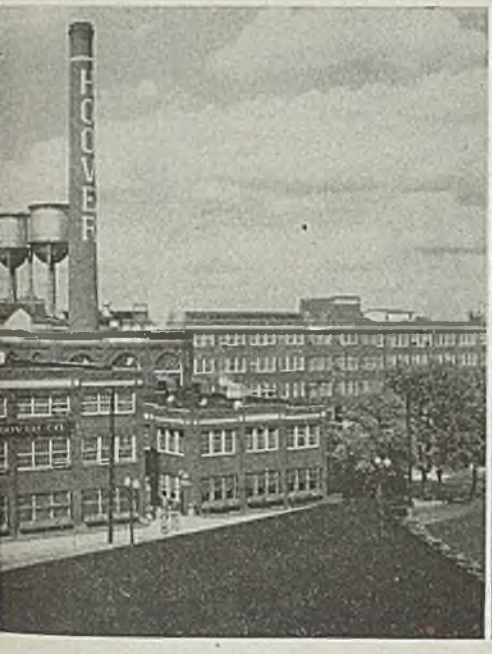
By 1923 the company had sold a million vacuum cleaners. Since then, about a million have been sold every four years—up to the outbreak of World War II.

Today, vacuum cleaner production at the North Canton plant is the highest in its history. Demand is even greater. And the best guess that Hoover officials will venture as to when supply will balance demand is "sometime in 1948."

During the past four decades the name Hoover has become almost synonymous with electric vacuum cleaners for many housewives.

Hoover Co.'s history is not without its dark spots. In the depression days of the early twenties, the company called back the cleaners in dealers' stocks and wrote off orders on its books. Again in the early thirties, sales fell sharply. It was at this time that the company entered the commercial die casting business, producing zinc and aluminum castings for manufacturers in various fields.

Commercial die castings now are an established line and Hoover counts



Electric vacuum cleaners are flowing from assembly lines at the Hoover Co., North Canton, O., in the largest volume in the company's history as Hoover works against a backlog extending into 1948. *At left, units receive final inspection at the end of the production line. Center photo shows exterior of the home office and plant at North Canton; plant has more than* 500,000 *sq ft of floor space. At right above is a scene in the tool and die shop; company makes most of its own dies and tooling. At right is H. W. Hoover, son of the founder and president of the company since* 1922

among its customers many well known names in the metalworking field.

Hoover officials believe that a successful formula in manufacturing in a field as keenly competitive as vacuum cleaners must include four elements: 1. Constant and progressive research and engineering; 2. aggressive sales promotion and organization; 3. efficient manufacturing; 4. managerial policies to coordinate and balance the first three.

Engineering has been heavily accented by the company and a large staff of technical men is constantly seeking improvements, both in design of the cleaner and in manufacturing methods.

From the Hoover engineering department have come many of the improvements in vacuum cleaners. Some of these remain exclusive Hoover features and are protected by patents in force. On others, the patents have expired and the features have been adopted by other cleaner manufacturers.

Chief among the exclusive features in today's Hoover cleaners is a principle known as positive agitation. Suction lifts the rug on a cushion of air and while the rug is so suspended, the smooth spiral bars flutter out the embedded grit, while the brushes sweep up thread, lint, and hair. As the dirt is removed from the rug suction pulls it into the dust-tight bag. This is the foundation for the company's twenty-seven-year-old advertising slogan, "It Beats As It Sweeps As It Cleans."

From the outset, Hoover officials recognized that a vacuum cleaner in the factory, however excellent, served no useful purpose or brought the company no profit until it was placed in the hands of the housewife.

The company began advertising on a national scale in its first year. Whenever an inquiry was received as result of the early ads, a Hoover sweeper was sent to a furniture or hardware dealer near the inquirer with instructions to demonstrate and try to sell the sweeper. If no sale was made, the merchant was asked to display the sweeper in an attempt to sell it to someone else.

The company's sales policy is backed by a strong service organization, and Hoover maintains sales and service offices in over 100 leading cities. Through these, the company has painstakingly built a reputation for quick and dependable service.

When the advent of World War II brought a moratorium to the manufacture of new sweepers, Hoover laid plans to maintain and strengthen its service policy. All new Hoovers, manufactured and unsold, were frozen into a reservoir from which new units could be parceled out to Hoover users whose old units wore out during the war.

Then, in effect, Hoover said to its customers: "We'll keep your old Hoover working until you can buy a new one." It directed much of its advertising to this service policy. Branch offices were stocked with parts which enabled the servicing of cleaners up to 25 years old. Repair service was usually obtainable within 48 hours and at a reasonable cost. Most service charges were only $2.84. The national average, including major repair jobs, was only $3.30.

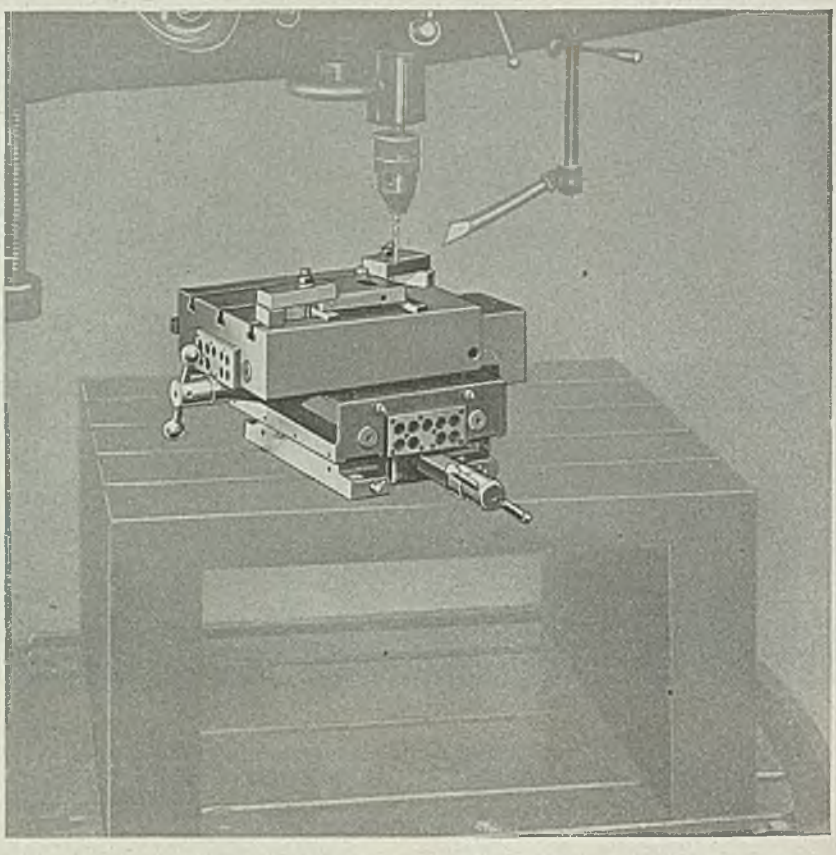
This service policy brought Hoover a tremendous amount of goodwill in the

(*Please turn to Page* 134)

NOW . . .

without JIGS

. . . . you can drill, bore, ream and tap . . . small work

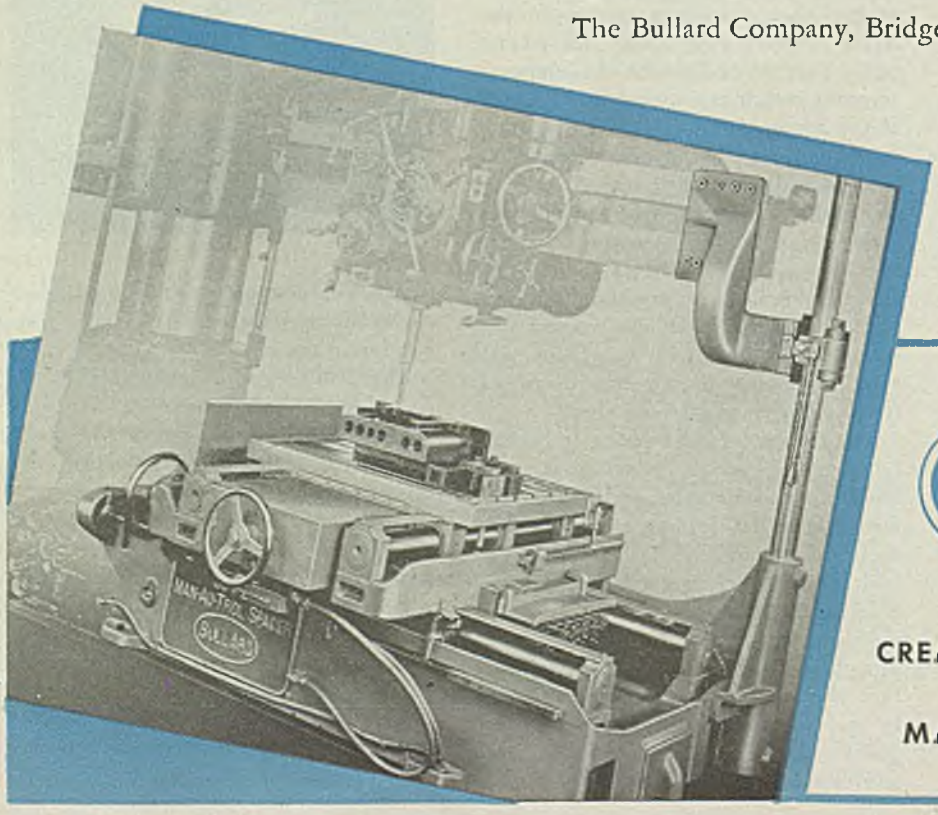


The new 4″x 4″ Bullard MAN-AU-TROL Spacer for speedily and accurately locating holes within a 4″x 4″ area . . . for use on smaller sensitive drills but usable on larger drills as shown. Its hydraulic unit will operate four 4″x 4″ Spacers if you so desire.

. . . as well as LARGE WORK

The new 30″x 20″ Bullard MAN-AU-TROL Spacer for accurately repeating a pattern of holes within a 30″x 20″ area . . . for use on radial drills.

BOTH the 4″x 4″ and 30″x 20″ Bullard MAN-AU-TROL Spacers give you such benefits as: elimination of expensive jigs . . . no production tie-ups for making jigs . . . straight holes 90° to the work . . . prevention of strain on drill spindle and reduction of drill wear because of perfect tool centering . . . less operator fatigue. Write for MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Connecticut.



Typical Installation of 30″x 20″ MAN-AU-TROL Spacer.

BULLARD

CREATES ***NEW METHODS*** TO MAKE MACHINES DO MORE

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

Mirrors of Motordom

General Motors expresses belief that despite disturbances in nation's economy a large demand still exists for its products although the extent to which the demand may be expected to become effective depends on how much high prices affect sales

DETROIT

TRYING to make any sense out of the current fog which is settling down over industry in the wake of the coal strike which no one in these parts thought would assume the proportions now reached is a wearisome task. Perhaps discretion would dictate a policy of forgetting the whole messy business and turning to other matters, such, for instance, as the sound observations contained in the latest message from General Motors to its stockholders.

The remarks might well constitute a pattern which all industry would endorse. The management of GM was convinced that, following the war, there would exist a pent-up demand for its products, and on the basis of this belief an extensive postwar program of plant rehabilitation was undertaken, designed both to raise production facilities to the highest technological standards and to provide some expansion of prewar facilities. The management also believed that at the close of the war there would be an active demand for all kinds of goods, and that a high level of business activity and national income would be established which would support the demand for automobiles and many other products.

Capacity Operations Expected

It was assumed—and logically enough—that with reconversion completed and production of peacetime products resumed there would be no adequate reason why capacity operations would not be assured for a considerable period of time. Capacity operations would have supported high employment—both in terms of number of workers and hours of employment—and high payrolls. They would have resulted in good earnings and dividends to stockholders and a high output of motor cars, trucks and other products sorely needed by the consumer because of wartime shortages.

But, notes GM, this has not happened, and people the country over are realizing the sad fact and wondering why. Opinions differ as to the cause, but GM declares it is pertinent to recall a government pronouncement of national economic policy made Oct. 30, 1945, just as industry was preparing to resume on a large scale the production of peacetime goods. This policy, as laid down, was split into two parts: (1) Wage increases are imperative. . . and (2) we must above all else hold the line on prices. Now the concept that wages, and other forms of compensation which must necessarily follow the trend of wages, might be increased without affecting prices has caused a great deal of trouble in the country during the past year (to use the mild terms suggested by GM). In the final analysis, the experience of business is that costs and prices change substantially in proportion to changes in wages, except as wage increases are justified by technological improvements—which takes time. It seems clear, says GM, that the two-point policy laid down by the government, one point in conflict with the other, served as a political justification for wage demands on the part of labor. The increases demanded were unsound and uneconomic, as events subsequently have proved. They could not possibly be supported by a corresponding increase in productivity. Hence, they were of necessity resisted by most managements, and there resulted a wave of major strikes on a broad front which seriously interfered with the production of both raw materials and manufactured products. This situation came at a time when materials and finished goods were both scarce, and the effects of these strikes are still manifested in continuing shortages of essential materials and supplies. Only further complicating matters is the present John L. Lewis political chicanery in behalf of his mine workers which will paralyze all industry in the U. S. if it continues to the end of December.

The second point in the government's policy—holding the line on prices—had a most discouraging impact on expanding production. Since prices of various products in a highly complex economy such as exists in this country are closely interrelated, the policy of attempting to freeze prices has intensified material shortages and interfered with completion of finished products. The policy failed not only because of its basic unsoundness but because of its ineffective administration.

Continuing on the GM message, its authors suggest that without entering into the argument on the theoretical justification of price control, or the possibility of controlling prices without wage controls or rationing, it seems reasonably clear, on the basis of the current situation and what has happened, that the constructive thing to do and probably the only way out, was to eliminate promptly all wage, price and other controls that retard production. Despite the inevitable dislocations and readjustments, this would tend to encourage to the maximum the expansion of all types of production and would leave to the force of competition the natural and economic adjustment of prices for one type of production as against another. In effect, this is happening today.

Relationship Poses Problem

Attainment of proper relationship between wages and prices presents a real problem, in sharp focus today. Should further demands be made on the part of labor, leading to another wave of production interruptions, with increases in wages and necessary increases in prices, the difficulty of readjusting the present unbalanced condition of the economy would be magnified, states GM, adding that apparently two possible solutions present themselves. . . first, a readjustment of existing wage-price relationships, if the time factor and existing circumstances permit, second, a more rapid readjustment which might involve a substantial though temporary shrinkage of

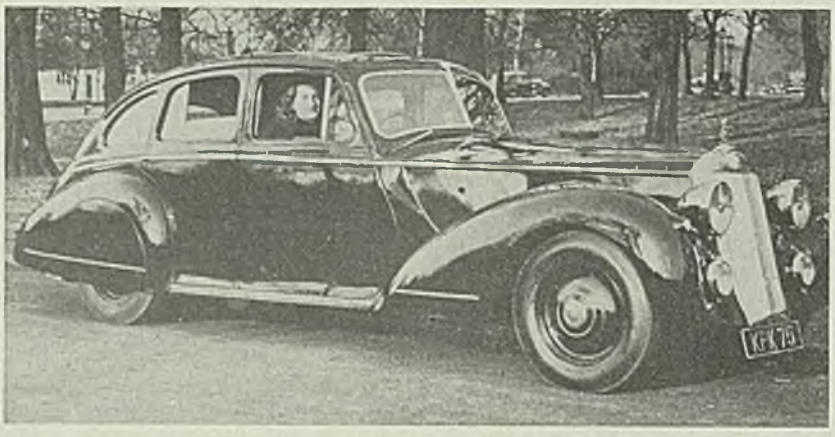
Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1946	1941
January	121,861	524,037
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	216,637	646,278
July	331,000	468,897
August	359,101	164,793
September	342,727	248,751
October	409,870°	401,369
Total, 10 mos.	2,501,752	4,532,512
Estimates for week ended:		
Nov. 16	94,425	96,990
Nov. 23	96,461	80,820
Nov. 30	72,692	96,495
Dec. 7	89,000	92,205

° Preliminary.



NEW BRITISH CAR: Great Britain's first gearless, clutchless automobile, a 25 hp Invicta "Black Prince," is shown above. An automatic torque-converter, working on the turbine principle, takes the place of clutch and gear box, and reduces controls to steering wheel, accelerator pedal, brake pedal, and a small switch with "forward" and "reverse" positions. To drive forward, the driver moves the switch to "forward," releases the brake and glides away. The car is powered by a six-cylinder engine, has built-in radio, air conditioning and a tamper-proof hood which cannot be opened from the outside. Price: About $9000 plus tax. NEA photo

business volume and of employment. Unfortunately, the latter may be unavoidable as a prelude to stabilization on a sounder basis, as hinted by the stock market barometer in recent months. What the solution eventually will be is impossible to determine at the present time in view of manifold uncertainties.

Purpose of the foregoing comments by General Motors is cited as being twofold: First, to express a point of view as to conditions under which the corporation is operating, with certain underlying reasons as to why the results, at least in part, are different from what had been anticipated, second, in view of all that has happened within the past year, to reappraise the question as to whether, when the essential readjustments are brought about, there will exist a large reservoir of effective demand for the corporation's products.

The fact cannot be ignored in attempting such an appraisal that costs and hence selling prices in many areas of production have advanced to the point where prices are getting out of reach of important parts of the potential market. They are further inflated by the inefficiency of current operations under present conditions, although it must be admitted there is some slight improvement noted in this respect.

While the purchasing power of some sections of the buying public may have increased in line with advancing prices, as to others that is not so. And in all probability the favored group represents a relatively small minority. In addition, the accumulated savings of previous years have been reduced in value by the depreciation of the dollar in terms of these higher prices. On the other hand, production of consumer nondurable goods continues at a high level. There is also a high level of demand for durable goods such as automobiles, but it has been impossible to establish production at a high level because strikes have hampered heavy goods industries.

For all these reasons it must be recognized that what was expected can still be expected, but only in part. Expressed otherwise, it is believed that a large demand for the products manufactured by GM and other consumer goods industries still exists but the extent to which it may be expected to become effective must be modified to the degree that high prices resulting from high costs reduce the number of people who can afford to buy these products.

Discusses Car of Tomorrow

Some predictions about automobiles of the future were made recently by Harold T. Youngren, vice president and director of engineering for Ford Motor Co., in his first public statement since assuming this post. His comments appear rather guarded, but it is understandable that no able engineer is going to go hog-wild in predictions of radical things to come in the automotive field. He said automobile bodies are going to be wider, and there will be more window area than ever before, two trends which already are in evidence in such cars as the Studebaker and Kaiser-Frazer. Youngren said the automobile is more and more becoming a comfortable room-on-wheels instead of just a place where people sit while being carried from one point to another. He added that the long, tapering hood of the present-day car is bound to disappear.

He suggested car interiors will become more comfortable and embody more eye-appeal, with wider front seats and merging of fenders into the body lines. Air-conditioning is on the way, he said, adding that while it is technically feasible it is economically possible only in the more expensive models.

Youngren predicted improvement in present gasoline engines, particularly in overcoming friction, combustion chamber design and in better fuel distribution. Shorter hoods will necessitate more widespread adoption of the V-8 engine (plug), while compression ratios will go higher to a moderate degree, he said.

On the subject of automatic transmissions, which after all is Youngren's baby, he said that in the lower price field the problems of cost, reliability and serviceability are most important. What he did not disclose is the destiny of the automatic transmission for which Detroit Gear & Machine Division of Borg-Warner was reported to be spending millions of dollars in tooling for production, to be used in the Ford line. Opinion heard around Detroit is to the effect this transmission has been discarded by Ford, following the appearance of Youngren on the engineering scene, and will be replaced by a revised design, perhaps simpler in construction and less costly, although these were reportedly two principal features of the Detroit Gear system.

Truck Production High

Production of trucks in 1946 may total over 900,000 units if the coal strike does not have too adverse an effect, was the prediction made recently by Karl M. Richards, manager, Motor Truck Division, Automobile Manufacturers Association.

This output would be greater than during any previous year except 1941, when about one-fifth of all units produced were for military purposes, Mr. Richards stated. The capacity of the industry is 1,500,000 vehicles annually, he pointed out.

During the first 10 months of the year, 729,371 trucks and busses were sold, 82 per cent of the number sold during the comparable period of 1941, Mr. Richards added.

Approximately half of the more than 5 million trucks registered this year should be replaced for economical operation, he said.

VICKERS HYDRAULIC CONTROL means *Greater Productivity and Versatility* FOR ETNA Tube Cutoff Machines

Important advantages of Vickers hydraulic controls that make for higher production rates and greater versatility are illustrated by this Etna Hydraulic Tube Cutoff Machine. Completely automatic is the cycle which feeds the tubing rapidly and accurately to length within a few thousandths, provides quick action clamping, cuts off and then unclamps the stock. Feeding and clamping rates are varied by simply turning a dial . . . there are no cams or gears to change. The rapid traverse approach of tool slides and the rapid return save time. The machine is compact and completely self-contained; it is changed from one diameter of tube to another in a few minutes.

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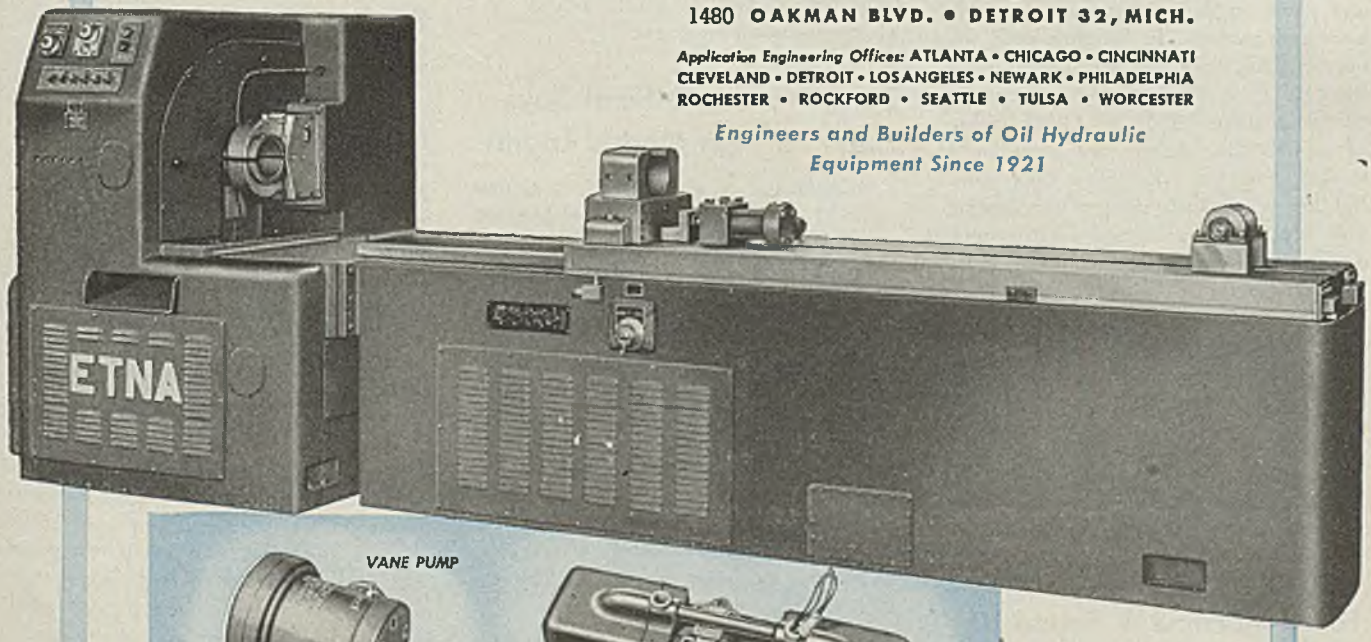

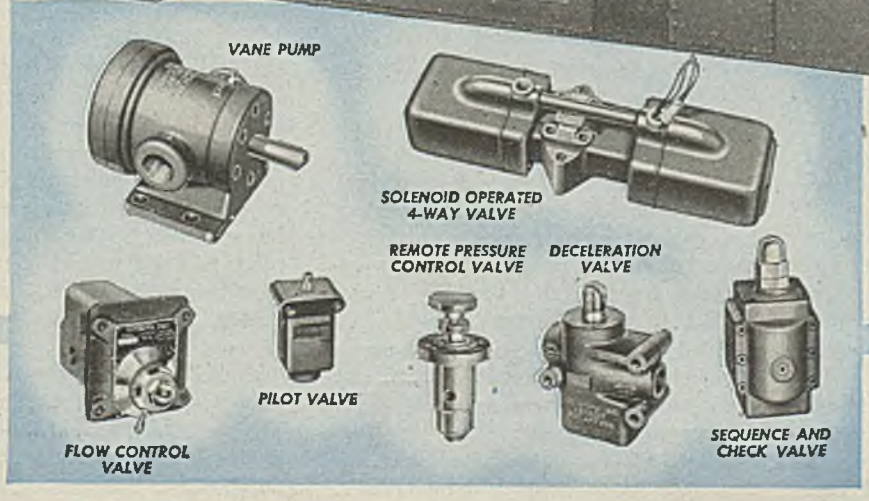

Representative Vickers Hydraulic Control Units used on Etna Tube Cutoff Machine

Ryerson Opens New Pittsburgh Office Building

Structure arranged to assure maximum speed and efficiency in handling and dispatching of orders

A NEW office building designed to assure maximum speed and efficiency in handling and dispatching of orders has been completed at the Pittsburgh plant of Joseph T. Ryerson & Son Inc., steel distributor.

The building is a 2-story steel, brick and stone structure of more or less conventional design, but its location with respect to plant operations, coupled with the engineered arrangement of the general offices, is such that order flow is streamlined to a degree that permits exceptionally fast handling.

General offices are on the first and a portion of the second floor, the rest of the second floor being used for locker space, and wash and rest rooms for office and plant employees. Appointments are new and modern, in keeping with the overall plant to speed customer service through a carefully planned system of communications handling. All floors are of asphalt tile, ceilings are acoustically treated, and the latest type fluorescent lighting is used. Equipment for heating and ventilating is housed on the roof, a departure from the customary basement installation.

H. L. Robinson, manager of the Ryerson Pittsburgh plant, said that the improvements could be expected to aid materially in expediting steel shipments, although under prevailing conditions, with warehouse stocks unbalanced from a size standpoint, considerable ingenuity is required to satisfy demands.

Engineered arrangement of new offices at the Pittsburgh plant of Joseph T. Ryerson & Son Inc. promotes speed and efficiency in communications handling and order flow

Management Group Buys Ferro Machine & Foundry

Sale of the plant and equipment of Ferro Machine & Foundry Co., Cleveland, to a group of the company's officers has been announced by Crispin Oglebay, chairman of the board. The new corporation, to be known as Ferro Machine & Foundry Inc., took over operations of the company and the property on Dec. 1.

One of the largest gray iron automotive foundries in the country, Ferro employs more than 2300 workers. Its plant contains 400,000 sq ft of floor space and has a daily capacity of 500 tons of metal, in addition to the production of a large machine shop.

Officers of the new corporation, are: John M. Price, president; Henry B. Myers, vice president; Ralph H. Weir, vice president and secretary; N. E. Gauthier, treasurer; and Ernest M. Knapp, assistant treasurer.

Borg-Warner Official Says Huge Foreign Market Looms

Outlook for sales of American-manufactured products stands at the greatest peak in history, J. W. DeLind Jr., president, Borg-Warner International Corp., Chicago, stated recently. Reporting on his three-months' survey of markets for Borg-Warner products in the Scandinavian countries, Holland, Belgium, France, Spain, Portugal, Switzerland and England, Mr. DeLind said that currently difficulty is being encountered in placing orders in America because of overseas restrictions in connection with the dollar exchange, but this condition is expected to improve in a few months. In Switzerland and Sweden, however, most cities seemed to be "literally bulging with sterling and dollars," he added.

Our inability to deliver well known and much demanded products, he asserted, has enabled some European manufacturers to make inroads on our foreign business, but through a flexible policy in respect to these foreign markets, Mr. DeLind said, American manufacturers should be able to maintain and increase their portion of sales of products which are typically American.

This flexibility, he explained, may embrace partial or complete fabrication in several of the larger foreign markets. Borg-Warner, he said, has licensing arrangements for the fabrication of certain of its products in England, Sweden and France, and other similar agreements are contemplated.

Bureau of Mines Reports On Nazi Castings Industry

A survey of the German steel castings industry during more than six years of war has been published by the Bureau of Mines, Department of the Interior. Prepared by Charles W. Briggs, research director, Steel Founders Society of America, Cleveland, and Maz T. Ganzauge, technologist, General Railway Signal Co., Rochester, N. Y., the report is based on a investigation begun in 1945 of this important segment of German industry.

Information sought for the survey included the type and classification of steel structures produced as castings, processing methods, mechanical properties of carbon and alloy cast steels, type and character of defective castings, appearance of castings, research in steel castings, and plant lay-out and equipment.

In reviewing the production techniques utilized at representative German foundries, the report discusses such topics as raw materials, steel melting and molding practices, tapping and pouring methods, heat treatment, welding, inspection and testing, and production of centrifugal castings.

Copies of Information Circular 7362, "The German Steel Castings Industry," may be obtained from Bureau of Mines, Department of the Interior, Washington 25, D. C.

BRIEFS . . .

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

Electroweld Steel Corp., Oil City, Pa., has purchased an industrial property in Azusa, Calif., and has installed a tube mill. Production of mechanical steel tubing is expected to be under way by Jan. 1.

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Cleveland Tapping Machine Co., Cleveland, has appointed Burgan Machinery Co., Inglewood, Calif., as sales representative for California, Nevada and Arizona.

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Pullman-Standard Car Mfg. Co., Chicago, is installing an automatic electrical braking device in new high-speed passenger equipment being built for the Illinois Central Railroad's "City of New Orleans" all-coach train. The device is actuated by the engineer by pushing a button. It automatically sets the brakes and permits smoother and faster stops.

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Monsanto Chemical Co., St. Louis, operator of the Clinton Laboratories, Oak Ridge, Tenn., has announced that 160 orders for radioactive isotopes for biological and physical tracer studies have already been filled, and demand for the isotopes is steadily rising.

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Award Incentives Inc., New York, has published a booklet "How Industry Profits from Service Awards" describing devices used to improve labor-management relationships.

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Milwaukee Gas Specialty Co., Milwaukee, has sold part of its plant at 2025 W. Clybourn St., that city, to Accurate Automatic Parts Inc., for a reported $65,000.

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Gladden Products Corp., Glendale, Calif., has received its first foreign order for airplane engines since prior to the war. The order, aggregating $85,000 for trainer engines and parts, was from the Argentine government.

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Wheeling Steel Corp., Wheeling, W. Va., has adopted a pension plan, effective Nov. 16, which provides a retirement income of $50 to $250 a month for employees reaching 65 years of age and having 20 years of continuous service with the company.

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Pitney-Bowes Inc., Stamford, Conn., has instituted a new employees' vacation policy providing up to four weeks' vacation a year with pay. Length of vacation is determined by length of service commencing with two weeks for workers employed ten months.

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Kennametal Inc., Latrobe, Pa., has established an office at Room 1605, Court Square Bldg., Baltimore.

—o—

Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J., has appointed Joseph Glenn & Sons, Clifton Heights, Pa., as representative in the Philadelphia area.

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United States Rubber Co., New York, has begun production of a lightweight bottle carrier, designed to aid in preventing accidents in laboratories and industrial plants. The shockproof carrier, used for carrying bottles of acids, caustics etc., is being distributed by Benson & Associates, Chicago.

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Westinghouse Electric Corp., Pittsburgh, will build four 65,000 hp electric motors, each said to exceed by more than 50 per cent the capacity of the most powerful single alternating-current motor now in existence, for installation at Grand Coulee dam.

—o—

Acme Aluminum Alloys Inc., Dayton, O., has opened a branch office in the Commercial Trust Bldg., Philadelphia.

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Machinery Division, Dravo Corp., Pittsburgh, has opened a sales office at 305 Techwood Drive N. W., Atlanta.

—o—

Arocast Corp. and Precise Castings Corp. have been combined in new quarters and are now operating as Precise Castings Corp., division of Cooper Alloy Foundry Co., Hillside, N. J.

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Olofsson Tool & Die Co., Lansing, Mich., has completed a new plant housing the operations of the company's two former plants. Approximately 30,000 square feet of floor space is available.

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Isthmian Steamship Co., subsidiary of United States Steel Corp., New York, has taken title from the U. S. Maritime Commission to the first of 24 vessels which will be allocated to the Isthmian fleet. The ship, the *Sea Phoenix*, has been renamed the *Steel Artisan*, and will soon sail for Indian and Persian gulf ports.

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Export Sales Department, Beech Aircraft Corp., Wichita, Kans., has sold a group of twin-engine planes to the Brazilian government, which, with parts, amounted to an order several times greater than any other single order for Beechcrafts received since the war.

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Industrial Packaging Engineers Association of America, Chicago, has organized a "Protective Packaging Contest," which will be held in conjunction with the association's exposition in the Sherman Hotel, Chicago, Apr. 29-May 1.

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University of Michigan's Chemistry Laboratories, Ann Arbor, Mich., has announced that the "electron diffraction" method of analyzing metal surfaces, developed by Prof. Lawrence O. Brockway, has been incorporated into a machine which is being marketed commercially.

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Denison Engineering Co., Columbus, O., has appointed Pump Engineering Co., Seattle, as a representative for Washington, Oregon and part of Idaho.

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Kaydon Engineering Corp., Muskegon, Mich., recently offered free inoculation injections to prevent influenza to its employees. Shortly after the medical service was announced, 80 per cent of the workers voluntarily took the "shots."

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Atlas Steel Co., Baltimore, steel fabricator, recently installed an overhead crane in its yard and made other improvements to its facility.

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Black & Decker Mfg. Co., Towson, Md., has opened a sales and service plant at Sao Paulo, Brazil. The portable electric tool manufacturer has branches in Canada, Australia and Great Britain.

—o—

School of Mines & Metallurgy, University of Missouri, Rolla, Mo., recently celebrated its seventy-fifth anniversary and conferred honorary degrees in engineering on James Presley Gill, vice president, Vanadium-Alloys Steel Co., Latrobe, Pa., and Herbert Russell Hanley, professor emeritus of metallurgical engineering.

—o—

Bureau of Mines, Department of the Interior, Washington, has published four reports describing results of investigations of mineral deposits. They are: "Exploration of the Riley Tungsten Mine, Humbolt County, Nevada;" "Exploration of Bishop Cap Fluorspar Project, Dona Ana County, New Mexico;" "Exploration for Barite in Hot Springs County, Arkansas;" and "Exploration of the Copper-Sulfur Deposit, Khayyam and Stumble-On Properties, Prince of Wales Island, Alaska."

Expect Rise In Building Activities

Many California companies seen reviving deferred construction projects with the economy decontrolled. Coal strike is new deterrent

SAN FRANCISCO

NORTHERN California industrial and commercial construction soon is expected to reflect the ending of federal price controls by showing an upward swing.

Not only will decontrol make scarce construction materials more plentiful as time goes on, but removal of government barriers will spur many companies to release building plans which had been held in abeyance until recent uncertainties began to clear.

One serious deterrent, however, at present is the coal strike. The shortage of steel, already a bottleneck for much construction, is expected to increase as the coal strike closes steel mills.

Reflecting the increased interest in new construction is the most recent report of the Civilian Production Administration on non-housing construction approvals in the ninth district for the week ended Nov. 21. The ninth district includes northern California, and parts of the Pacific Northwest.

Construction Permits' Value Up

For that week the CPA approved 144 projects valued at $3,354,797. That total value was more than a million dollars larger than the previous week and marked the fourth consecutive increase in construction permits.

At the same time, plans filed in October for new plants and expansions of present plants showed a further gain, according to reports of the San Francisco Chamber of Commerce.

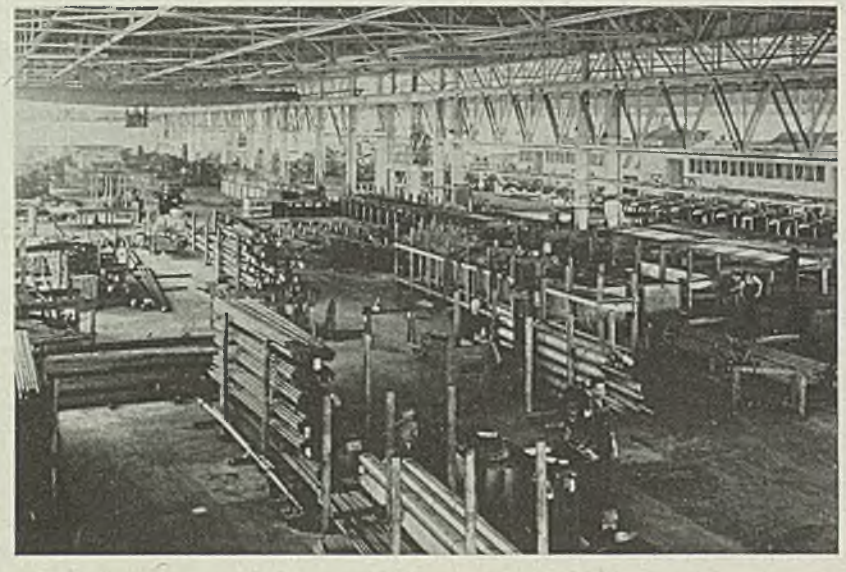
In October, 56 new industrial plants were planned to cost nearly $5 million, which is an increase of more than $2 million over the September total. In addition there were 40 expansions at a cost of $2.6 million.

For the year 1946 through October total industrial development in northern California is represented by 621 new projects valued at more than $62 million, and 454 plant expansions totaling nearly $60 million. Together these 1,075 projects add up to an investment of more than $122 million.

All totals for this year are considerably larger than in 1945, when the aggregate of new and expanded plants was 599 projects valued at $116 million.

California Scrap Iron Corp., Pittsburg, Calif., has purchased a wartime plant used for processing scrap iron from the War Assets Administration for a sale price of $41,100. The firm operated the plant for Defense Plant Corp. during the war.

The facility is located on a 6.6 acre site, and includes nine shed-type buildings. The plant's capacity is 7000 tons of scrap monthly.



BUYS PLANT: Pacific Tube Co., Los Angeles, has purchased the government-owned facilities it has operated in East Los Angeles for the past three and one-half years. The plant, of which an interior view is shown above, was built at a cost of $2½ million and was purchased by Pacific Tube for $1,525,000. The mill produces cold drawn seamless steel tubing, welded steel tubing and cold drawn bar stock in various analyses and sizes. Additional tube and bar making equipment will be installed

Sale of Tacoma Aluminum Plant Approved by WAA

TACOMA, WASH.

Sale of an aluminum reduction plant at Tacoma, Wash., to Permanente Metals Corp., Oakland, Calif., for $3 million has been approved by the War Assets Administration.

Leased and operated during the war by Olin Industries Inc., East Alton, Ill., the plant consists of 18 buildings on a 130-acre site. The facility has a rated capacity of 41½ million pounds of aluminum ingots a year and has a current fair value of $3,289,748, the WAA said. The new owner estimates than an additional $1 million will have to be expended to place the plant back into operation.

Permanente Metals Corp. plans to produce aluminum for civilian use and estimates that employment will be provided for 400 persons.

Pacific Northwest Hit by Pig Iron, Scrap Shortages

SEATTLE

Backwash of the coal strike is being felt in this area where the scarcity of pig iron is approaching the critical stage. Foundries are finding it difficult to obtain sufficient iron and scrap to maintain operations which are at a comparatively high level.

Pig iron is allocated through Washington and the small tonnages allowed plants in this area are applied almost entirely to government housing projects. In addition cast iron scrap is very tight and unless conditions improve in the near future production will be seriously curtailed. Scarcity of pig iron is causing a shortage of ingot molds, one large plant here being advised by headquarters there will be no shipments until further notice. Inventories are being rapidly reduced.

The coal supply in Washington and Oregon is rapidly dwindling, the situation being worse in Oregon which has

few producing mines. Many of the large coal burning industries have fuel inventories but smaller operations such as dairies and food packing establishments have no stocks and are suffering severely. With the exception of two small mines in the Northwest, all coal operations are down, workers having walked out. The two mines still producing have a daily output of only 150 tons.

Rolling mills are still operating at normal levels although the future is most uncertain. One mill has not yet opened first quarter books and new business by the other is confined to regular customers and emergency orders. Mills are making every effort to reduce backlogs which are large.

Fabricating plant operations are restricted to materials on hand which are only a fraction of the tonnages required. Some materials are coming by rail, other shipments still being held aboard ship, the maritime strike not yet being completely settled. The same situation applies to plate shops whose inventories are practically gone.

Atomic Power Studied at Hanford

Information released by the War Department discloses that research and development of several designs of nuclear reaction or piles for the generation of power are under way at the Hanford plant in eastern Washington. The atomic production works is being operated by General Electric, Dupont, the wartime operator, having relinquished control Sept. 1. In connection with General Electric's nation-wide research program, Hanford Engineering Works operations will be closely geared with research in progress at Schenectady and elsewhere. The Hanford staff will co-operate with experimental work in other plants.

Following an extended tour over the United States contacting prospects who might be interested in industrial investment in Alaska, George Sundborg, general manager of the Alaska Development Board, reports possibilities of opening up the territory's store of material for sulphite pulp and newsprint manufacture. He states plans are advanced by two large concerns planning to invest $25 million each in pulp and paper while a creosoting plant for Wrangell, Alaska, is being considered.

Western Pipe & Steel Co. of California, subsidiary of Consolidated Steel Corp., Los Angeles, has received notification of an award to it by the Bureau of Reclamation of a $1,271,000 contract on its Columbia Basin project. The contract calls for fabrication of about 9000 feet of 12 ft diameter steel pipe for the Grand Coulee pumping plant.

Further Slowing Down of Steel Deliveries Seen at Los Angeles

Curtailment in production as result of coal strike expected to be reflected in shipments into this area within few weeks. Coal scarcity to have less effect on district manufacturing operations than elsewhere

LOS ANGELES

CURTAILMENT of steel production in the East will cause further slowing of deliveries here, with the result that in three or four weeks southern California industries will be forced on reduced production schedules even if the coal strike is settled soon.

It is estimated that this time lag will become progressively longer as the duration of the strike extends.

Otherwise, lack of coal will not affect local industries since fuel oil-fired steam generating plants or hydroelectric power direct from dams impel prime movers throughout the region. Even railroads in California use fuel oil exclusively.

Up to last week the only heavy industry in southern California to feel effects of the coal lack was the Kaiser steel mill at Fontana where one open hearth was shut down. Open hearths closer in the Los Angeles metropolitan area continued operations at Bethlehem and Columbia, where fuel oil is used. Kaiser officials said that as coal shipments decrease further cuts in production will become inevitable. They did not list specifically the nature of such reductions, which were assumed to be blast furnace as well as open hearth operations.

Russell, Burdsall & Ward Bolt & Nut Co. has purchased the Cooper Screw Mfg. Co. plant in Los Angeles in an additional expansion of its southern California facilities which already include 56,000 sq. ft. of adjoining land.

The firm comes to the Pacific Coast with a full line of bolts, nuts, rivets and screws. In business more than 100 years the concern has sold its products in California since gold rush days, Samuel N. Comly, vice president and treasurer, said. R. A. MacDonald, plant manager, and Charles P. Brenner, Pacific Coast sales manager, will handle operations in Los Angeles.

The company has plants at Port Chester, N. Y., Coraopolis, Pa., and Rock Falls, Ill.

Wages and salaries are expected to total more than $8 billion in the 14 southern California counties during 1946, an economic report issued by the Security-First National Bank of Los Angeles disclosed last week. The sum is 250 per cent greater than in 1940.

This tremendous buying power is due to, first, a 33 per cent increase in population; second, a record volume of business per capita; third, a sharp increase in prices and, fourth, higher levels of income payments.

Highlight of this phase of the report lies in the fact that employment in the manufacturing plants of Los Angeles county showed a larger increase in October than in any month of the postwar period to date. Net rise in industrial payrolls from mid-September to mid-October was about 10,000 persons.

Realty activity, mirroring industrial as well as residential buying, is down in the Los Angeles region. Recorded deeds in the county numbered 24,010 in October as against the all time peak of last March when 30,353 were entered. The first figure, however, is still twice that of the immediate prewar years.

There is adequate information to show that factory inventories are not excessive despite the fact that much production has had to be temporarily shelved because of "nearly finished" articles which await small parts for completion.

Maritime Strikes Losses Tallied

On a gloomier note, the Chamber of Commerce pointed out last week that business losses brought on by the maritime strikes have amounted to $53 million in Los Angeles. Broad plans of sea traders to re-establish foreign commerce and develop sources of supply were shattered at once by the walkoffs, it was pointed out.

Chamber officials lauded action of the ICC in reducing trucking rates for iron and steel from Utah to Los Angeles to 40 cents per cwt. One steelmaker asked the ICC to suspend the rate for truckers, it was declared, while the Western States Steel Council and other organizations argued that this producer neither sells steel in the West nor maintains offices in Los Angeles or San Francisco.

The 40-cent rate covers minimum shipments of 35,000 pounds from Geneva, Ogden, Provo and Salt Lake City to those two cities.

Men of Industry

L. A. LINDBERG

L. H. MOULTON

LAWRENCE H. TAYLOR

L. A. Lindberg, president, Lindberg Steel Treating Co., Chicago, was elected president of Metal Treating Institute at the recent annual meeting of the society, at the Traymore Hotel, Atlantic City, N. J. Other officers elected were: **R. G. Sault,** vice president; **R. W. Thorne,** treasurer; **Stewart N. Clarkson,** executive secretary; and **J. R. MacAllister,** assistant secretary. Mr. Lindberg announced his plan for the coming year of publishing a book entitled *Manual for Heat Treating Services.*

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Fred A. Kaufman has been transferred to McKay Co., Pittsburgh, as metallurgical engineer. He had been an industrial fellow on the company fellowship at Mellon Institute of Industrial Research. He will have charge of technical and engineering service in the firm's Arc Welding Electrode Division.

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Rudolph T. Elstad has been elected president, Oliver Iron Mining Co., Duluth, a subsidiary of United States Steel Corp. He succeeds **LeRoy Salsich,** who is retiring after 45 years of operating and executive experience with the Oliver company. **Walter L. Maxson,** director of research, and **Jerome E. Machamer,** assistant general superintendent of the Hibbing-Chisholm district, have been elected vice presidents of the Oliver company. Mr. Elstad joined the company in 1919, and was elected vice president on Jan. 1, 1946. Mr. Salsich joined the firm when it was formed in 1901, as a mining engineer. A year later he became chief engineer for the Hibbing properties. He became president in March, 1930. Mr. Maxson has followed the mining profession for 30 years. He was selected as the director of a research laboratory established by United States Steel under the auspices of Oliver Mining Co. in 1944. Mr. Machamer joined the Oliver organization in 1922.

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L. H. Moulton has been appointed national sales director, and **D. T. Buist,** assistant national sales director, Turco Products Inc., Los Angeles. Mr. Moulton joined the company in 1931, and for the last 8 years has directed the Eastern Division from the Chicago plant office. Mr. Buist joined Turco in 1936, having had 20 years' experience in the automotive field. He was transferred to the Aviation Division in 1939, promoted to district sales manager in 1943, and western zone sales manager in 1944.

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Harold P. Curtis has been appointed Pacific Coast sales manager, Babcock & Wilcox Tube Co., Beaver Falls, Pa. His headquarters are in Los Angeles. Mr. Curtis had been Pacific Coast sales manager for Rustless Iron & Steel Corp., Baltimore, with his offices in Los Angeles. For 8 years he was with Columbia Steel Co., San Francisco, a subsidiary of United States Steel Corp. He became manager of stainless steel sales for Columbia Steel in the southern California area. Later he joined Budd Mfg. Co., working on the Pacific Coast, until he was appointed general sales manager of Budd Co., Philadelphia.

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H. E. Hall, president, Metals Disintegrating Co., Elizabeth, N. J., was re-elected president of Metal Powder Association at the recent annual business meeting of the society, held in Atlantic City, N. J., concurrently with the National Metals Congress and Exposition. **S. K. Wellman,** president, S. K. Wellman Co., Cleveland, was re-elected vice president of the association, and **F. E. Wormser,** New York, was re-elected acting secretary and treasurer. **P. E. Weingart,** American Metal Co. Ltd., New York, was elected chairman of the association's board of directors. **V. T. Price,** secretary, Pyron Corp., Niagara Falls, N. Y., was elected to the society's board for a 3 year term.

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Lawrence H. Taylor, recently released from active duty with the Navy, has been appointed an account executive, Charles H. Welling & Co. Inc., New York. Prior to the war, Mr. Taylor was vice president, Aviation Funding Corp., New York.

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Reginald L. Middleton has been appointed sales representative in the Dallas, Tex., territory, Falk Corp., Milwaukee. For 12 years he had been with Continental Supply Co., subsidiary of Youngstown Sheet & Tube Co., Youngstown. He was district manager of machinery sales in Tulsa, Okla., for Continental, and later, director of purchases in the Dallas office. Before that, he had been an oil field specialist in Tulsa for the Sales Division, General Electric Co., Schenectady, N. Y.

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Jay Stranahan has been named sales manager, Chicago district, Washington Steel Corp., Washington, Pa. Mr. Stranahan has been associated with the stainless steel industry for the last 7 years. He was a sales representative in the Cleveland and Philadelphia districts.

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Charles H. Woolf has been appointed manager of all sales and services for the Pacific Coast area, International Business Machines Corp., New York. **Edward Perkins** has been appointed his special assistant. They will make their headquarters at San Jose, Calif., where the company has a plant. Mr. Woolf joined IBM in 1930 in Los Angeles, and was

A WINDJAMMER *Goes Modern*

WITH DIESELS AND BRONZE BOLTS

WHEN the glorious old sailing vessel "Foz Do Douro" recently made a record crossing from Lisbon to Vera Cruz, it was with twin 650 hp. Fairbanks-Morse Marine Diesels in her new engine room . . . at the mercy of the wind no longer.

Her FM diesels, too, were protected against rust and corrosion the *modern way*—by Harper Bronze Bolts . . . long-lasting and easily removable . . . in their clutch plates and circulating pumps.

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One of the twin 650 Hp. Fairbanks-Morse Marine Diesels . . . equipped with Harper Bronze Bolts . . . goes into the new engine room of the 54 year old sailing vessel.

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HARPER
Everlasting Fastenings
Chicago

assistant IBM manager in Chicago prior to his present promotion. Mr. Perkins, who was manager of the company's Electric Accounting Machine Division in San Francisco prior to his present appointment, joined IBM in 1925 in New York, as a systems serviceman. He later transferred to sales work and held various sales and executive positions in New York and Philadelphia before becoming manager of the IBM Gallery of Science and Industry at the New York World's Fair in 1939.

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Francis B. Nimick has been elected a director, Vanadium-Alloys Steel Co., Latrobe, Pa., to fill the vacancy created by the death of **T. H. Childs.** Mr. Nimick is a son of the founder of Colonial Steel Co., Monaca, Pa., now the Colonial Division of Vanadium-Alloys Steel Co., and has been with that firm since 1913.

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John C. McPherson has been appointed manager of patent research and development, International Business Machines Corp., New York. He was director of engineering for the firm, and before that, head of the future demands department. Mr. McPherson joined the company in 1930 as a systems serviceman, later transferring to the transportation department in New York. He became a senior sales representative specializing in railroad accounts, and later assistant manager of the transportation department. He became manager of the future demands department at the time of its creation in 1940.

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Carl A. Ilgenfritz has been elected vice president of purchases, United States Steel Corp. of Delaware, succeeding **Charles R. Miller Jr.**, who has retired. Since Sept., 1945, Mr. Ilgenfritz had been vice president in charge of purchases, Carnegie-Illinois Steel Corp., Pittsburgh. He began his career as a storekeeper with Youngstown Sheet & Tube Co., Youngstown, later serving in the mechanical department of that firm. In 1924, he became assistant purchasing agent for Youngstown Sheet & Tube. Mr. Miller joined U. S. Steel as an office boy for Carnegie Steel Co. in 1897. He became purchasing agent for the Carnegie company in 1918. When Carnegie-Illinois Steel Corp. was formed in 1935, Mr. Miller became purchasing agent for the Pittsburgh district, and in 1940 was appointed director of purchases, United States Steel Corp. of Delaware. He was elected vice president of purchases on Jan. 1, 1942.

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Malcolm E. Gregg, Milwaukee district sales manager, Inland Steel Co., Chicago, will retire, effective Jan. 1, 1947. Mr. Gregg joined Inland in 1924 as assistant district sales manager of the St. Paul office, following several years of service with Republic Iron & Steel Co., and Lackawanna Steel Co. In 1928, he was transferred to Inland's Milwaukee office as assistant district sales manager. He became district sales manager of that office in 1934. **P. M. Lorenz** has been appointed to succeed Mr. Gregg as manager at Milwaukee. Mr. Lorenz, who had been district manager of the firm's St. Louis office since 1936, transferred to Milwaukee on Dec. 1, and will assume his new position on Jan. 1. He joined Inland Steel in 1910, in the main office in Chicago. In 1919, he became manager of the newly formed Detroit office. He returned to Chicago after the Detroit office was closed in 1922. **A. C. Roeth Jr.** has been appointed St. Louis district sales manager of Inland Steel Co., succeeding Mr. Lorenz. He took over his new assignment on Dec. 1. Mr. Roeth joined the company in 1933, and worked in the steel mill at Indiana Harbor, Ind. He joined the sales department in 1936, and became assistant district sales manager in St. Louis in 1939. In 1941, he became a member of the iron and steel section, Office of Production Management, Washington. Mr. Roeth joined the Army in 1942, and, following his release last March, resumed his former position in Inland's St. Louis office.

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Don Long, merchandiser for Ekco Products Co., Chicago, has been promoted to assistant to the president of the company. In his new position, he will work on the development of new products.

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Otto E. Zahn has retired from American Wheelabrator & Equipment Corp. (formerly American Foundry Equipment Co.), Mishawaka, Ind., to set up his own consulting service in South Bend, Ind.

—o—

William E. Bott has been appointed chief electrical engineer, American Bridge Co., Pittsburgh, succeeding **C. B. Seagle**, who is retiring after 34 years with this United States Steel Corp. subsidiary. Mr. Bott joined American Bridge in 1915 as an electrician. In his new position, he will be in charge of all electrical engineering for the company's six structural steel fabricating plants. Mr. Seagle joined American Bridge after several years of testing and engineering work for General Electric Co., Schenectady, N. Y.

—o—

J. W. Hoover has been appointed general traffic manager, Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of United States Steel Corp., succeeding **C. W. Trust**, retired. In his new position, Mr. Hoover also will represent National Tube Co., American Bridge Co., H. C. Frick Coke Co., United States Coal & Coke Co., and Pittsburgh Limestone Corp. He joined Carnegie-Illinois in 1917 in the traffic department, and was promoted to assistant to vice president of operations in May, 1944.

—o—

Gilbert E. Collyer has been appointed district manager, Detroit office, H. K. Porter Co. Inc., Pittsburgh. Mr. Collyer had been serving in the company's general sales office in Pittsburgh, where he specialized in equipment for the processing industries, locomotives, railway specialties and springs.

—o—

Dr. C. Earl Webb has been appointed chief engineer, American Bridge Co., Pittsburgh, subsidiary of United States Steel Corp., succeeding **Dr. Charles F. Goodrich**, retired. Succeeding Dr. Webb as the company's Western Division engineer is **Albert P. Boysen**, who has been with American Bridge since 1912. Dr. Webb joined the company in 1914 as

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45—133

a draftsman in the Gary, Ind., plant. In 1922, he became designing engineer in the company's Chicago office, and in 1935 he was appointed Western Division engineer in Chicago. Since 1942, Mr. Boysen had been in charge of design for United States Steel building activities in the western district, including the design of structural steel for the corporation's newest subsidiary, the Geneva Steel Co. plant at Geneva, Utah.

—o—

Alfred S. Glossbrenner has been elected assistant vice president in charge of steel operations for the Youngstown Sheet & Tube Co., Youngstown, under J. L. Mauthe, vice president in charge of operations. Mr. Glossbrenner has been general superintendent of Youngstown manufacturing operations for the company. Appointment of **H. E. Englebaugh** as manager of Youngstown district operations also was announced by the company. He has been assistant general superintendent.

—o—

Howard C. Kaeff has been appointed general superintendent, strip and tin plate plant, Indiana Harbor works, Indiana Harbor, Ind., Youngstown Sheet & Tube Co., Youngstown. Mr. Kaeff was superintendent, cold reduction department, Fairfield, Ala., Tennessee Coal, Iron & Railway Co., Birmingham. His first association with the steel business was in Gary, Ind., in the hot strip mills and finishing department of Carnegie-Illinois Steel Corp., Pittsburgh, a subsidiary of United States Steel Corp., New York.

—o—

J. F. Simon Jr. has been appointed works manager, Paul & Beekman Division, Philadelphia, Portable Products Corp., Pittsburgh. He will be directly responsible for all production. Mr. Simon has been plant manager for the last 2 years, Roller-Smith Co., Bethlehem, Pa. Previously, he had been in Philadelphia with United Specialties Co. He spent 7 years as production manager, Carrier Corp., Syracuse, N. Y.

—o—

Eugene W. Fuller, division manager, Shakeproof Inc., a division of Illinois Tool Works, Chicago, has relinquished his additional position as sales manager to devote all of his time to directing the management of the entire Shakeproof organization. **B. F. Bales** has been named sales manager. He will co-ordinate sales, field engineering and advertising activities. Mr. Bales had been assistant advertising manager of the division. **Russell H. Maude,** who had been associated with the automotive phase of Shakeproof, has been appointed sales manager of the Detroit district. **John B. O'Connor,** who was Detroit district sales manager, has been appointed chief engineer for the division. **Walter M. Hanneman,** formerly chief engineer for Shakeproof, has joined the SEMS Licensee Division as chief engineer to assist and counsel licensees in the problems of design and production.

—o—

Edwin L. Hobson has been appointed assistant branch manager, New York office, Plastics Division, Springfield, Mass., Monsanto Chemical Co., St. Louis. He will report to **C. F. Reeves,** manager of the New York office. From 1937 to 1941, Mr. Hobson was a sales engineer for Bakelite Corp., New York. He served in the Army during the war, and entered Monsanto's service last May, following his release from the Army. A reorganization of the New England territory of the company's Plastics Division has been announced. In northern New England, sale of thermosetting molding materials will be the responsibility of **J. Douglas Kirk,** while **Winston Richter,** who formerly handled both thermosetting and thermoplastic materials, will devote his efforts entirely to the sale of thermoplastic materials. In southern New England, the sale of thermoplastic materials has been assigned to **William H. Face,** and thermosetting materials to **T. J. Martin.** Mr. Martin formerly handled both types of plastic sales.

—o—

Sherman M. Fairchild has been elected board chairman, and **James S. Ogsbury,** president and director, Fairchild Industries Inc., Burlington, Vt., a subsidiary of Fairchild Camera & Instrument Co., Jamaica, N. Y. Both men hold similar offices with the parent company. Other officers of the subsidiary are: **J. H. Dalton,** vice president and treasurer; **J. S. Ogsbury Jr.,** vice president and secretary; and **John Carter,** assistant vice president in charge of production. Those men, and **Ernest Robinson,** senior vice president and general manager at Jamaica, are directors of the subsidiary.

PAUL W. POLK

Appointed president and manager, Threadwell Tap & Die Co., Greenfield, Mass., noted in STEEL, Dec. 2 issue, p. 100.

—o—

Thomas H. Miller has been promoted to the post of assistant director, United States Bureau of Mines. He has been with the bureau for nearly 20 years, and recently had served as assistant chief of its economics and statistics branch. In this post, he handled much of the bureau's statistical information on strategic metals during the war.

—o—

Joseph M. O'Brien, Philadelphia, has been appointed eastern sales manager, Central West Coal Co., Columbus, O.

—o—

John J. Healy Jr. has been appointed assistant general manager, Merrimac Division, Everett, Mass., Monsanto Chemical Co., St. Louis. He was director of development for the division, which he joined in 1921. In his new position, Mr. Healy will continue to carry the responsibility for co-ordination of the division's current expansion program. **L. F. Loutrel** will succeed Mr. Healy as director of the Plastic Division's development department.

—o—

L. W. Mason has been appointed manager, Pittsburgh sales office, National Tube Co., Pittsburgh, subsidiary of United States Steel Corp. He will be in charge of sales for all National Tube products in western Pennsylvania, West Virginia, Ohio, and eastern Kentucky. Mr. Mason had been in charge of the company's Detroit sales office since last July. He joined National Tube in 1923, as a buyer in the purchasing department. In 1930, he was named assistant purchasing agent. When the company's Tubular Division was opened in Gary, Ind., in 1942, he became manager of purchases there. Later Mr. Mason was transferred to Washington, as assistant to the company's general manager of sales. **C. E. Kennish,** who had been acting manager of the company's Pittsburgh sales office, has been named assistant manager of sales in Pittsburgh.

—o—

R. C. Todd, assistant general sales manager, and since 1931 an assistant vice president, American Rolling Mill Co., Middletown, O., has been elected a vice president of the company. He has been with the organization 46 years. **G. F. Ahlbrandt,** since 1909 in the sales department of the culvert sheets department, has been elected a vice president

WILLIAM K. GREENE

Appointed assistant division engineer, Chicago district, American Bridge Co., Pittsburgh, noted in STEEL, Nov. 4 issue, p. 90.

WILLIAM T. KELLY JR.

Who has been appointed a vice president, American Brake Shoe Co., New York, noted in STEEL, Nov. 25 issue, p. 60.

A. C. TEXTER

Appointed assistant general superintendent, Atlas Steels Ltd., Welland, Ont., noted in STEEL, Nov. 18 issue, p. 74.

of the company. He joined the firm 42 years ago, as a chemist. **Dr. Anson Hayes**, director of research since 1929, has also been appointed a vice president of the company, which he joined in 1928.

—o—

Richard C. Gerdes has been appointed Chicago district supervisor of production planning, American Steel & Wire Co., Cleveland, a subsidiary of United States Steel Corp., succeeding **J. A. Robinson**, who is retiring after 46 years of service with the company. Mr. Gerdes had been works supervisor of production planning at the firm's Joliet works for the last 3 years. He joined the company in 1929, in the office of the manager of operations, Chicago district.

—o—

Robert Walsh has been appointed head of the newly established automotive and export department, at the Wilmington, Del., plant, American Car & Foundry Co., New York. Mr. Walsh served his engineering apprenticeship with British Westinghouse Electrical & Mfg. Co. (now Metropolitan-Vickers Electrical Co.). He came to the United States in 1925 to take the test course of General Electric Co., Schenectady, N. Y. He entered the locomotive engineering department of that company in March, 1926, where he remained until joining American Car & Foundry Co.

—o—

John T. Casey has been appointed director of public relations, Jack & Heintz Precision Industries Inc., Cleveland. Since his release from the Navy last February, Mr. Casey had been with Ivy Lee & T. J. Ross Inc., New York, a public relations firm. Before the war, he directed his own public relations organization in New York. He is also a former Washington correspondent.

OBITUARIES . . .

Edward G. Budd, 75, founder and president, Budd Co., Philadelphia, who directed the development of the all steel automobile body, died at his home in Philadelphia, Nov. 30. Mr. Budd established Edward G. Budd Mfg. Co. in 1912, and Budd Wheel Co. in 1916. The two were merged last June into Budd Co., with plants in Philadelphia and Detroit.

—o—

Charles W. Borg, 85, pioneer Moline, Ill., manufacturer who invented a successful automobile clutch in 1904, died recently in Moline. Mr. Borg's company, Borg & Beck, was the predecessor of Borg-Warner Corp., Chicago.

—o—

Harold W. LaGanke, 50, manager of distributor sales, National Screw & Mfg. Co., Cleveland, died recently. Mr. LaGanke had been with the firm 29 years.

—o—

William R. Palmer, 89, who retired in 1943 after 70 years in the steel industry, died Nov. 30. Mr. Palmer began his career in 1873 with Cleveland Rolling Mill Co., which was later absorbed into American Steel & Wire Co., Cleveland, a subsidiary of United States Steel Corp. Later he became general superintendent at Ensley, Ala., for Tennessee Coal, Iron & Railroad Co., Birmingham. He was then appointed vice president and general manager, American Tube & Stamping Co., Bridgeport, Conn.

—o—

Walter O. Kurtz, 54, secretary-treasurer, Peninsular Steel Co., Cleveland, died in that city, Nov. 28. He joined the company shortly after World War I, and had held his position as secretary-treasurer for several years.

—o—

William W. Hodgson, 66, chief industrial engineer in Chicago until his retirement early this year, Continental Can Co. Inc., New York, died in Oak Park, Ill., Nov. 30.

—o—

Herbert W. Young, 71, founder and president, Delta-Star Electric Co., Chicago, died in that city, Nov. 25.

—o—

Clayton A. Dunham, 70, founder and chairman, C. A. Dunham Co., Chicago, died recently in Evanston, Ill. Internationally known as a heating engineer and inventor of heating appliances and systems, he had retired as the company's president last January.

—o—

Gilbert McMurtrie, 54, vice president and treasurer, Terre Haute Malleable & Mfg. Corp., Terre Haute, Ind., died recently in that city.

—o—

William Werme, 65, director and general superintendent, Worcester Pressed Steel Co., Worcester, Mass., died recently in that city. He had been with the company since 1905.

—o—

Sidney W. Wray, 55, sales manager, Washburn Wire Co., Phillipsdale, R. I., died in Providence, R. I., Dec. 1.

—o—

Fred Bissell, 81, one of the founders of Vacuum Cleaner Manufacturers' Association in 1913, and its first secretary-treasurer, died Nov. 28, at his home in Toledo, O. Mr. Bissell was elected honorary life member of the organization in 1938. Mr. Bissell founded Bissell Motor Co. in 1909.

Manufacturing Abrasive Buffing

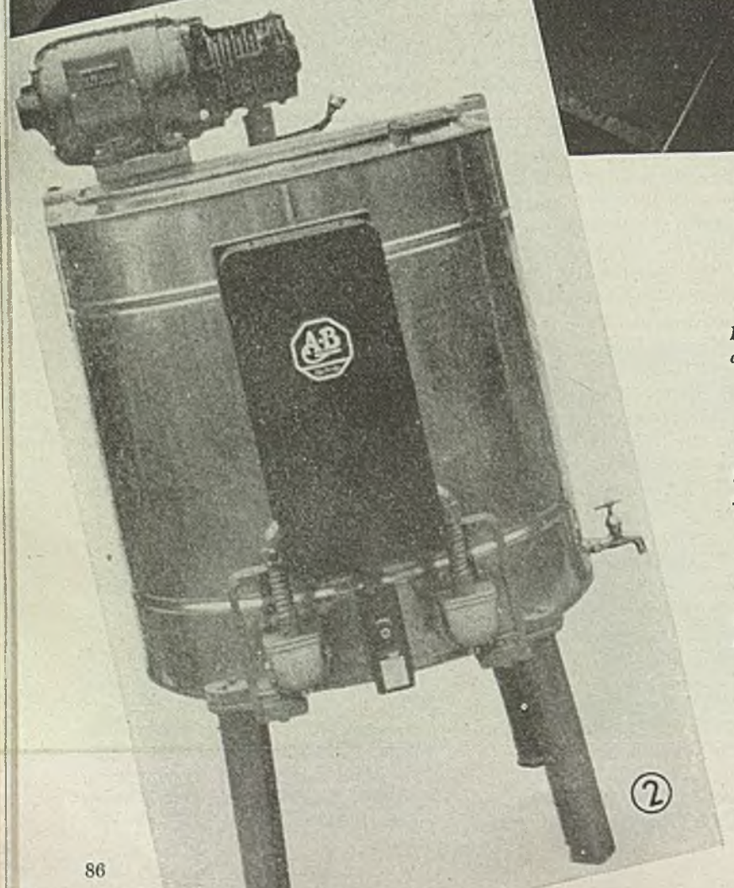
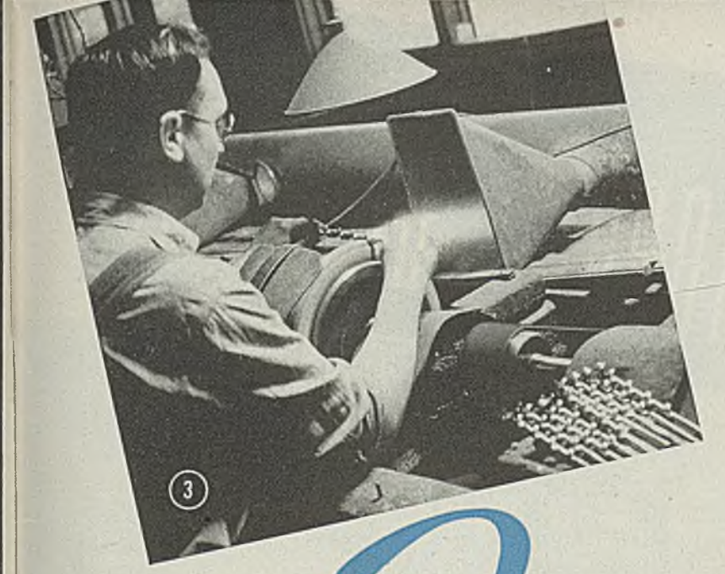


Fig. 1—Cultivator disk being polished here rotates on a central pivot to permit wheel to cover surface uniformly. Photo courtesy Norton Co.

Fig. 2—Glue heater and mixer of double-jacketed construction permits use of hot water or steam for heating. Photo courtesy New Advance Machinery Co.

Fig. 3—Polishing auger bits. Special suction hood provided behind the wheel carries dust into central suction system. Photo courtesy Norton Co.



By JOHN E. HYLER

In this first of a series of articles the author discusses some of the techniques employed in preparing abrasives and setting up polishing wheels

and Polishing Wheels

UNTIL recently, buffing and polishing did not have the benefit of as much research as has been devoted to other branches of the abrasive industry. As the result of well deserved though belated attention, familiar processes have been improved and new methods and machines introduced.

Some authorities differentiate between polishing and buffing. They hold that polishing means any operation involving wheels set up with abrasive grains and adhesive. They define buffing as including those operations in which buffing compound is applied to the periphery of the wheel while the work is in process. The writer has no objection to these definitions. This series of articles includes both, together with certain other abrasive smoothing operations.

In most cases, polishing operations as just defined precede buffing. Hence, care exercised in polishing makes buffing simpler and easier. It is essential to eliminate "wild" scratches from polishing. Manufacturers of abrasive grains for polishing have done much to help along the good cause. They insure uniformity of grain size through improved crushing methods, better sieving, etc. Badly-shaped grains—especially flats and slivers—are removed. If grains are purchased from dependable sources and if wheels are properly set up, wild scratches should be things of the past.

In plants where various abrasive grain sizes are used, never hang set-up wheels where stray grains dropping from them can get into a batch of smaller size. Otherwise, scratches will result just as though the grain had not been properly graded. There was a time when abrasive grain let loose from the wheel face so easily that much of it was scarcely dulled or reduced in size. In those days, many polishing departments in large plants reclaimed abrasive grain collected from polishing hoods. Progress in development of polishing abrasives, and in bonding methods giving far greater holding capacity on the face of the wheel, now makes such procedure unnecessary in most cases.

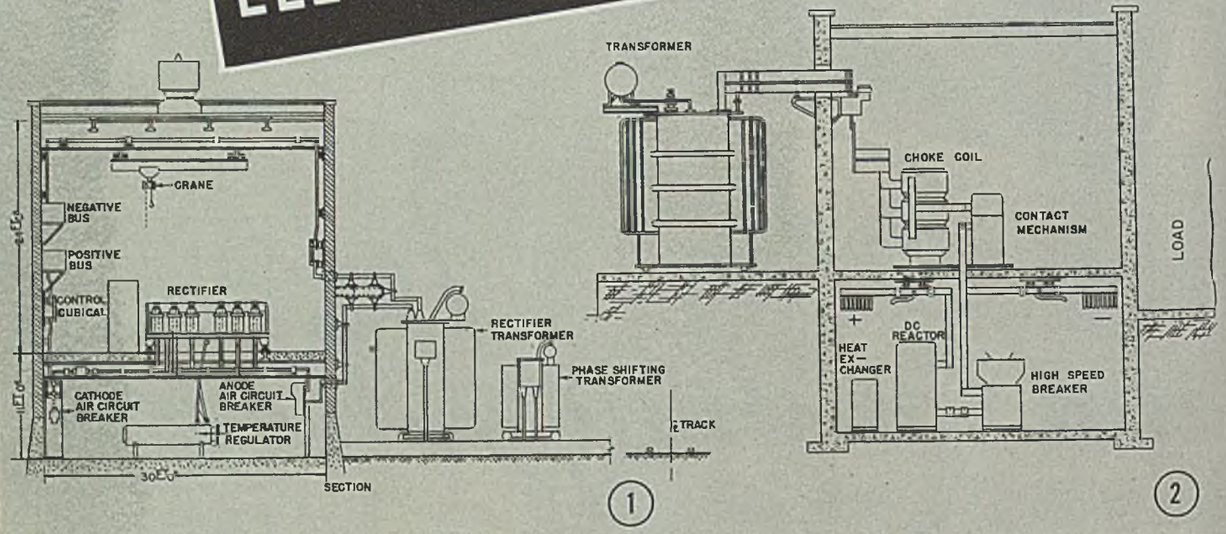
Greater holding capacity is obtained through better capillarity and greater surface tenacity. Capillarity is the ability of abrasive grain to receive, or to become wet with, the glue film. The term surface tenacity means the "gripping effect" between abrasive grain and glue. Methods also have been developed for testing and regulating tenacity. Such regulation makes it possible to give abrasive grain different adhesive values, while using the same adhesive. Abrasive grain with high surface tenacity automatically will produce an open coat effect on the face of a polishing wheel. This allows a greater amount of useful work to be done with a given amount of grain.

Opinion as to size of abrasive grain best suited for polishing any given product, or range of grain sizes used, varies somewhat with different manufacturers. Nor are polishers fully agreed on this. However, abrasive manufacturers are in a position (*Please turn to Page* 142)

Advances in ELECTROGRAPHIC ANALYSIS

. . . plating, rustproofing, rectification, power supply and other related fields revealed at the 90th regular convention of the Electrochemical Society at Toronto

By ALLEN G. GRAY
Consulting Editor, STEEL



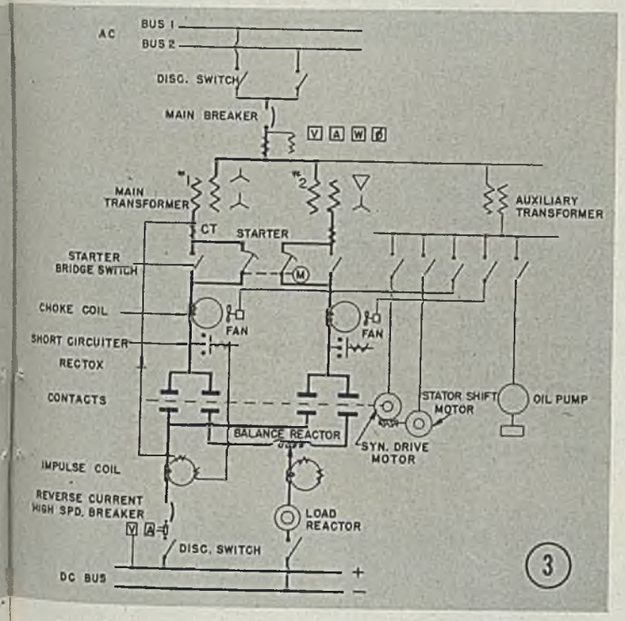


Fig. 1—Cross-section of 60,000-amp rectifier building for use in electrometallurgical industries

Fig. 2—Cross-section of typical contact converter installation

Fig. 3—Schematic diagram of contact converter, 12 phase, 10,000 amp

AN agenda characterized by a well-rounded variety of technical papers in which were described many new developments in electrochemistry, metallurgy, and related fields featured the 90th regular convention of the Electrochemical Society at Toronto, Canada, Oct. 16 to 19.

Codeposition of Tungsten-Nickel Alloys: At the opening session on electrodeposition, M. L. Holt and L. E. Vaaler of the University of Wisconsin described a new aqueous plating bath for the electrodeposition of corrosion-resistant tungsten-nickel alloys. The bath contains sodium tungstate, citric acid, nickel sulphate and ammonium hydroxide. When this type of bath was operated at various concentrations and conditions of electrolysis, it was found to yield bright, shiny cathode deposits containing from 10 to 35 per cent tungsten. The maximum tungsten content was obtained in the tungsten-nickel alloy deposit from a bath of low nickel concentration; high tungstate concentration; minimum citric acid concentration; a bath pH of about 7; a high bath temperature; and a fairly high cathode current density.

The most satisfactory bath contained 20 gram-liters $NiSO_4 .6H_2O$; 50 gram-liters $Na_2SO_4 .2H_2O$; 66 gram-liters citric acid; and a definite amount of ammonium hydroxide to give a bath pH of about 8. When this bath was used at a temperature of 70°C and a current density of 7 to 15 amp./dm², the bright shiny cathode deposit contained about 35 per cent tungsten and the cathode current efficiency was 40 to 45 per cent.

It was suggested by Holt and Vaaler in their presentation that complex ions formed in the bath have much to do with cathode current efficiency as well as appearance and composition of the tungsten-nickel alloy deposits.

Electrographic Methods of Analysis: In a session on the mechanism of electrode processes E. A. Arnold of Case School of Applied Science, pointed out some practical applications of electrographic methods of analysis in the metallurgical industry. The usual methods of chemical analysis require that the sample of metal to be analyzed be dissolved in suitable solvents before the confirming reactions are tried.

The technique of electrographic analysis is based on the fact that if a metal be made the anode toward an inert metal cathode in an electrolytic cell, the metals of the anode dissolve from the surface and pass into the electrolyte as ions. If the necessary electrolyte is soaked in a piece of bibulous paper such as filter paper, the charged ions leaving the anode (specimen) are directed toward the cathode and lateral diffusion is reduced to a minimum. If, in solution in the filter paper in addition to the electrolyte, a reagent forming an insoluble colored compound with the metallic ion, is present, the color stain so produced is an exact image of the surface electrolyzed.

Thus, it is evident that the color intensity of the stain on the paper is proportional to the time interval during which current flows as well as the percentage of the metallic ion present in the sample. By controlling the time and current in a series of stains the method may be made quantitative by comparing the color intensity of an unknown stain with a series of stains produced by known amounts of the metallic ion.

Advantages of the method are that the time consumed is less than that required for the conventional type of analysis and the sample actually dissolved off the surface of the metal is so small as to be negligible. Also when a given sample is dissolved and analyzed by conventional methods, the average composition of the particular sample taken is obtained and no information as to the homogeneity of the sample is shown. Because of the lack of lateral diffusion during solution by the electrographic technique, the print obtained shows inhomogeneity of the particular metal surface electrolyzed.

Some examples of this technique were pointed out by Arnold. It was desired to examine a piece of steel electro-plated in the usual way with coats of copper, nickel, and finally chromium, for pinholes in the outer chrome plate. The sample was made an anode against an inert platinum cathode with a piece of bibulous paper saturated with a solution containing dimethyl glyoxime and barium hydroxide. The chromium on leaving the surface of the specimen went into the electrolyte as the chromate ion which in turn reacted with the barium hydroxide to form yellow, insoluble barium chromate.

Where a pinhole in the plate exists, nickel from the undercoat goes into solution as the divalent nickel-ion which in turn reacts with the dimethyl glyoxime to form the characteristic insoluble red precipitate. The matter of locating and counting the pinholes is very simple.

The differentiation of leaded brass from the ordinary binary brass becomes a very simple matter using the electrographic technique. A sample of metal is subjected to electrographic solution using a bibulous paper containing a solution of sodium carbonate. Following this the print is treated in a solution of (*Please turn to Page* 146)

TABLE I
CLASSIFICATION OF PHOSPHATE COATINGS FOR STEEL

Method of Application	Coating Time	Approx. Coating Wt. per sq. dm	General Use	Typical Articles Coated
Immersion	30 to 60 min.	100 to 200 mg.	Corrosion preventive	Nuts, bolts, screws and small parts
Immersion	2 to 5 min.	30 to 60 mg.	Base for paint—Drawing aid	Stampings, etc.
Spray	1 min.	10 to 30 mg.	Base for paint	Auto bodies, refrigerators
Brush or Roller	3 to 10 sec.	5 to 10 mg.	Base for paint	Sheet & strip stock
Immersion	10 to 15 min.	150 to 700 mg.	Wear prevention	Pistons, rings, liners, gears, etc.

Lubricating hot strip mills

Increased speed of hot strip mills currently emphasizes the importance of lubrication under high temperature, and water and scale contamination conditions. Proper types of grease and oil for roller bearings, screwdowns, couplings, pinions, gears, coilers and other machinery are recommended

By A. F. BREWER
Mechanical Engineer
and
W. H. MANDY
Lubrication Engineer
The Texas Co.
New York

STRIP steel became a major product of the iron and steel industry when the automotive industry popularized highway transportation. Mass production of automobile bodies, truck cabs and other parts which are shaped under pressure, required steel in strips or sheets, rolled to accurate gage, and cut to specific widths and lengths. Strip steel was the answer.

At first, strip steel rolling was a relatively leisurely process, the mills rolling continuously in one direction producing around 300 ft of steel per minute. Through the ensuing years which preceded the latest war-time requirements, the procedure changed radically. Over a period of scarcely 10 years the rate of production was stepped up to around 2300 fpm; hot strip rolling was perfected; reversing mills were installed; then the modern 4-high tandem cold reduction stands, the temper pass mills, and more recently, specialized machinery such as the Sendzimir mill. Today the industry is preparing to produce at a rate approaching 5000 fpm. This means tens of thousands of miles of strip steel in a working day for the entire steel industry.

Postwar requirements are causing this fantastic rate of production, also prompting changes in mill design and operation making lubrication even more important than ever. Higher rolling speeds meant more work for the lubricants, greater use of water on hot mills meant greater chance of lubricant contamination. Then the lubrication engineer in the steel mill became an important personage. Today he must be an authority on bearing materials, methods of lubrication as well as means for preserving the lubricating ability of oils that are used in service.

Hot strip rolling starts with the slab which has been rolled from the ingot at the slabbing or blooming mill. The slab is charged into the rear end of a slab reheating furnace and discharged at the front onto the furnace table. From here it goes to the roughing stands. The first is a 2-high scale breaker stand. Then the slab goes through four 4-high roughing stands each of which is usually equipped with vertical as well as horizontal rolls. These are known as universal roughing stands. If the vertical rolls are installed on separate units they are termed vertical edger stands. As the steel goes through the roughing stands a considerable volume of water at high pressure is blown over the surface to wash off scale.

From the roughing stands the strip is passed to the finishing train which involves another 2-high scale breaker, then five or six 4-high finishing stands.

Lubricating under high temperature, high speed, water and scale-contamination conditions is a problem. It pertains particularly to the work roll bearings and backup roll bearings, and indirectly to the screwdown drives, universal couplings, pinion stands and reduction gears, table roll bearings and coiler.

Roller bearings on the work rolls usually are grease lubricated by automatic pressure systems. As the load is carried by the backup rolls, high pressure is not a factor on a work roll bearing. Temperature and contamination, however, are factors that may have an adverse effect unless the bearings are properly sealed to prevent leakage, and the lubricant is specially compounded to function over a wide temperature range. A grease having extreme pressure characteristics, which will pump readily through long lines even under low atmospheric temperatures, which will seal the bearing against entry of contaminants and carry the prevailing loads without separation, in considered best for such service.

Backup rolls can be mounted on roller bearings, grease lubricated by the same system as the work rolls, or they can be carried in specially designed sleeve bearings and lubricated by an oil circulating system. As the backup rolls carry most of the load the nature of the oil, its rate of circulation and temperature control, and the way it is kept free from contaminants, all affect its lubricating ability.

The modern trend is toward circulating systems of greater capacity than were formerly considered necessary; also means which will allow more time for the oil to rest. Two large settling tanks are essential in this connection, of capacity up to 5000 gals (or even greater) each according to the number of bearings involved.

Modern speed conditions have more recently favored consideration of two oiling systems; one for the lower speed roughing stands and one for the higher speed finishing stands. This

1. Permits better choice of oils of the right viscosity for running speeds.
2. Facilitates the use of smaller capacity oiling systems.
3. Involves less loss of oil by contamination in case of defective seals.
4. Eliminates long piping layouts and enables generally a more simple arrangement.

Screwdown controls the space between the work rolls, and, as a result, the gage or thickness of the strip; it is

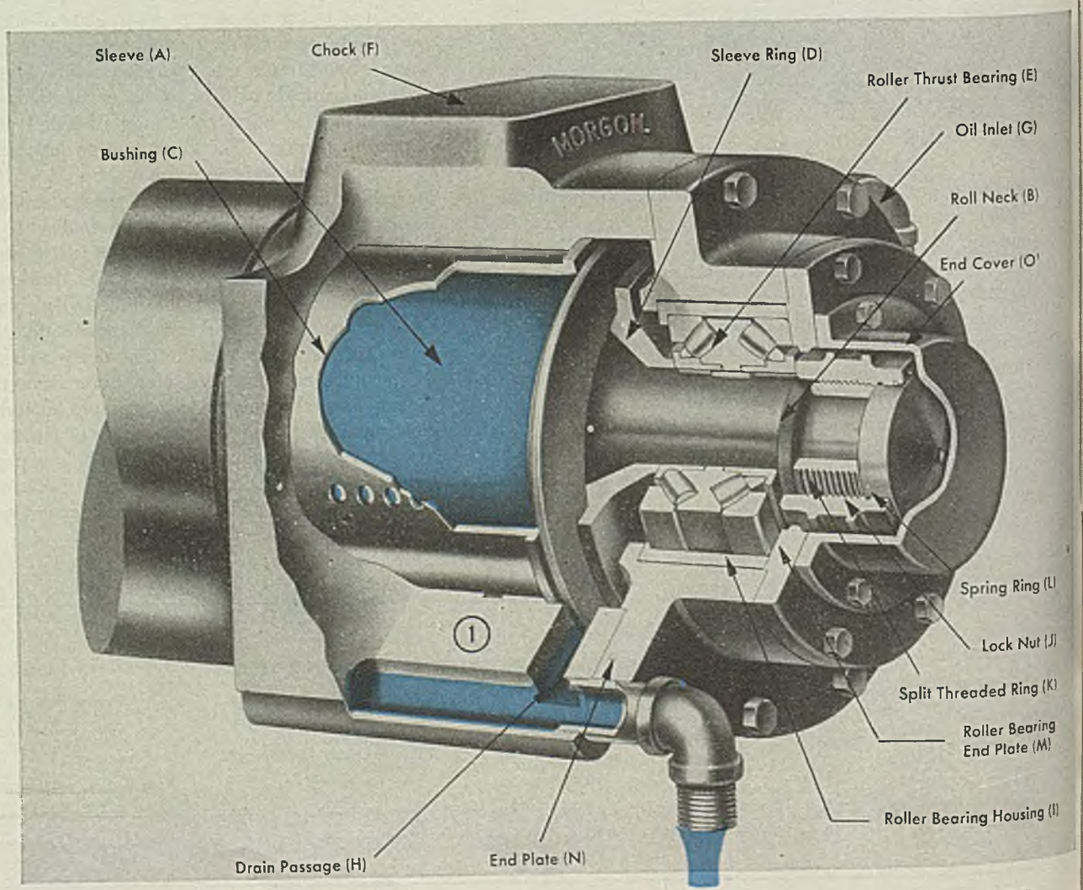


Fig. 1—Structural details of Morgoil bearing showing the roller thrust bearing

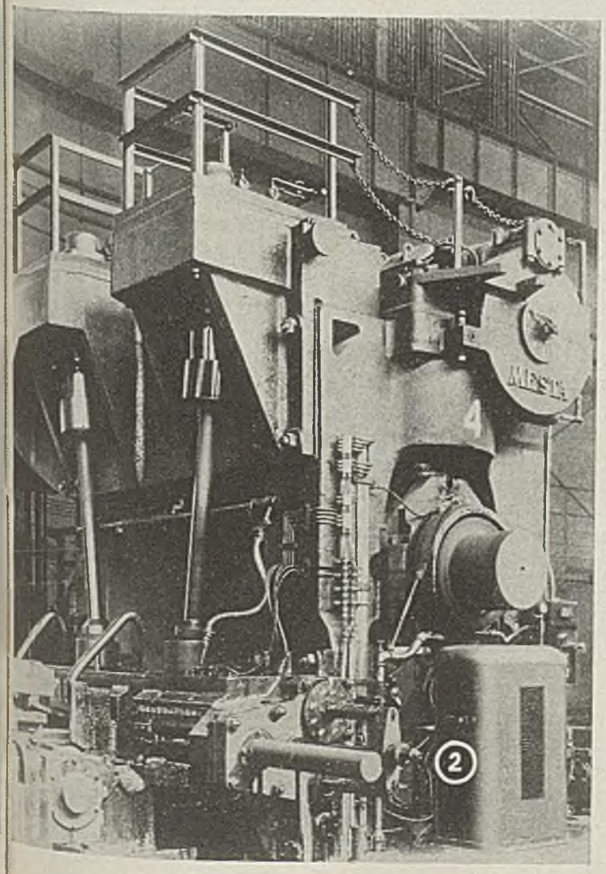
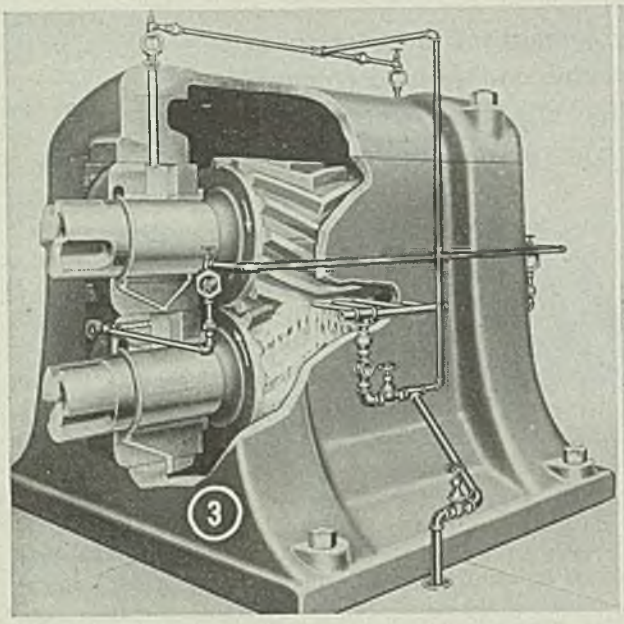
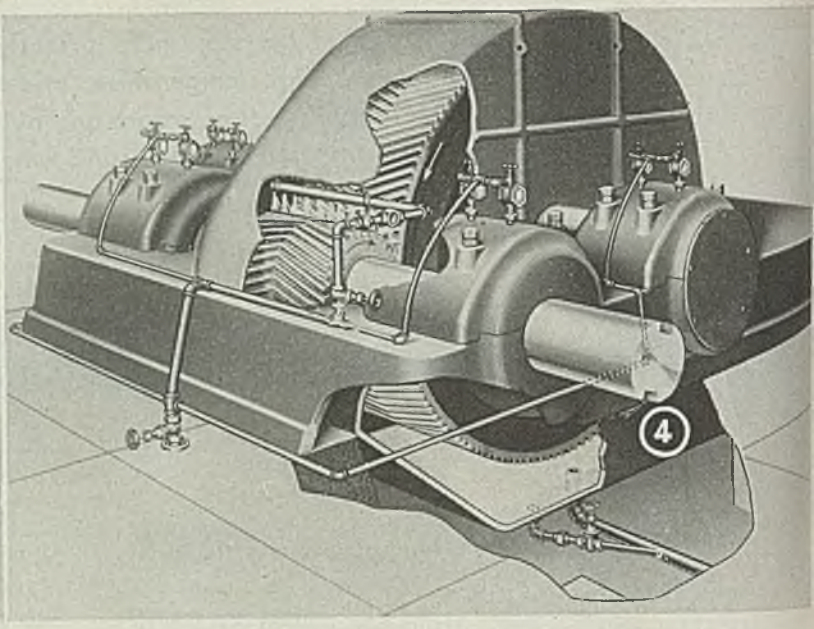


Fig. 2—Hot mill roughing stand showing centralized system of grease lubrication





comparable to the screwdown on the old-fashioned home laundry wringer. The modern steel mill screwdown is motor driven; it is a heavy duty device designed to withstand high shock loads.

Lubrication of the screw can present a problem if the threads of the screws are not properly protected by a shock-resistant film of lubricant. These are versatile elements, however, and lend themselves either to oil or grease lubrication.

When oil is desired, a circulating system is provided which serves many or all of the screwdowns in the mill. For this type of lubrication a mild, noncorrosive grade of extreme pressure oil is widely used.

Grease lubricated screwdowns can be individually lubricated by a unit greasing system, or a centralized pressure system can be used. Here again a lubricant possessing E. P. (extreme pressure) characteristics is most reliable.

Universal couplings are widely used in the modern strip mill rolling either hot or cold. They facilitate alignment between the rolls and the pinion stands.

Strip mill universal couplings are grease lubricated by unit pressure gun fittings. The problem in such a coupling is to keep an adequate film of lubricant between the brass, bronze or nonmetallic slippers which form the bearing contacts. Load is a factor, also leakage must be considered, hence the preference for an adhesive type of grease with good load-carrying ability. Some operators favor using the same grease as is used on the work-roll bearings.

Pinion stands and reduction gears which function as the main drives for the rolls are built to withstand extremely heavy loads, as the impact of the steel as it enters the rolls is reacted through the roll necks directly to the pinion and gear teeth. The designer has therefore planned such units virtually as precision mechanisms. Effective lubrication enables the mill to keep them in most efficient operation.

To this end, pinion stands are completely enclosed. Two schools of thought prevail as to their lubrication:

1. Lubricating the gear teeth and bearings separately. This involves a separate oil circulating system for each stand, the circulating pumps being driven by one motor.
2. Using the same lubricating system for both the pinion teeth as well as the bearings.

Where two systems are used, it is possible to use a more viscous, mild, noncorrosive type of E. P. oil for the pinions, and a less viscous oil for the bearings. When the oil serves both pinions and bearings, the lubricating engineer must seek a happy medium and use an E. P. lubricant light enough for the bearings but still able to protect the gear.

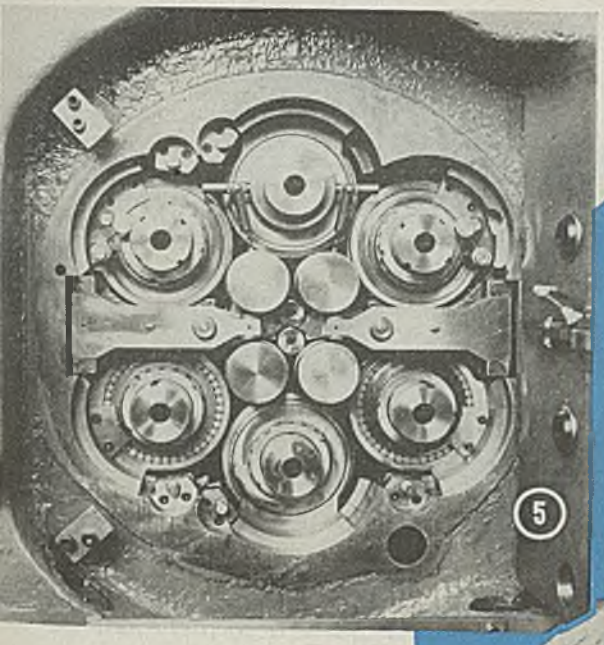
The gears and bearings of reduction gear drives are normally splash lubricated, with a mild noncorrosive E. P. oil ranging in viscosity from 900 to 2400 sec at 100° F.

Strip steel, as it passes from stand to stand is handled by table rolls; the bearings for these rolls are generally roller type. Most mills prefer the same grease as is used on their work roll bearings, in order to keep the number of lubricants at a minimum, applying same by a centralized pressure greasing system. This may be a unit system, although smaller sections of table rolls between stands can be lubricated from the same system as the work roll bearings.

The lubricating conditions can be severe on table roll bearings as, for example, on the runout table to the coiler where a flood of water is applied to the strip for cooling. This can cause grease contamination. Heat can be a factor on sections where water spray is absent, or when the strip lies on rolls for some time without moving should a "cobble" have occurred. For this reason, an all-purpose grease capable of standing water and heat is desirable. E.P. characteristics are not necessary, yet some mills use the same E.P. grease as is used on their work roll bearings to reduce the number of lubricants being handled.

The shaft bearings for the table roll mitre gears are normally grease lubricated with the same grease as used on the table roll bearings. The gears are splash lubricated with a mild, noncorrosive E.P. gear oil or the same straight mineral oil as is used on the backup rolls.

The coiler (or reel as it is called in cold mills) automatically rolls or coils the strip after it has passed through



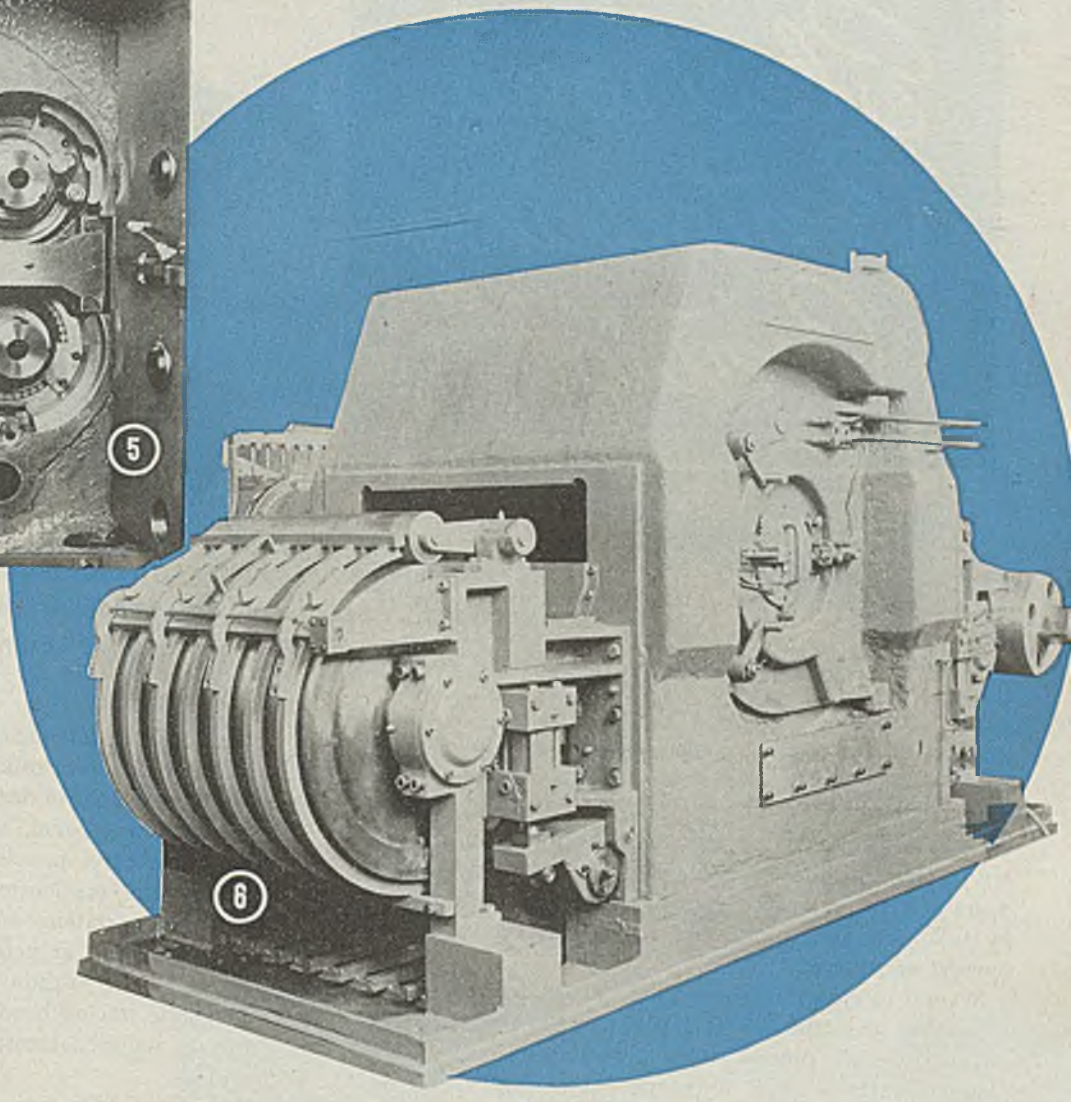


Fig. 3—Method of lubricating gear teeth and bearings of pinion stand

Fig. 4—Typical reduction gear drive installation showing method of lubricating gear teeth and bearings

Fig. 5—Housing door of Sendzimir mill removed

Fig. 6—Exterior view of Sendzimir cold-reducing mill showing arrangement of rolls

the last finishing stand. The coiler or reel comprises a rotating member surrounded by segments containing two guide rolls each. These rolls are carried on roller bearings provided for grease lubrication. Protection of these bearings is important due to the heat which is still retained by the strip, and the water which sometimes deluges the coil during winding. The problem, however, is not so much to find a suitable grease, as to protect the distributing pipes of the pressure lubrication system, against the flapping end of the strip as each coil completes its winding and is discharged from the machine. A good quality lime soap grease containing about 1100/1200 sec (Saybolt Universal Viscosity at 100° F) oil will perform satisfactorily if fed through delivery pipes which can be more or less molded to the end surfaces of the roll segments and thereby kept away from the end of the coil; guards are not entirely dependable as they are too easily knocked off.

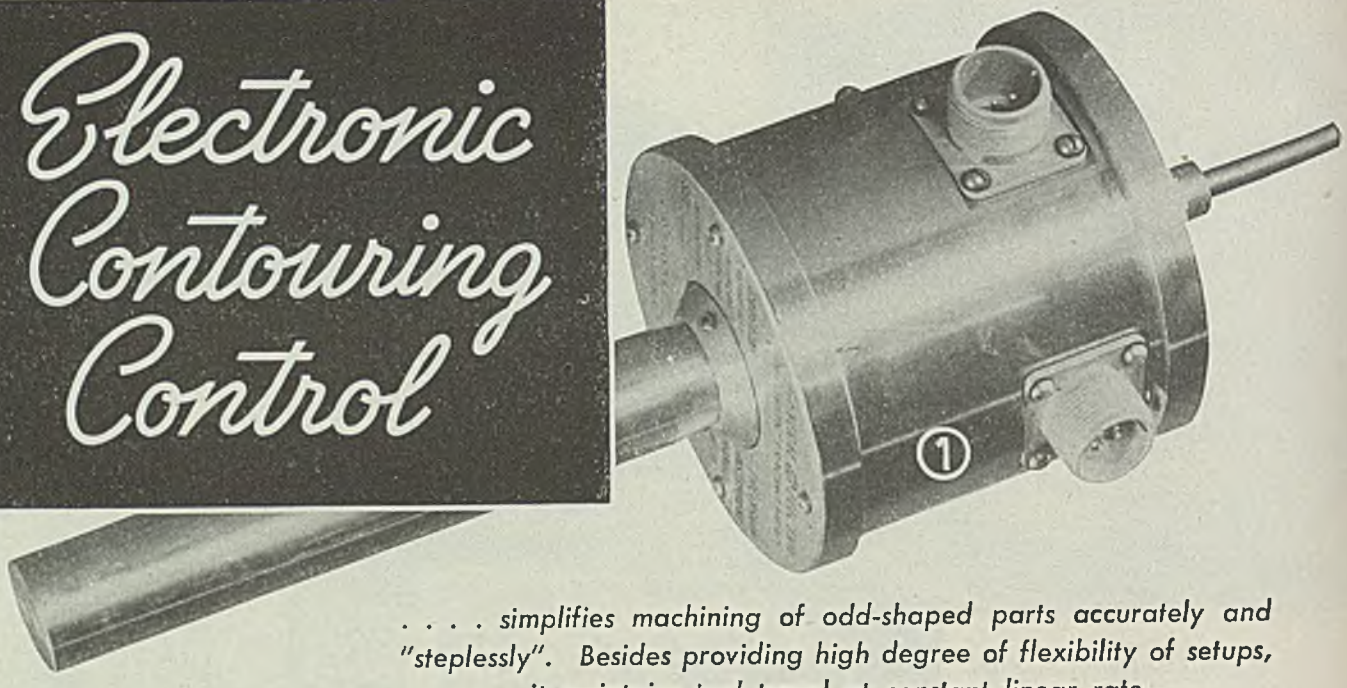
Cold reduction of strip steel involves the strip after it has passed through a number of previous reductions and been coiled. In the cold reduction department it is passed through raw coil pickling lines, uncoiled, run through a hot acid bath, then a water washing bath, dried by hot air and recoiled.

Bearings on the uncoiler and feed rolls are exposed to heat, acid and water. Also some contamination of the bearing lubricant with palm oil may occur. Palm oil or a light straight mineral oil is used to protect the surface of the strip as it leaves the pickling stage. An uncoiler in a cold reduction mill feeds the strip through three, four or five stands of the 4-high tandem cold reduction mills. The work rolls and backup rolls on these mills are similar to those used on hot strip mills and lubricated in like manner.

The type of roll oil which is ordinarily used depends on the gage of the strip. Heavier steels can be rolled with a 75 to 100 sec Saybolt at 100° F paraffin base oil; while on the lighter steels that are to be rolled, soluble oil-water mixtures, palm oil or water plus palm oil are employed.

Straight mineral roll oils in contact with bearing lubricants tend to thin them down; soluble oils or palm oil introduce a fatty oil which, when mixed with the bearing circulating oil, promotes permanent emulsions. Cold reduction mills however, are well-designed to retard such contamination; also there are no high pressure hydraulic sprays required since there is no scale problem. The water conditions, therefore, are not (*Please turn to Page* 154)

Electronic Contouring Control



. . . . simplifies machining of odd-shaped parts accurately and "steplessly". Besides providing high degree of flexibility of setups, it maintains tool travel at constant linear rate

AS in all contouring control systems—hydraulic, pneumatic, mechanical, or electrical—the basic problem is to guide the tool in machining odd-shaped work, such as cams or dies—work that cannot be machined on a standard machine without excessive attention on the part of the operator. Such manual control usually is accomplished by following and duplicating the contours of a master templet or pattern.

Several electronically-controlled devices have been developed to make the task of duplicating a simple and more or less automatic process. One of the latest developments along these lines is an automatic contouring control developed by General Electric engineers.

This new system takes advantage of inherent characteristics of basic electronic circuits. It features a "positioning-follow-up" control that is completely electrical and highly accurate. It provides continuous instead of step-by-step control, a constant speed tool travel, and unusual flexibility.

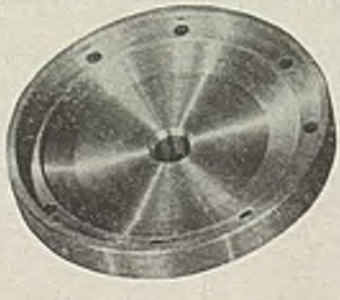
In the following discussion, description of the motor control circuits involved is abbreviated to avoid repetition of other articles on the same or related subjects. Further, to avoid confusion, it is limited to contouring in a milling machine, in the horizontal plane only. In a machine with provision for controlling vertical feed, it is simple to switch from one of the feeds being controlled to the vertical feed, at the same time re-orienting the tracing head. Principle of operation as described is the same.

The complete electronic contouring control equipment involves the following:

1. A machine tool. This may be a lathe, boring mill, or —as in this case—a milling machine, so constructed that two feed motors can be connected directly to corresponding lead screws.
2. Two feed motors. One is geared to the cross-feed lead screw, the other to the longitudinal-feed lead screw. Size of motors depends on the machine.
3. Motor control. This is floor-mounted and contains electronic control panels for both feed motors. Size of thyratron power tubes used depends on feed motors.
4. Contouring control desk. This is a bench-board type, floor-mounted panel, and contains the electronic contouring control panels. Pushbuttons, and potentiometers, etc., are located on its sloping top. Separate pushbutton stations sometimes are used. They can be either fixed or pendant, and may be in place of, or in addition to those on the contouring control desk.
5. Magnetic tracing head, Fig. 1. This is mounted rigidly in required location with respect to the cutting tool.
6. Templet and its support. Templet is rigidly mounted in proper relation to work, to provide free access for tracing head stylus.

Fig. 6 shows schematically how these components are co-ordinated. Functioning is that of a closed-loop control system or, more specifically, a "positioning-follow-up" control system. When templet is in contact with stylus, tracing head generates signals which after being amplified, "mixed", "bent" and "translated," are fed into the motor control panel. The motor controls so govern speed and direction of rotation of corresponding feed motors as to actuate the templet-carrying table in such manner that the stylus, "feels" along the edge of the templet.

By J. M. MORGAN
Control Engineering Division
General Electric Co.
Schenectady, N. Y.



Motor control panel can be set back of the machine, out of the way. Unless separate pushbutton stations are used, contouring control desk should be set where it is most convenient for operator.

Magnetic tracing head is located in fixed relationship to the cutting tool. It can be mounted by a clamp around the cylindrical arbor at the top, or it can be set in a cavity in the supporting frame. In either case, the stylus must have free access to the edge of templet. In addition, the tracing head must be properly oriented. Stylus must be perpendicular to plane of contouring, and axis of each set of tracing head coils must be parallel to corresponding feed motion.

Templet is mounted to maintain a fixed relationship with work. Tracing head and templet should be adjusted with respect to each other to simplify initial tool line-up. Either or both can be adjustable, depending on mechanical layout of the machine.

One feed motor is connected to the longitudinal-feed lead screw, the other to the cross-feed lead screw. There is no gearing or direct mechanical tie between the two feeds. They must be independent of each other.

The power supply and oscillator supplies direct-current voltage used in various circuits. Also 2000-cycle ac is provided through the medium of standard type vacuum tube oscillator and power amplifier. This 2000-cycle voltage is used for faster speed of response, and more efficient use of the variable inductances in the tracing head. Voltage from the power amplifier is fed into a phase-shift bridge which, by a resistor-capacitor combination, provides two output voltages 90 degrees out of phase.

The two output voltages, designated "reference" and "quadrature," are fed to corresponding translator circuits. In addition, they are stepped down and fed to corresponding tracing head bridge circuits, of which two sets of variable inductances in tracing head are a part.

Signals used for operating the equipment under automatic contouring conditions are "generated" in the magnetic tracing head, Fig. 1. Latter contains four variable inductances. When the tracing head is properly oriented, two of these inductances (1X and 3X) are in an "axis" parallel to the longitudinal feed, and are two "legs" of the corresponding bridge circuit. The other two inductances (2X and 4X) are in an "axis" displaced 90 degrees from the first and parallel to the cross feed, and are two "legs" of the other bridge circuit.

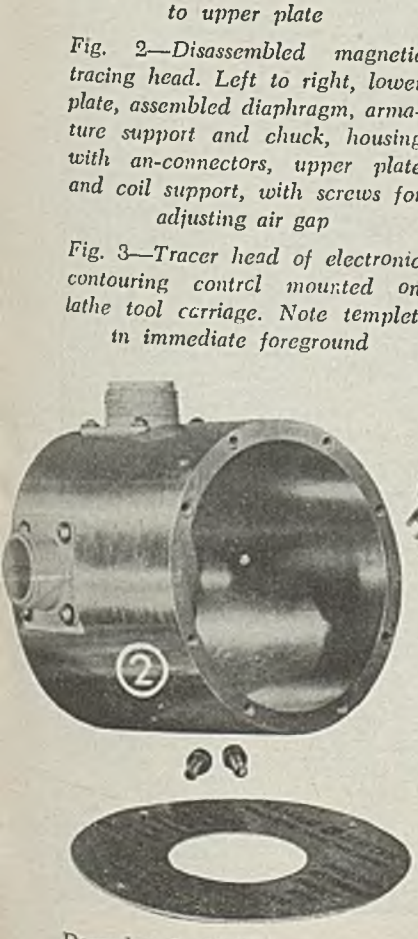
With no deflection of the tracing head stylus both bridge circuits are balanced, by proper adjustment of potentiometers 1P and 3P for one bridge circuit and potentiometers 2P and 4P for the other bridge circuit. Thereupon there is no output voltage from either bridge circuit. Tracing head is constructed mechanically so that deflection of stylus varies air gaps of one or both sets of inductances. This depends both on direction and magnitude of deflection. Consequently any deflection of stylus results in an output voltage from one or both bridge circuits. Vector sum of the two output voltages is directly proportional both in magnitude and direction to stylus deflection.

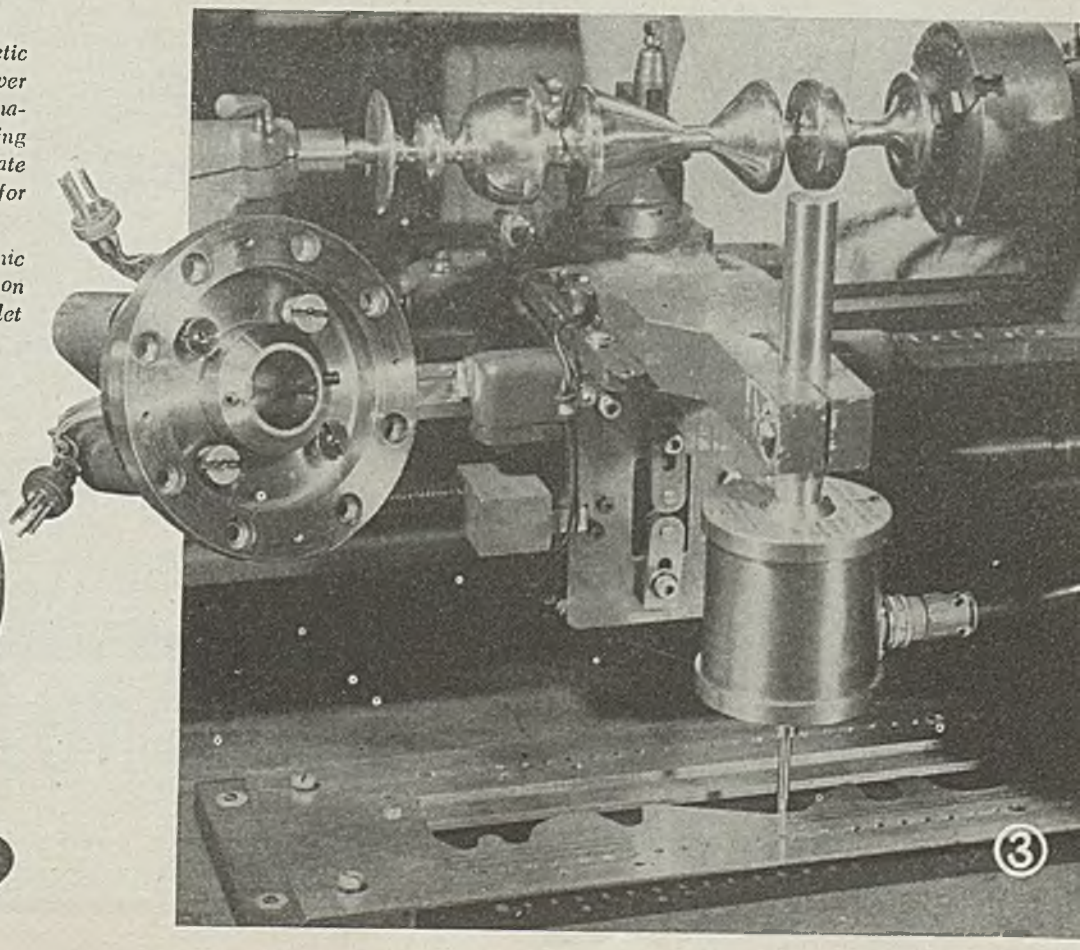
Output voltages of the two bridge circuits are fed into corresponding amplifier circuits. The two amplifier circuits—one for each bridge—amplify relatively weak

Fig. 1 — Completely assembled magnetic tracing head with stylus held in chuck, and arbor attached to upper plate

Fig. 2—Disassembled magnetic tracing head. Left to right, lower plate, assembled diaphragm, armature support and chuck, housing with an-connectors, upper plate and coil support, with screws for adjusting air gap

Fig. 3—Tracer head of electronic contouring control mounted on lathe tool carriage. Note templet in immediate foreground





bridge output voltages to workable level and in turn feed them into the mixer circuit.

Two-thousand-cycle output voltages built up by amplifiers are sine waves, magnitude and phase of which depend upon magnitude and direction of stylus deflection. These two voltages are fed into two primaries of a "mixer" transformer. Output or "signal" voltage from the mixer transformer secondary also is a sine wave, and is proportional, depending on transformer turns ratio, to the sum of the two input sine waves. In effect a single vector signal voltage is obtained from tracing head, its magnitude and phase being dependent on magnitude and direction of stylus deflection.

Movable work table can be considered as operating in a rectangular co-ordinate system, longitudinal feed parallel to the x axis and cross feed parallel to y axis. In addition, if a vector representing "reference" voltage is considered as lying along positive x axis, then signal voltage from the mixer circuit can be plotted as another vector, with angle with respect to positive x axis equal to phase angle.

Thus there is definite relation between direction of stylus deflection and phase of resulting signal voltage. This relation depends on mechanical orientation of variable inductances in tracing head, and phase of voltages supplied to bridge circuits.

For proper operation of the system shown in Fig. 6, relation between direction of stylus deflection and signal voltage phase is such as to give a signal voltage in phase with direction of stylus deflection, Fig. 5. For example, templet deflecting the stylus in a plus x direction will cause templet to move in a plus x direction, with resulting increase in deflection. Corresponding results are obtained for all directions of stylus deflection.

As previously stated, deflecting the stylus results in a signal voltage that "tells" templet to run in a direction corresponding to direction of deflection. In other words, once stylus is deflected by edge of templet, templet starts running in the same direction as stylus is deflected. Unless something is done to control it, this will result in damage to stylus, templet or tool. The necessary control is supplied by the bender circuit.

The bender circuit, Fig. 7, shifts phase of the signal voltage from mixer circuit in an amount proportional to magnitude of signal voltage or—in turn—magnitude of stylus deflection. If phase of signal voltage is shifted, and as stylus deflection increases, templet tends to move in a different direction. Change in direction depends upon phase shift of signal voltage. When stylus deflection is sufficient to give phase shift of 90 degrees, templet moves tangential to rim of stylus instead of into or normal to stylus. If deflection increases, the phase shift is more than 90 degrees,

(*Please turn to Page* 116)

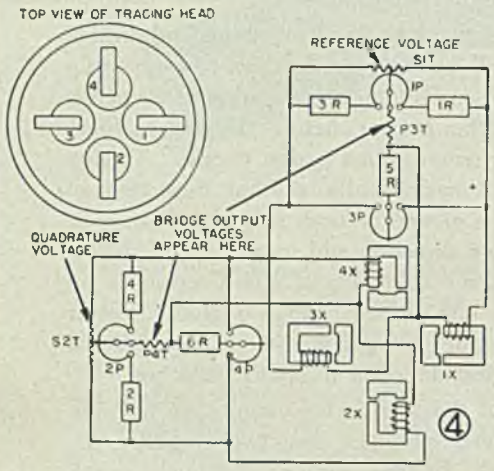


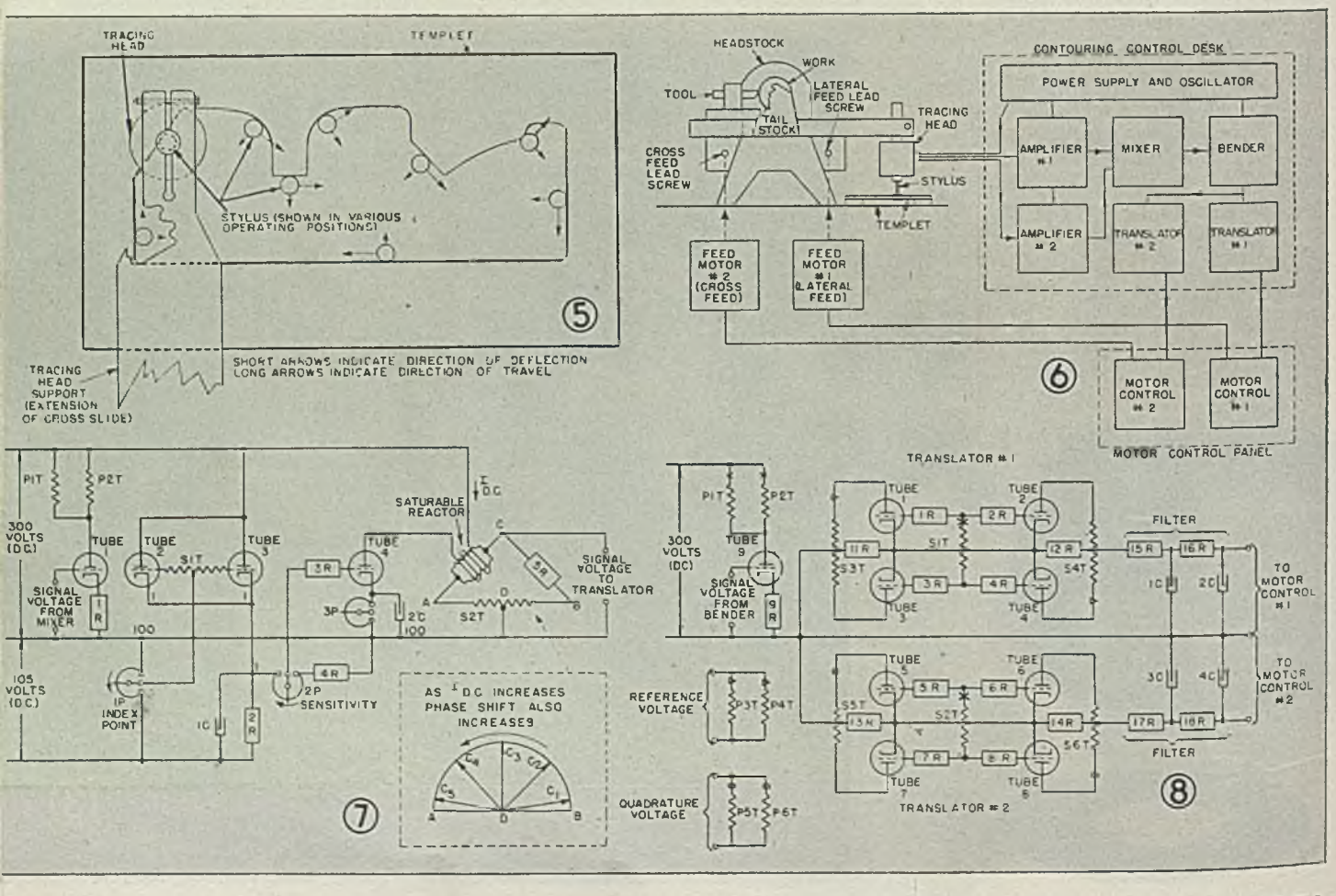
Fig. 4—Tracing head bridge circuits

Fig. 5—Variation of position of stylus with respect to templet

Fig. 6—Schematic diagram of complete contouring system

Fig. 7—Bender circuit

Fig. 8—Translator circuits



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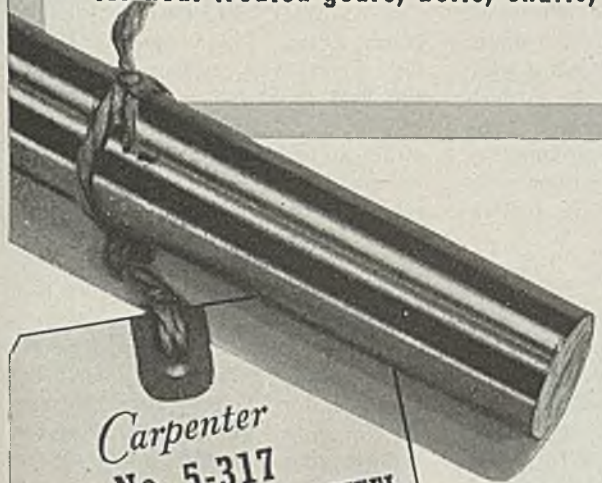

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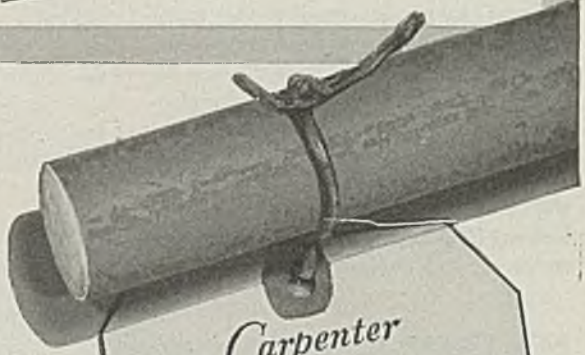

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Engineering News at a Glance

"STEEL TRADING": Hard-to-get sheet steel is being obtained currently by Lyon Metal Products Inc., Aurora, Ill., by going back to an early American custom of barter and exchange. In a national campaign, the company's advertising and sales force is offering to "swap" finished products for sheet steel. In the "horse-trading" offer Lyon includes finished products in two categories: First the customer is being told that, pound for pound for the steel he furnishes—that can be used for one or more of Lyon's standard products—he can select any of the products in current production. The second offer for steel covers specialized contract production—production made to customer specifications—if in satisfactory quantities to form production runs. Incidentally, the company produces steel shelving, lockers, shop equipment, filing cabinets, conveyors and kitchen cabinets.

NEW RESEARCH TOOL: An electromagnet so powerful that the operator must stay at the control 4 yards away when it is at peak operation in order to avoid having his pockets picked was developed by Dr. J. E. Goldman, it was learned in Pittsburgh at the Westinghouse research lab. It is an oil-cooled, 1½-ton, iron core unit wound with 6000 turns of square copper wire tipped with a special magnetic alloy. The magnet is capable of exerting a concentrated 4000-lb pull. Secret of its high magnetism lies in the special alloy tips used. According to Westinghouse, the development can be used as a fundamental research tool to study the relationship between the crystal structure of metals and their magnetic properties.

CHEAP OXYGEN: Wartime advances in separating oxygen from atmosphere have appreciably reduced costs. The new methods, furthermore, make possible the design of simple plants which may be small enough for industrial consumers to operate, or large enough for process uses on a scale never considered before. (See STEEL, p. 178, Nov. 11, and "Use of Oxygen in the Open Hearth" Dec. 2, 1946.) According to "Industrial Bulletin" of Arthur D. Little Inc., Cambridge, Mass., most important development is a new reciprocating engine or turbine first identified with a Russian, Kapitza, that cools air as low as 90 lb pressure in reversing heat exchangers—to produce refrigeration necessary for liquefaction. Oxygen is obtained by fractional distillation of the liquid air. Price of oxygen now depends on volume consumed—a user of tank-car quantities may pay some 30 to 40 cents per 100 cu ft, with some reduction in special circumstances. It is thought a consumer could operate a low-pressure generator, roughly, at a cost of 2 to 4 cents per 100 cu ft. Another possible outlet for cheap oxygen is the conversion of coal to manufactured gas. It is believed the gas could be produced at the mine, and delivered by pipeline to eastern industrial centers at a price competitive with natural gas. Tests showing the method to be economical are reported from the Soviet Union. The method, however, has not been tested in competition with mechanized methods of mining used in the United States.

"SALLY" DE SAW: Since the saw, better known as Sally Saw, was developed by Cummings Machine Works of Boston, pulpwood and woodlot cutting need no longer be a backbreaking chore. The saw, which operates in a horizontal position near the ground, is said to fell trees up to 11 in. in diameter with one pass and without notching. In sawing, its weight is supported by a tripod leg under the motor, and a saw support at the "business" end. According to "Nickel Steel Topics," a hand clamp screw at the motor end of the shaft enables the angle of the circular saw blade to be adjusted for felling or cutting on the ground.

ELIMINATES STICKING: Scoring and sticking are eliminated, and a clean, spotless zinc casting is assured with the use of a new lubricant for pressure die casting dies now marketed by G. W. Smith & Sons Inc., Dayton, O. The product is a colorless, noncorrosive, noncarbon-forming compound which is applied to the die in form of a fine mist spray. Besides preventing formation of zinc oxide on the core pins and die cavities, the lubricant leaves no undesirable deposit on the casting itself that might prove detrimental in subsequent plating.

MORE BATHTUBS: Completion of a new $250,000 porcelain enameling unit in its plumbingware division, will increase immediately by 50 per cent the output of plumbing fixtures, according to Briggs Mfg. Co., Detroit. W. D. Robinson, president, reports the new department, already tied into regular production at the Hamtramck plant, includes a 132-ft continuous porcelain enameling furnace, one of the largest of its kind in the country. Production of fixtures during the first 6 months of 1946 was up 114 per cent over the same period of 1941. With the new facilities, the company expects to turn out 75 fourteen-gage steel bathtubs per hour. Its capacity for lavatories and sinks each is expected to be stepped up to 300 per hour.

"VITAMIZED" FLUORESCENTS: In North Adams, Mass., Sprague Electric Co. reports that exhaustive laboratory and field investigations recently proved its Vitamin Q capacitors to be thermally stable at temperatures and voltages far in excess of those met even under most severe fluorescent ballast operating conditions. The company found that units normally rated at 330 v ac can be operated at 460 v ac at 85° C for 1000 hours without major change in power factor or other deterioration. Five capacitors tested at 490 v ac at 85° C in circulating air showed no failures after 750 hours. At 575 v, in still air, they showed no failures after a similar length of time.

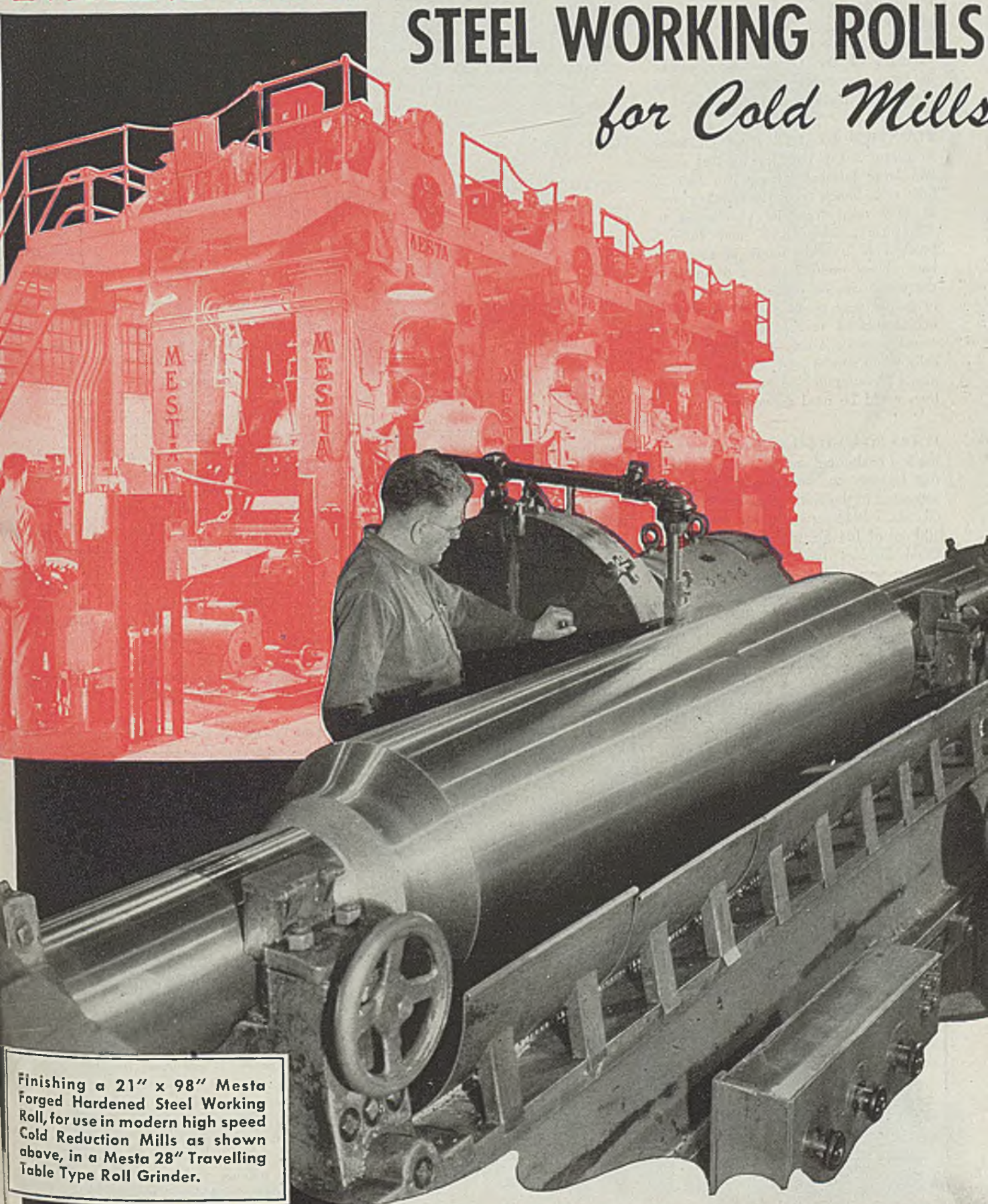
"DO'S AND DON'TS": Air Reduction's railroad technical sales division recently compiled a manual that includes the "do's and don'ts" for handling oxyacetylene and arc equipment. Distributed from the company's New York office, the publication is based on years of actual working relationship with welding operators on various railroads. It points out care to be exercised when using gas cylinders, torches and regulators, hose lines and generators.

REJECT ELIMINATOR: Use of its own silicone oil as a mold release agent is providing faster and improved production of molded mica parts, it was revealed at the Pittsfield, Mass. plant of General Electric Co. Engineers state the oil is being used as a lubricant in molding both shellac and Glyptal bonded mica. The application is eliminating carbon and other decomposition products which affect adversely the electrical properties of the mica. It also is providing a marked reduction in rejected pieces caused through breakage when removing parts from the mold.

COMPACT POWER: Locomotives, ships and long-range aircraft can be operated by a new engine that consumes less than one-third pound of fuel per horsepower-hour. According to a British report held by the Office of Technical Services, Washington, the engine, in its simplest form, consists of a turbo-com-

MESTA FORGED HARDENED STEEL WORKING ROLLS

for Cold Mills



Finishing a 21" x 98" Mesta Forged Hardened Steel Working Roll, for use in modern high speed Cold Reduction Mills as shown above, in a Mesta 28" Travelling Table Type Roll Grinder.

MESTA MACHINE COMPANY · PITTSBURGH, PA.

pressor, turbine and a regenerator. The report deals extensively with use of this engine as a power plant for high-altitude and long-range aircraft. It also describes briefly possible advantages of the German development in ships, locomotives, stationary power plants and mechanical refrigerators.

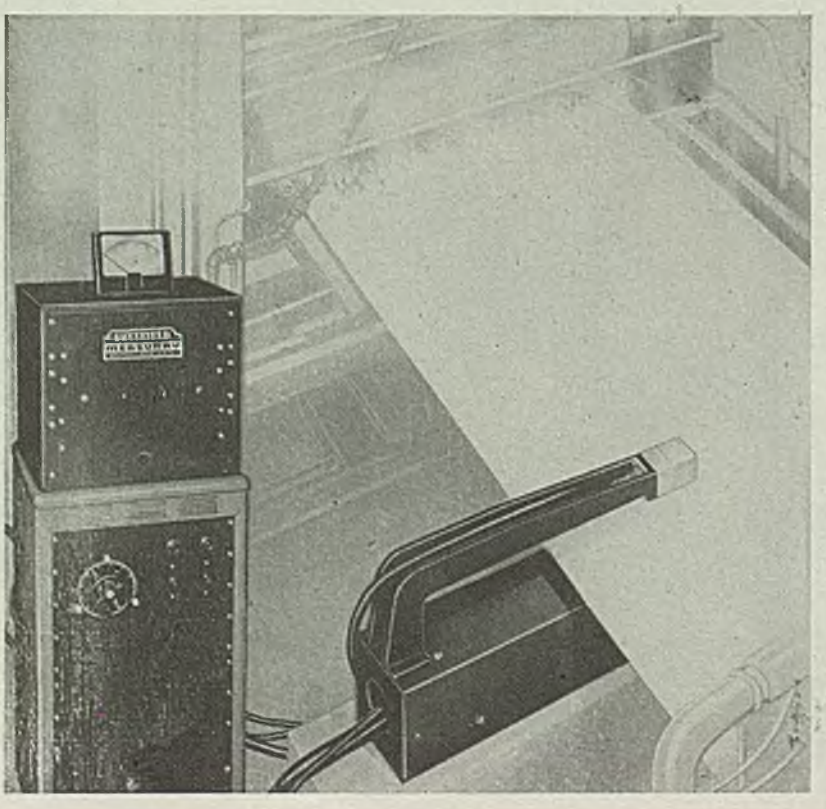
STAINLESS BY THE POUND: Peter A. Frasse & Co. Inc., reports that small and large fabricators now can buy as little or as much type 316 stainless steel as they need from its warehouses in New York, Philadelphia and Buffalo. Stocked in a wide range of sizes—in bars, sheets, welded pipe and tubing—the metal can be obtained by the foot or pound very readily. This is of particular interest to fabricators who previously could not use type 316 economically when special heat quantity requirements forced purchase of more stainless than could be used conveniently.

FOOD FOR MORALE: Industrial feeding is a health and morale measure, yielding benefits to worker and employer, according to the National Research Council. In a 1944 survey, it was found that 100 out of 101 plants will definitely continue in-plant feeding after the war. It then was concluded that the practicability of on-the-job feeding was adequately demonstrated to management. It still looks good to them as a means of maintaining morale, health, operating efficiency and employee relations. Many plants consider it a factor of production. Reports indicate that morale effects of in-plant feeding programs are just as important as nutritional effects, and its very hard to differentiate between them. From the practical point of view, its not necessary to differentiate, since the overall result is the important thing.

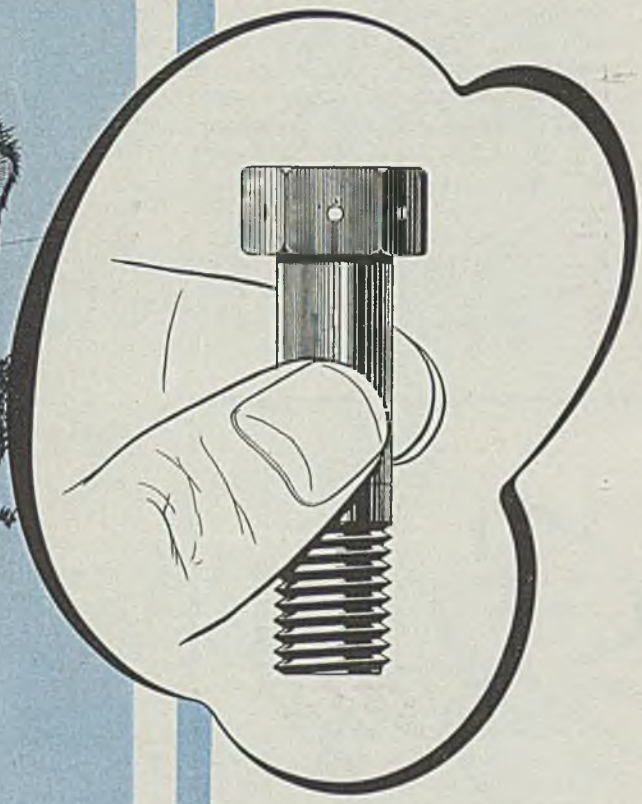
STEAMLESS HEAT: Radiator that uses no water or steam, yet gives off heat almost instantly upon plugging it into an electric outlet is now reported to be in mass production. Developed by Henry J. Morton Associates Inc., Detroit, a new concern, it operates on a dual-heat principle—radiation and convection. Besides radiating heat, the development draws cold air off the floor, passes it through the radiator, heats it, then expels it through concealed vents. The unit heats an entire room without ever getting too hot to touch, and its legs can be adjusted to uneven floors by just pressing on top of the radiator.

AIDS ALLOY STEEL USERS: From Reading, Pa., Carpenter Steel Co. reports a new program of simplification, consisting of two steels, to meet 95 per cent of users' alloy steel requirements. Program is designed not only to simplify selection, but also to facilitate inventory. Both grades are available from the company's warehouses. A booklet entitled, "2 Steels Simplify Your Alloy Need", is being distributed by Carpenter to provide further assistance to users interested in the program.

WATERPROOFED PARTICLES: Field of powder metallurgy may be broadened through wartime discovery that nonflowing, finely divided metal powders can be made to flow by waterproofing the individual particles, according to a report available from the Office of Technical Services, Washington. Condensation of moisture on metal particles causes them to flow slowly or erratically, and in some cases not at all, the report states. In experiments, the iron powder used was one of the most finely divided metal powders available, and typical of powders generally considered unsuitable for metallurgy. However, after treatment with a vapor of methyl chlorsilanes, the zero flow rate rose to 80 per cent of that of a standard silicon carbide powder. No impairment of mechanical properties was found in bars pressed from the waterproofed powder at 150,000 psi and sintered at 1100° C. Increased fluidity of the particles caused a slight rise in the apparent density of the iron powder. This characteristic is said to permit the use of shallower mold cavities, and facilitates uniform filling of complicated molds.



ELECTRONICS and x-rays play an important role in a noncontact method for spot or continuous checking thickness of moving materials. Applicable to almost any production process, this instrument manufactured by Sheffield Corp., Dayton, O., can be used in connection with steel, brass, copper, aluminum or any other material, holding accuracy to better than 1 per cent. It also checks concentricity in measuring wire surrounded by insulation. Speed of material movement, whether at the rate of 5 ft or 5000 ft per min, has no effect on its accuracy—neither does room temperature, nor that of the stock. Gaging unit uses masters of the same material to be checked for setup and operation purposes. It compares thickness of material with that of the sample, and any variations are indicated in percentages. Electronic power supply and amplification units, shown at left, may be set up wherever convenient. Gage head is located so moving stock passes between the x-ray source and detector.



It isn't the principle, it's development that counts

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SAFETY problems at blast furnaces are primarily concerned with the individual and require the wholehearted support of everyone. A safety program in order to be effective must come ahead of all other operations in the department. Experience has shown that where the department gives as much attention to safety as to the quality and quantity of production the number of accidents materially decreases. If safety is not always the first thought it could easily become the last.

Safety IN BLAST FURNACE OPERATION

By A. DuFRESNE
International Harvester Co.
Wisconsin Steel Works
S. Chicago, Ill.

During the last ten years there has been a greater turnover of employes than at any previous period and because many of the jobs around the blast furnace are of the unskilled type more men have entered here than in most other departments. Therefore, an important part of a safety program is job training. Key men in the department, generally the foreman, are given a course in job instructor training and job analysis. This course is patterned after the training within industry program which the government offered employes during the war to speed up the breaking in of new employes. The men selected to instruct are shown how to break down a job into the principal steps and key points, and how to introduce the worker to the job, how to present the operation, how to try him out on the job, and how to follow up and check his knowledge of the job. If a man is properly instructed in a job you can expect him to do it the right way and in a safe manner. No matter what job a new man is given even if its only shoveling dirt, he must know just what he is to do and how he is to do it, if control over his safety is to be expected.

Safety Committee: This group is composed of a foreman and a workman, to seek out and eliminate unsafe practices. It has been found advisable to rotate the men on the committee in order to have as many employes engaged in safety work as possible, the supervisory member serving two weeks and the workman changing every two or three days. It is easy to sell the safety idea to the man who is actively engaged in the work. The committee is free to go anywhere in the department to look for unsafe practices or conditions, and, with the rank and file members of the committee taking an active part in the correction of unsafe practices, both the man involved in the unsafe act and his fellow workers on the committee are made more safety conscious. It is also the duty of the committee to investigate every accident in the department, whether large or small, and to make recommendations for the prevention of a similar accident occurring again. Impromptu safety meetings held on the discovery of an unsafe practice are found to be more effective than regular or general meetings.

Before going to work in the department every new employe is talked to by the committee on safety and is made acquainted with various parts of the department and the important safety regulations in each section. Projector slides with a recorded talk can be used to show the safe way to do every job in the department and every safety device for the employes protection. By having a meeting several times a year and showing pictures of the correct way to do a job, when and how personal protective clothing and equipment are to be used, and how to make use of other safety devices, the old timer is "jacked up" and the new employes are given a better understanding of the departmental safety requirements as a whole.

Management's Responsibility: The department superintendent and his assistant are responsible, of course, for the success of the departmental safety program. They must see that there is a program and that it is kept alive. They must take an active and personal interest in the safety of the men in the department. By frequent inspection trips and personal contact with the employes, by prompt action on suggestions from the men, and by faithful compliance with safety rules, management can create an interest and respect for safety. Because he is closer to the men, the department safety record depends upon the attitude of the foreman; he is the key man in the organization from a safety standpoint. If he believes in safety, practices safety, and insists on it, safety will be the result. The foreman should see that each new employe is fully aware of the hazards and is instructed properly to work safely, that protective clothing and devices are used; that all injuries are reported promptly; that mechanical safety devices are in place and properly maintained, and that safety ideas are utilized. Another function of the foreman is getting safety information to the men and also from the men. This can be done by either personal contact and conversation with the individual or by the use of group safety

Probably the most important safety practice around a blast furnace is good housekeeping. This is particularly true in the cast house where at best the handling of hot metal and slag and the breaking and handling of scrap after the cast presents many potential hazards. Racks for poking bars, scrapers, tools for changing tuyeres, coolers and other equipment should be provided; the men should be instructed to replace tools promptly and safely on the rack. Hose reels and hangers should be used wherever possible so that hoses are not allowed on the floor. The floor around a blast furnace and the runners should be as clean and free of tripping hazard as any working space in the plant.

The ever-present danger of escaping gas requires the constant vigilance of every employe around a blast furnace. The question "Is there any gas in the area?" must be always answered before anyone is to do any work around the hearth, bustle pipe, furnace top, dust catcher, stoves and gas cleaning and distribution system. Employes regularly working at any of these locations should be constantly coached on the characteristics and hazards of gas. An alarm system should be available to summon help and as many employes as possible should be trained in artificial respiration and the use of oxygen or air masks. No one should be allowed to go into an area likely to contain gas without permission of someone responsible and without someone to stand aside and watch for symptoms of asphyxiation. If gas is suspected the plant gas detection squad should be called. There should be available at some easily accessible location sufficient oxygen or air masks and rescue equipment, all of which should be inspected regularly and in good order at all times. Periodically foreman and men

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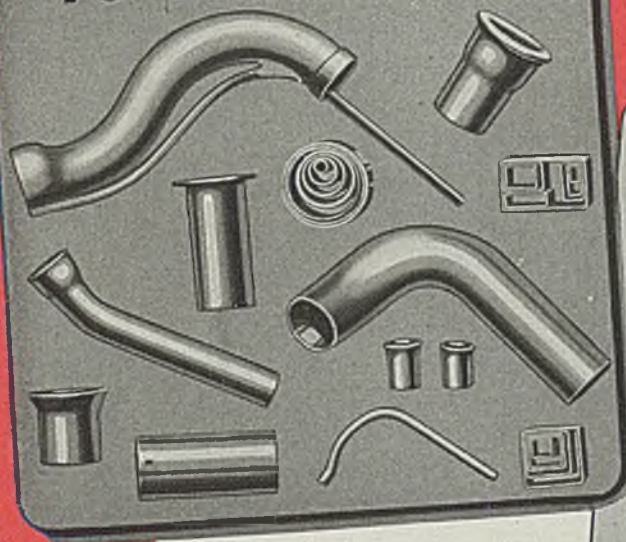

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who are required to work around the gas cleaning and distribution section of the department, should review their knowledge of these safety appliances.

With employe education and top management interest in the safety program to see that all participating are active, it has been shown that the blast furnace department, which in days past had the reputation of being a dangerous place to work, can be as safe as any other department in the steel plant. Properly planned safety work, with a good safety program and the necessary safeguards will impress the employe with your sincerity in maintaining the blast furnace department as a safe department and gain his co-operation in accident prevention.

From a paper presented before the Blast Furnace and Coke Association of the Chicago District, Del Prado hotel, Chicago. It was awarded fourth prize in the blast furnace section of the fifth annual technical papers contest sponsored by the association.

TEST DESIGN AND WELDING TECHNIQUE IN STUDY OF

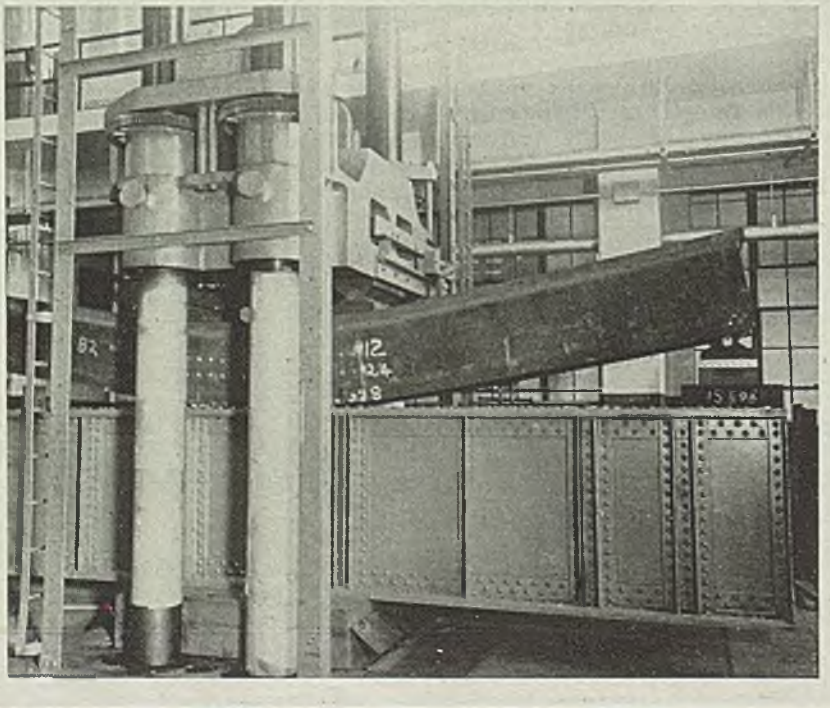
Welded Ship Plates

FACTORS of design, as well as welding, have an effect on the initial formation of cracks in large welded steel structures. This was concluded by structural steel committee of Welding Research Council in co-operation with Engineering Mechanics Laboratory of National Bureau of Standards, which is studying the strength of such structures after being brought into prominence during the war by Liberty ship failures.

The continuation of a crack depends upon the notch sensitivity of the steel, a property heretofore overlooked in specifications for ship plate. For purposes of experiment along these lines six 9-ton welded structural carbon steel box girders of 22 ft span, with an overall width of 2 ft 6 in. and a depth of 2 ft 1½-in. were constructed at Ingalls Shipbuilding Corp. shipyard at Pascagoula, Miss. For the deliberate purpose of producing the highest possible residual stresses, especially in the vicinity of the transverse closing butt of the tension flange, very abusive welding procedures were used, along with some unfavorable details of design. The tension flange plate, welded last under conditions of severe restraint, was fitted between side web plates to simulate the joints between the deck of a ship and the side plating when the ship is subjected to "hogging" stresses.

As test beams and girders usually fail by lateral deflection and buckling or twisting, these girders were successfully proportioned to insure against failure by these causes. The compression flange was made 2½-in. thick.

The first test, made with a girder of ordinary semikilled structural steel hull plating, was tested at room temperature. With a sudden release of energy that shook the testing building, this girder failed by rupture with a brittle or cleavage type of fracture.



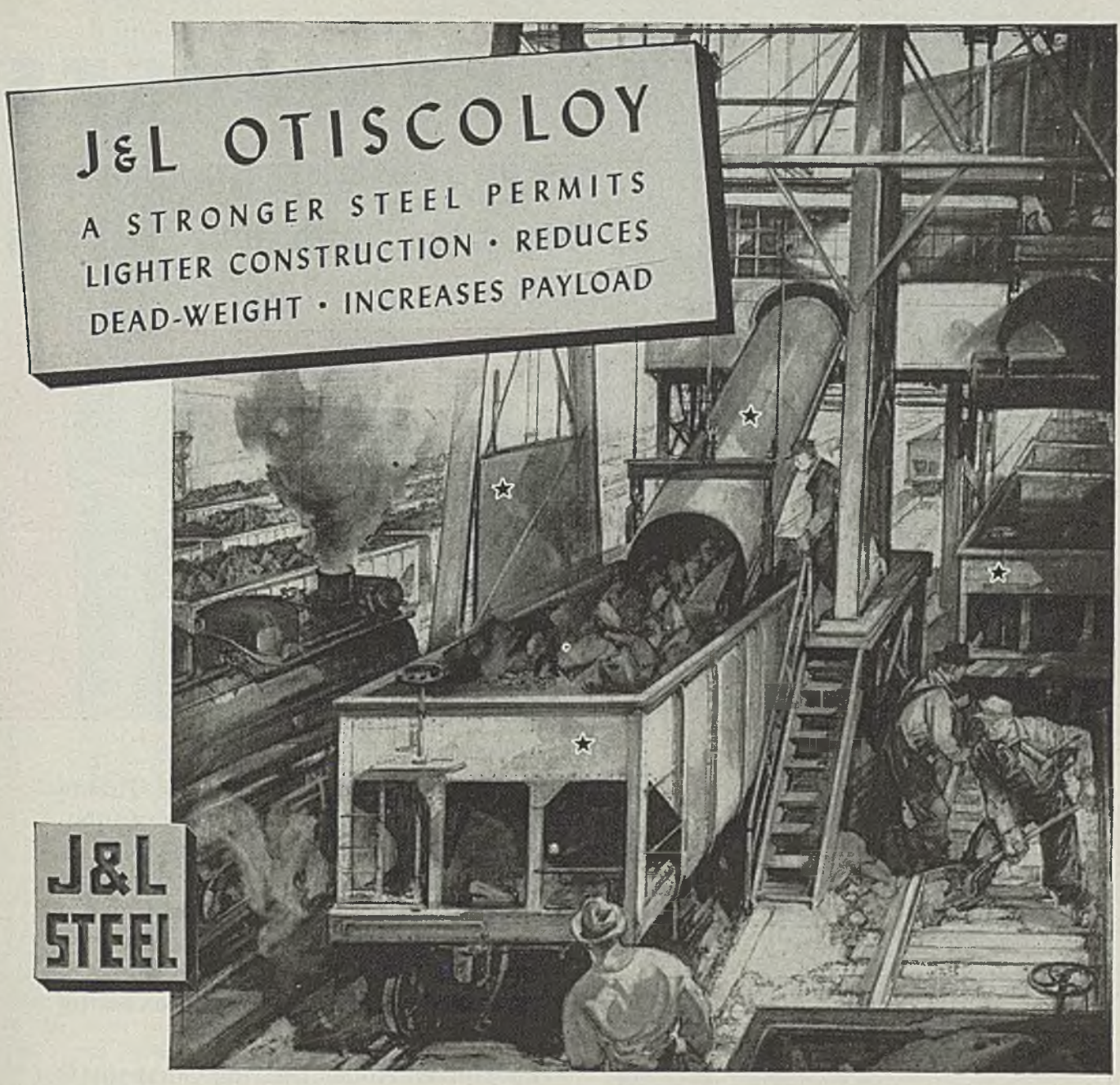
Measured strains and elastic deflection at time of failure indicated fiber stresses approximately equal to the predetermined ultimate tensile strength of the material. Failure was not far below the modulus of rupture of 75,600 psi as computed for the breaking load of 1,397,000 lb and corresponding bending moment of 71,200,000 lb-in. Of the 8-in. total deflection, about 7 in. was permanent set and less than 1 in. was elastic deflection.

A fully killed steel girder, the second tested, failed in a similar fashion at minus 45°F, but the fracture was more of a compound, shattering type. With the extremely cold temperature, the girder snapped in two. The breaking load was only 16.5 per cent lower (1,165,000 lb) than that for the first girder although it was 30.9 per cent lower than the maximum load imposed upon the third girder which was tested at room temperature.

A load of 1,658,000 lb failed to snap the third girder, made of fully killed steel. This load was equally distributed between the two load points which were 2½-ft on either side of the mid-span. With a center deflection of 18.06-in., the girder was almost touching the supporting girders of the test apparatus, making further testing impossible. The girder at this point in the testing procedure is shown in the accompanying illustration.

Upon the removal of the load, it was found that permanent center deflection was 16.45-in. Computed under this loading, extreme fiber stresses were 91,200 psi in the projections of the side plates and 70,200 psi in the tension flange plate. It is thought that a stress of 70,200 psi was actually realized. Still remaining to be analyzed are the data like the excessive strain gage reading.

The testing body states that the purpose of this research program is to investigate, at various temperatures, the effect of severe geometrical constraint against ductile behavior and upon the capacity of a welded structural member for resisting rupture under external load and to observe the detrimental effects of residual stresses.



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7. *Save* by more accurate machining resulting from cooler operations.
8. *Save* by less grinding of smoother machined surfaces.
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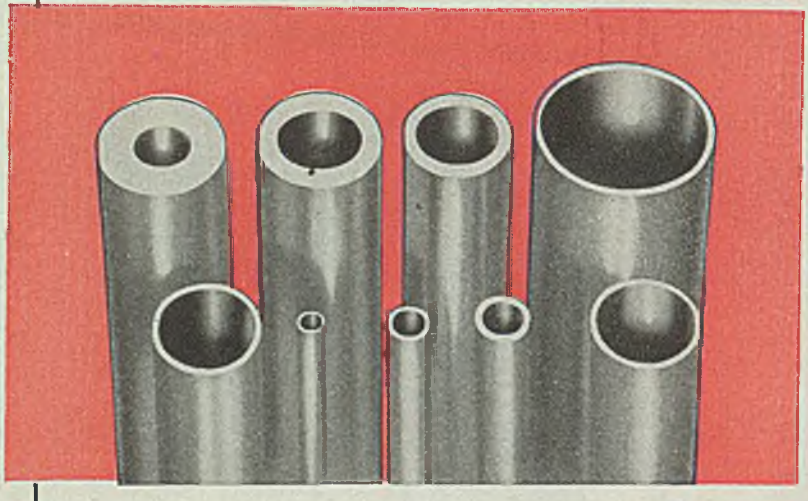
13. *Save* by reducing tool changes.
14. *Save* on tool grinding operations.
15. *Save* by use of longer stock in magazines.
16. *Save* by reducing crop-end losses.



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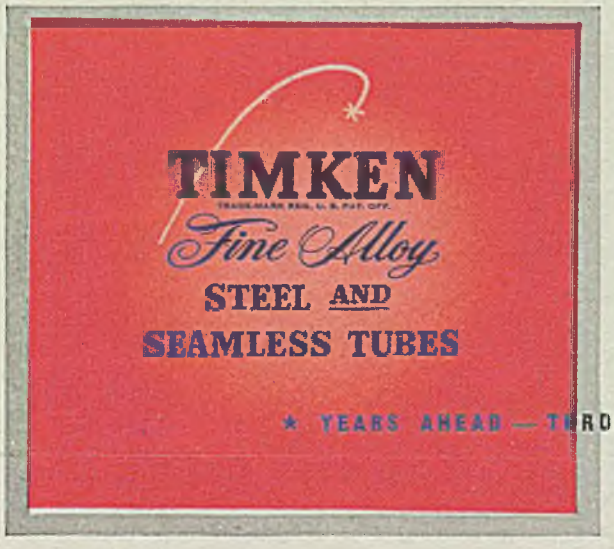

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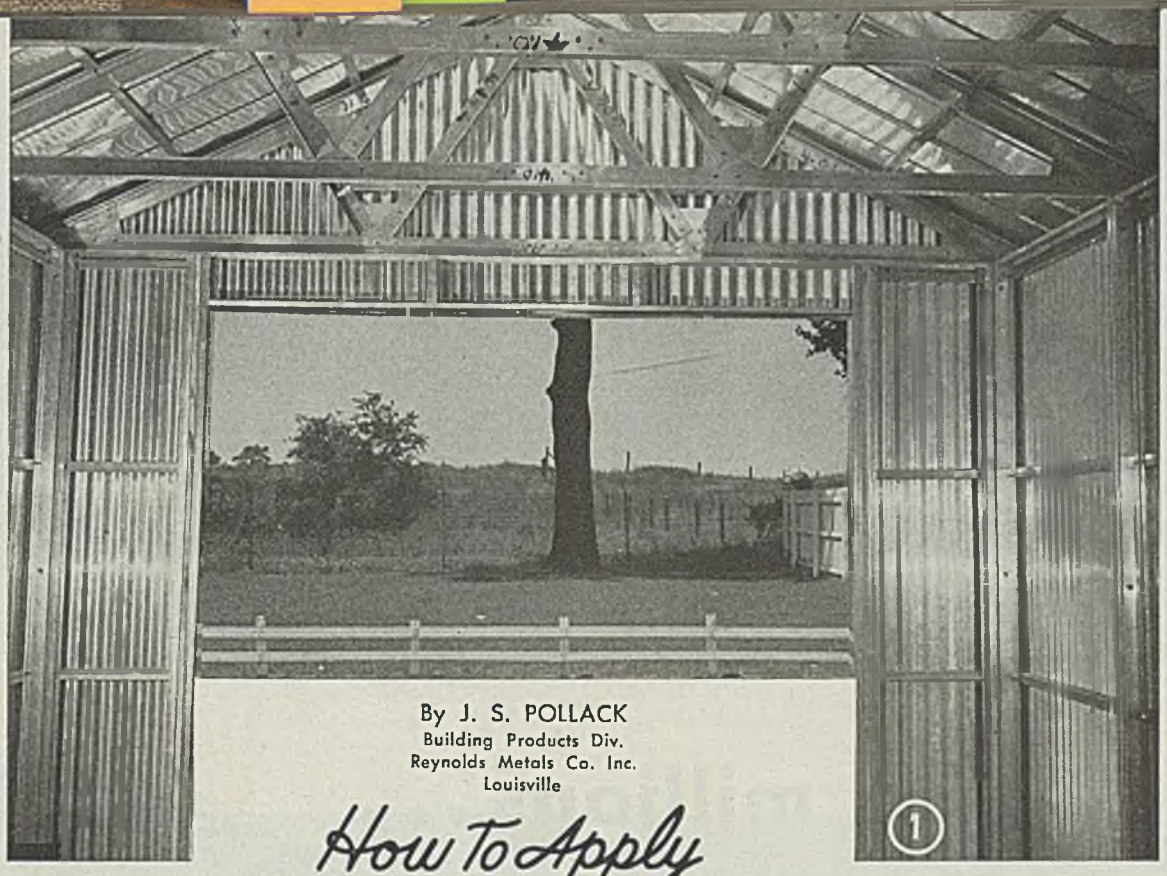


By J. S. POLLACK
Building Products Div.
Reynolds Metals Co. Inc.
Louisville

How To Apply

ALUMINUM ROOFING AND SIDING

Proper erection methods are essential if full service life is to be realized

PROPERLY applied, aluminum roofing and siding can provide a weatherproof and fireproof covering that will last a long time. The properties of this metal often can be used advantageously: Its light weight means, where conditions permit, that lighter supporting structures can be used. This factor of weight also leads to speedier and easier construction. Its high resistance to atmospheric corrosion reduces cost of upkeep. However, as is the case with other materials, certain precautions must be observed in the use of aluminum.

There are three factors that affect the serviceability of these construction materials. They are: Galvanic action, seals at points of fastenings and loading. Possibly most important of the three factors involved in erecting aluminum roofing and siding is proper insulation to avoid deleterious electrogalvanic action. There are a number of methods of doing this.

It is relatively simple to avoid this galvanic action by preventing actual metal-to-metal contact of dissimilar metals, i.e., aluminum and steel, aluminum and iron, at those points where moisture collects. This can be done by providing a protecting sleeve or saddle of aluminum to cover the steel at point of contact; by use of a nonconductor such as building paper; or by painting with aluminum paint which then provides an aluminum-to-aluminum contact at the moisture collecting point between roof and support.

Moisture collects frequently on the under side of aluminum roofs because the interior of the building may be considerably warmer than the outdoors. The roof, having a tendency to assume outside temperatures, will be at a temperature below the dew point of the air inside the building. As a result, moisture may condense on the under side of the roof and cause difficulties where roofing contacts steel supporting members.

The second important factor in proper erection is to assure a good seal around the opening made in fastening the sheet to its supports. Unless the fastening affords a good seal at this point, deterioration of the roof is inevitable. Sealing can be done by the use of rubber washers under nail, screw, or bolt heads; by use of washers made from zinc-chromate impregnated tape, by application of roofing compound over the fastening, etc. Hot dip galvanized nails may be used without washers when suitable

Fig. 1—Interior of all-aluminum utility building. Roof is 5-V crimp, sides are corrugated, frames are continuous roll formed shapes. Assembly is by riveting and bolting, using cadmium-plated steel bolts and aluminum rivets with aluminum washers

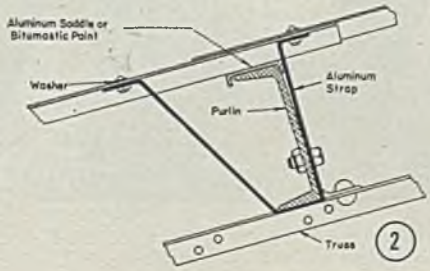
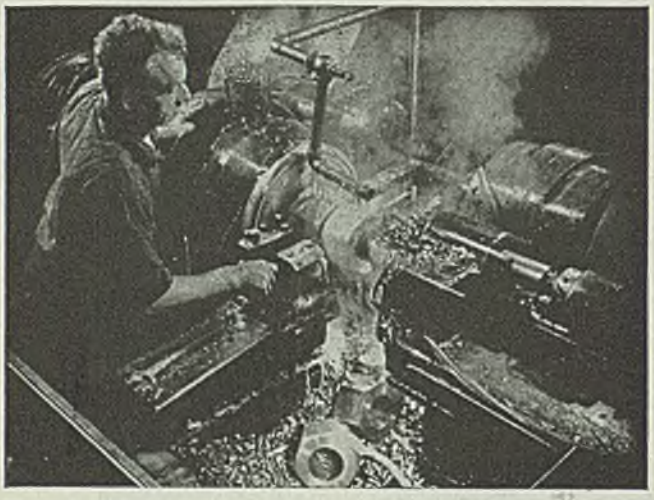
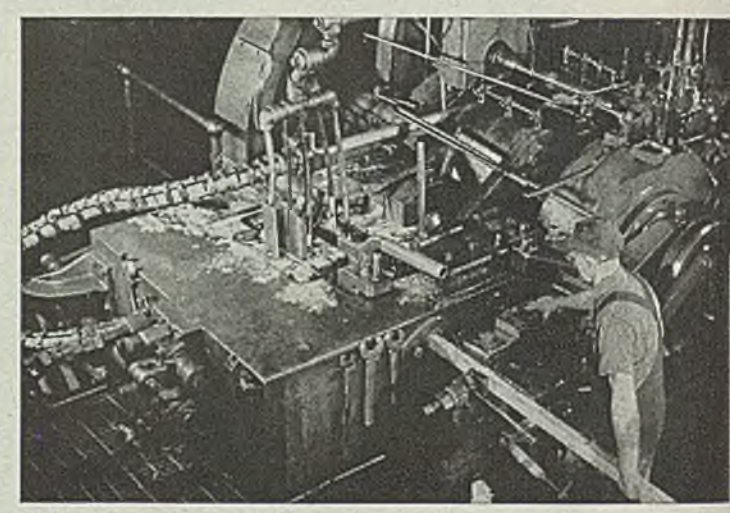


Fig. 2—Most highly recommended method for erecting corrugated aluminum roofing on steel purlins for industrial buildings without sheathing is to use the aluminum strap hanger. Aluminum saddle can be replaced by Bitumastic paint, building paper or similar nonmetallic insulating material



LARGEST NUTS—EMPIRE Nuts larger than 1½" bolt size are produced on machines of this type, especially adapted to RB&W requirements. Sizes up to 6½" across the flats are processed.



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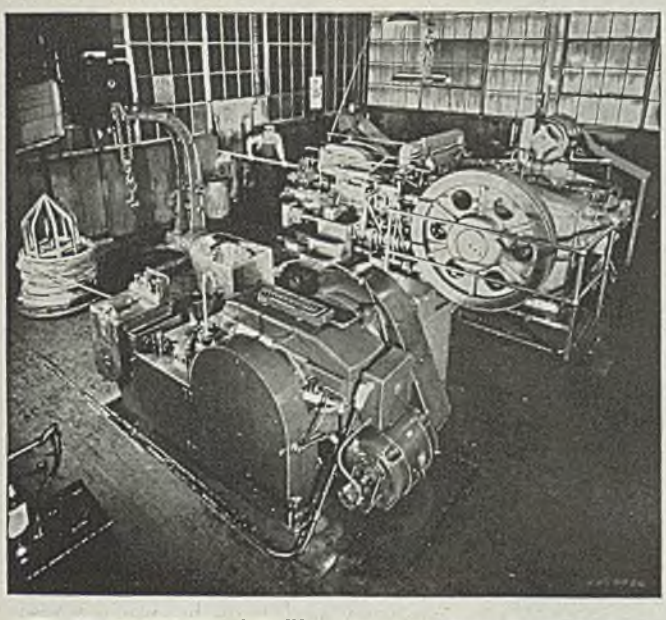
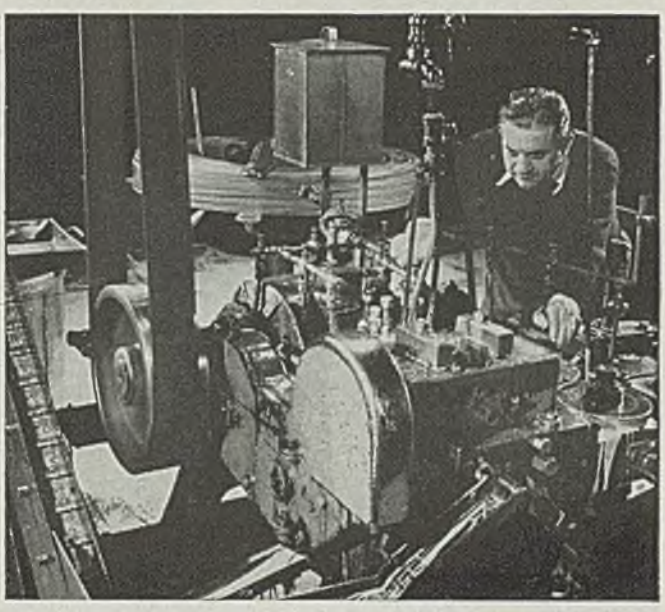
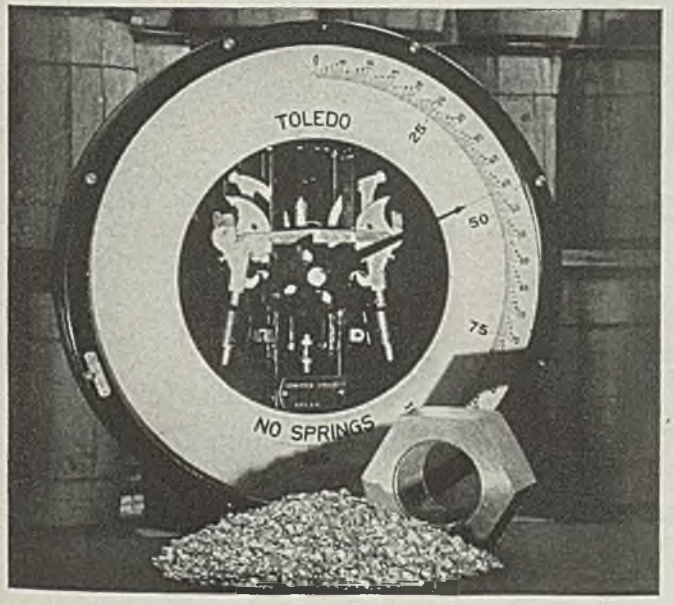


NEWEST MACHINES—RB&W works constantly to develop and perfect new processes. These machines are radically different in design and principle . . . are the only ones of their kind in the world.



HIGHEST SPEED—One thousand ¾-inch Square Nuts a minute is the pace of this machine which eats up a ton of steel every three hours. The raw material is cold-rolled in RB&W's own bar mill.



WIDE RANGE—RB&W produces light, regular and heavy nuts, hot-pressed, cold-punched, semi-finished and slotted. The 11,040 6-32 nuts in the pile are equal in weight to the single 4" nut.

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Fig. 3—Aluminum roofing on a large industrial building. Recommended method erecting the roofing panels is indicated in the following illustration

washers are not available—however, use of nonmetallic washers is recommended. Cadmium plated roofing nails, screws, etc., may also be used because the cadmium surfaces contacting the aluminum have little tendency to cause any deterioration from galvanic action.

Many applications of corrugated roofing sheets will be over sheathing which will in turn provide the support required to uphold wind and snow loads. Aluminum roofing can, however, be used without sheathing wherever the sheet has sufficient load carrying capacity.

The loading charts, Tables I and II, will serve as a guide in selecting the proper gage of aluminum for any particular application. Care should be taken in determining the maximum load value the corrugated sheet must withstand in a given locality. It is evident that the man applying a roof in the northern section of the country must make proper allowance for maximum snow loadings that may be encountered.

To prevent wind loads from pulling roofing sheets up off the nails, aluminum washers may be used to distribute the stresses and prevent such loads from tearing the sheet off the nail heads. Building codes obtainable from local building authorities usually specify maximum roof loadings.

TABLE I

SAFE UNIFORMLY DISTRIBUTED LOAD ON 2½ x ½" CORRUGATED SHEET

Gage	Safe Load for Various Span Lengths in Pounds Per Square Foot									
	18 in.	24 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.	66 in.	72 in.
.019	99	55	35	25	18	14	11	9	7	6
.025	129	73	46	32	24	18	14	12	10	8
.027	140	79	50	35	25	20	15	12	10	9
.032	165	93	60	41	30	23	18	15	12	10
.040	206	116	75	52	38	28	23	19	15	13
.051	260	149	95	66	49	37	29	24	20	17
.064	332	187	119	83	61	47	37	30	25	21
.078	420	232	149	104	76	58	46	37	31	26

TABLE II

SAFE UNIFORMLY DISTRIBUTED LOAD ON 1¼ x ¼" CORRUGATED SHEET

Gage	Safe Load For Various Span Lengths in Pounds Per Square Foot									
	18 in.	24 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.	66 in.	72 in.
.019	49	28	18	12	9	7	6	5	4	3
.025	65	36	23	16	12	9	8	6	5	4
.027	70	39	25	17	13	10	8	6	5	4
.032	84	47	30	21	15	12	9	7	6	5
.040	109	58	37	26	19	15	11	9	8	6

Hard Facing Electrodes Produce Flat Beads

High-carbon electrodes with a heavily extruded shielded arc-type coating developed by Lincoln Electric Co., Cleveland, are said to produce flat, smooth beads and deposits that can be hot-forged. They can be used in building up worn steel parts by welding with low voltage alternating and direct current transformers, the company reports.

The electrode is known as Hardweld 100 AC and 50 AC and produces a dense, tough surface of moderate hardness to resist shock and abrasion. Although exact hardness depends upon rate of cooling and carbon content of steel welded, the 100 AC series has a hardness of deposit on straight carbon steel of 20 to 45 rockwell C, while 50 AC series has a hardness of 20 to 35 rockwell C on the same material. Both series are made in various sizes and for various current ranges. Deposits of either may be further hardened by water quenching or by flame hardening.

Design Principles for Milling, Drilling, Tapping

Practical designs for Milling, Drilling and Tapping Tools, by C. W. Hinman; second edition; cloth, 416 pages, 5¾ x 8¾-in.; published by McGraw-Hill Book Co. Inc., 330 West 42nd St., New York 18, for $4.50.

This is a practical manual demonstrating best methods for designing, drafting and using drilling jigs, gages, hand tools and tapping and milling fixtures. It illustrates fundamental principles by which all tools must be designed for successful operation. With a wealth of illustrative material, detailed operational functions of tools, mathematical formulas and tool engineering tables, it supplies beginners with all the essentials of designing and drafting tools, and gives experienced tool designers many new ideas for doing machine work and designing tools.

The second edition presents numerous tooling methods recently introduced all of which have been used successfully and are reliable. A chapter on special and standard machine operations and the tools used therein illustrates some of the progress made in that line during World War II.

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By M. E. NICKEL
International Harvester Co.
Wisconsin Steel Works
Chicago

Production of LOW-SILICON BASIC IRON Using High-Magnesia Slags

Demand for lower silicon iron ordinarily used in the open-hearth shop spurred blast furnacemen to probe for economic means for meeting specifications. Experimental program conducted at Chicago stack operating with slags of high magnesia content gives promise of smelting iron low in silicon and sulphur and with a high physical temperature

STEELMAKERS long have adhered to the custom in the basic open-hearth furnace to charge hot metal from the blast furnace with a silicon content of 0.80 to 1.10 per cent. Of recent years, however, there has been a tendency to use metal of a lower silicon specification. This trend, which is of growing importance to blast furnace operators, has confronted them with the problem of producing an iron low in silicon, but yet physically high in temperature and low in sulphur.

Sometime ago, the blast furnace department at Wisconsin Steel Works was asked by the open-hearth department to furnish iron in the 0.30 to 0.60 per cent silicon range. To meet this demand, an experimental program was started in which the hot metal was treated with roll scale as the iron was tapped from the furnace. Desiliconizing the iron by scale additions was carried on for a period of six weeks. The results of this test have been previously published.(1) Though this method proved that the lower silicon specification could be met, objections were made by the open-hearth department of the low manganese in the iron that resulted when the scale was added. The addition of roll scale, while oxidizing the silicon also oxidizes and lowers the manganese content of the iron.

(1) All references are presented at the end of the article.

The resultant product as furnished to the open hearth during this six week period averaged 0.50 per cent silicon with the manganese approximately 1.00 per cent.

It was found that in using the desiliconized basic hot metal, the open-hearth practice was greatly benefited and the results were so gratifying that it seemed desirable that all hot metal be furnished in the 0.30 to 0.60 per cent silicon range, but with the manganese in the normal range of 1.50 to 1.75 per cent.

The blast furnace department could not readily meet the new specifications by continuing the scale additions at the furnace because of the resulting low manganese. A study was made, therefore, of the possibilities of producing the iron directly in the blast furnace. As is generally known, low-silicon iron produced under normal present day furnace practice, implies high sulphur and physically low temperature iron. C. H. Hoffman,(2) in a paper presented in February, 1940, told of producing low-silicon iron by operating on high blast temperatures of 1500 to 1600°F. This would have been one of the possible methods that could have been used, but since the stove capacity was not sufficient to carry the extremely high-blast temperatures, it was not the practical solution to the problem. Secondly, with the upper lake ores and with the relatively soft coke available for the furnaces, high-blast temperatures are limited for normal furnace operations.

The next step taken was to make a thorough study of slags formed in the blast furnace. From previous experiences, when operating on a high-magnesia slag, in producing low-silicon low-manganese merchant iron with low alumina in the slag, we found that a more fluid or less viscous slag was formed when the magnesia content was in the neighborhood of 20 per cent. A slag of this type is not only less viscous, but also has a lower melting point. A combination of these facts indicated that the production of low-silicon, normal sulphur, and physically hot basic iron might be accomplished. The possibilities led to the actual experimental program of operating a furnace on the high-magnesia slag in producing the low-silicon basic iron.

Accordingly, No. 2 furnace, which had been making normal basic iron, i.e., 0.80 to 1.10 per cent silicon, was changed over to produce the 0.30 to 0.60 per cent silicon iron. The furnace was held on this low-silicon specification for a period of five weeks during which time the magnesia content of the slag was increased from 6 to approximately 20 per cent by substituting dolomite stone for calcite stone. On this type of iron, the furnace worked smoothly and produced iron that averaged 0.48 per cent silicon for the experimental five week period. The temperature of this low-silicon basic iron as cast averaged well above 2700° F.

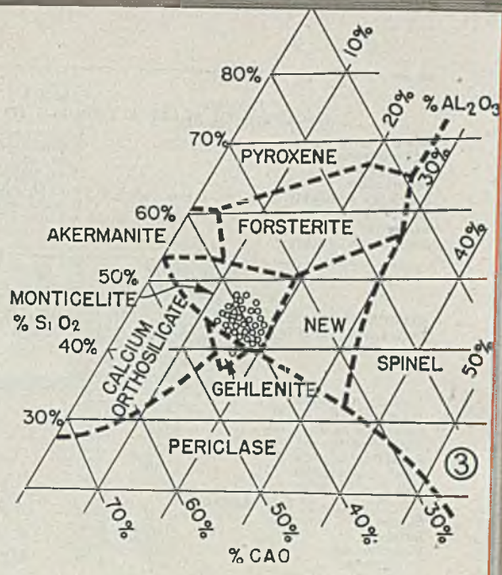

Fig. 3—Diagram of slag compositions in plane of 20 per cent magnesia

Shown in Fig. 1 are the plotted daily analyses of the iron produced. The average analyses were as follows:

Element	Per cent
Silicon	0.48
Sulphur	0.043
Phosphorous	0.164
Manganese	1.55

Operating practice is shown in Fig. 2, in which the daily iron production, coke consumption, stone consumption, and the ore to coke ratio are plotted. The practice showed that a daily iron production of 752 net tons was made on a low coke rate of 1372 lb of coke per ton of iron. An ore to coke ratio of 2.64 was carried with a stone figure of 880 lb per ton of iron. The slag volume, though not shown on the chart, averaged 1100 lb, represents an increase of approximately 200 lb over the normal slag volume for regular basic iron practice.

In the study of slag formations, the various works of McCaffery,(3) Holbrook,(4) Joseph,(5) and others were investigated. Using the tetrahedron of McCaffery as a working guide, the various slag compositions that are formed in the 20 per cent MgO plane were listed, along with the mineralogical constituent and melting point of each. In Table I are given the mineralogical compositions into which a high magnesia slag would fall. Actually there are 22 such compounds or oxides of alumina, silica, lime,

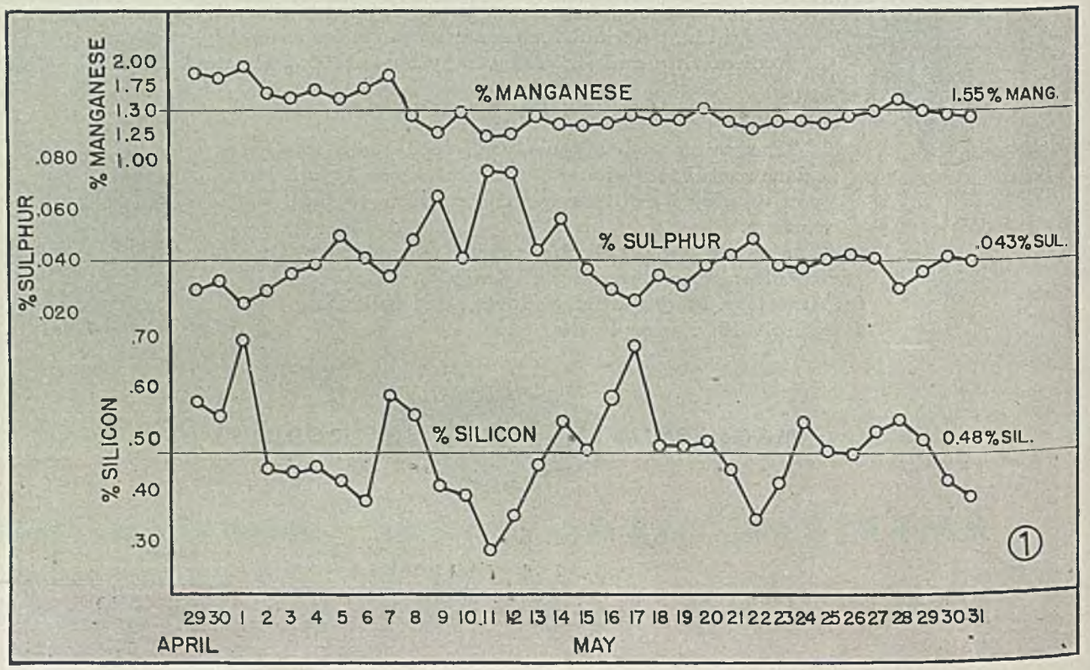

Fig. 1—Plotted analyses of daily iron production

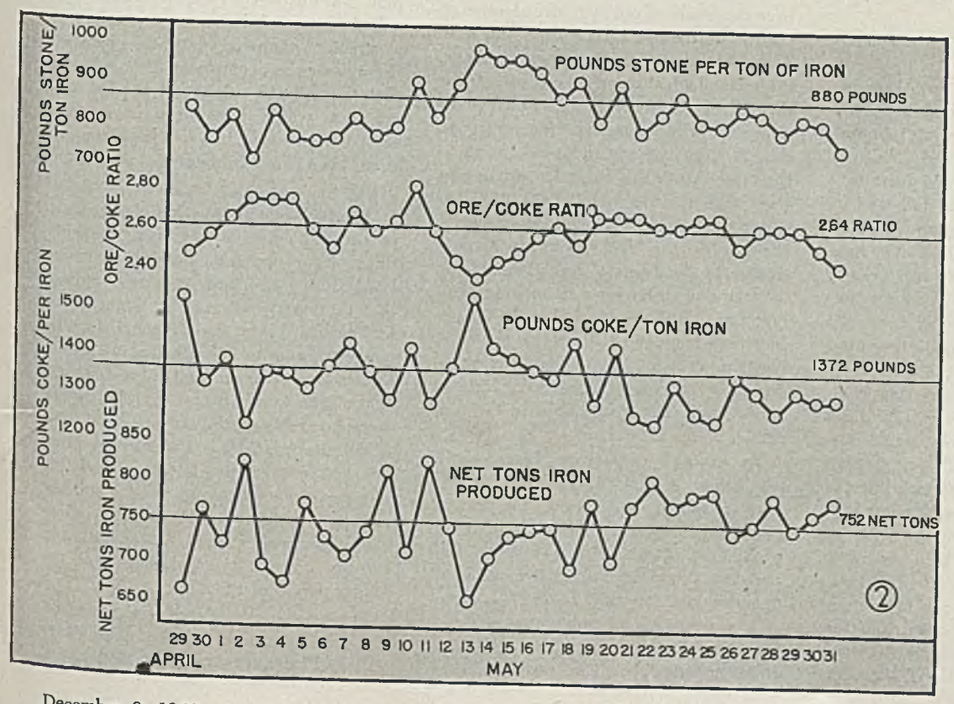

Fig. 2—Furnace practice data during production of low-silicon basic with high-magnesia slag

TABLE I
GROUPING OF SLAGS ACCORDING TO THEIR MELTING POINTS

Mineralogical Compounds	Composition	Melting Point, °F
Akermanite	$2\ CaO,MgO\ 2\ SiO_2$	2656
Monticellite	$CaO,\ MgO,\ SiO_2$	2728
Calcium Bi-silicate	$CaO,\ SiO_2$	2804
Gehlenite	$2\ CaO,\ Al_2O_3$	2894
Forsterite	$2\ MgO,\ SiO_2$	3434
Calcium orthosilicate	$2\ CaO,\ SiO_2$	3866
	$MgO,\ Al_2O_3$	3875

TABLE II
COMPARISON OF PRACTICE OF PRODUCING LOW SILICON (0.30-0.60%) vs. REGULAR SILICON (0.80-1.10%) BASIC IRON

	Regular Silicon	Low Silicon
Average tons/day, n.t.	780	752
Wind blown, cu ft	42,250	42,120
Coke/ton of iron, lb	1339	1372
Flue dust/ton of iron, lb	117	210
Stone/ton of iron, lb	667	880
Blast temperature, °F	1045	1020
Ore to coke ratio	2.40	2.64
Iron Analysis		
Silicon	1.07	0.48
Sulphur	0.034	0.043
Phosphorous	0.181	0.164
Manganese	1.74	1.55
Slag Analysis, %		
Silica	37.85	34.48
Alumina	11.75	12.26
Lime	41.06	31.89
Magnesium	6.77	19.24
Sulphur	0.85	0.73
Iron	0.23	0.25
Manganese	1.58	1.33

TABLE III
DISTRIBUTION OF SULPHUR ANALYSES IN IRON

Range of sulphur, %	Cases No	Cases %
Under 0.025	7	5.3
0.025 to 0.030	14	10.6
0.031 to 0.035	21	15.9
0.036 to 0.040	34	25.8
0.041 to 0.045	16	12.1
0.046 to 0.050	15	11.4
0.051 to 0.055	7	5.3
0.056 to 0.060	5	3.8
0.061 and over	13	9.8

Average: 0.043 per cent sulphur

and magnesia that enter into the composition of slags.

Of the slags in Table I, the Akermanite and the Monticellite groups have the lowest melting points. These are followed by the calcium bi-silicate, and Gehlenite groups into which the normal blast furnace slags of 4 to 8% MgO fall, and in general are the slag compositions most furnaces operate on successfully. The next grouping are the higher temperature slags, Forsterite, calcium orthosilicate, and Spinel, with melting temperatures 600 to 1000°F above the normal operating slag temperature.

After studying the various slag compositions, the point which was of most concern was to produce, in actual furnace practice, a slag with one of the lower melting points. The slags fall in the Monticellite group when producing low-silicon malleable iron with low alumina in the slag, but could it be done when producing low-silicon basic iron with higher alumina? The results of our experiment on basic iron showed that this could be done with normal furnace operation. Average analysis of the slags formed during the five week test period follow:

Element	Per cent
Silica	34.48
Alumina	12.26
Lime	31.89
Magnesium	19.24
Sulphur	0.73
Iron	0.25
Manganese	1.33

Fig. 8, is a portion of a cross section of the four component slag pyramid, taken at the horizontal plane of 20 per cent MgO. The slags in all but two cases fell in the Monticellite group as is shown in this figure. Each point plotted on the diagram represents the daily analyses of the slags taken during the test.

So far, two points have been mentioned in favor of the use of the high-magnesia slags; first, the lower temperature of the resultant slags formed, and secondly, the lower viscosity of the slag. Greater regularity of furnace operation may also be credited, to a point, which McCaffery[6] brought out in 1932, that if the silica-lime-alumina composition of a high-magnesia slag is changed at any one temperature, a relatively small change in viscosity results; but if the same change is made in a low-magnesia slag at the same temperature, a considerable change in viscosity may take place. Likewise, from the results of our own investigation of slags[7] formed in the blast furnace, it was found that in low-magnesia slags, the mineralogical compositions so arrange themselves that only a slight change in analyses was necessary for slags to change from one mineralogical group to the other. With this condition existing in slags that vary as much as 1200°F in melting points, any change in the composition of the slag shows a marked change in the furnace operation, due to the extreme differences in melting temperature of the resultant slag. In 20 per cent high-magnesia slags, when the composition is kept in one mineralogical group, or in groups which vary little in temperature, fewer variations in the properties of the slag result.

To make a comparison between the production of low-silicon basic iron to regular silicon basic iron, the No. 2 blast furnace was switched back to the production of the normal 0.80 to 1.10 per cent silicon iron after five weeks of operating on the 0.30 to 0.60 per cent silicon iron. An attempt was made to keep all furnace practice as nearly constant as possible. The resulting comparison of the furnace practice for the two periods is shown in Table II.

Comparison of the results shows that during the period when the furnace was operating on the low-silicon iron, production was lower by 28 nt per day, that the coke consumption was 33 lb per ton higher, and that the stone requirement was increased by 213 lb per ton of iron produced. Silicon in the iron averaged 0.48 per cent as compared to 1.07 per cent in the regular iron. The phosphorus and manganese were slightly lower, while the sulphur increased from 0.034 to 0.043 per cent.

Higher sulphur was due to the quality of coke charged the first two weeks of the experimental period on low-silicon iron during which time, most of the high-sulphur casts were made. Distribution of the sulphur analyses of the iron are shown in Table III. Of the 25 casts that went over the 0.050 per cent sulphur limit, 20 of them were made during this period when the quality of coke was not good. Proof that the coke was the fault, and not the high-magnesia slag, was made evident by the high-sulphur conditions on two other furnaces which were using the same coke and were operating on normal slags. Upon investigating the practice at the coke plant, it was found that 100 per cent stock coal was being used in the coal mixture going into the ovens. Partial oxidation of the coal had taken place as the coal had been in stock for over a year, which, no doubt changed its coking properties.

The coal mixture was changed to a 50 per cent stock coal and a 50 per cent new coal mixture, which immediately resulted in a much better quality coke and a greatly improved furnace operation throughout the department. It is believed that the average sulphur of the low-silicon iron would have been lower than the 0.043 per cent had the latter type of coke been used throughout the entire period.

If actual cost figures had been made on the economics of producing the low-silicon basic iron from the data accumulated during the test, it would appear that the cost was somewhat higher than for normal basic iron. Several factors, however, seem to indicate that with continuous operation on the 0.30 to 0.60 per cent silicon iron, the cost would compare more favorably to the normal basic iron. A definite improvement in furnace practice was noticed the last two weeks of the experimental period owing to the change in coke that was charged and to the experience gained in operating a furnace on this type of slag over the longer period of time.

During the period when the low-silicon iron was used in the open-hearth

(*Please turn to Page* 158)

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Electronic Contouring

(*Continued from Page 96*)

then templet tends to move away from stylus.

Referring to Fig. 7, signal voltage from mixer is fed into grid of tube 1 and, in turn, through transformers (1T and 2T), is fed into a cathode-follower rectifier circuit (tubes 2 and 3) and also into a saturable reactor phase shift bridge.

Amount of phase shift obtained in phase shift bridge depends upon amount of direct current flowing through direct-current winding of saturable reactor. Note, Fig. 7. Amount of direct current flowing through tube 4, in turn, depends on how much the tube is turned on by the grid voltage. Grid voltage is a direct current voltage (proportional to the magnitude of the signal voltage) obtained from cathode-follower rectifier circuit. Hence phase shift depends on magnitude of stylus deflection.

Voltage on the grid of tube 4 depends upon magnitude of signal voltage and also upon settings of index point potentiometer 1P and sensitivity potentiometer 2P. Saturable reactor tube cathode resistance (potentiometer 3P) is adjusted so that when point 1, Fig. 7, is equal in voltage to point 100, current through tube 4 (and the direct-current winding of the saturable reactor) gives 90-degree phase shift. By changing index point potentiometer 1P, amount of deflection required to give 90-degree phase shift is adjusted. In addition, the index point selected is independent of setting of sensitivity potentiometer (2P). Increasing sensitivity decreases change in stylus deflection required to give a correcting phase shift.

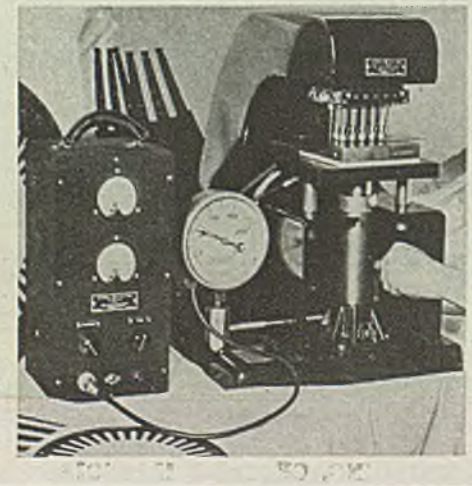
Combination of directional signal voltage obtained from tracing head, and phase-shifting action of bender circuit gives guiding characteristic needed to follow contours of a templet. Once templet is brought into contact with stylus, it starts moving in a direction tangential to stylus and continues until stopped by the operator.

When a corner or change of slope is reached, direction of stylus deflection changes, and templet tends to run in a different direction. If stylus digs into or loses contact with edge of templet, the bender circuit corrects this by changing amount of phase shift and keeps magnitude of stylus deflection constant. Consequently templet continues to run with same stylus deflection but in a new direction.

Signal voltage, after going through bender circuit, has necessary directional characteristic to cause correct movement of stylus along edge of templet. It has a certain phase relation which depends upon shape or slope of templet. The one basic problem remaining is that the signal voltage is a 2000-cycle alternating current voltage, and direct current voltages are needed to operate the two motor control circuits which operate the feed motors. Hence one alternating current signal voltage must be "translated" into two equivalent direct current voltages. That is the function of the translator circuits.

Signal voltage from bender circuit is fed (through tube 1 and grid transformers 1T and 2T) to grids of tubes of two similar translator circuits, Fig. 8. The circuits are identical except that one has the 2000-cycle reference voltage from the oscillator applied to the plates of the translator tubes, while the other uses the 2000-cycle quadrature voltage. In other words, signal voltage from the bender circuit is applied to grids and reference or quadrature voltage is applied to plates of the translator tubes.

Function of each translator circuit is to provide a direct-current voltage that can be used to govern the speed and direction of the feed motor corresponding to that translator. Each direct-current voltage must have magnitude proportional to required speed, and polarity to determine direction of rotation of feed motors.



TESTS ENAMEL INSULATION: Designed to measure the insulating value of enamel coating on steel sheets or punchings, this new testing device was built recently by General Electric Co., Schenectady, N. Y. In operation, two drills are forced into specimen; a closed circuit is formed with current passing through contacts and enamel to core metal and back through drills to power supply. Control unit is then switched on and adjusted to ½-v across the coating

The two translator circuits in Fig. 8 give desired direct-current voltages by utilizing phase relation of signal voltage (from the bender circuit) with respect to reference voltage in one translator, and to quadrature voltage in the other translator. Signal voltage is amplified to such a degree that its magnitude no longer matters.

Referring to Fig. 8, each translator output voltage, filtered, is a direct-current voltage proportional to cosine of phase angle between signal voltage (on grids) and reference or quadrature voltage (on plates). For example, assume that signal voltage is in phase with reference voltage. In translator No. 1 the corresponding grid is positive when plates are positive on "positive" tubes 1 and 3, but is negative when plates are positive on "negative" tubes 2 and 4. Consequently, output voltage is maximum positive (Cos 0 deg. —1). If grid voltage is shifted 180 degrees, then output voltage is maximum negative (Cos 180 deg. = —1). At the same time, signal voltage is 90 degrees out of phase with "quadrature" voltage. In translator No. 2 corresponding grid goes positive 90 degrees after plate voltage on "positive" tubes 5 and 7, and stays positive 90 degrees after plate voltage on "negative" tubes 6 and 8 goes positive. "Positive" and "negative" tubes are on equal time, consequently output voltage will be 0 (Cos 90 deg. = 0).

Since plate voltages have a 90-degree phase relationship, it follows that one translator has an output voltage proportional to cosine of phase angle between signal voltage and reference voltage, while the other translator has output voltage proportional to sine of the same phase angle. Polarity depends upon polarity of sine or cosine function. Consequently, the two motor governing direct-current voltages have a sine-cosing relationship. Thus the vector sum of two feed speeds is constant in magnitude, depending on setting of contouring speed potentiometer, but varying in direction, depending on slope of templet.

Under automatic contouring conditions, the operating signal is obtained from tracing head whenever stylus is deflected. This signal voltage is phase-shifted 90 degrees in the "bender" circuit. When there is no stylus deflection, there is no signal voltage, consequently, no templet movement.

In order to move templet and work with no stylus deflection, a "manual" signal voltage is fed into the system in place of normal signal voltage. This is obtained by using a potentiometer that has a 360-degree continuous winding and four 90-degree taps. Reference voltage is connected to two opposite taps and quadrature voltage is connected to the other two taps. Phase of resulting "manual" signal

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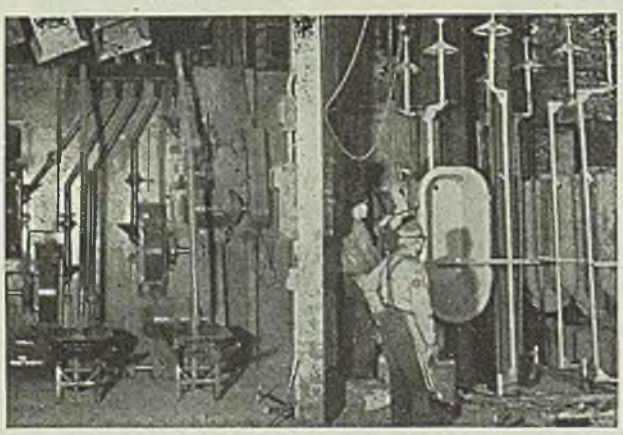

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voltage then depends upon position of potentiometer slider and can be varied through 360 degrees. By feeding the "manual" signal voltage directly into translator circuits, to eliminate "bending" due to changes in magnitude, it becomes possible to "steer" work and templet in a direction depending upon slider position. When properly connected and adjusted, direction of travel is indicated by the arrow on direction potentiometer knob.

Magnitude of direct-current output voltages from the two translators depends only on phase angle between signal voltage and reference voltage. To change tool travel or contouring speed (maximum speed of one motor when other motor is stopped) a double potentiometer is used to take an equal percentage of both translator voltages. Thus, if contouring speed potentiometer is set at half of its maximum value, contouring speed will be half that prevailing when potentiometer is set at half of its maximum value.

The two direct-current output voltages are then applied, through suitable electronic control circuits, to corresponding feed motors which drive cross and longitudinal feeds of movable work table. Motor control is such that it holds a motor speed proportional to magnitude of direct-current output voltages from corresponding translator, and runs the motor in a direction depending on polarity of the voltage. Consequently, a constant tool travel speed, or speed of movement of stylus along edge of the templet, is maintained, regardless of direction of travel.

By combining features inherent in electronic motor control with those described above, following three fundamentally different types of operation are available:

1. Automatic contouring, with motion of work in respect to the tool governed automatically. Basically, the equipment is operating as a "positioning-follow-up control." Under this condition, with the stylus of the tracing head in contact with the templet, the control will cause cutting tool to duplicate shape or contour of templet. Contouring speed, index point, amount of deflection, and sensitivity can be adjusted to suit work.

2. Manual contouring, with motion of work in respect to tool governed by a "manual contouring" push-button, and "direction" potentiometer. This condition is only obtained when stylus is not in contact with templet. If stylus is deflected, automatic contouring will "take over." Under this condition the operator can "steer" the tool in any desired direction. For example, work can be "roughed out" by following a rough drawing or scratch line. Speed can be varied to suit work.

3. Individual feed control, with motion of either, or both, feeds controlled independently of each other. Under this condition feeds are also independent of contouring control. Speeds of either feeds can be controlled by speed potentiometers in motor control circuits. Machine can be used for straight cutting and similar machining operations.

In addition to flexibility of machine use made possible by different types of operation outlined above, there are other advantageous characteristics, particularly in connection with automatic contouring.

1. Both cross and longitudinal feeds are regulated continuously depending on slope of templet. Work moves uniformly around the tool, not step by step.

2. Rate of templet travel around stylus, and work around the tool, is constant, depending on contouring speed setting, regardless of shape or slope of templet.

3. Above rate of work travel around tool is adjustable over a 10:1 range. Actually, motor speeds must vary over a much wider range to keep tool travel constant.

4. Direction of contouring (i.e., clockwise or counterclockwise direction of work travel around the tool) is easily reversed by operating switch on the control panel.

5. Pressure required to deflect stylus is low, being approximately 4 oz for a 0.01-in. deflection. Consequently wood or plaster templets can be used.

6. Amount of stylus deflection needed for normal operation is readily adjusted. Once adjusted, deflection remains constant as templet travels around stylus.

7. Light finish cuts (0.002 to 0.005-in.) can be taken after a roughing cut by increasing index point, and without the necessity of changing anything else.

8. Stylus can follow a closed templet, either internal or external, without attention of operator.

9. Safety features prevent damage to work or machine due to overload, undervoltage, over-travel, or over-deflection of stylus.

One of the most important requisites of any contouring control system is high duplicating accuracy. Exactness between successive pieces of work in connection with development of electronic automatic contouring control tests were made to determine what duplicating accuracy could be expected with this type of control. Results on a small lathe were as follows:

With a tool travel speed of 1 ipm five small brass pieces, shaped like a chess pawn, were turned out one after the other. The five pieces were then compared to determine extent and location of maximum error. It was found to be less than 0.001-in. It occurred where direction of tool travel had to change rapidly. Error on a relatively larger radius, approximately ½-in., was less than half the above.

Tests made at tool travel of 5 and 10 ipm showed errors of approximately 0.002-in. and 0.003-in. respectively. Use of a higher quality machine for these tests undoubtedly would have improved the accuracy.

New Literature

TRANSFER MOLDING MACHINES
By Watson-Stillman Co., Roselle, N. J. Illustrated bulletin contains data and specifications giving complete information, working ranges and power requirements of these units.

TERNALLOY ALUMINUM ALLOYS
By National Smelting Co., 6706 Grant avenue, Cleveland 5. Bulletin gives information on aging characteristics, mechanical and physical properties as sand cast and chill cast and chemical composition.

MODERN PLASTICS
By Bakelite Corp., 300 Madison avenue, New York 17. A 38-page booklet giving brief outline of origin, preparation and uses of plastics and their importance in our modern living.

POWER PUMPS
By Worthington Pump and Machinery Corp., Harrison, N. J. Bulletin W-414-B44, illustrated, gives specifications, general dimensions and installations of Type VTE 2, 4, 5 and 6-in. stroke power pumps.

EXPANSION, ANCHOR AND LOW PRESSURE JOINTS
By MagniLastic Division, Cook Electric Co., 2700 Southport avenue, Chicago 14. Catalog No. 276M contains engineering data, dimensional tables and specifications for standard packless expansion joints, anchor joints and low pressure-large diameter expansion joints.

FORMING ARTICLES FROM EXTRUDED TENITE SHEETING
By Tennessee Eastman Corp., 10 East 40th street, New York 16. A 12-page booklet describing and illustrating nine primary operations in fabrication of sheet plastic articles and the equipment which may be used.

BUILDNG MANTENANCE MATERALS
By Flexrock Co., 3630 Filbert street, Philadephia 4. A 64-page handbook on building maintenance, methods and materials for finishing and caring for floors.

CONVEYOR BELT
By B. F. Goodrich Co., Akron, O. Describes installation and operation of a single conveyor belt, 1556 ft from center-to-center, which eliminated three previous belts and two transfer points at Kevin iron ore pit of Butler Brothers near Cooley, Minn.

ELECTRIC CONNECTORS
By Cannon Electric Development Co., 3209 Humboldt street, Los Angeles 31. A 64-page bulletin containing information on K and RK plugs, receptacles, dust caps, junction shells, stowage receptacles for aircraft, instruments, radio, motors, geophysical equipment and general electrical applications.

Industrial Equipment

Spray Booth

Water tube curtain type water spray booth (immediate right) incorporates a series of tubes to clean paint laden air. Each tube contains two high velocity, clog-proof nozzles which wash the air twice. The booth, made by Newcomb-Detroit Co., 5741 Russell street, Detroit 11, draws the air, after washing, through moisture separators before discharging. Shipped 90 per cent preassemled, the booth has a built-in discharge fan that eliminates necessity for construction and installation of fan mounting and equipment. Water recirculating pump and motor are mounted directly to tank, permitting assembly of pump suction and spray prior to shipment. Spray booths are offered in five sizes—5000, 7500, 10,000, 12,500 and 15,000 cfm—and may be used individually or in combination.

Steel 12/9/46; *Item No.* 9016

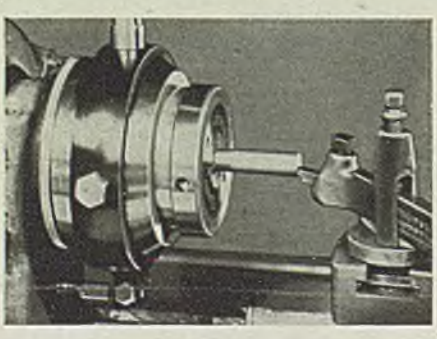
Collet Chuck

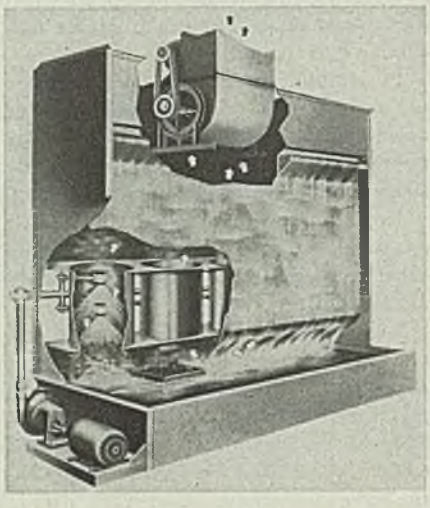
Collet chuck that provides a straight parallel grip on the work at all times and a steadier hold through the full length of collet bearing to compensate for work irregularities is announced by Porst Bros., 259 North California avenue, Chicago 12. Referred to as a Levermatic, the chuck, directly below, has a knurled, hand-operated, selective collet adjustment ring with self-locking positions that maintain a predetermined pressure. This feature assures a solid grip on tough steel and a gentle grasp on thin tubing and plastics. Chuck threads into lathe spindle nose and with aid of a hand-operated shifting lever, operates without stopping the spindle.

Steel 12/9/46; *Item No.* 9012

Quench Ring

Hydraulic rotary spindle and quench ring, center below, simplifies handling and heat treating of parts requiring rotation during the heating cycle and



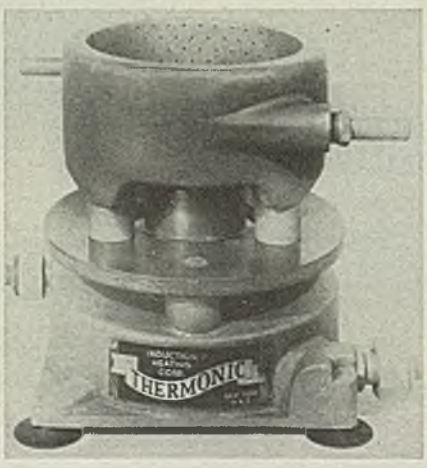


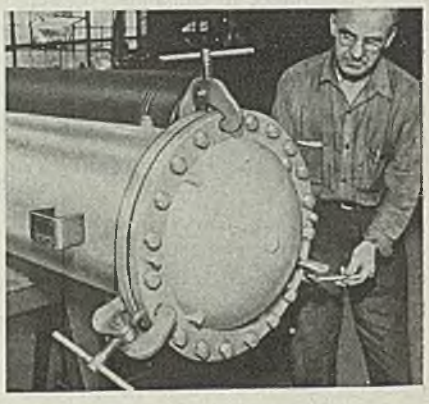
subsequent quenching in position. Manufactured by Induction Heating Corp., 389 Lafayette street, New York 3, it can be used with any type of induction heating equipment. Work is located on the spindle which is actuated by a water-driven turbine, fed through standard hose and nozzle attachments in base of unit. Speed of rotation is controlled by varying flow of water. Unit can be moved from one coil to another. Rubber suction cups hold it in position for short runs. These may be replaced by holddown bolts for long runs. Flexibility is achieved by interchangeable quench rings and adaptors, available in four sizes, 4 ¾, 7, 9 and 12 in. ID.

Steel 12/9/46; *Item No.* 9013

Flange Jack

T. G. Persson Co., 224 Glenwood avenue, Bloomfield, N. J. announces a flange jack that not only permits quick and safe gasket replacement but also is capable of opening all types of flanged surfaces, such as sectional tanks, evaporators, condenser heads, valve bonnets and heat exchangers.





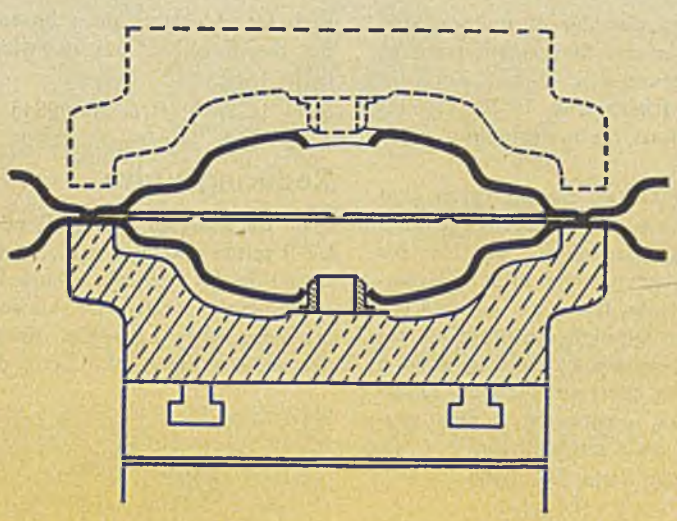
The jack permits easy renewal on either full face or ring gaskets. Jaws are one-piece steel forgings and screw tips are hardened. Standard size jacks open flanges from 2 to 20 in. Pressure is exerted smoothly and evenly without shock or vibration. For larger pieces, several jacks are recommended as shown above.

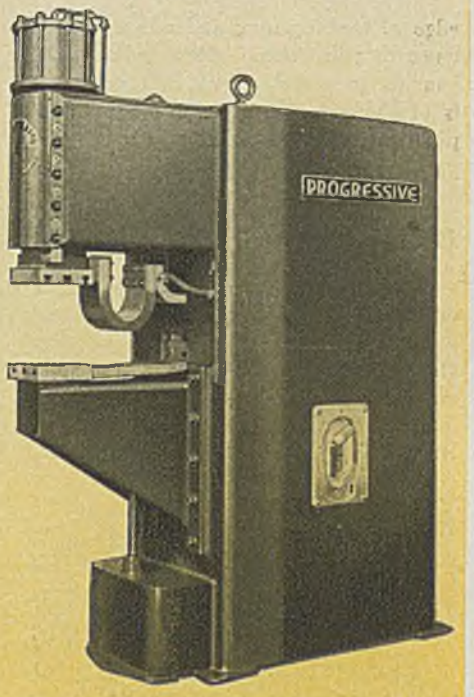
Steel 12/9/46; *Item No.* 9017

Self-Sealing Test Plug

Self-sealing test plug directly below, closes openings in tanks, boilers and other vessels requiring hydrostatic or pneumatic internal pressure tests. Developed by Mechanical Products Corp., 168 North Ogden avenue, Chicago 7, it uses testing pressure from within tank to force and hold seal of plug against the seat. Effective pressure area within cylinder of plug is greater than area of tank opening, insuring a tight, leak-proof seal. Called Hydro-Matic, plug has an oversized tapered head on pull rod which centers itself against inside

(All claims are those of respective manufacturers, for additional information fill in and return the coupon on page 122.)





We cut 75% off his fabricating cost

DESIGNED for Resistance Welding

Top, left... Simple ring dies are used on a Standard Progressive Projection Welder (Top, right) for fabricating steel wheels, out of two identical stampings, each with 4 projections. 8 welds are made simultaneously.

A manufacturer in Illinois was setting up to fabricate a line of toy wagons as a post-war product. He figured they could save money by making each wheel out of two identical stampings spot welded together in 8 places just below the rim.

He was right that spot welding *would* save him money and make a stronger wheel—but he did not know how much MORE he could save by a small change in the stampings.

When Progressive's engineers looked over the design they recommended that each wheel-half be provided with 4 small projections (formed during stamping—see sketch). The two halves could then be dropped into a simple fixture on a standard PROGRESSIVE PROJECTION WELDER—with the projections on one stamping half-way between the projections on the other. With this design, all eight "spots" are projection-welded simultaneously.

This simple design change cut welding and handling time down from over 11 to only 3 seconds per wheel. Desired output of 1200 wheels per hour could now be obtained with one man and one Projection Welder instead of 4 men operating 4 Rocker-Arm Spot Welders.

PROGRESSIVE engineers will be glad to save you money, too, by studying your design for lower cost resistance-welding.

For news of the latest developments in resistance welding equipment and methods, influencing product design, ask to be put on the mailing list for the Progressive "WELDING PICTORIAL".

IT PAYS TO WELD

PROGRESSIVE Welder Co. 3050 E. OUTER DRIVE • DETROIT 12

RESISTANCE WELDING EQUIPMENT

edge of tank opening and sets up resistance to pull exerted within cylinder. It handles pressures up to 500 psi, and is available for ½-in. to 2 in. standard pipe thread openings.

Steel 12/9/46; *Item No.* 9014

Battery Booster

Single storage for operation of alarm or signal systems, control apparatus, as well as for trucks and tractors, may be charged with the compact, light weight, automatic, constant voltage charger manufactured by Selectron Division of Radio Receptor Co., 251 West 19th

street, New York 11. Featuring slow charging that protects battery life and prevents deterioration of plates, the booster is rated at 4-2 amp but will supply 5 amp for short periods. Long life selenium rectifier and automatic circuit breaker provide overload protection. Cold rolled steel cabinet measures 4 x 4 x 5 in. and weighs 4 lb. Charger, illustrated here operates on 105-120 v ac, 60 cycles, providing 6 v dc, 4-2 amp.

Steel 12/9/46; *Item No.* 9015

Retaining Ring

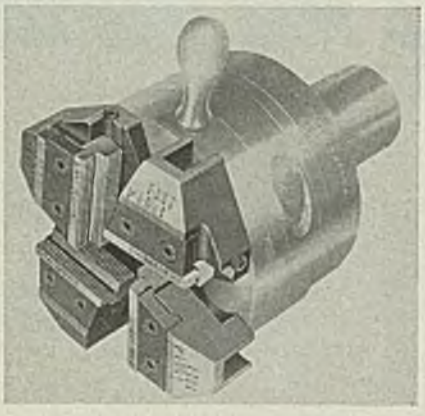
Two-part retaining ring of interlocking construction which, when fitted over a shaft in a radial direction, forms a complete annular shoulder of uniform section height around the circumference of shaft, is announced by Waldes Kohinoor Inc., Long Island City 1, N. Y. This feature increases the normal thrust capacity of ring.

Consisting of two mating halves that interlock, ring is of dynamically balanced design and particularly suitable for equipment involving high rates of revolutions per minute. It cannot be lifted out of its groove by high centrifugal forces or by linear expansion caused by friction with abutting parts or surfaces. Disassembly of ring requires only a slight prying action with a screw driver.

Steel 12/9/46; *Item No.* 9802

Thread Chasers

Landis Machine Co., Waynesboro, Pa., recently developed a double diameter tangential type ground thread chaser. It has all surfaces and thread form ground after hardening and will hold within a class three fit on the two dia-

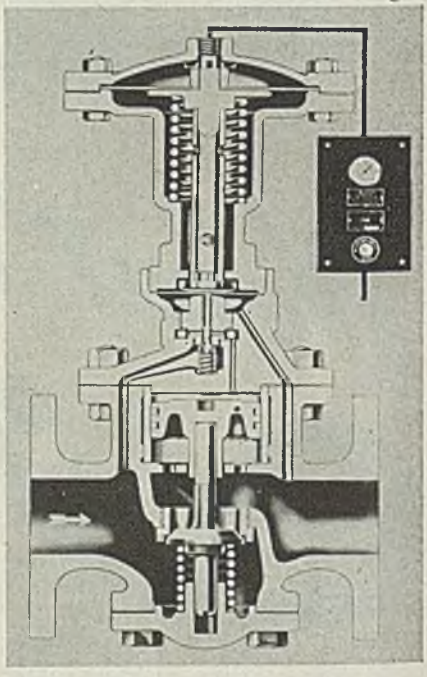


meters. Because there are limitations in the difference between the two diameters for which the chasers can be furnished, each set of chasers must be engineered for the threading job on which it is to be used.

Steel 12/9/46; *Item No.* 9848

Reducing Valve

A single-seated, internal pilot, class LT-3 piston operated reducing valve designed to be remotely adjusted from a conveniently located air loading panel, is announced by Leslie Co., 152 Delafield avenue, Lyndhurst, N. J. It is adaptable



to process piping arrangements, particularly steam heating systems that require either hazardous or inconvenient readjustments.

Air loading panel includes a small ⅛-in. combination pressure reducing and relief valve mounted on a panel containing an adjusting knob and a large air

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9016	9802	9846
9012	9848	9791
9013	9816	9841
9017	9950	9784
9014	9808	9847
9015	9972	9851
	9798	

12-9-46

NAME ..... TITLE .....

COMPANY .....

PRODUCTS MADE .....

STREET .....

CITY and ZONE ..... STATE .....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

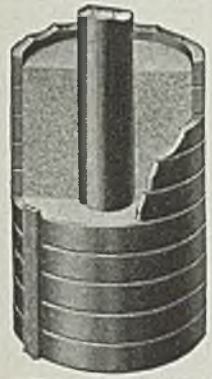
(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)

Exide

IRONCLAD BATTERIES

BUILT FOR PEAK PERFORMANCE AND LONG LIFE IN HEAVY-DUTY SERVICE...

The Exide-Ironclad is a different type of battery . . . in design, construction, service qualities. It was developed to meet the need for a battery to deliver high, sustained power in heavy-duty service over a long period of time.



THE POSITIVE PLATE is unique in battery design. It consists of a series of slotted, vertical, hollow tubes which contain the active material (See illustration at left). The slots in the tubes are so fine that, while they permit easy access to the electrolyte, they prevent the lead oxide from readily washing out, thus adding considerably to the life of the plate.

THE NEGATIVE PLATE has been designed and is built to equal the increased life of the positive plate. Like the positive plate, it has two feet at the bottom to raise it above the two supporting ribs.

SEPARATORS are made of Exide Mipor, a special rubber composition, and will match the long life of Exide-Ironclad plates. The cutaway illustration shows how separators rest on ribs well below bottom of plates, thus making probability of internal short circuits very remote.

THE EXIDE-IRONCLAD ASSEMBLY is sealed in jars of Giant Compound. Jars are practically unbreakable in normal service.

THE RESULT is an efficient, ruggedly built battery that assures dependable performance, long life and maximum economy . . . a battery that fully measures up to each service requirement . . .

★ ***HIGH POWER ABILITY*** . . . needed in frequent "stop and go" service.

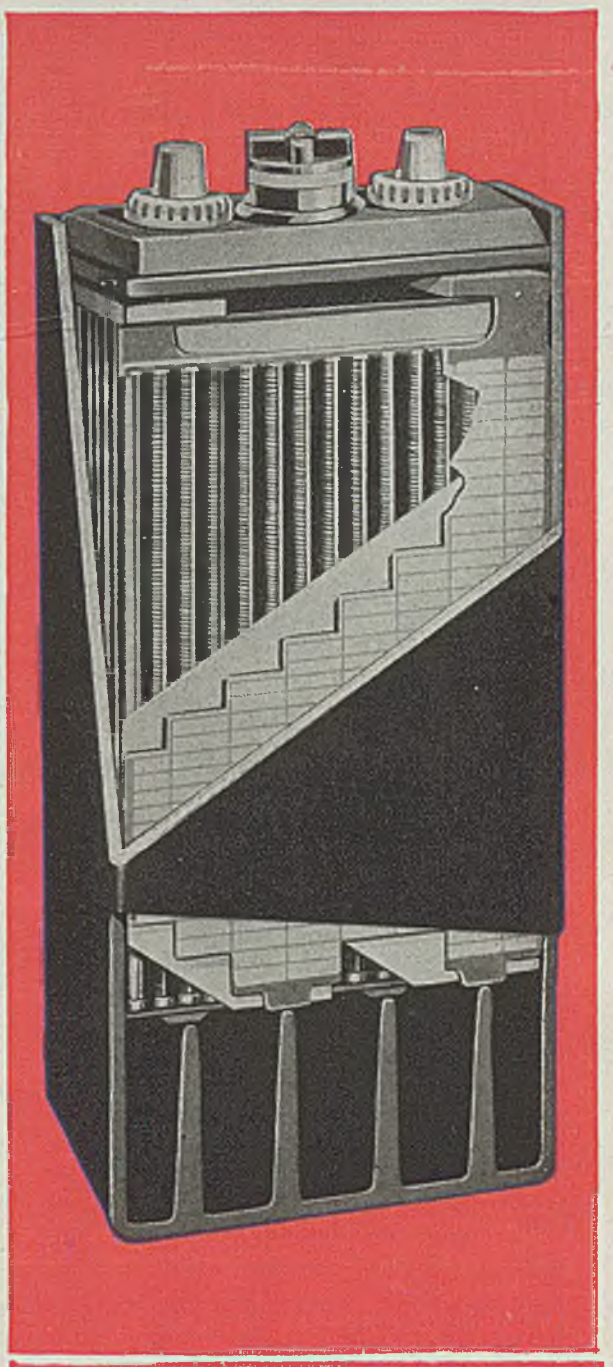
★ ***HIGH MAINTAINED VOLTAGE*** throughout discharge.

★ ***HIGH ELECTRICAL EFFICIENCY*** that keeps operating costs low.

★ ***RUGGED CONSTRUCTION*** . . . for long life.

Exide-Ironclads are supplied in sizes to suit every make and type of electric industrial truck.

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

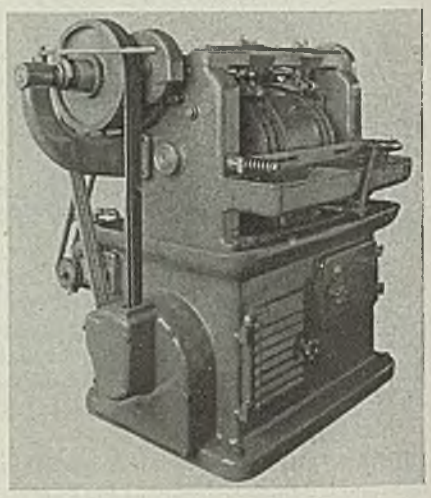


pressure gage. In operation, reducing valve is adjusted to desired pressure setting by air pressure supplied by loading panel. Constant loading force on upper diaphragm of reducing valve opens controlling valve and is balanced by a constant reduced pressure proportional to loading force, thereby maintaining a constant reduced pressure. Valve is furnished in high pressure bronze or cast steel body with flanged or screwed ends.

Steel 12/9/46; *Item No.* 9816

Milling Machine

Permitting single or double milling of four pieces at one time, the new drum-type milling machine developed by Sommer & Adams Co., Cleveland 12, owes its high production rate to multiple milling cutter mountings. Other features are a quick loading chuck, automatic ejection of finished work and easy access to cutters for adjustment or regrinding.



Drum rotating gearbox is mounted in center of frame and consists of a worm and a worm wheel driven by a hardened and ground worm and tractor bronze worm gear, with pick-off gears for changing speed of rotation of drum. Disk type clutch on spindle drive V-belt pulley disengages rotation of cutter spindles and drum.

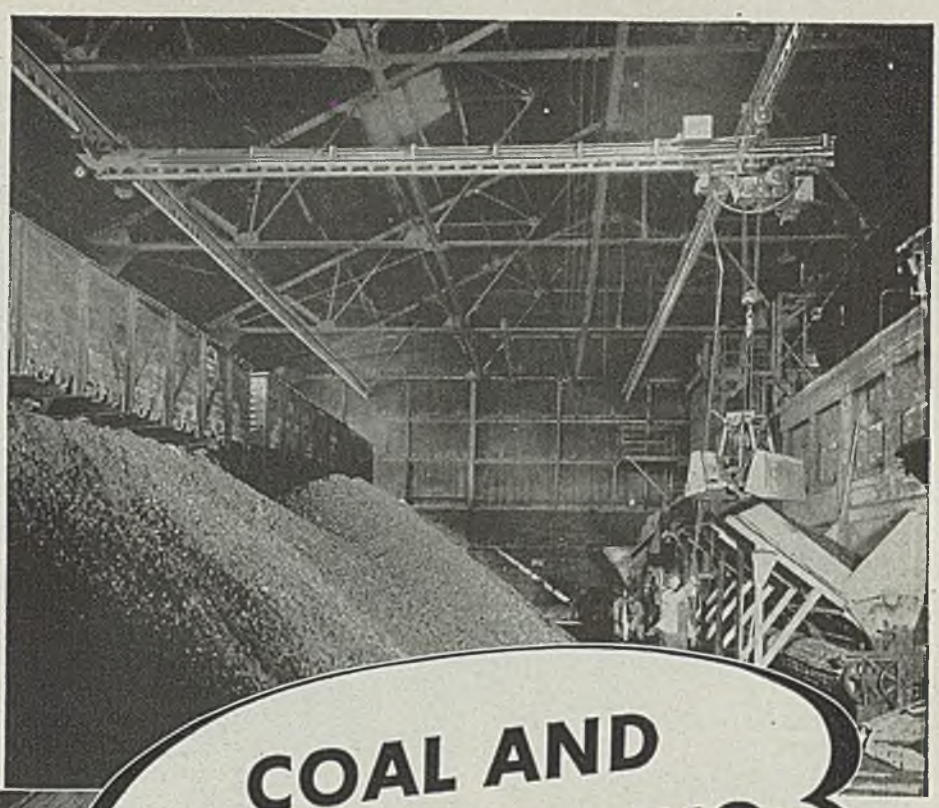
Steel 12/9/46; *Item No.* 9950

Electronic Timer

General Control Co., 1200 Soldiers Field road, Boston 34, announces an electronic timer, the Promatic, for controlling industrial processes under virtually any condition of temperature and humidity. It can be used to control equipment either automatically or semiautomatically.

Control of timing period is by means of a plug-in type condenser unit and a variable resistor, control of which has a graduated dial. One condenser unit is sup-

80 to 100 tons of coal are fed every 24 hours to the stoker hoppers of two 340 h.p. and two 560 h.p. boilers in this plant with a motor-driven floor-controlled Cleveland Tramrail crane and one-half yard single line grab bucket.



This bucket is ¾ yard size and carries ½ ton of coal. It is used as shown below.

COAL AND ASH HANDLING MADE EASY

Buckets are rolled under discharge chutes of overhead bin or to outside coal storage and filled. They then are picked up and delivered to stoker hoppers by Tramrail System. Same equipment hauls ashes away.

In many boiler rooms the problem of handling coal and ashes has been simplified by means of a Cleveland Tramrail overhead system. This equipment not only eases the work but cuts costs.

Both overhead cranes and rail systems are used depending upon the application. For large boiler rooms, as illustrated above, grab bucket handling cranes have proven advantageous. Overhead rail equipment as shown at left with electric hoist is in use in many small and medium size plants. One man usually can take care of a boiler room with this equipment and keep it clean and orderly. Inexpensive manually-operated equipment for handling one-half to one ton coal per hour can also be furnished.

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CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

plied with each timer to obtain the timing period specified.

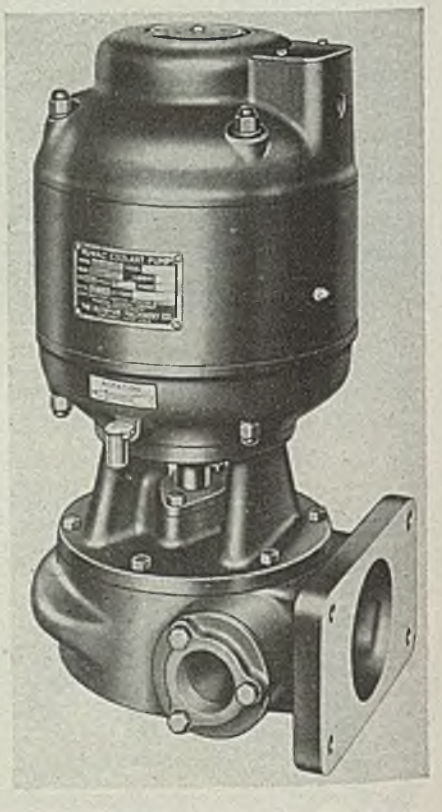
Five timing periods are available, in ranges of ½ cycle to 1.2 sec, ½ sec to 8

sec, ¾ sec to 15 sec, 1.5 sec to 30 sec and 3 sec to 60 sec. It is offered in both 110 and 220-v types, 60 cycles ac.

Steel 12/9/46; *Item No.* 9808

Motor Driven Pump

Capable of handling 70 gal of liquid per minute at a total head of 22 ft, new ball bearing, motor-driven Rumac pump



being marketed by Ruthman Machinery Co., Cincinnati 2, is equipped with a

COLD ROLLED STRIP STEEL • SHEET STEEL
COILS AND STRAIGHT LENGTHS • SHIM STEEL
COLD FINISHED BARS • SHAFTING
ROUND EDGE FLAT WIRE • ROUND WIRES
TEMPERED AND ANNEALED SPRING STEEL
FEELER GAUGE • DRILL ROD • STEEL BALLS

Simplify your production problems—GENSCO can process your steel into usable sizes for completely economical fabrication and handling. The GENSCO man in your territory will gladly explain the advantages of having your steel sheared, slit, and edged by our skilled operators. Call your Gensco representative or write, today for information about this specialized steel service.

GENERAL STEEL WAREHOUSE CO., INC.

1830 N. Kostner Avenue, Chicago 39, Illinois • Belmont 4266

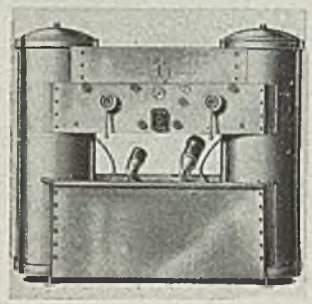
New York 17	Cincinnati 17	Milwaukee 2	St. Louis 5	Minneapolis 11
441 Lexington Ave.	56 E. Mitchell Ave.	208 E. Wisconsin Ave.	9301 Bonhomme Road	100 17th Ave., North
Vanderbilt 6-2750	Plaza 1470	Broadway 7629	Wydown 1368	Cherry 4457

¾-hp, 1725 rpm motor. It can be installed either below or above reservoir, in a vertical or horizontal position. The pump, illustrated here, can be converted to pipe inlet type by use of a pipe adapter plate available in several sizes.

Steel 12/9/46; *Item No.* 9972

Demineralizer

Line of four package unit demineralizers for providing industrially pure water is announced by Cochrane Corp., 17th Street and Allegheny avenue, Philadelphia 32. Units are designated by reaction



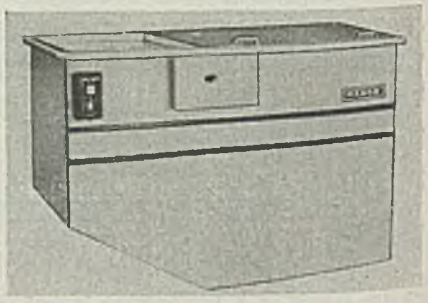
tank diameters as the CDM-12 (12 in. diameter reaction tank), CDM-18, CDM-24 and CDM-36. They are designed for plug-in operation from any 110-v 60 cycle source.

Demineralizers are constructed so that all steps of operation are performed from a position in front of the panel. Chemical tanks are also charged from this position making it suitable for location against a wall or in a corner. Control valves and instruments are located on the panel at eye level.

Steel 12/9/46; *Item No.* 9798

Dip Agitator

Drive mechanism in this dip-agitating machine developed by Mabor Co., Clark Township, Rahway, N. J., balances weight of parts by means of a knee that rests next to bottom of equipment outside



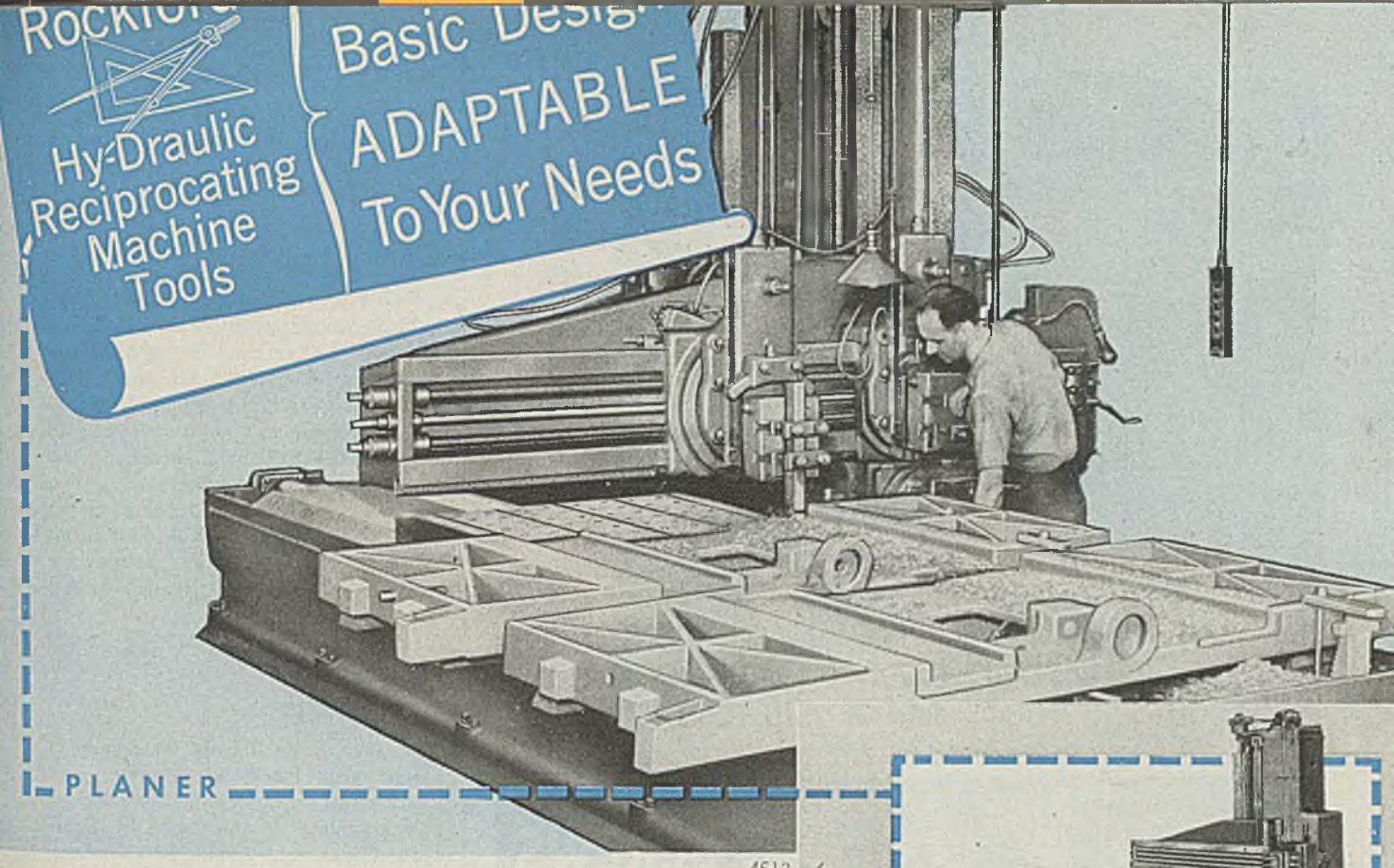
the tank. It is mounted in a removable frame that uses only two bearings.

Machine works at great speed, even though powered by a small motor, handling heavy or light loads quickly and easily. Built in several sizes, for wash

Rockford

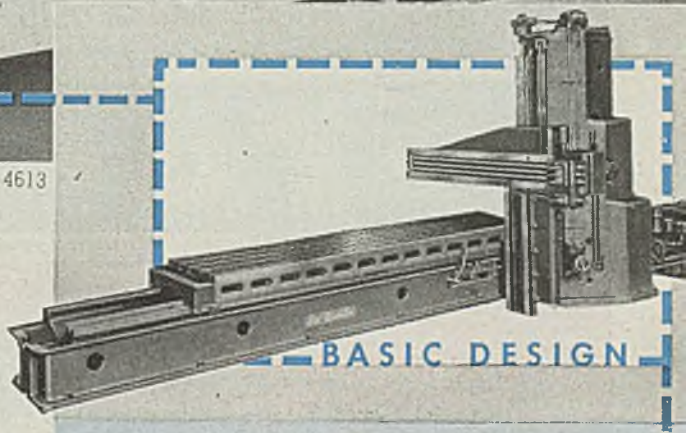
Hy-Draulic Reciprocating Machine Tools

Basic Design ADAPTABLE To Your Needs



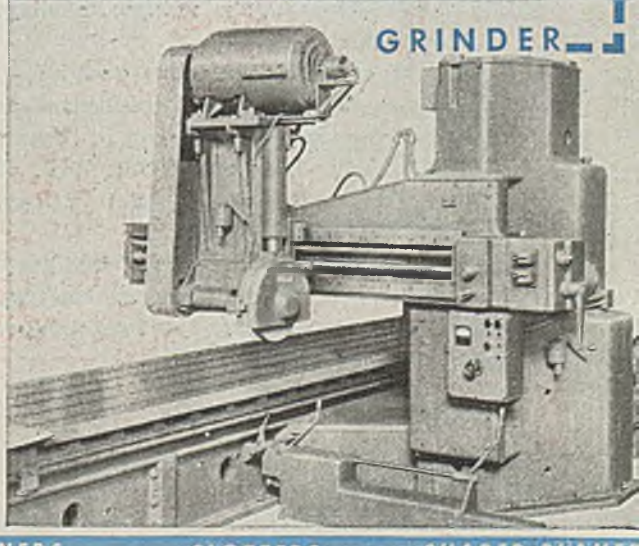
PLANER

4613



BASIC DESIGN

Basic design of the Rockford Hy-Draulic Openside Planer (above) is adapted to the heavy duty high-speed grinder below. Major change is that grinder head replaces tool head on the cross rail.



GRINDER

What Do You Want on the Cross Rail?

Rockford Hy-Draulic design is proving its basic soundness more fully each day. Because of it, as always, Rockford machines have powerful drives that are infinitely variable, fast, easily controlled, and smooth. Now the important feature of adaptability can be also demonstrated.

For example, the basic design of the machine shown here is normally used to build our standard Openside Planers. However, this basic Rockford Hy-Draulic design may also be applied to special machine design, such as to the grinder shown below. Whether the machine is built as a planer or a grinder, the same desirable operating advantages inherent in Hy-Draulic design are obtained.

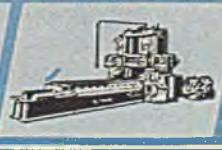
More than ever before, machine tools today must give you better work at minimum machine time. Let us show you how a Rockford Openside Planer can improve your operations because it's Hy-Draulic. For special problems, let our engineering department show you how basic Rockford design can be applied. Rockford Openside Planers are described in Bulletin 450. Write for your copy.

ROCKFORD MACHINE TOOL CO.
ROCKFORD ILLINOIS

Hy-Draulic

SHAPERS

PLANERS



SLOTTERS

SHAPER-PLANER

and rinse, and in special dimensions, it can be heated with steam, gas, oil or electricity

Steel 12/9/46; *Item No.* 9846

Gantry Hoist

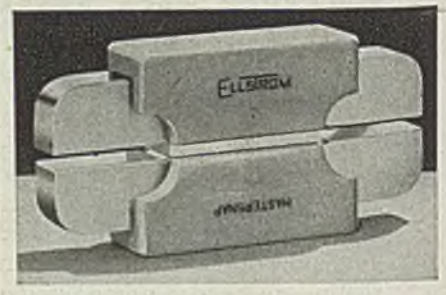
New type portable gantry hoist of all-welded tubular steel construction, designed by LaRay Engineering & Equipment Co., 1029 N. Seventh street, Milwaukee, has a lifting capacity of 6000 lb at the maximum span. Also each standard is equipped with four ball-bearing swivel casters for fast, easy mobility.

The I-beam is securely bolted to the top of each standard of the hoist to insure safe operation. Three heights are available—8, 9 and 10 ft, each having the same lifting capacity.

Steel 12/9/46; *Item No.* 9791

Snap Gage

A snap gage incorporating use of special gage blocks as accurate, non-wearing spacers in working, interchangeable assemblies is announced by Dearborn Gage Co., 22038 Beech street, Dearborn, Mich. Known as Ellstrom Mastersnap, it consists of a gage block



wrung between a pair of chromium plated alloy-steel jaws and locked in position by brass thumb fasteners. Colored thermoplastic insulators, green for go combinations and red for no go combinations, are fitted over jaws.

By this arrangement gage blocks are not subjected to wear and may be used indefinitely without loss of accuracy. Gage blocks are offered in sizes from 0.050-in. to 2.000-in. inclusive. They may be used separately or in combinations to form a wide range of double-end snap gage sizes. Separate assemblies are required for each combination.

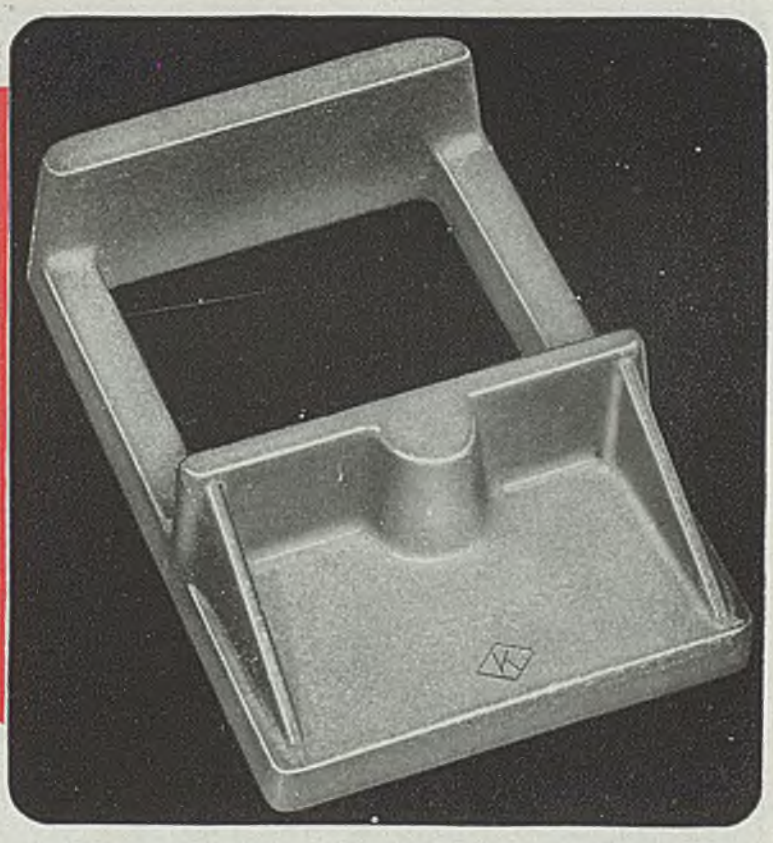
Steel 12/9/46; *Item No.* 9841

Rolling Mill Bearings

Four-row taper roller bearings of steel with high nickel content are featured by Kaydon Engineering Corp., Muskegon, Mich. Bearings are used principally in steel and nonferrous rolling mills, on backing rolls and working rolls.

Made of steel with a nickel content of

Forgings Offer 5 MAJOR ADVANTAGES Over Castings



Dependable Performance— Forgings provide ultimate strength and toughness, with maximum resistance to tensional, torsional and compression stress, and high resistance to impact and shock loads.

Longer Service Life— Forgings embody the highest obtainable fatigue resistance —the determining factor in the ultimate life of machine and equipment parts which are subject to repeated stress in continuous service.

Freedom from Breakdowns— The greater strength of forgings makes their liberal use the soundest possible insurance against breakdowns, down time for repairs and high maintenance costs.

Production Advantages— Forgings generally require less time to machine and finish, as the close tolerances obtainable leave a minimum of metal to be removed, resulting in lower machining and tooling costs. Weight is saved through the greater strength of forgings, which permits the use of thinner metal sections.

Available Now— Most types of forgings are quickly available without delays waiting for patterns, pouring or cleaning facility. DON'T WAIT FOR CASTINGS — LET US HELP YOU CONVERT YOUR JOBS TO LOW COST FORGINGS.

KROPP FORGE COMPANY

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Refer to Your Local Phone Directory for Kropp Forge Engineering Service in

Atlanta, Birmingham, Buffalo, Cedar Rapids, Chicago, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, New York, Portland, Rockford, St. Louis, St. Paul, San Francisco, Seattle, South Bend, Tulsa. Canada: Montreal, Toronto, Vancouver, Winnipeg. European Representatives: New York; Paris, France; Stockholm, Sweden.

SERVING INDUSTRY SINCE 1931 — KROPP FORGE CO. — OVER 100 YEARS

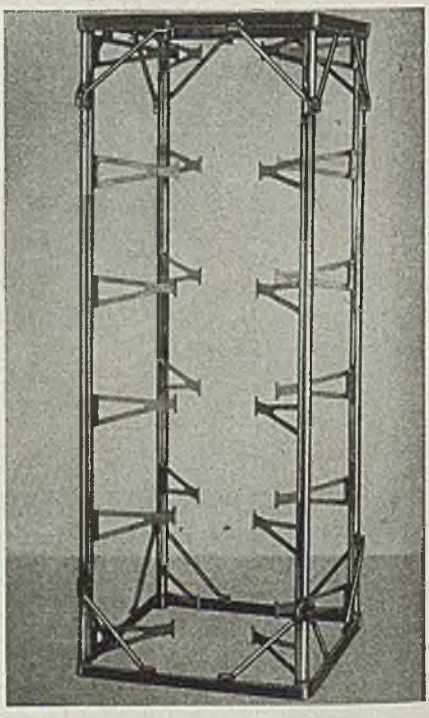
KROPP

"FORGINGS TO EVERY SPECIFICATION"

from 3.75 to 4.25 per cent and 1.5 per cent chromium, bearings are capable of withstanding heavy shock loads.
Steel 12/9/46; *Item No.* 9784

Enameling Fixture

Thorough circulation of heated atmosphere is possible with the lightweight fixture for handling dished tank heads being produced by Stanwood Corp., 4819 West Cortland street, Chicago 39. Fixture holds six tank heads, each supported at only four points, minimizing



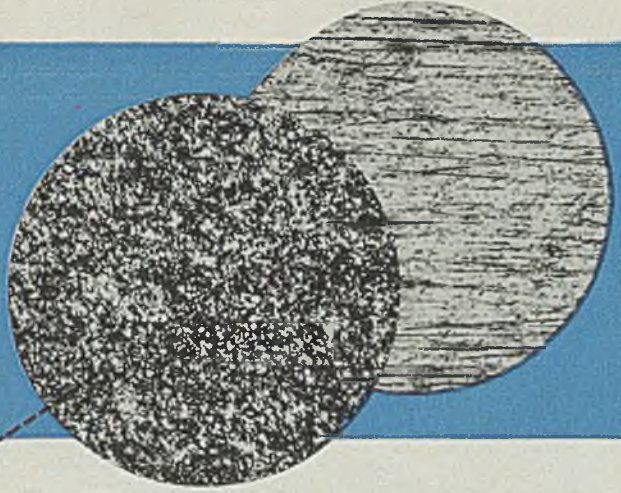
bearing surfaces. Pieces can be inserted from any side because of open design. It is a reversible fixture—when warpage begins in one direction, it many be inverted. Welded construction is of Inconel tubing and high nickel-chromium.
Steel 12/9/46; *Item No.* 9847

Roller Bearing Seal

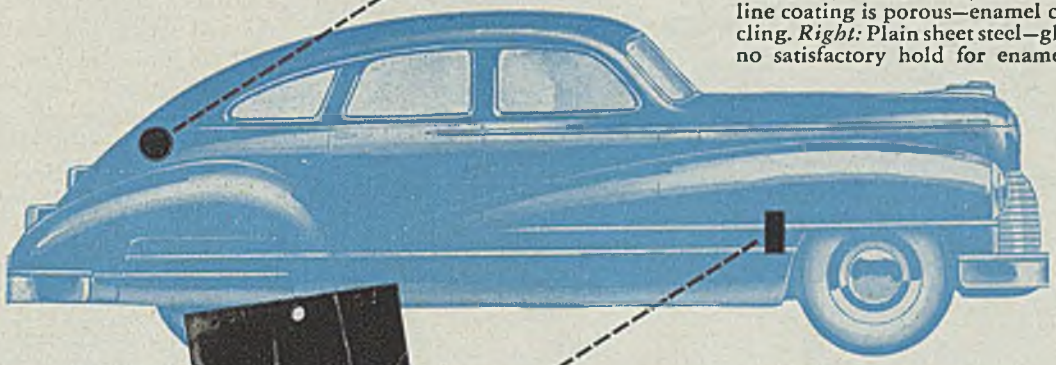
A newly designed housing seal for roller bearing units is announced by the Shafer Bearing Corp., 1412 West Washington boulevard, Chicago 7. Called the "Z" seal, it effectively retains lubricant and keeps out dirt.

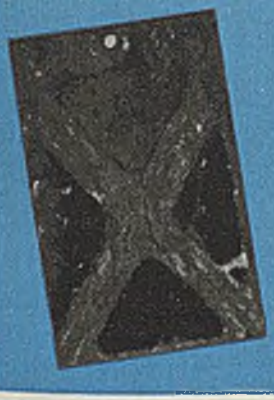
Seal consists of five parts. An element fits on an extension of inner bearing race with minimum running clearance, providing an almost frictionless seal. It is held under moderate tension yet is permitted to float radially, correcting for radial displacement from any cause. Brass is used in two parts to prevent corrosion and to provide natural bearing material during momentary contacts with the inner bearing race.
Steel 12/9/46; *Item No.* 9851

HOW *Bonderizing* PROTECTS FINE FINISHES



Above photomicrographs are 100x enlargements. *Left:* Sheet steel, Bonderized. Crystalline coating is porous—enamel can penetrate, cling. *Right:* Plain sheet steel—glossy, smooth, no satisfactory hold for enamel.





Results of identical salt spray tests: Left panel, typical auto finish on untreated steel has failed. Right panel, same finish on Bonderized steel, is in good condition.

Bonderizing ANCHORS FINISH TO METAL

Bonderizing is a better start to a better, longer-lasting finish. Applied finishes are *anchored* to Bonderized metal.

Forming a nonmetallic, crystalline coating that becomes part of the metal itself, Bonderizing resists corrosion. When scratches, dents or mars penetrate to bare metal, Bonderizing *localizes* corrosion, guards against its spread.

Nationally-advertised Bonderizing is used on many of today's finely-finished products—such as automobiles, washing machines, refrigerators. More buyers, every day, are conscious of the extra value of Bonderizing. Write for complete information.

PARKER RUST PROOF COMPANY, 2158 East Milwaukee Avenue, Detroit 11, Michigan

PARKER PRODUCTS CONQUER RUST

Janitor's Idea for Vacuum Cleaner Outmodes Broom

(*Continued from Page 71*)

millions of homes where Hoover sweepers are used. It is being continued in the postwar period while many thousands of housewives are waiting for new cleaners.

On the basis of the goodwill created by its service policy, Hoover officials are confident that many prospective buyers will wait to obtain a new Hoover, rather than accept another cleaner which may be available earlier.

The service policy also enabled Hoover to maintain the nucleus of its prewar sales and service organization, although this force dwindled from 5000 to 500 during the war. The commissions on the new Hoovers parceled out during the war plus the service charges enabled many of the veteran Hoover representatives to make a livelihood during the period when manufacture of new units was prohibited.

Components Made in Plants

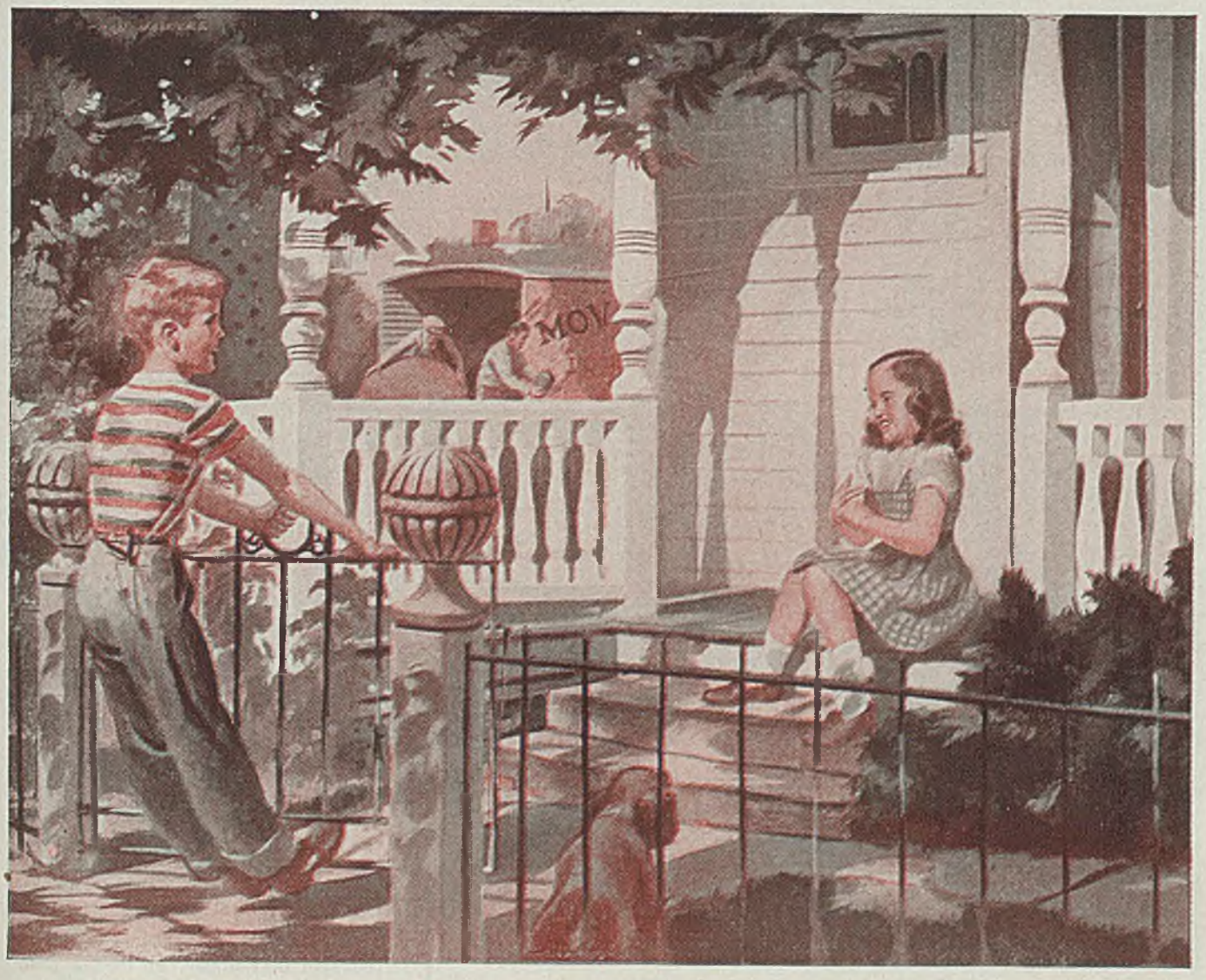
Manufacturingwise, Hoover is well integrated. Practically all components for the sweeper are made within the plant. The company makes its own dies and tooling and has modern tool and die departments. Toolmakers are trained within the plant through a regular apprentice training program.

The motor, fan and brush roll of the early sweeper were encased in wood or wood and metal. Seeking a more compact and sturdy case, the company turned to aluminum sand castings in 1912. Today the main castings are die cast on Hydraulic Press machinery and Lester Phoenix presses in the company foundry. Among its many resources, Hoover has a well equipped die shop.

Hoover has produced its own motors since 1919. This and its independence of other component suppliers has been an advantage during the past year when most companies' components suppliers have been plagued by strikes and assemblies have held up for want of components.

Materials shortages currently are preventing an approximate 25 per cent greater output of cleaners. Materials most difficult to obtain in sufficient quantities are steel, especially electrical sheet, plastics, magnet wire, copper, electric cords, and textiles for bags.

Notwithstanding, production is at the highest level in the company's history and most departments in the plants are on a two-shift basis and some are on three shifts. In a few, the foundry for example, workers are on the job seven



"BUT WHAT'S YOUR LAST NAME?"

Our last name is *Koppers*. Many of you know our "children" by their "first names," but do you know their last name?

That is important to us, and it's important to you, too.

Many of you vouch for the extra service you get from Fast's Self-aligning Couplings or American Hammered Piston Rings, or White Tar insecticides or D-H-S-Bronze . . . and don't know that their last name is Koppers. If you know, you are probably disposed to put more than ordinary trust in other products made by Koppers.

Did you know that you can get a Koppers product for coating metal surfaces to prevent corrosion? A Koppers material that makes roofs last longer? Lumber that defies decay and termites? And many other products made with the same skill and originality and inventiveness as those?

So . . . look for this trade-mark which will soon be found on all Koppers products. Here it is.

K
KOPPERS

It is the mark of an organization which is engaged in many phases of engineering, construction, chemistry and coal carbonization . . . is in the forefront of new synthetic developments . . . is an important supplier to the pharmaceutical industry and to many other industries. For top value, look for this mark. Koppers Company, Inc., Koppers Building, Pittsburgh 19, Pennsylvania.

THE INDUSTRY THAT SERVES ALL INDUSTRY

For example . . . for the steel industry

Among the principal products and services Koppers provides for the steel industry are:

Consulting, design and construction work in the fields of coal carbonization, gas manufacture and purification, and utilization of related products.

Fast's Self-aligning Couplings.

Roofing and Waterproofing Pitches.

Piston Rings for compressors, pumps, diesels and automotive equipment.

Locomotive Cylinder and Valve Packing.

Plastipitch Protected Metal roofing and siding.

Pitchmastic Flooring Compound.

Bituminous-base paints and coatings.

Bitumastic Protective Coatings.

Koppers-Elex Precipitators.

D-H-S Bronze.

days a week. On an average, the 2150 factory employees at North Canton, work 43 to 44 hours a week.

Were materials available, the company would increase its working force by possibly 20 per cent and more fully utilize the plant's capacity and incidentally make Hoover cleaners available to housewives earlier. Canton at present is a comfortable labor market and the company anticipates no difficulty in increasing its working force by this number.

In contrast to most metalworking plants, Hoover officials find labor productivity is now equal to the prewar rates.

Hoover's incentive pay system is built on a basic wage rate for a standard level of productivity with extra pay for exceeding the standard rate.

Plant Built in 1919

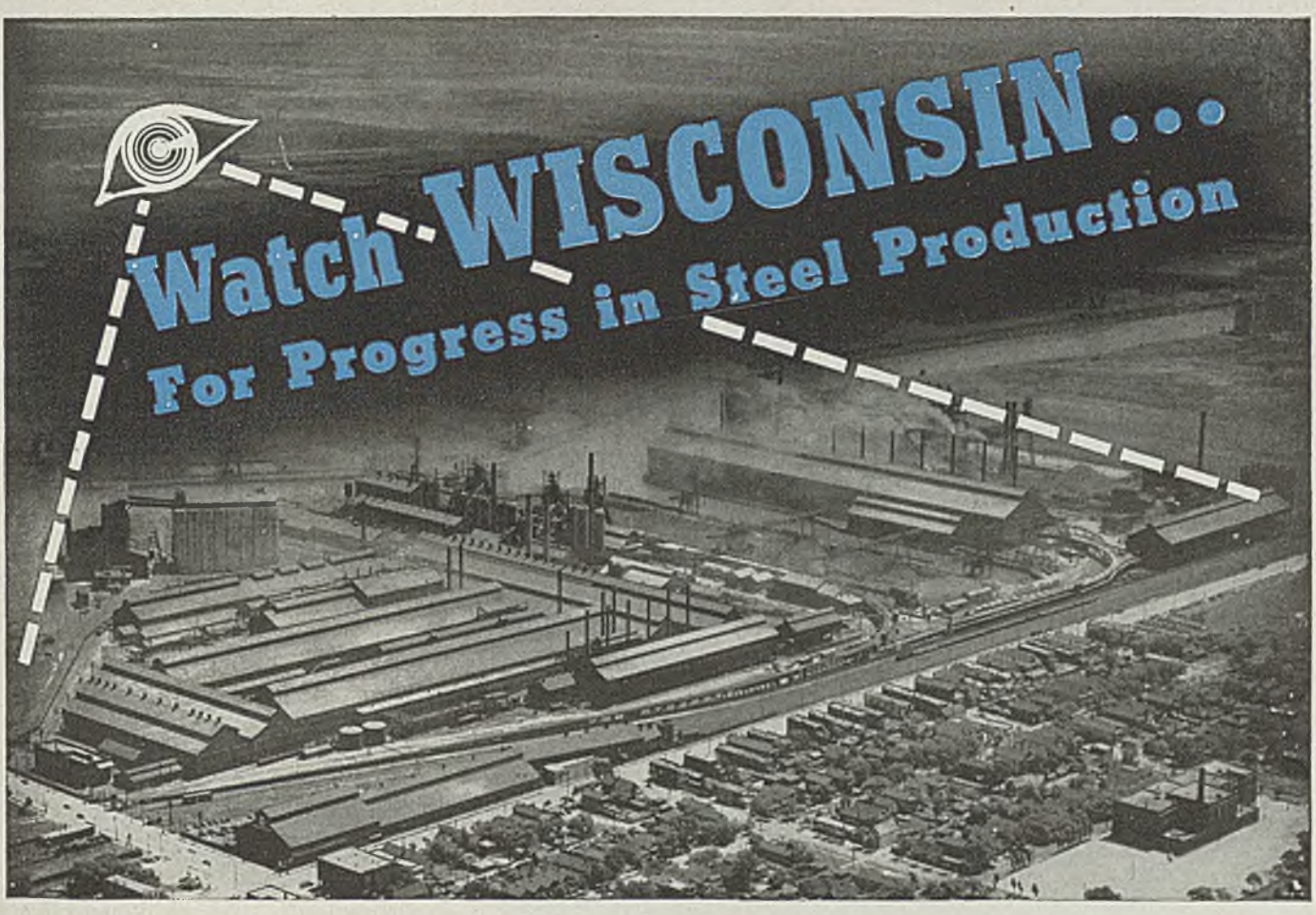
From the time of the first world war the history of the Hoover Co. on the whole is one of fairly steady expansion, slowed down of course by the cyclic recessions. In 1919, when demand for electric cleaners really reached large proportions, the company was pressed to supply the demand. In that year the company built a plant at Hamilton, Ont. This plant today is wholly integrated and builds in addition to vacuum cleaners, fractional horsepower motors. Then the company established a sales organization in England, later extending to other parts of the British Empire and to the continent of Europe. In 1932 a plant was built in England. This also is a wholly integrated plant and supplies Hoovers for most foreign countries, including the British Empire, Europe and South America.

In the U. S., Hoover's headquarters are at North Canton where it has a modern plant of more than 600,000 sq ft of floor space.

In addition, the company maintains an office in Chicago to take care of patents and advertising and has over 100 sales and service offices in leading cities.

In November, 1945, the company acquired control of the Kingston-Conley Electric Co., Plainfield, N. J., where it manufactures fractional horsepower motors.

When the manufacture of sweepers was halted by wartime conservation orders, Hoover launched into a program of all-out war production. It produced 25 million M-48 and M-51 fuzes for Army Ordnance. Plastic molding presses were converted to the production of helmet liners and fuze parts. The sewing machines and textiles equipment which normally made bags for cleaners turned out parachutes for fragmentation bombs. The motor line was converted



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Progressive is more than a word at WISCONSIN. It's a *fact* that has been demonstrated by our development of Sulfite-Treated Steel—the highly machinable steel that overcomes the faults of resulphurized steels. "H" steels of guaranteed hardenability are a specialty of ours. Both of these steels are earning wide acceptance and acclaim.

Superbly Staffed by top-flight steelmen, WISCONSIN has one prime objective: to make the best possible steel for our customers. Every man in the mill works toward that goal.

An Integrated Organization gives WISCONSIN complete control of the product from the ore mines to the customer. That control means finer steel.

Watch WISCONSIN for steel progress. We can't supply all the steel our customers need but the picture is improving. We haven't compromised with quality. Our sales and metallurgical staffs are ready to serve you.

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WISCONSIN STEEL

to making propeller pitch control motors, turret motors and amplidynes for use on Allied bombers. Similarly, other facilities were converted to making war materials for which they were easily adaptable.

But the outstanding war job performed by Hoover was in the development and production of components for the V. T. or proximity fuze, rated second only to the atomic bomb in effectiveness in winning the war. Because it was developed and used earlier, some authorities believe it should be rated first in World War II.

This was the fuze, kept secret until after V-J Day, which exploded its projectile when approximately 70 ft from its target, thus eliminating the difficult feat of actual hits or timing for distance to the fractional part of a second. It was used effectively in combatting German buzz bombs and the Japanese suicide bombers. This recognition was apart from the Army-Navy "E" flag, which was won by the company five times.

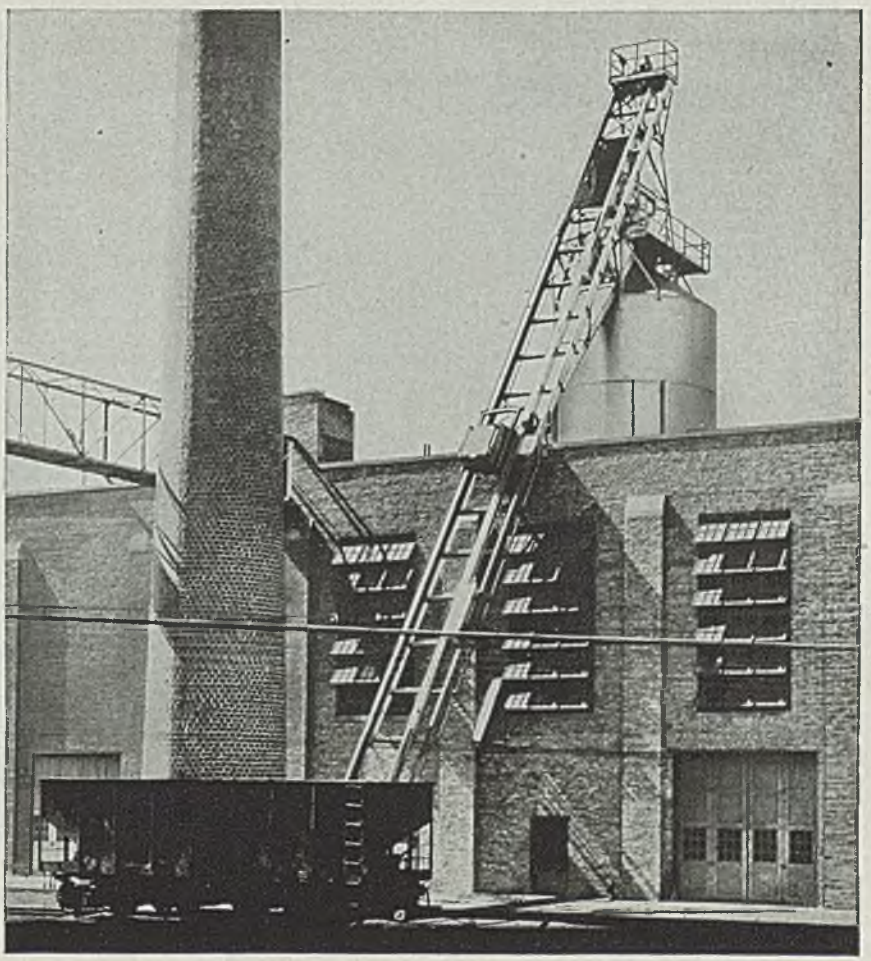
Received Navy Ordnance Award

For its part in development and making the V. T. fuze, the Hoover Co. was presented with the Navy Ordnance award, which was one of the most exclusive received by the company. In the early part of the war, fourteen such awards were made to manufacturing concerns, and the use of the Navy Bureau of Ordnance "E" flag was discontinued in favor of the Army-Navy "E". This along with the Navy "E" pennant was revived, however, at the end of the war in order to give recognition to 32 manufacturers of the VT fuze parts. Of these only one received four stars and nine others, including the North Canton plant of the Hoover Co., received three stars.

With the return of peace, Hoover was able to reconvert quickly and vacuum cleaners started to roll off the production line on Sept. 4, 1945, less than a month after the time of the Japanese surrender.

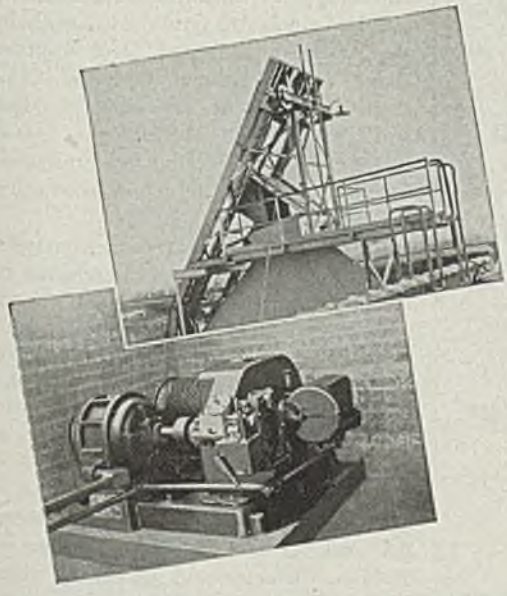
A major reason for the stability and growth of the Hoover Co. has been its management. Many of its officials have been associated with the firm throughout its existence or joined it in the very early days. Members of the Hoover family occupy many of the executive positions and six of the eleven directors are Hoovers.

President and general manager is H. W. Hoover, who was associated with his father in the leather goods business when Mr. Spangler brought his first crude vacuum sweeper to W. H. "Boss" Hoover. He served as vice president and general manager of the company



SKIP HOISTS

for handling coal and other abrasive materials



● Reflecting throughout their design and operation, our more than 40 years of cumulative improvements and developments, Bartlett-Snow Skip Hoists will give you a maximum of long, efficient, trouble-free service, with low operating and low maintenance costs. Widely used for handling coal in industrial boiler plants and central stations, also coke, coke breeze, sinter, limestone, ashes and other abrasives when the lift is high. Semi-automatic and full automatic, counterweighted and counterbalanced types. Capacities from 5 to 500 tons per hour. Send for Bulletin No. 83. It gives full details.

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Engineering and Sales Representatives in the Principal Cities

COAL HANDLING FOR CENTRAL STATIONS AND INDUSTRIAL BOILER PLANTS

from its inception until 1922 when he succeeded to the presidency.

Other top executives and officers of the company today include: F. G. Hoover, vice president and assistant general manager; H. Earl Hoover, vice president; W. W. Steele, vice president, sales; and J. F. Hattersley, vice president, production.

Ferrous and Nonferrous Data Published in Report

Data on the low-temperature properties of ferrous and nonferrous metal alloys, based on information available as of September, 1941, are contained in a 591-page report offered for sale by Office of Technical Services of Department of Commerce. Compiled by A. E. White and C. A. Sibert of University of Michigan, the report consists of seven volumes of data, classified into two main sections, nonferrous metals and alloys and ferrous alloys. With each group subdivided according to alloy types, composition, heat treatment, tensile test data and impact properties are given. Orders for the report should be addressed to Office of Technical Services, Department of Commerce, Washington. Cost is $40 for photostat edition and $6 for microfilm edition.

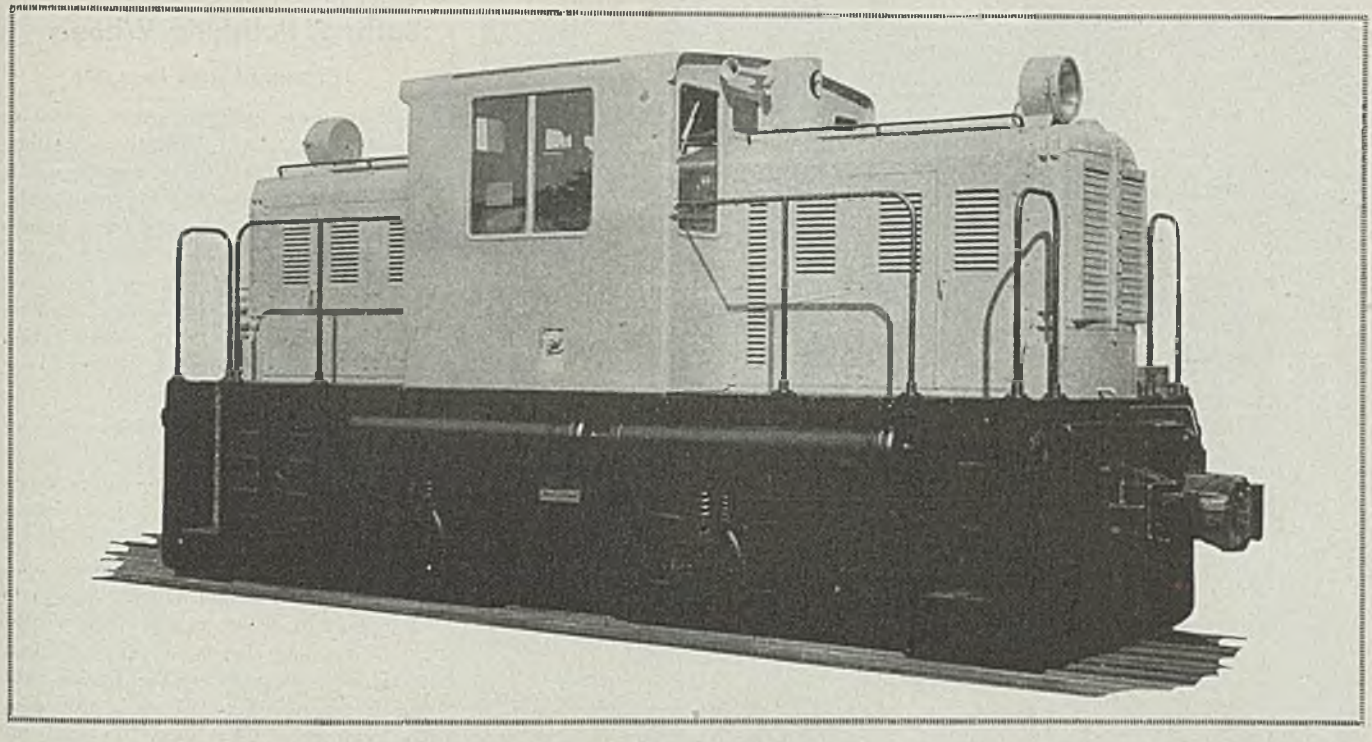
AISI Publishes Supplement To Steel Products Manual

Supplementary information on limits and ranges of chemical composition of standard steels was published recently by the American Iron and Steel Institute. Based on the General Technical Committee's policy of reviewing standard steels at frequent intervals, the revised lists are to be substituted for corresponding lists in latest edition of production manual sections.

Survey conducted in connection with the revision showed that, exclusive of stainless steels and tool steels, steels with several thousand different combinations of chemical elements were being manufactured to meet individual demands.

Shorter Drills

Fifteen per cent shorter drills which are available in fractional sizes from 1/8 to ½-in. diameter and wire gage sizes from No. 1 through No. 34 are illustrated and described in a new booklet issued by Republic Drill & Tool Co., Chicago. These mechanics length drills are said to be capable of faster feeds and require longer intervals between grinds because shorter length reduces vibration and allows sturdier construction.



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You'll find Whitcomb locomotives—just what the Doctor ordered. They are designed for years of dependable service and lasting satisfaction. The operating and maintenance costs will be much lower than you would reasonably expect and they will be available for operation near 100% of every 24 hours.

So if your haulage problems concern locomotives up to 95 tons, better consult with Whitcomb engineers. Let them prescribe a sure cure for your transportation worries. They are just as eager to find the right answers to your motive power equipment problems as you are.

Write for bulletins illustrating and describing Whitcomb Locomotives, both Diesel electric and Diesel mechanical models from 3 to 80 tons.

BLW THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

Buffing, Polishing Wheels

(*Continued from Page 87*)

to know those grain sizes most commonly used on standard work, therefore they can make general recommendations. It can be said of abrasive polishing grain, as of buffs, machinery and other polishing and buffing supplies, that cheapness does not necessarily represent economy. Remember that polishing and buffing costs include value of workpieces that will not pass inspection, and cost of labor, as well as cost of materials.

Setting Up Polishing Wheels: Various methods are used for truing cloth wheels while revolving in polishing lathes. Some have used the sharpened end of a piece of pipe, others an abrasive brick, still others make up a so-called "buff stick". This is a short length of hardwood, 1 to 2 in. square, which is repeatedly coated with glue and abrasive grain on all four sides. In most cases, the device used for truing a buffing wheel is guided so as to produce a flat face. In some instances, however, a special-shaped face is generated for some special types of polishing. Wheels should be arrow-marked to show direction of rotation.

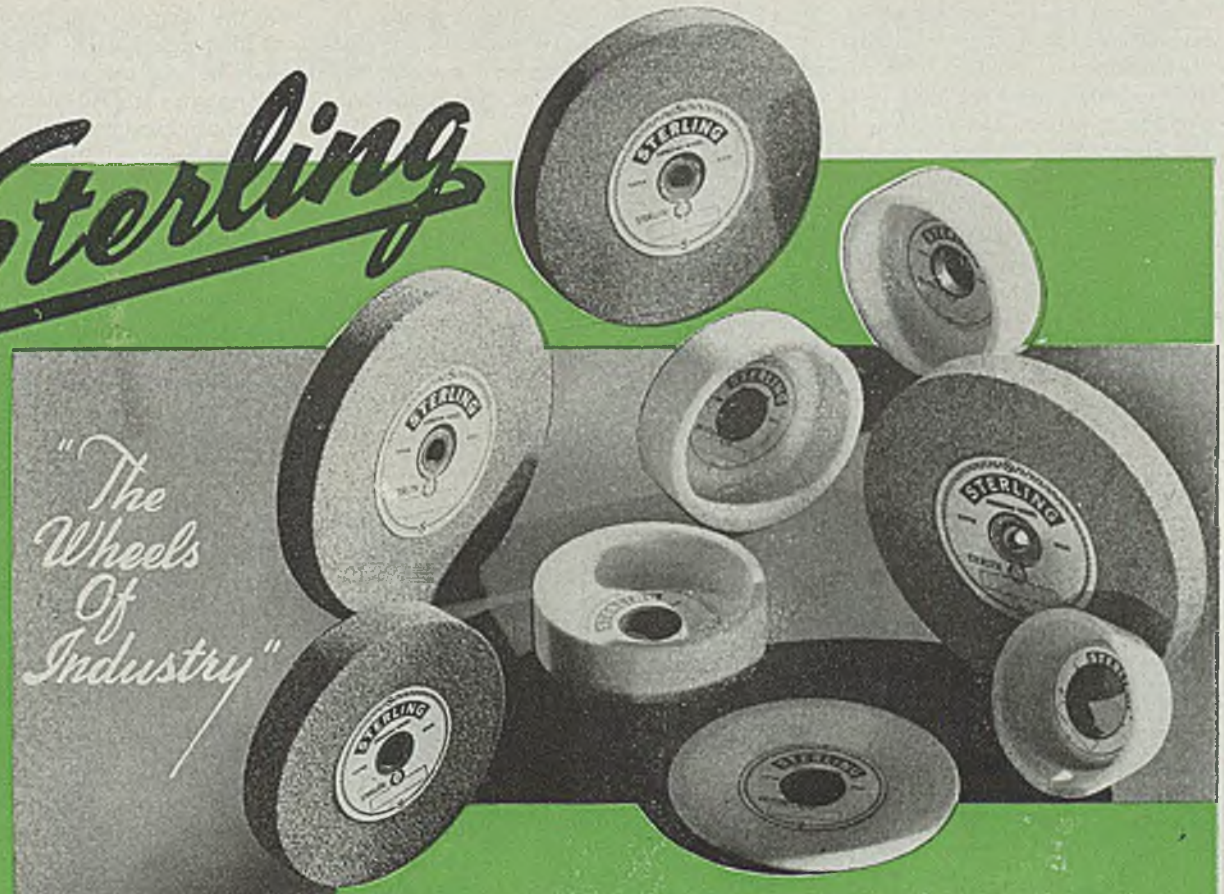
Although silicate of soda sometimes is used as an adhesive in setting up wheels, animal hide glue is the more accepted standard. This glue provides elasticity (when wheels are used only after drying to the proper degree) which gives great strength. This reaches maximum when glue has set to the point where it has about 10 per cent moisture content.

Great care must be used both in setting up wheels with hide glue, and in subsequent drying. Glue must be prepared in melters or converters, which keep it at 145 to 150° F. It must be kept from chilling during application. Therefore, it is wise to keep the setup room at 75 to 80° F to 90 - 125° F in the metal trough where it is applied. Careful technicians also heat the buffing wheels themselves just before applying glue. This can be done in a suitable low-temperature oven, wheels being brought up to same temperature range recommended for abrasive grain.

In many plants balancing of wheels is left up to the polisher. When he takes a dried wheel out of stock to put on his machine, he uses washers for this purpose. However, this procedure is not recommended. Balancing of polishing wheels (and certainly they should all be balanced) by rights should be done before glue and abrasive are applied. A wheel can be balanced perfectly but then, after being placed on the polishing lathe and used on a few pieces, will prove to be definitely out of balance.

The reason is simple. The most careful workman, in rolling a wheel in

Sterling



Tool and Cutter Sharpening Is Quick and Profitable With Sterling Grinding Wheels

● Today, toolroom grinding demands specialized wheels built to the needs of each individual job. Sterling meets this demand with grinding wheels of proper grain size and hardness to remove stock quickly and without burning. Literally thousands of tricky toolroom grinding problems have been solved by Sterling's "Wheels of Industry."

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• A complete listing of the correct Sterling Wheels for toolroom grinding jobs is available in this interesting folder. Ask for your copy.

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THE STERLING GRINDING WHEEL DIVISION
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THE WHEELS OF INDUSTRY

the abrasive trough after applying the glue, is liable to get more abrasive on one part than on another. If this wheel has been balanced before abrasive is applied, then put on the polishing lathe after glue has set, it may be slightly out of balance at first. However, after a few pieces have been polished, excess abrasive will have been forced off the high spots. That will bring it into approximate balance, and will so remain for the entire life of the abrasive setup.

Simple static balancing devices are used for polishing wheels, dynamic balancing seldom, if ever, being practiced. Manufacturers of polishing and buffing equipment catalog balancing stands. In some shops balancing mandrels are used in connection with general purpose, ball bearing, quadruple-disk type static balancing apparatus.

Humidity must be watched carefully in connection with polishing wheel setup and drying. Common practice is to allow polishing wheels to dry overnight, or for a comparable length of time, maintaining humidity at about 50 per cent. If wheels and glue have not reached the proper point in dryness by the time they are mounted for use, the abrasive will not be held as tightly as is necessary for maximum polishing life. On the other hand, if wheels are mounted after glue bond is too dry, it will be weak because it is too brittle.

Apparatus is available for maintenance of proper humidity. Lacking such control, however, all that can be done is to lengthen the drying period in the summer when natural humidity is high, and shorten it in the winter when humidity is low.

Other Adhesives and Methods: New adhesives for setting up polishing wheels appear from time to time. Some of them show real promise. One, for instance, has exceptional penetration qualities, remains flexible after application and resists frictional heat. Another simply requires heating before use, thus sidestepping other chores involved with ordinary glue. Synthetic adhesive is offered by a leading manufacturer of polishing and plating equipment who claims that "it holds abrasive grain like a vise" whether applied to cloth, metal or paper. He also recommends it as a wheel cement.

Infra-red drying equipment, to hasten drying of wheels after setting up, now is on the market. Wheel is placed on a shaft revolved at slow speed by a 1/6 hp motor and speed reducer through chain-and-sprocket drive. Infra-red lamp fixtures, spacing lamps in pairs around the wheel 120 degrees apart, are adjustable radially, so they can be brought together for small diameter wheels, or opened up for those of large diameter.

A polishing wheel can be removed from the machine, new abrasive applied, adhesive dried by infra-red rays and the wheel returned to actual service all in less than an hour. This system has possibilities in connection with setting of animal glue coatings on polishing wheels.

When glue coated wheels are set up by rolling them manually in an abrasive trough, it is well to relegate this work all to one man if possible. A certain moderate pressure is best when rolling them. Some one man is sure to have a knack at this. Troughs containing abrasive grits of different sizes must be kept far enough apart to preclude possibility of grains from one getting mixed into the other. Where volume of work is considerable, wheel-heading machines are desirable. These heat the abrasive grain and roll the glued faces with regulated pressure, thus eliminating human variables just mentioned.

In connection with hand rolling, it is well to have a hard, level testing plate alongside the abrasive trough. As much abrasive grain should be applied as the glue will hold firmly. If any fresh glue comes to the surface when the wheel is rolled on the testing plate, it must again be rolled in the abrasive grain.

(To be continued)

Draftsmen kept this secret 87 years!

IF IT takes you longer than a minute to reproduce a typewritten report, business form, file card, etc., you're probably not in on the secret yet!

But haven't you wondered why draftsmen always have been able to duplicate their drawings so quickly?

All along, you could have had the same speed in your own work!

The secret is *simply* this:

Draftsmen always draw and write on translucent paper.

They do this so that reproductions can be made in any OZALID, whiteprint, or blueprint machine. In these units, light rays penetrate the *translucent* original, exposing sensitized paper underneath.

Opaque originals cannot be printed in this quick, economical manner—they must be copied photographically. And by comparison with OZALID, which employs unique *dry development,* this takes up to 65 times as long!

No wonder leading companies are adopting translucent materials and utilizing drafting-room equipment . . . or are installing separate units for office use.

One of the world's largest insurance companies uses *translucent* application blanks . . . chain store organizations use *translucent* order forms and inventory lists . . . colleges use *translucent* student records . . . manufacturers use *translucent* salesmen's reports, production control charts, file cards, etc. Accountants use *translucent* work sheets and ledgers.

All save time, labor, and dollars.

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Economy! An 8½ x 11-inch reproduction costs only *one cent.*

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OZALID

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Johnson City, N. Y.

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

Electrographic Analysis

(*Continued from Page 89*)

potassium cyanide for a few minutes, which dissolves the copper and zinc as soluble complex cyanides but has no effect on the lead. After washing, the print is then treated with a solution of sodium sulphide by which the lead is converted to the more insoluble lead sulphide and appears on the paper as a dark brown stain. As an example of quantitative application of the method the determination of nickel in nickel steel was cited by Arnold. Three or four samples of steel whose nickel content is accurately known must be available, which are in turn subjected to electrographic solution in bibulous paper containing acetic acid with dimethyl glyoxime for a number of predetermined time intervals. The iron going into solution is washed from the paper with dilute acetic acid leaving only the red stain due to the nickel. A set of curves are prepared where the percentage of nickel is plotted as abscissae and the weight of nickel going into solution as ordinates. There will be one curve for each time interval chosen. The papers containing the spots are dried and identified and preserved between glass plates for future use. To determine the nickel in an unknown sample, three or four electrographic prints are made in the same way varying only the time interval during which current flows. These are washed and dried and then compared with the set of standard stains.

The quantitative application of this method of analysis requires that the alloys be homogeneous at least in the range of composition over which this method is to be used. If the alloy is not homogeneous, as in the case where a eutectic composition occurs, the rate of solution will no longer be uniform over the cross section exposed. Therefore, only homogeneous alloys may be analyzed quantitatively by this method, although for a purely qualitative examination this condition need not be fulfilled.

Formation, Application of Phosphate Coatings: According to Van M. Darsey and W. R. Cavanagh of Parker Rust-Proof Corp., Detroit, research has proved that the application of an organic finish directly over bare metal is an inferior solution for the corrosion problem. This suggests that the surface of the metal should be made as impervious to corrosion as possible prior to the application of any finish. This latter function is fulfilled by rust-proofing, wherein phosphate coatings are widely used. Protective coatings produced by converting the surface of a metal into a chemical compound of exceedingly low solubility in the environment to which it is to be exposed are being increasingly used.

Within the past few years the use of phosphating in industry to produce surface conversion coatings useful as a base for lacquer or paint adhesion has increased many fold. Solutions for phosphating are marketed commercially under the names of Bonderizing and Parkerizing. The thickness of the standard phosphate coatings such as Bonderizing run from 0.00005 to 0.0001-in. The thickness of heavier films such as Parkerizing run from 0.00015 to 0.0003-in.

Both finishes generally give about 4 hours salt-fog resistance when tested without further treatment. Parkerizing, however, accompanied by an oiling operation can give 25 to 50 hours salt-spray corrosion resistance and both Bonderizing and Parkerizing can give 100 to 200 hours salt-spray corrosion resistance when treated with the proper organic finish.

Phosphating has come to be a short-time process. According to Darsey and Cavanagh, many of the new developments in this field have been directed to this end. For Bonderizing in strip mills the time can be as short as 7 seconds and in job shops about 2 minutes.

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Whatever your plastics mold requirements, you are certain to find among these three specialized Disston Mold Steels one that will meet your needs exactly.

FOR DIFFICULT SHAPES AND SHORT RUNS

PLASTIRON . . . a low carbon steel that is easy to work, withstands extreme hobbing, and is exceptionally well suited for intricate forms.

FOR GENERAL SERVICE AND MEDIUM RUNS

PLASTALLOY . . . a low carbon steel having the right amount of chrome and nickel to assure great core strength and long wear, yet permit easy hobbing.

FOR HARD SERVICE AND LONG RUNS

PLASTIKUT . . . a "cut mold" steel for maximum core and case strength. Must be machined instead of hobbed, but because it stands up extra long in service, PLASTIKUT is very economical.

ALL PROVIDE THESE ESSENTIALS

Each of these Disston Mold Steels is composed of carefully selected raw materials and produced in Disston electric furnaces. Modern steel practice keeps every process under rigid control. Each is melted and hot-worked with great care . . is carefully inspected to assure freedom from porosity and inclusions . . . is uniformly sound, carburizes evenly, and produces unusually smooth cavities.

● If you have a special mold or hob problem, let Disston engineers and metallurgists help you solve it. You may consult them freely, without charge or obligation . . . and in confidence.

Write for Folder Contains much useful information which may help you get best results in your use of mold and hob steels.

STEEL . . . Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

HENRY DISSTON & SONS, INC., 1226 Tacony, Philadelphia 35, Pa., U. S. A.

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Achorn Steel Company
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METROPOLITAN NEW YORK AND NORTHERN NEW JERSEY

Bright Steel Corporation Offices & Warehouses, 528-540 West 22nd Street, New York 11, N. Y. and 224-236 Culver Avenue, Jersey City 5, N. J.

When phosphate coatings are to be considered for an application one of the primary considerations should be surface preparation. The general consensus of opinion is that acid pickling should be avoided if possible.

Phosphating of zinc and cadmium plated surfaces has come more in the foreground in the past few years. A corrosion-resistant and paint-holding zinc coated sheet is being marketed by the various steel companies under their own trade names. The deposition of the zinc and the phosphating is accomplished by continuously passing the properly cleaned strip steel or sheets through an acid type zinc plating bath, immediately followed by phosphating and rinsing.

The improved paint-holding quality of the phosphate surface and the added protection against corrosion afforded by the zinc layer beneath the paint and phosphate coating assures long service life for such finished parts. Due to the thin and adherent nature of the electrodeposited zinc coating, sheets can be drawn and articles fabricated therefrom can be subsequently painted, since the preformed phosphate coating serves as a satisfactory paint base. Shipment and storage of such sheets without rusting makes them suitable for many uses.

Phosphate Coating as an Aid in Drawing Metals: According to Darsey and Cavanagh phosphate coating and lubrication of steel prior to drawing reduces friction, permits faster drawing operations, reduces power consumption and increases tool and die life. The decrease in friction resulting from the use of phosphate coated steel in drawing seamless steel tubing is so pronounced that greater reduction of tube size per pass is possible; increase in reduction is sometimes as much as one-third. The type and degree of draw determines the amount of phosphate coating required to facilitate drawing. In general for seamless steel tubing 30 to 40 mg per sq decimeter are adequate for two separate draws without rephosphating.

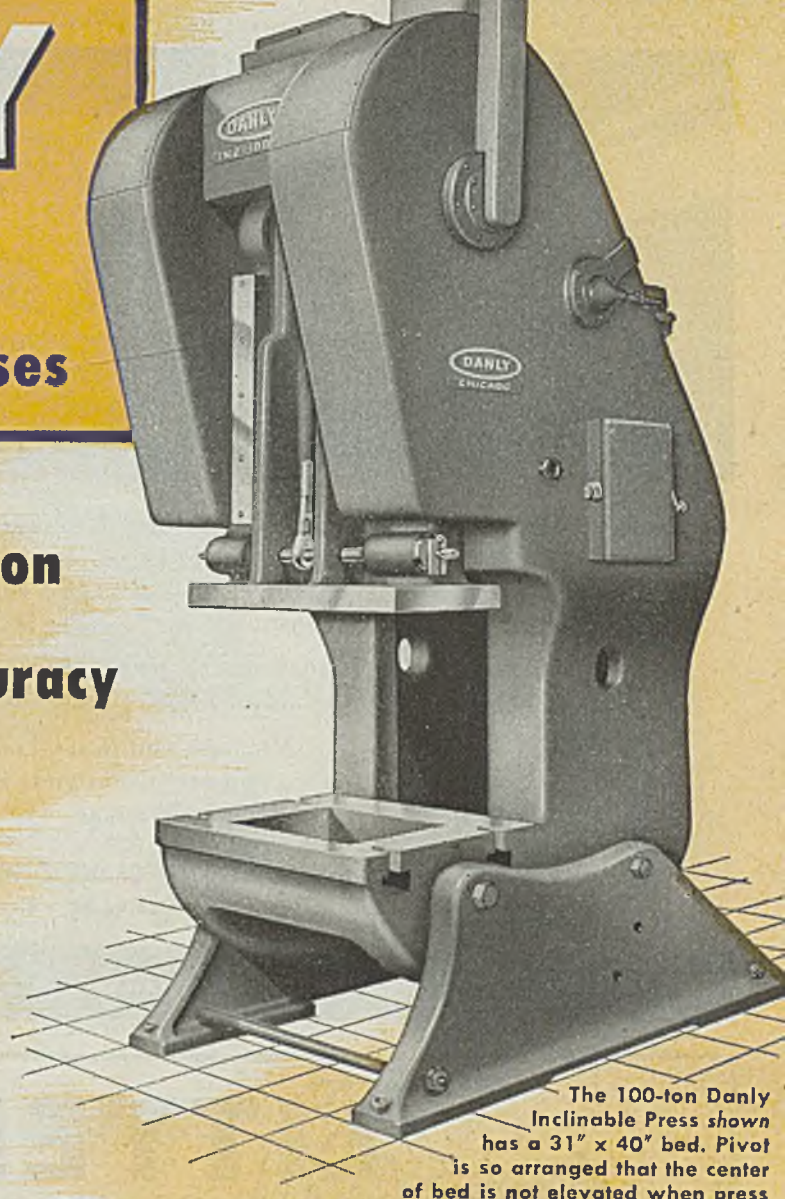
In a recent test 178 steel disks 35½-in. diameter by 18 gage were phosphate coated and drawn into washing machine tubs without any splits or breakers. It was impossible to draw tubs from this same grade of steel without damage when phosphate coating was omitted.

Phosphate coating steel has resulted in the reduction in the number of draws and process anneals in the forming of certain articles. Conversion of steel surfaces to a nonmetallic phosphate coating permits the distribution and retention of a uniform film of lubricant over the entire surface. The lubricant and nonmetallic coating prevents welding and scratching of steel in drawing operation.

A wide range of phosphate coatings

DANLY

Open Back Inclinable and .... Horning Presses

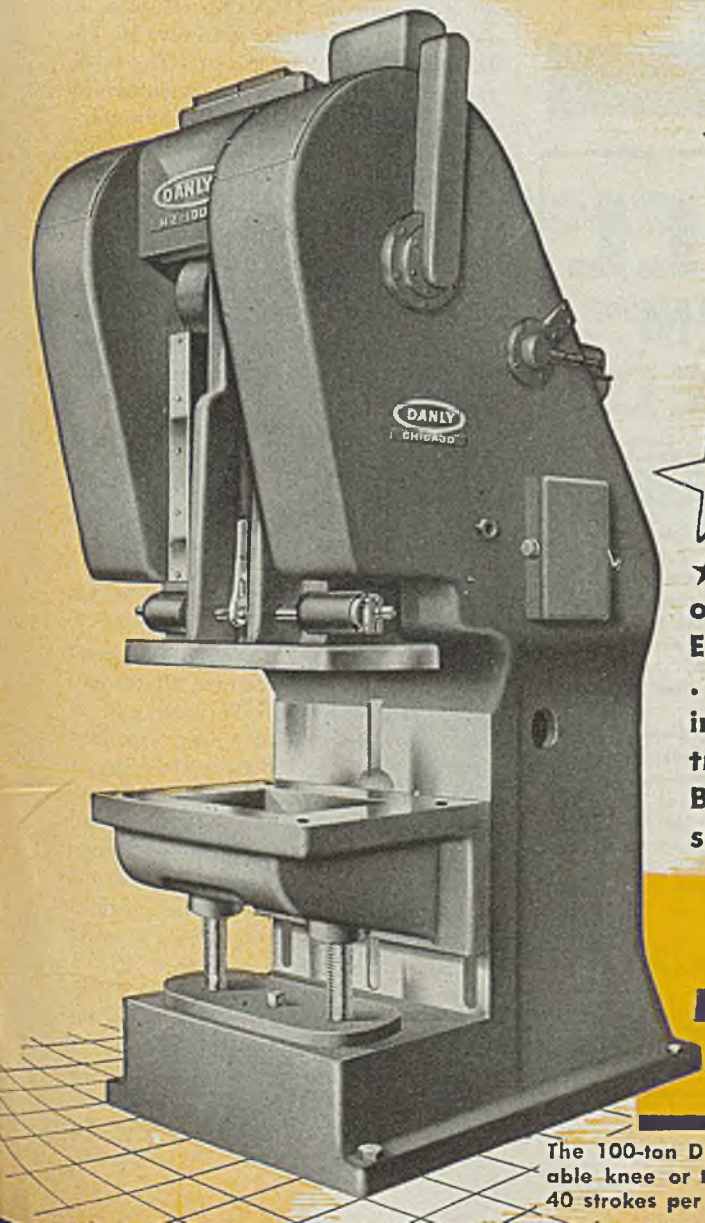


The 100-ton Danly Inclinable Press shown has a 31" x 40" bed. Pivot is so arranged that the center of bed is not elevated when press in inclined.

1 Rugged Construction

2 Mechanical Accuracy

3 Pressure Lubrication



4 Air-Friction Clutch

5 Modern Design Features

☆ Steel Unit Frames—one-piece cast-steel or Danlyweld as specified . . . ☆ Enclosed Eccentric Gear Drive . . . 2-Point Suspension . . . ☆ Pressure Lubrication of all gears and internal moving parts . . . ☆ Solenoid Controlled Air-Friction Clutch . . . ☆ Air Counter Balance Cylinder for slide return, and many similar features of modern design.

DANLY

MACHINE SPECIALTIES, INC.

2100 SOUTH 52nd AVENUE • CHICAGO 50, ILLINOIS

The 100-ton Danly Horning Press is shown with removable knee or table. Press has an 8" stroke—operates at 40 strokes per minute. Adjustments of slide 4" by hand.

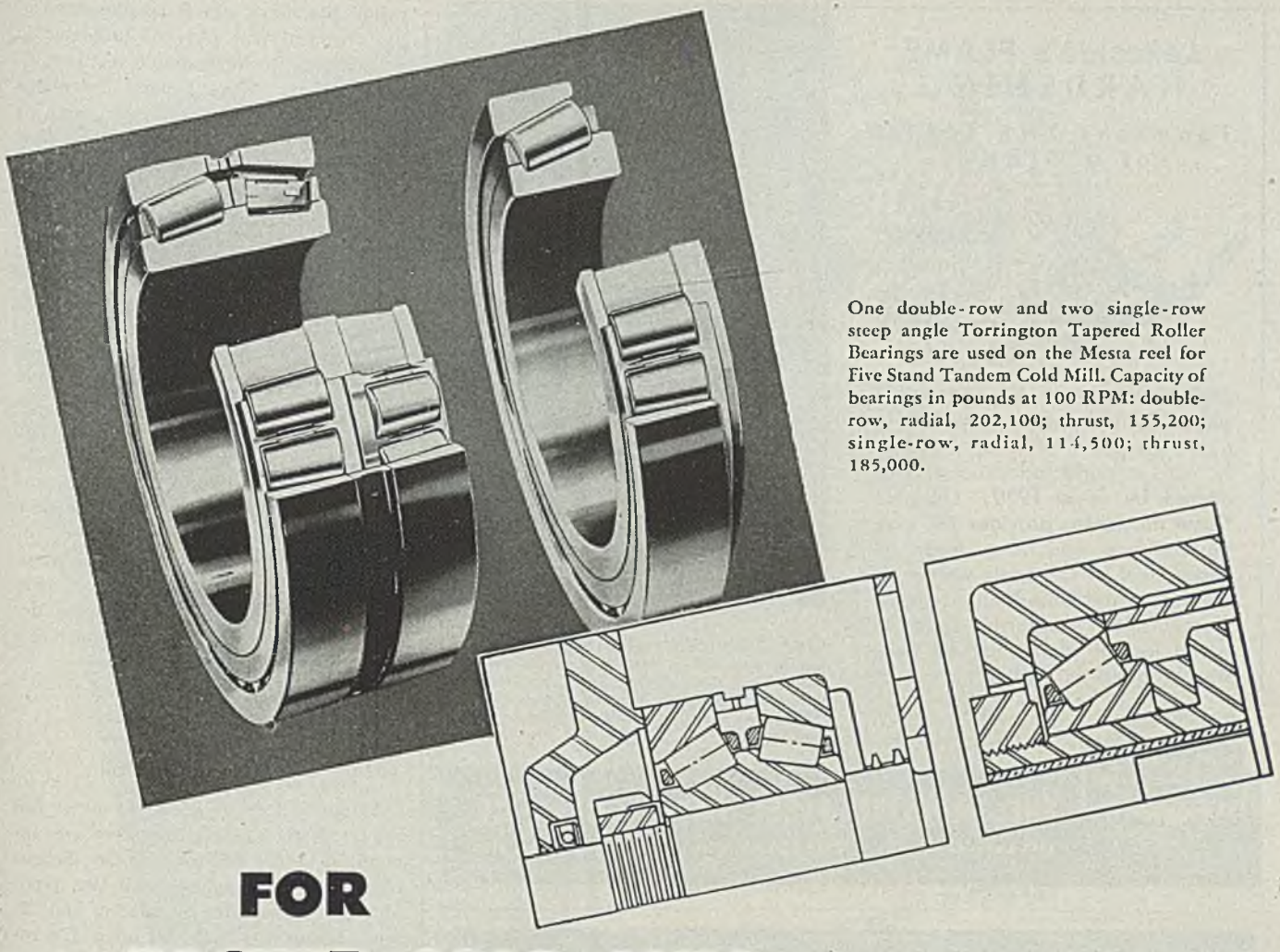
can be produced on metal surfaces depending upon the method of application, time of processing, and cleaning prior to phosphating. By the choice of proper solutions and conditions, it is possible to produce phosphate coatings on many metals especially suitable for different uses. A classification of phosphate coatings for steel is given in accompanying table.

At the beginning of the technical session on rectification and power supply for the electrolytic industry, Otto Jensen of I.T.E. Circuit Breaker Co. described a mechanical rectifier, Figs. 2 and 3, sometimes known as the contact converter which was developed by Siemens-Schuckert in Germany. It comprises a contact mechanism synchronously driven and adjusted to make metallic contact between the alternating current source and the direct current load at proper time intervals. To prevent arcing at the contact, a contact-making choke coil is introduced in such a way as to oppose the build-up of the load current. The moving contacts are approximately 32 x 32 mm and are silver inlaid. All moving parts are enclosed.

According to Jensen the German operating practice indicates the reliability of the contact converter, with overall efficiency of 97 to 98 per cent. The small space requirements and low maintenance cost would also appear to be advantageous. It was pointed out by Jensen that the absence of auxiliary equipment, such as vacuum pumps and complicated firing circuits and a multitude of vacuum-tight joints, together with the absence of backfires, may make the contact converter highly competitive with the mercury arc rectifier. The absence of large rotating parts, brushes, commutators and slip rings, together with the elimination of commutator flash-overs may make it highly competitive with rotary converters. Building costs for housing the contact converter should be considerably lower than for housing any competitive rectifying equipment.

Rectification and Power Supply for Electrolytic Industry: According to T. R. Rhea and B. R. Connell of General Electric Co., during the war alternating-direct current conversion equipment in the electrolytic industry was expanded to 4.5 million kw. The major part of such conversion equipment is in aluminum, magnesium, chlorine, copper and zinc. At the peak of operation during the war, these five processes consumed approximately 31 billion kwhr annually. This is more energy than is consumed by any other simple industry. Fig. 1 gives the plan and cross section of a typical 60,000 amp rectifier building for use in electrometallurgical processes.

Problems in the Manufacture of Sel-



One double-row and two single-row steep angle Torrington Tapered Roller Bearings are used on the Mesta reel for Five Stand Tandem Cold Mill. Capacity of bearings in pounds at 100 RPM: double-row, radial, 202,100; thrust, 155,200; single-row, radial, 114,500; thrust, 185,000.

FOR FASTER COLD MILL REELS... AND OTHER HEAVY-DUTY EQUIPMENT

THE TORRINGTON SELF-ALIGNING SPHERICAL ROLLER BEARING

features self-alignment, two-directional thrust and unit construction for easy installation and handling. It will be manufactured in a complete range of sizes from 1.5748" bore and up. See your nearest Torrington Representative or write for Bulletin 200.

The reel of the cold mill mentioned above is one of the world's fastest. It "coils" 3,200 feet of strip per minute . . . and at required tension for final quality control. That means extreme radial and thrust loads on the reel . . . loads handled efficiently by one double-row and two single-row, steep angle Torrington Tapered Roller Bearings.

On steel and paper mill machinery . . . on oil field and hoisting equipment . . . on machine tools and other heavy-duty applications . . . bearings designed and built by Torrington's Bantam Bearings Division provide efficient, economical, trouble-free *anti-friction operation.*

In today's competitive markets, you should assure yourself that kind of performance from *your* heavy-duty machinery. Our engineers will gladly help yours to incorporate Torrington Bearing advantages in your designs.

THE TORRINGTON COMPANY
BANTAM BEARINGS DIVISION • SOUTH BEND 21, IND.

TORRINGTON BEARINGS

SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

enium Rectifiers: In discussing some of the chemical and physical problems in the manufacture of selenium rectifiers C. A. Escoffery of the Federal Telephone and Radio Corp. presented methods for etching aluminum and steel base plates to secure adhesion of the selenium layer. The selenium rectifier consists essentially of a layer of selenium sandwiched between two metallic layers.

One of these, known as the base plate and usually made of steel or aluminum, acts as the carrier or support of the selenium layer and as one of the electrodes; the other, known as the front or counter electrode, and usually made of a low melting point alloy such as Wood's metal, provides the so-called barrier layer at the selenium-counter electrode interface and acts as the other contact to the external circuit.

Other sessions of the convention were concerned with plastic insulators, silicones, recent development of new dry cells and dry cells having high operating efficiency at low temperatures.

Stainless Steel Electrodes Announced

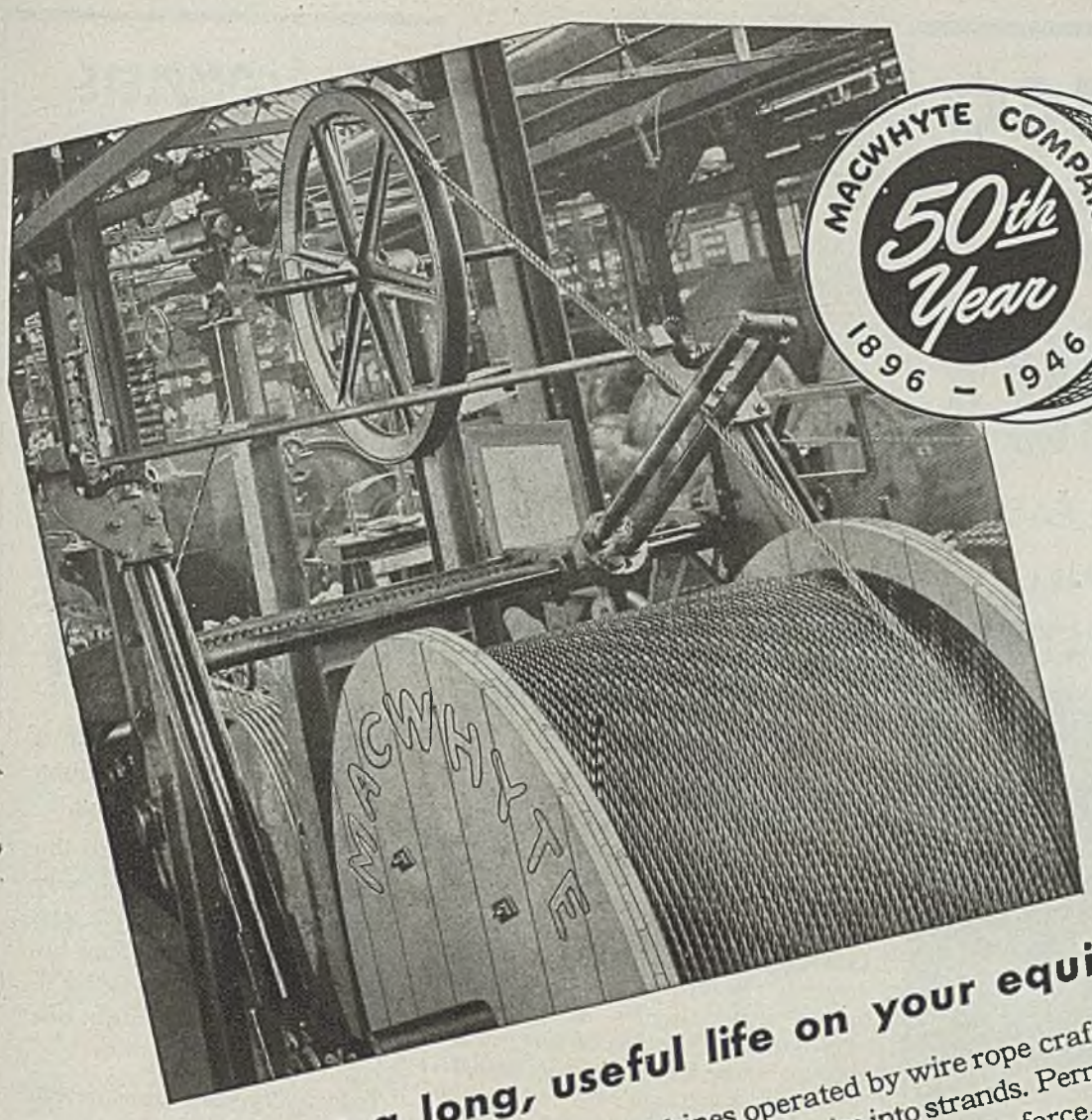
Stainless steel electrodes in a full range of grades and diameters are announced by General Electric Co., Schenectady, N. Y. Available with two types of coatings—one for alternating and direct current use and the other for reverse polarity direct current—they can be used in all welding positions, the company states.

Stability of arc and deposition characteristics are said to assure flat fillet welds, thereby reducing grinding made necessary by convex fillets. The stable arc characteristics permit good directional control. Electrodes are wrapped in 5 lb rolls with moisture-resistant paper.

Training Course on Electrical Instruments

Construction, operation and selection of electrical measuring instruments is subject of an intensive course, including sound slide films, a complete pocket size textbook, and an instructor's manual, prepared by Westinghouse Electric Corp., Pittsburgh.

Designed primarily for use by the company, course is available to educational institutions, engineering societies and engineering departments of all companies using electrical measuring instruments. Among subjects covered in films and lessons are: Permanent magnet moving coil mechanism; electro-dynamometer; stationary coil and moving iron mechanism; rotating vane mechanism; and in conclusion, selection and use of electrical instruments.



Ready to start a long, useful life on your equipment

Here you see Macwhyte Wire Rope as it comes from the closing machine. It is now ready to start giving the long service that has been so carefully built into it.

Select quality steel rods were its beginning. They were scientifically heat-treated and cold-drawn, into tough, metallurgically uniform wire. Precision machines operated by wire rope craftsmen layed the wire into strands. Permanent internal lubrication was force-fed around each wire. Closing the lubricated strands completed the wire rope that will give longer, more economical performance on your equipment.

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Make MACWHYTE your headquarters for WIRE ROPE AND SLINGS

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MACWHYTE PREformed and Non-PREformed Wire Ropes
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Rope Slings . . . Aircraft Cables, Assemblies and Tie-Rods . . . Stainless
Steel Wire Rope, Monel Metal Wire Rope,
Galvanized Wire Rope.

MO. 860

170-page Wire Rope Catalog G-15, yours for the asking

Lists Macwhyte's complete line. Gives other valuable information. Ask any Macwhyte representative or write Macwhyte Company

Lubricating Mills

(*Continued from Page* 93)

as bad as in a hot mill.

Screwdowns, pinion stands, reduction gears, coilers and the other machinery required for handling the strip is similar to the units already discussed under hot strip mills and lubricated accordingly.

Temper pass mills have a roll setup similar to that in a cold reduction mill; i.e., roller bearings on the work rolls, and roller or sleeve bearings on backup rolls.

Lubrication of a temper pass mill only involves the problem of heat and pressure. No water or roll oil is involved to cause lubricant contamination. Surface contamination is a different matter. The surface of the strip passing through a temper pass mill must be kept free from oil or grease stains, so lubricant leakage or throwing must be prevented. There is no provision to remove such stains.

Mill Designed for Accuracy

The Sendzimir mill is designed to roll to extreme accuracy, for example, reducing 3/16-in. strip to a thickness of 0.010-in.; but if need be it can reduce even alloy steels to thicknesses as low as 0.001-in. without anneal. A typical Sendzimir mill involves four driving rolls and six supporting rolls. Each of the latter is essentially a line of antifriction bearings, one after the other, so located that the work rolls are completely supported throughout their entire length. The outer bearings are mounted on eccentrics in staggered saddles so the distance between the work rolls can be accurately adjusted. The final backing is the extremely rigid steel housing.

In choosing an oil for this service four requirements are involved, i.e.,

1. It must lubricate the roll bearings.
2. It must act as a coolant.
3. It must be easily removed from the strip by the rubber scraper. If excessive oil remains, there is, on some metals, a tendency of the strip to telescope off the wind-up roll.
4. It must not "fog" to excess, especially at high speeds. Fogging may be due to agitation, temperature, the sudden release of pressure on the oil as it comes out on the strip from the rolls, or a combination of any of the above.

Filtered oil is first introduced under pressure into the hollow eccentric shafts, so that an even quantity of oil passes through each bearing, escaping through its seal, and cascades over the rolls at the rate of 9 gpm on a 15 in. mill, and 125 gpm on a 39-in. mill. The oil from the bottom of the housing drains back to the reservoir, from which it is circulated by a suitable pump. Much of the oil

gets on the strip before the latter goes through the rolls, a desirable feature from a cooling standpoint. The lower supporting rolls are submerged in oil, the overflow going out of slits located in the housing a little below the level of the work rolls. The oil is filtered before it is recycled to the work rolls.

(To be continued)

Illustrations by courtesy of Morgan Construction Co., Worcester, Mass.; Farval Corp., Cleveland; Mesta Machine Co., Pittsburgh; Bowser, Inc., Fort Wayne, Ind.; Armzen Co., Middletown, O.

Help for Estimators in Determining Machine Times

Machine Operation Times for Estimators, by Joseph C. Derse; cloth, 156 pages, 6 x 9 in.; published by Ronald Press Co., 15 East 26th St., New York, for $6.

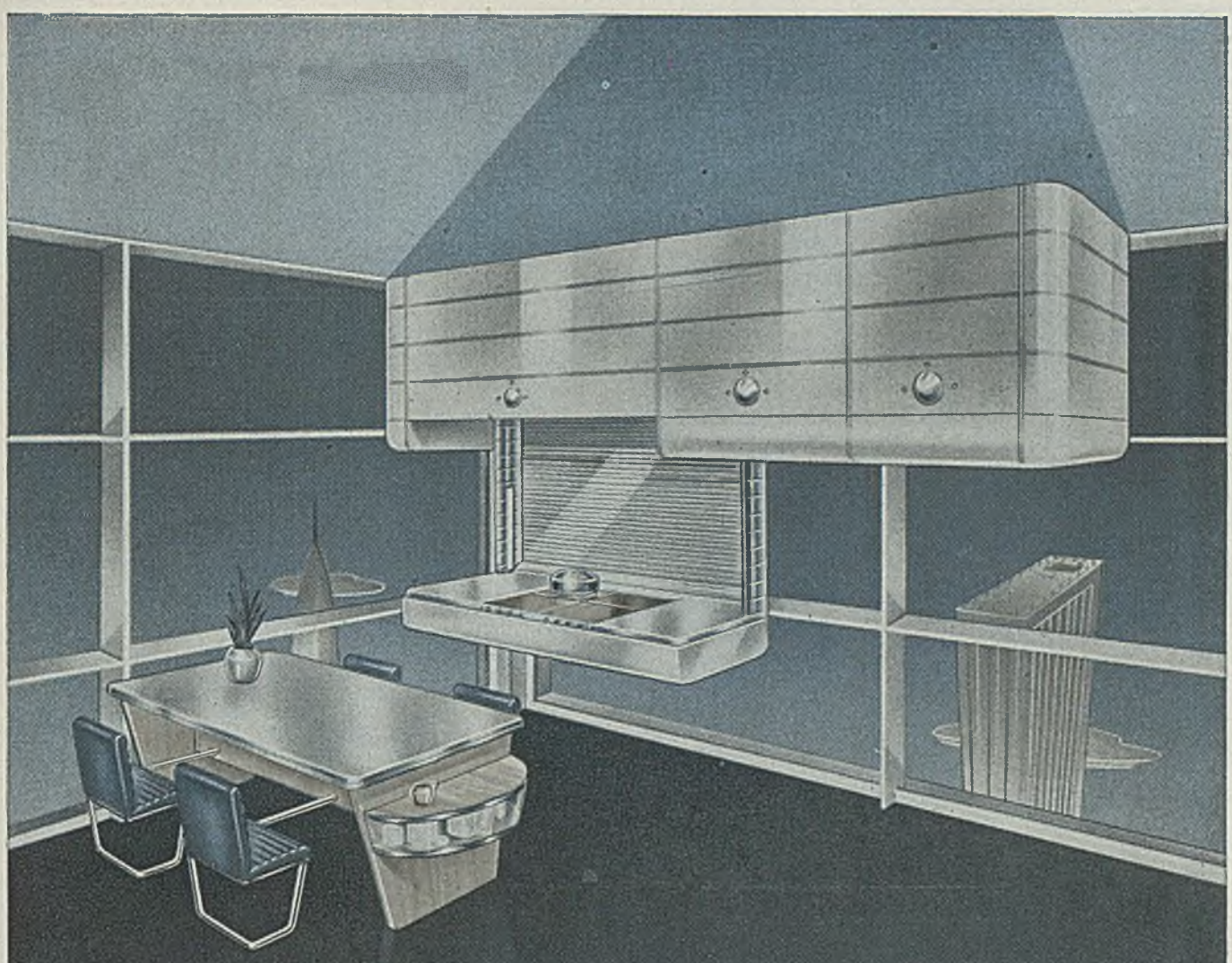
This book presents data and methods specifically designed to meet the estimator's immediate needs for usable information. Data cover different kinds of work done on machines commonly found in metalworking plants. From them the estimator can select the individual elemental operation times which combined will give him the correct overall times to allow on jobs to be done in his plant.

The volume is intended to be used not only by estimators but also by production managers, methods engineers, time-study men and others concerned with times on jobs, and avoids lengthy discussion of various theories of estimating. It gives instead a directly usable presentation of procedures, of the ways to determine machine and operation times for a wide range of work, and methods for applying the standard elemental times given in making detailed estimates.

Case examples for numerous typical jobs are worked out in full detail, with drawings of parts, diagrams of tool setups and detail estimate sheets filled with selected data. For added convenience in recurring use, extensive tables of feeds and speeds are included for various kinds of equipment covered, with illustrations and specifications of the machines.

—o—

Data on preparation of surfaces, metallizing technique and finishing procedure are contained in the fourth edition of the Metco Metallizing handbook, published by Metallizing Engineering Co. Inc., Long Island City, N. Y. In addition, information on corrosion resistance, specific gravity, hardness, tensile strength and relative shrink is contained in the 86-page book. Illustrated with pictures, drawings, diagrams, charts and graphs, the book is available from the company for $2.00.



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Here is super-modernity in its newest form. This design of tomorrow's kitchen for small apartments shows an overhead arrangement of sink, range and refrigerator, all operated hydraulically by the mere pressure of a button. Such revolutionary innovations are rapidly sweeping around the world. More and more are light alloys engineered and fabricated by the Bohn organization being used in new developments. Here at Bohn we are thoroughly familiar with what can and what cannot be accomplished with aluminum and magnesium. Let us advise you how these modern light alloys can be put to practical use—increasing the usefulness and saleability of your product. Bohn engineers and metallurgists are at your service. Our many years of practical experience are at your disposal. Maybe now is the right time for you to write us.

Designers and Fabricators—ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS

Low Silicon Basic Iron

(*Concluded from Page* 114)

furnaces, a study was made of the benefits derived from its use. A summary of a few of the beneficial results obtained in the open-hearth practice by use of the low-silicon metal over the higher-silicon regular basic iron follows:

1. An increase in steel production per furnace per hour.
2. A reduction in hours lost from bank and bottom trouble.
3. A lower limestone charge resulting in a lower slag volume, a faster working heat and a more uniform heat as to temperature and degree of oxidation of slag and bath.
4. Longer life on the refractory linings of the furnaces.
5. Permits the use of more hot metal in the open-hearth furnace charge without additional ore being necessary.
6. A reduction in the amount of iron and manganese lost in the open-hearth process due to the lower slag volume.

In this paper an attempt has been made to show the results obtained while operating a blast furnace on high-magnesia slags to produce low-silicon basic hot metal directly in the blast furnace. While not sufficient work has been carried out to substantiate any definite conclusions, the results of the experiments have been encouraging. From all indications, the use of the high-magnesia slag should enable the economic production of low-silicon basic hot metal with normal furnace operation.

REFERENCES

(1) "Production of Low-Silicon Iron by the Use of Roll Scale Additions" by P. R. Nichols, *Open Hearth Proceedings*, AIME (1941).

(2) "Manufacture of Low-Silicon Pig Iron Using High-Blast Temperatures," by C. H. Hoffman, *Open Hearth Proceedings*, AIME (1940), p. 146.

(3) "Composition of Iron Blast Furnace Slags," by R. S. McCaffery, Tech. Pub. No. 19, AIME (1927).

(4) "Relative Desulphurizing Powers of Blast Furnace Slags" Part II by W. F. Holbrook, Tech. Pub. 875, AIME (1938).

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(6) "Viscosity of Blast Furnace Slags" by R. S. McCaffery, *Transactions* AIME (1932) 100.

(7) "Experiences in the Use of High Magnesia Slags" by M. E. Nickel, *Proceedings* Blast Furnace and Raw Materials Committee, Vol. 1, AIME (1941), p. 49.

This paper was presented before the meeting of the Blast Furnace and Coke Association of the Chicago District, Del Prado hotel, Chicago, March 26. It was awarded first prize in the blast furnace section of the fifth annual technical papers contest sponsored by the association.

—o—

A large 12 x 20 in. calendar-catalog containing much engineering data has been issued by Frederick Post Co., Chicago. Copies may be secured by writing the company, asking for 1947 weekly wall calendar.

Trying to Stoke a Furnace with a Teaspoon?

It's just as unwise to expect out-of-date wiring to fully serve modern electrical equipment

Wire ahead!

PRODUCTION LOSSES through obsolete wiring service can run from 25% to 50%...regardless of machine production ratings!

Guard against this needless waste ... protect your investment in new, advanced electrical equipment ... make sure expanded power loads won't exceed your power sources.

Today, put in a call for your consulting or plant power engineer—or for your electrical contractor or power salesman. A discussion with him now may save you many thousands of dollars in emergency alterations, shutdowns later. Anaconda Wire & Cable Company, Subsidiary of Anaconda Copper Mining Company, 25 Broadway, New York 4, N. Y. Sales offices in Principal Cities.

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DON'T BE PENNY-WISE AND POWER-FOOLISH

ANACONDA WIRE & CABLE COMPANY

The Business Trend

Industrial Output Cut Back as Fuel Dwindles

SPREAD of the paralyzing effects of the bituminous coal miners' work stoppage, along with the Thanksgiving Day holiday, cut STEEL's industrial production index from 152 per cent in the week ended Nov. 23 to 125 per cent in the week ended Nov. 30. Before the coal miners quit work the index had reached a postwar high of 158 per cent of the 1936-1939 average of 100.

The strike has given rise to considerable speculation as to whether a business recession will be experienced soon. While some economists foresee a recession another school of thought holds that even though the coal strike does considerable harm the economy of the United States and the rest of the world continues to be marked by shortages, particularly of durable goods, and that obsolescence and wear and tear continue to generate demand, which in turn would sustain production and employment. A depression, according to this school of thought, is a period in which demand, either because of saturation or low incomes, is less than production, actual or potential. The present situation, it has been pointed out, is the opposite.

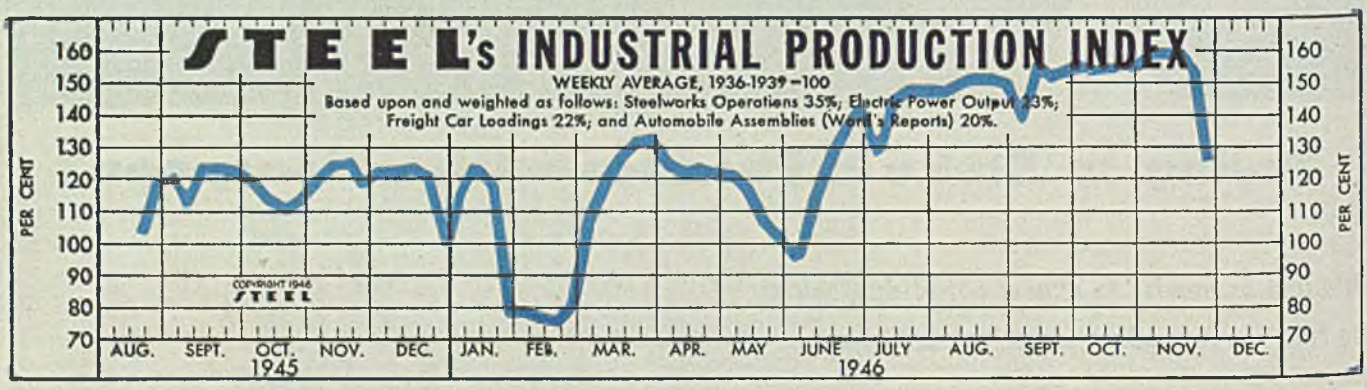
COAL OUTPUT—First half week of the miners' strike cut soft coal production in half. Output has been running about 12½ million tons a week but in the week ended Nov. 23 it dropped to 6,390,000 tons.

STEEL, AUTOS—Crippled by diminishing fuel stocks, the steel industry immediately was forced to cut operations, and many plants in the automobile industry took advantage of the Thanksgiving Day week and confined production that week to three days as means of stretching out stocks of fuel and materials. As a result, output of passenger cars, trucks and busses in the week ended Nov. 30 dropped to 72,692, compared with the postwar record of 96,461 in the preceding week.

ELECTRICITY—Reflecting the high level of industrial operations existing before the latest coal strike, distribution of 4,764,718,000 kilowatt-hours of electricity in the week ended Nov. 23 set a new all-time weekly record. In each of the weeks from and including the week ended Nov. 2, electricity output has been setting a new all-time weekly high.

PRICES—Rises for some industrial goods as well as for many agricultural products raised the Bureau of Labor Statistics average of primary market prices 1.1 per cent during the week ended Nov. 23. The increase pushed the bureau's index up to 137.3 per cent of the 1926 average of 100. This is the highest level since late 1920 and 21.8 per cent higher than at the end of June.

PRODUCTION INDEX—A new postwar high was set in October by the Federal Reserve Board's industrial production index which rose to 182 per cent of the 1935-1939 average of 100. Previous postwar high had been 180 per cent in September. The board reported that the index of production of durable goods rose from 212 per cent in September to 214 in October.



The Index (see chart above): Latest Week (preliminary) 125 Previous Week 152 Month Ago 157

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity) †	65.5	83.5	91	83.5
Electric Power Distributed (million kilowatt hours)	4,448	4,765	4,628	4,043
Bituminous Coal Production (daily av.—1000 tons)	1,065	2,091	2,077	1,723
Petroleum Production (daily av.—1000 bbls.)	4,760	4,810	4,759	4,448
Construction Volume (ENR—Unit $1,000,000)	$32.6	$77.8	$109.4	$59.6
Automobile and Truck Output (Ward's—number units)	72,692	96,461	95,427	13,140

* Dates on request. † 1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

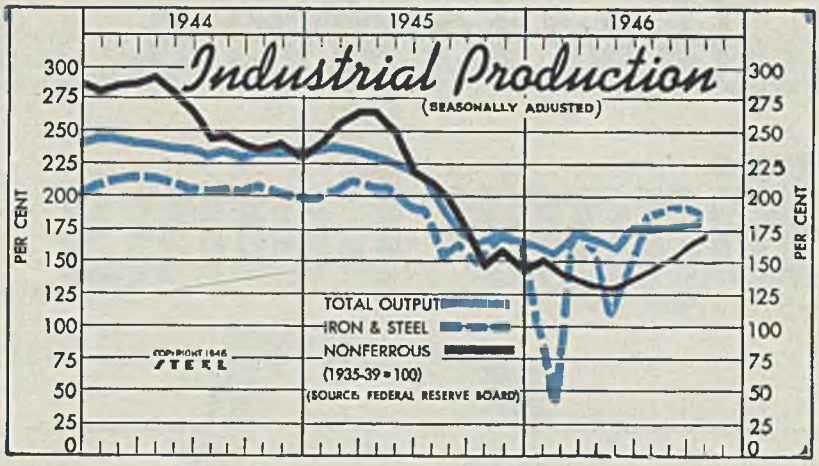
TRADE				
Freight Carloadings (unit—1000 cars)	650†	807	922	804
Business Failures (Dun & Bradstreet, number)	24	24	22	15
Money in Circulation (in millions of dollars)‡	$28,815	$28,689	$28,588	$28,169
Department Store Sales (change from like wk. a yr. ago)‡	+41%	+24%	+23%	+ 9%

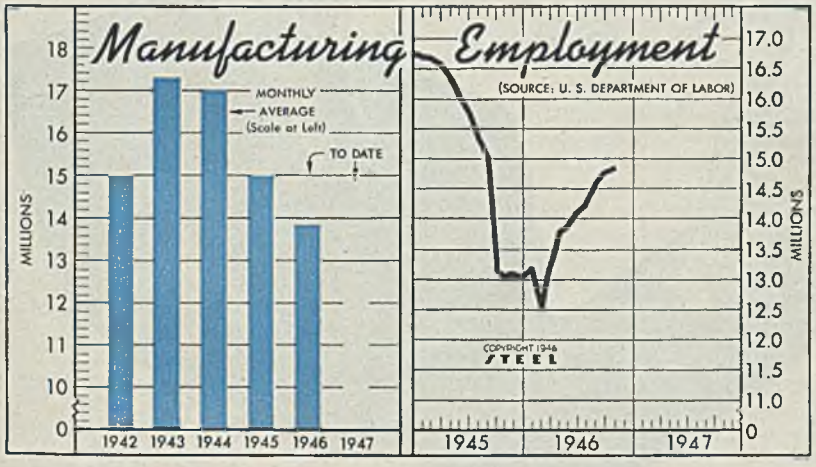
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1946	1945	1946	1945	1946	1945
Jan.	160	234	102	197	151	253
Feb.	152	236	43	202	139	257
Mar.	168	235	169	210	141	267
Apr.	165	230	159	206	132	263
May	160	225	109	204	130	248
June	170	220	154	192	135	219
July	172	210	179	187	143	196
Aug.	177	186	183	155	154	165
Sept.	180	167	184	163	167	139
Oct.	182	162	183	146	174	144
Nov.	...	168	...	167	...	148
Dec.	...	168	...	164	...	147
Avge.	...	203	...	183	...	204





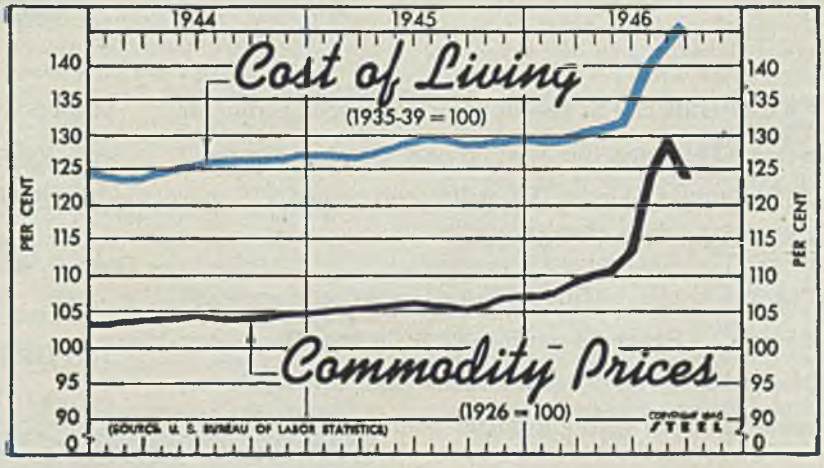
Factory Employment

(000 omitted)

	1946	1945	1944
January	13,236	16,696	17,587
February	12,536	16,684	17,581
March	13,206	16,557	17,447
April	13,779	16,302	17,235
May	13,885	16,012	17,105
June	14,098	15,749	17,116
July	14,245	15,331	17,091
August	14,578	15,019	17,085
September	14,752	13,159	16,888
October	14,807	13,048	16,758
November	.....	13,110	16,695
December	.....	13,059	16,747
Monthly Ave.	.....	15,060	17,111

Wholesale Commodity Price— Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1935-39=100)		
	1946	1945	1944	1946	1945	1944
Jan.	107.1	104.9	103.3	129.9	127.1	124.2
Feb.	107.7	105.2	103.6	129.6	126.9	123.8
Mar.	108.9	105.3	103.8	130.2	126.8	123.8
Apr.	110.2	105.7	103.9	131.1	127.1	124.6
May	111.0	106.0	104.0	131.7	128.1	125.1
June	112.9	106.1	104.3	133.3	129.0	125.4
July	124.3	105.9	104.1	141.2	129.4	126.1
Aug.	129.1	105.7	103.9	144.1	129.3	126.4
Sept.	124.0	105.2	104.0	145.9	128.9	126.5
Oct.	....	105.9	104.1	....	128.9	126.5
Nov.	....	106.8	104.4	....	129.3	126.6
Dec.	....	107.1	104.7	....	129.9	127.0
Ave.	....	105.8	104.0	....	128.4	125.5



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,059	$13,872	$11,534	$9,864
Federal Gross Debt (billions)	$262.6	$262.2	$263.8	$265.4
Bond Volume, NYSE (millions)	$19.9	$23.0	$30.3	$41.8
Stocks Sales, NYSE (thousands)	4,423	5,862	8,224	9,959
Loans and Investments (billions)†	$57.7	$57.5	$58.8	$62.1
United States Gov't. Obligations Held (millions)†	$37,881	$37,626	$39,619	$45,550

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$64.45	$64.45	$64.45	$58.27
All Commodities†	137.3	135.8	135.9	106.7
Industrial Raw Materials†	155.3	152.6	153.0	120.2
Manufactured Products†	131.1	130.4	131.7	102.3

† Bureau of Labor Statistics Index, 1926=100.

How to give a Bigger Bonus

...without budging your budget a bit!

SUPPOSE Bill S., one of your employees, is due for a $75 bonus this year. If you give the bonus in U. S. Savings Bonds, Bill will receive—not $75, nor a $75 Bond—but a *$100* Bond.

Yes, the bonus in Bonds looks like a lot more—and it *is* more. (Every $3 put into U. S. Savings Bonds pay $4 at maturity.) With the same size appropriation, you're actually giving a bigger bonus.

Consider, too, that Savings Bonds mean individual security for each Bond-holder—and collective security for all of us, because they help to control inflationary tendencies. You can easily see that you're doing yourself, your employees, and your country a favor by deciding to...

Give the BONUS in BONDS

...and keep up your Payroll Savings Plan!

IMPORTANT: If you have not already received your copy of "How You Can Help Give Free Enterprise a Boost," write on your letterhead to: Room 750, Washington Building, U. S. Savings Bonds Division, Washington 25, D. C. Limited supply. Please write today.

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

STEEL

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

Advertisement

DECEMBER, 1946

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

Wide Range of Copper-Base Alloys Developed for Electrical Requirements

Industry is moving forward, and the use of electricity continues to grow for electronic applications; melting and heat treatment of metals; counting and sorting devices; for automatic controls and for many other applications too numerous to mention. In urban and rural homes and on the farms electricity is used increasingly for food preservation, to eliminate unnecessary drudgery and to get work done more quickly and efficiently.

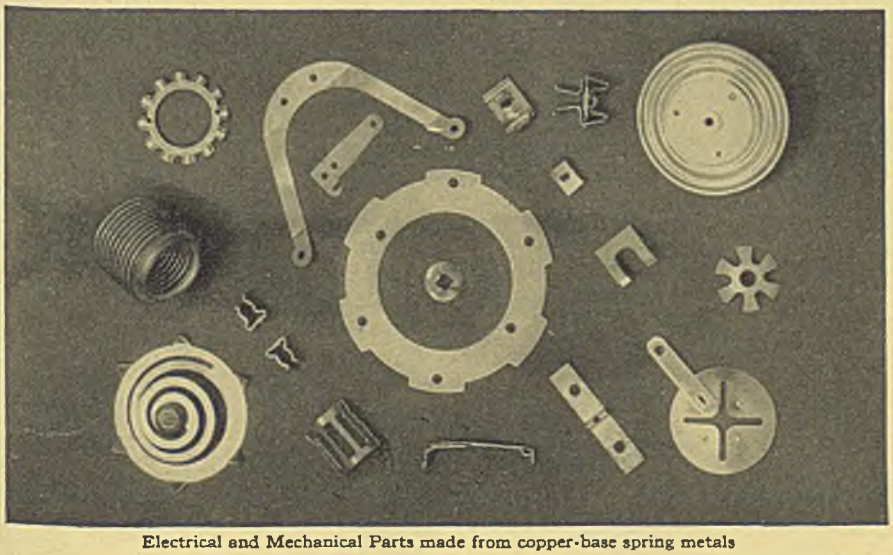
Certainly no electrical equipment is any better than the material from which its vital parts are made, and with the ever-increasing use of electrical appliances come important responsibilities for designers and engineers. Which material is best suited for the particular job at hand from the standpoint of dependability and long service life? What alloys are available and what improvements have been made in existing alloys?

Because of their wide range of desirable physical properties, workability and corrosion resistance, copper and copper-base alloys have for many years found ever wider acceptance in the manufacture of electrical apparatus. With the use of modern, powerful mill equipment, closer casting control and improved annealing furnaces, a group of copper-base alloys with exceptionally fine physical properties has been developed. Greater dependability, higher strength, more resistance to corrosion, wear and fatigue are adding service life for electrical and mechanical devices. Present-day mass production calls for great uniformity of metal as to composition, gauge, and temper for the successful operation of automatic machines.

Phosphor Bronze For Springs (Grade A No. 36, Grade C No. 35)—Modern phosphor bronzes are characterized by exceptional fatigue resistance and great toughness. They are among the best available alloys from the standpoint of corrosion resistance. Phosphor bronzes are used successfully for the manufacture of switch and relay springs which must withstand millions of flexing cycles without failure; for contacts and fingers, and in many other electrical applications. They are also used for bellows, diaphragms and springs in pumps and automatic controls.

The spring properties of phosphor bronze strip are developed by cold-rolling the metal, generally from 6 to 10 B. & S. numbers hard (50% to 68% reduction). Because of the amount of rolling necessary to produce spring temper, care must be exercised in the designing of parts, particularly with reference to the direction of bending. When bent 90 degrees the hard rolled metal will have more tendency to crack parallel to the grain than across the grain. This must be taken into account when severe bends are involved. For certain conditions it may be advisable to stamp the article at 45 degrees to the direction of rolling. Care should also be taken to avoid sharp corners on the tools and, wherever possible, to use as large a radius as permissible.

The most commonly used phosphor bronzes for spring applications are Grade A (approximately 95% copper, 5% tin) and Grade C (approximately 92% copper, 8% tin). Both alloys have similar properties, but Grade C is used for more severe conditions.



Electrical and Mechanical Parts made from copper-base spring metals

Aluminum Bronze (No. 712)*—In line with a consistent program of research, Bridgeport's Laboratory developed a new spring material which contains no tin and which is composed of copper, aluminum and silicon. This alloy was released in the form of strip and has been successfully used for spring contacts in electrical equipment, diaphragms, bellows, spiders for self-centering bearings and many other parts. Its fatigue resistance, dependable spring properties and toughness indicate a wide range of applications in switches, relays, capacitors, jack plugs, temperature controls, and other parts. Its electrical conductivity is comparable to Grade C phosphor bronze.

Duronze II (No. 1232)—Approximately 97% copper, 3% silicon. In applications which require a corrosion-resistant spring material, less expensive than phosphor bronze and where low conductivity is not detrimental, Duronze II can be used. In some applications the greater strength of silicon bronze is advantageous, and its forming properties are at least equal to phosphor bronze. The yield strength of Duronze II is lower than that of phosphor bronze, and limits its use to applications where the required bending movement is not too great.

Bronze (No. 840)—Copper 98.6%, tin 1.4%. This alloy has 40% minimum conductivity and is used where spring properties are not as important as electrical conductivity and corrosion resistance.

Nickel Silver (No. 555)—Approximately 55% copper, 18% nickel, remainder zinc. This alloy is silver-white in color and possesses good corrosion resistance, fairly good spring properties and can be used for applications where high electrical resistance is desired. It is specified for telephone switchboard parts, as well as various items in radios and other electrical apparatus.

Cadmium Copper (No. 985)—There are a great many electrical applications which require a material with high electrical conductivity, better resistance to the effects of arcing and with more stiffness and wear resistance than copper. Bridgeport's Cadmium Copper amply fulfills these requirements, and in order to attain the highest possible electrical conductivity (85% minimum) consistent with strength and hardness, it is alloyed under carefully controlled conditions, processed by modern equipment and, of course, subjected to constant laboratory control.

Oxygen-Free Copper (No. 104)—This metal is used for applications requiring the most pure copper and the highest possible electrical conductivity. For example, ex-

*Pat. Pending.

(Continued on Page 2, Col. 2)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

EFFECT OF STRESS ON CORROSION

Effect of Cold or Hot Working

The working of metals either at room temperature or at elevated temperatures may lead to the development of cracks in the metal. Those metals which develop cracks at room or moderate temperatures are said to be in the language of the metallurgist "cold-short"; the metals which develop cracks when worked at elevated temperatures are said to be "hot-short". Many metals must be worked in a limited range of temperature in order to avoid cracking.

Effect of High Pressures

Tensile stresses high enough to rupture cylinders, tubes, pipes, and tank walls may result from high pressures such as developed by high pressure gases (overheated boiler tubes, etc.) or during the freezing of water. Ruptures in tubing or pipe in this manner are characterized by a bulge containing a longitudinal split or crack. If the material is not ductile at the temperature and pressure at which rupture or cracking occurs, the bulge will be absent. A longitudinal flaw in a ductile material will also contribute toward the elimination of the characteristic bulge.

Effect of Changes in Microstructure

Phase changes occurring within a crystal grain may result in large volume changes and the formation of micro cracks. This may be encountered: (1) during the heat treatment of steel, (2) in certain zinc die casting alloys at moderate temperatures, (3) in shrinkage cracks in castings, (4) during the allo-tropic change of tin from ordinary tin (beta) to gray tin (alpha) at temperatures below 18° C., etc.

Corrosion fissuring or cracking may sometimes develop in certain media without the stimulus of stress. In some metals the attack follows a network of impurities existing at the grain boundaries or at boundaries of the primary grains. For example, an alloy in the vicinity of a grain boundary might be depleted of one of the alloying elements such as occurs during the heat treating of non-stabilized stainless steel.

Effect of Molten Metals

Molten metals (commonly low melting point alloys and elements) may penetrate tensile stressed ferrous and non-ferrous metals along the grain boundaries (intercrystalline penetration) with the production of cracks. The familiar "mercurous nitrate test" for detecting undesirable stresses depends upon the action of liquid mercury penetrating the stressed brass. The "fire-cracking" of certain leaded copper-base alloys appears to depend upon the combined action of high internal stresses in cold worked metal (strain hardened) and a temperature high enough to melt the insoluble lead but not high enough to relieve the stress (usually developed by slight amounts of cold-working or during cutting operations carried out with dull tools).

Effect of Hydrogen at Elevated Temperature

Certain gases at elevated temperatures may penetrate or diffuse through the metal and react with impurities or alloying elements with the production of fissured or embrittled metal. Hydrogen reacting with carbon in steel with the formation of methane within the metal: $2H_2 + C \rightarrow CH_4$ or hydrogen reacting with copper oxide in certain types of copper with the formation of water vapor:

$$H_2 + Cu_2O \rightarrow 2Cu + H_2O$$

are samples of this type of embrittlement. Another example is the hydrogen embrittlement of steels by nascent hydrogen during pickling and plating operations.

Wide Range of Copper-Base

(Continued from Page 1)

acting electronic applications and special operations such as hydrogen brazing of steel and sealing-in glass. Bridgeport's oxygen-free copper has been found superior for the manufacture of high-frequency vacuum tube parts because of its purity and freedom from surface scratches and flaws.

Technical Service Department

Bridgeport's Technical Service Department, composed of an experienced group of practical men, works closely with customers in studying the possibilities of copper-base engineering alloys as applied to their products. Contact the Technical Service Department through the nearest Bridgeport office and write for the 128-page Technical Handbook, which contains comprehensive information about Bridgeport's engineering alloys as well as standard mill products.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Inside Micrometer has been announced which manufacturer claims will measure bores without removing boring bars. Standard range of sizes is from 8 to 28 inches and covers bar diameters from 4 to 8 inches. **No. 732**

Bench Model Punch Press recently developed is said to be equally adaptable for stamping, marking, punching, crimping, riveting and other high speed production operations. Operates at 285 revolutions per minute and is driven by 1725-revolutions-per-minute electric motor. **No. 733**

New Continuous Bar Marker is designed, according to manufacturer, to mark bar material permanently throughout its length. Bars are fed between rolls from which they are ejected after marking. Automatic in operation, machine is said to be capable of handling flat, square, round, hexagonal and structural or extruded shapes at speeds of 70 to 210 ft. per minute. **No. 734**

Metal Hardness Gage recently announced is said to accurately determine hardness variations in copper, brass, aluminum and their alloys as well as other nonferrous metals. Two models available, one with readings from 1 to 29, the other with penetrator of greater sensitivity and shorter hardness range. **No. 735**

Electronic Micrometer is available which, it is claimed, will provide precise thickness measurement in laboratory, plant and shop to assure accurate readings to 0.00005-inch on production testing lines. Said to be capable of measuring thickness of compressible or non-compressible materials as well as conducting or nonconducting materials. **No. 736**

New Automatic Drilling Spacer is said to permit rapid precision drilling of holes in metal parts without use of jigs. Device consists of heavy flat table which moves either laterally or longitudinally on its base under fixed drill spindle. **No. 737**

Universal Dial Indicator having dial perpendicular to axis of body, is claimed by manufacturer to be particularly suitable for general machine shop, tool room and inspection work. Adaptable for use in jig borer and in certain drill press and milling machine applications where position of dial improves readability with resulting accuracy. **No. 738**

Precision Angle Square, capable of checking accuracy of work within 0.0001-inch, has indicator, manufacturer announces, that instantly shows error on dial and indicates amount of correction required. Recommended for precision work in tool and die shops, machine shop and testing laboratories. **No. 739**

More Steel Producing Units Forced To Cut Operations

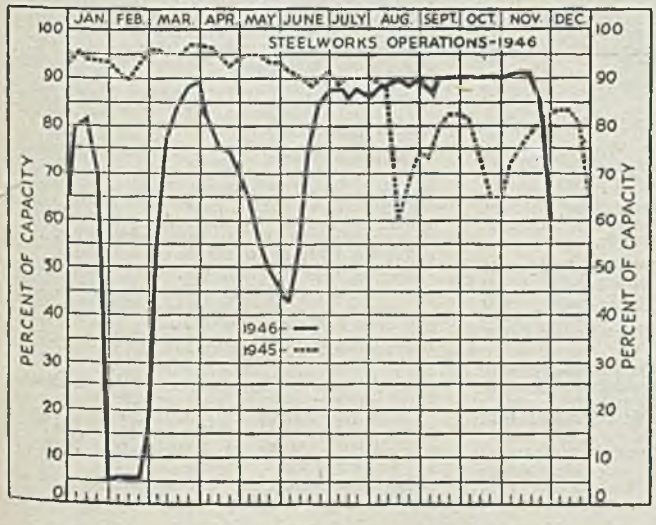
Rail embargo threatens widespread shutdowns in manufacturing industries . . . Additional upward revisions in steel prices reported

OUTLOOK for the metalworking industries was darkened last week by the freight embargo, corollary of the coal strike, which presented the most serious impediment to continued high industrial activity and which will force suspension of operations at many manufacturing plants within a brief period because of limited storage space and exhaustion of raw materials supply.

The steel industry has taken steps to protect its idle coke ovens which would be severely damaged by lack of heat; has banked or reduced draft on many blast furnaces; and is steadily reducing open-hearth operations which continue to drop closer to the low point reached during the coal strike earlier in the year.

Barring an unforeseen break in the coal strike, steel production will continue to decline throughout the month. During the period of forced curtailment, steelmakers plan to employ their workmen as far as possible in repair work and other fill-in jobs.

While the larger producers generally are adhering to unchanged price schedules, scattered revisions continue to be reported. Adjustments in galvanized sheets have spread, and one large producer, in addition to taking action on galvanized sheets, has also revised cards on hot and cold-rolled sheets, enameling stock and long ternes. Several large producers have discontinued quoting some products on certain long-established bases. A seller of narrow strip has adjusted schedules upward. Certain track accessories have been increased in price, and advances in bolts, nuts and rivets are spreading among manufacturers, with the increases varied. An eastern mill has advanced plates another dollar, equalizing with another mill. Export prices on steel products, including tin plate, have been advanced in various instances, sharply in some cases. Several of the smaller wire interests have increased prices on wire rods and various wire products.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Dec. 7	Change	Same Week 1945	Same Week 1944
Pittsburgh	50	— 7	79	91
Chicago	75	+ 0.5	90.5	100
Eastern Pa.	37	—21	80	95.5
Youngstown	35	— 5	80	89
Wheeling	82.5	— 3	95	87
Cleveland	92	None	86	94
Buffalo	51	None	88.5	79
Birmingham	45	— 2	95	95
New England	90	None	83	88
Cincinnati	84	None	67	87
St. Louis	72.5	None	68	75
Detroit	90	+ 6	89	87
Estimated national rate	60.5	— 5	83.5	96.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Meanwhile, the $2 advance in pig iron, first announced by the Birdsboro, Pa., producer three weeks or so ago, is being adopted by certain other merchant iron sellers, and there is growing indisposition to absorb freight in equalizing with distant basing points. For instance, two eastern Pennsylvania producers no longer recognize Sparrows Point as a base on foundry iron. Still another, it is understood, is quoting fob furnace on shipments into New England. The Troy, N. Y., producer is quoting fob furnace on all shipments. Other similar changes are reported in process. A leading eastern Pennsylvania by-product coke producer has advanced foundry grades 50 cents a ton and higher in some areas.

Heavy melting steel scrap prices are steady, though higher levels are being quoted in some districts on major cast grades. However, even these latter prices may level off pending a return to more normal shipping and operating conditions.

Steelmaking operations dropped 5 points further last week to an estimated national rate of 60.5 per cent compared with 91.5 per cent just prior to the coal strike. Operations in eastern Pennsylvania slumped 21 points to only 37 per cent of capacity while the Pittsburgh rate continued to drop sharply, reaching 50 per cent, a drop of 7 points for the week. Youngstown was down 5 points at 35 per cent; Wheeling, 3 points to 82.5 per cent, and Birmingham, 2 points to 45 per cent. Operations rose 6 points at Detroit to 90 per cent and 0.5 point to 75 per cent at Chicago. Rates in other districts were unchanged at 92 per cent at Cleveland, 90 per cent in New England, 84 per cent at Cincinnati, 72.5 per cent at St. Louis, and 51 per cent at Buffalo.

STEEL's composite market averages held on steelmaking scrap at $24.25, finished steel at $64.45, semifinished steel at $40.60; rose to $27.75 on basic iron.

COMPOSITE MARKET AVERAGES

	Dec. 7	Nov. 30	Nov. 23	One Month Ago Nov., 1946	Threee Months Ago Sept., 1946	One Year Ago Dec., 1945	Five Years Ago Dec., 1941
Finished Steel	$64.45	$64.45	$64.45	$64.45	$64.45	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	27.75	27.50	27.50	27.50	27.50	24.75	23.00
Steelmaking Scrap	24.25	24.25	24.25	22.22	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Dec. 7, 1946	Nov., 1946	Sept., 1946	Dec., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.86	2.86	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.48	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.558	2.558	2.558	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.10
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.75	3.75	2.90
Tin plate, per base box, Pittsburgh	*$5.25	*$5.25	*$5.25	$5.00

* Nominal.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to 9/32-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	Dec. 7, 1946	Nov., 1946	Sept., 1946	Dec., 1945
Bessemer del. Pittsburgh	$31.77	$29.77	$29.77	$26.94
Basic, Valley	28.00	28.00	28.00	25.25
Basic, eastern del. Philadelphia	31.93	29.93	29.93	27.09
No. 2 fdry., del. Pgh. N. & S. sides	31.27	29.27	29.27	26.44
No. 2 fdry., del. Philadelphia	32.43	30.43	30.43	27.59
No. 2 foundry, Chicago	28.50	28.50	28.50	25.75
Southern No. 2, Birmingham	24.88	24.88	24.88	22.13
Southern No. 2, del. Cincinnati	28.94	28.94	28.94	26.05
Malleable, Valley	28.50	28.50	28.50	25.75
Malleable, Chicago	28.50	28.50	28.50	25.75
Charcoal, low phos., fob Lyles, Tenn.	37.50	33.00	33.00	33.00
Gray forge, del. McKees Rocks, Pa.	30.61	28.61	28.61	25.80
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$25 00	$23.00	$20.00	$20.00
Heavy melt, steel, No. 2, E. Pa.	24.00	21.90	18.75	18.75
Heavy melting steel, Chicago	23.75	21.75	18.75	18.75
Rails for rolling, Chicago	27.25	22.88	22.25	22.25
No. 1 cast, Chicago	35.00	30.00	23.75	20.00

Coke

Connellsville, furnace ovens	$8.75	$8.75	$8.75	$7.50
Connellsville, foundry ovens	9.50	9.50	9.50	8.25
Chicago, by-product fdry., del.	15.10	15.10	15.10	13.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinishd Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, $33, fob mill; forging quality, $38, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop. $48.69.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41.50; Duluth (billets), $41; Pac. ports (billets), $51.50 (Andrews Steel Co., carbon slabs, $41.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49.50; Duluth, billets, $49; forging billets fob Pac. ports, $59.50.

(Andrews Steel Co., carbon forging billets, $50 gross ton at established basing points.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.93; eastern Mich. $61.93.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon, sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/16 in. inclusive, per 100 lb, $2.30. Do., over 5/16—47/64-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively, Worcester add $0.10; Pacific ports $0.535. Pittsburgh Steel Co., No. 5-5/16 in., $2.65; over 5/8 in., $3; Portsmouth Steel Corp., No. 5—5/16 in., $2.55; Keystone Steel & Wire Co., $2.70.

Bars

Hot-rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.635c; eastern Mich., 2.685c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.885c; Pac. ports, dock, 3.185c (Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.056c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
3400	3.462	6145 or 6150	1.298
4000	0.487	8612	0.703
4100 (.15-.25 Mo)	0.757	8720	0.757
(.20-.30 Mo)	0.812	9830	1.407

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.624c; Detroit, del., 3.759c; eastern Mich., 3.809c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, 2.535c; Gulf ports, dock, 2.735c; Pacific ports, dock 2.785c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, del., 2.535c; Gulf ports, dock, 2.735c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.56c; eastern Mich., del., 2.61c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 3.01c. (Andrews Steel Co. quotes hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., 3.25c on hot carbon sheets. Sparrows Point, Md.; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

(American Rolling Mill Co. quotes 2.50c, Middletown and Pittsburgh, plus new extras for widths and gages.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.41c; eastern Mich., del., 3.46c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.96c.

(American Rolling Mill Co. quotes 3.20c, Pittsburgh and Middletown, plus new extras for widths and gages.)

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.635c. (Granite City Steel Co., 4.50c, fob Granite City, Ill., 4.40c, fob Gary or Birmingham.)

(American Rolling Mill Co., Continental Steel Corp., Apollo Steel Corp., Newport Rolling Mill Co., quote 3.55c, base, 8, 9 and 10 gages, plus new gage and coating extras.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.635c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.335c; eastern Mich., 3.385c; Pacific ports, 3.885c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.935c; eastern Mich., 3.985c; Pacific ports, 4.485c.
(American Rolling Mill Co. quotes 3.55c, Middletown and Pittsburgh, plus new extras for widths and gages.)

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.685c	4.00c
Armature	4.25c	5.035c	4.35c
Electrical	4.75c	5.535c	4.85c
Motor	5.425c	6.21c	5.525c
Dynamo	6.125c	6.91c	6.225c
Transformer			
72	6.625c	7.41c	....
65	7.625c	8.41c	....
58	8.125c	8.91c	....
52	8.925c	9.71c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.585c; eastern Mich., del., 2.635c; Pacific ports, 3.135c. (Superior Steel Corp., 3.30c Pitts.)
Over 6-in.: Base, 2.35c; Detroit, del., 2.485c; eastern Mich., del., 2.535c; Pacific ports, 3.035c. (Superior Steel Corp., 3.20c, Pitts.)
Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.185c; eastern Mich., del., 3.235c; Worcester, base, 3.25c. (Superior Steel Corp., 4.70c, Pitts.)
Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(Maximum nominal tin plate prices permitted under OPA; actual market 25 points lower due to contract commitments.)
Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed 4.335c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.835c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point, $4.65.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 15-lb $14.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.71c; Phila., del., 2.558c; St. Louis, del., 2.74c; Boston, del., 2.86c; Pacific ports, 3.085c; Gulf ports, 2.885c.
(Granite City Steel Co., carbon plates, 2.65c fob Chicago or Birmingham; Central Iron & Steel Co., Harrisburg, Pa., 3.05c, basing points; Lukens Steel Co., Coatesville, Pa., and Worth Steel Co., Claymont, Del., 2.80c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c, base.)
Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.435c; Gulf ports, 4.135c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.308c; Pacific ports, 4.525c.
Clad Steel Plates: Coatesville, 10% cladding: nickel clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; Geneva, Utah, 2.50c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.035c; Gulf ports, 2.735c.
(Phoenix Iron Co., Phoenixville, Pa., 3.05c, Bethlehem, Pa.)
Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.235c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).
Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.05
Spring (except Birmingham)	*$4.00

Wire Products to Trade
Nails and Staples

Standard and cement-coated	†$3.75
Galvanized	‡$3.40

Wire, Merchant Quality

Annealed	§$3.50
Galvanized	§$3.85

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier	**72
Barbed wire, 80-rod spool	††79
Barbless wire, twisted	††79
Fence posts	74
Bale ties, single loop	72½

* Add $0.10 for Worcester, $0.05 for Duluth and $0.535 for Pacific ports. Portsmouth Steel Corp., $3.425, bright, basic.
† Add $0.30 for Worcester, $0.535 for Pacific ports. Nichols Wire & Steel, $4.25; Pittsburgh Steel Co., $4.10.
‡ Add $0.535 for Pacific ports.
§ Add $0.10 for Worcester; $0.735 Pacific ports.
** Pittsburgh Steel Co., 77.
†† Pittsburgh Steel Co., 89.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Welded

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	53	30	⅛	21	0½
¼ & ⅜	56	37½	¼	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51¼	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut length 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Elec. Weld— Hot Rolled	Cold Rolled
1"	13	.....	$9.90	$9.36	$9.65
1¼"	13	.....	11.73	9.63	11.43
1½"	13	$10.91	12.96	10.63	12.64
1¾"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2¼"	13	15.50	18.42	15.06	18.03
2½"	12	17.07	20.28	16.57	19.83
2¾"	12	18.70	22.21	18.11	21.68
3"	12	20.79	24.71	20.05	24.02
3½"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4½"	9	43.16	51.29	.....	.....
5"	9	49.96	59.36	.....	.....
6"	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, $60 per net ton, Birmingham; $65, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18. West Virginia Steel & Mfg. Co., $55, light rails.
Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.
Supplies Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $51 net ton, base. Standard track spikes, 3.65c-4.50c; screw spikes, 5.30c-6.40c.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago, Lebanon, Pa. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.
(Base prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65¼ off
Do., ⅞ and ⅝ x 6-in. and shorter	63¼ 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, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	..	64
½-in. and smaller	62	..
⅝-in.-1-in.	..	60
⅞-in.-1-in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago
Birmingham, Lebanon, Pa.

Structural	4.75c
⅞-inch and under	*65-5 off

*Plus 12 per cent increase on base prices, effective July 26.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

CHROMIUM NICKEL STEELS

	Bars	Plates	Sheets	H.R. Strip	C.R. Strip
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.50
312	38.95	43.28	53.02	.....	.....
*316	43.28	47.61	51.94	43.28	51.94
§321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35

STRAIGHT CHROMIUM STEEL

403	23.93	26.51	31.92	22.99	29.21
**410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.19	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.48

STAINLESS CLAD STEEL (20%)
(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304	....	19.48	20.56	....	....
410	....	17.31	18.39	....	....
430	....	17.85	18.94	....	....
446	....	19.48	20.56	....	....

* With 2-3% molybdenum. § With titanium. † With columbium. ** Plus machining agent. †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75
Connellsville, foundry	9.25- 9.75
New River, foundry	10.25-10.50
Wise county, foundry	9.00- 9.50
Wise county, furnace	8.50- 9.00

By-Product Foundry

Kearney, N. J., ovens	14.40
Chicago, outside delivered	14.35
Chicago, delivered	15.10
Terre Haute, delivered	14.85
Milwaukee, ovens	15.10
New England, delivered	16.00
St. Louis, delivered	†15.10
Birmingham, delivered	12.25
Indianapolis, delivered	14.85
Cincinnati, delivered	14.60
Cleveland, delivered	14.50
Buffalo, delivered	14.75
Detroit, delivered	15.10
Philadelphia, delivered	14.65

* Operators of hand-drawn ovens using trucked coal, $9.35.
† 15.68 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	22.00c
Industrial xylol	22.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.00c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

WAREHOUSE STEEL PRICES

Base delivered prices, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in. and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.356[1]	4.203[1]	4.203[1]	6.039[1]	4.050[1]	5.548[1]	4.418[1]	5.725[13]	5.031[14]	4.656[21]	4.965
New York	4.134[1]	4.038[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[13]	4.838[14]	4.584[21]	5.075
Jersey City	4.155[1]	4.018[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[13]	4.890[14]	4.605[21]	5.075
Philadelphia	4.114[1]	3.937[1]	3.875[1]	5.564[1]	3.774[1]	4.664[1]	4.554[1]	5.499[13]	5.139[26]	4.564[21]	5.064
Baltimore	4.093[1]	4.05[1]	3.865[1]	5.543[1]	3.64[1]	4.293[1]	4.193[1]	5.365[17]	5.118[20]	4.543[21]	....
Washington	4.232[1]	4.22[1]	4.067[1]	5.632[1]	3.842[1]	4.432[1]	4.332[1]	5.667[17]	5.007[24]	4.532[21]	....
Norfolk, Va.	4.377[1]	4.303[1]	4.262[1]	5.777[1]	4.037[1]	4.927[1]	4.477[1]	5.862[17]	4.552[24]	4.677[21]	....
Bethlehem, Pa.*	....	3.70[1]	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Buffalo (city)	3.60[1]	3.65[1]	3.92[1]	5.55[1]	3.575[1]	4.21[1]	4.11[1]	5.20[13]	4.625[14]	4.20[21]	4.96
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[13]	4.525[14]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[13]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.88[1]	3.65[1]	5.48[1]	3.575[1]	3.95[1]	3.850[1]	5.347[13]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	....	3.55[1]	....	3.475[1]	3.85[1]	3.750[1]	....	4.525[24]	4.10[21]	4.00
Detroit	3.735[1]	3.987[1]	3.935[1]	5.607[1]	3.710[1]	4.085[1]	3.985[1]	5.526[13]	4.760[24]	4.25[12]	4.985
Omaha (city, del.)	4.32[1]	4.37[1]	4.37[1]	5.97[1]	4.045[1]	4.52[1]	4.42[1]	6.00[15]	5.72[24]	4.945[21]	....
Omaha (country)	4.22[1]	4.27[1]	4.27[1]	5.87[1]	3.945[1]	4.42[1]	4.32[1]	5.90[15]	....	....	....
Cincinnati	3.902[1]	3.983[1]	3.952[1]	5.583[1]	3.671[1]	4.046[1]	3.946[1]	5.296[15]	4.271[24]	4.602[21]	....
Youngstown*	....	....	....	....	....	....	....	4.85[13]	....	....	....
Middletown, O.*	....	....	....	....	3.475[1]	3.85[1]	3.750[1]	5.10[15]	....	....	....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	5.40[15]	4.425[24]	4.20[21]	4.90
Milwaukee	3.908[1]	3.958[1]	3.958[1]	5.558[1]	3.638[1]	4.108[1]	4.008[1]	5.558[13]	4.583[24]	4.358[21]	5.058
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.748[1]	4.118[1]	4.018[1]	5.368[15]	4.793[24]	4.43[21]	5.060
St. Paul	4.092[3]	4.142[3]	4.142[3]	5.742[3]	3.817[3]	4.292[3]	4.192[3]	5.666[15]	4.767[24]	4.852[21]	5.398
St. Louis	3.918[1]	3.968[1]	3.968[1]	5.568[1]	3.643[1]	4.118[1]	4.018[1]	5.622[15]	4.593[24]	4.522[21]	5.222
Memphis, Tenn.	4.296[1]	4.346[1]	4.346[1]	6.071[1]	4.221[1]	4.596[1]	4.496[1]	5.746[15]	....	4.821[21]	....
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[15]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	....	5.808[15]	5.304[24]	5.079[21]	....
Houston, Tex.	4.00[3]	4.50[1]	4.50[1]	5.75[3]	3.988[3]	4.668[3]	4.563[3]	5.763[14]	5.819[18]	4.10[21]	....
Los Angeles	4.65[4]	4.70[4]	5.86[4]	7.05[4]	4.95[4]	5.80[4]	5.200[4]	6.55[13]	6.60[9]	6.105[21]	5.868
San Francisco	4.235[7]	4.185[7]	4.185[7]	5.885[7]	4.16[7]	5.885[7]	4.535[7]	6.385[15]	6.91[15]	5.783[21]	7.588
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[15]	6.825[15]	5.983[15]	....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[15]	6.55[15]	6.23[21]	....
Seattle	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[15]	6.55[15]	6.23[21]	....

* Basing point cities with quotations representing mill prices, plus warehouse spread.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—800 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, cif Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	18.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
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	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 15c to 17c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnaces

Designation	Chemical Composition Limits, Per Cent: Carbon	Mn	Si	Cr	Ni	Mo	Bars per 100 lb	Billets per GT	Bars per 100 lb	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

PIG IRON

Maximum prices per gross ton. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$29.50	$29.00	$30.50	$30.00
Newark, N. J., del.	31.20	30.70	32.20	31.70
Brooklyn, N. Y., del.	32.28	....	....	32.78
Birdsboro, Pa., base	31.50	31.00	32.50	32.00
Birmingham, base	24.88	23.50	29.50	....
Baltimore, del.	30.22	....	....	....
Boston, del.	29.62	....	....	....
Chicago, del.	28.72	....	....	....
Cincinnati, del.	28.94	28.06	....	....
Cleveland, del.	28.62	27.74	....	....
Newark, N. J.	30.82	....	....	....
Philadelphia, del.	30.05	29.55	....	....
St. Louis, del.	28.62	29.54	....	....
Buffalo, base	28.50	27.50	29.50	29.00
Boston, del.	30.00	29.50	31.00	30.50
Rochester, del.	30.03	....	31.03	30.53
Syracuse, del.	30.58	....	31.58	31.08
Chicago, base	28.50	28.00	29.00	28.50
Milwaukee, del.	29.73	29.23	30.23	29.73
Muskegon, Mich., del.	32.05	....	....	32.05
Cleveland, base	28.50	28.00	29.00	28.50
Akron, Canton, del.	30.04	29.54	30.54	30.04
Detroit, base	28.50	28.00	29.00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
Duluth, base	29.00	28.50	29.50	29.00
St. Paul, del.	31.13	30.63	31.63	31.13
Erie, Pa., base	28.50	28.00	29.50	29.00
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	28.50	28.00	29.00	28.50
St. Louis, del.	29.00	28.50	....	29.00
Hamilton, O., base	28.50	28.00	....	28.50
Cincinnati, del	29.68	29.18	....	29.68
Neville Island, Pa., base	30.50	30.00	31.00	30.50
*Pittsburgh, del., N.&S. sides	31.27	30.77	31.77	31.27
Provo, Utah, base	26.50	26.00	....	....
Sharpsville, Pa., base	28.50	28.00	29.00	28.50
Sparrows Point, base	29.50	29.00	....	....
Baltimore, del.	30.60	....	....	....
Steelton, Pa., base	....	29.00	....	....
Swedeland, Pa., base	31.50	31.00	32.50	32.00
Philadelphia, del.	32.43	31.93	....	32.93
Toledo, O., base	28.50	28.00	29.00	28.50
Youngstown, O., base	28.50	28.00	29.00	28.50
Mansfield, O., del.	30.66	30.16	31.16	30.66

* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.24, Oakmont, Verona; $1.38, Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron. On Birmingham base, Republic Steel Corp. quotes $2 a ton higher for foundry and basic pig iron and Sloss-Sheffield Steel & Iron Co., $2 higher for foundry, basic and bessemer.

High Silicon, Silvery

6.00-6.50 per cent (base).....$34.00

6.51-7.00	$35.00	9.01- 9.50	40.00
7.01-7.50	36.00	9.51-10.00	41.00
7.51-8.00	37.00	10.01-10.50	42.00
8.01-8.50	38.00	10.51-11.00	43.00
8.51-9.00	39.00	11.01-11.50	44.00

Fob Jackson county, O., per gross ton. Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $50, Jackson, O.; $53.25 Keokuk, Iowa; $51.25 Niagara Falls, N. Y. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. $37.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $30.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $34, base; $35.38, del., Philadelphia. Birdsboro, Pa., $36, base; Intermediate phosphorus, Central furnace, Cleveland, $31.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point
Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00

Intermediate Heat Duty

Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59.00
Ala., Ga.	61.00
N. J.	62.00

Low Heat Duty

Pa., Md., Ohio	51.00

Malleable Bung Brick

All bases	75.00

Ladle Brick
(Pa., O., W. Va., Mo.)

Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennsylvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	22.00
Bags	26.00

Basic Brick

Net ton, fob 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, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

Open Market Prices of Leading Ferroalloy Products

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $40; Pittsburgh, $40.50; Chicago, $40.60.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone; Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed: 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Ferrotungsten: Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 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.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, lump packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.05c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.15c; ton lots 21.00c, less ton lots 22.00c eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 9.50c, ton lots 9.50c less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Chromium Metal: 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c, central 81c and 82.60c; western 82.25c and 84.75c fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 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.

Calcium metal; cast: Contract ton lots or more $1.35, less $1.60, pound of metal; $1.36 and $1.61

central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 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 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, 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 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, 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% Si and max. 2% Fe, 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, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb and containing exactly 2 lb Si, or about 2½ lb and containing exactly 1 lb Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal eastern zone bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 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: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, 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.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11% Al 5-7%, Zr 5-7%, Ti 9-11% and B 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 0.25c.

Silvaz Alloy: (Si 35-40%, Ca 9-11% Al 5-7%, Zr 5-7%, Ti 9-11% and B 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 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe 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 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 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 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Zirconium Alloy: 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; less 7.25c. Spot up ½c. **Simanal:** Approx. 20% each Si., Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, less-ton lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 $7.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5:84% NA_2O; or air dried, 83-85% V_2O_5 and 5.15% NA_2O, $1.10 per lb contained V_2O_5, fob plant freight allowed on quantities of 25 lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, delivered at consumer's plant except where noted.

OPEN HEARTH AND BLAST FURNACE GRADES

	—Heavy Melting— No. 1	No. 2	No. 1 Busheling	—Bundles— No. 1	No. 2	No. 3	Machine Shop Turnings	Mixed Borings, Turnings	Short Shovel Turnings	Cast Iron Borings
Pittsburgh	25.00	25.00	25.00	25.00	25.00	23.00	20.00	20.00	22.00	21.00
Philadelphia	23.75–24.25	23.75–24.25	23.75–24.25	23.75–24.25	23.75–24.25	21.75–22.25	18.75–19.25	18.75–19.25	20.75–21.25	18.75–19.25
Cleveland	24.50	24.50	24.50	24.50	24.50	23.00	19.50	19.50	21.50	20.50
Buffalo	24.25	24.25	24.25	24.25	24.25	22.25	16.75	16.75	18.75	17.75
*Boston	20.35	20.35	20.35	20.35	20.35	....	14.00	14.00	16.00	
Valley	25.00	....	....	25.00	....	....	17.50	....	19.50	18.50
Mansfield							17.50			
Chicago	23.75	23.75	23.75	23.75	23.75	21.75	18.75	18.75	20.75	17.25
Birmingham	22.00–22.50	22.00–22.50	22.00–22.50	22.00–22.50	22.00–22.50	20.00–20.50	14.50–15.00	14.50–15.00	16.50–17.00	15.50–16.00
San Francisco	19.50	19.50	19.50	19.50	19.50	10.00	8.00			
Cincinnati	24.50	24.50	24.50	24.50	24.50	....	18.20	16.20	20.00	17.00
‡Detroit	22.32	....	22.32	22.32	22.32	20.32	17.32	17.32	19.32	18.32
‡New York	20.33	20.33	20.33	....	20.33	18.33	15.33	15.33	17.33	....
St. Louis	22.22	22.22	....	....	....	....	14.72		16.72	....
Seattle	17.00	17.00	....	17.00	....	....	9.50	9.50	....	....
Los Angeles	16.50	15.50	....	14.50	14.50	....	8.00	8.00	....	....

ELECTRIC FURNACE, FOUNDRY AND SPECIAL GRADES

	Bar Crops and Plate	Cast Steel	Punchings and Plate Scrap	Electric Furnace Bundles	Heavy Turnings	Alloy Free Turnings	Cut Structural —and Plate Scrap— 1 ft and under	2 ft and under	No. 1 Chemical Borings	Tin Can Bundles
Pittsburgh	27.50	27.50	27.50	26.00	24.50	23.00	27.50	27.00	24.00	21.00
Philadelphia	26.25–26.75	26.25–26.75	26.25–26.75	25.25–25.75	23.25–23.75	....	26.25–26.75	26.25–26.75	22.75–23.25	
Cleveland	27.00	27.00	27.00	27.00	24.00	22.50	27.00	27.00	23.50	20.50
Buffalo	....	27.00	28.50	28.50	22.50	19.75	28.50	28.50	22.75	....
*Boston				....	....	....			20.31	....
Chicago	26.25	26.25	26.25	24.75	23.25	....	26.25	25.75	....	....
San Francisco	18.00	18.00			....	8.00	20.50	20.00	....	17.00
‡Detroit	....	....	24.82	23.82	....	....			....	....
‡New York			22.83	21.33	....	....	22.83	22.33	19.33	....
Birmingham	24.50–25.00	24.50–25.00	24.50–25.00	....	....	....	24.50–25.00	24.50–25.00	....	....

STEEL GRADES OF RAILROAD ORIGIN

	No. 1 Heavy Melting R.R. Steel	Railroad Malleable	Axles	—Rails— Rerolling	Random Lengths	Cut 3-ft. and under	Cut 18-in. and under	Railroad Specialties	Uncut Tires	Angles, Splice Bars
Pittsburgh	26.00	27.00	31.00	28.50	26.50	28.50	29.50	29.50	28.50	28.50
Valley	23.50								....	
Chicago	24.75	29.00	30.75	27.25	25.25	27.25	28.50	28.25	....	27.25
Cincinnati	25.50	29.00								
St. Louis		28.00	27.00	25.00	24.00	27.50	....	....	23.50	23.50
Birmingham	23.00–23.50			25.50–26.00	24.00–24.50	26.50–27.00	27.50–28.00	....		25.50–26.00
San Francisco			26.50		21.00		....	....	23.00	
Seattle	17.00	17.00	....	....	....	....				....

CAST IRON GRADES

	No. 1 Cupola Cast	Charging Box Cast	Heavy Breakable Cast	Stove Plate	Unstripped Motor Blocks	Malleable	Brake Shoes	Clean Auto Cast	No. 1 Wheels	Burnt Cast
Pittsburgh	30.00–34.00	24.00–26.00	23.00–25.00	26.00–28.00	23.00–25.00	27.00–29.00	20.75–22.75	30.00–32.00	25.00–27.00	20.75–22.75
Philadelphia	38.00–40.00	35.00–36.00	35.00–36.00		35.00–36.00	35.00	23.50–24.00	37.00	34.00	
Buffalo	29.50		24.00	25.00	24.00	....	....		....	24.00
*Boston	35.00	31.00	30.00	33.00	31.50	....	....	37.00	....	....
Chicago	30.00–40.00	....	....	....	....	....	....	....	30.00	....
*Seattle									24.50	....
Cincinnati	33.00	31.00	30.00	31.00	29.00	....	23.00	33.00	....	....
‡Detroit	35.00–37.00		28.00–30.00			....		35.00–37.00		
*St. Louis	25.00–30.00	25.25	22.75	27.00	....	....	20.25	32.00	26.00	20.25
‡New York	35.00–36.00	32.00–33.00	32.00–33.00		32.50–33.50	30.00			30.00	....
Birmingham	30.00		25.00	28.00	25.00	....	22.75		27.00	....
Los Angeles	30.00	....	....	....	....	....	....	....	....	....

* Fob shipping point; † fob tracks; ‡ dealers buying prices.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 19.50c, del. Conn.; less carlots 19.62½c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 19.25c, refinery, 20,000 lb or more; 19.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 20.50c; 88-10-2 (No. 215) 24.75c; 80-10-10 (No. 305) 23.50c; No. 1 yellow (No. 405) 16.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Price western 10.50c, select 10.60c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 11.65c, chemical 11.70c, corroding 11.75c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.62½c; No. 12 foundry alloy (No. 2 grade) 15.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.25c; grade 2 (92-95%) 15.75c; grade 3 (90-92%) 15.50c; grade 4 (85-90%) 15.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights, 70.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 69.87½c; Grade C, 99.65-99.79% incl. 69.62½c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.12½c; Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 23.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 24.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, fob refinery 38.50c lb; pig and shot produced from electrolytic cathodes 39.50c; "F" nickel shot or ingot for additions to cast iron, 37.50c. Prices include import duty.

Mercury: Open market, spot, New York, $89-$93 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.50 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.55.

Cobalt: 97-98%, $1.50 lb. for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N.Y. 90.12½c per ounce.

Platinum: $67.50 per ounce.

Palladium: $24 per troy ounce.

Iridium: $125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 19.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 30.93c; yellow brass 27.53c; commercial bronze, 95% 31.07c, 90% 30.56c; red brass, 85% 29.53c, 80% 29.02c; best quality 28.44c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 35.79c; nickel silver, 18%, 39.82c; phosphor bronze, grade A, 5%, 48.82c.

Rods: Copper, hot rolled 27.28c, cold drawn 28.28c; yellow brass, free cutting, 22.28c, not free cutting 27.22c; commercial bronze, 95% 30.76c, 90% 30.25c; red brass, 85% 29.22c, 80% 28.71c; best quality 28.13c.

Seamless Tubing: Copper 30.97c; yellow brass 30.29c; commercial bronze 90% 32.97c; red brass 85% 32.19c, 80% 31.68c; best quality brass 30.85c.

Copper Wire: Bare, soft, fob eastern mills, carlots 25.52c, less carlots 26.02c; weatherproof, fob eastern mills carlot 26.42c, less carlots 26.92c; magnet, delivered, carlots, 28.95c, 15,000 lb or more 29.18c, less carlots 29.68c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb 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 14.90c; cut sheets 15.40c; pipe, full coils 14.15c, cut coils 14.65c.

Zinc Products: Sheet fob mill 15.40c, 36,000 lb and over deduct 7%, Ribbon and strip 14.50c; 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 13.25c; 1-3 tons 14.25c; 500-2000 lb 14.75c; 100-500 lb 15.25c; under 100 lb 16.25c. 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 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 27.34c; flat untrimmed, 27.84c; electro-deposited, 27.09c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels nom.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls. nom., fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob 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 lb and over nom. del.; 500-999 nom.; 200-499 nom.; 100-199 nom.

Tin Crystals: 400 lb bbls nom., fob Grasselli, N. J.; 100-lb kegs nom.

Sodium Stannate: 100 or 300-lb drums nom., del.; tons lots nom.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ½c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	17.125	17.125	16.375
Yellow brass	13.750	13.250	12.875
Commercial Bronze			
95%	15.875	15.625	15.125
90%	15.750	15.500	15.000
Red brass			
85%	15.500	15.250	14.750
80%	15.375	15.125	14.625
Best Quality (71-79%)	14.625	14.375	.....
Muntz metal	12.875	12.625	12.125
Nickel silver, 5%	14.500	14.250	7.250
Phos. bronze, A, B	18.125	17.875	16.875
Naval brass	13.250	13.000	12.500
Manganese bronze	13.250	13.000	12.375

BRASS MAKERS' BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.25, No. 2 copper 16.25, light copper 15.25, composition red brass 15.50, auto radiators 13.00, heavy yellow brass 11.75, brass pipe 11.75.

DEALERS' BUYING PRICES

(Cents per pound in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 15.00-15.50; No. 2 14.00-14.50; light copper 12.50-13.00, No. 1 composition red brass 14.00-14.50, No. 1 composition turnings 13.00-13.50, mixed brass turnings 9.50-10.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 11.50-12.00, light brass 8.00-8.50, heavy yellow brass 10.00-10.50, new brass rod ends 11.75-12.00, auto radiators, unsweated, 11.00-11.50, clean red car boxes 12.50-13.00, cocks and faucets 11.00-11.50, brass pipe 11.00-11.50.

Lead: Heavy lead 10.00-10.25, battery plates 5.25-5.50, linotype and stereotype 12.00-12.50, electrotype 10.50-11.00, mixed babbitt 12.00-12.50, solder joints 13.50-14.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 5.50-6.00, mixed die cast scrap 4.00-4.50.

Tin: No. 1 pewter 44.00-45.00, block tin pipe 60.00-62.00, auto babbitt 35.00-36.00, No. 1 babbitt 35.00-38.00, siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, turnings 3.00-3.25, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 19.50-20.00, turnings 16.50-17.00, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00-10.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 9.50-10.00.

Sheets, Strip . . .

American Rolling Mill, Sharon Steel Corp. and others post new prices

Sheet & Strip Prices, Page 166

Cincinnati — Sheet mills of this district continue rolling schedules near former levels although primary steel output has been cut. American Rolling Mill Co. banked the Belfont furnace at Ashland, Ky. This company has revised sheet prices, at 2.50c, Middletown and Pittsburgh, on hot-rolled, 3.20c base on cold-rolled, and 3.55c base on enameling sheets. Readjustments in differentials and extras were also put into effect. Pricing of galvanized and long ternes follows a plan previously announced by Newport Rolling Mill Co. and others, for a base of 3.55c to which is added zinc extras and gage differentials. STEEL Nov. 25, p. 140.)

The new gage differentials on long terne sheets, commercial quality, in cents per 100 pounds are as follows:

Gage	Extras	Gage	Extras
10	Base	21	0.60
11	0.05	22	0.70
12	0.10	23	0.80
13	0.15	24	0.90
14	0.20	25	1.05
15	0.25	26	1.15
16	0.30	27	1.25
17	0.35	28	1.40
18	0.40	29	1.65
19	0.45	30	1.90
20	0.50	..	...

Extras for coating: 9 pound, 0.20c; 12 pound, 0.35c; 15 pound, 0.50c; primes only, 0.20c.

New York — Further price adjustments are being reported in sheets and hot strip. Sharon Steel Corp., Sharon, Pa., has increased size extras on hot-rolled strip 12 inches and narrower and is also applying new quantity extras up to 10,000 pounds.

Sheet sellers here report heavy increase in priority tonnage for the housing program. These priorities apply to hot-rolled pickled, galvanized and cold-rolled sheets and call for delivery in the first quarter. At the rate this tonnage has been coming in recenty, one large seller reports that his first quarter priority business will probably exceed that for current quarter.

Chicago — Consumers of sheet and strip are disappointed over the small quotas assigned for mills for next year, but now are more concerned over prospects of not getting even full quota amount. It is feared that a prolonged coal strike will result in even more dislocation in fabricating schedules than was the case the latter part of this year. It can be expected that as soon as the strike ends, consumers will press strenuously for delivery of material. Offsetting this situation to some extent is the fact that many manufacturing plants have heavy inventories of goods in process but held up for certain short items, raising fear as to what would happen in case of a price break.

St. Louis — Sheet production slipped last week as mills shifted partially to oil and gas fuel to meet the coal shortage. A rate just under capacity is expected this week. The freight embargo is an immediate threat to shipments. Pressure for sheets is unabated and the coal strike has had no easing effect on order books. Schedules are filled through the first half with deliveries still 6 to 8 months late. A continued shortage of bricklayers is interfering with maintenance work.

Philadelphia — One midwestern sheet mill, in revising its price schedules on several grades, indicates it will be increasingly less interested in meeting the Sparrows Point base on hot-rolled sheets. Priority tonnage for the first quarter has been substantial of late, affecting hot-rolled pickled, cold-rolled and galvanized sheets and all required for the housing program. Apart from this tonnage, the mills have been accepting little new business because of disturbed shipping and operating conditions.

Pittsburgh — In contrast with other steel products, sheets are one of the few items that have been sustained at near normal production levels throughout the coal strike period to date, although shortage of coke oven gas for reheating furnaces is retarding output somewhat. However, the freight embargo is expected to force drastic curtailment in output early this week. The Vandergrift Works of Carnegie-Illinois Steel Corp. was shut down last week, but from a tonnage standpoint this was not significant compared with the company's overall output in this district.

American Rolling Mill Co., which has announced a new pricing system on sheets, is no longer recognizing Buffalo as a base on galvanized or Birmingham on cold-rolled sheets. This company has also eliminated cold-rolled primes and seconds and cold-finished run grades from its products classifications and substituted cold-rolled commercial quality sheets at $3.20 per 100 pounds.

Civilian Production Administration has expanded the flat galvanized sheet steel items down to 23 gage and lighter on schedule A to PR-23.

Steel Bars . . .

Bar Prices, Page 166

Pittsburgh — Merhant bar production schedules were curtailed sharply last week as result of the coal strike; some mills were shut down completely and others operated well below normal. Leading interest expects to produce but 20 per cent of normal tonnage this month even should the coal strike be abruptly terminated. Prior to strike, most interests had revised order books in line with tonnage lost earlier this year. However, it now appears that projected production schedules next quarter again will have to be revised. Sharp reduction in mill output will be felt almost immediately in metalworking operations, although the freight embargo is expected to force curtailment in operating schedules sooner than dwindling steel inventories. Cold-drawers report adequate inventories to maintain unbalanced operations for nearly 4 weeks, but the rail embargo is expected to force almost complete shutdown in operations this week.

No price action on new billet carbon, alloy or cold-finished bars has yet been taken by larger producers, although rail steel carbon bars have been advanced to $2.75 per 100 pounds by some interests.

St. Louis — Production of merchant bars so far has been unimpaired by the coal strike, since mills in this district either have made their annual winter changeover to gas, or use that fuel regularly. They feel, however, it is only a question of time until pig iron supplies or freight embargo compel curtailment. Drawers at the moment have 30 days' stocks or better of both pig and scrap. Order backlogs have been unaffected by the strike, the pressure increasing if anything. A definite increase in calls for export steel is noted. Export production here is probably not over 3 per cent. Books for 1947 still are closed, but space has been made on rolling schedules for specific projects to the extent that the first half of the year is almost filled. Deliveries of merchant bars are 4 to 6 months behind; concrete bars, about two months.

Boston — Bar users are generally well balanced with larger sizes of carbon and alloy items, but critically short of small sizes both hot and cold-drawn carbon grades. For cold-drawing producers have about four weeks supply, except some grades under one-inch. Unbalanced inventories, with few exceptions, are general in consuming industries, including forge shops and producers of fastenings, bolts and nuts. Price lists for the latter are being revised upward; substantial part of bolt and nut production is in specialties and increases are based largely on costs rather than across the board and in some cases the advances are as high as 15 per cent.

Steel Plates . . .

Another producer advances carbon steel plate prices $1 a ton to 2.80c, base

Plate Prices, Page 167

New York—One eastern plate mill has increased carbon plate prices $1 a ton to 2.80c base, being the the second to have taken such action recently. Other eastern plate mills are holding prices unchanged. Demand is being turned down in most cases, pending clarification of the coal situation. Producers generally are falling behind on commitments as a partial result of declining operations, due in turn to the tie-up at the coal mines.

Chicago—Demand for steel plates for fabrication of pipe lines constitutes a sizable portion of total iquiry. Several pipelines are under construction and others are being contemplated. Pipemakers are booked solid for at least 18 months ahead, and are not now working much better than 60 to 75 per cent capacity because steel can not be obtained. Another substantial part of plate output is going into tanks and pressure vessels of all kinds, some for water and some for oil refinery construction. Major oil companies are engaged in extensive expansion programs.

Pittsburgh — Leading producers began curtailing plate output early last week, reflecting the sharp decline in primary steel production and inadequate coke gas supply for reheating furnaces. Should the coal strike continue, plate mills here likely will be shut down this week. Some fabricators already have curtailed shop work as much as 25 per cent. Prior to the coal strike some of these interests were four months behind on commitments and order backlogs were extended ten months. Intermittent steel deliveries through most of this

STEEL CAPACITY?

1. How much steelmaking capacity was added during the war?
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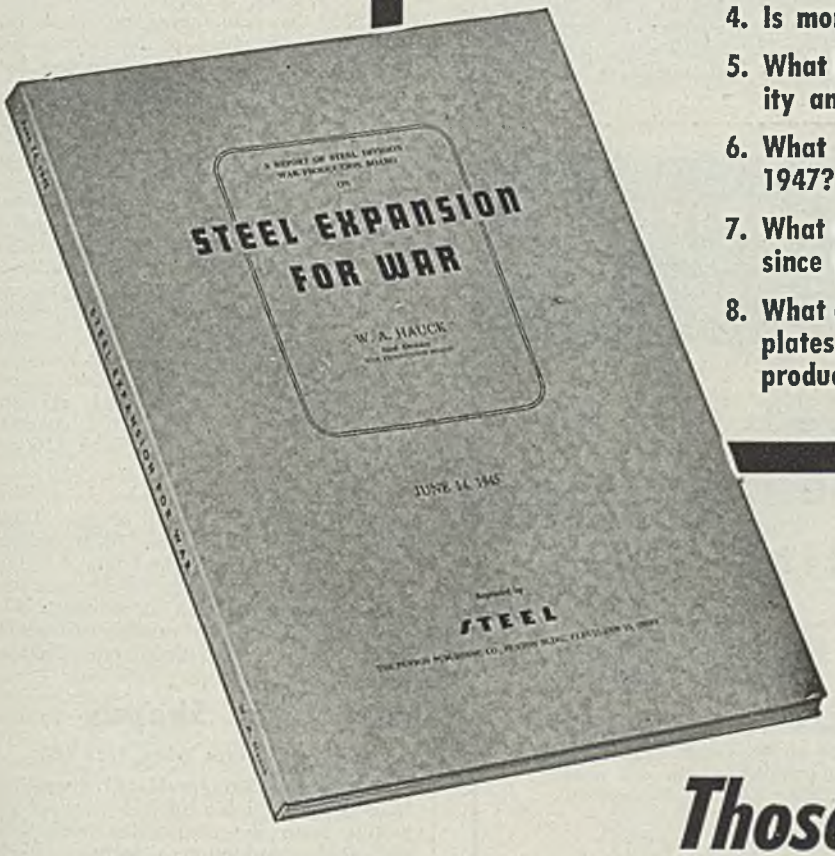
4. Is more capacity needed?
5. What has been the long-term trend in capacity and production?
6. What will sheet and strip capacity be in 1947?
7. What new finishing capacity has been added since the war?
8. What companies make the sheets, strip, bars, plates, shapes, pipe, wire and other finished products you need today?



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AN OFFICIAL REPORT

Prepared by W. A. Hauck who was closely associated with the steel expansion program all through the war as a top executive of the Steel Division of the War Production Board and now is in charge of steel plant disposal for the War Assets Administration.

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* Please add 3% state sales tax on orders for delivery in Ohio

year has been major factor in delaying much of the work on fabricators' books. Mill order backlogs generally are extended six months, of which about one month's output represents carryover tonnage not taking into consideration effect of current coal strike. No increase in prices yet have been announced by producers here.

Boston—What hope most mills entertained toward making inroads on backlogs is fading with falling production. Plate fabricators are short of steel, notably in lighter gages, and tank shops experience difficulty in maintaining orderly schedules. Warehouses are also low on plates. Mill schedules are confronted with further revisions and extensions. Substantial volume is offered producers, but relatively little new tonnage is being taken on a firm basis and considerable is still to be submitted for second quarter scheduling.

Philedelphia — Confronted with a still further decline in operations, plate sellers are turning down much of such tonnage as is coming their way. Some are booked up for the entire first half and are refusing to schedule tonnage beyond; and still others, not in so extended a position, are refusing to schedule until they can see more stable conditions ahead.

One district plate mill has advanced its price $1 a ton to 2.80c, base, in line with a recent advance by another seller. Still another district mill, quoting 2.75c, is holding unchanged for at least the time being. At present the spread on plate in the East ranges from 2.50c to 3.05c, base or equivalent.

Reinforcing Bars . . .

Re-rollers advance prices 25 cents per 100 pounds. Extra cards revised

Reinforcing Bar Prices, Page 167

Pittsburgh — West Virginia Steel & Mfg. Co., Huntington, W. Va., and other re-rollers have increased rail steel carbon bars 25 cents to $2.75 per 100 pounds, and rail steel reinforcing bars 25 cents to $2.60 for mill stock lengths and $2.85 for fabricated material. It is also reported Laclede Steel Co., St. Louis, has advanced reinforcing bars $15 a ton; Atlantic Steel Co., Apollo, Pa., $10; and Sheffield Steel Corp., Kansas City, Mo., $13 a ton. West Virginia Steel & Mfg. Co. has revised size extras on rail steel reinforcing bars as follows: Base, 15 cents; ⅝-in., 20; ½-in., 30; ⅜-in., 50; and ¼-in., $1.20. Sellers indicate the present $5 per ton discount to jobbers and fabricators may be eliminated if and when new concrete bar price structure is established, at same time the extra for fabricated concrete bars may be raised from $5 to $10 per ton.

Mill production schedules have been curtailed sharply as result of coal strike, which will necessitate an additional revision in projected scheduling for first quarter. Extended mill deliveries and uncertain price structure continue to hold up new inquiries on much construction work long past the development stage.

Structural Shapes . . .

Structural Shape Prices, Page 167

Pittsburgh—Structural mill operations have been hard hit by lack of steel resulting from the coal strike, and their projected production schedules likely will have to be revised once more at a time when producers were hopeful of clearing up carryover tonnage by end of year. Fabricators estimate they have 3 to 4 weeks' steel supply on hand, and in some instances already have begun to curtail shop work. This trend will be accentuated by the freight embargo. Completion of numerous plant expansion programs has been delayed this year due to strikes, and it appears many additional programs will be postponed because of the curtailed mill production schedules. Uncertain outlook in regard to price level and mill deliveries also are forcing many proposed expansion programs to be temporarily held up. Bulk of construction work recently approved by CPA represents miscellaneous repairs.

Boston — Heavier finishing mills, including structural units, will be forced to extend deliveries on plain material soon, since they were the first to be affected by curtailment in rolling schedules. Before the curtailments they had begun to make inroads on backlogs. With some producers limiting the ratio of several smaller sizes, efforts are directed toward better balance in bookings. One eastern mill, hampered by lack of raw materials, notably scrap, is unable to build up semifinished supplies to per-

mit orderly rolling schedules. High costs, extended deliveries, June in some cases, and CPA restrictions are contributing factors to a slackening in inquiry for fabricated material. Bulk of active work is industrial, bridge inquiry being light except Connecticut with a 5000-ton high level span, Connecticut river, Saybrook-Old Lyme, about to come out for estimates. Most bridge and public works programs are behind schedule. Grinnell Corp., Cranston, R. I., has authorization for a new foundry.

While there are few cancellations in this district, overall backlog for the entire fabricating industry, or tonnage available for fabrication over the next four months, is lower, reflecting some country-wide cancellations and a decline in contracts. Starting last month, this backlog dropped nearly 23,000 tons and if the trend continues will approximate 625,000 tons at the year end or a loss of around 50,000 tons since October.

Philadelphia — With conditions so greatly disturbed, fabricators say it is small wonder that district structural buying has sunk to one of the lowest levels of the year. Apart from 100 tons for the Sharpless Corp., this city, structural awards were virtually negligible last week. The Sharpless tonnage was through Barclay White & Co. with Cantley & Co., this city. Inquiry includes 1100 tons for an addition to the Du Pont plant at Niagara Falls, N. Y. on which bids closed Dec. 6.

Tin Plate . . .

Tin Plate Prices, Page 167

Pittsburgh — Wheeling Steel Corp. has raised export tin plate prices $1 per base box, 107 pounds, to $6.60. Bethlehem Steel Co. is reported to have taken the same action.

Price action on 1947 domestic tin plate deliveries is expected momentarily. Industry members are unwilling to predict extent of probable increase, but point out the advance likely will be substantial on basis of higher pig tin, palm oil, and scrap prices, and probable additional increase in labor and other production costs.

No report yet has been made of the outcome of Industry Advisory Committee and CPA discussions last week over possible relaxation of tin plate conservation orders. Extent of possible revision to present regulation channeling 70 per cent of the tin plate production into essential items is said to be largely dependent on size of export load directive for first quarter.

Tin plate production to date has not been adversely affected by the coal strike as much as other products. However, box car shortage and absenteeism continue to retard output and should the coal strike continue for another two weeks, operating schedules will be sharply reduced.

Chicago — Prospects for high level production of tin plate during the coal strike are not as rosy as a week ago. It is understood that some steelmakers feel that tin plate manufacture takes too high a proportion of power generated. Since power must be conserved, there is a strong possibility that steel mills will curtail tin plate operations, despite exceptions under the rail embargo, because the power thus saved can be used more economically in the making of some other steel products.

Wire . . .

Several independent drawers raise prices for various merchant wire items

Wire Prices, Page 167

Chicago—Although the larger wiremakers in this district are holding prices as existed under OPA control, most independents have made price increases effective in the past two weeks. These advances amount to about $8 a ton on wire rods, and range from $5 a ton on low-carbon wire up to $15 on barbed wire. On some items for which base price is unchanged, new extras under consideration before OPA demise have been introduced. Little slackening in demand for fence and barbed wire is reported, and jobbers complain they are not receiving sufficient material to accommodate backlogs of orders.

Keystone Steel & Wire Co., Peoria, Ill., increased prices on a number of wire product items effective Nov. 21. Wire rods No. 5 9/32-inch inclusive is advanced $8 per ton, fob Chicago, from $2.30 to $2.70 per hundred pounds; low carbon wire, 12-inch and larger diameter coils, $5 a ton, from $3.05 to $3.30 per hundred pounds; barbed wire up $15; field and poultry fence, 15½-gage and heavier, $10; 2-inch 20-gage poultry netting, 15 per cent; and bale ties, $9.50. Base on nails remains unchanged but

application of new extras amounts to about $5 per ton.

Pittsburgh—Portsmouth Steel Corp., Portsmouth, O., has raised wire rod prices 25 cent to $2.55 per 100 pounds fob Portsmouth, and bright manufacturers wire to $3.425. Portsmouth also has revised its size, chemistry, packaging and galvanizing extras, amounting to an additional $2 to $3 increase. Sheffield Steel Co. of Texas, Houston, Tex., is reported to have advanced prices as follows: $15 a ton on barbed wire, $8 on wire rods, $10 on nails and merchant wire items. Northwestern Steel & Wire Co., Sterling, Ill., is said to have advanced wire rods 40 cents to $2.70 per 100 pound base and bright manufacturers wire 25 cents to $3.30; and also raised galvanized nails and staples from a $3.40 base to that of $3.75 now prevailing for standard and cement-coated nails. It is also reported this company has increased woven fence and other merchant items. The industry soon is expected to revise straightening and cutting extras and some revision in the price differential of 53.5 cents per 100 pounds on Pacific coast nail prices to $1 is also under consideration. Wire ouput has held up very well to date.

Boston—Price advances, mainly in the form of revisions in extras, are being made by smaller mills, but no changes have been announced by the largest producer in this area. Screw manufacrers have increased prices, ranging from 8 to 20 per cent, depending on quantities, grade and other factors. Increases in smaller fastenings reflect recent advances in heading wire.

Pig Iron . . .

Several producers advance prices $2 to $4.50 a ton in restricted districts

Pig Iron Prices, Page 169

Pittsburgh — Tennessee Products Corp., Nashville, Tenn., lone producer of charcoal pig iron in this country, raised the price $4.50 per gross ton on Dec. 1, to $37.50, fob furnace, Lyles, Tenn.

The $2 per ton increase announced by Pittsburgh Coke & Chemical Co., as of Dec. 1, applies on gray forge iron as well as the major steel and foundry grades. Merchant stack here has adequate coal stocks to maintain capacity output for about three weeks. This interest has curtailed coking operations to conserve coal, with result its sales of by-product coke have been reduced accordingly.

Additional blast furnaces were banked last week, leaving only about 28 out of 54 pouring iron at week end while many of those still active were not operating at capacity. Shortage of coke rather than pig iron is expected to be controlling factor in foundry operations for immediate future. Some of the smaller interests soon are expected to begin curtailing production schedules due to lack of coke.

Birmingham—Sloss-Sheffield Steel & Iron Co. advanced pig iron prices $2 a ton last week to the basis of $26.88 for No. 2 foundry, $25.50 for basic, and $31.50 for bessemer. Another producer was expected to take similar action late last week. Republic Steel Corp. had been quoting $2 a ton higher prior to decontrol. Two of Woodward Iron Co.'s three furnaces are idle, while Republic has both of its furnaces down at East Thomas. Sloss-Sheffield is operating three of its four furnaces.

Philadelphia — The Swedeland, Pa., producer has advanced prices on pig iron $2 a ton, following similar action recently by the Birdsboro, Pa., furnace. Increases also are being announced by certain other merchant sellers throughout the country. A second local district seller is no longer recognizing Sparrows Point, Md., as a basing point on foundry grades. The smaller of the two furnaces at Swedeland, after some delay, has blown out for repairs. One leading district by-product producer has advanced prices on foundry iron 50 cents a ton and higher for shipment into certain areas. However, the delivered Philadelphia price remains unchanged for the present.

New York — The Troy, N. Y., producer has switched to an fob furnace base, quoting No. 2 foundry at $29.50, low phos at $34 and malleable at $29. Freight from Troy to Brooklyn is $3.82 and to Newark, N. J., $3.37. This producer has switched, however, to production of low phos iron. The Swedeland, Pa., producer has advanced all of his grades $2 a ton, the second eastern Pennsylvania seller to have taken such action recently, the other being the Birdsboro, Pa., furnace, as noted at the time.

Pressure for pig iron, and also cast scrap, is being exceeded only by demand for coke, which was scarce before the coal strike and has become markedly so since. Various foundries are being forced to curtail primarily because of coke.

Buffalo — Raw material shortages and the freight embargo have upset the merchant iron market. Blast furnace operations have been slashed. Some foundries are hit hard by the coal tie-up while others are still operating brisk schedules, up to six days a week. Producers requested foundries to pare operations to a three-day week schedule, but melters are wary of violating labor agreements, or antagonizing labor relations. One seller said an embargo is welcomed because with output curtailed it is difficult to satisfy all customers. If producers are able to operate during the embargo, local melters will continue to truck castings, but shipments into New England will be stopped.

Chicago — Banking of blast furnaces producing merchant pig iron, because of the coal strike, is about to bear down heavily on foundries in this area. So far, a total of 12 furnaces have been idled, of which at least six have been engaged wholly or partially in merchant iron output. Unless the strike ends, more stacks will go down. Thus, foundries have slim prospects of getting normal iron supplies for some weeks and current inventories are negligible, leaving no choice but an early end to castings production. While coke supply is diminishing, it is not as critical at the moment as iron. Scrap also is short, despite higher prevailing prices. So far, there has been no move here to boost pig iron prices.

Cincinnati — Pig iron shipments were well sustained last month and, despite uncertainties in pig, scrap and coke, foundries will make a valiant effort to supply castings. There were unconfirmed reports that northern furnaces proposed elimination of Hamilton base in making quotations for this district. The Hamilton furnaces long ago discontinued foundry iron. An increase in price, and quotations on Cleveland or Chicago base would be a major markup.

St. Louis — Pig iron deliveries to this district will be cut 50 per cent this week, according to outside shipping sources, while local producers do not foresee more than two weeks' continued operation unless the coal strike ends. Melters were unaffected last week. Last month supplies were fair for the first time in many months. Most melters are prepared for a shutdown, although some have inventories up to 30 days.

Tubular Goods . . .

Tubular Goods Prices, Page 167

Seattle — Cast iron pipe inquiry is seasonally quiet but the potential demand in this area is large. Deliveries are far in the future. The coal strike is curtailing mill production and this is reflected by selling agencies.

H. G. Purcell, Seattle, has taken 900 tons involved in system improvements at Tacoma, delivery in 24 months. Home water district, 7840 S.W. Capitol Highway, Portland, has called bids Dec. 9 for about 500 tons of 4, 6 and 8 inch cast iron, 43,000 feet, and accessories. Clark County PUD., Vancouver, Wash., has approved $200,000 bond issue for a water system, bids soon; Henry L. Gray, Seattle, engineer.

Scrap . . .

Scrap Prices, Page 170

Pittsburgh — Mills and foundries are taking advantage of present curtailed production schedules to build up depleted scrap inventories. However, the scrap supply outlook for winter months remains critical despite temporary easing in the situation. Incoming scrap tonnage, although improved, is still below expectations of the more optimistic users following the $5 across-the-board advance for turnings and steelmaking grades and $5 to $8 on cast items. Automotive lists have been substantially larger recently, but continuation at this level is improbable due to threatened reduction to operating schedules because of curtailed finished steel output resulting from the coal strike. Scrap shipments from many metalworking plants soon is expected to decline for same reason. Pennsylvania Railroad has not yet announced distribution of latest list, with result prices for railroad items remain largely nominal at $5 above OPA ceilings. Despite the current easing in immediate scrap requirements, there is strong evidence that prices will hold firm at the higher levels.

Cincinnati — Demand for cast scrap has become acute as foundries try to fortify stocks against furnace curtailments which have not, so far, affected pig iron shipments. Scrap prices appear to be finding their levels, although bids on railroad lists, so far unannounced, may indicate quotations on scrap steel still point upward. Acts to conserve coke may mean supplies of blast furnace scrap are adequate but other melters are actively seeking material.

Buffalo — While confusion over the coal strike and freight embargo gripped the scrap market, dealers were still able to find buyers for all available offer-

ings. Prices held at recently-advanced levels. Buying interests were not quite so persistent, but demand was ample to absorb limited offerings. Dealers report yard receipts are only mildly better than they were under controls. Dealers think it will be well into 1947 before any appreciable improvement is shown in supplies. A shrinkage is expected in industrial scrap as the effects of curtailed operations because of the coal strike are felt.

St. Louis — Scrap shipments have leveled off following a rather substantial pickup just after decontrol. Volume is not great enough for building of inventories but brokers believe it is sufficient to avert another price rise. Mill reserves vary widely, from a week to 45 days, and foundries may average as high as 30 days. Railroads took scrap price offerings last week and quotations are expected to be up this month, but probably not to exceed the usual 25 per cent except in specialties. Shipments are hampered by income tax considerations, the possibility of another price rise and what is believed to be a thin supply at remote points. Therefore, inventories will not increase rapidly here unless coal strike repercussions force curtailed operations.

Boston — Restricted supply of pig iron contributes to sustained strength in scrap and not until volume of blast furnace output in larger tonnage is available are prices likely to be subjected to normal pressure and test at current levels. Steelmaking grades are steadier at $20.35, shipping point, than cast and foundry grades, but some users of heavy melting have not been buying, not being convinced the price has leveled at that figure. When purchases are resumed in one case, No. 1 heavy melting will be bought and deliveries will be accepted only to rigid specification. Some pressure is appearing for former differentials between the heavy melting grades and other steel classifications, including bundles. Shortages in iron make necessary high ratio of scrap in foundry melts, a situation likely to prevail until supply of pig improves.

Seattle—Steel scrap supply is not improving despite the advance of $2.50 gross to $17 gross following the removal of OPA ceilings. Little surplus is reported in the country areas and the scarcity is aggravated by inability to get new equipment. For this reason railroads, industrial plants and the automobile scrap industry are not producing the normal amount. The situation justifies fears of western mills when heavy shipments of shipyard scrap were made from this area to eastern centers early in the year. Tonnage from scrapped ships will not be available in quantity for some time.

New York — Scrap dealers' buying prices on the major cast grades have undergone a further increase. No. 1 cupola cast is now holding at $35 to $36, charging box cast and heavy breakable cast at $32 to $33, and unstripped motor box at $32.50 to $33.50. Stove plate is nominal, with practically all of this material moving in with the No. 1 cupola cast scrap.

The freight embargo was expected to bring the movement of scrap to a negligible flow shortly after its effective time. A reported exception had to do with materials required for the manufacture of car wheels and other equipment badly needed by the railroads.

Philadelphia — Delivered prices on No. 1 cupola cast still range from $38 to $40, although little can now be had at the lower figure. No. 3 bundles are being quoted at $21.75 to $22.25, delivered consumer plant.

Movement of scrap until the time of the scheduled freight embargo had been showing some improvement, with the pressure for material increasing as the deadline on most rail shipments approached. Any tonnage for which the bill of lading had been signed by midnight Thursday could be moved. Various consumers, despite the prospect of an almost complete shutdown within a few days, were and still are willing to take in as much scrap as they can obtain. They placed some hope on the possibility of heavier shipments by truck, and some, engaged in the manufacture of car wheels and other supplies badly needed by the railroads were encouraged by reports that shipments to them would be exempted.

Chicago — Despite declining operations due to the coal strike, mills seek scrap actively but confine purchases of open-hearth material at $23.75, or $5 over former ceilings. Payment of the 50-cent broker's commission is retained. Only moderate offerings are available and prospect now is that much of this will be held up by the embargo. Still heard are prices up to $25 as brokers cover on commitments. Railroad grades hold at $5 over old ceilings, carriers agreeing this is the maximum to be accepted at present. Cast grades are scarce and prices paid vary widely with some tendency for prices to edge up from the $30-$40 bracket to one between $35-$40. How scrap flow will be affected by the rail embargo cannot now be appraised.

Warehouse . . .

Warehouse Prices, Page 168

Pittsburgh — Reduction in finished steel shipments due to the coal strike is expected to result in a further reduction in steel warehouse stocks, estimated by some to be at the lowest level on record. Despite strict allocation of limited steel available, most steel distributors' stocks are nearly depleted in sheets, shapes, wire items, and small size carbon bars, while inventories of tubing, plates, cold-finished bars and alloys are expected to be reduced substantially because of disruption of mill shipments. Some warehouse interests state a few of their customers have been forced to reduce production schedules because of the inability to get necessary steel requirements. No warehouse steel price action has been taken, although serious consideration is being given re-establishment of the normal relationship between steel mill and warehouse prices.

Cincinnati — Warehouses here expect an early revision of quotations in reflection of mill adjustments. Inquiries for steel spurted coincident with the coal miners' strike, but the stocks of jobbers are unbalanced and light, in most items, and in no condition to provide interim material.

Boston — To meet sustained heavy demand for steel, notably in light gages of flat-rolled, small bars, plates and shapes, warehouses are taking in substantially less steel this quarter. Year-

end inventories will be badly out of balance and prospects for first quarter are obscure.

Chicago — Steel warehouses continue to be swamped with demand for steel to keep manufacturing plant production lines going as long as possible while receipts of steel from mills are cut back because of the coal tieup. To meet this current demand, warehouses have discouragingly low inventories. Stocks of plates, structurals, small carbon bars and sheets are virtually nonexistent, and under present conditions replenishment does not look promising. Items in better supply are alloys and large sizes of carbon rounds.

Seattle — Jobbing houses report galvanized and black sheets, pipe, reinforcing bars, nails and wire extremely short. Some shipments are coming overland but supplies are far below demand, which continues strong notwithstanding building restrictions. The price list is unchanged, no revisions being expected unless mills raise their sights.

Philadelphia — One leading jobber reports November business on a dollar basis was the largest this year, with volume on the tonnage basis well sustained. This reflects not only good demand but good receipts from the mills. However, prospects for this month are far less encouraging, because of disrupted mill operations.

Nonferrous Metals . . .

Nonferrous Prices, Page 171

New York—A steadier price tone prevailed in the nonferrous metal markets last week, all major metals holding unchanged. Cadmium advanced, however, to the basis of $1.50 a pound in commercial quantities from $1.25.

Copper—Releases of copper from the Office of Metals Reserve's stockpiles this month, estimated at about 50,000 tons, will be subject to delays because of the freight embargo. This volume, if shipped, plus domestic tonnage available would hardly cover increasing requirements and consumers will be cramped further by shipping delays. The government's stockpile will not last much beyond February.

Congressional action during the first quarter on suspension of the four-cent import duty is being urged. Through commitments before withdrawal of the government foreign copper purchasing program, about 35,000 tons of Chilean copper will be taken in during the first three months of 1947.

Premium for regular vertically cast lake copper cakes has been increased to $5 a ton from $4.50 by all refineries. The export price is about 18.50c, fas New York. Some business is being done at that level as well as at 18.25c.

Zinc—Sellers in some instances are making no firm quotations on forward deliveries but business is being done in some directions at 10.50c for prime western delivery this month and January. Larger consumers of special grade are attempting to ascertain first quarter prospects as to volume of supplies and premiums to be paid. All producers are not yet charging 1.25-cent increased premium over the prime western price.

Lead—After this month, Office of Metas Reserve will no longer supply consumers out of stockpile, having no foreign metal for allotment. Smelter receipts of lead in ore and scrap in October totaled 30,883 tons, a decline of 6316 tons from the September total of 37,199 tons. The decline is attributed chiefly to a falling off of receipts of foreign metal.

Antimony—All restrictions on imports of antimony have been removed by the Civilian Production Administration. At the same time, the agency has directed the Reconstruction Finance Corp. to discontinue public purchase of antimony from foreign sources except for commitments and arrangements undertaken prior to Nov. 29. Antimony was placed under import control originally in December, 1941, and was removed in November, 1944. The difference between the world price of the ores and the domestic price ceilings required that it be returned to M-63 controls in October of this year.

Rails, Cars . . .

Track Material Prices, Page 167

Pittsburgh — Rail, plate, structural and bar mill production schedules have been hard hit due to coal strike, further delaying railroad construction and maintenance programs. Freight car construction already is far behind former schedules and it appears that projected assembly operations again will have to be revised in light of present sharp reduction in steel output. The rail embargo is expected to indefinitely retard the French car program.

West Virginia Steel & Mfg. Co., Huntington, W. Va., has increased its price on light rails from $49.18 per net ton to $55. This interest also has revised extras on light rails as follows: 60 pounds, base; 50 to 25 pounds, $4; 20 pounds, $6; 18 pounds, $8; 12 pounds, $12; and 8 pounds, $18. Under the old schedule 25 pounds and over was base, while the 20, 16, 12 and 8-pound rails carried extras of $2, $4, $8 and $12, respectively.

Bethlehem Steel Co. and Republic Steel Corp have raised cut spikes 85 cents to $4.50 per 100 pounds.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 167

New York — One leading eastern bolt and nut producer has increased large bolts around 5 per cent; small, approximately 7 per cent. A Buffalo interest is said to have increased his entire line anywhere from 12 to 15 per cent.

Some sellers have stepped up their prices on large rivets from 4.90c to 5.40c, and on small rivets have changed from 65 plus 5 per cent to 55 plus 5 per cent plus 15 cents per hundred gross weight. Also advanced in some quarters are track spikes, now holding at 4.50c as compared with 3.65c, and screw spikes at 6.40c, compared with 5.30c.

Pittsburgh — Bolt, nut and rivet producers here state that due in part to fact mills are now charging the $10 extra for cold-heading quality steel, not permitted under OPA, they will issue new price lists for their products some time this week. The increase is expected to range from 6 per cent for smaller sizes down to 3 per cent. Some producers outside this district have revised their price lists. However, the advances have not been consistent with the result there is considerable disparity in present quotations. It is also reported Sheffield Steel Corp. has made Kansas City, Mo., a basing point on bolts, nuts and rivets. Formerly, basing points on these items were Pittsburgh, Cleveland, Chicago, Birmingham and Lebanon, Pa.

Producers have made little headway against order backlogs in recent weeks, which currently extend 6 to 8 months. Most interests operated at about 75 per cent of capacity last week, but further sharp drop is indicated as result of rail embargo and decline in steel mill shipments.

Iron Ore . . .

Iron Ore Prices, Page 168

Cleveland — Shipments of Lake Superior iron ore in November totaled 6,701,305 gross tons, compared with 4,145,322 tons in November, 1945, an increase of 2,555,983 tons, or 61.66 per cent, according to the Lake Superior Iron Ore Association, this city. In October, shipments were 9,209,304 tons. Details of November shipments are as follows:

	November, 1946	November, 1945
Escanaba	392,060	438,796
Marquette	354,936	308,110
Ashland	467,042	237,811
Superior	2,069,934	1,280,417
Duluth	1,597,818	860,591
Two Harbors	1,682,457	936,995
Total U. S. Ports	6,564,247	4,062,720
Michipicoten	53,014	51,707
Port Arthur	84,044	30,895
Total Canada	137,058	82,602
Grand total	6,701,305	4,145,322

Increase from year ago, 2,555,983, or 61.66 per cent.

Cumulative shipments to Dec. 1 totaled 59,170,243 gross tons, compared with 75,643,715 tons in the comparable period of last year, a decline of 16,473,472 tons, or 21.78 per cent. Details of the season's shipments to Dec. 1 this year and last are as follows:

	To Dec. 1, 1946	To Dec. 1, 1945
Escanaba	3,052,648	4,640,370
Marquette	2,502,154	3,890,974
Ashland	3,710,657	4,308,671
Superior	18,978,160	24,536,819
Duluth	15,756,369	20,036,365
Two Harbors	13,892,590	17,625,890
Total U. S. ports	57,892,578	75,039,089
Michipicoten	452,276	466,644
Port Arthur	825,389	137,982
Total Canada	1,277,665	604,626
Grand total	59,170,243	75,643,715

Decrease from year ago. 16,473,472 tons, or 21.78 per cent.

Manufacturing Hit by Rail Freight Embargo

(*Continued from Page* 58)

a possible peace feeler inspired by the mine workers' union.

William Green, president of the American Federation of Labor, late last week suggested the government arrange a conference of coal mine operators and representatives of the United Mine Workers

to negotiate a settlement of the strike. He warned the miners will interpret the heavy fines imposed upon them and Lewis as an attempt to wreck their union.

The situation at the various steel producing points as reported by STEEL's district editors follows:

Valley Operations Hit Hard

YOUNGSTOWN — Steel operations this week are down to 35 per cent of capacity, against 40 per cent last week, 75 the previous week and 91 for many weeks before that. Currently only 35 open hearths and 9 blast furnaces are operating.

More thousands of steel, fabricating plant and rail workers will be thrown out of work as a result of the freight embargo. The steel plants still have three or four weeks of coal at present reduced operations.

Cleveland Ingot Rate Holds

CLEVELAND — Steelmaking operations in this district continued to hold at a surprisingly high level last week with the estimated ingot rate unchanged at 92 per cent of capacity, highest rate recorded by any district in the country.

Producers in this district expect to maintain operations at current levels for the present week (ending Dec. 14) but will make sharp curtailments at that time if the coal miners are still idle.

Manufacturing industry in the district plans sharp curtailments in production schedules as a result of the freight embargo.

Operations Down in South

BIRMINGHAM — Almost complete stagnation faced Birmingham industry last week as the pinch in gas caused by the coal strike resulted in shutting off fuel supplies to the cast iron pipe plants and the district's foundries with the list of idle estimated at 14,000. Steelmaking slumped to an estimated 45 per cent for the week. In addition to retrenchments already announced, additional curtailments are scheduled.

Rate Slumps at Pittsburgh

PITTSBURGH—About 30,000 steelworkers in this district have been laid off or put on a part time basis due to the coal strike, and this number is expected to be augmented considerably should the strike continue because of the freight embargo rather than the shortage of coal.

By-product coke output has been cut more than 50 per cent and there were only 28 out of 54 blast furnaces active in the district last week. Ingot operations dropped to 50 per cent of capacity last week and output of many finished steel items was reduced to about 75 per cent of normal.

The freight embargo will force drastic curtailment in metalworking operations with the Tri-State Industrial Association estimating over 100,000 employees laid off by the end of this week if the strike continues.

Cut Is Expected at Chicago

CHICAGO — Steel producers in this district last week were uncertain just how much steel operations would be affected by the coal strike and the freight embargo. Indications were, however, some curtailment from last week's relatively high ingot rate of 75 per cent would be effected. At the beginning of the strike ingot operations for the district averaged 92 per cent.

Greatest uncertainty in the situation results from the freight embargo. Just how hard this will hit manufacturing industry was problematical with some observers pointing out that there may be some loopholes in the embargo order which may allow for shipments in certain circumstances and with certain equipment. The Association of Commerce of Chicago estimated that the first of 750,000 employees in 10,000 area industrial plants would become idle within 24 hours after the embargo.

Drop Sharp in the East

PHILADELPHIA — Steelmaking operations in Eastern territory last week dropped precipitously, falling 21 points to 37 per cent of capacity. Further decline in activity is in prospect this week with the effect of the freight embargo on district manufacturing operations difficult to estimate.

Curtailments Ordered at Detroit

DETROIT—While ingot operations declined in most other producing districts last week, the ingot rate here advanced six points to 90 per cent of capacity. Explanation for this surprising action was found in the fact that local steel plants have substantial stocks of coal and are understood to have adequate storage space to stock steel even if the freight embargo prevents shipments from mills on a large scale. One large plant here last week added four openhearths to its active list.

Full effect of the freight embargo on manufacturing operations in this district

was uncertain. Some curtailments have been ordered in local plants and expectations are severe cuts will be made in operations if the strike and rail embargo continues for more than a week.

On the eve of the rail embargo, automobile plants were making plans to close operations progressively, leading to complete cessation of production inside of 10 days.

Little Change at Cincinnati

Cincinnati — Little change was reported in steel operations in this district last week with the ingot rate holding at 84 per cent. However, curtailment is in prospect this week, one large plant planning curtailing to 50 per cent of capacity starting Dec. 9 and holding at that level for 10 days or two weeks, after which production will practically cease until coal is available.

Output Holds at Buffalo

BUFFALO — Ingot operations here last week were estimated at 51 per cent of capacity, unchanged from the preceding week. However, uncertainties arising from the imposition of the freight embargo made it impossible to estimate operations for the current week.

Focus Attention on Labor Relations at NAM Meeting

(*Concluded from Page* 61)

or where the public interest is paramount to the rights and interests of the contending parties; 3—in dealing with labor relations, Congress should apply "the liberal concept or equal justice and responsibility under the law for all individuals and groups which underlies our whole Constitution and form of government."

He suggested the following changes in the National Labor Relations Act:

1—Outlawing of jurisdictional strikes and requiring unions to use and abide by the democratic election machinery provided by the act.

2—Giving employers the absolute right to an election whenever threatened by a jurisdictional or organizational strike.

3.—Requiring that NLRB findings of fact be reviewable by courts unless supported by the "weight of evidence."

4.—Clarification of the definition of an employee, so that after a certain length of time an employer can declare that strikers are no longer employed by him and request a new election "to determine the bargaining agent of those who really are working for him."

5—Definition of collective bargaining in such a way as to require unions as well as employers to bargain.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, power plant, Pennsylvania Light & Power Co., Sunbury, Pa., through Ebasco Services, New York city; to Bethlehem Steel Co., Bethlehem, Pa.

740 tons. Tishman apartment, 3 East 71st St., New York, to Harris Structural Steel Co., that city.

675 tons, two bridges, Central Railroad of New Jersey, Bayonne, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

650 tons, new building, National Gypsum Co., Clarence, N. Y., to Ernst Iron Works Inc., Buffalo; Siegfried Construction Co., Buffalo, contractors.

425 tons, building, Forest Hills, Long Island, through Kalter Iron Works, to the Gold Seal Iron Works, Brooklyn, N. Y.

250 tons, 70-ton gantry crane for Coulee pump plant, to Star Iron & Steel Co., Tacoma, low $127,883.

250 tons, foundry building, Scovill Mfg. Co., Waterbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; through Stone & Webster Engineering Corp., Boston.

220 tons, building, Economics Laboratory Inc., Lyndhurst, N. J.; to Harris Structural Steel Co., New York.

175 tons, tanks, Richfield Oil Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, boiler house, Smith college, Northampton, Mass., to American Bridge Co., Pittsburgh; George A. Fuller Co., Boston, general contractor.

130 tons, building, Chicago, for American Sanitary Rag Co., to Lichtenwald Iron Works Co., Chicago.

125 tons, machine shop, Kidder Press Co., Dover, N. H., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, I-beam span, for an industrial installation, Bethlehem, Pa., through E. C. Machin, General Contractor, that city, to Bethlehem Steel Co.

100 tons, Sharless Corp., Philadelphia, through Barclay White & Co. with Cantley & Co., Philadelphia.

STRUCTURAL STEEL PENDING

7500 tons, Lillian Wald Housing Development of New York City Housing Authority; bids postponed to Dec. 10.

5000 tons, power plant, Sewaren, N. J., for Public Service Electric Light & Cas Co., Newark, N. J.; bids postponed until Dec. 10.

5000 tons, power plant, Sewaren, N. J., for Public Service Electric Light & Gas Co., Newark, N. J., bids asked.

3300 tons, hangars, National Airport, Washington, Dyker Construction Co., New York city, low on general contract.

1100 tons, plant addition at Niagara Falls, N. Y., E. I. Du Pont de Nemours & Co.; bids closed Dec. 6.

1060 tons, H-piling, stockhouse No. 5, Milwaukee, for Blatz Brewing Co.

550 tons, extension to Dresser power station, Terre Haute, Ind., for Public Service Co. of Indiana; Sargent & Lundy, Chicago, engineers; bids Nov. 29.

500 tons, coffer dam, spec. 1571, Shasta Dam, Central Valley, Calif., for Bureau of Reclamation; bids to Denver Jan. 7.

500 tons, du Pont laboratory, Philadelphia, bids Dec. 6.

400 tons, Chesapeake & Ohio shop addition, Russell, Ky.; general contract awarded to Hughes-Foulkrod Co., Philadelphia.

330 tons, beam bridge, Bloomfield, N. Mex., for state.

315 tons, highway bridge, Santa Fe, N. Mex., for state.

280 tons, bridge, Sec. 202V-F, Madison county, Ill., for state highway commission; Illinois Steel Bridge Co., Jacksonville, Ill., low; bids Nov. 15.

265 tons, building, Aurora, Ill., for Independent Pneumatic Tool Co.

200 tons, pilot plant, Owens-Illinois Glass Co., Toledo, O.

200 tons, elevated platform extension, Frankfort Elevated Railway, new bids asked.

184 tons, machine shop, spec. 1567, Grand Coulee Dam, Odair, Wash., for Bureau of Reclamation; bids to Denver Jan. 6.

175 tons, steel girder bridge, with clear span of 103 feet 10¼ inches over Dixwell Ave., south crossing, Wilbur Cross parkway project, Hamden, Conn.; bids Dec. 16, Hartford.

120 tons, bridge, Sec. 43F, White county, Ill., for state highway commission; Illinois Steel Bridge Co., Jacksonville, Ill., low; bids Nov. 15.

100 tons, stop logs, spec. 1560, Grand Coulee dam, Odair, Wash., for Bureau of Reclamation; bids to Denver Jan. 2.

Unstated, 11 stop logs, Caulee project; spec. 1560; bids to Bureau of Reclamation, Denver, Colo., Jan. 2.

REINFORCING BARS . . .

REINFORCING BARS PLACED

750 tons, Southwest Side intercepting sewer, contract No. 12, for Sanitary District of Chicago; to Carnegie-Illinois Steel Corp., Chicago; Santucci Construction Co., Skokie, Ill., contractor; bids Oct. 24.

300 tons, paving, Calhoun county, Iowa, for state, to Sheffield Steel Corp., Kansas City, Mo.; Koss Construction Co., Des Moines, Iowa, contractor; bids Nov. 12.

PLATES . . .

PLATES PLACED

415 tons, eight 10,000-barrel storage tanks, four each for Parkersburg and Huntington, W. Va., for Pure Oil Co., to Graver Tank & Mfg. Co., Chicago; bids Oct. 7.

200 tons, 55,000-barrel storage tank, Chicago, for Pure Oil Co., to General American Transportation Corp., New York.

PLATES PENDING

225 tons, 72-inch water pipe, spec. 1534, Ft. Collins, Colo., for Bureau of Reclamation; bids to Denver Dec. 17.

PIPE . . .

CAST IRON PIPE PLACED

900 tons, various sizes, local system improvements at Tacoma, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

500 tons or more, 43,000 feet, 4, 6 and 8-inch, for Home water district, Portland, Oreg.; bids to 7840 SW Capital Highway, Portland, Dec. 9; C. E. Carter, Portland, engineer.

325 tons, 20-inch, Metropolitan District commission, Boston, contract 149; bids in.

265 tons, 6 to 20-inch, mostly latter, Saugus, Mass.; bids in.

STEEL PIPE PENDING

Unstated tonnage, 4000 feet, 6-inch, water line, airport Homes, Hartford, Conn.; contractors' letting.

RAILS, CARS . . .

RAILROAD CARS PENDING

New York City Board of Transportation, 100 subway cars for operation on the Interborough Rapid Transit lines; American Car & Foundry Co., low bidder.

Pennsylvania Railroad, 32 sleepers.

Pennsylvania Railroad, seven diesel electric switch engines, bids Dec. 18. This company is also closing bids Dec. 19 on plates, shapes, sheets, wheels, axles, forgings, structural tubes, track material, steel tires and tool steel.

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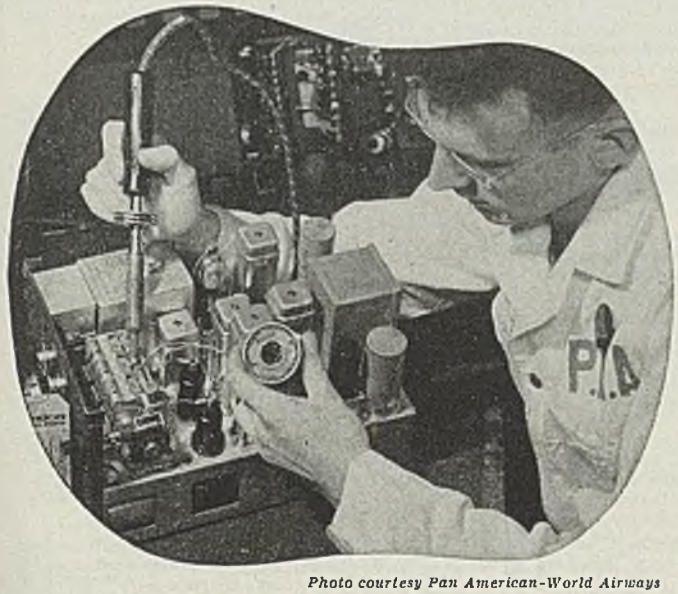

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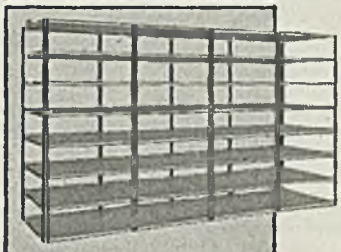

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CONSTRUCTION AND ENTERPRISE

ALABAMA

ANNISTON, ALA.—Rudisill Foundry Co. has obtained CPA approval for work on cast iron pipe shop, to cost $34,000.

BIRMINGHAM—Tennessee Coal, Iron & Railroad Co. has CPA approval for construction of pipe fabricating shop and storeroom at Fairfield works, to cost $42,000.

BIRMINGHAM—Southern Natural Gas Co., Watts Bldg., is planning 138-mile, 20- and 22-inch natural gas pipeline extension to Chattanooga, Tenn., and Lexington, Miss., to cost $6,500,000.

GADSDEN, ALA.—Alabama Power Co., Birmingham, is planning construction of a two-unit steam plant in, or adjacent to, Gadsden, at estimated cost of $10 million. The new plant, first unit of which is expected to be in use by the end of 1948, will increase the company's capacity from 700,000 to 820,000 kilowatts.

ARIZONA

PHOENIX, ARIZ.—Phoenix Refinery Co. has plans under way for construction of refinery, to cost $2,500,000. R. E. Richardson, Phoenix, is consulting engineer.

CALIFORNIA

STOCKTON, CALIF.—Pacific Can Co. plans construction of can manufacturing plant on Garwood Ferry Rd., to cost $125,000. Cahill Bros., San Francisco, will build.

TRONA, CALIF.—American Potash & Chemical Corp. plans expansion of its local plant with construction of a $4,500,000 carbonation facility. Also contemplated are a $2 million power plant expansion and a new research and chemical engineering facility to cost approximately $300,000.

ILLINOIS

EAST PEORIA, ILL.—Caterpillar Tractor Co., 600 W. Washington St., will soon let contract for superstructure of 790 x 1190-foot engine plant. Contract for foundation and substructures has been awarded to S. N. Nielson Co., 3059 Augusta Blvd., Chicago. The plant is estimated to cost in excess of $8 million. Giffels & Vallet, Marquette Bldg., Detroit, are architects.

OTTAWA, ILL.—Bakelite Corp., unit of Union Carbide & Carbon Corp., 30 East 42nd St., New York, has begun construction of a new plant including a 529 x 277-foot manufacturing building and a boiler house to be 130 x 68 feet. Contractor is F. H. McGraw & Co., Hartford, Conn., and architects and engineers are Giffels & Vallet Inc., and L. Rossetti, 1000 Marquette Bldg., Detroit.

MARYLAND

BALTIMORE—Bids have been asked for cable and insulated wire buildings by Western Electric Co., New York. Estimated cost, $4,688,000.

BALTIMORE—Belaseco Chemicals Division, Baltimore Service Engineering Co., 2002 St. Paul St., has acquired a 2½-acre plot at Erdman and Mapleton Aves. to be used as a site for a new plant to contain approximately 45,000 square feet.

BALTIMORE—Eastern Stainless Steel Corp. has let contract to Turner Construction Co., Essex, Md., for construction of one-story cafeteria and polishing building, Rolling Mill Rd.

BALTIMORE—Ceco Steel Products Corp. has completed plans for storage building at 600 S. Caton Ave., to cost $20,000. Owner will build.

MICHIGAN

ADDISON, MICH.—George C. Knight Industries Inc. has been formed with 10,000 shares of no par value and $100,000 capital to conduct a general manufacturing business by George L. Williams.

ANN ARBOR, MICH.—Utilex Mfg. Corp., 3686 Jackson Rd., has been organized with $50,000 capital to conduct a general manufacturing business, by Walter Graves, 76 Golfview.

BELLEVUE, MICH.—Ziegler Mfg. Co., Williams St., has been formed with $250,000 capital by Albert F. Ziegler, 750 N. Sheldon Ave., Charlotte, Mich., to conduct a general manufacturing business.

DETROIT—Columbia Steel Treating Co., 13788 Buena Vista, has been organized with $100,000 capital by Albert C. Dames, 13995 Woodmont Ave., to heat and steel treat metals.

JACKSON, MICH.—Hillsdale Plating Co., 536 N. Mechanic St., has been organized with $100,000 capital to engage in a general plating business, by Marie L. Michner, 2124 Spring Arbor Rd.

MARSHALL, MICH.—Maes Milkers Inc., R. R. No. 2, Bear Creek Farm, has been organized by Robert E. Maes, same address, with $100,000 capital to manufacture milking machines.

MELVINDALE, MICH.—National Hydraulic Co., 4505 Oakwood Blvd., has been formed with $100,000 capital to manufacture production machinery and equipment, by Ford J. Dupure, 511 N. Gulley Rd., Dearborn, Mich.

PONTIAC, MICH.—Dostal Per-Mold Foundry Co., 2500 Williams Dr., has been organized with $750,000 to conduct a general manufacturing and foundry business, by Joseph L. Dostal, Overhill Rd., Birmingham, Mich.

PORT HURON, MICH.—Littite Foundries Inc., 2431 Conner St., has been organized with $100,000 capital to conduct a general foundry and manufacturing business, by Henry Holth, same address.

ROYAL OAK, MICH.—Washington Welding & Mfg. Co., 4336 Coolidge Rd., has been formed with $50,000 capital to weld, braze and assemble metal products, by Samuel E. Cornell, 1933 Cedarhill Ave.

VAN DYKE, MICH.—L & L Mfg. Co., 8088 East Nine-Mile Rd., has been organized with $100,000 capital to manufacture hydraulic machines and screw machines and accessories, by Gilbert T. Lyon, 2009 Houstonia, Royal Oak, Mich.

MISSOURI

DESOTO, MO.—Missouri Pacific Railroad has plans to spend $750,000 on its local car shops to increase capacity to about 1300 freight cars annually.

ST. LOUIS—General Cable Corp., 4121 N. Kingshighway Blvd., has awarded the general contract for a one-story, 25 x 62-foot factory addition at 5100 Brown Ave. to A. H. Haeseler Bldg. & Contracting Co., 2340 Palm St. The project will cost about $72,460.

ST. LOUIS—Goodyear Tire & Rubber Co. Inc., 1144 Market St., Akron, has received CPA approval for construction of one-story warehouse and office building, to contain about 60,000 square feet of floor space. It will cost about $280,000. Plans and specifications are being prepared by Goodyear's staff.

ST. LOUIS—Newman Mfg. & Sales Co. Inc., has been incorporated with $75,000 capital with James G. Gale as president, and will acquire a building providing some 20,000 square feet of floor space. The company's first product will be forged screw drivers.

ST. LOUIS—Majestic Mfg. Co., 2134 Delmar, has awarded contract to L. O. Stocker Co., 1673 Arcade Bldg., for one-story factory, 3901 Neosho, to cost $215,000. Hugo K. Graf, 2825 Olive, is architect.

OHIO

NEWARK, O.—Central Ohio Coal Co., subsidiary of Ohio Power Co., 205 Cleveland Ave., Canton, O., has asked the SEC for authority to issue and sell to Ohio Power 12,500 shares of $100 par value stock. The estimated $1,250,000 proceeds will be used to purchase mining equipment and for additional working capital.

OKLAHOMA

CUSHING, OKLA.—Texas Pipe Line Co., Texas Co. Bldg., Houston, Tex., contemplates construction of 440-mile, 20-inch oil pipeline from West Texas to Cushing, to cost $5 million.

TULSA, OKLA.—Mid-Continent Gas Transmission Co. is planning construction of pipeline from the Hugoton fields in Texas to St. Paul via Kansas City, Mo. Estimated cost is $79 million.

SOUTH CAROLINA

ROCK HILL, S. C.—Celanese Corp. is seeking CPA approval for construction of a $20 million plant for manufacture of synthetic textile yarns. Daniel Construction Co., Greenville, S. C., is general contractor.

TENNESSEE

BRISTOL, TENN.—Monroe Calculating Machine Co. is having plans prepared by Epple & Kahrs, 15 Washington, Newark, N. J., for a factory to cost $1 million.

CHATTANOOGA, TENN. — Southern Natural Gas Co., Watts Bldg., Birmingham, is planning construction of a compressor station to cost $1,250,000.

CHATTANOOGA, TENN.—Mascot Stove Co. has let contract to A. F. Hahn for construction of one-story, 170 x 400-foot factory building, to cost approximately $250,000. B. F. Hunt & Associates, architects.

CHATTANOOGA, TENN. — Columbian Iron Works is planning construction of foundry building to cost approximately $275,000. CPA approval has been obtained. Ford, Bacon & Davis Construction Co. Inc., New York, is architect and contractor.

MEMPHIS, TENN.—National Battery Co., St. Paul 1, Minn., reports its 50,000 square-foot factory on Person Ave., costing $350,000, is 50 per cent completed. Seth E. Giem, Porter Bldg., is general contractor.

MEMPHIS, TENN.—Mills-Morris Co. plans construction of an automotive equipment plant to cost about $100,000.

OAK RIDGE, TENN.—Maj. Gen. Leslie F. Groves, chief, Manhattan Project, has awarded contracts to Monsanto Chemical Co., St. Louis, and General Electric Co., Schenectady, N. Y., for construction of experimental power plant, to be built for development of nuclear energy in generation of electric power. Babcock & Wilcox Co., New York, Wright Aeronautical Corp., Woodbridge, N. J., F. H. Colvin, Point Pleasant, N. J., Combustion Engineering Co., Commonwealth Edison Co. and Foster Wheeler Corp., all of New York, are associated on the project.

WASHINGTON

LONGVIEW, WASH.—Carney Co., Mankato, Minn., has purchased local site and will establish a $200,000 rock wool manufacturing plant.

WEST VIRGINIA

FAIRMONT, W. VA.—Owens-Illinois Glass Co., has awarded contract for one-story, 56 x 110 ft factory addition to Interstate Engineers & Constructors, 208 Newton St., for about $60,000.

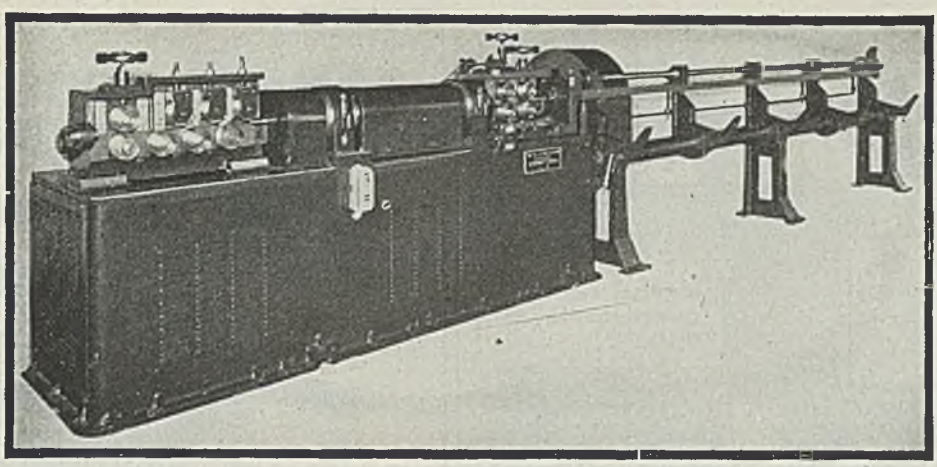
WISCONSIN

APPLETON, WIS.—Appleton Supply Co., W. Spencer St., has awarded contract for one-story 112 x 134-ft warehouse to Robert Smith, Appleton. E. A. Wettengel, 116 S. Pierce St., is architect.

CANADA

SASKATOON, SASK.—J. I. Case & Co., has awarded contract for construction of a warehouse to cost about $75,000 to Shannon Bros., 202 The Avalon. Portnall & Stock, 109 Angus Crescent, Regina, Sask., are the architects.

TYPE 3A
CAP.
3/16"-3/8"
DIA.
(7/16" Dia. in
soft stock)



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YOU will be surprised how much time can be saved in the spotting and switching of cars by using a Jones car puller. These sturdy, compact units will speed up car handling to the point where they soon pay for themselves in the saving of time and labor.

These car pullers are built by Jones as complete units with motor included if desired, or with base to take standard motor, as supplied by the purchaser. The cable drum is driven by a Jones triple reduction Herringbone speed reducer and the control station may be located at a point to give the operator a clear view of the tracks and spotting positions.

Even in plants where comparatively few cars are handled it has been found that a Jones car puller more than pays its way. Prices and complete information will enable you to judge whether such an outfit might pay out in your plant. Write for complete information.

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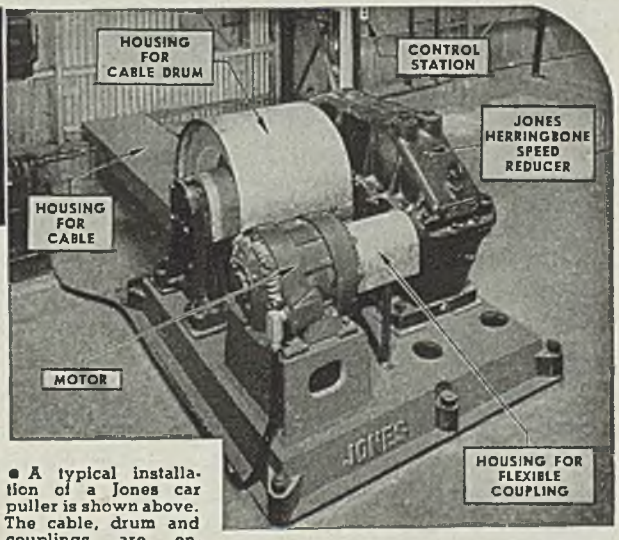
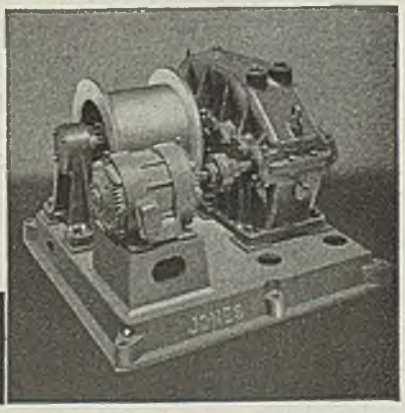


• A typical installation of a Jones car puller is shown above. The cable, drum and couplings are enclosed by sheet metal housings as an extra precaution in this installation to eliminate all hazard from moving parts.



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70 tons 3/16" x 1" Rolled strip

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30,000 29/32" Grade 1 Steel Balls

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- 50 tons 12" BP Beam Sections 53 lbs., random lengths.
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WATER TANK & TOWER
60,000 gallon Water Tank on a 113' tower with 12" riser pipe
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INSULATED, GAS-FIRED BAKING OVEN
With Full Thermostatic Controls. Size 10' 6" x 7' 9" x 4' 0". Blue Prints Furnished on Request.
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3100 Ton Cap., 19" Stroke—Complete with Gas Fired Melting Pot and all gages, etc.-No Pump
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NEW ELECTRODE WELDING ROD

8000 lbs.	1/8"	For Thin Nickel Plate Type 1, Class B, Spec. WXS-33—Mfg. A.C. & C. Co. (AC&DC)
2050	" 1/8"	Nickel Copper Alloy, Spec. WXS-32—Mfg. Int. Nickel Co.
225	" 1/8"	Brazing Rod, Phosphor-Copper Mfg. Air Reduction Sales Co.
6050	" 5/32"	Type II, Class WD-E7010, Spec. 57-203-1B—Mfg. Air Reduction Sales Co.
4750	" 5/32"	Nickel Copper Alloy, Spec. WXS 32—Mfg. Int. Nickel Co.
3150	" 3/16"	"MUREX" Nickel Steel—Mfg. Metal & Thermit Corp.
10100	" 3/16"	Type 2—Class WD-E7010—Mfg. Metal & Thermite Corp.
2000	" 3/16"	"Bronzend-P Arcoa"—Mfg. ARCOS Corp.
25900	" 1/4"	Type 1, Class C—18" Lengths—Spec. 57-203-1A. For both AC & DC Welding.
21050	' 1/4"	Type 1, Class WD E-6012, Spec. 57-203-1B — Mfg. General Elec. Co.
44000	" 1/4"	Type 1, WD-E6013—Spec. 57-203-1B Plain Carbon Steel—Mfg. Harn schfeger Corp.

Packed Commercial Straight Lengths - New - Original
25 & 50 lb. Packages
Low Prices — All or Part
SEABOARD STEEL CO., INC.
New Haven, Conn.
Telephones: 8-0929 8-2034

★ ★ WANTED ★ ★

WANTED
STEEL BUILDINGS
AND
CRANE RUNWAYS
ECONOMY CO., INC.
49 Vanderbilt Ave., New York, N. Y.
CALL OR WIRE COLLECT

Wanted—SHEARINGS
Any Amount—All Sizes, Galvanized, Cold and Hot Rolled Aluminum—Stainless and Copper. 6" Minimum Width to 36" Minimum Length. Uniform Quantities. Gauges from 16 to 30 Inclusive.
Write or Wire
Los Angeles Sheet Metal Mfg. Co.
901-903 E. 9th St. Los Angeles 21, Calif.
TRinity 4713

GALVANIZED SHEETS
Can use any amount up to 50 tons of galvanized sheets 26 to 28 gauge in widths from 29-3/4" to 48". Can also use drop-offs or crops of same gauge to make pieces 4-1/2" x 6".
Telegraph full particulars to
HELWIG MANUFACTURING CO., INC.
422 E. 7th St. St. Paul 1, Minn.

WANTED
CIRCLE SHEAR
With Flanging Attachment
3/16" x 49" Dia. Capacity.
Address Box 796,
STEEL, Penton Bldg., Cleveland 13, Ohio

Wanted
STEEL SHEETS
7, 8, 9, 10, 11, 12, 13 ga. H. R. or H. R. P.
24 x 60 and larger.
Phone, write or wire
THE WATERMAN-WATERBURY CO.
Minneapolis 13, Minn. Telephone Main 8701

STEEL
FOR SALE
200 Tons 4" Rounds x 16'
SAE 1040
Call or Wire
GLAZER STEEL CORPORATION
2100 Ailor Ave. Knoxville, Tenn.
Phone 4-8601

WANTED
¼" AND ½" MILD STEEL PLATE
BLACK SHEETS 14 gauge through 22 gauge. 8" STANDARD PIPE.
W. E. GRACE MFG. CO.
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WANTED
Structural Steel Buildings
Shears, Press Brakes, Forming Rolls
Benkart Steel & Supply Co.
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Pittsburgh 12, Pa.

HAMMERS, 4-B Nazel, 5" x 5" M.D.
BORING MILLS, 24"-42"-52"-66"-72"-96"
LATHE, Turret 24" Gisholt, 6¼" hole.
MILLERS, Plain Nos. 3 K & T and No. 4 Cin.
PRESS, Forging 1000 ton United Steam-Hyd.
PLANER, O. S. 60" x 60" x 14' D&H, M.D.
SHAPER, 36" Morton Draw Cut.
SHEARS, Alligator 1"-4".
SHEAR, Open End 22" blades 2½" sq. M.D.
SLOTTER, 12" Putnam, 35" table, B.D.
STRAIGHTENER, Plate, 110" x 1¼", H&J.
WEST PENN MACHINERY COMPANY
1208 House Bldg. Pittsburgh 22, Pa.

WANTED
SHEET METAL 28 GAUGE to 20 GAUGES
Any size any quantity, seconds acceptable.
P. O. BOX 1678
Hartford, Conn. Tel. 7-9224

WANTED
Vaughn Model 1222 Motobloc
MONARCH STEEL CO.
Indianapolis, Ind.

LOCOMOTIVE
36" Ge. Saddle Tank—18/20 tons. Completely overhauled. Immediate delivery.
Address Box 789,
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Opportunities

FOR SALE
Steel Mfg. & Fab. Plant

5 bldgs., 25,150 sq. ft. floor space. Well equipped. Ground space approx. 190,000 sq. ft. Add. 10a. leased at $10 per mo. R. R. siding.

Advantages: Low taxes, operating exp. Exc. labor situation emp. 35 to 40 workers. Plenty room expansion.

Pres. prod. 300 tons steel fab. monthly. $40,000 to $45,000 vol. Netting 30% exclusive adm. costs. $750,000 bus. on hand major oil co's., a'one

Inv. approx. $250,000. Can be bought approx. this fig. Good future, little competition.

C. L. WHITE CO.
Ranches, Industrial & Oil Properties Southwest & West
Suites: 403-404 Danciger Bldg.
Fort Worth, Texas

Positions Wanted

METALLURGICAL ENGINEER WITH DEGREE and over nine years diversified experience in respective field. Available immediately. Age 32. Experiences: Electric Salt Bath Heat Treating 300-2500 F., Trouble shooting, Steel making, Steel shaping, Steel treating, Process Engineering, Specifications, Designing, Metallography, Sales. Knows steels and processing inside and out. Minimum salary $500. Address Box 795, STEEL, Penton Bldg., Cleveland 13, O.

PLANT SUPERVISOR 45 YEARS OF AGE WITH 20 YEARS OF THOROUGH SHOP AND EXECUTIVE EXPERIENCE IN SHEET AND PLATE FABRICATION, STRUCTURAL STEEL, CAN SUPERVISE, DESIGN, METHODS, PRODUCTION, GAS AND ELECTRIC WELDING. WILL LOCATE ANYWHERE. ADDRESS BOX 799, STEEL, PENTON BLDG., CLEVELAND 13, O.

PLANT MANAGER'S ASSISTANT, WELL BALanced background in the metal processing industries. Experienced in administration, budgeting, internal controls, supervision, purchasing, correspondence, production and sales. Prefer middlewest or northwest. Age 38. Address Box 765, STEEL, Penton Bldg., Cleveland 13, O.

ENGINEER, HIGHLY EXPERIENCED WELDing all phases electrical design, development, mechanical, industrial engineering. Will relocate. Address Box 801, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXPERIENCED STEEL TUBE SALESMAN desires position in orders, production or sales department of steel tube mill. Write Box 785, STEEL, Penton Bldg., Cleveland 13, O.

Representatives Wanted

CONTACT MAN WANTED BY MEDIUM sized Tool & Die Shop in Detroit, Michigan, for Indiana, Ohio and Illinois area, for Jigs, Fixtures, Multiple Spindle Drill Heads and Special Machinery. Must have very good sources—Commission basis. Reply Box 797, STEEL, Penton Bldg., Cleveland 13, O.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.

When you have an opportunity to offer, use the Help Wanted columns of STEEL.

Help Wanted

DISTRICT MANAGER WANTED

Well established firm wishes man capable of managing district sales group in western Pennsylvania and West Virginia selling Tool Steels, Stainless Steels, Cutting Tools and Dies. Good background in Tool and Die Making, Heat Treating, Metallurgy, Tool Design, Die Design or metal trades manufacturing experience desirable. Knowledge of trade and customers in area required. Reply giving full details to Box 784, STEEL, Penton Bldg., Cleveland 13, O.

FOUNDRY SUPERINTENDENT

For shop producing 400 tons carbon and alloy steel, 400 tons electric iron and 150 tons brass pressure vessel castings per month. Must have broad and extensive experience in foundry operations, proven administrative ability, and good practical and technical background. Excellent opportunity with long established company of best reputation. Address Box 731, STEEL, Penton Bldg., Cleveland 13, O.

TOP NOTCH GENERAL MANAGER

For small forge shop in Pennsylvania. Board hammers up to 4,000 lbs. Must know sales and forge shop practice. Attractive opportunity for right man. Reply Box 798 STEEL, Penton Bldg., Cleveland 13, Ohio, with full information as to experience, companies worked for, and salary expected.

Accounts Wanted

ANNOUNCING NEW MANUFACTURERS' CAnadian Agency and Consulting Service. Group of graduate engineers, excellent contacts, averaging 10 years' experience in steel industry, wish to represent manufacturers of reputable products. Headquarters in Hamilton, Ontario. Address Box 800, STEEL, Penton Bldg., Cleveland 13, O.

MANUFACTURERS REPRESENTATIVE WITH established representation and clientele desires to represent reliable steel plate fabricating concern in Cleveland or outlying district. Address Box 788, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $2,500-$25,000. THIS thoroughly organized confidential service of 38 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

Help Wanted

SALES MANAGER

Excellent opportunity for man with background of successful sales promotion in the steel field, with a well-established and progressive Illinois manufacturing concern. Give full information and references in first letter.

Write Box 792,
STEEL, Penton Bldg.,
Cleveland 13, O.

FOUNDRY SUPERINTENDENT

Electric Furnace. Steel foundry located in Midwest, 500 ton capacity. Give education, history, experience and salary expected.

Address Box 787
STEEL, Penton Bldg., Cleveland 13, O.

BUYER—MECHANICAL ASSEMBLIES. PRACtical design engineer able to analyze sources as to quality, reliability and cost. Must possess purchasing skill and judgment to buy at a price which will allow lowest possible customer cost of end profit to supplier and manufacturer. Principal items to be purchased are low gallonage oil and water pumps, blowers, bronze and iron valves, fan wheels, mechanical air flow control equipment, fluid and pressure gauges, gears, worms, linkages, water heater assemblies and filters. Address Box 790, STEEL, Penton Bldg., Cleveland 13, O.

WANTED—SALES ENGINEER FOR DISTrict representative in charge of our New York Branch Office. Must be experienced on centrifugal pump sales and have working knowledge of steam turbines. Commission basis, drawing account. Real opportunity for $10,000 man. Reply must give full particulars as to age, education and experience record. Strictly confidential. Dean Hill Pump Co., 4000 E. 16th St., Indianapolis, Ind.

STRUCTURAL STEEL FABRICATOR LOCATED IN SOUTH HAS OPENING FOR EXPERIENCED SALES ENGINEER. IN REPLY GIVE EXPERIENCE AND REFERENCES. ADDRESS BOX 780, STEEL, PENTON BLDG., CLEVELAND 13, O.

EXPERIENCED FORGING ENGINEER, FOR medium-sized plant in the Detroit area. Must be qualified in forging die design. State age, experience and expected salary. Address Box 786, STEEL, Penton Bldg., Cleveland 13, O.

WANTED—WORKS MANAGER OR GENERAL Foundry Superintendent for highest quality electric steel foundry producing small steel castings. Please state qualifications. Address Box 793, STEEL, Penton Bldg., Cleveland 13, O.

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