STEEL

ESTABLISHED 1882

Contents

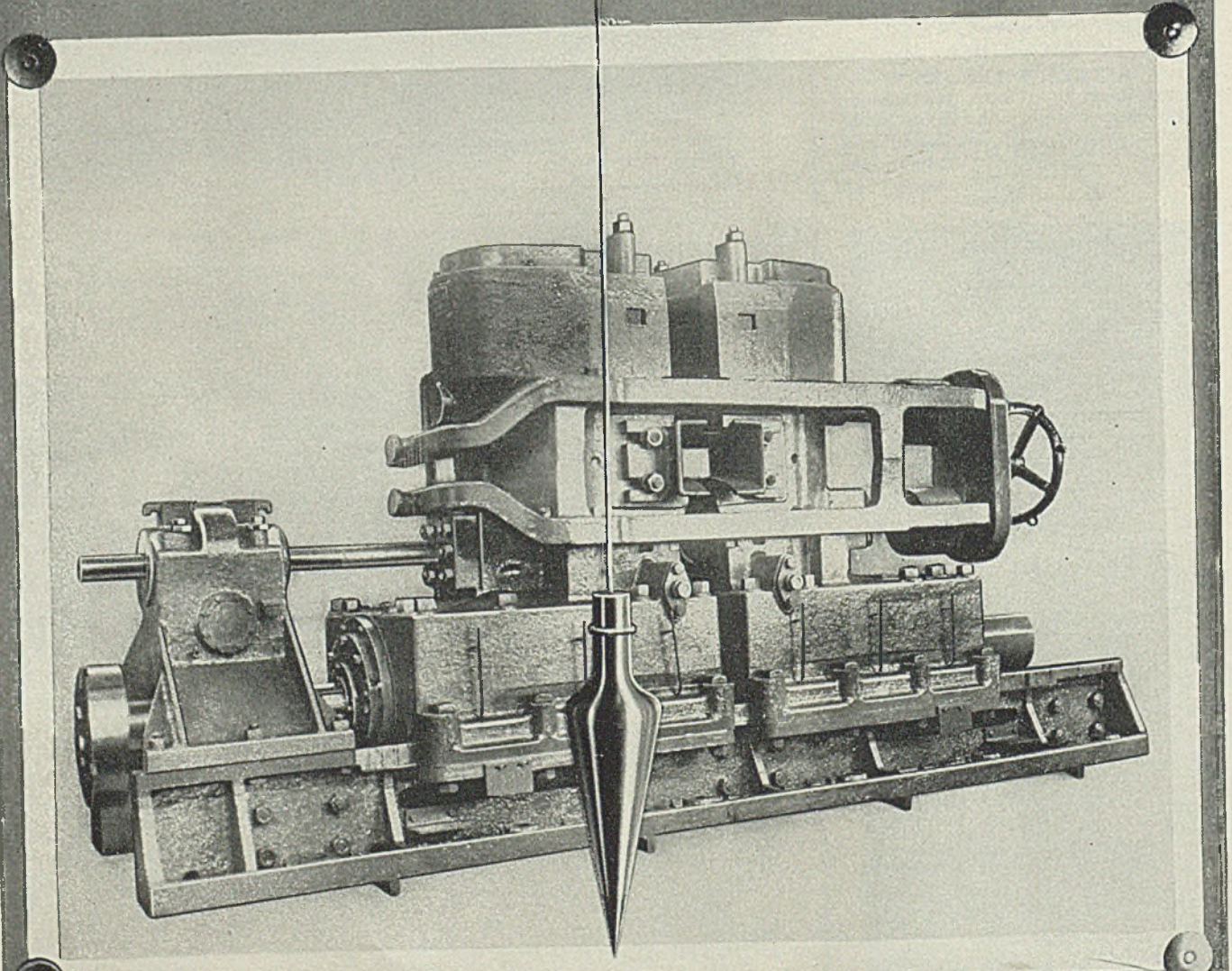
Volume 109—No. 24 December 15, 1941

PRODUCTION • PROCESSING • DISTRIBUTION • USE

A new VERTICAL MILL by MORGAN

MORGAN WORCESTER ENGINEERS AND MANUFACTURERS

To design a vertical rolling mill capable of horizontal mill work, thereby eliminating the necessity for twisting heavy sections between adjacent stands . . . this is a nice engineering problem! Morgan has solved it in this new 28" vertical mill.



MORGAN CONSTRUCTION COMPANY

WORCESTER • MASSACHUSETTS

HIGHLIGHTING THIS ISSUE OF STEEL

■ NOW that we finally are "all the way in the war," thoughtful manufacturers taking stock of the immediate and more distant future can be assured of a number of things. As pointed out by E. L. Shaner, STEEL's editor-in-chief (p. 47), we for the first time in a decade have national unity; industry, labor, government—all sectors of our population now have a common purpose, to win the victory. There will be little further talk about allocating scarce critical materials for civilian use (p. 21). Certain to arrive shortly are more government controls, higher taxes, a trend toward a lower standard of luxury living. From now on, until the victory, this is to be a deadly serious, exceedingly busy United States.

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Outstrip The Axis

In raw materials and in our potential ability to convert them into weapons of war (p. 24) we outstrip the Axis powers. With patriotic fervor at the highest pitch since World War I, there can be no doubt of the final outcome. There will be renewed, more intensive effort to mobilize every possible facility into war production. That means that many manufacturers not yet enlisted will have new opportunities to get orders —that not only will contribute to our country's striking power but will enable them to keep going. . . . There are ways in which manufacturers can co-operate further: Mr. Knudsen (p. 25) calls for a 168-hour work-week in armament production; Mr. Nelson (p. 30) appeals for release of surplus quantities of critical materials not immediately needed.

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Further Curtailment

C. E. Adams (p. 32) is the new head of OPM's Iron and Steel Section. . . . Prices on ferromanganese, ferrosilicon and silicomanganese (p. 32) are reaffirmed. . . Passenger car and light truck output will be further curtailed (p. 118). . . . Civilian consumption of rubber will be reduced drastically (p. 37). . . . Production of coin-operated machines (p. 33) will be cut; copper conductors are to be simplified further; a new order gives priorities assistance to the petroleum industry. . . . Public utility expansion (pp. 30 and 34) is under control; containers are covered by an industry committee. . . . The steel expansion program (p. 24) is to be broadened. . . . OPA cites two scrap dealers (p. 34) as price violators; products of copper and copper alloys will continue to be made from inventories of partially fabricated metal.

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Forming Work Without Dies

Short-run stamping and forming operations of many types can be handled without dies by employing a novel series of bench machines. Some of the work that can be done by this method is explained (p. 50) by A. T. O'Neil. . . . Paul J. McKimm discusses the melting phase (p. 62) in the second of his studies on the manufacture of high-quality low-cost steel. . . . Professor Macconochie describes (p. 72) a high-speed metal saw for cutting shell billets to length for forging. . . . A vertical system of high-speed reaming for rifle barrels (p. 77) combines three independent 4-spindle hydraulic powered reaming machines in one frame for high production rates.

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Checks Welding Technique

Harold Lawrence explains (p. 54) how recording ammeters and voltmeters can provide an accurate record of your welding operations. Same charts can be interpreted to determine causes of faulty welds. Such checks on technique help keep operators on their toes. . . . S. F. Swain tells (p. 80) how planned materials handling improves foundry operations by permitting closer control of physical and chemical analyses, thus making possible higher quality iron. . . . Dr. R. W. Mitchell, in the second of his series on metal cleaning and ordnance work, analyzes (p. 86) the characteristics which influence rinsing and precleaning. He also discusses the field for electrocleaning.

Inland Helps Motorize America's New Army

Modern warfare calls for vast quantities of high powered motorized equipment. That is why factories throughout the land are working day and night to supply America's new army with trucks, trailers, scout cars, staff cars and other essential vehicles.

And for their construction Inland is rolling thousands of tons of steel products—sheets and strip for frames, bodies, fenders, wheels—plates for axle housings—bars for springs and bumpers. At a record pace Inland is producing these and other products so that the soldiers of the U. S. A. may have the fine motorized equipment they require and deserve.

Not only for army transport but for many other needs, Inland men and mills are all-out for National Defense. It is Inland's No. 1 Job!

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INLAND STEEL

■ ON GUARD: Heavily armed and wearing steel helmets, a detachment from the 52nd Coast Artillery march to plant of Air Associates Inc., Bendix, N. J., after orders were issued to protect vital centers. NEA photo

Industry Enters War with Flying Start to New Production Goals

Twenty-Months' Defense Effort Considered Good Practice For Faster Action . . . Country Heads Into New Era of Expansions and Controls . . . This Week's Conference in Washington May Determine If It's To Be Labor Peace Without Additional Laws

■ AMERICA AT WAR is at last launched on a really all-out industrial production campaign.

Activity during the coming months—perhaps years—will dwarf that of the "defense" program of the past 20 months. Our rearmament effort to date, tremendous as it has been, may be considered as practice for what is to come.

Arms will flow from factories steadily, relentlessly—a little more now, a lot more in a few months—and then the flood.

Aircraft, gun, tank and ammunition plants and shipyards will be placed as nearly as possible on 168-hour week operations.

Controls over metals and other strategic materials will be greatly intensified. Civilian production will give way to the manufacture of war *materiel*. Half or more of all our available metals will be devoted to military goods.

Capacity for production will be expanded, by building more new plants and enlarging existing units. Aircraft and ships will receive first attention, then other fighting equipment, then steel and other materials.

That is America's answer to the Axis attack on the United States.

The instant effect of Japan's treachery was to wipe out the internal dissensions which had divided this country and to create a determination to out-produce the Axis at any cost. Industry, labor, government and public were fused in the first national unity in a decade.

Industry declared last week in emphatic terms: "We will deliver the goods." Typifying this attitude was a wire from the National Association of Manufacturers to the President:

"Industry will build two battleships for every one that sinks.

"It will match every bomb with a dozen.

"It will blacken the skies with planes to replace the ones shot down."

Immediately on receipt of news of Japan's attack, secret plans to protect industrial plants from sabotage were put into effect.

Labor laid aside its selfish ambitions and called for an end to strikes.

Said AFL President Green: "With America at war, the no-strike policy . . .must be made 100 per cent effective." CIO President Murray: CIO unions will work "unselfishly and self-sacrificially on a program of uninterrupted production." UMW President Lewis: "Every American must rally to defense. All other considerations become insignificant."

A number of strikes in process or scheduled were canceled by local union leaders.

In Detroit some interruptions to automotive assembly lines resulted as workmen left their jobs to enlist in the armed services in hope

of seeing action against Japan. Departures were not in great number, but were sufficient to complicate operations and delay schedules.

A public which had been somewhat apathetic toward the "defense" program and lend-lease aid to the democracies accepted the fact of war calmly, after the initial shock, and prepared to make the sacrifices that will be required.

The government acted swiftly to place the country on a full war footing. Recognition of existence of a state of war was quickly given and plans for co-ordinating all the industrial capacity, the materials and man-power available for war production started.

All exports to Japan and occupied territories and to Japanese nationals were immediately embargoed.

Appraisal of the situation resulted in this major conclusion: That while the Axis powers lead this country in military preparation they are far behind in resources and potentialities.

Superior Steel Capacity

Comforting to Americans is the realization that the United States alone is producing three tons of steel for every two tons made by the Axis powers and the countries they dominate, and that the combined steel capacity of this country and her allies is considerably more than twice the Axis total.

United States capacity now is approximately 88,000,000 tons annually, and 10,000,000 tons of additional capacity is either underway or projected. All will be allocated within 30 days. Additional expansion was being talked in Washington last week and will be undertaken if a new appraisal of needs indicates it is necessary.

In the 20 months since the United States started to rearm, vast new facilities to produce all the implements of war have been constructed. Workmen have been trained in ordnance manufacture. Designs have been tested and perfected. A system of control over materials has been organized, and a war materials production planning agency developed. Capacity for the production of needed nonferrous metals has been enlarged, and stockpiles of strategic materials accumulated.

Tin Probably Most Important

Of the latter, tin is probably the most important. Stocks held here amount to about 116,000 long tons, enough to last for more than a year. A year's stock of rubber also has been built up and strict conservation measures adopted. Manganese, tungsten, graphite, mica, chromite, and other materials which are largely imported from the Far East have been stocked in varying quantities.

Stringent measures to conserve these stockpiles have been taken by the government, and means are being explored to continue their importation despite the war.

To this end the Reconstruction Finance Corp. is studying plans to concentrate imports from the Far East in the hands of one of its subsidiaries. Feeling the added risk and expense involved in purchasing and transporting the materials would discourage private companies from continuing the trade, the RFC will be prepared to buy all necessary imports. Government purchase and sale of these items would make it easier to control prices both in the foreign and domestic markets.

Imported stocks would be allocated monthly under instructions from OPM in much the same manner that imports of rubber and lead now are distributed.

Restrictions on the use of rubber were tightened soon after the outbreak of hostilities. The OPM Priorities Division decreed no new tires or tubes could be sold from midnight Dec. 10 to Dec. 22 except on preference rating orders of A-3 or higher. The action followed a buying "spree" during the first several days last week.

Asks Surplus Be Made Available

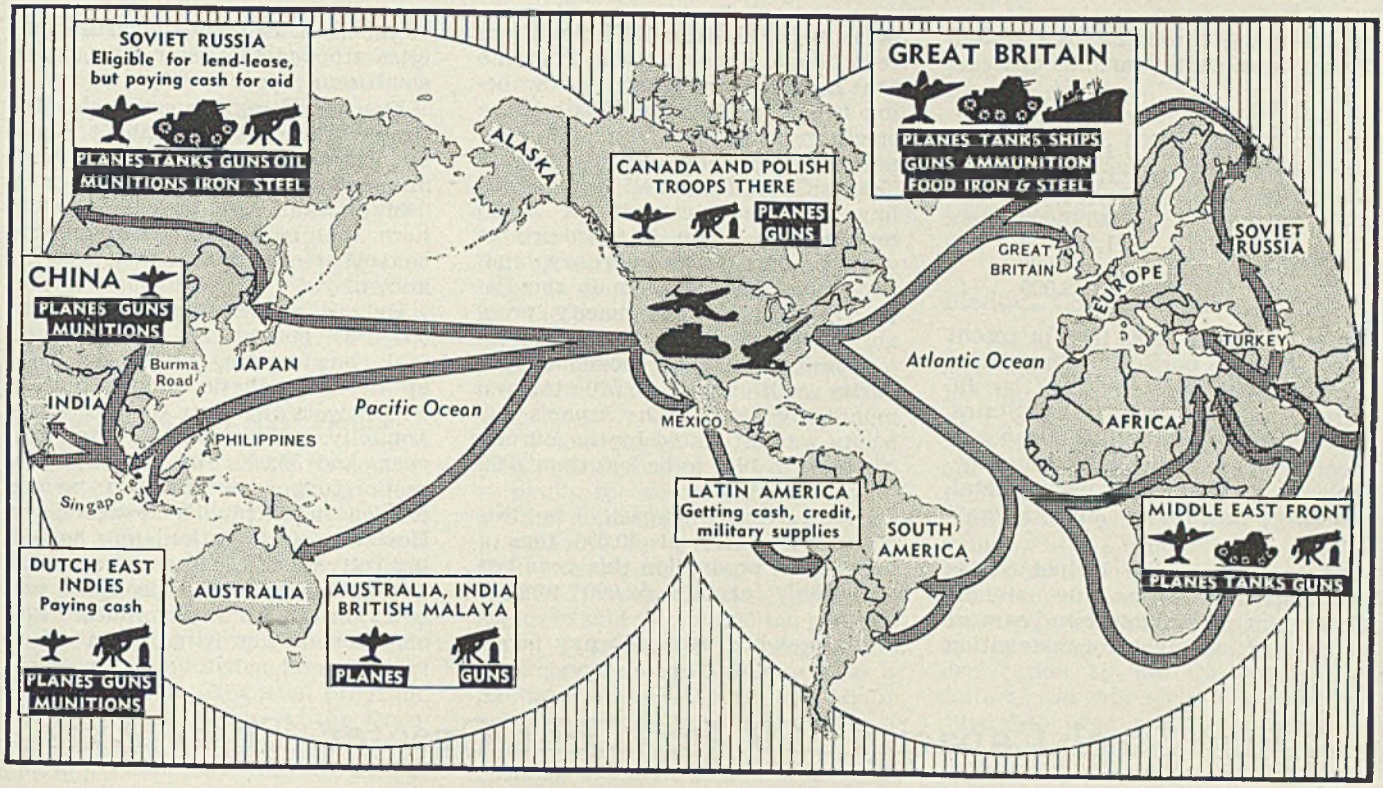
Priorities Director Donald M. Nelson appealed to manufacturers holding inventories of needed materials in excess of immediate requirements to voluntarily make their surpluses available to the government for defense production.

OPM already has power to requisition inventories or any property it deems necessary.

Further curtailment of automobile production beyond the previous 50 per cent cut was specified last week, and decreased output of other civilian goods requiring metals, will be ordered soon, according to OPM officials.

Priority ratings on the more urgently needed types of military equipment are being raised. AA ratings have been placed on needed requirements for battleships and certain other naval craft. Ratings on many ships, including a number of merchant vessels, have been advanced from A-1-b to A-1-a, with lower ratings stepped up according-

■ **THEY PLAN THE STRATEGY: Joint board of Army and Navy chiefs meets at the War Department in Washington. Left to right: Brig. Gen. H. F. Loomis; Maj. Gen. Henry H. Arnold; Maj. Gen. William Bryden; Gen. George C. Marshall, chief of staff; Admiral H. R. Stark, chief of naval operations; Rear Admiral R. E. Ingersoll; Rear Admiral J. H. Towers; and Rear Admiral R. K. Turner. Army Signal Corps photo**



■ United States' world-wide job in the conflict, which calls for increased production, is indicated by this map of supply lines, showing how countries on every continent have been receiving assistance. Maintenance of these lines has been considered vital. Extent to which those across the Pacific have been disrupted is still a military secret. NEA graph

ly. In fact, the military arms have been given a virtual blank check on priorities.

Other controls being formulated or planned by government officials:

An effective price control bill, passage of which will be facilitated by the war.

Restrictions on profits in arms manufacture.

Compulsory savings plan.

Higher taxes, to become effective in 1942. Among the new taxes probably will be a "purchase" tax on specific articles competing with defense materials.

Compulsory extension of subcontracting and pooling of facilities for defense manufacture.

Consensus in all quarters is that the war will be long and difficult, that it will entail the expenditure of $150,000,000,000 or more, that the civilian population will be asked to give up many things entirely and that there will be a general decline in the standard of luxury living.

■ Maj. Gen. Robert M. Danforth, chief of field artillery for the United States Army, told 500 Midwest manufacturers at a meeting in Chicago last week that a "bottleneck" exists in production of 105-millimeter howitzers, ammunition for them, sights and other equipment. He added the army can get all the manpower it needs, but guns and ammunition are required quickly. Meeting was called by the Army Ordnance Association.

Japan No Match for United States In Essential Metals Supplies

■ WHILE the United States holds a vast superiority over Japan in metals and other strategic materials supplies and capacity, the outbreak of hostilities will bring further restrictions on the use of these materials in civilian goods manufacture.

Most severely affected, of course, will be those materials which this country has been importing from the Far East and for which adequate sources of supply have not been developed in this hemisphere. Included are tin, tungsten, rubber, manganese chromite, graphite and various oils. Sizeable stockpiles of these materials have been built up during recent months, but the uncertainty of future supplies will necessitate the utmost in conservation measures.

In iron, steel, aluminum, copper, lead and zinc, the United States has large capacities established and sizeable expansion programs underway. Total output of these metals can be expanded. Japan's capacity for producing these metals is comparatively insignificant, although it is probable stockpiles have been created.

Japan's annual steel producing capacity, for example, is estimated to be about equal to the United States' monthly production. The Japanese have carefully guarded output figures in recent months. Comparative production figures for the two countries since 1929 follow:

	United States	Japan
1929	60,830,000	2,519,000
1930	44,000,000	2,563,000
1931	28,216,000	2,098,000
1932	14,922,000	2,576,000
1933	25,305,000	3,528,000
1934	28,671,000	4,124,000
1935	37,428,000	5,441,000
1936	52,425,000	5,795,000
1937	55,443,000	6,404,000
1938	31,071,000	6,720,000
1939	51,585,000	7,056,000
1940	66,982,000	.....
1941*	82,000,000	.....

*Estimated.

Japan has ranked still lower in comparison with the United States and other countries as a producer of pig iron. Lack of sufficient ore has necessitated increased imports of both pig iron and scrap to accommodate the expansion in steelmaking facilities. As a consequence, from 1933 until the 1940 embargo, Japan took more than 10,000,000 net tons of scrap from the United States.

Japanese imports of iron and steel

scrap in net tons from the United States in recent years follow:

1929	233,000
1933	613,000
1934	1,309,000
1935	1,193,000
1936	1,131,000
1937	2,097,000
1938	1,530,000
1939	2,258,000
1940	1,078,000

Ironical is the fact that in recent years a large portion of the strategic war materials imported by Japan came from the United States. In addition to the bulk of iron and steel scrap, Japan bought much petroleum, ferroalloys, copper, metalworking machinery and aircraft here.

Tin stocks in the United States are 116,000 long tons, adequate for 13 months, or possibly two years or more if stringent conservation measures are effected. While 92 per cent of our imports came from the Far East last year, ore is now being bought in Bolivia. This will be smelted in a new plant being financed by Defense Plant Corp. at Texas City, Tex., and which will have an annual capacity of 18,000 tons a year. Plant is scheduled to start production in February, and, in view of the situation in the Pacific, the smelter's capacity probably will be increased.

Aluminum ingot producing capacity will reach 60,000 tons a month by late 1942; Japan's capacity was estimated by the Bureau of Mines in 1939 to be less than 2000 tons a month.

Lead refining capacity in this country is rated at 70,000 tons a month, but production this year has been only around 52,000 tons a month.

Japan, which was a heavy buyer of Mexican lead until such imports were stopped this year, has only a small domestic capacity.

Zinc smelting capacity in the United States will be about 83,000 tons monthly in 1942. Japan's estimated capacity is 5000 tons a month.

Magnesium producing capacity here will be 15,000 tons monthly next year. Japan's capacity is unknown.

Rubber stocks aggregating 600,000 tons, enough for a year's normal consumption, have been built up here. Synthetic rubber production now is at a rate of 12,500 tons annually, will reach 24,000 tons next year, and 35,000 tons in 1943. Synthetic rubber output can be expanded more rapidly if necessary. However, conservation steps, including retreading of tires and reclamation of used rubber probably will be essential. An 11-day moratorium on sales of new tires is in effect.

Allies' Steel Capacity 120 Per Cent Greater Than Axis'; Broadening of U. S. Expansion Program Considered

■ UNITED STATES alone can produce three tons of steel for every two tons that can be made by Germany, Italy, Japan and all the Axis-dominated countries of the world put together.

Combined steel capacity of the United States, the British Empire and Russia is considerably more than twice the Axis total.

Even if two-thirds of the Russian capacity should fall into German hands, the United States and the Allies could still make 60 per cent more steel than Germany and the rest of the world.

These facts were revealed in a recent study by the American Iron and Steel Institute of available data on world steel capacity and production.

By the close of 1941, the American steel industry will have capacity for producing approximately 88,000,000 net tons of steel per year. According to the best information available, approximately 60,600,000 tons per year can be produced by Germany, Japan, and all continental European steelmaking nations except Russia. American steel capacity exceeds that total by close to 50 per cent.

Steel capacity of the British Empire is approximately 20,600,000 tons per year, and Russia's about 21,800,000 tons.

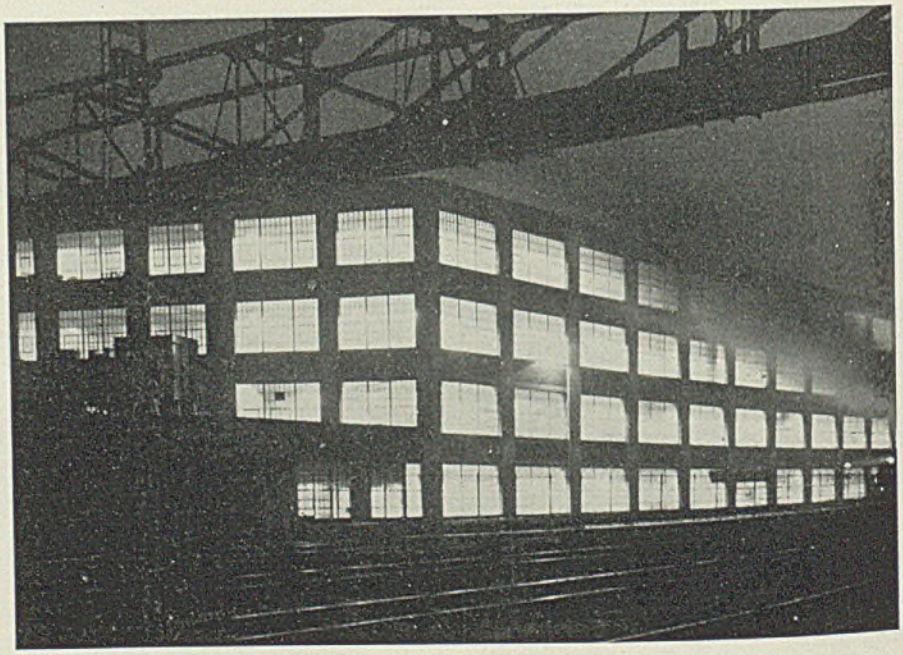
Steel capacity of the United States, the British Empire and Russia is about 130,400,000 tons per year, nearly 120 per cent more than that of the Axis.

About 60 per cent of the Russian steel capacity is believed to be located in its central and southern areas. If Russia should lose those areas, approximately 117,300,000 tons of steel could still be produced annually by American and British Empire steel industries plus the remaining 40 per cent of Russian capacity.

By comparison, the Axis and Axis-dominated countries could make only about 73,700,000 tons of steel per year at full capacity, with all the steelmaking facilities in central and southern Russia engaged, which seems doubtful.

Steel mills of Germany, Austria, Czechoslovakia and Poland have produced as much as 29,600,000 tons of steel per year, equivalent to about half the total steel capacity owned by Axis and Axis-dominated countries.

French steel capacity is estimated at 10,700,000 tons, actual production in 1929. In no succeeding year did France come within 12 per cent of



■ Built without thought of the possibility of air raids, many American industrial plants in vulnerable areas would present excellent targets for bombers. How to improvise blackouts is a problem confronting defense officials and management

that total. Belgium produced about 4,500,000 in 1929. Japan's capacity is about 7,100,000 tons, based on 1940 output. Italian capacity is about 3,000,000 tons, the peak reached in 1939. Luxembourg's peak was in 1929, with 3,000,000 tons. Hungary, Spain and Sweden can produce about 2,700,000 tons.

France, Belgium and Luxembourg, conquered by Germany in the 1940 campaigns, reached their peak in 1929, and failed to reach that level in any later year.

President Asks for New Plants

Additional steel expansion — above the 10,000,000-ton program already approved by OPM—was considered a distinct possibility in Washington last week, although no definite plans had been made.

W. A. Hauck, chief of the OPM steel expansion unit, stated he had not received any instructions to start work on a new expansion program. He added that in view of the President's remarks at press conferences and in his address to the nation that he expected consideration would be given to further steel expansion. Two-thirds of the approved 10,000,000-ton program has been allocated and the remainder will be allocated within 30 days.

In his broadcast to the nation Dec. 9, Mr. Roosevelt said:

"I have been working today on the subject of production. Your government has decided on two broad policies.

"The first is to speed up production by working on a seven-day week basis in every war industry, including the production of essential war materials.

"The second policy, now being put into form, is to rush additions to the capacity of production by building more new plants, by adding to old plants and by using the many smaller plants for war needs."

Other high defense officials joined in pleading for greater production from existing facilities.

OPM Director General William S. Knudsen said the production goal for heavy four-motored bombers must be stepped up from 500 to 1000 a month. He called for a 168-hour work-week and went on record for a "work-or-fight" policy.

Sidney Hillman, OPM associate director general, appealed to the CIO and AFL unions to introduce the 168-hour week in defense industries. He urged that the program be effected immediately and that adjustments in existing contracts and wage scales be made later.

Donald M. Nelson, executive director of SPAB, called for vastly increased production of war materials and utilization of all resources, plants, men and materials, to that end.

Pledges Co-operation

The utmost co-operation of the steel industry in supplying materials for the armed forces was pledged to President Roosevelt by Walter S. Tower, president, American Iron and Steel Institute, in a telegram following the declaration of war.

Mr. Tower's telegram: "The steel industry of the United States, as you know, has been giving its utmost in production in co-operation with the defense program. The vicious attack by Japan upon this country and the declaration by the Congress of a state of war will serve to put the industry to even greater efforts and you have its pledge to provide the Army and the Navy and the air forces of the country with the vital materials essential to the victory which your stirring message promised."

Copper, Lead, Zinc Miners Propose Continuous Operations, With Joint Committees in Charge; Labor Steadier

■ PROGRAM of seven-day three-shift operation of the nation's copper, zinc and lead-mining capacity has been recommended by the war production committee of the International Union of Mine, Mill and Smelter Workers—CIO, to the OPM Labor Division. Sidney Hillman, associate director general, announced that this program will be referred to the SPAB for action.

Along with the union's report, the OPM Labor Division will transmit a report of its own study of the copper industry, making recommendations for expanding output.

The union report recommends the establishment of national and local committees of government, management and labor to carry out the proposed program of continuous operation.

Such a program can be carried out, the union report says, provided improvements are made in conditions of work, in mine management, and in labor relations.

Important points in the union's program include:

1. Seven-day, three-shift operations.
2. Improved ventilation.
3. Abolition or modification of the contract system of wage payments.
4. More efficient "servicing" of miners with tools, haulage and hoisting facilities.
5. "Up-grading" of skills, greater specialization of tasks, training of new miners on the job, and a complete survey of the available mining labor supply.
6. Increases in wage rates where necessary to attract workers from less hazardous and less essential occupations.
7. Provisions of adequate housing in mining camps.
8. Establishment of local union-management production committees to work out at each mine, mill, smelter, refinery and primary fabricating plant the details of wage adjustments, labor management, working conditions and the handling of grievances.
9. Provision by the OPM of engineering and other consultants to assist local production committees in expanding nonferrous metals production.
10. Establishment of a national industry-wide committee of government, industry and labor officials to co-ordinate the work of the local committes, make overall surveys of production capacity, and study the possibilities of bringing idle mine capacity into operation.

Management-Labor Parley To Ban Strikes Scheduled

A conference between 12 representatives of labor and 12 representatives of management to place industrial relations on a war-time basis with a binding agreement that would prohibit strikes for the duration of the war will be held in Washington Wednesday. President Roosevelt summoned the conference to work out a program "within a very few days."

"The first and essential objective of the conference," the President said, "will be to reach an unanimous agreement to prevent the interruption of production by labor disputes during the period of the war. It is not expected there will be any hesitation on the part of either labor or industry to accept this basic condition of the nation's safety."

Labor's representatives will be chosen by the CIO and the AFL, six each, and the business representatives will be selected by the Depart-

ment of Commerce Business Advisory Council. The President will appoint a moderator and associate moderator.

Washington representatives of industry feel that the management-labor conference this week is merely to stall off legislation. They feel some resentment that labor has had a chance to select its own representatives while management has not been allowed that privilege.

Bell Aircraft Grants Wage Increase; Dispute Settled

Agreement in the 3-month dispute between Bell Aircraft Corp., Buffalo, and the CIO United Auto Workers which will provide more than $750,000 in retroactive pay for approximately 10,500 workers has been reached, it was reported last week.

Settlement terms include a wage increase of 12½ cents an hour for the company's Buffalo and Niagara Falls, N. Y., plants. Minimum wage for beginners has been raised from 50 to 65 cents an hour, with automatic increase to 75 cents per hour after a 60-day probationary period.

Union's demands for a "maintenance of membership" union shop and dues checkoff were not granted.

Arsenal Strike Called Off "In View of the War"

Strike of union workmen at the government's $57,000,000 shell-loading plant near Ravenna, O., operated by Atlas Powder Co., Wilmington, Del., was officially called off early last week "in view of the war in the Far East."

Action was taken at the suggestion of Hugh E. Sperry, regional director of the National Labor Relations Board, who is said to have told union spokesmen the company had agreed not to discriminate against workers who had participated in the strike.

Unions involved included the National Arsenal Workers of America, Brotherhood of Locomotive Firemen and Enginemen, Switchmen's Union (AFL), and the Machinists' Union (AFL).

A strike of welders in various plants in the East and Middle West did not materialize, as threatened just before the Japanese incident.

Captive Coal Mines Under Closed Shop Agreement

Captive coal mines last week were operating under the Appalachian agreement, including the closed shop clause, after the three-man arbitration board voted two-to-one in favor of the United Mine Workers.

Dr. John R. Steelman, chairman of the board, and an employe of the Department of Labor, and John L. Lewis, UMW president, voted in favor of the closed shop. B. F. Fairless, president of the United States Steel Corp., and representative of the mine owners, dissented.

International Harvester, CIO Agreement Affects 20,000

International Harvester Co., Chicago, and the Farm Equipment Workers' Organizing Committee, CIO, have reached an agreement settling a dispute over working conditions affecting 20,000 employes in five plants. Units include the tractor and McCormick works, Chicago; West Pullman, Ill., works; Rock Falls, Ill., works; and East Moline, Ill., works.

Terms of the contract were not revealed. If ratified by the union, the agreement will continue for the duration of the war, but in no case will terminate in less than two years.

Steel Ingot Output for 11 Months Up 25 Per Cent

■ Production of steel ingots and castings in November averaged 1,624,706 net tons per week, only 10,211 tons less than the record of 1,634,917 tons in October, according to the American Iron and Steel Institute. In November, 1940, production averaged 1,507,950 tons per week, a record at that time.

Total output in November was 6,969,987 tons, compared with 7,242,683 tons in October, 272,696 tons less than that all-time high. In November, 1940, production was 6,469,107 tons.

Eleven months totaled 75,763,558 tons, 25 per cent more than 60,486,305 tons in the corresponding period in

Steel Ingot Statistics

	Estimated Production—All Companies								Calculated weekly produc-tion, all companies Net tons	Number of weeks in month
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity		
Based on Reports by Companies which in 1940 made 92.91% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1941										
Jan. ..	6,276,429	99.1	451,637	76.0	200,019	91.0	6,928,085	96.9	1,563,902	4.43
Feb. ..	5,673,289	99.2	378,330	70.5	186,281	93.9	6,237,900	96.6	1,559,475	4.00
Mar. ..	6,461,936	102.0	460,169	77.4	209,536	95.4	7,131,641	99.7	1,609,851	4.43
1st quar	18,411,654	100.1	1,290,136	74.8	595,836	93.4	20,297,626	97.8	1,578,353	12.86
Apr. ..	6,135,941	100.0	395,009	68.6	225,999	106.2	6,756,949	97.6	1,575,046	4.29
May ..	6,365,172	100.5	444,361	74.8	243,705	110.9	7,053,238	98.7	1,592,153	4.43
June .	6,103,767	99.5	458,242	79.6	238,721	112.2	6,800,730	98.2	1,585,252	4.29
2nd qtr	18,604,880	100.0	1,297,612	74.3	708,425	109.8	20,610,917	98.2	1,584,237	13.01
1st half	37,016,534	100.1	2,587,748	74.5	1,304,261	101.6	40,908,543	98.0	1,581,312	25.87
July ..	6,089,859	96.6	489,239	85.0	242,584	87.4	6,821,682	93.4	1,543,367	4.42
Aug. .	6,243,100	96.6	495,523	85.9	262,334	94.4	7,000,957	95.7	1,580,351	4.43
Sept. .	6,058,731	97.0	500,687	89.8	260,288	96.9	6,819,706	96.4	1,593,389	4.28
3rd qtr	18,391,690	96.0	1,485,449	86.8	765,206	92.9	20,642,345	95.2	1,572,151	13.13
9 mos.	55,408,224	98.7	4,073,197	78.6	2,069,467	98.2	61,550,888	97.0	1,578,228	39.00
Oct. ..	6,427,977	99.4	532,862	92.3	281,843	101.4	7,242,683	99.0	1,634,917	4.44
Nov. ..	6,198,368	99.0	488,986	87.5	282,633	105.0	6,969,987	98.3	1,624,706	4.29
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1940										
Jan. ..	5,356,444	85.7	285,447	56.1	122,832	77.0	5,764,723	83.4	1,301,292	4.43
Feb. ..	4,208,249	72.1	205,458	43.2	112,090	75.2	4,525,797	70.0	1,093,188	4.14
Mar. ..	4,078,843	65.3	191,568	37.6	118,772	74.5	4,389,183	63.5	990,786	4.43
1st quar	13,643,536	74.4	682,473	45.7	353,694	75.6	14,679,703	72.3	1,129,208	13.00
Apr. ..	3,808,031	62.9	176,419	35.8	116,024	75.1	4,100,474	61.2	955,821	4.29
May ..	4,583,771	73.4	258,741	50.8	125,270	78.5	4,967,782	71.8	1,121,395	4.43
June .	5,222,120	86.3	305,115	61.9	130,208	84.3	5,657,443	84.5	1,318,751	4.29
2nd qtr.	13,613,922	74.2	740,275	49.5	371,502	79.3	14,725,699	72.5	1,131,875	13.01
1st half	27,257,458	74.3	1,422,748	47.6	725,196	77.4	29,405,402	72.4	1,130,542	26.01
July ..	5,269,701	84.5	322,567	63.5	132,357	83.2	5,724,625	83.0	1,295,164	4.42
Aug. ..	5,670,932	90.8	369,770	72.6	145,681	91.3	6,186,383	89.5	1,396,475	4.43
Sept. .	5,535,198	91.7	365,289	74.2	155,759	101.1	6,056,246	90.6	1,415,011	4.28
3rd qtr.	16,475,831	89.0	1,057,626	70.1	433,797	91.7	17,967,254	87.7	1,368,412	13.13
9 mos.	43,733,289	79.2	2,480,374	55.1	1,158,993	82.2	47,372,656	77.5	1,210,339	39.14
Oct. ..	6,059,792	97.0	408,317	80.2	176,433	110.6	6,644,542	96.1	1,499,897	4.43
Nov...	5,872,162	97.1	420,448	85.3	176,497	114.2	6,469,107	96.6	1,507,950	4.29
Dec. ..	5,907,840	94.8	399,434	78.6	188,083	118.2	6,495,357	94.1	1,469,538	4.42
4th qtr.	17,839,794	96.3	1,228,199	81.3	541,013	114.3	19,609,006	95.6	1,492,314	13.14
Total..	61,573,083	83.5	3,708,573	61.7	1,700,006	90.3	66,981,662	82.1	1,281,210	52.28

The percentages of capacity for 1940 are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons. Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

The percentages of capacity operated in the first six months of 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as of June 30, 1941 as follows: Open hearth, 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons.

1940 and 50 per cent more than 50,467,880 tons in the entire year 1917, the peak in the first World war.

Average capacity engaged in November was 98.3 per cent, compared with 99 per cent in October and 96.6 per cent in November, 1940.

Man-Hour Steel Output Lower as Payrolls Rise

■ Output of finished iron and steel products per man-hour has decreased as a result of the necessary hiring of 66,000 new wage earners by the steel industry between the last quarter of 1940 and the third period of 1941, according to a study by the American Iron and Steel Institute.

Total tonnage of finished products increased to new high levels between the two periods, however, the over-all decline in output per man-hour notwithstanding. The decrease per man-hour occurred despite increased demand for so-called "heavy" steel products like plates and shapes which require relatively fewer man-hours to produce than items like sheet steel, it was reported.

In the last quarter of 1940, when the industry employed an average of 513,000 wage earners, output of finished iron and steel products, including shipments of pig iron to consumers, averaged more than 136 pounds per man-hour worked by wage earners. Output of the same classes of products in the third quarter this year, when wage earners averaged 579,000, was less than 134 pounds per man-hour.

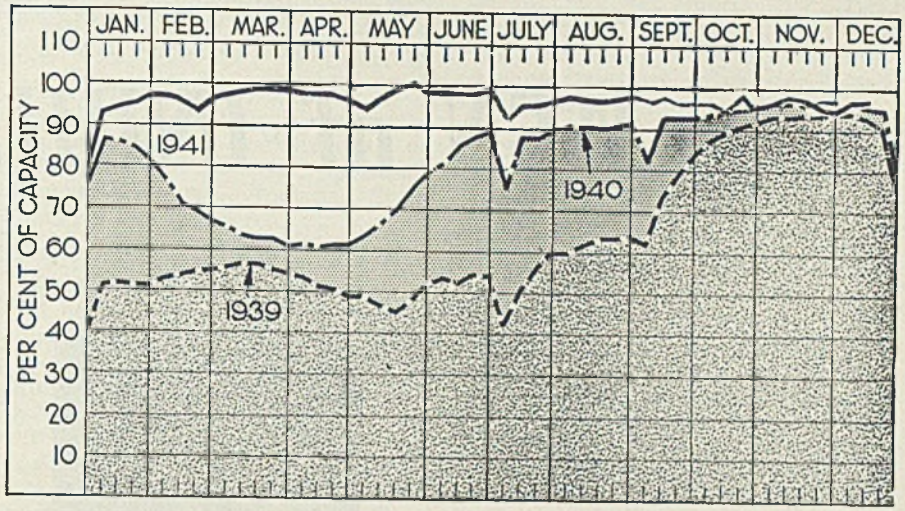
Wages paid per ton of products increased 16 per cent between the two periods. In the fourth quarter last year, steel industry wage earners received an average of $12.75 per ton of finished products, including pig iron, produced. Wages had risen to $14.85 per ton by the third period in 1941.

November Gear Sales Index Down 8.3% to 241

■ Industrial gear sales in November were 8.3 per cent below the October rate, but 39.3 per cent greater than in November, 1940, it was reported last week by the American Gear Manufacturers Association, Wilkinsburg, Pa. In the first 11 months this year, sales were 81.6 per cent above the period in 1940.

Comparative index of sales, based on 1928 as 100, was 241 in November. This compared with 261 in October, 243 in September and 276 in August. Peak index this year was 299, in June. In November, 1940, the index was 173.

Compilation as set forth by the association applies only to industrial gears.



PRODUCTION . . . . Up

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week advanced 1 point to 97½ per cent. Four districts gained, two declined and six were unchanged. A year ago the rate was 95½ per cent; two years ago it was 92½ per cent.

Cincinnati—Continued at 91 per cent, with two open hearths still under repair.

St. Louis—Relighting of two open hearths lifted the rate 10 points to 96 per cent, which is expected to continue until the holidays.

Chicago—Up 1½ points to 101½ per cent. One interest advanced its rate nearly 3 points, three others increased fractionally, one held even and another dropped several points. Scrap supplies average less than 30 days requirements.

Buffalo—Maintained its rate of 79 per cent as scrap shortage prevented relighting idle open hearths.

Central eastern seaboard—Held at 87 per cent in face of continued light scrap supply.

Birmingham, Ala.—Unchanged at 90 per cent with 22 open hearths in production.

New England—Further drop of 8 points to 84 per cent was caused by necessity for repairs.

Pittsburgh—Steady at 98 per cent of capacity, various shifts not affecting the average.

Wheeling—Receded 1 point to 94 per cent as slight changes in equipment were made.

Cleveland — Advanced 2.5 points from the revised rate of the preceding week, to 94 per cent.

Detroit—Gained 5 points to 90 per cent as two open hearths were relighted during the week, after being repaired.

Youngstown, O. — Steelmaking continues at 92 per cent with 71 open hearths and three bessemers active. Lack of scrap is the only factor preventing return to the recent rate of 98 per cent, five or six units being idle for that reason. The same rate is scheduled for this week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 13	Change	Same week 1940	Same week 1939
Pittsburgh	98	None	96	93
Chicago	101.5	+ 1.5	98	92.5
Eastern Pa. ...	87	None	95	88
Youngstown ...	92	None	92	93
Wheeling	94	— 1	98.5	85
Cleveland	94	+ 2.5	86.5	90
Buffalo	79	None	93	90
Birmingham ...	90	None	97	94
New England..	84	— 8	90	93
Cincinnati	91	None	87	69
St. Louis	96	+10	87.5	85
Detroit	90	+ 5	90	94
Average	97.5	+ 1	95.5	92.5

Timken Equips To Make Tank Piercing Shells

■ Timken Roller Bearing Co., Canton, O., has revamped its long unused Savannah avenue plant, covering 21,000 square feet, for manufacture of 37-millimeter shells and as soon as additional equipment can be installed plans to start production of 20-millimeter shells. The 37-millimeter shell is a one-piece armor-piercing missile of SAE 4150 modified steel bar stock, with finished weight of 1.91 pounds. Machinery is being provided for production of 15,000 shells per day.

Testing is accomplished on an army range, firing at armor plate at 300 feet. Penetration must be complete, preferably with substantial pieces going entirely through the plate, with the effect of a high-explosive shell inside the tank.

MEN of INDUSTRY

F. R. GAMMON, manager of sales at Cleveland, Carnegie-Illinois Steel Corp., since January, 1938, has been appointed manager of sales, New York district sales office, effective Jan. 1. He succeeds **James R. Mills,** who will retire after many years of service. Mr. Gammon joined Carnegie-Illinois in 1936 as a special representative.

William P. Andrews, since May, 1938, manager of sales, Cincinnati district, succeeds Mr. Gammon as manager of sales, Cleveland district. Mr. Andrews has been associated with United States Steel Corp. subsidiaries 20 years. Prior to going to Cincinnati he was assistant manager of sales, Chicago district.

♦

Junius S. Morgan has resigned as a member of the board and as an alternative member of the finance committee, United States Steel Corp., New York. He has been called to active duty in the United States Naval Reserve.

♦

A. H. Nicoll has been elected president, Graybar Electric Co. Inc., New York, succeeding **F. A. Ketcham,** who has become chairman of the board. **G. F. Hessler, D. H. O'Brien** and **E. W. Cashman** have been elected vice presidents.

♦

Raymond R. Newell, associated with John A. Roebling's Sons Co., Trenton, N. J., 39 years, and manager of the Cleveland branch since 1911, has retired.

F. R. Gammon

W. P. Andrews

Eugene King, former assistant manager, has been appointed manager, succeeding Mr. Newell. Mr. King has been associated with the company 24 years.

Eugene King

♦

William S. Wilbraham, manager of sales, Lukenweld Inc., Coatesville, Pa., has been promoted to manager of costs. **Robert C. Sahlin,** heretofore assistant manager of sales, succeeds Mr. Wilbraham as manager of sales.

♦

John H. Ashbaugh has been appointed manager of manufacturing and engineering, Merchandising Division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Acting manager of the two departments since last January, Mr. Ashbaugh now directs the manufacturing and engineering activities of the two Westinghouse merchandising division plants, in Mansfield, O., and Springfield, Mass. He will make his headquarters in Mansfield.

♦

Armand T. Chandonnet, manager, Elmira Foundry Co. Inc., Elmira, N. Y., has been appointed co-ordinator of aircraft turret manufacture in all General Electric Co. plants. He will be succeeded at the Elmira company by **N. Harold Boardman.**

♦

R. W. Gemmell, associated with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., 15 years, since 1939 in charge of aviation sales, has been appointed to the staff of the Emergency Products Division as supervisor of defense products.

William M. Work has been named supervisor of office systems, district manufacturing and repair department. Associated with the company since 1922, he served in various capacities in district and East Pittsburgh offices of the sales department until 1939 when he began a series of special assignments at the East Pittsburgh works.

♦

E. F. Brown has been appointed general superintendent of the Amer-

John H. Ashbaugh

ican, Consolidated and Newburgh wire works of American Steel & Wire Co., Cleveland, while **R. C. Helm** has been made superintendent, American works, and **H. R. Patterson** has been named superintendent, Consolidated works.

Mr. Brown has been associated continuously with the Wire company since October, 1904, when he began as a draftsman at American works. Since 1936 he has been superintendent at that works. Mr. Helm joined the company in 1913 and has been superintendent, Consolidated works, since August, 1938. The past year Mr. Patterson has been an engineer in the wire drawing division, engineering department, and before that was assistant general superintendent at Donora, Pa.

♦

T. W. Conrad has been appointed acting manager, Omaha, Nebr., office, Graybar Electric Co. Inc., New York. Sales manager, Tulsa, Okla., office, since 1928, Mr. Conrad succeeds **F. J. Saffer,** who has resigned due to illness.

♦

J. E. von Maur has been appointed representative in southern Ohio for American Gas Furnace Co., Elizabeth, N. J., with offices at 63 South High street, Columbus, O.

Earle S. Dudley, heretofore in the company's Elizabeth office, has succeeded **W. F. Faber** as representative in eastern New York state.

♦

Louis J. Borinstein, of Indianapolis, president of the Institute of Scrap Iron and Steel Inc., has been elected treasurer, Indiana State Chamber of Commerce.

♦

K. R. Beardslee, sales manager, will be in charge of the centralized sales engineering department of Carboloy Co. Inc., Detroit. **Martin Muhling,** former special engineering executive, and **Earl Glen,** formerly Pittsburgh representative, have been appointed assistant sales managers.

A. H. Godfrey, heretofore Cleveland district manager, has been transferred to Detroit as factory manager, and has been succeeded in Cleveland by **W. S. Baker,** formerly with Carboloy's Chicago office.

R. R. Preston, superintendent of the wire mill, Page Steel & Wire Co., succeeds Mr. Glen in Pittsburgh.

♦

Edward M. Murphy has been appointed division metallurgist, cold drawn, American Steel & Wire Co., Cleveland. Since April, 1936, assistant to superintendent at Newburgh wire works, Mr. Murphy has been associated with the Wire company 21 years.

Activities of Steel Users, Makers

■ GENERAL Electric Co. has started construction of a $25,000,000 factory at Fort Wayne, Ind., for manufacture of turbo-superchargers for airplanes. The building, to be erected by Stone & Webster Engineering Corp., Boston, as a Defense Plant Corp. project, will be one-story, 700 x 800 feet, and have 560,000 square feet of floor space.

♦

Sandusky Foundry & Machine Co., Sandusky, O., last week was awarded the Bureau of Ordnance flag and the Navy "E" pennant, "in recognition of exceptional effort and production in the national emergency." Rear Admiral W. T. Cluverius, retired, now president of Worcester Polytechnic Institute, Worcester, Mass., made the presentation address.

♦

Hard Chrome Engineering Co. has moved to its newly completed building at 1717 East Slauson avenue, Los Angeles.

♦

Allen Billmyre Corp., manufacturer of pneumatic equipment, is now located in new quarters at 431 Fayette avenue, Mamaroneck, N. Y.

♦

Kilby Steel Co., Anniston, Ala., has awarded contract to Loftus Engineering Corp., Pittsburgh, for a 35-ton open-hearth furnace to be used for production of shell steel.

♦

Foote Mineral Co., Philadelphia, has purchased a grinding and milling plant at Exton, Pa., which will be used to speed up production. John Worcester is in charge of remodeling operations at the plant.

♦

Perfect Circle Co., Hagerstown, Ind., has begun construction of the first unit of a new $100,000 engineering laboratory, containing offices, garages, machine shop and drafting room.

♦

E. F. Houghton & Co., Philadelphia, manufacturer of oils, leathers and metal working products, held open house for stockholders and customers Dec. 11 to mark completion of a new office building. Structure is a 3-story unit with glass-block construction and air conditioning. Facilities for manufacture of cutting, quenching and lubricating oils, packings, heat treating, metal working and other products have been recently increased also.

♦

Westinghouse Electric & Mfg. Co., Mansfield, O., has received a $45,000 order from the United States Army Air Corps for metal film-processing trays.

Form PD-25A Available At Once

Under the new "Production Requirements Plan", explained in detail in the Dec. 1, 1941 issue of STEEL, p. 29, many manufacturers in defense or essential civilian work will want to file Form PD-25A with OPM's Division of Priorities before Jan. 1, 1942. This application should cover anticipated material requirements for the first quarter of the calendar year, although an additional application may be filed for the second quarter at the same time. The earlier PD-25A is submitted, the earlier the manufacturer will receive priority assistance.

PD-25A consists of 20 pages, which include five copies of each section to be filed and a copy to be retained by the applicant. The forms are available from the Priorities Division and its field offices or will be furnished promptly by STEEL at the following prices:

Less than 10	50c per copy
10 to 25	45c per copy
26 to 50	40c per copy
51 to 100	35c per copy
100 to 500	25c per copy
500 or more	20c per copy

Write, wire or phone:

STEEL, Readers Service Department, Penton Building, Cleveland

Note: If your order originates in Ohio, please include 3% sales tax.

War Program's Effect Topic for SAE Meeting

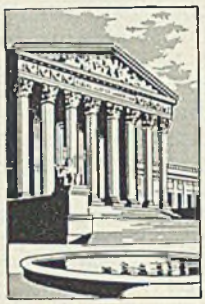
■ Effect of the war program on automobile, aircraft, truck and allied manufacturing companies will be summarized at the thirty-seventh annual meeting of the Society of Automotive Engineers Inc., Book-Cadillac hotel, Detroit, Jan. 12-16, it was reported last week by John A. C. Warner, SAE secretary and general manager.

Thirty-three technical papers, ranging from research to factual data on design and manufacture of war products and more efficient servicing of equipment, will be presented at the 5-day meeting.

Products manufactured for war by various automobile, truck and allied companies will be displayed.

Windows of WASHINGTON

Nelson asks manufacturers to voluntarily release surplus inventories . . . Automobile production quotas further curtailed . . . Prices of three ferroalloys frozen for first quarter . . . Subcontracting exhibits to be established in 50 cities . . . C. E. Adams appointed chief of OPM Iron and Steel Branch . . . Public utilities forbidden to undertake substantial new construction



By L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ DONALD M. NELSON, Director of Priorities, has appealed to manufacturers holding inventories of materials greater than their immediate needs to make their surpluses available for military production.

His appeal followed the announcement of creation of the new Inventories and Requisition Section of OPM, headed by E. A. Tupper, which has power to requisition necessary materials.

"We know," Mr. Nelson said, "that many manufacturers both large and small are holding inventories, particularly of metals, in excess of present demand.

"These metals are needed, and needed now, for war. We want to forge every weapon at our command, and we want to do it immediately. Patriotic and voluntary release of inventories will help us, at the moment, more than any other one thing to do just that.

"Iron and steel scrap is equally as important as any raw material. I appeal to everyone who has scrap on hand in quantities to respond to this appeal."

Mr. Nelson asked manufacturers to wire to him directly giving size of inventories of critical materials and amounts of each they can spare for allocation to war production.

He urged a complete nationwide response to his appeal "in order that we may get these materials immediately without having to resort to the slower processes of requisition."

Public Utilities Forbidden To Undertake New Construction

Public utilities last week were forbidden to undertake any substantial expansion of property or equipment without express permission from the OPM by amendments to Preference Rating Order P-46.

Order as amended applies to all producers engaged in supplying electric power, gas, water, public sanitation services, or central steam heating, regardless of whether or not they have applied for priority assistance by executing an acceptance of the order. It applies to publicly owned as well as private utility companies, and will cover Rural Electrification Administration co-operatives.

Projects already underway and at least 40 per cent complete as of Dec. 5 may be finished if the utility has supplies on hand for the purpose, or is granted priority assistance to obtain them.

With that one exception, utilities may not without permission withdraw materials even from their own stores or inventories for expansion projects costing more than $1500 in the case of underground connections or more than $500 in other cases.

Highspots of the Week's Washington News

Can Manufacturers Industry Advisory Committee Named

Bureau of Industry Advisory Committees, OPM, announced formation of a Can Manufacturers Industry Advisory Committee, as follows:

J. F. Hartlieb, president, Continental Can Co. Inc., New York.

D. W. Figgis, executive vice president, American Can Co., New York.

Richard P. Swartz, assistant to the president, Crown Can Co., Philadelphia.

F. J. Costello, vice president, Federal Tin Co. Inc., Baltimore.

Adam Batdorf, president, Liberty Can & Sign Co., Lancaster, Pa.

E. R. Thompson, president, Thompson Can Co., Dallas, Tex.

L. H. Clark, president, J. L. Clark Mfg. Co., Rockford, Ill.

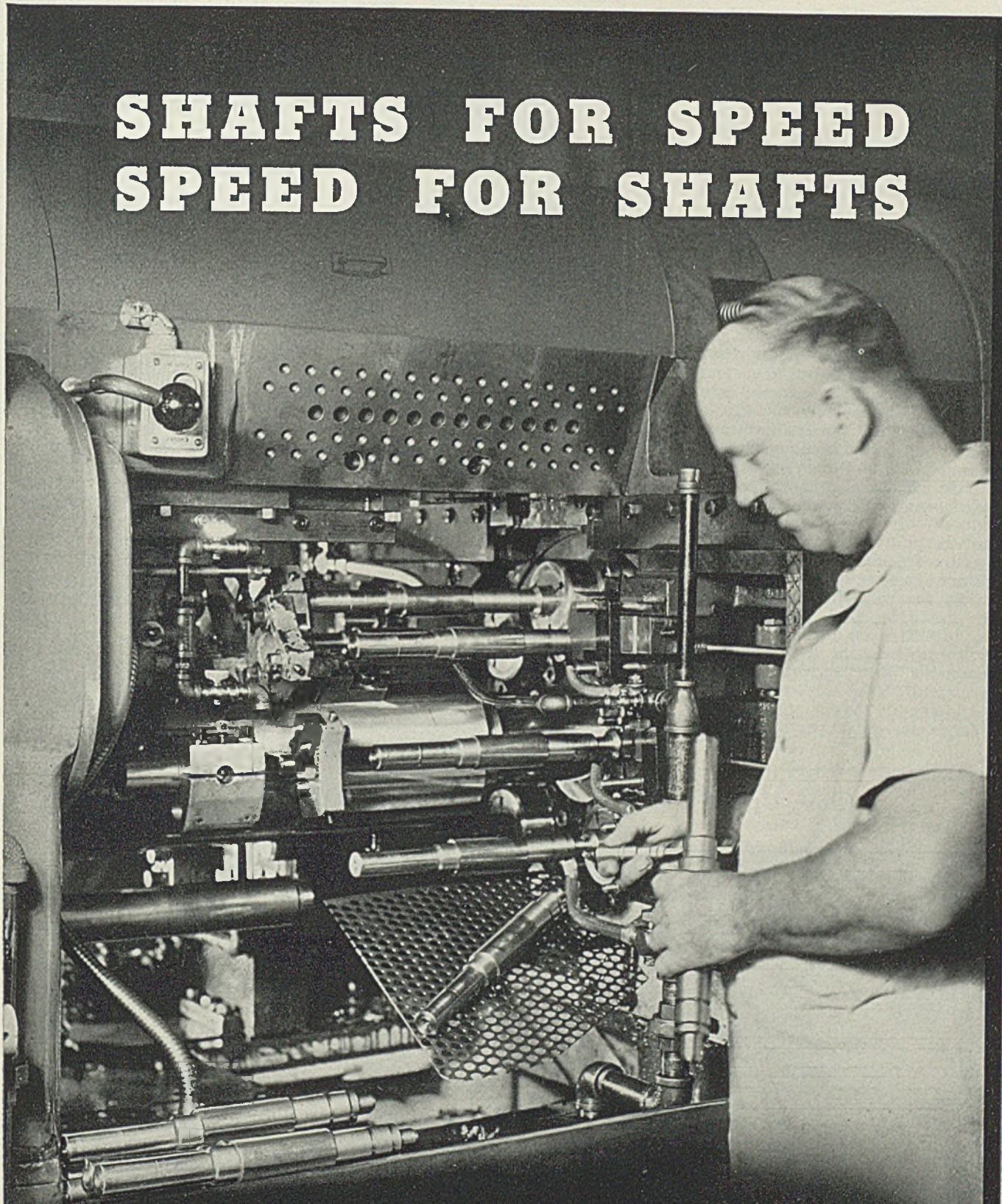
F. T. Nesbitt, vice president and general manager, Owens-Illinois Can Co., Toledo, O.

D. M. Heekin, secretary and treasurer, Heekin Can Co., Cincinnati, O.

L. F. Gieg, president, National Can Corp., New York.

George A. Milton, Sr., president, George

SHAFTS FOR SPEED
SPEED FOR SHAFTS



Transmission Shafts have changed since the horse-and-buggy days.

Today, as the motor car yearly attains new heights in efficient, dependable transportation, shafts are built for safety, speed and endurance over thousands of miles of travel.

Improved production methods permit better quality cars at lower cost. More quality per shaft per dollar means more trouble-free miles per dollar—more automobile per dollar. This is why so many Transmission Shafts are now rough- and finish-turned in one operation on Conomatics.

Complete details sent on request.

CONE AUTOMATIC MACHINE CO. INC. WINDSOR, VT.

A. Milton Can Co. Inc., Brooklyn, N. Y.
E. A. Mignacco, general manager, Western Can Co., San Francisco.
W. C. Cross, vice president, Carnation Co., Oconomowoc, Wisc.
R. S. Sollinsky, president, Cans Inc., Chicago.

Prices of Three Ferroalloys Frozen for First Quarter

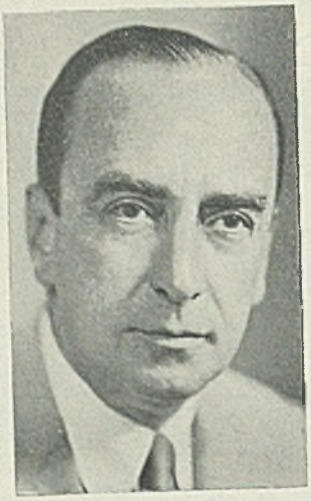
Present prices for three essential elements in the production of steel—ferromanganese, ferrosilicon, and silicomanganese—will continue unchanged through the first quarter of 1942, OPA has announced.

All of the major producers of ferromanganese told OPA they did not intend to advance current prices for the initial three months of 1942, while producers of ferrosilicon and silicomanganese have entered into individual agreements with OPA to continue to sell at present levels.

There has been no change in the prices of these three ferroalloys since July 1, 1940, excepting in the case of one relatively small high-cost producer of ferromanganese, located in the South, which has been charging $25 a ton above the general market level of $120 a ton, Atlantic seaboard. This producer has been asked by OPA to reduce its price to $135 a ton, f.o.b. furnace.

Price involved in the individual agreements with ferrosilicon producers is $74.50 a gross ton in carload lots, with freight allowance to St. Louis, for the 50 per cent grade.

Appointed Chief of OPM Iron and Steel Branch



C. E. Adams

C. E. Adams, chairman, Air Reduction Co., and the United States Industrial Alcohol Co., New York, has assumed charge of the OPM Iron and Steel Branch. He succeeds Arthur D. Whiteside, president, Dun & Bradstreet, who resigned effective Dec. 1, but who continued to serve pending the appointment of Mr. Adams.

Mr. Adams first joined the defense program in June, 1940, as senior administrative assistant to E. R. Stettinius Jr., on the National Defense Advisory Commission. Pressure of private business caused him to resign in March this year. He is expected to make his organization appointments soon.

OPM Issues Instructions for Reproduction of Forms, Orders

Reproduction of Priorities Division forms and orders is subject to the following instructions:

Any application form, including form PD-1, may be reproduced.

Any report form, including inventory report forms, may be reproduced.

Any "M" order, "L" order, or "E" order may be reproduced.

As to "P" orders, two rules are to be followed:—

1. If the order is issued to a general class of persons, and does not name any individual as the recipient of the order (as is the case in P-22, the maintenance and repair order) the order may be freely reproduced in the same manner as "M" orders.

2. If the "P" order has been issued for the use of specifically named firms or individuals, it may be reproduced for use either by the individual producer or by his suppliers who are entitled to use the order, by the photo-offset or similar photographic process. Such copies must be identical in size and every other respect with the order as issued by OPM. Blank forms of "P" orders may be reproduced for informational purposes only when they are stamped "Specimen" or "Sample," so as to make it clear that the copy is for information only and not for use.

The purpose of these rules is to permit reproduction of forms and orders for (1) informational purposes, or (2) for purposes of applying for priority assistance, or (3) furnishing information to the OPM—but also to prevent reproduction of forms and orders which might lend themselves to improper use.

Whenever any form required by the OPM is reproduced, for whatever purpose, it must be reproduced in the exact format, language, color, type, size, and phraseology of the original.

Additional Washington news will be found on page 118.

Close-Ups of Men You Know

■ Floyd B. Odlum, director, Division of Contract Distribution (left) and Donald M. Nelson, executive director, Supplies Priorities and Allocations Board. NEA photos at Congress of American Industry, New York. For report of meeting, see STEEL Dec. 8, p. 29

Supply Houses Servicing Oil Industry Get A-8 Rating

Supply houses furnishing materials and equipment to the petroleum industry are assigned a prefer-

ence rating of A-8 on their orders to specified quantities of materials by Preference Rating Order No. P-83 issued last week by the Priorities Division.

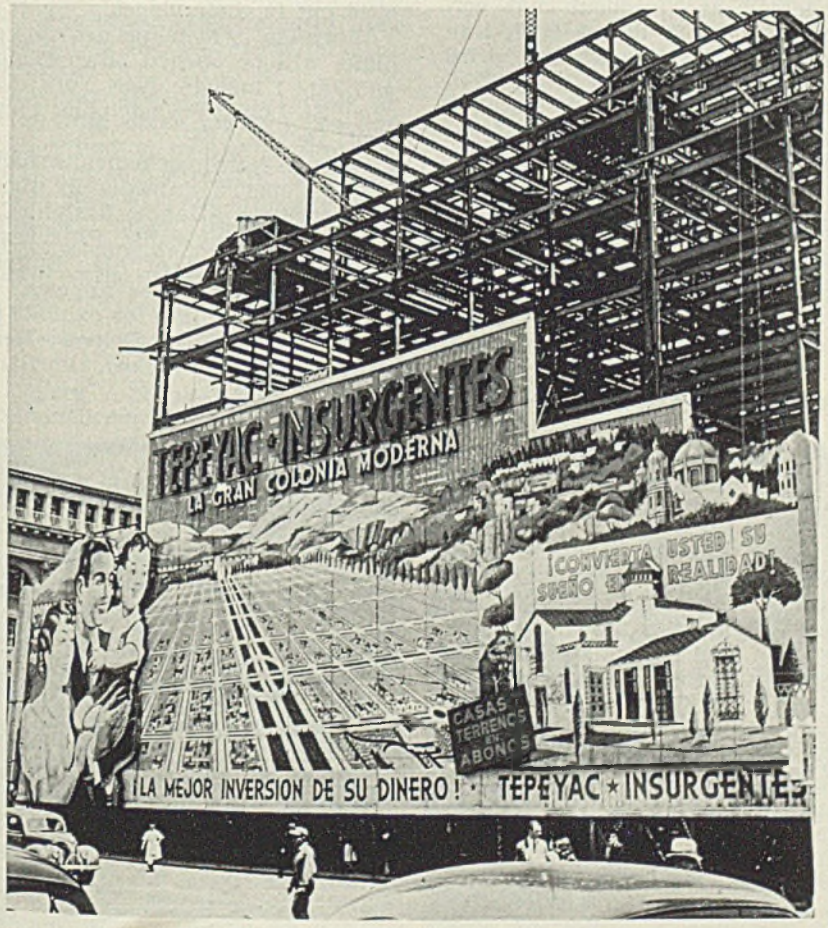
This order has the effect of classifying materials needs of the petroleum industry as war requirements, since orders for materials to be used in the production, refining, transportation or marketing of petroleum are given a war rating. Production, as defined in the order, includes discovery, development and depletion of petroleum pools. Marketing covers the operation of facilities for the distribution of petroleum products, not including natural gas, to service stations or to consumers, including service stations, substations, bulk plants, warehouses, and wholesale depots.

Preference Rating Order No. P-83 gives priority assistance in supplying needs of the whole petroleum industry for materials and equipment, because the industry is so organized supply houses serve as an inventory of its materials needs.

The order covers supply houses as that term is generally accepted in the industry, and may also cover tool or equipment manufacturers exclusively engaged in furnishing materials to the petroleum industry. Before being entitled to use of a preference rating under the order, a supply house or manufacturer must execute an acceptance of the terms of the order and must also furnish information as to previous shipments, inventories and requirements of the materials for which a preference rating is assigned. A special form, PD-82-a, has been prepared for this purpose.

No supply house may make deliveries of materials obtained by application of the preference rating assigned to it except under purchase orders or contracts which themselves bear a preference rating. Supplemental orders will be issued by the Priorities Division granting a general rating to specified orders for the materials sold through supply houses, so that deliveries of materials will not be held up pending submission of individual applications for priority assistance by each firm in the petroleum industry.

Mexico Adopts Yankee Methods in Realty Boom



■ Advertising a new American style building development featuring "all the trimmings", this huge sign in the heart of Mexico City offers "Easy payment plans—own your own home." Steel structure in the rear, for new home of Banco de Mexico, presents an appropriate background for the advertisement's theme. Homes like that pictured on the signboard are reported to cost about $3000 in American currency, completely furnished, and six times as much Mexican. Four huge developments like this are under way in Mexico City alone. NEA photo

Limit Production of Some Coin-Operated Machines

Sharp cuts in production of automatic phonographs, weighing, amusement and gaming machines were ordered last week by the Priorities Division.

Manufacture of gaming machines will be prohibited beginning Feb. 1 until otherwise ordered.

To conserve steel and other war materials, the order requires a 25 per cent cut in the output of automatic phonographs and weighing and amusement machines (principally pinball machines) during December below average production in the 12 months ended June 30, 1941.

Curtailment of these products will be increased to 50 per cent beginning Jan. 1 and 75 per cent Feb. 1. The last restriction will continue until further notice.

Increased Mining Activity Reported in Mexico

Increased mining activity in Mexico, with a movement to smelters from stockpiles, notably zinc, that have not been tapped for years, is reported by the Department of Commerce.

Increased exports of minerals, including antimony, zinc, graphite, copper and molybdenum, chiefly to the United States, likewise have been noted.

Prospecting has increased, new properties are being developed, some idle or abandoned properties put back into production, with a consequent rise in July production figures in a number of items, among them lead, zinc, mercury, antimony, graphite, cadmium and molybdenum.

Further Simplification of Copper Conductors Proposed

Further simplification of copper conductors used for building purposes, designed to save substantial quantities of both copper and rubber, will be laid before a conference called to meet at the National Bureau of Standards Dec. 17.

The conference, to which manufacturers and representative distributors and users have been invited, was called by the Division of Simplified Practice to consider a revision of the recently promulgated Simplified Practice Recommendation R180-41, which established a list of 17 stock sizes.

A revision proposed by the stand-

ing committee in charge of that recommendation not only contemplates a further reduction to ten sizes, but also the establishment of a single insulation and rating for each of the retained sizes.

It is the belief of the standing committee that the proposed revision will eliminate two-thirds of the stock items now required and release for other important uses copper and rubber now tied up in inventories.

SPAB To Grant REA Copper To Complete Power Projects

In line with the policy laid down earlier on construction, the SPAB has announced a broad policy covering the building of public and private power projects. Policy in substance directs that every effort be made to aid in the completion of projects now substantially under way, but that aid be withheld from new projects unless they can be shown to be essential to the war effort or to the public health and safety.

SPAB also announced that 1500 tons of copper will be made available monthly to the Rural Electrification Administration, up to a total of 10,500 tons. SPAB estimated that this will enable REA to finish all projects which are now more than 40 per cent complete, and to finish a number which are less than 40 per cent complete. All projects in this latter group will be reviewed, and those which have been started and on which construction is well under way will be completed.

In the general policy on power projects are the following points:

Both public and private power projects must be treated alike, and the mere possession of a substantial inventory should not allow one group to undertake a project for which the other is denied priority assistance.

During the emergency, neither public nor private power bodies may start projects which would duplicate facilities of the other.

SPAB held that however important it may be to extend feeder lines into unserved agricultural areas, such extensions usually represent a use of copper less essential than other uses which should be satisfied first; and the board also pointed out that such extensions usually require relatively large amounts of copper per customer connected.

Restrictions on Use of Partly Fabricated Copper Eased

Manufacturers of copper and copper alloy articles will be permitted to use, to a limited extent, inventories of partially fabricated metal between now and March 31, the Priorities Division has announced. Restrictions were to have gone into effect Jan. 1.

Restrictions are: (1) That the material was on hand as of Dec. 1; (2) that the metal was in a form or alloy that could not be used in the manufacture of any item not on List A of the order; (3) that no additional copper be required to complete the item; (4) that the aggregate metal used does not exceed twice the amount permitted between Oct. 15 and Dec. 31; and (5) that by Dec. 20, each manufacturer files with the OPM Form PD-189, establishing the facts in his case, setting forth inventories and other particulars.

Several changes are made for purposes of clarification, the most important being the statement that restrictions of the order do not apply to installation of a finished product for the ultimate consumer.

OPA Publicly Cites Two Scrap Dealers as Price Violators

Two of the larger iron and steel scrap dealers in the middle west, Capital Iron & Metal Co., and Pioneer Iron & Metal Co., both of Oklahoma City, Okla., have been cited publicly by OPA Administrator Henderson as "frequent and persistent" violators of the OPA iron and steel scrap maximum price schedule.

This is the first instance that OPA has given full publicity to violators of its steel scrap price schedule.

Henderson Finds Buyers, Sellers "Satisfied with Scrap Prices"

Satisfaction with the present general level of iron and steel scrap prices as established by Price Schedule No. 4 has been expressed by representatives of both buyers and sellers of scrap at a series of meetings with the OPA, according to Leon Henderson, administrator.

Among the matters under discussion at the meetings are: Possibility of higher railroad freight rates; problems of allocation resulting from the OPM scrap priority order; simplification of a few features of the grade structure; and methods to direct the flow of various types of scrap into the most suitable consuming channels.

Consideration is being given to establishment of foundry steel grades because at present little or no scrap rail is available for foundry use.

Industry representatives brought to the attention of OPA several abuses that threaten to disturb operation of the schedule. These include: "Trading" of prime and second grade steel products for scrap; reciprocal purchase agreements; tying arrangements; and certain forms of by-passing of customary dealer-broker-consumer relationships. These are definite evasions of the schedule, and OPA officials indicated that action will be taken against those responsible.

Subcontracting Exhibits To Be Established in 50 Cities

Permanent exhibits or "market places," where manufacturers may see and examine samples of currently needed war equipment and parts, will be established in six major cities between now and Jan. 1 and in a number of other cities shortly thereafter, according to Floyd B. Odlum, Director of the OPM Contract Distribution Division.

The Army, Navy, other government purchasing agencies and many large companies holding war contracts will break down war equipment into subassemblies and bits and pieces and exhibit these smaller items in the "market places." Manufacturers who have not yet obtained war work but believe they are qualified for it will be urged to visit the exhibit halls regularly. Displays will be changed often, items being taken out as manufacturers are found to make them and new parts or subassemblies put in their places.

Cities in which permanent exhibits will be opened between now and Jan. 1 include: New York; Chicago; St. Louis; Philadelphia; Cleveland; Detroit.

Cities in which permanent exhibits will be opened immediately thereafter include: Atlanta; Boston; Cincinnati; New Orleans; Pittsburgh; Seattle; Birmingham, Ala.; Buffalo; Kansas City, Mo.; Los Angeles.

Those next in line for exhibits include: Dallas, Tex.; Denver; Memphis, Tenn.; Milwaukee; Portland, Me.

A total of about 50 permanent exhibits will be established.

Suggests Lower Rates For Low-Grade Ores

■ Suggestion that rail freight rates on low-grade ores in the Pacific Northwest be lowered to permit their movement to centrally-located smelters was advanced last week by Charles C. Berg, president, Beralloy Corp., Veradale, Wash.

"There are in the states of Washington and Idaho enough ferrous ores to provide the United States with iron now and long after the war is over," he stated. "The deposits are scattered and of sizes which would not allow the erection of smelters at the mines, but if these ores could be shipped to centrally-located smelters at rates making their utilization possible, enough iron and steel could be produced to satisfy military demand and have a good margin for civilian requirements."

Analyzes Steel Scrap Situation as United States Enters the War

CHICAGO

■ A STUDY of the current iron and steel scrap situation appears to offer foundrymen little encouragement that they will be able to obtain increased supplies during the war. It seems probable that the shortage which has existed for some time will become more acute.

At the regular monthly meeting of the Chicago chapter, American Foundrymen's Association, Dec. 8, the gray iron, malleable and steel sections constituted themselves into a roundtable to hear E. G. Howell, John T. McEnroe Co., scrap broker, Chicago analyze the present and future scrap situation. G. B. Stantial, Illinois Malleable Iron Co., Chicago, was chairman.

Practically every foundryman, Mr. Howell asserted, has experienced difficulty in obtaining scrap. Some grades are almost nonexistent, and the volume of available grades is inadequate. As a result, melters have been required to take whatever they could get, at the expense of efficient operations.

The shortage of scrap arises directly from unprecedented demand. It is estimated by the Institute of Scrap Iron and Steel Inc. that 1941 consumption of home and purchased scrap will approximate 52,000,000 tons, exceeding by a wide margin the prior record of 41,687,000 tons in 1940, and the first World war banner year, 1917, of 26,800,000 tons. In the first ten months this year, consumption amounted to 45,000,000 tons, against 34,000,000 tons in the corresponding period last year.

Mr. Howell cited four factors as responsible for today's shortage: (1) Unprecedented demand; (2) quick depletion of stocks after advent of the defense program, because of large exports in recent years; (3) government pricing policies, which operate to impede collection of scrap; and (4) low production of steel ingots during the years 1932-35, reducing the volume of steel which should be reaching the scrap stage at this time. In explanation of the factor of unprecedented demand, it was pointed out that steel capacity has increased far more rapidly than pig iron capacity, thereby increasing requirements for scrap.

No. 2 Scrap Was Exported

Answering criticism leveled at our policy of allowing scrap to be exported in recent years, the speaker pointed out that most of the 20,000,000 tons shipped out of the country was No. 2 steel, which in normal times is a poor seller at home. Furthermore, these exports were made during poor scrap industry years and proved a life saver in keeping collectors, dealers and brokers in business. This year, the United States has become an importer of scrap, although the tonnage being brought in is comparatively small.

Under the lend-lease program, which involves shipping large tonnages of semifinished steel abroad, we are losing considerable scrap. Ordinarily that steel would be finished here and the croppings and shearings would be available. Railroads are producing lower volumes of scrap because old equipment is being repaired and kept in service. Lack of adequate steel for new construction forces rehabilitation of existing rolling stock.

Another interesting angle contributing to scrap shortage has to do with motor trucks. Most new truck production is going to national defense, with the result that private truck operators are unable to purchase new ones to replace units that would normally be abandoned.

Viewing scrap expectancy, Mr. Howell said a flow may be developed from farms. It is estimated that from ¼ to ½-ton can be found on the average farm and the Department of Agriculture is attempting to get this collected. It is believed 3,000,000 tons could be obtained from this source. What results can be obtained is problematical because the farmer believes the price he receives for his material too low. The price f.o.b. dealer's yard is far less than OPA price to consumers.

In the average year, automobile graveyards provide 2,500,000 tons of scrap and an effort is being made to increase this by 1,000,000 tons. But here again, an obstacle presents itself. With new automobile production being cut 50 per cent, old cars increase in value for spare parts, and yard operators fare better by holding parts for sale than to wreck cars for scrap. Wrecking costs are mounting, but scrap price remains fixed at low level.

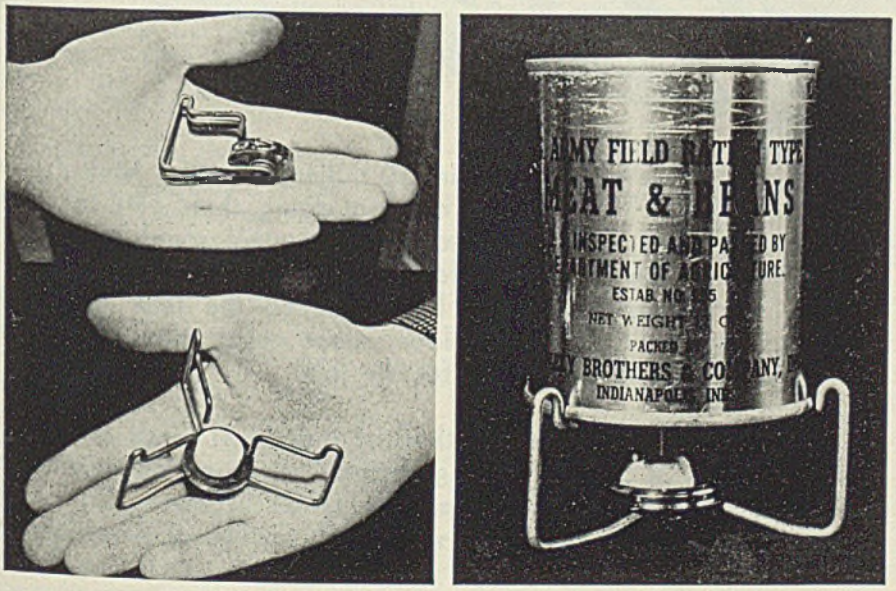
As for removing old, buried street car rails in cities, Mr. Howell explained that the cost of removing the rails and resurfacing the streets considerably exceeds the scrap value of the rails.

In concluding, Mr. Howell stated that despite widely-spread reports, 95 per cent of all scrap is being sold at legitimate prices, that is, within OPA price schedules.

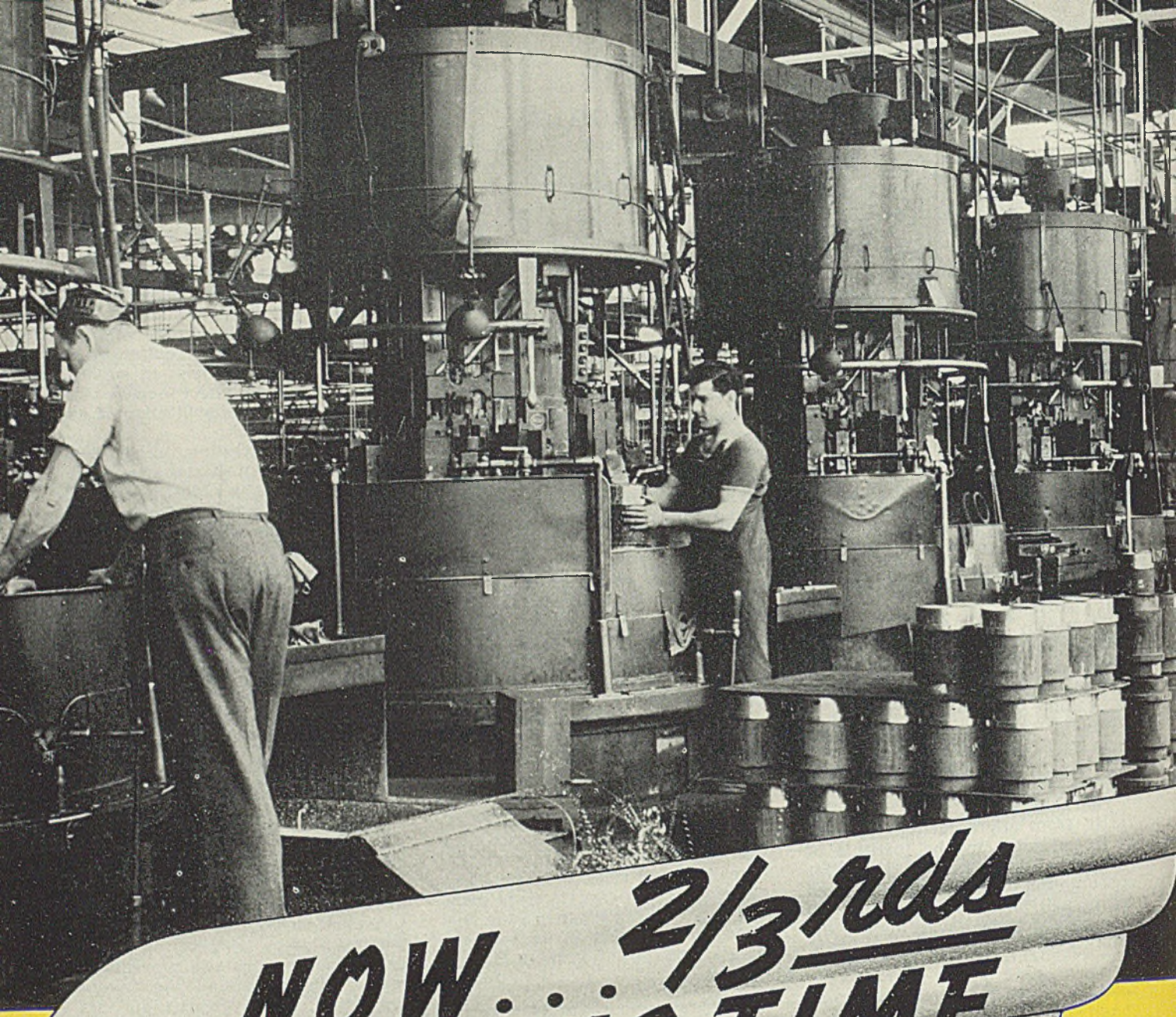
The nonferrous group of the association heard C. V. Nass, assistant superintendent of foundries, Fairbanks, Morse & Co., Beloit, Wis., discuss "Cores and Test Bars."

■ Orders for steel boilers booked in October numbered 958, compared with 1131 in September and 1221 in October, 1940, according to the Bureau of Census. Total for ten months this year was 12,192, compared with 8962 in the first ten months last year.

"Toy" Stove To Heat Emergency Army Rations



■ CHICAGO: United States army parachute troops are being issued tiny folding stoves that burn chemical tablets, to heat their emergency rations while in the field. The stove folds small enough to fit in a vest pocket; opened, it fits the bottom of the can, as illustrated. NEA photos



NOW 2/3rds PREVIOUS TIME

Installation
a Wright
nautical p

THERE are 10 Bullard 6-station Mult-Au-Matic in this battery, doing their part to speed u aeroplane engine production. They are rough turning, facin and boring 60-lb. nitralloy steel cylinder barrel forgings. Th manufacturer says they have reduced the time one-third an saved a tremendous floor space over the single spindl machines formerly used for the job.

The Mult-Au-Matic method of individual feeds and individua speeds at 5 or 7 working stations, all operating simultaneously is adaptable to a tremendous range of machining operation —and almost always at substantial savings of time, labor, floo space and cost.

BULLARD

THE BULLARD COMPANY

Mirrors of MOTORDOM

Axis attack seen aimed at civilian morale. Military critic urges public to "quit seeing black trouble behind every mulberry bush" . . . Reductions in rubber consumption may be first result, with only a year's supply now on hand. Possibilities in reclamation of scrap . . . Truck booster engine raises speed, increases economy on hilly runs . . . Ford engine for tanks?

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ ALONG with the rest of the country, Detroit appeared stunned by the suddenness of the Pacific war and the early reverses suffered by the United States and Britain last week. Ears were glued continuously to radios, and newspapers published nine and ten extras of a single edition, all of which were gobbled up by a news-hungry public.

Guards around industrial plants here were reinforced and civilian defense agencies, of which there are at least six in this city, stumbled over each other in hurrying preparations for precautionary maneuvers. No hysteria was apparent; rather the general attitude seemed to be, "How in the hell could it have happened."

One of the most astute analyses of the current situation was that broadcast by S. L. A. Marshall, expressive military critic of the *Detroit News*. His remarks were so full of common sense and sound advice that they were reprinted the day following the broadcast. We take the liberty of reproducing here a part of his comment on the situation:

Demoralization Sought By Axis

"As time moves on, it becomes plainer than plain that one of the main drives of the Axis is toward giving this nation a bad case of the jitters. And what's plainer yet is that if we fall for it, we're a bunch of saps. The bullseye the Axis is aiming at is the public morale of the United States. Get the Pacific Coast all stewed to a frazzle! Make every congressman and mayor so apprehensive that he can see a bomber hiding behind every cloud! Encourage every civilian in the thought that his house is standing square across the main line of resistance! Do all these things and you have built up a situation which could bring this country so close to the point of tripping over itself that it could not even unlimber its fighting material. It would have no offensive position because it had been emotionally stampeded into a defensive attitude.

"And I want to point out that it isn't necessary for either Germany or Japan to send an air assault against this country to obtain such a result. Simulated attacks will do it, and not even those are necessary, for rumors alone will turn the trick, and we don't seem to have any lack of citizens who are willing to aid in the circulation of rumors. This would be a little bit funny if it were not so grim.

"In the wake of what happened Sunday, there is a tendency to heap reproaches on the army and navy . . . The military logic of this first point of contention in the war goes this far at least—until all the facts are in, until government knows what happened and how, the wise citizen will reserve judgment. That's hard to do, but necessary. Restraint is called for now to the limit of our ability to apply it. That is wisdom in wartime, and the judicious line of approach to our tremendous problem.

"While realizing that buffets are coming our way and that we are liable to attack, the wise citizen will realize that these things must be met as they mature, and it is better to forbear seeing black trouble behind every mulberry bush."

There has been no time to realize what industry will be called upon to do beyond what it is already doing, except for vague reports of the $150,000,000,000 victory program. It is alright to talk about billions for victory, but as industry knows only too well, the delays between appropriations and contracts are, to say the least, annoying. They will have to be slashed, and industry might well cast about to see what it can do to help speed up the placement of war contracts.

Rubber for Tires Held To Be Essential

As far as automobiles are concerned at the moment, any discussion of the outlook appears academic at best. However, the country and its army moves on wheels, so the subject cannot be dismissed too lightly. One of the first impacts of the Pacific war on the motor industry is in respect to rubber. Now stockpiled in this country is something over 500,000 tons of raw rubber, with another 100,000 tons afloat and headed this way. Annual consumption of rubber has been at a level of 650,000 tons a year, so about a year's supply at the 1941 consumption rate can be considered on hand.

Reductions in civilian use of rubber tires are a foregone conclusion. Three avenues are suggested—produce fewer tires, make inferior tires from reclaimed rubber, or turn to the synthetics.

The first of these plans is the one likely to be put in force for the present. But it becomes apparent after a little analysis that such a move might possibly cripple our domestic war effort. More miles per car are being traveled every month, and analyses show that 77 per cent of all automobile trips and over 50 per cent of car mileage can be classed as "necessity use." In this country are 2320 cities, with population of 12,607,823, which do not have local mass transportation systems. Mileage per registered car in the country is now close to 10,000. So it will not answer the problem permanently just to discontinue making tires.

Use of synthetic rubber for tires is unfavorable because of relatively

high cost of the product and restricted capacity to produce the material.

Principal use of reclaimed rubber up to now has been in articles other than tires, although it is possible to produce a low-quality type of tire from reclaimed rubber entirely, or from part prime and part reclaimed rubber. While the supply of scrap rubber available in the country is large it is not unlimited. A logical plan might be to study the changeover of items now made of prime rubber to reclaimed rubber, permitting as much prime rubber as possible to move into passenger car and truck tires.

In the meantime, the government took action last week "to stop a consumers' buying wave" by forbidding sale of tires between Dec. 11 and 22, except "for top defense." A "more permanent plan regarding sale of tires is being worked out."

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,355
June	324,253	362,566	546,278
July	218,600	246,171	468,895
Aug.	103,343	89,866	164,792
Sept.	192,679	284,583	248,751
Oct.	324,689	514,374	401,360
10 mos.	2,895,059	3,674,434	4,432,551
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Wards Reports

Week ended:	1941	1940†
Nov. 15	92,990	121,943
Nov. 22	76,820	102,340
Nov. 29	93,495	128,783
Dec. 6	90,205	125,690
Dec. 13	95,990	125,625

†Comparable week.

November Sales Off 30 Per Cent from 1940

Representative figures are in on November car sales to dealers and to customers. General Motors sales of cars and trucks to dealers, U. S. and Canada, were 171,412, comparing with 217,406 a year ago, or a decline of 21.2 per cent. This low November total is even under the off-year of 1938 when factory sales were 185,852 in November. Sales to consumers in the U. S. were 126,281, comparing with 181,421 in the same month last year and 131,387 in 1938. The decline from a year ago was 30.4 per cent, not so severe as the 44.2 per cent drop in October sales.

Studebaker records show a curious trend for November. Retail deliveries were 6959, comparing with 8314 a year ago, a drop of 16.3 per cent; yet factory sales totaled 13,340 against 10,945 a year ago, or an increase of 21.9 per cent. The divergent trend between deliveries and factory sales is undoubtedly explained by the increasing numbers of army trucks being produced, which are apparently not included in retail deliveries. Either that or Studebaker is anticipating a bang-up Christmas season.

Auxiliary Engine Aids Truck Economy, Speed

How heavily loaded trucks can increase their speeds over hilly routes and at the same time reduce fuel consumption was demonstrated in a recent AAA test on a Pikes Peak highway west of Denver, with a Chevrolet 1½-ton truck equipped with a Clark automatic booster engine, towing a semitrailer loaded with heavy steel plates. The route was a 14-mile ascent with many turns, elevation at the finish being 11,315 feet, over ½-mile higher than the start.

When the climb was made under power of the truck engine alone, the time was 1 hour and 40 minutes and 5 seconds, average speed 8.37 m.p.h. and gasoline consumption 10.8 gallons. With the booster engine operating on the same route, the time was 58 minutes and 30 seconds, average speed 14.36 m.p.h. and gasoline consumption 8.0 gallons. Thus the booster engine effected a 42 per cent saving in time, a 72 per cent gain in speed and a 23 per cent reduction in fuel consumption.

Explanation, of course, is that, with the added power of the booster engine, the truck could be operated in a higher gear than without the booster. Thus the truck engine, instead of running at wasteful high speeds, ran within the range of speeds at which it was most efficient and economical. The automatic 46-horsepower booster engine is installed in the regular truck chassis behind the cab and below the level of the body platform. It delivers its power through the truck transmission and regular driveshaft. It cuts in when road speed at full throttle drops below 31 m.p.h., and cuts out when road speed of 45 m.p.h. is reached.

Convert Ford V-12 Air Engine to Power Tank

Production plans are reported to be under way to convert the experimental V-12 Ford aircraft engine to a V-8 engine for installation in tanks. Four cylinders are lopped off the aircraft engine to make the resulting unit 750-horsepower capacity, likely sufficient power for even a 60-ton tank, since a 450-horsepower engine is now used in the 28-ton tank. Ford engineers are said to have told army officers that this was the quickest way they could determine to get into production on an efficient tank engine, requiring a minimum of tooling and preliminary design. The aircraft engine, embodying a number of innovations, such as cast steel crankshaft, cast steel cylinder barrels, etc., has been given a thorough test in a two-cylinder section or unit, and the proposed tank engine is a grouping of these units in line, with liquid cooling.

Ford is pushing through tooling work in the bomber program for the new Willow Run plant with characteristic automotive "head and pressure". Sixty independent companies in the Detroit area and 12 Ford village industries in Michigan and Ohio have been assigned more than 50 per cent of the project which will require an estimated 6,000,000 hours.

Most of the 60 outside tool shops are working two shifts a day on the Ford orders, while the small village plants, now devoting 80 per cent of their production to war work, have extended their working day from 8 to 10 hours.

Ninety per cent of the facilities of the vast Ford tool and die shop at the Rouge plant have been diverted to defense work, with about 50 per cent on the bomber project. Altogether the Rouge plant has been assigned 1,500,000 hours of tooling work, with a force of 1800 tool designers now translating blueprints from 400 engineers and draftsmen into production tools.

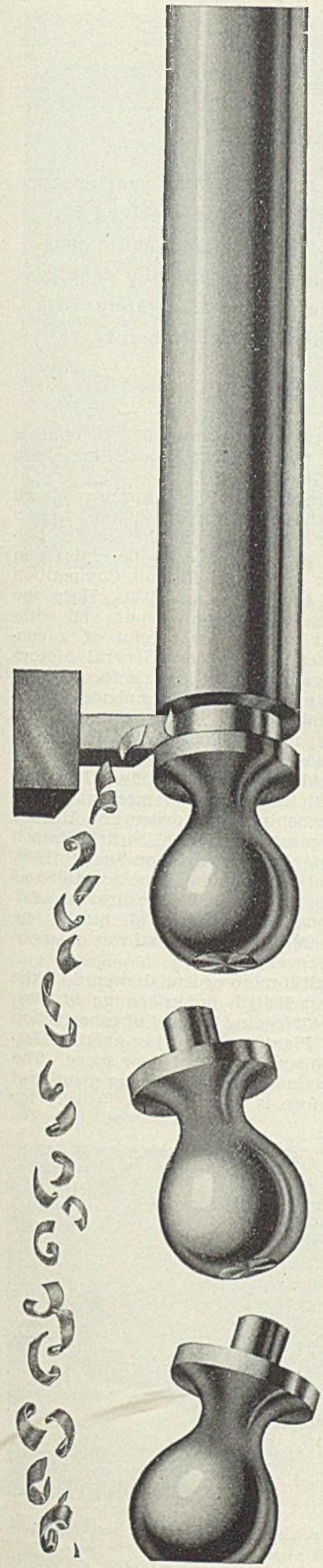
DPC Contracts for 1696 More Milling Machines

■ Kearney & Trecker Corp., Milwaukee, last week reported signing a war contract for 1696 milling machines valued at $9,650,826. This order, according to Ralph W. Burk, general sales manager, is the second received from the Defense Plant Corp. and brings to 2306 the number of machines to be built for that agency, with combined value $13,820,774. Company's backlog is increased to 5468 machines valued at more than $35,000,000.

The milling machines, said Mr. Burk, are used in manufacturing war items as guns, shells, gun carriages, tanks, trucks, planes, plane parts and marine power units.

Operating 24 hours a day, seven days a week, the plant employs approximately 3600.

■ Production of heavy steel barrels and drums in October was 1,780,911 units, compared with 1,712,681 in September and 1,519,624 in October, 1940, the Bureau of the Census reports. For ten months this year production was 14,868,700, compared with 13,546,351 in the corresponding period last year.



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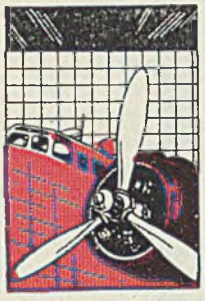
WING TIPS



Production miracle wrought by Allison in three years since first government contract for engines was received . . . Steady flow of orders expands plants to million and a quarter square feet of space . . . Horsepower virtually doubled from first experimental engine to present 1325 rating, with end not yet in sight . . . 7000 parts of 700 different types

LIKE the frog in the well who dropped down three hops every time he went up two, the Allison Division of General Motors Corp. at Indianapolis has been hard pressed to keep pace with orders piled on orders for its 12-cylinder V-type liquid-cooled airplane engine, now refined to the point where it weighs less than one pound per horsepower, according to the latest military rating which shows 1325 horsepower and 1303 pounds weight. If James A. Allison, who organized the Allison Experimental Co. back in 1915 and divided his time between the Indianapolis speedway and fussing around with racing cars and engine designs, were alive today he would no doubt be dumbfounded at what has happened to his little business since his death in 1929.

The little plant where he started and where, during the last war, experiments on tooling of parts for the Liberty motor were being conducted, is now given over entirely to production of a steel-back lead bronze connecting rod bearing which Allison conceived 25 years ago. Scattered around the landscape adjoining it is the present far-flung Allison empire, comprising three more modern plants, providing well over a million square feet of floor space. The few hundred original employes have grown to the present staff of around 12,000, working around the clock, and production has soared.

Accepted by Air Corps in 1937

What happened between the last Armistice and the present time? Not much until 1930, when experimental work began on the present Allison engine. Up to that time, the company puttered around modernizing, repairing and remodeling Liberty engines for the Air Corps and transport companies, and designing some special types of reduction gears for the Navy's Bureau of Aeronautics. In 1929 General Motors, with a weather eye on the future, bought the company and began looking around for a production job to do there. Eight years later the first Allison passed the 150-hour Air Corps type test and was accepted, the first time an engine with 1000 horsepower normal rating had completed this grueling test.

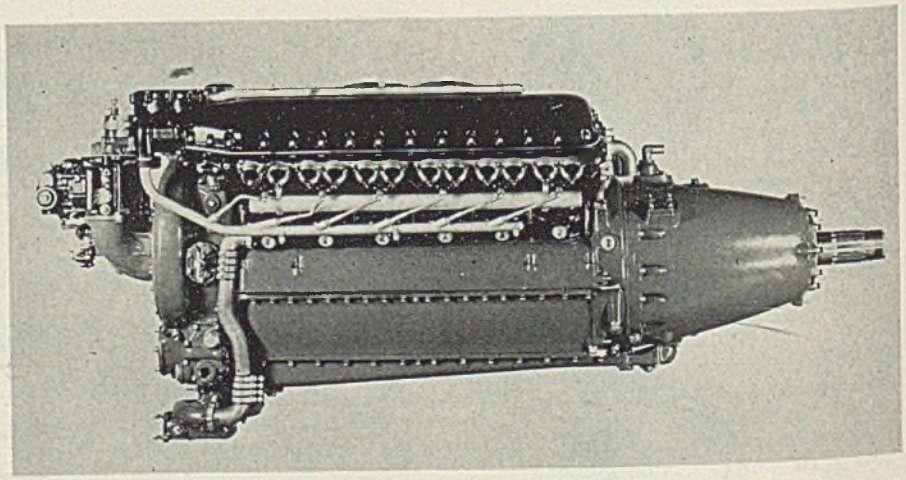
The original design concept is credited to Norman Gilman, now retired but in 1930 head of the Allison organization. He and his engineering crew believed the most logical approach to improvement of aircraft engines rested in the development of the in-line liquid-cooled plant, because of its smaller frontal area, better distribution of fuel regardless of the engine's position, and closer temperature control. They proposed to design the engine around a new coolant, ethylene glycol, which has a high boiling point and readily finds its way into thin cooling passages.

The first handful of engines built during this development period was assigned to various test spots. Some were even placed in dirigibles. Meanwhile the Air Corps became interested in the original design ideas and started work on a program with Allison leading to the engine which on March 23, 1937, clicked off 1000 brake horsepower at 2600 r.p.m. Between 1931 and 1937 16 engines of ten different models had been built and tested.

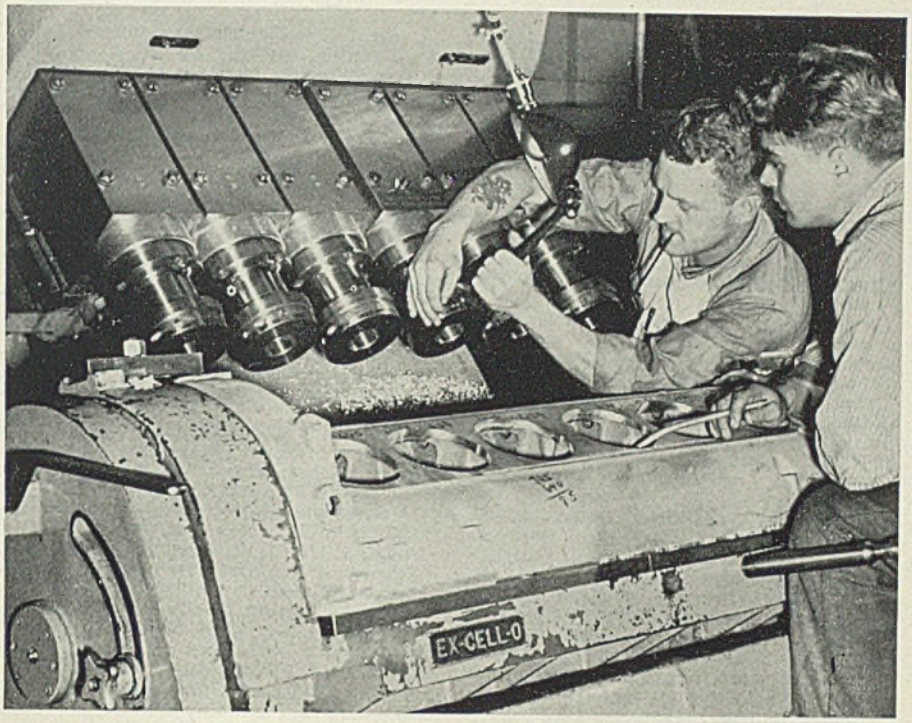
In June, 1938, contract was placed with Allison for one of the engines for installation in the Curtiss XP-40 pursuit plane, to be entered in the Air Corps Pursuit Competition in the spring of 1939. Here the power plant won its spurs and, without waiting for receipt of a contract for engines, General Motors began breaking ground for a larger plant which was completed in December, 1939. By that time the War Department had ordered 969 engines.

Almost immediately, however, with the European mess gathering momentum, new orders for Allisons began to pour in. The first French order was received on Dec. 8, 1939, and another new plant, identified as No. 3, was started to provide additional floor space. This quickly appeared inadequate and was enlarged to cover 21 acres.

Still more orders showered in, the first British order coming in May, 1940, leading to start of construction of Plant 4 and adding another 250,000 square feet of floor space. The original Allison plant, as mentioned before is now used exclusively for



Allison V-12 aircraft engine weighs 1303 pounds, delivers 1325 horsepower at better than 3000 r.p.m.



■ Six-spindle precision boring machine with inclined head developed specially for boring crankcase to receive cylinder barrels

manufacture of bearings. Plant 2 is devoted to experimental and training work, and even One-Eye Connolly would have a tough time getting in here these days. Plants 3 and 4 house the receiving, manufacturing, assembly, testing and shipping departments, as well as offices.

Despite difficulties attendant upon such a steady expansion of plant and equipment, production of the Allison 1710 model has mounted steadily since August, 1940, to the present. At the moment the plants are considered to be about 85 per cent equipped, the remaining 15 per cent being needed to balance out present facilities and to reach the production goal.*

Engine Adapted to Special Installations

Strictly speaking, the Allison engine has been produced in quantity in three models. One is the so-called C15 model built prior to the increase in horsepower from 1040 to 1150, this being effected principally through a change in blower ratio from 8.77 to 1 to 8.80 to 1. More recently the latter type has been increased to 1325, and this engine is built in two types, one the so-called "short nose" type, F-3R, and the other the E-4 with extension shelf and outboard reduction gearbox, for installation in Bell Airacobra pursuit ships in which the engine is located to the rear of the pilot. In this model the extension shaft runs forward through a center bearing to the gearbox in the nose of the ship, permitting installation of a cannon firing through the propeller hub. Allison, incidentally, manufactures the extension shaft, gearbox and accessories.

Horsepower ratings mentioned previously were achieved in Air Corps tests. Engine displacement is 1710 cubic inches, bore 5.5 inches, stroke 6 inches. Fuel used is rated at 100 octane. Length of the F-3R engine is 88⅜ inches, the extension shaft model 196 inches overall; width of both is 29 9/32 inches, height 36 17/32 inches.

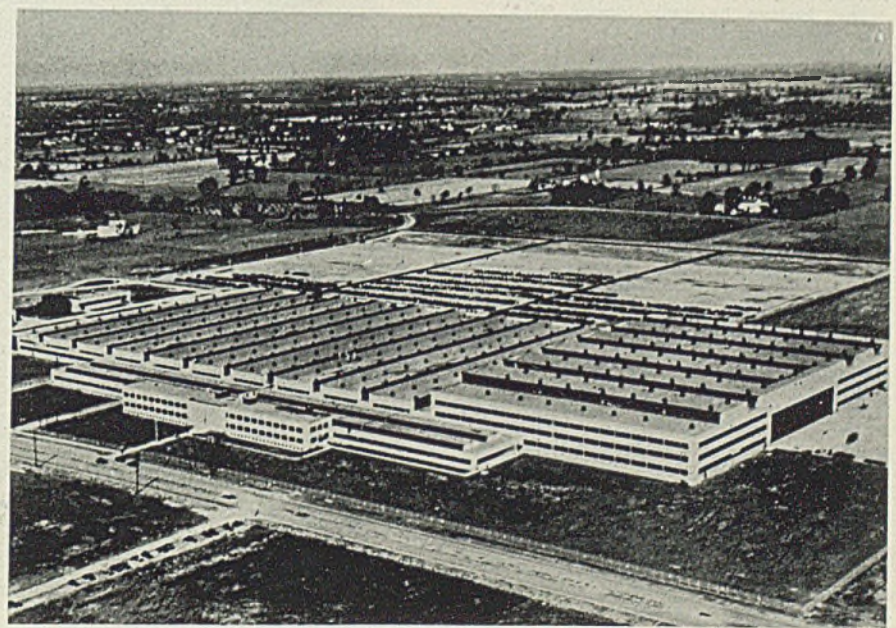
Construction details are briefly as follows: Cylinder block comprises a cast en bloc head of aluminum alloy, carburized steel barrels shrunk into the head and a one-piece cast aluminum alloy jacket for circulation of coolant around the barrels. The block is held to the head by studs, and the bottom of the coolant jacket is held to each barrel by a threaded nut. Each of the two cylinder block assemblies is positioned at a 60-degree V and is held to the crankcase by 14 stud bolts extending through the head. Combustion chambers are of the roof type, each pair of exhaust and inlet valves being positioned 22.5 degrees from the cylinder axis. Exhaust valve seats are forged alloy steel faced with Stellite; inlet valve seats are aluminum bronze. Exhaust valves are sodium cooled and seats are faced with stellite.

Rocker arm assemblies are mounted on top of the cylinder head, actuated by a central hollow over-

(*Please turn to Page* 121)

*Censorship by the Army Air Forces in Washington has rather completely destroyed the sense of this paragraph. Figures on rates of production by Allison have been published widely; why they were deleted here is not known. However, in August, 1940, the engines were being produced at a rate of 65 per month, and the goal at the end of this year is 1000 engines a month.

Curtiss-Wright's New 25-Acre Dive-Bomber Plant



■ Aerial view of the new 25-acre aircraft plant erected at Columbus, O., by Curtiss-Wright Corp., New York, in 147 days. Costing $14,000,000, the plant was officially dedicated Dec. 4 as America's largest producer of dive-bombers for the United States Navy. It is reported the largest aircraft factory in the Middle West and is the second of three units built by Curtiss-Wright for manufacture of aircraft in the war program. NEA photo

Ordnance Department Awards Lead $87,428,154 War Contracts in Week

■ ORDERS reported last week by the War Department totaled $87,428,154, with most of them being awarded for the Ordnance Department. Many of the individual contracts were small, representing broad distribution of armament work among manufacturers with comparatively limited facilities. The orders included:

Ordnance Department Awards

Ahlberg Bearing Co., Chicago, parts for gun carriages, $6959.

Allis-Chalmers Mfg. Co., Milwaukee, parts, 35211.

Aluminum Seal Co., New Kensington, Pa., aluminum detonator parts, $23,665.

American Brake Shoe & Foundry Co., American Forge Division, Chicago, ammunition, $59,555.

American Brass Co., Waterbury, Conn., copper rod, $4546.

American Chain & Cable Co. Inc., American Cable Division, Wilkes-Barre, Pa., towing cables, $20,666; Wright Mfg. Division, York, Pa., blocks, $13,164.

American Foundry Equipment Co., Mishawaka, Ind., parts for wheelabrator, $5280.

American Locomotive Co., Railway Steel Spring Division, Latrobe, Pa., steel springs, $21,278.

American Manganese Bronze Co., Philadelphia, manganese bronze, $28,964.

American Safety Razor Corp., Brooklyn, N. Y., shell housings, $77,500.

American Type Founders Co., Elizabeth, N. J., tools and machinery, $495,000.

Ampco Metal Inc., Milwaukee, welding rods, $4105.

Apex Electrical Mfg. Co., Cleveland, machine gun mounts, $3,000,640.

Appliance Mfg. Co., Alliance, O., tripod mounts, $323,380.

Armstrong, G. R., Manufacturers Supplies Inc., Boston, hacksaw blades, $5443.

Arter Grinding Machine Co., Worcester, Mass., grinders, $3490.

Athey Truss Wheel Co., Chicago, trailers, $41,771.

Barber-Colman Co., Rockford, Ill., milling cutters and cutting tools, $16,271.

Bath, John, & Co. Inc., Worcester, Mass., gages, $4009.

Bendix Aviation Corp., Eclipse Machine Division, Elmira Heights, N. Y., shells, ammunition, $476,882; Scintilla Magneto Division, Sidney, N. Y., parts for tanks, 34973.

Bonney Forge & Tool Works, Allentown, Pa., wrenches and tools, $7609.

Brown & Sharpe Mfg. Co., Providence, R. I., lathes, $80,518.

Brown, Wilson, Co., New York, lathes, $12,400.

Bruner-Ritter Inc., Bridgeport, Conn., boosters, $96,406.

Budd, E. G., Mfg. Co., Philadelphia, ammunition, $326,646.

Carnegie-Illinois Steel Corp., Chicago, steel bars, $39,868.

Centennial Cotton Gin Co., Columbus, Ga., practice bombs, $161,015.

Chase Brass & Copper Co. Inc., Waterbury, Conn., brass rods, bronze bars and seamless brass tubing, brass strips, $34,687.

Chicago Electric Co., Chicago, generator sets, $8000.

Cleveland Cutter & Reamer Co., Cleveland, tools, $3400.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., pistols and magazines, small arms, $116,255.

Columbus Forge & Iron Co., Columbus, O., forgings, $15,710.

Continental Motors Corp., Muskegon, Mich., gears, gear pins, rod assemblies, tools, parts for tanks, $49,511.

Crucible Steel Co. of America, New York, steel, $7144.

Davis Tool & Equipment Co. Inc., Chicago, taps, $3825.

Doehler Die Casting Co., Toledo, O., boosters, $93,000.

Draper Corp., Hopedale, Mass., ammunition, $131,000.

Easy Washing Machine Corp., Syracuse, N. Y., machine gun mounts, $4,322,120.

Fuller Mfg. Co., Unit Drop Forge Division, West Allis, Wis., forgings, $31,134.

Gairing Tool Co., Detroit, cutters, $3192.

General Motors Corp., Delco Products Division, Dayton, O., shells, $191,250; Detroit Division, ammunition, $6,780,000; Hyatt Bearings Division, Harrison, N. J., bearings, $7108; Chevrolet Motor Division, Detroit, pilot caissons, $10,975; Delco-Remy Division, Anderson, Ind., starters, generators and regulators, $226,177; Olds Motor Works Division, Lansing, Mich., guns $2,350,000.

General Power Inc., Quapaw, Okla., ammunition, $19,445.

Gibson Electric Refrigerator Co., Greeneville, Mich., ammunition chests, $604,782.

Graybar Electric Co. Inc., Boston, wire and cable, $3439.

Great Lakes Steel Corp., Ecorse, Detroit, rails, 39685.

Greenfield Tap & Die Corp., Greenfield, Mass., gages, $8071.

Gries Reproducer Corp., New York, gages, 36215.

Gulberson Diesel Engine Co., Chicago, engines, $2,455,301.

Hanssen's, Louis, Sons, Davenport, Iowa, snap bolts and gimp tacks, hinges, $5781.

Hesse Machine & Mfg. Co., Boston, gages, $3625.

High Standard Mfg. Co., New Haven, Conn., guns, $10,254,557.

International Harvester Co., Chicago, tractors, $1,207,116.

International Nickel Co. Inc., Huntington, W. Va., cylinders, $319,435.

Jobst, Richard V., Chicago, axes, $7662.

Johnson & Dealaman Inc., Newark, N. J., material loaders, $6400.

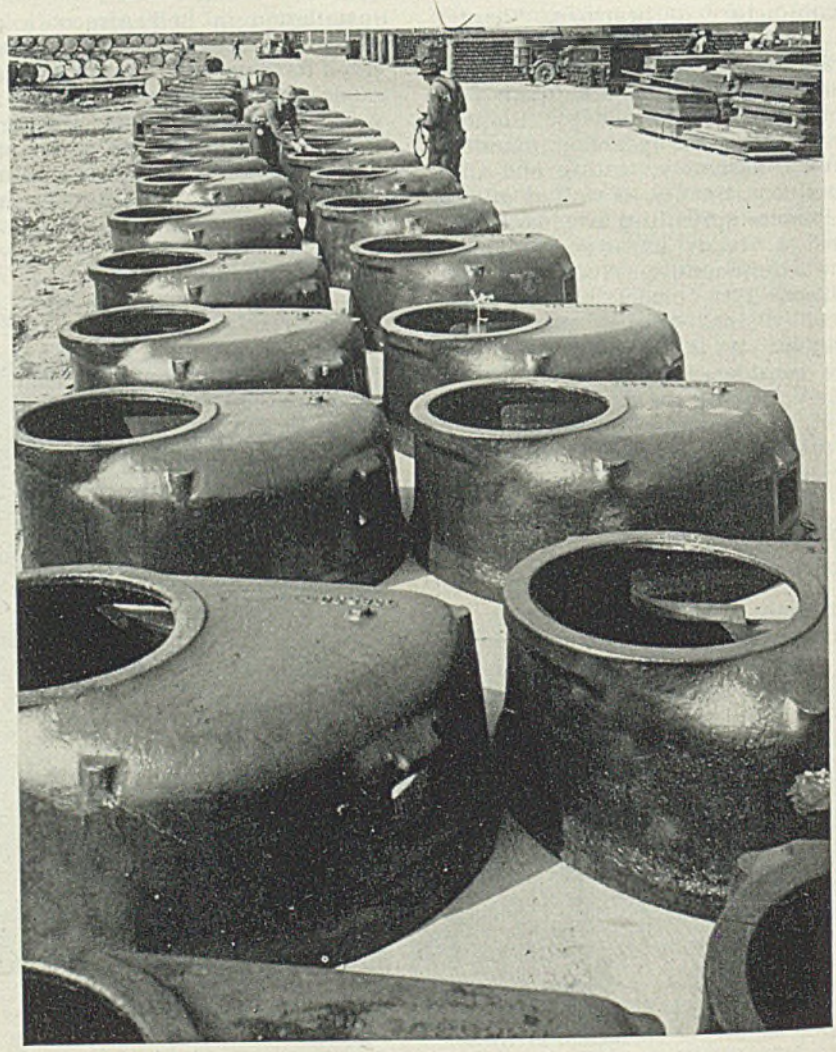
Jones & Lamson Machinery Co., Springfield, Vt., lathes, $5762.

Joslyn Mfg. & Supply Co., Chicago, ammunition, $13,974.

Kloster Steel Corp., Chicago, steel, $4989.

Krueger, H. R., & Co., Detroit, chamber-

Cast Turrets for 28-Ton M-3 Tanks



■ Ready for installation in 28-ton Chrysler M-3 tanks, these 4000-pound turret castings have just been received at the huge Chrysler tank arsenal in Detroit. More than 10,000 men are engaged at this plant in production of the medium "rolling arsenals." OEM photo

ing machines, $42,800.
Liberty Tool & Gage Works Inc., Providence, R. I., gages, $44,481.
Lindberg Engineering Co., Chicago, furnaces and equipment, $4678.
Liquid Carbonic Corp., Chicago, ammunition, $83,389.
Lovell Mfg. Co., Erie, Pa., tripod mounts, $409,530.
Lyman Gun Sight Corp., Middlefield, Conn., sight parts, $24,190.
McCord Radiator & Mfg. Co., Detroit, helmets, $2,307,268.
McGill Mfg. Co., Valparaiso, Ind., ball bearings, $17,394.
Mack Mfg. Corp., New York, prime movers, $67,960.
Merco Co., Los Angeles, gages, $7354.
Merz Engineering Co., Indianapolis, gages, $3857.
Midvale Co., Nicetown, Philadelphia, suspension rods, $6518.
Midwestern Tool Co., Chicago, gages, $10,449.
Minneapolis-Moline Power Implement Co., Minneapolis, shells, $805,200.
Moore Special Tool Co. Inc., Bridgeport, Conn., punches and dies, $7890.
Nash-Kelvinator Corp., Detroit, binoculars, $599,535.
National Cash Register Co., Dayton, O., shell housings, $147,490.
National Lock Co., Rockford, Ill., hinges, hasps, and swivel assemblies, $26,385.
New Jersey Machine Corp., Hoboken, N. J., labeling machines, $23,940.
Nineteen Hundred Corp., St. Joseph, Mich., machine gun mounts, $4,322,120.
Nunn Mfg. Co., Evanston, Ill., shells, $66,285.
Oilwell Supply Co., Oil City, Pa., shells, $125,955.
Oliver Farm Equipment Co., Chicago, shells, $154,837.
Otis Elevator Co., Buffalo, castings, $6876.
Plume & Atwood Mfg. Co., Thomaston, Conn., brass strips, $41,035.
Poor & Co., Canton Forge & Axle Works, Canton, O., drop forgings and trimming dies, $10,125.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $4987.
Precision Castings Co., Cleveland, boosters, $93,990.
Precision Mfg. Co., Philadelphia, gages, $18,416.
Prentiss, Henry, & Co., New York, drilling and boring machines, tools, $29,120.
Putnam Tool Co., Detroit, cutting tools, 38590.
Read Machinery Co. Inc., York, Pa., gun parts, $5571.
Reasoner Tool & Supply Co., Detroit, hacksaw blades, $5540.
Remington Arms Co. Inc., Bridgeport, Conn., cartridges, $6358.
Republic Electric Co., Davenport, Iowa, cable, $5008.
Revere Copper & Brass Inc., Chicago, brass, $3412.
Robertshaw Thermostat Co., Youngwood, Pa., shells, $130,618.
Schwitzer-Cummins Co., Indianapolis, cartridge cases, $253,597.
Shipley, W. E., Machinery Co., Philadelphia, grinders, $6849.
Smalley General Co., Bay City, Mich., thread milling machines, $17,704.
Smith, Thomas, Co., Worcester, Mass., discs, $3864.
Specialty Engineering Co., Philadelphia, conveyors and boosters, motor starting equipment, $11,790.
Standard Forgings Corp., Indiana Harbor, Ind., shells, $390,720.
Suburban Essex Machinists Inc., Orange, N. J., gages, $8650.
Superior Steel Corp., Pittsburgh, cups for guns, $4750.
Swartzbaugh Mfg. Co., Toledo, O., packing cans, $5096.
Swind Machinery Co., Philadelphia, milling machines, $4829.
Timken Detroit Axle Co., Detroit, gear boxes, $82,976.
Timken Roller Bearing Co., Canton, O., bearings, ammunition, journal boxes, $184,904.
Triad Tool & Die Co., Newark, N. J., staking pins, $5600.
Triumph Explosives Inc., Elkton, Md., percussion element assemblies, $194,625.
Universal-Cyclops Steel Corp., Titusville, Pa., steel, $3133.
U. S. Hoffman Machine Corp., New York, conveying equipment, $9466.
Van Dyck Churchill Co., New York, tools, $24,028.
Vinco Corp., Detroit, gages, $3897.
Vulcan Mold & Iron Co., Latrobe, Pa., molds, $3426.
Wagner Electric Corp., St. Louis, ammunition, $25,200.
Waltham Gage Co., Detroit, shells, $3600.
Warner Electric Brake Mfg. Co., Beloit, Wis., jumper cables, safety chain assemblies and cable clamps, $6945.
Watson-Stillman Co., Roselle, N. J., intensifiers, pumps and motors, $3806.
Weaver, Frank M., & Co. Inc., Lansdale, Pa., steel, $8882.
Weaver Mfg. Co., Springfield, Ill., trucks, $17,953.
Western Cartridge Co., Winchester Repeating Arms Co. Division, New Haven, Conn., rifles, $5,807,742.
Western Corp., Chicago, roller bearings, $12,675.
West Tire Setter Co., Rochester, N. Y., presses, $367,850.
Winter Weiss Co., Denver, trailers, $27,790.
Wood, John, Mfg. Co. Inc., Muskegon, Mich., parts for recoil mechanisms, $74,452.
Wright Aeronautical Corp., Paterson, N. J., tools, $109,468.
Zimmerman Steel Co., Bettendorf, Iowa, castings, $3763.

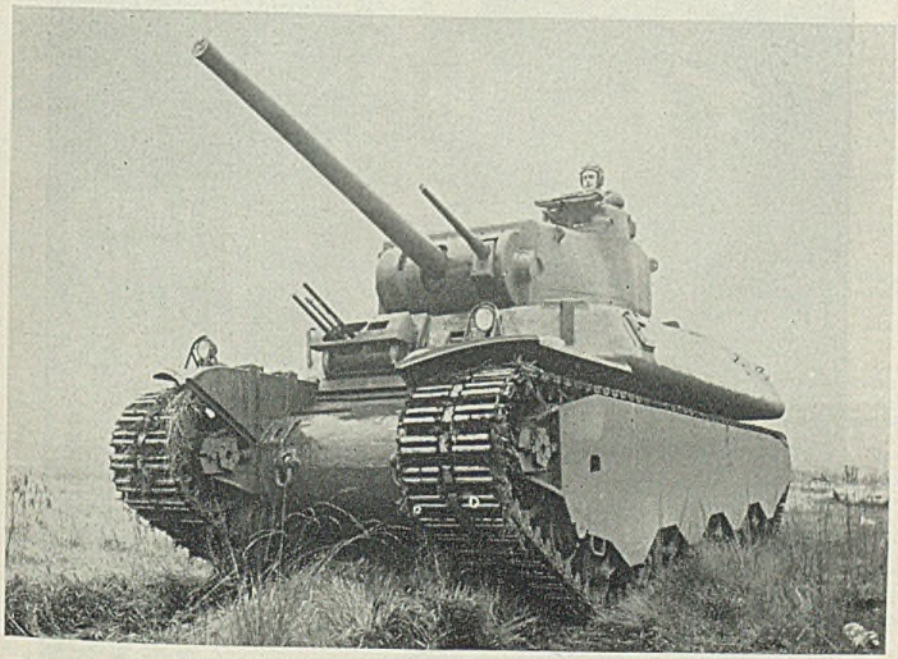
Quartermaster Corps Awards

Ford Motor Co., Dearborn, Mich., 5-passenger cars, $113,460.
Gray Marine Motor Co., Detroit, diesel engines, $15,368.
Hall Scott Motor Car Co., New York, engines, $80,250.
Kremkau, C. F., & Son, Pittsburg, Calif., motor launches, $22,000.
Lincoln Engraving Co., Baltimore, lubricating guns, $2062.
Mack Mfg. Corp., Plainfield, N. J., parts for trucks, $20,876.
Manteo Boatbuilding Co., Manteo, N. C., boats, $187,000.
Nash-Kelvinator Corp., Racine, Wis., 2-wheel trailers, $453,360.
Tempte Bros., Denver, 2-wheel semi-trailers, $103,019.
Van Dorn Electric Tool Co., Towson, Md., valve reseating accessories, $6668.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., trucks, $6,717,424.

Chemical Warfare Service Awards

Duquesne Smelting Corp., Pittsburgh, zinc dust and drums, $3960.
Grammes, L. F., & Sons Inc., Allentown, Pa., washers, $7322.
Miller Co., Meridian, Conn., brass, $15,747.
Stewart-Warner Corp., Chicago, elbow nozzles, $9795.
United-Carr Fastener Corp., Cambridge, Mass., clinch plates, sockets, studs, washers, $16,360.
United Pressed Products Co., Chicago,

First 60-Ton Tank Delivered to Army



■ The first 60-ton heavy combat tank built in the United States was formally delivered to the Army by the Baldwin Locomotive Works, Eddystone, Pa., last week. A number of industrialists, officials of the War Department and several thousand employes witnessed the ceremony and a series of demonstrations.

Charles E. Brinley, president, was to have made the official presentation, but the death of W. H. Winterrowd, vice president in charge of ordnance, made it impossible for him to be present. His place was taken by William H. Harman, a vice president. Major General Barnes received the tank.

"We offer for your inspection the first M-I tank to be built in this country—the 60-ton unit," said Mr. Harman. "Last April our first medium tank was presented on a similar occasion, and now the M-3 tanks are rolling out of our plant, fulfilling all present production schedules and in constantly increasing number."

The new tank's specifications and firing power are closely guarded secrets. Turrets are castings.

faceforms, $6497.
Wolverine Tube Co., Detroit, seamless brass tubing, $23,328.

Signal Corps Awards

American Automatic Electric Sales Co., Chicago, automatic telephone central office equipment, tool equipment, $44,156.
Antonelli Fireworks Co., Rochester, N. Y., ammunition, $1,005,000.
Belmont Radio Corp., Chicago, radio receivers and parts, $74,261.
Brach, L. S., Mfg. Corp., Newark, N. J., counterpoises, $11,085.
Burke Electric Co., New York, motor generators, $4490.
Chicago Tool & Kit Mfg. Co., Chicago, tool set, $67,481.
Collins Radio Co., Cedar Rapids, Iowa, radio transmitters, $21,090.
Graybar Electric Co., New York, cables, reels, wire, $40,327.
Hammarlund Mfg. Co. Inc., New York, radio receivers, $49,243.
Horton Mfg. Co., Bristol, Conn., mast bases and sections, $3418.
Janette Mfg. Co., Chicago, rotary converters, $8740.
Kellogg Switchboard & Supply Co., Chicago, switchboard equipment, $71,646.
Philco Corp., Trenton, N. J., batteries, $3431.
Rauland Corp., Chicago, transmitter tuning units and parts, $30,145.
RCA Mfg. Co. Inc., Camden, N. J., radio equipment, $947,389.
Remler Co. Ltd., San Francisco, plugs, $18,930.
Simpson Electric Co., Chicago, voltometers, $30,000.
Technical Appliance Corp., New York, guys, $10,101.
Teletype Corp., Chicago, teletype parts, $104,561.
Widin Metal Goods, Garwood, N. J., mast bases and sections, $3653.
Winslow Co. Inc., Newark, N. J., keys, $4650.

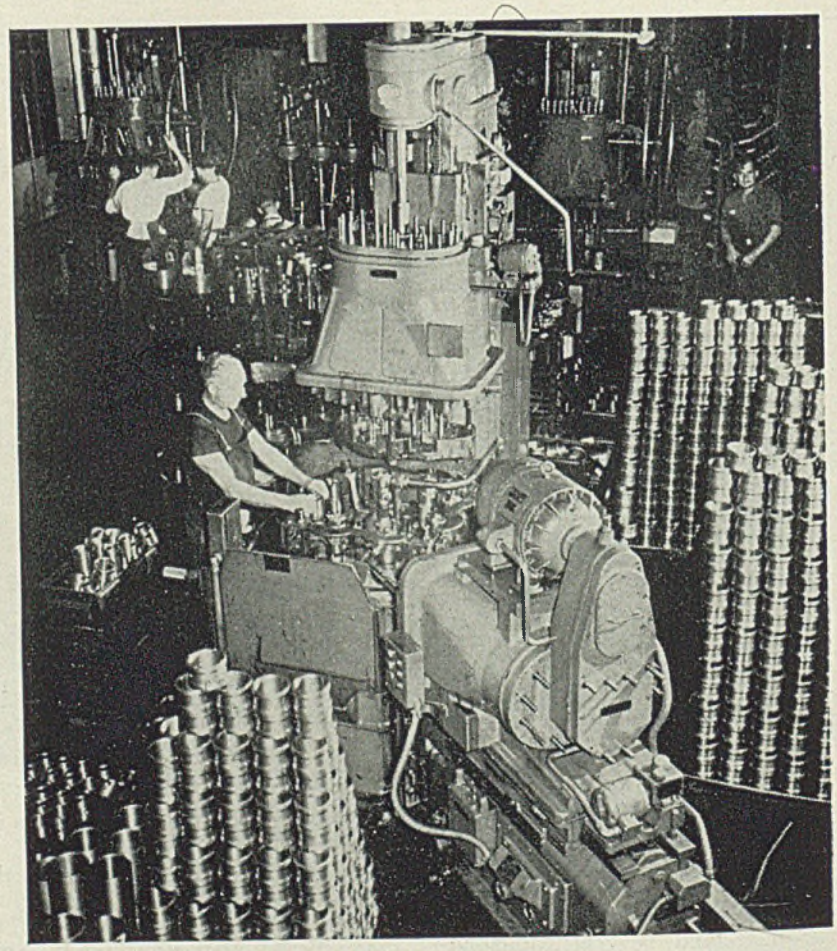
Air Corps Awards

American Bosch Corp., Springfield, Mass., magneto and distributor assemblies, $10,320.
American Chain & Cable Co. Inc., American Cable Division, New York, tow target exchange ring assemblies, cable, $124,751.
American Steel & Wire Co. of New Jersey, Columbus, O., cable, $51,051.
Artos Engineering Co., Milwaukee, stand assemblies and tachometers, $42,250.
Bendix Aviation Corp., Scintilla Magneto Division, Sidney, N. Y., magneto and distributor assemblies, $51,739; Bendix Products Division, South Bend, Ind., tail wheel assembly parts, $140,149.
Boeing Aircraft Co., Seattle, parts for airplanes, engine cowl wings, $311,305.
Bowser, S. F., & Co. Inc., Ft. Wayne, Ind., sight assemblies, $166,181.
Curtiss-Wright Corp., Curtiss Propeller Division, Caldwell, N. J., parts for airplanes, $812,709; Airplane Division, Robertson, Mo., parts for airplanes, $176,064.
C. & E. Marshall Co., Chicago, jewelers' lathes, $70,310.
Garland Mfg. Co., Saco, Me., hammers and mallets, $53,589.
General Motors Corp., Delco Products Division, Dayton, O., motor assemblies, $43,821.
Hamilton Watch Co., Lancaster, Pa., navigation watches, $111,762.
Heil Co., Milwaukee, oil servicing trucks, $2,620,584.
Independent Engineering Co., O'Fallon, Ill., generators, $585,000.
Jacobs Aircraft Engine Co., Pottstown, Pa., parts for airplane engines, $92,730.
Jaeger Watch Co. Inc., New York, clock assemblies, $74,970.
Kidde, Walter, & Co. Inc., New York, cylinder assemblies, $330,925.
Lockheed Aircraft Corp., Burbank, Calif., fuselage and bomb bay fuel tanks, airplane parts, $11,023,889.
Longines-Wittnauer Watch Co. Inc., New York, compass assemblies, $47,191.
Meriam Co., Cleveland, manometers, $107,892.
Pyle-National Co., Chicago, floodlights, $88,490.
Snap-On Tools Corp., Kenosha, Wis., tools, $342,660.
Sparks Withington Co., Jackson, Mich., mooring kits, $320,700.
Taylor Instrument Companies, Rochester, N. Y., compass assemblies, $48,298.
Trailer Co. of America, Cincinnati, semitrailers, $1,759,065.
Vichek Tool Co., Cleveland, tools, $257,290.
Westinghouse Electric & Mfg. Co., Dayton, O., floodlights, $62,201.
Williams, J. H., & Co., Buffalo, tools, $232,400.
Wire Rope Corp. of America Inc., New Haven, Conn., cable, $51,051.
Wright Tool & Forge Co., Barberton, O., tools, $205,953.

Corps of Engineers Awards

American Monorail Co., Cleveland, cranes and craneways, aircraft assembly plant, Kansas City, Kans., $95,922.
American Petrometal Corp., Long Island City, N. Y., steel bars, $3287.
Armature Electric & Machine Co., Omaha, Nebr., extension boxes, $7260.
Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia, test machines, $18,810.
Barnes Drill Co., Rockford, Ill., drill presses, $6070.
Bethlehem Steel Co., Bethlehem, Pa., steel trash racks, gates, stop logs, Bonneville, Oreg., $66,180.
Bethlehem Steel Export Corp., New York, one meter gage turnouts, $71,496.
Buckeye Steel Castings Co., Columbus, O., steel castings, $233,970.
Century Equipment Corp., New York, engine and generator sets and parts, $26,969.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines and cutters, $9696.
Cincinnati Shaper Co., Cincinnati, shapers and vee belts, $25,257.
Clamshell Bucket Sales Corp., Long Island City, N. Y., clamshell and dragline buckets, $8730.
Dixie Mill Supply Co., New Orleans, machine shop equipment and supplies, $4188.
Ft. Pitt Bridge Works, Pittsburgh, bridge superstructure, Massillon, O., $448,044.
Four Wheel Drive Auto Co., Clintonville, Wis., boring machines and augers, $171,922.
Freyn Bros. Inc., Indianapolis, special type steel racks and steel frame tables, $31,713.
Gale Service & Construction Co., Chicago, boiler washing systems, $23,065.
General Fire Truck Corp., New York,

GM Plant Converted 100% to Defense Production



■ Complete changeover from automobile equipment to defense production will have been achieved by General Motors Rochester Products Division, Rochester, N. Y., by year's end, the company reports. Requiring 12 months for the conversion to 100 per cent defense output, the change was made without any general work stoppage or major layoffs. Typical of steps taken in the conversion process is the multiple drill shown here which combines a score of operations into one. The machine drills 20 holes in generator and starting motor "yokes" on frames for military planes and tanks

fire fighting equipment, $2469.

Heller, Regina, Los Angeles, guard rail posts, mounting bolts, nuts, bevel washers and braces, $10,539.

Independent Pneumatic Tool Co., Chicago, pneumatic drills and accessories, $15,568.

Ingersoll-Rand Co., Washington, air compressors and parts, $15,901.

Landis Machine Co. Inc., Waynesboro, Pa., threading machines, $8985.

Mahoney-Clarke Inc., New York, welding supplies, hardware and tools, $9739.

Manning, Maxwell & Moore Inc., Jersey City, N. J., drill presses, punches and shears, $3460.

McMaster-Carr Supply Co., Chicago, nuts, $8957.

O'Brien & Co., St. Paul, chlorinators and flow meters, $4601.

Pacific Car & Foundry Co., Seattle, steel trash racks, gates, stop logs, Bonneville, Oreg., $36,981.

Penn, H. O., Machinery Co. Inc., New York, attachments for tractors, $4050.

Philadelphia Tramrail Co., Philadelphia, overhead hoists and parts, $9765.

Pomona Pump Co., New York, pumping units, $9958.

Pressed Steel Car Co. Inc., Pittsburgh, rails, splice bars and ties, $14,836.

Price Bros. Co., Dayton, O., scraper with tractor, $3680.

"Quick-Way" Truck Shovel Co., Denver, parts for cranes, $43,216.

Sidney Machine Tool Co., Sidney, O., lathes, $4544.

Sterling Motors Corp., Long Island City, N. Y., truck supplies, $18,126.

Titusville Iron Works Co., Titusville, Pa., water tubes, low head, oil-fired boilers with fittings, soot blowers, tube cleaner and tools, $14,849.

Van Dorn, Oliver H., Co. Inc., New Orleans, used and new machine shop equipment and tools, $3180.

Warren Pipe Co. of Mass. Inc., Boston, pipe and fittings, $5831.

Webber Motor Car Co. Inc., Westwood, N. J., plant, Jersey City, N. J., trucks and motors, $5167.

Contract Opportunities . . . . .

■ District offices of the Contract Distribution Division, OPM, last week issued more subcontract opportunities not heretofore published in STEEL. The opportunities are reported available to all qualified manufacturers possessing requisite facilities for handling the work offered and who are not already engaged to capacity upon war orders.

Additional information concerning any specific item may be secured from either the office issuing the opportunity or from the prospective subcontractor's nearest district office. Actual samples or drawings of the desired article are available, in most cases, for personal examination at the district offices. The opportunities:

Division of Contract Distribution, OPM, Union Commerce building, Cleveland, is seeking subcontractors for the following work:

66-1205: Aircraft manufacturer wishes to subcontract machining and internal splining. Operations to be quoted on (a) Machine complete (b) machine internal splines only. Material furnished—chrome nickel S.A.E. 3312. Quantities in lots of 50-100; 500-1000. Delivery not stated—A1A priority. Blueprints on file in this office.

67-1205: Manufacturer requires machining facilities for alloy rotor forgings. Operations to be quoted on (a) Machine complete or (b) boring only. Indications of repeat orders on this and similar forged rotors. Equipment indicated H. D. boring mill. Size of forging 41 x 40 inches high. Quantities and delivery unknown. Blueprints in our files.

68-1205: Manufacturer requires facilities for machining complete small gear case and component parts including cover and gears. Equipment indicated: Light boring mill; milling machine; multiple spindle adjustable drill press with tapping attachment; hand screw machine; cylindrical grinder; blanchard grinder; broach and gear cutter. Chrome moly steel S.A.E. 4140 bar and sand-cast aluminum. Initial requirement, 250 units per week. Blueprints in this office.

69-1025: Manufacturer requires machining facilities for machining of 14 items in varying quantities. Equipment indicated covers wide range of machines, also heat treating and plating facilities. Materials consist of nickel molybdenum; chrome, nickel steel; nitralloy bar stock, and nickel molybdenum; chrome nickel steel forgings. Prints on file this office.

70-1025: Manufacturer wishes to subcontract considerable work requiring large automatics, sizes 3½ to 5½-inch bar capacity multiple and single spindle. Material, steel, E 3135-1 and E 512004. Limits commercial. Quantities 5000 and 10,000 of four items. Blueprints on file this office.

71-1025: Manufacturer requires machining facilities consisting of horizontal boring mills; heavy duty horizontal and vertical milling machines, multiple stop, multiple spindle adjustable head heavy duty drill press. Material, cast steel armor. Limits medium. Quantities large. Blueprints on file this office.

Detroit office, Division of Contract Distribution, 160 West Fort street reports the following subcontracting opportunities:

I.S. 109: Large boring mill, planer and gear work available for the following machines, all capable of taking work over 72 inches: Horizontal boring mills, with spindle over 4½-inches diameter; planers and gear hobbers.

I. S. 106: Cutting tools urgently needed, especially reamers, cutters (profile, form, inserted tooth), counterbores and form tools (flat and circular).

I. S. 107: Machining of 27 aluminum, bronze and steel parts. All material furnished. Various sizes; small quantities. Close tolerances. Operations required: Lathe, screw machine, drill press, hand mill, tapping, centerless grinding, cyaniding, carburizing and cadmium plating.

I. S. 108: Machining and assembling gear box, consisting of cast aluminum alloy gear case (2 x 3 x 3 inches) and cover, and seven gears (5/16 to 1⅝-inch outside diameter) of chrome molybdenum steel SAE 4140. Casting source known. A-1-b priority. Present requirements 250 per week; subsequently 1000 per week.

I. S. 110: Parts to be machined are aluminum forgings and castings of from 4 x 4 inches to 8 x 12 inches. Requires lathes up to 16-inch swing, vertical mills and drill presses. Tolerance 0.002 to 0.005-inch.

Minneapolis office, Division of Contract Distribution, Rand Tower, reports the following subcontracting opportunities:

S. O. 143: Twin Cities manufacturer requires assistance on the following: Punches (screw machines and cylindrical grinders); dies (screw machines and internal grinders); perishable tools for drawing brass (mirror finish.) Material is tool steel; tolerances very close; quantities 100 to 1800 each. These are mostly cylindrical dies for shell forming operations.

S. O. 144: Twin Cities manufacturer requires assistance on gun mount parts. Large steel castings to be rough machined before normalizing. Involves vertical boring mills 8 to 16 feet; planer type mills with three or more heads; horizontal boring mills, table type.

S. O. 145: Minneapolis manufacturer requires subcontracting assistance on 8-inch spur gear worm threads; miscellaneous small parts.

■ Production of molybdenum in October was 3,918,000 pounds and shipments 4,135,300 pounds, according to the Bureau of Mines. This compares with production of 3,816,000 pounds and shipments of 3,093,000 pounds in September. Average rate of production and shipments in 1940 was 2,859,400 and 2,110,800 pounds, respectively.

Striking Power Comparison

CHICAGO

■ WHEN we get our manufacturing, our mass production rolling, no nation can make anything like the quantities that we can make, declared Charles F. Kettering, vice president, General Motors Corp., Detroit, in addressing the forty-eighth annual banquet of the Illinois Manufacturers' Association, Chicago, Dec. 9. Twenty-two hundred executives from Illinois and other parts of the Middle West attended the dinner meeting.

The association unanimously adopted a resolution pledging full support to the United States in the war.

Mr. Kettering defined mechanized warfare as power warfare, and asserted that the amount of power used is astonishing. Grand Coulee dam when finished will develop 1,500,000 horsepower, but that is just one-third of the horsepower production of the three large aviation engine companies per month today. We are making about 4,500,000 horsepower per month in aviation engines alone.

The normal automobile production of this country, 4,000,000 cars, counted at only 50 horsepower per car, amounts to 200,000,000 horsepower per year. The same 50 horsepower for the 30,000,000 vehicles running gives a 1,500,000,000 installed horsepower in our transportation system. That is "almost the same amount that the railroads and other people have." Consequently, power and power machinery are the important factors in this war. Total installed horsepower in all central stations in the United States today is only 40,000,000 horsepower.

Unprecedented Horsepower Needed

"So when you talk about mechanized warfare, you are talking about horsepower warfare and the use of it such as has never been done before." He then expressed confidence in the Army and Navy to use this power.

Sterling Morton, secretary, Morton Salt Co., Chicago, was installed as the new president of the association, succeeding Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill.

O. M. Burton, president, Burton-Dixie Corp., Chicago, became the new first vice president; H. G. Myers, president and general manager, Gardner-Denver Corp., Quincy, Ill., second vice president; and E. F. Mansure, president, E. L. Mansure Co., Chicago, treasurer of the organization.

STEEL

Remember Pearl Harbor!

■ SUNDAY, Dec. 7, 1941, while Japanese envoys were engaging in gestures of peace in Washington, Japan's bombing planes attacked Pearl Harbor without warning.

Thursday, Dec. 11, 1941, Germany and Italy declared war upon the United States of America.

• • •

Had the most astute master minds of the Axis nations labored for months to seek the most certain method of paving the way for their ultimate defeat, they could not have done better. The infamous treachery of Japanese at Hawaii and Washington, and Germany and Italy's declaration of war against us constitute a chain of circumstances which not only puts the United States in a favorable position in history but also unites the American people more promptly and more completely than would have been possible under any other combination of events.

The initial result of Japan's quick thrust was a triumph for the attackers. The damage at Pearl Harbor and the sinking of the PRINCE OF WALES and the REPULSE are feats more spectacular than anything that Hitler's thoroughly trained fighters have accomplished in this war.

But these early successes of Japan and practically all of Hitler's diplomatic craftiness of the past do not add up to an advantage for the Axis that is even remotely comparable to the total advantage which a united, fighting-mad America gives to the cause of free nations everywhere. Japan's coup and Hitler's blundering diplomacy have rendered us a history-making service of unity and solidarity which for more than two years of floundering we had not been able to perform for ourselves.

Japan has won the first round in the shooting war, but the United States has won out against the Axis in the two-year battle of nerves.

Henceforth we can concentrate on war. To industry this means "doubled and quadrupled production; working on a seven-day week basis, and building more new plants, adding to old plants and using many smaller plants for war needs," as President Roosevelt has indicated. It also means 1000 giant bombers a month, as William S. Knudsen has stated, and drastic increases in the number of ships, tanks, bombs, guns, etc.

But these estimates are just shots in the dark. Nobody knows now what the quotas for any type of war equipment, materials or supplies will be. We can only go on the assumption that the most we can produce is the goal.

However, while we are waiting for specifications and quotas, we can do much to help our cause. There are numerous jobs that can be started immediately with full confidence that they will contribute in a vital way to whatever condition the gods of war impose upon us in the future.

• • •

One of the most important of these is the scrap problem. It is so fundamental to production that the dimensions of the entire war production effort are dependent upon it. What is the use of expanded facilities and new plants unless we can increase the supply of scrap or its equivalent?

Now is the time to discard all foolish inhibitions regarding not only scrap but all other critical materials.

Our job is to go after scrap, copper, rubber, tin, etc. with the same fervor that the Navy will go after the Japs.

Remember Pearl Harbor!

E. L. Shaner

EDITOR-IN-CHIEF

Dec. 15, 1941

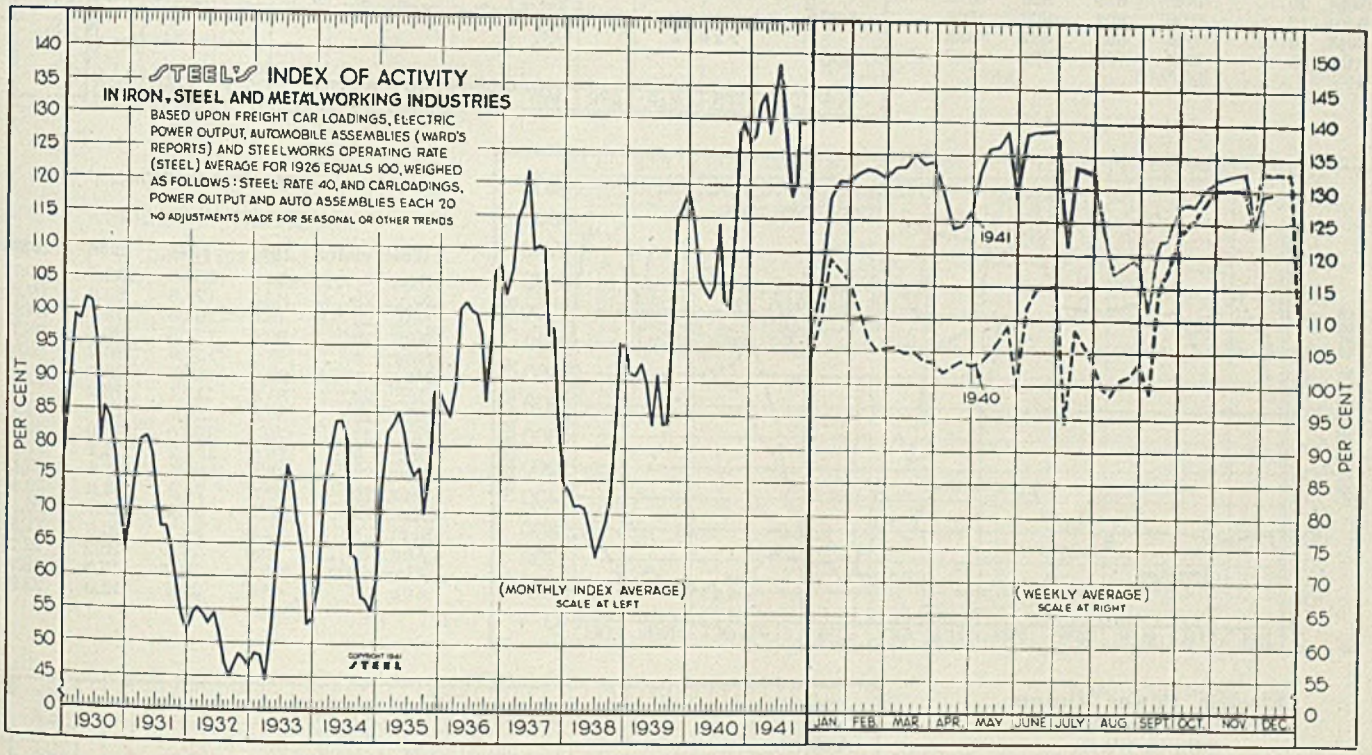
The BUSINESS TREND

War Has Unified Effort To Increase Output

■ OUTBREAK of war with Japan has had a pronounced effect on labor, capital and government officials alike in unifying our all-out effort to increase production. No longer will there be obvious production slow downs and serious disruption of activity due to organizational strikes. It is also encouraging to note the change in attitude of Washington officials in stating that it may be necessary to grant higher prices for lead scrap, secondary lead, zinc scrap and copper, to stimulate output of these metals.

Tighter priority controls are expected to cut further into civilian goods production over the coming months, in many instances direct allocation will be resorted to. Steel orders now carrying top ranking ratings may be subject to revision in the light of the new war developments. Increased emphasis on war material to the disadvantage of civilian goods is believed certain.

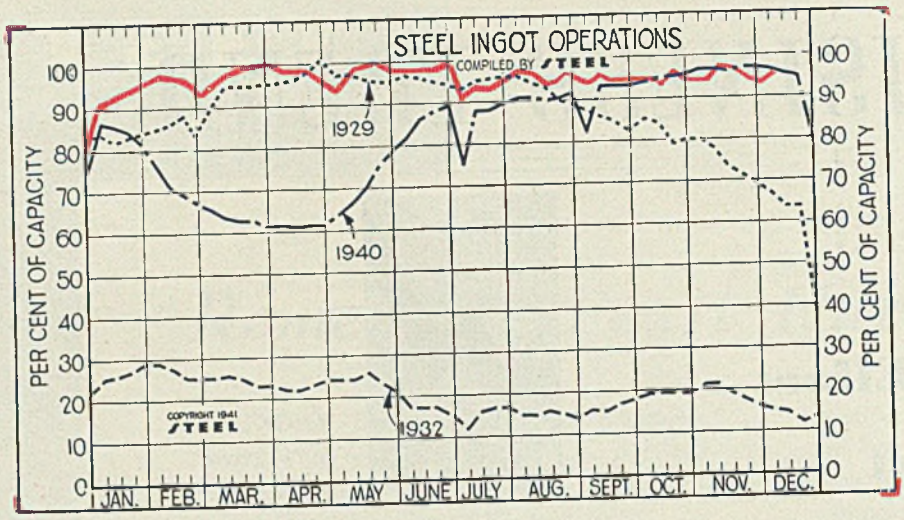
STEEL'S index of activity advanced 0.2 point to 129.9 during the week ended Dec. 6 Advances in steelmaking operations and electric power consumption offset a slight decline in automobile production and freight carloadings during the latest period.



STEEL'S index of activity advanced 0.2 point to 129.9 in the week ended Dec. 6:

Week Ended	1941	1940
Sept. 20	122.9	124.4
Sept. 27	127.5	122.8
Oct. 4	128.0	124.4
Oct. 11	127.9	126.0
Oct. 18	130.2	128.3
Oct. 25	131.4	129.9
Nov. 1	131.9	130.2
Nov. 8	132.3	130.3
Nov. 15	131.8	130.3
Nov. 22	124.1	124.7
Nov. 29	129.7	132.6
Dec. 6	129.9	132.5

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101 2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95 8
July	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	121.1	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	129.9	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	129.7	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64 3



Steel Ingot Operations

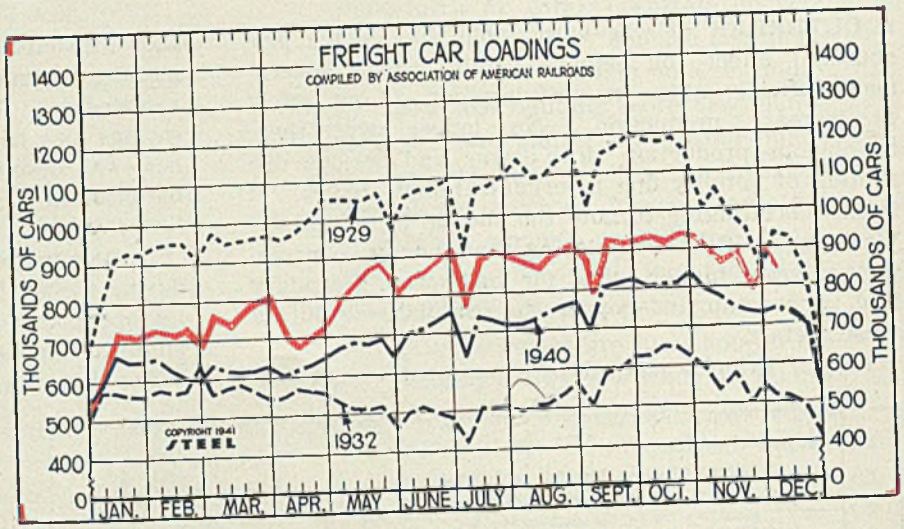
(Per Cent)

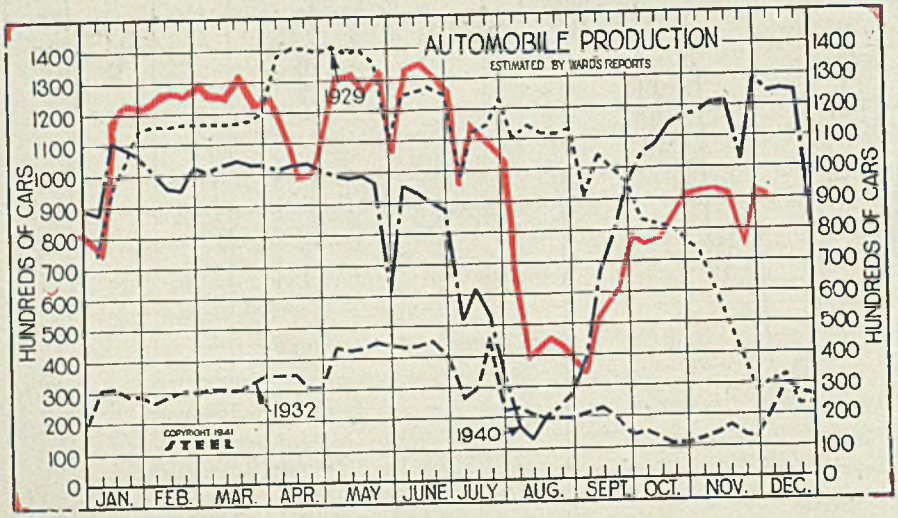
Week ended	1941	1940	1939	1938
Dec. 6	96.5	96.5	94.0	61.0
Nov. 29	95.0	97.0	94.0	61.0
Nov. 22	95.5	97.0	93.5	62.0
Nov. 15	97.0	96.0	93.5	63.0
Nov. 8	97.5	96.5	93.0	61.5
Nov. 1	95.5	96.5	93.0	57.5
Oct. 25	95.5	95.5	92.0	54.5
Oct. 18	96.5	95.0	91.0	51.5
Oct. 11	94.5	94.5	89.5	51.5
Oct. 4	96.0	93.5	87.5	48.5
Sept. 27	96.0	93.0	84.0	47.0
Sept. 20	96.0	93.0	79.5	48.0
Sept. 13	96.5	93.0	74.0	46.0
Sept. 6	95.5	82.0	62.0	41.5
Aug. 30	96.5	91.5	64.0	44.5
Aug. 23	96.0	90.5	63.5	43.5
Aug. 16	95.5	90.0	63.5	41.5

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
Dec. 6	833	738	687	619
Nov. 29	866	729	689	649
Nov. 22	799	733	677	562
Nov. 15	884	745	771	657
Nov. 8	874	778	786	637
Nov. 1	895	795	806	673
Oct. 25	914	838	834	709
Oct. 18	923	814	861	706
Oct. 11	904	812	845	727
Oct. 4	918	806	835	703
Sept. 27	920	822	835	698
Sept. 20	908	813	815	676
Sept. 13	914	804	806	660
Sept. 6	798	695	667	569
Aug. 30	912	769	722	648





Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
Dec. 6	90.2	124.8	115.5	100.7
Nov. 29	93.5	128.8	93.6	97.8
Nov. 22	76.8	102.3	72.5	84.9
Nov. 15	93.0	121.9	86.7	96.7
Nov. 8	93.6	120.9	86.2	86.3
Nov. 1	92.9	118.1	82.7	80.0
Oct. 25	91.9	117.1	78.2	73.3
Oct. 18	85.6	114.7	70.1	68.4
Oct. 11	79.1	108.0	75.9	50 5
Oct. 4	76.8	105.2	76.1	37.7
Sept. 27	78.5	96.0	62.8	25.4
Sept. 20	60.6	78.8	54.0	20.4
Sept. 13	53.2	66.6	41.2	16.1
Sept. 6	32.9	39.7	26.9	17.5
Aug. 30	40.0	27.6	25.2	22.2
Aug. 23	45.5	23.7	17.5	18.7
Aug. 16	45.6	20.5	13.0	23.9

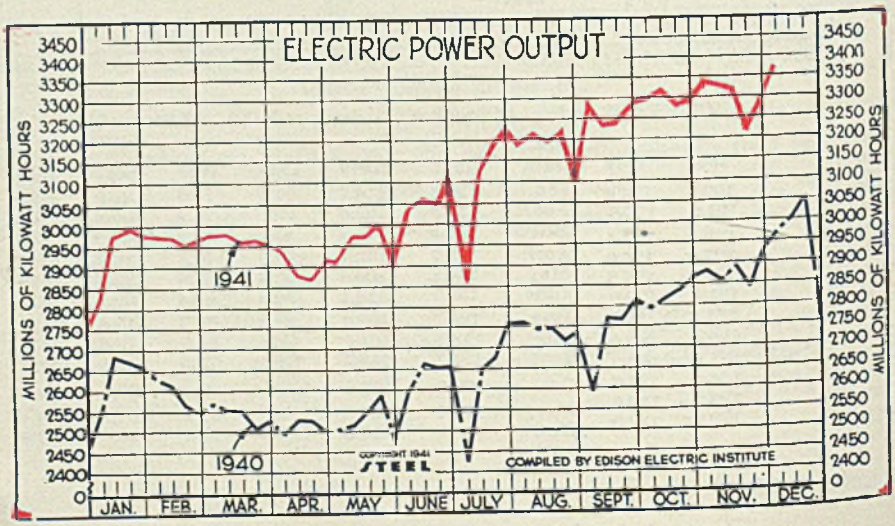
Electric Power Output

†

(Million KWH)

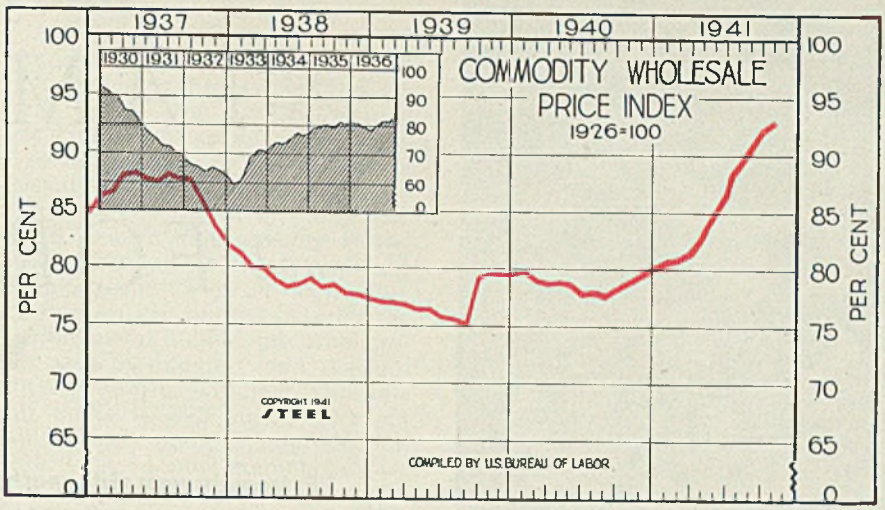
Week ended	1941	1940	1939	1938
Dec. 6	3,369	2,976	2,654	2,377
Nov. 29	3,295	2,932	2,605	2,335
Nov. 22	3,205	2,839	2,561	2,248
Nov. 15	3,304	2,890	2,587	2,325
Nov. 8	3,339	2,858	2,589	2,277
Nov. 1	3,339	2,882	2,609	2,271
Oct. 25	3,299	2,867	2,622	2,284
Oct. 18	3,273	2,838	2,576	2,281
Oct. 11	3,315	2,817	2,584	2,251
Oct. 4	3,290	2,792	2,554	2,229
Sept. 27	3,233	2,816	2,559	2,208
Sept. 20	3,232	2,769	2,538	2,211
Sept. 13	3,281	2,773	2,532	2,279

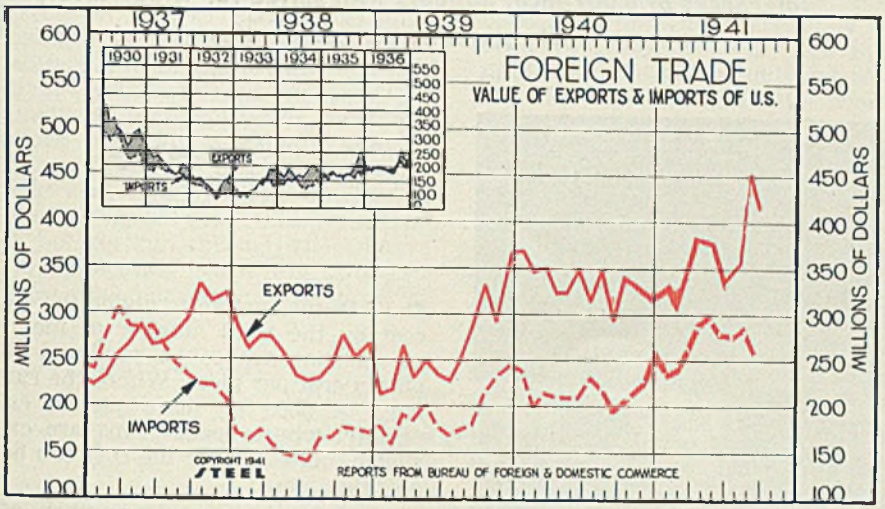
†New series: Includes additional governmental and power generation not previously reported.



All Commodity Wholesale Price Index
U. S. Bureau of Labor
(1926 = 100)

	1941	1940	1939	1938	1937
Jan.	80.8	79.4	76.9	80.9	85.9
Feb.	80.6	78.7	76.9	79.8	86.3
March	81.5	78.4	76.7	79.7	87.8
April	83.2	78.6	76.2	78.7	88.0
May	84.9	78.4	76.2	78.1	87.4
June	87.1	77.5	75.6	78.3	87.2
July	88.8	77.7	75.4	78.8	87.9
Aug.	90.3	77.4	75.0	78.1	87.5
Sept.	91.8	78.0	79.1	78.3	87.4
Oct.	92.4	78.7	79.4	77.6	85.4
Nov.	....	79.6	79.2	77.5	83.3
Dec.	....	80.0	79.2	77.0	81.7
Ave.	....	78.5	77.1	78.6	86.3





United States Foreign Trade

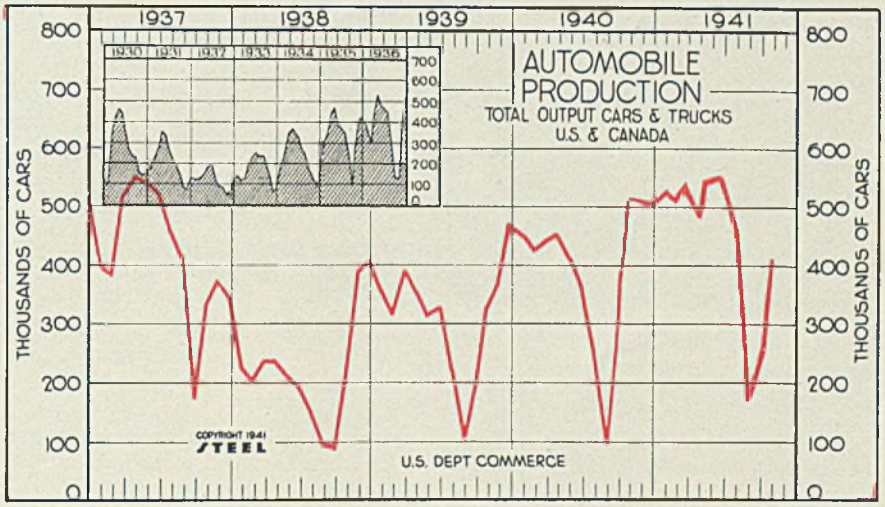
(Unit: $1,000,000)

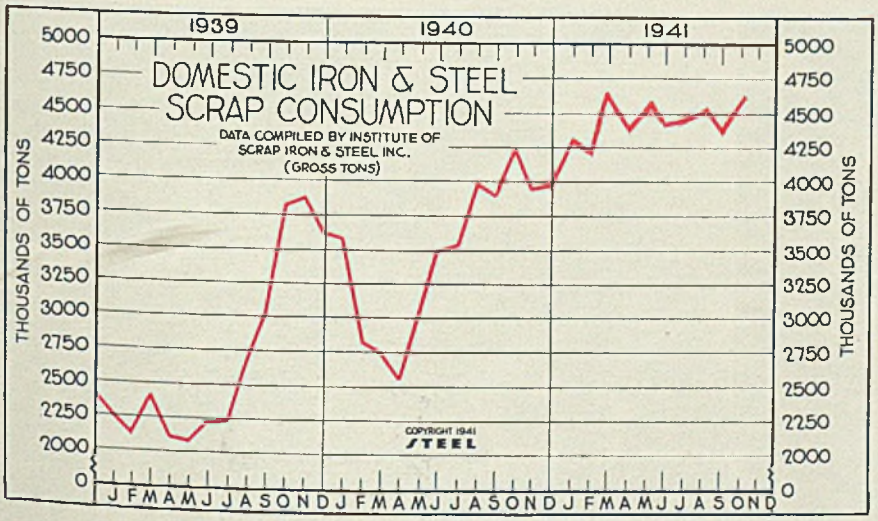
	Exports		Imports	
	1941	1940	1941	1940
Jan.	$325.4	$368.6	$228.7	$241.9
Feb.	303.4	347.0	233.7	199.8
Mar.	357.6	352.3	267.8	216.7
April	385.5	324.0	287.6	212.2
May	384.6	325.3	296.9	211.5
June	337.7	350.2	279.5	211.4
July	358.6	317.0	277.8	232.3
Aug.	455.3	349.9	282.5	220.5
Sept.	417.1	295.2	262.7	194.9
Oct.	....	343.5	....	207.1
Nov.	....	327.7	....	223.4
Dec.	....	322.3	....	253.1
Total	....	$4,021.6	....	$2,625.4

Automobile Production

(Unit: 1000 Cars)

	1941	1940	1939	1938	1937
Jan.	524.1	449.3	357.0	227.1	399.2
Feb.	509.3	421.8	317.5	202.6	383.9
March	533.9	440.2	389.5	238.6	519.0
April	489.8	452.4	354.3	238.1	553.4
May	545.3	412.5	313.2	210.2	540.4
June	546.3	362.6	324.2	189.4	521.1
July	468.8	246.2	218.5	150.4	456.9
Aug.	164.8	89.9	103.3	96.9	405.1
Sept.	248.8	284.6	192.7	89.6	175.6
Oct.	401.4	514.4	323.0	215.3	338.0
Nov.	.....	511.0	370.2	390.4	376.6
Dec.	.....	506.9	469.0	407.0	346.9
Ave.	.....	391.0	311.0	221.3	418.0





Iron and Steel Scrap Consumption

(Gross Tons)

	1941	1940	1939	1938
		(000 omitted)		
Jan.	4,278	3,581	2,257	1,331
Feb.	4,172	2,812	2,124	1,306
Mar.	4,662	2,728	2,419	1,543
Apr.	4,406	2,548	2,114	1,477
May	4,609	3,061	2,079	1,387
June	4,406	3,482	2,221	1,257
July	4,415	3,526	2,247	1,520
Aug.	4,518	3,968	2,675	1,953
Sept.	4,392	3,876	3,018	2,218
Oct.	4,649	4,233	3,809	2,393
Nov.	.....	3,922	3,858	2,732
Dec.	.....	3.950	3,613	2,411
Total	.....	41,687	32,434	21,528
Mo. Av.	.....	3,474	2,703	1,794

Fig. 1—Here is production setup of three machines shown in Figs. 2, 3 and 4 for producing formed channel sections

Short Run STAMPING and FORMING ... Without Dies

Extremely versatile method of forming produces parts within tolerances of 0.001-inch; appears well suited for wide variety of work; requires no costly dies

By A. T. O'NEIL
O'Neil-Irwin Mfg. Co.
Minneapolis

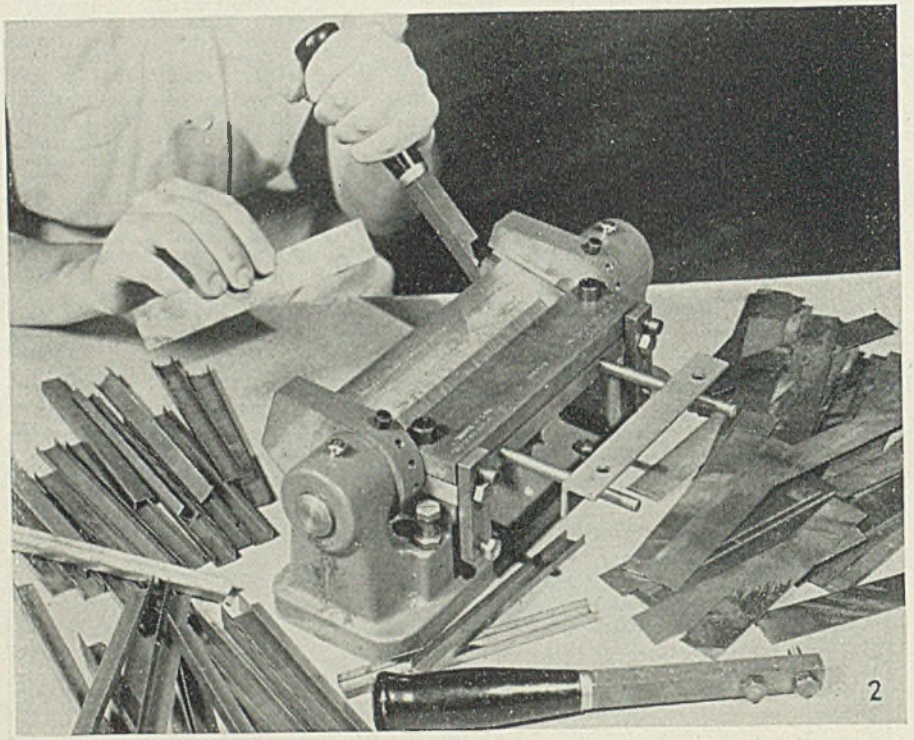


Fig. 2—Heavy duty bench brake easily forms channel or angle sections to any combination desired

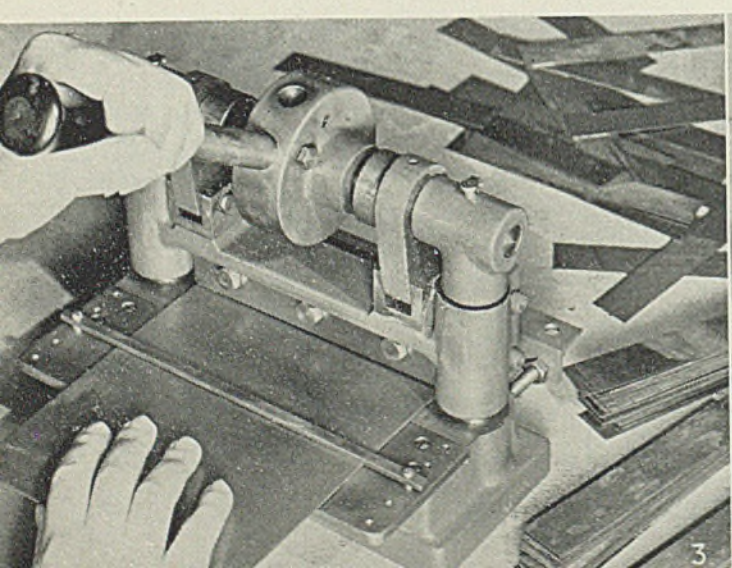
Fig. 3—Bench shear can be set up with stops for precision work

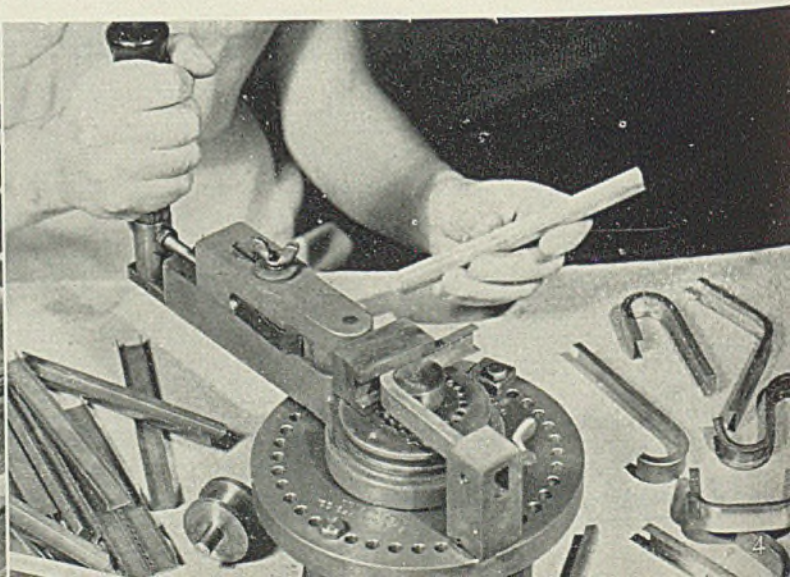
Fig. 4—Di-Acro die duplicating bender shown here easily forms right or left hand bends in channel. With simple conversions, can handle much other forming work within precision limits of 0.001-inch

IT IS the custom to divide the die cost by the total number of metal pieces that are to be produced to obtain cost per piece. Where the run may be 5000 or more pieces, especially where repeat runs are expected, quite a large die cost can be absorbed easily.

But where a small number of pieces—1000 or less—may be required and there is no further use for the dies or die sets, excessive cost per piece of work produced may easily result.

To eliminate the expense of making blanking or forming dies for short-run work, a number of precision hand-operated bench machines have been developed as alternatives for blanking and forming dies. In a great number of instances, this equipment can duplicate metal stampings accurately on a semiproduction basis without the need for dies. Also, these machines are frequently able to eliminate one or more operations necessary in com-





plicated progressive die work.

This equipment includes a precision bench bender, brake folder, press, punch, rod cutter, roller and shear, also a power-driven nibbler, a swage and a large straightener. These units are used individually and in co-operation with each other for duplicating metal pieces on a limited production basis with only a minimum setup cost and without specially made dies. Of this equipment, the bench shear, Fig. 3; the bench brake, Fig. 2; and the bench bender, Fig. 4, are the three most essential units.

Let's see how these units are used in a typical cycle of operations. One job required approximately 1000 pieces or less of accurately duplicated non-stock angle or channel material, including a right and lefthand radius formed on ends. To duplicate these pieces by hand, the stock material is rapidly and accurately cut to angle or channel size with the Di-Acro die duplicating shear, Fig. 3. The resized material is quickly run through the Di-Acro die duplicating brake, Fig. 2, to produce the non-stock size angle or channel. Then the right or lefthand radius is formed on the Di-Acro bender, Fig. 4. The change over from right to lefthand radius is made possible by a single conversion. A typical production line of this sort is shown in Fig. 1.

This bender unit possibly is the most intriguing of the devices yet developed, for its metal duplicating possibilities are limited only by the possible metal duplicating problems. The ease of handling and the stability of setting obtained with this unit make it well suited to rapid duplicating and semiproduction work. Fig. 4, for example, shows only a few of the parts it has produced. Semiproduction work may be carried on with these units by ordinary labor. Not only are they light, portable and readily adapted for bench or assembly line work, but because of their ease of operation they can be operated equally well by either men or women. No skilled labor is required, not even in setting the machines.

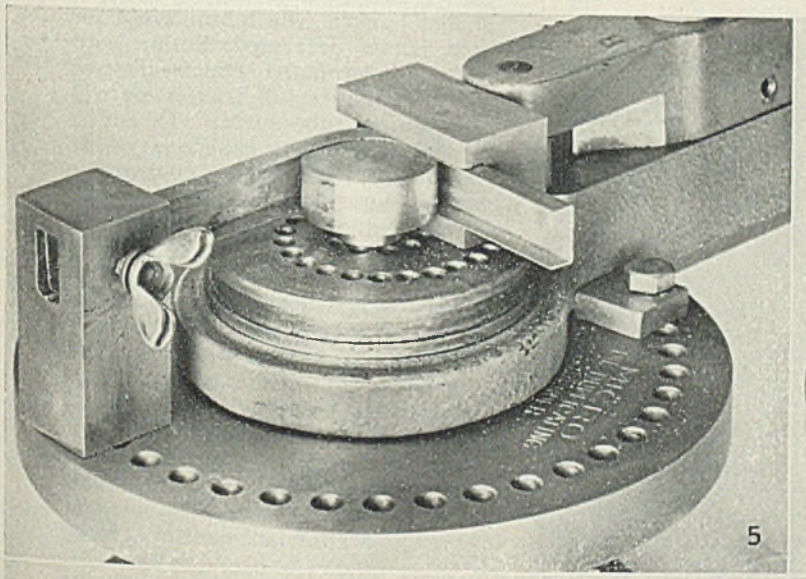
The bender will economically duplicate ductile materials of hollow cross section as well as solid and will produce shapes and outlines of regular or irregular radii to tolerances usually expected only from forming dies. It is easy to make conversions to adapt the unit for rapidly forming round or square tube, angle, channel, half round or flat wire and strip stock formed on edge or vertically. The unit will accept a large variety of clamps, gages and material guides for accurately forming almost any material to shapes and degrees limited only by their mechanical properties. For rapidly receiving and delivering materials, an automatic nose efficiently functions for either right or lefthand direction of operation. Time required to change the direction of operation is less than a minute.

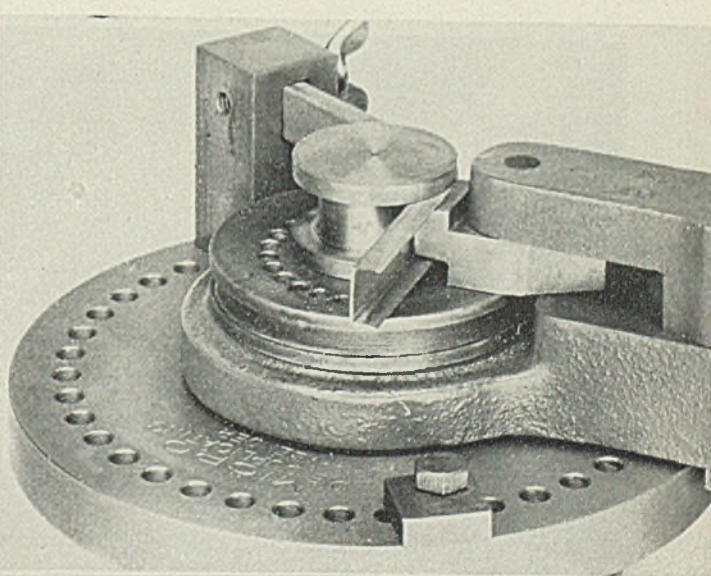
The standard bender may be located in any one of 12 convenient positions for bench operation. Additional operating positions may be gained each time one additional hole is drilled in the base. Holddown lugs of ample capacity securely retain the unit in its operating position.

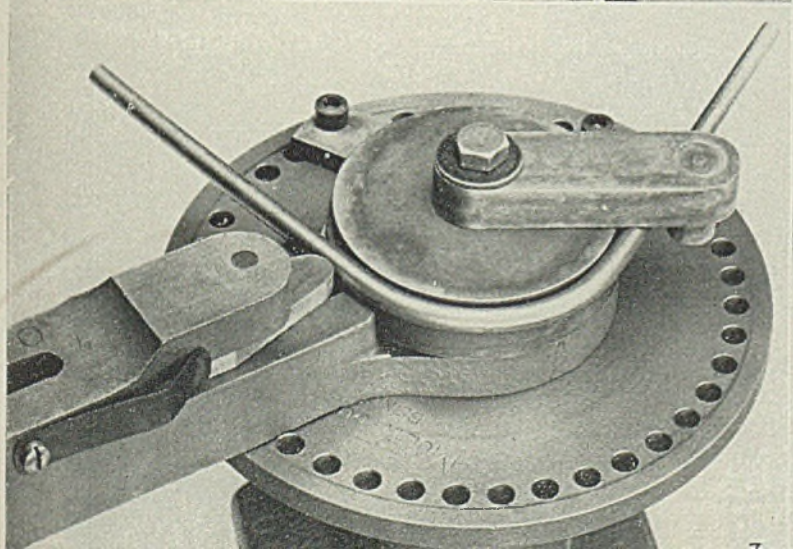
A setup can easily be changed to handle a particular type of work and then changed back to the original setting to duplicate the first operations with tolerances not to exceed 0.001-inch. Stops and material guides facilitate operation at rates in excess of 1000 pieces per

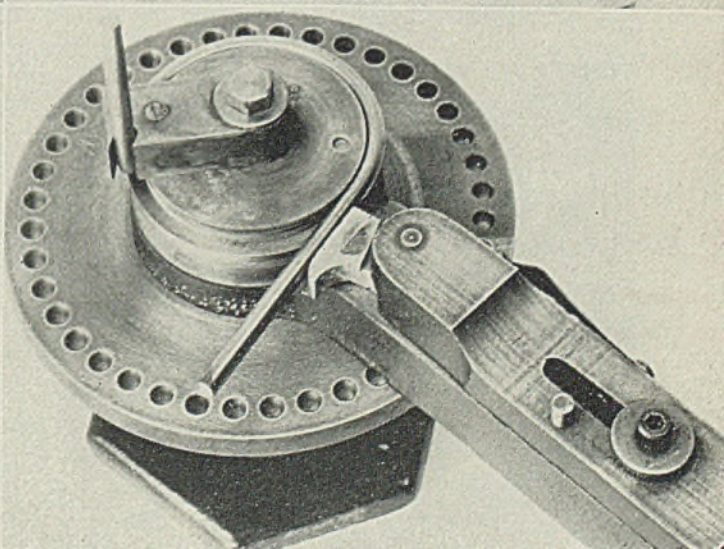
Figs. 5 and 6, show how forming nose and mandrel can be changed to bend channel material either way

Figs. 7 and 8, show how other simple conversions (different forming noses and mandrels) are utilized in forming solid rod









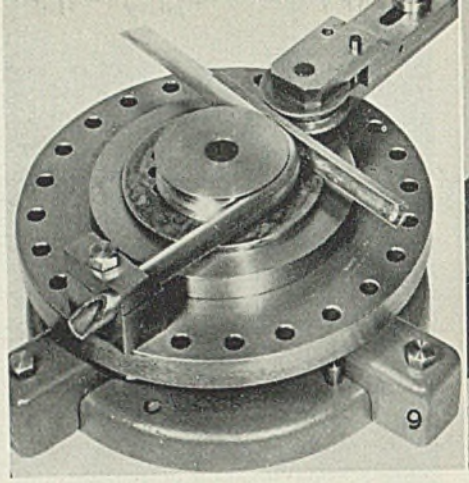


Fig. 9—Tubing is formed without flattening cross section and without friction on any surface as semi-circular former is used between forming roll and outer tube surface

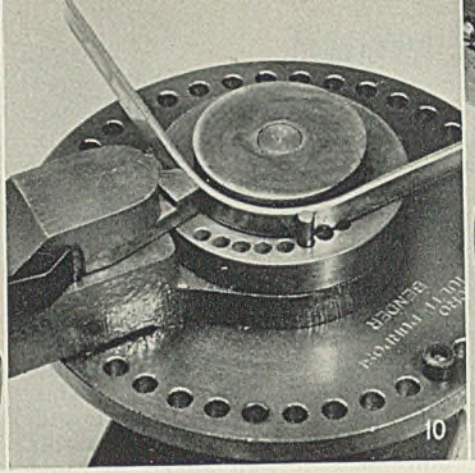


Fig. 10—Flat strip is formed easily to almost any radius and angle of bend. Changing the stops makes accurate settings of the machine possible for wide range of work

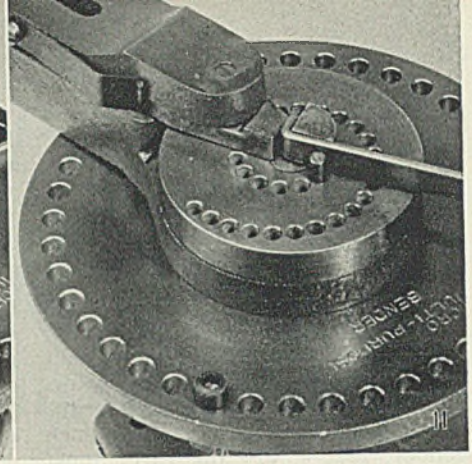


Fig. 11—Right angle bends are formed without any difficulty by using a mandrel of the type shown here. Note spiral row of holes in mandrel block, which permits spacing pin at almost any radius

hour, depending, of course, upon the material and type of work. All individual bends are made in one operation. Fig. 5 shows bender set up to produce a bend on open side of a channel section while Fig. 6 shows simple conversion for producing an outside bend in the same material.

Some of the accompanying illustrations show the ease with which a wide variety of work can be handled and the simple conversions which make it possible. For instance, Fig. 7 shows the unit set up for making a bend in solid rod. Here an overhead arm is employed to hold the portion of the rod that is to remain straight, while the arm of the machine is swung from right to left to produce the bend desired. Stops set in holes in the outer periphery of the base plate limit the bending operation.

This same machine is shown changed over for forming rod that already has a rightangle bend. The only change is to use a different type of fixed stop as shown in Fig. 8. This stop is placed on top of the bender and, of course, can be made longer if a straight portion is to be left in the rod before the bend. Here it will be noted a different type of shoe also is used to contact the rod in bending.

To convert this unit to handle tubing, a simple change is made in the forming tool as shown in Fig. 9. Here, also, a different type of fixed holder is used. The tubing cross section is not deformed. Roller bears against a hardened semicircular section eliminating all friction or sliding against tube surface. Of course bends of different radii can be accommodated merely by changing the diameter of the central form around which the tube is bent and by positioning the forming tool farther out on the arm. This tool can be adjusted to various positions easily by means of a simple clamp arrangement shown in various illustrations.

Fig. 10 shows the unit converted to bending flat stock merely by changing the center form and the tool nose. Note here that the center tool form is made in two sections. The top section is merely a large

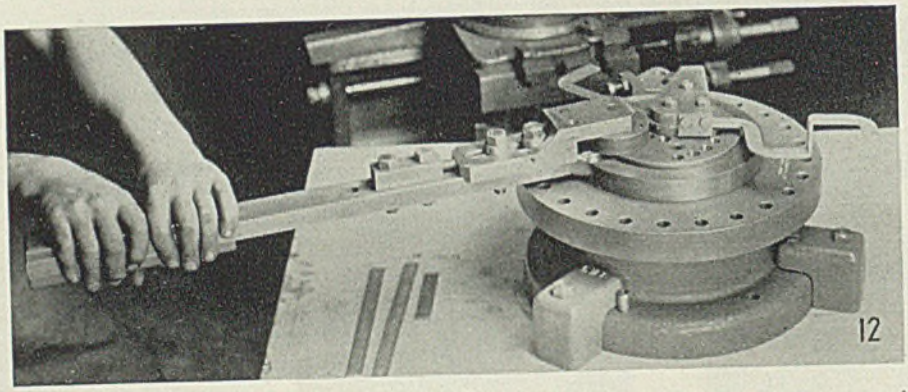
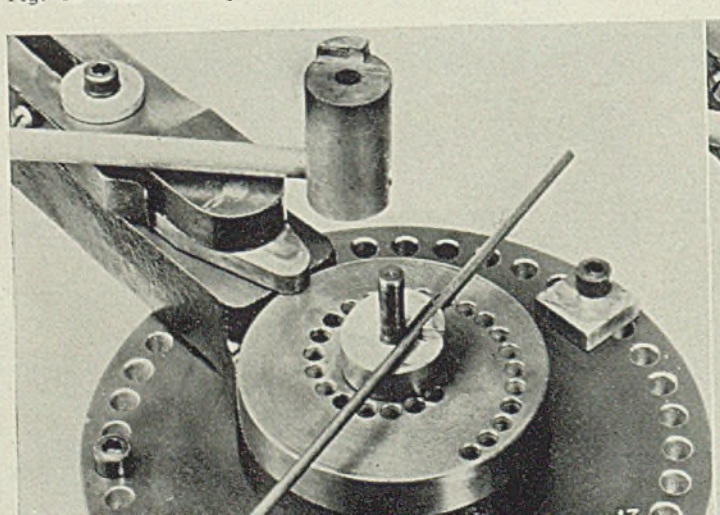
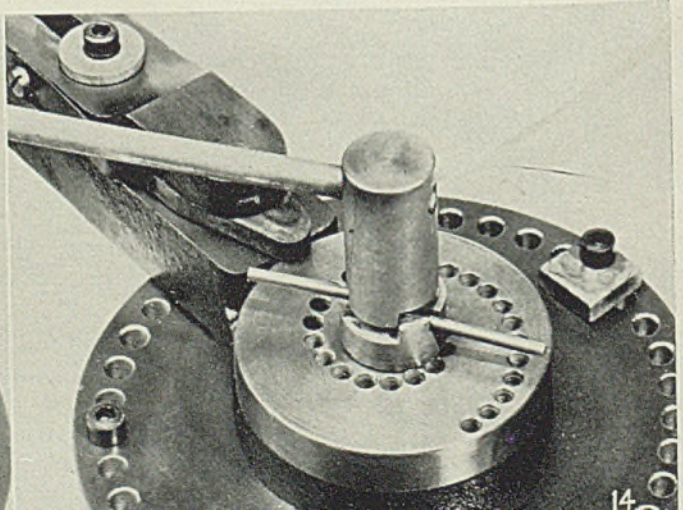


Fig. 12—After making vertical bends shown at right, same bender is converted easily for forming the edge bends in this copper bus bar for a switchboard

Fig. 13—This shows setup for coiling a spring from a straight bar. Coiling tool is shown resting on arm of machine. By changing diameter and slope of mandrel, coil diameter and pitch can be made any value desired

Fig. 14—Here coiling tool has completed formation of the coil





"washer" of sufficient thickness. By using different diameter pieces here, bends of varying radii can be produced.

Note also the holes punched in the piece immediately below this to accommodate a pin which contacts the outer surface of the strip to hold it in place during bending. These holes and the pin which fits in them afford a stop at a large number of positions at varying distances from the center of the machine. This spiral series of holes for the pin is shown better in Fig. 11 where a rightangle bend is being formed in strip stock simply by changing the center fixture of the unit.

Fig. 12 shows various acute bends including edge bends in flat strip made with a simple conversion of the machine.

Figs. 13 and 14 show how coiling also is done on this same machine. In Fig. 13, the rod to be coiled is laid in the die and a tool to engage it for coiling is shown lying on the arm of the instrument. Note the simple construction of these devices. In Fig. 14 the winding tool is being inserted over the mandrel on which the coil is wound. Simply by changing the diameter of the mandrel and hole in the revolving tool, the work can be coiled to different diameters.

These 14 illustrations afford some evidence of the extreme versatility of this method of forming. It is not difficult to see how this system can be expanded to cover a large number of other forming operations. As the cost of the conversion tools to handle any particular job is only a small fraction of the usual die costs, the method may be the means of producing important savings in short run and semiproduction work.

Inspection of the illustrations will show that the conversions require only the simplest of lathe turning and milling machine work—operations that can be handled by an ordinary machinist not necessarily skilled in tool or die work.

Obviously an extremely great range or variety of shapes may be acquired merely by changing the material guides or position settings of the shear, brake and bender. Either greater or less radii can be secured simply by changing stop locations on the bender. Sharp angles of less than 90 degrees can be produced or odd shapes made simply by bending the work around a center piece made with the desired contour.

Moldings or other material of irregular cross section can be handled just as easily as other shapes. The use of a forming nose and center mandrel of correct outline is all that is necessary.

Fig. 12 well illustrates the versatility of this method of forming. Here ⅝ x ⅛-inch copper bus bar material is being bent edgewise after being formed vertically using a simple conversion of the same bender. This bus bar is for a switchboard being made by an eastern manufacturer for submarines for the United States Navy.

Quite a few of these benders are in use forming "normalized" SAE X-4130 molybdenum steel materials to predetermined radii established by the United States Air Corps and doing this with precision. This is a type of work that is extremely difficult to handle with conventional sheet metal working equipment. Yet a roller brake of the type shown in Fig. 2 is being used by one aircraft manufacturer to form X-4130 material in widths up to 12 inches both with and against the grain.

Manual of Wire Gages

■ *Wire and Wire Gauges*, by F. J. Kamm; fabrikoid, 138 pages, 4½ x 6½ inches; published by Chemical Publishing Co., Brooklyn, N. Y., for $2.50.

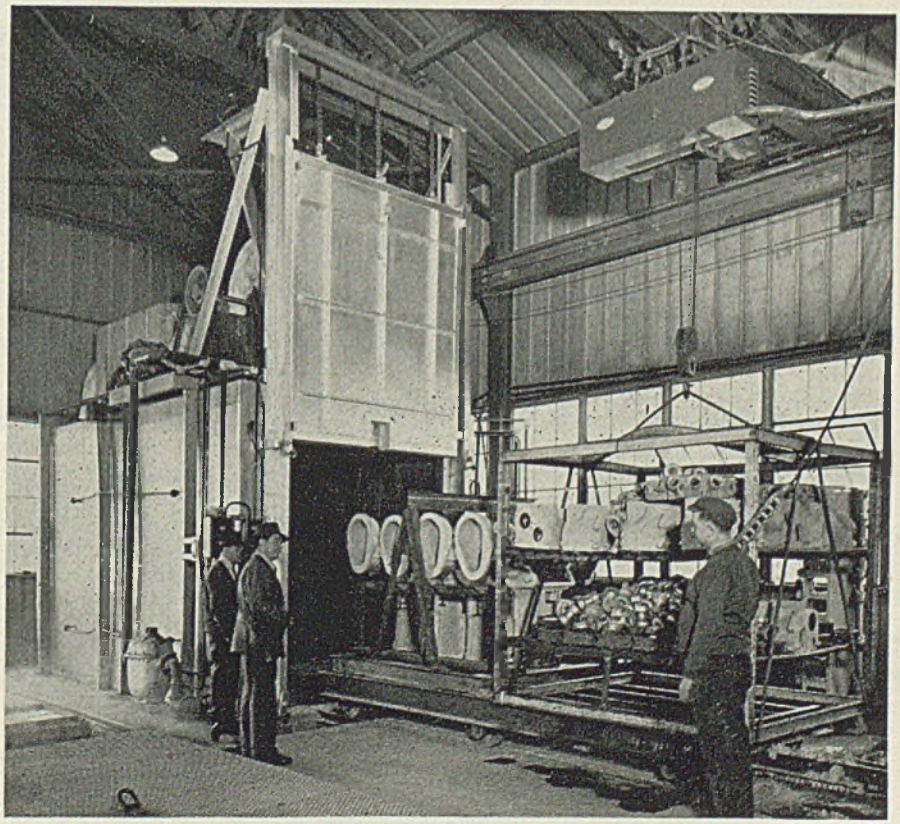
Each standard wire system is described separately and a section is devoted to wire ropes. Numerous systems of gages are used in the United States, Great Britain and other countries, and these are covered by this book. Also included are instructions for handling wire.

New Radiant-Tube Furnace Has Indirect Heating System

■ Accompanying illustration shows what is said to be the first application of radiant tube gas burners for heat treatment of aluminum and magnesium castings. Developed by Despatch Oven Co., Minneapolis, the unit also features the first use of "panel design" in furnace construction—an innovation said to permit faster fabrication at the factory and quicker installation on the job. The furnace illustrated can be completely installed and ready for maximum production in 8 working days. The panel construction allows the furnace to be knocked down and moved to another location easily. Or if production demands are increased, the furnace may be enlarged merely by adding panels.

A second outstanding feature is the use of externally mounted radiant tubes in direct gas-fired heating elements to afford an indirect heating system said to meet Navy specifications for prevention of contact between combustion gases and the work. The furnace atmosphere is claimed to be free from contaminating gases, and all types of aluminum alloys may be processed.

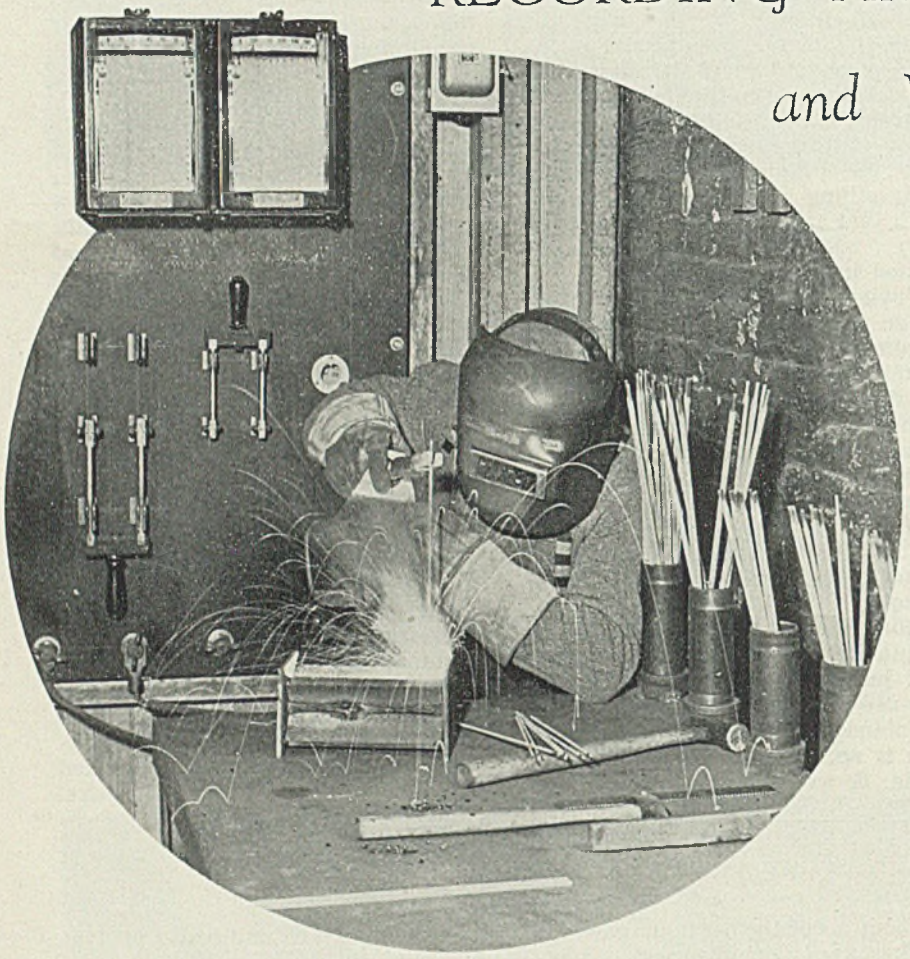
In conjunction with this heating system, a large-volume high-pressure fan moves air at a rate equal to about a 60-mile-per-hour gale, affording an efficient forced convection system for uniform and fast heating.



The Use of

RECORDING AMMETERS and VOLTMETERS

In Welding



. . . . provides accurate record of the welding. Charts can be interpreted to determine cause of faulty welds, serve also as check on all factors of technique, thus keep operators on their toes

By HAROLD LAWRENCE
Metallurgist and
Welding Engineer

Fig. 1—Recording ammeters and voltmeters shown here are used by an electrode manufacturer in determining most suitable ranges of current and voltage for various electrode types

WELDING electrode salesmen are busier today than they have ever been before. Still they are not trying to sell electrodes because the demand far outstrips the available supply. Then what are they doing? These salesmen who combine the knowledge of practical welders with the technical training in welding now recognized as welding engineers are shooting trouble. Not trouble that springs from any defect in their product but difficulties that are wrapped up in the shortage of skilled welders and, what is even worse, experienced plant welding engineers.

No one feels badly because the welding salesmen are overly busy. But the number of these men on call for welding advice is limited, too. As usual the smaller consumer must await his turn, which seems a mighty long time in coming. Meanwhile his welding costs are mounting and the slow progress of welding work through his plant is swelling his overhead.

Fortunately there is an answer within the reach of the smallest user of metallic arc welding. The remedy lies in the speedy installation of recording ammeters and voltmeters. Their intelligent use will permit raw college engineering graduates to become welding engineers of an elementary sort almost overnight. Or a good welding foreman can become a working engineer by improving his knowledge of welding with these instruments.

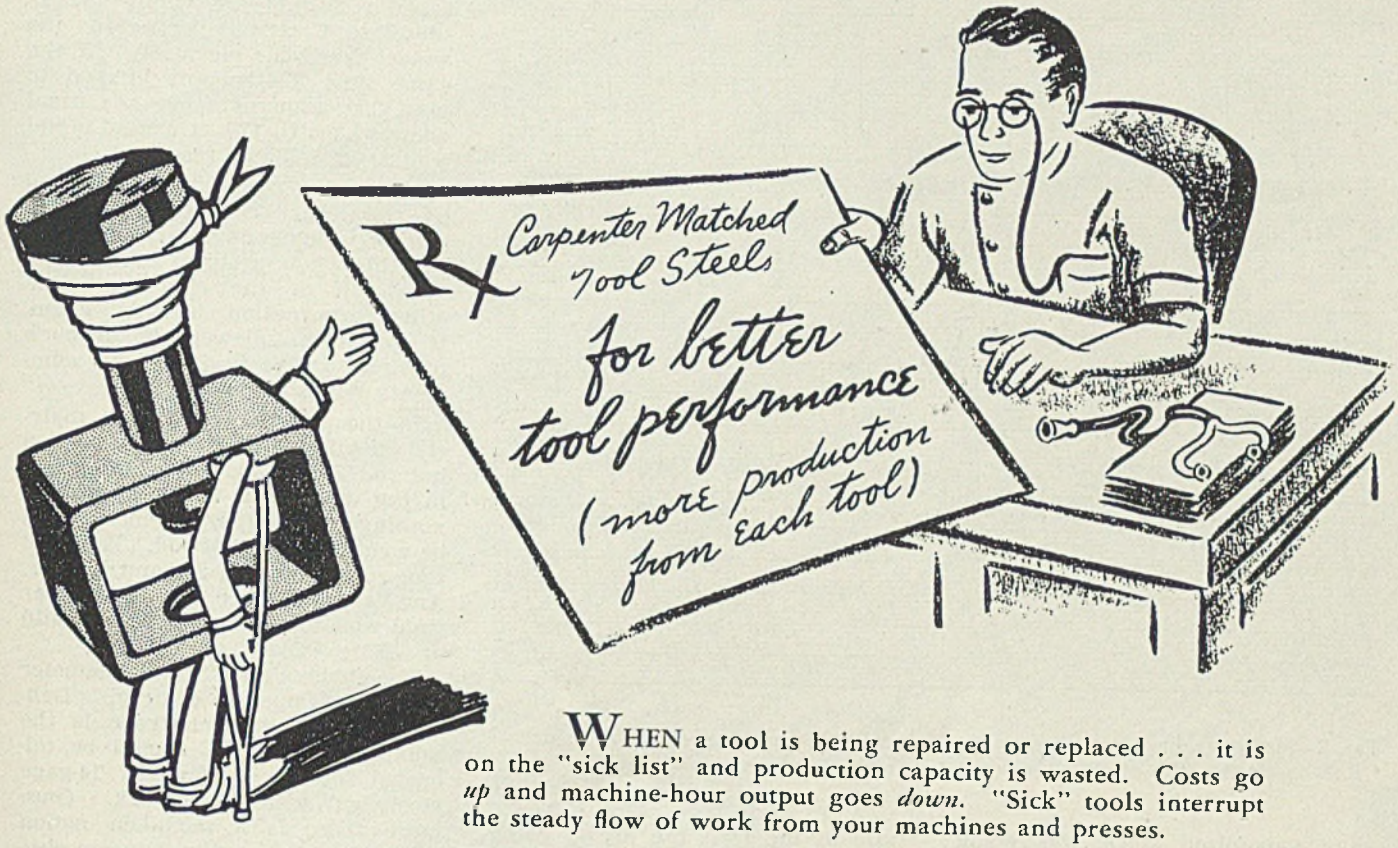
Getting back to the overworked electrode salesmen, it is interesting to learn what they find on their trouble-shooting expeditions. Without exception, the whole difficulty lies in the inability of green welders to establish proper welding conditions. The men, as a group, are unable to set their machines correctly. And some of these men have been welding long enough to become veterans. The welding machines themselves are not at fault. Often long lengths of welding leads cause difficulty.

What about the ammeters and voltmeters on the machines? Certainly these small instruments are reliable. And they are. However, the electric meters on the welding machines are usually too far away from the welding work to tell a good story. Furthermore, it is impossible for the operator to watch his meters and weld at the same time. Thus the need of graphic meters is clearly indicated.

Electrode manufacturers furnish data on the recommended ranges of current and voltage to be used and by correspondence specific data for a particular welding job becomes available. This information does not originate from indicating meters. Instead the electrode manufacturer uses graphic meters in his development laboratories to study the problem and to arrive at a definite answer to a particular inquiry. Such a test installation in the plant of an electrode manufacturer is shown in Fig. 1.

A suggested plan of action is to get a priority for graphic instruments as a first step. Then ask for some welding service to establish a workable set of welding conditions. And finally, use the graphic meters to familiarize each operator with the right machine setting that will yield the desired current and voltage. *This scheme is almost fool-proof in its application.*

Fig. 4, p. 59, shows a working setup in a welding plant where 14-



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That means tools must be made to work more *consecutive* hours before they need attention. And the best way to make sure of *continuous* production from each tool is to simplify the proper *selection* of tool steel—and closely follow recommended *heat treatment* methods.

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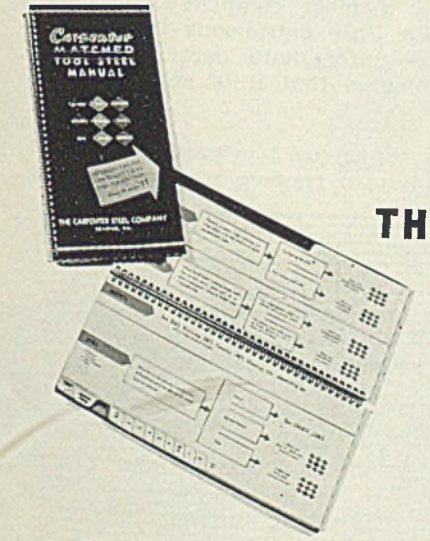
To help customers get the most out of every pound of tool steel they use, we have prepared this 158-page Carpenter MATCHED TOOL STEEL MANUAL. It contains the useful *Tool Index and Steel Selector* that shows how to make tools work more hours on every job. This handy MANUAL also contains heat treating and drawing instructions, to make the proper *selection* of tool steel most effective. Your Carpenter representative will be glad to give you a copy of the MATCHED TOOL STEEL MANUAL.



● The Carpenter MATCHED TOOL STEEL MANUAL, showing sample pages from the *Tool Index and Steel Selector*.

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Carpenter MATCHED TOOL STEELS

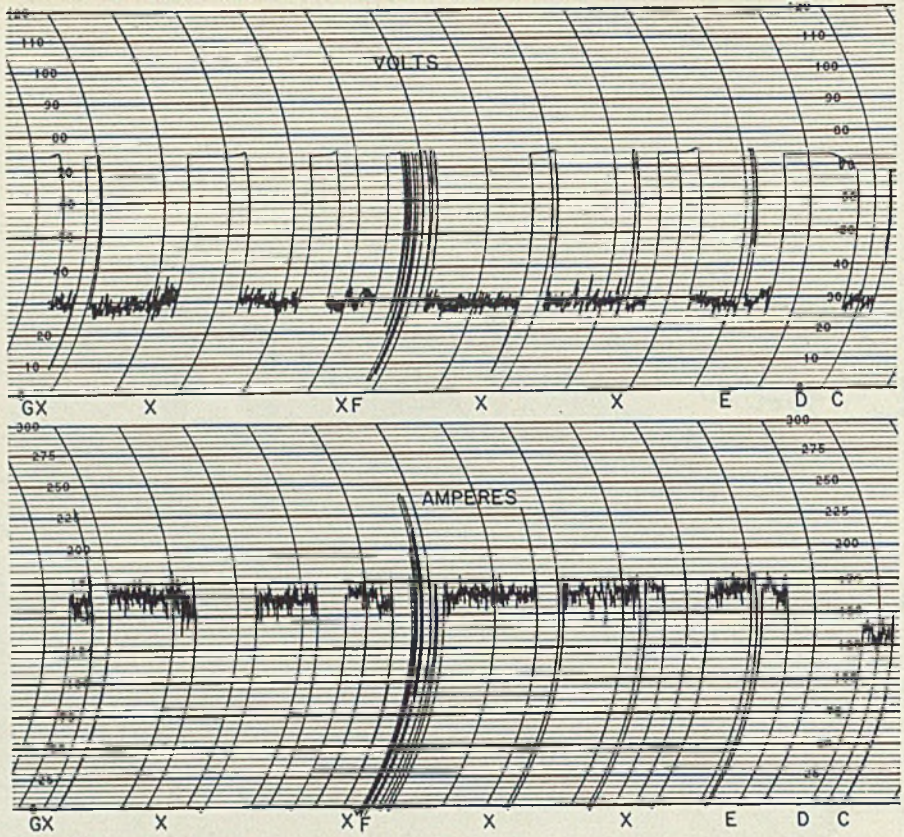


Fig. 2—Many welding faults are easily read from this graphic record of an actual weld. The analysis is presented in the accompanying article

gage galvanized stock was being welded with a 7/32-inch heavily coated electrode of the E6020 type. The head was on a 4-foot cylindrical tank which was being driven by powered rolls. The welding supervisor was using his meters to discover the correct current setting for this particular welding job. Fig. 2 shows the records obtained from both the ammeter and the voltmeter with a wealth of information available for interpretation.

The chart reads from right to left as the paper moves from top to bottom of the instruments illustrated in Fig. 4. The chart speed was ¾-inch per minute, which means that the 11 inches of record covers a little over 14 minutes of arc time. See what happened.

From C to D, the first electrode was tried. The current was too low. The welding machine was set for a higher current and was a machine of the type that increases the open circuit voltage as the current is increased. Notice that the voltmeter chart shows an open circuit voltage of 75 immediately after the first weld and that following the second electrode the open circuit voltage is 80 and remains at 80 for the rest of the record.

The welding started again at E on the ammeter chart and at the same letter on the voltmeter chart the arc was extinguished momentarily. The voltage shot right up to the open circuit value of 80 and the current fell off to zero. All the points marked with an X indicate electrode changes and the ratio of the time the arc is going to the total time of welding could be used to indicate the operating factor. Thus the meters could furnish cost data for definite time studies of each phase of the welding operation.

At F the welder burned a hole in the seam and was making a repair by striking and withdrawing his arc a number of times until the hole was filled. (Note: It is not recommended that a 7/32-inch electrode of the hot rod type such as is being used here in this example be applied to the filling of holes. A small diameter—1/8 or 5/32-inch—electrode of the No. 6010 class is much better.) Violent fluctuations of both amperage and voltage occur during this patching operation.

At the second X and again at GX the welder struck his electrode thereby producing a momentary short. Naturally the voltage fell from a normal arc voltage of 28 to 32 to 6 to 9 volts before the welder freed his electrode. At the same time his current jumped to over 230 amperes from a normal value of 155 to 170. Unfused metal would very likely result.

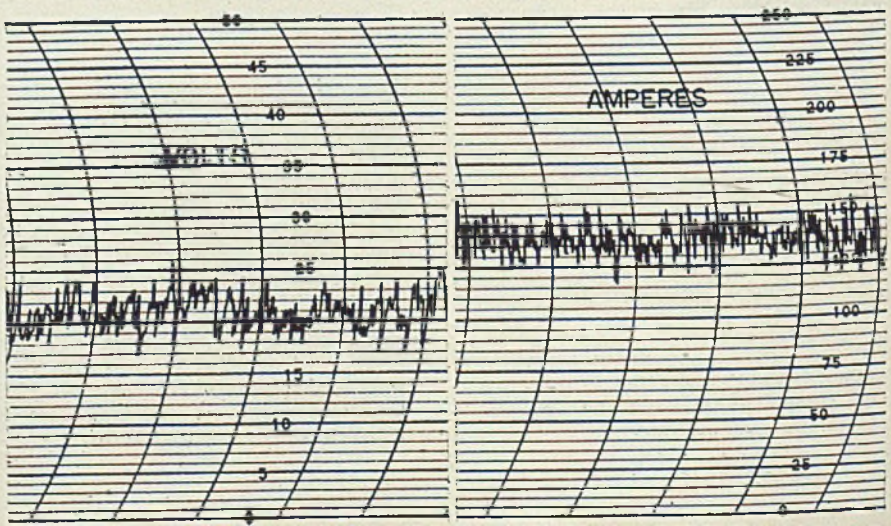
The entire procedure indicated by this chart is wrong. A consulting welding engineer could rectify this whole problem from a consideration of the chart and the other information already given. If you have followed the author's previous article in STEEL, his comments will sound familiar.

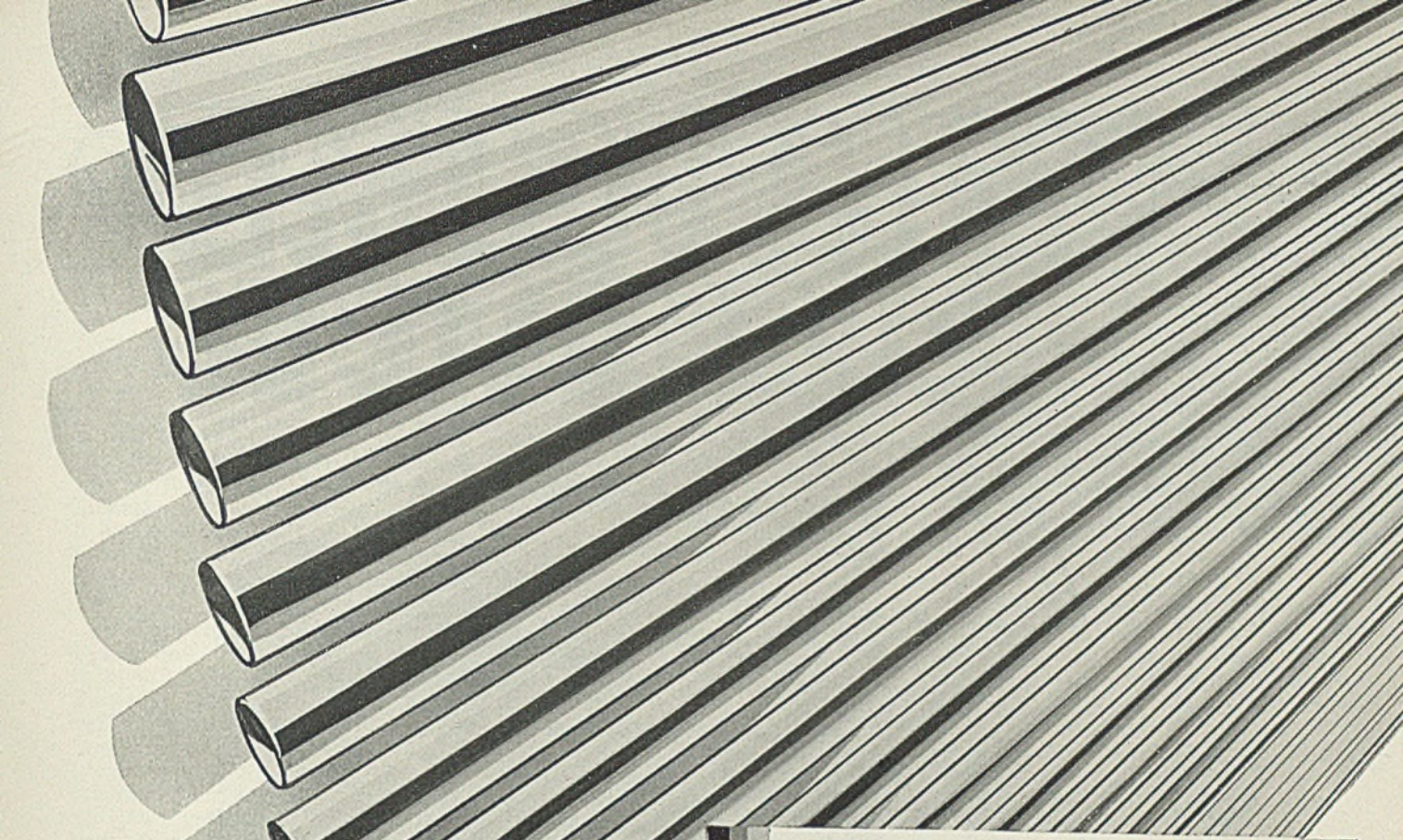
In the first place, 14-gage material should not be welded with a hot rod. Hot rods have their place in the welding of heavy plate, and nothing thinner than 3/8-inch should be welded with a hot rod. The weld that results looks poor and is poor. And it costs more than a similar weld with an electrode of the E6010 or E6012 class.

The choice of a 7/32-inch diameter electrode is open to criticism. Definitely a 5/32-inch electrode is the maximum size that should be tolerated for the welding of 14-gage steel, galvanized or black. Once more there is a mistaken notion about the relationship between electrode diameter and production. Using too large an electrode at a low current such as has been done in this example leads to sticking of the electrode which took place twice and burning through (melting a hole in the seam) which happened once. Sticking and burning through detract from the soundness of the joint while consuming important production time by interrupting the steady progress of the work.

The above example, admittedly a very bad one, points out the worthwhile information recorded by the graphic meters. The wiggles and waggles all have a meaning and tell a most complete story even with little extraneous information. The unfortunate part of this example is that it is not faked. A

Fig. 3—These two charts show voltage and current used in making a perfect welding in carbon-molybdenum steel parts of a pressure piping system





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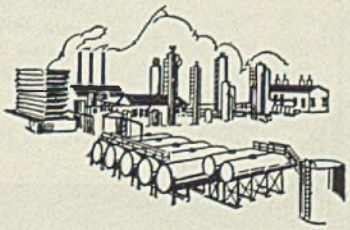

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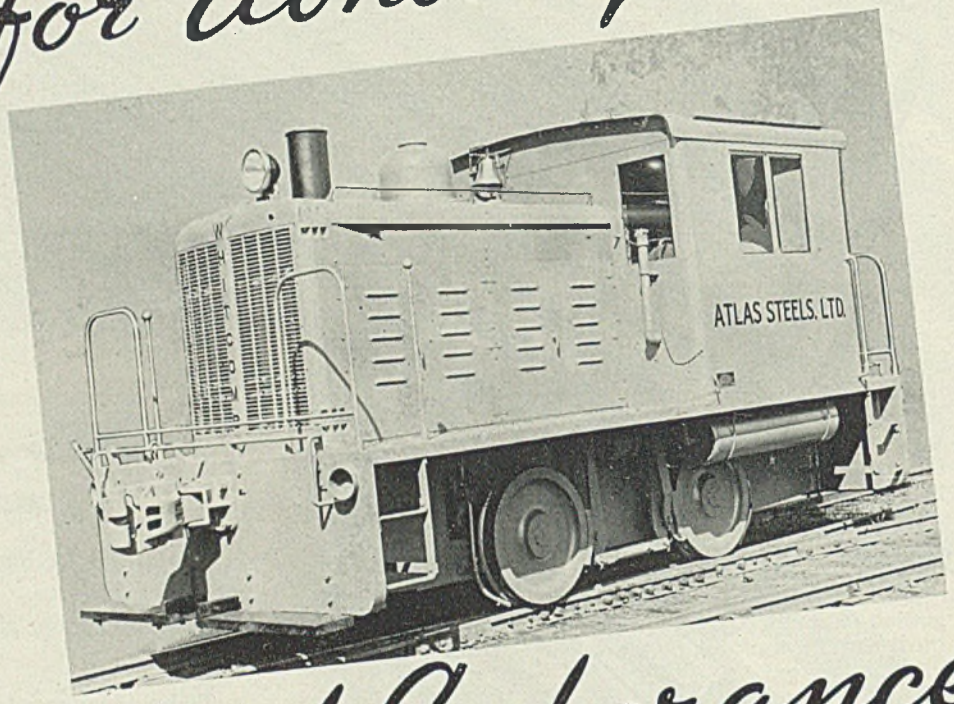

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shop really started out in the manner shown. The poor chart indicated the need for prompt action on the part of the welding supervisor to acquaint the welder with the limits set by the job for type of electrode and for size of electrode.

It is too bad that most welding points are best made by using a negative approach that tells of the wrong method or poor results. But as with the case of the 14-gage tank weld, this type of discussion is well adapted to welding analyses. But not all welds or all welding can be judged by the failures and mistakes. Thus the charts of Fig. 3 are nowhere near as interesting as those of Fig. 2 because they illustrate a sound welding practice.

Here the record covers a weld in carbon-molybdenum pipe of 10¾ inches outside diameter with a 1-inch wall. For this work 5/32-inch diameter electrodes of the E7020 variety were specified. With a 1-inch wall, a small diameter hot rod is not out of place. Prepared specifications were detailed to cover all possible variables including amperes and volts during welding. A range of 130 to 160 amperes was specified while the voltage was to fall between 27 and 33 volts.

The charts in Fig. 3 are taken from the record made during the welding of the preliminary tests to check the procedure. Chart speed was 3 inches per minute, which accounts for the more open pattern seen in Fig. 3. The test welds were perfect. The amperes ranged from 130 to 150 for the most part while the voltage varied between 18 and 24 volts. Because the welds were very good, the voltage range in the specification was changed and the work proceeded without a hitch.

Much pressure piping is being constructed by welding. It is a matter of record that much of the present high-pressure high-temperature work would be impossible were it not for the substitution of welded fittings for flanged and bolted connections where the very bolts are susceptible to creep. Wall thicknesses for 9 inches, pressure of 2500 pounds and temperatures of 1000 degrees Fahr. are encountered in power plants in this, the age of welding.

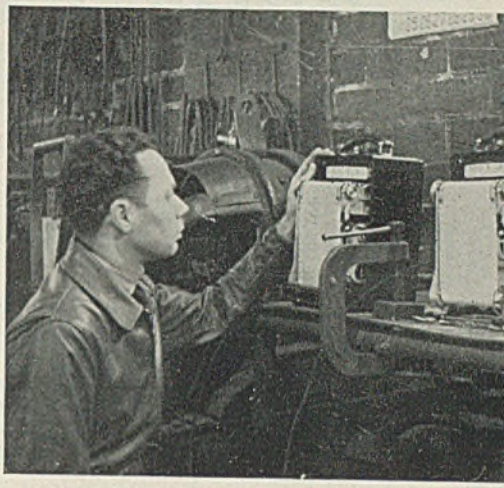

Fig. 4—A typical plant installation of graphic recorders for the purpose of production control of welding operations. All illustrations furnished by Esterline-Angus Co. Inc., Indianapolis, Ind.

In order for a contractor to qualify his welding procedure for power plant work he must make sample welds on the particular weld thickness and type of metal to be welded. This must be done in all positions involved. After these welds are made, they are subjected to physical tests, etch tests and chemical analysis checks. After the procedure is once qualified, each operator must qualify as well by following the outlined and approved procedure. However, in this case the tests are somewhat simpler.

Keep Men "On Their Toes"

Having completed the qualification of procedure and operators, the actual welding is undertaken. "Man to man" inspection is the practice with an inspector continuously watching each working welder in addition to the graphic ammeter and voltmeter. While good or bad welding is not always discernible from the graphic instrument records alone, although it frequently may be, the graphic records coupled with a log made by an inspector as the weld progresses provide indisputable information.

The graphic records are well liked by both the contractors and the inspectors. The contractors employ recording instruments to demonstrate the quality of their welding work to younger and less experienced inspectors, thereby protecting their interests and avoiding unnecessary rework. On the other hand, the inspectors appreciate that the meters are a reliable watchdog that may be trusted to keep the welding personnel on its toes.

While records of both current and voltage are usually made, the voltage record alone may suffice on repetitive work where all other conditions are well known. In most cases the voltage is held within plus or minus 2.5 volts of some normal value. Abnormal fluctuations furnish a recorded warning of any trouble that might be anticipated, not to mention the value of the record as a medium for the prevention of a repetition of the same fault.

Bronze Welding Speeds Propeller Repairs

■ Bronze welding, according to Hobart Bros. Co., Troy, O., not only is a successful method of repairing boat propellers, but also it saves much time and money.

An example is the repair of a cast iron propeller of the tow boat BOULKER at the Sullivan Dry Dock Co., Brooklyn, N. Y. not long ago. The entire procedure took less than 24 hours and saved the owners several hundred dollars plus time.

The method involves joining by bronze welding a scrap cast iron blade to the damaged one. In preparing the scrap blade, it is first chipped to the shape of the other blades on the boat, then the repair part and the damaged blade edge are V ed on both sides. Next holes are drilled in the damaged and new blade so that steel straps can be placed for metal joining. The blades are fitted together with points of the V touching, the latter being first cleaned.

The Vs are next heated slowly with an oxyacetylene torch to about 450 degrees Fahr., and finally filled in on both sides by bronze welding.

Tests Indicate Performance of Finish

■ As a result of extensive tests, Alrose Chemical Co., Providence, R. I., announces and guarantees that its Jetal process for blackening iron and steel will now effect 30 per cent or more savings in price, treatment, time and wear resistance on products treated. It is said to give 250 per cent more abrasion and wear resistance. In a salt spray test, it resisted rust more than 50 hours.

New Edition on Circuit Breaker Standards Out

■ A new edition of the "Large Air Circuit Breaker Standards", No. 41-67, superseding publication No. 37-43 is announced by the National Electrical Manufacturers Association, 155 East Forty-fourth street, New York. It contains thirty pages of information inclusive of commercial standards, general standards, definitions and instructions for the installation, operation and care of large air circuit breakers.

The publication also contains application standards for large air circuit breakers, and rating and manufacturing standards for both large air and enclosed air circuit breakers.

Copies of the edition are available from the organization's headquarters for 75 cents each.

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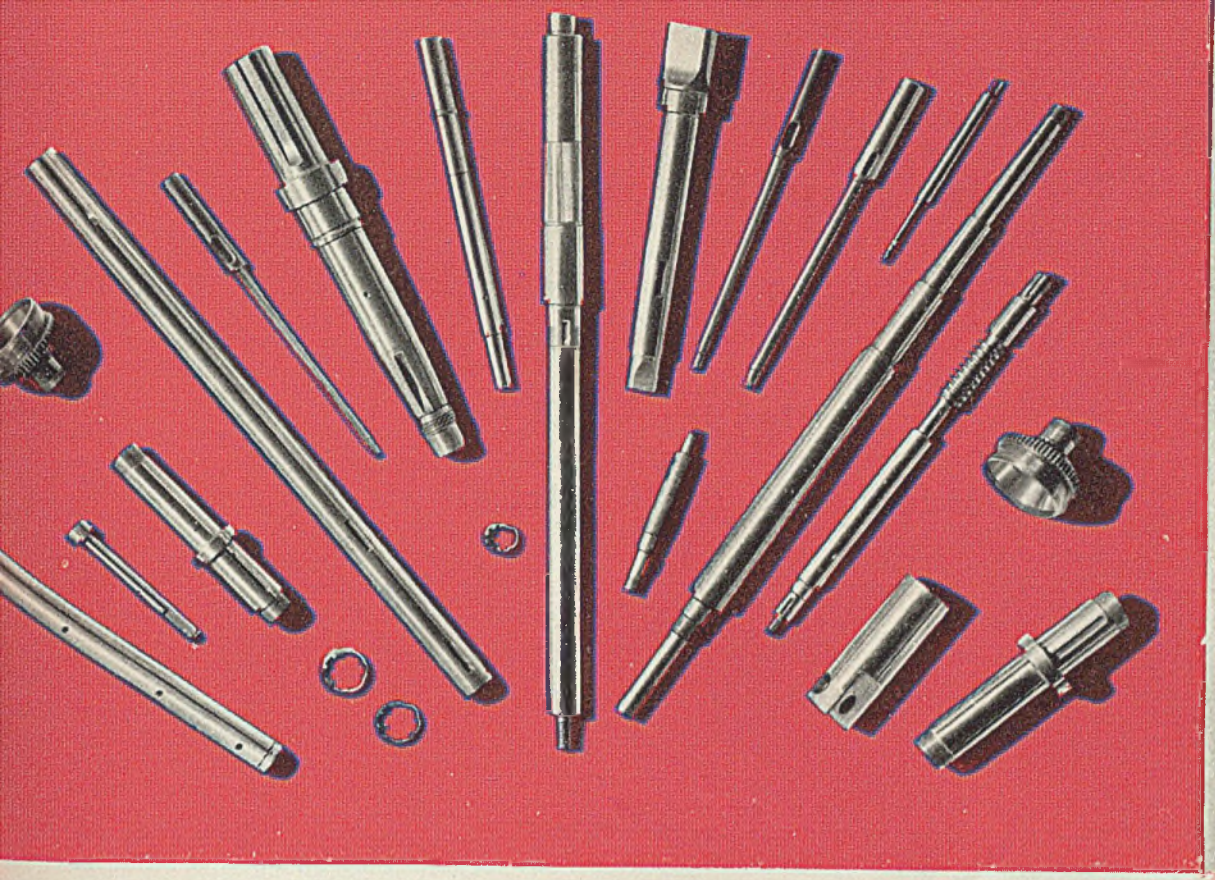

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URGENT DEFENSE DEADLINES

BACKBONE of defense production . . . that's the machine tool industry. The lathes, the milling machines, the grinding machines, planers, boring machines and other machine tools it produces are the very starting point of *all* production.

La Salle takes pride that this "Key" industry has found in STRESSPROOF Cold Finished Steel Bars staunch allies in its race against time. All over the country machine tool makers are using this remarkable "all-purpose" bar to step up production of vital machine tool parts.

The reason behind this acceptance of STRESSPROOF is simple. For here is a steel which combines *right in a single bar all these desirable qualities:* UNUSUAL STRENGTH, which eliminates heat treating on many applications . . . GREAT RESISTANCE TO WEAR, reducing the need for case carburizing . . . EXCELLENT MACHINABILITY, reflected in higher machining rates and excellence of finish in the machined part . . . MININUM WARPAGE, eliminating many straightening operations.

But supplying STRESSPROOF to machine tool makers is only one of La Salle's contributions to the Defense Program. This modern steel bar has opened up short-cuts to faster production in many other vital defense plants. And the other steels in La Salle's great line are doing a stand-out job on applications for which they are especially suitable.

These are the reasons why La Salle continues in this emergency to be known to buyers throughout the Mid-West as "top name" in the cold finished steel bar industry.

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HIGH-QUALITY, LOW COST STEEL

The Melting Phase—II

(Charges of 40 to 45% Iron)

By PAUL J. McKIMM
Cleveland, O.

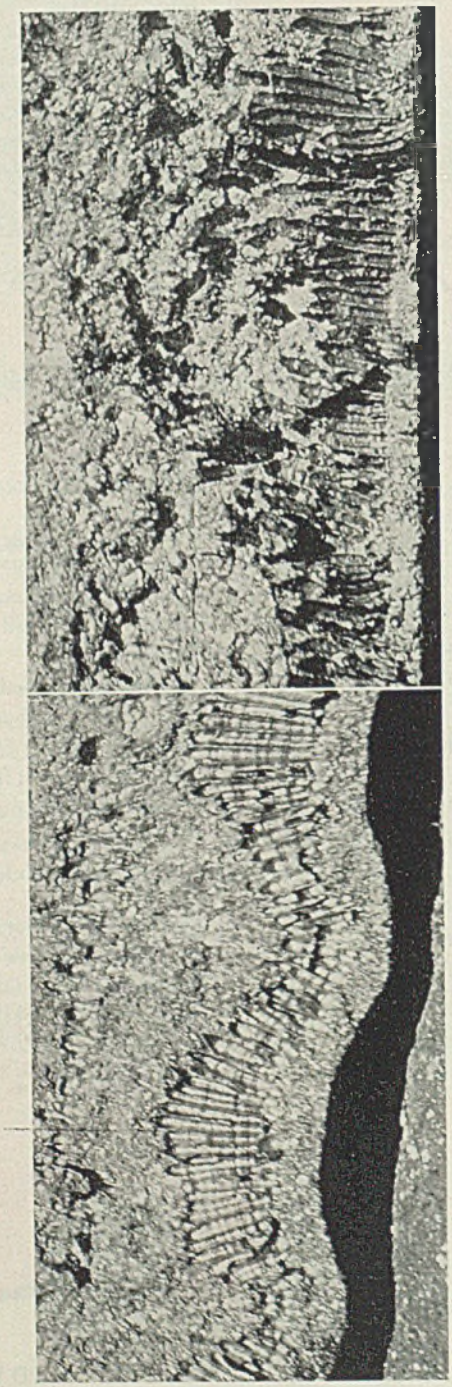

Fig. 1 (Upper view)—Structure of split ingot showing thin skin

Fig. 2 (Lower view)—Fracture of half ingot showing honey-combed condition

■ IN THE production of low-carbon steel for special or extra deep drawing products usually effervescent or rimming grades and occasionally silicon or aluminum killed in particular, it is not necessary to adhere to open-hearth charges composed of approximately 40 to 45 per cent iron. Large tonnages of quality steel have been produced with a wide range of open-hearth charge. Characteristics of three heats having a high cost charge are given in Table 1.

The heats were tapped on the low temperature side, the skulls for one month averaging 11,800 pounds per heat.

Excessive aluminum additions were made to the heats such as 77, 73 and 75 pounds, respectively. The heats rimmed flat and had the characteristic of semikilled steel which could not be heated successfully. The result was a low yield at the blooming mill and seams in the sheet and narrow cold strip. The sheet bars possessed excessive edge seams which resulted in rejections of the final sheet. In some cases the steel was diverted from autobody stock to that of single pickle or some other grade.

Fig. 1 depicts the structure of the split ingot and Fig. 2 the half ingot fractured across the section.

These ingots were extremely thin skinned, as shown in Fig. 1; in fact they lacked wall area and were badly honey combed. Fig. 2 shows this honey-combed effect. This type of fracture later found among several other split ingots necessitated a change from the fluted mold to the straight wall mold because when the steel had a tendency to be thin skinned invariably the thinnest areas were toward the outside radius of the flute. Steel ingots of this quality cannot be successfully heated and processed into a normal product.

Progressively the first change was a reduction of aluminum to 15 pounds per heat in the ladle, with no change in furnace practice. The first heat thus produced required only four pellets of aluminum per ingot for about half the molds; seven pellets were necessary to maintain ideal rimming action. This steel was satisfactory as compared to the usual quality because it could be fired to a good soaked rolling temperature. The ingots were difficult to bring up to temperature inasmuch as they absorbed heat more slowly as compared to the old type ingot which absorbed it rapidly but appeared dark, cold and hard by the time rolling commenced. Later, as other changes were made, the aluminum required for an ideal rimming action drop to 6 to 8 pounds to the ladle and from a few pellets up to 3 or 4 ounces per ingot of 17,500 pounds. The aluminum requirement held to 1 pound per heat for about three months during which the steel would not take anymore.

Weight of Steel Is Reduced

The next progressive step was to get the steel hot enough to pour without a skull. Instead of the skull averaging 11,800 pounds per heat it has consistently averaged around 700 pounds per heat. This condition yields the desired results. In the event too high a temperature is reached the ladle can be held for a few minutes.

The next step involved a decrease in the limestone charge and the elimination of all burnt lime from the melt shop. Next the spiegel addition was eliminated after a test for long periods using an iron charge of higher manganese and also heats with large amounts of manganese and spiegel added with the charge. The spiegel was replaced with an addition of one box or 4500 pounds of a good grade of pig iron as a reboil. Thus when the heat came off as a result of the iron reaction, the boil was much more rigorous. That is, numerous small bubbles were uniformly distributed over the bath area and appeared like an 0.07 to 0.09 per cent carbon instead of the 0.03 or 0.04 per cent carbon which at most plants lies

Shop Bulletin No. 1 gives hints on handling valves and fittings; No. 2 shows pointers on piping placement. Ask your Crane Representative to explain how you can get valuable aid from this practical service.

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Table I—Charging Data on Three Extra Deep Drawing Heats

(Specification: Carbon, 0.08; manganese, 0.35 to 0.50; phosphorus, 0.020; sulphur, 0.03 per cent)

Heat Number:—	1	2	3
CHARGE:			
Limestone, %	8.83	8.65	8.88
Skulls & pit scrap, %	.....	6.15	.....
Crops & butts, %	31.98	46.92	25.69
Pressed sheet, %	.....	.....	12.73
No. 1 Bundle, %	34.32	17.59	19.98
No. 2 Bundle, %	0.57	.....	8.56
No. 1 Heavy melt., %	18.27	14.66	11.42
No. 2 Heavy melt. (road), %	1.14	.....	.....
Interplant, loose, %	9.70	.....	.....
Interplant, plate, %	3.99	2.34	11.99
Punchings, %	.....	.....	3.19
Railroad, rails & structural, %	.....	11.73	6.39
Total scrap, %	56.40	54.60	55.90
Total scrap, lbs.	175,100	170,500	175,100
Iron, %	43.50	45.30	44.10
Iron, lbs.	134,860	141,460	137,800
Iron, silicon, %	1.03	0.92	1.09
Iron, sulphur, %	0.020	0.021	0.017
Iron, manganese, %	1.80	1.86–	1.90
Iron, phosphorus, %	0.350	0.350	0.350
Total metallic mix, lbs.	309,960	311,960	312,900
FURNACE PRACTICE:			
Cold pig, lbs.	.....	5,000	.....
Ore, feed, lbs.	4,500	1,000	.....
Spar, lbs.	700	500	1,100
Rods, number	.....	.....	2
Spiegel reboil, lbs.	2,500	2,500	2,500
Manganese 85% H. C., lbs.	400	1,200	400
Time of heat, hours-minutes	11-55	13-22	12-10
LADLE PRACTICE:			
Manganese, 85% H. C., lbs.	500	0	400
Aluminum, lbs.	32	28	30
Aluminum-silicon-titanium, lbs.	100	100	100
POURING PRACTICE:			
Aluminum per mold, ounces	24	24	24
Mold size, inches	24 X 30	24 X 30	24 X 30
Nozzle, inches	1¾	1¾	1¾
Residual manganese, %	0.18	0.21	0.21
ANALYSIS:			
Carbon, %	0.08	0.09	0.08
Manganese, %	0.41	0.38	0.42
Phosphorus, %	0.006	0.007	0.006
Sulphur, %	0.025	0.024	0.031

perfectly flat. The duration and intensity of the boil from the standpoint of nonmetallic inclusions are important because at this time of the process the action in the bath is always light at the metal-slag interface and hence a little more action brings more metal into contact with the slag which is beneficial.

Subsequently, the manganese specification was lowered in order to attain a better ingot and not to save manganese. For years the shop specification for manganese was 0.35 to 0.50 per cent with melters aiming for the middle of the range. This specification was lowered to 0.30 to 0.35 per cent. All heats fell within the range of 0.29 to 0.33 per cent manganese. A better rimmed ingot was secured and a saving in manganese of approximately 0.10 per cent.

Heats made with part of the manganese added to the bath and part to the ladle and heats with all the manganese added to the ladle showed no difference in rolling quality, surface condition, rejections nor physical properties. Hence, manganese addition to the bath was discontinued with further saving of manganese

Table II—Charging Data on Nine Open-Hearth Heats

(Specification: Carbon, 0.06/0.08; manganese, 0.30/0.40; phosphorus, 0.010; and sulphur 0.030)

Heat number:—	1	2	3	4	5	6	7	8	9
CHARGE:									
Limestone, %	8.69	9.15	9.21	10.02	6.56[1]	8.34	8.06	9.43	9.40
Pit scrap, %	.....	3.27	.....	.....	.....	.....	.....	.....	.....
Skulls, %	.....	.....	.....	12.50	.....	.....	30.30	5.89	19.33
Crops and slabs, %	25.00	.....	.....	.....	15.10	50.30	24.40	30.38	26.41
No. 1 bundle, %	.....	.....	.....	.....	46.70	10.00	11.90	.....	.....
No. 2 bundle, %	.....	.....	12.36	15.20	12.70	.....	.....	9.38	28.57
No. 2 heavy melting, %	.....	29.00	26.20	5.55	.....	.....	.....	19.51	.....
Road scrap, %	57.10	58.30	46.50	59.20	11.70	11.07	19.10	17.64	19.18
Loose scrap, %	18.00	11.50	13.20	4.08	13.50	28.03	14.10	17.15	35.81
Plate scrap, %	.....	.....	13.90	5.42	.....	.....	.....	.....	.....
Total scrap, %	61.00	59.00	57.14	57.03	53.61	52.70	54.90	54.52	54.26
Total scrap, lbs.	226,600	219,900	217,600	225,000	199,200	201,000	213,400	203,400	199,100
Total iron, %	38.90	40.90	42.86	42.97	46.39	47.20	45.00	45.48	45.74
Total iron, lbs.	144,686	152,640	163,200	154,980	172,380	179,900	175,120	169,640	167,800
Cold pig iron, lbs.	43,000	49,900	80,500	54,800	76,000	93,000	68,000	78,000	78,400
Iron, % silicon	0.95	1.06	1.16	1.20	1.28	1.21	1.06	1.15	1.21
Iron, % sulphur	0.023	0.023	0.024	0.024	0.028	0.028	0.024	0.023[2]	0.021
Total metallic mix, lbs.	371,280	372,540	380,800	379,780	371,580	380,900	388,520	373,040	366,900
FURNACE PRACTICE:									
Ore, feed, %	13,500	11,500	16,000	2,500	18,000	13,500	19,000	3,000	21,500
Staflux, lbs.	.....	.....	.....	.....	.....	.....	.....	.....	1,000
Rods, number	1	.....	.....	4	2	6	4	.....	5
Fluorspar, lbs.	100	.....	700	450	100	100	100	700	50
Pig reboil, lbs.	.....	4,500	4,500	.....	4,500	.....	4,500	.....	.....
Spiegel reboil, lbs.	800	.....	.....	1,200	.....	1,200	.....	1,200	1,200
Manganese, 85%, reg., lbs.	.....	.....	.....	600	.....	.....	.....	.....	.....
Manganese, (1.25% C.) lbs.	800	.....	.....	.....	.....	2,000	2,000	.....	.....
Time of heat hours-minutes	12-10	11-40	12-00	11-45	12-15	13-45	13-15	12-45	12-50
LADLE PRACTICE:									
Manganese, 85% H. C., lbs.	800	1,200	900	100	1,100	.....	.....	1,200	1,200
Aluminum, lbs.	12	3	6	5	11	6	5	5	6
POURING PRACTICE:									
Aluminum per mold, ounces	6	2	.....	4	7	.....	6	.....	8
Mold size, inches	24 X 48	24 X 48	24 X 54	24 X 54	24 X 42	24 X 42	24 X 42	24 X 48	24 X 48
Nozzle size, inch	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾
Residual manganese, %	0.12	0.14	0.17	0.25[3]	0.15	0.16	0.18	0.14	0.14
Mold action, down, inches	0	2-3	3-4	2	2	2-3	0	3	3
Mold action, up, inches	1	0	1-2	1	1	0	0 rim	1	0
ANALYSES:									
Carbon, %	0.07	0.07	0.08	0.09	0.08	0.05	0.05	0.08	0.09
Manganese, %	0.34	0.30	0.32	0.31	0.35	0.29	0.30	0.33	0.33
Phosphorus, %	0.009	0.008	0.009	0.011	0.009	0.008	0.009	0.008	0.007
Sulphur, %	0.032	0.030	0.029	0.029	0.029	0.025	0.030	0.029	0.025
Silicon, %	.....	0.003	0.005	.....	.....	.....	.....	.....	.....
Copper, %	0.15	0.19	0.16	0.17	0.08	0.11	0.11	0.15	0.12
Chromium, %	0.036	0.030	.....	.....	.....	.....	.....	.....	.....
Nickel, %	0.03	0.02	.....	.....	.....	.....	.....	.....	0.09
Tin, %[4]	0.06	0.035	.....	.....	0.020	0.028	0.031	0.040	.....
SLAG:									
FeO, %	20.62	20.62	24.45	22.00	20.19	22.74	25.01	21.32	27.30
SiO_2, %	14.80	14.80	11.00	12.36	11.09	10.40	9.86	9.60	8.74
P_2O_5, %	2.73	2.73	2.45	3.07	3.07	3.09	3.05	2.47	2.82
CaO, %	45.00	45.00	45.67	46.46	46.33	46.68	45.45	46.79	44.32
MnO, %	8.93	8.93	8.77	10.06	9.55	9.42	8.90	9.16	9.42
MgO, %	5.35	5.35	6.49	6.82	7.23	6.55	6.42	8.89	6.23
Al_2O_3, %	2.69	2.69	1.05	2.60	2.72	1.41	1.47	1.50	1.41

[1] Low limestone charge of 6.56% was due to replacing three boxes of limestone with two boxes of Staflux or 0.8 per cent of the charge. [2] Remainder of iron analysis was manganese 1.91, phosphorus 0.348, and copper 0.09 per cent. [3] This heat had an addition of 3000 pounds of spiegel at the end of the meltdown. [4] See "Residual Tin in Sheet Steel" in STEEL, May 6 and 13, 1940.

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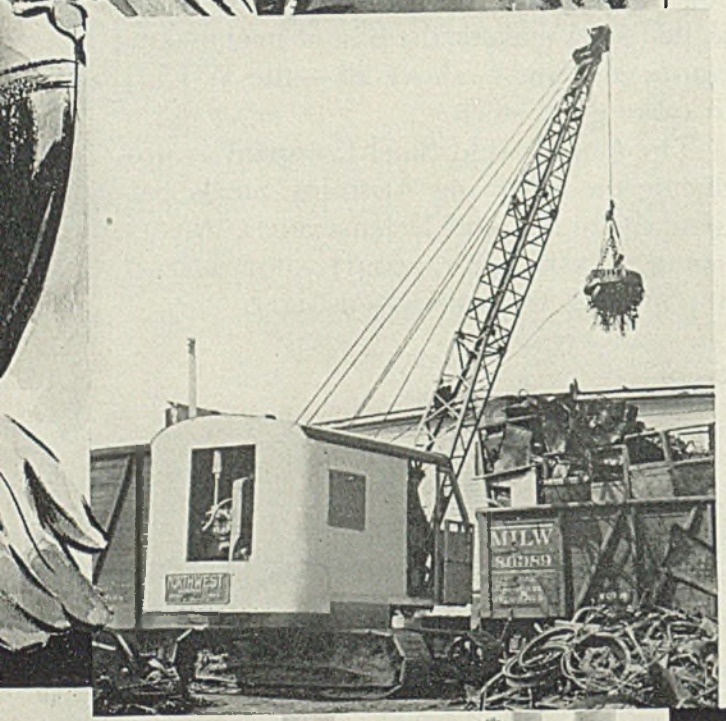

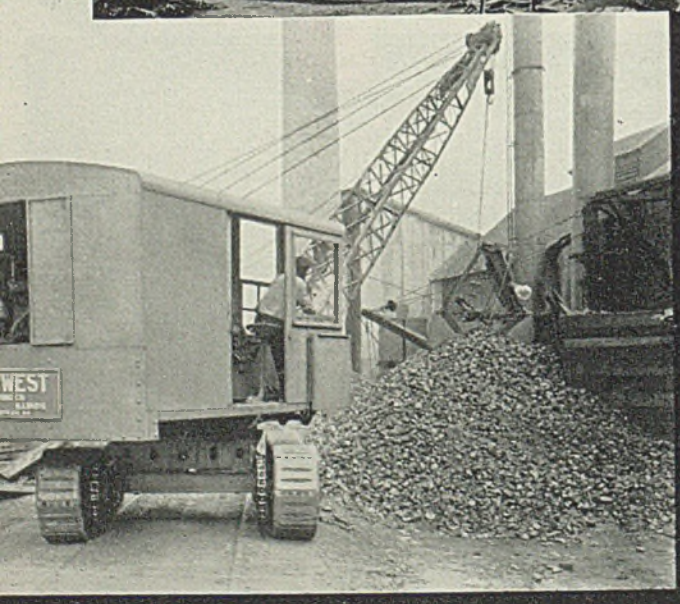

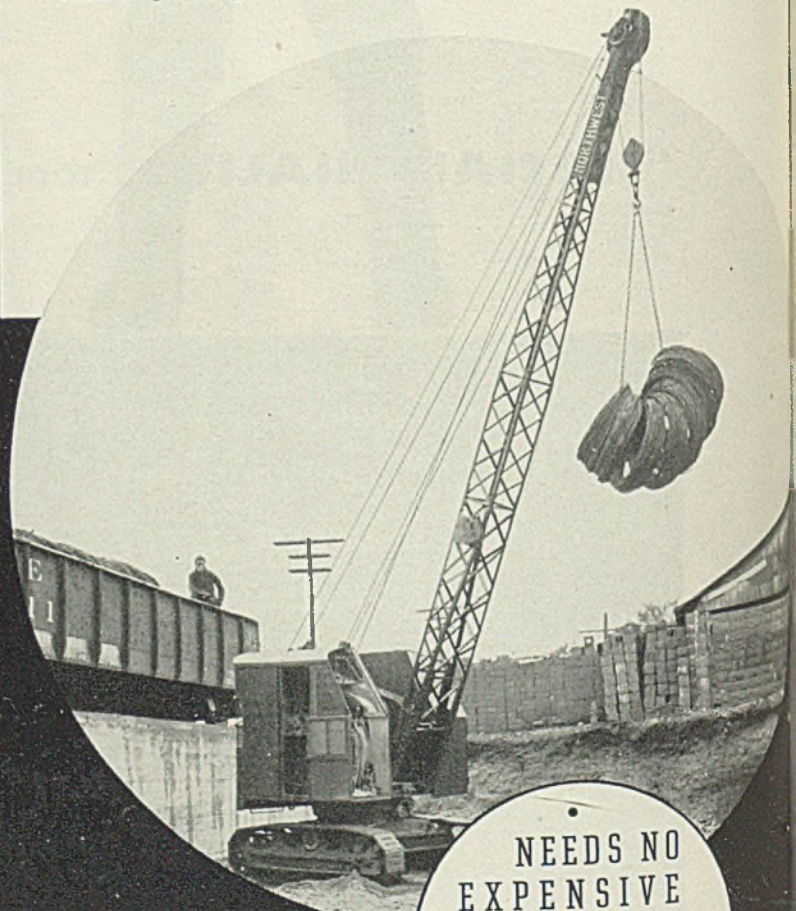

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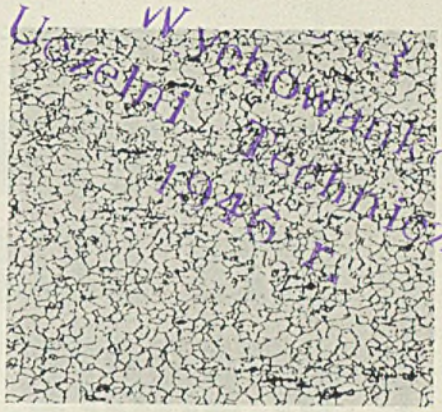
Figs. 3 and 4 (Left and Right)—Photomicrographs of samples tested for ageing. X100



efficiency. The ladle addition is about 10 per cent higher than for the furnace addition. This feature is of paramount importance in the face of our major defense program. Certain grades, however, require a number of additions to the ladle and it is well to add all the elements that do not incur too great a loss to the furnace unless the heat is exceptionally hot and reladled.

Generally ferromanganese contains from 0.90 to 1.20 per cent silicon. Since one containing less than 0.25 per cent silicon was better suited this was established as standard. Either can be used successfully, however, as long as the different silicon contents are kept separate because with the higher silicon the aluminum addition must be lower.

The grades of scrap used in heats Nos. 1, 2 and 3 were costly and later were substituted with lower cost material. In fact, all railroad, No. 1 bundle, No. 2 bundle and crop butts were eliminated from the charge and the resultant steel remained of high quality.

Burden Contained Scrap

The iron used in the heats, shown in Table Nos. 1 and 2, analyzed approximately 0.85 to 1.25 per cent silicon; 0.350 and plus phosphorus and always under 0.022 per cent sulphur. The blast furnace burden contained 35 per cent scrap and 16 per cent open-hearth slag. Regular movement of the blast furnace afforded uniform iron analysis which is one of the requisites of high-quality, lower cost steels.[1]

Steelmaking, processing and annealing practices at a plant drifted considerably from the established standards because of the lack of proper supervision and it was held that a higher quality charge was necessary to produce suitable extra deep drawing cold reduced strip. It was claimed that the scrap in the blast furnace burden would have to be discontinued and only crops, butts and No. 1 scrap (bundle and heavy melting) could be used in the open hearth to maintain a low residual (tramp) alloy contamination. Instructions were issued to tap the heats with a 0.06 per cent carbon and a 0.35 per cent manganese. This necessitated the use of medium carbon ferromanganese. Each detail meant a marked increase in the cost. This practice was followed for six weeks without any noticeable increase in quality and then was abandoned for the original shop procedure governing supervision of the deoxidizing, soaking and reheating phases. The cause of the foregoing trouble was the decrease in the time and temperature of the soaking period to increase the capacity. Rockwell values were high, Olsen values low and the fracture of the cone was ragged.

Figs. 3 and 4 are photomicrographs of the samples tested for ageing.[2] Both show an extremely poor microstructure.

Ladle Samples Killed

The ladle analyses shown in Table 2, were obtained from tests that were killed with a few pellets of aluminum in the test spoon. Extensive sampling of rimmed and killed ladle tests showed a difference of approximately 2 points of carbon on heats under 0.12 per cent carbon; where a killed test analyzes 0.08 the corresponding rimmed sample will be 0.06 to 0.065 per cent carbon averaging generally closer to the full 2-point differential.

In the slag analyses the FeO represents the total FeO because the method reduced the Fe_2O_3 to FeO. Consequently the figures are somewhat higher than where only the ferrous oxide is shown and the ferric oxide percentage is omitted.

Heats shown in Table 2 are representative of a large number for each group. Heats Nos. 1, 2, 3, and 4 represent a group where road scrap or miscellaneous road scrap was substituted for the highest grades of scrap averaging approximately 125,000 pounds. Some No. 2 bundle and No. 2 melting scrap also was charged.

These series were designed to demonstrate that quality steel could be produced with a lower cost metallic charge. About 8½ per cent limestone was charged for the first several heats the same as for the higher grade scrap. With this grade of scrap and the regular amount of lime the ingots from these heats broke during the blooming operation which necessitated scarifying or chipping.

Rejections for defects in the finished product were far in excess of that of the normal practice. The lime was finally raised to about 9.25 per cent which decreased the breakage in blooming. With a charge of approximately 10 per cent limestone the steel in all respects including rejections was absolutely normal. The increased lime was required solely because of the change in the scrap quality inasmuch as the silicon in the iron ranged from 0.90 to 1.25 per cent. In each group of different limestone charges half of the heats were shaped-up with 4500 pounds of pig iron and half with spiegel varying in amounts from 800 to 1200 pounds, and in each group those having the pig-iron reboil were better in quality.

Meeting the desired manganese specifications of 0.30 to 0.35 per cent was accomplished by making both furnace and ladle addition in half of the heats and only a ladle addition in the remaining number of heats.

No differences existed in the steel quality but inasmuch as the yield of manganese when added to the fur-

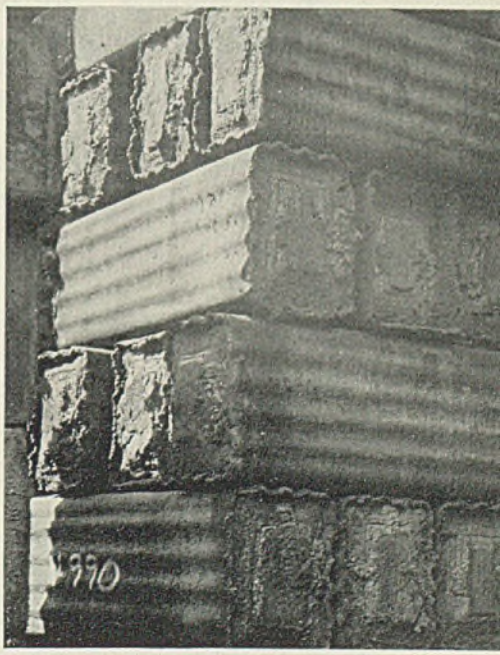


Fig. 5—Fluted ingots, 24 x 30 inches, showing condition of tops

[1] See "Manufacture of High-Quality, Low Cost Steel—Basic Open-Hearth Iron", STEEL, June 23, 1941, p. 62.

[2] For detailed information on ageing, see "Age Hardening of Cold Reduced Strip", STEEL, Sept. 30, page 44; Oct. 7, page 46; and Oct. 14, 1940, page 52.

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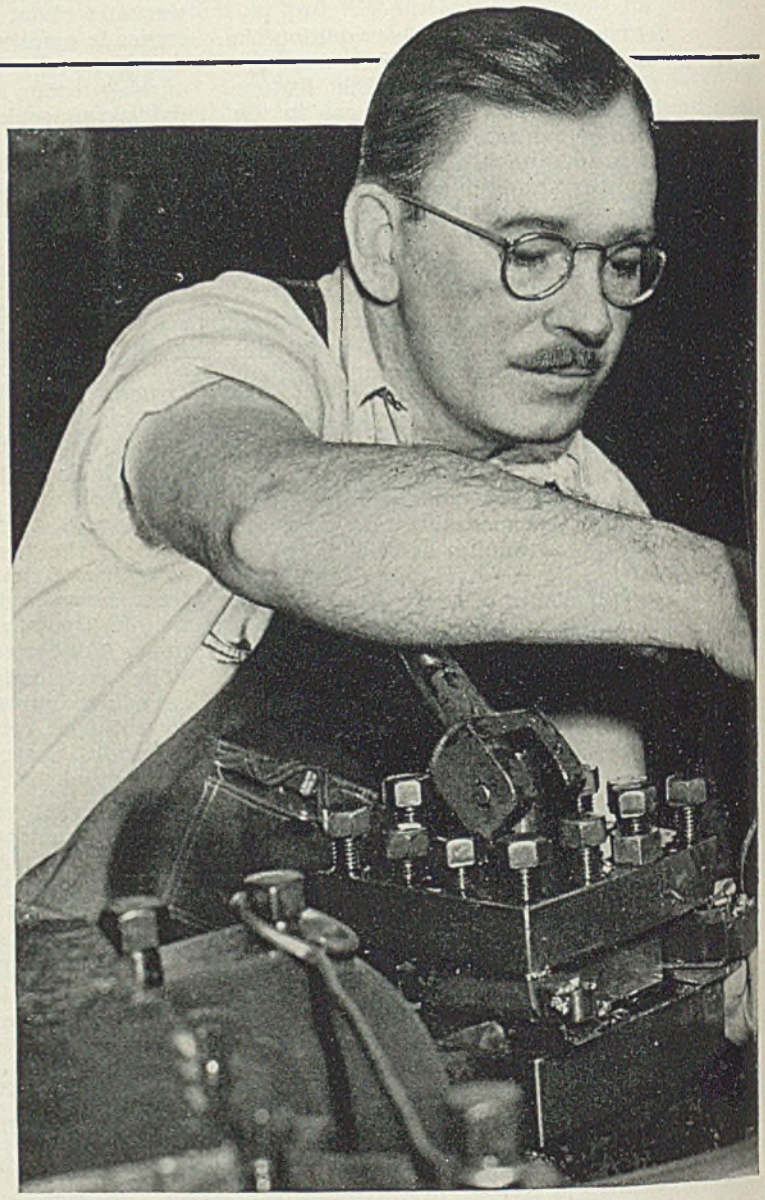

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nace is approximately 60 per cent, it is advisable to realize this saving in cost.

Aluminum additions, which were used to control the rimming action, were low. It was endeavored to have rimming action start immediately at the shut-off which resulted in the ingot rimming down and leaving a collar 2 to 3 inches and rather thick. Invariably these ingots rolled without a break or tear and the resultant slabs required no conditioning which means a saving in cost.

Characteristics of the ingots are depicted in Fig. 5. This illustration shows the tops of three different heats of 24 x 30-inch ingots taken at random. Identical features exist with all of the slab size ingots. These ingots were of the flutted design but were replaced with the smooth walled mold, as previously explained. In the slab mold the wall is straight for 18 inches from the butt before tapping starts. This feature was developed by long-time research eliminating occasional vertical ingot cracks.

The most desirable ladle carbon for deep-drawing quality was found to be 0.07 to 0.09 per cent carbon, killed test. This evidence was developed by producing a large number of heats conforming to two carbon specifications—0.08 and under and 0.06 per cent and under.

During solidification of the ingot the carbon at the ingot wall was as low as 0.02 per cent and occasionally 0.01 per cent. These low-carbon areas had a tendency to crack but when the carbon was about 0.025 per cent or over no cracking would occur. This respective feature would vary considerably with different heating and hot strip units because cracking only can occur under certain critical temperature conditions*.

* STEEL, June 17, p. 54; June 24, p. 50; and, July 1, 1940, p. 52. Also April 28, p. 74 and May 5, 1941, p. 66.

"Ghosts" in X-Rays Show Movement of Atoms

■ Hazy spots once believed to be imperfections or "ghosts" in X-raying crystals have been found to be of great importance according to Dr. Roman Smoluchowski of the General Electric Research Laboratory at Schenectady, N. Y. Since commonly used metals and alloys have a crystal structure, this discovery may prove important practically, it is claimed.

According to the doctor's explanation—if the atomic lattice of the crystal is entirely at rest, all scattering of X-rays is by the usual theory, and they form the well known Laue pattern. But at higher temperatures atoms are set in motion and they cause a diffuse scattering. The atoms do not move at random, however, for there is enough coupling between them that when one atom moves, adjacent ones move also.

The effect, he said, is as if sound waves were traveling back and forth through the crystal in all directions. The atoms momentarily displaced form extra planes, which scatter rays in abnormal directions and make the ghostly spots.

The intensity of the ghosts increases with the temperature of the crystal. Since their intensity depends on the amount that the atoms shift out of their usual position, it can be measured and used to determine the amplitude, or extent of swing of the vibration waves. From effects of this diffuse scattering of X-rays, it is possible to learn more about the fundamental mechanism of crystal structure, he stated.

Eaves Trough Revision Eliminates 275 Items

■ As a further contribution in the war effort, the standing committee in charge of simplified practice recommendation R-29-39 — "Eaves Trough, Conductor Pipe and Fittings, and Ridge Rolls"—recently approved a revision estimated to eliminate 275 items, according to the Department of Commerce, Washington. Copies of the proposed revision have been mailed to all interested groups in the industry for consideration and approval.

The revision proposed consists of the elimination of the 4, 5, 6, and 7-inch double bead eaves trough, together with all accessories such as miters, end pieces, hangers, etc., in all grades of material and all gages.

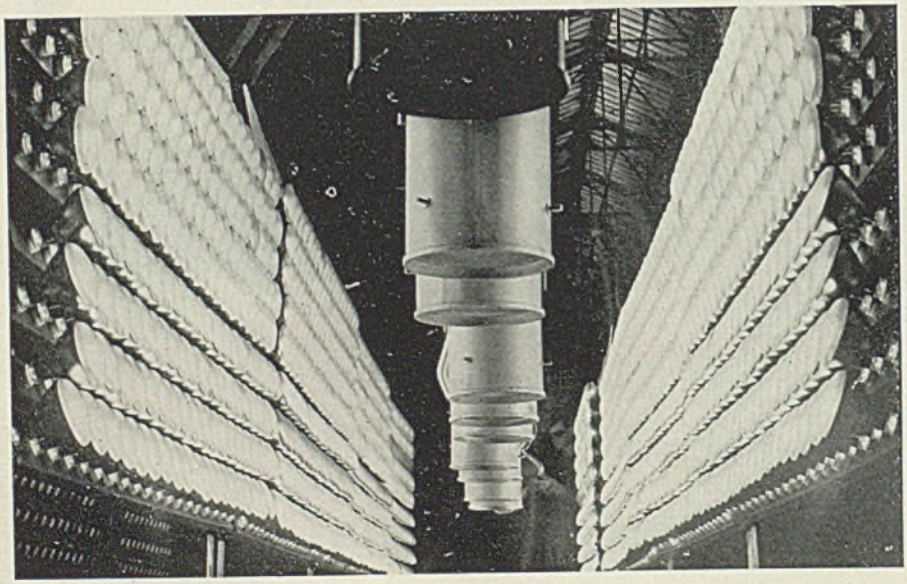
Designing Tools for Production Machines

■ *Tool Design*, by C. B. Cole; cloth, 498 pages 5½ x 8¼ inches; published by American Technical Society, Chicago, for $4.50.

Fundamental principles of design as applied to tooling for production form the background of this volume. The tool designer is the link between the engineering department and the production job. He needs all the practical knowledge of the expert mechanic, coupled with inventive genius. His job is to select the machines and develop the tools that will produce piece parts at high accuracy and speed.

This volume is a companion text to a previous book, *Tool Making*, by the same author. It covers the same general field but stresses design rather than methods of making them.

How To "Finish" an Hour's Work in 8 Minutes



■ An hour's job in 8 minutes is being done by a battery of 1368 infrared lamps at the Sharon, Pa., Transformer Division of Westinghouse, drying transformer tanks needed for victory. Used by the Army and Navy, these small transformers are an important link in production of light and power for air fields, munitions plants and naval bases. In the painting process, transformer tanks are hung by hooks from an endless conveyor chain. Traveling at 4 feet per minute, the tanks first pass a workman who sprays them inside and out. Then the tanks take their 8-minute ride between the two banks of drying lamps where infrared radition dries the paint at 300 degrees Fahr. Each bank of lamps is about 4 feet high and 32 long. The present installation dries only the base coat — however, more lamps and special machinery are being installed to spray and dry both base and finish coats in one operation.

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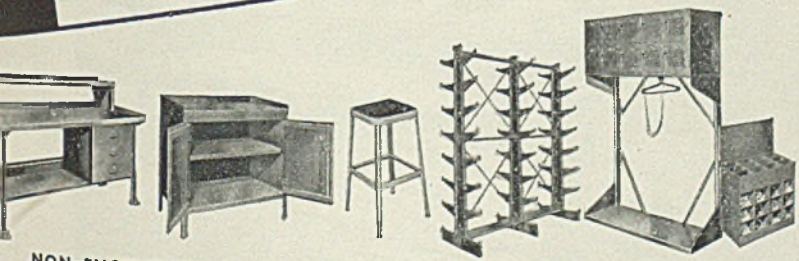

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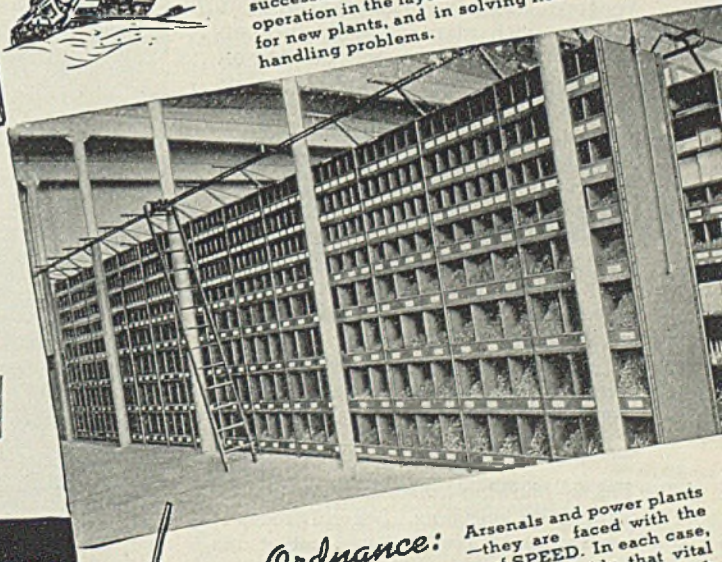

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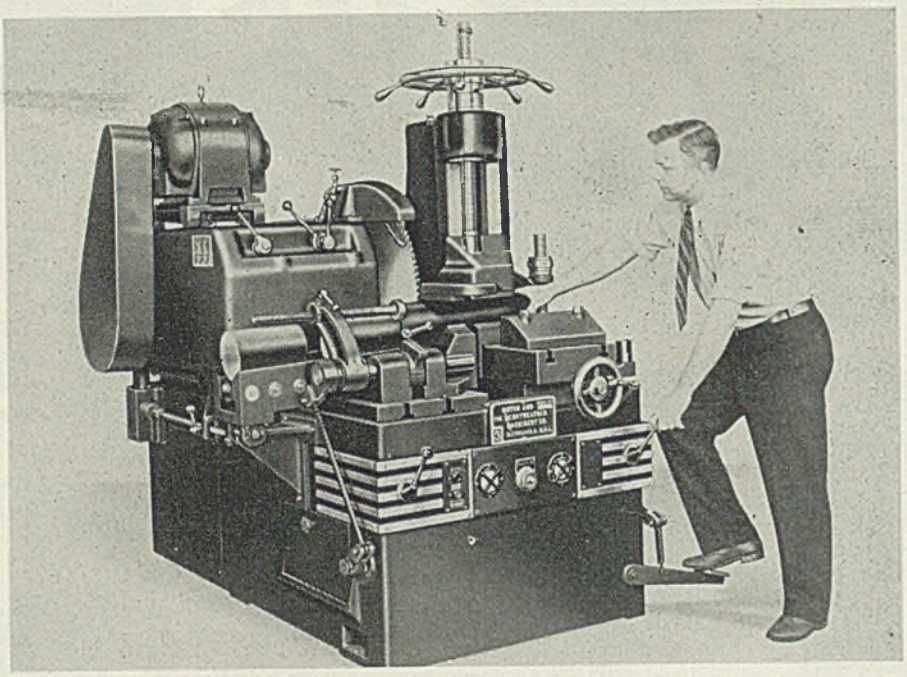


Fig. 1—Saw in action. Note saw cuts upward. Operator has his left hand on lever controlling hydraulic clamping and unclamping; his foot on treadle operating stock stop. One operator can easily take care of three or four machines

HIGH SPEED CUTTING

Of Shell Billets

■ BACK in 1914-18 when individual slugs for semiarmor piercing and other shell were cast direct from the ladle, the Royal Ordnance Factories at Woolwich arsenal employed parting-off lathes to remove the risers. Nowadays this method would hardly be fast enough, but at least it had the merit of producing a good clean square end—important in securing concentricity of the forged blank. While it is generally conceded that uniform heating to the core of the billet is of the first consequence, a dead square end certainly adds nothing to the difficulties of the piercing punch. But present use of rolled bar of square section (square is easier to handle and is desired for reasons already discussed in connection with pierce and draw operations) also renders the parting-off lathe impractical in addition to its slow speed. Obviously the simplest way to cut off square section billets is to hold the stock and let the tool move.

Before proceeding to describe a modern design of billet cutting machine employing this procedure, it may be well to consider some of the desirable characteristics of the slug as these are influenced by the method used to separate it from the bar. First, of course, is the necessity of securing reasonably square ends. Also extremely important is that these ends must be in such condition that they may be examined for pipe. For even after the top and bottom ends of the cogged down bloom are sheared off, there may remain a secondary pipe, especially with "big-end-down" pouring.

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

While many of the original weaknesses of the ingot are eliminated by the welding action of the rolls and the press, central pipe tends to resist these healing influences and may finally appear in the center of the bar stock and so at last in the base of the shell—the last place in which we desire porosity, lest the high-pressure propellant gases in the powder chamber of the gun penetrate the shell and ignite the explosive within, causing the shell to explode in the gun.

Perhaps the ease with which the ends of the billet could be examined has been one of the principal attractions of the "nick and break" method. This involves, as we know, the notching of the bar on two opposite sides with torch or saw to a depth of perhaps 3/16-inch and thereafter breaking the bar in a heavy press. Nick and break, however, offers by no means a secure guarantee that the ends will be square and it is difficult to control billet weight with sufficient accuracy to hold the resulting forgings within desirable length limits. Too, the stock must go through two operations. Indeed it might be easier to let the stock stay in the saw or under the torch and so complete the job in a little longer time perhaps, but with considerably less effort.

Now as far as burning the bar through is concerned, the stock, of course, must be acceptable to inspection without the necessity of examining each billet for soundness. Where the torch is used—and this technique has already been very fully described in a former article dealing with the operations in the National Steel Car Co.'s plant in

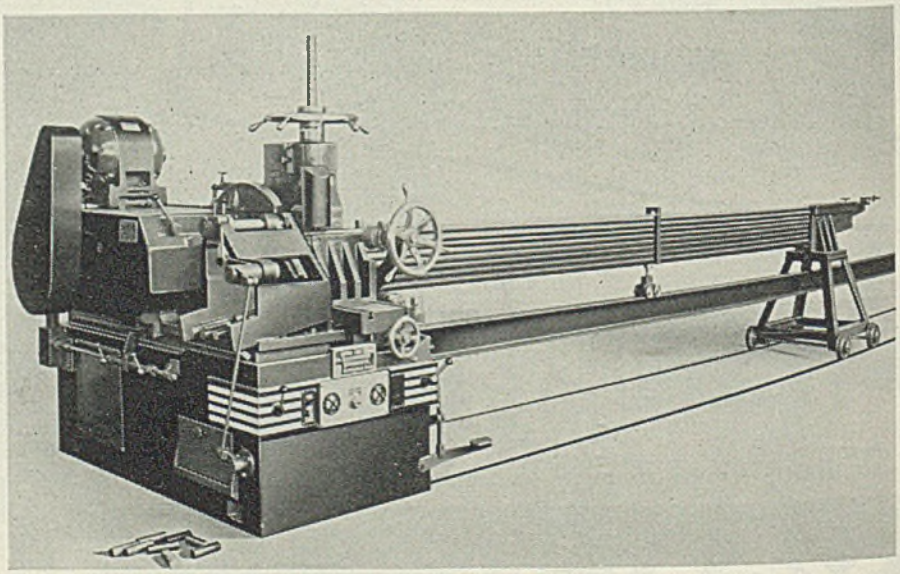
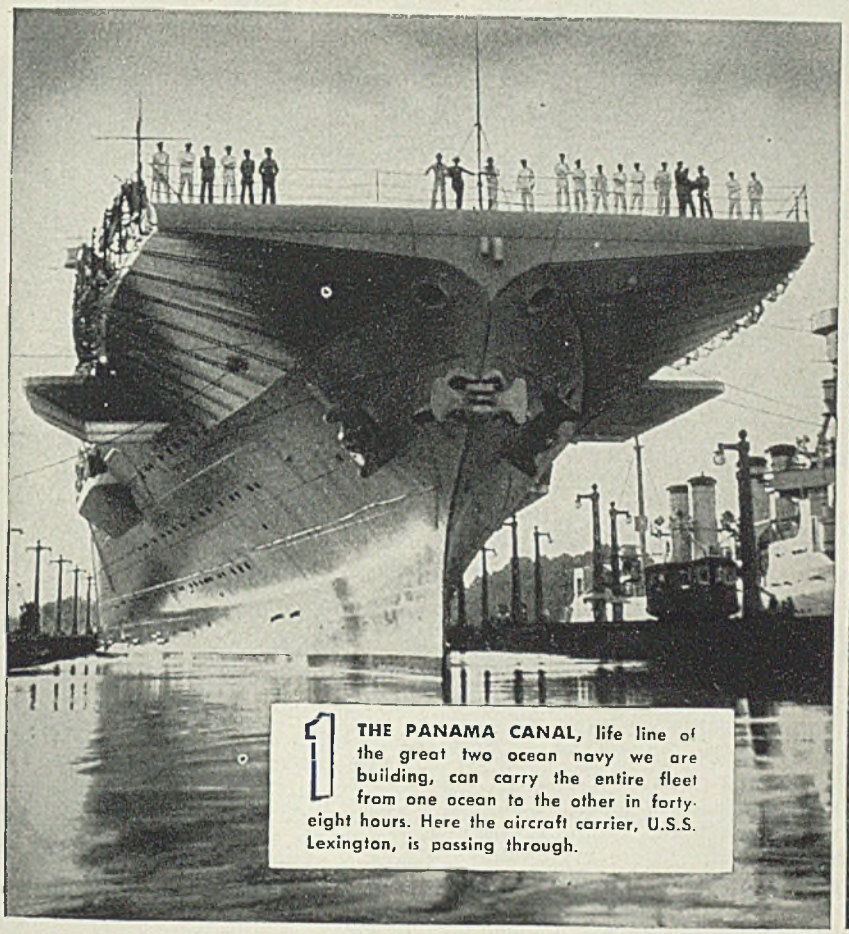


Fig. 2—Showing trolley arrangement for supporting long bars. Several pieces of stock may be clamped and cut at one time as shown here

FAMOUS LIFE LINES



1 **THE PANAMA CANAL,** life line of the great two ocean navy we are building, can carry the entire fleet from one ocean to the other in forty-eight hours. Here the aircraft carrier, U.S.S. Lexington, is passing through.

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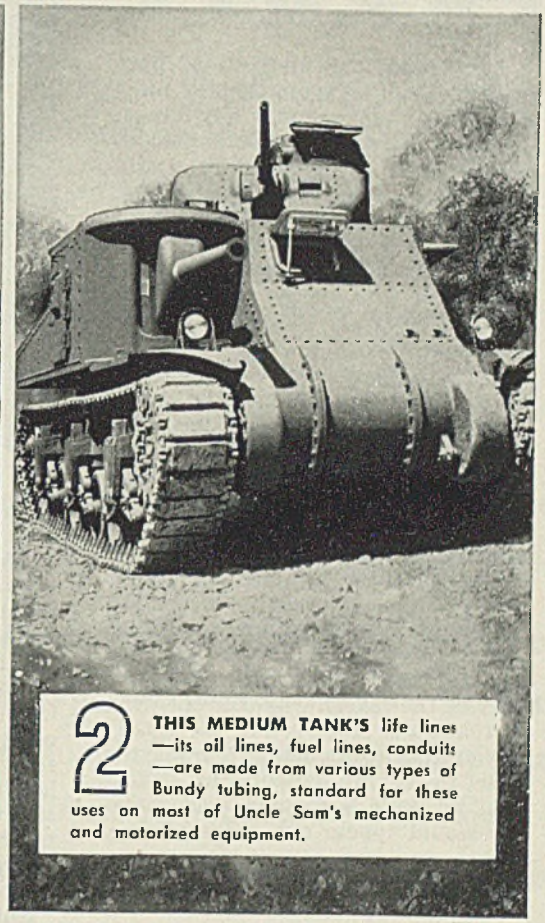

2 **THIS MEDIUM TANK'S** life lines —its oil lines, fuel lines, conduits —are made from various types of Bundy tubing, standard for these uses on most of Uncle Sam's mechanized and motorized equipment.

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Hamilton, Ont., (STEEL, April 21, 1941, p. 58)—the bar stock is broken and inspected at the mill. Further, this particular plant, operating under British specifications, uses steel made from ingots poured big-end-up with hot top and so offering a rather secure guarantee against secondary pipe.

All the various methods of parting off the billet from the bar have, of course, their peculiar advantages and disadvantages. Burning is no exception to the general rule inasmuch as it gives a good spare end; but an end which cannot be examined for flaws due to the fused surface. Nor is the presence of the hard scale left by the torch an advantage; and the cost of gas is not inconsiderable.

Perhaps the quickest way to separate the bar into billets is to cut it under a heavy shear. In one plant visited recently by the author, this method was in use, but the slugs, being far off-square, were subjected to an upset operation to remedy the situation before being placed in a second upsetter for piercing in two operations and subsequent cross-rolling to finished shape. The first short upset—some ⅜-inch—cracked off the scale effectively, and this may be the reason why cold shearing is tolerated. However, if we finally get around to induction heating the billet to forging temperature so fast that no scale is formed, cold shearing would appear out of the picture.

Saw Cuts Upward

As already indicated, the bar might be left under the hack saw, a method that would be much more popular if it were faster and always gave a square end. The writer has seen hack saws at work on expensive alloy steels where the intent was to save a dollar or two per cut in material as compared with a milling or machine sawing operation involving a cut 0.25-inch wide. As far as shell steel is concerned, the small loss of material is perhaps the only disadvantage which could be urged against the use of a cold saw since a well designed machine of this kind will cut a heavy bar off square within a few thousandths, as well as expose the ends to the macro-etch and visual examination leave a burrless finish and do the job in short order. The writer recently watched a Motch & Merryweather saw push its way through a 5-inch round of shell steel (X 1340) in 26 seconds.

Figs. 1 and 2 show one of these saws. Note the saw cuts upward, thus setting the cutting head down

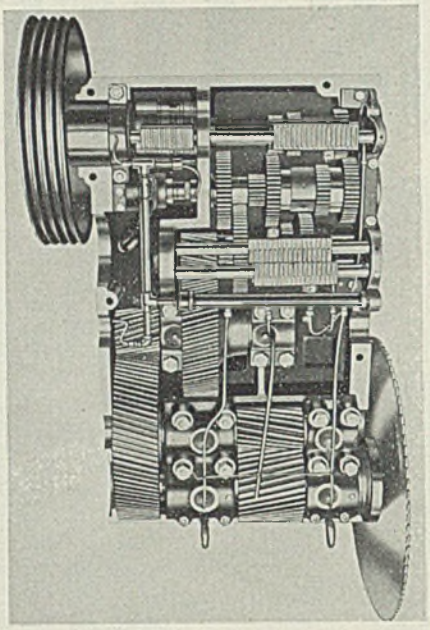

Fig. 3—Main motor, gear drives are mounted on saw carriage. Multiple disk clutch and brake drum in oil, are controlled from both front and rear of unit

on the bed and avoiding chatter. Also with the same object in view, the stock is clamped firmly on both sides of the saw by means of hydraulic pressure. It is really a pleasure to watch this machine at work. All that the operator has to do is to move the lever shown at front lower right in Fig. 1. This lever controls both the power feed roll shown at the right in this same illustration and the hydraulic clamp seen within the main column of the machine. A foot treadle moves the stock stop out of the way when desired.

Shifting the control lever in one direction unclamps the vise and causes the feed roller to rise and start revolving. Moving the lever in the opposite direction starts a similar train of events in reverse. In action, the stock moves up to the stop, the vise descends and the carriage bearing the saw starts forward. Just before cutting starts, heavy jets of lubricating fluid appear at either side of the saw, the upward movement of the teeth tending to hold the lubricant. At the end of the cut, the billet drops on an inclined roller conveyor and moves off, the supply of cutting fluid is cut off, and the carriage retreats in readiness for the next cut.

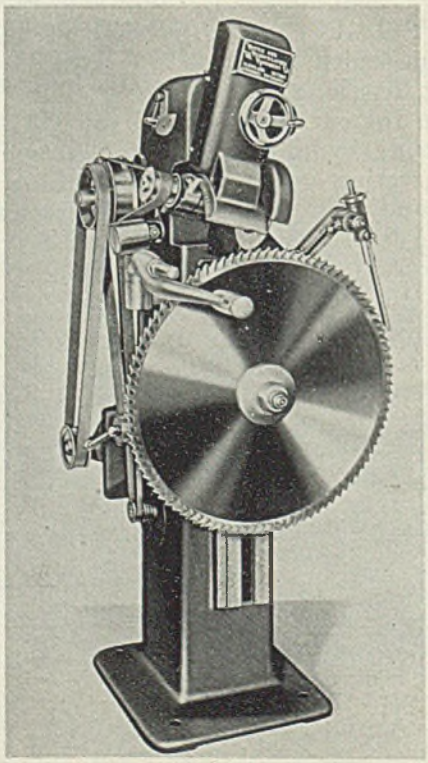

Fig. 4—Saw sharpening machine has wheel spindle and wheel slide mounted in same plane, thus minimizing vibration and chatter

Blade Body Trued Carefully

The construction of the saw itself is of considerable interest. The body of the blade is a carefully trued disk, having a recessed rim which is straddled by the teeth segments. Separate inserted teeth are not used, but segmental elements, bearing perhaps four teeth, are machined out of tool stock and riveted to the rim of the blade in such wise as to form a close-fitting ring around the blade. These teeth are designed, of course, to suit the metal being cut just as in the case of lathe or planer tools. The most efficient arrangement, apparently, is the use of rougher and ripping tool alternately around the periphery of the saw. Considerable side clearance must be given to protect the saw itself from injury.

To provide for cutting speeds between 18 and 134 feet per minute as the work may require, nine speed changes in geometrical progression are furnished. The change gear box is shown in Fig. 3. The author was much impressed by the total absence of backlash in the driving gear trains which are certainly most carefully cut and fitted in their housings.

Another aspect of interest is the sharpening machine shown in Fig. 4. The saw, being mounted on the spindle, accurate indexing is secured by means of an indexing disk. First the grinding wheel descends, cleaning up the face of the tooth at the desired angle. Thereafter by means of a cam the wheel rides over the back of the tooth as the blade revolves to the next position. Thus the clearance of the tooth and the general profile of the rear surface is determined. By a further ingenious arrangement, high and low teeth may be ground at will and by double indexing and suitable positioning of the grinding wheel, the sides of the roughing teeth are ground.

Saws may be ground, it is understood, as many as 7 times. Cost of sharpening is low since the sharpen-

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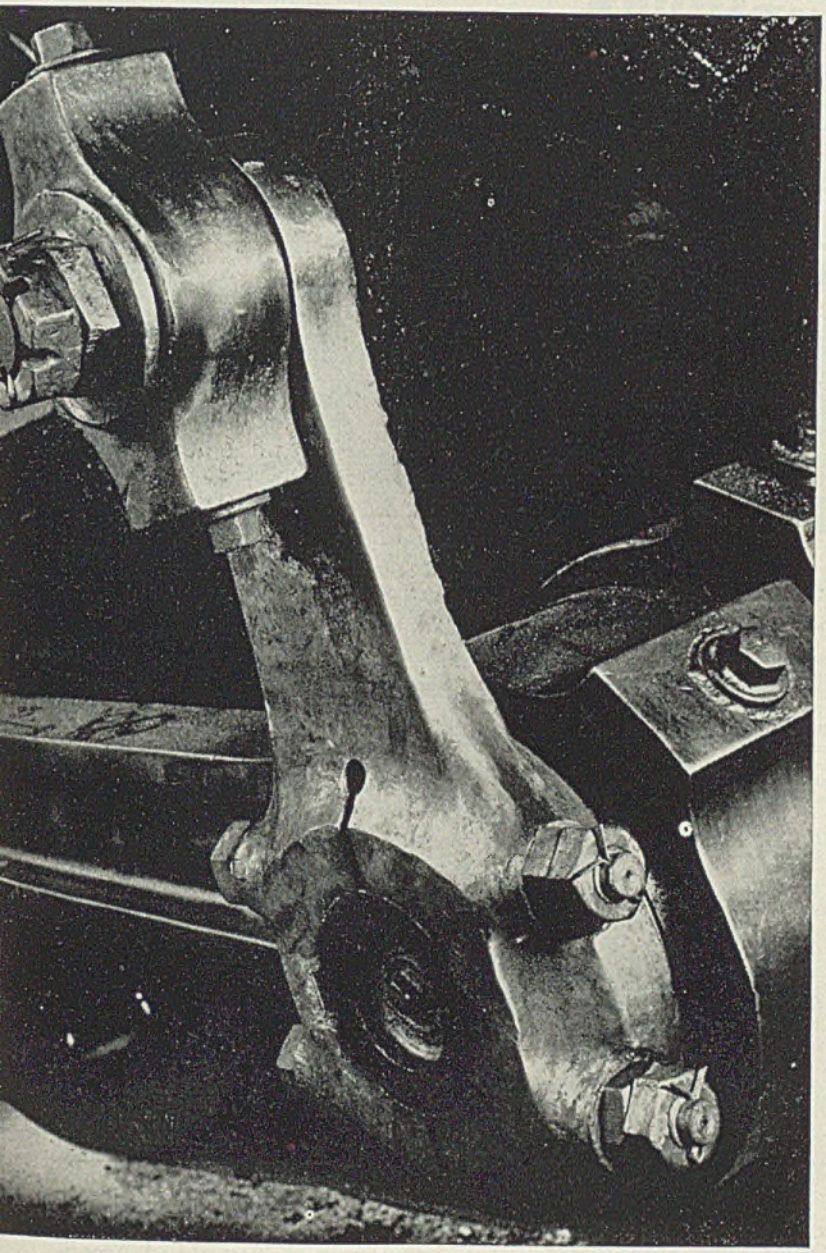

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Of the five bridges that are American Bridge-built, the plate girder structure over Dunnings Creek, in Bedford Township, is of special interest. Esthetically pleasing in its simplicity of treatment and efficient use of durable steel, the Dunnings Creek Bridge was singled out by the Jury of Award of the American Institute of Steel Construction as the most beautiful "Class B" (cost range between 250,000 and 1,000,000 dollars) steel bridge opened to traffic during 1940.

Thus again is exemplified American Bridge Company's continuing participation, of more than a half century's standing, in the growth and development of America's steel-framed network of travel and commerce.

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ing machine, once started, is completely automatic and requires no attention. Apparently the only difficulty encountered by users of these machines arises from the desire of piece-work operators to continue to push the saw long after a halt should be called for the replacement of a blunt saw by one which has been sharpened.

This account would not be complete without referring to the neat and effective device for removing chips from between the teeth of the saw while at work. Unfortunately we have no illustration of this arrangement, but in brief it consists of a series of cylindrical pins mounted radially upon a small boss whose axis is placed in the plane of the saw and in such a position that the pins engage with the spaces between the teeth of the saw after the fashion of a pin gear. As the saw revolves the pins push their way into the teeth spaces, clearing the chips ahead of them. This chip remover is placed at the rear of the saw and well out of the way of cutting operations.

New Recommendations For Valves Approved

■ New simplified practice recommendations listing simplified schedules of pressure ratings recommended for brass or bronze and iron body valves have been approved for promulgation, according to the Division of Simplified Practice, National Bureau of Standards, Washington. They will be identified as RI83-42, "Brass or Bronze Valves" and RI84-42, "Iron Body Valves". They apply to steam rated gate, globe, angle and check valves, and will be effective for new production from Jan. 1, 1942.

Surveys of the industry showed that 97 per cent of all bronze or brass valves shipped in 1939 fell into one of the 5 pressure classifications, whereas the other 3 per cent were distributed over 6 other presusre classes. Likewise 95 per cent of all iron body valves shipped fell in 3 pressure classifications, while 9 other pressure ratings enjoyed between them only 5 per cent of demand. The simplified schedules recommend the continued manufacture as regular stock of valves in only those pressure ratings enjoying substantial demand. Until printed issues are available, mimeographed copies of these recommendations may be obtained.

Revises Practice

■ A tentative recommended practice for "Inspection and Tolerances for Gears" as revised October, 1941, is announced by the American Gear Manufacturers Association, 602 Shields building, Wilkinsburg, Pa. Dealing with spur and helical gears, the practice was adopted in May, 1940.

SPEEDS RIFLE-BORE FINISHING OPERATIONS

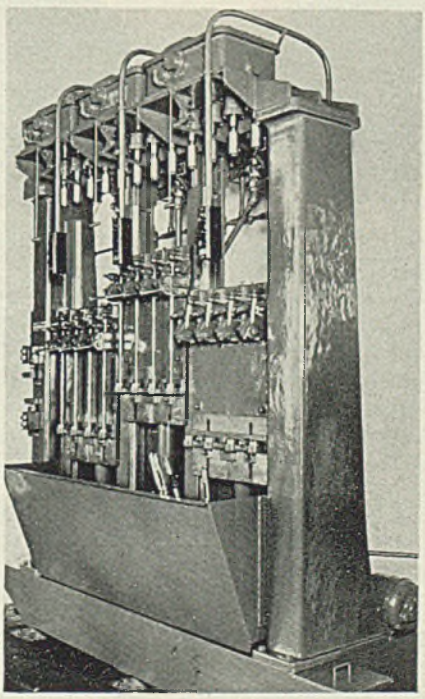
■ FINISHING long holes of small diameter to close tolerances as to diameter, roundness, straightness and surface quality always has been a most difficult machine shop problem. At the present time the mass production of firearms for the victory program brings this problem very much to the fore, especially in connection with the manufacture of rifles where finishing a small bore of considerable length is involved.

With faster and better methods of deep hole drilling already perfected, and with rifling successfully speeded up through ingenious applications of the broaching process, there is a tendency for the rifle barrel reaming operation to become a bottleneck in the finishing machining. To meet this situation W. M. Steele Co., 98 Beacon street, Worcester, Mass., has developed a vertical system of high speed reaming exemplified by the 12-spindle machine shown in the accompanying illustration.

This machine virtually is three 4-spindle machines built into one frame. Each of the three 4-spindle units is entirely independent of all the others, both in action and in control. When desirable each unit can be set up to handle lengths and diameters of barrels that are different than those handled in the other units, speeds and feeds can be set independently to suit the work, and each unit can be started or stopped at any time without affecting the others.

Barrels, in groups of four, are mounted on hydraulically controlled slides by means of self-centering supports at the bottom and quick acting clamps at the top. Supports and clamps are quickly adjustable to suit diameter and length of the work.

The reamers are driven from oil-tight gear boxes mounted on the top plate of the machine and they can be attached rigidly to their respective spindles or they can be mounted in quick-acting chucks. Coolant is pumped in through the hollow shanks of the reamers, thus keeping the cutting edges lubricated and flushing out the chips continually.



This machine can be arranged to do its work either by pushing the reamers through the bores or by pulling them through—operation in either case being semiautomatic. The push-reaming cycle is as follows:

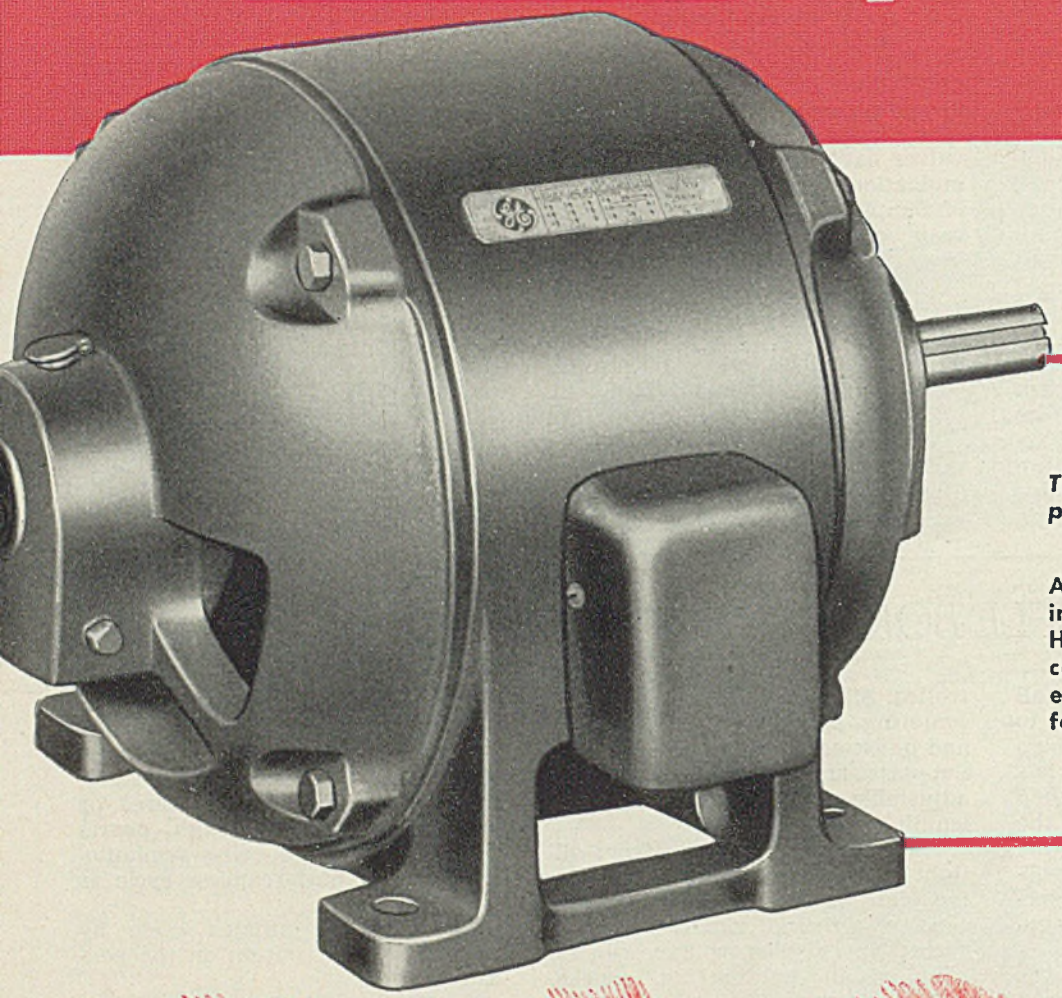
1. Operator initiates cycle by pressing "start" button on the pendant switch.
2. Slide feeds barrels upward, thus causing the revolving reamers to pass through the bores.
3. Upon prearranged contact of the slide with an adjustable lug on the control bar, reversal is effected at end of the reaming stroke and the slide then returns at high speed, stopping automatically at the end of return stroke.

For full reaming, the cycle begins with the workslide at the top of the machine—the reamers being inserted after the barrels are in place. In this case, the cutting feed is downward (as the barrels are lowered by the slide mechanism) and the return stroke upward. Otherwise the cycle is the same as for push reaming. The machine can be set to stop at the end of the cutting stroke to permit removal of the reamers. In any event, the reamer spindles revolve only during the reaming stroke.

These vertical reaming machines are built in two sizes—one for 0.30-caliber barrels from 22 to 28 inches long, the other for 0.50-caliber barrels ranging in length from 36 to 46 inches.

TRI/CLAD protection

S. U.S. PAT. OFF.



TRI-CLAD Sleeve-bearing Polyphase Industrial Motor Is Most Widely Used

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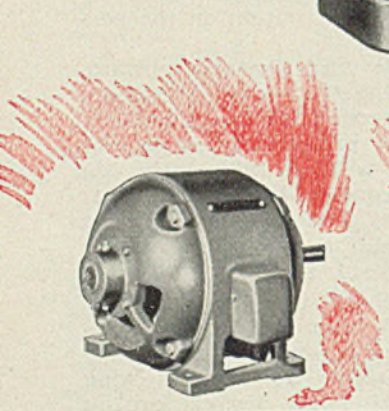
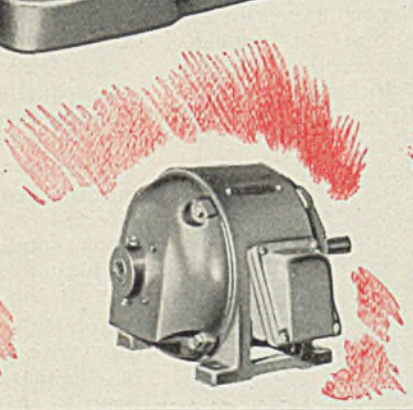


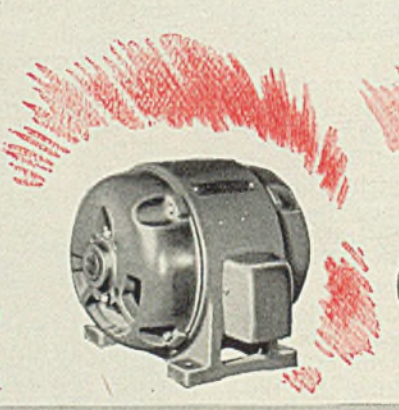
TRI-CLAD Ball-bearing Polyphase Motor

Has additional advantage of being mountable in other than horizontal positions. Will take end thrust—for example, from beveled-gear pinion. Similar to the sleeve-bearing motor and, like it, available in many types.



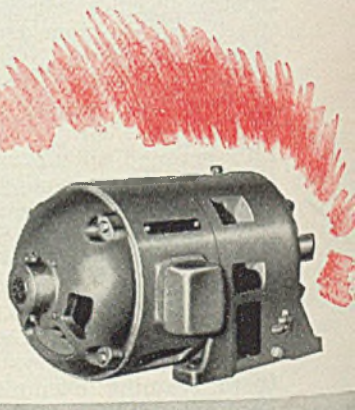
TRI-CLAD Splashproof Ball-bearing Polyphase Motor

For use in wet surroundings, such as dairies, breweries, paper mills, canning factories, etc. Furnished with cast-iron, waterproof conduit box, deflecting end shields, and moisture-resistant insulation.



TRI-CLAD Capacitor-Motor (in sleeve-bearing or ball-bearing types)

For single-phase operation. Available in types to drive such devices as compressors, pumps, fans, etc. No radio interference; no brushes to wear; quiet operation.



TRI-CLAD Gear-Motor

For economical, compact, low-speed direct or pinion drive. Wide range of output speeds available. Open, splashproof, and capacitor-motor construction. Oil- and dust-tight housings reduce maintenance.

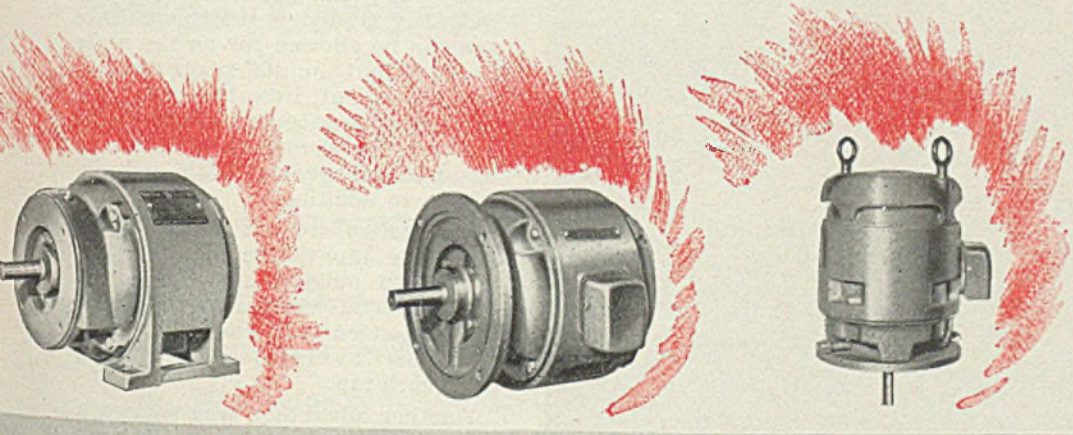
Built for Protection First.....to Last!

is now a *family affair*

THE improvements in Tri-Clad motor design are *fundamental* improvements, not just "sales features" to popularize a new model. That's why they are being extended, month by month, to a whole family of G-E integral-horsepower motors—both general-purpose and special types.

So, in these special fields you can now count on getting the same benefits of extra protection that have made the *general-purpose* Tri-Clad motor the acknowledged leader in performance and service life.

All these new members of the Tri-Clad family are the result of basic redesign to meet modern industrial conditions. Each has new performance and convenience features important to its particular field of service. For complete information on the right Tri-Clad motor for *your* application, consult our local office, or write General Electric Company, Schenectady, N. Y.



TRI-CLAD Ball-bearing Induction Motor, with Face-type End-shield Mounting
For close-coupled attachment to machine tools, compressors, pumps, etc. Motor bolted from driven machine. A few standard mounting dimensions apply to many motor ratings.

TRI-CLAD Round-frame, Ball-bearing Induction Motor, with Flange-type End-shield Mounting
For close-coupled attachment, or direct bolting to driven machine. Mounting dimensions are standard, but larger than those of face-type end shield.

TRI-CLAD Vertical Motor
For general-purpose fan, pump, and machine drives in vertical position. Openings protected and bearings designed for vertical operation. Both polyphase and capacitor-motors available with variety of bases.

Today a wider range of your special needs can be filled by the growing Tri-Clad motor family. Every member offers extra strength and longer life because of these 3 "extras":

Extra Protection
AGAINST PHYSICAL DAMAGE
Sturdy, cast-iron frame and end shield construction.

Extra Protection
AGAINST ELECTRICAL BREAKDOWN
Stator windings of Formex wire "armored" by synthetic resin against moisture, heat, oil, and abrasion.

Extra Protection
AGAINST OPERATING WEAR AND TEAR
New sleeve-bearing design and improved ball-bearing mounting lengthen life.

In addition, you'll find the modifications to meet special requirements are soundly engineered to give you space-saving, time-saving, and money-saving advantages all down the line. Consult your G-E representative for Tri-Clad horsepower ratings now available.

GENERAL ELECTRIC

PLANNED MATERIALS HANDLING

Improves Foundry Operation

By S. F. SWAIN
Golden Foundry Co.
Columbus, Ind.

■ PURCHASE of equipment at the Golden Foundry, Columbus, Ind., in recent years has been made with more and more emphasis on closer control of physical and chemical analyses and improvement of quality of the iron. These were the main reasons for erecting a new charging floor served by elevators, instead of charging the cupola from the ground. Raising the charging level helps improve quality, as will be shown. This is a jobbing foundry producing machinery and diesel castings in the range of 1 ounce to 3 tons

The new charging floor is 29 feet above the ground. This is 21 feet above the center of the tuyeres and 11 feet above the old floor. Charges of 2000 pounds are made up in steel trucks of cur own design and manufacture. The material comes from stock piles convenient to a 4 x 6-foot platform scale in front of two elevators. Loaded on one of the elevators, the charges are taken up to the charging floor, which is about 40 x 50 feet and a 2-ton Harnischfeger electric hoist for dumping the trucks.

By being able to make up all charges in advance it is possible to arrange them all on the charging floor in the order in which they go in. It is also possible to add ferroalloys, make minor changes in composition based on analyses from the previous day and have a last minute check by the foreman. This is a distinct advantage in control because four or five different mixtures are used every day and it is imperative that they be put in the cupola in the order outlined for the day. There is the further advantage that a breakdown of both elevators at the same time is so unlikely as to assure that the operation will be free from mechanical failure.

It was felt that the measures toward control taken on the charging floor would be voided to some extent unless we knew exactly what was being taken out at the tap hole and therefore a Toledo scale was installed to weigh out the molten iron. This was a somewhat unusual application of a standard type of scale which ordinarily is used with a dead section of monorail for weighing materials suspended from trolleys.

Scale Eliminates Guess Work

In this case the mixing ladle is permanently suspended from the dead monorail section. The ladle receives two charges or 4000 pounds per tap directly from the spout, less a small allowance for melting loss which, of course, can be checked by adding together the sum of the taps and the drop for comparison with what was actually put in. The tare weight of the ladle, lining and linkage can be allowed for on the scale beam so that the dial reads directly the pounds of iron taken out. A further allowance can be made in advance for considerable amounts of nickel, copper, chromium and molybdenum additions.

No molten iron is carried over from one tap to the next so that even slap buildup and the consequent gradual change in weight of the suspended ladle can be compensated for by readjusting to zero after each tap.

Another advantage was noticed a short time after installation. The use of this scale makes it possible to know the amount of iron required to pour a given floor or casting within a few pounds. This is many times closer than when it was necessary to guess the right amount of iron to send to a casting, especially with several thousand patterns in a job.

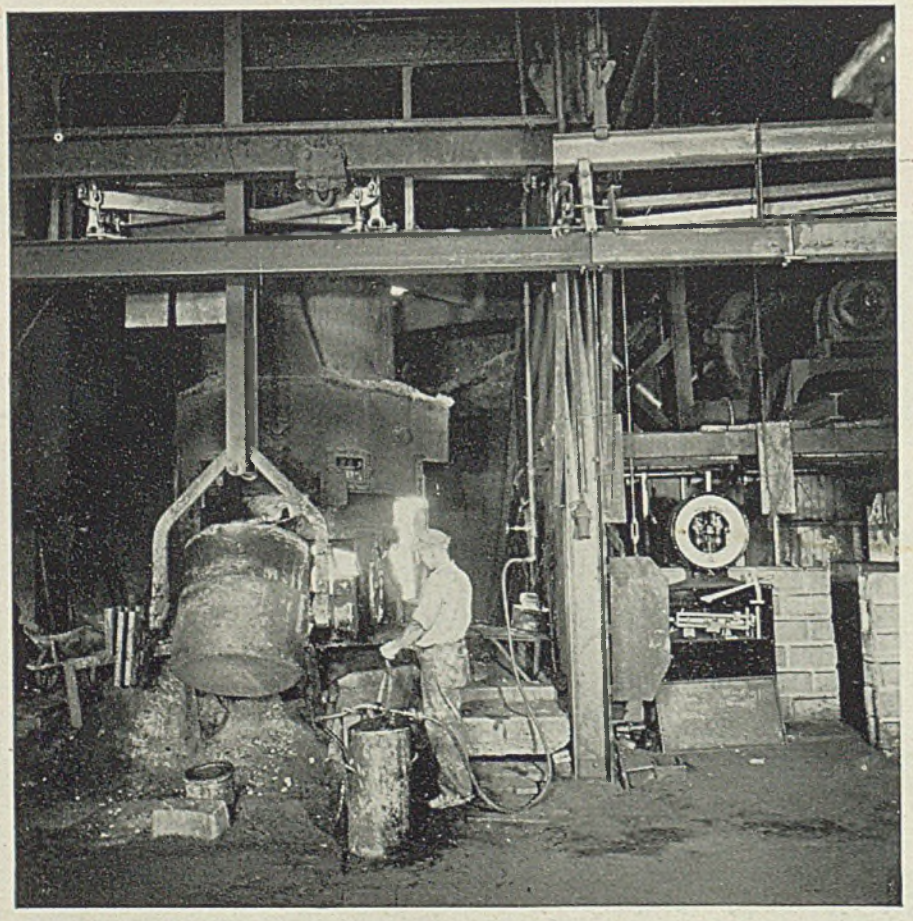
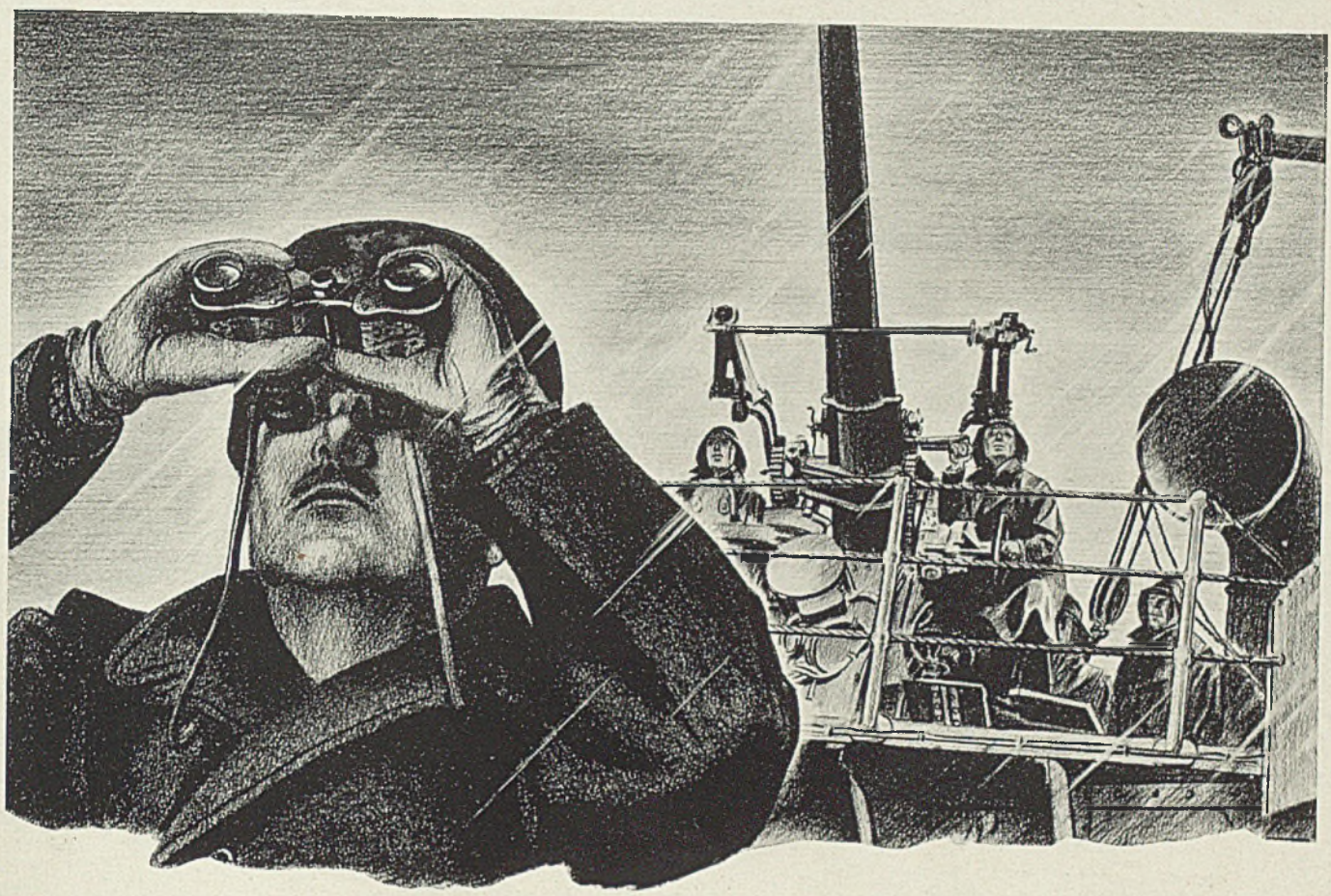


Fig. 1—Toledo scale installation at Golden Foundry, Columbus, Ind., for measuring hot metal as it is poured from cupola. Lower monorail is part of distribution system, has nothing to do with scale



10,400 Guns for Merchant Ships from Steel Conserved by Preformed Wire Rope

★ It pays to use preformed wire rope. Being preformed this "rope" lasts longer—cuts the number of machine shutdowns—steadies production. It is easier, faster, safer to handle. It saves both time and money.

★ But preformed wire rope does far more than that. By lasting longer, it conserves steel, and steel is a vital necessity to America today. Anything that helps conserve steel for America is of itself a vital necessity.

★ The steel conserved *this year* by the longer service of preformed wire rope would be enough to build more than 10,400 3-inch caliber guns for merchant ships.

★ Preformed wire rope is an essential to industry, a necessity for the Nation.

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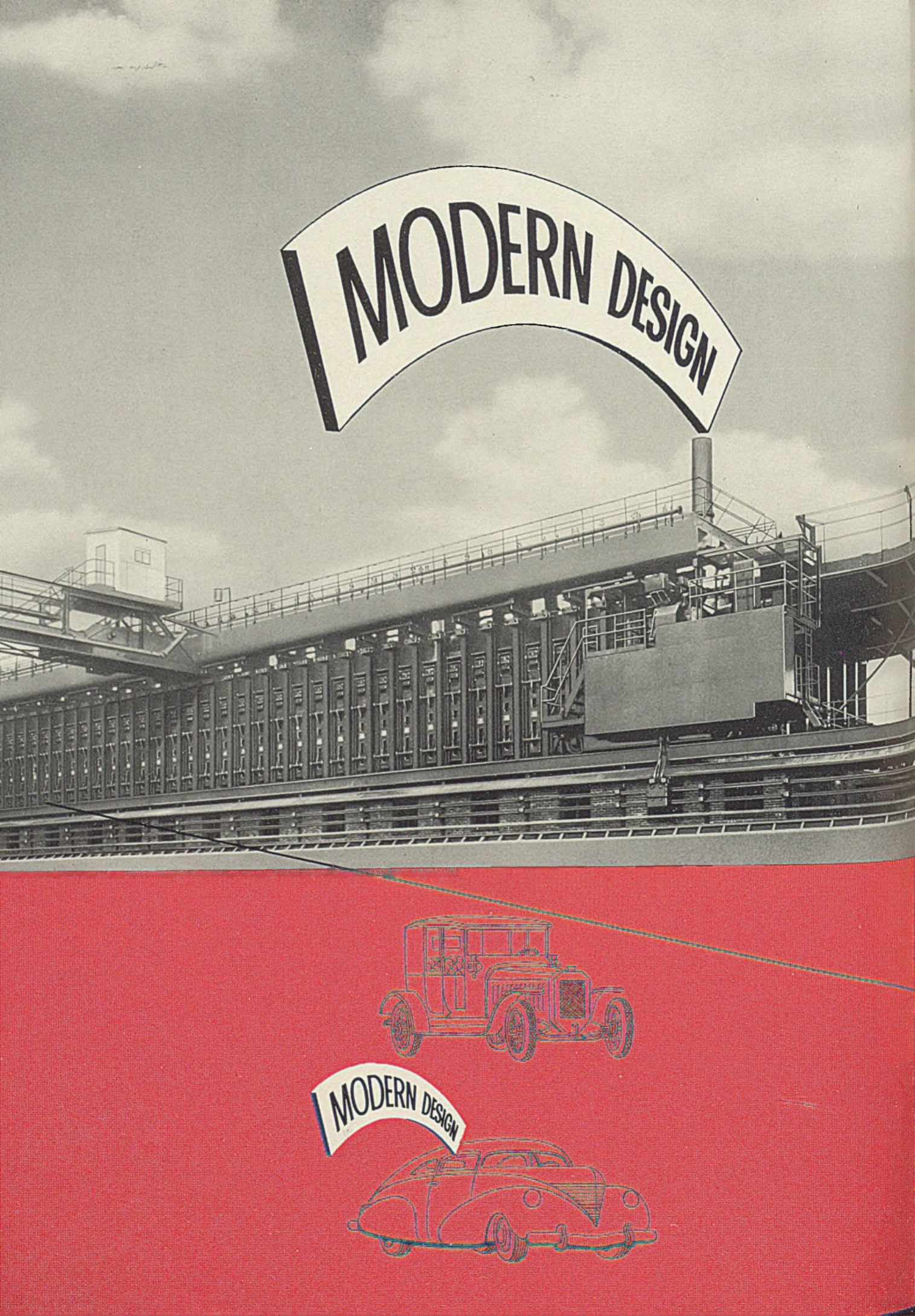
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7. Elimination of deposits of any kind in the heating gas regulating orifices and, therefore, elimination of all cleaning labor
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1. Weirton Steel Company, Weirton, West Virginia
2. Monessen Coke and Chemical Company, Monessen, Pennsylvania (Subsidiary of Pittsburgh Steel Co.)
3. Philadelphia Electric Company, Chester, Pennsylvania
4. Brazilian National Steel Company, Rio de Janeiro, Brazil, S.A.

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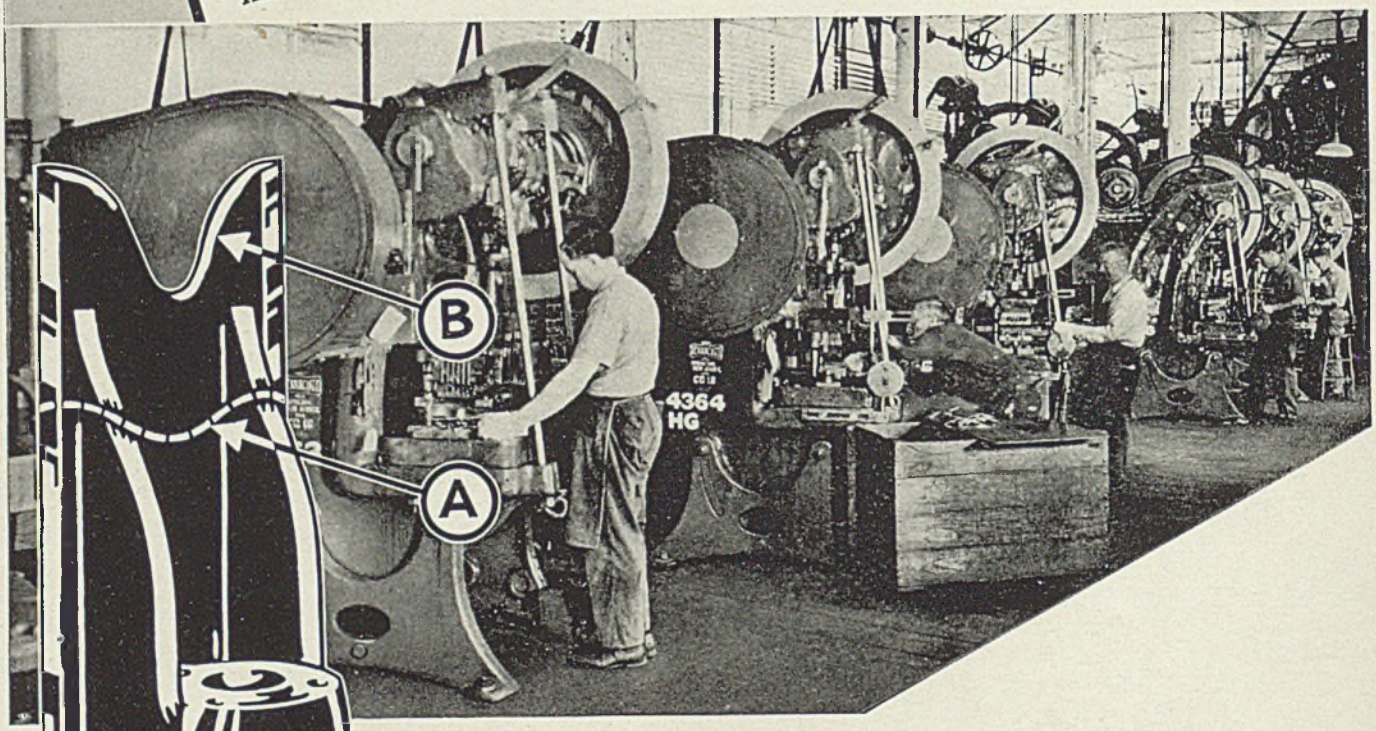

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Additional bearing surface for the ram is just one of many engineering details built into FERRACUTE CUTTING PRESSES to assure economical production. The ram is guided in its course of travel by substantial gibs which are independently adjustable to compensate for wear. In the diagram at the left, "A" shows the bearing surface of ordinary presses as compared to "B" in FERRACUTE CUTTING PRESSES.

Other important details of construction are: Double brakes, Massive 4-bolt Pitman cap, Extra-wide crankshaft bearings, All crankshaft and flywheel bearings bronze bushed, Deep-ribbed frame section, Unusually deep, wide bed; Ram can be flanged to suit large size punch holders.

FERRACUTE MACHINE COMPANY

Bridgeton, New Jersey, U. S. A.

bing foundry. After the pouring weight of a large casting is known, the scales permit weighing out to the monorail ladles the exact amount of iron required, regardless of condition and thickness of lining or size of ladle which happens to come up for iron for that casting. This weighing is, of course, a matter of subtraction from the quantity of iron contained in the suspended mixing ladle.

The scale unit has paid for itself several times in avoidance of castings poured short and pigging of excess iron, as well as making it possible to keep the downstairs tapping operation in register with the upstairs charging work.

Monorail Ladles Deliver Iron

Distribution of molten iron and of the larger castings is handled on a 9-inch I-beam as a monorail to all parts of the shop, using 2 and 3-point switches and turntables. The iron is taken to the pouring floors in monorail ladles of from 1000 to 1600-pound capacity. The cupola, lined to 66 inches, melts about 14 tons per hour and as many ladles are used as is required to keep the iron moving quickly. Each crane floor is equipped with a bridge crane with an 8 or 10-inch Curtis pendant air hoist and transfer hook. This makes for reasonably fast handling from spout to mold. Bridge cranes on the heavy floors each carry two 5-ton chain hoists. While these are slower, it makes little difference in pouring large castings.

The night shift removes all castings to the cleaning room, using both the monorail and the same steel trucks employed for charging. It might be added here that these steel trucks provide the third and final movement—that of transporting the gates, risers and scrap from the cleaning room back to the point where the charges are made up the next day. The night crew, in loading light castings in the trucks, does a certain amount of separating and classifying so that certain trucks go directly to either a group of five tumbling mills or to a wheelabrator blasting machine.

Medium and heavy castings go over a shake-out grating under a monorail branch. Each is then set on a flat truck for handling in and out of an 8 x 12-foot shot blast room. The sand, gaggers, pins, etc. drop through the grating into an 8 x 8 foot hopper below the floor from which point the material is fed by a pan conveyor onto an 18-inch belt conveyor, inclined so that the head pulley is about 10 feet above grade and outside. Separation at this point is effected by using a magnetic head pulley. Ferrous scrap is chuted into one of the charging trucks and refuse sand is taken off the discharge chute into a dump truck. Controls for both pan and belt conveyors are placed near the head pulley for operation by the dump truck driver.

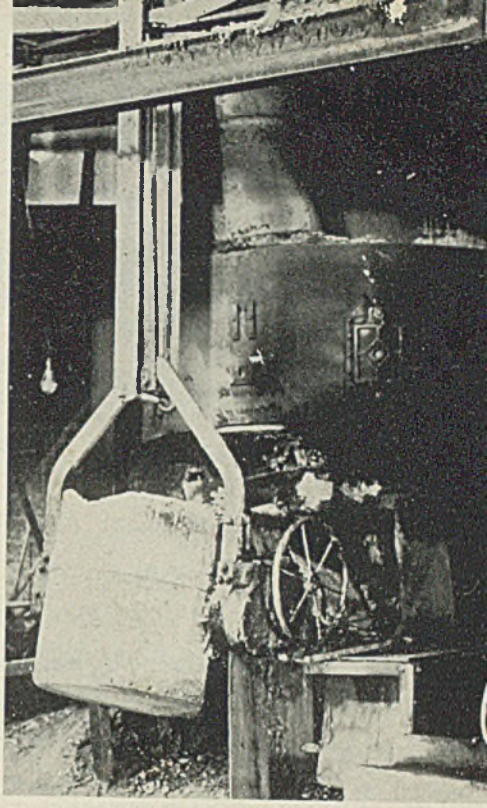


Fig. 2—Closeup of suspension system. Dead section of I-beam to which scale linkage system is attached is concealed here by monorail beam. Ladle is not suspended from four bars but only from two inner ones. Outer pair of bars and the pin connecting them at the bottom swing free but serve as a safety in case of failure of any part of regular suspension. Load is transferred by means of horizontal beam to a vertical tension rod just to left of scale in Fig. 1

In connection with sand handling, a home-made core sand drier that works well might be mentioned. No labor is required nor any attention other than lighting and turning off the gas burners. Essentially, this sand drier is a false bottom in the sand bin at which point head is applied and through which the dried sand runs by gravity. A car of Lake Michigan sand is unloaded directly into the upper portion of the bin and is dried as needed. The false bottom is supported by three horizontal I-beams running full length of the bin, one each along the outer and inner walls and one down the middle. The bin is a little over 11 feet wide. This makes the beam about 5½ feet apart. They were all placed parallel and in a horizontal plane.

Across the tops, 3 x 3 x ¼-inch angles run in the opposite direction. These extend from outer to inner wall (11 feet long) and are placed on 6-inch centers full length of the bin except where burner tubes are placed. The burner tubes are installed in pairs, (i.e., they replace a given pair of adjacent 3 x 3-inch angles) and where we want the most dry sand to pile up. Only two pairs of burner tube units are used each, each unit consisting of a 1-inch inspirator gas burner firing into the end of a 5-inch boiler tube, 11 feet long and fitted with five vertical vent pipes made of 1½-inch boiler tubes equally spaced and welded onto the top side of the horizontal 5-inch tube. The 1½-inch vent tubes are long enough to extend vertically well through the west sand.

The opposite end of the 5-inch burner tube is closed so all products of combustion in the total of four burner tubes must travel up through twenty 1½-inch vent tubes. On top of the 3 x 3-inch angles is laid enough 5-mesh medium-weight steel-wire fabric to completely cover all the angles and thus provide something to retain the sand until dry enough to drop through. This 5-mesh material was run UNDER instead of on top of the 5-inch burner tubes, however. Wet sand gets some heat from the vent pipes and is then permitted contact with almost all of the outside surfaces of the four 5-inch pipes. Fuel is 1000—B t u natural gas at 12 pound pressure. But seldom is more than 8 pounds used.

On the drawing board at this time are tentative plans for a slag conveyor to take slag away from the cupola as fast as it runs into a water tank and becomes chilled. This unit will probably use cast iron flights in an inclined concrete trough. There is little doubt, however, that provision for efficient materials handling already has made a marked improvement in quality, cut spoilage and generally improved efficiency of our operations. That is why we will continue to place emphasis on this factor.

Arc Welding Lessons

■ *Arc Welding*, paper, 218 pages. 5½ x 8 inches; published by Hobart Bros. Co., Troy, O., for 50 cents.

This is a series of practical lessons in arc welding, excerpted from the larger Hobart book, *Arc Welding and How To Use It*, and is in its third edition. It is concisely written in simple terms, offering an abundance of practical arc welding data and lessons. It is patterned after the course offered in the company's trade school and covers 42 complete arc welding lessons.

The lessons include: Striking and manipulating the arc; welding with bare and coated electrodes; welding light gage steel. Each lesson gives complete instructions for practicing the exercise, material, position, proper electrode, current value and polarity setting.

By DR. R. W. MITCHELL
Technical Director
Magnus Chemical Co.
Garwood, N. J.

METAL CLEANING

And Ordnance Production

Characteristics influencing ease of rinsing. Precleaning—what to use and where to use it. The field for electrocleaning

■ SEVERAL of the important characteristics of metal cleaning compounds were discussed in the first section of this series. See STEEL, Dec. 8, 1941, p. 90. These included wetting, penetration, alkalinity, ability to retain alkalinity with continued use. It was explained how metal cleaning is not simply one of emulsifying and dissolving grease, but effective wetting action must be provided by addition of a specific wetting agent. To this must be added penetration, obtained by the wetting agent and furthered by the detergent action of the soap and the alkalinity of the solution.

But even if this does provide a good cleaning job—the metal surface is not clean until it is rinsed free not only of dissolved, loosened and dispersed dirt, grease and solid particles, but also the residues from the cleaner must be removed. Thus it is extremely important to know the rinsing characteristics of any cleaning solution.

Rinsing: Dependence on plain alkalies leads to poor results because these chemicals are not easy to rinse off completely and quickly. A good wetting agent should be present for easy wetting means easy rinsing. Rinsing must be exceptionally complete if the harmful effects of cleaning chemicals carried over into a plating bath, for example, are to be avoided. But even where no bad effects from "dragover" need be considered, poor rinsing and the film of dirt and cleaning compound it leaves on the metal surface are never desirable and usually harmful to the metal or to the final finish applied.

While water characteristics, particularly relative hardness, deserve careful study as regards water for making up plating solutions, no great care is necessary in preparation of water for use in cleaning solutions. Except in areas where water is exceptionally hard or high in silicates, well compounded cleaners work as well on normally hard waters as soft, assuming that proper care has been taken in providing and retaining the required alkalinity of the solution.

Cleaning compounds especially suited to the metals you have to clean and to the types of dirt you have to remove are available. Whether you "roll your own" or ask for "tailor-made" cleaners, look first to the complexity of the dirt to be removed. While a universal cleaner for all cleaning jobs, regardless of the kinds of cutting or stamping oils, buffing or polishing compounds and similar impurities that are present would be fine—frankly, there "ain't no sich animile" and never will be.

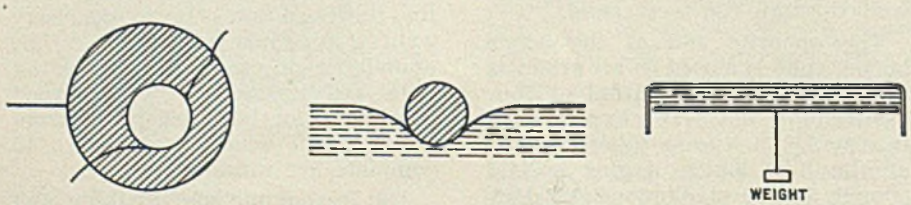
In the early days of metal cleaning no one ever thought of the necessity of making a 2-stage process of the operation. Whether the metal being cleaned had to be plated or merely painted, one cleaning was regarded as all that was necessary. Even though sometimes this worked, more often it did not.

Precleaning: Today, precleaning is fast becoming standard practice—the use of a preliminary operation to remove many types of dirt, notably buffing and polishing compounds, certain cutting and stamping oils and spacing materials such as lithopone, lime, etc. The demands for high production dictate the elimination of manual brushing, scraping or scrubbing wherever possible.

When suitable cleaning compounds are used, a precleaning operation will provide a physically clean surface on metals with minimum manual operations. A physically clean surface is one from which most surface dirt, including grease and oil has been completely removed.

Such a degree of cleanliness is ample for many metal pieces. For most painting or lacquering operations, for example, a surface that is physically clean is perfectly satisfactory.

But for plating, on the contrary, a physically clean surface is not satisfactory by a long shot. Often enough dirt remains on the apparently clean metal to prevent bonding of an electrodeposit. For example, a physically clean surface will often reveal the presence of residual grease or oil (even a trace) by the "water break" that occurs



Some aspects of surface tension—a major factor in cleaning metals—are demonstrated here. Left shows how surface tension breaks the film inside a loop of thread placed on a soap film formed in a ring of wire. Surface tension then draws loop into true circle. Center, a needle floating on water is possible by surface tension. The water surface is depressed as shown. Right, when two fine wires are held together by a film of water, surface tension can be expressed by the force required to pull the wires apart

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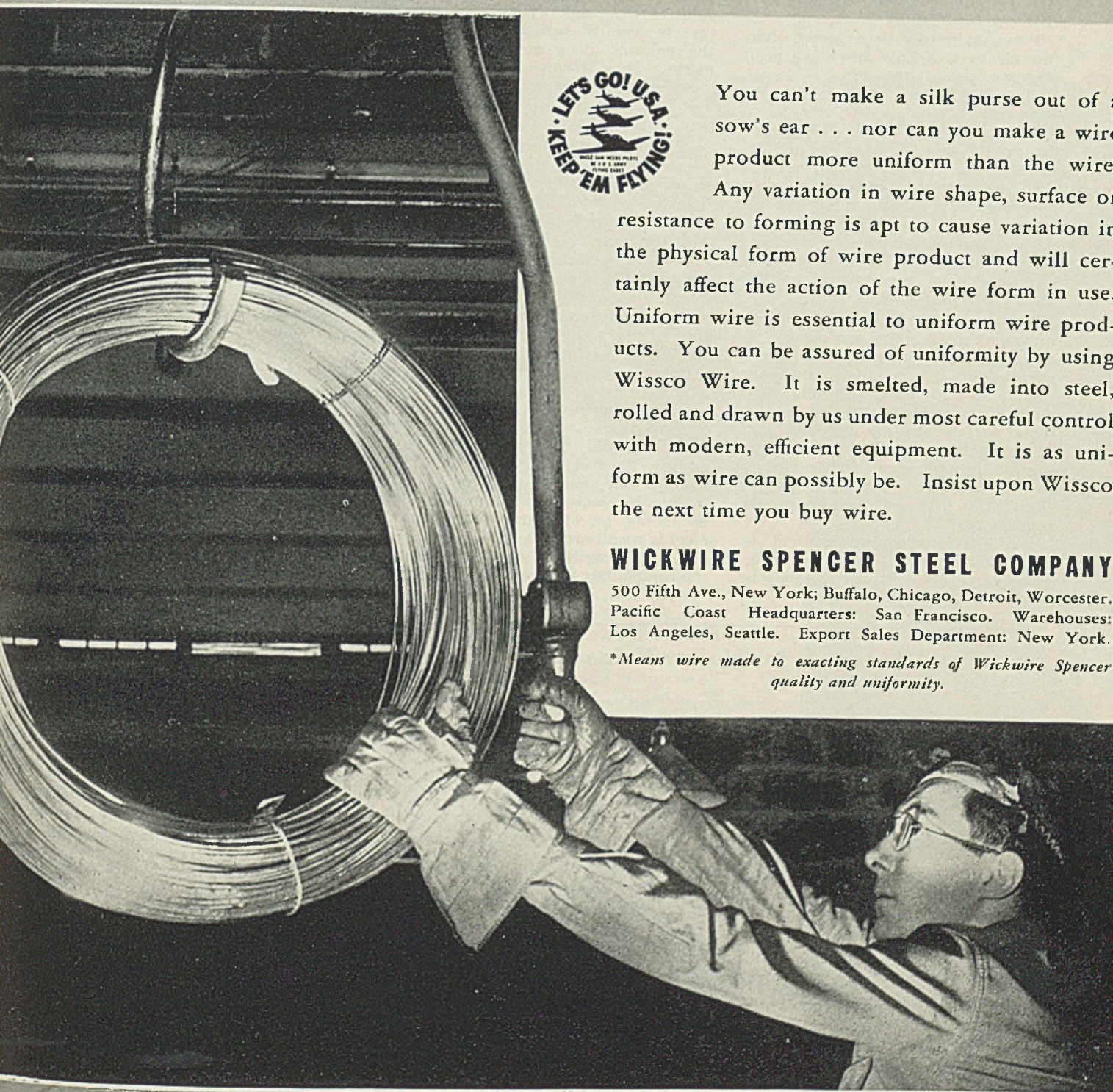

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WISSCO WIRE
BY WICKWIRE SPENCER

on the surface after the final rinse. Not only may residual oil and grease be present, but other dirt and microscopic particles may lodge in the fissures and interstices of the metal. When *all* dirt and grease are removed, you have a *really* clean —or what is known as a *chemically* clean—surface. Such a completely clean surface is absolutely essential for quality plating and for vitreous enameling.

It would hardly be expected that the cleaner capable of good precleaning would also give a chemically clean surface. In fact, it rarely does. Obviously other factors are involved also such as the nature of the metal or combination of metals to be cleaned. Nevertheless, the development of preliminary cleaning or precleaning has led to attempts to provide one simple method and material for all types of precleaning work as this would eliminate any need for a multiplicity of compounds.

The vapor degreaser is one such universal precleaning method. It is quite effective in removing those greases and oils soluble in the particular solvent used. All solid dirt particles not tightly bonded to the metal surface also are removed, giving a highly satisfactory precleaning job in many cases and leaving a dry surface for subsequent operations. But it is not adaptable to all precleaning.

Another precleaning method is the emulsifiable solvent process. Here a powerful solvent cleaner is combined with wetting and emulsifying agents so the resulting concentrate is readily miscible with oils and forms an easily and thoroughly rinsable emulsion with water. This concentrate is usually mixed, one part to eight up to twelve, with safety solvent or kerosene and the resulting solution used for cleaning. Work to be cleaned is dipped in or sprayed with this solution. A short period of contact is usually sufficient although the solution does not attack any metal. Thus it can be used safely for long soaking periods.

During contact with the dirty work, some of the oil and grease on the metal is dissolved, but all of the deposit of dirt and oil or grease is penetrated and every solid particle is thoroughly wetted. At the same time, the bond of all solid dirt with the metal surface is destroyed.

Work is removed from the dip, is sprayed with water under pressure, flushing away the loosened dirt and leaving a physically clean metal surface. Only a slight residual film of kerosene or safety solvent remains.

Features of this method are: It is a cold operation, usually done at room temperatures, although the solution may sometimes be heated slightly. Cold water rinses as well as hot. Work is exceptionally clean, some of the most recalcitrant dirts being removed easily without hand scrubbing or brushing. Smut on steel is readily removed. Too, many commonly used buffing and polishing compounds and most of the hard-to-remove cutting and stamping oil ingredients also yield readily to this treatment.

Obviously the field of application does not include the objects which contain recesses or pockets that cannot be reached by the pressure spray rinse and the process usually is not applicable to small parts handled in bulk. Such buffing and polishing compounds as tripoli and rouge are better handled by the standard soap soaking operation. On the whole, however, the emulsifiable solvent cleaner offers important advantages for most precleaning.

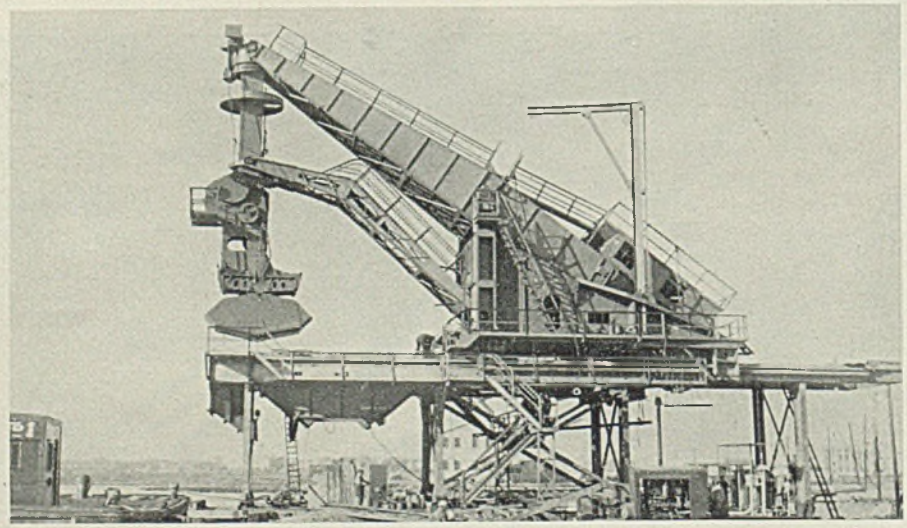
Chemically clean surfaces are produced by suitable soaps or synthetic wetting reagents. Usually the work is done in mechanical washing machines or in tanks and almost invariably in hot well-agitated solutions. Watch foaming tendencies in such solutions. The modern trend in preparing a chemically clean surface for electroplating is toward the use of electrocleaning tanks.

Electrocleaning: Here the essential point to consider is the use of a cleaning compound that will have all the properties discussed above—good wetting action, effective penetrating, emulsifying and dispersing powers and above all, good rinsing qualities—and in addition, provide a solution capable of carrying the increasingly high current densities being used today in electrocleaning. If you expect to clean at above 40 amperes per square foot, make sure that the conductivity of the solution will permit the flow of such a current at an applied potential of 6 to 8 volts.

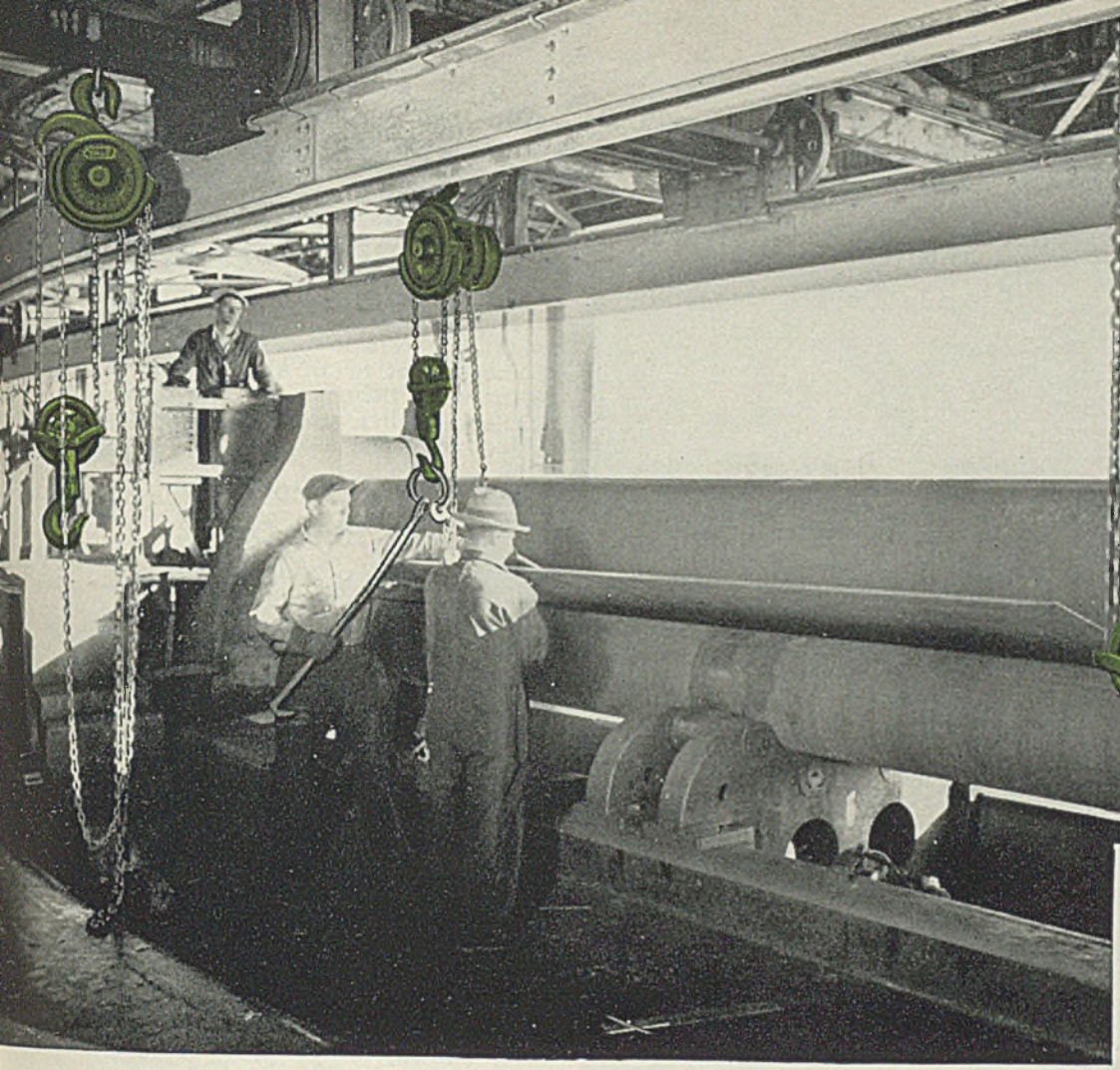
In electrocleaning steel, copper or brass, high-current-density anodic or "reverse current" cleaning is popular. It avoids the difficulties attendant upon the absorption of hydrogen by the metal in cathodic cleaning and gives a "plating off" effect on certain types of dirt particles which are not otherwise removable. Cathodic cleaning, however, is an old method still in wide use. Note that certain metals must be cleaned cathodically since they suffer electrochemical corrosion when treated anodically.

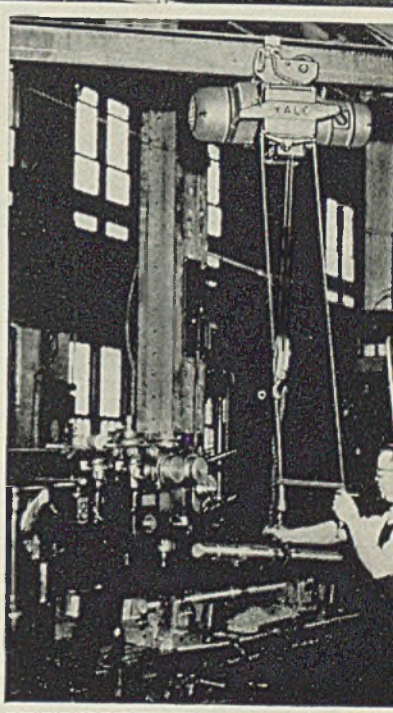
Metal cleaning is a specialized process requiring fully as much technical control, intelligent selection of methods and materials and careful operating supervision as electroplating or any other process. Obviously any cleaning department is severely handicapped both as to expenses and results if it is forced to use out-of-date methods or materials—or worse still, forced to use unsuitable materials and methods because of a short-sighted policy of buying cleaning materials on a per-pound, instead of a per-job, basis. If a cleaner costs twice as much as some other material, but cleans four times the area or four times

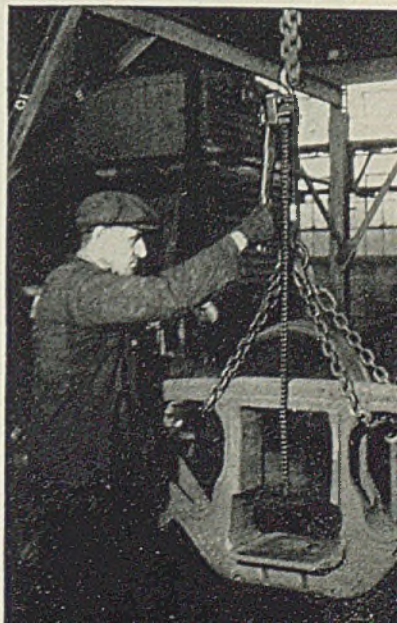
New Job for Hulett Unloader



■ One of the latest applications of the Hulett unloader is for unloading mixed garbage and rubbish from scows. Illustration shows 12-cubic yard unit built recently by Wellman Engineering Co., Cleveland, operating at Sound View, N. Y. Use of the unloader, in which the operator is stationed in the leg immediately above the bucket, is estimated to save $60,000 per year. This amount represents damage done to scows due to use of former equipment. The machine is mounted on a stationary runway and the barges are moved along as unloading proceeds. Its operating cycle is 40 seconds







YALE HOISTS CUT COSTS— SPEED PRODUCTION FOR DEFENSE

To increase hoisting efficiency, cut costs and help speed production, install Yale Hoists for your every hoisting job. Yale Hoists are backed by nearly 75 years of manufacturing experience, are built to last, give top performance day-in and day-out, under the most rigorous conditions.

The Ball-Bearing Spur-Geared type of Hoist (above) was originated and pioneered by Yale. It has the highest lifting efficiency ever achieved in a hand chain hoist. Among its many advantages are self-actuating load brakes, safety load hooks and friction-minimizing steel load chain.

Yale "Cable King" Wire Rope Electric Hoists (top right) are the only electric hoists to incorporate air-cooling as an integral part of their design. Air-cooling permits them to work on heavier duty cycles, since it eliminates excessive brake heat. Portable "Pul-Lift" Hand Hoists (lower right) fit in on almost any job. Inasmuch as they work in either vertical or horizontal position, they can be used for both pulling and lifting. You can't corner these hoists, either. Ratchet handle operates at any point within a complete circle.

Get in touch with your nearest Yale distributor today. Let him show you how Yale Hoists can increase the efficiency of your hoisting operations.

Spur-Geared Hand Chain Hoists Capacities: 300 lbs. to 40 tons. Electric Hoist Capacities: 1/4 to 10 tons. Portable "Pul-Lift" Hoist Capacities: 3/4, 1 1/2, 3, 4 1/2 and 6 tons.

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the number of units, it is not the more expensive, but on the contrary is by far the less expensive of the two. It is this limited viewpoint, measuring metal cleaners by their initial cost per pound, which is responsible for more poor cleaning and consequent wastage in rejects and refinishing than any other single source.

While costs of metal cleaning are insignificant in the light of total production costs, the results of poor cleaning in time wasted, in slowed-up production and in off-quality products can be an extremely serious factor.

The third and concluding section of this series will present detailed recommendations for cleaning shell bodies, shell cases, cartridge cases and other ordnance items. It is scheduled for STEEL of Dec. 29, 1941.

Offers New Publication On Bridge Railings

■ Copies of bulletin No. 176, "Bridge Railings, Their Design and Construction", recently published by American Institute of Steel Construction, 101 Park avenue, New York, are now available. The publication embodies 14 studies accompanied by drawings and engineering data.

Simple Device Reveals Action of Phosphorus

■ Too much phosphorus makes steel brittle, and the more that can be determined about the way these two substances combine with each other, the greater the opportunity to improve steelmaking.

Recently at the Westinghouse Research Laboratories in East Pittsburgh, Pa., a simple "camera", consisting of a tin can, two small brass disks and a screw clamp together with artificially radioactive phosphorus tracers served to prove that phosphorus concentrated on the surfaces of the little air pockets or blowholes in iron or steel.

Evidence was obtained by laying a piece of photographic film on each side of a steel disk containing the tracer atoms, then placing the two small brass plates on the outside of the film—the whole thing being clamped together and placed inside of the tin can to keep out all light. Blotches caused by rays from the phosphorus tracers upon the developed film revealed the areas on which the phosphorus had concentrated.

The artificially radioactive phosphorus tracers were obtained by bombardment in an atom-smasher. These were then put into the steel while in molten state before being made into a disk.

New Process Provides Synthetic Pine Oil

■ A new process for the synthetic production of pine oil from gum turpentine is announced by Hercules Powder Co., Wilmington, Del. It is said to produce oil of substantially the same chemical and physical properties as natural pine oil. Laboratory and plant tests indicate the new pine oil is suitable for all uses which pine oil is now employed. Included in these are paint and varnish manufacture, industrial and commercial laundering, disinfectants, industrial cleansers, flotation reagents in mining metals, metal polishes and solvent for synthetic resins.

According to the company, the major influence on the price of the new oil will be the price of gum turpentine. The new process, however, will assure an increased supply of pine oil for war industries, and possibly will make available some supplies for civilian uses.

Develops Odorless Paint For Inside Jobs

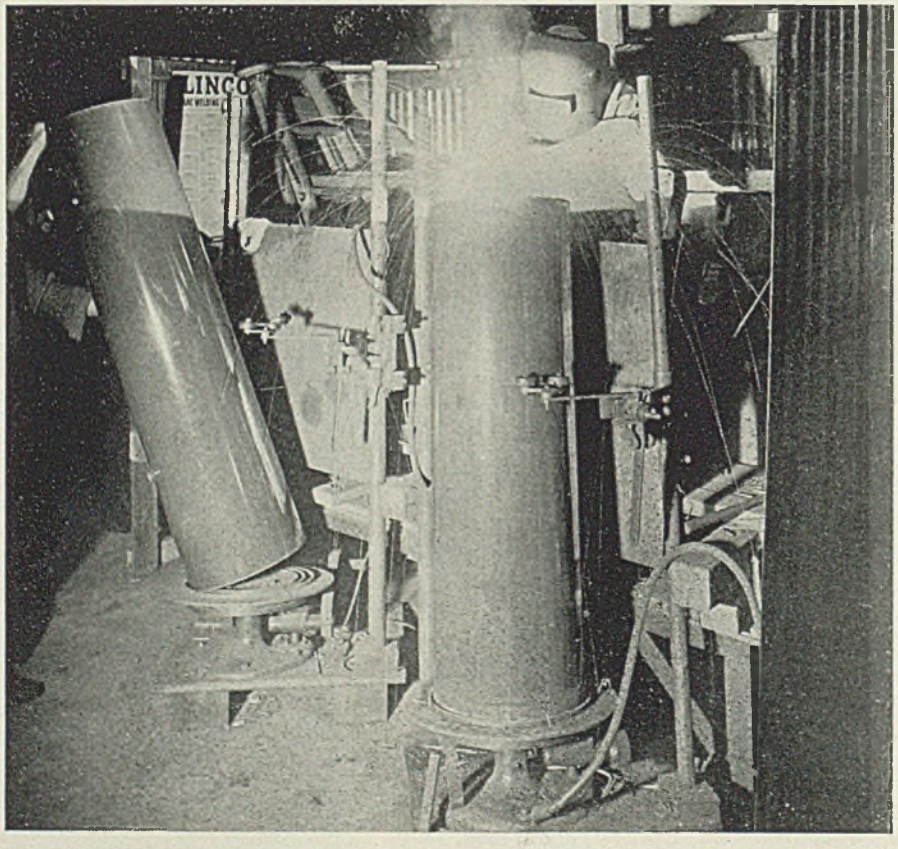
■ An improved de-odorized paint, developed for use in plants and offices where odors from conventional paints are offensive to workers, is announced by American-Marietta Co., 43 East Ohio street, Chicago. Actually de-odorized before being canned, it makes possible painting in winter or summer without discomfort.

The product sets in three hours, and is completely dry in 12 to 15 hours. Called Valdura No-Odor paint, it may be used on plaster, wall board, wood, cement, brick or metal, and is available in flat, egg-shell and gloss finishes. It may be applied with a spray gun.

Article on Springs

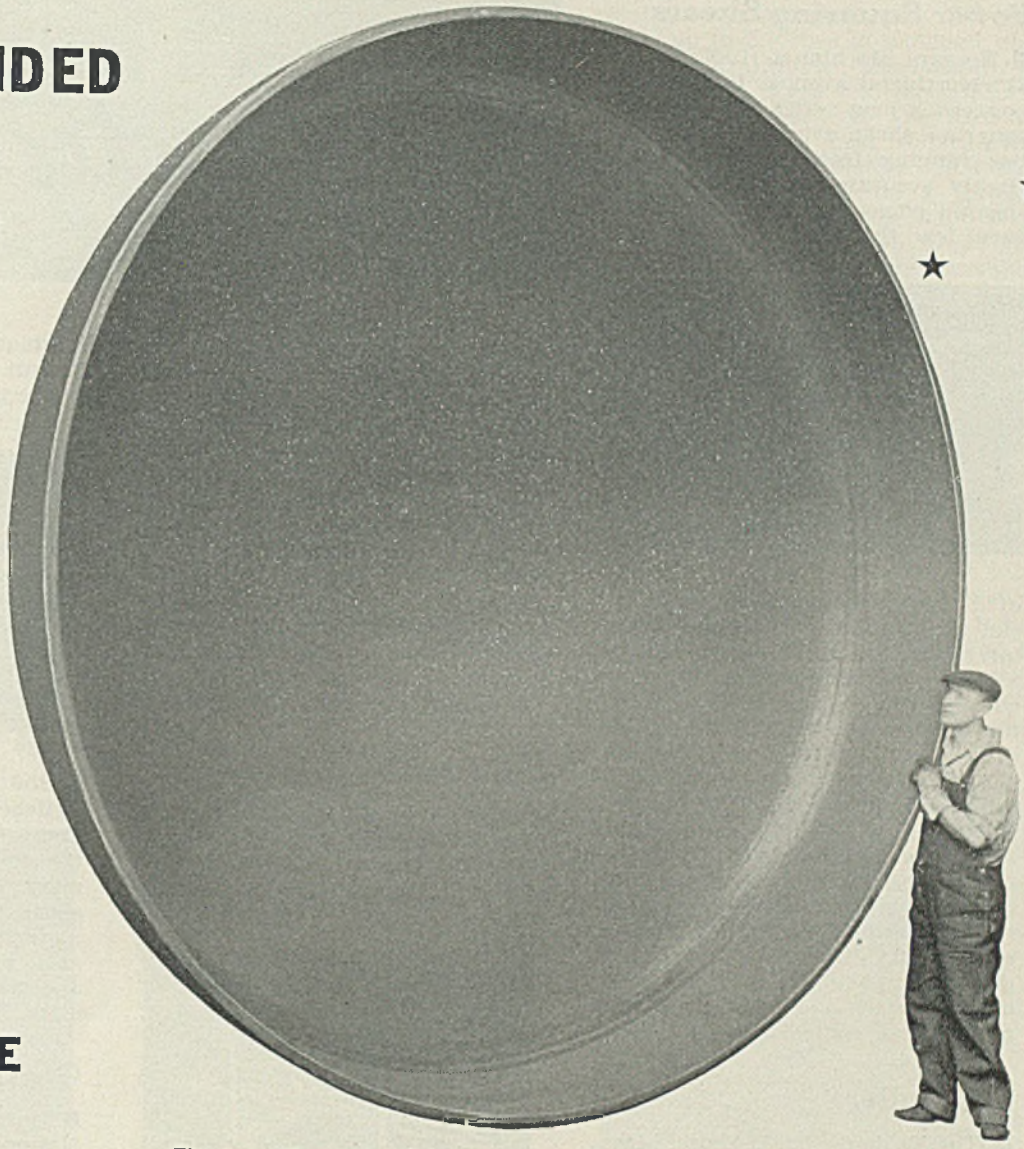
■ An 8-page reprint entitled "What Alloys Have To Do with Springs" is being offered for distribution by Lee Spring Co. Inc., 30 Main street, Brooklyn, N. Y. Those interested in obtaining a copy of this article, which was written by Harold Carlson, chief engineer, should address their requests direct to the company.

Glass Cloth Seals Weld



■ When arc welding concave heads to cylinders to form hot water tanks, Porcelain Steels Inc., Cleveland, places a strip of glass cloth between tank shell and head. When shell and head are joined by welding around rim, the heat developed fuses the glass cloth to make a water-tight seal, according to the manufacturer. Both head and shell have been porcelain enameled prior to the operation, the glass cloth fusing with the enamel. Photo from American Rolling Mill Co., Middletown, O.

ALLOY BONDED HEAD *for* *Babcock & Wilcox*



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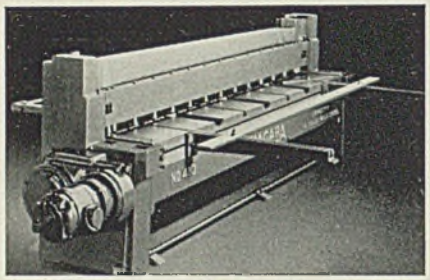
Industrial

Power Squaring Shears

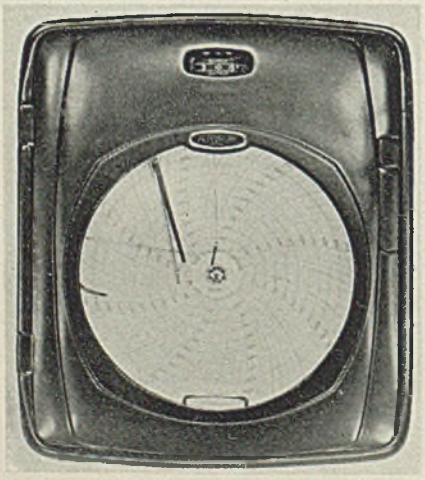
■ Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, announces a new series No. 4 power squaring shear available in capacities ranging from 12 to 16 gage. Highly accurate, it is said to cut sheared edges straight to within a very few thousandths of an inch



of a straight line without any special skill on the part of the operator. In addition, the shear features a higher production rate, producing cut strips at the rate of 75 per minute on 60-cycle current. The unit's drive, including flywheel, gearing, clutch, eccentrics and connections, are wholly enclosed within the machine and operate in a bath of oil. A new detent device completely replaces the customary friction brake. Standard equipment includes a direct connected 3-phase, 60-cycle 110 or 220-440-volt alternating current motor completely wired with magnetic starter, and start and stop push button control.

Controller

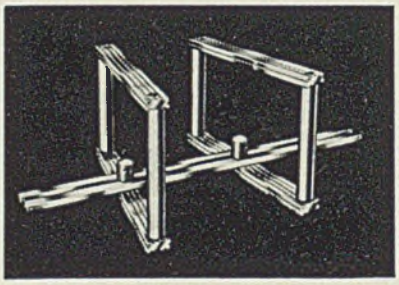
■ The Foxboro Co., Foxboro, Mass., has introduced a new model 30 Stabilog controller which features still closer control. It appears in the new universal rectangular case. When panel-mounted, the instrument extends only ¾-inch from the panel surface. The door is recessed; hinges and hasp are flush with the



door surface. A dual pressure indicator, replacing the customary two small gages, is easily seen through a rectangular opening in the door. Interior illumination is readily provided when desired. All operating adjustments are made from the front of the case, the adjusting mechanisms for change of control point, throttling range, and reset resistance being immediately accessible when the door is opened. Entire operating mechanism is protected and concealed behind a removable plate. Unit construction simplifies any servicing of the mechanism that may be necessary.

Die Cradle

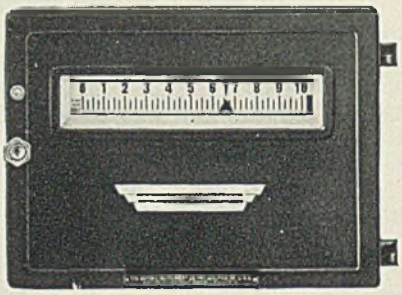
■ Acro Tool & Die Works, 2822 Montrose avenue, Chicago, has developed a handy die cradle for diemakers. It is, in effect, a universal



parallel unit, adjustable in length to accommodate varying sizes of dies, jigs and metal parts, with parallel vertical supports and parallel top cross-pieces holding the work in level position. The unit assures correct alignment while drilling, counterboring, tapping, milling or grinding. Two thumb-screws adjust the die cradle to any desired length. Standard height of parallels is 7 inches, with an adjustment for length up to 20 inches. The unit is of steel, hardened and ground.

Temperature Control

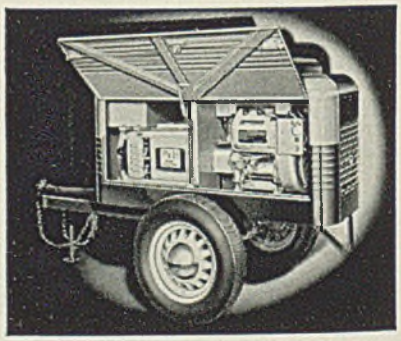
■ Brown Instrument Co., Wayne and Roberts avenues, Philadelphia, is offering a new temperature control system for pickling tanks. It is equally suitable for continuous or batch type picklers. The unit consists essentially of a thermocouple, an indicating and controlling potentiometer, manual control station and a control valve. The thermocouple detects the temperature of the bath, which is indicated by the potentiometer. Control is ac-



tuated by enclosed mercury switches, mounted in the latter. Contacts are completely free from the corrosive action of the atmosphere. Other advantages include shortening of pickling time, saving materially on steam cost and of acid, reduction of injuries to men and machinery and reduction of the discomfort to working personnel.

Gas-Driven Welders

■ Harnischfeger Corp., 4400 West National avenue, Milwaukee, has introduced two new Hansen gas-driven welders model WN-150 and WN-200, with capacities of 15 to 200, and 30 to 260 amperes respectively. Equipped with latest self-contained welding generators they are pow-



ered by a direct connected 4-cylinder, V-type Wisconsin gasoline engine. Units are mounted on pneumatic-tired trailers with low centers of gravity which permit towing at normal traffic speeds. Hinged side panels allow ready access to generator and engine. The panels may be swung up and locked in place

Equipment

like automobile trunk doors. Under the canopy recessed compartments provide ample room for storage of cables, operator's tools, welding rod, etc.

Finger Guard

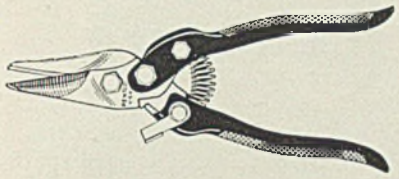
■ Industrial Gloves Co., Danville, Ill., reports development of a combination leather and flexible lastex finger guard for use by buffers, polishers, sanders, grinders, opera-

tors of stamping-out presses, assemblers of small parts, book binders, trimmers, mechanics and machine operators, both women and men. It gives protection on fingers and thumb, in any combination, and can be used under gloves for extra protection.

Besides of grain leather, the finger guard is offered in heavy split leather, light weight kid leather or wool felt. The lastex feature makes the guards snug fitting, flexible and porous for ventilation.

Combination Snip

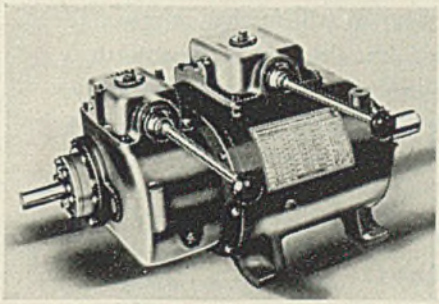
■ Penn Tool Co., 2415 North Howard street, Philadelphia, has introduced a Pentco combination snip for cutting steel, cable, flexible tubing, etc. It is capable of making straight, right or left-curved cuts. The snip is of alloy steel, blades being serrated to avoid slipping. The latter also are removable and equipped with a locking feature. Handles of the cutter are of extra heavy cold rolled steel and knurled for a better grip. The snip is being offered in three sizes: No. 185 for light, general work that makes



¼-inch cut up to 1⅛ inches; No. 190 for cutting up to 16 gage, and recommended for general heavy work—making ¼-inch cuts up to 1¾ inches; and No. 195 for larger cuts up to 2¼ inches, cutting up to 18 gage metal.

Transmission

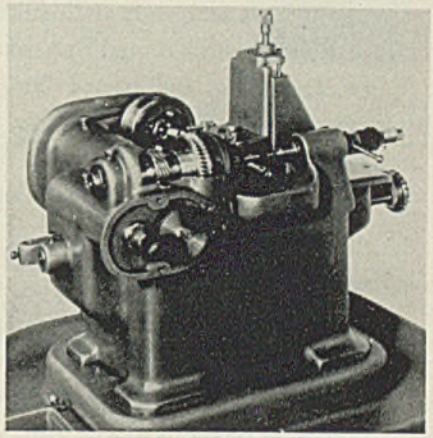
■ Western Mfg. Co., 3428 Scotten avenue, Detroit, has introduced a new Super transmission of 30-horsepower capacity for motorizing Cone-driven machine tools. It is suitable for replacement of gear boxes on large boring mills, radial drills, etc. and can be used to motorize large slotters, engine and turret lathes. It features eight changes of speed in geometric progression of 1.29—maximum reduction of 6:1. Its



gears and shafts are of alloy steel, heat treated. Shafts run on autifriction bearings.

Gear Hobber

■ Triplex Machine Tool Co., 125 Barclay street, New York, is now offering an American built small gear hobbing machine of a type similar to the Swiss "Mikron No. 79". Known as the American Micron spur gear hobbing machine, it has a capacity for spur gears and pinions up to 2 inches in diameter and 20 diametral pitch. The machine is for cutting brass and steel wheels and pinions such as are used in watches, clocks, gas, water, electricity and other meters. It's hob spindle is mounted on a vertical slide having micrometer hand feed for positioning the hob to proper depth of cut. The entire assembly has a horizontal power-screw feed with automatic stop. Revolution of hob spindle, through index change gears in the rear of the machine and through a worm wheel on the workspindle, is transmitted to the latter in a ratio proper for the number of teeth to be generated. A hand wheel engages the automatic longitudinal feed of the hob spindle slide and an adjustable stop stops it when the work is finished. A 1/3-horsepower motor mounted inside the pedestal drives the hob spindle over a pair of 2-step pulleys and a flat belt. Provision also is made for maintenance of belt tension. Hob spindle speeds of 518 revolutions

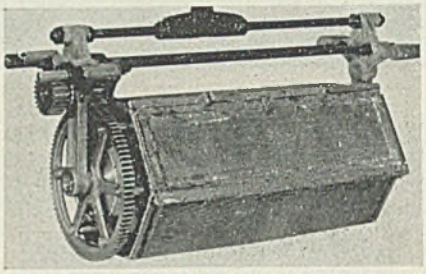


per minute for steel and 1030 revolutions per minute for brass are standard, but additional motor pulleys are furnished to provide for different speeds.

Unit for Processing Shell Casings

■ Hanson-Van Winkle-Munning Co., Matawan, N. J., has developed a new Mercil type equipment for washing, pickling and rinsing 20 millimeter shell casings after annealing. Two installations are to be made shortly. One of these will have a motor-driven rotary cleaning unit with a loading compartment. The pickling consists of a double station hot sulphuric pickling tank, a spray rinse compartment, a cold rinse compartment and a final hot rinse compartment. The pickling compartment is lead lined with lead coils to withstand hot sulphuric acid used. The warm rinse and the spray rinse compartments are also lead lined, a lead

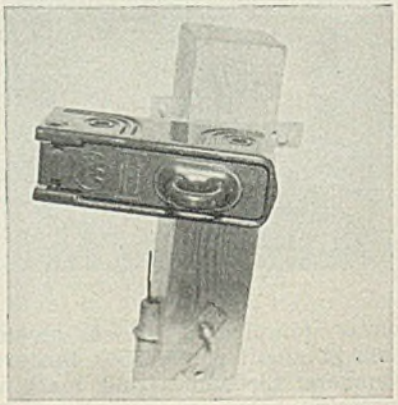
coil being included for the warm rinse tank. The unloading hopper on the warm rinse tank is of Monel metal with ½-inch perforations. Monel cylinders, 16 inches in diameter by 30 inches long with ½-inch perforations, gears and hangers made of bronze, ¼-inch Monel heads



and ⅛-inch body stock are included. Cylinders of this size hold about 600 to 700 shell. In the other installation the regular soak cleaner tank is being followed by a cold rinse tank which is in turn followed by a quenching tank.

Fuse Cutouts

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reports a new primary fuse cutout for use on alternating current circuits up to 12,500 volts where fuse requirements do not exceed 50 amperes. Known as type EA, cutouts are of-



fered housed in Prestite porcelain. All contacts are coated with silver to assure low contact drop, and the fuse tube is of fiber lined duck Micarta. The toggle mechanism provides drop-out action of the door to indicate a blown fuse. Any size stranded wire from the smallest to zero solid or No. 1 stranded can be inserted. All live parts are totally enclosed, and the door is easily removed and inserted by means of any standard hookstick.

Hose Reel

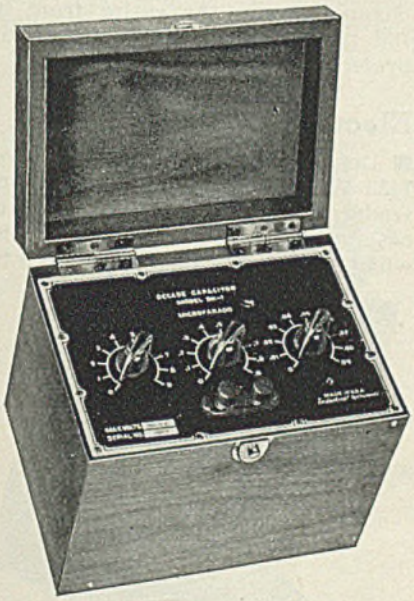
■ Air-Scale Co., Delta, O., announces a hose reel for use in conjunction with water or air in cleaning machine tools, patterns and castings and other industrial uses. Furnished in both open and enclosed models, it is provided with a special mounting bracket which permits

mounting above or below ceiling, above or below floor, on wall, post or shelf. It also is semiautomatic in action. The unwinding action, in pulling out the hose, winds a spring that re-winds the hose when a retain-

ing ratchet is released. The hose connects at the reel hub for incoming air or water. A governor-controlled brake regulates re-winding speed.

Capacitor

■ Industrial Instruments Inc., 156 Culver avenue, Jersey City, N. J., is offering a new type DK decade capacitor for most laboratory as well as industrial applications, particularly for bridge measurements, filter design and experimental tuned



circuits. It is housed in a walnut cabinet with hinged cover and snap lock. The etched metal panel has three knobs and dials calibrated directly in capacitance so that reading from left to right totals up the value available at the binding posts. The unit provides a choice of any capacity value from 0.01 to 11.1

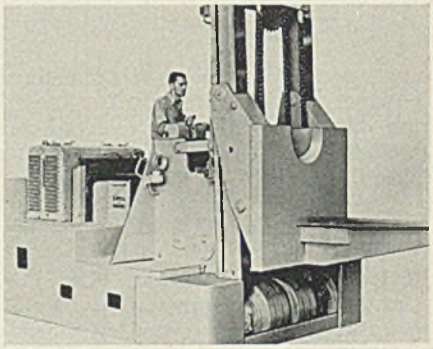
microfarads in 0.01 microfarad steps or other ranges. Adjustments are made progressively in small uniform steps. The instrument measures 7 x 8 x 5¾ inches, and weighs 8 pounds.

Diamond Nibs

■ Diamond Tool Co., 938 East Forty-first street, Chicago, announces a new design feature which is to be incorporated in all diamond nibs in the future. Known as the Loc-Key-Set, it consists of two internal locking keys that are integrally cast on the slug-holding nib by forcing the molten metal into two internal key seats milled in the nib head. It is claimed that diamonds set in this manner never shift or loosen in operation, making possible micrometer adjustment of each pass. Other features claimed are: A large diameter head which draws heat away from the grinding point and dissipates it rapidly, and corrected face angles which permit greater tool clearance without loss of strength.

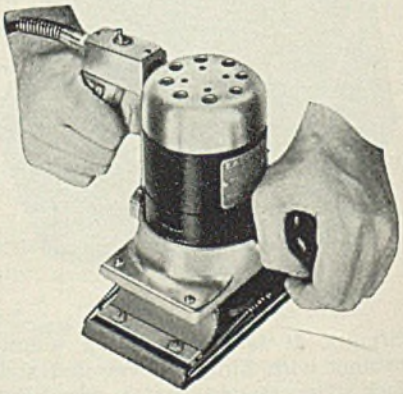
Ram Truck

■ Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland, recently introduced a new ram truck featuring a rated capacity of 25,000 pounds. It is said to be the first truck within this capacity range to have the drive under the load end of the truck. The truck's four front wheels are arranged in pairs. Each pair supports the frame on pivots, and is so articulated that wheels conform to floor irregularities. Hydraulic brakes are provided on all the wheels. One wheel of each pair is driven by a long center roller chain from the motor-driven differential bearing axle, located forward of battery deck. By locating uprights over drive wheels the load stresses on carriage and uprights require less material for the same rated capacity. Trail axle is pivoted in frame affording, with axle, a full three point suspension of frame. Truck equipment includes extra heavy drive and power plants, full magnetic contactor control on all operations and follow-through type power steer. Wheel guards are positioned around the two outside wheels. An extra heavy bumper channel across the entire front of the truck protects tires from any projecting objects.



Electric Sander

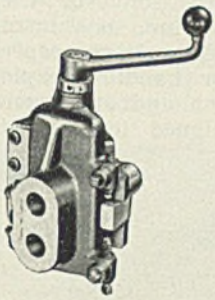
■ Detroit Surfacing Machine Co., 7433 West Davison, Detroit, has introduced a new model XL reciprocating sander or metal polisher in which vibration has been reduced to a minimum. It incorporates an interchangeable front handle which can be shifted from front to side position enabling operator to work into close corners, at right angles and directly against vertical sur-



faces. Also the addition of an improved fan and baffle plate increases the flow of air through the motor, insuring adequate cooling. On the new unit, the motor, filter and switch are now readily accessible through use of a new motor filter cap. Sanders are offered with 110 or 220-volt motors.

Slide Tool

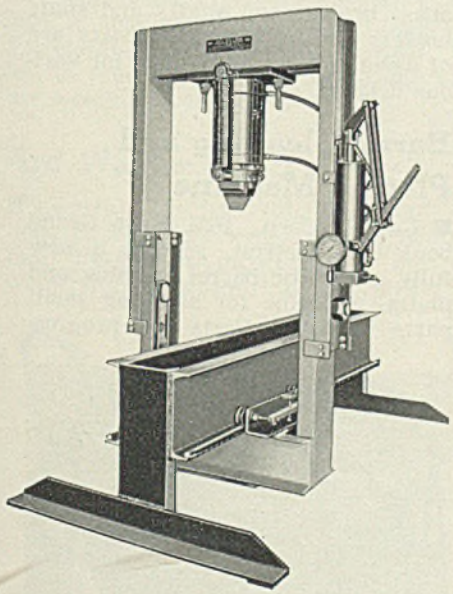
■ Gisholt Machine Co., 1217 East Washington avenue, Madison, Wis., announces a new rapid slide tool for turret lathes. It is designed to hold small boring bars and forged cutters. A simple movement of its



lever transmits a rapid, smooth motion to the slide permitting backspacing and recessing operations to be performed quickly. Adjustable stops also are provided for quick setting, permitting duplicate work.

Hydraulic Press

■ The Bee-Line Co., Davenport, Iowa, announces a new 125-ton hydraulic press for general industrial use. It is mounted on a movable roller bearing carriage, which per-



mits application of pressure at any point in an 84 x 34-inch bed. The jack carriage of the unit can be raised or lowered 16 inches with a minimum space between the ram and bed of 2 inches, and a maximum space of 28 inches. The ram travel

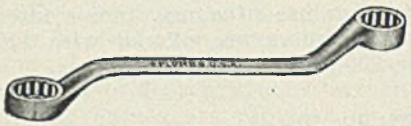
is ten inches. The jack features three speeds—high, medium and low. Overall dimensions of the complete press are: Length 8 feet, width 4 feet 8 inches.

Cable Plug

■ Ohio Brass Co., Mansfield, O., announces a new 6-conductor Mechano-Plug for effecting trailing cable connections. Designed especially for making connections to reversible motors, its terminals accommodate No. 6 and smaller sizes of wire. The unit is a mechanically assembled and installed plug, and can be installed in the field with simple tools. Male and female plug bodies cannot be connected improperly because the terminal plugs and sockets are so arranged as to prevent improper polarity in making connections. The plug body is of rubber. Moisture and dust-proof joints insure a positive, leak-proof electrical connection. The plug is for currents of 80 amperes, voltages from 250 to 600 direct current.

Box Wrench

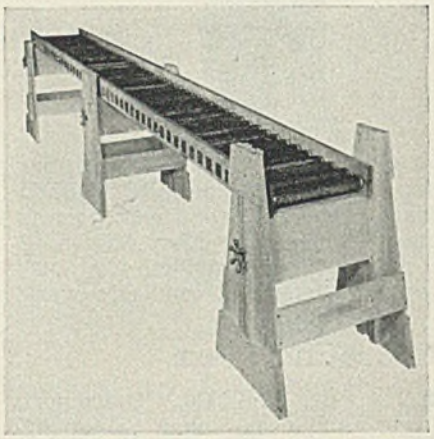
■ Plomb Tool Co., 2209 Santa Fe avenue, Los Angeles announces a set of 12-point, offset box wrenches, with an obstruction clearance of 9/16-inch and overall length of 5 to 6½ inches. Made for places recessed or hidden with limited space, these wrenches can be used when installing fuel pumps, starters etc. in automobiles, trucks and planes.



The short shank of each wrench may be held almost entirely within the hand and claimed to be accurately placed in position with greater speed and safety.

Nonsparking Conveyor

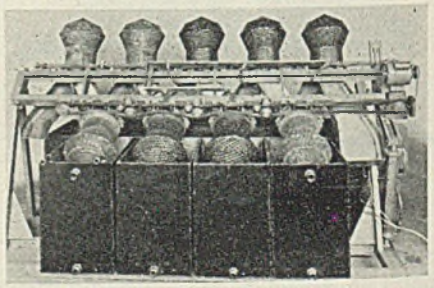
■ Standard Conveyor Co., North St. Paul, Minn., has introduced a wood roller conveyor especially designed for handling explosives in ammunition and armament plants. It is designed to prevent sparks



from friction. The conveyor's rollers and frames are of maple and brass. Bearings are either ball bearing or oiless bronze, and shafts and shaft holders are of brass. Supports are of wood and are adjustable for various heights.

Barrel Cleaning and Plating Machine

■ Udylite Corp., 1651 East Grand boulevard, Detroit, reports a new fully automatic barrel cleaning and plating machine for handling small parts in bulk. Parts are progres-

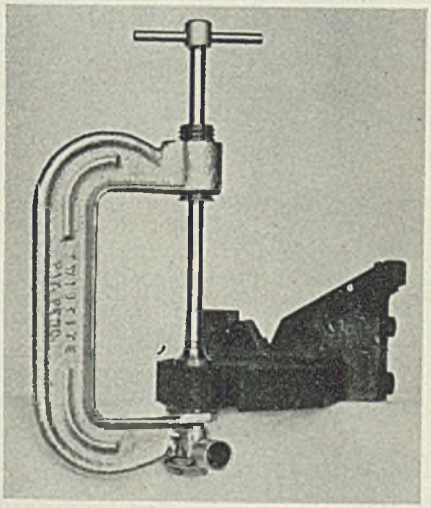


sively subjected to various cleaning, rinsing, pickling, plating and drying operations without manual handling. Operators using this machine do not need rubber gloves,

boots or aprons and do not come in contact with the material after it is loaded until it is discharged clean and dry. No baskets are needed to transfer the work from one solution to another. The tanks in the plating barrels have sufficient anode and solution capacity to maintain the correct metal content without addition of metal in form of salts. The entire machine is driven by one motor. It is timed by an electric clock and cannot be slowed down or speeded up by an unauthorized person.

Welding Clamp

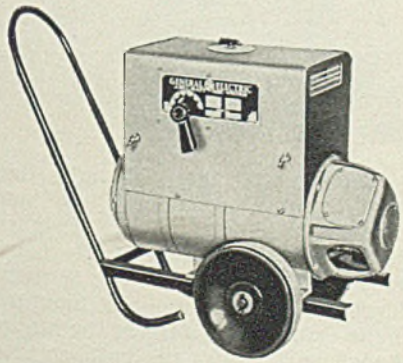
■ Michigan Clamp Co., Jackson, Mich., has introduced a new Twistite welding C clamp which combines an instant adjustment feature with its spatter proof treatment against



welding spatter. Its swivel foot turns on a ball bearing and its stationary foot is insulated from the frame. The clamp also incorporates a solder lug to hold the welding cable during welding operations.

Arc Welder

■ General Electric Co., Schenectady, N. Y., announces a new Strikeasy 150-ampere direct-current arc welder for use in fabricating bright-



surfaced, thin-gage metals, such as aircraft tubing SAE-4130. Its chief feature is its "pep" or extra high instantaneous recovery of voltage (40 to 60 volts) which helps operator to strike the arc with ease. Rapid adjustment of the welding current is obtained by a tap switch and a rheostat; the former for speed in getting wide range adjustments, and the latter for accuracy in obtaining the exact number of amperes needed. The wide welding range permits use of shielded-arc electrodes as large as 3/16-inch in diameter and as small as 3/64-inch. As a further convenience, the arc welder may be used with a remote-control device. The equipment is horizontally mounted. Cool operation is obtained by means of a fan cooling system, while isothermic relays guard against operation on harmful overloads. The welder is offered with or without running gear. Without running gear, the over-all dimensions are—length, 28 inches, width 13½ inches, and height 21 inches.

Electric Hoist Cranes

■ Northern Engineering Works, 2615 Atwater avenue, Detroit, is now offering a line of electric hoist cranes for auxiliary use in large plants, and main hoisting in smaller plants. Units in the line are built

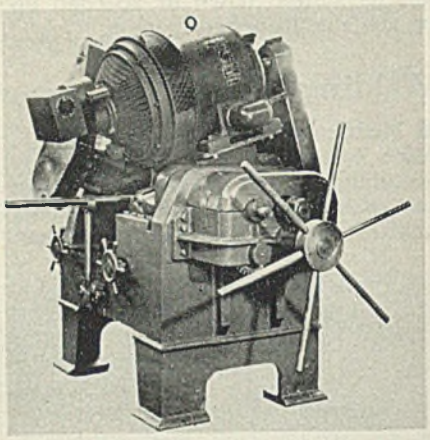
in various capacities up to those large enough to move 15-ton loads. Those available include top running or underhung, hand or motor travelled bridges and hoists, transfer types, and special double-hook types.

Door Operator

■ Schoelkopf Mfg. Co., Madison, Wis., reports a new type Air-Lec door operator for sliding doors. Called the Inertia model, it is designed upon an entirely different principle than ever before employed in door operation. The application of force is more direct. The action is started by compressed air from a cylinder. During main course of travel the door is rolling freely by its own momentum, at a controllable predetermined speed and free from the operator. The main spring of the door operator, regulated by the checking action of the air cylinder, does the last part of opening or closing the door.

Sizing Machine

■ Medart Co., Potomac and De Kalb street, St. Louis, has placed on the market a 2 & 2 universal bar and tube straightening, sizing and polishing machine which is capable of output speeds of 50 to 1000 feet per minute. No universal joints or bevel gears are incorporated in the unit. This has been made possible by using two instead of one motor, and by mounting each motor upon the same adjustable member which supports its driven roll. Each roll and motor is connected by a direct silent chain and gear drive which is completely enclosed in an oiltight case. Rolls are of the straight and concave design. Complete integration of each roll and motor unit makes



extreme angularity adjustment of the rolls (from 10 to 35 degrees) possible. It also permits repolishing of rolls without removing them from the machine. The company is offering this unit in four sizes to accommodate every size of bar and tube from 1/6 to 6 inches in diameter.

Floodlight Bulb

■ Wabash Appliance Corp., 335 Carroll street, Brooklyn, N. Y., reports a new-type concentrating floodlite bulb for high bay lighting in industrial plants. It is said to deliver

a concentrated flood of light that cuts through distance, haze and smoke. The new bulb is designed to force down to the work plane level the full light that the filament develops. The filament is mounted at the exact focal point of the hump-shaped parabola of the bulb, so that light rays are forced straight out of the bulb. The inside of the bulb is lined with pure polished silver. Unit illustrated is of the 1500-watt size.


...HERE'S WHAT WE NEED TO COMPLETE OUR PLAN FOR '42!
STEEL's MARKET SELECTOR
TO HELP YOU LOCATE and MEASURE the PREFERRED MARKETS FOR YOUR PRODU
...the METAL WORKING INDUSTRY
Which of these PRODUCTS indicate a market for you?
TOTAL NUMBER OF PLAN
CONSUMERS FOR FABRICATION AND TREATMENT
Bar Products (Bolts, Nuts, Rivets, etc.) 575
Wire Products (Wire Specialties, Cable, Wire Fabric, etc.) 754
Sheet and Strip Products - Light Gauge Tubing - Stampings 1,2
Plate Fabricators, Including Welded Pipe
Structural Fabricators
Ornamental and Wrought Iron
Surface and Metallurgical Treatment - Job Galvanizing, Plating, Heat Treating, Welding, etc.
Jobbing Machine Shops and Repair Shops
Dies, Molds for Stamping, Forging, and Plastics
Building Hardware and Trim, including Prefabricated Buildings, Sheet Metal and Tin Working
Heating, Ventilating and Air Conditioning Equipment
Metal Furniture, Cabinets, Kitchen Equipment, etc. 613
Containers and Holloware - Light Pressure Vessels 1,266
Light Metal Products - Toys, Specialties, Light Hardware, Musical Instruments, Sporting Goods 449
Plate Products - Boilers, Pressure Vessels, Processing Equipment, Stokers 84
Track Material - Frogs, Switches, etc. 207
Locomotives, Cars and Ships - Including Steel, Mine and Industrial Cars and similar Flat Wheeled Equipment
Furnaces and Kilns - Metallurgical and Industrial 153
Automobile Accessories 1,505
Parts - Auto and Machine 324
Auto Bodies, Truck Bodies, Trailers, Aircraft Fuselages 1,189 608
CONSUMERS FOR MANUFACTURING
Small Tools, Cutler
Steam Specialties
Agricultural Imple
Contractors Equip
Automobiles, Tra
Electrical Equipr
Electrical Appli
Materials Han
Engines - Stea
Heavy Machi
Special Mach
Metalworking
Machine Tools 578
Machine Tool Accessories, Tools, Jigs, Dies, etc. 565
Instruments - Time, Recording, Measuring, and Testing
Office Machinery and Equipment, including Typewriters, Calculating Machines, Addressing Machines, etc.
IT'S A REAL PICTURE OF OUR MARKET!
See other side for STEEL PRODUCING
also Metal Working plants
Find out now about this helpful new planning tool

...GET THE ANSWERS TO YOUR QUESTIONS ON THE METALWORKING AND METALPRODUCING MARKET!

IT'S surprising how many useful things STEEL's Market Selector will tell you. With it, some companies have discovered several brand new markets—others are finding it a source of new selling ideas—advertising managers report it extremely helpful in selling management on an adequate plan for '42—agency men are enthusiastic over the complete marketing picture it provides. Before you complete your plans for '42 see this helpful new planning tool. The Market Selector quickly answers many questions about the metalworking and metalproducing markets. It will save you time—and place in your hands information that has cost thousands of dollars to compile.

STEEL

Penton Building, Cleveland, Ohio

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See other side for STEEL PRODUCING INDUSTRY DATA also Metal Working plants classified by operations

War Needs To Impose New Demands on Steel

Civilian use faces further contraction.
Pig iron, scrap allocations co-ordinated.
Production records continue to be made.

MARKET IN TABLOID ★

Demand
War presages increase.

Prices
Scrap adjustments considered.

Production
Up 1 point to 97½ per cent.

■ ENTRY of the United States into the World War last week has not yet been reflected in the iron and steel market, aside from a general tightening of nerves and improved morale among all interests. That war requirements will call for even greater production and further curtailment of steel to civilian users is fully recognized and all thinking is along these lines.

Steel, recognized as the basis of all war preparation, is being provided in tonnage never before attained and every possible method to increase output is welcomed. Pending completion of enlarged production facilities the only means by which more steel can be obtained for war use is limiting or cutting off supply to channels not connected with the main object. Already indications are being given of further reduction in automobile output and other articles probably will feel the hand of the government in heavy restriction. The President has indicated that half the steel formerly going to civilian use will be diverted to war purposes. This would indicate a sharp contraction in peacetime production.

In an effort to synchronize supply of raw materials OPM has placed allocation of scrap and pig iron under practically one agency, co-ordinating control of these two complementary materials, largely used by the same type of industrial plants. This is expected to ease the situation to some extent, though small supply of scrap will place an added burden on pig iron.

Pig iron production promises to be heavier from now on as additional blast furnace stacks come into production. National Steel Co. has blown in a stack at Detroit and has another practically ready at Weirton, W. Va. Two Carnegie-Illinois Steel Corp. and two Republic Steel Corp. furnaces are under way. Relining is almost completed on several other units. More pig iron may be a partial answer to lack of scrap, supply of which seems impossible of enlargement under present price conditions.

Announcement of unchanged prices on ferroalloys for first quarter has been made by a leading producer. Expectation had been that ferromanganese price would be increased in view of higher cost of manganese ore. Nevertheless the quotation of $120, seaboard, is maintained. This material has risen $40 per ton since September, 1939.

Production last week advanced 1 point to 97½ per cent in spite of scrap shortage holding several districts down. St. Louis gained 10 points to 96 per cent as furnaces were relighted. Chicago advanced 1½ points to 101½ per cent, Detroit 5 points to 90 and Cleveland 2½ points from the revised rate of the previous week, to 94 per cent. New England declined 8 points to 84 per cent as another open hearth was taken off and Wheeling lost 1 point to 94 per cent. Rates were unchanged as follows: Pittsburgh, 98; Youngstown, 92; Birmingham, 90; Eastern Pennsylvania, 87; Buffalo, 79; Cincinnati, 91.

Tempo of the steel industry is indicated by shipment of 18,612,901 net tons of finished steel by the United States Steel Corp. in the first eleven months this year, compared with 13,431,487 tons in the corresponding period last year, a new record for these months. November shipment of 1,634,186 tons was the highest in history for that month, although 227,093 tons less than in October, largely due to the shorter month.

Weekly average production of steel ingots in November was second highest in history, 1,624,706 net tons, slightly under the record of 1,634,917 tons in October. In November, 1940, production averaged 1,507,950 tons, a peak at that time. November total output was 6,969,-987, compared with an October production of 7,242,683 tons. In eleven months ingot production was 75,763,558 tons, 25 per cent greater than during the same period in 1940 and 50 per cent over the entire year 1917, which was the peak of the first World War.

Steel and iron imports in September totaled 4230 gross tons, with 4259 tons of scrap. This compares with 1975 tons of steel products and 16,405 tons of scrap in August. In September, 1940, 2542 tons of steel products were imported, with 56 tons of scrap.

All records were broken in Lake Superior iron ore movement, the season total being 80,116,360 gross tons, 25.75 per cent above the 1940 total of 63,712,982 tons. The former season record was in 1929 when 65,204,600 tons was moved. December shipments were 835,081 tons, compared with 14,547 tons in December, 1940. Last spring Office of Production Management set a goal of 74,600,000 tons for the season.

Composite prices are: Finished steel, $56.73; semi-finished steel, $36.00; steelmaking pig iron, $23.05; steelmaking scrap, $19.17.

COMPOSITE MARKET AVERAGES

	Dec. 13	Dec. 6	Nov. 29	One Month Ago Nov., 1941	Three Months Ago Sept., 1941	One Year Ago Dec., 1940	Five Years Ago Dec., 1936
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$54.66
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	35.45
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	22.32	19.48
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	21.40	17.05

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, 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.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Mouth, Three Months and One Year Ago

Finished Material

	Dec. 13, 1941	Nov. 1941	Sept. 1941	Dec. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Dec. 13, 1941	Nov. 1941	Sept. 1941	Dec. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.95
Basic, Valley	23.50	23.50	23.50	23.10
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.84
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.29
No. 2 foundry, Chicago	24.00	24.00	24.00	23.75
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.715
Malleable, Valley	24.00	24.00	24.00	23.60
Malleable, Chicago	24.00	24.00	24.00	23.75
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.35
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$22.75
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	19.75
Heavy melting steel, Chicago	18.75	18.75	18.75	20.70
Rails for rolling, Chicago	22.25	22.25	22.25	25.00
No. 1 cast, Chicago	20.00	21.50	21.50	19.00

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$5.50
Connellsville, foundry, ovens	7.25	7.25	7.25	6.00
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base .. 3.05c
Granite City, base 3.15c
Detroit, del. 3.15c
Other Mich. pts., del. ... 2.25c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square 3.31c
Granite City 3.38c
Pacific Ports 3.73c

Culvert Sheets

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.
Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.
Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.
Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

Enameling Sheets

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c
Granite City, base 2.85c
Pacific ports 3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c
Granite City, base 3.45c
Pacific ports 4.00c

Electrical Sheets, No. 24

	Pittsburgh Base	Pacific Ports	Granite City
Field gr.	3.20c	3.95c	3.30c
Armat.	3.55c	4.30c	3.65c
Elect.	4.05c	4.80c	4.15c

Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c
Detroit, del. 2.20c
Other Mich. pts. del. ... 2.25c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c
Other Mich. pts. del. ... 2.95c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over 2.95c
Worcester, base 3.35c
Detroit, del. 3.05c
Other Mich. pts. del. ... 3.10c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

TYPE	BARS	PLATES	SHEETS	H. R. STRIP	C. R. STRIP
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
304-20% clad	.....	*18.00	19.00	.....	.....
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
316	40.00	44.00	48.00	40.00	48.00
317	50.00	54.00	58.00	50.00	58.00
347	33.00	38.00	45.00	33.00	42.00
403	21.50	24.50	29.50	21.25	27.00
410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
430F	19.50	22.50	29.50	18.75	24.50
431	19.00	22.00	29.00	17.50	22.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

*Includes annealing and pickling.

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box $5.00
Granite City $5.10
Pacific ports, f.o.b. $5.75½

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed 4.27½c

Long Ternes

Pittsburgh, Gary No. 24 unassorted 3.80c
Pacific Ports 4.55c

Special Coated Mfg. Ternes

Pittsburgh, Chicago, Gary, 100-base box $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,

Youngstown 2.10c
Coatesville, Sparrows Point, Claymont 2.10c
Gulf ports 2.45c
Pacific Coast ports 2.65c

Steel Floor Plates

Pittsburgh 3.35c
Chicago 3.35c
Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh, Bethlehem, Chicago, Buffalo, Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20
4100	.15-25 Mo.		0.55
4600	0.20-0.30 Mo.; 1.50-2.00 Ni.		1.20
5100	80-1.10 Cr.		0.45
5100	Spr. flats		0.15
6100	Bars		1.20
6100	Spr. flats		0.85
Carb., Van.			0.85
9200	Spr. flats		0.15
9200	Spr. rounds, squares		0.40
T 1300, Mn, mean 1.51-2.00			0.10
Do., carbon under 0.20 max.			0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pitts., Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pitts., Chicago, Gary, Cleveland, Birm., base 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar ... 5.00c
Pittsburgh, staybolt ... 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails $2.55

(Per Pound)

Polished fence staples .. 2.55c
Annealed fence wire 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C. L. column) 59
Galv. barbed wire, 80-rod spools, base column 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago Birmingham (except spring wire at Birmingham)

Bright bess., basic wire 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg $3.85

Alloy Plates (Hot)

Pitts., Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill ... $40.00
Relay rails, base, 35 lbs. and over.....28.00-30.00
Light rails, billet qual., Pitts., Chicago, Bham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated 5.00c
Car axles forged, Pitts., Chicago, Birmingham.. 3.15c
Tie plates, base 2.15c
Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller .... 65½ off
Do., ⅞ and ⅝ x 6-in. and shorter ..... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts ..... 56 off
Plow bolts ..... 65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	

Hexagon Cap Screws

Upset 1-in., smaller .... 60 off

Square Head Set Screws

Upset, 1-in., smaller ... 68 off
Headless, ¼-in., larger .. 55 off
No. 10, smaller ..... 60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅜-inch and under ..... 65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l ..... $3.50 off

Tool Steels

Pittsburgh, Bethlehem, Syracuse, base, cents per lb.

Carb. Reg. 14.00 Oil-hard-
Carb. Ext. 18.00 ening .. 24.00
Carb. Spec. 22.00 High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
...	4	2	8	54.00
5.50	4	1.50	4	57.50
5.50	4.50	4	4.50	70.00

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2½"O.D.	12	15.16	...
2½"O.D.	12	16.58	26.57
2¾"O.D	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	...

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Welded Iron, Steel, Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	51
¾	66½	55
1—3	68½	57½

Iron

¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe, Plain Ends

Steel

1 to 3, butt weld 68½
2, lap weld 63
2½ to 3, lap weld 66
3½ to 6, lap weld 65
7 and 8, lap weld 64
Seamless, 3 pts. lower discount.

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm. $45.00-46.00
4-in., Birmingham .. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in & over, east fdy. 49.00
Do., 4-in 52.00
Class A Pipe $3 over Class B
Stnd. fittgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point.. $34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10, Galveston up $0.25 and Pacific Coast up $0.50 on water shipments.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.. $6.00- 6.25
Connellsville, fdry . 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. .. 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del. 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered .. 12.25
Terre Haute, del. .. 12.00
Milwaukee, ovens .. 12.25
New England, del. .. 13.75
St. Louis, del. 12.02
Birmingham, ovens . 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.75
Do. (1000 lbs. or over) 13.00

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia $29.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.00	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide. net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00
Do., barge	23.00
No. 2 lump	23.00

Ferroalloy Prices

Ferromanganese, 78-82%,
Carlots, duty pd., seab'd $120.00
Carlots, del. Pittsburgh 125.33
Carlots, f.o.b. So. f'ces. 145.00
Add $10 for ton, $13.50 for less than ton, $18 for less than 200-lb. lots.

Spiegeleisen, 19-21%, gross ton, Palmerton $36.00

Manganese Briquets, Contract carloads, bulk freight allowed, per lb. 5.50c
Packed 5.75c
Ton lots 6.00c
Less-ton lots 6.25c
Less 200-lb. lots 6.50c
Spot ¼c higher.

Manganese Electro, 99.9+%, less car lots 42.00c

Chromium Metal, per lb. contained chromium

	Contract	Spot
98% Cr. ton lots	$0.00c	$5.00c
88% Cr. ton lots	79.00c	84.00c

Ferrocolumbium, 50-60% f.o.b. Niagara Falls, per lb. contained Cb on contract $2.25
Less-ton lots 2.30
(Spot 10c higher)

Chromium Briquets, per lb., freight allowed

	Contract	Spot
Carlots	8.25c	8.50c
Packed	8.50c	8.75c
Ton lots	8.75c	9.00c
Less-ton lots	9.00c	9.25c
Less 200 lbs.	9.25c	9.50c

Ferrochrome, 66-70%, freight allowed, 4-6% carbon, per pound contained (chrome)
Carloads 13.00c
Ton lots 13.75c
Less-ton lots 14.00c
Less than 200-lb. lots 14.25c

67-72%, low carbon, cts. per pound:

	Car loads	Ton lots	Less ton	200 lbs.
2% C.	19.50	20.25	20.75	21.00
1% C.	20.50	21.25	21.75	22.00
0.20% C.	21.50	22.25	22.75	23.00
0.10% C.	22.50	23.25	23.75	24.00

Spot is ¼c higher.

Ferromolybdenum, 55-75%, per lb. contained molybdenum, f.o.b. furnace 95.00c

Calcium Molybdate (Molyte), 40-45% Mo., per lb. contracts, f.o.b. producers plant $0.00c

Molybdic Oxide Briquets, 48-52% Mo. per lb. contained, f.o.b. producers plant 30.00c

Molybdenum Oxide, (In 5 and 20 lb. mo. contained cans) 53-63 mo. per lb. contained f.o.b. producers' plants $0.00c

Molybdenum Powder, 99%, f.o.b. York, Pa., per lb. in 200-lb. kegs $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Ferrophosphorus, 17-19%, gross ton carloads, f.o.b. sellers' works, $3 unitage, freight equalized with Rockdale, Tenn. for 18% phos.
Contract $58.50
Spot 62.25
23-26%, $3 unitage, freight equalized with Mt. Pleasant, Tenn., for 24% phos.
Contract 75.00
Spot $0.00

Ferrosilicon, Gross tons, freight allowed, bulk

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

(Above for contracts; spot ¼c higher)

Silicon Metal, Spot ¼-cent higher (Per Lb., Contracts):

	1% Iron	2% Iron
Carlots	14.50c	13.00c
Ton lots	15.00c	13.50c
Less-ton lots	15.25c	13.75c
Less 200 lbs.	15.50c	14.00c

Silicon Briquets, Contract carloads, bulk freight allowed, per ton $74.50
Packed $0.50
Ton lots $4.50
Less-ton lots, per lb. 4.00c
Less 200-lb. lots 4.25c
Spot ¼c higher on less ton lots; $5 higher on ton lots and over.

Silicomanganese,

Carbon	1½%	2½%
Carloads (contract)	$128.00	$118.00
Ton Lots (contract)	140.50	130.50

Freight allowed spot $5 above contract

Ferrotungsten, (All prices nominal) Carlots, per lb. contained tungsten $1.90

Tungsten Metal Powder, (Prices Nominal) 98-99 per cent, per pound, depending upon quantity $2.60-$2.65

Ferrotitanium, 40-45%, f.o.b. Niagara Falls, per lb. contained in ton lots $1.23
Less ton lots 1.25
20-25%, C. 0.10 max., in ton lots per lb. contained Ti 1.35
Less-ton lots 1.40
(Spot 5c higher)

Ferro-Carbon-Titanium, 15-20% Titanium,

	6-8% C	3-5% C
Carlots, contract, f.o.b. Niagara Falls, freight allowed to destinations east of Mississippi and north of Baltimore and St. Louis	$142.50	$157.50

Ferrovanadium, 35-40%, contract per pound contained vanadium $2.70-$2.80-$2.90
(Spot 10c higher)

Vanadium Pentoxide, Per lb. contained, contracts $1.10
Do., spot 1.15

Zirconium Alloy, 12-15%, carloads, contract, bulk $102.50
Packed 107.50
Ton lots 108.00
Less ton lots 112.50
Spot $5 a ton higher
35-40%, contract, carloads, bulk or package, per lb. alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot is ¼-cent higher

Alsifer, Per lb., f.o.b. Niagara Falls.

	Contract	Spot
Carlots	7.50c	8.00c
Ton lots	8.00c	8.50c

Simanal, Per lb. of alloy, contracts, freight allowed (approx. 20% Si, 20% Mn, 20% Al)

Carlots	Ton Lots	Ton Lots
10.50c	11.00c	11.50c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.10
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.50	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	6.00	....	4.42	....	....
Memphis	4.15	4.35	4.35	4.20	4.20	5.96	4.35	....	6.00	....	4.56	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.45	....	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 10 bun. in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis ,Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle, 1 to 99 pounds in Los Angeles; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.95c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1 10 9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.40	1 16 9
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.50c	18 7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro,

Scheelite, lmp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	....
So. African, 50%	68.00-70.00
Indian, 50%	68.00-70.00
Brazilian, 46%	68.00-70.00
Chilean, 47%	68.00-70.00
Cuban, 50-51%, duty free	....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

OTHER THAN RAILROAD GRADES (a) (b)	Pittsburgh, *Wheeling, *Johnstown, Weirton, Steubenville	Youngstown, *Warren, Canton, Sharon	Chicago	Kokomo, Ind.	Bethlehem	*Eastern Pa.	Sparrows Pt.	Cleveland	Buffalo	Cincinnati, Ashland, Ky., Portsmouth, O. Middletown, O.	St. Louis	Detroit	Duluth	Alabama City, Atlanta, Birmingham	Los Angeles, San Francisco	Minnequa, Colo., Portland, Oreg.	Seattle, Wash.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$17.50	$17.85	$18.00	$17.00	$17.00	$16.50(f)	$14.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.50	19.25	19.50	17.50	17.85	18.00	17.00	17.00	16.50(f)	14.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00	15.50(f)	13.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00	15.50(f)	13.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.50	17.25	17.50	15.50	15.85	16.00	15.00	15.00	14.50(f)	12.50
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.75	14.50	14.75	12.75	13.10	....	12.25(d)	12.25	11.75(f)	9.75
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	15.50	15.00(d)	12.50	12.00(f)	10.00
Shovel turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	16.00	15.75	16.00	14.00	14.35	16.50	16.00(d)	13.50	13.00(f)	11.00
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	19.00	18.75	19.00	17.00	17.35	17.50	16.50(d)	16.50	16.00(f)	14.00
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	13.50	12.50(d)	12.50	12.00(f)	10.00
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.25	15.00	†15.25	13.25	13.60	13.75	12.75(d)	12.75	12.25(f)	10.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	18.50	16.85	17.00	16.00(d)	16.00	15.50(f)	13.50
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00	20.35	19.00	20.00(e)	19.50	18.00(g)	18.00
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50	18.85	17.50	18.50(e)	18.00	16.50(g)	17.00
Stove plate	19.00	.....	17.00	16.00	18.00	18.50	18.00	18.00	19.00	17.50	17.00	14.10	16.00	17.00(e)	16.50	15.00(g)	14.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.50	24.25	24.50	22.50	22.85	23.00	22.00(e)	22.00	20.50(g)	19.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	22.50	20.50	20.85	21.00	20.00(e)	20.00	18.50(g)	19.50
Low phos. punch., plate scrap**	23.00(c)	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	22.50	20.50	20.85	21.00	20.00(e)	20.00	18.50(g)	17.50
Machinery cast cupola size***	22.00	22.00	21.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00	21.35	20.00	21.00(e)	20.50	19.00(g)	19.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50(e)	21.00	19.50(g)	19.50
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50(e)	21.00	19.50(g)	19.50
Punchings and plate scrap††	22.00(c)	22.00	20.75	20.75	20.25	20.75	20.75	21.50	21.25	20.50	19.50	19.85	20.00	19.00(e)	19.00	17.50(g)	16.50
Punchings and plate scrap§§	21.00(c)	21.00	19.75	19.75	19.25	19.75	19.75	20.50	20.25	19.50	18.50	18.85	19.00	18.00(e)	18.00	16.50(g)	15.50
Heavy axle and forge turnings	19.50(c)	19.50	18.25	18.25	17.75	18.25	18.25	19.00	18.75	18.00	17.00	17.35	17.50	16.50(e)	16.50	15.00(g)	14.00
Medium heavy elec. furnace turnings	18.00(c)	18.00	16.75	16.75	16.25	16.75	16.75	17.50	17.25	16.50	15.50	15.85	16.00	15.00(e)	15.00	13.50(g)	12.50
GRADES ORIGINATING FROM RAILROADS																Kansas City	
No. 1 R.R. heavy melting steel	21.00	21.00	19.75	19.25	....	19.75	19.75	20.50	20.25	20.50	18.50	18.85	19.00	18.00(e)	18.00	17.00	15.50
Scrap rails	22.00	22.00	20.75	20.25	....	20.75	20.75	21.50	21.25	21.50	19.50	19.85	20.00	19.00(e)	19.00	18.00	16.50
Rerolling quality rails	23.50	23.50	22.25	21.75	....	22.25	22.25	23.00	22.75	23.00	21.00	21.35	21.50	20.50(e)	20.50	19.50	18.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	....	22.75	22.75	23.50	23.25	23.50	21.50	21.85	22.00	21.00(e)	21.00	20.00	18.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	....	23.00	23.00	23.75	23.50	23.75	21.75	22.10	22.25	21.25(e)	21.25	20.25	18.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	....	23.25	23.25	24.00	23.75	24.00	22.00	22.35	22.50	21.50(e)	21.50	20.50	19.00

*Johnstown, Pa., and Warren, O., not bases for railroad grades; Wheeling railroad only. Eastern Pa. includes Coatesville, Claymont, Conshohocken, Phoenixville and Harrisburg as bases only for "other than railroad grades"; Philadelphia and Wilmington are Eastern Pa. bases only for railroad grades. †Base price at Portsmouth and Ashland; Cincinnati, Middletown 25 cents less. **¾-inch and heavier, cut 12 inches and under; ***may include clean agricultural cast; ††under ¾-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. (c) add $1.75 at Pittsburgh. (d) Bases at Alabama City and Birmingham only. (e) Bases at Birmingham only. (f) Minnequa only. (g) Portland only.

OTHER BASE PRICES: Machine shop turnings $17.60, Alloy, W. Va., $13.35 Toledo, O.; **Shoveling turnings,** $14.35 Toledo; **cast iron borings,** $13.60 Toledo; **No. 1 cupola cast,** $19 Minneapolis and St. Paul, $20.50 Chattanooga, $21 Radford, Va. and $22 Phillipsdale; Bridgeport and Worcester; **Heavy breakable cast,** $20.50 Phillipsdale, Bridgeport and Worcester, $17.50 Minneapolis and St. Paul; **Stove plate** $16 Minneapolis and St. Paul, $17.50 Chattanooga, $18 Radford, Va., $15.60 Toledo and $17.50 Phillipsdale, Bridgeport and Worcester; Machinery cast cupola size $21.50 Chattanooga, $22 Radford, Va. and $23 Phillipsdale, Bridgeport and Worcester; **No. 1 machinery cast, drop broken** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester; **Clean auto cast** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester.

(a) The grades specified are, except dealers' No. 1 and No. 2 bundles and uncut structural and plate scrap, as named and defined in the simplified recommendations R-58-36 of the Department of Commerce which shall be the governing specifications for iron and steel scrap hereunder (other than railroad grades). Dealers' No. 1 bundles shall consist of new, clean black sheet scrap, hydraulically compressed in the dealer's yard. Dealers' No. 2 bundles shall consist of old fender and body scrap, and shall in no case command a premium. (b) These grades (other than railroad grades) represent the major classifications of iron and steel scrap. The maximum prices of superior or inferior grades shall continue to bear the same comparable relationship to those major grade classifications as heretofore existed between the prices of such superior or inferior grades and the prices of the major grades.

Maximum price at shipping point: A shipping point is the point from which the scrap is to be shipped to a consumer. Maximum price at which a grade of scrap may be sold f.o.b. its point of shipment is the shipping point of such scrap. **For shipping points located within a basing point,** the shipping point price is determined by taking the basing point price and deducting actual transportation costs to the consumer's plant within the basing point. Exception: Shipping point price within the Cincinnati basing point, for all grades other than No. 1 cupola, heavy breakable, stove plate, machinery cast (cupola size), No. 1 machinery cast (drop-broken 150 lbs. and under) and clean auto cast, shall in no case exceed basing point prices minus 80 cents. **For shipping points outside a basing point,** the shipping point price is determined by taking the nearest basing point and subtracting the lowest transportation charge. (Example: No. 1 steel shipped from Toledo takes the Detroit base of $17.85 minus transportation of $1.52 or $16.33. This shipping point price is the same to all consumers wherever located.) **Exceptions:** Shipping point of any grade not listed as having a basing point in New England is the Johnstown base minus the all-rail freight from the shipping point to Johnstown. Shipping point prices for New York City, Brooklyn, New York and New Jersey must be computed on the basis of the Bethlehem base although nearer to Buffalo in terms of barge transportation.

Maximum prices to consumers: Maximum price at which any grade (other than railroad) may be delivered to a consumer wherever located is the shipping point price plus actual transportation charges. Where shipment is by water, not more than 75 cents per gross ton may be included for handling charges at dock. Maximum delivered price in no case shall exceed by $1 a ton the nearest maximum base price in terms of transportation charges. (Example: The $1 excess is the so-called "springboard" arrangement. Youngstown consumers can draw on the Cleveland area for No. 1 steel scrap by taking the Cleveland base of $19.50, subtracting the Cleveland switching charge of 65 cents and adding freight to Youngstown of $2.08. The resulting delivered figure of $20.93 is within the "springboard" limit of $1 over the Youngstown base of $20.)

Billet and bloom crops originating in the Pittsburgh district may be sold within or without the district at the Pittsburgh base price plus up to, but not more than $2.50 in transportation charges. Maximum prices for **unprepared scrap** shall be $2.50 a ton less than the maximums for corresponding grade or grades of prepared scrap. **Remote scrap** takes a maximum delivered price $5 above the nearest basing point price.

Railroad grades: Where a railroad operates in two or more basing points, the highest base applies to consumers anywhere on the line. (Example: New York Central Railroad uses the $21 Pittsburgh base on No. 1 steel since the P. & L. E. operates there). Exception: Switching charges of 84 cents a ton must be subtracted from prices on scrap originating from railroads operating in Chicago and sold for consumption outside Chicago. Where railroad scrap is shipped to an off-the-line consumer, the highest maximum on-the-line price or the nearest basing point price, whichever is higher, applies. For scrap rails and rerolling rails originating from mines, logging roads, etc., take the nearest basing point and subtract the lowest established transportation charge to determine shipping point price, which need not be less than $13.50 for scrap rails, $15 for rerollers.

Commissions: Brokers are allowed a commission up to 50 cents a ton above maximum prices to consumers, including export.

Export prices: Maximum on No. 1 heavy melting steel (other than railroad) is the domestic shipping point price plus lowest transportation charge to point of export. Maximum price to a domestic consumer on line of the originating railroad plus transportation to point of export applies on No. 1 railroad steel. Customary differentials apply on other railroad and non-railroad grades.

Sheets, Strip

Sheet & Strip Prices, Page 104

Sheetmakers, while continuing to schedule requirements of commercial customers for the first few weeks of 1942, are making few promises on delivery beyond January and these with reservations. Actual war is expected to change the situation materially and until the picture develops they are proceeding with caution.

One unknown factor is the extent to which sheet and strip mills will be called on to produce light-gage plates to relieve the burden on plate mills, which are unable to meet heavy demands for shipbuilding and other essential work. Already much sheet mill capacity is being devoted to light plates but it is believed much more will be demanded in the emergency.

Sheet mills probably will find it increasingly impossible to supply tonnage rated below A-10 and the line probably will rise as more rated tonnage is booked. Narrow strip mills will not be affected as severely as wide mills, but as many of these are non-integrated shortage of semifinished steel may produce the same effect.

Galvanized sheet output is not likely to be as much affected as other grades of sheets. Because of zinc shortage most galvanized sheet production is already highly rated and because of the warehouse situation and the large share of galvanized material sold through this channel buyers of unrated tonnage may be able to obtain small lots from that source.

A substantial tonnage apparently is being moved to jobbers this month, due more to the special priority business they are obtaining than to their blanket A-9 rating. On these special orders, the warehouses wait until they at least have a carload of specifications of a single rating and then go to OPM and obtain a lump priority for all such specifications to present to mill suppliers. This enables them to obtain a better price and also proves more satisfactory to mills from a production standpoint.

Plates

Plate Prices, Page 104

Despite efforts to freeze schedules for rolling plates a month in advance by allocations OPM continues to make fresh demands on mills for prompt delivery material, resulting in frequent revisions. In some cases allocation is to mills unable to handle the order and on such showing it is shifted elsewhere.

Plate demand is unprecedented, especially for ship work and the allocation plan has not yet been refined sufficiently to meet contingencies arising from overloaded order books.

One effect of the heavy plate demand seems likely to be further inroads in sheet and strip mill capacity for production of lighter gage plates, plate mills concentrating on heavier material.

War conditions are expected to intensify need for plates, especially for ships and tanks and supply for other less essential construction is likely to be curtailed considerably. One line likely to suffer is railroad car building, which, although it has an A-3 rating, has been unable in the recent past to obtain sufficient steel to meet delivery schedules.

Considerable new plate capacity is under construction but will not be ready until late next year and therefore cannot aid in the present emergency.

PLATE CONTRACTS PLACED

500 tons, tanks, ordnance plant, Choteau, Okla., to Pittsburgh Des Moines Bridge Co., Pittsburgh.

Unstated, but large tonnage, tank and oil storage facilities, San Juan and Charlotte Amalie, P. R., to Chicago Bridge & Iron Co., Chicago; The Arundel Corp., Consolidated Engineering Co. Inc. and Hardaway Contracting Co., Baltimore, joint contractors.

PLATE CONTRACTS PENDING

580 tons, 24 and 30-inch, ¼-inch, welded steel water pipe, Airport Way improvement, Seattle; Hydraulic Supply Mfg. Co., Seattle, low.

Unstated, eight steel, 230-foot mine sweepers, for navy; Associated Ship builders, Seattle, contractor.

Tin Plate

Tin Plate Prices, Page 104

Tin plate thus far has not been

rated as a defense essential though it is so regarded and as the situation develops it may be given a high preference to cause sheet mills to divert a sufficient supply to tin mills. Thus far it has been a tacit understanding that tin mills should be supplied first, regardless of other commitments. Now, however, there will be some question whether tin plate or heavy plate comes first. In most instances this situation has been met by rolling sufficient black plate to keep tin mills supplied until the next rolling is possible. War demand is expected to interfere with this procedure unless actual priority is provided.

Bars

Bar Prices, Page 105

Cold drawn bar sellers go under allocation next month. They will receive regular monthly quotas based on the average of their monthly receipts for the first seven months of this year, but get them from their regular suppliers in 1940 instead of this year.

Integrated and nonintegrated producers will be placed on the same basis and on their rated business all priorities will end with them and not die with the hot mills as is now the case. In other words, they will get a regular set tonnage, each month according to present plan, and the distribution of the tonnage will depend entirely on the ratings they receive.

Cold drawers generally regard the new arrangement as a distinct forward step. It will not only eliminate much paper work, which over recent months has caused some to increase their office force by 50 per cent, but will result in more even flow of tonnage.

For some time past, cold drawers have not infrequently found themselves in receipt of tonnage they could not use for considerable time. This not only made a problem of storage, but tied up well ahead of time of actual need tonnage which might be urgently required in other directions.

These cases involve usually long time contracts, for which the cold drawers would buy the hot steel, specifying certain set deliveries over the respective periods of the contracts, only not infrequently to have the entire amounts shipped at one time. It made undoubtedly for a more efficient and economical rolling schedule for the mills but nevertheless had distinct disadvantages.

Under the new procedure such a situation will be relieved. Meanwhile, cold drawers will have to make a monthly accounting to OPM of orders, shipments and inventories on hand. Further details are expected to be announced shortly.

Cold drawers this week were given an idea of what was to be expected of them in connection with the government's new shell program. About 250,000 tons of shell work will involve cold drawing. This program includes antitank and antiaircraft shells principally, with the 20, 37 and 40-millimeter projectiles predominating. In fact, there will be substantially more 20 and 40-millimeter shells than 37-millimeter sizes. There will also be a fairly substantial amount of fuze work, in addition.

The shell program in its entirety is expected to involve more than 1,000,000 tons, with distribution expected in the near future. One day last week 5000 tons of shell steel was placed, but this was not believed to be part of the new program.

Washington has assured cold drawers that with increased war demands now in prospect capacity will be greatly taxed, and made clear that the government stood ready to supply whatever additional equipment may be needed. This was not interpreted necessarily as indicating that all cold-drawn capacity would be absorbed by war work, but it was indicated that a consumer without a priority rating will have considerable difficulty getting this type of steel.

In addition to 250,000 tons of shells requiring a certain amount of cold-drawn steel, a large program of incendiary bombs is being considered A few weeks ago 300,000,000 of these bombs were reported contemplated, a program which would require almost 200,000

tons of cold-drawn steel alone. It is believed this program is being refined upward.

Pipe

Pipe Prices, Page 105

Demand for merchant pipe is heavy but suppliers find difficulty in meeting needs of consumers from badly depleted stocks. Further heavy requirements are expected to develop when additional cantonments are undertaken to house an increased army.

Cast iron pipe makers are producing to the extent permitted by supply of pig iron and scrap, both of which are limited. Cities are buying less cast pipe, deferring as much work as possible to release material for defense.

CAST PIPE PENDING

1550 tons, 8 to 30-inch Airport Way improvement, Seattle; Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., low for sand cast, $106,397; American Cast Iron Pipe Co., low for centrifugal, $122,877; alternates for part steel welded; Olympic Foundry Co., Seattle, low for 60 tons, fittings, $9140; Rensselaer Valve Co., low for valves, $13,848.

800 tons, 6 to 16-inch for Kelso, Wash.; Hugh G. Purcell, Seattle, low $86,491; award awaits priority ruling.

Rails, Cars

Track Material Prices, Page 105

Locomotive buying continues the feature of the railroad situation. The War Department has placed 150 2-8-2 steam locomotives for lease-lend export, in addition to 50 others recently placed. The order was divided equally among three builders. The Nickel Plate has placed ten diesel-electric switchers with two builders and the Wabash three of the same type with two builders.

American Association of Railroad's announcement that carriers plan to buy 25,000 additional cars in 1942 brings up the question whether steel will be available for that purpose in view of the war situation. About 75,000 cars are now on order and delivery has been delayed by lack of sufficient steel. Addition of 25,000 cars is deemed by steelmakers as impossible under the circumstances.

In noting ceiling prices on relaying rails last week the price of first class relayers was stated at $25, a typographical error. The figure should have been $28 f.o.b. any station on the originating road.

Car buying includes a greater number of orders although the total number of cars is light. Recent orders involve 15 ninety-ton stake cars for Inland Steel Co. and 10 covered hopper cars for the Chicago, Indianapolis & Louisville, both going to General American Transportation Corp.; and 100 fifty-ton box and 50 fifty-ton hopper cars to the Missouri & Illinois, placed with American Car & Foundry Co. This latter builder has also booked 25 seventy-ton covered hopper cars for the New York, Chicago & St. Louis.

Export demand at present is practically all on the part of the war department, which recently placed 230 specially designed freight cars for the Far East, with the Magor Car Corp., Passaic, N. J. This department is also reported to be inquiring for 3500 eight-wheel freight cars for the Near East, including 2000 forty-ton box cars, 900 forty-ton high side gondolas and 600 forty-ton low side gondolas.

Inquiry includes 50 seventy-ton gondolas for the Colorado Fuel & Iron Co. and 10 fifty-ton gondolas for the Philadelphia navy yard.

LOCOMOTIVES PLACED

Akron, Canton & Youngstown-Northern Ohio, one 1000-horsepower diesel-electric switch engine, to American Locomotive Co., New York.

Canadian Pacific, seventeen 4-6-2 type locomotives, to Canadian Locomotive Co., Montreal.

Chicago, Indianapolis & Louisville, four diesel-electric switch engines, three of 1000 horsepower and one of 600 horsepower, to Electro-Motive Corp., La Grange, Ill.

Kansas City Terminal, four 660-horsepower diesel-electric switch engines, to American Locomotive Co., New York.

Navy, seven 45-ton diesel-electric locomotives, five to the General Electric Co., Schenectady, N. Y., and two to H. K. Porter Co., Pittsburgh.

Nickel Plate, ten diesel-electric switchers, six to American Locomotive Co., New York, and four to Electro-Motive Corp., La Grange, Ill.

Ravenna Ordnance plant, Ravenna, O., two 45-ton diesel-electric engines, to

General Electric Co., Schenectady, N. Y.

Tennessee Central, one 660-horsepower diesel-electric switch engine, to American Locomotive Co., New York.

Tennessee Coal, Iron & Railroad Co., four 660-horsepower diesel-electric switch engines, to American Locomotive Co., New York.

Terminal Railroad Association of St. Louis, five diesel-electric switch engines, two going to Electro-Motive Corp., La Grange, Ill., two to the American Locomotive Co., New York, and one to Baldwin Locomotive Works, Eddystone, Pa.

Wabash, three diesel-electric locomotives, two to American Locomotive Co., New York, and one to Baldwin Locomotive Works, Eddystone, Pa.

War department, one 23-ton diesel-electric locomotive, for delivery to La Karne, O., to General Electric Co., Schenectady, N. Y.

War Department, 150 type 2-8-2 steam locomotives for lease-lend export, 50 each to American Locomotive Co., New York, Baldwin Locomotive Works, Eddystone, Pa., and Lima Locomotive Works, Lima, O.; in addition to previous order for 50 to same builders.

CAR ORDERS PLACED

Chicago, Indianapolis & Louisville, 10 seventy-ton hopper cars, to General American Transportation Corp., Chicago.

Inland Steel Co., 15 ninety-ton stake cars, to General American Transportation Corp., Chicago.

Long Island railroad, five double-deck motor cars and five double-deck trailers, to Pennsylvania Railroad Co.'s shops; each car and trailer will be more than 80 feet in length, and will have capacity for 130 passengers or more.

Missouri & Illinois, 100 fifty-ton box and 50 fifty-ton hopper cars, to American Car & Foundry Co., New York.

Nashville, Chattanooga & St. Louis, one steel coach, to Edward G. Budd Mfg. Co., Philadelphia.

Navy, 20 narrow gage, 20-ton freight cars, to Pacific Car & Foundry Co.

New York, Chicago & St. Louis, 25 seventy-ton covered hopper cars, to American Car & Foundry Co., New York.

Pennsylvania, three passenger coaches, to Pullman-Standard Car Mfg. Co., Chicago.

Tennessee Coal Iron & Railroad Co., 10 seventy-ton ore cars, to own shops.

Virginian, 1000, comprising 900 fifty-five-ton hoppers and 100 fifty-five gondolas, to company shops, Princeton, W. Va.

War department, 230 special type freight cars for export to the Far East, to Magor Car Corp., Passaic, N. J.

CAR ORDERS PENDING

Colorado Fuel & Iron Co., 50 seventy-ton gondolas; bids asked.

Navy, 10 fifty-ton gondolas for Philadelphia; bids asked.

War department, 3500 eight-wheel freight cars for Near East, inquiry reported; list comprises 2000 forty-ton box cars, 900 forty-ton high side gondolas and 600 forty-ton low side gondolas.

RAIL CONTRACTS PENDING

Wabash, 5000 tons 110-pound rails and accessories; court permission granted.

BUSES BOOKED

A.c.f. Motors Co., New York; Ten 41-passenger and four 35-passenger for Eastern Massachusetts Street Railway Co.; ten 43-passenger for Bureau of Supplies and Accounts, Washington; ten 41-passenger for United Electric Railways Co., Providence, R. I.; five 32-passenger and two 33-passenger for Southeastern Greyhound Lines, Lexington, Ky.

Structural Shapes

Structural Shape Prices, Page 105

Little rated structural tonnage is coming into the market at the moment and deliveries have eased somewhat, ranging from ten to 16 weeks, depending on priorities. Plates to be fabricated with the shapes, however, are increasingly difficult to obtain, in some instances as much as eight weeks behind schedule for high priority jobs now in process. An instance has been met of rails for a crane runway being quoted for delivery in five months, delaying the entire project.

SHAPE CONTRACTS PLACED

1553 tons, trash racks, Shasta dam, Coram, Calif., Bureau of Reclamation, invitation 1004; to Joseph T. Ryerson & Son Inc., Chicago; bids Nov. 4.

1000 tons, state bridge FASH-41-3, Goshen, N. Y., to American Bridge Co., Pittsburgh.

730 tons, bridge No. 87, Watson, Ark., for Missouri Pacific railroad, to American Bridge Co., Pittsburgh.

680 tons, assembling shop, Aberdeen Proving Ground, Maryland, to Lehigh Structural Steel Co., Allentown, Pa., direct by government.

600 tons, fabrication and erecting, tank repair building, Watervliet, N. Y., arsenal, to Bethlehem Fabricators Inc., Bethlehem, Pa., bids Dec. 5, direct to constructing quartermaster.

520 tons, additional plant for manufacture of aircraft parts, Scott & Wil-

liams Inc., Laconia, N. H., to R. C. Mahon Co., Detroit; H. E. Beyster Corp., Detroit, contractor; reinforcing bars to Ceco Steel Products Corp., New York.

150 tons, infirmary and class room building, U. S. Coast Guard, New London, Conn., to Lehigh Structural Steel Co., Allentown, Pa.; Tremeglio Bros., Waterbury, Conn., contractors; 50 tons, reinforcing bars to be placed.

SHAPE CONTRACTS PENDING

2700 tons, airplane repair shop, unit 2, Hill Field, Utah, for War department; bids postponed to Dec. 10.

2509 tons, state bridge over Potomac river, Sandy Hook, Md.

1800 tons, inert storehouses, Hawthorne, Nev., for navy; William P. Neil Co., low on general contract.

1700 tons, superstructure, contract 2, main viaduct, Trafficway project, Kansas City, Mo.; J. A. Tobin Construction Co., Kansas City, Mo., low on general contract; bids Nov. 18; project abandoned for present.

1310 tons, viaduct superstructure, Hartford, Conn., for state.

1225 tons, Spokane street viaduct, Seattle, state project; bids to Olympia, Dec. 23.

1000 tons or more, transmission towers, Midway-Coulee section, No. 2 230-kv Bonneville power line; American Bridge Co. low, $391,847.

700 tons, navy building, Bellevue, Md., bids opened Dec. 10.

530 tons, buildings, Union Drawn Steel Division, Republic Steel Corp., Beaver Falls, Pa.

500 tons or more, three penstock coaster gates for Coulee dam; American Bridge Co., low one schedule, $201,805, low combination bid four items, $732,082; Bethlehem Steel Co., low to Denver Item No. 1, $238,488.

350 tons, shop building, Maryland Dry Docks Co., Baltimore, Kaufman Construction Co., Philadelphia, low on general contract; 400 tons of reinforcing bars also required.

335 tons, buildings, American Steel Castings Co., Newark, N. J.

325 tons, highway bridge, Livingston county, New York, bid Dec. 18.

310 tons, power house, Ocoee No. 3, Ducktown, Tenn., for Tennessee Valley Authority.

280 tons, torpedo storage building, Hawthorne, Nev., for navy; William P. Neil Co., low on general contract.

205 tons, intake gates, Ft. Loudon dam, Lenoir City, Tenn., for Tennessee Valley Authority.

190 tons, state bridge over New York, New Haven & Hartford railroad, Groton, Conn.

175 tons, highway bridge, Montgomery county, New York, bid Dec. 18.

153 tons, state bridge over Crooked creek, Pike county, Ohio.

150 tons, launching way girders, New York Shipbuilding Corp., Camden, N. J.

150 tons, administration building, United States Department of Agriculture, Beltsville, Md., bids Dec. 26; 75 tons of bars also required.

148 tons, state overpass, LR-151, Abington township, Pennsylvania.

132 tons, crane runway, the Heckett Corp., Middletown, O.

125 tons, highway bridge, Erie county, New York, bid Dec. 18.

100 tons, barracks, navy yard, Philadelphia, bids Dec. 16.

Unstated tonnage, six deck girder spans, Pennsylvania railroad, Plain City, O.

Unstated, transmission towers, Longview-Ranier, Washington loop; bids to Bonneville project, Portland, Dec. 8.

Unstated, foundry and pattern shop and building additions, Keyport naval station, Washington state; bids to Com. R. E. Thomas, Puget Sound navy yard, Jan. 7.

Unstated, eight steel, 230-foot mine sweepers for Navy; Associated Shipbuilders, Seattle, awarded general contract.

SHAPE AWARDS COMPARED

	Tons
Week ended Dec. 13	5,233
Week ended Dec. 6	16,661
Week ended Nov. 29	37,818
This week, 1940	32,761
Weekly average, 1941	27,364
Weekly average, 1940	28,414
Weekly average, Nov., 1941	20,935
Total to date, 1940	1,399,203
Total to date, 1941	1,368,199

Includes awards of 100 tons or more.

Reinforcing Bars

Reinforcing Bar Prices, Page 105

Little buying of reinforcing bars for large commercial projects is being done and at the moment there is a lull in demand for war requirements, though this situation is expected to be reversed soon. Deliveries on small scattered lots can be made fairly promptly though a larger tonnage of a particular size can not command better shipment than for some time past.

Recent orders for defense and

war projects carrying A-3 priority or better have been heavy and some mills are unable to supply any tonnage at lower ratings. Outlook for January is not clear and war needs have not developed sufficiently to indicate what may be expected. Tonnage probably will be required for repairing bomb damage. Some orders for this purpose have been received and shipments will be made promptly as orders are small.

Rolling of large tonnages of shell rounds is expected to provide an increasing quantity of discards which are excellent material for reinforcing bars. Specifications for shells are stiffer than for other steel and the crop after rolling the rounds sometimes is as high as 10 to 15 per cent.

REINFORCING STEEL AWARDS

4000 tons, smokeless powder plant, Du Pont company, Choteau, Okla., to Sheffield Steel Corp., Kansas City, Mo.; W. R. Crimshaw, contractor.

3400 tons, Bureau of Reclamation, invitation A-33457-A-1, Coram, Calif.; 1050 tons to Youngstown Sheet & Tube Co., Youngstown, O.; 850 tons to Carnegie-Illinois Steel Corp., Pittsburgh; 750 tons to Columbia Steel Co., San Francisco; 750 tons to Inland Steel Co., Chicago; bids in Denver Nov. 25.

2060 tons, Odair, Wash., invitation D-38133-A, for Bureau of Reclamation; 1050 tons to Youngstown Sheet & Tube Co., Youngstown, O.; 625 tons to Inland Steel Co., Chicago, as reported in STEEL, Dec. 1; 385 tons to Bethlehem Steel Co., Bethlehem, Pa.; bids Oct. 28. No bids received on an additional 625 tons.

800 tons, Indiana-Michigan Electric Co., Mishawaka, Ind. to Truscon Steel Co., Youngstown, O.

750 tons, Frances Cabrini Homes, Chicago, for Chicago Housing Authority to Bethlehem Steel Co., Bethlehem, Pa.; S. N. Nielson Co., Chicago, contractor, bids Oct. 15.

615 tons, assembling shop, Aberdeen Proving Ground, Maryland, to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, bauxite plant, Aluminum Co. of America, Alcoa, Ark., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

575 tons or more, for Anderson Ranch Dam, project, Idaho, by Reclamation Bureau, to Carnegie-Illinois Steel Corp., low at $46,461.

290 tons, three bridges, New London, Conn., state highway department, to Truscon Steel Co., Youngstown, O.; A. I. Savin Construction Co., contractor.

275 tons or more, Coulee dam, Washington state, by Reclamation Bureau, to Bethlehem Steel Co., low at $21,760.

254 tons, Northern States Power Co., St. Paul; to Paper, Calmenson & Co., St. Paul; bids Nov. 26.

150 tons, Wayne county, Mich., for Wayne County Road Commission, to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

100 tons, navy yard letting Nov. 25, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

REINFORCING STEEL PENDING

1500 tons, Spokane street viaduct, Seattle, state project; bids to Olympia Dec. 23.

1000 tons, army base requirements, Newfoundland; bids Dec. 13.

850 tons, road bridge 3, War Department, Arlington, Va.; bids Dec. 11.

600 tons, Penway viaduct, Kansas City, Mo.; bids Nov. 18; project abandoned for present.

460 tons, sewage treatment plant, Stamford, Conn.; Thompson-Starrett Co., contractor.

400 tons, shop building, Maryland Dry Docks Co., Baltimore, Kaufman Construction Co., Philadelphia, low on general contract; 350 tons of shapes also required.

295 tons, seven pumping plants, U. S. Engineer, Paducah, Ky.; bids Dec. 7.

276 tons, building 87, packing plant, Morrell & Co., Ottumwa, Iowa; bids Dec. 19; bids too high, job being reduced in size to 175 tons and refigured immediately.

250 tons, laboratory, Bureau of Standards, Washington; bids Dec. 23.

231 tons, state highway project 253, Montgomey county, Ohio.

200 tons, reservoir, Indianapolis Water Co., Indianapolis; bids Dec. 12.

200 tons, building, Iowa Packing Co., Des Moines, Iowa; bids deferred from Nov. 15 to Dec. 12.

CONCRETE BARS COMPARED

	Tons
Week ended Dec. 13	13,244
Week ended Dec. 6	2,562
Week ended Nov. 29	10,069
This week, 1940	5,261
Weekly average, 1941	13,931
Weekly average, 1940	9,661
Weekly average, Nov., 1941	11,379
Total to date, 1940	488,086
Total to date, 1941	696,556

Includes awards of 100 tons or more.

180 tons, state hospital for insane, Manitowoc, Wis., Maurice Schumacher, Minneapolis, low on general contract; bids Dec. 12; bids high, project indefinitely postponed.

Unstated tonnage, housing project, Champaign, Ill., for Champaign Housing Authority; bids Jan. 2.

Unstated tonnage, housing project 14-4, LaSalle, Ill., for LaSalle Housing Authority; bids Jan. 2.

Unstated tonnage, housing project, Ottawa, Ill., for LaSalle Housing Authority; bids Jan. 2.

Unstated tonnage, housing project, Jacksonville, Ill., for Morgan County Housing Authority; bids Jan. 2.

Unstated, paving project, Paine airfield, near Everett, Wash.; bids in to U. S. Engineer, Seattle.

Unstated, three storage tanks, Pierce county, Washington; C. F. Davidson, Tacoma, low $48,600, to Defense Public Works.

Scrap

Scrap Prices, Page 108

Representatives of steel mills, foundries and scrap dealers met in Washington Thursday with Ross K. Whitman, chief of OPA steel section, to discuss general adjustments of the scrap schedule. It is understood certain recommendations were agreed on, which did not take up price changes but are in the nature of adjustments of the present schedule to take out certain inequalities. It is expected OPA will issue a statement early this week.

Co-ordination of scrap and pig iron allocations will be undertaken by the raw materials section of the iron and steel division of OPM. The plan is to continue the present scrap organization and simply line up its work with that of the pig iron section, which has been successful in handling the pig iron situation efficiently. Scrap and pig iron being consumed by the same interests, it is deemed logical to combine allocations, needs for raw material being filled by considering the combined total allowed each melter. Reports of requirements and inventories will continue to be filed as before, as a basis of allocation. Up to this time scrap allocation has been confined to scattered diversions to meet pressing need of some melter.

A revised plan for price ceilings on scrap has been submitted to Washington, designed to simplify the schedule and remove many abuses. It suggests setting a single ceiling price f.o.b. shipping points on all material for open-hearth use and similar single-piece ceilings on material for blast furnaces, electric furnaces and foundries. It is believed by its proponents that such a plan would remove upgrading and eleminate much cross hauling now prevalent.

It is understood an official prohibition against use of electric furnace grades in the open hearth may be issued soon to safeguard supplies for electric furnaces.

Pennsylvania railroad closes Dec. 15 on a scrap list totaling 7315 tons of which 2000 tons is No. 1 heavy melting steel. Frankford, Pa., arsenal takes bid Dec. 22 on salvage which includes 6000 gross tons of heavy melting steel and 175 tons gilded metal and steel turnings, mixed.

Pig Iron

Pig Iron Prices, Page 106

Larger pig iron production appears a certainty for December as new furnaces are put in blast. National Steel Corp. blew in its rebuilt and enlarged stack at its Great Lakes plant at Detroit Dec. 8, ahead of schedule. This has capacity of 450,000 tons annually. This company has another stack at Weirton, W. Va., which add further tonnage. Work is well under way at Cleveland on two 1275-ton furnaces for Republic Steel Corp. and at Braddock, Pa., where two large units are being erected by Carnegie-Illinois Steel Corp. Rebuilding and relining are well advanced on about a dozen other stacks, though probably none will be completed this month.

Plan for co-operation in allocations of pig iron and scrap by the raw materials group of OPM is expected to ease the situation in both materials, which are used largely by the same class of consumers. In general, allocation of pig iron during the months it has been in effect has been satisfactory and all defense demands have been met, though some melters without preferred status have been unable to obtain iron. Those in the latter class

are obtaining some war work and will be able to continue operation.

Stepping up of war requirements may not be reflected to a marked degree in pig iron allocations for January, in all probability it will be shown in allocations for February. At the same time, however, it is considered likely that commercial melters will feel a squeeze next month because of possible allowance for increasing shortage of scrap as the winter, with adverse weather conditions, sets in. The belief is general that the moment snows and cold weather appear the scarcity of scrap will become acute, throwing a greater burden on suppliers of pig iron.

Pacific Coast

Seattle—Rolling mills are making every effort to clean up heavy defense project backlogs but new business continues to develop. Fabricating shops are approaching a position where further orders can be considered.

Reports from British Columbia announce that Burrard Dry Dock Co., Vancouver, and Yarrows Ltd., Victoria, have been awarded contracts for 17 twin-screw steel corvettes, costing $25,000,000. Yarrows upon completing two large steel freighters will work exclusively on navy contracts. Associated Shipbuilders, Seattle, has been awarded eight 230-foot steel mine sweepers, a $14,000,000 contract. This plant is now working on a contract for four steel seaplane tenders involving $17,000,000.

Unstated tonnages of shapes are involved in the Longview-Rainier transmission tower line for Bonneville Project and pattern shop, foundry and other buildings, Keyport torpedo station, bids to Puget Sound navy yard, Jan. 7. War department has awarded Boeing Aircraft Co., Seattle, contracts for parts and engine cowl rings, $213,163 and $98,142, respectively.

Several sizable contracts for cast iron pipe are pending, these including 1550 tons of 8 to 30-inch water pipe for the Airport Way improvement, Seattle, part of which may go to welded steel. At Fort Lewis a contract for 900 tons of 16-inch cast iron pipe is still unawarded while Kelso, Wash., is awaiting priority rating before awarding 800 tons to Hugh G. Purcell, Seattle, low bidder.

Reclamation Bureau will lower Coulee lake 13 feet within a month to permit removal of an abandoned railroad bridge on barges, the longest span 253 feet. Structure, involving 1150 tons of shapes and other metals, will be towed to Coulee dam for dismantling.

Canada

Toronto, Ont. — Canada is faced with shortage of steel in the coming year to maintain its steadily expanding war program. There is little prospect of much improvement over the current domestic production rate unless additional blast furnaces are built to supply larger quantities of pig iron, or more abundant supplies of scrap are found. With regard to pig iron or scrap there appears little prospect of any betterment, with the result that this country will have to look to the United States for its requirements. With the United States now at war on her own behalf it is believed in some quarters here that our steel imports from that country may be curtailed, at any rate not increased. Should imports be reduced or merely maintained at their present level, Canada will be faced with the problem of finding new sources of supply and it may be necessary to build blast furnaces and coke ovens. However, to complete such new installations would require six months to a year.

About the only handicap to extended operations at shipyards is lack of steel and it is hoped to obtain larger quantities from the United States. Canadian plate mills are maintaining capacity production with all output going directly into war materials production. Heavy orders are pending and while some of these will go to the Sydney, N. S., mill, which will be in production early next year, it is estimated that about 100,000 tons will be required from the United States. For civilian needs no plate is available.

Many inquiries are appearing for sheets, but except for government

Nonferrous Metal Prices

Dec.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures
1-12	12.00	12.12½	11.75	52.00	52.00

Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
5.85	5.70	8.25	15.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.12½-10.25
Cleveland	10.25-10.50
Chicago	10.25-10.50
St. Louis	10.50

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.37½-9.75

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	6.00
Chicago	6.00-6.25
St. Louis	6.25

Lead

New York	5.25-5.50
Cleveland	5.00-5.25
Chicago	4.75-5.00
St. Louis	4.75-5.00

Old Zinc

New York	5.00-5.25
Cleveland	4.00-4.12½
St. Louis	4.50-5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	14.50

approved orders, mills are not accepting new business and non-war consumers are unable to obtain supplies.

Nonferrous Metals

New York—Metal price control likely will be used to bring out all production of nonferrous metals possible to meet war demands. Leon Henderson, OPA administrator, has testified higher prices for scrap and secondary lead and zinc may be necessary. Anaconda, Phelps Dodge and other companies have stepped up operations to a 7-day work week basis.

Copper—High-cost producers may be paid up to 18.00c a pound to increase output. Three high-cost Michigan producers are being paid 15.00c. Refined output eased to 84,020 tons in November from 86,617 in October while shipments increased to 123,168 tons from 121,313, including foreign copper released by Metals Reserve Co. Producers' stocks rose to 72,352 tons from 67,260.

Lead—An advance in price may be made following the meeting in Washington Dec. 15 since the present price is not bringing out enough ore to allow smelters to operate at capacity.

Zinc—Smelters are producing about 76,000 tons of virgin and 300 tons of secondary metal per month. Expansion programs now underway will lift output to 84,000 tons per month.

Tin—The equivalent Far Eastern price, based on 10 per cent war risk insurance rate, was 53.50c, New York on Friday against the OPA maximum of 52.00c. Reserve total 116,000 tons, or sufficient for several months' requirements.

December, January Auto Quotas Cut Further

WASHINGTON

■ Passenger car and light truck production quotas for December will be cut 25 per cent and those for January 50 per cent, Leon Henderson, Director of the Division of Civilian Supply, said last week.

This month's curtailment will take effect Dec. 15. This means a reduction of 51,212 cars from the quota of 204,848 cars fixed for the entire month. In January, 102,424 cars will be cut from the quota of 204,848. Passenger car output in December, 1940, was 396,823, and in January, this year, it was 418,350.

Light truck (less than 1½ tons) production beginning Dec. 15 will be cut by 6042 trucks from the quota of 24,169 established for the month, and output in January will be reduced by 12,084.

Use of Iridium Prohibited In Jewelry Manufacture

Use of iridium and alloys in manufacture of jewelry has been prohibited under conservation order M-49 issued last week to conserve metals for military use. These are used principally in the manufacture of hardened platinum magneto points for aircraft and in control instruments for tanks and other motorized equipment. Substitute use of ruthenium was recommended for jewelry manufacture.

Production of Washers, Ironers Further Curtailed by OPM

Further curtailment in production of washing machines and ironers was ordered last Friday for February by the Priorities Division, ranging from 40 per cent for largest manufacturers to 5 per cent for smallest below monthly average factory sales in year ended June 30. Previous reduction was 20 per cent for largest manufacturers under five-month production, August-December, with none for small operators.

Manufacturers of Industrial Explosives Get A-8 Rating

Priority rating A-8 last Friday was extended to manufacturers of industrial explosives in acquiring materials for both production and packaging. Industrial explosives defined in order include liquid nitroglycerine, all dynamite, all black powder, all blasting accessories including machines and other equipment, and blasting gelatin.

Retail Consumers Required To Furnish Priority Certificates

Priorities Division last week pointed out that retail consumers are now required to furnish preference rating certificates when placing normal orders for such items as farm machinery, spare parts for private automobiles, trucks and hand tools and similar metal products, following complaints that dealers in these metal goods have misunderstood such restrictions.

Additional Storage Space Located Through OPM Survey

Additional storage facilities have been located through country-wide survey of public warehouses just completed by OPM. Facilities will be made available for defense use. Copies of survey are obtainable from the office of the Warehouse Consultant, room 1244, Federal Reserve building, Washington.

Control Over Scrap Lead Prices To Be Established

Action to establish control over the prices of scrap and secondary lead will be taken soon by OPA.

About 90 secondary lead smelters and scrap dealers have been invited to meet with OPA officials in Washington Dec. 15, to discuss the price situation.

Budd Says Railroads Ready for War Needs

CHICAGO

■ American railroads stand prepared to meet whatever demands the war may impose upon them, Ralph Budd, president, Chicago, Burlington & Quincy railroad, and member of the Advisory Committee on National Defense, declared at a meeting of the National Conference of Business Paper Editors here last week. "Since Nov. 1 it could be said that transportation facilities are adequate," he stated.

Starting with the fall of 1939, when carriers were caught unawares, they have passed through three peak periods satisfactorily and have been able to haul raw materials in excess of the country's ability to consume or utilize them. Transportation must be considered part of our production facilities.

The most important contingency at present is the regulation of traffic to ports for foreign shipment, he continued. In the last war, a jam was caused by too many priorities being granted to too many shippers. This time, embargoes rather than priorities will be used, in other words, prohibitions against certain shipments will be put into effect.

Mr. Budd said the railroads would like to relay about 1,500,000 tons of rails in 1942. In the best year recently, only about 740,000 tons was laid down. Whether this ambitious program can be carried out will depend upon whether steel is available.

Steel Corp. Shipments Set November Record

■ Shipments of finished steel by the United States Steel Corp. in November, 1,624,186 net tons, was a record for that month, but fell 227,093 tons short of 1,851,279 tons in October. Shipments for 11 months established a new record at 18,612,901 tons, compared with 13,431,487 tons in the corresponding months in 1940.

(Inter-company shipments not included)
Net Tons

	1941	1940	1939	1938
Jan.	1,682,454	1,145,592	870,866	570,264
Feb.	1,548,451	1,009,256	747,427	522,395
March	1,720,366	931,905	845,108	627,047
April	1,687,674	907,904	771,732	550,551
May	1,745,295	1,084,057	795,689	509,811
June	1,668,637	1,209,684	807,562	524,994
July	1,666,667	1,296,887	745,364	484,611
Aug.	1,753,665	1,455,604	885,636	615,521
Sept.	1,664,227	1,392,838	1,086,683	635,645
Oct.	1,851,279	1,572,408	1,345,855	730,312
Nov.	1,624,186	1,425,352	1,406,205	749,328
Dec.	.....	1,544,623	1,443,969	765,868
Total, by Mos.	.....	14,976,110	11,752,116	7,286,347
Adjustment	.....	†37,639	*44,865	†29,159
Total	.....	15,013,749	11,707,251	7,315,506

†Increase. *Decrease.

Steel in Europe

Foreign Steel Prices, Page 107

London—(*By Cable*)—Steelworks in Great Britain operating on war contracts are fully occupied and many will work without stopping through Christmas Day. December output is fully covered. The situation in iron ore is satisfactory, home output is increasing and foreign shipments are arriving.

Iron Ore

Iron Ore Prices, Page 107

Lake Superior iron ore moved during the 1941 season totaled 80,116,360 gross tons, which was 16,403,379 tons, 25.75 per cent, greater than 63,712,982 tons brought down in 1940, the Lake Superior Iron Ore Association reports. The season's tonnage was 14,911,760 tons greater than the previous high record of 65,204,600 tons, made in 1929. The largest tonnage before 1929 was 64,734,198 tons carried in 1916. Office of Production Management last spring set a goal of 74,600,000 tons.

Of the 1941 tonnage 79,654,785 tons, 99.42 per cent, was from United States ports, the remainder being from Michipicoten, a Canadian port on the Algoma Central railroad.

Three of the six American loading ports made new all-time rec-

ords and the Canadian port also exceeded previous shipments. Marquette, Mich., with 5,658,672 tons slightly exceeded its 1940 new record of 5,486,289 tons. Superior, Wis., loaded 27,745,737 tons, compared with its previous record of 22,222,000 tons in 1937. Two Harbors, Minn., loaded 15,011,066 tons, compared with its previous top record of 10,736,000 tons in 1916. Other ports failed to exceed former records.

December shipments totaled 835,081 tons, compared with 14,547 tons in December, 1940. The last ship carrying ore was the BETLEHEM of Bethlehem Transportation Co., which left Duluth Dec. 8.

President Roosevelt last week announced he had been informed there is a total stock pile of iron ore 2,000,000 tons larger than last year. He said also that he has information to the effect that with the new ore carriers all ore needed can be brought down the lakes during the 1942 season.

Lake Superior Iron Ore Movement

Port — Dock	Dec. 1941	Dec. 1940	Season 1941	Pct. of Total	Season 1940	Pct. of Total
Escanaba, C. & N. W.	.....	.....	4,513,079	5.63	3,423,334	5.37
Marquette, D. S. S. & A.	.....	.....	860,674	1.07	642,837	1.01
Marquette, L. S. & I.	52,145	8,685	4,797,998	5.99	4,843,452	7.60
Ashland, C. & N. W.	8,294	.....	4,294,590	5.36	4,110,393	6.45
Ashland, Soo Line	.....	.....	1,932,860	2.41	1,857,821	2.92
Superior, Great Northern	179,524	.....	25,484,085	31.81	19,459,831	30.54
Superior, Soo Line	.....	.....	1,032,324	1.29	842,121	1.32
Superior, Northern Pacific	.....	.....	1,229,328	1.53	1,200,131	1.88
Duluth, D. M. & I. R.	383,350	.....	20,498,781	25.59	16,267,848	25.54
Two Harbors, D. M. & I. R.	199,685	.....	15,011,066	18.74	10,705,000	16.80
U. S. Ports, Total	822,998	8,685	79,654,785	99.42	63,352,768	99.43
Michipicoten, Algoma Central	12,083	5,862	461,575	.58	360,214	.57
GRAND TOTAL	835,081	14,547	80,116,360	100.00	63,712,982	100.00
Increase from Year Ago	820,534		16,403,378	25.75%		

Totals for Past Nine Years

1940	63,712,982	1937	62,598,836	1934	22,249,600
1939	45,073,052	1936	44,822,023	1933	21,623,898
1938	19,263,011	1935	28,362,368	1932	3,567,985

Ferroalloys

Ferroalloy Prices, Page 106

The leading producer of ferroalloys has reaffirmed prices for first quarter and other interests are expected to concur. Maintenance of $120 on ferromanganese is contrary to expectations of many who thought the advanced cost of manganese ore would be reflected in higher alloy prices. Ore prices are substantially higher than 18 months ago, when the $120 price became effective. Ferromanganese has advanced $40 a gross ton since just before the start of war in Europe in September, 1939, but is still far below the peak in World War No. 1. In 1917 ferromanganese reached $400 per ton before receding to $250 where it was stabilized through most of 1918.

September Steel Imports Gain; Scrap Falls Off

■ September imports of steel and iron products, excluding scrap, totaled 4230 gross tons, valued at $524,510, compared with 1975 tons, valued at $462,232, in August, and 2542 tons, valued at $160,988, in September, 1940, according to the Department of Commerce. Cumulative imports for nine months were 18,544 tons, valued at $2,954,094, against 46,809 tons, valued at $5,528,578, in the corresponding period last year.

Ferromanganese provided the largest tonnage in September, 2532

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1941 Exports	1941 Imports	1940 Exports	1940 Imports
Jan.	698,853	423	583,521	8,274
Feb.	600,240	796	671,301	6,740
Mar.	567,227	6,273	663,980	5,096
April	635,809	4,286	612,906	6,674
May	472,734	5,633	783,964	7,759
June	457,685	10,190	936,047	5,505
July	537,921	11,049	1,034,938	3,542
Aug.	697,732	18,380	1,402,075	2,105
Sept.	706,580	8,489	1,221,052	2,598
Oct.	.....	.....	1,105,510	3,966
Nov.	.....	.....	788,176	980
Dec.	.....	.....	805,158	4,064
Tot.	.....	.....	10,608,628	57,303

tons, of which 2001 tons came from the United Kingdom and 531 tons from Canada. Steel ingots and blooms totaled 877 tons, all from Canada, and rails and track material 305 tons, of which 300 tons were from Canada and five tons from Mexico. Canada supplied 2098 tons and the United Kingdom 2081 tons of the September imports. Norway, Sweden and Mexico also contributed some tonnage.

Steel and iron scrap imports dropped sharply to 4259 tons from the August total of 16,405 tons. Canada furnished 3161 tons and Cuba 1084 tons, with small lots from Mexico and Ecuador.

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	—Sept.— 1941	1940	Jan. through 1941
Pig iron	.....	1,830	...
Sponge iron	.....	.....	23
Ferromanganese[1]	2,532	...	2,928
Spiegeleisen	5	25	2,946
Ferrochrome[2]	4	...	76
Ferrosilicon[3]	242	137	2,572
Other ferroalloys[4]	1	.....	2
Steel ingots, blooms, etc.	877	.....	938
Billets, solid or hollow	.....	.....	56
Concrete reinforc. bars	...	.....	2
Hollow bar, drill steel	43	1	203
Bars, solid or hollow	64	11	361
Iron slabs	.....	.....	.....
Iron bars	.....	...	15
Wire rods	.....	37	105
Boiler and other plate (including skelp)	1	.....	50
Sheets, skelp, saw plate	2	2	47
Die blocks or blanks, etc.	2	.....	11
Tin plate, taggers' tin and terneplate	26	11	95
Structural shapes	16	.....	77
Sashes and frames	19	.....	211
Sheet piling	.....	.....	.....
Rails and track material	305	1	4,419
Cast iron pipe, fittings	.....	.....	.....
Malleable iron pipe fittings	.....	27	.....
Welded pipe	.....	.....	.....
Other pipe	13	336	761
Cotton ties	.....	.....	.....
Other hoops and bands	.....	2	.....
Barbed wire	.....	.....	.....
Round iron, steel wire	1	34	30
Teleg., telephone wire	.....	.....	.....
Flat wire, steel strips	43	47	2,215
Wire rope and strand	2	4	94
Other wire	.....	.....	1
Rails, tacks, and staples	1	1	24
Bolts, nuts, and rivets	2	1	30
Horse and mule shoes	...	...	...
Castings and forgings	29	35	252
Total	4,230	2,542	18,544
Iron and steel scrap	4,259	56	46,975
GRAND TOTAL	8,489	2,598	65,519

[1] Manganese content.
[2] Chrome content.
[3] Silicon content.
[4] Alloy content.

ORIGIN OF SEPTEMBER IMPORTS

Gross Tons

	Iron ore	Manganese ore	Ferromanganese
United Kingdom	50	.....	2,001
Canada	45,672	.....	531
Mexico	488	...	.....
Cuba	15,908	13,604	.....
Chile	121,800	911	.....
Brazil	9,700	20,497	.....
Newfoundland	12,366	...	.....
British India	.....	9,642	.....
Philippine Islands	.....	1,051	.....
South Africa	.....	12,503	.....
Total	205,984	58,208	2,532

	Sheets, skelp and sawplate	Structural steel	Steel bars
Canada	2	16	63
United Kingdom	.....	.....	1
Total	2	16	64

Wing Tips

(*Concluded from Page 41*)

head camshaft driven through a tower shaft and bevel gears at the rear. Pistons are aluminum permanent mold castings, each with three compression and two oil scraper rings. Pendulum-type dynamic vibration dampener is mounted at the rear end of the crankshaft which is hollow throughout its central axis, aluminum plugs being inserted at each crank to retain pressure lubrication.

The engine comprises approximately 7000 parts of 700 separate types, most of them machined to exceptionally close tolerances — plus three or four ten thousandths and minus nothing, for example—and, in the case of steel, machined and ground over the entire surface instead of just on working surfaces. About half the weight of the engine is accounted for by alloy steel parts, the balance nonferrous material—600 pounds of aluminum castings and forgings, and 150 pounds of magnesium castings.

Some steel parts are supplied by the Cadillac Motor Car Division of General Motors in Detroit; others are machined at Allison from semi-finished material purchased.

(*To be concluded*)

Construction and Enterprise

Ohio

BERGHOLZ, O.—Village, S. G. Carson, mayor, will take bids soon for erection of waterworks treatment plant. Carl Simon & Associates, Evans-Central building, Van Wert, O., consulting engineers.

CLEVELAND—Gent Machine Co., 5810 Richmond road, Arthur Gent, president, is building a $5000 addition to its machine shop.

CLEVELAND—Apex Electrical Mfg. Co., Edward L. Frantz, president, 1079 East 152nd street, is building $17,000 addition to plant to handle some of the operations in fulfillment of gun mount contract. Part of work will be carried out by Holland-Rieger Corp., Sandusky, O., E. C. Buchanan, general manager, subsidiary of Apex, necessitating retooling at that plant.

CLEVELAND—United States Steel & Wire Spring Co., 7800 Finney avenue, will expand facilities. Site adjoining present plant has been purchased. Charles Schultz is president.

CLEVELAND—Foundry Equipment Co., 1831 Columbus road, will soon start construction of an addition to its plant. Charles A. Barnett is president.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 113 and Reinforcing Bars Pending on page 114 in this issue.

CLEVELAND — Cleveland Welding Co., West 117th street and Berea road, H. W. Kranz, president, will build a $10,000 factory addition.

MORROW, O.—Village, Kenneth Williams, clerk, will soon take bids on waterworks system, including pump house, 40-foot elevated steel tank, 100,000-gallon capacity. Estimated cost $60,000. Carl Simon & Associates, Evans-Central building, Van Wert, O., consulting engineers.

YOUNGSTOWN, O.—United Engineering & Foundry Co. plans erection of $500,000 addition to its plant here, 85 x 275 feet.

Connecticut

HARTFORD, CONN.—Whitney Chain & Mfg. Co. has let general contract to Bartlett-Brainard Co. for two-story addition. Cost over $65,000 with equipment.

STAMFORD, CONN.—Acme Electric Plating Co. is building one-story addition, 40 x 125 feet, costing about $445,000, with equipment.

WATERBURY, CONN.—Scovill Mfg. Co. is erecting a one-story, 44 x 182-foot factory addition. Estimated cost $40,000.

WEST HARTFORD, CONN. — Niles-Bement-Pond Co. is installing additional equipment for production of tools for government. Cost over $75,000.

WEST HARTFORD, CONN. — Holo Krome Screw Corp. has awarded contract to R. G. Bent Co., 93 Edward street, Hartford, for erection of one-story 45 x 130-foot factory addition. Cost $40,000.

Maine

PORTLAND, ME. — Southworth Machine Co. is rebuilding burned plant. Loss estimated close to $400,000, with machinery.

Massachusetts

BOSTON—General Alloys Co. is building plant for manufacture of aircraft equipment. Defense Plant Corp. will finance. Cost estimated over $90,000, including machinery and equipment.

BOSTON—Wrentham Products Co. will spend approximately $442,258 to build plant for manufacture of airplane parts.

CHICOPEE FALLS, MASS. — Stevens Arms Co. is erecting a one-story addition, to cost about $50,000, with equipment.

LYNN, MASS.—General Electric Co. is building a one-story addition, 61 x 198 feet, to cost over $65,000, with equipment.

PALMER, MASS.—Wickwire Spencer Steel Co. is constructing a 104 x 150-foot plant for manufacture of submarine torpedo nets.

PITTSFIELD, MASS.—General Electric

Co. plans to build a $1,000,000 plant here for manufacture of synthetic phenol.

WORCESTER, MASS. — Massachusetts Steel Treating Corp., 118 Harding street, plans one-story 60 x 96-foot factory, for which contract has been awarded to Worcester Stone Co. Inc., 21 Adams street.

WORCESTER, MASS.—American Steel & Wire Co. will build a one-story machine shop addition. Estimated cost $40,000.

WORCESTER, MASS. — Rice-Barton Corp. will spend approximately $42,000 for one-story 50 x 160-foot foundry building, and one-story, 16 x 28-foot core oven.

New Hampshire

CLAREMONT, N. H.—Scott Williams Inc. is building a factory for manufacture of aircraft equipment. Estimated cost over $800,000. Defense Plant Corp. will finance.

Rhode Island

PAWTUCKET, R. I.—Rothwell-Smith Brass Foundry plans one-story foundry, 80 x 100 feet, to cost about $45,000, with equipment.

New York

BUFFALO—Chevrolet Buffalo division, General Motors Corp., 1001 East Delevan avenue, has let contract for addition to aviation engine plant 2 to John W. Cowper Co., 775 Main street. Cost $50,000.

NEW YORK—Steel Processing Corp. has been incorporated with 500 shares of preferred and 100 shares of common no par value. Appel & Tannenbaum, 342 Madison avenue, correspondent.

NIAGARA FALLS, N. Y. — National Carbon Co. Inc., Hyde Park boulevard, will soon let contract for 59 x 117-foot and 45 x 113-foot plant addition. Cost $40,000.

New Jersey

BAYONNE, N. J.—Western Electric Co., Kearny, N. J., has awarded contract to Hugh Montague & Son Inc., 880 Bergen avenue, Jersey City, for altering and repairing its factory. C. T. Siebs, 100 Central avenue, Kearny, engineer.

BRUNSWICK, N. J.—Mack Mfg. Co., 97 Jersey street, will soon let contract for one-story steel tank transmission manufacturing building. Cost over $40,000. Lockwood Greene Inc., 10 Rockefeller Plaza, New York, architect.

EAST RUTHERFORD, N. J.—Public Service Electric & Gas Co., 80 Park place, Newark, N. J., will soon let contract for altering and repairing electrical substation, estimated to cost over $40,000.

KEARNY, N. J.—Acme Tool & Machine Co., 576 Davis avenue, will soon let contract for one-story, 100 x 100-foot machine shop addition. R. B. Flatt, 50 Broad street, Bloomfield, N. J., architect.

RIDGEFIELD, N. J.—Superior Marking Machine Co., 45 Lispenard street, New York, will erect one-story 80 x 105-foot steel factory, and has let contract to Interstate Construction Co., 418 Fifteenth avenue, Paterson, N. J. Cost over $40,000.

Pennsylvania

FOSTER BROOK, BRADFORD, PA.—Case Cutlery Co. will build one-story cutlery manufacturing plant addition, and has let contract to Benz Engineering Co., 29 Main street, Salamanca, N. Y. Estimated cost $40,000, with equipment. T. H. Hendryx, 165 Interstate parkway, Bradford, architect.

GENEVA, PA.—War Department plans erection of TNT plant near here, cost of which is estimated at $40,000,000. Frasier-Brace Engineering Corp., New York, engineer, is establishing local office at Meadville, Pa., under R. B. Norris, superintendent.

HOMESTEAD, PA. — Thomas Platt, architect, 828 East Eleventh street, Homestead, has been selected to prepare plans for a manufacturing plant by John Gedris & Sons Co.

LATROBE, PA.—Prack & Prack, architects, 517 Martin building, Pittsburgh, will soon let general contract for addition to forge shop No. 2, covered wharf for craneway and open craneway, for American Locomotive Co. C. Davies, Latrobe, is in charge. (Noted Nov. 24).

PITTSBURGH—Pittsburgh & Lake Erie Railroad Co., N. W. M. McCallum, chief engineer, will soon let general contract for one-story 200 x 400-foot steel warehouse. Cost $150,000.

PITTSBURGH—Blaw-Knox Co. has pre-

liminary plans for factory building at Sixty-second and Butler streets, to cost approximately $350,000, and to be financed by Defense Plant Corp. Hunting, Davis & Dunnels, Century building, Pittsburgh, architects.

PITTSBURGH—Hubbard & Co., J. N. Hubbard, chairman of the board, 6301 Butler street, has let contract for one-story boiler house to Rust Engineering Co., Clark building, cost of which is estimated at $50,000.

Michigan

CADILLAC, MICH.—Malcomson, Calder & Hammond Inc., Detroit, architects, are preparing sketches for a factory building here.

COLDWATER, MICH.—Michigan Foundry Co. is erecting an addition which will enable the company to increase production about 25 per cent.

DETROIT—Arrow Tool & Reamer Co. will erect a plant on Eight Mile road. Paul R. Sewell, Detroit, architect.

DETROIT—Gorham Tool Co. will erect a foundry addition at its factory on Woodrow Wilson avenue.

LANSING, MICH. — Chrisman Co., Lansing, has been awarded general contract for alterations to factory building here for Nash-Kelvinator Corp.

FONTIAC, MICH.—Yellow Truck & Coach Mfg. Co., Pontiac, has let general contract for an addition to its factory to Darin & Armstrong Inc., Detroit.

Illinois

BUSHNELL, ILL.—City plans construction of light and power plant addition.

CHICAGO—White Cap Co., manufacturer of metal products, will build a $100,000 addition to its plant at Central and Bloomingdale ave., in the Keeney industrial district.

CHICAGO—Great Lakes Carbon Corp., 910 South Michigan avenue, will soon take bids for erection of carbon plant, estimated to cost $500,000.

Indiana

EVANSVILLE, IND.—City plans constructing electric light plant addition to cost $125,000 or more with equipment.

FORT WAYNE, IND.—Fort Wayne Tool Die & Engineering Co., W. A. Mayer, manager, plans to erect plant addition, costing $110,000, with equipment.

Maryland

BALTIMORE—Owner, care of L. R. White Jr., architect, 10 West Chase street, will build two-story, 40 x 80-foot factory addition. Estimated cost $45,000.

Georgia

MACON, GA.—Wiedeman & Singleton, Candler building, Atlanta, Ga., engineers, will have plans ready about Dec. 18 for construction of waterworks improvements for city, to cost approximately $250,000.

Mississippi

BROOKHAVEN, MISS.—J. M. Roberts Lumber Co. is rebuilding mill at cost of $40,000, including machinery and equipment.

West Virginia

POINT PLEASANT, W. VA.—War Department, Washington, has tentatively selected site here for construction of TNT plant, to be built and operated by private firms but under control of the United States Army, and to be known as the West Virginia Ordnance Works.

Missouri

NORTH KANSAS CITY, MO. — Continental Can Co., C. C. Conway, chairman of the board, 1400 Guinotte street, Kansas City, Mo., plans construction of plant.

SPRINGFIELD, MO.—Springfield Trailer Co., H. F. Fellows, secretary, is remodeling its plant and installing new equipment, at cost of about $40,000.

Wisconsin

FOND DU LAC, WIS.—Ben Sadoff Iron & Metal Co. is erecting a plant to press steel shavings and metal scrap into briquettes. Approximate cost $30,000.

Texas

BROWNWOOD, TEX.—City will make waterworks improvements costing $320,000, including 500,000-gallon elevated tank. Julian Montgomery, Littlefield building, Austin, Tex., engineer.

DAINGERFIELD, TEX. — Texas Iron, Steel & Coke Co., W. W. Lynch, 1920 West Colorado street, Dallas, Tex., director, has selected tentative sites for location of proposed $33,000,000 iron and steel mill, and is awaiting approval by OPM. (Noted Nov. 24).

HOUSTON, Tex. — War Department, Washington, will build plant here for

manufacture of gun tubes, to be known as Dickson Gun Plant.

MARSHALL, TEX.—OPM, Washington, has approved and recommended to Defense Plant Corp. construction of a $50,000,000 TNT plant, on Caddo Lake, near here.

QUITMAN, TEX.—City, H. V. Puckett, mayor, plans electric generating and distribution system, including generating machinery and equipment, auxiliaries, switchboard, transformers, etc. Albert C. Moore & Co., 2404 Smith-Young tower, San Antonio, Tex., consulting engineer.

Iowa

CEDAR RAPIDS, IOWA—Iowa Electric Light & Power Co., Security building, plans two steam electric generating plants.

California

LOS ANGELES—Contract will soon be awarded for construction of an aluminum extrusion plant on Western avenue, south of 190th street, here, for Bohn Aluminum & Brass Corp., 1400 Lafayette building, Detroit. Cost estimated at $1,753,000. Plant will be operated by the Bohn corporation as agent for Defense Plant Corp.

LOS ANGELES—West Coast Machine & Tool Co., 1010 North McCadden place, has been organized by Harry Bassett and B. G. Bassett.

LOS ANGELES—Ace Metal & Machinery Corp., 2308 Santa Fe avenue, has been organized by E. Brodie.

NORTH HOLLYWOOD, CALIF.—Adel Precision Products Corp. will start work immediately on construction of a factory building, with 40,000 square feet of floor space, at 10737 Vanowen street, costing $75,000.

Washington

PUGET SOUND, WASH.—Puget Sound navy yard, Commander R. E. Thomas, public works officer, will take bids Jan. 7 for foundry and pattern shop, 61 x 121 feet and 100 x 156 feet at Keyport naval torpedo station.

SPOKANE, WASH.—Inland Truck & Diesel Co., 1229 First avenue, has plans by A. W. Crowley, 1115 Thirteenth street, for erection of one-story, 125 x 142-foot warehouse. Cost $45,000.

Canada

GALT, ONT.—Canada Machinery Corp., 19 Concession street, has completed plans and will start work soon on one-story plant addition to cost, with equipment, about $30,000.

KITCHENER, ONT.—Goodrich Rubber Co., 252 King street, has had plans prepared by Prack & Prack, architects, 36 James street South, Hamilton, Ont., and will let contracts for plant addition to cost about $50,000.

PETERBOROUGH, ONT. — Canadian General Electric Co. Ltd., Park street, has let general contract to A. W. Robertson, 57 Bloor street West, Toronto, Ont., for erection of carriage shop to cost $500,000 with equipment.

SCARBORO TOWNSHIP, ONT.—Plans are being prepared for addition to filtration plant, including new filters, pumps, etc., for Public Utilities Commission, 1660 Kingston road. James, Proctor & Redfern, 36 Toronto street, Toronto, Ont., consulting engineers.

TORONTO, ONT.—Sully Brass Foundry, 7 Wabash avenue, has let general contract to D. J. Benham, 351 Windermere avenue, for erection of two-story plant addition to cost $25,000, equipment extra.

TORONTO, ONT. — James Morrison Brass Mfg. Co. Ltd., 276 King street West, maker of valves, pumps, etc., will build plant addition, 50 x 175 feet to cost, with equipment, about $100,000. Bids are being received by Murray Brown, architect, Confederation Life building, Toronto.

TORONTO, ONT.—Canadian Kodak Co. Ltd., Mount Dennis, will build plant addition and install new equipment to cost about $20,000.

WINDSOR, ONT. — Canadian Motor Lamp Co. Ltd., 2429 Seminole street, has given general contract to Pigott Construction Co. Ltd., Pigott building, Hamilton, Ont., for construction of shell case plant here, to cost about $500,000. Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, is financing the project. Ewart, Amer & Byam, Excelsior Life building, Toronto, engineers.

HULL, QUE.—Hull Iron & Steel Foundries, Montcalm street, is having plans prepared by Richars & Abra, architects, 55 Metcalfe street, for addition to foundry to cost, with equipment, about $60,000.

MONTREAL, QUE.—United Shoe Machinery Co. of Canada Ltd., 2610 Bennet street, will build plant addition to be equipped for production of nails and tacks.

VILLE ST. LAURENT, QUE.—Robert Mitchell Co. Ltd., 750 Belair avenue, metal fittings, brass goods, etc., has let general contract to Anglin Norcross Corp. Ltd., 892 Sherbrooke street West, Montreal, Que., for construction of plant addition to cost $250,000.

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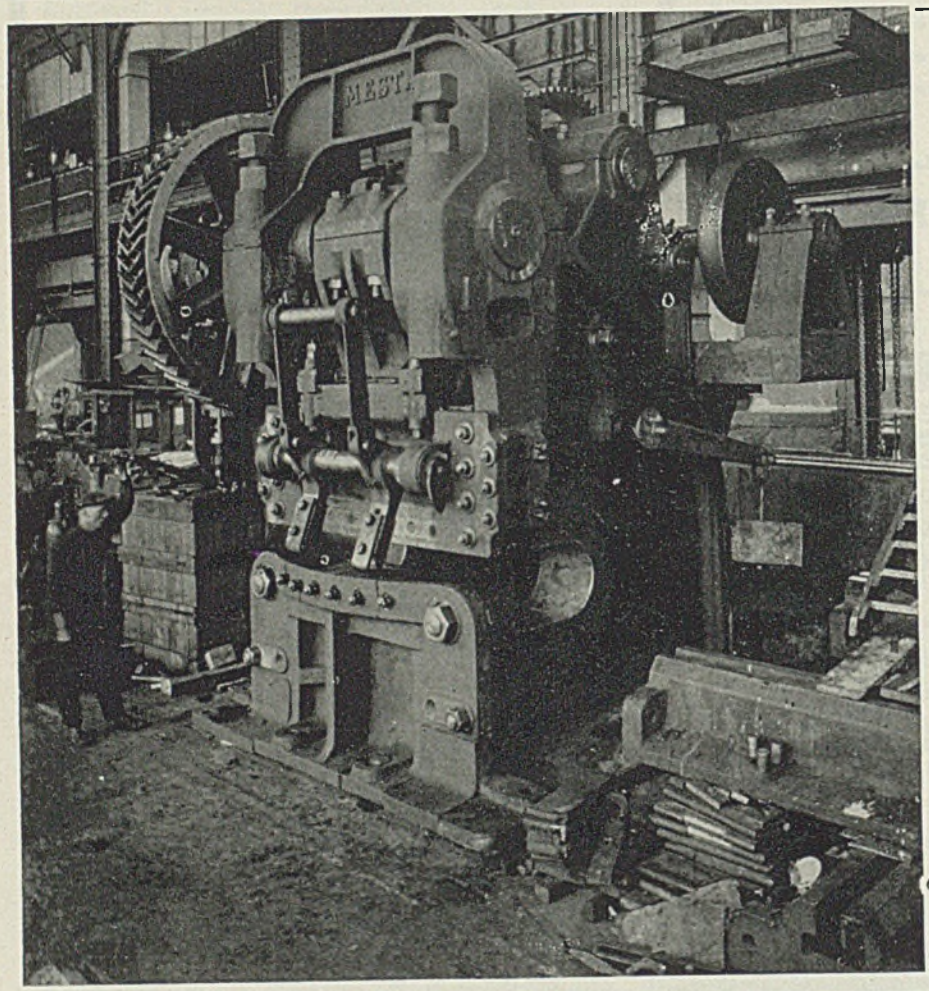

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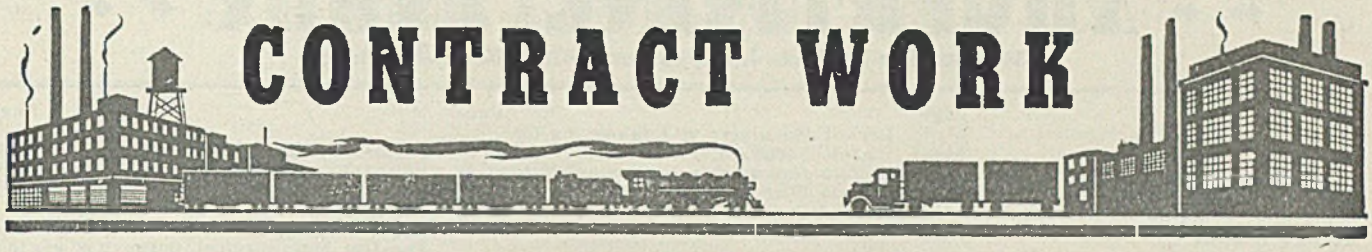

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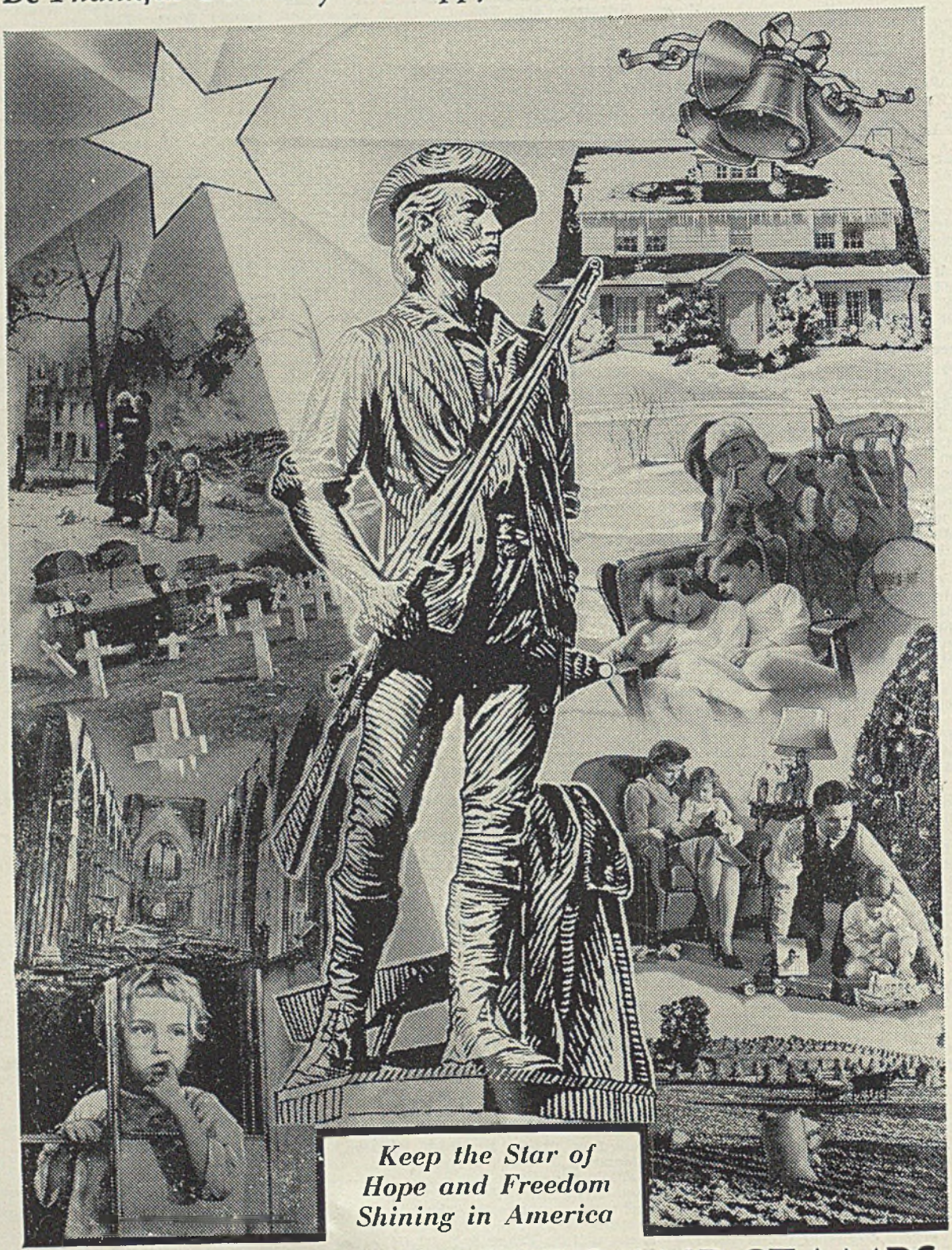

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