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STEEL

ESTABLISHED 1882

Contents

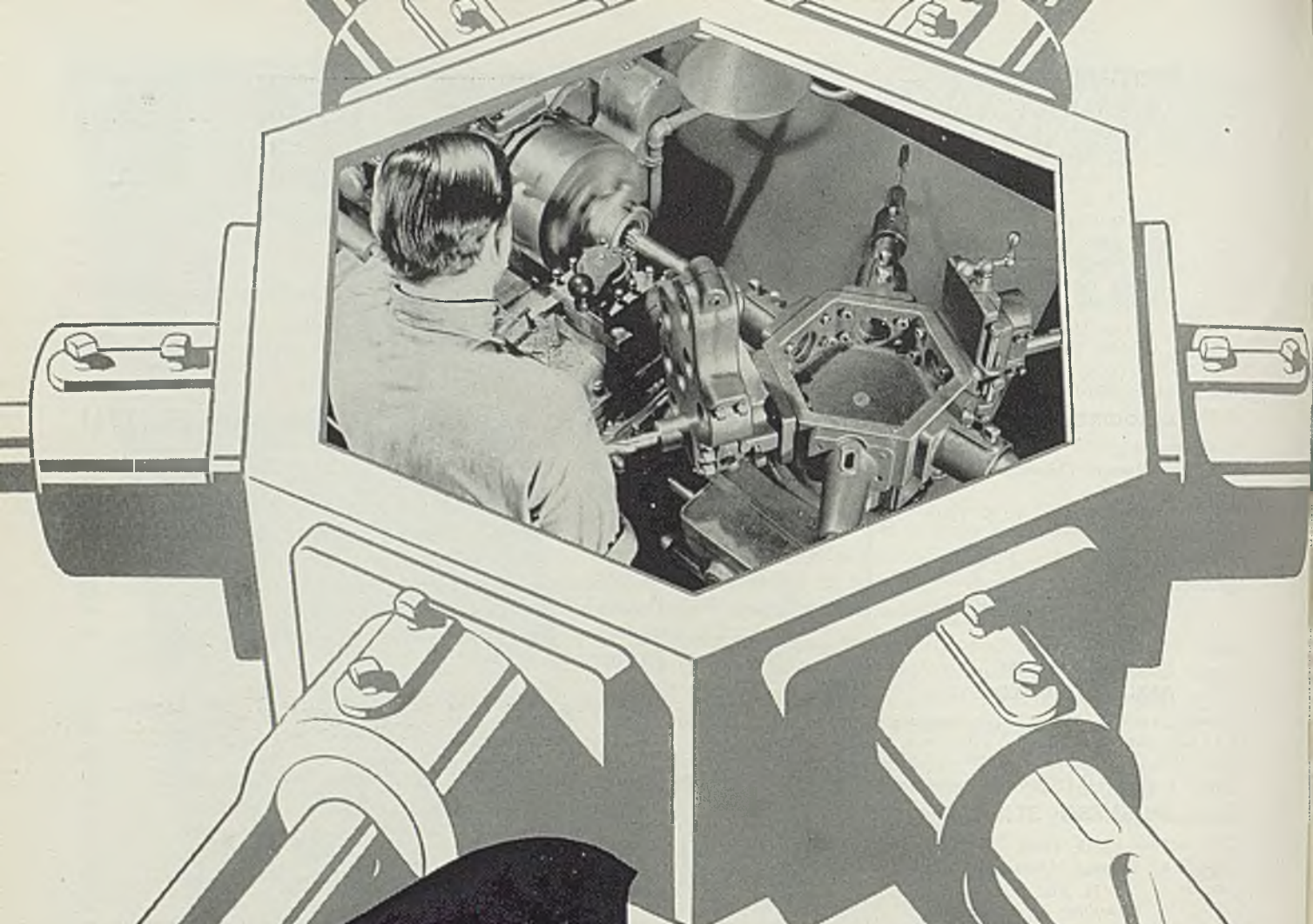


Volume 108—No. 4

January 27, 1941

READER COMMENTS	4
HIGHLIGHTING THIS ISSUE	11
NEWS	
"Strikes in Defense Industries Should Be Restricted by Law"	13
Higher Wage Demands Threaten Price Structure, Rearmament Pace	15
Blanket Licensing System To Expedite Iron, Steel Exports to Empire	16
Steel Industry To Spend \$282,000,000 To Expand Productive Capacity in 1941	17
Improved Bessemer Process May Raise Steel Production Without Expansion	18
Steelworks Operations for Week	19
Food Canning Industry Prepared To Meet Defense Program's Needs	20
Financial	21
OPM's Production Division Organization	25
Men of Industry	30
American Car & Foundry To Build 15 Light Combat Tanks Daily	32
Government Defense Awards	33
Manufacturers Say Larger Defense Orders Would Curtail Normal Output	36
Welding Enables Britain To Speed War Material Output Despite Bombs	37
Activities of Steel Users, Makers	68
Obituaries	68
WINDOWS OF WASHINGTON	22
MIRRORS OF MOTORDOM	27
EDITORIAL—Management Vital in Defense	38
THE BUSINESS TREND	39
TECHNICAL	
Tooling Tells the Tale in Making Torpedo Parts	42
Background Information on High-Explosive Shell—By Arthur F. Macconochie	44
Stainless Steels for Aircraft—By Oliver Fraser Jr.	52
<i>Metal Finishing</i>	
"Double Boiler" Galvanizing—By A. S. Burnett	48
<i>Progress in Steelmaking</i>	
Pickling Stainless Steel—By L. F. Loutrel Jr.	54
<i>Joining and Welding</i>	
Let Welding Simplify Your Structural Changes—By E. W. P. Smith	56
<i>Materials Handling</i>	
How to Get the Most from Power-Truck Handling—(Conclusion)	58
HELPFUL LITERATURE	65
INDUSTRIAL EQUIPMENT	62
MARKET REPORTS AND PRICES	69
BEHIND THE SCENES	82
CONSTRUCTION AND ENTERPRISE	89
INDEX TO ADVERTISERS	96

PRODUCTION • PROCESSING • DISTRIBUTION • USE



THE
TURRETS ARE
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TO DEFEND
AMERICA

Inspect America's first line of defense and you'll see them! In machine shops everywhere, the turret lathes are carrying a heavy burden of responsibility. And justly so! For the turret lathe is the greatest single contribution to mass production in the turning of metals.

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GISHOLT MACHINE COMPANY

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HIGHLIGHTING THIS ISSUE OF STEEL

■ LAST WEEK steel production again moved up another point (p. 19) to 99 per cent of ingot capacity. Even in the face of this staggering output demand continues to grow and steel mills (p. 69) continue to become more strict in rationing their customers. One factor that is complicating orderly shipments of civilian needs is the increasing volume of defense business which is covered by priority certificates. Apparently all requirements are being met and no instances are known where production is being halted by shortage of steel. One feature of current buying is a usual one at this time of year; there is a tendency on the part of many consumers to build up inventories.

Last week the labor situation took a turn for the worse. The steel industry, already one of the highest wage industries, was broached by CIO's leader (p. 15) for still higher rates. More strikes were called or threatened, and indications were that the trouble area would grow in

size. This is a problem that, under today's conditions, can be handled only at Washington . . . Col. William Frew Long proposes a law aimed at avoiding tie-ups (p.13) at the whim of some union business agent or a small minority of employees; it would establish a legal formula under which a strike could be called . . . Expansions to steelmaking capacity in 1941 (p. 17) will cost more than \$282,000,000.

More manufacturers believe that enlargement of the defense program (p.36) will necessitate definite curtailment of civilian production . . .

Revere Chapell (p. 4) sees the need for conscripting skilled labor from civilian industries in order to produce armament in needed quantities . . . The automobile industry already is giving some thought to possibilities that this coun-

try, like Canada, eventually (p. 27) will impose high excise taxes on car sales . . . Withdrawal of the "moral embargo" against Russia (p. 24) was announced last week; trade significance of the move was not fully revealed . . . Advancing prices on used machine tools (p.22) and on scrap and secondary zinc (p.24) are under scrutiny at Washington.

The subject of this week's article in STEEL'S continuing series on munitions design and manufacture is high-explosive shell. The author (p. 44)

High-Explosive Shell Making

is Prof. Arthur F. Macconochie, one of the country's best-known experts in this field. In next week's issue Prof. Macconochie will go into more detail in his discussion of shell production. . . . Aircraft designers are urged by Oliver Fraser Jr. (p. 52) to reduce the number of specifications to which they now order stainless steel; by so doing they will enable the mills to make better deliveries. . . . Production of turret lathes is stimulated (p. 60) by "bagging" parts in cellophane. . . . New core dressing (p. 47) reduces time in cleaning castings.

L. F. Loutrel Jr. (p. 54) reviews a pickling method successfully adapted to all modifications of the austenitic grades of stainless steel. It

Torpedo Parts Pictorialized

involves a bath composed of anhydrous ferric sulphate and hydrofluoric acid. . . . STEEL pictorializes the production (p. 42) of torpedo parts; in this, as in so many other instances, machine tools constitute the backbone of the defense program. . . . A new mill white coating (p. 60) reflects 89 per cent of light. . . . A. S. Burnett (p. 48) sets forth advantages obtained with electrically heated galvanizing tanks equipped with immersion units. . . . E. W. P. Smith (p. 56) tells how to simplify structural alterations and additions by using arc welding.

"Cracker Barrel Steel" is Gone!



BACK IN THE "GOOD OLD DAYS" crackers came in barrels; and many people bought steel, too, with no clear idea of what it was, or how it was made. Methods of storing and handling were "hit and miss"; results to be expected were uncertain! Crackers were crackers; steel was steel!

It is different today — with both! The Ryerson plan of Certification provides definite data on every ton of the steel in the vast Ryerson stocks. You *know* the steel you're getting. You have accurate information as to its chemical and physical characteristics, its strength, hardness, heat-

treatment response! You can select Ryerson Certified Steel with positive assurance that it is the kind and quality *exactly* suited to the job you want it to do.

Ryerson stocks are complete; shipment is immediate! One of the ten Ryerson plants, conveniently located near you, is ready to serve you. Get acquainted now with the many advantages of this *modern* steel-service. 1940-41 Stock List will be sent promptly on request.

JOSEPH T. RYERSON & SON, INC., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

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STEELS

"Strikes in National Defense Industries Should Be Restricted by Law"

By COL. WILLIAM FREW LONG



■ STRIKES in defense industries should be outlawed but not prohibited.

There are a great many people who misunderstand the meaning of the word "outlaw" and think it is synonymous with "prohibit." That is not the case, however. According to Mr. Webster, the word "outlaw" means "to deprive of the benefit and protection of the law," and so by "outlawing strikes" I do not mean that legislation should be adopted prohibiting them. That to my mind would be an interference with a fundamental right which is not warranted if any other way can be found to remedy the strike threat to our defense program.

In a democracy refusal to work is not a crime punishable by law—unless you are in the army. But in totalitarian countries the employe works where and when he is told.

It is difficult to understand how any American workman could be so short-sighted as to engage in a strike which interferes in the slightest degree with the efforts of our government to prevent the establishment of similar conditions in this country. In fact, strikes during this emergency are so utterly foolhardy that those who engage in them cannot complain if they are suspected of a deliberate attempt to sabotage our defense efforts.

That it is absolutely necessary to place some restriction on the wanton calling of strikes at the whim of some business agent or small minority of employes is, I believe, perfectly obvious. My suggestion, therefore, is that congress pass an act which would provide that strikes shall not be called:

1. Unless two-thirds of all the employes in the plant to be struck sanction such a strike by secret ballot;
2. In violation of the terms of a

■ Congressional action to restrict strikes in defense industries is suggested by Col. William Frew Long, general manager, Associated Industries of Cleveland. He would "outlaw but not prohibit" such actions by depriving defense strikers of the benefit and protection of the law.

Colonel Long is recognized nationally as an authority on labor relations. Twenty years in his present post has brought him in close touch with the problems of employers in practically every industry in the Cleveland area and he has negotiated hundreds of contracts with unions on behalf of employers. Frequently he is called upon to act as arbiter in industrial disputes.

Colonel Long is chairman, Industrial Relations Group, National Industrial council; industry's representative on the Advisory Committee for Emergency Training of the Cleveland board of education; and the National Committee for the Conservation of Man Power in Defense Industries. He is an officer in the air corps reserve in which branch he served during the World war and formerly was commanding officer of the 414th pursuit squadron.

The accompanying article is an address before the Columbus, O., Town Meeting, Jan. 21. Opposing views were presented on the same program by Victor G. Reuther, Detroit, international representative of the United Automobile Workers.

collective contract or of an arbitration agreement;

3. For the purpose of forcing another labor organization to recognize the alleged right of the striking union to represent certain employes;
4. Until 30 days' notice of intention to strike has been filed with state and national departments of labor, as required, for instance, by the laws of Minnesota and Michigan.

If a strike is called in defense industries in violation of the provisions of this act, the union which calls the strike and the men who respond to the call should be deprived of the protection of the Norris-La Guardia anti-injunction and national labor relations acts.

Setting aside the Norris-La Guardia act would mean, among other things, that an employer would be entitled to an injunction without

first having to deal with representatives of the strikers.

Setting aside the national labor relations act would mean that any person or group of persons or organization of employes who engage in or cause, aid or abet a strike in a plant directly or indirectly engaged in the manufacture of material for defense, would, among other things, be deprived of:

1. The right to certification as exclusive bargaining agent;
2. The right to compel the employer to reinstate striking employes.

And the employer in addition should be relieved of all legal restrictions in securing men to replace employes who by striking under the circumstances confronting us today have indicated their indifference to the national emergency.

In other words, anyone may

strike, but if he does so he cannot demand the protection of the laws of the nation whose defense program he has jeopardized in order to further his own selfish interests.

The country must be protected, for instance, from such a series of strikes as the CIO unions called in 1937 when we were in the midst of a serious economic emergency. In that case, you will remember, although the United Automobile Workers of the CIO had signed an agreement not to strike during the period covered by the contract, before six months had passed General Motors had suffered about 250 strikes.

Already the defense program has lost many tragically valuable hours due to strikes at the Vultee Aircraft Co.; at the Federal Shipbuilding & Dry Dock Co.; where two badly needed cruisers and a number of destroyers, tankers and merchantmen are under construction; at the plant of the Aluminum Co.—everyone knows how important aluminum is in the manufacture of war material; at the plant of the Crucible Steel Co., and International Harvester Co., and others.

Defense Program Threatened

At this very moment the defense program is threatened with a number of walkouts which would seriously retard the production of essential defense materials. As United States Attorney General Jackson said in the case of the Vultee strike, communist influence is playing a large part in some of these affairs. Their purpose, especially now that Stalin is in league with Hitler, is, of course, to cripple our defense program and we are just plain nitwits if we stand by and let them do it.

We might have hoped that regardless of its past record, the CIO would in this emergency adopt an entirely different policy. But that hope was promptly blasted the other day by Mr. Philip Murray, president of the CIO, who declared that his organization would not agree to any restraint on labor's right to strike a defense industry.

In happy contrast to this narrowly selfish attitude of the CIO comes the announcement of Mr. John Frey and his colleagues in the metal trades department of the AFL, to the effect that his department has decided not to call strikes in industries working on national defense orders.

This action, which was undoubtedly prompted by the highest patriotic motives, does not, however, remove the need for remedial legislation. While the AFL unions in Mr. Frey's department have members in many plants engaged in defense production, there are thousands of plants whose employes are independent of any union, and

in many other plants, particularly the vital airplane and automobile factories, CIO members predominate.

In the gigantic total defense effort to which we are committed the man in the shop who handles anything from a shovel to the most complicated piece of machinery is of just as much importance as a soldier with his gun. And while I do not suggest that there should be the same disciplinary relationship between management and the men in the shop that there is between the captain of a company and the men in the ranks, I do think that in one respect they should be more nearly on a par.

The soldier cannot strike. No matter what the provocation or how unsatisfactory his pay, such an action in barracks would be mutiny and the guilty soldier would be court martialed and severely punished. If it happened on the field of battle the penalty would be death.

Interference with the right to strike, however, is not an action that should be taken without very careful consideration. Let us see, therefore, whether labor would run any substantial risk in case that right were to be restricted during the emergency.

In the first place, the national labor relations act and other national laws adopted during the last five or six years guarantee the worker complete protection of his right to bargain collectively if he so desires and protect him against discrimination and other unfair labor practices set up in the act. And we have it on the authority of the national labor relations board itself that employers who are violating the labor act employ but a very small fraction of the industrial workers of the country.

Conciliation Effective

In the second place, I believe that if there is one thing generally admitted it is that the average employer is more than anxious to pay the prevailing wage, and if possible a little bit more. There are thousands of cases where wages have been adjusted in a normal, harmonious manner to every one case where employes have had to strike for an increase.

After all, the fixing of a fair wage is not an exact science, and conciliation and voluntary arbitration are always available for the purpose of reconciling differences.

But whether it be higher wages or some change in working conditions that is demanded experience has shown that the difference between what employes can secure through peaceful negotiations with their employer and what they might secure as the result of a strike is so little that no group of employes is justified in

stopping defense production and jeopardizing the safety of the country in an attempt to secure the last possible penny or the greatest possible advantage. As a matter of fact, in a large number of cases strikers returned to work without gaining a single thing which was not offered before they struck.

In conclusion, I submit that the right to strike should be restricted:

First and foremost, because the safety of the country demands that there be no stoppage of defense production;

Second, because employes are protected in their rights by the national labor relations act;

Third, because experience has shown that peaceful negotiations will provide a fair wage in the great majority of cases;

Fourth, conciliation and arbitration can be relied on to bring about a fair settlement where there is a difference of opinion between employers and employes which might otherwise result in a strike or lockout. Mr. John R. Steelman, director of the United States conciliation service, states that 94 per cent of all threatened strikes in 1940 called to the service's attention were settled without interruption of work.

Industry Surrenders Rights

As far as industry is concerned, it is perfectly willing to surrender without qualification its right to a lockout. During this emergency we are all going to have to surrender temporarily some rights which under other circumstances we would fight for to the last ditch. I need not tell you how many rights employers have had to surrender.

Industry is fully in accord with the statement of the office of production management which was recently established by the President. This statement said, among other things, ". . . everything in our national life must be subordinated to the necessity for defense. Industry must subordinate its concern over the possible future effects of tremendous immediate expansion. Democracy is fighting for its very life in its struggle to retain the principles of a free economic system. . . . Just as it is intolerable for capital to seek a selfish advantage by reason of the present emergency, so must labor avoid any attempt to make improper use of its position in the present worldwide emergency. If the totalitarian forces of the world are victorious, all the hard-won rights of labor will be destroyed and both capital and labor will become the involuntary vassals of an all-powerful state. Labor has as great a stake in this crisis as capital, and both must work together harmoniously if the United States is to make its contribution to a democratic victory in the world."

Price Structure, Rearmament Pace Threatened by Higher Wage Demands

■ IN THE FACE of demands that national defense materials be produced more rapidly and that prices be maintained near present levels, what loosely are termed "labor relations" last week were growing more unsatisfactory.

Strikes and threatened strikes in defense industries, demands for wage increases and other concessions jeopardized speedy rearmament and the price structure.

Obviously strikes in defense industries disrupt production to a greater extent than the actual loss in man-hours would indicate. Examples are legion where absence of a score or so of key men has

halted productive efforts of several thousand workers.

That prices can be maintained if wages, often the largest single cost factor, are increased is unlikely. Profits generally have not kept pace with rising industrial activity, due to increases in various costs. For example, one nonintegrated steel company last week reported fourth quarter, 1940, earnings were down sharply from those in the corresponding period of 1939 despite the higher rate of steelworks operation. Add a substantial wage increase to costs—at present prices—and profits would disappear entirely.

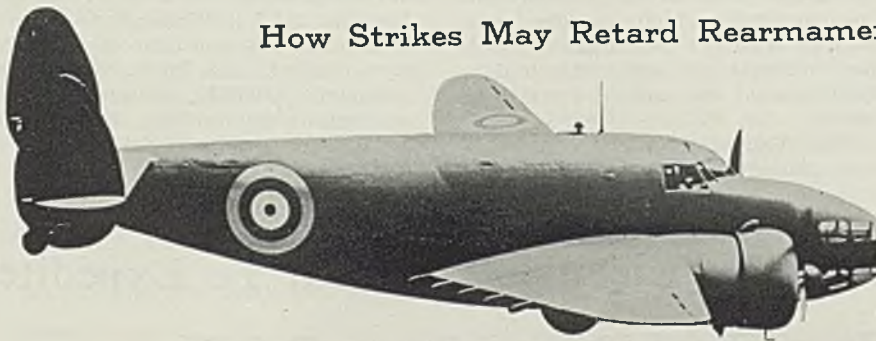
Drive for higher steel wages, how-

ever, is under way. Steel Workers Organizing committee of the Congress of Industrial Organizations, last week approached three leading producers with demands which are reported to include a 10 per cent wage increase, union shop, and other concessions. No agreement yet has been announced.

A conference of several hours between William Beye, United States Steel Corp. vice president in charge of industrial relations, and Philip Murray, SWOC head, was described as "exploratory," and negotiations were postponed, will be resumed Jan. 31.

Conferences with Crucible Steel Co. of America, New York, and Jones & Laughlin Steel Corp., Pittsburgh, have been scheduled but may be delayed pending outcome of the SWOC-U. S. Steel conversations. Crucible and SWOC have extended their contract from Jan. 26 until

How Strikes May Retard Rearmament Program



THIS BOMBER

requires 24,000
man-hours to build



ONE STRIKE

like this, affecting 8000 workers
and lasting only 12 days, results
in loss of 768,000 man-hours

THIS MEANS 32 BOMBERS,

vital to our defense and that
of England

WON'T BE BUILT

Feb. 16 to provide time for negotiating a new agreement.

Storm areas appeared in other metalworking industries, and, in fact, broke at the Allis Chalmers Mfg. Co. plant, Milwaukee. Production at the company, which is working on defense orders valued at \$26,000,000, was halted by strike called by a CIO union. Nine thousand workers were directly involved. Company officials stated the closed shop was the sole issue involved although the union also presented demands for wages increases and rehiring on a seniority basis of all workers who have been laid off. Controversy arose over demands by the CIO union that some members of an AFL union employed by the company be discharged.

The aircraft industry, keystone in the defense effort, continued to be bedeviled by unions' demands. A strike narrowly was averted at Ryan Aeronautical Co., San Diego, Calif., after wage increases had been granted. Ryan employs 1600 men and has \$11,400,000 backlog.

United Automobile Workers leaders immediately turned their attention to Consolidated Aircraft Corp., San Diego, which employs about 15,000 workers and has government and British airplane orders totaling \$350,000,000.

At the Rieke Metal Products Co., Auburn, Ind., a strike was called by SWOC and reinstatement of 31 discharged workers demanded.

Unionists at two southern shipyards curtailed defense production by "slowdowns." Federal conciliators were attempting to restore production at the two yards, the Alabama Drydock & Shipbuilding Co., Mobile, Ala., and the Ingalls Shipbuilding Corp., Pascagoula, Miss.

At Pittsburgh, a strike of American Federation of Labor construction workers was called at the Mesta Machine Co. Union leaders charged company had used nonunion labor within craft union jurisdiction. It was threatened that the strike would be extended to companies using Mesta machinery.

Sign "No Strike" Agreements

Meanwhile many industrial concerns were reported to be stocking coal in anticipation of the wage conferences between operators and the United Mine Workers which start March 10.

On the brighter side of the labor picture appeared several "no strike" agreements. American Car & Foundry Co., New York, and an AFL union signed a pact providing for government mediation or arbitration of all disputes. Reynolds Metals Co., Richmond, Va., and union leaders pledged full support to the defense effort. Metals trades section of the AFL also has publicized an anti-

strike platform. In several other cases unions are offering "no strike" agreements in return for contracts.

Congress Must Decide on Wagner Act Compliance and Arms Orders

Congress must decide whether firms accused of violating the national labor relations act shall be denied defense contracts, according to war department officials.

The department will not write into its contracts a requirement that contractors comply with the labor relations statute unless it receives specific instructions from congress.

Sidney Hillman, labor leader and associate director of the office of production management, recently tried to have such a clause placed in two contracts with the Ford Motor Co.

War department officials said they still had under study the question of whether departmental contracts generally should include labor provisions in addition to those now incorporated, which require compliance with the Walsh-Healey public contracts act and with legislation against the use of convict labor.

The Walsh-Healey and convict labor clauses are included in con-

tracts at the direction of congress.

Undersecretary Robert Patterson, who handles contract matters, is understood to be opposed to writing of laws by administrators.

At a hearing several months ago before a congressional committee, Mr. Patterson said the department took into consideration alleged Wagner act violations in deciding whether a prospective contractor's labor record was such that speed in deliveries could be expected. But he has never publicly made Wagner act compliance a positive prerequisite for obtaining defense contracts.

Foundry Equipment Index Up in December

■ Foundry Equipment Manufacturers' association, Cleveland, reports index of net orders closed for new equipment in December was 276.1, compared with 278.8 in November. Index for repairs was 203.2 in December and 188.7 in November. Total sales index was 257.8 in December and 254.2 in November.

Indexes are per cent of monthly averages of sales to metalworking industries, 1937-39. Practical comparison on the old base, 1922-24, can be determined by multiplying new base figures by 1.328.

Blanket Licensing System To Expedite Iron, Steel Shipments to Empire

NEW YORK

■ EFFECTIVE Jan. 25 British Iron & Steel Corp., in an effort to expedite shipments, will handle blanket licenses for shipment of iron and steel products to all countries of the empire. This follows action on Dec. 30, at which time the British corporation was given blanket licenses for Great Britain and Canada for export of iron and steel products covered by the Presidential proclamation of Dec. 10.

Iron and steel producers and their associations, who are known to the British corporation, have been given full lists of so-called empire numbers and advised of the procedure to be followed. Other exporters of licenseable iron and steel products should communicate with their suppliers or, in absolute necessity, with R. W. Finlayson, local secretary, British Iron & Steel Corp., 43 Exchange place, this city. It will not be necessary for exporters to submit their requests to export to the British empire on the usual department of state export application forms, but they should advise by letter details of the product to be exported and the country of destination.

Attention of exporters is called to the fact that this arrangement covers solely the 47 licenseable iron and steel products in the Presidential proclamation of Dec. 10 and that applications should not be forwarded to the British corporation in respect to any other licenseable commodity such as machinery, machine tools and other metals and their products.

Since information was given regarding the obtaining of certain blanket numbers for export of iron and steel products to Canada, the department of state has issued general licenses for export to Canada of articles and materials named in the Presidential proclamation.

A set of new Canadian numbers will supersede the former list given by the British Iron & Steel Corp., and it is suggested that exporters get in touch with suppliers or customs authorities to acquire these new numbers. Numbers previously given governing exports to Great Britain or sections of the empire have not been affected. The new Canadian general licenses dispense with the necessity of 10-day reports for Canada being filed with the British corporation.

Steel Industry To Spend \$282,000,000 To Expand Productive Capacity in 1941

■ TO MEET the expected expansion in the nation's requirements for steel for defense and other purposes, steel companies plan to spend more than \$282,000,000 for new productive equipment during 1941, according to information furnished to the American Iron and Steel Institute by 160 companies representing over 95 per cent of the country's steel-making capacity.

The expenditure is expected to gear the industry for increased production during the defense emergency, although some of the new equipment will not be available until next year. With the sum budgeted for this year, the sum spent or about to be spent for new equipment by the industry since the beginning of 1935 is brought to a total of \$1,390,000,000.

From the beginning of 1935 to the end of 1940, steel ingot capacity was increased from approximately 78,000,000 net tons to approximately 83,000,000 net tons, and further increases will be effected this year with the sums provided for such enlargement. Productive capacity for pig iron, coke and finished steel is also being increased.

To forestall any bottleneck in the

various phases of steel production, actual expenditures in 1940 for new equipment were sharply increased and totaled \$25,000,000 in excess of the amount budgeted at the beginning of the year before the defense program was expanded.

The total actually spent was over \$171,000,000, whereas expenditures contemplated at the beginning of the year had been estimated at only \$146,000,000. No small part of that increase was due to the building of new electric furnaces not scheduled at the beginning of the year.

This year's program covers the entire range of steel mill productive facilities and provides additional coke, pig iron and steel ingot capacity as well as equipment for many varieties of rolled and finished steel.

The breadth of the construction program is shown by the fact that 15 companies are contemplating expenditures for new rolling mills; 29 companies for modernization or enlargement of existing rolling mills; 23 companies for new wire drawing facilities; 22 companies for new cold finishing equipment; 40 companies for new heat treating equipment.

Fourteen companies plan to install new blast furnace equipment and several other companies propose to build new blast furnaces, open-hearth furnaces for steel and new coke ovens. Twelve companies have budgeted expenditures for new electric furnaces to increase the output of special steels.

U. S. Steel Subsidiaries Improving Plant Facilities

Installation of equipment and alteration of facilities for rolling stainless steel and other high quality rods is underway at the Joliet, Ill., plant of American Steel & Wire Co.

Installation includes five 10-inch stands, two reels, a conveyor and two new billet heating furnaces with provision for a third, besides the necessary handling, driving and control equipment. A new building approximately 60 feet square is being constructed to house the furnaces.

Carnegie-Illinois Steel Corp. is installing additional facilities for producing light armor plate and shafts at its Homestead and Clairton plants. New installations, not previously announced, will provide for casting pits and handling facilities for large ingots at Clairton, and for pre-heating and annealing furnaces, casting, and handling equipment at Homestead.

Carnegie-Illinois also will rehabilitate its No. 3 blast furnace at the Clairton, Pa., works. Last operated in October, 1930, the furnace is expected to be in blast about May 1. Return of the Clairton furnace to the active list will make possible additional annual pig iron production of 200,000 net tons. Carnegie-Illinois Steel Corp. has 32 active and four reserve blast furnaces in its Pittsburgh district.

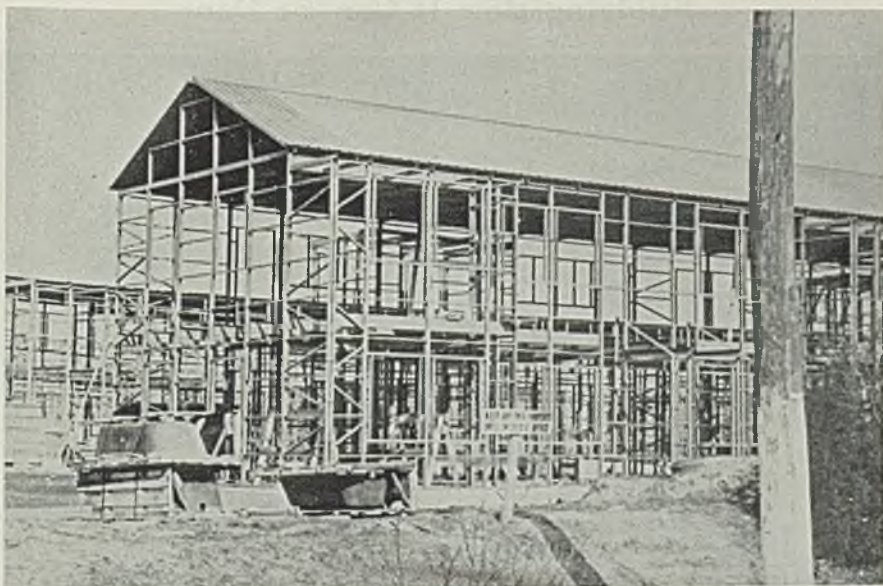
H. C. Frick Coke Co. is rehabilitating 400 beehive coke ovens at its Collier plant, Fayette county, Pennsylvania, providing employment for 200 men. The company has placed approximately 1100 beehive ovens in operation since April 1, 1940.

Reynolds Metals Co. Engaged In \$35,000,000 Expansion

Reynolds Metals Co., Richmond, Va., currently has under way or projected a building program to cost about \$35,000,000. By midsummer the company will be producing more aluminum alloy sheet, rod, tubing and extruded shapes than was being produced in the entire country before war started in Europe, according to R. S. Reynolds, president.

Mr. Reynolds' announcement of the expansion program was made jointly with announcement that a pledge had been signed by the management

Navy Speeds Housing with Steel Units



■ NEWPORT NEWS, VA.: Prefabricated steel-frame houses which can be fastened together like a child's construction toy and dismantled almost as readily appear to be the answer to the defense problem here. After the defense emergency these houses can be unbolted, knocked down and stored in warehouses, or moved to other localities and erected anew. The above are some of the prefabricated buildings being built by the navy department in a \$2,837,560 project involving erection of 100 12-family apartment houses. (For an account of this and similar steel-frame housing projects see STEEL, Dec. 30, P. 13.) Wide World photos

and 17 officers of CIO and AFL union officers devoting combined man power and plant energies to the production of defense materials. Company employs 7000, never has had a strike.

Last year the company fabricated more than 40,000,000 pounds of aluminum. This year's production totals are expected to exceed 10,000,000 pounds a month.

Aluminum ingots will be produced at the Lister, Ala., plant from bauxite imported from Brazil and the Dutch East Indies and also from domestic bauxite from Alabama and Arkansas.

Clark Equipment Co. Enlarges Army Truck Parts Capacity

Clark Equipment Co., Buchanan, Mich., will spend \$2,500,000 to expand its facilities for manufacture of truck housings and truck transmission used in army trucks. Company has obtained permission from the government to depreciate over a short period the additional facilities which will be completed in seven to ten months.

Cleveland Pneumatic Tool Co. To Spend \$5,000,000

Cleveland Pneumatic Tool Co., Cleveland, will double factory facilities which already have been tripled during the past year. Expansion will be financed by the government and will cost \$5,000,000, of which \$1,000,000 will be for buildings and \$4,000,000 for equipment. Plant additions will have approximately 230,000 square feet of floor space.

Company manufactures shock absorbing landing struts for many of the military and transport planes built in the United States. Currently about 2000 workers are employed; company is working two shifts.

Thompson Products To Erect \$11,000,000 Aircraft Plant

Thompson Products Co., Cleveland, will construct an \$11,000,000 plant to manufacture aircraft valves and parts at Euclid, O. Factory will have 575,000 square feet of floor space, employ 5000 persons and have capacity to produce products valued at \$22,000,000 annually.

Federal Shipbuilding To Build New Ways, Outfitting Basin

Federal Shipbuilding & Dry Dock Co., Kearny, N. J., a United States Steel Corp. subsidiary, will acquire 15½ acres adjacent to its Kearny yards for further extensions to its operations. Contemplated expansion includes new shipways, an outfitting basin and certain miscellaneous crane equipment and service buildings.

Company has on hand orders for 42 naval and ten merchant vessels, employs 10,000 men and is working three shifts

Improved Bessemer Process May Raise Steel Production Without Expansion

■ HOW steel output for defense needs can be increased without actually constructing steel producing units was indicated last week in announcement by Jones & Laughlin Steel Corp., Pittsburgh, that it has licensed three other producers to use its bessemer flame control method.

License agreements have been made with Republic Steel Corp., Cleveland; Youngstown Sheet & Tube Co., Youngstown, O., and Wheeling Steel Corp., Wheeling, W. Va., to equip their bessemer converters with the photoelectric cells and recording devices necessary to determine automatically the important "end-point" or termination of the "blow," which has a definite influence toward uniformity in quality of the steel. Much of this equipment has already been installed and is in operation. Other steel companies are negotiating for licenses.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., also has been licensed. All future agreements with steel foundries will be made by the Whiting Corp., Chicago, which has been authorized to negotiate such licenses.

H. W. Graham, director of metallurgy and research for Jones &

Laughlin, says the published capacity for the bessemer process has, over a period of years, been revised downward until the rated output of existing bessemer facilities is believed to be much below the tonnage that could actually be produced.

Pointing out that bessemer and open-hearth steel are not interchangeable without restriction, Mr. Graham said: "It is not intended to convey that more bessemer steel could be produced to directly supply such needs as aircraft production; yet the fact that existing converters could produce more bessemer steel, to replace open-hearth steel for many uses, may prove to be a fact of great importance if the national need for steel should become acute." Metallurgists are generally of the opinion that adjustments could be made in manufacturing operations to advantageously use a greater portion of bessemer steel, he said.

"If the bessemer converters in the United States were operated at their fullest rate of production," Mr. Graham continued, "it might be found that existing coke and iron-making facilities would have to be enlarged; but in any event the required investment cost would pre-

Studying How It Can Be Done



■ Left to right, Charles Sorenson, production manager of Ford's River Rouge plant; Donald W. Douglas, president of Douglas Aircraft Co.; and Edsel Ford, president of Ford Motor Co. Accompanied by Sorenson and Dr. George Meade, aircraft production chairman of the national defense advisory commission, Ford recently visited the Douglas plant in Santa Monica, Calif., as part of the study now being made for joint production of four-engined, long-range bombers by automotive and aircraft firms

sumably be less than involved in an equivalent increase in ingot production by the open-hearth method."

Mr. Graham further pointed out the advisability of more complete utilization of the bessemer process, which produces more scrap than it consumes, to keep the scrap and pig iron requirements of the industry in balance. He said: "There is today a full and active demand for scrap for steelmaking and any considerable increase in open-hearth capacity would bring the industry perilously close to an acute shortage."

That a scrap shortage already exists is indicated, he said, by the fact that certain steel companies are using bessemer converters to produce "synthetic" scrap.

Institute Broadens Base For Production Figures

■ In the regular weekly and monthly calculation of ingot production, the Iron and Steel institute is now taking into account electric furnace and casting capacities, as well as those of open hearth and bessemer ingots.

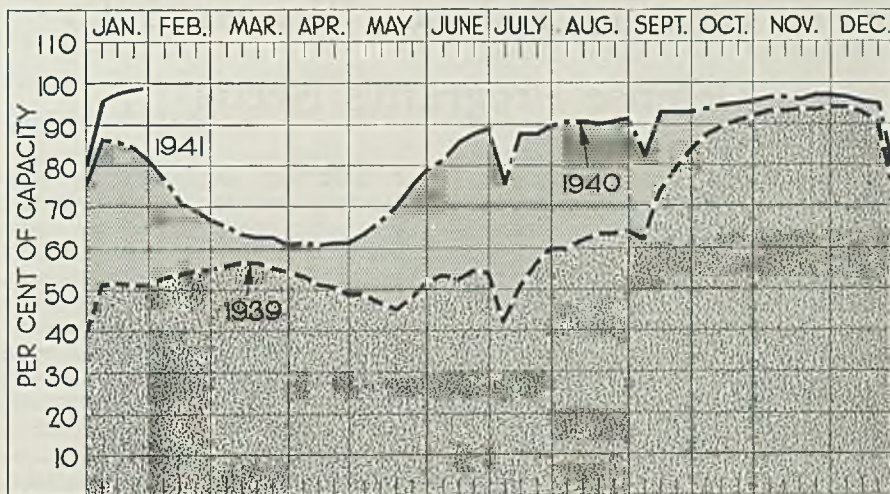
This step is designed primarily to standardize figures as among the various individual producers. In the past, some have taken into account certain types of production and have ignored others of lesser importance, whereas other producers have included all processes in their estimates.

The actual effect upon production rates will not be large. Although no official figures have yet been announced as of Dec. 31, 1940, the capacity rating for electric furnace ingots and castings as of Dec. 31, 1939, was 1,882,630 net tons. The latest year-end figure will unquestionably show an increase, but it is obvious that the new figure will be small, compared with total open-hearth and bessemer ingot capacity. Likewise, casting capacity will be small. On Dec. 31, 1939, this capacity was 668,595 net tons and it is considered doubtful if there has since been any appreciable increase in this amount. The casting figures will include castings by all processes poured by ingot producers.

Crucible ingot production is not being included, as this is a relatively negligible item.

The new capacity ratings as of Dec. 31, 1940, will be announced shortly.

■ Chemical laboratories of the East works plant, American Rolling Mill Co., Middletown, O., have worked since Jan. 14, 1921 without a lost-time accident.



PRODUCTION Up

■ STEELWORKS operations last week advanced 1 point to 99 per cent, three districts making small gains, two lost ground and seven were unchanged. Only continuing necessity for furnace repair prevents capacity operation. A year ago the rate was 81.5 per cent; two years ago it was 51.5 per cent.

Birmingham, Ala.—Unchanged at 100 per cent for the fourth consecutive week.

Detroit—With only one of 26 open hearths out of service the rate remains at 95 per cent.

St. Louis—Held at 87½ per cent, the same as for the past month and the best rate attained in 1940.

Cincinnati—Increased 1½ points to 90 per cent as open hearths were returned to service after repair.

Cleveland—Dropped 5 points to 84 per cent, one interest taking off open hearths for relining.

Pittsburgh—Advanced ½-point to 96 per cent. American Steel & Wire Co. blew in No. 1 blast furnace at its Donora, Pa., works Jan. 18, after being idle since 1930.

Wheeling—Maintains production at 100 per cent for the second week.

Chicago—Down 1½ points to 97 per cent, the second consecutive

drop, caused by necessity for furnace repair.

New England—Steady at 100 per cent, every open hearth in the district in production.

Buffalo—Addition of an idle open hearth raised the rate 2½ points to 93 per cent.

Central eastern seaboard—Sustained production at 96 per cent for the second week.

Youngstown, O.—Unexpected necessity for open hearth repair prevented the scheduled rate increase last week, Republic Steel Corp. losing two furnaces at its Warren, O., plant. Carnegie-Illinois Steel Corp. and Youngstown Sheet & Tube each added one furnace, the rate holding unchanged at 94 per cent. A rate of 95 per cent is expected this week with one Republic furnace returned to service.

German Coke Reported Sold on Pacific Coast

SAN FRANCISCO

■ German coke is reported to have been sold recently in Washington, Oregon and California by the Canadian government, material comprising two cargoes seized in the Pacific by British men-of-war and conducted to a port in British Columbia.

It is said the Germans were soliciting orders in western United States for several months.

This unusual movement of coke is not explained here. One theory, however, is that the deals were re-sales when original contracts were canceled.

District Steel Rates

District	Percentage of Ingot Capacity Engaged In Leading Districts		1940	1939
	Week ended Jan. 25	Change		
Pittsburgh	96	+ 0.5	78	46
Chicago	97	- 1.5	91	45.5
Eastern Pa.	96	None	80	34
Youngstown	94	None	68	45
Wheeling	100	None	80	64
Cleveland	84	- 5	74	60
Buffalo	93	+ 2.5	67	44
Birmingham	100	None	94	77
New England	100	None	75	70
Cincinnati	90	+ 1.5	74.5	52
St. Louis	87.5	None	83	40
Detroit	95	None	87	88
Average	89	+ 1	81.5	51.5

Food Canning Industry Prepared To Meet Defense Program's Needs

■ AMERICA'S food canning industry is prepared to meet any demand which the national defense program may impose upon it. Although the future is uncertain and 1941 crops are not completely predictable, authorities agree that canners have adequate capacity to handle greatly increased business.

These observations come as a reflection of the thirty-fourth annual convention of the National Canners association and the annual meeting and exhibit of the Canning Machinery and Supplies association in the Stevens hotel, Chicago, Jan. 1941. Several thousand representatives of the canning and equipment industries attended.

In his address as president of the association, H. F. Krimendahl, Crampton Canneries Inc., Celina, O., said:

"The canning industry has the production capacity to meet national defense requirements; the practical maximum limit to the industry's production is the amount of raw products, supplies (including cans), and labor that is available. Of these, question has been raised only with respect to the tin situation, and adequate supplies now seem assured at least for the coming year."

Predicts Best Year Since 1920's

Dr. Neil Carothers, dean, school of business administration, Lehigh university, Bethlehem, Pa., addressed the convention on "The Canning Industry at the Beginning of 1941." For two years Dr. Carothers has been conducting an economic survey of the canning industry under direction of the association's economic research committee.

After first speaking on the general economic situation confronting the United States and the world, he said that the outlook for the canning industry is good. "On the basis of the present outlook, if every canner in the industry would produce his pack within the safe limits of his investment in his business, the entire canning industry should have the best year since the 1920's."

Lt. Col. Paul P. Logan, chairman, food committee, commodities division, army and navy munitions board, Washington, outlined the procedure which the government will pursue in purchasing food for the armed forces, but he made no estimate of the quantity to be required except to say that "by July 1 we will be using approximately \$750,000 per day for food for the army."

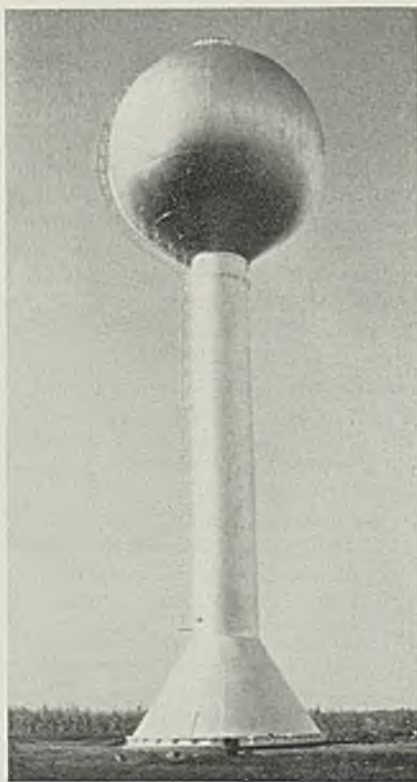
Represented in the exhibit were nearly 115 manufacturers and sellers

of machinery, equipment and supplies in the canning industry. Among these were several well-known producers of stainless steel and tin plates, and important can makers. Most impressive was the increasing use of stainless steel in food processing and handling equipment. Also in evidence were many nonferrous metals, alloys, and plated metals which are resistant to acids, brines and fruit juices.

Much of the machinery available to the canning industry today is streamlined in modern style, operates quietly with antifriction bearings and speed controls, and is equipped with devices to afford as near automatic operation as possible.

John H. Eleveld, vice president,

Water Tower Streamlined



■ Spherical, or so-called "streamlined", water tanks are being erected in various cities in the United States. This structure at Shakopee, Minn., reported to be one of the largest, has capacity for 250,000 gallons. It is 130 feet, from earth to top, and required 130 tons of steel. The cylindrical column is 10 feet in diameter, and flares at the base to 36 feet, where it is anchored in concrete. Painted with aluminum, and with the name of the city in black letters on its side, it forms a novel landmark

Michigan Lithographing Co., Grand Rapids, Mich., was re-elected president of the Canning Machinery and Supplies association. Sherlock Mc Kewen, assistant to executive vice president, Continental Can Co. Inc., New York, was continued vice president. S. G. Gorsline, 827 Bedford road, Battle Creek, Mich., was re-elected secretary-treasurer for the twelfth time.

Two new directors for three years are R. M. Roberts, assistant general manager of sales, American Can Co., New York, and Philip O. White, secretary-treasurer, White Cap Co., Chicago.

Five honorary memberships in the association were conferred for outstanding service to the industry as follows: Edward E. Appleton, until his recent retirement in charge of lithographed can sales, American Can Co., Chicago, for pioneer work in the lithographic process; Dr. Samuel C. Prescott, dean of science, Massachusetts Institute of Technology, Cambridge, Mass., for pioneer work in bacteriological research in food spoilage; Dr. Walter Eddy, professor of nutrition, Columbia university, New York, for discovery that vitamins are not destroyed in canned foods; E. H. Temple, Pasadena, Calif., retired executive of American Can Co., for pioneering in can manufacture; and Dr. A. W. Bitting, San Francisco, for outstanding research in canning.

Forecast 9.5% Gain in Freight Carloadings

■ Freight car requirements for the first three months of 1941 will be 9.5 per cent higher than in the corresponding period in 1940, according to forecasts of the regional shippers' advisory boards. Total estimated loadings will be 5,572,106, compared with actual loadings of 5,089,820 in the first three months last year.

Greatest increase in shipments is expected to be in iron and steel. The advisory boards expect 527,785 loadings, compared with 391,386 last year, an advance of 34.9 per cent.

Coal and coke shipments are estimated to be 4.4 per cent higher with 2,046,487 cars required. Ores and concentrates loadings are estimated at 157,007 cars, up 16.4 per cent. Machinery and boilers will take 35,161 cars, an increase of 27.9 per cent.

■ Fritz Thyssen, German steel and industrial leader, is in the hands of the Gestapo, the nazis' secret police, according to the *London Daily Express*. Dr. Thyssen fled from the Reich late in 1939 after he had incurred the nazis' enmity by opposing Hitler's war policy. Later his industrial holdings were confiscated.

FINANCIAL

Republic's 1940 Net Income at Record Level, Totals \$21,113,507

■ REPUBLIC STEEL CORP., Cleveland, last week reported aggregate net income in 1940 was \$21,113,507. Equal to \$3.30 per share on common after dividend requirements on the preferred stock, this was the largest net profit earned by the corporation since its organization in 1929. It compared with net income of \$10,671,343 or \$1.42 per share on common earned in 1939.

Fourth quarter net income, after all charges and taxes, was \$8,480,174. This was equal to \$1.39 per share on common, and compared with net profit of \$6,772,693 or \$1.03 per common share in the period a year earlier. In third quarter last year, net profit was \$6,183,880 or 96 cents per share on common.

Provisions for depreciation and depletion in 1940 totaled \$11,787,631, it was reported. Federal income tax provisions were approximately \$8,000,000, against \$2,450,000 in the preceding year.

Operating rate for the year was reported at 78 per cent of capacity; in fourth quarter, at 95 per cent.

Current operations are at 99 per cent of capacity.

Rustless Iron & Steel's 1940 Earnings Increase 17 Per Cent

Rustless Iron & Steel Corp., Baltimore, reports aggregate net income in 1940 was \$1,280,799. Equal to \$1.28 per share on common, this was more than 17 per cent greater than net profit of \$1,090,876 or \$1.13 per share on common in 1939.

Net income in fourth quarter totaled \$456,609, equal to 47 cents per common share. This compared with net profit of \$445,848 or 48 cents per share on common in the quarter in 1939, and \$321,588 or 32 cents per common share in third quarter, 1940.

Keystone Steel Corp.'s Fourth Quarter Net Income \$288,966

Keystone Steel & Wire Co., Peoria, Ill., reports net profit earned in fourth quarter, 1940, was \$288,966 after all charges. This was equal to 38 cents per share on the company's outstanding capital stock, and compared with \$418,489 net income, equal to 55 cents per share on capital stock, earned in the period in 1939.

Aggregate net profit in six months ended Dec. 31, 1940, was \$569,375 or

75 cents a share, against \$692,412 or 91 cents per share in the latter half of 1939. Sales in last six months of 1940 totaled \$6,967,898, and compared with aggregate of \$6,549,109 for the period in the preceding year. Gain was 6.4 per cent.

Keystone, whose fiscal year ends June 30, earned an aggregate net income of \$1,295,185 in 1940, according to quarterly reports. Total net income in calendar year 1939 was \$1,390,758, according to computation based on quarterly reports.

Jones & Laughlin To Redeem First Mortgage Series B Bonds

Jones & Laughlin Steel Corp., Pittsburgh, will redeem Feb. 21 all its first mortgage series B 4 per cent bonds, due 1940-46, and the first B 4½ per cent bonds, due 1947-50, according to H. E. Lewis, president. All first 4½ per cent series A bonds, due 1961, will be redeemed March 1, said Mr. Lewis.

Series B issues will be redeemed at 101 for the 4 per cent bonds and 102 for the 4½ per cent. Bond holders of any of these issues, it was reported last week, may obtain full redemption price at once on surrender of their bonds before the respective redemption dates.

Grant 67 Corporations Special Tax Allowances

■ Their new plants considered vital in the defense emergency, 67 corporations have received from the defense commission and the war and navy departments certificates of necessity, it was reported last week. Most of them in the machine tool, aviation and metal processing industries, these corporations will be entitled to special tax allowances on new plants which they are building at an aggregate cost of \$120,188,000. They were the first of more than 750 applicants to receive tax clearances.

Companies granted the certificate of necessity will be entitled to charge off cost of new plants for tax purposes over a 5-year period, instead of the normal amortization rate.

Plant additions certified for tax allowances include: Bethlehem Steel Co.'s \$20,390,000 project for increasing coke, pig iron and steel ingot capacity; Boeing Aircraft's \$10,737,000 additional plane-building facilities; Cramp Shipbuilding Co., \$10,000,000 shipyard; Donner-Hanna Coke Corp., \$3,000,000 for by-product coke ovens; Grumman Aircraft Engineering Corp., \$3,500,000 for aircraft production; Southern Railway Co., \$7,576,000 for transportation facilities; Westinghouse Electric & Mfg. Co., \$5,670,000 for marine propulsion machinery production; and Western Land Improvement Co., Santa Monica, Calif., \$11,255,000 for aircraft production.

Elected President, Chairman of Norton Co.



George N. Jeppson



Aldus C. Higgins

■ George N. Jeppson has been elected president, the Norton Co., Worcester, Mass., succeeding Aldus C. Higgins. Mr. Higgins becomes chairman of the board, a position vacant since the death Nov. 4 of Charles L. Allen.

Mr. Jeppson has been associated with Norton for 49 years. He was elected a director in 1906; secretary in 1919; and treasurer in 1933. He has been a vice president for several years. Mr. Higgins' service dates back to 1900. He was manager of the abrasive plants; was elected secretary in 1919; treasurer and gen-

eral counsel in 1919; and was president since 1933.

Norton's machine division now is operating 24 hours a day, six days a week, and has a backlog sufficient to maintain that schedule until June. Orders in prospect would sustain the rate until well into 1942.

Fifteen smaller companies are making parts for Norton machines under subcontracts to expedite production for the defense program.

Defense production, officials say, is being carried out without interfering with contracts from private sources.

Windows of WASHINGTON



By L. M. LAMM

Washington Editor, STEEL

Defense commission experts seek to match army, navy requirements with machine tool industry's output . . . Pilot plants for research on domestic manganese ore, extraction methods near completion . . . Congress approves appropriations for war fleet additions, vessel alterations . . . Biggers, OPM director of production, lists assistants approved by President Roosevelt

WASHINGTON

■ DEFENSE commission officials are reported working very closely with the machine tool industry. Maintaining the contact, a large group of machine tool manufacturers comes to Washington every couple of weeks.

Administration officials, it is said, were anxious recently to double machine tool capacity of the country. Convinced by some experts in government service this would not be feasible, however, the plan was abandoned.

Defense commission experts are reported trying to match up army and navy requirements against machine tool production for 1941. Commission officials are urging the industry to let as many subcontracts as possible and also to go into two or three shifts.

Machine tool manufacturers to date have expanded capacity at their own expense and it is suggested that future expansion be done at expense of the government. Defense officials point out that sale of machine tools in 1932 was approximately \$20,000,000; in 1940 it had increased to \$450,000,000 and is expected to total \$650,000,000 this year.

It is reported some machine tool manufacturers have already expanded their plants considerably by the use of Reconstruction Finance Corp. money, while others are using bankable contracts. Under the latter the government assumes all of the risk.

Second hand machine tool situation, with prices reported to have skyrocketed from 30 to 100 per cent for 20 year old machines, is causing

concern. Dealers in second hand machine tools recently met in Washington and promised close co-operation in holding down prices. Report, however, is that threats were made to take over their stocks if prices were not reduced. It is believed that both the army and navy have power to take over these second hand machine tools if they think it advisable.

Bureau of Mines Studies Low Grade Manganese Ore

Bureau of mines, interior department, is going ahead rapidly with the research work that it is doing under a \$2,000,000 congressional appropriation in connection with low-grade domestic manganese ore.

This appropriation was originally in a war department bill and was transferred to the bureau of mines last September at the suggestion of experts of the war department and the national defense commission. The appropriation is available until June 30 next, the end of the present fiscal year. There is no question but what at that time the bureau will have to ask for additional money because it cannot hope to complete the research work which it is doing before that time. Officials of the bureau state that the laboratory work is going ahead and that several small-scale pilot plants are being erected at Boulder City, Nev. Also, the bureau in connection with this work is increasing its present facilities at Salt Lake City, Rolla, Mo., and Minneapolis.

The bureau intends to go into the

question of ore dressing, smelting and into electrolytic, and hydrometallurgical methods. It is reported that the pilot plants will probably be completed within the next 90 days. Officials of the bureau seemed to be well satisfied with progress which has been made up to this time.

House Passes Naval Expansion, Warship Modernization Bills

House of representatives last week passed H.R. 1053 which authorizes expenditure of \$300,000,000 for major alterations to naval vessels. Bill was passed with no votes recorded against it.

Battleships, aircraft carriers, heavy and light cruisers are to be modernized in light of war developments to date, particularly the advent of the dive bomber.

More heavy anti-aircraft guns and fast-firing "pom-poms"—four-barreled weapons designed to meet the dive bomber threat—will be placed on warships. Light armor will be installed around "exposed top-side battle stations" for protection of personnel against "splinters"; and additional steel "blisters" will be added to the hull at the water-line to protect against bombs exploding in the water nearby.

House also passed the \$909,000,000 naval expansion program bill (H.R. 1437) which authorizes 400 more submarine chasers and other small warships and additional shipbuilding and ordnance facilities to speed completion of the two-ocean navy. Both bills are pending in the senate.

Firms Engaged in Prime Defense Work Listed by Labor Division

To speed the farming-out system inaugurated by the labor division of the national defense advisory commission, local defense production groups throughout the country have aided in compiling a list of 650 firms now working on prime contracts for either the army or the navy so that

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SHELL Turbo Oil

these groups could more readily solicit defense orders.

List was compiled under direction of Morris L. Cooke, management engineer attached to the staff of Sidney Hillman, associate director of the office of production management. Contractors who have received defense orders of more than \$100,000 each for any of seven major types of equipment are listed. Period from July 1 through Dec. 30, 1940, is covered.

Categories selected included ammunition components; aircraft and parts; automotive, tanks and equipment; machinery and parts; guns and parts; ships and parts, and electrical equipment.

Welles Reports "Moral Embargo" Against Russia Is Withdrawn

Sumner Welles, under secretary of state, last week notified the Russian ambassador that the United States government has withdrawn the "moral embargo" against Russia.

The embargo followed a statement by the President Dec. 2, 1939, expressing hope American manufacturers and exporters of airplanes, aeronautical equipment and materials essential to airplane manufacture, would bear in mind before negotiating contracts for the exportation of these articles that the American government and the American people had for some time pursued the policy of wholeheartedly condemning unprovoked bombing and machine gunning of civilian populations from the air. Reference was to Russia's assault upon Finland.

All articles and materials covered by the "moral embargo" are included in the list of articles and materials now subject to the export license system.

OPM Production Division Heads Named by Biggers Approved

John D. Biggers, director of production division, office for production management, has announced appointment of chief executives of the production division.

Mr. Biggers reported the following members of his staff have been approved by President Roosevelt and the OPM:

William L. Batt, deputy director, president of SKF Industries, on leave; he was deputy commissioner of the industrial materials division of the advisory commission to the defense council.

W. Averell Harriman, chief, industrial materials, on leave as chairman of the board of directors, Union Pacific railroad; has been liaison officer of the industrial materials division.

E. F. Johnson, chief, aircraft, ord-

nance and tools, formerly vice president of General Motors Corp. He also has been director of the light ordnance section of the production division.

W. H. Harrison, chief, ships, construction and supplies, on leave as vice president and chief engineer of the American Telephone and Telegraph Co., and for seven months chief of the construction section of the production division.

Mr. Harriman's major division heads will be:

George M. Moffett, chief, mining and mineral products, on leave as president of the Corn Products Refining Co., has been director of the food products section of the production division.

R. R. Deupree, chief, agriculture and forest products, on leave as president of Procter & Gamble Co., and for two months division executive of agriculture and forest products.

E. R. Weidlein, chief, chemicals, drugs, and allied products, on leave as director of the Mellon Institute; has been division executive of chemicals and allied products of the industrial materials division.

Mr. Johnson's major associates will be:

Merrill C. Meigs, chief, aircraft, on leave as publisher of the *Chicago Herald-American* and for the past two months director of the aeronautical section of the production division.

A. R. Glancy, chief, ordnance, formerly president of the Pontiac Motor Co., and recently a special advisor to the ordnance section of the production division.

Mason Britton, chief, tools, on leave as vice chairman of McGraw-Hill Publishing Co., and for three months director of the machine tool section of the production division.

Mr. Harrison's key associates thus far chosen include:

Emory S. Land, chief, ships, chairman of the maritime commission and for the past seven months director of the shipbuilding section of the production division.

J. C. Nichols, chief, supplies, on leave from J. C. Nichols Investment Co., Kansas City, Mo., and for the past seven months director of the miscellaneous equipment section of the production division.

Discuss Zinc Prices at Washington Conference

Representatives of the scrap zinc and secondary zinc industry have agreed to prepare a report on how customers' requirements may be adequately met, according to Leon Henderson, national defense commission. This was decided on at a meeting of the producers of secondary zinc and the price stabilization division in Washington.

Officers of the National Associa-

tion of Waste Material Dealers attended the conference which discussed the situation in the market for both scrap and secondary zinc.

Although the price of primary zinc has remained at 7.25 cents per pound at East St. Louis for the past four months some producers of secondary zinc recently have been charging premiums.

At the same time the price of zinc scrap, source of secondary zinc, has increased sharply. It is clear, according to Henderson's announcement, that the actual tonnage of metal which has been sold above the base price is relatively small. Nevertheless, these sales are "an unsettling influence on the market." Some secondary producers and scrap dealers have contributed to the situation by trying for the highest price obtainable.

Consumers are said to have been made unduly anxious by exaggerated rumors of shortages and high prices. Stabilization officials point out additions to the primary zinc smelting capacity in the United States in the first half of this year will amount to 100,000 tons.

Henderson Condemns Price Increase in Iridium

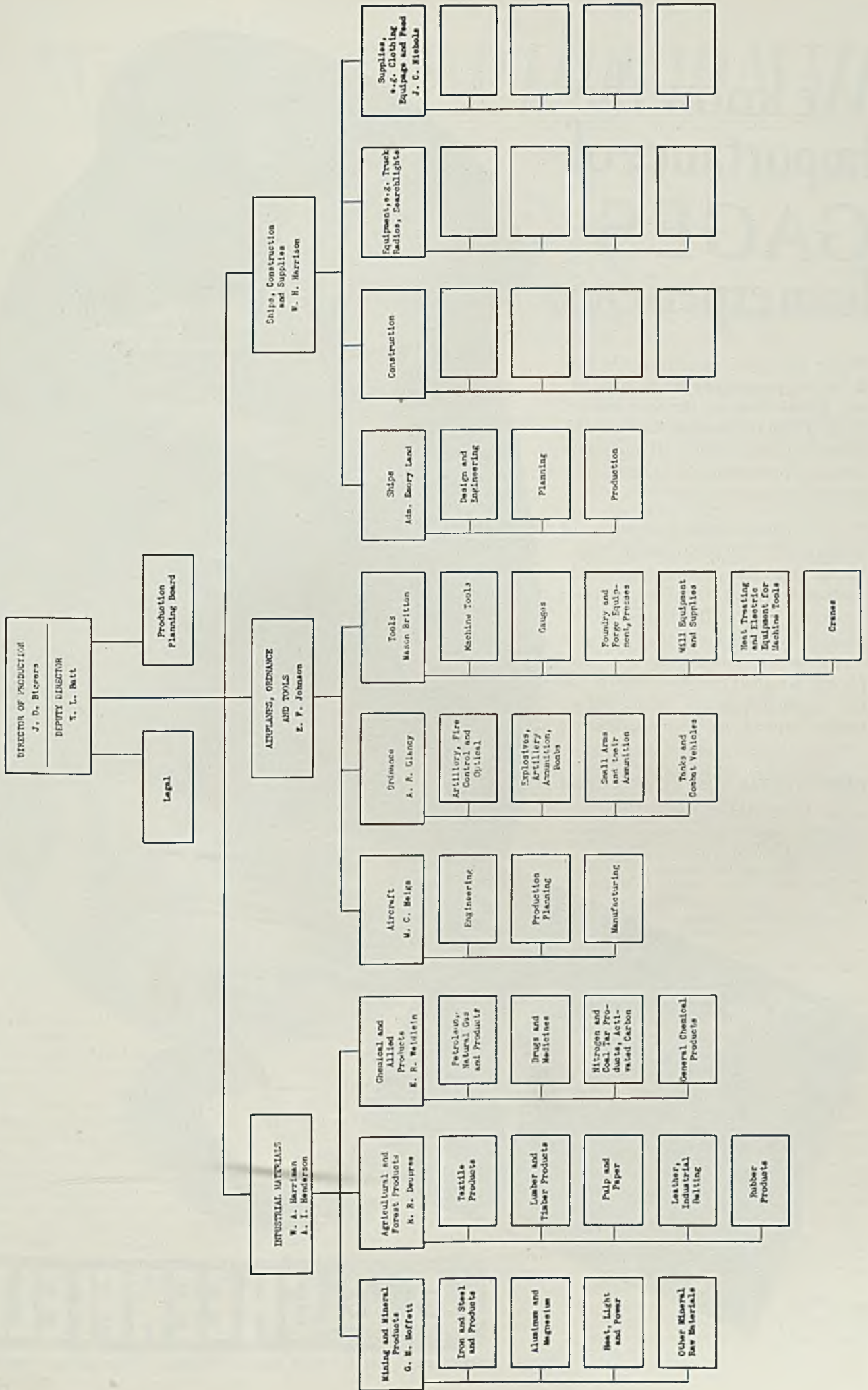
Advance in price of iridium, culminating in a jump during November and December from \$148 to \$300 or more per ounce, was unjustified according to Leon Henderson, commissioner of the price stabilization division, national defense advisory commission. Used as a hardening agent for platinum in airplane motor parts, iridium sold for \$65 per ounce throughout the summer of 1939. During the three years 1937-1939 average price was about \$92.

Members of the price stabilization division have uncovered evidence, Mr. Henderson said, that this price rise is due to sheer speculation. He pointed out that in many basic industrial commodities as steel, zinc and copper, there has been active co-operation in preventing undue and dangerous price increases. Iridium, he added, appears to present an instance of wilful exploitation of urgent defense needs.

Comprehensive study of military requirements and available supplies of iridium has been conducted jointly by the staffs of Mr. Henderson and J. D. Biggers, director of the division of production, office of production management. Study indicates that contrary to prevalent rumor there is no real shortage.

According to a survey made for the defense commission by the bureau of mines, total stocks of iridium in the hands of domestic refiners are equivalent to several times military requirements for 1941 and 1942. Foreign dealers in the United States have stocks in addition to those reported to the bureau of mines.

Production Division, Under Director General, Office of Production Management



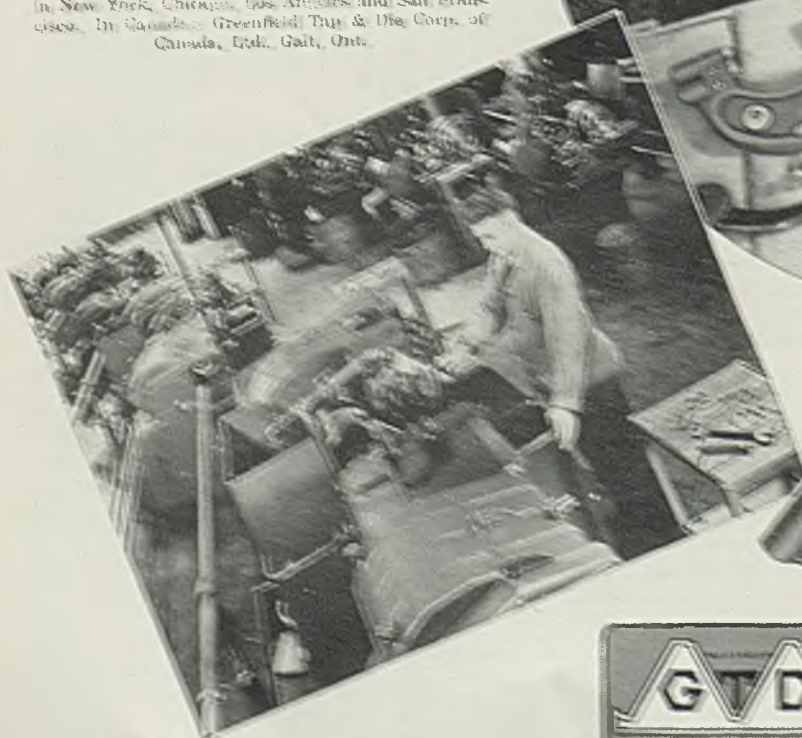
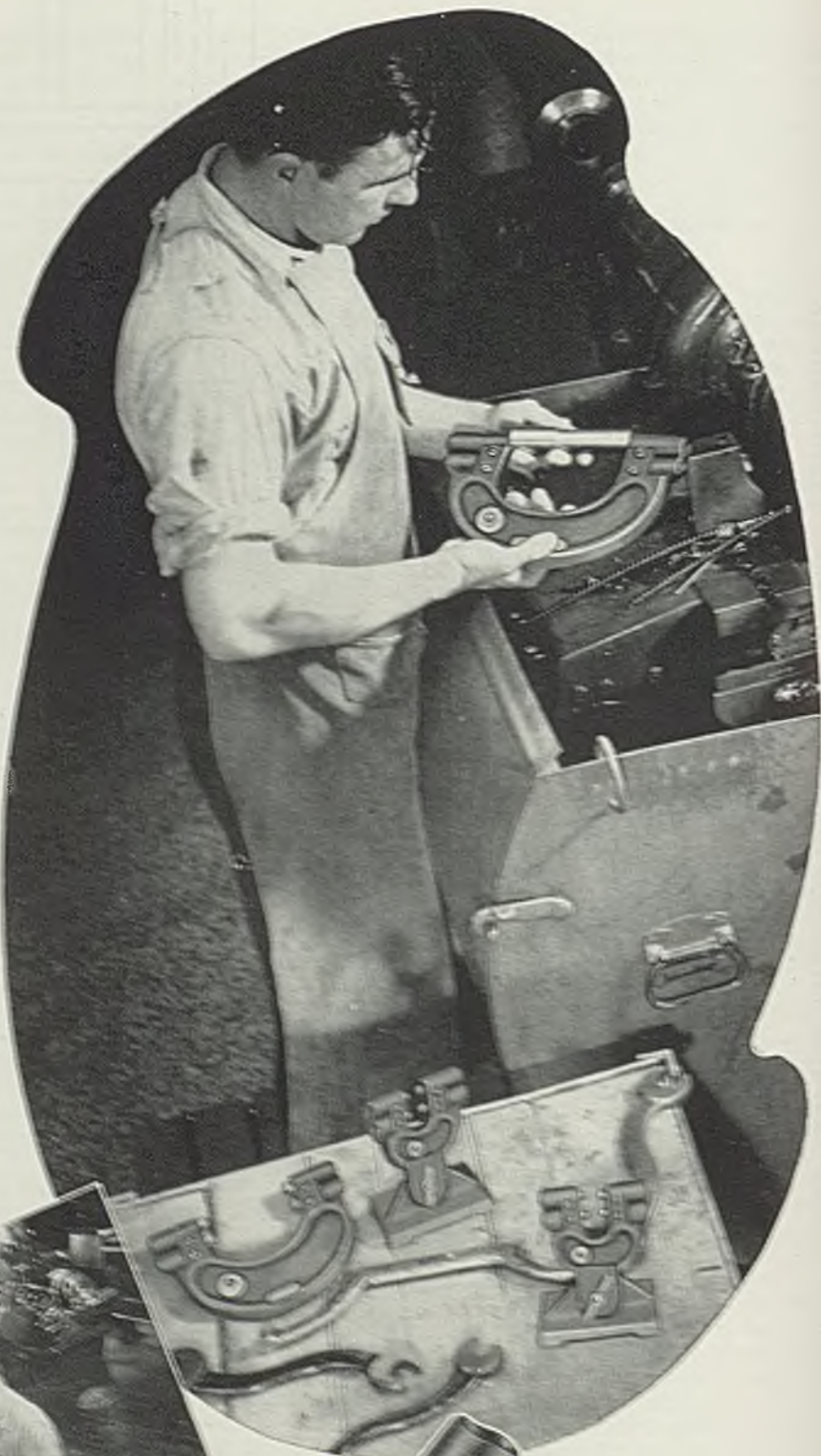
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STEEL

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

Small Buick, with shorter wheelbase, new body and lower price will make public bow in about a week and will tighten competition in its field. . . Effort being made to bring national automobile show to Detroit following cancellation of New York event, but industry not likely to approve this year. . . Fisher Body will supply bomber parts to North American Aviation late this summer

DETROIT

■ LAST July reports were current here about a new series 20 Buick which was being groomed for introduction at the fall shows. This was to be a smaller and less expensive car than any of those in the Buick line, but when show time came around no such model was included in the Buick family.

On Thursday of last week however, Buick lifted the lid from a new model which may be the final conception of a series 20 car, although when it is announced to the public next week it will be known as an addition to the series 40 line. Shorter wheelbase (by 3 inches), shorter overall length and new bodies are the three chief characteristics of the new line, in addition to a lower price, as yet unannounced.

A nationwide telephone hook-up of 26 key cities brought together more than 10,000 Buick dealers to hear messages from H. H. Curtice, general manager, and W. F. Hufstader, sales manager, outlining features of the new cars and mapping the spring sales program. At Flint, 200 dealers and the press gathered to inspect the models and to hear factory production and sales plans.

Buick executives pointed out that the general business and economic outlook is encouraging, national income is expanding and industrial activity is at a high rate with the trend upward. These factors are self-evident to business men, and they are accepted at face value by Buick which is operating at a record rate for the 1941 model season of 335,000 cars.

The new model obviously will ex-

tend Buick competition down into the ranks of Pontiac, Dodge, Oldsmobile, De Soto and others in this price class, but in these days of a seller's market, intensification of competition is not overly resented.

Broadening of Buick line is regarded as good insurance against future economic developments. For example, if sharply increased federal excise taxes should be imposed, such as are now in effect in Canada, the manufacturers with lower-priced lines stand to benefit, since taxes on these cars are lower. It is no easy task to sell a prospect a \$1200 car when it carries with it a \$1000 tax assessment such as now in effect in the dominion.

Another line of reasoning is to the effect that with a brand new, low-price model now available, Buick can realize a good profit on it until the model changeover this summer. Development costs have not been excessive, since parts and accessories are standardized and have required few new tools and dies. Bodies, for example, are substantially those used on the present Chevrolet and the lowest-priced Olds and Pontiac.

With development costs and good margin of profit realized from a brief 1941 run, it then may be possible to continue the car in a slightly modified 1942 version with an even lower price, or at least no increase.

Signs are appearing that new models will be marked up in price. Already there have been increases of around \$40 in certain makes.

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Some station wagons likewise have been boosted. Labor costs will be higher, material costs certainly no lower. Specialties even now are appreciably higher. Hence it is only reasonable to expect about a 5 per cent increase in prices of new cars.

One thing certain—the reception of this new Buick will be watched carefully by other producers. If it appears to be going over with a rush, some additional new entries in the low-price field will be pushed into the market. Several are all ready for the production signal. The Ford 6 engine and the new Packard model, to name two, might be speeded into the fray. “Economy model” Chevrolets and Plymouths are said to be ready to go.

Distributors See Chance To Stage National Show in Detroit

■ CANCELLATION of the New York auto show this fall by directors of the Automobile Manufacturers association may be the long awaited break which will give a group of Detroit automobile dealers and distributors the opportunity to schedule a national auto show in Detroit. Plans already are in the making despite the industry's stated decision to eliminate the show this year.

Alvan Macauley, president of the A. M. A., has stated, “We believe the public will approve the industry's decision to eliminate the show in a period such as this. The action will not control the course each company may follow as to introducing new models for 1942. Some model changes may be expected, where they will not interfere with the defense program, because it has been possible in many cases to keep tool and die departments going with this work pending readiness of their defense assignments. Changes also may be advisable or necessary on account of needed defense materials.”

The last sentence is significant. It might imply the use of substitute materials in passenger cars where

presently used materials could be released for defense needs, a dangerous procedure if any lessening of standards or quality of workmanship is involved. The average passenger car embodies few of the so-called critical defense materials, with the possible exception of stainless steel and the latter can be replaced readily in most instances by a not-too-inferior steel. Hence at this stage it is difficult to foresee many instances where changes may be called for on the score outlined by Mr. Macauley.

The A. M. A. president directs attention to the fact that many of the most important defense items in the automobile and truck and automotive parts plants will have emerged from the make-ready or engineering stage by fall. They will involve work for tens of thousands of men (40,000 in General Motors plants alone) and will absorb a large share of the energies of executive and supervisory forces, just as the undramatic and unrecognized preparatory stages are now requiring day and night work for engineering, design, and construction and planning groups in the industry.

Figures show that defense contracts and commitments which automotive companies have undertaken amount to better than 10 per cent of the total defense program to date.

How the industry would look on the proposal for a national show in Detroit seems problematical, in view of the above defense activities. Normally the idea would be welcomed, for Detroit is the motor capitol of the world and about the only excuse for a New York show is the force of habit and the attendant publicity and national fanfare which can be drummed up. It is at least a good bet that there will be no more New York shows, and that even if the idea of a national show here this fall is turned down, the event will be here when it is resumed.

Outlines G.M.'s Participation In Aviation Defense Program

C. E. Wilson, president of General Motors, who incidentally had the misfortune to fall and fracture his hip last week while ice skating, has announced completion of arrangements for GM's participation in the aviation defense program. They call essentially for preparations to produce parts and subassemblies for 200 twin-engine bombers monthly and for increasing airplane engine production by 500 engines a month to a total of 1500.

A subsidiary company, North American Aviation Inc., will assemble the B25 medium bombers at a new plant in Kansas City, Mo., expected to be in production by late

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce			
	1938	1939	1940
Jan.....	226,952	356,692	449,492
Feb.....	202,597	317,520	422,225
March...	238,447	389,495	440,232
April....	237,929	354,266	452,433
May.....	210,174	313,248	412,492
June....	189,402	324,253	362,566
July.....	150,450	218,494	246,171
Aug.....	96,946	103,343	89,866
Sept....	89,623	192,678	284,583
Oct.....	215,286	324,688	514,374
Nov....	390,405	368,541	510,973
11 mos...	2,248,211	3,263,600	4,185,407
Dec.....	406,960	469,120	.....
Year	2,655,171	3,732,608	.....
Estimated by Ward's Reports			
Week ended:	1941	1940†	
Dec. 28	82,545	89,365	
Jan. 4	76,690	87,510	
Jan. 11	115,935	111,330	
Jan. 18	124,025	108,545	
Jan. 25	121,948	106,400	

†Comparable week.

summer. Parts and subassemblies will be supplied by Fisher Body division, principally from plants in Cleveland and Detroit. Supervisory employes and engineers have been sent by Fisher to the North American plant in California for first-hand study of airplane manufacture.

Buick has been awarded contract for \$36,497,520 to cover Pratt & Whitney engines to be built at its new airplane engine division, 500 a month being projected output. Further negotiations are expected to bring the value of the Buick contract, including the plant, to \$125,000,000.

Meanwhile, the Allison division of GM, now producing at a rate of 350 engines a month, is expected to step up output to 1000 a month by late fall, when this division will be employing a total of 15,000 men at Indianapolis, at Cadillac in Detroit and at the aluminum foundry in Anderson, Ind.

Perfects Method To Produce Retainer Rings from Scrap

An engineer with one of the motor companies in Detroit, after long years of experimentation during which several times his management was just about ready to order the work abandoned, has perfected a method of producing a steel retainer ring from scrap steel turnings. Briefly, he grinds turnings in a ball mill, presses them to shape in a die, heats the compact to sintering temperature and then hot coins the piece to size. This is the familiar technique by which iron powder, and other powders, are handled, but so far as is known the idea of starting with scrap steel has

not been attempted except on a laboratory scale.

The retainer ring, formerly made of cast iron, is claimed to show superior properties and considerably lower costs. It is not required to have any strength properties in service so it makes a good starting point for the work which, as it expands, may conceivably be adapted to other parts where special properties are required.

In addition to using scrap turnings the engineer has made some compacts from dust and grit removed from a shotblast cleaning machine.

A new type of thermocouple for use in reducing atmospheres, with wires of nickel and nickel-molybdenum alloy, housed in an inconel tube except for a short exposed portion at the end, is showing remarkably long life in tests, and also is somewhat less expensive than present types of couples.

Retail Sales of Cars, Trucks Up 26 Per Cent in 1940

Retail sales of cars and trucks in the United States during 1940 were 26 per cent higher than in 1939, totaling 4,094,354 units, against factory production in the U. S. and Canada of 4,675,000 units.

Mecca for tourists, the Ford Motor Co. rotunda here played host to 951,558 persons last year, averaging nearly four a minute. Of this huge throng, only 376 were from foreign countries and a large proportion of them from South America.

Nash-Kelvinator has received an order for 25,000 of its 1941 model 6 $\frac{3}{4}$ -cubic foot electric refrigerators for defense housing projects.

Observe Development of American Tool Industry

■ Vital position of the machine tool worker in defense was stressed recently by H. D. Bennett, president, Toledo Scale Co., Toledo, O. Mr. Bennett spoke at a meeting of employes of Defiance Machine Works, Defiance, O., held in observance of 90 years of American mechanical development. Toledo Scale acquired control of the Defiance company two years ago.

Gold pins were presented 40 Defiance employes with service records of more than 25 years. Those with 10-25 years' service received silver pins; bronze pins were awarded to employes with 5-10 years' service.

A feature speaker was Fred S. Miller, oldest employe in point of service, who has been with Defiance 50 years. Mr. Miller traced the company's history since its organization in 1856 with two employes and \$125 capital.



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GENERAL OFFICES, CLEVELAND, OHIO
Your Jobber stocks the Lamson Line

LAMSON & SESSIONS



Jay J. Seaver



Charles B. Bohn

MEN of

■ **JAY J. SEAVER** has become associated with Day & Zimmerman Inc., Philadelphia. A graduate of the University of Michigan, Mr. Seaver formerly was associated with Arthur G. McKee & Co., Cleveland, as vice president, and more recently with H. A. Brassert & Co., Pittsburgh, as vice president.

Henry S. Evans was elected president and chief executive officer, Central Iron & Steel Co., Harrisburg, Pa., at the regular meeting of the board of directors Jan. 20, and **Basil M. Graham** was elected vice president, continuing in the offices of secretary and treasurer.

William F. Aske has been appointed Detroit manager for D. A. Stuart Oil Co. He succeeds the late Bruce W. Deacon.

Frank G. Oviatt, secretary-treasurer, Otis Steel Co., Cleveland, has been elected a director, National Bank of Hudson, Hudson, O.

A. R. Blackburn, formerly research engineer, Ironton Fire Brick Co., Ironton, O., has been promoted to production engineer.

Charles O. Lippy, heretofore mid-west representative for United States Sanitary Mfg. Co., Pittsburgh, has been promoted to general sales manager.

J. H. Sprenger has been appointed southern sales representative for Process Equipment division, H. K. Porter Co. Inc., Pittsburgh, with headquarters in Memphis, Tenn.

George H. Kenyon has been named manager, metal finishes department, American-Marietta Co., Chicago. Prior to joining the company a year ago, Mr. Kenyon was employed as a sales engineer with Link-Belt Co., Chicago, a number of years, and in 1933 became asso-

ciated with Devoe & Reynolds Co., New York, later being transferred to the Jones Dabney division of that company.

Charles B. Bohn, chairman, Bohn Brass & Aluminum Co., Detroit, was elected president, Aluminum association, at its annual meeting in New York, Jan. 15. **William G. Golden**, vice president, Reynolds Metals Co., Louisville, Ky., was named eastern vice president; **Harold B. Harvey**, president, Harvey Metal Corp., Chicago, western vice president; and **Arthur V. Davis**, chairman, Aluminum Co. of America, New York, chairman of the board of directors. **Kenneth G. Castleman**, 420 Lexington avenue, New York, continues as secretary.

Merle J. Trees, vice president and sales manager, Chicago Bridge & Iron Co., Chicago, has been elected a director, Northern Trust Co., Chicago.

Charles W. Bimba, formerly metallurgist in the tool division, Acme Steel Co., Chicago, is now associated with the Tuff-Hard Corp., Detroit, as plant superintendent. The company produces special types of heat treated production cutting tools.

John W. Brussel has been named president and general manager, Steel Materials Corp., Detroit, following his resignation as factory manager of Bendix Aviation Corp., South Bend, Ind.

E. R. Godfrey has been promoted from works manager to assistant general manager, Frigidaire division, General Motors Corp., Dayton, O. **Mason Roberts** is now works manager of that division, succeeding Mr. Godfrey.

Ralph R. Newquist has been appointed manager, Houston, Tex., district office, Allis-Chalmers Mfg. Co., Milwaukee. Since joining the com-

pany in 1934, Mr. Newquist has been stationed in the district offices at Chicago and Pittsburgh, and more recently at Boston. At Houston he succeeds **K. P. Ribble**, who has obtained leave of absence because of ill health.

M. P. Robinson, proprietor of Robinson Filter Co., has joined Worthington Pump & Machinery Corp., Harrison, N. J., to take charge of that firm's newly organized water purification equipment division.

Marvin F. Pixton has been elected treasurer and a director, Ingalls Iron Works Co., Birmingham, Ala., and its subsidiaries. The past 16 years he has been associated with Peat, Marwick, Mitchell & Co., Atlanta, Ga., accounting firm.

W. Homer Hartz, president Morden Frog & Crossing Works, Chicago, and immediate past president, Illinois Manufacturers' association, has been named chairman of the organization's advisory board.

William E. Williams, sales engineer, Metal Lubricants Co., Chicago, has been presented with a life membership in American Society for Metals, "in recognition of his faithful, loyal and continuous service to the Chicago chapter."

Franklin E. Weaver, director and vice president, American Brass Co., Waterbury, Conn., has retired after more than 35 years' association with the company. **John A. Coe Jr.**, vice president in charge of sales, now has jurisdiction over all sales development, advertising and sales promotion activities of the company.

Henry T. Heald, president, Illinois Institute of Technology, Chicago, has been named to receive the distinguished service award for 1940 of the Chicago Junior Association of Commerce. Mr. Heald was

INDUSTRY



E. S. Chapman



N. A. Swanson

chosen for successful direction of the merger of Armour Institute of Technology and Lewis Institute into the Illinois Institute of Technology. The award, in the form of a key, was presented at the annual distinguished service award banquet Jan. 21, LaSalle hotel, Chicago.

Henry F. Millmann, executive vice president and general manager, Geuder, Paeschke & Frey Co., Milwaukee, was given a testimonial banquet at the Wisconsin club Jan. 15, to celebrate his completion of 50 years of continuous service with the company. He was presented with a gold watch by his associates.

Harry J. Schultz, formerly manager, contractors division, Independent Pneumatic Tool Co., has joined Worthington Pump & Machinery Corp., Harrison, N. J., as central regional manager, construction equipment division. He will make his headquarters at 400 West Madison street, Chicago.

F. W. McIntyre, vice president and general manager, Reed-Prentice Corp., Worcester, Mass., reported to Washington Jan. 20 to work with Howard W. Dunbar, vice president, Norton Co., on work for the council of national defense, machine tool co-ordinating committee, directed by Mason Britton, vice chairman of McGraw-Hill Publishing Co.

Ira W. Davies, superintendent, Indianapolis works, International Harvester Co., has been named assistant works manager of the company's motor truck division, Chicago. **H. B. Rose**, assistant superintendent of the company's Farmall works, Rock Island, Ill., has been transferred to Indianapolis, succeeding Mr. Davies.

Hugo A. Weissbrodt, since 1935 assistant superintendent of the Fort Wayne works, has become superin-

tendent of the motor truck plant at Springfield, O.

E. S. Chapman, vice president and assistant general manager of Chrysler Corp.'s Plymouth plant the past five years, has been loaned by the corporation, at the request of the national defense commission, to serve on its staff.

N. A. Swanson has been appointed chief metallurgist, Gary, Ind., works of Carnegie-Illinois Steel Corp. Since 1940 he has been assistant to division superintendent of the west mills. Mr. Swanson was first employed at Gary works in 1922 in the metallurgical department where he served in various capacities until 1934 when he became assistant chief metallurgist.

A. J. Schamehorn, since 1929 director of General Motors Corp. proving ground near Detroit, has been transferred to a manufacturing assignment at the Linden, N. J., division of the corporation. **Ernest E. Wilson** succeeds Mr. Schamehorn as proving ground director.

F. E. Fairman Jr. has been appointed assistant manager, switchgear division, central station department, General Electric Co., Philadelphia. **J. D. Hoffman**, also of Philadelphia, has been promoted to manager of sales of the equipment section in the switchgear division, taking over work formerly handled by Mr. Fairman.

George W. Frick, the past nine years manager of the Ohio district for Firth-Sterling Steel Co., McKeesport, Pa., has been made manager of the company's Firthite division. In this newly created post he will be in charge of sales of sintered carbide cutting materials.

Henry P. Jeager succeeds Mr. Frick as manager of the Ohio district.

Henry M. Hale has resigned as

eastern sales manager, Caterpillar Tractor Co., Peoria, Ill., to enter partnership with **John R. Taylor** as the Taylor-Hale Machinery Co., Memphis, Tenn. The new company will handle sales and services of Caterpillar products in the southern area.

George Rinck, formerly assistant eastern sales manager of Caterpillar, succeeds Mr. Hale.

James M. White, heretofore assistant to manager, LaPorte, Ind., works of Allis-Chalmers Mfg. Co., Milwaukee, has become assistant to **William Watson**, vice president in charge of manufacturing. **John G. Finch**, formerly Mr. White's assistant, has become manager of the LaPorte works, succeeding **Charles J. Hood**, retired.

Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., and president, Illinois Manufacturers' association, has been appointed assistant to the state supervisor on occupational deferment under the selective service act. Mr. Gaylord will be called upon to give recommendations and suggestions to the state occupational deferment board.

Horatio B. Hackett has resigned as president and director, Thompson-Starrett Co. Inc., New York. **George J. Atwell Jr.** has been elected a director in his place, but the office of president has not yet been filled.

E. N. Horr, associated with Cowles Detergent Co., Cleveland, since 1925, recently in charge of production and purchasing, has been elected vice president and general manager. **C. C. Bassett**, manager of the Mitchell Wing division at Cambridge, Mass., since 1932, has been elected vice president and director of sales; **C. C. Barrett**, secretary and treasurer, and **C. H. Fisher**, assistant secretary and assistant treasurer.

American Car & Foundry To Build 15 Light Combat Tanks Daily

■ COMBAT tank production for the United States army by American Car & Foundry Co., New York, will reach a rate of 15 units daily by September, according to F. A. Stevenson, vice president. Company also is manufacturing armor plate for the tanks and for 3439 half-track scout cars being built by other contractors, and tank suspensions or running gear for tanks being manufactured in Canada and England for Great Britain.

Initial order for 329 tanks was built at a rate of three daily and the order completed last December, earlier than required by the contract. These had been ordered and were in production before the efficiency of the German Panzer divisions was demonstrated in Western Europe. Additional orders for 3089 light tanks have been received; these with spare parts are to be delivered to the army within 540 days.

Facilities Expanded

"We anticipate beginning shipments in March and producing at that time at the rate of four tanks a day, building to a maximum output by September of 15 tanks a day. This requires a substantial increase in facilities in that new building space is required as well as a multitude of machine tools," said Mr. Stevenson.

American Car & Foundry estab-

lished its own armor plate manufacturing facilities when officials learned it was impossible to purchase the case-carburized plates as they had expected. This necessity, coupled with the magnitude of the tank program, led to the setting up of a separate department for tank manufacture at Berwick, Pa., a department divorced from the company's normal railroad equipment manufacturing business. The armor plate tank was built and 75 machine tools installed and completely tooled up in four months.

Company now has orders for 14,000 tons of finished armor plate, including that required for tanks on order. Capacity will be 1000 tons monthly.

To achieve the scheduled production of 15 tanks a day, the company has provided 175,000 square feet of floor space for the tank machine and assembly departments and 200,000 square feet for the armor plate department. Three hundred machine tools have been installed for manufacturing tank parts and 202 machine tools provided for the armor plate plant. Other equipment includes 16 carburizing furnaces, 9 annealing furnaces and 21 heat treating furnaces.

A total of 2663 drawings is involved in building a tank; 2865 different kinds of parts, or a grand

total of 14,318 individual pieces, are required, exclusive of engines and accessories. The machining of parts for each tank involves 705 items upon which 2728 operations are performed.

Tank machine shop has installed 60 Warner & Swasey turret lathes; 43 milling machines; lesser numbers of various other tools. Armor plate department has 43 planers and 51 radial drills.

To provide the necessary workmen for the program, company instituted a method of training employees to perform certain definite operations on certain parts and on certain machines. These machines are tooled in such a way that with proper supervision the minimum of inaccuracies result.

"Our method in training is employing so-called 'learners' who work with experienced operators and as a result, in a period of six to eight weeks, if they approach the task in the right attitude, become familiar enough with the operation to operate their own machine in a satisfactory manner," said Mr. Stevenson. "Please understand that these are not machinists but are purely operators of certain machine tools to produce certain definite parts."

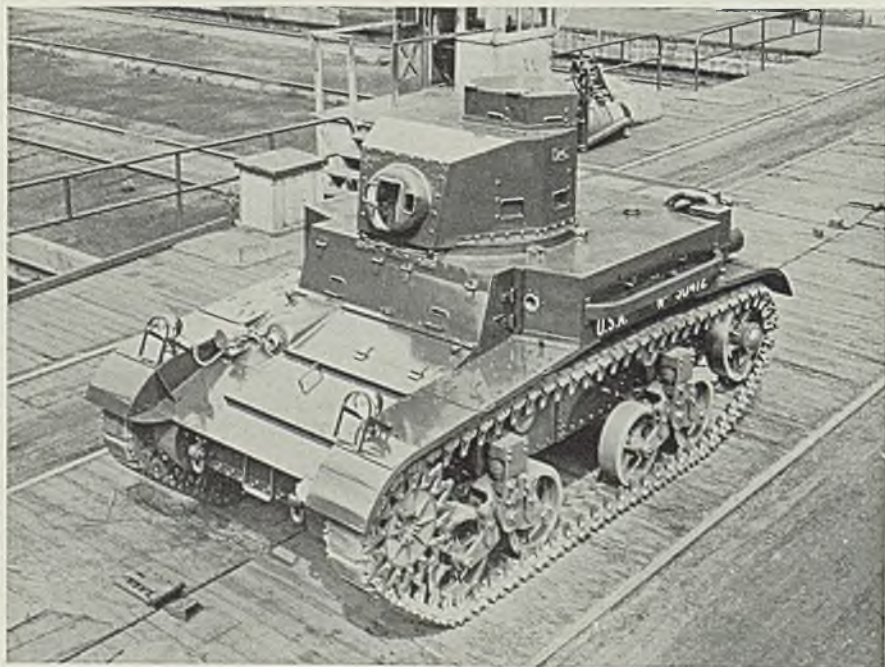
Lukens Authorized To Expand Wide Plate Mill

■ Navy department has awarded \$2,160,000 to Lukens Steel Co., Coatesville, Pa., for extending the heating facilities of its 206-inch plate mill.

The huge mill is supplying large quantities of wide plates which are used in the construction of hulls of submarines, as well as for the heads for boilers for naval ships. Mill also rolls plates for other companies manufacturing national defense equipment. One division of Lukens, Lukenweld Inc., uses plates from this mill in the manufacture of gun mounts for navy antiaircraft guns, while another division, By-Products Steel Corp., makes component parts for Lukenweld and other government suppliers.

Included among the changes which will be made in the mill are an extension to and strengthening of the present heating building to increase charging facilities in the soaking pits, as well as to permit the handling of heavier ingots and plates. The mill's shear building will be extended and strengthened to handle a larger volume and heavier material. Four new heating furnaces, with necessary cranes, and an ingot chariot for transferring the heated steel to the mill for rolling, will be installed.

All design and construction work will be handled by Arthur G. McKee & Co., Cleveland. Construction will start shortly.



■ Twelve-ton tanks for the United States army, capable of about 40 miles an hour, will be rolling off assembly lines at American Car & Foundry Co.'s Berwick, Pa., plant at a rate of 15 daily by September. Company has orders for more than 3000 of these units

Ordnance, Air Corps, Quartermaster Department Lead in Defense Awards

■ INCREASING proportion of government defense awards, excepting those for plant expansions and for facilities to accommodate the conscript army are relatively small, though still numerically heavy. Ordnance department, air corps and quartermaster corps are heaviest contractors for the army; bureau of supplies and accounts has been making most awards for the navy department.

Aggregate of contracts last week reported awarded was \$110,888,607.01. Army contracts totaled far more than half of that amount. About two thirds of the total was for materiel and equipment, the rest for plant expansions. Largest individual award was \$36,497,520, to Buick motor division of General Motors Corp., Detroit, for Pratt & Whitney aeronautical engines and spare parts. Other major awards: Norwalk Lock Co., South Norwalk, Conn., ammunition components, \$2,910,000; Scovill Mfg. Co., Waterbury, Conn., artillery ammunition components, \$3,780,000; and Brewster Aeronautical Corp., Long Island City, N. Y., airplanes, \$4,544,287.

War department reported the following contracts were awarded on a cost plus fixed fee basis: H. K. Ferguson Co., Cleveland, and Oman Construction Co., Nashville, Tenn., construction of an ammunition loading plant at Milan, Tenn., to be operated by Procter & Gamble Defense Corp., Cincinnati, \$8,514,370; W. Horace Williams Co., New Orleans, construction of cantonment at Leesville, La., \$7,294,227; E. B. Badger & Sons, Boston, construction and installation of equipment for an explosives plant at Sandusky, O., to be operated by Trojan Powder Co., Allentown, Pa., \$9,388,330; Mason & Hanger Co., New York, construction of a bag loading plant near Pulaski, Va., to be operated by Hercules Co., Wilmington, Del., \$9,376,390; and Good Construction Co. and Blythe Bros. Inc., both of Charlotte, N. C., construction of an airport and facilities at Charlotte, \$1,187,127.

Plant facilities' expansion and construction contracts reported by the navy department included: Lukens Steel Co., Coatesville, Pa., acquisition, construction and installation of additional facilities for increasing capacity of the company's 206-inch mill at estimated cost of \$2,160,000; Foote Gear & Machine Co., increasing previously announced contract for acquisition of additional machinery and equipment

at the Chicago plant from \$1,020,000 to \$1,940,000.

Following expansion awards reported by the navy department were for enlarging facilities for manufacture of aircraft engine and propeller parts; New Process Gear Corp., Syracuse, N. Y., \$348,000; Hartford Machine Screw Co., Hartford, Conn., \$469,000; New Britain Machine Co., New Britain, Conn., \$409,000; Republic Aircraft Products division of the Aviation Corp., New York, \$532,000; and Perkins Machine & Gear Co., West Springfield, Mass., \$365,000.

War department last week announced the following:

Air Corps Awards

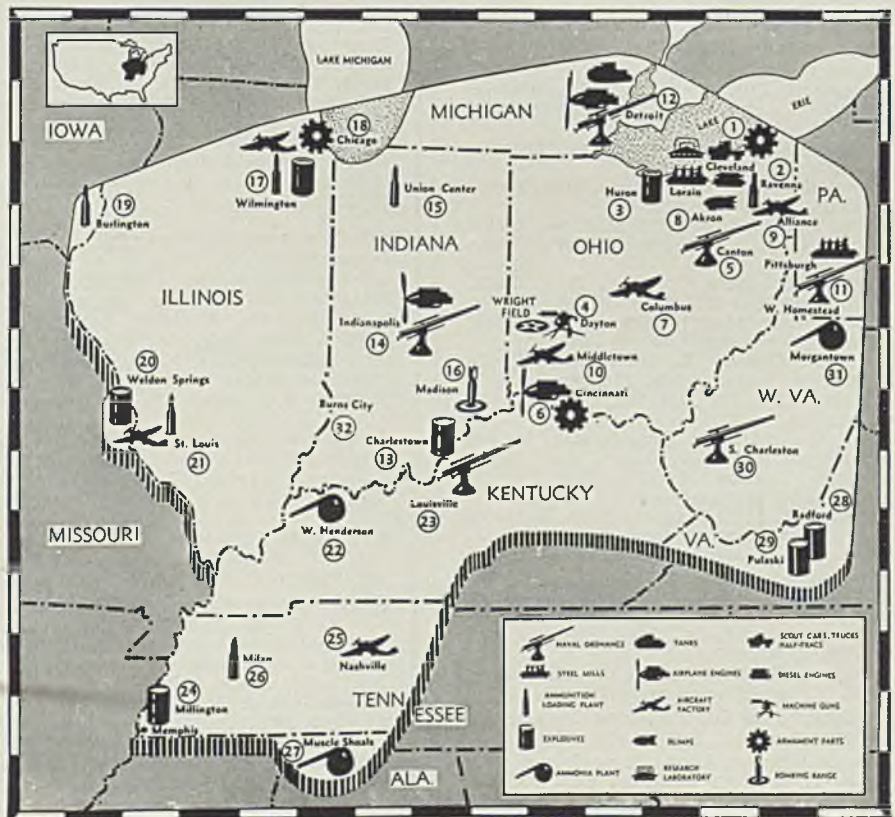
Air Cruisers Inc., Clifton, N. J., cylinders, \$406,330.28.
Aro Equipment Corp., Bryan, O., segregators, \$48,850.
Bell Aircraft Corp., Buffalo, adapter assemblies, \$249,375.
Bendix Aviation Corp., Bendix Parts division, South Bend, Ind., maintenance parts, \$168,266.02.

Biederman Motors Corp., Cincinnati, tractors, \$31,120.
Boyle Mfg. Co., Los Angeles, steel drums, \$27,044.16.
Fairchild Aviation Corp., Jamaica, N. Y., cameras, \$387,475.
Gallon Iron Works & Mfg. Co., Gallon, O., road rollers, \$161,800.
General Motors Corp., Buick Motor division, Detroit, Pratt & Whitney aeronautical engines and spare parts, \$36,497,520.
Leece-Neville Co., Cleveland, generator assemblies, \$39,700.
Mitchell Camera Corp., West Hollywood, Calif., under assemblies, \$58,559.77.
Pease, C. F., Co., Chicago, lamp assemblies, \$38,869.
Pump Engineering Service Corp., Cleveland, assemblies, \$72,471.
Square D Co., Kollsman Instrument division, Elmhurst, N. Y., compass assemblies, \$95,000.
Variety Aircraft Corp., Dayton, O., stand assemblies, \$57,600.
Weston Electric Instrument Corp., Newark, N. J., thermometer indicators, \$144,500.
Yale & Towne Mfg. Co., Stamford, Conn., fuel pumps, \$191,688

Quartermaster Corps Awards

Diamond T Motor Car Co., Chicago, trucks, \$3,112,360.
Dolph-Bateson Construction Co., Dallas, Tex., construction of warehouses, San Antonio general depot, Ft. Sam Houston, Texas, \$1,572,776.
Eastern Plumbing Co., Columbus, O., sanitary sewer and water systems and gas lines to service temporary build-

American Midwest Arsenal for Democracy



■ Map shows location of new airplane, tank, gun, powder, shell-loading and engine building plants erected, planned or being built in the vast inland area of United States' midwest in keeping with government policy of placing defense plants as far from the seaboard as practicable. NEA photo

ings, Ft. Hayes, Columbus, O., \$14,695.
 J. A. J. Construction Co., New York, general hospital, including utilities there-to at Ft. Dix, New Jersey, \$1,828,000.

Ordnance Department Awards

Allis-Chalmers Mfg. Co., Milwaukee, transmission assemblies and spare parts, industrial type tractors, \$38,162.85.
 Aluminum Co. of America, Massena, N. Y., aluminum alloy, \$1782.60.
 American Brass Co., Waterbury, Conn., small arms materiel and ammunition, \$29,351.07.
 American Car & Foundry Co., New York, armor plates, \$63,196.80.
 Atlantic Mfg. Co., Philadelphia, artillery ammunition, \$3350.
 Atlas Tool & Machine Co., Boston, gages, \$1900.
 Atwater Mfg. Co., Plantsville, Conn., steel plugs, \$118,125.
 Auto Ordnance Corp., Bridgeport, Conn., small arms materiel, \$8432.50.
 Barwood & Co., Philadelphia, gages, \$20,447.40.
 Bausch & Lomb Optical Co., Rochester, N. Y., projectors, \$3669.40.
 Bendix Aviation Corp., Eclipse Machine division, Elmira, N. Y., artillery ammunition, \$148,824.
 Blakeslee, G. S., & Co., Cicero, Ill., washing machines, \$8055.
 Bohn Aluminum & Brass Corp., Detroit, artillery ammunition components, \$342,490.
 Breeze Corporations Inc., Waverly plant, Elizabeth, N. J., artillery materiel, \$18,673.20.
 Bridesburg Foundry Co., Philadelphia, bronze castings, \$7983.63.
 Brill, J. G., Co., Philadelphia, artillery materiel, \$189,627.
 Brown & Sharpe Mfg. Co., Providence, R. I., equipment for milling machines, \$3304.16.
 Buffalo Forge Co., Buffalo, heaters, \$1067.
 Canister Co., Phillipsburg, N. J., artillery ammunition components, \$418,954.36.
 Carrier Corp., Syracuse, N. Y., condensing unit, \$7196.
 Caterpillar Tractor Co., Peoria, Ill., tractors, \$5385.
 Cleveland Container Co., Philadelphia, artillery ammunition components, \$4250.
 Colman, Frederick, & Sons Inc., Detroit, gages, \$1231.
 Colonial Broach Co., Detroit, broach sections, \$3393.25.
 Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, \$28,216.86.
 Conray Products Co. Inc., New York, artillery materiel, \$1588.60.
 Continental Motors Corp., Muskegon, Mich., tools, \$5667.53.
 Crofoot, Charles E., Gear Corp., South Easton, Mass., gears, \$14,490.
 Dayton Type Inc., Dayton, O., machines, \$10,550.
 Detroit Broach Co. Inc., Detroit, broach sections, \$3013.35.
 Detroit Testing Machine Co., Detroit, hardness testing machines, \$1085.
 DuPont, E. I., de Nemours & Co., Carney's Point works, Carney's Point, N. J., smokeless powder, \$117,750.
 Ex-Cell-O Corp., Continental Tool Works division, Detroit, broach sections, \$3621.90.
 Farquhar, Lynd, Co., Boston, milling machines, \$20,860.
 Fischer, Charles, Spring Co., Brooklyn, N. Y., small arms materiel, \$24,185.60.
 Froehlich, S., Co. Inc., New York, small arms materiel, \$10,928.95.
 General Bronze Corp., Long Island City, N. Y., artillery materiel, \$102,405.
 General Drop Forge Co. Inc., Buffalo, levers, \$1755.
 General Motors Corp., Guide Lamp division, Anderson, Ind., artillery ammunition, \$352,500.
 General Steel Castings Corp., Eddystone, Pa., automotive equipment, \$26,500.

Goddard & Goddard Co. Inc., Detroit, cutters, \$1680.
 Goodman Mfg. Co., Chicago, artillery materiel, \$591,500.
 Greenfield Tap & Die Corp., Greenfield, Mass., hand taps, \$1232.44.
 Honing Equipment Corp., Detroit, honing machines, \$4713.
 Improved Mailing Case Co. Inc., Brook-

lyn, N. Y., artillery ammunition components, \$2521.50.
 Johnson, Justus & Son Co., Hartford, Conn., dies, \$1365.
 Jones & Lamson Machine Co., Springfield, Vt., grinding machines, \$13,863.50.
 Kelly, John P., Philadelphia, manganese and bronze castings, \$1194.60.
 Kennedy-Van Saun Mfg. & Engineering

PURCHASES UNDER

(In Week Ended Jan. 11)

Iron and Steel Products	Commodity	Amount
Adams, S. G., Co., St. Louis	Dippers	\$18,900.00
Allegheny Ludlum Steel Corp., Brackenridge, Pa.	Steel	26,756.50
American Bridge Co. Inc., New York	Steel plates, structural steel	39,008.22
American Chain & Cable Co. Inc., York, Pa.	Plate and chain assemblies	11,500.00
Astrup Co., Cleveland	Tent slips	19,087.60
Austin Hastings Co., Cambridge, Mass.	Steel tubing	31,031.00
Bellaire Enamel Co., Bellaire, O.	Pans	12,320.00
Bethlehem Steel Co., Bethlehem, Pa.	Gate guides, forgings	7,294,964.10
Bethlehem Steel Export Corp., New York	Steel plates, bolts, screws	69,045.94
Blaw-Knox Co., Pittsburgh	Culvert forms	12,675.00
Boott, Wm. R., successor to Crescent Stove Works, Evansville, Ind.	Fire units	226,200.00
Breeze Corp. Inc., Newark, N. J.	Armor plates	18,673.20
Bridgell, Chas. D., Inc., Crisfield, Md.	Cleavers	11,707.50
Bridesburgh Engineering Co., Philadelphia	Tools	29,546.72
C. & J. Mfg. Co., Dallas, Tex.	Cabinets	299,750.00
Carpenter Steel Co., Reading, Pa.	Steel	14,330.32
Ceco Steel Products Corp., Jersey City, N. J.	Steel	37,762.00
Champion Rivet Co., Cleveland	Rivets	*16,090.80
Chapman Valve Mfg. Co., Indian Orchard, Mass.	Valves	22,000.00
Chatillon, John, & Sons, New York	Cleavers, saws	30,896.00
Cleaver-Brooks Co., Milwaukee	Boilers	16,400.00
Clyde Cutlery Co., Clyde, O.	Knives	45,455.00
Columbia Steel Co., San Francisco	Steel castings	13,125.00
Comstock-Castle Stove Co., Quincy, Ill.	Ranges	22,880.00
Continental Can Co. Inc., New York	Gas mask components	155,991.34
Copperweld Steel Co., Warren, O.	Steel bars, steel	277,172.70
Crane Co., Chicago	Vaives	19,835.20
Crosley Corp., Cincinnati	Cabinets, fire units	765,885.00
Cuyahoga Spring Co., Cleveland	Wire slips	12,800.00
Darby Corp., Kansas City, Kans.	Closure works	*10,688.40
Dover Stamping & Mfg. Co., Cambridge, Mass.	Pans, dippers	15,682.50
Enterprise Foundry Co., San Francisco	Weights	28,024.00
Farquhar, A. B., Co. Ltd., York, Pa.	Boilers	10,848.00
Geuder, Paeschke & Frey Co., Milwaukee	Pans	25,520.00
Globe Machine & Stamping Co., Cleveland	Trays	29,500.00
Graham, John H., & Co. Inc., New York	Hacksaw blades	32,536.05
Grigoleit Co., Decatur, Ill.	Ammunition components	23,372.70
Griswold Mfg. Co., Erie, Pa.	Meat choppers	17,120.00
Inland Steel Co., Chicago	Sheet steel	18,960.00
International-Stacey Corp., Columbus, O.	Weights	30,014.82
Katzinger, Edward, Co., Chicago	Pans, dippers	59,600.00
Kilby Steel Co., Anniston, Ala.	Forgings	694,960.00
Kirk & Blum Mfg. Co., Cincinnati	Cases	35,700.00
Knox Stove Works, Knoxville, Tenn.	Griddles	33,800.00
Lakeside Bridge & Steel Co., Milwaukee	Spillway gates	94,213.00
Lalanc & Grosjean Mfg. Co., Woodhaven, Long Island, N. Y.	Ladles	33,840.00
Lamson & Goodnow Mfg. Co., Shelburne Falls, Mass.	Forks, knives	13,900.00
Legion Utensils Corp., Long Island City, N. Y.	Pans, pots	17,304.93
Lockwood Mfg. Co., Cincinnati	Pans	28,875.00
Louisville Tin & Stove Co., Louisville, Ky.	Boxes, stove pipes, dippers	60,880.00
Lynchburg Foundry Co., Lynchburg, Va.	Cast iron pipe	33,501.60
Marshall Stove Co., Lewisburg, Tenn.	Stoves	14,280.00
Midwest Steel & Iron Works Co., Denver	Structural steel	12,736.00
National Enameling & Stamping Co., Long Island City, N. Y.	Containers	348,590.00
National Road Joint Mfg. Co., Chicago	Range cabinets	598,700.00
National Stamping Co., Detroit	Angletubes	105,032.34
Norris Stamping & Mfg. Co., Los Angeles	Containers	1,006,205.00
Oliver Iron & Steel Corp., Pittsburgh	Bolts	48,207.02
Phoenix Mfg. Co., Joliet, Ill.	Horse shoes	21,836.93
Polar Ware Co., Sheboygan, Wis.	Ladles, pans	53,211.50
Prentice, G. E., Mfg. Co., New Britain, Conn.	Buckles	21,831.10
Presto Gas Mfg. Co., Chicago	Range equipment	51,273.20
Reeves Steel & Mfg. Co., Dover, O.	Cans	84,359.96
Republic Steel Corp., Cleveland	Burster casings, iron culverts	108,330.90
Roebbling's, John A., Sons Co., Trenton, N. J.	Steel wire, rope	52,909.20
Rustless Iron & Steel Corp., Baltimore	Steel	38,632.42
Ryerson, Joseph T., & Son Inc., Chicago	Steel	38,328.50

Corp., Danville, Pa., wheel assemblies, \$11,366.40.
 Kilgore Mfg. Co., Westerville, O., artillery ammunition, \$267,376.20.
 Landis Tool Co., Waynesboro, Pa., grinding machines, \$1164.
 Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, \$21,132.03.
 Lukens Steel Co., Coatesville, Pa., steel plate, \$39,037.40.

McGill Mfg. Co., Valparaiso, Ind., automotive equipment, \$1551.38.
 McKiernan-Terry Corp., Dover, N. J., stacking machines, \$3432.
 Milwaukee Saddlery Co., Milwaukee, artillery materiel, \$18,614.
 Modern Tool & Die Co., Philadelphia, gages, \$1524.
 National Cash Register Co., Dayton, O., artillery ammunition, \$174,000.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., gages, \$39,485.47.
 Norton Co., Worcester, Mass., grinders, \$1407.50.
 Norwalk Lock Co., South Norwalk, Conn., artillery ammunition components, \$2,910,000.
 Oliver Iron & Steel Corp., Pittsburgh, steel plugs, \$118,125.
 Otis Elevator Co., Buffalo, steel castings, \$10,617.71.
 Parker & Harper Mfg. Co., Worcester, Mass., small arms materiel, \$2509.64.
 Pipe Machinery Co., Cleveland, gages, \$23,952.70.
 Poor & Co., Canton Forge & Axle Works, Canton, O., artillery materiel, \$16,870.40.
 Porter Forge & Furnace Inc., Boston, steel forgings, \$1140.51.
 Republic Steel Corp., Alloy Steel division, Massillon, O., steel, \$1361.72.
 Riordan Machinery Co., Detroit, milling machines, \$31,348.
 Ryan, E. G., & Co., Chicago, presses, \$6200.
 Scovill Mfg. Co., Waterbury, Conn., artillery ammunition components, \$3,780,000.
 Shipley, W. E., Machinery Co., Philadelphia, screw machines, \$9397.50.
 Somerville Machine & Foundry Co., Somerville, Mass., aluminum and bronze castings, \$3182.78.
 Steele, W. M., Co., Worcester, Mass., machines, \$9450.
 Taft-Pelree Mfg. Co., Woonsocket, R. I., gages, \$1706.88.
 Thomson-Gibb Electric Welding Co., Lynn, Mass., press welders, \$8460.
 Triumph Explosives Inc., Elkton, Md., automotive equipment, \$12,570.
 Union Spring & Mfg. Co., New Kensington, Pa., springs, \$15,876.
 Union Twist Drill Co., Athol, Mass., mills, cutters, drills and countersinks, \$5670.60.
 Vinco Tool Co., Detroit, gages, \$3553.90.
 Vinco Corp., Detroit, gages, \$3689.
 Vogt, Henry, Machine Co., Louisville, Ky., machinery, \$15,290.50.
 Warner Electric Brake & Mfg. Co., Beloit, Wis., parts for Warner electric brakes, \$26,369.96.
 Westinghouse Electric Supply Co., Wetmore-Savage division, Worcester, Mass., cable, \$1116.67.
 Winchester Repeating Arms Co., New Haven, Conn., artillery ammunition components, small arms ammunition, \$9815.
 York Safe & Lock Co., York, Pa., fire control equipment, \$16,059.05.

WALSH-HEALEY ACT

Iron and Steel Products

Schoedinger, F. O., Columbus, O.
 Sringmeour, William, Washington

Sedgley, R. F., Inc., Philadelphia

Servel Inc., Evansville, Ind.
 Standard Forgings Corp., Chicago

Stevens Walden Inc., Worcester, Mass.
 Swanson Machine Co., Jamestown, N. Y.
 Taylor Metal Products Co., Mansfield, O.
 Taylor-Wharton Iron & Steel Co., Easton, Pa.
 Truscon Steel Co., Youngstown, O.
 Union Parts Mfg. Co. Inc., Brooklyn, N. Y.
 United States Steel Export Co., Washington

Valley Iron Works Inc., Yakima, Wash.
 Virginia Bridge Co., Birmingham, Ala.
 Welker Mfg. Co. Inc., Cromwell, Conn.
 Wilson, W. S., Corp., New York

Wrought Iron Range Co., St. Louis

Youngstown Sheet & Tube Co., Youngstown, O.
 Youngstown Welding & Engineering Co., Youngstown, O.

Commodity	Amount
Pans	\$21,150.00
Knives, ladles, cooking utensils	849,575.00
Rifle barrels	134,640.00
Fire units	196,100.00
Ammunition components	624,000.00
Blanks	17,217.00
Containers (steel)	87,320.42
Grates	33,660.00
Gas cylinders	24,430.35
Steel buildings	33,962.00
Projectiles	10,168.00
Fabricated structural steel	*617,203.00
Frames	10,850.00
Structural steel	24,860.00
Buckles	20,209.50
Wrench sets	12,211.68
Ranges	24,750.00
Steel angles	17,946.47
Water boxes	\$3,107.76

Nonferrous Metals and Alloys

Aluminum Co. of America, Pittsburgh

Aluminum Cooking Utensil Co., New Kensington, Pa.

Aluminum Goods Mfg. Co., Mantowoc, Wis.

Aluminum Products Co., LaGrange, Ill.

American Metal Co. Ltd., New York

American Metal Crafts Co., Attleboro, Mass.

American Smelting & Refining Co., San Francisco

Chase Brass & Copper Co. Inc., Waterbury, Conn.

Froehlich, S., Co. Inc., New York

Gardner Metal Co., Chicago

International Nickel Co. Inc., New York

International Silver Co., Meriden, Conn.

Kilde, Walter, & Co. Inc., New York

Noland Co. Inc., Columbia, S. C.

North American Smelting Co., Philadelphia

Rex Products Corp., New Rochelle, N. Y.

Union Parts Mfg. Co. Inc., Brooklyn, N. Y.

Wallace, R., & Sons Mfg. Co., Wallingford, Conn.

Whitehead Metal Products Co. Inc., Philadelphia

Aluminum alloy rods, aluminum	\$56,343.34
Range equipment, boilers, colanders	990,457.39
Aluminum utensils	368,000.00
Pitchers, pots	538,460.00
Solder	22,426.00
Insignia	34,496.00
Plg lead	41,800.00
Tubing	97,800.88
Cases	10,928.91
Solder	11,351.81
Nickel	236,731.89
Plated tableware	160,084.50
Fire extinguishers	255,007.50
Plg lead	44,352.00
Solder	25,893.40
Insignia	192,432.24
Plunger heads	13,582.40
Forks, spoons	28,000.00
Nickel-copper-alloy	10,520.24

Machinery and Other Equipment

American Tool Works Co., Cincinnati

Barco Mfg. Co., Chicago

Bullard Co., Bridgeport, Conn.

Caterpillar Tractor Co., Peoria, Ill.

Chisholm-Moore Holst Corp., Tonawanda, N. Y.

Edison, Thomas A., Inc., Ediphone division, West Orange, N. J.

Electric Boat Co., Bayonne, N. J.

Firestone Tire & Rubber Co., Akron, O.

Jaeger Machine Co., Columbus, O.

Johnson, Almon A., New York

Kennedy-Van Saun Mfg. & Engineering Corp., Danville, Pa.

Lidgerwood Mfg. Co., Elizabeth, N. J.

Link-Belt Speeder Corp., Chicago

Mine Safety Appliance Co., Pittsburgh

Norse Chain Co., Detroit

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.

Northern Commercial Co., Seattle

Shipley, W. E., Machinery Co., Philadelphia

Simmons Machine Tool Corp., Albany, N. Y.

Singer Sewing Machine Co., New York

Warner & Swasey Co., Cleveland

Will Corp., New York

Willows Mfg. Corp., Brooklyn, N. Y.

Lathes	\$19,960.00
Power hammers	11,840.25
Lathe	12,249.77
Tractors	19,560.00
Holsts	15,473.54
Shaving machine	12,800.00
Motor parts	21,259.50
Engine parts	14,525.00
Pumps	29,148.88
Winches	27,240.00
Wheel assemblies	11,366.40
Winches	35,950.00
Crane	17,225.00
Oxygen transfer equipment	21,362.10
Engine parts	50,559.14
Lathes	23,075.00
Tractors	14,760.00
Boring machines, hole grinders	72,545.00
Lathes	19,500.00
Sewing machines	16,100.75
Lathes	23,936.00
Centrifuges	25,671.36
Carriers	13,123.08

Navy department reported the following:

Bureau of Supplies and Accounts Awards

Aerial Machine & Tool Corp., New York, assemblies, \$40,320.
 Allis Chalmers Mfg. Co., Milwaukee, tractors, \$8492.40.
 Atlas Car & Mfg. Co., Cleveland, locomotive, \$22,975.
 Automatic Temperature Control Co. Inc., Philadelphia, fuel oil valves, \$30,842.50.
 Balfour, Guthrie & Co. Ltd., San Francisco, foundry pig iron, \$19,949.
 Beacon Devices, North Tonawanda, N. Y., pumps, \$6924.
 Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., generators, control boxes, \$34,690.30.
 Bethlehem Steel Co., Bethlehem, Pa., tool steel, \$95,379.
 Brewster Aeronautical Corp., Long Island, N. Y., airplanes, \$4,544,287.
 Bullard Co., Bridgeport, Conn., vertical mills, \$58,596.60.
 Calumet & Hecla Consolidated Copper Co., New York, ingot copper, \$48,200.
 Carey Machinery & Supply Co., Baltimore, bench lathes, \$21,988.66.
 Chambersburg Engineering Co., Cham-

*Estimated

(Please turn to Page 68)

Manufacturers Say Larger Defense Orders Would Curtail Normal Output

■ TO WHAT extent will national defense orders necessitate curtailment of civilian production?

A large group of executives in manufacturing industries most affected by the rearmament program was surveyed by the National Industrial Conference board to determine: Whether they have had any difficulty in meeting both regular demand and defense requirements; if difficulties existed, whether they were due to shortages of raw materials, labor or productive facilities; what situation would prevail if the present volume of defense awards were to be doubled.

Twenty-five per cent replied they were experiencing some difficulty in meeting both types of demand. Nearly all these companies were in the durable goods field, including a large number of machine tool builders.

More than half the companies reporting difficulties expect the situation will become more serious. A few expect the situation will ease as time passes.

Nearly two-thirds estimated that doubling the present volume of defense orders would necessitate defi-

nite curtailment of civilian production.

Shortages of skilled labor and productive facilities were cited as the underlying causes for present difficulties. Many executives said they would put on an extra shift if they could obtain sufficient skilled men.

Few shortages of raw materials were reported, although in some cases marked extensions of delivery dates were noted.

Machine tool builders were experiencing the greatest difficulty of all classes of industry and most producers expect the situation to become much worse. Most regular customers now have defense work and there is little regular commercial trade left.

Representative comments by executives in the machine tool and other metalworking industries:

Machine tools: "Practically all of our new orders are directly or indirectly due to the defense program. Although we have been unusually fortunate on the question of labor supply, we do anticipate some difficulty next year on shortages of mechanics. We may also experience

some difficulty on gray iron castings."

"There is an extreme shortage of skilled labor; in fact, there is almost none to be had in this neighborhood, and our man-power growth for some time has come from the training of learners which, of course, takes some time, although I believe we are now doing it very rapidly. It seems to me that it is very plain that billions of dollars worth of new orders suddenly dumped into the manufacturing plants of this country cannot do other than reduce regular commercial output and why should it not be that way? It is impossible to quickly expand existing facilities to take care of both situations at the same time."

"We anticipate no difficulty in taking care of our ordinary demands, for this reason: In many cases—I should say most cases—people who are taking war contracts, and to whom we are supplying machine tool equipment, are the same people who ordinarily buy our machines for domestic demand . . . The difficulty arises from the fact that in Washington neither the defense commission nor any other agency has taken time to sit down and carefully make an analysis of the machine tools needed for defense contracts, subcontracts and sub-subcontracts."

Foundries: "Skilled labor is hard to get; however, apprentices are being broken in. There is no shortage of raw materials and productive facilities, in the main, are sufficient."

"Our main difficulty at the present time is getting certain types of skilled labor. We are assimilating new employes gradually and training them ourselves."

"We have recently had quite a pick-up in our incoming orders so it begins to look as if we will soon have some difficulty in making satisfactory deliveries. A doubling of the present volume of defense orders, we believe, would probably necessitate a curtailment in civilian production."

Electrical equipment: "As far as I know the electrical industry is not experiencing any serious difficulty in meeting its regular commercial demands because of the defense program. An exception might be made of that branch of our industry that manufactures large turbines. My guess, and it is only a guess, is, that doubling the present volume of defense business would necessitate a curtailment in civilian production, certainly where such materials as aluminum, copper and stainless steel are involved."

"If the present pressure in connection with the defense program continues, it will soon have an effect upon the civilian production and

Train in Kansas College for Machine Jobs



■ Increasing share of the burden of defense work is being actively assumed by nonindustrial sections of the United States. Kansas State college, Manhattan, Kans., has enrolled 25 men and two women in an engineering drawing course as a start toward active participation in the \$9,000,000 federal program of engineering training for defense industries. Shown here are students receiving practical instruction in use of gages in machine operation. NEA photo

this will be especially true if priorities are issued."

Railroad equipment: "About 50 per cent of our business intended for the private consumer is being retarded due to increased tempo of defense orders. . . . There is a shortage in skilled machine operators."

"We do not look for any difficulties in the near future, and do not anticipate any necessity for curtailment in civilian production."

"The only difficulty that I can see ahead is the possible procurement of raw materials, principally steel."

Steel: "We believe that there is ample capacity in the steel industry to meet all requirements, both government and civilian, for quite some time to come."

"We think there will be temporary difficulty in securing enough steel for regular commercial purposes at this time. The little shortage existing is due to productive facilities. As to the necessity for curtailment in civilian production, this would

apparently depend on the activity in defense production. This, in turn, would depend, we believe, on the events in Europe."

"Our plant is operating at approximate capacity but we are not experiencing any difficulty in meeting the regular commercial demands because of the defense program. There is no shortage of labor. The principal handicap for the smaller steel companies that are not self-contained is the increased cost of raw materials such as pig iron, scrap iron, spelter, ferromanganese and other alloys that are necessary to produce defense materials. The labor rates for the moment are set, the selling price seems to be frozen at its present level, but raw materials have increased in the last four months from 25 per cent to 50 per cent. This is a condition that cannot continue. Either the raw material prices will have to be reduced to a normal point or the sales price will have to be increased."

Automotive: "We are under the

impression that the automobile industry, to which we are very closely related, will have to forego some of its productive activity in order to assist in the defense program, and this event may not be very far away."

"If we had no normal production, we still could not get into production on defense contracts earlier because the bottle-neck on each of these contracts is special machines that we do not have for normal production. We do not believe there will be any shortages of labor, raw materials or productive facilities."

Nonferrous metals: "Our industry is not yet experiencing any great difficulty in meeting its regular commercial demand because of the defense program. A doubling of the present volume of defense orders would necessitate some curtailment in civilian production, unless export orders for the account of Great Britain are reduced. If exports to Great Britain were eliminated, I believe our industry would be able to take on double the present volume of defense orders without curtailing civilian production."

Heavy machinery: "I do not believe it is possible for America to rearm speedily without restricting production in or for civilian industries. The expenditure of possibly \$15,000,000,000 per year represents a certain amount of man hours of labor, and with all of the restrictions existing due to the Walsh-Healey act and the wage and hour act, we have not available enough man hours to accomplish the armament program and maintain the standard of living. By 'standard of living' I refer to the production of consumption articles."

"We can see no reason for not accomplishing a speedy rearmament without restricting production in or for civilian industries, as our observation is that were it not for the rearmament program, the industries of this country would be operating at a very low percentage of capacity."

"Some difficulties are arising in acquisition of metal-finished products at this time. We believe that difficulties will increase from now on and that a doubling of the present volume of national defense orders would greatly accelerate the condition."

"Heavy forgings and castings are becoming increasingly difficult to obtain, owing to the priorities granted to the machine tool builders and to those supplying forgings. We look for a continuation of existing difficulties, and an intensification of those difficulties as the program advances further. In the steel casting industry molders are extremely scarce, which makes for delayed receipt by us of steel castings."

Welding Enables Britain To Speed War Material Output Despite Bombs

■ AN ESTIMATED reduction of 15 per cent in British industrial production from damage caused by German air raids has been largely offset by improved manufacturing methods, including wider application of welding processes, according to George F. Clipsham, managing director, Lincoln Electric Co. Ltd., Welwyn Garden city, England.

Mr. Clipsham cited use of large size arc welding electrodes as a major factor in the success of British industry in speeding output.

In one instance larger size electrodes made a reduction of welding time on a marine mine from 4½ to 2¼ hours. Proportionate reductions are being made in tank, shell, torpedo, gun carriage, gun mount and other defense material production.

So important is welding in the British industrial picture today that a welding advisory group has been set up under authority of the minister of supplies to study welding operations. Purpose is to encourage welding wherever it will save time.

Although large size electrodes are used to some extent, Clipsham estimates that their full utilization would save thousands of much needed man hours for industry.

"Suppose", said Mr. Clipsham, "that there are 50,000 arc welders not now using large electrodes. By going to the larger sizes, they could each save at least 10 per cent of their time which would make a to-

tal daily saving of 40,000 man hours."

This figure becomes staggering since conservative estimates give



George F. Clipsham

the number of arc welders in the United States as 100,000.

"Welding has had a tremendous boost in England since the war started because it has been recognized as a means of speeding up production in shortest possible time."

Mr. Clipsham, a native of Liverpool, expects to return to England early in February after gathering data on latest developments in the welding industry here.

Management Is as Vital as Men, Money, Materials, Machines

■ AT THE TURN of the century the Carnegie Steel Co. was one of the world's largest industrial enterprises and Andrew Carnegie was without question the world's leading industrialist.

Historians and biographers who have tried to determine the key to Carnegie's success agree that his genius lay in his extraordinary faculty for organization.

Carnegie himself often stressed organization. The late Charles M. Schwab never tired of telling friends that Mr. Carnegie once said to him, "Charlie, if I were deprived at one stroke of all of my furnaces and mills but were left my organization, I could re-establish myself in four years or less."

More of the Carnegie fetish for organization would stand this nation in good stead today.

Daily Washington announces plans for tremendous new plants for defense. Throughout the country, industrial companies are breaking ground for plant additions. Simultaneously facilities now operating on automobiles, refrigerators and other non-defense products are pointing toward an early shift over to parts for planes, ships, tanks, etc.

In discussions regarding this great spurt in industrial activity the emphasis invariably falls heavily upon what it involves in the four M's—men, money, materials and machines.

The nation is conscious of the approaching demands upon labor, particularly upon skilled workers. It is painfully aware of the cost of this effort and of the resultant great burden of taxes. It realizes the

need of more materials and the possibility that capacity in some lines may have to be expanded to provide sufficient volume. Also, everybody knows how important are machines to the success of the entire program.

* * *

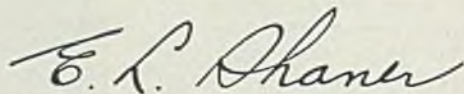
But a fifth M—an almost forgotten M—is of equal, if not greater, importance. It is management, which also involves organization. The quality which served Carnegie so well also will be the key to the efficiency of the defense effort.

To provide competent management and proper organization for the new plants and expanding old ones will tax to the utmost the executive personnel of the country. At the very best, the talent of the available top-flight executives must be spread out too thinly.

* * *

Industry should prepare immediately for this wholesale dispersion of its executives. Now is the time to delegate authority down the line, to test the understudies for each key position and to introduce junior executives to more exacting responsibilities.

In this way, and in this way only, can we hope to provide good management and organization for the approaching test, which will be by all odds the greatest industrial undertaking in the world's history.



EDITOR-IN-CHIEF

The BUSINESS TREND

Activity Index Moves To Higher Level

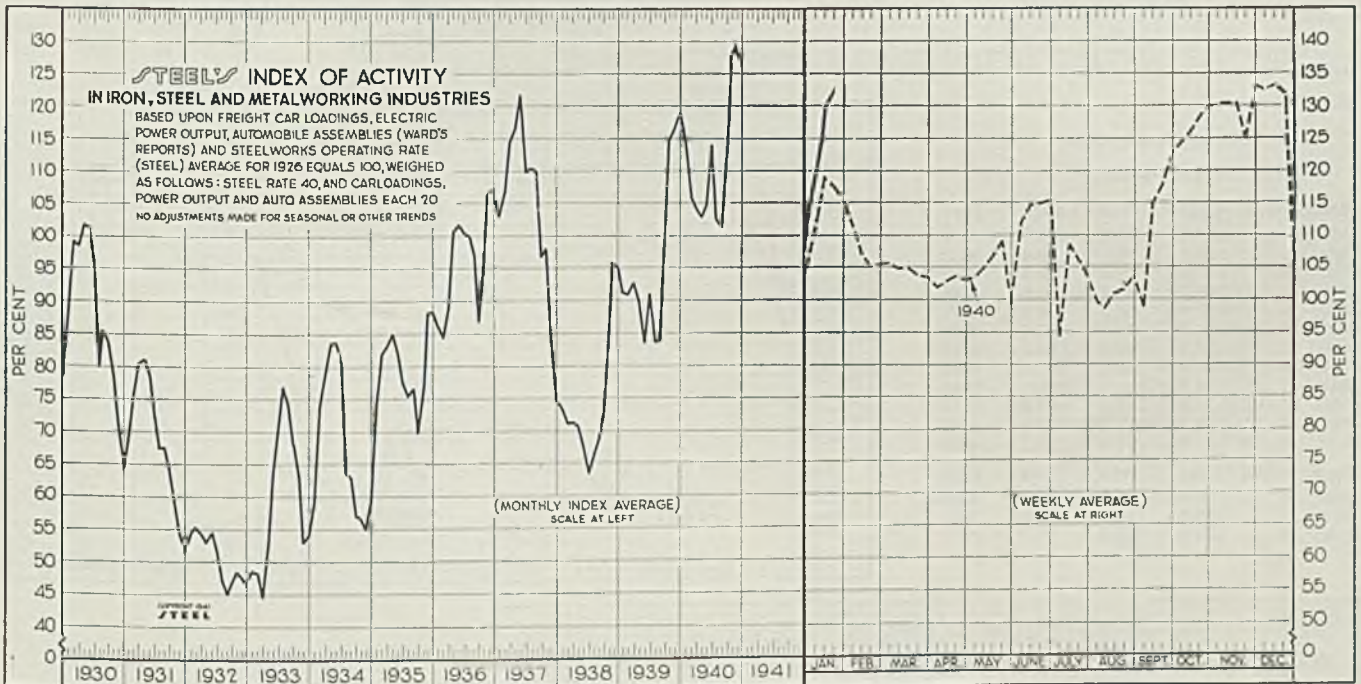


■ UPWARD trend of industrial production continues, with activity in those lines directly related to the defense program recording encouraging gains. New records have recently been established in steel, automobile and machine tool output. While the capital goods industries are still furnishing the best records, activity in a number of consumer lines is showing steady improvement.

STEEL'S index of activity in the iron, steel and metalworking industries advanced 2.4 points to 132.3 during the week ended Jan. 18. This is in sharp contrast with a year ago when the index stood at 117.3 and was tending downward.

Steel ingot production is currently at the highest level in history. During the week ended Jan. 18 the national steel rate advanced to 98 per cent and is still moving upward. In the previous week steelmaking operations stood at 97 per cent, while in the comparable period a year ago it was at 84.5 and edging downward. Steel producers report no let-up in new orders despite the industry's effort to eliminate fears of shortages later.

Automobile assemblies and electric power consumption again recorded moderate gains in the latest period, while revenue freight carloadings receded 1.6 per cent to 700,440 cars.



STEEL'S index of activity gained 2.4 points to 132.3 in the week ended Jan. 18:

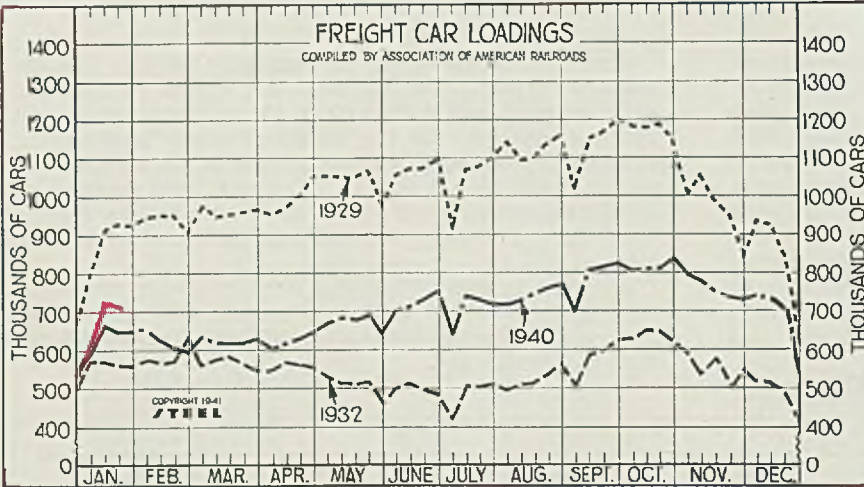
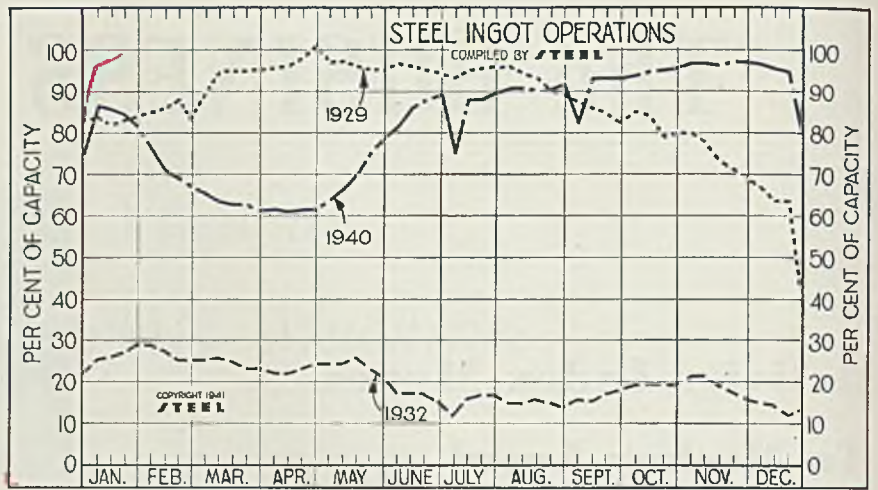
Week Ended	1940	1939	Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan. 16	130.3	117.3	Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Nov. 23	124.7	111.4	Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
Nov. 30	132.6	117.9	March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
Dec. 7	132.5	123.9	April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
Dec. 14	132.6	124.2	May	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
Dec. 21	132.4	123.4	June	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
Dec. 28	107.5	104.0	July	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Week Ended	1941	1940	Aug.	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Jan. 4	115.7	110.3	Sept.	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Jan. 11	129.9	119.2	Oct.	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Jan. 18	132.3	117.3	Nov.	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
			Dec.	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Oct. 5	93.5	87.5	48.5	66.0
Oct. 12	94.5	89.5	51.5	63.0
Oct. 19	95.0	91.0	51.5	53.0
Oct. 26	95.5	92.0	54.5	51.0
Nov. 2	96.5	93.0	57.5	47.0
Nov. 9	96.5	93.0	61.5	39.0
Nov. 16	96.0	93.5	63.0	35.0
Nov. 23	97.0	93.5	62.0	31.5
Nov. 30	97.0	94.0	61.0	30.5
Dec. 7	96.5	94.0	61.0	27.0
Dec. 14	95.5	92.5	58.0	27.0
Dec. 21	95.0	90.5	52.0	23.0
Dec. 28	80.0	75.5	40.0	21.0

Week ended	1941	1940	1939	1938
Jan. 4	95.5	86.5	51.5	21.0
Jan. 11	97.0	86.0	52.0	26.0
Jan. 18	98.0	84.5	51.5	29.0



Freight Car Loadings

(1000 Cars)

Week ended	1940	1939	1938	1937
Oct. 12	812	845	727	810
Oct. 19	814	861	706	773
Oct. 26	838	834	709	772
Nov. 2	795	806	673	732
Nov. 9	778	786	637	690
Nov. 16	745	771	657	647
Nov. 23	733	677	562	559
Nov. 30	729	689	649	623
Dec. 7	739	687	619	622
Dec. 14	736	681	606	603
Dec. 21	700	655	574	460
Dec. 28	545	550	500	457

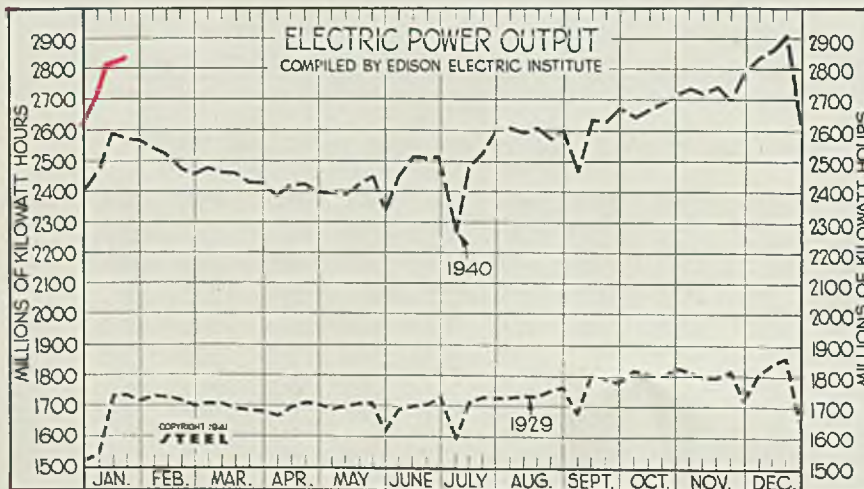
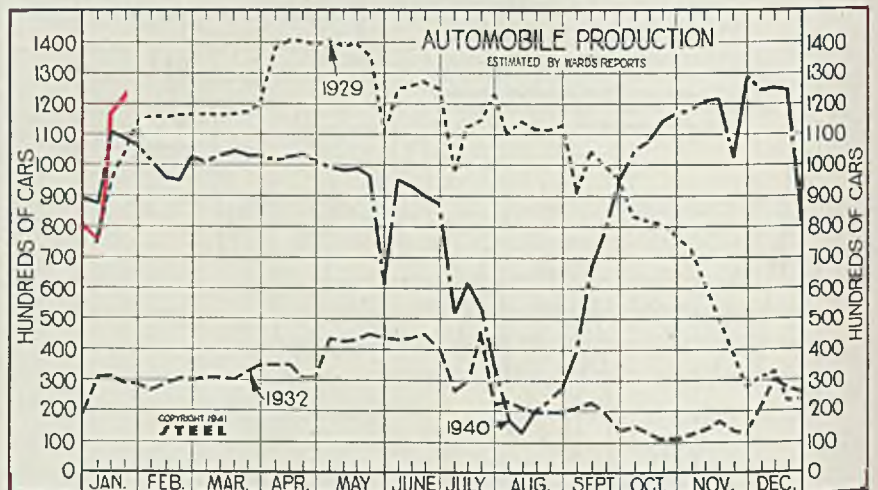
Week ended	1941	1940	1939	1938
Jan. 4	614	592	531	457
Jan. 11	712	668	587	552
Jan. 18	700	646	590	581

Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Oct. 12	108.0	75.9	50.5	89.7
Oct. 19	114.7	70.1	68.4	91.9
Oct. 26	117.1	78.2	73.3	90.2
Nov. 2	118.1	82.7	80.0	89.8
Nov. 9	120.9	86.2	86.3	85.3
Nov. 16	121.9	86.7	96.7	85.8
Nov. 23	102.3	72.5	84.9	59.0
Nov. 30	128.8	93.6	97.8	86.2
Dec. 7	124.8	115.5	100.7	85.8
Dec. 14	125.6	118.4	102.9	82.0
Dec. 21	125.3	117.7	92.9	67.2
Dec. 28	81.3	89.4	75.2	49.6

Week ended	1941	1940	1939	1938
Jan. 4	76.7	87.5	76.7	49.6
Jan. 11	115.9	111.3	86.9	54.1
Jan. 18	124.0	108.5	90.2	65.7

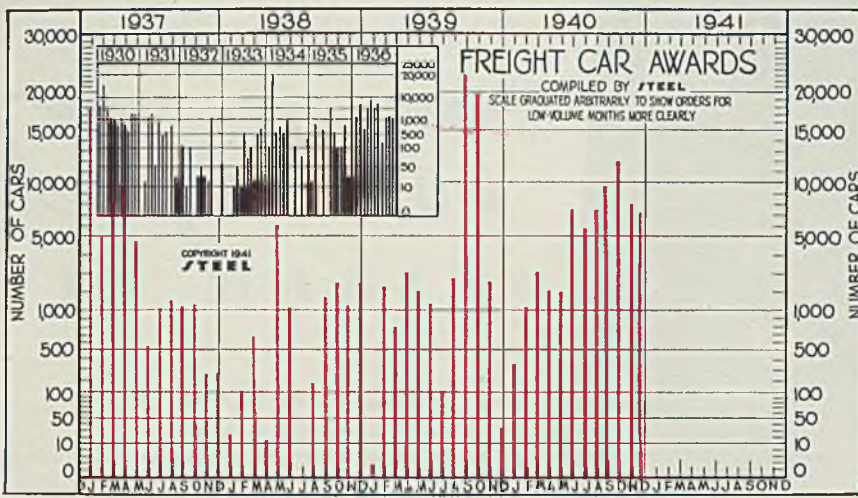


Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Oct. 12	2,665	2,495	2,183	2,276
Oct. 19	2,687	2,494	2,214	2,262
Oct. 26	2,711	2,539	2,226	2,255
Nov. 2	2,734	2,537	2,207	2,202
Nov. 9	2,720	2,514	2,209	2,176
Nov. 16	2,752	2,514	2,270	2,224
Nov. 23	2,695	2,482	2,184	2,035
Nov. 30	2,796	2,539	2,285	2,153
Dec. 7	2,838	2,586	2,319	2,196
Dec. 14	2,862	2,605	2,333	2,202
Dec. 21	2,911	2,641	2,363	2,085
Dec. 28	2,623	2,404	2,121	1,998

Week ended	1941	1940	1939	1938
Jan. 4	2,705	2,473	2,169	1,998
Jan. 11	2,835	2,593	2,270	2,140
Jan. 18	2,844	2,572	2,290	2,115



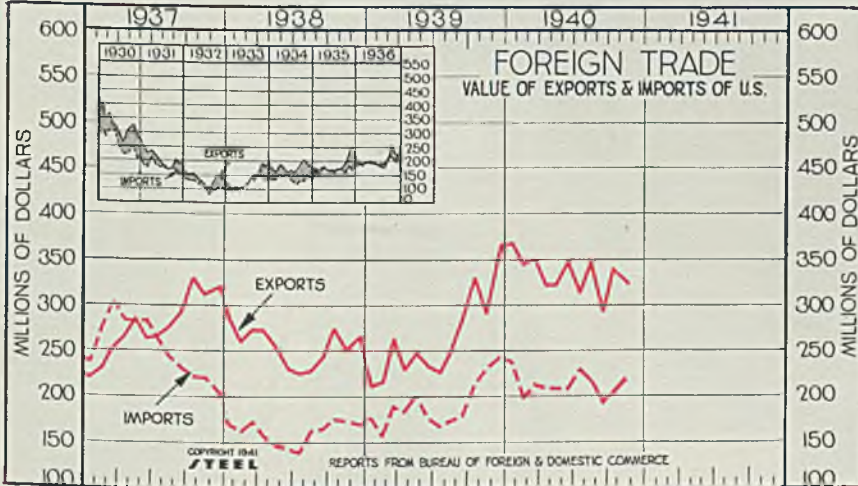
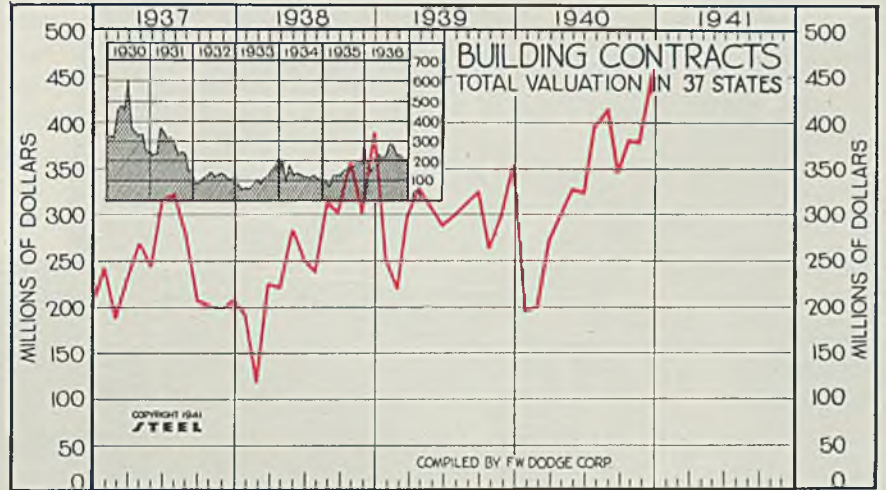
Freight Car Awards

	1940	1939	1938	1937
Jan.	360	3	25	17,806
Feb.	1,147	2,259	109	4,972
March ...	3,104	800	680	8,155
April ...	2,077	3,095	15	9,772
May ...	2,010	2,051	6,014	4,732
June ...	7,475	1,324	1,178	548
July ...	5,846	110	0	1,030
Aug.	7,525	2,814	182	1,475
Sept.	9,735	23,000	1,750	1,216
Oct.	12,195	19,634	2,537	1,355
Nov.	8,234	2,650	1,232	275
Dec.	7,181	35	2,581	275
Total ..	66,912	57,775	16,303	51,611

Construction Total Valuation In 37 States

(Unit: \$1,000,000)

	1940	1939	1938	1937	1936
Jan.	\$196.2	\$251.7	\$192.2	\$242.7	\$204.8
Feb.	200.6	220.2	118.9	188.3	142.1
Mar. ...	272.2	300.7	226.6	231.2	199.0
April ...	300.5	330.0	222.0	269.5	234.8
May ...	328.9	308.5	283.2	243.7	216.1
June ...	324.7	288.3	251.0	317.7	232.7
July ...	398.7	299.9	239.8	321.6	294.7
Aug. ...	414.9	312.3	313.1	281.2	275.3
Sept. ...	347.7	323.2	300.9	207.1	234.3
Oct. ...	383.1	261.8	357.7	202.1	225.8
Nov. ...	380.3	299.8	301.7	198.4	208.2
Dec. ...	456.2	354.1	389.4	209.5	199.7
Ave. ...	\$333.7	\$295.9	\$266.4	\$242.8	\$222.3



United States Foreign Trade

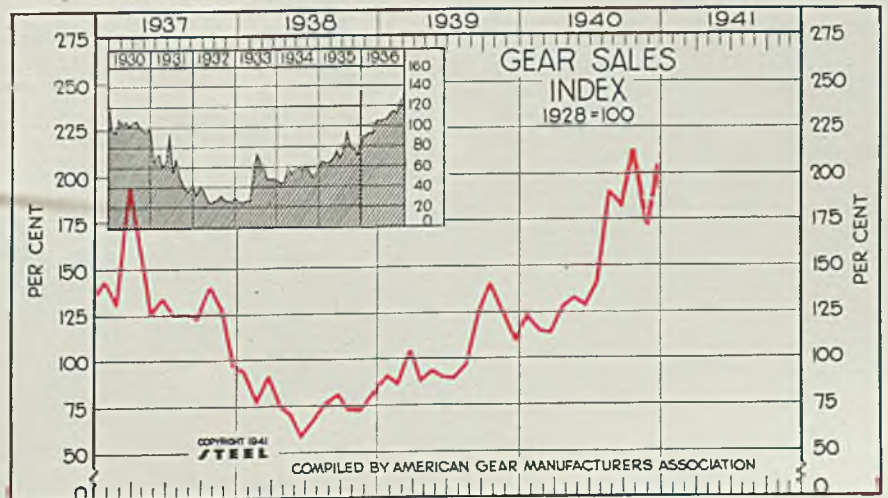
(Unit: \$1,000,000)

	Exports		Imports	
	1940	1939	1940	1939
Jan.	\$368.6	\$212.9	\$241.9	\$178.2
Feb.	347.0	218.6	199.8	158.0
Mar.	352.3	267.8	216.7	190.5
April ...	324.0	231.0	212.2	186.3
May ...	325.3	249.5	211.4	202.5
June ...	350.2	236.1	211.4	178.9
July ...	317.0	229.6	232.3	168.9
Aug.	349.9	250.8	220.5	175.8
Sept. ...	295.2	289.0	194.9	181.5
Oct.	343.5	332.1	207.1	215.3
Nov. ...	327.7	292.5	223.4	235.4
Dec. ...	.....	367.8	.....	247.0
Total	\$3,177.0	.....	\$2,318.3	.....

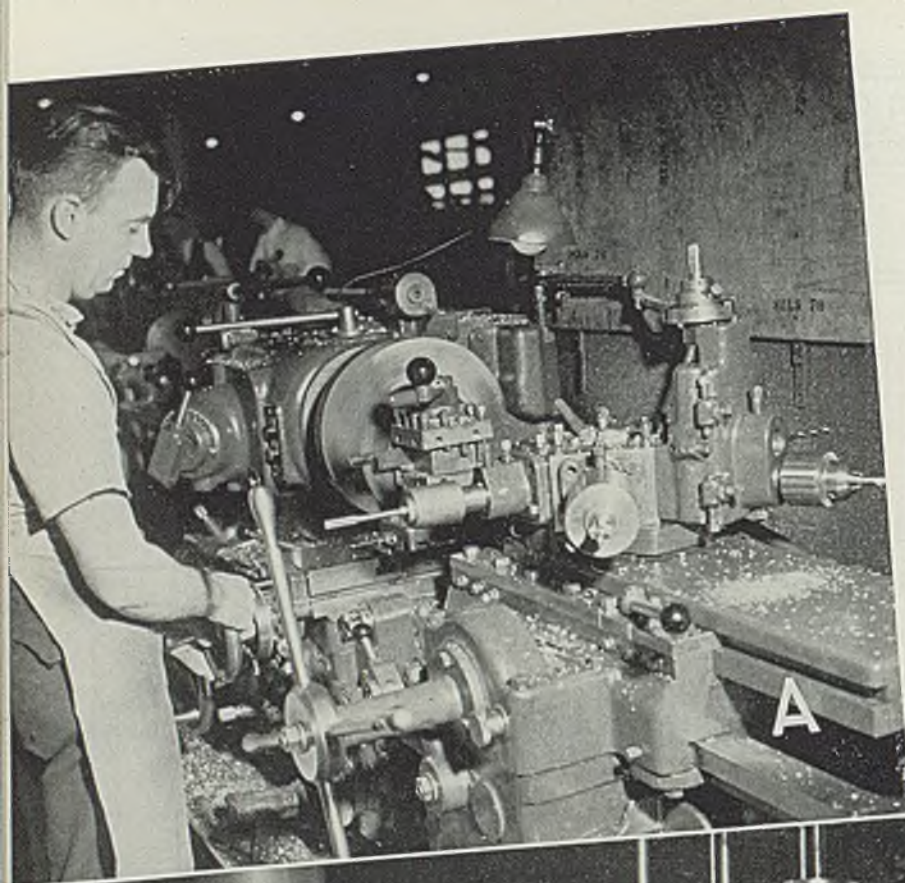
Gear Sales Index

(1928 = 100)

	1940	1939	1938	1937	1936
Jan. 1-3	91.0	93.0	144.0	90.5	
Feb. 116	86.0	77.0	130.5	93.0	
Mar. 114	104.0	91.0	195.0	92.0	
April 128	88.0	74.0	164.0	105.0	
May 133	93.0	70.0	125.5	105.0	
June 129	90.0	58.0	134.0	105.0	
July 141	89.0	67.0	124.0	107.5	
Aug. 191	96.0	76.5	125.0	113.0	
Sept. 183	126.0	80.5	123.0	115.5	
Oct. 216	141.0	72.5	139.5	112.5	
Nov. 173	126.0	72.0	127.5	112.5	
Dec. 208	111.0	81.0	97.0	132.5	
Ave. 155.0	103.0	76.0	135.5	107.5	

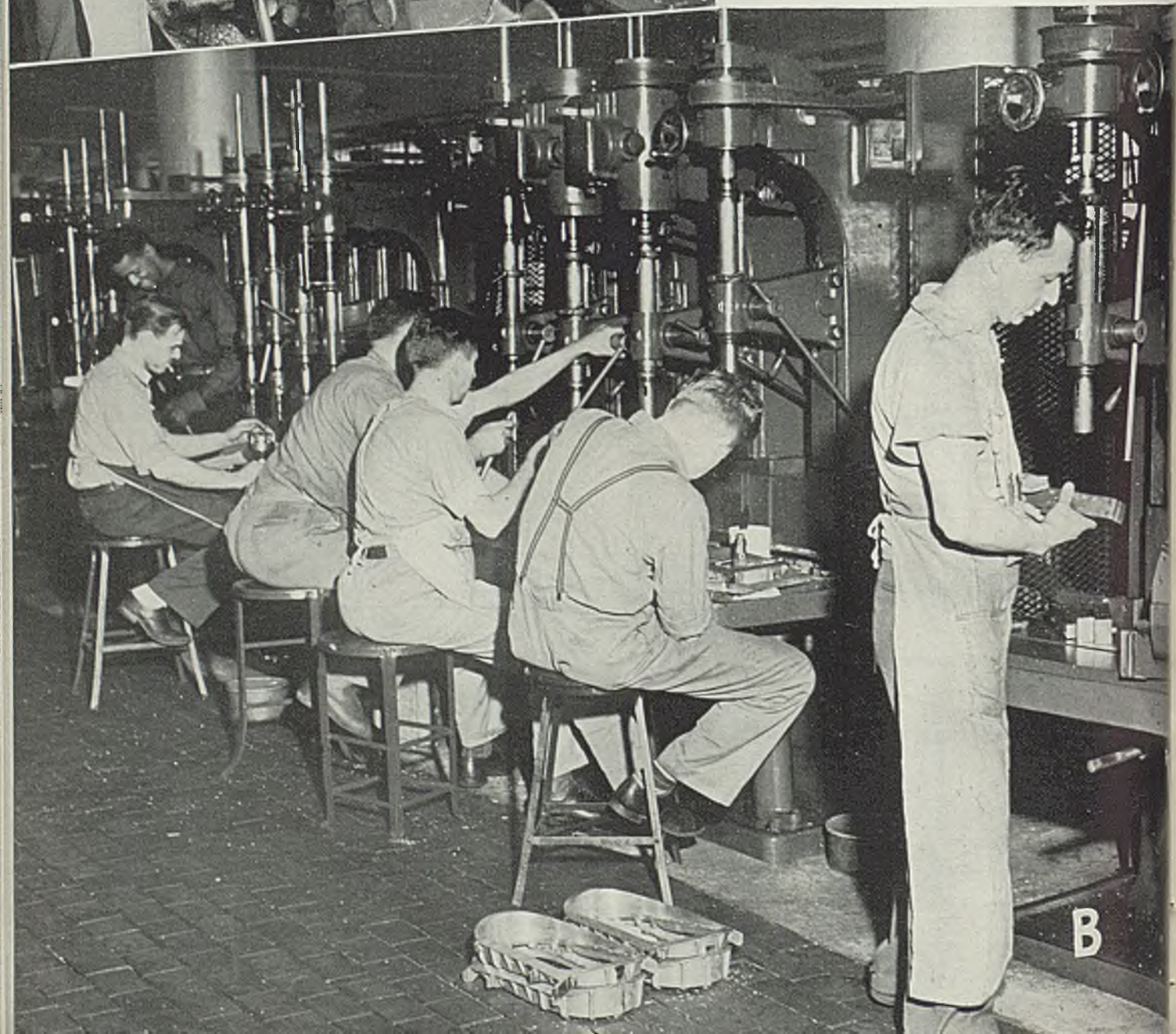


Tooling Tells



A—

As in most other munitions manufacturing projects, turret lathes are machine tools of basic importance in the mass production of parts for naval torpedoes. Here we see one of many skilled turret lathe operators at Naval Torpedo station, Alexandria, Va., in process of machining at one setting a small, precision part involving many operations—including outside turning as well as drilling, reaming and counterboring of interior

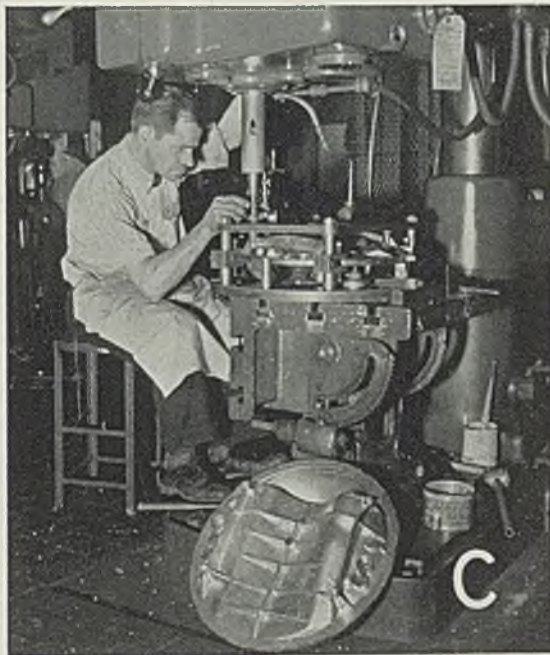
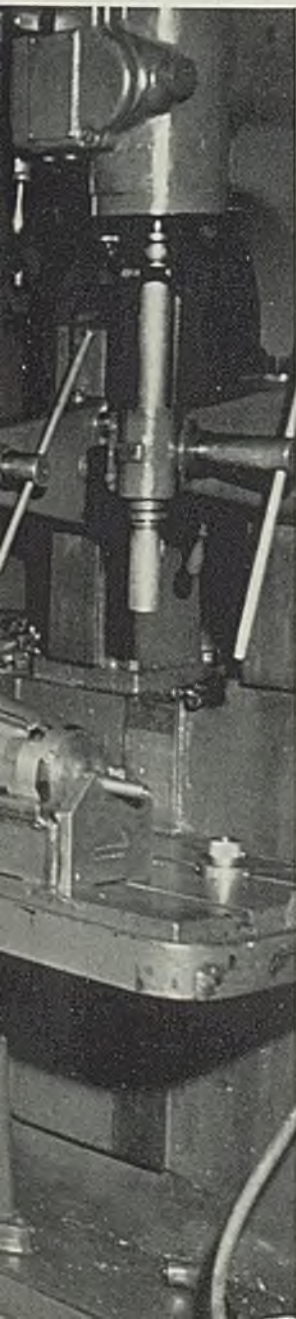


The Tale

IN MAKING TORPEDO PARTS

■ MANUFACTURE of a naval torpedo, like that of its "big brother" the submarine, involves hundreds of small, intricate details in addition to the big parts such as the hull. Under small-lot conditions these parts might be made under "tool-room methods," but under the naval expansion program now under way, mass production methods are demanded in the United States naval torpedo stations.

Some ideas as to how modern machine tools and modern tool engineering methods are being utilized in solving problems involved in mass production of the smaller parts in the shops at Alexandria, Va., are given in the accompanying photographs by Palmer, just released by the national defense advisory commission, Washington.



C—

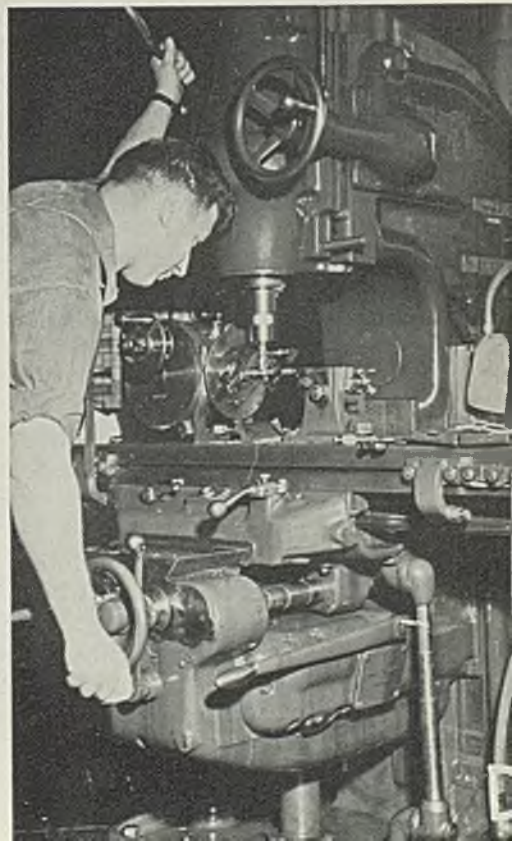
Role of tool engineering in torpedo manufacturing again is demonstrated by this setup on a radial drill for drilling and reaming holes in a torpedo bulkhead. Ribbed design of this part prevents its being laid flat on a work table. Therefore it is edge-supported in a jig provided with legs carrying clamps parallel to table. Drilling and reaming tools are guided and supported by bushings in top plate, thus locating holes exactly in the work without requiring tedious "laying out" of each part

B—

On this battery of multiple-spindle vertical drilling machines in the shops at Alexandria, repetitive operations are speeded up and interchangeability of parts at the same time assured through use of jigs and fixtures. Operator in foreground is setting up his machine for drilling a cone-shaped piece which ordinarily would be difficult to locate and hold. Welded steel fixture on the table of his machine is typical example of how tool engineers solve problems of this nature when quantity lots are involved

D—

Another type of machine tool for which the defense program has created tremendous demands is the milling machine. Vertical-spindle miller here shown is being used to flatten the sides of a torpedo detail. This small part is supported between centers and is indexed by means of a dividing head to insure that the milled flats will be in exact angular relation to each other



Some Background Information on

High-Explosive

To understand fully the problems connected with modern shell production, the very interesting background of shell development is traced from the invention of gunpowder by the Chinese about the sixth century. Round stone shot was first used

■ *This is the first of a series of authoritative articles detailing munitions manufacturing methods prepared especially for readers of STEEL by Arthur F. Maccocchi, head, department of engineering, University of Virginia, and an outstanding authority in this field. Appearing consecutively in STEEL, the wide scope of these articles will make them of exceptional interest.*

Next week's instalment will cover:

No general agreement of the ONE BEST WAY to make shell. Various types of shell—for land and sea use. Major requirements and early methods of making shell. Melting procedures. Composition and heat treatment of armor-piercing shell. Why chromium-nickel steel? Finishing processes. Cap of the naval projectile. Production—the major problem. Manufacturing policies. Composition of high-explosive shell for anti-aircraft and other land types. Effects of sulphur and manganese in shell steel. Forward on manufacturing techniques. The task that lies ahead—General Wesson's message. Choke points in shell production. Work of the ordnance department. The Army Ordnance association.

■ TUCKED away in archives of the Ambrosian library of Milan, Italy, is an ancient manuscript which contains perhaps the earliest reference to the possibility of using explosive shell. The author of this remarkable document is none other than Leonardo da Vinci, that master mind whose intellectual power ranks with the greatest of all the ages. In a letter Leonardo wrote when only 28 years old, therefore about 1480, he not only presages the use of shells but points to "bridges very light and strong and capable

of easy transportation"; "tunnels and secret passages, made without any noise, to reach a certain designated point"; "covered wagons, secure and indestructible which, entering with their artillery among the enemy, will break up the largest body of armed men (tanks). And behind these can

follow infantry unharmed and without any opposition"; and "mangonels, dart-throwers and machines for throwing fire." If it be remembered that da Vinci left sketches of the airplane, the helicopter and the parachute and that he perceived beyond the little gun of the period with its round, ill-fitting ball, a broad field of ordnance wholly unexplored and embracing such modern developments as built-up wire-wound guns, breech loaders, rapid-fire guns and machine guns as well as conical and explosive shells, we recognize in him the inspirational genius of modern engineering in warfare—to some perhaps the evil genius, since he also proposed the use of gas and projected the submarine.

The manuscript to which particular reference has been made above, includes a sketch of two mortars discharging explosive shells and shrapnel, p. 46, a large container ball in the foreground exhibiting some sort of jointed covering. This may have been of leather or some other material that could be sewed along the edges. Another covering is shown broken, permitting small enclosed balls to scatter, while to the left of the diagram, the balls are shown in the act of exploding, leaving no doubt in the mind of the student that here in embryo are explosive shells, grape and shrapnel.

That little progress in the art of projectile manufacture was made between the period of the Renaissance and the middle of the last century is evidenced by reference to the course in instruction and gunnery offered to cadets of the United States Military Academy by Brevet-Col. James Gilchrist Benton, instructor in ordnance and science of gunnery, who wrote a text on the subject published in 1867. There the relative advantages and disadvantages of stone as a material of construction are discussed, the author

Shell

By **ARTHUR F. MACCONOCHIE**

Head, Mechanical Engineering
Department of Engineering
University of Virginia
University Station, Va.



*Meet
Professor
Macconochie*

He Knows Shell

Production Methods-

Here's Why:

—Born a Scot, he was a member of headquarters staff of Midlothian Brigade, Royal Field Artillery, Territorial division, Scotland, 1908-12, and trained as gunner, signaller and rangefinder.

—Jig and tool draftsman with Barr & Stroud, rangefinder manufacturers, Glasgow. Supervisor, Royal Ordnance factories, Woolrich arsenal, on improvements in bullet manufacture and making of experimental shell. Helped design a moment-of-inertia machine for shell. Redesigned diving shell for submarine attack. Designer with Vickers, makers of machine guns. Spent four post-war years training ex-service officers and men in

engineering. All this during 1915-23.

—Teacher of industrial management, metallurgy, air conditioning and refrigeration, dynamics of machines, power plants including steam turbines and diesels, and now head, mechanical engineering, department of engineering, University of Virginia, 1923-40. Also:

—Consultant for Birmingham subsidiary of United States Steel Corp., Chambersburg Engineering Co., Crompton-Shenandoah Co. and others.

—As special representative, American Society of Mechanical Engineers, he recently organized a series of conferences on high-explosive shell manufacture for members of ordnance department in Washington, manufacturers of shellmaking equipment and those manufacturers about to engage in shell production.

—In charge of evening classes presenting engineering subjects to 350 students and 18 part-time instructors almost all engaged in such defense industries as the aeronautical research laboratories of national advisory committee on aeronautics, Langley Field; Newport News Shipbuilding & Dry Dock Co., Norfolk, navy yard and naval base.

—Member of the University of Virginia committee on education for defense and responsible for defense classes in Roanoke and Tidewater, Va.

—Member and former chairman of the Virginia section, American Society of Mechanical Engineers.

noting its want of density and tenacity, but observing that when the English fleet under Admiral Duckworth forced the passage of the Dardenelles in 1807, a stone ball weighing 800 pounds struck and nearly destroyed the English admiral's ship, and that 100 men were killed and wounded by it—a truly remarkable performance when compared with the effect of the most modern high-explosive shell.

Lead, wrought iron, cast iron and compound projectiles are considered in order, the last mentioned being an endeavor to correct the bad and combine the good qualities of different metals. While rifled-cannon had made their appearance, the older smooth-bore weapon had by no means disappeared. Thus we are informed that spherical projectiles possess certain advantages over those of an oblong form inasmuch as they present a uniform surface of resistance to the air as they turn over in flight; for a given weight they offer the least extent of resistance; and they touch the surface of the bore at only one point, being therefore less liable to wedge in the bore and endanger the safety of the piece. Such projectiles as were then manufactured for rifled barrels were constructed usually of cast iron covered with a coating of lead or other soft metal to obviate the serious effects of wedging of the flanges in the grooves of the gun. Such was the design of Armstrong's projectile in England and Sawyer's and others in this country. The French had developed

and used against the Italians a projectile having flanges of tin.

Back in the time of Louis XIV, experiments were made with a hollow projectile divided by a transverse partition into two cavities, the one in front being filled with bullets and the one to the rear with powder. Difficulty seems to have been experienced with the fuse, since some of them burst in the air; while the lack of high rotational speed about the longitudinal axis caused others to strike the target sidewise. Up until less than 100 years ago, shells were made of cast

iron, the powder charge used for propulsion being reduced in comparison with that used for solid shot because of the weakness of the case.

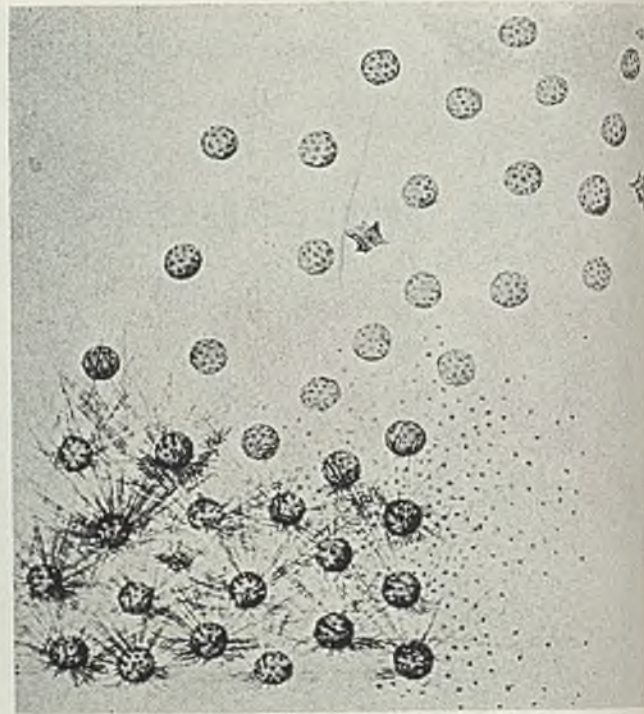
Such shell contained a bursting charge—also of powder—if the object was explosive destruction; but an incendiary composition was sometimes added if the object was to destroy by both explosion and combustion. Already the fundamental requisites of shell design had been recognized since we observe that the cavity was made as large as possible, consistent with the retention of sufficient strength in the body to resist the shock of discharge. Just as in a modern shell, a fuse hole was provided which served the double purpose of loading and fuse insertion. In addition, two “ears” or small recesses near the fuse hole were provided in shells larger than 42 pounders to permit insertion of lifting hooks.

Although the art of making steel by the bessemer process and of producing semisteel and wrought iron by the puddling process had been developed by the sixties of the last century, no attempt seems to have been made to forge the bodies of explosive shells. Since these were still commonly of spherical form, the task may have appeared beyond the capacity of the smith. At any rate the specification called for grey or mottled iron of good quality, and for particular care in casting lest they broke in the gun. The cavity was made by inserting a sand core formed around a stem fastened into the lower half of the mold. This stem was made hollow and perforated with small holes to permit the escape of steam and gas generated by the heat of the molten metal. The stem itself was made of iron but that part of it which came in contact with the molten metal to form the fuse hole was coated with sand.

The specifications further called for care in the prevention of scoria and dirt from entering the mold by skimming with a wooden stick. Before the casting was cold, the flasks were opened and the sand knocked from the castings. Thereafter, the core was broken up and knocked out, the interior cleaned with a scraper, the sinking head and other excrescences knocked off, and the surface smoothed in a rolling barrel or with a file or chisel. Reaming of the fuse hole completed the operation and rendered the case ready for inspection.

The instructions for shell inspection offered to cadets of West Point prior to the introduction of forged bodies not only foreshadow modern procedures but offer an interesting commentary on human nature, inasmuch as they were advised if cavities or small holes appear on the surface to examine these with some care lest an attempt had been made to conceal such defects by filling them up with nails, cement, etc. Even the least scrupulous shell manufacturer would hardly be guilty of such nefarious practice today, did the necessity for concealment arise.

Cylindrical limit gages were employed, provision being made for mounting in an inclined position and for rotation from time to time in order that furrows might not be worn in the metal. Shot which slid or stuck in the cylinder were to be rejected as oversize or out-of-round. Shells were struck with a hammer to

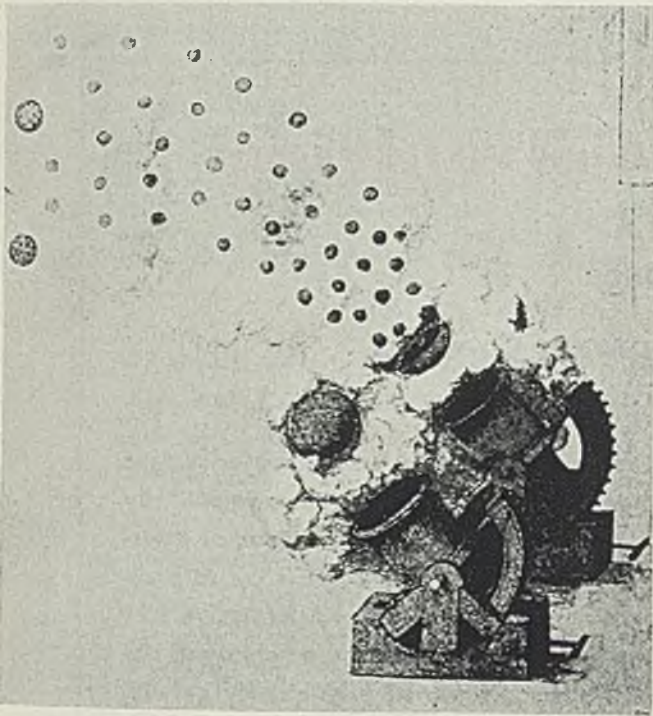


Leonardo's sketch of two mortars discharging explosive shells and shrapnel. He had conceived this idea as early as 1480 . . . he really had an imagination for his day. Illustration from General Parsons' "Engineers and Engineering in the Renaissance," published by Williams & Wilkins Co., Baltimore

judge by the sound whether they were free from cracks; the position and dimensions of the ears were verified; the thickness of the metal measured at several points on a great circle perpendicular to the fuse hole. The job was completed by immersion in a tub of water and the forcing of air into the cavity by means of bellows, through a suitable fuse plug.

In 1846, the invention of rifled cannon by Major Cavalli of the Sardinian artillery and Baron Wahrendorff, a Swedish nobleman, lent impetus to the development of the cylindro-spherical shot into a form more nearly akin to modern shell and incidentally simplified the problem of manufacture by forging from the billet. Originally the elongated form was regarded as possessing certain advantages from the standpoint of its superior power to smash larger holes in ships' timbers and carry away masts. Only when employed in a rifled barrel could its diminished resistance to the friction of the atmosphere in flight be turned to advantage. Many and varied were the designs of shell adapted to the new rifle, inventors of many nationalities vying with each other in the oddest creations.

Noteworthy amongst these was the Whitworth projectile which had a hexagonal helix machined on the central portion of the body. This shell was square-ended and was made of tempered steel, each end being closed with a screw. Earlier forms of this type of shell were apparently made of cast iron since we have an account by General Sir Howard Douglas, written about 1860, of a test of a hexagonal 68-pounder using a cast-iron shot and 12 pounds of powder, which burst with great violence, some of the fragments cutting away the



This is another in the series of articles on munitions design and manufacture being presented to readers of STEEL. For others already published, see STEEL, March 11, 1940, p. 38 for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50, Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160 and Jan. 6, 1941, p. 219 on How Technical Progress Aids Defense; Jan. 13, 1941, p. 48 for Some Typical Shell Forging Methods; Jan. 20, 1941, p. 54 for Recommendations on Heating Billets for Forging Into Shells; Dec. 30, 1940, p. 38 on Naval Torpedoes; Nov. 11, 1940, p. 46, Design and Construction of Mobile Repair Shops for the Army; Jan. 20, 1941, p. 74 on Making Cylinders for Packard V-12 Torpedo-Boat Engines

And now about the middle of the nineteenth century and more or less coincident with the advent of the age of steel, arrives the prototype of the modern shell with all the vast complications of exterior ballistics, stress analysis, metallurgy and modern manufacturing processes to which it has given rise.

It is true that a treatise on the flight of projectiles was published by Nicholas Tartaglia as early as 1537 and that men of the caliber of Galileo and Sir Isaac Newton had made contributions on the subject prior to the advent of the rifled cannon; but the elongated shell, which rotates at high angular velocity during flight, has imposed on recent generations of mathematicians, metallurgists and manufacturers of shell and shell-making equipment, problems of the first magnitude and of the greatest consequence to the survival of nations in these strenuous days.

While differential calculus has been successfully applied to the solution of the trajectory in air, and the metallurgist has given us steel which will penetrate the heaviest armor, there is as yet no general agreement on the ONE BEST WAY to manufacture shell. It is with this problem that subsequent articles in this series will deal.

fore and mainmast and knocking a large piece out of the funnel. "The greater part of the gun was blown overboard, leaving pieces of the breach only about the carriage, which was much shattered."

Thus commenced what is generally recognized as the third epoch in projectile development and manufacture. Prior to 1520 and reaching backward into the dim obscurity of the centuries which elapsed between the invention of gun-powder by the Chinese at least as early as the sixth century, we have the first phase, marked by the use of round stone shot. With the increasing use of iron during the middle ages appeared the round cast-iron shot which held the favor of the fighting man for more than 300 years.

How To Make Contracts Under Defense Program

■ *Doing Business Under the Defense Program*, paper, 123 pages, 6 x 8 1/2 inches; published by bureau of national affairs, Washington, at \$1; in lots of 250 at 75 cents.

This is a handbook of laws governing business practices during rearmament. It covers bidding on defense contracts, the rules on large and small orders; negotiating government contracts, the procedure and terms when departments work directly with a producer rather than throw open to bid; securing advances for plant facilities, a convenient way to finance expansion; assigning claims to secure loans, a new device to aid tapping private funds to fulfill orders; meeting special labor requirements set for government contracts; planning tax amortization at the new accelerated rates on defense facilities; handling sales contracts and other relations

with those in military service and those who may enlist or be taken out of industry through the medium of the selective service act.

New Core Dressing Reduces Cleaning Costs

■ Corecoat, a core dressing with enamel finish, developed by Foundry Service Inc., 280 Madison avenue, New York, is said to reduce the amount of cleaning necessary for the finished casting. It also prevents metal from burning into the core and forming a rough skin on the casting.

The dressing can be applied in casting all nonferrous alloys and also iron and steel, and cores may be made of any sand mixture. After being mixed with water, the dressing is applied either by spraying, dipping or brushing. Thickness of coating varies with each section of metal.

New Synthetic Enamels Air-Dry Quickly

■ Synthetic enamels that air-dry so hard in 24 hours that they will not "paper print" is announced by Maas & Waldstein Co., Newark, N. J. Known as Coprene enamels, these have a chlorinated-rubber base, and air-dry dust-free in a few minutes. The hardening is not merely a surface change but extends throughout the entire coating, thus making it resistant to handling, wrapping, etc. Similar hardening can be obtained by force-drying for 1 hour at 200 degrees Fahr.

The enamels are supplied in clear, black, white and colors, and also in silver, copper and other metallic lusters. They feature good adhesion, good resistance to outdoor weather and household chemicals and retain their gloss, flexibility and color. They are suitable for use on all kinds of metal products, and also on wood.

"Double Boiler" Galvanizing

..... Cuts Maintenance

..... Improves Coatings

By A. S. BURNETT

Industrial Heating Specialist
General Electric Co.
Chicago

■ HOT-DIP galvanizing perhaps is the oldest process for applying a protective metallic coating to the surface of iron and steel parts. To maintain its effectiveness, such a coating must remain essentially intact. This requires that the coating be uniform over the entire surface of the piece and that the alloy bond be firm. Actual life of the coating depends on the severity of exposure and thickness of the zinc and iron-zinc alloys which form the coating.

However, as this thickness also affects the cost of the galvanizing process, it is important that the coating selected be no thicker than necessary to provide the required protection, and this thickness must be accurately maintained in production.

The thickness and reliability of the alloy bond is determined largely by the time of immersion, surface condition and temperature of the bath. The importance of bath temperature is demonstrated by Fig. 1, which shows the rate of solubility

of iron in zinc. It is seen that temperatures above 900 degrees are accompanied by rapid corrosion of the iron tanks.

In the usual galvanizing range of 825 to 875 degrees Fahr., the rate of solubility is low and nearly constant. If, however, the temperature is permitted to reach, say 950 degrees Fahr., the rate of solubility easily may be 8 to 20 times as high as at 850 degrees. From the standpoint of applying the zinc to the work, it might appear desirable to operate the bath at temperatures well above 900 degrees to obtain considerable iron-zinc solution rapidly. However, it must be remembered that the zinc is contained in a kettle which is also

In new design, heat is applied to nearly all the outer surface of the galvanizing pot instead of at only a few points. By thus keeping down the temperature gradient needed to transfer the required heat, deterioration of the pot is cut to practically nothing, dross formation is minimized, excessive zinc carryout is prevented and other important advantages obtained. The design is applicable to all high-quality galvanizing work where no large masses of metal must be coated

subject to solution, and the deterioration of the pot is accelerated by even slightly excessive operating temperatures.

Furthermore, the attack on the pot and the rapid rate of solution with the work causes excessive formation of dross, an iron-zinc alloy containing a considerable amount of zinc which collects at the bottom of the pot and which must be removed at regular intervals. The formation of dross is an expensive waste of iron and zinc. While it cannot be prevented entirely, it can be controlled to a great extent by proper bath temperatures.

Thus it is seen that the bath temperature must be high enough to assure correct coating, yet low enough to limit the dross formation and assure low pot maintenance. This is a close operating range.

It is exceedingly important that the pot as well as the zinc itself be maintained at the correct temperature. This means the heat density through the walls must be low and uniform and no localized "hot spots" be allowed to occur. The importance of this can readily be seen as if the temperature at any point on the pot exceeds the galvanizing temperature, there will be rapid solution and early failure of the pot at that point.

With any externally heated galvanizing tank, it is necessary to have a temperature gradient from the outside to the spelter on the inside in order to introduce heat to the bath. However, this gradient must

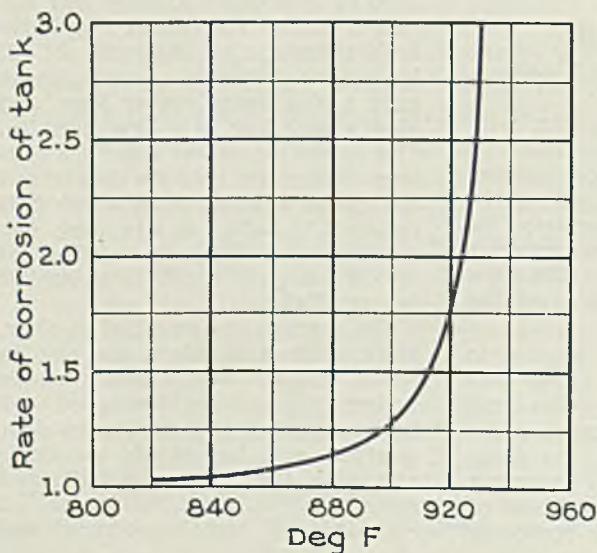


Fig. 1—This diagram shows effect of zinc temperature on rate of corrosion of the galvanizing pot (Diegel)

be kept as low as possible. Thus, if the heat source is applied uniformly to the entire surface of the tank, the tank walls will be at approximately the same temperature as the zinc bath and thus afford minimum corrosion rates.

Theoretically the ideal method of inducing heat to the zinc would be by means of immersion units in the zinc bath itself, since this would pro-

duce the quantity of lead required for the jacket, but also restricts the heating medium to the level where heat is desired.

Since all work is dipped above the maximum allowable dross level and most of the radiation losses are from the surface of the bath, practically all of the heat is required in the upper portion of the tank. Furthermore, the dross is a rela-

tion and smoother surfaces of galvanized parts.

The importance of accurate temperature control for quality galvanizing has been shown. In an electrically heated galvanizing tank using immersion units, this accuracy can be obtained automatically and reliably with only simple control equipment. On small tanks where there can be little temperature difference between the zinc and the surrounding lead, the temperature controlling element is a thermocouple or sensitive bulb in the lead bath. In larger tanks where there may be a difference in temperature between the lead and the zinc, it is advisable to use two heat-sensitive elements, one in the zinc and one in the lead. This arrangement will afford a means of controlling the temperature gradient between the heat source and the zinc and so assures a uniform safe temperature on the tank walls as well as accurate temperature in the zinc bath itself.

The most expensive single production factor in hot-dip galvanizing is the zinc consumption represented by zinc carry-out and dross formation. The most expensive single maintenance factor is tank replacement. If the temperature of the bath is allowed to drop while the work is passing through, parts will pick up excessive zinc. If the temperature overshoots, the rate of dross formation will increase. The 2-point control system eliminates possibility of either of these variations and so as-

By putting electric immersion heaters in upper portion of lead bath jacket, heat input is to upper portion of galvanizing pot where it is needed. This reduces lead oxide losses and also keeps dross from boiling up from the bottom of the pot

duce a decreasing instead of an increasing temperature gradient from the inside to the outside of the tank wall. However, the action of the zinc on the immersion heaters makes this method impractical.

There is no reason why the zinc cannot be immersed in the heating medium, even if the heating source cannot be placed in the zinc. Such an arrangement would evenly distribute the heat over the entire wall of the tank and would utilize a construction similar to water-jacketed glue pots. The liquid employed to heat such jacketed galvanizing tanks is molten lead.

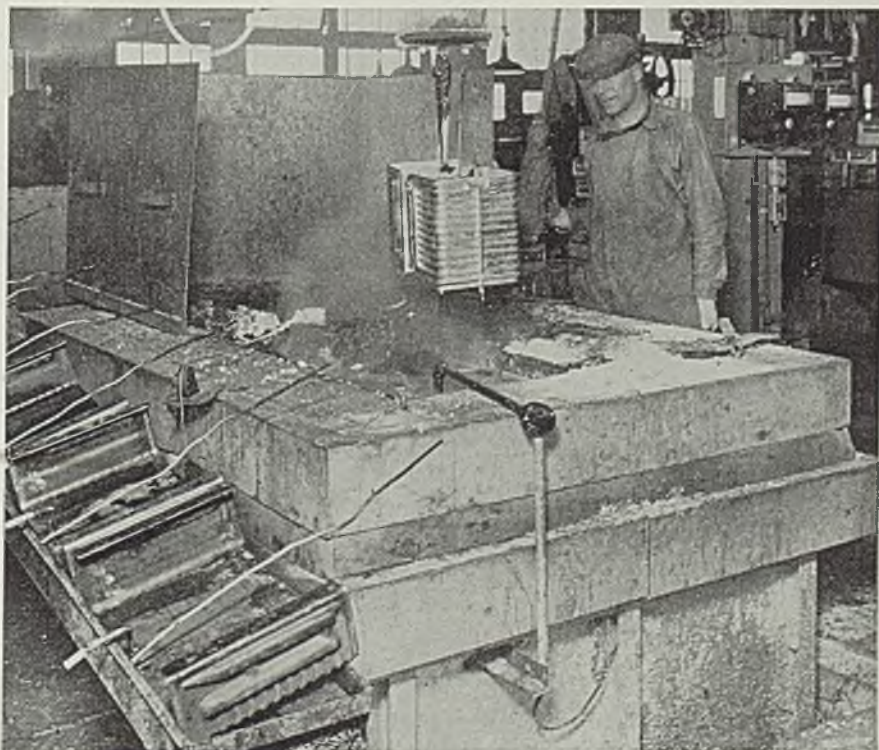
Lead-jacket heating proves excellent since the molten lead is practically noncorrosive as compared with molten zinc, and it also does not affect the immersion units. Furthermore, it is an excellent heat conductor and will distribute the heat uniformly over the surface of the tank to give maximum tank life and uniform temperature throughout the bath. Because lead is heavier than zinc, the bath will be under compression rather than tension. So if the tank does eventually fail and leak, the zinc will not run out and damage the brickwork and insulation. Instead the lead will tend to enter the zinc tank and collect at the bottom, but only until the levels of the two metals have reached a point where the pressure is equalized, after which there will be no more leakage. This protects against excessive loss of zinc and also against replacement of brickwork and insulation.

A typical electrically heated galvanizing tank using immersion units is shown in Figs. 2 and 3. The tank for the zinc is constructed of heavy top-grade firebox steel reinforced and provided with lugs so it can be anchored in the lead jacket. The tank for the lead can be of lighter material of the same grade, and the walls should be well reinforced as shown. The taper not only reduces

tively poor conductor of heat and if heat is provided below the upper limits of dross level, that portion of the tank will be hotter than is desired, causing the dross to boil up and produce rough spots on the work. The tapered lead tank and proper location of the heating elements are critical and important factors in the application of galvanizing to high-quality parts and are extremely important features of this design.

With this construction and with the heating units properly located, the bottom part of the bath will be operated at a lower temperature than the working portion, assuring longer tank life, less dross forma-

Fig. 2—This jacketed galvanizing pot is 24 inches wide, 72 inches long and 36 inches deep inside. Heat is supplied by 90 kilowatts of electric immersion heaters in the lead bath jacket



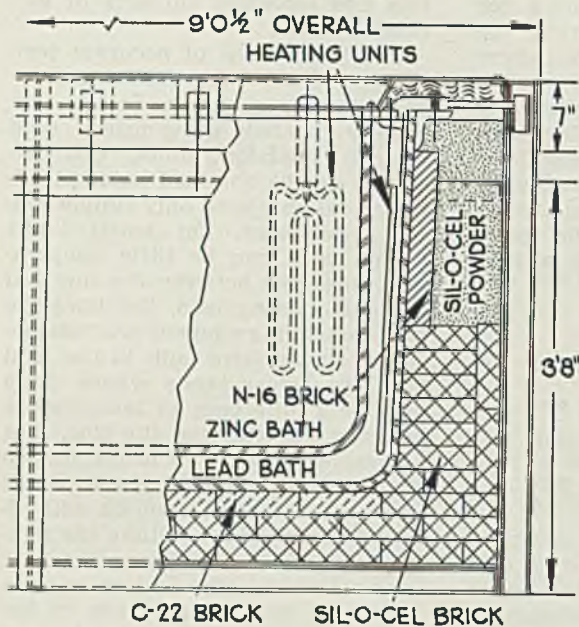


Fig. 3--Construction details of lead jacketed galvanizing pot like that shown in Fig. 2

sures valuable savings in operating as well as maintenance costs.

Electric immersion heaters are especially adapted to this application. If the heat source in the lead is operated at a temperature much above that of the lead itself, a localized hot spot is sure to result. Also the lead at that point, being hotter than necessary, will cause a high rate of formation of lead oxide and so will consume an excessive amount of lead, thereby lowering the level of effective heating with the possibility of disturbing the dross at the bottom of the tank. If fuels are to be burned efficiently, they must be combusted at high temperatures in spite of the disadvantages just mentioned. Thus, any expected fuel savings may well be offset by the increased cost of main-

tenance and zinc on such a double-boiler bath arrangement if gaseous fuels are utilized.

Electric immersion heaters on the other hand, operate at 100 per cent heating efficiency at any temperature and so may be run at a low enough watt density on the sheath of a unit so the surface temperature produced is only slightly higher than the lead bath temperature itself.

Furthermore, the contact surface or heat-transfer surface between the immersion heating element and the lead bath can easily be arranged to have considerable area, thus permitting a high volume of heat transfer with a temperature gradient of only a few degrees. Furthermore, electric elements can be controlled accurately to keep the

temperature constant at all times.

The jacketed galvanizing tank described is particularly applicable to small and medium-sized parts and to moderate production work. In selecting this type of equipment it is well to make an analysis of the parts to be protected against corrosion considering the following factors: Remember quality of product depends upon uniform coating, strong alloy bond, pleasing appearance and smoothness of coating. Remember, too, low overall cost depends upon high overall efficiency and good economy, minimum zinc carry-out, minimum dross formation, low maintenance, good working conditions, maximum availability of equipment that results from few shutdowns, and high inspection standards and reduction of rejects. All of these are obtainable with the jacketed construction described.

The savings in zinc and maintenance alone may well exceed the entire cost of electric power consumption, while additional savings may be expected as a result of the automatic control of the equipment, improved working conditions and better quality and uniformity of the parts being coated.

Excellent applications for this type of galvanizing tank are found in the manufacture of air conditioning and refrigerating equipment, road and farm machinery, electric fittings, wire and wire rope. These and other products require parts that are inexpensively but thoroughly protected from corrosion. For this and similar work the jacketed pot construction offers the possibility of considerable savings as it does away with the necessity for expensive alloy pots in addition to the other advantages mentioned.

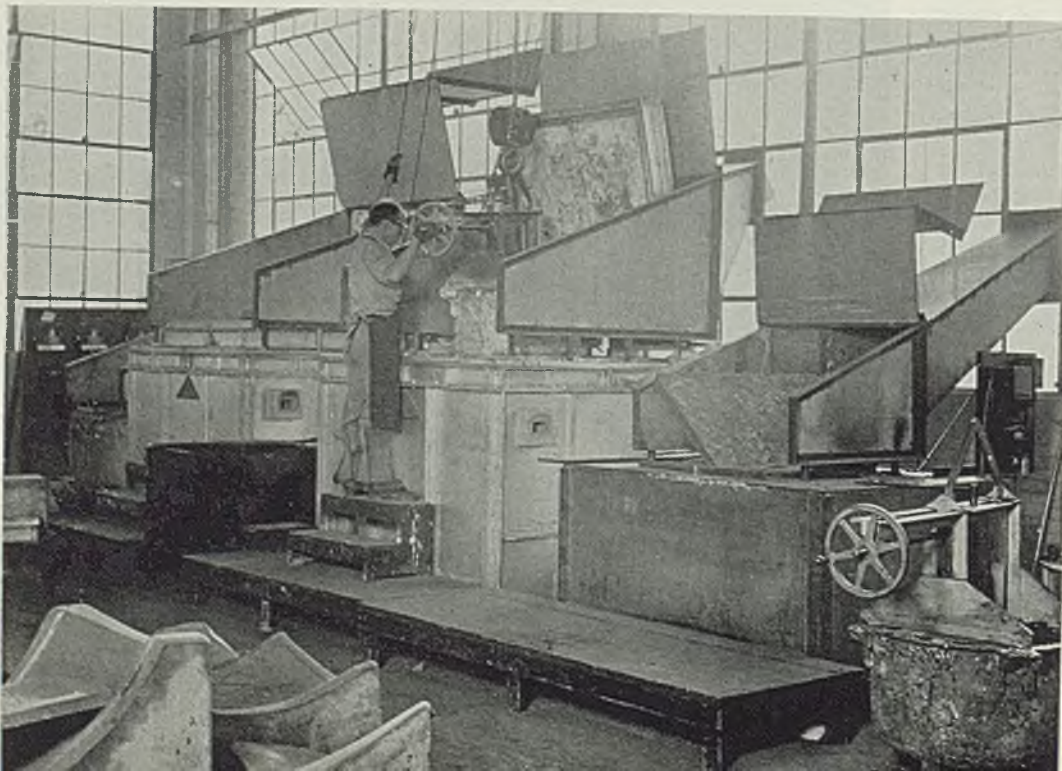


Fig. 4--Ladling zinc from a double-boiler melting furnace at Martin aircraft plant in Baltimore. The zinc alloy is used to cast forming dies for working sheet metal aircraft parts. Some typical dies are shown in the left foreground. Zinc bath and container is immersed in a lead bath similar to construction shown in Fig. 3, above

There must be a mighty good reason why Carpenter Stainless is entrusted with those jobs where unflinching performance is demanded.

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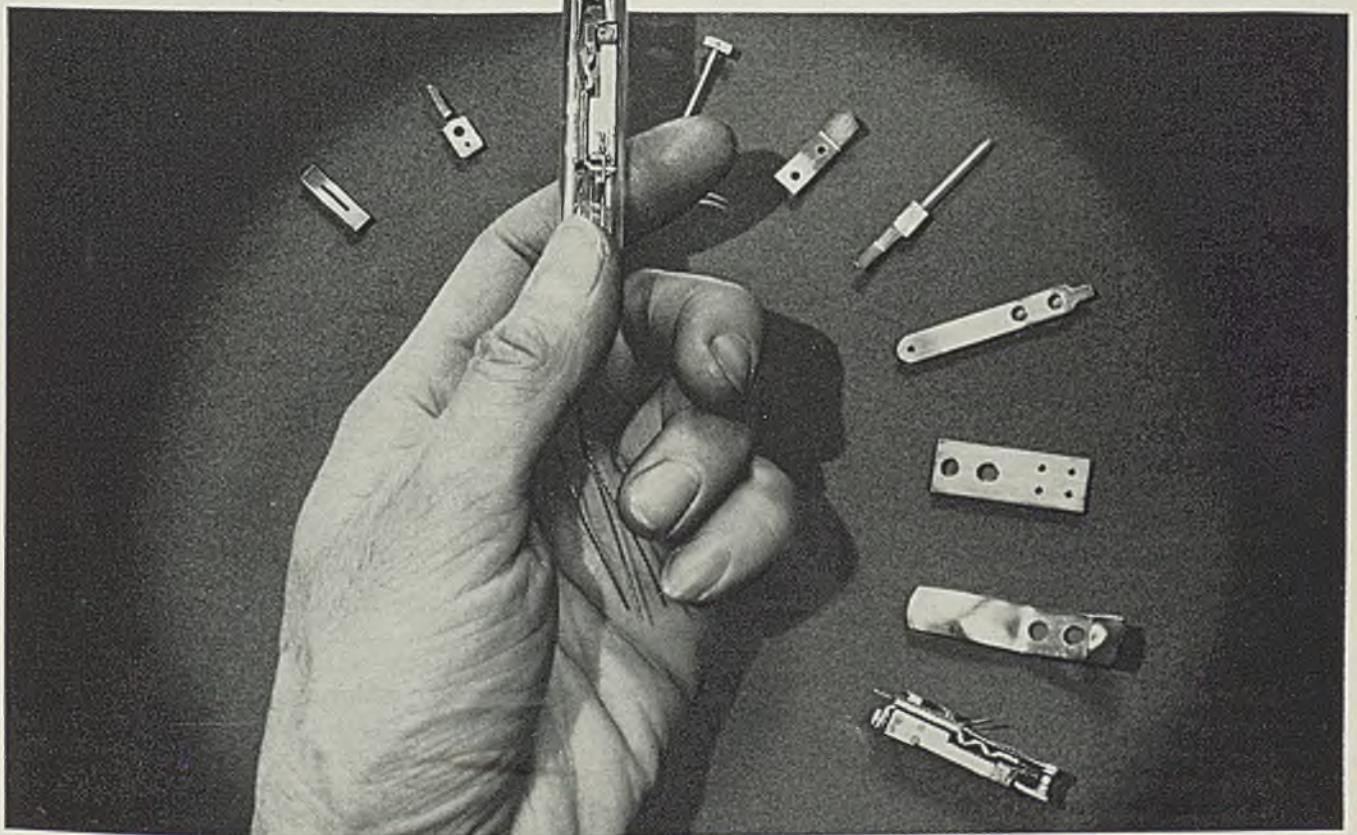
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—Chemical Analyses

—Different Tensile Strengths

—Sizes of Sheets

—Formability Requirements

By OLIVER FRASER JR.

Aeronautical Sales Engineer

Carnegie-Illinois Steel Corp.

Subsidiary of United States Steel Corp.

■ EXCEPT for materials engineers and a few project engineers, it is amazing how few aircraft engineers concern themselves with procurement. For some time to come, specifications for material will determine the cost of structures, delivery date of airplanes and in some cases whether or not the material necessary for a design can be made at all.

While the peculiarities of producing and procuring stainless steel were true years ago, they were not important to you, Mr. Aircraft Engineer, because the volume required was low and because the steel industry was not stretching every nerve and sinew to meet production requirements of other industries.

Increased Volume: Today, aircraft makers want tons of stainless steel where previously only a few sheets were needed. Your industry, Mr. Aircraft Engineer, is now big business of a particularly vital sort to the entire world. Your requirements are understood by the steel industry, and practically all of them can be and will be met. However, you can help yourself, your purchasing agent and your entire industry as well as the steel industry and those co-ordinating the defense program if you will include in your designs, features which will permit a reduction in the number of chemical analyses, the number of different tensile strengths, the number of sizes of sheets required and the present wide range of formability requirements.

Specifications Difficult: Stainless steel requirements of your aircraft industry today present a particularly difficult problem. Your specifications are for the alloys most difficult to make, your shapes costly to produce. Great skill is required to develop the physical properties needed and at the same time hold the close tolerances specified. While every man in the steel business knows that your specifications are the absolute minimum that you must have, at

the same time the steel man's side of the story is just as real.

Briefly, this is his story.

From Custom Business: Ten years ago there was only one analysis of the 18-8 type stainless steel in common use and also one each of the chromium irons and cutlery grades. When a small order came in, it would be possible to look around the stock yard and find some size of hot-rolled material that could be worked up into the size and temper wanted. Many of these small orders ranged from one to four sheets of a kind. Your aircraft industry was engaged in a custom business, and the steel mill had to prepare the material on a custom basis on a hand mill employing the best men on the job because of the strict specifications. Truthfully, there was no money in such business, but faith in the future of stainless steel in aircraft made the steel companies absorb more than their share of the burden.

To Volume Business: Soon it became evident that one analysis of 18-8 was not sufficient because of special requirements, such as heat resistance and formability. Several types of stabilized austenitic stainless steels came into being to satisfy the need for carbon fixation, other modifications being introduced also to improve certain other properties. This introduced serious problems of inventory at the steel mill. The numbers of alloys used were multiplied many times. Result was that total tonnage of stainless alloy, although not increasing appreciably, became spread over many different alloys.

Obviously, the situation resulting involved many difficulties because stainless steel is made in the electric furnace, most precise steel making method used commercially. The electric furnace produces one alloy of one chemical composition at a time. Thus when an order comes in for a chemical composition which cannot be filled out of stock, it is necessary

From paper presented at recent National aircraft production meeting of the Society of Automotive Engineers at Los Angeles.

As the author here points out, the aircraft industry today is so important that it will get exactly what it wants, when it wants it. However, if this industry can standardize on a few acceptable combinations in stainless steel and will adhere to them rigidly—and if the entire industry will swing over simultaneously when improvements are developed and proved—it will be of immense help at this time. If, in addition, the number of alloys is reduced, the best possible co-ordination between the aircraft and steel industries will be effected

to make a heat of electric furnace steel to the analysis specified, roll it into finished form, take the small portion of the total furnace capacity required by the order and roll that portion further to the desired size and temper.

It is not uncommon to be forced to keep 30,000 to 35,000 pounds of a 30-ton heat in idle stock as unordered inventory which will be used when, as and if someone happens to want that particular alloy. Multiply this amount of stock by the six to ten alloys and various modifications and the bad inventory situation that can exist becomes apparent.

Output Is the Problem: The steel industry does not wish to bring the problem of the multiplicity of alloys to your attention, Mr. Aircraft Engineer, because of the mere cost involved, regardless of the fact that these alloys are so valuable that their cost is figured on a pound basis. There is a much more serious problem—one which only you can solve. As no doubt you have read in the newspapers, the steel industry is working at more than 95 per cent of full capacity. Actually this means that every plant is working at maximum volume, the remaining time being used for repairs on the hardpushed equipment.

Thus there is no moral excuse in the face of the existing emergency to maintain a useless stock of any alloy anywhere as it represents wasted time of an electric furnace sorely needed to melt alloys vital to defense. It ties up tonnages of chromium, nickel and molybdenum that could be used.

Can Save Alloys: Today we all must budget our time and capabilities to the best interests of the complete defense program without undue favor being shown any one vital industry. If you aircraft engineers can eliminate any one, or preferably some, of the alloys now required, it will be possible to keep these alloys out of inventory, it will greatly help moving other alloys through the plant and out to you in the quickest time and at the lowest cost.

The steel industry, let it be emphasized, has no general preference regarding the alloys desired as all these alloys can be manufactured on a competitive basis. It is pertinent to say, however, that some of the stabilized stainless alloys are fundamentally less expensive than others and it has not been possible to discern substantial differences in corrosion resistance, stability or workability attributable entirely to the chemical composition which would dictate a preference for any one alloy over another.

Why "Pet" Alloys: For instance, the 18-8 analysis

stabilized with titanium is about 4 cents per pound cheaper than when it is stabilized with columbium, yet tests comparing the two alloys show the differences to be practically indiscernible. At the same time, certain customers say that titanium alloy works much better in their fabricating processes. While either alloy can be furnished by the steel industry, it is puzzling to have a few customers still specifying columbium-stabilized 18-8 stainless steel when all

data available appear to indicate no reason to want this more expensive alloy.

In view of this, it is suggested that you aircraft engineers can save yourselves unnecessary expense in the cost of your stainless steels simply by studying test results on all alloys before making your decision regarding those on which you will standardize.

Only Great Skill Can Do It: The second consideration which affects the aircraft engineer as well as the steel manufacturer is that of temper-vs-size-vs-tolerance-vs-workability-vs-flatness-vs-finish. These factors are so interrelated that it is necessary to consider them all simultaneously. Let it be emphasized at this point that manufacture of these materials is still an art, for the results obtained are still dependent upon the skill of the workmen. It also is a fact that in many cases the manufacturer of raw materials does not concern himself with the use to which the purchaser wishes to put the material.

However, it is possible for the steel manufacturer to help his customers greatly if they will only specify the use for which the steel is intended and the degree to which it will be worked during fabrication. Then it is possible to change certain operations and the rate of reduction in thickness during the rolling operations so a steel product much superior for the particular application will result. Almost every stainless steel producer has many customers whose entire manufacture is in stainless steel and with whom the interchange of information is strictly confidential. When an inquiry is made by the steel manufacturer as to the use intended for the steel, the purpose is not to get competitive information but to get facts needed by the steel maker so he will know what thickness and temper to use as the starting point in breaking down your material and so he can determine the exact sequence of operations to follow so as to end up with material most suited for your operations.

Specify Use, Please: It is possible to make this flat statement: If you will specify the use to which the material will be put and the degree of working on the worst or most severe operation which it will be required to withstand or if you will permit a study of your requirements, you will be provided with the best material for the purpose intended.

Consider the example of exhaust stack stainless steel. If you state that it will be used on stacks, the producer knows that it will be drawn severely

(Please turn to Page 61)

PICKLING STAINLESS STEEL

Mixture of anhydrous ferric sulfate and hydrofluoric acid is employed for pickling austenitic types of stainless steels. The ferric sulfate assists in removing scale by oxidizing certain constituents to higher oxides more readily soluble in the acids. It combines with any excess hydrofluoric acid to form ferric fluoride which is nonsolvent at pickling temperatures. Scale removal using this mixture is rapid, permitting high production from pickling tanks



By L. F. LOUTREL JR.
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Everett, Mass.

■ DEVELOPMENT of stainless steel has brought to the attention of management the importance of the pickling operation in the manufacture of steel. Prior to the introduction of stainless steels the same acids—muriatic and sulfuric—had been used successfully over a period of years on all varieties of steel. The results had been modified only slightly by the incorporation of effective acid inhibitors and the use of more concentrated solutions and careful temperature control to meet the exacting time requirements of high-speed strip pickling. To handle the requirements of stainless materials, however, it has been necessary to develop certain modifications of the established pickling agents and technique.

Initial attempts to pickle the newer stainless alloys containing nickel and chromium involved the use of these same acids. It was found, however, that these solutions did not satisfactorily remove scale, and that while more drastic conditions of temperature and concentration would do so, the action of the acid on exposed metal was harsh and rough etched surfaces were produced. It was found that the oxide scale was no more soluble than the base metal, and the organic acid-inhibitor proved detrimental in that the speed of scale removal was greatly reduced.

Growth of stainless steel during the past decade has been tremend-

ous and production of over 180,000 tons was realized in 1939. With this expansion have been new developments in methods of pickling to keep pace with the exacting customer demands which the metal must meet. The first of these was the commercial use of mixtures of nitric and hydrofluoric acid. In retrospect this development is a logical one, but it combines the well-known ability of

ly, the acids are dangerous to handle and when in use the bath at times gives off fumes of nitric acid which are detrimental to workers' health. In addition, the bath is difficult to control closely since a lengthy method of analysis is required to distinguish accurately between its two acid constituents, and as a result its use has been attended by considerably more art than science.

A newer method of pickling, and one that has been successfully adapted to the pickling of all modifications of the austenitic grades of stainless steel, has recently been developed. It involves the substitution of anhydrous ferric sulfate for nitric acid and the use of a bath composed of this chemical and hydrofluoric acid as the pickling medium.

However, the ability of ferric sulfate to passivate the surface of stainless steel has long been known. It has been, however, only with the production of a commercial product that the full advantages of such a product have become apparent. In combination with hydrofluoric acid it reacts to form a stable salt, ferric fluoride, which cannot be driven off from the bath, as can volatile hydrofluoric acid, at ordinary pickling temperatures. Its oxidizing power is sufficient to aid scale removal by the oxidations of certain of the lower or suboxides to others more readily soluble in the acids present and sufficient to almost completely

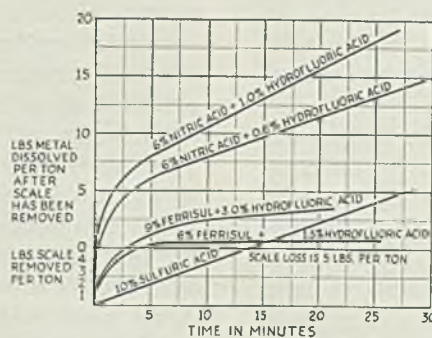


Fig. 1—Metal loss in various pickling agents used for cleaning 24-gage cold rolled 18-8 stainless steel. Concentrations as 100 per cent acids. Temperature 155 degrees Fahr.

nitric acid to passivate the surface of stainless steel with the rapid action of hydrofluoric acid in dissolving scale. Such mixtures, while they offer a large advance over the mineral acids still have some disadvantages.

The acid mixture involved is cost-

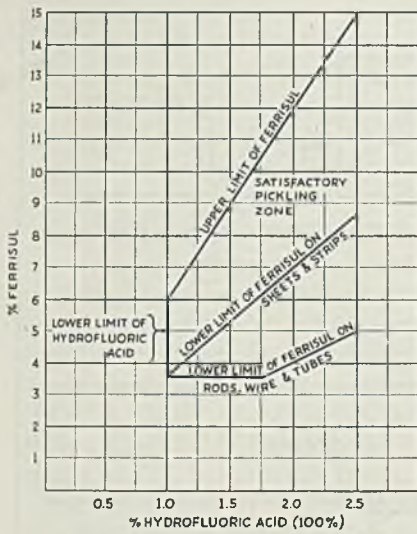


Fig. 2—Optimum concentrations of ferrisul and hydrofluoric acid for pickling 18-8 stainless steel

inhibit any action on the metal itself.

Comparative data on such mixtures and typical nitric and hydrofluoric acid baths are shown in Fig. 1. Also included for comparison is the rate of attack of sulfuric acid showing the slower attack on scale and attack on the metal proceeding at the same rate as on the scale. Other mineral acids such as muriatic and hydrofluoric acid (when used alone) have similar characteristics.

In addition, the bath lends itself to accurate chemical control since the oxidizing salt and the acid can be distinguished readily by standard chemical analysis. This makes it possible to stay within a specific range of both concentrations, as indicated in Fig. 2, and thus secure consistent results in pickling practice.

These are the properties which have led to the adoption of ferric sulfate as an aid in the quality pickling of 18-8 stainless steel. By its use new standards of safety have been introduced to the operation of the pickle house and better quality obtained in the finished product through greater uniformity, and freedom from etching, pitting, and other pickling defects.

Silica Co. Offers Two New Coating Products

■ Tamms Silica Co., 228 North LaSalle street, Chicago, announces two new coating materials. *Patternseal*—a new material for sealing and coating match plates, core boxes, etc., and *Metaline*—a new liquid metal for coating and sealing wax fillets and gates.

The former forms a protective coating which prevents moisture

penetration and permits patterns to be used without applying a parting compound. It can be applied over plates that have been shellacked as well as wooden patterns. In most cases it permits a full day's run without re-coating.

The latter is said to be superior to shellac and is used to form a solid bond between two surfaces, such as between metal hand patterns when mounted on metal or wooden plates. It also eliminates approximately 50 per cent of hand soldering on metal plates.

Construction of Saw Teeth Aid Production

■ Segmental construction of heavy duty metal cutting saws, as developed by E. C. Atkins & Co., Indianapolis, is particularly valuable where tooth breakage is liable to occur because of the rough service to which tools of this kind invariably are subjected in these days of speeded up production.

In a recent instance, several steel bars were being cut off at one time, and the operator failed to tighten the vise sufficiently. One of the bars, rolled over after the cut, got under way—breaking out two teeth

in two of its riveted-on four-tooth segments.

Being interchangeable, these two segments readily were replaced, whereupon the saw was found to be again in perfect operating condition.

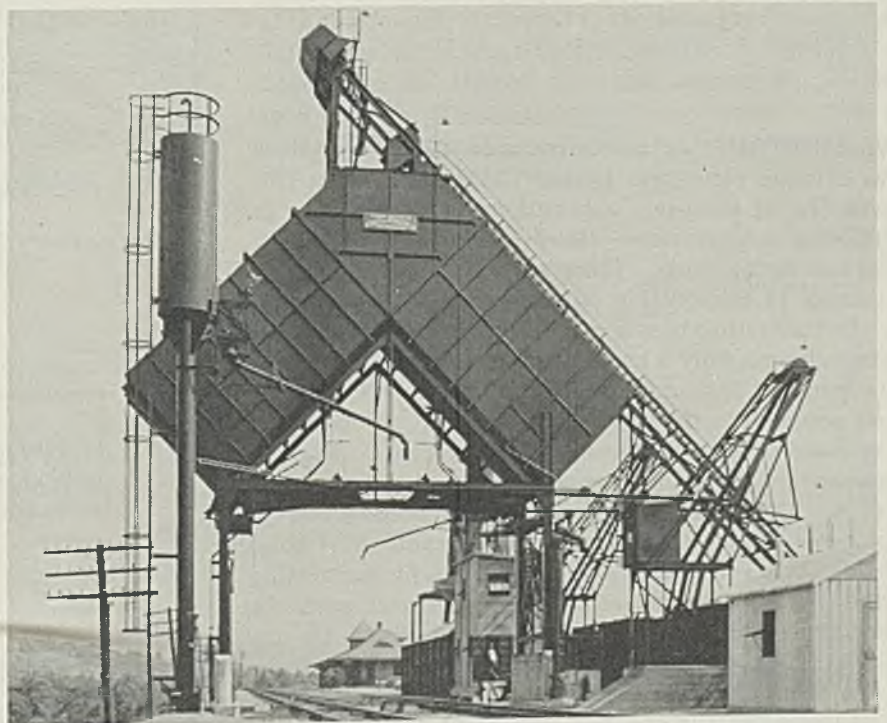
The saw disk itself had been well protected effectively by its tough chrome-nickel steel segmental rim, of which the high-speed steel teeth are practically an integral part.

Gage Blank Standard Is Effective Immediately

■ With the receipt of signed acceptances from a number of manufacturers, distributors and users of gage blanks estimated to represent a satisfactory majority, national bureau of standards, United States department of commerce, Washington, announces that commercial standard CS8-41 may be considered effective for new production on Jan. 1, 1941, and for clearance of existing stocks on Jan. 1, 1942.

Printed copies of the adopted standard will be forwarded to each acceptor of record as soon as they are available. Copies will be mailed to nonacceptors only on specific request.

One of the "Largest"—300-Ton Coal Loading Station



■ *Mayari R* steel supplied by Bethlehem Steel Co., Bethlehem, Pa., was used in the construction recently of the above 300-ton coaling station for Lehigh Valley railroad at Towanda, Pa. Due to the steel's high corrosion resistance, a material increase in life of the structure is expected even though a lighter design was used. The bin plates themselves were used as structural members and the side plates of the bin are designed as plate girders. The tie of the A-frame was made sufficiently strong to take the thrust of both the dead load and the coal load



By E. W. P. SMITH
 Consulting Engineer
 Lincoln Electric Co.
 Cleveland

Let Welding Simplify Your Structural

Alterations and Additions

As Mr. Smith shows here with detail drawings, it is a simple matter to connect onto existing structures when building additions or alterations are made, if arc welding is employed. Important economies include removal of only a small amount of fireproofing and quick, simple fabrication

■ ADDITIONS or new structures are easily joined to existing structures by arc welding. In fact, this was one of the early applications of arc welding in building construction. Many economies result from its use in this work. Since arc welding also is quiet, tenants in the existing building are undisturbed.

In connecting beams of the new structure to existing columns, only a small amount of fireproofing need be removed from one face of the columns. The overall economy in time and money of such an operation, in making alterations, is very attractive. Fig. 13 shows an arc-welded connection to an existing column. This connection was made by bolting two ½ x 4-inch plates to the end of the beam. The holes in the beam web were slotted horizontally, permitting the plates to be moved into close contact with the original column and then held in position by the bolts. Plates were arc welded to the web of the new beam and to the original column.

Connecting the end bay purlins of a mill building to the frame of an existing structure is most easily and economically solved by an arc-welded design. The conditions of a typical case are depicted in Fig. 1. The 18-inch I-beam in the end wall of the existing building is shown, supported by its columns; the row of sloping purlins is to carry the roof of a

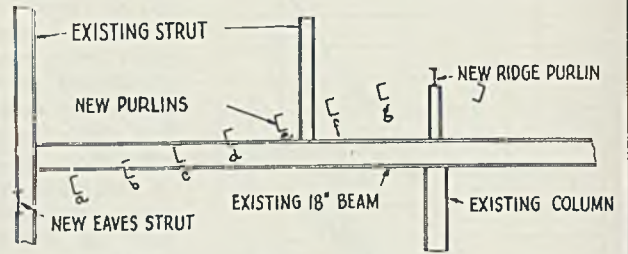


FIG. 1

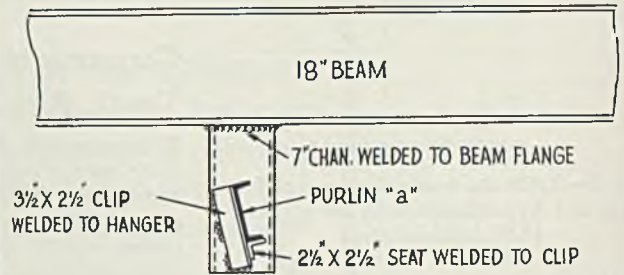


FIG. 2

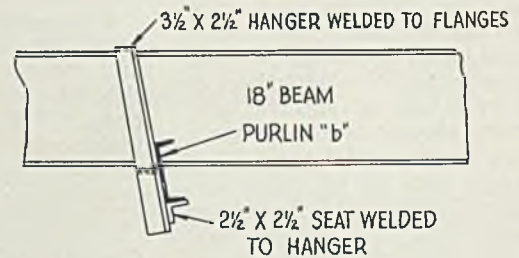


FIG. 3

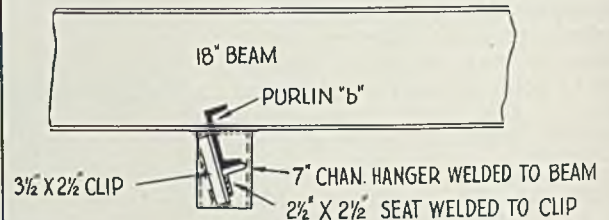


FIG. 4

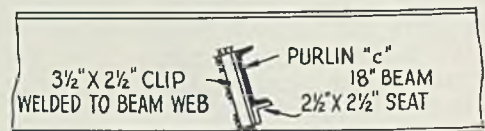


FIG. 5

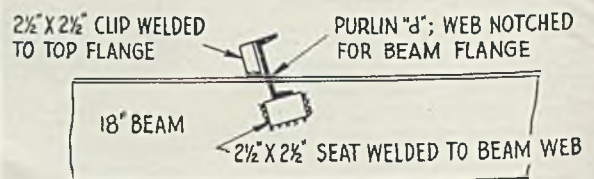


FIG. 6

new structure. These new purlins are to be attached to the existing 18-inch I-beam.

The detail, Fig. 2, shows the connection of purlin "a" to the 18-inch beam. A channel hanger is field welded to the bottom flange of the beam. This hanger carries two angle clips, shop welded at the proper slope and at the right level, to receive the purlin.

Two different ways of securing purlin "b" to the beam are shown in Figs. 3 and 4. In Fig. 3, the seat angle is shop welded to a hanger angle. This hanger is field welded to the top and bottom flange edges of the beam at the proper slope. In Fig. 4, a detail similar to that shown in Fig. 2 is used.

Fig. 5 shows a connection for purlin "c" which frames directly to the web; the detail is the same as shown in Fig. 2, omitting the hanger.

The connection of purlin "d" is shown in Fig. 6. This connection also requires two clip angles, one forming a seat for the bottom flange of the purlin while the other one, riding on the top flange of the beam, stays the purlin's web. The purlin is notched to clear the flange of the I-beam.

Purlin "e" is carried by a chair, Fig. 7, made of two angles, one acting as a strut and one as a seat.

Figs. 8, 9 and 10 illustrate methods of securing purlins to the beam when they are located as shown in Fig. 1 in positions "f" and "g". In Fig. 8, two clips welded to an I-beam strut form the purlin's seat. In Fig. 9, the top of an H-strut is bevel-cut to the slope of the purlin's web, a clip angle and a bar forming the seat. In Fig. 10, the seat clips are shown attached to an angle strut.

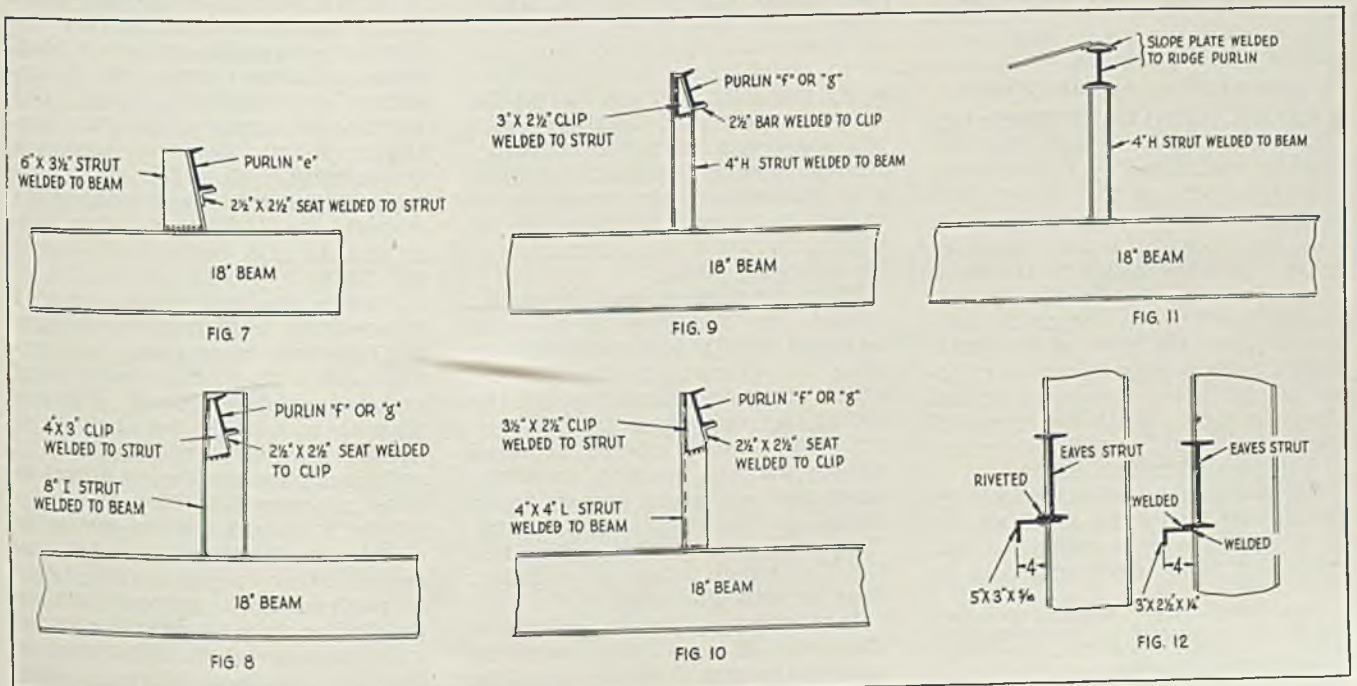
In the case of the ridge purlin's connection, Fig. 11, the purlin rests on a cap plate welded to the top of the post. If desired, a thin bent plate may be tack welded in the shop to the ridge purlin forming a convenient seat for the metal decking.

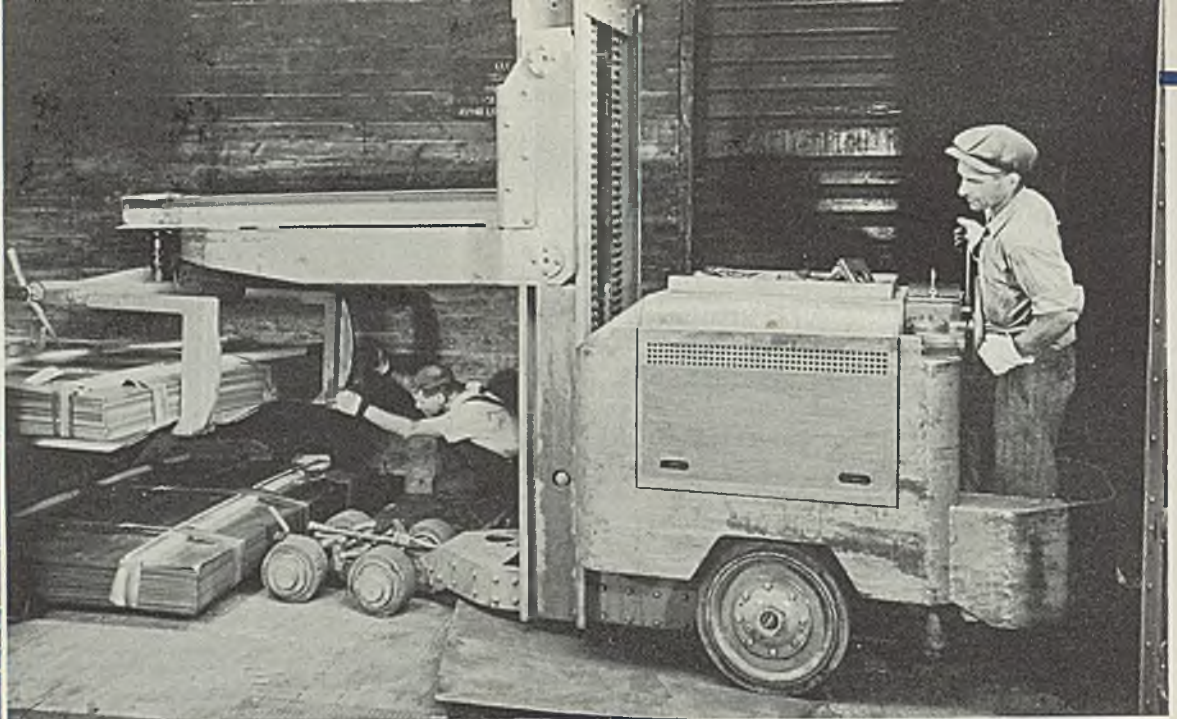
The eaves strut of the new building, consisting of a beam and a sash angle, is framed to the existing column, a new seat, welded to the column, having



Fig. 13—Arc-welded connection of beam to an existing column . . . easily and quickly made

been provided. In order to allow the wall sash to extend uninterruptedly by the face of the columns, it is customary to locate the vertical leg of the sash angle about 4 inches out from the column face. If the sash angle is riveted to the beam, the horizontal leg of the angle must be long enough to permit the beam gage and that of the angle to register. If the sash angle is welded, no matching of gages is necessary and, consequently, a smaller sash angle, as shown in Fig. 12, may be employed.





Crosswise stowing of heavy bulky loads is accomplished easily by a swivel fork truck attachment as shown here. It permits loads to be swung lengthwise to clear the door, crosswise for placing in car

How to Get the Most from

POWER-TRUCK HANDLING

Many vital and practical suggestions that will increase the efficiency of any power truck handling system are given in this presentation which concludes this important series of articles on materials handling fundamentals prepared from material gathered by The Industrial Truck Statistical association, Chicago. For preceding sections see *STEEL* Dec. 23, 1940, p. 72; Dec. 30, 1940, p. 54; Jan. 13, 1941, p. 66; Jan. 20, 1941, p. 58

(Concluded from Last Week)

■ **EXCHANGING BATTERIES:** Batteries of 6 kilowatt hours or less may be exchanged by sliding them in and out between the battery compartment and the charging bench with the truck run beside an empty bench. Benches should be the same height as the skids in the battery compartment when the truck tires are new, and the front of the bench should be beveled sufficiently to allow for tire wear and spring action. Greasing top of bench and compartment skids will permit movement of batteries with little effort.

For batteries up to approximately 10 kilowatt hours, the bench should be equipped with a roller top. A cable and hand winch will help to

move the battery in and out of the truck compartment. Such batteries are too heavy to move manually. Another method is to use an adjustable roller-top table mounted on casters to transfer the batteries between the truck compartment and the charging bench.

Most practical method, however, consists in the use of a hoist equipped with a suitable insulating sling for attaching to the battery, which then is removed through the top of the compartment. This permits the battery to be removed quickly and set down on an empty bench and a charged battery to be placed in the truck compartment. Time studies have shown that less than a minute often is sufficient time for this operation.

Ventilation: Certain minimum standards of ventilation must be observed to control carbon monoxide

hazards in use of gas-electric or gas-mechanical trucks. According to the bureau of mines, the average automobile engine exhaust contains 7 per cent carbon monoxide. Investigations have determined that if the time of exposure in hours times the concentration of carbon monoxide in parts per 10,000 equals 3, there is no perceptible effect. When the figure is 6, the effect becomes perceptible and at 9 headache and nausea ensue. At 15, conditions are dangerous to life. Calculating in terms of exposure during an 8-hour day, the maximum concentration at which no perceptible effect is to be expected becomes $\frac{3}{8}$ -part per 10,000, and that dangerous to life becomes $1\frac{1}{8}$ parts per 10,000.

Some authorities have attempted to prescribe ventilation for interiors, but these can be no more than generalizations unless a particular room or area is studied in detail. A better plan is to survey the air with a carbon monoxide indicator, and if sufficient concentration is found to cause a perceptible effect or to constitute a hazard, carbon monoxide alarms can be installed and so arranged either to give warning when a predetermined concentration is reached or to set ventilating equipment into operation. The latter is the plan usually employed in large



Consummable pallets of zinc spelter are being stored, left, in the plant of a user just as received from the smelter where the pigs are cast in the form of interlocking slabs. Above are shown details of one form of slab for such work. Not only is carloading efficiency improved but subsequent rehandlings are greatly reduced. The method is applicable to anything that melts or dissolves

grouped into routes and transfer points established where routes intersect. One or more truck operators may be assigned to each route, and their job first of all is to see that their route is continuously and adequately served.

However, if any operator sees that an intersecting route has become congested, he is expected to divide his time between it and his own until the congestion has cleared up. Of course a certain amount of judgment is necessary to avoid congestion on his own end. This plan generally affords high efficiency, and usually results in a minimum of running without load. It requires little supervision.

A variation of this plan well adapted to smaller plants consists of the use of one central transfer point through which all movements between departments are cleared.

For serving departments with little traffic, the scheduling of trips at regular intervals is steadily gaining favor in preference to the plan of dispatching trucks as called for by the foremen concerned. With schedules properly established and dependably maintained, foremen not only find it easy to plan accordingly in requisitioning supplies and in preparing outgoing materials for pickup, but they also receive better service than could possibly be rendered by the same number of trucks operating under a less orderly dispatch plan.

Training Truck Operators: Although the electric truck is one of the simplest handling mechanisms, it is wise to give operators an elementary training in driving it. Give the new operator a clear space on a shipping platform or in the storeroom and let him practice turning, tilting, elevating, tiering and traveling. An hour or two usually suf-

vehicular tunnels at the present.

Duty cycle records afford means of maintaining an industrial-truck handling system in efficient operation. After a truck has been assigned a given duty cycle, new uses are usually discovered which together with natural growth of the business increase the duties little by little until one truck operating one shift per day is no longer adequate.

The solution may be more trucks or higher battery capacity for the truck already in use. The higher capacity may be provided by a larger battery or by additional batteries per truck, with the batteries being exchanged at intervals. In fork trucks which require a counterweight, larger batteries may be preferable, while for elevating platform trucks which require no counterweight, more batteries of the same size may be preferable.

Obviously it is best to have warning of the need for either more trucks or more batteries and so permit proper plans to be made before the need grows acute.

As a general overall check, the record of the total electric power consumption is useful. Tabulating the daily ampere-hour consumption per truck affords this record. A ton-foot - duty - cycle check also affords important information. Obtained by multiplying the total tons moved by the average distance moved, the result often is amazing. A ton-foot check made for the first time on trucks that have been in service a few years frequently amazes the management. Unlike

other types of machinery, the electric industrial truck seldom gives any tangible indication when it is being overloaded.

Actual total cost of operating the trucks is also useful.

Routing and dispatching are determined by the flow of work. The dispatching problem is simplest in heavy manufacturing where one or more trucks are frequently employed continuously in handling work from one machine to another. It grows more complex in proportion to the number of separate and distinct movements of material.

In a small plant where all handling operations are performed by one truck, the operator usually follows a routine of visiting the manufacturing departments in rotation. This routine develops quite easily and simply in the course of the first few weeks of experience and soon results in the truck's appearing when and where needed. By means of lights or a factory call system, the operator can be summoned to any part of the plant when he is needed.

In medium sized plants employing a large number of trucks for interdepartmental transfer work, handling operations usually are

Practical Operating Hints

- Mark or paint white or orange lines definitely indicating aisles or truck runways.
- Keep aisles clear of overhanging or projecting obstructions.
- Place large mirrors at blind corners of aisles where there may be heavy traffic.
- Keep all runway floors and pavements in good repair.
- Assign each driver to the same truck regularly and make him responsible for its upkeep.
- Organize regular lubrication and inspection of trucks without division of responsibility between electrical and mechanical departments.
- Obtain the full co-operation of the manufacturing departments for most efficient handling.

fices to determine whether or not a man has the necessary qualifications for a safe and efficient operator. An examination of sight, hearing, reflexes and speed of coordination also may be desirable. Elementary instruction in the mechanical and electrical operation of the truck also is well worth while. Here a most important feature is training in correct acceleration—essential to avoid needless waste of current.

Operating Checks: In any plant, various types of power trucks may have been in use for a number of years without any definite checkup on their routing and dispatching. It is well to review truck operations and consider factors such as brought out last week in the "Guide for Analysis of Truck Operating Conditions." Handling routes and physical plant conditions that appreciably reduce the efficiency of truck operation often may go unnoticed unless a careful review of the entire handling system is made at definite intervals. It would be well to review truck operations every time a department location is changed or whenever production volume increases or decreases any significant amount. In any new plant it would be well to review the handling methods carefully every week or two as no matter how carefully it may be laid out, possible

improvements will become evident as conditions not foreseen are encountered.

There are a number of practical operating hints which may prove quite useful. The accompanying tabulation lists a few of those which should be given careful consideration.

Bibliography

- Your New Plant—Multistory or Single Story? The Austin Company, Engineers and Builders, Cleveland, 1936; 8 pp. Discusses relative merits of two classes of buildings and explains why single-story buildings afford more usable space in proportion to construction and operating costs as well as higher material-handling efficiency.
- Commodity Packaging Data; U. S. Tariff Commission, Washington, 1937; 161 pp. A guide to current practices in the packaging of typical commodities that move in domestic and international trade.
- Public Health Bulletin No. 195, Review of Carbon Monoxide Poisoning; U. S. treasury department, public health service, Washington, 1936; 128 pp. Includes full discussion of the carbon monoxide hazard resulting from exhaust gases of internal combustion engines.
- Standard Specifications of Automatic Battery Charging Motor-Generators and Panels; The Industrial Truck Statistical Association, Chicago, 1939; 8 pp. Describes the design of automatic charging equipment for industrial truck batteries which (1) cuts off each battery when charged; (2) shuts down the motor-generator when the last battery is cut off; (3) shuts down the motor-generator during line-power

interruption; (4) restarts the motor-generator on resumption of line power supply; (5) controls the charging rate; (6) starts and shuts down additional motor-generators as needed when more than one is used. Gives complete data for use of both constant-current and modified-constant-voltage systems as well as voltage, current and resistance values for charging both lead-acid and nickel-alkaline batteries by modified-constant-voltage method.

Railway Equipment Register; published monthly by Railway Equipment and Publishing Company, New York City. Lists complete specifications of freight-car equipment currently in use by all American railroads including door dimensions and height of floor above rails. Is useful both for calculating clearances of industrial trucks in and out of cars and for ordering cars having floor heights most closely approaching the heights of loading docks.

Industrial Power Trucks and Tractors, Safe Practices Pamphlet No. 55; National Safety Council Inc., Chicago, 1940; 12 pp. Discusses accepted safe practices in the operation of industrial trucks and tractors; gives numerous practical suggestions for layout of aisles, training and supervision of drivers, operating rules, and related topics.

State of New York, department of labor, Bulletin No. 181; Albany, 1933. Analyzes 23,735 material-handling accidents compensated in 1932.

New Mill White Reflects 89 Per Cent of Light

■ A new synthetic mill white, which when applied in a plant reflects and diffuses as much as 89 per cent of the light is announced by Sherwin-Williams Co., Cleveland. It covers with one coat and dries overnight to a hard, tile-like surface. Called Kem Safe-Lite, it is recommended for plants where unusual conditions require maximum durability, faster drying, and extremely sanitary washable surfaces.

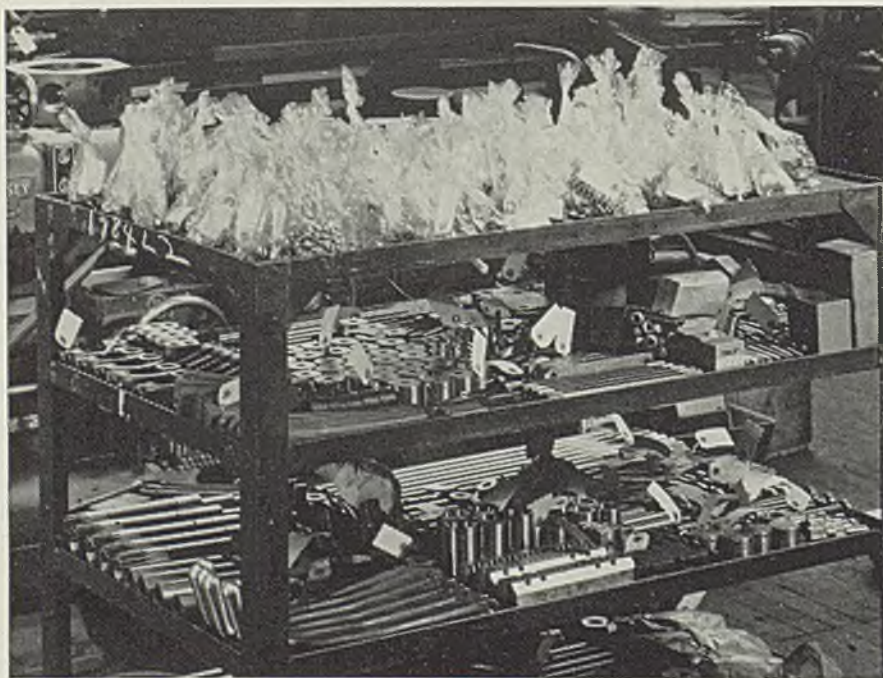
Combining a new synthetic vehicle with improved pigments, the finish is said to remain white longer than previous mill whites, yet it applies as easily as oil paint. Its greatest value lies in its exceptional resistance to moisture and its resistance to repeated cleaning. It also has an opacity which permits one-coat work on average surfaces. It is supplied in gloss, eggshell and flat.

Forecasts Hose Capable Of Tremendous Pressure

■ High-pressure rubber hose capable of withstanding internal pressures of 15 tons a square inch and more is in process of development according to research engineers of B. F. Goodrich Co., Akron, O.

Already testing equipment that creates such extremes of pressure is in use in the company's laboratories. Development of such a hose is due to the increasing requirements of automotive, construction and allied industrial users.

"Bagging" Lathe Parts in Cellophane



■ By the use of Cellophane bags for small parts the Warner & Swasey Co., 5701 Carnegie avenue, Cleveland, has expanded a production bottleneck and quickened the flow of some 5000 to 9000 parts needed on its lathe production line. All smaller parts are tagged with a part number in the stock room—then loaded into the bags. This, in addition to keeping them intact and fully visible, simplifies part orders checkup. Photo courtesy Dobeckmun Co., Cleveland

Stainless for Aircraft

(Concluded from Page 53)

and acts accordingly. If, in addition, the worst radius in the part is specified, the roller has a still better idea of the problem and yet you have not given out any information that will help a competitor. However, the producer now knows whether he must start out with an 0.093-inch thick hot-rolled sheet or a ¼ or ⅜-inch plate in order to get a sheet of the fineness necessary for the particular draw in your part. He varies the rate of rolling and the points of annealing and finally ends up with what you need.

Temper Is Another Thing. Usual specifications for exhaust stack material call for the full soft temper and then further specify flat sheets. This is an impossible set of conditions, for these reasons: The only time that a stainless-steel sheet is full soft is when it comes out of the annealing furnace, warped and buckled from the heat. If it must be straightened by stretching or rolling or if it is rolled in coils, the material is work-hardened sufficiently that the physical properties are higher than those specified for annealed material, namely, 80,000 to 90,000 pounds per square inch. The steel mill cannot alter this fundamental phenomenon. You can be furnished fully annealed sheet that may be wavy, but it is not possible to furnish perfectly flat sheet in the dead soft temper.

Cold-worked materials present so many variables that no attempt to outline the problem in its entirety is possible here. It will be sufficient to say that lack of standardization in customer requirements necessitates handling most orders on a specialty basis. While it is true that government bureaus have done much to limit the number of variables possible, still every time a customer requires a variation from the standard established, that material must be taken through the entire operation as a special order.

Specials Destroy Sequence: The fund of knowledge that skilled workmen have developed by years of work on the problem is of little use to them on special orders—the size and temper of the stock with which to start; the reductions in thickness per pass through the mill; the number of passes per anneal; the thickness and temper necessary to start the cold rolling operation in order to finish up with exactly the right physical properties, thickness, surface finish and workability. It is amazing to watch a skilled man pilot his steel through hot mills, furnaces, pickling machines, cold-roll mills and flattening processes and end up with every requirement satisfied.

Inject into this sequence a set of special requirements and the entire chain of operations is disrupted, necessitating much time and effort being spent by the producer to work out the answer slowly and laboriously.

Not Normal Times: In normal times, special orders may even be welcomed by steel men as an opportunity to learn something and as a way to keep the operators developing their skill. However, these are not normal times. Every special order today ties up equipment that could be working at top speed on other defense orders and takes up time of the best men available in the plant. Here again consideration is not cost or profits but is necessity of planning and utilizing all productive capacity in this country, be it melting, rolling or processing equipment or skilled man power in the best interests of the defense program.

You Have The Solution: The so-

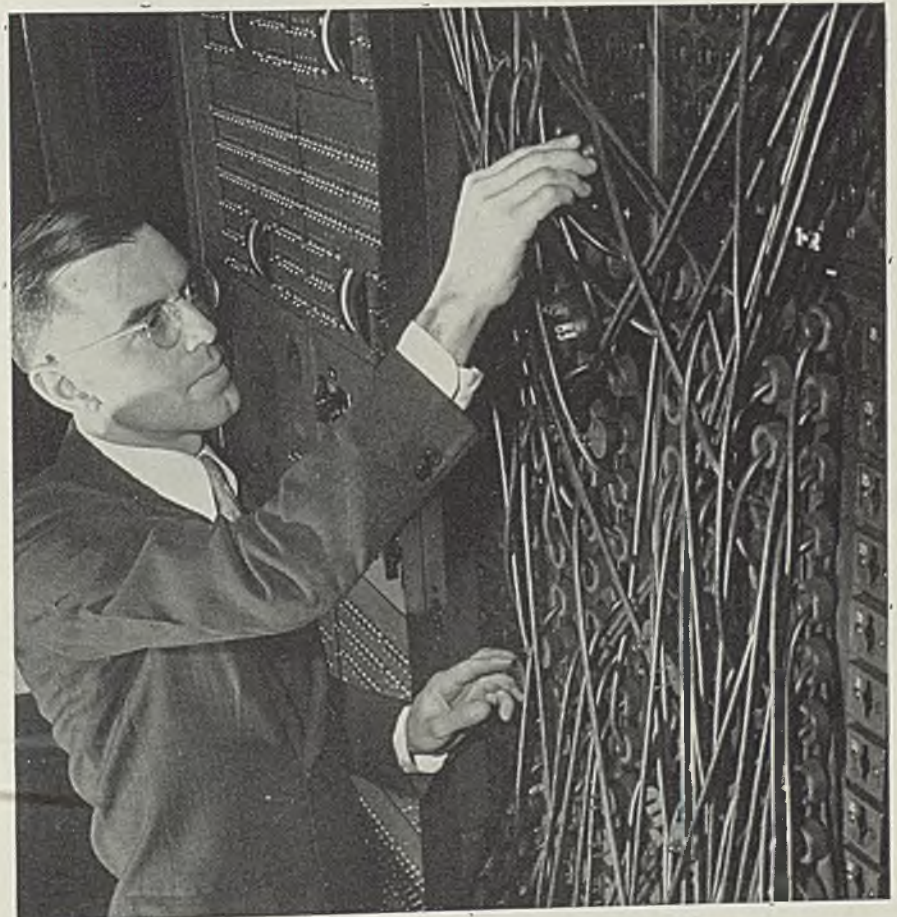
lution of this problem is distinctly beyond the jurisdiction of the steel industry.

Nearly all you aircraft engineers can solve your phase of the problem and part of the troubles of the steel industry if you can get together and co-ordinate your requirements. It is hoped that this project may be started and completed in the near future.

Metal & Thermit Offers New Electrode

■ Metal & Thermit Corp., 120 Broadway, New York, announces the addition of a new Murex Alternex electrode for use with transformer-type alternating-current welding equipment. It is said to handle well in all positions, including "vertical-down-welding." In the smaller sizes it also may be used to advantage in welding ordinary light-gage steel.

Reproduces Power Systems in Miniature



■ This Network Calculator at Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., saves innumerable hours of engineering time in designing new power lines. Resembling somewhat a telephone switchboard, it has 300 wire circuits which can be varied, adjusted and interconnected to simulate any proposed or existing power system. It produces, in miniature, impedances, voltages, currents and phase angles of any of the real electrical setups. Its sources of power are packed in cabinet drawers that can be arranged to correspond to the power sources of the particular system involved

Electric Operators for Overhead Garage Doors

■ Barber-Colman Co., Rockford, Ill., has placed on the market an improved model S electric operator for overhead type garage doors. It consists of motor, speed reducer and friction clutch and screw type limit-relay.



The whole unit is bolted to two channel irons as shown in the illustration. The motor is of the split phase $\frac{1}{4}$ -horsepower type, operating on 110 volt, 60 cycle, single phase alternating current. It is rubber mounted for quiet operation. Speed reduction is accomplished by a worm and worm gear. The 2-thread steel worm is driven at motor speed, and meshes with a 39-tooth bronze worm gear. The worm shaft is provided with deep groove ball-bearings. Both gears are made amply strong for any load they are required to transmit. They are fully enclosed and run in a bath of motor oil. The screw type limit-relay has three purposes. It maintains the circuit to the motor for the full travel of the door after the operator has been started by momentary contact, shuts off the motor when the door reaches the fully open or closed position, and prevents starting the motor in the opening direction when the door is already in the open position, or in the closing direction when the door is already in the closed position. The connecting mechanism which transmits power from the motor unit to the door consists of a channel iron track, a front sprocket, a roller chain, a chain car and a connecting link. Doors are opened and closed at the rate of 1.1 foot per second. The operator handles doors up to 120 square feet in area and uniform in weight.

Bulkbinding Truck

■ Signode Steel Strapping Co., 2608 North Western avenue, Chicago, announces an all-steel Bulkbinding truck for quickening and facilitating the job of transporting coils of Bulkbinding strap and application tools to points of operation. Its coil cradles are adjustable for various widths of strapping and will accommodate three sizes at the same time. Each size may be dispensed independently, or any combination can be dispensed simultaneously. Design of cradles and coil cradle rollers is said to reduce effort required for dispensing strap, and to effectively

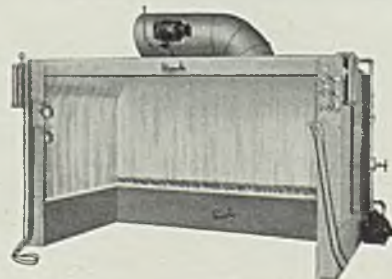
eliminate back lashing at all stages of dispensing. Roller bearing, rubber tired wheels make for easy roll-



ing, quiet operation and protection of floors. Wheels of 7 inch diameter are provided for general usage. Where strap and tools must frequently be transported over rough ground, railroad tracks, etc., trucks are equipped with 12-inch rubber tired wheels.

Airfinishing Booth

■ Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, announces new Water Wash airfinishing booths available with water wash for back, sides, and at bottom. Each includes panels, a wash chamber, settling pan, eliminator plates, nonclogging



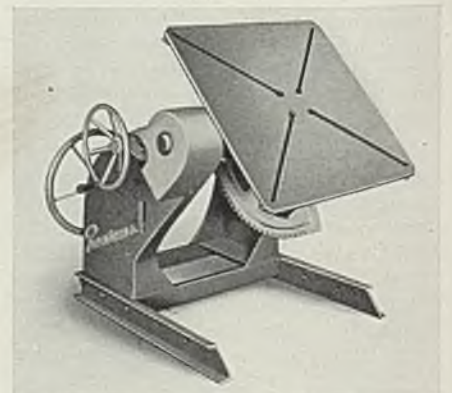
nozzles, removable strainer, float valve and water flow of 4 gallons per minute, per foot of booth width. Booths of this type are said to reduce fire hazards and effectively wash away all overspray by the

Industrial

curtain of water. They may be had in all types and sizes.

Welding Positioner

■ Ransome Concrete Machinery Co., Dunellen, N. J., has placed on the market a new welding positioner for positioning pieces weighing up to 2500 pounds. Its all welded table top, with T-Slots for easy clamping, revolves a full 360 degrees, and tilts 135 degrees beyond horizontal. A worm and worm wheel arrangement makes the table self-locking when handling unbalanced loads. The machine is available with hand



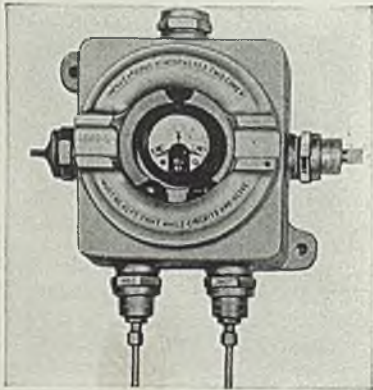
wheels for manual operation or with tilting and revolving motors with remote control push buttons.

Combustible Gas Alarm

■ Mine Safety Appliances Co., Braddock street, Pittsburgh, announces a new explosion-proof combustible gas alarm for safely and continuously sampling atmospheres where combustible gases and vapors may be present. It provides instant warning when gas concentrations exceed a predetermined limit, and may be adapted for automatic process or ventilation control. The alarm including sampling pump is contained in an explosion-proof container, and can be safely installed in gaseous atmospheres. It is specifically calibrated for the par-

Equipment

particular gas or vapor which it will test. It also is so constructed that the operator can adjust the measur-



ing circuit to operate a warning signal at any predetermined point within a wide range.

Radiamatic Pyrometer

■ Brown Instrument Co., division of Minneapolis-Honeywell Regulator Co., 4508 Wayne street, Philadelphia, announces a new Radiamatic pyrometer, designed to operate under severe conditions of temperature, vibration, etc. It is completely self-contained and compensated for ambient temperature



errors. The detector is sighted on the hot object, and continuously measures and controls the desired temperature of the material itself. The unit consists essentially of a heat-resisting lens, a compensator

and a thermopile. The heat radiated from the hot object falls on the lens and is focused on the thermopile.

Barrel and Drum Truck

■ Lewis-Shepard Sales Corp., 295 Walnut street, Watertown, Mass., has developed a new barrel and drum tipper for handling barrels and drums safely. It consists of a strong handle with a pronged collar which is adjustable. This collar allows the device or tipper to fit all types of drums, and large or small-bilged barrels. Its job is to make safe the job of tipping barrels from a horizontal to vertical position or



the reverse. The long handle increases its leverage so that much less effort is required.

Drafting Tables

■ Frederick Post Co., Box 803, Chicago, announces two new modern drafting tables—Primo Metapost and Metapost incorporating the latest innovations for modernizing a drafting room. The table first mentioned is adjusted quickly and smoothly by turning a free operating hand wheel that will raise the working surface from 35½ to 43 inches. Its top may be tilted front to back at an angle within 60 degrees by the manual adjustment of two hand clamps. The Metapost has the same adjustment features with

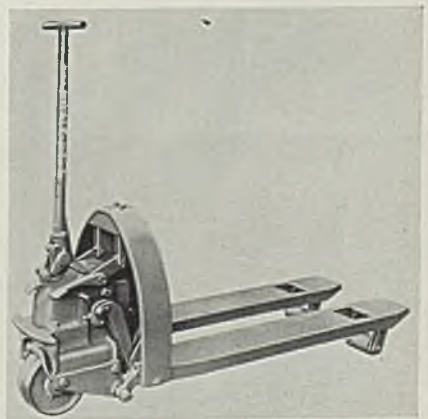
the exception of the hand wheel control which raises the top. To raise the top of this table merely requires loosening two thumb screws on the up-rights supporting the table top, permitting the working surface to be manually raised from 35½ to 43



inches. It may be tilted forward or backward at an angle within 60 degrees. Both tables are of attractive satin chromium tubular steel—a pleasing contrast to the baked, black morocco castings. The table tops are of soft texture pine 1½ inches thick. For convenience a reference shelf may be attached to either model. Each shelf is supported by tubing that harmonizes with the construction of the table itself. Tables having a small base (table tops 36 x 54 inches or under) have a reference shelf 21 x 26 inches. Tables having a large base (table tops 36 x 60 inches) take a shelf measuring 21 x 39 inches.

Pallet Truck

■ Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, announces a new Y4RP-9 hand-operated pallet truck which may be used as a supplement to electric truck handling, being particularly useful for short hauls and close quarter operations. It features an effortless lift through a multiple stroke lifting mechanism. For smooth operation, all wheels are ball bearing equipped. Safety to load, truck and floors is assured

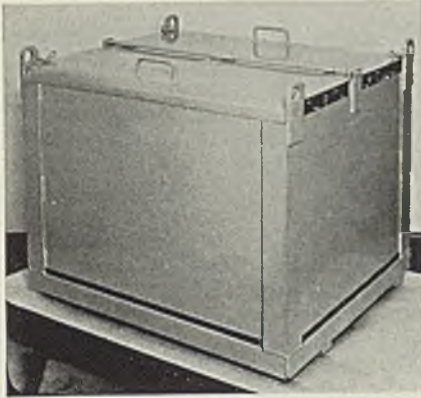


through a positive locking device and hydraulic release check which cushions every descending load. Designed to provide easy entry between pallet decks, the rollers and wheels

on the truck fork frame are spaced in relation to each other so that when the wheels are over an empty deck space, the rollers are supporting the truck by resting solidly on one of the boards of the lower pallet deck. This eliminates the usual wheel drop. The truck is made in several frame widths—25, 27 and 30 inches, and in frame lengths 36, 42, 48, 54 and 60 inches. Load capacities range up to 4000 pounds.

Battery Compartments

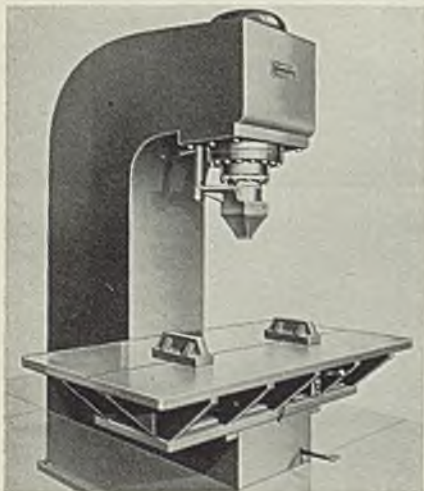
■ Edison Storage Battery division, Thomas A. Edison Inc., West Orange, N. J., announces a new de-



mountable steel compartment for industrial truck batteries. It permits quick exchange of the entire unit, including battery, and provides secure attachment to the truck.

Straightening Press

■ Hannifin Mfg. Co., 621 South Kilmar avenue, Chicago, has placed on the market a 150-ton hydraulic straightening press equipped with a sensitive pressure control to facilitate straightening of steel cast-

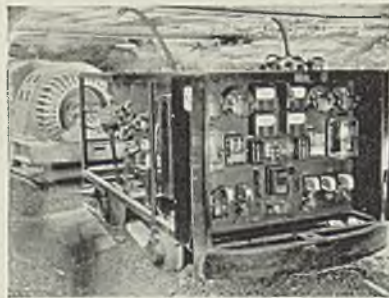


ings and similar work. Its base is designed for installation below floor level, to bring the table to a convenient height for handling bulky

pieces. The operation of the sensitive control allows unusually rapid handling of straightening operations, with finger-tip or light foot pedal control of the ram movement and pressure. The ram has a pressure proportional to the distance the control lever is moved. Any required ram pressure up to the capacity of the press, is obtained by moving the control lever down. Release of the lever at any point automatically returns the ram to top position at high speed. The unit's motor-driven hydraulic power unit is built into the base. Its stroke is 20 inches and the table measures 54 x 96 inches.

Portable Switchgear

■ Westinghouse Electric & Mfg. Co., Dept. 7-N-20, East Pittsburgh, Pa., announces a new unitized automatic switchgear for controlling synchronous-motor-generator substations in mining service. It can be arranged for mounting on a portable truck or car so that it may be moved along with the load center. Available for standard operation from a 2300-volt, 60-cycle alternating-current supply, and with a 275-volt direct-current output, it also can be obtained for other standard voltages. The unit provides for the

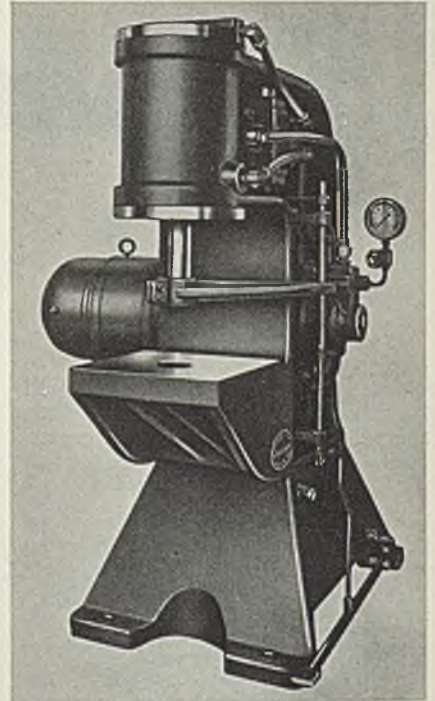


starting, stopping and running of the motor-generator set. The operation of the switch or push button is the only manual action required. Starting and stopping sequences are automatic and are accomplished by control relays on the switchgear itself. Complete protection against overload, short circuit, etc., is provided. The switchgear is available for controlling both single and double unit substations. Optional on the double unit systems is a "load responsive" feature which automatically starts and stops both units in response to load demand.

Hydraulic Press

■ Greenerd Arbor Press Co., Nashua, N. H., has introduced a No. H 70 30-ton hydraulic press which features a pressure variable from 6 to 30 tons on the down stroke. Self-contained, its frame and cylinder are cast of hydraulic semisteel and the cylinder is honed

to size. Both the motor and pump are mounted on opposite sides of the main housing, being directly coupled. The oil sump is located in



the base. The press ram is of heat treated alloy steel, 2 7/16 inches in diameter. It is equipped with hardened shoulder plug. The 18 x 15-inch working table is approximately 34 1/2 inches from floor. The machine features a ram travel up to 15 tons pressure at the rate of 138 inches per minute, with instantaneous change-over to a working speed of 38 inches per minute within the range of 15 to 30 tons pressure. The press is capable of receiving work up to 22-inch diameters. Stroke of ram is adjustable from 1 to 10 inches. The unit is powered by a 10 horsepower, 1200 revolutions per minute motor and starter for 220/440/550 volt, 2 or 3 phase, 50 or 60 cycle current as standard equipment.

Gun Rifling Machine

■ R. K. LeBlond Machine Tool Co., 2694 Madison road, Cincinnati, has introduced a No. 2 gun rifling machine for rifling guns up to 3-inch bore and 88 inches in length. Indexing is facilitated with this unit. The grooves may be either cut or



broached. Adjustable automatic stops control the movement of the carriage. It is possible to get any travel up to the maximum of 10 feet. Conveniently located on the control rod are two manually operated lev-

< < HELPFUL LITERATURE > >

1. Fabricating Clad Steel

Ingersoll Steel & Disc division, Borg-Warner Corp.—16-page illustrated "Manual of Welding and Fabricating Procedures for Stainless Clad Steel" includes latest technique to assure maximum strength, corrosion resistance and ductility in welded fabrication. Chart shows corrosion resistance of two types of "Ingaclad" to acids, alkalies and corrosive materials.

2. Steel Plates

Lukens Steel Co.—12-page illustrated bulletin No. 107 contains technical data on sheared and flame cut, universal rolled steel plates and manufacturer's standard tolerances. Plates up to 186 inches in width can be rolled on company's 206-inch mill.

3. Tool Steel Chart

Jessop Steel Co.—28 x 22 inch "Tool Steel Recommendations" chart for wall hanging provides quick method of determining proper tool steel for use in machining all types of parts. Recommended heat treatments are given for oil and air hardening, water hardening, high speed and hot work steels.

4. Motor Starter

General Electric Co.—6-page illustrated bulletin No. GEA-2964B is descriptive of small full-voltage motor starter for use on all types of machines. Features include ease of mounting and isothermic overload protection, as well as ease of wiring and maintenance.

5. Centrifugal Refrigeration

Worthington Pump & Machinery Corp.—6-page illustrated folder gives specifications and outlines features of centrifugal refrigeration equipment for industrial and air conditioning applications. Machines may be driven by electric motor or steam or gas turbine.

6. Pyrometer Potentiometer

Lewis Engineering Co.—4-page illustrated bulletin No. 8-3 is descriptive of pocket size portable pyrometer potentiometer for measuring temperatures up to 3000 degrees Fahr. Complete details of this compact instrument are given.

7. Press Brakes

Verson Allsteel Press Co.—6-page illustrated bulletin No. MBP40 presents specifications and data on T series "Major" press brakes for forming, bending, coping, notching and multiple punching operations. Capacities range up to 16 feet for 7/32-inch mild steel plate.

8. Molding Plastics

Bakelite Corp.—32-page illustrated booklet, "Bakelite Molding Plastics," contains descriptions of compression and injection molding processes and explains thermosetting and thermoplastic materials. Physical, mechanical and electrical properties of phenolics, ureas, polystyrenes and acetates are enumerated in editorial and tabular form.

9. Electric Hoists

Reading Chain & Block Corp.—12-page illustrated bulletin, "144 Answers to Your Hoisting Problems," is written for production, materials handling and maintenance men. Booklet treats of application and use of electric hoists throughout industry.

10. Balancing Machine

Taylor Sales Co.—6-page illustrated bulletin No. 761 describes various models of static universal balancing machines, with or without weighing mechanism. Equipment provides means for balancing all types of parts and machines to eliminate vibration.

11. Seamless Steel Tubing

Summerill Tubing Co.—8-page illustrated bulletin, "Taking 'Specials' in Stride," shows by one example how company functions to bring advantages of seamless tubing to users whose needs are not covered by ordinary mechanical stocks. Production practices are adapted to make regular runs of tubing to meet exceptional specifications.

12. Dial Test Indicator

George Scherr Co.—4-page bulletin, "Introducing New Dial Test Indicator," presents construction details, applications, features and specifications of this tool, which is available with or without universal mounting, as well as in combination sets.

13. Motor Insulation

Owens-Corning Fiberglas Corp.—16-page illustrated bulletin, "The Motor of Tomorrow," shows performance of motor insulated with "Fiberglas" yarn covered wire, and tape and fabric covered windings. Comparison of "Fiberglas" is made with standard electrical insulating materials. Application of this insulation to motors is shown.

14. Honed Finish

Micromatic Hone Corp.—16-page illustrated bulletin, "Honed Microfinish for Aircraft Parts," shows application of finishing methods to engine cylinders, connecting rods, crank and cam shafts, valve tappet guides, gears, bushings, propeller parts, and other airplane parts.

15. Gas Cutting Machines

Air Reduction Sales Co.—24-page illustrated bulletin No. ADC-628 describes line of "Oxygraph" and "Travograph" gas cutting machines for cutting unlimited variety of shapes from steel plate, slabs, billets and forgings. Typical parts include blanking dies, connecting rods, links, cams, hangers, and gear blanks.

16. Unit Heaters

B. F. Sturtevant Co.—16-page illustrated catalog No. 454 is descriptive of "Sturtevant" downblast speed heaters. Features are shown pictorially and outlined. Capacity tables are included for all models. Engineering data includes conversion tables, heat loss coefficients, mounting information, dimensions and piping diagrams.

17. Radiant Drying Lamps

Westinghouse Electric & Manufacturing Co.—12-page illustrated bulletin No. A-3817 is entitled, "Drying, Baking, Heating With Westinghouse Radiant Heat Drying Lamps." Advantages, typical installations, applications, and specifications of available lamps are included.

18. Pyrometer Testing

Leeds & Northrup Co.—28-page illustrated catalog No. E-33A-503 is entitled, "Apparatus for Checking Thermocouple Pyrometers." Portable equipment for plant tests under actual operating conditions is described, as is laboratory apparatus for standardization.

19. Concrete Resurfacers

Flexrock Co.—4-page illustrated bulletin on "Ruggedwear Resurfacers" outlines features and applications of this floor resurfacing material which is waterproof, acid resistant and fireproof. Material can be applied to featheredge in repairing concrete.

20. Pyrometers

Brown Instrument Co.—24-page illustrated catalog No. 15-E describes millivoltmeter type pyrometers. Indicating, recording and control instruments are covered, with construction features and operating advantages described. Also shown are diesel engine, marine and portable type units.

21. Surface Grinders

Hill Acme Co.—6-page illustrated bulletin No. H-V-2 shows features of "Hill" heavy duty precision surface grinders, both in horizontal and vertical spindle types. These units employ hydraulic feed. Applications of machines are shown.

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22. Bearings

W. A. Jones Foundry & Machine Co.—8-page illustrated bulletin No. 56 includes description, parts list, bearing capacities, standard dimensions and lubrication data on roller bearing pillow blocks, plain and wedge adjusting base plates, bearing units, and hanger units.

23. Rotary Sweeper

Ideal Power Lawn Mower Co.—8-page illustrated bulletin on "Ideal Roto" sweepers describes these machines for industrial maintenance purposes. With one of these power driven units, it is said one man can clean from 25,000 to 50,000 square feet per hour. Specifications of various models are given.

24. V-Belt Data

B. F. Goodrich Co.—170-page illustrated "V-Belt Data Book" gives alphabetical listings of belt requirements for electric appliances, pumps, woodworking machines, air compressors, buffing machines, and other equipment. Belt sizes and dimensions are included.

25. Heating Coils

Fedders Manufacturing Co.—52-page illustrated catalog No. AC601 presents complete data on type K heating coils for industrial heating systems. "Time Saver Charts" are included for calculating required coil sizes. Engineering data are included for all types of industrial heating and ventilating problems.

26. Rectifiers

Fansteel Metallurgical Corp.—8-page illustrated bulletin No. F1-3 describes operating characteristics, construction and features of "I. T. & T." selenium rectifiers for providing direct current power. Circuit arrangements and available models are shown and described.

27. Electric Hoists

Master Electric Co.—6-page illustrated bulletin, "Be Prepared with Speedmaster Hoists," explains features and gives specifications of worm gear driven hoists in capacities ranging from 250 to 6000 pounds.

28. Chemicals From Coal

Koppers Co., Tar & Chemical division—28-page illustrated booklet, "Chemicals from Coal," gives grades, uses and properties of such coal tar chemicals as anthracene, benzene, fluorene, naphthalene, phenol, picolines, pyridine, notation sulphur, and toluene.

29. Heat Treating Baths

A. F. Holden Co.—8-page illustrated bulletin, "Heat Treating Baths for the Metal Industry," gives details of products for use in tempering, bluing, blacking, annealing, hardening, case hardening and high speed hardening operations.

«« HELPFUL LITERATURE

(Continued)

30. Nickel Alloy Welding

International Nickel Co.—32-page illustrated bulletin No. T-2 gives technical information on welding, brazing and soft soldering of Monel, nickel and Inconel. Subjects covered include joining of dissimilar metals, heat treatment of welded vessels, and grinding and finishing of welded joints. Instructions are included for all operations.

31. Chucking Devices

Anker-Holth Manufacturing Co.—16-page loose-leaf illustrated catalog gives complete information on "Alogrip" chucking devices. Ball bearing air cylinders, collet chucks, and two and three jaw chucks are described and specifications given.

32. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 860A describes series 860 rotary crossed-axis gear finisher for use with short runs or where large variety of gears are to be finished on same machine. Specifications are given for machines which will accommodate gears up to 8, 12, or 16-inch diameters.

33. Grinding Wheels

Manhattan Rubber Manufacturing division, Raybestos-Manhattan, Inc.—8-page illustrated folder No. 6878 describes vibration dampener bushing or resilient mounting which is built into "Manhattan" wheels for portable grinders. Advantages claimed for these wheels include elimination of vibration, better finish and increased production.

34. Dredge Buckets

American Manganese Steel division, American Brake Shoe & Foundry Co.—4-page illustrated bulletin No. 1140 outlines features of "Amsco" rivetless lip dredge buckets which are made of abrasion and impact resistant manganese steel.

35. Blueprint Cabinet

All-Steel-Equip Co.—4-page illustrated bulletin No. BP-6 presents specifications and construction details of blueprint filing cabinets which provide clean, safe protection and ready access to plans, master drawings and printed sheets in practically all sizes up to 48 x 36 inches.

36. Stainless Steel

Rustless Iron & Steel Corp.—20-page illustrated bulletin commemorates completion of plant enlargement program. Manufacture of stainless steel bars and wire is shown by pictorial trip through plant. Each operation is explained by text.

37. Crawler Tractor

Allis-Chalmers Mfg. Co.—24-page 2-color illustrated catalog points out features of "HD-7" 54-horsepower diesel crawler tractor. Catalog stresses machine's performance and protection against lost time.

38. Swaging Machines

Etna Machine Co.—6-page illustrated folder on series 200, 300 and 400 swaging machines gives specifications of two and four-die units. Features of these machines for swaging large diameters are outlined and shown by sectional views.

39. Alloy Steels

Crucible Steel Co. of America—32-page illustrated regular publication, "Crucible News" contains interesting stories on applications and use of tool, alloy, stainless and other specialty steels.

40. Hydraulic Presses

Baldwin Southwark Division—28-page illustrated bulletin No. 160 gives complete information on self contained hydraulic presses. Available types are illustrated and described. Features of design and operation are included.

41. Safety Electric Fixtures

Appleton Electric Co.—4-page illustrated bulletin Form 1050 gives complete description of explosionproof sealed safety switches, receptacles, and lighting fixtures designed for use in locations where there is an explosion hazard.

42. Hobbing Machine

Barber-Colman Co.—4-page illustrated bulletin No. F1403-2 presents features, advantages and typical applications of taper splines and type T hobbing machine. Full specifications on this taper spline hobbing machine are given.

43. Salt Bath Furnace

Ajax Electric Co.—4-page illustrated bulletin No. 109 is devoted to description of process for brazing of ferrous and non-ferrous assemblies by dipping into salt bath of "Ajax-Hultgren" furnace in which temperature is maintained above melting point of brazing alloy.

44. Sprocket Chain

Peoria Malleable Castings Co.—60-page illustrated catalog No. 106 is devoted to malleable iron sprocket chain. Facilities of company are shown pictorially. Complete dimensions and specifications are given for detachable, pintle, drive and transfer, refuse and feeder sprocket chains, and for standard attachments.

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ers. The control rod runs the full length of the bed, and operates a 4-way valve to start, stop and reverse the direction of carriage travel. In the head-end leg are two adjustable hydraulic speed control valves—one to change the speed of the carriage on the forward stroke, while the other performs a similar duty on the return stroke. A 5-horsepower constant speed motor is connected to a constant delivery, vane type rotary pump having a capacity of 18 gallons per minute, and exerting a maximum pressure of 600 pounds per square inch. This pump energizes the main hydraulic cylinder.

Oxygen Recorder

■ Cambridge Instrument Co. Inc., Grand Central terminal, New York, has introduced a dissolved oxygen recorder sensitive to one part in 400,000,000 for boiler system corrosion control. It is completely automatic and provides a continuous indication and record of dissolved oxygen entering the boiler. The operation of the instrument's metering unit is based upon the thermal conductivity principle wherein four platinum spirals forming four arms of a Wheatstone bridge are employed. As shown in the schematic diagram, the water to be analyzed enters the cooler-regulator A where it is reduced in temperature and maintained at approximately 85 degrees Fahr. This constant head device B maintains the correct flow of water through the scrubbing tower C of analyzer unit D. Hydrogen is generated in the electrolytic cell E and flows to the scrubbing tower where it comes into intimate contact with the sample water. The water

balance and no deflection of the recorder occurs, indicating zero oxygen. When the exposed spirals are surrounded by a mixture of hydrogen and oxygen their temperature will increase due to the lower thermal conductivity of the mixture. This causes a change in resistance of the spirals with a consequent unbalance of the bridge circuit. The deflection of the recorder is, therefore, proportional to the concentration of dissolved oxygen in the sample water passing through the scrubbing tower.

Flat Spray Nozzles

■ Spraying Systems Co., 4021-R West Lake street, Chicago, announces a simple flat spray nozzle for use in processing, industrial washing machines or where sprays are overlapping each other. It gives a flat spray pattern with slightly heavy center at higher pressures, and can be had in a number of different spray angles. Nozzles are available in $\frac{1}{8}$ to $\frac{1}{2}$ -inch male pipe connection. Capacities range from 0.5 to 10 gallons per minute at 10 pounds pressure, and 1 to 20 gallons per minute at 40 pounds pressure.

Standard stock construction is brass or all iron.

Gas-Fired Unit Heaters

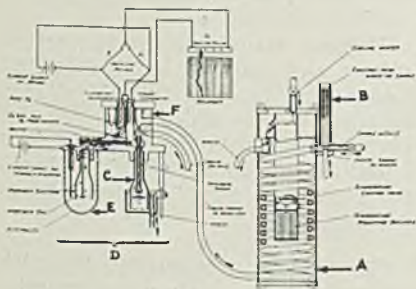
■ Reznor Mfg. Co., 186 James street, Mercer, Pa., has developed a new line of gas-fired unit heaters, which includes fan, blower and duct type units.

Each heater is available in five different capacities ranging from an input of 55,000 to 200,000 B.t.u. per hour.

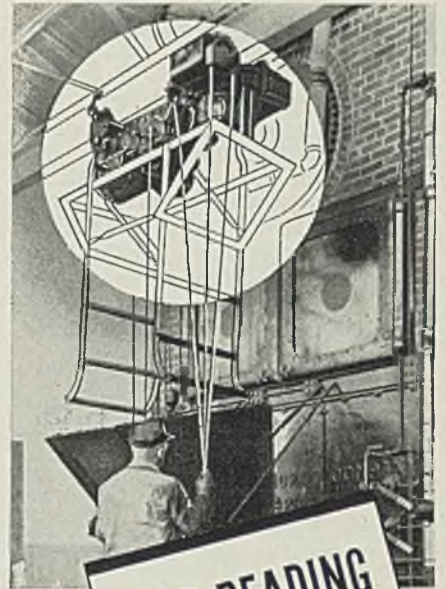
Face Shield

■ Boyer Campbell Co., 6540 Antoine street, Detroit, announces a new model face shield with a plastacele window which provides greater flexibility for adjustment to operator's face, yet does not lose its shape. This same flexibility eliminates cocking of the headgear, if objects are bumped into when working in confined places, and its black binding absorbs confusing light reflections.

The window buttons on with snap fasteners. It also may be adapted to all models of B & C face shields except Nos. 10 and 20. Other features such as complete interchangeability of parts, fully adjustable friction joints and exceptionally long sweat bands are incorporated. A broad, adjustable elastic head band also is provided. Window sizes are 0.020-inch 4 x 9 and 0.020-inch 6 x 9. The model is referred to as the No. 66.



dissolves some of the hydrogen and gives up part of its oxygen. The resultant mixture of gases diffuses to meter block F which contains the sensitive elements. The latter consists of the four platinum spirals connected in the form of a Wheatstone bridge which are heated to a definite value by the current flowing through them. Two of the spirals are exposed to the sample gas and two are permanently sealed with saturated hydrogen. When pure saturated hydrogen surrounds the exposed spirals, the bridge is in



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\$46,536.00**

12 years ago \$2,200 was spent installing this "straight line" Reading system in the boiler room of a large textile plant. Repairs and maintenance have averaged less than 1% per year. Savings in handling costs have averaged \$3,878 per year. Other benefits include—ability of engineer to handle turbine room as well as boiler room—more constant, even firing of boilers to provide maximum B.T.U. conversion—elimination of dirt and dust.

Today—Reading's Unit Construction Plan of Hoist Building would reduce the cost of a similar installation by more than \$200—because a standard mechanism could be used as a base for the design.



This Plan provides 144 combinations of basic units to meet unusual conditions—144 standard price Answers To Your Hoisting Problems. Write for this free booklet.

READING CHAIN & BLOCK CORP.
DEPT. 31 READING, PA.

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Chain Hoists, Electric Hoists,
Cranes and Monorails

Activities of Steel Users, Makers

■ **FOSTER MACHINE CO.**, Elkhart, Ind., has acquired assets of International Machine Tool Co. Inc., Indianapolis. In connection with the purchase, it was reported C. Russell Feldman, New York, and E. H. Welker, Detroit, have acquired majority interest in the Foster company. W. H. Foster, founder and president of the company, will continue active in the management.

Swartz Tool Products Co. Inc., Detroit, has moved its offices and factory from 5259 Western avenue to 13330 Foley avenue.

Green Fuel Economizer Co. Inc. has moved its New York office to 165 Broadway.

Chelsea Fan & Blower Co. Inc., New York, has purchased a plant at Olsen and Grove street, Irvington, N. J., and will be located at that address after Feb. 1.

Utility Fan Corp. has moved its offices and manufacturing facilities to new quarters at 4851 South Alameda street, Los Angeles.

Iron & Steel Products Inc., Chicago, has discontinued its St. Louis branch and will handle that territory from Chicago.

Amthor Testing Instrument Co. Inc. has purchased a two-story factory building at 45-53 Van Sinderen avenue, Brooklyn, N. Y., and has moved to the new quarters.

James Metal Products Co. Inc., maker of metal specialties and stampings, Chicago, has leased for five years a one-story building, containing 30,000 square feet, at 2929 North Oakley avenue. Lease contains provision for building an extension to provide 15,000 square feet additional if space is needed.

Heller Brothers Co., Newark, N. J., will reopen its hot rolling mill early in the second quarter to roll bars from 1/4 to 1 1/2-inches, in rounds, squares, octagons and hexagons from various grades of carbon and alloy steels to specified SAE analyses.

Liquid Carbonic Corp., Chicago, has acquired business and assets of Independent Oxygen Co., Cincinnati, and has merged that company with its wholly-owned oxygen manufacturing subsidiary, Wall Chemicals Corp. In addition, it has also purchased the business and assets of Wall Chemicals Ltd., with plants in Montreal, Toronto and Windsor, Ont. These will be owned and oper-

ated by Liquid Carbonic's direct subsidiary, Wall Chemicals Canadian Corp. Ltd., which has been organized for that purpose. The newly acquired units will give Liquid Carbonic a total of six oxygen and seven acetylene producing plants.

Liberty Foundry Inc., Wauwatosa, Wis.; Spring City Foundry Co., Waukesha, Wis., and Milwaukee Steel Foundry Co., Milwaukee, headed by William J. Grede, have been merged to form Grede Foundries Inc., with Mr. Grede as president. There will be no change in policy or personnel.

Ordinance, Air Corps Defense Awards Heavy

(Concluded from Page 35)

bersburg, Pa., hydraulic press, \$7250.
 Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, \$49,736.20.
 Crucible Steel Co. of America, New York, tool, carbon steel, \$383,923.04.
 Davidson, M. T., Co., Brooklyn, N. Y., centrifugal type and sea water pumps, \$95,074.80.
 DeLaval Steam Turbine Co., Trenton, N. J., governor pumps, \$19,104.
 Electric Arc Cutting & Welding Co., Newark, N. J., generator units, \$24,320.
 Ellicott Machine Corp., Baltimore, propeller shafts, \$8133.
 Gardner-Denver Co., Quincy, Ill., compressors, \$13,912.51.
 General Steel Castings Corp., Eddystone, Pa., steel anchors, \$96,612.
 Gibbs Gas Engine Co. of Florida, Jacksonville, Fla., mine sweepers, \$640,000.
 Globe Machine & Stamping Co., Cleveland, mess trays, \$26,000.
 Gould & Eberhardt, Newark, N. J., metal shapers, \$8859.
 Gray Steel Products Corp., Norfolk, Va., mooring steel buoys, \$5020.
 Greenfield Tap & Die Corp., Greenfield, Mass., threading sets, dies, taps, \$200,833.48.
 Greenville Steel Car Co., Greenville, Pa., peg top buoys, \$425,085.
 Harrisburg Steel Corp., Harrisburg, Pa., compressed gas cylinders, \$41,717.50.
 Hooven, Owens, Rentschler Co., Hamilton, O., lower cylinder jacket, \$7163.50.
 Ingersoll-Rand Co., New York, compressors, \$29,088.
 Jack & Heintz Inc., Cleveland, starters, \$15,000.
 Kay Mfg. Corp., Brooklyn, N. Y., wire bottoms and helical springs, \$8315.95.
 Leland-Gifford Co., Worcester, Mass., drilling machines, \$46,880.
 Lloyd & Arms Inc., Philadelphia, radial drills, \$23,218.
 Marshall, F. W., & Co., Philadelphia, foundry pig iron, \$5624.30.
 Monarch Machine Tool Co., Sidney, O., precision lathes, \$8671.
 National Tube Co., Pittsburgh, steel flasks, \$228,347.69.
 Niles-Bement-Pond Co., Pratt & Whitney division, Hartford, Conn., vertical shaper, \$5745.41.
 Nye Tool & Machine Works, Chicago, stocks, dies, \$16,964.02.
 Okonite Co., Passaic, N. J., electric cable, \$28,333.55.
 Ourisman Chevrolet Sales Co., Washington, motor trucks, \$10,849.30.
 Pacific Marine Supply Co., Seattle, portable gasoline-engine pumps, \$32,632.50.

Pittsburgh Steel Foundry Co., Glassport, Pa., steel anchors, \$431,298.
 Spencer Lens Co., Buffalo, telescope alidades, \$15,768.
 Steel Products Engineering Co., Springfield, O., propeller hubs, \$6400.
 Wayne Tool Co., Waynesboro, Pa., countersinks, \$25,349.57.
 Western Pipe & Steel Co. of California, Los Angeles, peg top buoys, \$54,348.
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., electric fans, \$9300.
 Yale & Towne Mfg. Co., Automatic Transportation Co., division, Chicago, tilting trucks, \$13,310.

Bureau of Yards and Docks Awards

Cyclone Fence Co., Waukegan, Ill., installation of fence at naval reserve aviation base, Fairfax airport, Kansas City, Kans., \$2121.
 Elevator Engineering Co., Baltimore, repairs to elevators, naval operating base, Norfolk, Va., \$7200.

DIED:

Norman R. McLure, 61, vice president, E. J. Lavino Co., Philadelphia, in that city, Jan. 21. He was a member, American Iron and Steel institute.

John P. Dowd, 71, chief engineer, Industrial Brownhoist Corp., Cleveland, until his retirement seven years ago, Jan. 15, in Cleveland. Associated with the company about 35 years, he was at one time assistant sales manager.

George Stevens Pages, 76, who retired in 1923 as general manager, Park steelworks, Crucible Steel Co. of America, Pittsburgh, Jan. 19, in Pittsburgh. A graduate of Columbia University School of Mines in 1885, he was associated with the Edgar Thomson Steel Works, Braddock, Pa., for a year when he joined W. G. Park in the Black Diamond Steel Works, which in 1900 became the Park plant of Crucible Steel.

Duncan MacVichie, 83, mining engineer and railroad builder, in Salt Lake City, Jan. 18. Mr. MacVichie recently was awarded the Legion of Honor gold medal by the American Institute of Mining and Metallurgical Engineers for 50 years of membership.

Chester W. Vanderbilt, 45, sales engineer, New York office, Bethlehem Steel Co., Jan. 17. He was affiliated with Bethlehem since 1928.

Gordon H. Stewart, 48, vice president and general manager, American Twist Drill & Tool Co., Detroit, in that city, Jan. 16.

William A. Nelson, 65, president, Adams & Nelson Co., Chicago, at his home in that city, Dec. 8.

Winfield H. Smith, 80, president of Winfield H. Smith Inc., Springfield, N. Y., Jan. 14 in Buffalo.

Steelmakers More Severe In Rationing Products

Gain of Washington priorities makes civilian apportioning more imperative, but situation is under control. Industry is sold through April.

■ PRESSURE for deliveries on the part of consumers becomes more severe while producers in turn exert more pressure to confine buying to actual needs in sight. The latter are ever more strict in rationing steel. The bulk of time of sales offices is devoted to attending complaints of consumers on belated or under tonnage deliveries.

What complicates orderly shipments on civilian needs is the increasing volume of defense orders accompanied by priority certificates issued by Washington. More frequently are producers unable to meet delivery promises, both as to dates and quantities, though they remain confident that in the long run the situation will resolve itself satisfactorily.

Adding to the intensity of business is the natural trend at this time of year for customers to build up inventories, which is the opposite of a month ago. Mills are by now generally sold up through April. They admit that much business now being placed on books may be so-called speculative business, though it seems that by far the major share will prove purely legitimate coverage. What had seemed speculative orders in late 1940 proved finally to have been thoroughly warranted.

Producers warn that much business now being placed on the books is subject to priorities, and deliveries on dates and amounts specified are not guaranteed. Some sense that possible bottlenecks have been passed along from raw material departments to the more finished stages such as rolling mills, raw material production having acquitted itself admirably.

Tendency is to take orders only from adjacent customers, mills refusing more and more to absorb freights. Often consumers are willing to pay freights from distant mills. In some cases makers of plain steel are aided by interruptions in fabricating operations such as strikes or lack of supply of some essential part which retards entire fabricating operations at affected plants. In such cases plain steelmakers can divert tonnages to smooth-running plants.

Sales volume generally holds up to high levels of recent months, with orders exceeding production because of the tendency to get places on books far ahead.

Prices of finished steel receive but minor consideration alongside desire to be supplied. A marked ex-

ception in market firmness generally are concrete reinforcing bars which have sold at 1.90 cents as against accepted prices of 2.05 and 2.15 cents, rail and billet bars, respectively, concessions usually being made on WPA work.

Galvanized sheets, which often suffer from weakness in normal times, are apparently exceedingly firm, not only because of scarcity of zinc but also because of exceptional demand for defense work, such as roofing and sidings of buildings.

Pig iron sales are relatively lighter than finished steel because first quarter needs are covered and producers are not yet willing to place orders on books for second quarter.

Among unusual sales were those of German coke to consumers along the Pacific Coast of the United States, two cargoes reportedly having been captured by the British navy, taken to a port in British Columbia and resold to American users.

Makers of flat bar products have made slight changes in the dividing line between flat bars from strips as regards gages and widths.

The influenza epidemic has interfered somewhat with production in plants and offices.

Automobile production for the week ended Jan. 25 is estimated at 121,948 units, a drop of 2077 for the week, comparing with 106,400 in the corresponding week of 1940.

The largest fabricated structural steel contract in months involves 30,000 tons for a naval ordnance plant, largely for manufacture of armor plate, at Charleston, W. Va., let to the American Bridge Co.

Steel ingot production for the country advanced 1 point to 99 per cent. Gains were attained in three districts: Pittsburgh, up $\frac{1}{2}$ point to 96, Buffalo, up $2\frac{1}{2}$ points to 93 and Cincinnati, up $1\frac{1}{2}$ points to 90. Declines took place at Chicago, by $1\frac{1}{2}$ points to 97 and at Cleveland, down 5 points to 84. The following areas were unchanged: Eastern Pennsylvania at 96, Wheeling, Birmingham and New England at 100, St. Louis at $87\frac{1}{2}$, Detroit at 95 and Youngstown at 96.

Because of further mild declines in steel scrap prices, two of STEEL's composites are lower. Steelworks scrap was off 8 cents at \$20.42 and iron and steel dropped 9 cents to \$38.24. Finished steel was unchanged.

MARKET IN TABLOID ★

Demand

Brisk.

Prices

Generally firm.

Production

Up 1 point to 99.

COMPOSITE MARKET AVERAGES

	Jan. 25	Jan. 18	Jan. 11	One Month Ago Dec., 1940	Three Months Ago Oct., 1940	One Year Ago Jan., 1940	Five Years Ago Jan., 1936
Iron and Steel....	\$38.24	\$38.33	\$38.47	\$38.30	\$38.07	\$37.33	\$33.34
Finished Steel....	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	20.42	20.50	21.00	21.37	20.56	17.48	13.15

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Jan. 25,	Dec.	Oct.	Jan.	Pig Iron	Jan. 25,	Dec.	Oct.	Jan.
	1941	1940	1940	1940		1941	1940	1940	1940
Steel bars, Pittsburgh.....	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh.....	\$25.34	\$24.95	\$24.34	\$24.34
Steel bars, Chicago.....	2.15	2.15	2.15	2.15	Basic, Valley.....	23.50	23.10	22.50	22.50
Steel bars, Philadelphia.....	2.47	2.47	2.47	2.47	Basic, eastern, del. Philadelphia	25.34	24.84	24.34	24.34
Iron bars, Chicago.....	2.25	2.25	2.25	2.15	No. 2 foundry, Pittsburgh.....	25.21	24.80	24.21	24.21
Shapes, Pittsburgh.....	2.10	2.10	2.10	2.10	No. 2 foundry, Chicago.....	24.00	23.75	23.00	23.22
Shapes, Philadelphia.....	2.215	2.215	2.215	2.215	Southern No. 2, Birmingham....	19.38	19.38	19.38	19.38
Shapes, Chicago.....	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati..	23.06	23.06	23.06	23.06
Plates, Pittsburgh.....	2.10	2.10	2.10	2.10	No. 2X, del. Phila. (differ. av.)..	26.215	25.715	25.215	25.215
Plates, Philadelphia.....	2.15	2.15	2.15	2.15	Malleable, Valley.....	24.00	23.60	23.00	23.00
Plates, Chicago.....	2.10	2.10	2.10	2.10	Malleable, Chicago.....	24.00	23.75	23.00	23.00
Sheets, hot-rolled, Pittsburgh...	2.10	2.10	2.10	2.10	Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Sheets, cold-rolled, Pittsburgh...	3.05	3.05	3.05	3.05	Gray forge, del. Pittsburgh.....	24.17	23.35	23.17	23.17
Sheets, No. 24 galv., Pittsburgh...	3.50	3.50	3.50	3.50	Ferromanganese, del. Pittsburgh..	125.33	125.33	125.33	105.33
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 3/4-inch, Pitts..	2.00	2.00	2.00	2.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled		Black Plate, No. 29 and Lighter		Long Terns No. 24 Unassorted		Enameling Sheets	
						No. 10	No. 20
Pittsburgh.....	2.10c	Pittsburgh.....	3.05c	Pittsburgh, Gary.....	3.80c	Pittsburgh.....	2.75c
Chicago, Gary.....	2.10c	Chicago, Gary.....	3.05c	Pacific Coast.....	4.55c	Chicago, Gary.....	3.35c
Cleveland.....	2.10c	Granite City, Ill.....	3.15c			Granite City, Ill.....	3.45c
Detroit, del.....	2.20c					Youngstown, O.....	3.35c
Buffalo.....	2.10c					Cleveland.....	3.35c
Sparrows Point, Md.....	2.10c					Middletown, O.....	3.35c
New York, del.....	2.34c					Pacific Coast.....	3.40c
Philadelphia, del.....	2.27c						
Granite City, Ill.....	2.20c						
Middletown, O.....	2.10c						
Youngstown, O.....	2.10c						
Birmingham.....	2.10c						
Pacific Coast ports.....	2.65c						

Galvanized No. 24

Pittsburgh.....	3.50c				
Chicago, Gary.....	3.50c				
Buffalo.....	3.50c				
Sparrows Point, Md.....	3.50c				
Philadelphia, del.....	3.67c				
New York, delivered.....	3.74c				
Birmingham.....	3.50c				

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.		Chrome-Nickel		Straight Chromes	
		No. 302	No. 304	No.	No.
Bars.....	24.00	24.00	25.00	410	430
Plates.....	27.00	27.00	29.00	430	442
Sheets.....	34.00	34.00	36.00	442	446
Hot strip.....	21.50	21.50	23.50		
Cold strip.....	28.00	28.00	30.00		

Plates... 21.50 22.00 25.50 30.50	Gulf ports.....	2.45c
Sheets... 26.50 29.00 32.50 36.50	Birmingham.....	2.10c
Hot strip... 17.00 17.50 24.00 35.00	St. Louis, del.....	2.34c
Cold stp... 22.00 22.50 32.00 52.00	Pacific Coast ports.....	2.75c

Steel Plate

Pittsburgh.....	2.10c
New York, del.....	2.29-2.44c
Philadelphia, del.....	2.15c-2.30c
Boston, delivered.....	2.43c-2.57c
Buffalo, delivered.....	2.33c
Chicago or Gary.....	2.10c
Cleveland.....	2.10c
Birmingham.....	2.10c
Coatesville, Pa.....	2.10c
Sparrows Point, Md.....	2.10c
Claymont, Del.....	2.10c-2.25c
Youngstown.....	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.....	2.10c
Philadelphia, del.....	2.21½c
New York, del.....	2.27c
Boston, delivered.....	2.41c
Bethlehem.....	2.10c
Chicago.....	2.10c
Cleveland, del.....	2.30c
Buffalo.....	2.10c

Tin and Terne Plate

Tin Plate, Coke (base box)	
Pittsburgh, Gary, Chicago.....	\$5.00
Granite City, Ill.....	5.10
Mfg. Terne Plate (base box)	
Pittsburgh, Gary, Chicago.....	\$4.30
Granite City, Ill.....	4.40

Bars

Soft Steel	
(Base, 20 tons or over)	
Pittsburgh.....	2.15c
Chicago or Gary.....	2.15c
Duluth.....	2.25c
Birmingham.....	2.15c
Cleveland.....	2.15c
Buffalo.....	2.15c
Detroit, delivered.....	2.25c
Philadelphia, del.....	2.47c
Boston, delivered.....	2.52c
New York, del.....	2.49c
Gulf ports.....	2.50c
Pacific Coast ports.....	2.80c

Rail Steel

Rail Steel	
(Base, 5 tons or over)	
Pittsburgh.....	2.15c
Chicago or Gary.....	2.15c
Detroit, delivered.....	2.25c
Cleveland.....	2.15c

Buffalo 2.15c Birmingham 2.15c Gulf ports 2.50c Pacific Coast ports 2.80c

Iron

Chicago 2.25c Philadelphia, del. 2.37c Pittsburgh, refined 3.50-8.00c Terre Haute, Ind. 2.15c

Reinforcing

New Billet Bars, Base Chicago, Gary, Buffalo, Cleve., Blrm., Young., Sparrows Pt., Pitts. 2.15c Gulf ports 2.50c Pacific Coast ports 2.60c

Rail Steel Bars, Base Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Blrm. 2.15c Gulf ports 2.50c Pacific Coast ports 2.60c

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) 56 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) Bright bess., basic wire 2.60c Galvanized wire 2.60c Spring wire 3.20c Worcester, Mass., \$2 higher on bright basic and spring wire.

Cut Nails Carload, Pittsburgh, keg 3.85

Cut Nails

Cold-Finished Bars

Pittsburgh 2.65c Alloy 3.35c Chicago 2.65c 3.35c Gary, Ind. 2.65c 3.35c Detroit 2.70c *3.45c Cleveland 2.65c 3.35c Buffalo 2.65c 3.35c *Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over) Pittsburgh, Buffalo, Chi. cago, Massillon, Canton, Bethlehem 2.70c Detroit, delivered 2.80c

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 0.15 to 0.25 Mo. 0.55 4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.20 5100 0.80-1.10 Cr. 0.45 5100 Cr. spring flats 0.15 6100 bars 1.20 6100 spring flats 0.85 Cr. N., Van. 1.50 Carbon Van. 0.85 9200 spring flats 0.15 9200 spring rounds, squares 0.40 Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham 2.10c Detroit, del. 2.20c Philadelphia, del. 2.42c New York, del. 2.46c Pacific Coast ports 2.75c

Cooperage hoop, Young., Pitts.; Chicago, Blrm. 2.20c Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown 2.80c Chicago 2.90c Detroit, del. 2.90c Worcester, Mass. 3.00c Carbon Cleve., Pitts. 0.26-0.50 2.80c 0.51-0.75 4.30c 0.76-1.00 6.15c Over 1.00 8.35c Worcester, Mass. \$4 higher.

Commodity Cold-Rolled Strip Pitts.-Cleve.-Youngstown 2.95c Chicago 3.05c Detroit, del. 3.05c Worcester, Mass. 3.35c Lamp stock up 10 cents.

Commodity Cold-Rolled Strip Pitts.-Cleve.-Youngstown 2.95c Chicago 3.05c Detroit, del. 3.05c Worcester, Mass. 3.35c Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons) Standard rails, mill \$40.00 Relay rails, Pittsburgh 20-100 lbs. 32.50-35.50 Light rails, billet qual., Pitts., Chicago, B'ham. \$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 4.15c 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 1/2 x 6 and smaller .68 off Do., 1/2 and 5/8 x 6-in. and shorter .66 off Do., 3/4 to 1 x 6-in. and shorter .64 off 1 1/2 and larger, all lengths .62 off All diameters, over 6-in. long .62 off Tire bolts .52.5 off

Stove Bolts

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in. Step bolts .60 off Plow bolts .68.5 off

Nuts

Semifinished hex. U.S.S. S.A.E. 1/2-inch and less. 66 70 1/4-1-inch 63 65 1 1/2-2-inch 61 62 1-inch and larger 60

Hexagon Cap Screws

Upset 1-in., smaller .68 off Square Head Set Screws Upset, 1-in., smaller .74.0 off Headless set screws .64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.40c 1/2-inch and under 65-10 off Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. \$5.40; c.l. \$5.75 off

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 2 1/2 and 1 1/2 less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld Steel

In. Blk. Galv. 1/2 63 54 3/4 66 58 1-3 68 60

Iron

1-1 1/2 30 13 1 1/2 34 19 2 38 21 1/2 37 21

Lap Weld Steel

2 61 52 2 1/2-3 64 55 3 1/2-6 66 57 7 and 8 65 55

Iron

2 30 15 2 1/2-3 1/2 31 17 4 33 21 4 1/2-8 32 20 9-12 28 15

Line Pipe Steel

1 to 3, butt weld 67 61 2, lap weld 60 63 2 1/2 to 3, lap weld 63 65 3 1/2 to 6, lap weld 65 64 7 and 8, lap weld 64

Iron

1/2 butt weld 25 7 1 and 1 1/2 butt weld 29 13 1 1/2 butt weld 33 15 2 butt weld 32 15 1 1/2 lap weld 23 7 2 lap weld 25 9 2 1/2 to 3 1/2 lap weld 26 11 4 lap weld 28 15 4 1/2 to 8 lap weld 27 14 9 to 12 lap weld 23 9

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 1 1/2 O.D. 13 \$ 9.72 \$23.71 1 3/4 O.D. 13 11.06 22.93 2 O.D. 13 12.38 19.35 2 1/4 O.D. 13 13.79 21.68 2 1/2 O.D. 12 15.16 26.57 2 3/4 O.D. 12 16.58 29.00 3 O.D. 12 18.35 31.36 3 1/2 O.D. 11 23.15 39.81 4 O.D. 10 28.66 49.90 5 O.D. 9 44.25 73.93 5 1/2 O.D. 7 68.14

Seamless

Sizes Gage Hot Rolled Cold Drawn 1 O.D. 13 \$ 7.82 \$ 9.01 1 1/4 O.D. 13 9.26 10.67 1 1/2 O.D. 13 10.23 11.79 1 3/4 O.D. 13 11.64 13.42

2 O.D. 13 13.04 15.03 2 1/2 O.D. 13 14.54 16.76 2 3/4 O.D. 12 16.01 18.45 2 1/2 O.D. 12 17.54 20.21 2 1/2 O.D. 12 18.59 21.42 3 O.D. 12 19.50 22.48 3 1/2 O.D. 11 24.62 28.37 4 O.D. 10 30.54 35.20 4 1/2 O.D. 10 37.35 43.04 5 O.D. 9 46.87 54.01 6 O.D. 7 71.96 82.93

Cast Iron Pipe

Class B Pipe-Pet Net Ton 6-in., & over, Blrm. \$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 Std. flgs., Blrm., base \$100.00.

Semifinished Steel

Rerolling Billets, Slabs (Gross Tons) Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Blrm., Sparrows Point. \$34.00 Duluth (billets) 36.00 Detroit, delivered 36.00 Forging Quality Billets Pitts., Chi., Gary, Cleve., Young, Buffalo, Blrm., 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 3/4-inch incl. (per 100 lbs.) \$2.00 Do., over 3/4 to 1 1/4-in. incl. 2.15 Worcester up \$0.10; Galveston up \$0.25; Pacific Coast up \$0.50. Skelp Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Price Per Net Ton

Beehive Ovens Connellsville, fur. \$5.00- 5.75 Connellsville, fdry. 5.25- 6.00 Connell, prem. fdry 6.00- 6.60 New River fdry. 6.50- 7.00 Wise county fdry. 5.50- 6.50 Wise county fur. 5.00- 5.25 By-Product Foundry Newark, N. J., del. 11.85-12.30 Chicago, outside del. 11.00 Chicago, delivered. 11.75 Terre Haute, del. 11.25 Milwaukee, ovens. 11.75 New England, del. 12.50 St. Louis, del. 11.75 Birmingham, ovens. 7.50 Indianapolis, del. 11.25 Cincinnati, del. 11.00 Cleveland, del. 11.55 Buffalo, del. 11.75 Detroit, del. 11.50 Philadelphia, del. 11.63

Coke

Price Per Net Ton Connellsville, fur. \$5.00- 5.75 Connellsville, fdry. 5.25- 6.00 Connell, prem. fdry 6.00- 6.60 New River fdry. 6.50- 7.00 Wise county fdry. 5.50- 6.50 Wise county fur. 5.00- 5.25

By-Product Foundry

Newark, N. J., del. 11.85-12.30 Chicago, outside del. 11.00 Chicago, delivered. 11.75 Terre Haute, del. 11.25 Milwaukee, ovens. 11.75 New England, del. 12.50 St. Louis, del. 11.75 Birmingham, ovens. 7.50 Indianapolis, del. 11.25 Cincinnati, del. 11.00 Cleveland, del. 11.55 Buffalo, del. 11.75 Detroit, del. 11.50 Philadelphia, del. 11.63

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 xylo 26.00c Per lb. f.o.b. Frankford and St. Louis Phenol (less than 1000 lbs.) 13.75c Do. (1000 lbs. or over) 12.75c Eastern Plants, per lb. Naphthalene flakes, balls. bbls. to jobbers 7.00c Per ton, bulk, f.o.b. port Sulphate of ammonia \$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	\$24.00	\$24.50	\$23.50	\$25.00
Birmingham, Ala.	19.38		18.38	24.00
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	24.50	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	24.00	23.50	24.50
Sparrow's Point, Md.	24.00		23.50	
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

†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	24.78		23.66	
Boston from Birmingham	24.12			
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	26.50	27.00		
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	24.22			
Cincinnati from Hamilton, O.	24.24	25.11	24.61	
Cincinnati from Birmingham	23.06		22.06	
Cleveland from Birmingham	23.32		22.82	
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	25.15			
Newark, N. J., from Bethlehem	25.53	26.03		
Philadelphia from Birmingham	24.46		23.96	
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	
Pittsburgh district from Neville Island				
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	

	No. 2 Fdry.	Malle-able	Basic	Besse-mer
St. Louis from Birmingham	+23.12		22.62	
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

Valley furnace	\$23.50	Lake Superior fur.	\$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

+Silvery

Jackson county, O., base: 6-6.50 per cent \$29.50; 6.51-7—\$30.00; 7-7.50—\$30.50; 7.51-8—\$31.00; 8-8.50—\$31.50; 8.51-9—\$32.00; 9-9.50—\$32.50; Buffalo, \$1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus \$1 a ton.
†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.
Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices	Ladle Brick (Pa., O., W. Va., Mo.)
Fire Clay Brick	Dry press..... \$28.00
Super Quality	Wire cut..... 26.00
Pa., Mo., Ky.	Magnesite
First Quality	Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk..... 22.00
Pa., Ill., Md., Mo., Ky.	net ton, bags..... 26.00
Alabama, Georgia	Basic Brick
New Jersey	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.
Second Quality	Chrome brick..... \$50.00
Pa., Ill., Ky., Md., Mo.	Chem. bonded chrome... 50.00
Georgia, Alabama	Magnesite brick..... 72.00
New Jersey	Chem. bonded magnesite 61.00
Ohio	Fluorspar
First quality..... 39.90	Washed gravel, duty pd., lide, net ton \$25.00-\$26.00
Intermediate..... 36.10	Washed gravel, f.o.b. Ill. Ky., net ton, carloads, all rail 20.00-21.00
Second quality..... 31.35	Do. barge..... 20.00
Malleable Bang Brick	No. 2 lump..... 20.00-21.00
All bases..... \$56.05	
Silica Brick	
Pennsylvania..... \$47.50	
Joliet, E. Chicago..... 55.10	
Birmingham, Ala..... 47.50	

Ferroalloy Prices

Ferromanganese, 78-82%,	Do., ton lots..... 11.75c	Do., spot..... 145.00	Silicon Metal, 1% iron, contract, carlots, 2 x 1/4-in., lb..... 14.50c
carlots, duty pd..... \$120.00	Do., less-ton lots..... 12.00c	Do., contract, ton lots 145.00	Do., 2%..... 13.00c
Ton lots..... 130.00	less than 200 lb. lots. 12.25c	Do., spot, ton lots..... 150.00	Spot 1/4c higher
Less ton lots..... 133.50	67-72% low carbon:	15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50	Silicon Briquets, contract carloads, bulk, freight allowed, ton..... \$74.50
Less 200 lb. lots..... 138.00	Car-loads	Do., spot..... 160.00	Ton lots..... 84.50
Do., carlots del. Pitts. 125.33	Ton lots	Do., contract, ton lots. 160.00	Less-ton lots, lb..... 4.00c
Spiegelisen, 19-21% dom.	2% carb... 17.50c 18.25c	Do., spot, ton lots..... 165.00	Less 200 lb. lots, lb. 4.25c
Palmerton, Pa., spot... 36.00	1% carb... 18.50c 19.25c	Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c	Spot 1/4-cent higher.
Ferrosilicon, 50%, freight allowed, c.l..... 74.50	0.10% carb. 20.50c 21.25c	Do., ton lots..... 8.00c	Manganese Briquets, contract carloads, bulk freight allowed, lb..... 5.50c
Do., ton lot..... 87.00	0.20% carb. 19.50c 20.25c	Do., less-ton lots..... 8.50c	Ton lots..... 6.00c
Do., 75 per cent..... 135.00	Spot 1/4c higher	Spot 1/4c lb. higher	Less-ton lots..... 6.25c
Do., ton lots..... 151.00	Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb..... 0.95	Chromium Briquets, contract, freight allowed, lb. carlots, bulk..... 7.00c	Spot 1/4c higher
Silicomanganese, c.l., 3 per cent carbon..... 113.00	Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80	Do., ton lots..... 7.50c	Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton..... 102.50
2 1/4% carbon..... 118.00	Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots... \$1.23	Do., less-ton lots..... 7.75c	Do., ton..... 108.00
2% carbon, 123.00; 1%, 133.00	Do., less-ton lots..... 1.25	Do., less 200 lbs..... 8.00c	35-40%, contract, carloads, lb., alloy..... 14.00c
Contract ton price \$12.50 higher; spot \$5 over contract.	20-25% carbon, 0.10 max., ton lots, lb..... 1.35	Spot, 1/4c higher.	Do., ton lots..... 15.00c
Ferrotungsten, stand., lb. con. del. cars..... 1.90-2.00	Do., less-ton lots..... 1.40	Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb..... \$2.50	Do., less-ton lots..... 16.00c
Ferrovandium, 35 to 40%, lb., cont..... 2.70-2.80-2.90	Spot 5c higher	Do., smaller lots..... 2.60	Spot 1/4c higher
Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electric turn, per ton, c. l. 23-26% f.o.b. Mt. Pleasant, Tenn., 24% \$3 unitage 75.00	Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls... \$2.25	Vanadium Pentoxide, contract, lb. contained \$1.10	Molybdenum Powder, 89% f.o.b. York, Pa. 200-lb. kegs, lb..... 2.75
	Do., less-ton lots 2.30	Do., spot..... 1.15	Do., 100-200 lb. lots 3.00
	Spot is 10c higher	Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots..... \$0.00c	Do., under 100-lb. lots
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots..... 11.00c	Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill..... 0.80	Do., spot..... \$5.00c	Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant..... \$0.00c
	Ferro-carbon-titanium, 15-18% tl., 6-8% carb., carlots, contr., net ton \$142.50	Do., spot..... \$4.00c	

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			Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	S.A.E. 2300	S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.75	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	4.40	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	4.65	3.31	4.06	8.56	7.16
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	3.22	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	3.20	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.95	3.65	5.25	....	4.42	....	....
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.42	4.00	4.67	3.47	4.00	8.75	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.25	4.10	4.60	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.50	4.35	4.75	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	8.88	7.38
St. Louis	3.64	3.54	3.54	3.69	3.69	5.29	3.39	4.12	4.87	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	....	....
Indianapolis	3.60	3.55	3.55	3.70	3.70	5.30	3.45	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	3.99	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	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.	3.50	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.70	10.55	9.80
San Francisco	3.50	4.00	6.00	3.50	3.50	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed)				
	1035-1050 Series	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	7.75
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.40	....	....	....	....
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	5.85	....	8.00	7.85	8.65
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	5.00	9.65	8.80	8.65	9.30

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; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Oreg.; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 200-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles 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; 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.

CURRENT IRON AND STEEL PRICES OF EUROPE

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	2.79c	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, 103 pounds	\$ 6.29	1 11 4

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	7.15 1 15 6
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	3.30c 18 7 0††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

Sheets, Strip

Sheet & Strip Prices, Pages 70, 71

Pittsburgh—Sheet production continues to gain and is now up to the pre-holiday high. Buying is heavier than anticipated, principally from automotive sources, although the impetus of this tonnage has caused increases all along the line. Galvanized sheet output remains steady at 81 per cent. Producers in this district are covered on zinc for immediate needs, but none holds stocks for more than two to three months' supply.

Cleveland—Mills are usually sold up through April on sheets and strip, with May promptest delivery on many items. Appearance of defense orders on larger scale disrupts more and more civilian deliveries and causes shipments beyond dates promised originally. On new business in strip early May is best promise for cold-rolled and late April on hot-rolled. More wide sheet mills may be diverted to rolling plates for shipbuilding, thus intensifying scarcity of sheets.

Chicago—Sheet and strip buying is increasing and orders in January equal or are slightly better than for the corresponding period of December. Deliveries on sheets remain essentially unchanged; narrow strip, 2½ inches and under, however, has advanced from 8 to 10 weeks to 11 to 13.

Boston — Orders for narrow cold strip, now mostly for second and even third quarter shipment, are heavy and ahead of shipments, with backlogs mounting despite capacity operations. Most orders now being booked are at open prices. Demand for stainless is heavy with deliveries extended, hot material of some types being 12 to 14 weeks, with rerolled shipments extended. A large volume of second quarter tonnage is also on the books for shipment to automobile accessory shops.

New York—Repeated waves of narrow cold strip buying indicate January bookings will be the heaviest in months with most rerollers. Orders for second quarter shipment increase and some protective volume for third quarter is being taken. Most current tonnage is being placed at open prices. Combination of possible priorities, high prices, increased consumption and a widespread fear of a steel shortage later sustains heavy forward buying.

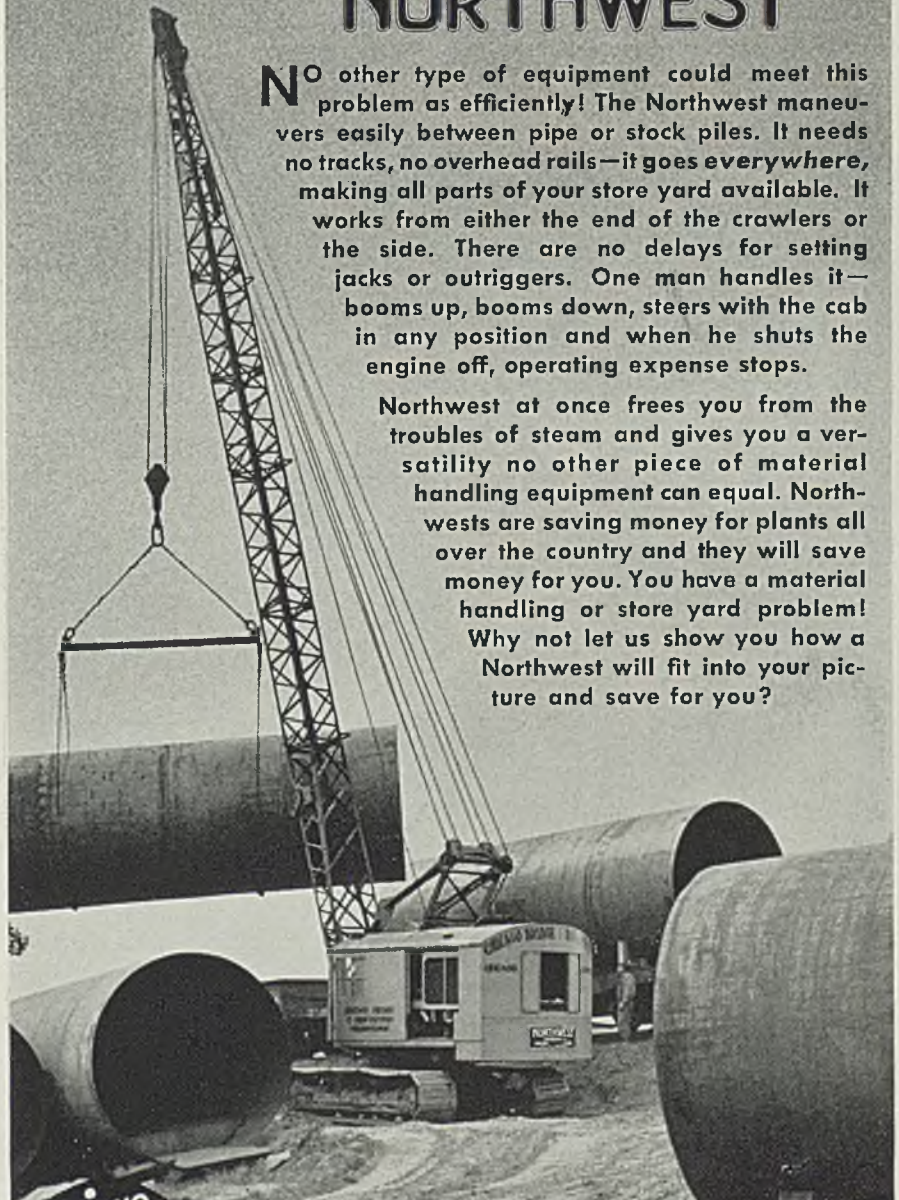
Philadelphia — Second quarter order books are being filled as many buyers anticipate six months' requirements. Mills are attempting to discourage too extensive forward coverage, but there has been no cessation in bookings. Buyers occasionally are offering premiums for expedited shipment but without success, since

The Job's "A Pipe"

when you have a NORTHWEST

NO other type of equipment could meet this problem as efficiently! The Northwest maneuvers easily between pipe or stock piles. It needs no tracks, no overhead rails—it goes everywhere, making all parts of your store yard available. It works from either the end of the crawlers or the side. There are no delays for setting jacks or outriggers. One man handles it—booms up, booms down, steers with the cab in any position and when he shuts the engine off, operating expense stops.

Northwest at once frees you from the troubles of steam and gives you a versatility no other piece of material handling equipment can equal. Northwests are saving money for plants all over the country and they will save money for you. You have a material handling or store yard problem! Why not let us show you how a Northwest will fit into your picture and save for you?



NEEDS NO
EXPENSIVE
TRACKS OR
OVERHEAD
EQUIPMENT

NORTHWEST

THE CRANE THAT GOES ANYPLACE

NORTHWEST
ENGINEERING COMPANY
1805 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.

Built in a
range of 18
sizes—4½ to
40 tons capacity

no tonnage is available for early delivery.

Cincinnati — Sheet mills are accepting orders for second quarter, at open prices. Such buying is heavy, as consumers seek to assure delivery position. Mills profess to be sold fully through first quarter.

St. Louis—Local mills are virtually sold up on sheets and strip during the next 60 days, and are accepting orders for delivery only when the material is available and at prices applying then. Shipments continue on a large scale and consumption is apparently increasing, so that consumer inventories have not expanded.

Toronto, Ont. — While Canadian

mills are producing sheets at a high rate, current orders are for delivery in about six months. Buying continues at a high rate. While most of the sheet demand is for war work, heavy call is reported from electric equipment makers and other consumers.

Baltimore—Sheets are moving actively, with light building construction and various government defense projects taking considerable tonnage. Hot and cold sheets are being quoted generally for late April delivery.

Birmingham, Ala. — Sheets are moving in large volume. Some jobbers and distributors are restocking. Orders about balance deliveries.

Plates

Plate Prices, Page 70

Pittsburgh—Steel mill equipment companies are working on specifications for the new 140-inch plate mill to be installed by Tennessee Coal, Iron & Railroad Co. at Birmingham. Work will begin shortly on the widening project at Homestead, and other refinements in heat treating equipment and handling are being instituted constantly to push up plate output. Continuous strip mills devoting more time to plate rolling are in the lighter gages.

Cleveland—Producers are suggesting that even more sheet mills be devoted to rolling plates, in view of the urgent need for shipbuilding. It is pointed out that several 96-inch and 84-inch sheet mills could produce plates. Plate demand continues unabated. The navy has a live project for building 280 auxiliary vessels, a major share for Great Lakes yards, thus requiring large plate tonnages from plate mills in the vicinity.

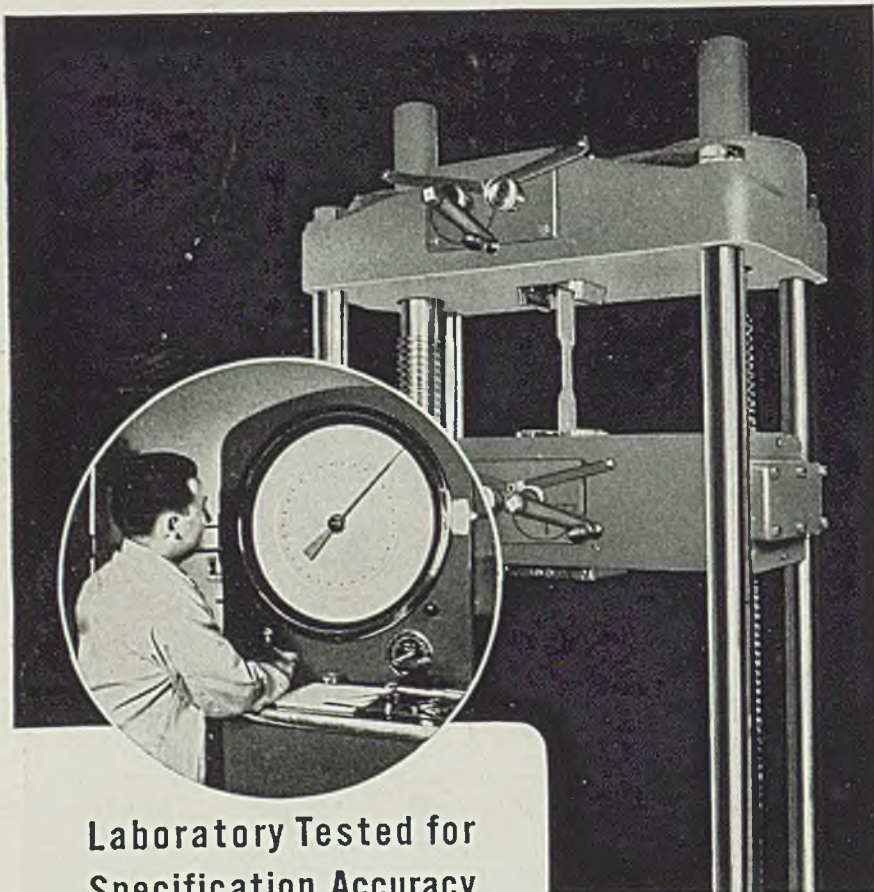
Chicago—Heavy construction industries, including machinery builders, car builders and fabricators of boilers and tanks, continue to purchase steel plates heavily. With orders running ahead of production, mill backlogs are growing and deliveries moving back. Late May is the best that can be done on heavy plates; sheared plates, 30 to 84 inches, have moved from six to eight weeks to eight to nine weeks.

New York—Increased delivery delay features plates. Most sellers now have little to offer much before late April and in the case of exceptionally wide plates, deliveries run many weeks beyond. Anything for delivery in this quarter is a marked exception to the rule and is principally in universal plates.

Philadelphia — Demand continues heavy, generally matching or exceeding shipments and holding backlogs to their recent peak. Plates for local delivery are bringing 2.25c, Claymont, Del., in some instances, although the market generally continues 2.10c. Tendency for producers to quote f.o.b. mill to other destinations where a freight disadvantage prevails also continues.

Birmingham, Ala.—No let-up in plate output is noted. Mills are well booked, even for delivery in second quarter. New tonnage is in sight to tax mill capacity.

Toronto, Ont. — Further heavy orders for plates will be let soon in connection with Canada's enlarged shipbuilding program. Announcement was made last week of awards of 18 merchant vessels to Canadian builders, involving outlay of \$30,000,000, for which plate and other equipment will be required. Plans also are proceeding towards greater



Laboratory Tested for Specification Accuracy

Laboratory approval of each operation by test is an essential part of Thomas Steel processing. Complete records of these tests are made and preserved. Hence, specifications can be met accurately and duplicated consistently. Product improvement and lower cost for fabricators are often the result of this constant laboratory approval.

Thomas Steel
COLD ROLLED
STRIP STEEL

Always Laboratory Approved

BRIGHT FINISH UNCOATED, AND
ELECTRO COATED WITH NICKEL,
ZINC, COPPER, BRASS

THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO

production of tanks and gun carriers for which special alloy plate will be required. Several thousands of tons are expected to be placed almost immediately.

Baltimore—Plate deliveries are rapidly becoming more extended. Some sellers, who less than a week ago could offer sheared plates in 12 weeks, can now do little under 15 to 17 weeks. Still others have little tonnage available under 20 to 22 weeks. On the other hand, some tonnage is still available for middle April and in the case of universal plates, shipments can be had in nine to 11 weeks

Plate Contracts Placed

- 9600 tons, two repair ships for United States maritime commission, to Los Angeles Shipbuilding Co., Los Angeles.
- 6760 tons, four 15-foot diameter penstocks for Shasta Dam, Central Valley project, Coram, Calif., to Western Pipe & Steel Co., San Francisco.
- 5000 tons, five tankers for the navy, to Albina Engine & Machine Works, Portland, Oreg.
- 4800 tons, two marine transports for United States maritime commission, to Consolidated Steel Corp., Los Angeles.
- 1050 tons, 62 gasoline tanks, naval air station, Quonset Point, R. I., to Eastern Steel Tank Corp.; Merritt-Chapman & Scott and George A. Fuller Co., New York, joint contractors.
- 988 tons, fabricated plates and structural steel for machinery room and latch room decks, Panama, schedule 4673, to United States Steel Export Co., Washington, at \$121,925; bids Jan. 9, Washington.
- 720 tons, four submarine tenders for United States maritime commission, to Associated Shipbuilding Co., Seattle.
- 400 tons, two 500,000-gallon tanks and towers, Fort Huachuca, Ariz., to Allison Steel Mfg. Co., Phoenix, Ariz.
- 177 tons, masonry plates, anchor bolts and accessories, Panama, schedule 4640, to Bethlehem Steel Export Co., New York, at \$18,823.95; bids Jan. 2.

Plate Contracts Pending

- 100 tons, or more, 350,000-gallon elevated tank, Ogden, Utah, bids Jan. 24 to constructing quartermaster, ordnance depot.

Bars

Bar Prices, Page 70

Pittsburgh — Merchant bar inventories are better than most other hot-rolled products in the hands of consumers, and although releases are large, particularly from automotive sources, there is no reason to fear a bar shortage this year.

Cleveland — Producers are frequently unable to live up to deliveries promised because of unexpected defense orders, which are increasing. Producers of flat bars have revised the dividing point between bars and strip.

Chicago—Purchases of steel bars are in substantial volume. Sales are about on a par with the correspond-

ing period of December. Alloy and carbon grades top specifications with deliveries well into April and May. Some makers are completely sold for first quarter.

Boston — Protective orders for bars continue in good volume, mostly for second quarter shipment at open prices, but pressure for delivery of tonnage placed with mills several weeks ago is maintained, notably by warehouses with specifications in for inventory replacements. Meanwhile consumption is heavier and broadening as production on defense contracts gains momentum, small arms, forgings, shipbuilding, forged die-

lock chains and numerous armament parts being involved.

New York—Late April appears to be the general rule on carbon bar deliveries, with alloy bars and special treatment steels involving schedules many weeks beyond that. Mills are confronted with far more business than they desire to take and the general policy of most is to first limit business to regular customers.

Philadelphia—Bookings are supported largely by the activity of buyers in securing protection on future needs. This generally represents material for shipment beyond March, and the volume of such busi-



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A. Extra-Flexible Inner Wires in every Monarch Whyte Strand PREformed line are improved plow steel, designed to fight internal friction caused by continuous bending.

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And around both wires and strands is a specially formulated Macwhyte lubricant to protect the unseen inside wires against damaging and costly internal friction.

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THESE BRAIDED SLINGS SPEED HANDLING.. SAFELY

... because they're made from left-&-right lay endless wire ropes.

Their left-&-right lay endless rope construction (patented) makes these Macwhyte slings extremely flexible ... light-weight ... easy to handle ... kink-resistant ... non-spinning ... SAFE.

Swiftly, safely they take the load up and away. Each Rope (eight of them) carries its full share of the load, thanks to the continuous uniform spiral braiding of the endless ropes.

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ness is fully maintained near the level of recent weeks.

Birmingham, Ala.—Bar output remains consistently high. Merchant bars are in good demand, and production is somewhat behind current bookings. Output is 85 per cent or slightly above.

Toronto, Ont. — Orders for merchant bars at about the same level as previous to the year-end, with indications pointing to sharp increase. Tool and machinery builders are pressing for supplies and operations in some plants are being hampered by lack of steel.

Baltimore—Most sellers of carbon bars have little to offer before late

April; and in the alloy and specially treated steels, deliveries are virtually out of sight. This situation is throwing an increasing burden on local jobbers, who in December experienced not only the best December, but the best month in the history of the trade.

Tin Plate

Tin Plate Prices, Page 70

Pittsburgh — Production is estimated this week at 53 per cent of capacity, with specifications somewhat better, as might be expected at this season. Estimates place the

tonnage for this year at slightly less than last year, although forecasts are uncertain and a change in the export picture due to war developments might reverse the entire situation.

Pipe

Pipe Prices, Page 71

Pittsburgh—Merchant pipe releases during January have been about the same as during December, and there has been little change in oil country tubular goods demand. Slight increases are seen in drill pipe casing, which is normal for this season. Pressure tubing demand continues steady, and there has been an upward movement in mechanical tubing specifications. Tightest position is still alloy tubing.

Cleveland — Though December business, particularly shipments, had reached an all-time high, January holds to the December level, at least in merchant pipe. Most orders are for cantonments and other defense buildings. Line pipe demand is good for the season and casings are fairly active.

New York — Contracts will be awarded shortly for 13,400 tons, 4 to 36-inch, cement-lined cast iron pipe for yard stocks by the department of purchase, New York.

Birmingham, Ala.—Pipe plants are working at the best schedules in several months. Most of them are putting in five days with an occasional six-day week. Most tonnages are comparatively small, but the aggregate is good. Government buying accounts for much of the output.

Seattle—While no important jobs are up for immediate action, several projects are developing, including the Seattle, Sand Point and Breerton, Wash., housing improvements, involving unstated quantities of water pipe.

Cast Pipe Placed

1175 tons, 4 to 16-inch pipe, San Francisco; 850 tons to United States Pipe & Foundry Co., Burlington, N. J., and 325 tons, universal pipe, to Central Foundry Co., Holt, Ala.

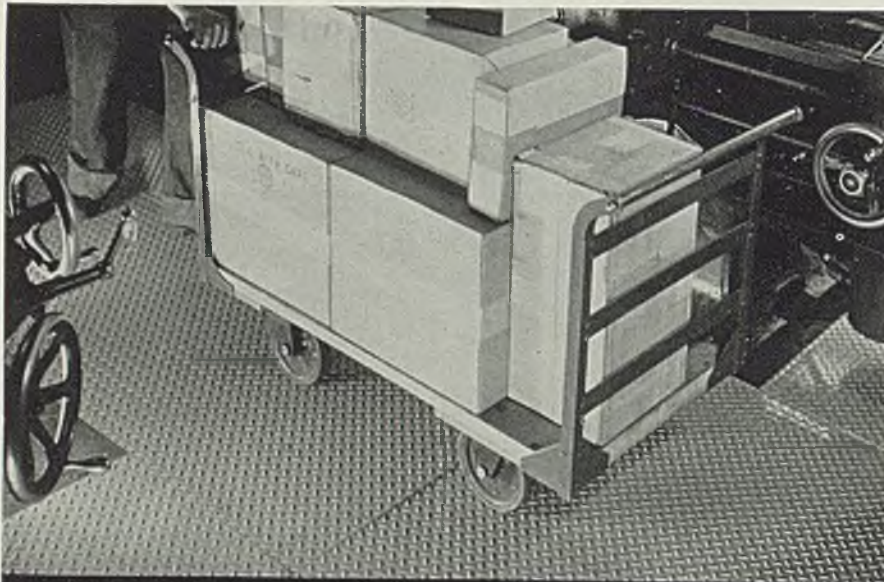
925 tons, 4 to 12-inch bell and spigot for Spokane, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

105 tons, various sizes, Panama, schedule 4679, to American Cast Iron Pipe Co., Birmingham, Ala.; bids Jan. 9.

Cast Pipe Pending

158 tons, 3 to 10-inch, United States engineer Office, Los Angeles, for Murco Lake, Calif., water system; bids Jan. 27.

150 tons, 16-inch, Vancouver, Wash.; city purchased transite pipe.



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Keep Them Safe With INLAND 4-WAY FLOOR PLATE

Increasing numbers of men are moving faster, and more trucks are speeding with heavier loads now. Extra safety and greater resistance to wear are needed on industrial floors. Inland 4-Way Floor Plate is made especially for these "busier floors."

The 4-Way Safety of Inland Floor Plate guards against slips and falls. It prevents lost-time accidents, keeping valuable men on the job. Its projections prevent wheels from skidding, permitting parts in process to move swiftly and safely without accidents that retard production schedules.

Inland 4-Way Floor Plate has all the strength and wearing qualities of fine rolled steel plate. It will take the hardest traffic abuse, reduce floor maintenance to the minimum, and give maximum safety.

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INLAND STEEL CO.

38 South Dearborn Street, Chicago

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Rails, Cars

Track Material Prices, Page 71

Equipment buying by railroads continues in moderate volume, cars and locomotives being placed by various carriers as need for better facilities to meet increased traffic demand becomes evident. Chesapeake & Ohio and Pere Marquette are in the market for more than 1000 freight cars and 20 locomotives.

Car Orders Placed

Baltimore Transit Co., 20 trolley cars to Pullman Standard Car Mfg. Co., Chicago.

Bethlehem Steel Co., 100 gondolas for Sparrows Point, Md., plant, reported placed with own shops at Johnstown, Pa.

Chicago, Burlington & Quincy, 250 Rodgers ballast cars, to American Car & Foundry Co., New York.

Chicago, Burlington & Quincy, 2175 cars, to own shops; also 350 cars for Colorado & Southern and 800 for Fort Worth & Denver City, subsidiaries.

New York Central, 32 stainless steel coaches for two new trains, to Edward C. Budd Mfg. Co., Philadelphia.

Virginian, 100 fifty-ton box cars to Pressed Steel Car Co., Pittsburgh.

Car Orders Pending

Canadian National, 30 forty-ton automobile cars, 200 seventy-ton gondolas and 100 seventy-ton flat cars.

Chesapeake & Ohio, 1000 fifty-ton box cars; 50 fifty-ton flat cars; 45 special flat cars and well cars; 20 standard steel air-conditioned coaches.

Lake Superior & Ishpeming, 100 ore cars; bids asked.

Louisville & Nashville, 50 covered hoppers; bids asked.

Pere Marquette, 40 allsteel caboose cars.

Virginian, 100 hoppers; bids asked.

Locomotives Placed

Chicago, Burlington & Quincy, 30 diesel electric locomotives; five 360-horsepower switch engines to General Electric Co., Schenectady, N. Y.; six 600-horsepower, fifteen 1000-horsepower switch engines and four 2000-horsepower passenger engines to Electro-Motive Co., La Grange, Ill.

Locomotives Pending

Chesapeake & Ohio, eight Hudson-type and two J-3 passenger locomotives.

Chicago & North Western, five 2000-horsepower locomotives; bids asked.

Pere Marquette, 12 N.1-type locomotives.

Buses Booked

A.C.F. Motors Co., New York: Six for Southeastern Greyhound Lines, Lexington, Ky.; two for E. Vanderhoof & Sons, West Orange, N. J.; two for Burlington Rapid Transit Co. Inc., Burlington, Vt.; two for San Francisco Municipal Railway, San Francisco.

Wire

Wire Prices, Page 71

Pittsburgh — Merchant demand continues active and increasing.

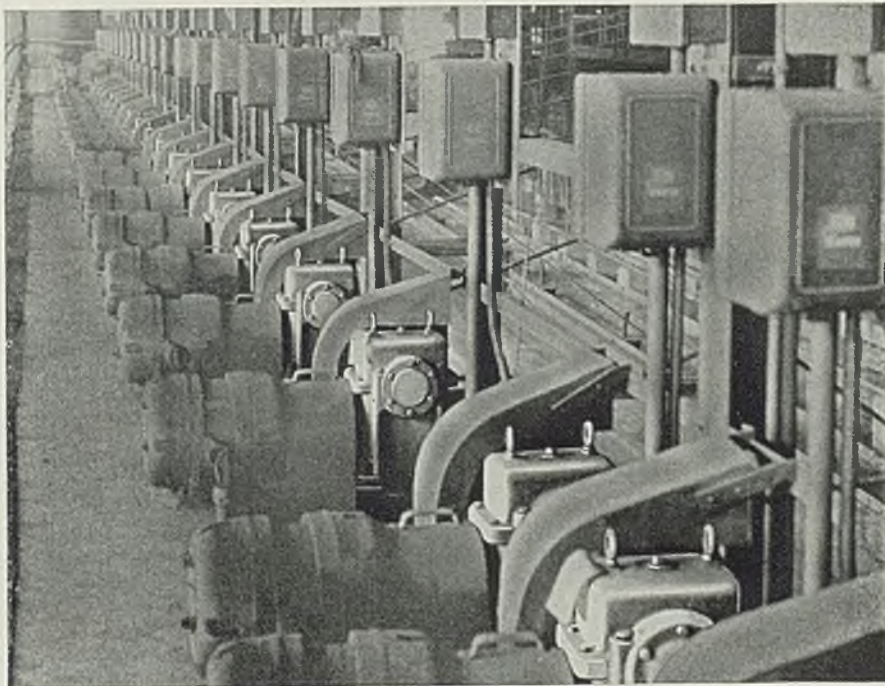
Jobber specifications have been active and prices are good for the first time in several years. Manufacturers' wire specifications are piling up, although deliveries are relatively good. Spot buying is still virtually impossible, with deliveries running into second quarter on practically all items.

Boston — Wire rod producers are sold up for first quarter and are taking only limited tonnage for second quarter, at open prices. Only in rare spots is finishing capacity available for first quarter shipment.

New York—Sustained heavy orders for wire products have bol-

stered incoming January volume above last month. New business is still ahead of heavy shipments and backlogs are growing despite efforts by some producers to discourage over-coverage. Volume offered by other than regular consumers is being carefully scrutinized. Capacity available for first quarter shipment is limited. In the fine wire field a few mills can promise delivery before April 1.

Baltimore — Manufacturers' wire is moving briskly. Demand for merchant wire is only fair, with deliveries easy and the outlook for spring agricultural demand none too



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THE HORSBURGH & SCOTT CO. GEARS AND SPEED REDUCERS

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promising, particularly from tobacco growers, who financially have been experiencing rather lean seasons recently.

Shapes

Structural Shape Prices, Page 70

Pittsburgh — Because of heavy rolling schedules on structural mills, most of which are dividing time between finished shapes and semi-finished material as well as attempting to roll shell steel requirements, deliveries show no improvement.

Cleveland — Current business is comparatively light but plant expansion projects will soon bring out a flood of inquiries. Many extensions are planned for plants which had already expanded materially. Probably at least 75 per cent of orders can be traced to defense work. Chesapeake & Ohio inquires for round tonnages for car repair work, chiefly shapes and plates.

Chicago — Structural fabricators are loaded to capacity on current orders, having booked considerable new tonnage in the last two weeks. A number of substantial jobs are pending and more are expected out

shortly. Most present work is government construction and plant expansions arising from armament production.

Boston — Industrial plant expansions and additional shipyard facilities account for most structural steel activity, new contracts aggregating approximately 1500 tons.

New York—Structural steel inquiry for expanding industrial facilities continues heavy, the construction phase of the defense program not having yet passed its peak when potential demands on shops in connection with shipbuilding are considered. Numerous construction contracts are being supplemented by enlarged plans and more plant additions are being developed than first considered, even in the machine tool and aircraft industries.

Philadelphia—Awards are headed by 3000 tons of shapes and piling for the Raritan and Edgewood arsenals and the local navy yard. Additional business is in prospect for improvements at the Cramp Shipbuilding yard here. Inquiries from private sources are relatively light, and total of pending work has been reduced materially the past 60 days. No improvement is noted in plain shape deliveries.

Seattle — Business continues active and shops here and in Portland report large backlogs. Pacific Car & Foundry Co., Seattle, has divided 3000 tons of shapes, 1500 tons of black and 150 tons galvanized sheets, 650 tons strip and 725 tons round and flat bars between Columbia Steel Co. and Bethlehem Steel Co. for 1000 refrigerator cars for Pacific Fruit Express.

Shape Contracts Placed

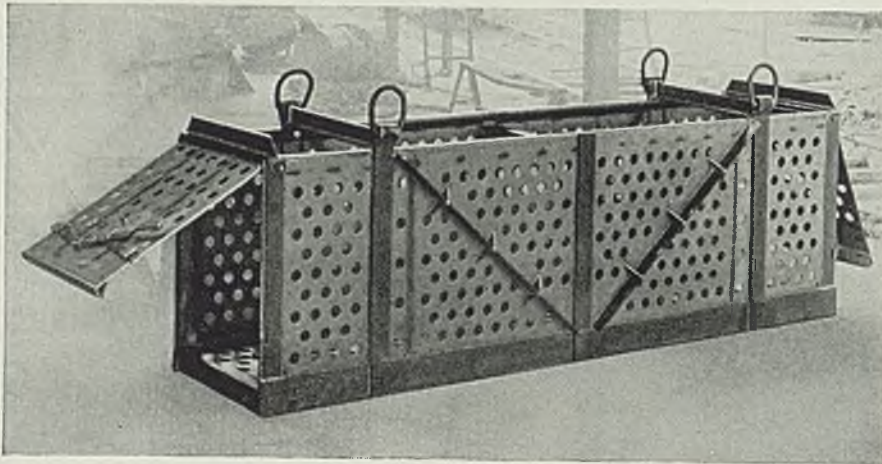
- 30,000 tons, naval ordnance plant, largely armor plate, Charleston, W. Va. to American Bridge Co., Pittsburgh.
- 9500 tons, office building, Prudential Life Insurance Co., Newark, N. J., to Harris Structural Steel Co., New York.
- 6900 tons, Remington Arms plant buildings 1, 2 & 3—50 to 100 small buildings, to Bethlehem Steel Co., Bethlehem, Pa.
- 6200 tons, ten warehouses, quartermaster corps, U. S. army, Inv. 6278-41-80. Fort Sam Houston, San Antonio, Tex., to Mosher Steel Co., Houston, Tex.
- 6220 tons, 82 standard ammunition magazines, each 50 x 218 feet, Kingsbury ordnance plant, war department, La Porte, Ind., divided as follows: 3280

Shape Awards Compared

	Tons
Week ended Jan. 25	98,582
Week ended Jan. 18	53,548
Week ended Jan. 11	24,480
This week, 1940	15,880
Weekly average, 1941	57,998
Weekly average, 1940	28,414
Weekly average, Dec.	31,516
Total to date, 1940	55,752
Total to date, 1941	231,992

Includes awards of 100 tons or more.

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This type of design made possible by the strength and corrosion resistance of Monel . . .

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Fabricated by Youngstown Welding and Engineering Company of Youngstown, Ohio, this crate is 11½ ft. long, 2½ ft. wide, and over 3 ft. high. Sides and ends are ¼ inch thick, bottom ⅜ inch. The whole crate is made from standard mill forms employing all-welded construction.

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MONEL

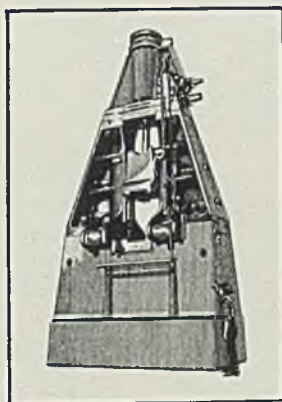
"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

What is the metal? It's Monel . . . the alloy that resists corrosion by pickling acids and so retains its strength. Available in all standard mill forms and easily fabricated into crates and other pickling accessories, Monel assures years of service. And because Monel equipment is lighter in weight, your payloads are bigger, repair and maintenance bills smaller.

How you can take advantage of lightweight Monel construction is told in detail in "Equipment Designs for the Pickle House," "Where Monel pays its Way in Pickling," and "A Good Start to a Better Finish." This literature is free. Write for it today. Address:

- tons, to American Bridge Co., Pittsburgh; 1750 tons, to Bethlehem Steel Co., Bethlehem, Pa.; and 1190 tons, to Mississippi Valley Structural Steel Co., Decatur, Ill.
- 6000 tons, H- and sheet piling, bridge, foundations, New London-Groton, Conn., divided Bethlehem Steel Co., Bethlehem, Pa. and Carnegie-Illinois Steel Corp., Pittsburgh, through A. I. Savin Co., Hartford, Conn.
- 5498 tons, fabricated structurals and accessories, Panama, schedule 4640, to U. S. Steel Export Co., Washington, \$595,934.14; bids Jan. 2.
- 7000 tons, also 3,025 tons black and galvanized sheets, strip, rounds and flat bars, to Bethlehem Steel and Columbia Steel Co., Seattle, for 1000 refrigerator cars, Pacific Fruit Express; Pacific Car & Foundry Co., Seattle, general contractor.
- 1950 tons, piling, government arsenal, Raritan, N. J., to Bethlehem Steel Co., Bethlehem, Pa.
- 1900 tons, shop building, Otis Elevator Co., Harrison, N. J., to Bethlehem Steel Co., Bethlehem, Pa.
- 1900 tons, east end extension, open hearth building, International Harvester Co., South Chicago, Ill., to American Bridge Co., Pittsburgh.
- 1515 tons, Cadoa dam gates, U. S. engineers, Cadoa, Colo., to Consolidated Steel Corp. Ltd., Los Angeles; bids last July.
- 1200 tons, highway bridge, St. Louis county, Missouri, to Stupp Bros. Bridge & Iron Co., St. Louis.
- 1100 tons, binding and insulation plates for open hearth furnaces, for International Harvester Co., South Chicago, Ill., to American Bridge Co., Pittsburgh.
- 1000 tons, tunnel lining, Delaware Aqueduct, contract 313, department of water supply, New York, to Bethlehem Steel Co., Bethlehem, Pa.
- 900 tons, naval air base buildings, Sand Point, Seattle, to Pacific Car & Foundry Co.; The Austin Co., general contractor.
- 750 tons, airplane motor testing laboratory, Cleveland airport, Cleveland, to American Bridge Co., Pittsburgh.
- 724 tons, navy hangar, Minneapolis, to Minneapolis-Moline Power Implement Co., Minneapolis, Standard Construction Co., Minneapolis, contractor.
- 660 tons, buildings, Edgewood arsenal, Maryland, to Belmont Iron Works, Philadelphia, through Cummins Construction Corp., Baltimore, general contractor.
- 655 tons, steel piling, Consolidated Shipyard, Orange, Tex., Bechtel-McCone-Parsons Corp., contractors, to Bethlehem Steel Co., Bethlehem, Pa.
- 615 tons, spillway bridge, Marshall Ford dam, Colorado river project, Texas, spec. 945, to American Bridge Co., Pittsburgh, \$53,821, f.o.b. point, Gary, Ind.; bids Jan. 9, bureau of reclamation, Denver.
- 600 tons, steel storage, transportation and exploder buildings for Puget Sound navy yard and Seattle-Tacoma Shipbuilding Co., Seattle, to Isaacson Iron Works, Seattle.
- 526 tons, under-crossing, Azusa, Calif., to Consolidated Steel Corp., Los Angeles.
- 510 tons, graphitizing furnace building, National Carbon Co., Clarksburg, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.
- 500 tons, viaduct, New York Central railroad, 11th avenue, New York, to Bethlehem Steel Co., Bethlehem, Pa., through Elmhurst Contracting Co., New York.
- 500 tons, addition to structural assembly shop, United States navy yard, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.
- 500 tons, tubular piling, assembly shop, Hunters Point drydock, San Francisco, to Columbia Steel Co., San Francisco.
- 489 tons, state highway bridge, Sec. 411-F, Green and Jersey counties, Illinois, to Illinois Steel Bridge Co., Jacksonville, Ill.; bids Jan. 7.
- 450 tons, state highway bridge, route 29, section 33-A, Deans, N. J., to American Bridge Co., Pittsburgh.
- 450 tons, two factory buildings, International Graphite Co., to the Bethlehem Steel Co., Buffalo.
- 400 tons, six buildings, Alaska air base, Anchorage, Alaska, cost plus basis, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 370 tons, hangar, Alaskan air base, Anchorage, Alaska, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 360 tons, state bridge FAGH-RC-40-32, Leicester, N. Y., to American Bridge Co., Pittsburgh.
- 325 tons, tannery storage building, Winslow Bros. & Smith, Norwood, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.
- 315 tons, bureau of reclamation, Spec. 1453D, Earp, Calif., to Valley Iron Works, San Juan, Tex.
- 300 tons, industrial building, Harrison, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.
- 300 tons, specification 942, penstock gates, Earp, Calif., bureau of reclamation, to American Bridge Co., Pittsburgh.
- 250 tons, plant addition, Greenfield Tap

BETTER DROP FORGINGS WILL SPEED DEFENSE



DEVELOPMENT of forging practice in the past decade permits the mass reproduction of parts from the minimum of material and greatly reduces the need for subsequent machining operations. ▲ The modern forge shop—usually equipped with Chambersburg Hammers—producing properly designed forgings held to close tolerances and properly sized, thus contributes an important relief to the Defense Program. ▲ On an estimated Defense and Commercial Program of 440,000

tons in 1941—it has been suggested that properly designed close-limit forgings can easily save at least 5%—22,000 tons of metal, 200,000 hours of machining and 2,000,000 horsepower hours. ▲ Obsolete forging methods cannot stand in the way of the tremendous urgency of this program

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Behind the Scenes with STEEL

Binding Friendships

■ Once in a long while our bindery here lets a copy of STEEL slip through that looks more like a Dagwood Bumstead sandwich than an issue of the industry's most progressive business paper. Such was the case last week and of course it would go to our good subscriber, L. C. Warren, president, Susquehanna & New York railroad. He writes: *Shrdlu must have assembled and stitched your January 20 issue. We find pages all mixed up, out of place, and duplicated.* That's one of the nicest compliments we've had since that fellow out in Oshkosh said we surely had an unusual type of dementia praecox.

What Price Glory?

■ You can see for yourself that anyone with admirers like that would naturally be the subject of all sorts of rumors and gossip. Why, right here in our own office there are certain people who size us up and down sometimes just as if to say they thought we were actually crazy!

More Water Hazards

■ Of course, now, you take our Detroit editor, Art Allen—he's different. He appreciates the finer things in life and was quick to see the real social significance of our water fountain study last week. As a matter of fact, he adds one we've heard about but never actually seen—the *Geyserette*. Reports are it is a simple porcelain type with 3/8-inch outlet hole, button controlled. Outstanding feature is a secret inlet for introducing air into the system. Blithe drinker steps up, lowers head, and presses button. Weak dribble develops and drinker dives for it just as burst of air from line sprays water to ceiling, effectively soaking face, hair, collar and tie. Another type under investigation is the *Mechanical Mirage*. Unit is square, porcelain-top, electrically cooled and so nicely designed bewildered drinker fumbles over all four sides hunting knob. To his embarrassment discovers foot pedal on floor, nonchalantly presses it down, leans over. Water streams

out of pipe but as mouth opens stream reduces to a dribble and drinker merely moistens lips, and starts over. Improved version is the *Mechanical Mirage, E. E.**

Statistics

■ The *United Press* reports that soon the government will be spending money at the rate of \$33,367.75 every minute. Another item goes into a little more detail on the defense budget. Translated into terms of \$1.00 bills, it would pave a road, six bills wide, from here to the moon.

The Lady & Her Horse

■ Up in Detroit a week ago Saturday the local posts of the Canadian Legion presented an inspirational show at the State Fair Grounds, and one act was a dandy. It was entitled: *A Tribute to Coventry—Lady Godiva Rides Again*. The boys had a little trouble lining up Godiva but finally a comely Ferndale miss was chosen. Then they had even more trouble locating a white horse but dug one up somewhere. As she was trying on her long hair for the benefit of the newspaper photographers, Godiva expressed concern over her locks tickling the horse into unexpected antics. Everything worked out all right, however, and Lady Godiva rode again for the glory of shambled Coventry.

War Gardens Again

■ And from near Coventry last week came a letter to STEEL's editor with the postage stamp cancelled with this official slogan: *Grow More Food. Dig for Victory.*

Dog Gone

■ This short tale from Dallas reminds us that our pup needs a new dog license for 1941. City officials launched a drive to get more dog licenses with a form letter that read: *This is to advise that the dog license purchased by you expired May 31.* One gentleman replied: *So did the dog. I've lost interest.*

*With Electric Eye.

SHRDLU.

- & Die Corp., Greenfield, Mass., to Haarmann Steel Co., Holyoke, Mass.
- 250 tons, crane runway, Buffalo Bolt Co., Buffalo, N. Y., to Buffalo Structural Steel Co., Buffalo.
- 245 tons, mill, Stevens Paper Co., Westfield, Mass., to Standard Structural Steel Co., Hartford, Conn.
- 215 tons, building, Liberty Aircraft Corp., Farmingdale, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Brown & Matthews Co., New York.
- 215 tons, shop, DeLaval Steam Turbine Co., Trenton, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.
- 200 tons, office and laboratory, General Electric Realty Corp., Pittsfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa.
- 185 tons, addition, Ingersoll-Rand Co., Painted Post, N. Y., to American Bridge Co., Pittsburgh.
- 185 tons, bridge, Main street, East Hartford, Conn., to American Bridge Co., Pittsburgh; Alexander Jarvis Co., Manchester, Conn., contractor.
- 175 tons, bridge, route 4, section 42 A, Middlesex county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa., through Jannarone Construction Co., Belleville, N. J., contractor.
- 170 tons, track covering, New York Central Railroad, Park avenue-96th-97th streets, New York, to Bethlehem Steel Co., Bethlehem, Pa.
- 160 tons, addition, National division, Massillon, O., Republic Steel Corp., to Fort Pitt Bridge Works, Pittsburgh.
- 155 tons, warehouse, Corning Glass Works, Wellsboro, Pa., to American Bridge Co., Pittsburgh.
- 150 tons, fixed wheel gate, Spec. 942, bureau of reclamation, Earp, Calif., to American Bridge Co., Pittsburgh.
- 150 tons, state bridge, John Day river, Oregon, to unstated Portland fabricator; Averill & Corbin, Portland, general contractor.
- 145 tons, under-crossing, Burbank, Calif., to Consolidated Steel Corp., Los Angeles.
- 125 tons, crane runway, General Electric Co., Pittsfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa.
- 125 tons, telephone building addition, Bayside, N. Y., to Schacht Steel Construction Co., New York.
- 100 tons, high school addition, Coalinga, Calif., to Kyle Steel Construction Co., Los Angeles.
- 100 tons, including plates, tender, 65-foot Coast Guard; Birchfield Boiler Works, Tacoma, general contractor.
- 100 tons, plant building addition, Parish Pressed Steel Co., Reading, Pa., to Reading Steel Products Inc., Reading, Pa.

Shape Contracts Pending

- 6000 tons, airplane factory, Kansas City, Kan.; bids Jan. 22.
- 5000 tons, airplane factory, Tulsa, Okla.
- 4000 tons, aircraft engine plant, Studebaker Corp., South Bend, Ind.
- 3500 tons, addition, Thompson Products Inc., Cleveland.
- 3000 tons, aircraft parts plant, Studebaker Corp., Chicago.
- 2500 tons, power house, Consolidated Gas, Electric & Power Co., Baltimore; inquiry soon.
- 1800 tons, hangars, etc., Minneapolis, Robertson, Mo., Grosse Isle, Mich., for navy.
- 1500 tons, Norfolk dam, White river water shed, Arkansas, U. S. engineer, Little Rock, Ark.; bids Feb. 20.
- 1200 tons, aircraft gear plant, Stude-

baker Corp., Fort Wayne, Mich.
 815 tons, ramp connection, routes 109 and 49, Brooklyn, N. Y.; bids Feb. 4, board of transportation, New York.
 800 tons, motor supply warehouse, Fort Wayne, Mich., for government.
 800 tons, sheet piling, turning basin, project 35, Cuyahoga river, Cleveland; bids Jan. 23.
 800 tons, floating dry dock, U. S. coast guard, Curtis Creek, Md.; bids Feb. 20.
 775 tons, building, board of transportation, Brooklyn, N. Y.; bids Feb. 10.
 750 tons, building, Mills field airport, San Francisco; bids Feb. 4.
 650 tons, office building, Columbus Mutual Life Insurance Co., Columbus, O.
 650 tons, 12 magazines, Edgewood, Md., arsenal, pending.
 525 tons, tunnel supports, specification 950, Colorado-Big Thompson project near Estes Park, Colo.; bids Feb. 3.
 514 tons, miscellaneous state bridges, Denver, bids Jan. 24.
 500 tons, two storehouses, specification 10240, navy yard, Bremerton, Wash.; bids opened.
 500 tons, naval torpedo station, Keyport, Wash.; Bailey Construction Co., Seattle, low.
 500 tons, government shop, Aberdeen, Md., bids through contracting quartermaster, Baltimore, Feb. 4; this is in addition to 450 tons on which Irwin & Leighton, Philadelphia, opened bids Jan. 17.
 450 tons, foundry addition, Sunnyvale, Calif., for McDonald & Kahn, Ltd., San Francisco.
 438 tons, two railroad under-passes, Adams county, Colorado, for state; bids opened.
 400 tons, store, S. H. Kress & Co., San Diego, Calif.
 400 tons, chemical factory, Monsanto Chemical Co., bids Feb. 22.
 400 tons, warehouses, Patterson field, Dayton, O.
 395 tons, flood prevention project, Paducah, Ky., U. S. Engineers office, Louisville, Ky.
 365 tons, manufacturing building, Liberty Aircraft Products Corp., Farmingdale, N. Y.
 300 tons, two buildings, Adley Express Co., New Haven, Conn.
 300 tons, highway bridge, Bowmansville, N. Y., Ellis G. Della, New Hartford, N. Y., low on general contract.
 260 tons, laboratory and shop building, Wright field, Dayton, O., Simpson Construction Co., Chicago, contractors.
 240 tons, building, Paramount Realty Co., Newark, N. J.
 220 tons, rock crushing plant, Lackawack, N. Y., for city.
 200 tons, Maryland navy reserve armory, Baltimore, inquiry soon.
 165 tons, beam spans, Tucker county, West Virginia, for state.
 140 tons, building addition, Niacet Company, Niagara Falls, N. Y.
 125 tons, gate track beams, Delhi, O., for war department.
 125 tons, highway bridge, Warren County, Pa.
 Unnamed tonnage, plant addition, Charles T. Brandt Inc., Baltimore, active.

Toledo Scale Co., Toledo, O., will expand its plant facilities 40 per cent, due largely to several important defense contracts.

Reinforcing

Reinforcing Bar Prices, Page 71

Pittsburgh—As new billet steel tonnages pile up and deliveries run further in the future, the price on rail steel reinforcing bars strengthens. Many current jobs are bringing full new billet prices conforming with the announcement made by several rail steel producers at the beginning of this quarter and the trend is definitely in that direction.

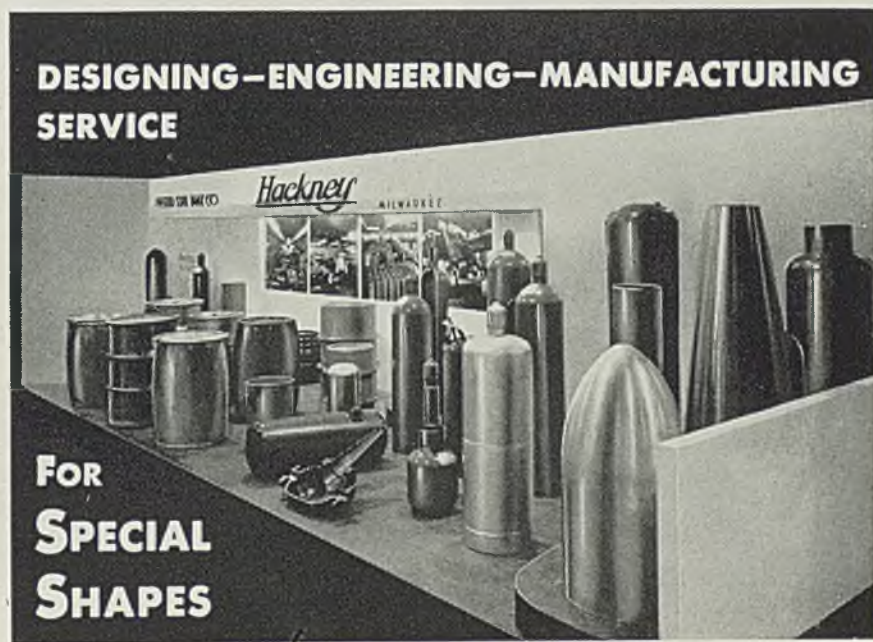
Cleveland—Prices are still being shaded materially, particularly on WPA work. Sales are reported at 1.90 cents against 2.05 and 2.15 cents as official prices for rail and

billets bars, respectively. Awards and inquiries are rather light, but prospects are unusually good for the season.

Chicago — Orders and inquiries for reinforcing materials are substantial, with much traceable to national defense construction and related plant expansion programs. The number of inquiries is increasing and suppliers are hard pressed to make bids. Substantial mill stocks of bars facilitate filling of orders, with mills well engaged.

Boston—Reinforcing bar buying and inquiry have declined moderately, although small-lot orders are fairly numerous and sustained.

New York — Following award of most large pending contracts for



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reinforcing bars, inquiry is slower; also buying, although small-lot volume is maintained. Concrete bar prices are generally firm, notably at mills, but deliveries are lengthening and nearby stocks are filling small spot orders, distributors in some instances being pressed to meet demand on some sizes.

San Francisco—Demand for small lots continues exceptionally heavy but few large inquiries of size are in the market. Awards aggregated 3841 tons, bringing the total to date to 6181 tons, compared with 6629 tons for the corresponding period in 1940.

Reinforcing Steel Awards

- 3600 tons, four government warehouses, Franklin county, Ohio, to Jones & Laughlin Steel Co., Pittsburgh, through Fireproof Products Co., New York.
- 1200 tons, bridge superstructure, New London-Groton, Conn., to Bethlehem Steel Co., Bethlehem, Pa., through Harris Structural Steel Co., New York.
- 790 tons, WPA requirements, New York, to Ceco Steel Products Co., New York, through procurement division, treasury department, New York.
- 700 tons, Clason Point housing, New York, to Republic Steel Corp., Cleveland, through Carroll-McCreary Co.; Tobias Heller & Co., contractor.
- 600 tons, building, Sears, Roebuck & Co., Birmingham, Ala., to Ceco Steel Products Corp., Birmingham, Ala.
- 590 tons, highway route 25, sec. 33 A, Middlesex county, New Jersey, to Joseph T. Ryerson & Son Inc., New York, through George M. Brewster & Son Inc., Bogota, N. J.
- 575 tons, Ft. Leonard Wood cantonment, Rolla, Mo., to Missouri Rolling Mills, St. Louis.
- 555 tons, elevated parkway, contract B-16, Brooklyn, N. Y., to Jones & Laughlin Steel Co., Pittsburgh, through Fireproof Products Co.; Corbett Construction Co., contractor.
- 500 tons, proving ground, U. S. army, Madison, Ind., to Laclede Steel Co., St. Louis. J. L. Simmons Co., Indianapolis, contractor.
- 460 tons, bakery, Streltman Biscuit Co., Cincinnati, O., to Truscon Steel Co., Youngstown, O.; Ferro Concrete Construction Co., contractor.
- 350 tons, Martin's Point bridge, Portland, Me., to Baneroft & Martin; Wyman & Simpson Inc., contractor.
- 315 tons, hospital wing, Stockton, Calif., to Pacific States Steel Corp., San Francisco.
- 260 tons, switching center and boiler room, unit 17, Fisk street station, Commonwealth Edison Co., Chicago, to

Concrete Bars Compared

	Tons
Week ended Jan. 25	12,523
Week ended Jan. 18	9,054
Week ended Jan. 11	17,400
This week, 1940	3,331
Weekly average, 1941	11,096
Weekly average, 1940	9,661
Weekly average, Dec.	7,204
Total to date, 1940	29,641
Total to date, 1941	44,383

Includes awards of 100 tons or more.

Inland Steel Co., Chicago; Herlihy Mid-Continent Co., Chicago, contractor; bids Dec. 9.

- 225 tons, factory, Chicago Flexible Shaft Co., Chicago, to Ceco Steel Products Corp., Chicago. Campbell-Lowrie-Lautermilch Corp., Chicago, contractors.
- 208 tons, bridge, route 25, sec. 33 A, Middlesex county, New Jersey, to Igoe Bros., Newark, N. J., through George M. Brewster & Son Inc. Bogota, N. J.
- 200 tons, viaduct, 11th ave, New York, New York Central railroad, to Bethlehem Steel Co., Bethlehem, Pa., through Elmhurst Contracting Co., New York.
- 176 tons, two warehouses, quartermaster corps, war department, Jeffersonville, Ind., to Ceco Steel Products Corp., Chicago.
- 175 tons, state highway bridges 2090 and 2094, Marlon, Ind., to Bethlehem Steel Co., Bethlehem, Pa.
- 175 tons, store, F. W. Woolworth Co., Syracuse, N. Y., to Truscon Steel Co., Youngstown, O.; F. W. O'Connell Co., Syracuse, contractor.
- 170 tons, bureau of reclamation, invitation 48,347-A, Corbet, Wyo., to Colorado Fuel & Iron Co., Pueblo, Colo.
- 165 tons, store, General Electric Co., Schenectady, N. Y., to Truscon Steel Co., Youngstown, O.; James Stewart & Co., New York, contractor.
- 155 tons, highway sections, Milford-Orange and West Haven, Conn., to Concrete Steel Co., New York, through New Haven Road Construction Co., New Haven, Conn.
- 144 tons, U. S. military reservation, Point Judith, R. I., to The Charles C. Lewis Co., Springfield, Mass., \$7482.31 net, f.o.b.; bids Jan. 7, U. S. engineer, providence, R. I.
- 125 tons, St. Helena's church, Bronx, New York, to Fireproof Products Co., New York, through George A. Fuller Co., New York.
- 110 tons, Franklin county commission, Ohio, to Ben Tom Supply Co., Cleveland; bids Jan. 4.
- Unstated tonnage, 450,000 square feet, airplane landing mat and miscellaneous tools, chief of engineers, Washington, to Irving Subway Grating Co., Long Island City, N. Y., \$203,845.

Reinforcing Steel Pending

- 2500 tons, warehouses and miscellaneous construction, Elwood ordnance plant, war department, Elwood, Ill., Sanderson & Porter, Joliet, Ill., engineers; bids Jan. 22.
- 2000 tons, armory, Capitol street, Washington, D. C.
- 2000 tons, defense housing, unit 4, Hartford, Conn.; bids Feb. 3.
- 1200 tons, contr. 5, sewage plant, Coney Island, New York, E. W. Foley Inc., Brooklyn, N. Y., low; bids Jan. 24.
- 900 tons, plant, Coca Cola Bottling Co., Chicago.
- 637 tons, foundations, airplane engine parts plant, Studebaker Corp., South Bend, Ind.; bids Jan. 24.
- 550 tons, housing project, Hartford, Conn.
- 429 tons, specification 6818, Los Angeles, Trojan Steel Co., Los Angeles, low.
- 400 tons, flood prevention project, Paducah, Ky., United States engineer's office, Louisville, Ky.
- 300 tons, two railroad underpasses, Adams county, Colo.
- 300 tons, buildings, torpedo station, Keyport, Wash.; Bailey Construction Co., Seattle, low.
- 250 tons, factory, Johnson Wax Co., Racine, Wis.
- 200 tons, buildings, Brown University, Providence, R. I.
- 160 tons, highway projects, Connecticut;

bids Feb. 3, Hartford.
 143 tons, 75-foot span, Lewis county, Wash.; bids to Bureau of Roads, Portland, Oreg., Feb. 6.
 142 tons, arch and viaduct, Lewis county, Washington, bureau of public roads; bids Feb. 6.
 114 tons (also 14 tons gates, etc.) Descutes project, Oreg; bids in to Bureau of Reclamation.
 105 tons, substation, Ampere, Wash.; bids to Bonneville project, Portland, Jan. 27.
 105 tons, invitation 1674, Bonneville power administration, Bonneville, Oreg.; bids opened.
 100 tons, Columbia hospital, Milwaukee.
 100 tons, city hospital, Milwaukee.
 Unstated, power house, Alcoa, Wash.; bids in to Bonneville project, Portland.

Pig Iron

Pig Iron Prices, Page 72

Pittsburgh—There are now 43 furnaces out of 50 active in the district, which is a post-depression high. The latest one to be blown in was at Donora, Pa., by American Steel & Wire Co. This furnace has been relined and the stoves redesigned. It was last operated in 1930. Output continues at peak, although there is still at least one idle furnace which might be blown in, and Carnegie-Illinois Steel Corp. has announced it will commence rehabilitation of No. 3 furnace at Clairton works, which will be ready for operation about May 1. This furnace has been idle more than ten years. Inquiry in the market for basic pig iron has been reported from more than one steelmaker in this district. Merchant iron producers are virtually sold out for first quarter and are offering little spot iron. Coke supply is relatively good, with additional beehive ovens going into operation weekly. H. C. Frick Coke Co. has announced rehabilitation of 400 ovens at its Collier plant in the Connellsville district. First operations are expected Feb. 15 and the entire bank will be running before April 1. This will bring the total ovens placed in operation by the Frick company since Sept. 1 to 1500.

Cleveland—Demand is moderate as it is between buying seasons, first quarter needs being taken care of and producers not yet willing to sell for second quarter. Producers are rationing sales even more strictly. Some export inquiries appear here but are usually turned down, both because home needs come first and because of red tape.

Chicago—Sales of pig iron are on a full capacity basis, with practically all sellers booking whatever tonnage is available at the \$1 higher price. Some furnaces are well sold up for first quarter and are temporarily out of the market.

Boston — Shipments of pig iron are heavy, but would be larger were

sellers supplying all the tonnage requested by some consumers, who seek to build up inventories in addition to current requirements. Shops in need of iron are supplied with a safe margin for the period ahead, but few, including regular consumers, are being sold or shipped tonnage which appears too far out of line with needs. Shipments are against contracts covered before the recent \$1 advance, although some iron is moving to consumers at the higher quotations.

Philadelphia — Shipments are falling behind schedule in some instances but not sufficiently to be reflected in operations of foundries or steelworks. Most foundries are working a full five-day week, with some plants running Saturday. Both pressure and soil pipe foundries are busy, the former experiencing an unusually heavy demand for fittings.

Buffalo—Brisk demand complete-

ly absorbs current production and is making further inroads on furnace stocks. Shipments, however, are on a spot basis and, while consumers are not receiving all tonnage asked for, no interruption to melting operations has taken place so far.

Cincinnati — Furnace interests refuse to enter forward commitments even at prices in effect at delivery. An occasional fill-in order has been taken at the \$1 advance, price announcements for this quarter still being withheld.

St. Louis—Purchasing of pig iron is mainly in small scattered lots and by the smaller users, most large melters having provided for their needs through first quarter. Some transactions to regular customers are reported at the old price, but little iron is being sold below the recent advance of \$1 per ton. However the price is still not entirely clarified.



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Scrap

Scrap Prices, Page 74

Pittsburgh — Normal markets have been restored, with the single exception that the trend remains downward instead of upward, as it has been in every previous similar period in history. This is the result of action by brokers to find the bottom range of the market, which will enable them to secure sufficient quantities of scrap to meet demand. Sales of No. 1 steel the past week range from \$21 to \$22, and brokers' buying prices amount to practically the same figures. As a result, the quotation this week has leveled off at that spread. With the results of last week's railroad list closings, No. 1 railroad steel is quoted at \$22 to \$22.50, and No. 2 heavy melting steel likewise shows reduced prices.

Cleveland — Prices have been marked down 50 cents per ton here and at Youngstown, O., on heavier grades but cast and blast furnace material are unchanged. Melters have not entered the market recently and are restricting shipments on contracts.

Chicago—Prices on all grades of scrap are now fairly well established. In general, present prices are a reduction of 25 cents to \$1 a ton. No. 1 heaving melting steel con-

tinues pegged at \$19.50 to \$20, brokers freely paying the lower price and mills having taken substantial tonnages at the higher. Shipments to mills on contract are steady.

Boston — Iron and steel scrap prices based on scattered buying tend lower and the situation has not yet clarified. Heavy melting steel for Worcester delivery is off \$1 a ton from the recent top and No. 2 for eastern Pennsylvania is off 50 cents. Further confusion has developed from a strike at several Eastern Massachusetts yards outside of Boston.

Philadelphia — Scrap has a steadier tone, and the recent decline in prices appears to have been checked. No. 1 heavy melting steel is quotable at \$20, this figure prevailing on latest mill purchases. Offerings have moderated since a week ago, thereby removing much of the weakness prevailing at the time of the initial market break. Reductions so far have been limited principally to leading steelmaking grades, with cast items and specialties still firm.

Buffalo—While buying interest is reported at recently reduced levels no sales of note have taken place. Not all mills are willing to do business on the basis of the present range of \$21 to \$21.50 for No. 1 heavy melting. One consumer is bidding \$1 to \$1.50 under the range.

Detroit—With further reductions

of 25 to 50 cents per ton on various grades, the market has become clarified and is no longer considered nominal. One of the principal effects of the price reduction has been the tendency among dealers to sell tonnages which they held on to as long as the price trend was upward.

Cincinnati — Dealers in iron and steel scrap reduced prices 25 to 50 cents a ton, following an initial cut the week previous of \$1. Conditions are more nearly normal, with considerable covering on contracts. Less tonnage is coming out at the reduced prices, and general activity has not rebounded to recent marks.

St. Louis — The iron and steel scrap market appears to be adjusting to the declines and other recent factors, and trading has been resumed at the lower levels. One St. Louis mill and another on the East Side have agreed on a price and substantial tonnages were placed by each on the basis of the dealers' buying price of \$17 as a maximum.

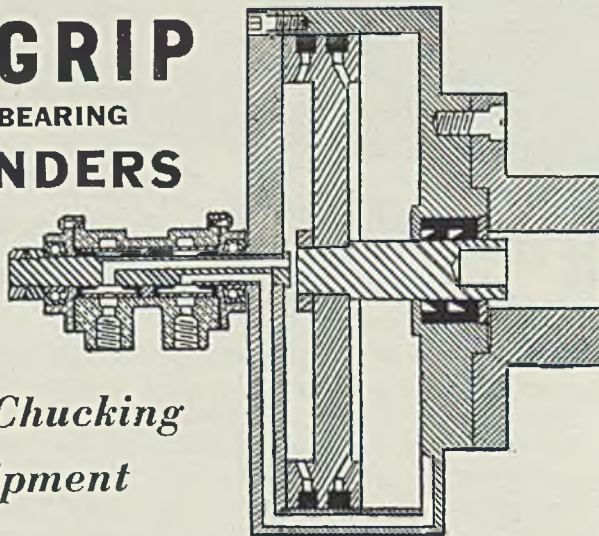
Seattle—Purchase of 3000 tons of cast iron scrap in the local market by Vancouver, B. C., interests has reduced tidewater stocks. This item is strong at \$16 a net ton but adding freight, exchange, tariff and other items, the delivered price on the Canadian side is figured at \$23.

Birmingham, Ala.—The scrap market is still highly problematical. Turnings, cast iron borings and stove plate are up \$1 a ton this week, but prices are still described as largely nominal.

Toronto, Ont. — Sharp advances have been put into effect in cast scrap prices to stimulate supplies for the big increase in consumers' demands that developed in the past few days. Machinery cast was marked up \$1.75 to \$20; dealers' cast a like amount to \$19 net ton delivered dealers' yards and cast borings and steel turnings were advanced 50 cents gross ton with dealers now paying \$8.

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Warehouse

Warehouse Prices, Page 73

Cleveland — The average warehouse finds supply more serious and most are out completely on several descriptions, finding that other distributors lack the same materials and sizes. Occasionally a warehouse has larger than average supply, but will sell only to regular customers. Volume of inquiry is high.

Chicago — Warehouse sales continue their upward trend and are higher than during the corresponding period of December. Demand is well diversified, both as to product and consuming industry.

Boston—Demand for steel out of warehouse is heavy. Movement of

warehouse steel in the Connecticut district is notably strong, although the same holds for the most part in other areas. Buying is widely diversified and prices are firm on most products. Both nails and resale merchant pipe, normally weak, are stronger.

New York — Warehouse sales are limited by supplies with replacements uncertain as mill deliveries lengthen. Aggregate volume is maintained, few jobbers noting slackening in buying, which is widely diversified. With numerous warehouses, servicing regular customers is becoming the problem. While stocks of hot-rolled steels are short and broken on more sizes, alloys are even more affected by strong demand and slow deliveries.

Buffalo — Distributors show increased concern over mill shipments as heavy buying reduces stocks. Upward price adjustments continue, with galvanized sheets No. 24 raised \$3 to 4.75c.

Cincinnati — Warehouse sales are heavy. Stocks have been maintained fairly well but difficulties in supplying some items, principally building materials, are more acute. Prices on hot-rolled sheets, at 3.42c, are up \$4 a ton on a belated reaction to higher mill quotations.

St. Louis—Demand for steel out of store has shown no sign of diminishing. January volume is reported well ahead of the like period in December. Stocks of certain commodities have been lowered during the past six weeks, notably sheets and plates. Belated mill shipments continue a sharp stimulant to warehouse sales.

Iron Ore

Iron Ore Prices, Page 74

Cleveland—Consumption of Lake Superior iron ore in the United States in December was 6,173,038 gross tons, compared with 5,973,007 tons in November and with 5,538,374 tons in December, 1939, according to the Lake Superior Iron Ore association, Cleveland. Consumption for 1940 was 62,426,314 tons, against 44,361,289 tons in 1939. The use of ore was largest since 1929, when it was 63,645,598 tons.

Stocks at furnaces and on Lake Erie docks Jan. 1, 1941, were 36,072,833 gross tons, against 35,439,773 tons a year before and 41,711,704 tons a month previous. As of Jan. 1 there were at furnaces 31,791,961 tons and on Lake Erie docks, 4,280,872 tons.

The association estimates that blast furnaces, which depend principally on Lake Superior iron ore, active Dec. 31, 1940, were 166 of a total of 189, the same as a month before, comparing with 155 a year ago.

Steel in Europe

Foreign Steel Prices, Page 73

London — (By Cable) — Demand for foundry pig iron is increasing in Great Britain but supplies are adequate. American imports largely supplement hematite requirements. Production of steel and iron continue at a high level, practically all absorbed by shipbuilding and war work. Rolling mills are working at capacity. Supply of semi-finished steel is adequate. Black and galvanized sheet output is being used almost wholly for national defense purposes. Tin plate exports are active.

Coke Oven By-Products

Coke By-Product Prices, Page 71

New York—Demand for coke oven by-products is active, and while production is heavy most materials are moving into consuming channels without accumulations at firm and unchanged prices. Toluol requirements for munitions are expanding with indications available supplies will be fully absorbed until synthetic plants now under construction, are in production. Plastics are taking most phenol, which is also active in other directions. Industrial naphthalene is sold up into next quarter, and buying has started for household use but is not likely to reach a peak until late this quarter or April. Shipments of sulphate of ammonia to the fertilizer trade are heavy.

Semifinished Steel

Semifinished Prices, Page 71

Pittsburgh—Following shortage of plates comes a tight situation in semifinished. Most steel producers are using structural and rail mills to roll semifinished material in an attempt to make headway against increasing specifications. There has been a good deal of farming out of this business to spread it around on mills which still have a little idle time. However, tonnages are still mounting and local nonintegrated mills report that while they are covered for immediate needs, their inventory is considerably lower than what might be considered safe for such an active period.

Ferroalloys

Ferroalloy Prices, Page 72

New York—Ability to produce rather than the scope of demand is the limiting factor in the current movement of leading ferroalloys. The movement this month will not be as large as in June and July of last year at the time of price increases in various important alloys,

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but this is accounted for by the fact that sellers now have not the stocks of their own to draw upon that they had six months ago.

Current shipments are expected to be slightly better than those in December, which in turn showed a rather appreciable increase over November. This is particularly true in ferromanganese and reflects the fast diminution of stocks which consumers were able to lay in early last summer. Some consumers still have a little of this stock on hand, it is said, but for the most part reserves were well eaten into during late summer and fall.

Prices generally are unchanged,



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with ferromanganese holding at \$120, duty paid, Atlantic and Gulf ports; and 19 to 21 per cent spiegeleisen at \$36, Palmerton, Pa.

Nonferrous Metals

New York—Further government control of nonferrous metal prices appears in the offing, largely affecting copper and zinc. Defense officials are insistent that metal prices be held at reasonable levels and apparently have the necessary power to back them up.

Copper—There is still talk of a single price on copper, probably 12.00c, Connecticut. Mine producers continue to do business on the basis of 12.00c but custom smelters are encountering no difficulty in obtaining 12.50c. Metals Reserve Co. may buy a second 100,000 tons of South American metal to supplement domestic supplies. Domestic sales are running close to 100,000 tons per month, against an indicated monthly output of 85,000 tons. Consumption will be increased sharply if the government's \$37,000,000 expansion program for the copper and brass fabricating industry goes through.

Lead—Prices are holding well in line at 5.35c, East St. Louis. Sup-

plies appear to be adequate for requirements as now estimated. December production hit a new high of 61,906 tons.

Zinc—Secondary zinc smelters and scrap dealers were called to Washington last week to work out a plan for reducing prices on both scrap and secondary slab metal. Scrap has been selling at above the price for virgin metal and Washington regards this as a disturbing factor. High grade metal has been offered in the outside market at as high as 12.50c, against a prime market of 7.25c.

Tin—Private tin consumers have added 9000 tons to their reserve stocks in the past five months, it is indicated, while the Metals Reserve Co. has taken on 15,500 tons. Prices are holding close to the 50-cent mark.

Equipment

New York—Priorities are being tightened in the machine building industry, resulting in more adjustments as to preferential deliveries of finished machines for defense needs and in the matter of supplies for their assembly. As more work

Nonferrous Metal Prices

Jan.	Copper			Straits Tin, New York		Lead N. Y.	Lead East St. L.	Zinc St. L.	Alumi- num 99%	Anti- mony Amer. Spot, N.Y.	Nickel Cath- odes
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures						
18	12.00	12.00	12.12 1/2	50.15	50.10	5.50	5.35	7.25	17.00	14.00	35.00
20	12.00	12.00	12.12 1/2	50.15	50.10	5.50	5.35	7.25	17.00	14.00	35.00
21	12.00	12.00	12.12 1/2	50.15	50.10	5.50	5.35	7.25	17.00	14.00	35.00
22	12.00	12.00	12.12 1/2	50.15	50.10	5.50	5.35	7.25	17.00	14.00	35.00
23	12.00	12.00	12.12 1/2	50.15	50.10	5.50	5.35	7.25	17.00	14.00	35.00
24	12.00	12.00	12.12 1/2	50.15	50.10	5.50	5.35	7.25	17.00	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	8.75
Zinc, 100 lb. base	12.50

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
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Wire

Yellow brass (high)	19.73
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OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.00-8.25
Cleveland	9.50-9.75
Chicago	8.62 1/2-8.87 1/2
St. Louis	8.37 1/2-8.50

Heavy Copper and Wire

New York, No. 1	9.62 1/2-9.87 1/2
Cleveland, No. 1	10.00-10.50

Chicago, No. 1	9.75-10.00
St. Louis	9.62 1/2-9.75

Composition Brass Turnings

New York	7.62 1/2-7.87 1/2
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Light Copper

New York	7.62 1/2-7.87 1/2
Cleveland	8.00-8.25
Chicago	7.75-8.00
St. Louis	7.62 1/2-7.75

Light Brass

Cleveland	5.00-5.50
Chicago	5.87 1/2-6.12 1/2
St. Louis	5.00-5.25

Lead

New York	4.60-4.70
Cleveland	4.50-4.75
Chicago	4.50-5.00
St. Louis	4.25-4.50

Zinc

New York	5.75-6.00
Cleveland	5.00
St. Louis	4.50-4.75

Aluminum

Mis., cast, Cleveland	11.00-12.00
Borings, Cleveland	8.00
Clips, soft, Cleveland	14.75-15.00
Misc. cast, St. Louis	11.00-11.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.75-13.25
Standard No. 12 aluminum	16.50-17.00

goes to smaller shops resulting from the "farm out" policy, the latter as sub-contractors, are appearing with additional priorities secured through the original contractor. Machine tools themselves are A-1-A on the revised schedule, unchanged, and

shops experience only slight difficulty in securing steel supplies, castings and fixtures, although suppliers of electrical control equipment, including starting boxes, are pushed to fill demands. There is little or no delay in delivery of motors.

story addition covering 3500 square feet.

STERLING, ILL.—Northwestern Steel & Wire Co. is adding a 50-ton top-charge electric furnace, doubling its capacity for electrically refined steel.

SYCAMORE, ILL.—Ideal Commutator Dresser Co. will build a one-story plant addition 94 x 144 feet. Gilbert A. Johnson, Rockford, Ill., is architect.

Connecticut

BRIDGEPORT, CONN. — Remington Arms Co. Inc., Barnum avenue, has let general contract for a one-story 160 x 200-foot factory unit on Helen street, to Harry Maring Jr. Inc., 536 Lindley street, at cost of about \$100,000.

MERIDEN, CONN.—Miller Co., F. S. Slagle, vice president, Center street, will

Construction and Enterprise

Illinois

AURORA, ILL.—Austin-Western Road Machinery Co. has given general contract to Algot B. Larson, 3837 West Lake street, Chicago, for a one-story plant addition 70 x 300 feet. (Noted Jan. 6.)

CHICAGO—Caine Steel Co., 1820 North Central avenue, steel distributor, will build a one-story steel warehouse with 40,000 square feet floor space to double capacity, costing about \$150,000. Includes three ten-ton cranes and several shears.

CHICAGO — Paasche Albrush Co., 1909 West Diversy parkway, will build one and two-story addition of about 10,000 square feet, doubling capacity. Building will cost about \$40,000 and equipment \$10,000. Company manufactures air-painting equipment, rubbing machines and offset printing equipment.

CHICAGO—Acme Steel Co., 2840 Archer avenue, will expand its plant at Riverdale, Ill., at cost of about \$1,000,000.

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 82 and Reinforcing Bars Pending on page 84 of this issue.

Includes one-story warehouse with 45,000 square feet floor space and pump house 25 x 75 feet. Equipment will be re-arranged for better operation.

CHICAGO—Chicago Metal Mfg. Co., 3724 South Rockwell street, manufacturer of sheet metal products, angle rings, irrigation pipe and fittings, is building a one-story warehouse of about 20,000 square feet for shipping and receiving, including a truck-loading dock.

CHICAGO—Arthur J. O'Leary & Son Co., 5757 West Sixty-fifth street, is building an addition to its steel fabricating plant, covering about 18,000 square feet, entirely for national defense operations. William J. Kelly is president.

CHICAGO—Rheem Mfg. Co., manufacturers of steel barrels and containers, has given contract to Brown & Matthews Inc., 122 East Forty-second street, New York, for a new plant at Kedzie avenue and Seventy-fifth street, two units each 160 x 500 feet, to cost about \$750,000. (Noted Jan. 6.)

ELGIN, ILL.—McGraw Electric Co. will build warehouse 150 x 280 feet and an addition containing 25,000 square feet additional floor space. (Noted Jan. 6.)

FAIRFIELD, ILL.—Wayne-White counties Electric Co-operative Inc., J. Wess Barth president, will build 344 miles rural electric line, REA having allotted \$285,000.

NORTH CHICAGO, ILL. — Fansteel Metallurgical Corp., producer of rare metals, alloys, electrical and chemical products, is having plans prepared for a one-story plant addition 125 x 150

feet. (Previous addition noted Jan. 6.)

PEORIA, ILL.—R. G. LeTourneau Inc., manufacturer of roadbuilding and earth-moving machinery, will build a one-

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rebuild its blacksmith shop and rolling mill and erect a 70-foot steel chimney, at cost of \$40,000 to \$50,000.

NEW BRITAIN, CONN.—Fafnir Bearing Co., 37 Booth street, has let general contract to Aberthaw Co., 80 Federal street, Boston, for a six-story factory addition 62 x 110 feet.

WATERBURY, CONN.—Waterbury Tool Co., 188 East Aurora street, has let general contract to Austin Co., 19 Rector street, New York, for a two-story storage and office building 58 x 140 feet, costing about \$80,000.

Massachusetts

GREENFIELD, MASS.—Greenfield Tap & Die Corp., Sanderson street, has let general contract for 82 x 214-foot gage manufacturing building at Sanderson and North streets to E. J. Pinney Co. Inc., 220 Dwight street, Springfield, Mass., at cost of about \$100,000. (Noted Jan. 6.)

New York

BATAVIA, N. Y.—Doehler Die Casting Co., 286 Fourth avenue, New York, will build additions 200 x 200 and 50 x 200 feet. General contract to F. Gleason Co., 108 Colvin street, Rochester, N. Y., at about \$150,000. G. Morton Wolfe, 1377 Main street, Buffalo, is architect and engineer.

ILION, N. Y.—Remington Arms Co. Inc., Barnum avenue, Bridgeport, Conn., will build new factory units, general contract being given to Morton C. Tuttle Co., 862 Park Square building, Boston, at cost of over \$40,000.

NEW YORK—American Smelting & Refining Co., 120 Broadway, plans an electrolytic zinc refining plant in Texas, possibly on the Gulf coast, with capacity of 2500 tons monthly.

PAINTED POST, N. Y.—Ingersoll-Rand Co., A. O. Carpenter, chief engineer, will build a plant addition 120 x 200 feet, costing about \$40,000.

New Jersey

BELMAR, N. J.—City plans new sewerage pumping station at Eighth and Ocean avenue, costing about \$75,000. C. W. Birdsall, 1700 Avenue F, is engineer.

HARRISON, N. J.—Otis Elevator Co., 260 Eleventh avenue, New York, will build a manufacturing building for production of cranks for airplane engines, costing about \$1,000,000. Epple & Kahrs, 17 Washington street, Newark, N. J., are architects.

Ohio

AKRON, O.—Akron Gear & Engineering Co., James Shattuck, president, 42 East South street, is building machine shop and office building on Morgan street, 90 x 120 feet for shop building and 20 x 60 feet for the office. Kraus-Alexander Construction Co., 1106 Bell-rider road, is general contractor.

AKRON, O.—Burt Mfg. Co., C. A. Palmer, president, 44 East South street, will double manufacturing capacity for ventilators, oil filters and similar products, by an addition of 30,000 square feet. Austin Co., 16112 Euclid avenue, Cleveland, is in charge of construction.

CLEVELAND—Linderme Tube Co., 1500 East 219th street, Emil L. Linderme, president, will build an addition covering 2400 square feet to accommodate enlarged production. Bids are being taken by A. C. Wolfe, architect, Sweetland building.

CLEVELAND—H. & P. Mfg. Co., 1635 East Fifty-fifth street, die manufacturer, Edward Petranek, president, will build new plant 50 x 120 feet at 13841 Triskett road. Bids to Herman W. Maurer, 3126 Scarboro road, architect, to Feb. 1.

CLEVELAND—Overly-Hautz Co., 1617 West 117th street, sheet metal products, will expand manufacturing space, C. T. Regan Construction Co., 1900 Euclid avenue, in charge of work. H. W. Overly is president.

LORAIN, O.—American Stove Co., 1200 Long avenue, will add 12,000 square feet floor space, one of several plant enlargements during past year. J. C. F.

Shafer Co., Caxton building, Cleveland, is contractor.

RAVENNA, O.—Army quartermaster's office, Washington, is negotiating with contractors for an ordnance depot to be operated in conjunction with shell-loading plant, including 454 reinforced concrete igloos, four ammunition warehouses, administration and personnel quarters, cost estimated \$4,500,000. Jennings & Lawrence Co., 12 North Third street, Columbus, O., is architect and engineer.

SHELBY, O.—Ohio Seamless Tube Co. plans to increase production of tubing for government by installation of \$190,000 worth of equipment, including furnaces.

TOLEDO, O.—Toledo Scale Co. is building a plant addition of 65,000 square feet, costing over \$200,000.

Pennsylvania

ERIE, PA.—General Electric Co., H. L. R. Emmett, works manager, Blake road, will build a one-story addition to building 18, 150 x 200 feet, to cost about \$75,000. J. F. Tridle, East Lake road, is company engineer.

FULLERTON, PA.—Warner Steel Co., W. Newman, president, is enlarging and improving the former Fuller-Lehigh machine shop at cost of \$100,000.

MEADVILLE, PA.—City plans construction of a brick and steel incinerator plant. R. Phillips is city engineer.

MT. JEWETT, PA.—Kane Gas Co. Inc., Kane, Pa., is developing natural gas areas at cost of \$40,000 to \$50,000, including deep wells, booster station, pressure plant and pipe lines.

PLEASANTVILLE, PA.—C. B. Collins, Titusville, Pa., will develop 612-acre tract of crude oil property, including deep wells, pipe lines, steel storage tanks, pumps and machinery at cost of more than \$40,000.

VANDERGRIFT, PA.—United Engineering & Foundry Co., G. T. Ladd, president, First National Bank building, Pittsburgh, has let general contract for a one-story plant addition and two 100 x 130-foot side additions to Uhl Construction Co., 6001 Butler street, Pittsburgh. H. H. Talbot, care company, is engineer.

WILKES-BARRE, PA.—Empire Ordnance Corp., care Vulcan Iron Works, South Franklin and Horton streets, is altering and enlarging its foundry, general contract being given to Sordoni Construction Co. Cost estimated at \$40,000.

Missouri

CHILLICOTHE, MO.—City will vote Jan. 29 on \$125,000 bond issue for sewage disposal plant and sanitary sewers, estimated to cost \$300,000. J. W. Shikles & Co., 708 New York Life building, Kansas City, Mo., is engineer.

ST. LOUIS—American Stove Co., 825 Chouteau building, has let general contract to Rinehart Construction Co., 212 Chouteau building, for a building at 2001 South Kingshighway.

ST. LOUIS—Carondelet Foundry Co., 2101 South Kingshighway, has bought two acres adjoining its plant and will erect storage building, utilizing present storage space for enlarged production.

ST. LOUIS—Gaylord Container Corp., 2820 South Eleventh street, has bought five acres at Oakland, Calif., and will erect plant for manufacture of containers, at cost of about \$600,000.

ST. LOUIS—War department has given



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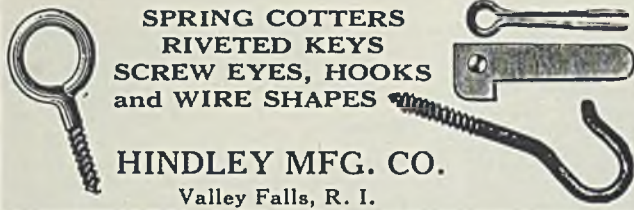
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general contract for small-arms ammunition plant at Bircher and Goodfellow boulevards to Fruin Colton Contracting Co., 502 Merchants-Laclede building and Fruco Construction Co., 516 Merchants-Laclede building, both St. Louis, and Massman Construction Co., 20 West Ninth street, Kansas City, Mo. Contract is on cost plus fixed fee basis at about \$11,819,400.

ST. LOUIS—Monsanto Chemical Co., 1700 South Second street, has leased to government without cost a site adjacent to its plant at Monsanto, Ill., on which plant for manufacture of gas warfare defense chemicals will be built. Monsanto will operate plant on non-profit basis.

Wisconsin

BELOIT, WIS.—Yates American Machine Co. is building a one-story plant addition 50 x 66 feet for use as core room.

GREEN BAY, WIS.—Chicago and North Western will build a shop addition to house two track drop tables, large traveling crane and other equipment.

MADISON, WIS.—Gisholt Machine Co., manufacturer of machine tools, has given general contract to J. H. Findorff & Son, for a plant addition, boiler house and other improvements.

MILWAUKEE—Globe-Union Inc., manufacturer of spark plugs, radio parts, roller skates, etc., has given general contract to Selzer-Ornst Co. for one-story addition 160 x 180 feet and alterations to present plant.

MILWAUKEE—Falk Corp., manufacturer of speed reducers, gears, gear drives, castings, etc., has given general contract to Klug & Smith Co. for a two-story addition 38 x 125 feet.

MILWAUKEE—Milwaukee Forge & Machine Co. has given contract to Bentley Construction Co. for a one-story machine shop addition 50 x 64 feet.

MILWAUKEE—Harley-Davidson Motor Co., motorcycle manufacturer, is building a one-story factory building 35 x 120 feet. Federal Engineering Co. is engineer.

SUPERIOR, WIS.—Superior Water, Light & Power Co., H. J. Underhill, general manager, will make improvements to light plant at cost of \$1,550,000 to increase capacity.

WAUWATOSA, WIS.—Liberty Foundry Corp. has been incorporated with 250 shares no par value to manufacture gray iron, steel and other metal castings, by William J. Grede, Arthur J. Grede and Richard H. Tyrrell.

WAUKESHA, WIS.—Spring City Foundry Corp. has been incorporated with 250 shares no par value to manufacture gray iron and steel castings by William J. Grede and associates.

WEST ALLIS, WIS.—Griffith-Hope Co., S. N. Hope, president, sheet metal specialties, has given general contract to Selzer-Ornst Co., Milwaukee, for a one-story shop addition.

WEST ALLIS, WIS.—Allis-Chalmers Mfg. Co. has given general contract to Permanent Construction Co., Milwaukee, for a one-story tank and plate shop addition 52 x 425 feet and 90 x 200 feet, costing about \$150,000.

Minnesota

MINNEAPOLIS—D. W. Onan & Sons, manufacturers of saws and lighting plants, are building a one-story plant addition 125 x 128 feet.

MINNEAPOLIS—Northern States Power Co., Robert F. Pack, president, 15 South Fifth street, will spend over \$8,-

000,000 in 1941 for improvements and expansion, including additional equipment at Riverside station in Minneapolis and High Bridge steam plant in St. Paul. A 50,000-kw. generating unit, substations at St. Louis Park, Minn., Hugo, Minn., and additional coal-handling equipment at Fargo, N. Dak., are planned.

MINNEAPOLIS—University of Minnesota, W. T. Middlebrook, comptroller, will build \$750,000 aeronautical and mechanical engineering building.

MINNEAPOLIS—Minneapolis Gas Light Co., H. K. Wrench, vice president, will make improvements and expansion costing \$1,000,000 including \$330,000 for a gas-mixing plant.

MINNEAPOLIS—Western Alloyed Steel Casting Co. has given general contract to W. A. Best, 1262 Raymond avenue, for plant addition.

ST. PAUL—American Hoist & Derrick Co., manufacturer of shovels, cranes, snow plows, etc., has given contract to F. J. Romer Construction Co. for an addition and extensive alterations.

ST. PAUL—Industrial Tool & Die Works, 2233 University avenue, has been incorporated with \$275,000 capital by J. H. Campbell, H. R. Naftalin and G. Campbell.

ST. PAUL—Rotary Valve Marine Engine Corp., 745 East Third street, has been incorporated by F. G. Haas, J. W. Bonk and Charles Noll.

Texas

HOUSTON, TEX.—Houston Shipbuilding Co., subsidiary of Todd Shipyards Corp., 1 Broadway, N. Y., J. W. Lawder in charge, will build six-way shipyard on Houston ship channel to build ocean-going vessels for maritime commission. Grant of \$4,680,000 has been made by government.

HOUSTON, TEX.—Texas Tin Corp., H. C. Cockburn, president, 3201 University avenue, recently incorporated, will import tin from Durango, Mexico, and process it here.

HOUSTON, TEX.—Diamond Alkali Co. of Texas, incorporated by S. W. Walters, 1006 Main street, and associates, will build several plants for manufacture of liquid silicate of soda and other silica products.

Kansas

DODGE CITY, KANS.—Dodge City Co-operative Exchange, C. F. Erbe, president, has given general contract to Chalmers & Borton, Nelson building, Hutchinson, Kans., for a grain elevator to cost about \$60,000, with equipment, with capacity of 250,000 bushels. Includes six reinforced concrete storage tanks and headhouse.

HORTON, KANS.—Brown-Atchison electric co-operative association has given contract for 145 miles of transmission line to Inland Construction Co., 3867 Leavenworth street, Omaha, Nebr. H. H. Henningson, Service Life building, Omaha, is engineer.

IONIA, KANS.—REA has allotted \$198,000 to Jewell-Mitchell Co-operative Electric Co. Inc., H. H. Walters, president, for construction of 217 miles of rural electric lines.

SALINA, KANS.—Shellabarger Milling Co., 511 North Santa Fe avenue, has given contract to Chalmers & Borton, 28 East First street, Hutchinson, Kans., for a grain elevator of 1,000,000 bushels capacity, 24 bins.

Nebraska

LEXINGTON, NEBR.—Dawson county public power district will receive bids

early in February for construction of 403 miles of rural transmission line. E. H. Reed Engineering Co., Abilene, Kans., is consulting engineer.

Iowa

ANAMOSA, IOWA—Maquoketa valley rural electric co-operative, E. D. Beach, superintendent, will take bids soon on 344 miles of rural electric line for which REA has allotted \$264,000. Kenneth R. Brown, Valley Bank building, Des Moines, Iowa, is engineer.

CHARLES CITY, IOWA—Salsbury Laboratories plans erection of a chemical manufacturing plant building 120 x 120 feet, a two-story unit 40 x 120 feet and a one-story unit 80 x 120 feet.

DUBUQUE, IOWA—War department has approved plans for highway bridge over Mississippi river to East Dubuque, Ill., by the Dubuque bridge commission. Charles T. Landon, chairman, Ash-Howard, Needles & Tammen, Orser-Leslie building, Kansas City, Mo., are engineers. Bids will be asked soon.

MAQUOKETA, IOWA—City council, J. G. Thorne, city clerk, will take bids Jan. 31 for improvements to municipal light and power plant, including 200-horsepower diesel engine.

VINTON, IOWA—F. J. Lynch, city clerk, will receive bids Feb. 14 on improvements to municipal light and power plant, including diesel engine generating unit, 700 to 750 kilowatts, with accessories. Stanley Engineering Co., Muscatine, Iowa, is consulting engineer.

California

BEVERLY HILLS, CALIF.—Payne Furnace & Supply Co., 339 North Maple drive, will build an addition 68 x 323 feet costing \$45,000.

BURBANK, CALIF.—Lockheed Aircraft Corp. will build service and maintenance building at 1705 Victory place, at cost of \$245,000.

LONG BEACH, CALIF.—Long Beach Iron Works, 2020 West Anahelm street, will build a shop addition 50 x 53 feet, costing \$5300.

LOS ANGELES—Aircraft Precision Products Inc. has been formed with 100 shares no par value, represented by Gibson, Dunn & Crutcher, 634 South Spring street.

LOS ANGELES—Keystone Engineering Corp. and Southwest Welding & Mfg. Co. have applied to Los Angeles harbor commission for sites on which to establish shipyards. The former asks for 18 acres on which to build four 500-foot ways for freighter construction. The latter will build smaller craft.

LOS ANGELES—Automatic Tension Screen Co., 6245 South St. Andrews place, will build a new plant at cost of \$14,900.

LOS ANGELES—Toolcraft Mfg. Co. has been organized with \$20,000 capital by William R. Bloom and associates. Union Bank building.

LOS ANGELES—Abegg & Reinhold Co. will build a heat-treating plant at Twenty-sixth and Harriett streets 60 x 120 feet, costing \$12,000.

LOS ANGELES—Robot Laundry Machinery Corp. has been organized with \$1,600,000 capital by Harold Larson, 814 Central building, and associates.

SOUTH GATE, CALIF.—Pacific Screw Products Co., 5209 South avenue, will build machine shop costing \$42,000.

Washington

ABERDEEN, WASH.—Grays Harbor Shipbuilding Co. has been incorporated with \$100,000 capital by Albert Schafer, W. H. Abel and Ed. Lundgren.

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- 600 KW (2) GENERAL ELECTRIC synchronous, 125/250 volts 3-wire D.C., 4000/2300 volts A.C., 900 RPM.
- 600 KW ALLIS-CHALMERS synchronous, 250 volts D.C., 2300/600 volts A.C., 900 RPM.

ROTARY CONVERTERS

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◆ ◆ ADVERTISING INDEX ◆ ◆

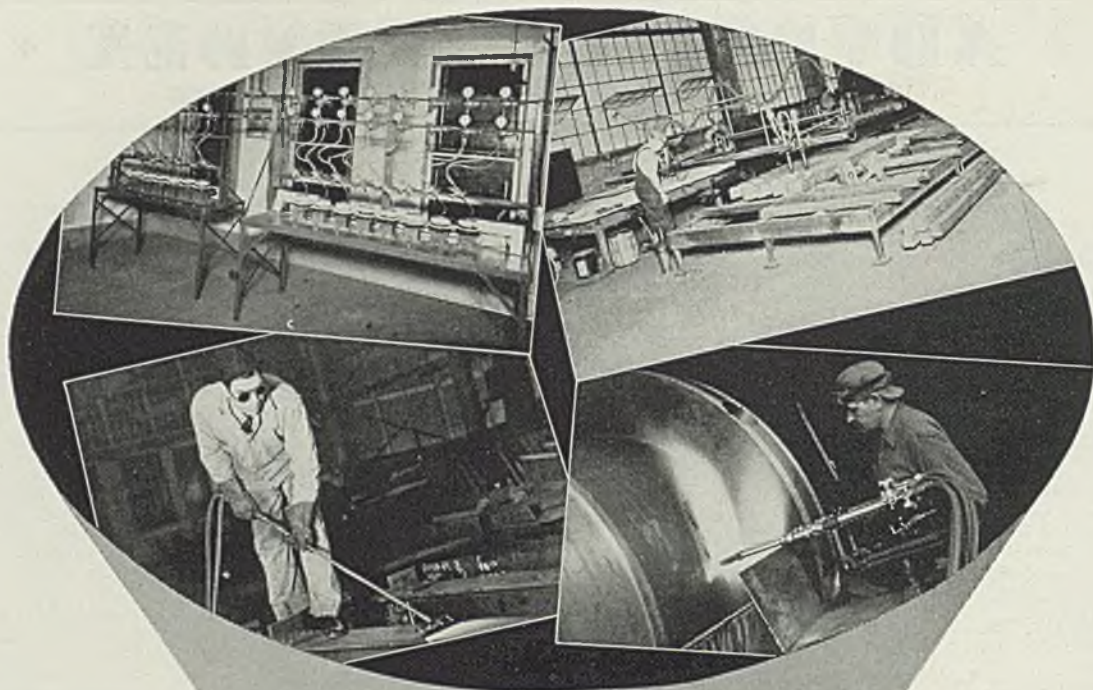
Where-to-Buy Products Index carried in first issue of month.

	Page		Page		Page
A					
Abart Gear & Machine Co.	—	Carborundum Co., The	—	Finn, John, Metal Works	—
Acme Galvanizing, Inc.	—	Carey, Phillip, Co., The	—	Firth-Sterling Steel Co.	93
Acme Steel & Malleable Iron Works..	—	Carnegie-Illinois Steel Corp.	—	Fitzsimons Co., The	—
Alrgrip Chuck Division of Anker-	—	Carpenter Steel Co., The	51	Flexrock Co.	—
Holth Mfg. Co.	86	Carter Hotel	—	Ford Chain Block Division of Ameri-	—
Air Reduction	98	Cattle, Joseph P., & Bros., Inc.	—	can Chain & Cable Co., Inc.	—
Ajax Electrothermic Corp.	—	Cellcote Co., The	—	Foster, L. B., Co.	94
Ajax Flexible Coupling Co.	—	Central Screw Co.	84	Foxboro Co., The	—
Alan Wood Steel Co.	—	Challenge Machinery Co., The	—	Fuller Brush Co.	—
Allegheny Ludlum Steel Corp.	—	Chambersburg Engineering Co.	81	G	
Allen-Bradley Co.	—	Chandler Products Co.	—	Garlock Packing Co., The	—
Allis-Chalmers Mfg. Co.	—	Chicago Perforating Co.	91	General Blewer Co.	94
Alrose Chemical Co.	—	Chicago Rawhide Mfg. Co.	—	General Electric Co.	—
American Brass Co., The	—	Chromium Mining and Smelting Corp.,	—	General Electric Co., Lamp Dept.	—
American Bridge Co.	—	Ltd.	—	Gisholt Machine Co.	10
American Chain & Cable Co., Inc.,	—	Cincinnati Grinders, Inc.	—	Globe Brick Co., The	—
American Chain Division	—	Cincinnati Milling Machine Co.	—	Granite City Steel Co.	—
American Chain & Cable Co., Inc.,	—	Cincinnati Shaper Co., The	2	Grant Gear Works	—
Ford Chain Block Division	—	Clark Controller Co., Inside Front Cover	—	Graybar Electric Co.	—
American Chain & Cable Co., Inc.,	—	Cleveland Cap Screw Co.	—	Great Lakes Steel Corp.	3
Page Steel & Wire Division	85	Cleveland-Cliffs Iron Co.	—	Greenfield Tap & Die Corp.	26
American Chain Division of American	—	Cleveland Crane & Engineering Co.,	—	Gregory, Thomas, Galvanizing Works	—
Chain & Cable Co., Inc.	—	Cleveland Hotel	—	Grinnell Co., Inc.	—
American Chemical Paint Co.	—	Cleveland Punch & Shear Works Co.,	—	Gulf Oil Corporation	—
American Engineering Co.	—	Cleveland Tramral Division, Cleve-	—	Gulf Refining Co.	—
American Flexible Coupling Co.	—	land Crane & Engineering Co.,	—	H	
American Gas Association	—	Cleveland Twist Drill Co., The	—	Hagan, George J., Co.	—
American Hollow Boring Co.	95	Cleveland Worm & Gear Co., The	—	Hanlon-Gregory Galvanizing Co.,	—
American Hot Dip Galvanizers Asso-	—	Climax Molybdenum Co.	—	lianna Engineering Works	—
ciation	—	Columal Broach Co.	—	Hanna Furnace Corp.	—
American Lanolin Corp.	91	Columbia Steel Co.	—	Hannliff Mfg. Co.	—
American Monorail Co.	—	Columbus Die, Tool & Machine Co.,	—	Harnischfeger Corp.	—
American Nickeloid Co.	—	Commercial Metals Treating, Inc.	—	Harrington & King Perforating Co.,	91
American Pulverizer Co.	—	Cone Automatic Machine Co., Inc.,	—	Hays Corp., The	—
American Roller Bearing Co.	—	Continental Machines, Inc.	—	Heald Machine Co.	—
American Rolling Mill Co., The	—	Continental Roll & Steel Foundry Co.,	—	Heppenstall Co.	—
American Screw Co.	—	Continental Screw Co.	—	Hevi Duty Electric Co.	—
American Shear Knife Co.	—	Copperweld Steel Co.	—	Hillside Fluor Spar Mines	—
American Society of Tool Engineers..	—	Corbin Screw Corp.	—	Hindley Mfg. Co.	91
American Steel & Wire Co.	—	Cowles Tool Co.	—	Hobart Bros.	91
American Tinning & Galvanizing Co.,	—	Crane Co.	—	Holliday, W. J., & Co.	94
Ampeco Metal, Inc.	—	Crawbuck, John D., Co.	94	Holsburgh & Scott Co.	79
Amsler-Morton Co., The	—	Crosby Co., The	93	Hubbard & Co.	—
Andrews Steel Co., The	—	Cullen-Friedstedt Co.	—	Hubbard, M. D., Spring Co.	—
Armstrong-Blum Mfg. Co.	—	Culvert Division, Republic Steel Corp.,	—	Huther Bros. Saw Mfg. Co.	—
Armstrong Cork Co.	—	Cunningham, M. E., Co.	—	Hyatt Bearings Division, General Mo-	—
Atlantite Steel Co.	—	Curtis Pneumatic Machinery Co.	—	tors Sales Corporation	—
Atlas Car & Mfg. Co.	—	Cutler-Hammer, Inc.	—	Hyue Park Foundry & Machine Co.,	—
Atlas Drop Forge Co.	—	D			
Atlas Lumnite Cement Co.	—	Damascus Steel Casting Co.	—	I	
B					
Babeock & Wilcox Co.	—	Darwin & Milner, Inc.	—	Illinois Clay Products Co.	—
Bailey, Wm. M., Co.	—	Davis Brake Beam Co.	—	Illinois Development Council	—
Baker-Raulang Co.	7	Dearborn Gage Co.	—	Independent Galvanizing Co.	—
Bantam Bearings Corp.	—	Detroit Leland Hotel	88	Industrial Brownhoist Co., P.	—
Barnes, Wallace, Co., Division of Asso-	—	Diamond Expansion Bolt Co., Inc.	—	Ingersoll-Rand	—
ciated Spring Corporation	—	Differential Steel Car Co.	—	Ingersoll Steel & Disc Division, Borg	—
Basile Dolomite, Inc.	—	Dings Magnetic Separator Co.	—	Warner Corp.	—
Bay City Forge Co.	—	Dravo Corp., Engineering Works Div.,	—	Inland Steel Co.	78
Bay State Abrasive Products Co.	—	Dravo Corp., Machinery Division	93	International Correspondence Schools	—
Beatty Machine & Mfg. Co.	—	Duer Spring & Mfg. Co.	—	International Nickel Co., Inc.	80
Bellevue-Stratford Hotel	89	E			
Belmont Iron Works	93	Eagle-Picher Lead Co., The	—	International-Stacey Corp.	—
Berger Manufacturing Div., Republic	—	Elastic Stop Nut Corp.	—	Isaacson Iron Works	—
Steel Corp.	—	Electric Controller & Mfg. Co., Back Cover	—	J	
Bethlehem Steel Co.	1	Electric Furnace Co., The	—	Jackson Iron & Steel Co., The	93
Birdsboro Steel Foundry & Machine	—	Electric Storage Battery Co.	—	James, D. O., Mfg. Co.	—
Co.	—	Electro Alloys Co., The	—	J-B Engineering Sales Co.	—
Bissett Steel Co., The	87	Electro Metallurgical Co.	—	Jessop Steel Co.	—
Blanchard Machine Co.	—	Elmes, Charles F., Engineering Works	—	Jessop, Wm., & Sons, Inc.	—
Blaw-Knox Co.	—	Enterprise Galvanizing Co.	91	Johns-Manville Corp.	—
Blaw-Knox Division, Blaw-Knox Co.,	—	Equipment Steel Products Division of	—	Johnson Bronze Co.	—
Bliss & Laughlin, Inc.	—	Union Asbestos & Rubber Co.	—	Jones & Lamson Machine Co.	—
Bower Roller Bearing Co.	—	Erdle Perforating Co., The	—	Jones & Laughlin Steel Corp.	—
Brassert, H. A., & Co.	91	Erie Bolt & Nut Co.	—	Jones, W. A., Foundry & Machine Co.,	—
Bridgeport Brass Co.	—	Erie Foundry Co.	—	Joslyn Co. of California	—
Broderick & Bascom Rope Co.	—	Eureka Fire Brick Works	—	Joslyn Mfg. & Supply Co.	—
Brooke, E. & G., Iron Co.	—	Ex-Cell-O Corp.	—	Junkin Safety Appliance Co., Inc.,	—
Brosius, Edgar E., Inc.	—	Excelsior Tool & Machine Co.	—	K	
Brown & Sharpe Mfg. Co.	—	F			
Brown Instrument Co., The	—	Fafnir Bearing Co., The	—	Kantlink Spring Washers	—
Bryant Chucking Grinder Co.	—	Fairbanks, Morse & Co.	8	Kardong Brothers, Inc.	—
Buffalo Galvanizing & Tinning Works	—	Fanner Mfg. Co.	—	Kearney & Trecker Corp.	—
Buffalo Wire Works Co., Inc.	93	Fansteel Metallurgical Corp.	—	Kemp, C. M., Mfg. Co.	—
Bullard Co., The	—	Farrel-Birmingham Co., Inc.	—	Kester Solder Co.	94
Bundy Tubing Co.	—	Farval Corp., The	—	Keystone Machinery Co.	—
C					
Cadman, A. W., Mfg. Co.	—	Federal Machine & Welder Co.	6	King Fifth Wheel Co.	—
				Kinney Mfg. Co.	95
				Kirk & Blum Mfg. Co.	—

♦ ♦ ADVERTISING INDEX ♦ ♦

Where-to-Buy Products Index carried in first issue of month.

	Page		Page	Page
Koch, George, Sons	93	Ohio Galvanizing & Mfg. Co.		Stoody Co.
Koppers Co.		Ohio Locomotive Crane Co., The.	91	Strong Steel Foundry Co.
Koven, L. O., & Brother, Inc.		Ohio Seamless Tube Co., The		Sturtevant, B. F., Co.
Kron Co., The		Ohio Steel Foundry Co., The		Sun Oil Co.
L		Open Steel Flooring Institute, Inc.		Superior Mold & Iron Co.
Laclede Steel Co.		Oxweld Acetylene Co.		Superior Steel Corp.
Lake City Malleable Co.		P		Surface Combustion Corp.
Lamson & Sessions Co., The	29	Page Steel & Wire Division of Ameri-		Sutton Engineering Co.
Landis Machine Co., Inc.		can Chain & Cable Co., Inc.	85	T
Lang Machinery Co.	94	Pangborn Corp.		Tennessee Coal, Iron & Railroad Co.
Lansing Stamping Co.		Parker-Kalon Corp.		Thomas Machine Mfg. Co.
LaSalle Steel Co.		Pease, C. F., Co., The		Thomas Steel Co., The
Latrobe Electric Steel Co.		Penn Galvanizing Co.		Thompson-Bremer & Co.
Lawrence Copper & Bronze		Pennsylvania Industrial Engineers		Tide Water Associated Oil Co.
LeBlond, R. K., Machine Tool Co., The		Pennsylvania Salt Mfg. Co.		Timken Roller Bearing Co.
Leeds & Northrup Co.		Penola, Inc.		Timken Steel & Tube Division, The
Lee Spring Co., Inc.		Perkins, B. F., & Son, Inc.		Timken Roller Bearing Co.
Lehigh Structural Steel Co.		Pheoll Mfg. Co.		Tinnerman Products, Inc.
Leschen, A., & Sons Rope Co.	90	Pittsburgh Crushed Steel Co.	93	Toledo Stamping & Mfg. Co.
Lewis Bolt & Nut Co.		Pittsburgh Gear & Machine Co.		Tomkins-Johnson Co.
Lewis Foundry & Machine Division of		Pittsburgh Leetromelt Furnace Corp.		Torrington Co., The
Blaw-Knox Co.		Pittsburgh Rolls Division of Blaw-		Townsend Co.
Lewis Machine Co., The		Knox Co.		Tri-Lok Co., The
Lincoln Electric Co., The		Pittsburgh Saw & Tool Co.		Truscon Steel Co.
Lincoln Hotel		Pittsburgh Spring & Steel Co.	93	U
Linde Air Products Co., The		Pittsburgh Steel Co.		Union Carbide & Carbon Corp.
Link-Belt Co.		Plymouth Locomotive Works, Div. The		Union Drawn Steel Div. Republic
Loftus Engineering Corp.	91	Fate-Root-Heath Co.		Steel Corp.
Logemann Bros. Co.		Poole Foundry & Machine Co.		United Chromlum, Inc.
Loveljoy Flexible Coupling Co.		Pressed Steel Car Co., Inc.		United Engineering & Foundry Co.
Ludlow-Saylor Wire Co., The		Pressed Steel Tank Co.	83	United Maintenance Sales Co.
..... Inside Back Cover		Prest-O-Lite Co., Inc., The		United States Steel Corp., Subsidiaries
Mc		Pure Oil Co., The		American Bridge Co.
McKay Machine Co.		R		American Steel & Wire Co.
McKee, Arthur G., Co.		Raymond Mfg. Co., Division of Asso-		Atlas Lumnite Cement Co.
McKenna Metals Co.		ciated Spring Corp.		Carnegie-Illinois Steel Corp.
M		Reading Chain & Block Corp.	67	Columbia Steel Co.
Mackintosh-Hemphill Co.		Ready-Power Co.	91	Cyclone Fence Co.
Macwhyte Co.	77	Reliance Electric & Engineering Co.		Federal Shipbuilding & Dry Dock Co.
Marr-Galbreath Machinery Co.		Republic Steel Corp.		National Tube Co.
Mathews Conveyer Co.		Revere Copper and Brass, Inc.		Oil Well Supply Co.
Maurath, Inc.		Rhoades, R. W., Metalline Co., Inc.		Scully Steel Products Co.
Medart Co., The		Riverside Foundry & Galvanizing Co.		Tennessee Coal, Iron & Railroad Co.
Mesta Machine Co.		Roosevelt Hotel		United States Steel Export Co.
Metal & Thermit Corp.		Ruemelln Mfg. Co.		Universal Atlas Cement Co.
Michigan Tool Co.		Russell, Burdsall & Ward Bolt & Nut		Virginia Bridge Co.
Midvale Co., The		Co.		United States Steel Export Co.
Millwaukee Foundry Equipment Co.		Rustless Iron & Steel Corp.		V
Missouri Rolling Mill Corp.		Ryerson, Joseph T., & Son, Inc.	12	Valley Mould & Iron Corp.
Moltrup Steel Products Co.		S		Vanadium-Alloys Steel Co.
Monarch Machine Tool Co., The		Salem Engineering Co.		Vascoloy-Ramet Corp.
Monarch Steel Co.		Samuel, Frank, & Co., Inc.		Voss, Edward W.
Morgan Construction Co.		San Francisco Galvanizing Works		W
Morgan Engineering Co.		Sanitary Tinning Co., The		Waldron, John, Corp.
Morrison Metalweld Process, Inc.		Sauereisen Cements Co.	95	Wapakoneta Machine Co.
Morris Paper Co.		Scovill Mfg. Co.		Warner & Swasey Co.
Morton Salt Co.		Scully Steel Products Co.		Washburn Wire Co.
Motor Repair & Mfg. Co.	94	Seneca Wire & Mfg. Co., The	93	Wean Engineering Co., Inc.
N		Shafar Bearing Corporation		Front Cover
National Acme Co., The		Shakeproof Lock Washer Co.		Weinman Pump & Supply Co., The.
National Bearing Metals Corp.		Shaw-Box Crane & Holst Division,		Weltron Steel Co.
National Broach & Machine Co.		Manning, Maxwell & Moore, Inc.		Wellman Bronze & Aluminum Co.
National Carbon Co., Inc.		Sheffield Gage Corp.		Wellman Engineering Co.
National-Erie Corp.		Shell Oil Co., Inc.	23	Westinghouse Electric & Mfg. Co.
National Forge & Ordnance Co.		Shenango Furnace Co., The		West Penn Machinery Co.
National Power Machinery		Shenango-Penn Mold Co.		West Steel Casting Co.
National Roll & Foundry Co.	94	Shepard Niles Crane & Holst Corp.		Wheeling Steel Corporation
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Niles Steel Products Div., Republic		Standard Steel Spring Co.		Wood, R. D., Co.
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Nilson, A. H., Machine Co.	95	Stanley Works, The		Worth Steel Co.
Nitralloy Corp., The		Steel & Tubes Division, Republic Steel		Wyckoff Drawn Steel Co.
Norma-Hoffmann Bearings Corp.		Corp.		Y
North American Manufacturing Co.		Steel Conversion & Supply Co.		Yale & Towne Mfg. Co.
Northwest Engineering Co.	75	Steel Founders' Society of America		Youngtown Alloy Casting Corp.
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