#### EDITORIAL STAFF E. L. Shanen Editor-in-Chief E. C. Kreutzberg Editor

WM. M. ROONEY News Editor J. D. KNOX Steel Plant Editor DON S. CABOT Art Editor

#### ASSOCIATE EDITORS

G. H. MANLOVE, W. J. CAMPBELL G. W. BINDSALL, F. R. BRIGGS, D. B. WILKIN, VANCE BELL New York: B. K. PRICE, L. E. BROWNE

Pittsburgh: J. C. SULLIVAN Chicago: E. F. Ross Detroit: A. H. Allen Washington: L. M. LAMM London: VINCENT DELPORT

ASSISTANT EDITORS A. J. FINGULIN, DOLORES K. BLAHA, VIRGINIA B. HARMS, JOHN PARINA JR. H. C. TUTTLE

#### EDITORIAL CORRESPONDENTS

R. W. KINCEY	L. C. FELDMANN
Birmingham Ala	Buffalo N Y
GEORGE R. REISS	SAMUEL S. CARR Cincinnati
MAC HUTCHENS	F. S. TOBIN
St. Louis, Mo.	Toronto, Ont.

MAURICE BEAM 4453 Bel Aire Drive, La Canada, Los Angeles, Calif Robert Bottorff

415 Bush St., San Francisco, Calif. R. C. HILL

408 Marion St., Seattle, Wash.

#### BUSINESS STAFF

G. O. HAYS Business Manager

R. C. JAENKE Advertising Manager New York, E. W. KNEUTZBENG, K. A. ZOLLNER Pittsburgh, S. H. JASPER, B. C. SNELL Chicago, L. C. PELOTT, V. W. VOLK Cleveland, D. C. KIEFER, H. G. ROWLAND Los Angeles, F. J. FULLER

> RESEARCH and PROMOTION J. W. ZUBER, Manager R. L. HARTFORD, Assistant Manager HELEN METZNER, Circulation

PRODUCTION DEPARTMENT A. V. ANDERSON, Manager

MAIN OFFICE

#### Penton Building, Cleveland 13, Ohio

#### BRANCH OFFICES

 New York
 17
 16 East 43rd St.

 Chicago
 11
 520 North Michigan Ave.

 Pittsburgh
 19
 2800 Koppers Bldg.

 Detroit
 2
 6560 Cass Ave.

 Washington
 4
 956 National Press Bldg.

 Los Angeles
 4
 130 N. New Hampshire Ave.

 London
 2 Caxton St., Westminster, S.W.
 1

. .

Published by THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio, E. L. SHANER, Iresident and Treasurer; G. O. HAYS, Vice Fresident and General Manager; R. C. JAENNE, Vice President; F. C. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Ishers' Association. Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year \$6; two years \$10; all other countries, one year \$12. Single copies (current issues) 25c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1946 by the Penton Publishing Co.



The Magazine of Metalworking and Metalproducing VOL. 118, NO. 2 JAN. 14, 1946

#### NEWS-

Administration Moves To Raise Wages, Prices To Avert Strikes	51
Reconversion Stymied	53
New Record Set by Warehouses	54
1946 Is Seen Busiest Peacetime Shipbuilding Year in History	55
Human Element in Production Discussed by Ford	56
Postponement of Steel Deliveries to Struck Plants Involves Small Tonnages.	. 57
West Coast Job Opportunity Program Pushed on Broad Front	58
Carnegie-Illinois Announces New Stainless Steel	59
Bureau of Mines Will Continue Major Metallurgical Programs	65
British Steel Prices Increased To Compensate for Higher Costs	70

#### **TECHNICAL**-

Engineering News-Abstracts from SAE Meeting in Detroit	80
Three Reynolds' Processes for Aluminum Powder Production	82
Important applications found in coatings, chemicals and metallurgy	
Assembling Small Parts on Westinghouse Line	86
Closer control over quality achieved by extremely efficient setup	
How To Select and Use Cast Iron Shanks for Cutting Tools High damping capacity contributes to smooth cutting and finishing	90
Using the "Electric Eye" To Control Cutting Torches Device follows outline of drawn patterns, eliminating templates	94
Zine Extrusions—Physical Properties and Processing Methods Wide variety of new forms and shapes available to manufacturers	96
Methods Employed for Blowing Out Blast Furnaces Survey provides detailed information on efficient practices	109

#### FEATURES-

As the Editor Views the News	47	Men of Industry	74
Present, Past and Pending	55	Obituaries	79
Windows of Washington	60	Industrial Equipment	116
Mirrors of Motordom	67	The Business Trend	132
Activities	72	Construction and Enterprise	158

#### MARKETS-

Steel Industry Set To Go Ahead Under Labor Peace	137
Market Prices and Composites	138
Index to advertisers	168

10

#### NEXT WEEK ....

New Engine Uses Stamped Steel Parts

Economics of Arc Welding-Part I

New Tools for Metallurgical Research

Cold Heading Die Steel

Making Steel Products from Billet-Size Ingots



# As the EDITOR

# **Needed: A Fresh Start**

As this is being written, it is impossible to know whether or not the steel strike scheduled for Monday, Jan. 14, will take place. If the strike is averted, it probably will be because the federal administration will have granted a moderate increase in steel prices, thus permitting the producers to grant an increase in wages that will have been acceptable to the CIO leaders.

If a settlement on this basis is made now or at some future time, it will be an unsatisfactory settlement for numerous reasons. In the first place, in common with many other settlements since V-J Day, it is a compromise dictated by expediency. Secondly, it is based not upon factors pertinent to justice to both disputing parties and to the public, but upon the government's best guess as to how it may get out from under an embarrassing situation with the least loss of face. Also, it is based upon the economic theories of advisers whose predictions since V-J Day have been more wrong than right and for this reason it introduces new cause for fear as to the ability of the administration to cope with inflationary tendencies.

However, assuming that a settlement as outlined has been reached or will be shortly, what next? Is there any reasonable hope that a structure of enduring industrial peace can be built upon the foundation of this settlement?

We think not. Regardless of whether or not temporary peace has been patched up by means of this or any other settlement of expediency, industry and labor should begin right now to build a new foundation for future labor relations. This holds true, regardless of what the settlements in the numerous other pending strikes may be.

The approach should be from an entirely new angle. Almost everything that has happened during the past few years should be thrown into the discard. Responsible representatives of employers and employees should set down their basic requirements in detail and then work toward a common understanding without undue government interference and without attempts to play to the gallery.

Competent representatives, working conscientiously for the interests of their respective groups and realizing that they have many interests in common, could reach agreements that would place labor relations on a plane of sanity. If both sides really put their minds to this task, they can do it.

It is time to discard the Gilbert and Sullivan technique and to apply ordinary horse sense to the job.

# VIEWS the NEWS

are more cautious as to how they will proceed.

A spokesman for NHA says that if the industries interested in housing play their cards correctly, they may be able to increase the consumption of metals per house from an average of five tons to ten tons.

On a potential market of a million new housing units annually for 10 years, this is an impressive increase in metal consumption. It involves not only the use of ferrous and nonferrous metals in prefabricated houses, but also the use of these materials in

**METALS IN NEW HOUSES:** One of the important problems confronting the nation is that of providing millions of homes as quickly as possible. In view of the tremendous opportunities in this field, it is curious that steel manufacturers have been reticent as to their plans in regard to it. Some years ago numerous steel companies spent money liberally in exploring the possibility of introducing more steel into house construction. Today, with an unprecedented market beckoning, they

January 14, 1946

(OVER)

January 14, 1946

appliances and equipment that go into modern houses.

In developing this market, cost will be a primary consideration. Apparently many authorities look to the ingenuity of mass production in connection with metals to offset some of the inherited high-cost operations in the housing field. This is an alluring challenge. -p. 60

**THE FORD EQUATION:** Henry Ford II is a comparative newcomer to the ranks of industrial executives. In this position he may be influenced less by traditional concepts of industrial problems than are some of his contemporaries who have had longer experience.

At any rate, his address before last week's convention of the Society of Automotive Engineers in Detroit will be studied in detail by every industrialist. Mr. Ford said that while American industry has gone a long way in perfecting mechanical operations, it has not successfully written into its equations "whatever complex factors represent man —the human element."

He predicted that if industry can solve the problem of human relations, it will make as much progress toward lower costs during the next 10 years as it made during the past 25 years through the development of the machinery of mass production.

To many employers of the old school the factor of cost reduction as a major incentive for improved labor relations will represent a new approach. It is a point well worth careful consideration.

-p. 56

#### OAKS FROM ACORNS GROW: In

commemorating its 115th anniversary, Fairbanks, Morse & Co. has published an attractive booklet outlining the history of the company. To read its text and to visualize the steps of progress by which the company has grown from a small business with a dozen workers making scales in St. Johnsbury, Vt. to a large organization operating nine plants, manufacturing a diversified line of products and employing thousands of workers is to renew one's faith in the "inventive resourcefulness, self-reliant courage and organizing ability" that have made this nation strong.

Fairbanks, Morse is an excellent example of the traditional American way of developing a strong industrial enterprise from a modest beginning. One wonders what the status of this and scores of similar industrial corporations would be today if they had been compelled to grow up under the restrictive rules which now govern business. —p. 73 SIGNS OF THE TIMES: CPA has modified its inventory control regulations. Now continued receipts of materials are permitted beyond the 30-day period previously allowed (p. 65) wherever this is necessary to bring the resultant inventory up to the minimum needed for the first 45 days after resumption of production halted by work stoppage. . . . Motordom is pondering the real import of the UAW-CIO-Kaiser-Frazer wage agreement. When subjected to cold analysis, the terms represent a liberal deal for Kaiser-Frazer employees (p. 67) which should not be too burdensome on a company of the Kaiser-Frazer size. However, these same terms applied to General Motors, Ford or Chrysler, might be something quite different. Important in the agreement are guarantees against wildcat strikes. ... The minister of supply has ordered an increase of £1 per ton in the base price of pig iron and an increase of about 5 per cent in the prices of rolled steel products (p. 70) to compensate for higher costs incurred by British iron and steel producers. . . . In spite of holiday interruptions and strikes, the automobile industry produced 13,920 cars in the week ending Jan. 5. Three-quarters of this output (p. 132) came from Ford and Chrysler plants. . . . An electronic tracing device, which can be applied to pantograph-type oxyacetylene cutting machines (p. 94), increases accuracy to within a few thousandths of an inch, simplifies steel cutting operations and makes cutting to intricate designs more practical. . . Twelve technical papers dealing with developments in honing, synthetic lubricants, tin substitutes, atomic energy, high temperature alloys and other timely engineering subjects (p. 80), presented at last week's first postwar meeting of the Society of Automotive Engineers, are abstracted in this issue. . . . Of nine million tons of finished steel products received in 1945 by warehouses, more than five million tons, or 59 per cent, were general steel products such as plates, shapes, bars, uncoated sheets and alloys. This high percentage of heavy steel products (p. 54) exceeds comparable figures of previous years by a wide margin. . . . Ground has been broken in Los Angeles for a new automobile assembly plant for Ford Motor Co. (p. 58) to employ 1500 persons and to cost \$4 million. . . . In spite of the sharp drop in merchant ship construction (p. 55), enough vessels are on order to make 1946 the busiest peacetime shipbuilding year in history.

E.L. Aha



# Finer Things Are Coming Out of the Ground

From the ore ranges, the coal fields, and the limestone beds are coming vast quantities of blended iron ore, coking coal, and purest limestone — the principal ingredients for making steel, the "master metal" of our industrial age.

These ingredients are stored in huge stock piles at the Inland docks. Daily, thousands of tons of coal are made into coke, and this coke, with iron ore and limestone, is charged into blast furnaces—the first step in making controlled quality steel—the first step in producing the finer things that come to us from out of the ground.

Inland metallurgists are constantly testing

and re-testing, melting and re-melting, adding one element and taking away another—always seeking for something better. Already they have contributed many new methods and new steels to American industry.

These, and the newer Inland steels which are coming from continued intensive research, will help you meet the needs of America.

Principal Products: Bars, Floor Plate, Piling, Plates, Reinforcing Bars, Sheets, Strip, Structurals, Tin Plate, Rails, Track Accessories. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis. St. Paul.



# Large Stocks of Alloy Steel Available

## Complete Heat Treating Data with Each Shipment

You can get quick shipment of alloy steel right now. Ryerson Stocks—the nation's largest—are in excellent shape.

And you can be sure of exact analysis when your alloy steel requirements are obtained from Ryerson. With *each* shipment complete data sheets are supplied. These sheets give analyses and test results for each alloy in the shipment, and furnish a guide for heat treatment.

Ryerson service is dependable. It deliv-

ers your alloy shipment to your plant when you want it.

The 1945-46 edition of the Ryerson Stock List and Steel Data Book including information on all steel products, has been distrib-

uted, but if for some reason you haven't received a copy, place your request and copy will be sent to you promptly.



JOSEPH T. RYERSON & SON, INC. Steel Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston





Members of the fact-finding board appointed by President Truman to study the dispute between the United Steelworkers and the United States Steel Corp. Left to right: Roger I. McDonough, associate justice of the Utah Supreme Court; Nathan P. Feinsinger, chairman of the panel; James M. Douglas, chief justice of the Missouri Supreme Court. NEA photo

# Administration Moves To Raise Wages, Prices To Avert Strikes

High stabilization officials reported to have overruled OPA in recommending steel advance. Government action forced by prospects for paralyzing work stoppages involving nearly two million. Interpreted as new break in stabilization line

SIGNS that the flood of strikes and threatened strikes which has been blocking a return to high production and employment since the war's end soon may be dammed were appearing at week's end.

Pattern for settlement of the pending disputes appeared to include substantial wage increases for organized labor, although somewhat less than demanded by the unions. To enable industry to meet these increased costs, the government stabilization authorities will permit some increases in controlled prices.

The pattern is hardly satisfactory to any of the parties concerned. It generally is conceded to be a continuation of the policies of expediency which have governed such situations in recent years.

The wage and price increases mean another rupture in the stabilization line. It means a little more inflation and reopens the question as to how far wages and prices may be allowed to go and control over them still retained. The inflationary effects of the action were evidenced in the stock market last week as investors rushed to buy common stocks as rumors of the impending advances leaked out of Washington.

The new wage-price policy has both proponents and opponents in administration circles. Chester Bowles, head of the Office of Price Administration, held out firmly against substantial price increases but was overruled by higher administration authorities, who, confronted with a paralyzing strike situation, strove to solve the problem by giving way on both prices and wages.

When the policy was formulated, the labor picture was perhaps the darkest in the country's history. Nearly half a million workers were still on strike, including nearly 200,000 General Motors employees, who have been idle for eight weeks. A million and a half more were scheduled to stop work if their wage demands were not met. These latter included 700,000 steelworkers, 335,000 meat packers, 200,000 electrical workers and various smaller groups. Altogether, they represented one-ninth of the organized workers in America.

Administration authorities recognized a steel strike alone could paralyze practically all the durable goods industries, employing about 5½ million, in which



Leaders of CIO unions directing present or impending strikes meet in Washington to discuss overall strategy. Seated, left to right: Albert Fitzgerald, president, United Electrical Workers; Philip Murray, president, CIO and United Steelworkers; R. J. Thomas, president, United Automobile Workers. Standing: Lee Pressman, general counsel; Neil Brandt, international representative, United Electrical, Radio and Machine Workers of America; Clint Golden, assistant to the president, United Steelworkers; Van A. Bittner, assistant to the president, United Steelworkers; James Matles, director of organizution, United Electrical Workers; Richard Frankensteen and Walter Reuther, vice presidents, United Automobile Workers; Harold Ruttenberg, research director, United Steelworkers; James Carey, secretary-treasurer, CIO. NEA photo

it is the basic material, within a short time and that its effects would quickly spread to other industries.

It was this realization that led to decision by top administration authorities to permit a steel price increase, unofficially reported at week's end to be \$4 a ton, in the expectation that the union's demands for a \$2-a-day increase would be partially granted in a resumption of bargaining negotiations.

The increase in steel prices is not considered adequate by steel producers who during the war have absorbed labor cost increases amounting to more than \$10 a ton.

An accompanying table shows that wage costs per ton of finished steel rose irom \$16 in 1940 to \$22.10 in 1944, an increase of \$6.10. This was further increased at the beginning of 1945 by the "fringe" wage increases recommended by the National War Labor Board and made retroactive through 1944. During most of the months cf 1945, wage costs per ton of finished

STEEL WAGES, OUTPUT AND PRICES

					Production	
				Finished	finished	Wages per
	Ave, earning	s Total	Ave. weekly	steel price	steel	ton of fin-
	per hour	wages	wage	composite	(net tons)	ished steel
1939	84.2	\$649,917,000	\$29.30	\$57.36	39,067,553	\$16.66
1940		780,922,000	30.77	56.73	48,660,369	16.00
1941	95.9	1,085,541,000	36.01	56.73	62,324,187	17.42
1942	105.6	1,218,203,000	40.07	56.73	62,445,914	19.50
1943	113.5	1,374,078,000	48.80	56.73	63,292,673	21,75
1944	121.9	1,454,254,000	57.13	56.73	65,803,979	22.10
1945						
Jan,		150,266,500	58.81	56.73	5,435,647	27.65
Feb.	125.0	138,414,800	59.00	57.55	5,184,498	26.70
Mar.	127.3	154,976,700	60.34	57.55	6,179,452	25.08
April	126.4	146,954,800	58.78	57.55	5,769,786	25.47
May		154,035,100	60,29	57.73	5,938,055	25.94
Iune	127.2	144,082,600	57.87	58.27	5,437,206	26.50
July	126.9	141,006,400	55.20	58.27	5,214,074	27.04
Aug.	125.3	128,117,000	50.62	58.27	4,512,637	28.39
Sept.	123.4	119,107,500	50.47	58.27	4,391,143	27.15
Oct.	119.6	121,528,100	49.87	58.27	4,660,237	26.08
Nov.	122.0	122,796,800	51.12	58.27		

steel were \$10 or more above 1940.

From 1940 through 1944, steel prices remained constant, STEEL's finished steel price composite standing ut \$56.78, a low level holding over from the 1938 recession. During 1945, minor price inpreases were granted to raise the composite price to \$58.27.

Average hourly wages in the steel industry increased from 85 cents in 1940 to \$1.25 in 1945, or 47 per cent.

Obviously, the steel price increase proposed by the administration cannot compensate producers for the increased labor costs already absorbed and the adjustment in the current dispute.

Earlier the steel industry had asked OPA for an increase of \$7 a ton to offset cost increases already incurred and had stipulated that any wage increase granted now would necessitate further adjustment in prices.

Bargaining negotiations between U. S. Steel and union were resumed last Thursday afternoon at the corporation's New York offices. Representing U. S. Steel were Benjamin F. Fairless, president; John A. Stephens, vice president; and Roger Blough, vice president and counsel. Representing the union were Philip Murray, president; Clint Golden, assistant to the president; and Lee Pressman, general counsel.

# **Reconversion Stymied**

HOW the strike in General Motors plants throughout the country has halted reconversion and blocked the flow of civilian goods to waiting consumers is indicated in a series of pictures. The stoppage, now in its eighth week, has held output of new automobiles to a trickle, and its effects have spread to other industries supplying materials, parts and services to the corporation.

Hundreds of freight cars loaded with equipment and materials for new cars stand idle in yards throughout the Detroit area. Typical of the stagnant transportation is the view at top of cars filled with materials consigned to General Motors at Flint. Among them is one string of 58 cars of steel sheet intended for fenders and other stampings. Because of the strike, these materials cannot be unloaded to release the freight cars for vitally needed reconversion transportation.

At right is a view of a stalled assembly line in the strike-bound Fisher Body plant at Flint.

Below is a representative view of reconstruction and reconversion work which was halted by the strike. Shown is a new unit for Chevrolet at Flint. General Motors has projected an expansion program totaling \$600 million, much of which has been halted by the United Automobile Workers' strike even though many of the workmen engaged on the construction projects belong to other unions.





# New Record Set by Warehouses

Fifty-nine per cent of distributors' receipts in 1945 were heavy steel products, exceeding all previous marks by wide margin

WAREHOUSE distribution of general steel products, such as plates, structurals, bars, uncoated sheets and alloys, in 1945 exceeded all previous records by a wide margin, according to the American Steel Warchouse Association Inc., Cleveland.

Of 9,200,000 tons of finished steel products received in 1945 by warehouses, 5,400,000 tons, or nearly 59 per cent, were general steel products. Previous record for general steel products received by warehouses was 4,210,000 tons, or 46 per cent, in 1941 when total warehouse receipts were the same as in 1945, 9,200,000 tons. In 1944, warehouses received 4,107,000 tons of general steel products, which made up 51 per cent of the total shipments of 8,008,-000 tons to warehouses that year.

Although total shipments to warehouses in 1945 are estimated at the same total as in 1941 the shipments in 1945 were 16.6 per cent of the total output of 56 million tons of finished steel mill products, as compared with 14.7 per cent of 62,500,000 tons in 1941.

In addition to receipts of 5,400,000 tons of general steel products in 1945, warehouses received 3,800,000 tons of merchant steel products which include merchant pipe and tubular products, wire rods, drawn wire products, tin plate and terne plate and galvanized sheets. The figures do not include any surplus steel delivered to warehouses.

Shipments to warehouses in the past five years are shown in the accompanying table.

Because of severe restrictions on products and sales of merchant steel products during the war, it is reasonable to assume, the association said, that pent-up demand for these items may be relatively greater than the need for the heavier industrial steel products. "Had it been possible for warehouses to meet these requirements for merchant steel products



WARPLANES SALVAGED: Thousands of aircraft engines which powered the United States attack on the Axis lie idly in neat rows at this airfield in Kingman, Ariz., with their propellers stacked behind them. The engines will be scrapped as they are now obolete. NEA photo

since V-J Day, to the same extent that they have taken care of industrial consumers, total shipments to warehouses in 1945 undoubtedly would have reached an all-time record figure considerably in excess of 10 million tons.

"The figure cited for the war period, including all of 1941 and 1945, demonstrate the splendid co-operation by sources of supply with their warehouse customers, particularly during the first and last years of the period, as well as the efficacy of the Controlled Materials Plan in 1943 and 1944," the association said. "In view of this record, if the steel mills continue to share their available output with their regular customers as they did during 1941 and are presently doing, warehouses should receive a fair and equitable share of available tonnages.

"Mill order books which are filled many months into the future and unabated clamors for all kinds and types of steel mill products continue to puzzle even the most experienced observers," the association stated. "This pressure for steel has been bolstered by the threat of an allout steelworkers' strike in January. Markets which normally account for bulk tonnages are, for the most part, either

Year	Total Production of Finished Steel Mill Products	Total Shipments to Warehouses	Per Cent of Total Production	General Steel Products	Merchant Steel Products
1945°	. 56,000,000	9,200,000	16.6	5,400,000	3,800,000
1944	. 60,000,000	8,008,000	13.3	4,107,000	3,901,000
1943	. 60,000,000	6,800,000	11.3	3,496,000	3,304,000
1942	60,500,000	6,000,000	11.2	3,120,000	2,880,000
1941	. 62,500,000	9,200,000	14.7	4,210,000	4,990,000
PEctimated					

normal or subnormal. The automotive industry is consuming only dribbles of steel and prospects of its assuming its position as a first-rank customer of the steel industry in the immediate future are not too bright.

"Rumors that motor car builders are storing huge quantities of sheets can be largely discounted," the association declared. "Shipbuilding demands have dropped to nil. The construction industry has few sizable projects under way and not many of consequence in the offing. While railroads are building some new equipment and have some maintenance programs on hand, their needs do not account for impressive quadtities of steel. Export customers are not being favored.

"Either huge and mysterious inventories are being accumulated or mill order books are being inflated with duplicate and triplicate orders," the warehouse association declared. "If this is not true, then there is occurring in industry a phenomenon which neither practical steel men nor theoretical economists can fathom.

"This steel is not going into warehouse inventories. Distributors' stocks are declining sharply. Distributors, too, are confronted with inflated orders reminiscent of the hectic weeks of 1941 when warehouse orders jumped from pounds to tons and from truck loads to car loads.

"As producers reject or quote extended deliveries on smaller orders, the load on the warehouses increases. Stocks of all kinds of coated and uncoated sheets are virtually depleted. From day to day more and more bar racks are being emptied. Despite all the efforts distributors make to hold their shipments to normal quantities for immediate requirements, their inventories are shrinking and becoming unbalanced," the warehouse association pointed out.

Possibilities of a resumption of steel allocation by federal agencies have disquieting aspects, the association said. "The efficient mechanism for doing such a task, built up during the war, has been dissipated."

Considering possible increases in steel prices, the warehouse association said distributors will be required to absorb these advances in steel mill prices unless they can demonstrate that their current profits, after such absorptions, are less than profits in the base period. 1936-1939, inclusive.

Fears that surplus stocks of steel will overhang and threaten warehouse markets for years to come are not justified, the association asserted.

#### Steel Corp. Shipments in December Show Increase

Finished steel shipments by the United States Steel Corp. in December totaled 1,459,803 net tons, an increase of 113,396 tons from the 1,346,407 tons shipped in November and a decrease of 307,797 tons from December, 1944, shipments of 1,767,600 tons. For the year ended Dec. 31, 1945, before yearend adjustments, shipments totaled 18,484,277 tons, compared with shipments after adjustments of 21,052,179 tons in 1944.

(Inter-company shipments not included)

		Net To	ns	
	1945	1944	1943	1942
Jan.	1,569,115	1,730,787	1,658,992	1,738,893
F.ep.	1,562,488	1.755.772	1 691 592	1 616 587
Mar.	1,869,642	1.874.795	1 772 397	1 780 939
Apr.	1,722,845	1,756,797	1 630 828	1 759 994
May	1,797,987	1 776 934	1 706 542	1 934 107
June	1,602,882	1 737 769	1 552 662	1 774 009
July	1,608,994	1 754 525	1,552,005	1 765 740
Aug.	1.332.180	1 743 495	1,000,102	1 700 050
Sept.	1.321.576	1 733 602	1 664 577	1,100,000
Oct.	1.290.358	1 774 060	1 704 022	1,703,570
Nov.	1.346.407	1 743 752	1,134,900	1,101,001
Dec.	1,459,803	1 767 600	1,000,094	1,000,040
		1.101,000	1,119,024	1,849,655
Total	18,484 277	21 150 799	20 044 920	01 004 157
Adjus	t-	*1,100,100	20,244,830	21,004,157
ment		*02 600	807.914	8440.000
Total		21 052 170	50 147 616	~449,020
		21,002,119	20,147,616	20,010,137
°De	crease.		1. 321	

#### Surplus Property Disposals Exceed \$1 Billion Mark

Cumulative disposals of surplus property through Dec. 15 passed the \$1 billion mark, Surplus Property Administration announced recently. Proceeds from disposals totaled \$525 million, or a little over one-half of the reported cost of the property sold. By Dec. 15, acquisitions of probably salable surplus property totaled \$7404 million.

# 1946 Is Seen Busiest Peacetime Shipbuilding Year in History

Enough vessels are on order from private operators to assure high-level activity in yards despite sharp cutback from wartime schedules. Number of ships contracted for private account totals 62

DESPITE the heavy drop in merchant shipbuilding as a result of the ending of the war, enough ships are already on order by private operators for construction and delivery this year to make 1946 the busiest peacetime shipbuilding year in American history, according to J. Lewis Luckenbach, president, American Bureau of Shipping, New York city.

He disclosed recently that the bureau has a list of 62 vessels of more than 2000 gross tons for which contracts have been signed. These ships are in addition to 30 which will be completed this year for government account as part of the war emergency shipbuilding program.

The bureau's list does not include the proposed construction of 11 combination passenger liners outlined by the Maritime Commission at the November meeting of the American Society of Naval Architects or the four cargo vessels on which bids were recently opened by the commission.

The 62 vessels, contracted for private operation, will total 475,715 gross tons and 635,800 deadweight tons. They include 17 combination passenger and cargo carriers; 13 refrigerated cargo ships; 2 tankers; 3 bulk ore carriers; and 26 other types of cargo ships.

The war emergency shipbuilding program, he said, has already been "practically completed." Vessels still to be delivered to the Maritime Commission include 3 combination lumber and cargo ships; 5 twin screw Navy type oil tankers; 10 C14 type cargo ships; 10 C2 cargo ships and 2 special type cable laying vessels.

American yards will also complete this year for Holland and Brazil, 24 oceangoing cargo ships, 164,400 gross tons and 225,000 deadweight tons.

# Present, Past and Pending

#### GM FACT-FINDING BOARD SUGGESTS 191/2-CENT RAISE

WASHINGTON—An increase of 19½ cents an hour for General Motors employees was recommended by the President's fact-finding board. This would represent an advance of 17½ per cent, compared with the union's demand for a 30 per cent increase.

#### **FARM MACHINERY PRODUCTION INCREASES**

WASHINGTON—Farm machinery production increased to \$55 million in November, a gain of \$2 million over October. Continued uptrend is dependent upon a steady flow of components and upon avoidance of shutdowns in assembly plants.

#### **OUTPUT OF STEEL AND PIG IRON IN SOUTH DECLINES**

BIRMINGHAM—Southern production of steel ingots during 1945 declined to about 3,044,000 tons from 3,430,000 in 1944 while that of pig iron dropped about 250,000 tons to 3,750,000, according to preliminary estimates.

#### HEAVY INDUSTRIAL CONSTRUCTION IN EAST FORECAST

NEW YORK—A tremendous upsurge in industrial construction was forecast last week for the eastern United States by Wells N. Thompson, vice president, H. K. Ferguson Co. He said almost every plant in the eastern district is a potential expander.

#### **ICC AUTHORIZES RATES ON MANGANESE SHIPMENTS**

WASHINGTON-Interstate Commerce Commission has authorized carload commodity rates on shipments of manganese and manganese ore from points in Montana to destinations in Virginia, West Virginia, Pennsylvania, New Jersey, New York, Connecticut and Massachusetts.

#### SPOKANE ALUMINUM PLANTS TO CLOSE JAN. 20

SPOKANE, WASH.—Aluminum Co. of America will complete current operation Jan. 20 at its two aluminum plants here. Mead reduction plant and Trentwood rolling mill are being maintained by General Machinery Co. for Reconstruction Finance Corp.

#### SAE CONVENTION

# Comprehension of Human Element In Production Urged by Ford

Ford Motor president tells automotive engineers at Detroit convention problem of human relations must be solved to assure industrial progress. Preview of many automotive technical developments presented at meeting

#### DETROIT

HOTELS in Detroit and vicinity were filled to overflowing throughout the week of Jan. 7 as a result of the first full scale convention of the Society of Automotive Engineers in many months. Although as usual for many years, the Book-Cadillac Hotel was headquarters for this annual meeting, more than 2000 requests for places at the banquet on Wednesday evening required that this event be held at the Detroit Masonic Temple. Several hundred more came in after the tables were removed.

Guest speaker on this occasion was Henry Ford II, president, Ford Motor Co. Mr. Ford, who was introduced by W. J. Davidson, administrative officer, General Motors Technical Center, General Motors Corp., Detroit, made some highly significant comparisons between the achievements in America in mass production, as far as its mechanical phases are concerned, and the much less praiseworthy situation as far as the human side of the picture is concerned.

"Machines alone do not give us mass production," said Mr. Ford. "Mass production is achieved by machines and men. While we have gone a very long way toward perfecting our mechanical operations, we have not successfully written into our equations whatever complex factors represent man—the human element.

"I am suggesting, therefore, that we try to rewrite the equation to take into account the human factor. If we can solve the problem of human relations in industrial production, I believe we can make as much progress toward lower costs during the next 10 years as we made during the past 25 years through the development of the machinery of mass production.

"I assume that all of us agree that labor unions are here to stay. Certainly we of the Ford Motor Co. have no desire to break the unions—to turn the clock back to the days which sometimes look in retrospect much more attractive than they really were. The truth of the matter is that the unions we deal with rose out of the very problems we are discussing. Namely, the human problems inherent in mass production.

"What is needed today is industrial statesmanship—from both labor and management. Instead, we have a tradition of industrial antagonism. Men who in their private lives would not think of entering into a brawl on the street,

#### Calendar of Meetings .

Jan. 14-17, American Road Builders' Association: Forty-third annual convention, Stevens Hotel, Chicago. James J. Skelley, International Bldg., Washington 4, president.

Jan 16-19, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. John C. Stevens, Portland, Oreg., is president. The society's address is 33 West 39 St., New York.

Jan. 19, American Electroplaters Society, Chicago branch: Nickel plating symposium, Palmer House, Chicago.

Jan. 20-22, Institute of Scrap Iron & Steel Inc.: Eighteenth annual convention, Congress Hotel, Chicago. Edwin C. Barringer, 1536 Connecticut Ave. N.W., Washington, president.

Jan. 23, Association of Steel Re-Distributors: Board of Directors and MidWest Region meeting, Congress Hotel, Chicago.

Jan. 28-30, American Society of Heating & Ventilating Engineers: Fifty-second annual meeting, Hotel Commodore, New York. A. V. Hutchinson, 51 Madison Ave., New York 10, is secretary.

Feb. 4-7, American Welding Society: National meeting, Hotel Cleveland, Cleveland. Miss M. M. Kelly, 33 W. 39 St., New York, secretary.

Feb. 4-8, American Society for Metals: Twenty-seventh National Metal Congress and Exposition, Public Auditorium, Cleveland. William H. Eisenman, 7301 Euclid Ave., Cleveland, secretary.

Feb. 4-8, American Institute of Mining & Metallurgical Engineers: Iron & Steel and Institute of Metals Divisions meeting, Hotel Statler, Cleveland. A. B. Parsons, 29 W. 39 St., New York 18.



L. RAY BUCKENDALE

have found themselves blasting each other in the public press by colorfulname calling. This tradition has given rise in some circles to the theory that open conflict is inevitable. I have even heard that strikes are supposedly helpful in so-called clearing of the atmosphere.

"With such unhappy theories, I do not hold. Modern man—who has done so much to reduce manpower losses due to disease—can certainly hope to reduce manpower losses from industrial conflict. Public interest requires that we find ways to eliminate industrial warfare without impairing or diminishing the rights which both management and labor must continue to enjoy."

At this banquet L. Ray Buckendale, president of SAE for 1946-47 was introduced to the membership. Mr. Buckendale, who is engineering vice president, Timken Detroit Axle Co., is the first Detroit born and Detroit educated president of the society.

During wartime meetings of SAE there (Please turn to Page 154)

#### Steel Scrap Prospects To Be Discussed at Meeting

"What's Ahead for Iron and Steel Scrap and its Consuming Industries" will be discussed by five leaders of industry at the opening session of the eighteenth annual convention of the Institute of Scrap Iron & Steel Inc. at Chicago, Jan. 21.

T. W. Lippert, editor of *The Iron Age*, New York, will bring the convention up-to-date on market developments. He will be followed by Newman Ebersole, the American Rolling Mill Co., Middletown, O., discussing the outlook for scrap at blast furnaces; James D. Sloan, the Youngstown Sheet & Tube Co., Youngstown, O., for open-hearth furnaces; Herman Schultz, Carnegie-Illinois Steel Corp., Chicago, for electric furnaces; and Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., for foundries.

These addresses, according to Edwin C. Barringer, president and executive secretary of the institute, are designed to provide iron and steel scrap dealers with the background of the requirements that will be made upon them as far into 1946 as can be foreseen. Preparation of scrap as well as tonnage will be discussed.

#### Prices and Wages Raised In Soil Pipe Industry

Price and wage increases in the cast iron soil pipe and fittings industry have been approved, respectively, by the Office of Price Administration and the National War Labor Board.

NWLB's Wage Stabilization Division has approved a collective bargaining agreement for a wage increase of 10 cents an hour, effective as of Dec. 31, making the common labor rate 65 cents and molders' rate \$1.20 an hour, affecting 3000 employees of 9 companies, represented by the Southern Soil Pipe Manufacturers Negotiating Committee; and for a 10 per cent increase in hourly and piece rates, effective as of Nov. 5, making the common labor rate 75 cents an hour and the molders' rate \$1.05 an hour, affecting 800 employees of 8 foundries, represented by the Northern Soil Pipe Manufacturers Negotiating Committee.

The price increase grants a raise of 8 per cent, or \$6 per ton, in the maximum price for sales of cast iron soil pipe and fittings over and above the increases of 4 per cent authorized by OPA last September and of 6 per cent granted in June.

## Postponement of January Steel Deliveries To Struck Plants Involves Small Tonnages

GENERAL Motors Corp. and other firms whose plants have been closed by work stoppages occurring before Dec. 6 have requested postponement of deliveries of critical materials during the balance of this month. In the case of General Motors, no blanket order has been issued but delivery of materials, such as sheet and strip steel, under specific orders has been postponed.

This action is required by direction 6 to priorities regulation 32, as amended Dec. 29, if receipt of such deliveries would raise inventories above permitted levels. A plant closed by a work stoppage may receive, for instance, up to a total 45-day supply of sheet steel but only a 30-day supply of pig iron or solder.

Production of materials in process will be completed in those instances where the material cannot be used by other consumers and deliveries will be made as originally scheduled. The amount of critical materials made available to the mills for January shipment to other consumers will vary widely, therefore, and in the case of steel products will be comparatively small. However, the effect of the order on available supplies in February and subsequent months probably will be more noticeable.

By the 15th of each month, as long as the work stoppage continues, the plant must postpone or cancel all orders of critical materials for delivery in the following calendar month, unless its inventories are below the maximum level.

Suppliers are not taking uniform action in regard to production of critical

#### STEEL INGOT PRODUCTION STATISTICS

Based on reports by companies which in 1944 made 97.9% of the open hearth, 100% of the bessemer and 86.7% of the electric ingot and steel for castings production

	-Open H	earth-	Estimated — Bes	Produc	tion—All	Compan	les	otal	Calculated weekly produc-	Num- ber
	37.4	Per cei	nt	Per cei	nt	Per cen	t	Per cent	tion, all	01
	tone	01	Net	of	Net	of	Net	of	companies	weeks
Jan	E ten ata	capac.	tons	capac.	tons	capac.	tons	capac.	Net tons	in mo
Feb.	0,455,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
Mar.	6 907 277	92.4	347,227	77.1	339,520	81.1	6,654.589	90.8	1,663,647	4 00
1st ate	10 201 001	96.9	398,351	79.8	382.237	82.4	7,707,965	95.0	1,739,947	4.43
Anu	19,364,034	93.3	1,124.640	77.6	1,080,103	80.2	21,568,777	91.6	1.677.199	12.86
Man	6.541,097	94_4	372.952	77.2	377.877	81.4	7.291.926	92.8	1.699.750	4 29
Juna	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4 43
2nd -to	0,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,594,939	4 29
zini qir.	19,333,940	92.1	1,154,859	78.8	1,097,169	80.6	21,585.968	90.6	1,659,183	13.01
Ist hif.	38.697.974	92.7	2,279 499	78 2	2 177 272	80.4	43 154 745	91.1	1 668 139	25.87
July	6,318,463	88.6	391 990	76 7	006 712	61.0	6 097 009	96.2	1 590 771	4.49
Aug	5,171.925	72.3	347.088	69.5	217 363	46.9	5 736 376	70.7	1 294 893	4 43
Sent	5,435,358	78.7	352.847	73.2	195,156	43.5	5,983,361	76.3	1.397,982	4.28
3rd gtr.	16,925,746	79 9	1 081 767	73 1	600 232	50.9	18 706 745	77.8	1 424 733	13 13
9 mos.	55.623 720	00 0	2 201,101	BOE	035,252	00.0	10,100,1400	00.0	1 800 100	20,00
Oct.	5 140 070	00.3	3,301,200	76.5	2,876,504	70.4	61,861,490	80.0	1,000,194	39.00
Nov	5,140,370	72.0	242.122	48.5	209,290	45 1	5,597,782	69.0	1,263,608	4.43
Dec.	5 546 150	81.5	358,664	74.2	201,866	44.9	6,201,380	78.9	1,445,543	4.29
4th atr	16 222 200	11.1	344,092	69.1	194,685	42.1	6,084,929	15.2	1,376,681	4.42
Loct his	10,333,372	77.0	944,878	63.8	505,841	44.1	17,884,091	74.3	1,361,042	13.14
That III.	33,259,118	78.4	2,026,645	68.5	1,305,073	47.5	36,590,836	76.0	1,392,875	26.27
Total	71,957,092	85.5	4.306.144	73.3	3.482 345	63.8	79.745.581	83.5	1.529.451	52.14
For	3046				-,,					-

For 1945 percentages are calculated on weekly capacities of 1.614.338 net tons of open hearth 112.658 tons of bessemer and 104.640 tons of electric ingots and steel for castings, total 1.831.636 tons; based on nannual capacities as of Jan. 1, 1945 as follows: Open hearth 84,171,500 net tons, bessemer 5,874.000 tons, electric 5,455,890 tons. materials for future delivery to plants now closed by work stoppages. In most instances they have not received cancellation of orders and, therefore, will place them on production schedules at the normal time. If postponement or cancellation of a delivery order subsequently is received, production of the material in process will be completed and the finished product shipped, if it cannot be used to fill other orders.

In the case of work stoppages occurring on and after Dec. 6, which are still in effect, the plant must postpone or cancel by the 30th day of the work stoppage all orders for delivery in the current month, if receipt of such deliveries would raise inventories above the maximum permitted level. Also, by the 30th day of the work stoppage, or the 15th day of the current month, whichever is later, and by the 15th of each month thereafter as long as the work stoppage continues, the plant must postpone or cancel all such orders for delivery in the following calendar month.

CPA is not considering the allocation of domestic steel supplies. While an extremely tight situation prevails in most classes of steel products, the government agency believes that equitable distribution of steel under present circumstances can best be made by the industry itself, as it is doing at present. The allocation of tonnages for export for rehabilitation work in Europe, requiring an estimated minimum amount of 850,-000 tons in the first half, will be made on a voluntary basis by the producers.

#### Steel Output Down in 1945 But Tops Peacetime Years

Production of 79,745,581 net tons of ingots and steel for castings in 1945, while well above the highest for any peacetime year, was almost ten million tons below the record production of 89,-641,600 tons produced in 1944, according to the American Iron & Steel Institute, New York. Average operating rate for the year was 83.5 per cent of capacity, compared with 95.5 per cent in 1944. Calculated weekly production was 1,529,451 tons in 1945.

First half production was only two million tons below output for the corresponding portion of 1944, but in second half of 1945 it was down about eight million tons from last half of 1944.

Fourth quarter output of 17,884,091 tons was lowest of the year. December production was 6,084,929 tons.

# Job Opportunity Program Pushed On Broad Front

Government employment official lists objectives in campaign to attain first quarter job goal in Pacific Coast area

#### SAN FRANCISCO

ATTAINMENT of West Coast employment goals in the first quarter of 1946 will depend largely on success in reaching three main goals, according to F. W. Hunter, regional director of the U. S. Employment Service.

Mr. Hunter lists these objectives as follows:

1—To provide new jobs by accelerating expansion of western industries, trades and services.

2-To take emergency action to relieve housing shortages which are hampering reconversion and employment.

3—To break the bottlenecks of material shortages by increasing stockpiles needed to provide more jobs. These shortages chiefly are in lumber, metals, rubber and fabricated articles.

During the first 11 months of last year, USES offices in the five western states placed 1,418,166 workers in jobs, a record for placements. These were divided: California, 958,000; Washington, 230,000; Oregon, 140,500; Arizona, 54,415; Nevada, 30,211.

For the full year 1945, Mr. Hunter estimates that the 185 USES western offices brought the total placement figure to 1,500,000, or approximately one-half of the western labor force.

Difficulties now facing job placement officials include the fact that employers and employees are more selective than during the war, Mr. Hunter says. For example, in November, the latest available month, USES offices made 1,509,-617 contacts, about double the number in August.

Although at present about 70,000 job openings are listed by the USES in West Coast industrial areas, three principal factors are delaying filling them:

Jobs offered are not acceptable to workers who became accustomed to high wartime wages.

Employers have set higher standards for their peacetime labor force.

Jobs calling for higher skills or substandard working conditions are not being filled from the present available labor market.

Mr. Hunter believes this paradoxical



START WEST COAST PLANT: Benson Ford, director of the Ford Motor Co., and Mrs. Ford turn the first spadeful of earth at a ceremony starting the new Ford assembly plant in Los Angeles. Others in photo, left to right: William Smith, county supervisor; Fletcher Bowron, mayor of Los Angeles; Nelson Bowe, Ford's Long Beach plant manager

situation may be relieved during 1946 when displaced war workers with upgraded skills return to former types of employment and veterans seek permanent jobs.

#### Ground Broken for New Ford Plant at Los Angeles

LOS ANGELES Ground was broken recently for the Ford Motor Co.'s new \$4 million plant in Los Angeles. The ceremony marking the event was held on a 36-acre tract at Slauson and Eastern avenues in the central manufacturing district. There, Benson Ford, a director of Ford Motor Co. and a former captain in the Army Air Forces, turned the first soil, using a chromium-plated spade.

The plant will be designed for assembly of Mercury and Lincoln cars and is scheduled for completion in six months. Its capacity at first will be 250 automobiles a day, with employment for 1500.

Equipment will include three singlestory steel and reinforced concrete buildings and a one-mile testing track. The assembly and parts depot building will be 300 ft x 840 ft, and the other structures will house offices, showrooms, oil and paint storage and garage facilities. The factory is part of the company's \$175 million postwar expansion program.

Prior to the ceremony, Mr. and Mrs. Ford met with Los Angeles government heads and industrial leaders. They were introduced by Nelson F. Bowe, manager of the company's plant at Long Beach, which will continue to operate in addition to the new factory.

Mayor Fletcher Bowron of Los Angeles, County Board Chairman William A. Smith, LeRoy M. Edwards, president of the city's Chamber of Commerce, Leonard K. Firestone of the Firestone Tire & Rubber Co., and James F. Bone, manager of the chamber's industrial department, were among local leaders who attended the ceremony.

#### U. S. Steel Still Considered As Bidder for Geneva Mill

#### LOS ANGELES

Wholly unconfirmed but persistent rumors continue on the West Coast that United States Steel Corp. will place a bid for the Geneva steel mill in Utah, now offered by the Surplus Property Administration. It also is believed that if the corporation does bid, it will be an offer to purchase the plant rather than lease it.

Up to this writing the SPA office

has not received any bids or inquiries since it called for offers about three weeks ago.

It is a common belief in steel quarters here that the maximum number of bids will be four, but, of course, there may be none. In addition to U. S. Steel, the other three most frequently mentioned are Colorado Fuel & Iron Corp., the Henry Kaiser interests and a syndicate of Utah industrialists.

#### New Co-operative Group Formed by Industrialists

California industrialists formed a new "co-operative front" recently at a meeting in Los Angeles when the California Manufacturers Association was organized, with K. T. Norris, head of the Norris Stamping & Mfg. Co., as president.

The new organization is a consolidation of the Aircraft Parts Manufacturers Association and the old California Manufacturers Association. It starts with a membership of about 600, with its prime objectives "the setting up of a broad, united and co-operative front for California to promote solidarity between Northern and Southern California and eliminate sectionalism between the two areas,"

Two offices will be maintained, one in Los Angeles and the other in San Francisco. Headquarters will be in Los Angeles.

The roster of officers includes T. W. Norris, Livermore, Calif., and M. B. Pendleton, Los Angeles, first and second vice presidents, respectively; John Parker, San Francisco, secretary; and Emerson Spear, Los Angeles, treasurer.

On the board of directors are O. H. Fischer, Oakland; A. C. Carrington, Alameda; Alexander DeBretteville, San Francisco; T. T. Arden, Lynwood; J. D. Grant, Stockton; J. R. Miller, Oakland; H. H. Sawyer, Napa; H. C. Thomas, Pasadena; Paul Davies, San Jose; W. J. Boyle, Los Angeles; John B. Rauen, Los Angeles; E. R. Doak, Torrance; and J. D. McDonald, Los Angeles.

#### Los Angeles Shipbuilding & Drydock Corp. Is Sold

Physical assets of the Los Angeles Shipbuilding & Drydock Corp. were sold recently to the Todd Pacific Shipyards Corp., for \$1,250,000 plus acceptance of the Navy Department's offer of settlement for seizure of the company's plant in 1943 for \$1,114,553.

Announcement of the sale followed a stockholders' meeting of the drydock corporation.

## Carnegie-Illinois Announces New Stainless Steel That Is Expected To Find Wide Use

A NEW multiple-purpose steel which is expected to have wide application in industry was announced last week by Carnegie-Illinois Steel Corp., subsidiary of United States Steel Corp.

Known as "Stainless W," the new steel indicated in preliminary commercial applications its usefulness where strength, hardness, and corrosion resistance, all or in part, are essential, according to J. L. Perry, president of Carnegie-Illinois. The new steel was perfected and patented by research technicians of the Carnegie-Illinois Wood Works, McKeesport, Pa.

Experience during the war with this new steel demonstrated that it can be treated successfully in standard equipment and that no difficulty is encountered through warping or dimensional changes in hardening operations. It is readily fabricated, and high joint efficiencies may be achieved by spot welding, as well as with metallic arc, atomic hydrogen and heliarc welding equipment. Machinability, as proved by shop tests, is slightly better than with austenitic 18-8 stainless steel.

#### Wide Use Expected

Stainless W is expected to find wide application in wrought and cast forms in the machinery field, and is available also in strip, sheet, wire and tube form. It is expected to be useful in cams and rollers in food handling and bottling equipment. It also shows promise for application in bearings, pump valves and seats, plug valves and other parts subjected to service in food as well as oil and chemical industries. Its strength and corrosion resistance promise further advantages for structural members.

Of the chemical elements in the new steel, titanium is said by Carnegic-Illinois metallurgists to give it its prime distinction, the optimum proportion of this element being found in the range of 0.40 to 1 per cent. In addition to titanium, for which columbium may be substituted at will to produce precipitation hardening, and iron, Stainless W contains carbon, nitrogen, manganese, silicon, nickel, chromium and aluminum.

Stainless W is magnetic, said R. E. Zimmerman, vice president of United States Steel Corp. in charge of research and technology. "We also know that it can be subjected to drawing operations and given intermediate annealing as often as desired in the course of forming and then given a thermal age-hardening treatment to develop high physical properties on the entire piece. This characteristic," Mr. Zimmerman pointed out, "makes the steel a promising material for parts requiring forming and ultimate high strength in the finished piece."

Stainless W can be rolled into billets, bars, sheets or shapes, drawn into wire or pierced for tubing, or it may be wrought as desired to any shape or size. The finished product is amenable to heat treatment to develop uniformly high hardness throughout large cross sections. In addition, it possesses high resistance to most corrosive media.

#### Northern States Fight Freight Rate Revision

Development agencies of 13 northeastern and north central states have adopted a resolution attacking as "discriminatory" the freight-rate revision ordered by the Interstate Commerce Commission last May to become effective Jan. 1, 1946.

The resolution says that the ICC decision was "a dangerous threat to the economic well-being of the entire nation" and that the order, increasing freight rates on manufactured goods by 10 per cent in the North and reducing them by 10 per cent in the South and West, was adopted after years of "political agitation by the South."

It was also declared that the order places "arbitrary and artificial burdens amounting to millions of dollars on the northeastern and north central states."

A federal court ruling handed down in December temporarily staying the ICC order will afford relief, pending final adjudication of a petition by the northern states.

The resolution was adopted by official development agencies of New York, New Jersey, Pennsylvania, Indiana, Maryland, Michigan, Ohio, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

#### RFC Reports Good Response To Tool Disposal Plan

Reconstruction Finance Corp. reports a large response to its proposal to appoint approved dealers to sell surplus government-owned machine tools and allied equipment on a 12½ per cent commission basis. Seven hundred eightyone applications had been received as of Dec. 31 and of these 250 had been approved and six rejected.

# windows of **WASHINGTON**

# Use of Metals in Postwar Homes May Rise to Ten Tons Per Unit

Housing technician warns new products must be made by mass production methods and sell at moderate prices and that metals must be employed only where investigation has demonstrated they will prove satisfactory

POSTWAR homes may well use a larger amount of metals than those built before the war in the opinion of housing experts. C. W. Farrier, technical director, National Housing Agency, says that by the exercise of production and sales ingenuity the average consumption of metals per house may be increased from the present five tons to close to ten tons.

However, metals firms that hope to share in the huge postwar housing program—the NHA estimates that to meet the country's requirements new housing will have to be built at a rate of 1,000,-000 to 1,250,000 units annually over the next ten years—will have to bear two factors in mind.

First, the new products will have to be made by mass production methods, and they will have to be made available to builders through efficient systems of distribution set up to render adequate service at low cost. This is very important, says Mr. Farrier, since the main consideration in government planning in connection with postwar housing construction is to encourage use of quality materials and building methods at costs which will be substantially lower, on a comparative basis, than home building costs have been in the past.

Not only will such a trend encourage home construction and give a boost to all businesses that benefit from home building, but it will benefit most other lines of business. When a family is able to buy a home for a smaller portion of its income over a period of years, it will have more purchasing power to satisfy other needs and desires—and the result will be greater production and employment in the rest of the economy.

Second, the new products should be made of metals only when investigation has demonstrated that the metals will perform satisfactorily in these uses. Several serious objections have arisen from use of metal in home construction. "The worst trouble has been encountered where steel floor joists or other steel members are set in the outside walls," says Mr. Farrier. "Steel is a fine conductor of heat and we have one defense housing project where cold spots occur at places where the joists come in contact with the ceilings. Living in these houses in the winter is a good deal like living in a shower bath; moisture in the air condenses and drips off these cold spots.

"But that is not all. The portions of the joists in contact with the ceilings have been attacked by the moisture and have rusted so badly that they have lost about 15 per cent of their original weight. That same condition is found wherever steel sections are set in the outside walls. We estimate that in an apartment building built as a wartime project in Washington the corrosion is proceeding at a rate which will lead to collapse of the floors in about 15 years from the time of erection. No paint yet made available protects the steel against this attack which is especially virulent because the vapor that does the damage really is distilled water. Galvanized steel has been tried but the moisture has caused the zinc to scale off the steel.'

#### New Type Steel Beams Being Tried

Unless new methods of construction are devised, or adequate insulation developed, Mr. Farrier believes that steel floor beams will be unacceptable for home construction. Some further investigations are being made toward this end. A house at Arlington, Va., at present is being built with a new type of steel floor beam made by forming and welding steel rods and strip, and wrapping the ends of the beams heavily with roofing felt.

Mr. Farrier does not see similar objections to the use of prefabricated steel beams and other members in other types of buildings. A lot of moisture is gen-



C. W. FARRIER

erated in homes, he points out, in such operations as cooking, bathing, heating water, drying and ironing clothes. This condition does not occur in many types of buildings—as in filling stations where open doors prevent accumulation of moisture-laden inside air, and in steel restaurant buildings from which the air continually is exhausted by fans.

Opposition also has been encountered in some cases because the use of steel building members has resulted in objectionable noises.

"Light steel sections are not precision products," says Mr. Farrier, "and they not only undergo some warpage during shipment and installation, but they are flexible and give or vibrate with different stresses, as when the wind blows and when the occupants of the home walk about. As a result there is drumming and banging, and tinny noises and rattles that are difficult to combat."

Use of sheet steels for wall construction in homes must be along intelligent lines, says Mr. Farrier. In addition to noises and condensation of moisture in cold weather, he says, discomfort results when the sheets are not carefully insulated. "Rapid heat transmission," he says, "results in rapid loss of radiant heat from the human body, so that a person under this condition gets the impression of being subjected to a chill from standing in a draft. It is important from the standpoint of comfort to keep the steel in walls as near to room temperature as possible."

Porcelain-enameled steel sheets, despite the satisfactory service they have given as exterior walls in many types of buildings, have not worked out so successfully in home construction, says Mr. Farrier. "It is difficult to prevent the porcelain coating from being damaged. If it is not damaged during installation, it may craze or crack when boys throw a stone or a baseball or when the householder strikes against the side of the house with his lawn mower. And repairs in such cases often are made with some difficulty."

But even after eliminating the above uses, Mr. Farrier told STEEL, there are many opportunities for the metals in the field of home construction.

"There should be a good market for steel and aluminum doors and windows. Closets, wall cabinets, storage walls with drawers and bookshelves, staircases, interior walls, outside porches, whole bathrooms, whole kitchens and whole heating plants can be prefabricated, or can be built by assembling prefabricated metal parts. Careful study of the possibilities should reveal many. opportunities for making building components in manufacturing plants.

#### Low Distribution Costs Necessary

"The main thing is that these components be made by methods which will permit their sale at comparatively low prices, and that they be distributed without undue markups because of high-cost distribution, warehousing and service setups.

"A recent NHA survey revealed that about five tons of metals are used in today's home on the average. This covers building hardware, bathtubs and plumbing, gutters and downspouts, furnaces and radiators, roofing, refrigerators, washing machines, pipe connections, etc. There is no reason why, by the exercise of production and sales ingenuity, the amount of metal in the average postwar home should not be closer to ten tons."

Through the courtesy of Harry H. Steidle, general manager, Prefabricated Home Manufacturers Institute, 1232 Shoreham Bldg., Washington, STEEL presents a list of the country's manufacturers of prefabricated homes. All these companies have been busy in the production of prefabricated homes during the war. During the war most of them built houses mostly of plywood and wood; what materials and building components they will use in the future will depend upon comparative availability, comparative costs and comparative merit. The list of prefabricated home manufacturers follows:

Allied Housing Associates Inc., Langhorne, Pa.

Burke Millwork Co., Seattle 3.

Bush Prefabricated Structures Inc., 370 Lexington Ave., New York 17.

Canadian Prefabrication Inc., 68 Lalemand St., Quebec.

Capital Prefabricators Inc., 6616 Dallas Highway, Austin 5, Tex.

Central Lumber Co., 1001 East Channel St., Stockton 39, Calif.

Crawford Co., P. O. Box 980, Baton Rouge 1, La.

Cumberland Homes, P. O. Box 500, Middlesboro, Ky.

Drycemble Corp., P. O. Box 9286, Houston 11, Tex.

Field Detroit Co., 651 W. Baltimore St., Detroit 2.

Ivon R. Ford Lumber Co., Mc-Donough, N. Y.

GBH-Way Homes Inc., Walnut, Ill. Green Lumber Co., Laurel, Miss.

Green's Ready-Built Homes, Rockford, Ill.

Gunnison Homes Inc., New Albany, Ind.

Halliday Co. Ltd., Burlington, Ont.

Scott Lumber Co., 1112 Chapline St., Wheeling, W. Va.

Flury & Crouch, 4600 Georgia Ave., West Palm Beach, Fla.

Hardin & Ramsey, 161 Spring St., Atlanta 3, Ga.

Harnischfeger Corp. 100 Lake St., Port Washington, Wis.

E. F. Hodgson Co., 1110 Commonwealth Ave., Boston 15.

Home Building Corp., 4434 Main St., Kansas City 2, Mo.

Houston Ready-Cut House Co., 3601 Polk Ave., Houston 1, Tex.

Illinois Lumber Mfg. Co., Cairo, Ill. T. C. King Co., Aniston, Ala.

National Homes Corp. of Indiana, Lafayette, Ind.

North American Buildings Ltd., Winnipeg, Manitoba, Can.

Page & Hill, 1017 Plymouth Building, Minneapolis.

Pease Woodwork Co., Blue Rock & Turrill Sts., Cincinnati 23.

Prefabrication Engineering Co., American Bank Building, Portland 5, Oreg.

Southern Mill & Mfg. Co., Box 1087, Tulsa 1, Okla.

Tacoma Lumber Fabricating Co., Box 1133, Tacoma, Wash.

Timber Structures Inc., 535 Fifth Ave., New York.

Harry Thompson Ltd., Edmonton, Alberta, Can. R. C. Baughman, Admiral Homes Co., West Newton, Pa.

John Taylor, American Houses Inc., 570 Lexington Ave., New York.

E. L. Bruce, Memphis, Tenn.

Sterling Hogan, Burge Demountable House Co., First National Bank Building, Houston 2, Tex.

LaVerne Burmester, Burmester Housing Co., Middleton, Wis.

I. Shine, City Lumber Co., 75 Third St., Bridgeport, Conn.

J. E. Dade, Dade Brothers, Mineola, L. I., N. Y.

Michael J. O'Brien, Dooley's Basin & Drydock, Fort Lauderdale, Fla.

A. H. Parr, Economy Portable Housing Co., West Chicago, Ill.

George Eddy, Eddy Shipbuilding Co., Bay City, Mich.

R. R. Lambert, Forbert Corp., Mc-Geheysville, Va.

Paul H. Brown, General Industries Corp., Box 3P, Richmond 7, Va.

Maurice R. Harrison, Box 188, Hialeah, Fla.

Ralph Baker, Hayward Lumber & Investment Co., 4085 Sheila St., Los Angeles.

J. W. Hull, Hull Housing Co., Houston, Tex.

Ed Johnson, John A. Johnson Contracting Co., 270 41st St., Brooklyn, N. Y.

Vincent Conley, Liberty Homes Co., Schiller Park, Ill.

Sam Pistorio, Knecht Ave., Arbutus, Baltimore, Md.

Leo J. Hanley, Portland Door Co., 604 Mead Building, Portland, Oreg.

J. F. Donahue, Pre-Fab Industries, 1535 South Main St., South Bend 23, Ind.

Lucian T. Zell, Schult Corp., 1730 Main St. S., Elkhart, Ind.

C. F. Ponty, Shell-Sasse Mfg. Co., Jacksonville, Fla.

H. F. Pettigrew, Texas Prefabricated House & Tent Co., 9001 Denton Drive, Dallas, Tex.

#### **Companies Interested in Prefabrication**

In addition, the National Housing Agency has compiled the following list of companies and institutions which have at one time or another in the past few years reflected interest in prefabricated homes and which may again become interested:

American Houses Inc., 570 Lexington Ave., New York.

American Rolling Mill Co., Middletown, O.

Ora J. Baer, Hoopeston, Ill.

Bailey & Co. Inc., Philadelphia.

(Please turn to Page 64)



# DIFFERENT GRIND 9 DIAMETERS ON A LONG NARROW PART 13! GRINDING WHEEL 134 REGULATING WHEEL

Sketch shows the part between the grinding and regulating wheels, and dimensions of each of nine diameters. Production is 45 pieces per hour.

These long, slender armature shafts, ground on the CINCINNATI Centerless at the right, actually presented two problems. First, the parts are approximately 13" long and comparatively slender. Second, there are nine concentric diameters. The logical solution was to centerless grind the complete length of the part in one setting by the infeed method, for then there could be no doubt about accuracy and concentricity. The part is too long for a standard centerless grinder, so a CINCINNATI No. 3 size machine was equipped especially to handle the job. Equipment consisted of Profile Truing Attachments over grinding and regulating wheels, special wheel mounts to accommodate  $13\frac{1}{4}$ " wide grinding and regulating wheels, a special wide work rest, magnetic work loading fixture, and Automatic Infeed Attachment. I Selection of correct production methods for all sizes and shapes of parts is a habit with Cincinnati Application Engineers. Why not bring your difficult grinding problems to this group of engineers for efficient, economical solution?



CINCINNATI

CENTER TYPE GRINDING MACHINES



This illustration, taken with grinding wheel removed, shows the entire setup for grinding nine different diameters on a long, slender part. The machine is a CINCINNATI No. 3 Centerless.



# GRINDERS INCORPORATED CINCINNATI 9, OHIO, U.S.A.

CENTERLESS GRINDING MACHINES . CENTERLESS LAPPING MACHINES

January 14, 1946

/TEEL





(Continued from Page 61)

Barr Lumber Co., 1022 East Fourth St., Santa Ana, Calif.

Bethlehem Steel Co., Bethlehem, Pa. Branstrator Body Co., P.O. Box 211, Ft. Wayne, Ind.

Burmester Housing Corp., Middleton, Wis.

- Butler Mfg. Co., 13th and Eastern Ave., Kansas City 3, Mo.
- Central Contracting Co., 407 Tower Petroleum Bldg., Dallas 1, Tex.
- Charlotte Lumber & Mfg. Co., 2760 S. Boulevard, Charlotte, N. C.
- Columbia Lumber & Mfg. Co., Columbia, S. C.
- Columbian Steel Tank Co., 1401-1621 West 12th St., Kansas City 7, Mo.
- Columbus Inc., 29 West Vine St., Columbus, O.

Evans Products Co., Fullerton at Greenfield, Detroit 27.

- Fairfield Lumber & Supply Co., 1700 Post Road, Fairfield, Conn.
- Fox Bros. Mfg. Co., Ohio Ave. and Sidney St., St. Louis.
- General Building Units, 234 Talbott Realty Bldg., Dayton 2, O.
- General Houses Inc., Chicago Daily News Bldg., Chicago 6.
- General Industries Corp., Box 3P, Richmond 7, Va.

General Timber Service Inc., P. O. Box 1632, Burlington Postal Station, Omaha, Nebr.

Great Lakes Steel Corp., Stran Steel Division, 1130 Penobscot Bldg., Detroit.

Hoess Bros., P. O. Box 226, Hammond, Ind.

Anchorage Homes Inc., 7 Court St., Arlington 74, Mass.

Horsley Company Inc., 205 East 42nd St., New York 19.

Intermountain Houses, Logan, Utah. J & B Mfg. Co., 6th and Bowman Sts., Mansfield, O.

John A. Johnson Contracting Corp., 270 41st St., Brooklyn 32, N. Y.

M. B. Kolb Co. Inc., 250 West 57th St., New York 19.

Kroening Engineering Corp., 4500 West Mitchell St., Milwaukee 14.

Lakeside Lumber Co., Oswego, Oreg. R. G. LeTourneau Inc., Peoria, Ill. Liberty Homes Corp., 33 North La-

Salle St., Chicago 2.

Long-Bell Lumber Co., R. A. Long Bldg., 926-8 Grand Ave., Kansas City 6, Mo.

Luhring Lumber Co. Inc., Division St., at Morton Ave., Evansville, Ind.

Marshall Electric Co. Inc., 1603 West Main St., Marshalltown, Iowa.

Midwest Housing Corp., 625 E. Eastern Ave., Janesville, Wis.

Minter Homes Corp., Huntington, W. Va. Modulok Inc., 700 Cathedral St., Baltimore.

- Moyer Bros., 2605 Beale Ave., Altoona, Pa.
- National Fireworks Inc., West Hanover, Mass.
- New England Houses, 441 Stuart St., Boston.

Palace Corp., Flint, Mich.

- Patent Scaffolding Co. Inc., 3821 Twelfth St., Long Island City, N. Y.
- PHC Housing Corp., (Peerless Houses), 300 Fourth Ave., New York 10.

Ply-Wel Industries, 4805 Tidewater Ave., Oakland 1, Calif.

Porete Mfg. Co., Porete Ave., North Arlington, N. J.

Portable Cottage Corp., Porter Ave. and Division Place, Greenpoint, Brooklyn, N. Y.

- Port Barre Lumber Co., Port Barre, La.
- Prebilt Co., Revere Beach Parkway, Revere, Mass.

Precision-Built Homes Corp., Trenton, N. J. Production Homes Inc. 2460 Fairmount Blvd., Cleveland Heights, O.

Quality Homes, 1022 S. Robertson Blvd., Los Angeles.

- Republic Steel Corp., (Berger Manufacturing Co.), 6100 Truscon Ave., Cleveland 4.
- H. R. Rieger Co., 4634-40 Parrish St., Philadelphia 39.

Roof Structures Inc., 45 West 45th St., New York.

Schult Corp., Elkhart, Ind.

Sheboygan Fabricators Ltd., P. O. Box 27, Sheboygan, Wis.

Show Win-Do Display Inc., 27 Sheriff St., New York,

Samuel M. Shultz, 517 North 7th St., Sheboygan, Wis.

Soule Steel Co., 1750 Army St., San Francisco 24.

Southwest American Houses, 2005 Canal St., Houston, Tex.

Standard Pre-Fabricating Co., 1020 Seaboard Bldg., Seattle.

Steger Furniture Mfg. Co., Steger, Ill. Stout Houses Inc., Stephenson Bldg.,



Wilson Wyatt, federal housing expediter, gets down to work in an attempt to solve the acute home shortage throughout the United States. NEA photo

Bureau of Mines Will Continue

Major Metallurgical Programs

Congress grants \$4 million appropriation for mining and metal-

lurgy for fiscal year ending June 30, 1946, less than half of

amount spent last year on war programs. Sponge iron plant

at Laramie, Wyo., to remain idle until new funds are received

Detroit 2.

Strand Building Products Co., 2626 Buhl Bldg., Detroit.

Texas Pre-Fabricated Housing Co., Avery and Beckley Sts., Dallas 8, Tex.

Tovell Construction Co., 403 W. Monument St., Baltimore.

C. S. Van Gorden & Son, Eau Claire, Wis.

Watkins Inc., 204 North Waco, Wichita 2, Kan.

Wesco Construction Co., 5335 Southern Ave., South Gate, Calif.

Willisway System, 9 South Clinton St., Chicago 6.

Wingfoot Homes Inc., Akron 16, O.

#### Strike-Closed Plants Get New Inventory Rules

#### Inventory controls which granted a 30-day period to permit plants in which work stoppages had occurred to postpone or cancel material orders have been amended by the Civilian Production Administration.

Continued receipts of materials are permitted beyond the 30-day period wherever necessary to bring the resulting inventory up to the minimum needed for the first 45 days after resumption of production. An exception to this is provided, however, in the case of the very scarce materials on list 1 of priorities regulation 32, in which case the shorter inventory periods provided in that list apply.

In the case of work stoppages occurring before Dec. 6, the plant must have, by Jan. 5, postponed all such orders for delivery in January. Also, by the 15th of each month the plant must postpone or cancel all such orders for delivery in the following calendar month.

In the case of work stoppages occurring on and after Dec. 6, the plant must, by the 30th day of the work stoppage, postpone or cancel all such orders for delivery in the current month. Also, by the 30th day of the work stoppage or the 15th day of the current month, whichever is later, and by the 15th day of each month thereafter as long as the work stoppage continues, the plant must postpone or cancel all such orders for delivery in the following calendar month.

#### Allocation Controls Over Mining Machinery Lifted

Allocation controls have been lifted on mining machinery including cutting machines, loaders, conveyors, crawler-type trucks, hoists, crushers, grinding machinery, smelting and refining equipment, and ore dressing and coal dressing equipment. Increased production of mining equipment permitted lifting controls.

#### of heart in the House Appropriations Committee, the Bureau of Mines has \$4 million to spend on mining and metal-

lurgy during the fiscal year ending June 30, 1946. This compares with about \$9 million which it received and spent last year when the bureau was working on many programs tied in with the war.

AS RESULT of a last-minute change

The \$4 million allotment, while much less than the bureau had hoped to get, will permit a good deal of work to be carried on. This compares with the threat last September and October that substantially all mining and metallurgical work would have to be abandoned. In particular, it appeared likely at that time that the bureau would have to dismiss the great majority of its experienced engineers and metallurgists. Now the bureau is in a position to hold on to practically all these men.

#### Laramie Sponge Iron Plant Must Wait

Of the \$4 million about \$2.5 million is earmarked for metallurgical work; this is enough to support all major programs planned, with the exception of that slated for the sponge iron plant at Laramie, Wyo. The large rotary kiln there went out of operation early in December and was due to resume in a couple of months. Now the rotary kiln will not be operated until the bureau finds out what appropriation it will receive for the fiscal year ending in 1947. In the meantime a skeleton staff will be maintained at Laramie and small-scale programs conducted there.

The only sponge iron plant to be operated over the first half of 1946 is the small plant at Salisbury, N. C., which has a continuous brick kiln. The product will continue to go to the bureau's Redding, Calif., alloy steel plant.

The ductile titanium plant at Boulder City, Nev., will continue to make about 200 pounds of titanium weekly in the form of powder or grains. It will continue to be shipped to the bureau's powder metallurgy plant at Salt Lake City where experiments will continue with processes for pressing titanium into solid shapes to be drawn or rolled into wire.

Another plant which will continue in

operation is the electrolytic manganese pilot plant at Boulder City, Nev.

Work will be continued at the bureau's electrolytic chromium plant at Boulder City, Nev., now producing about 50 pounds daily of a product containing in excess of 99 per cent chromium. Work also will be continued at the new pilot plant at Albany, Oreg., which is just getting started on nickel and chromium ores from the western states.

The Salt Lake City plant will continue to dress ore for the western mining industry, and it will continue to work on alumina processes with RFC assistance. The College Park, Md., will continue to work on processes for utilizing aluminum scrap from airplanes with the assistance of the Navy Department and will dress ore for miners in the eastern states. Wartime work on aluminum processes which has been under way at College Park also will be pushed to completion.

Under the head of mine exploratory work the bureau now has 47 projects scheduled to be undertaken prior to June 30.

In the field of iron ore it is exploring magnetite deposits in the Port Henry area in New York state, near Dillsburg, Pa., and one in western North Carolina. Another project to be set up at once is proving of brown iron ore deposits in Alabama. Geophysical methods will be employed to prove more iron ore in Minnesota.

In fluorspar, one deposit to be proved is in Hudspeth County, Tex. Some exploratory work is to be started soon to prove more fluorspar in Illinois.

Only one tungsten project is scheduled, exploration of a deposit in Nevada.

Most of the money for mineral exploration is to be spent on lead and zinc. Numerous projects are scheduled to be carried out in Washington, Utah, Colorado, Idaho and New Mexico.

Other projects slated for the present fiscal year include exploration of a corrundum deposit in Nevada, one copper deposit in Nevada and two in Arizona and one sillimanite deposit in South Carolina. A copper exploration project in Alaska also tentatively is slated.



# HYATT RENEWS ITS PLEDGE OF COOPERATION

At this beginning of our first year in the new peace, Hyatt joins with Industry—and the whole world—in deepest gratitude to the men of our armed forces for their service and sacrifice in achieving a glorious triumph. On behalf of mankind, Hyatt thanks Industry for the tremendous production job that made the United States the arsenal for victory. For itself, Hyatt thanks Industry for the patience and understanding that eased the difficult period from which we are now emerging.

As Industry turns again to design and manufacture of the machines and implements of peace, Hyatt renews its pledge of cooperation. Hyatt has developed new techniques during the war—in the construction of higher precision bearings and in their application—and we invite Industry to use this advanced knowledge. Realizing that anti-friction bearings will be in greater demand, Hyatt has increased production facilities in readiness.

This collaboration which now resumes between Industry and Hyatt assures equipment of efficiency and dependability that will set new standards for the world. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Chicago, Detroit, Pittsburgh, Oakland, California.

HYATT ROLLER BEARINGS



Kaiser-Frazer signs agreement with United Automobile Workers providing for basic wage of \$1.19, plus bonus on production, plus whatever adjustment union wins from GM. Pact hailed by union as largely meeting demands for 30 per cent raise

#### DETROIT

ALTHOUGH automotive production lines are still mostly stalled, the New Year dawned busily in Detroit for the industry's engineers and technicians. Annual gathering of the Society of Automotive Engineers (See page 56) was the focal point for thousands last week, while a convention and exhibit of the Society of Plastics Engineers intrigued many and further congested hotel space.

Assembly lines were limping along at a pace of about 13,000 passenger cars weekly, but parts shortages, particularly glass, plus strikes continue to put the damper on anything resembling real production. It appears unlikely now that there will be any substantial output of automobiles much before Feb. 15.

Wage agreement between the UAW-CIO and Kaiser-Frazer Corp. grabbed top headlines and was immediately interpreted by the union as equivalent to a 30 per cent wage boost, but a sober analysis of the proposition suggests this is anything but the truth. There are six main points to the agreement. First, the basic hourly wage rate is \$1.19 an hour, identical with the rate at the Ford Rouge plant and a few cents higher than the current General Motors basic rate. Second, a bonus of \$5 on each Kaiser or Frazer car produced and sold at wholesale is projected in the form of an incentive payment to be distributed at the end of the year. If by some stroke of good fortune K-F production should total 200,000 for the current year, this would mean a pool of \$1,000,000 to be dished out among an estimated 10,000 working people, or approximately \$100 each-roughly two weeks' wages. The bonus would be denied to any employee who had participated in unauthorized strikes.

Third point is that additional increases will be made in the basic rate in accordance with any agreement worked out by the UAW-CIO and General Motors, retroactive to the date of the signing of the contract. Curbstone opinion around Detroit now is that this may amount to something in the neighborhood of 20 cents an hour, which would bring the basic rate to around \$1.35 an hour-and that definitely ain't hay.

Fourth point accedes a closed shop with the checkoff system for collection of union dues. Fifth point covers special dispensation for veterans, including disabled personnel. Sixth and final proviso involves a union guarantee against wildcat strikes.

Hailed as revolutionary, the contract actually can be considered as putting additional pressure on General Motors as the bellwether of the industry, for the simple reason that it was immediately welcomed by the UAW-CIO as something extra special, whereas it is really nothing more than an agreement to pay the "going" wage, plus a \$5 per car bonus as an incentive rider. The latter is a rather tricky thing, since for the small producer of automobiles it involves a relatively small outlay, but for a company like any one of the big three it would be something else. Thus, if General Motors should produce 2,000,000 cars this year and be forced to pay a \$5 bonus on each, a payment of \$10 million would be called for, which distributed among 250,000 hourly rated employees would amount to only \$40 per employee but would still call for an appreciable investment. While an unlimited market for cars exists, the bonus appears to be a



THE KAISER: First American car in the low-priced field to have front-wheel drive is the Kaiser, light-weight entry of the Kaiser-Frazer Corp. in the postwar automotive derby. The six-passenger car will have a 117-inch wheelbase, six-cylinder engine, independent "torsionetic suspension" on all four wheels and a "monocoque" body

(Material in this department is protected by copyright and its use in any form without permission is prohibited)

fine thing, but what will happen when the sales department cannot move what the production line turns out is something else again.

Kaiser-Frazer also made news with announcement of the flotation of another 1,800,000 shares of common stock, to be sold to the public at approximately \$15 per share and yielding the company around \$25 million. The issue reportedly is to cover costs of acquiring a West Coast manufacturing site, probably a Douglas Aircraft plant in Southern California vacated with the war's termination. Previous financing raised about \$20 million which is rapidly being eaten into by tooling and equipment of the Willow Run plant. Should the new financing be exhausted, there is still another million shares unissued of the original five million authorized.

After a 13-week delay occasioned by inability to obtain transmissions, Studebaker Corp. is now in production, first units off assembly lines being four-door Champion model sedans. As quickly as possible, output will be pushed to a rate of 400 cars daily, a force of 8000 now being at work in the South Bend plant. William K. Studebaker, paymaster and son of one of the five pioneer Studebaker brothers, drove the first car off the assembly line, following settlement of a protracted strike at Warner Gear Co.

Nash also is moving back into production after delays in receipt of glass and a number of other parts. The company was building 360 cars a day until the stoppage of production Dec. 21 when supplies of glass ran out. Total for 1945 was 6200, although plans had been drawn for turning out 26,500. Current plan calls for a production rate of 200,-000 annually by mid-summer, well below earlier estimates. George W. Mason, president, thinks the industry may turn out 3,500,000 cars this year.

Continental Motors will start production of a new diesel engine line and a new hydraulically operated controllable pitch propeller as soon as tooling can be completed. The diesel has been under development for several years, and substantial orders are reported. Conversion of the company's main plant at Muskegon, Mich., is well along, and a production peak is looked for by spring. The Detroit plant is getting under way on a diversified line of engines, including the power plants for Kaiser and Frazer cars, the latter being a conventional 6-cylinder in-line engine said to be remarkably similar to the Ford 6.

As is the case with other manufacturers, Continental has been harried by slow deliveries of machine tools and interruptions to shipments of accessories from suppliers. The company's light plane engine division, which has orders for more than 34,000 units in the 65-210 horsepower range, has been enlarged to handle anticipated production ten times the volume of 1941. Continental's subsidiaries, Wisconsin Motor Corp. and Gray Marine, also are completing substantial expansion programs in the face



SUBASSEMBLY BACKLOG: Typical of heavily stocked feeder lines at the Studebaker plant is this hood department. Studebaker resumed production of new passenger cars after a 13-week delay caused by a labor dispute in a supplier's plant. Company used a part of the waiting period to build up stocks of parts and subassemblies

of bulky order books. The company has released facilities of its governmentowned Dallas, Tex., plant and is continuing research and development work on gas turbines in its aviation division.

Half-page newspaper advertisements appearing in Detroit and New York papers under the signature of the Society of Sentinels have occasioned more than a little comment. The gist of their text is that government should abandon the Wagner Act, the Fair Labor Standards Act, price control and other regulatory measures, in favor of returning this form of economic supervision to the respective states. The recommendations were of course immediately denounced by R. J. Thomas, president of the UAW-CIO, as a program which would "mean the wiping out of all the social legislation that was forced upon the people not only of America but of the world by the impact of the industrial revolution. . . .

Thomas also seized upon the fact that Stephen M. Du Brul, General Motors labor economist, was one of the vice presidents of the SOS.

#### Union Spokesman Attacks SOS

A union spokesman said, "They are making an effort to revive the discredited Liberty League at two bucks per copy, holding out as bait to reactionary professional and small business men the idea that they will be able to sit in with General Motors and plan the future of America for such a small admission fee."

This typical union small talk and veiled invective is perhaps the best proof that the sentiments of the Sentinels may be taking hold of the popular belief. After all, some of the logic of the SOS is not to be denied, viz: "This great nation is at the crossroads of destiny. All over the world nations are floundering in the quicksands of socialism and communism. We ourselves have gotten off the main highway of economic freedom and constitutional government. . . . Respect for law cannot be inculcated in our citizens unless the lawmakers themselves obey the law . . . that law is the Constitution of the U. S., under which we became prosperous, great and strong. Whatever others may do let us preserve this nation as an island of freedom, so that liberty may not everywhere perish from this earth."

Head of the budding SOS is Edward Fielder who declares: "We are planning a campaign to reach the individual and show him we cannot have a mixture of free enterprise and regimentation." Chairman of the group is Les Allman, advertising director of Fruehauf Trailer, and associated with him on the board of governors are leading industrial and automotive executives.



MOLYBDIC OXIDE-BRIQUETTED OR CANNED . FERROMOLYBDENUM . "CALCIUM MOLYBDATE" CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.



# British Steel Prices Increased To Compensate for Higher Costs

Minister of supply permits advance of about 5 per cent in main steel products and £1 on pig iron. Auto body sheets reduced £2 per ton. First major adjustment in price schedule since 1940, stability having been achieved by means of central fund

#### LONDON

FOR SOME time past it had been expected that British iron and steel prices would be increased, so that it was no surprise in the trade when the minister of supply recently issued an order providing, as of Dec. 31, for higher maximum prices to bring the schedule into closer relationship with costs.

The base price of pig iron was increased by  $\pounds 1$  per ton and, in general, the price increase on the main steel products amounted to about 5 per cent. Significantly, however, the price of automobile body sheets was reduced by  $\pounds 2$  per ton.

Iron and steel prices had remained practically stable since 1940, despite increasing costs of production caused by higher wages, increases in the prices of coal, coke, ores and other raw materials and freight. The only material increase made since 1940 was for pig iron, which was increased by 15s a ton in March of last year.

The stability of steel prices was achieved by means of the central fund, to which all iron and steel firms contributed on a levy basis. This fund accumulated surpluses until 1943, but since then the resources of the fund have dwindled owing to the necessity of meeting increasing costs while keeping steel prices to a stable level. The fund was also used to indemnify the less efficient firms that were not in a position to produce economically at the prices fixed by control. Concurrently with the increase allowed by the ministry the central fund is abolished and the control on the price of iron ore is lifted.

The average increase of 5 per cent in steel prices is relatively low in the face of increased costs such as exemplified by coal, which is now 100 per cent above prewar prices, and a rise of 50 per cent in wages.

The reduction of  $\pounds 2$  per ton on automobile body sheets is entirely due to the economies effected by the operation of the modern strip mills at the Richard Thomas works at Ebbw Vale.

In view of the tendency of the steel industry of this country to concentrate on the export of the more finished products, the relatively small increase in prices should not handicap export trade to any large extent, and it is likely that when reconstruction plans have materialized and the contemplated greater efficiency of the industry has been achieved, the trend will then be toward a decrease of prices.

New prices of pig iron and current steel products, in the domestic market, and current quotation for export are listed in the accompanying table.

#### \$100 Million Credit Given Belgium; U. S. To Profit

Recent authorization of credits totaling \$100 million to Belgium, the De-

Increase

s. d.

0. 0

0. 0 0. 0 7. 6 16. 6 16. 6 16. 6

16. 6 16. 6

10. 0 5. 0 3. 0

16. 6

BRITISH IRON & STEEL PRICES Domestic Prices per ton Delivered at Works or Furnace

				1
	£.	5.	d.	£.
Foundry pig iron, No. 3 Silicon 2.50-3.00	8.	3.	0	1.
Basic Pig iron	7.	15.	6	1.
Hematite pig iron	8.	13.	6	1.
Billets, basic, soft for re-rolling	12.	17.	6	
Heavy rails	15.	7.	0	
Merchant Bars, under 3 in.	18.	8.	0	
Shapes	16.	4.	6	
Plates, ship	17.	2.	0	
Plates, boiler	17.	19.	6	
Sheets, black 24 G	23.	5.	0	
Sheets, galvanized, 24 G corrugated	27.	7.	6	1.
Plain Wire	24.	18.	0	1.
Bands and Strips	19.	3.	6	
Export Prices				

Export Prices f.o.b. Port of Shipment

Merchant Bars	19.	5.	0
Structural shapes	19.	5.	0
Plates	17.	3.	U

partment of Commerce has pointed out, are intended to restore to the United States' markets abroad one of the best importing countries so far as American goods are concerned.

Belgium's imports of American goods in prewar 1938, it is recalled, amounted to over \$84 million, more than \$10 per capita of Belgian population, and included raw materials, especially cotton, and such manufactured products as autos and machinery.

Due to its own limited raw material resources, Belgium must rely on foreign trade for its economic life, the department said. Thus per capita imports of Belgium, with Luxemburg, were only a little below those of the United Kingdom.

Normally Belgium depends on the United States for about 10 per cent of its total imports, but with European sources destroyed or retarded by the war, this proportion of United States requirements is expected to be increased substantially.

#### Poland Nationalizes All Basic Industries, Utilities

In a decree nationalizing all basic industries the Polish parliament recently took control of every industry employing more than fifty persons per shift, thus bringing into the government the communication systems, banks, mines, factories and public utilities.

In explaining the action, Minister of Industry Hilary Mine said that before the war foreign capital held 50 to 80 per cent of most Polish industry. Although he did not estimate the amount of foreign holding involved, he said that nearly one-third of the basic industries would pass to the state without reparation payments because they were formerly German property. Citizens of Allied nations who have holdings in the nationalized industries will be compensated in cash or bonds, he said.

Private initiative will continue to operate, but the minister added, "private industry will be able to function only by use of state-produced raw materials which it may obtain on condition of cooperation in the state production system."

#### Peru Will Spend \$10 Million For Road Building Equipment

Peru will spend at least \$10 million for highway construction equipment in the next five years, according to Eduardo A. Salgado, assistant director of the Peruvian Highway Department, and Juan Quirago, the department's chief designing engineer. Both are spending three months in the United States visiting road building machinery plants and studying U. S. highway construction methods.

Peru has started a five-year highway building program that will cost more than \$50 million, they said. Of this amount, at least 20 per cent will go for equipment and machinery.

#### Westinghouse Experts Say Germans Showed Ingenuity

Asserting that German engineering was completely thorough and competent but that planning and management was far inferior to our own, two Westinghouse Electric Corp. experts have returned recently after working with the United States Strategic and Tactical Air Forces for three months. During this time the men toured the factories and laboratories of Germany, inspecting workmanship, new materials and substitutes to determine how the Germans had managed to keep their war machine going despite shortages of such important metals as nickel and chromium.

Dr. Weldon H. Brandt, materials and engineering expert, said that although the German materials, on the whole, were inferior to our own, much ingenuity in solving design difficulties posed by the poor metals had been shown. P. A. Pontius, another member of the mission, disclosed the research done to find a suitable ceramic material that could be subiected successfully to high stresses at high temperatures inherent in turbo-jet engines.

#### Trade Between Norway and Finland and U. S. Resumed

Resumption of private trade on a limited scale with Norway and Finland has been reported by the Department of Commerce. Exporters may now obtain licenses covering commercial shipments to both countries; however, imports into those countries are still subject to control of their respective governments, due to the demands of rehabilitation and reconstruction. Mail service, including parcel post, has also been resumed.

#### Argentina Held Needing Construction Machinery

Argentina is a potential market for construction machinery, according to a survey made by American official representatives during the past several months and reported in Washington.

Imports for the past several years have been negligible; hoists and elevators and parts, imported in 1943, amounted to 247,500 lb compared with 102,600 lb in 1944, and 41,500 lb in the first six months of 1945. Other construction machinery imports for road building totaled 13,000 lb for the first half of 1945.

Production of such heavy goods is relatively small in that country, although some assembly work is done.

#### £10 Million of Surplus Machine Tools To Be Sold

Machine tools worth about £10 million, to be released by the Australian Disposal Commission, will be sold as they become available by the Department of Munitions through normal trade channels, the foreign press has reported. A revaluation will be made of each machine to be sold.

#### British Textile Machinery Exports Up For First Half

The United Kingdom exported textile machinery totaling 7618 tons having a value of  $\pounds 2,706,052$  for the first half of 1945, according to the British Board of Trade. This compares with 7072 tons in 1943 and 35,388 tons in 1938.

#### Spanish Market for More Electric Goods Reported

Shortages of coal and coke during the war have stimulated Spanish demands for imported electrical equipment, it is reported from that country. Increases of from 30 to 50 per cent are reported for 1943, in practically all classifications. Projected imports and domestic construction point to a gain in the use of electric power.

#### Imports As Necessary As Exports, Says Spokesman

The United States is now not only the leading market for other nation's goods but is the chief source of exports to foreign countries, the Department of Commerce has discovered, according to Paul Wiers, chief of the International Trade unit of the department.

He added, however, that many important United States industries even before the war relied on their export trade to help maintain high production levels. A large export trade, Mr. Wiers pointed out, entails also a large import trade not only because we need raw materials, but because foreign countries can pay for our goods only through sales of their own products in the United States.

#### Portugal Plans Extensive Hydroelectric Development

Portugal has announced an ambitious plan for expanding its hydroelectric generating stations over the next eight years, according to information reaching Washington from abroad. However, that country's imports showed a decline of imports of electrical goods in 1944, following two years of expanding shipments.



TRAINS FOR EUROPE: Diesel-powered trains are assembled at the recently nationalized Renault automobile works at Billancourt, France, to replenish the railroads in devastated Europe. Continental railroad equipment suffered greatly during the war; much was destroyed and the remainder generally is in run-down condition. NEA photo

#### ACTIVITIES

# Aetna-Standard Gets Contract For Equipment

Carnegie-Illinois to place hotdip galvanizing line in Irvin plant. Capacity set at ten tons per hour

AETNA-STANDARD Engineering Co., Youngstown, has been awarded a contract for continuous hot-dip galvanizing equipment for Carnegie-Illinois Steel Corp.'s Irvin Works at Pittsburgh.

This equipment, developed through joint experiments of Carnegie-Illinois and American Steel & Wire Co. over a two-year period, will be the first wide continuous line to be used by the company, and will enable it to produce galvanized sheets or strips in coils, similar to the continuous line production method for tin plate.

The new line will be 200 ft long and will coat sheets or strip up to 54-in. wide. Annual capacity is expected to be between 60,000 and 80,000 tons, or about ten tons per hour. The machinery is designed to coat heavy gage material such as railroad car roofing and culvert stock and will provide a sufficiently tight coating so that the processed sheets or strips may be drawn or shaped without flaking. Steel entering the line will be uncoiled at one end and after hotdipping, will be recoiled.

The contract will furnish additional employment at Aetna-Standard's Youngstown, Ellwood City, Pa., and Warren, O., plants, each of which is busy now with a large volume of the steel plant equipment business.

#### New Steel Casting Company Formed in Chester, Pa.

A group of experienced steel men have announced the acquisition of Crum Lynne Foundry, Chester, Pa., built by the Reconstruction Finance Corp., and operated by Atlantic Steel Casting Co. during the war.

The new company, known as Chester Electric Steel Co., which is now in full operation, will specialize in carbon, alloy and stainless steel castings.

Officers of the company are: Fred Grotts, president; Stanley J. Roush, vice president and treasurer; William Burroughs, plant manager; and Sam Nicholson, sales manager.



RECEIVES ORDNANCE AWARD: Capt. R. E. Cofer Jr., ordnance officer of the Ninth Naval District, presents Naval Ordnance Department's development award to Herbert J. Framhein, chief engineer of the Automatic Transportation Co.'s transporter division, Chicago. At extreme left and right, respectively, are Hugh Cross, lieutenant governor of Illinois, and Elmer F. Twyman, general manager of Automatic

## BRIEFS...

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

Biad Powder Metallurgy Co., Pittsburgh, has been organized by Cecil J. Bier and Art Addis to produce filters, magnetic materials, oil-less bearings, electric contacts and structural parts of iron, steel, bronze, brass, copper and aluminum. The company's plant is located at 6635 Kelly St., Pittsburgh 6.

A. M. Castle & Co., Chicago, steel distributor, has acquired Gibbs Steel Co., Milwaukee, and will operate the latter company as Gibbs Steel Division.

-0-

Marquette Machinery Co., Detroit, has been formed by Walter Hannaum and I. Gruskin to sell used metalworking machinery. Temporary offices are at 15000 Charlevoix Ave., Detroit 30.

Lee Metal Products, Baltimore, has moved from 712 Stirling St., to 918 East Fort Ave., that city.

-0-

Bureau of Mines, Department of the Interior, will open a new laboratory in West Virginia University, Morgantown, W. Va., for experiments in the production of gases required in the manufactture of synthetic liquid fuel from coal.

Bethlehem Steel Corp., Wilmington, Del., has announced plans for further

expansion at Sparrows Point, Md. Plans include an annealing building which with equipment will cost \$380,000, and it contemplates additions to its coil storage, pickling, cold mill and skin pass and finishing buildings, costing more than \$1 million.

Ellinwood Industries, Los Angeles, has purchased Parts Mfg. Co., Glendale, Calif., which will continue its present contracts.

Faxfilm Co., Cleveland, has incorporated and is now located at 1220 W. Sixth St.

Tube Development Laboratory, Nela Park, Cleveland, General Electric Co., has terminated its activities there, and its cathode-ray tube operations will be continued by Electronics Department, Buffalo.

Bendix Radio Division, Towson, Md., Bendix Aviation Corp., has purchased its plant from the Defense Plant Corp. for approximately \$1,700,000 and is making additions and improvements costing approximately \$500,000.

#### ACTIVITIES

# Fairbanks, Morse Commemorates 115th Birthday

Publishes history of the firm, detailing pioneering efforts in scales, engines and other products

FAIRBANKS, Morse & Co., Chicago, has commemorated its 115th anniversary by publishing a history of the company, which provides an outstanding example of American industrial pioneering with success based on "inventive resourcefulness, faith, self-reliant courage and organizing ability."

Immense problems left this country by the war will be solved, the company believes, in proportion as "we display the individual resourcefulness and initiative which our forefathers brought to bear on the different, but no less difficult, problems of early America."

Pioneering efforts of the company were first applied to the Fairbanks scale which was invented in 1830 and which, for the first time in history, made possible the accurate recording of weights. The company not only produced a unique product but blazed new trails in advertising and promotion.

#### **Develops Diesel Engine**

Following the Civil War, the company pioneered in the development of steam engines and railway equipment. Later, it took the lead in developing what was then a new and untried device, the gasoline engine. More recently the company has played a leading role in the development of the diesel engine. Other important products in which the company has played a pioneering role include ball-bearing motors and pumps of every variety.

An outstanding example of the industrial pioneering is in connection with municipal power plants. Fairbanks, Morse & Co. has developed a service whereby it designs and builds such plants—complete with d'esels, generators, transformers, and other equipment.

The company was of special service to the country during the second world war when among other products it built diesel engines for the United States Navy. A new building at the Beloit, Wis., plant was devoted wholly to that purpose. Submarines, destroyers, mine sweepers and other craft ranging up to battleships were equipped with the company's "OP" engine or with smaller diesels. FairbanksMorse also helped to train the men to run these engines in a school equipped by the company and staffed by the company's own engineers.

The company's war service was broader than this, however, since it supplied homeowners, small merchants, municipalities, industries and railroads with such equipment as engines and electric motors, generators and magnetos, automatic stokers, pumps and compressors, railroad inspection cars and diesel electric locomotives, water standpipes, coaling stations, home lighting plants and water systems, windmills, feed grinders and cornshellers, hammermills, etc.

From a small business which began to make scales in St. Johnsbury, Vt., with less than a dozen workers, the company has grown with the nation until now it operates nine plants in as many comnunities, manufactures a diversified line of products and employs thousands of workers. It has 38 main and subbranches in the principal cities in this country and is represented by many sales agents in foreign countries.

The Beloit Works, Beloit, Wis., which includes a \$2.5 million foundry built in 1921, is the company's largest plant.

#### International Harvester Buys Evansville Plant

International Harvester Co., Chicago, has announced purchase of the former Republic Aviation Corp.'s plant near Evansville, Ind., from the Reconstruction Finance Corp. for \$5,648,000. The plant, to be used for the production of International Harvester's line of refrigeration equipment, is the second large government-owned war plant to be acquired by the company for its expinded postwar manufacturing program, the first being the Buick plant at Melrose Park, Ill., which was bought in November for \$13,750,000.

The new transaction is subject to the approval of the Department of Justice and the War Department.

E. F. Schneider, general manager, refrigeration division, said that the company hopes to begin initial production of its full line of refrigeration products, including home and farm freezers, household refrigerators, milk coolers for farm use and motor truck refrigeration, in the late summer, by which time government machinery and equipment will have been removed and new machine tools will have been delivered.

Mark V. Keeler, former works manager of Harvester's St. Paul gun plant, will be in charge of operating the Evansville plant. The entire managerial personnel of the refrigeration division will also be moved to Evansville, Ind.

Total area of all buildings comprising the plant is 934,000 sq ft; the tract has 71 acres. When in full production, the plant will have 3500 workers.



WINS PERSONAL CITATION: For outstanding contribution to the war effort, Maj. Gen. H. C. Ingles, left, presents a unique personal War Department citation to Dwight R. G. Palmer, president of General Cable Corp., which produced 80 per cent of the field wire procured by the Signal Corps in World War II



John J. Gillis has resigned as vice president and general manager of sales, Spencer Wire Co., West Brookfield, Mass. Prior to that Mr. Gillis was manager of sales, Worcester, Mass., district, American Steel & Wire Co.

-0-

Walter F. Nicoden has been appointed assistant general superintendent, Edgar Thomson works, Braddock, Pa., Carnegie-Illinois Steel Corp., succeeding John Lloyd, who has retired.

Edward P. Geary, who has been assistant vice president in charge of sales, Rustless Iron & Steel Corp., Baltimore, for the past six and a half years, has resigned.

Paul L. Lindsay has been named general staff manager, sales, American Steel & Wire Co., Cleveland, and in addition to other duties has assumed responsibilities of V. H. Farr, assistant general manager of sales, retired.

C. Q. Wright has returned as vice president, Whiting Corp., Harvey, Ill., following several years service as a submarine commander with the Navy.

-0-

James C. Barnaby, consulting engineer, Worthington Pump & Machinery Corp., has been transferred to the general engineering staff, Harrison, N. J., works, as assistant director of research and development.

-0-

Albert M. Willett has been appointed purchasing agent and Claude B. Kershner, assistant purchasing agent, Phoenix Iron Co., Phoenixville, Pa. Mr. Willett has been with the company since 1936 and for the past four years has been traffic manager.

Claude S. Lawson, with Sloss-Sheffield Steel & Iron Co., Birmingham, since 1917, succeeds Ben Davis as vice president and general manager. Mr. Davis joined the organization in 1930 as general superintendent of mines.

-0-

-0-

Richard W. Banfield, secretary and office manager, has been elected treasurer to succeed Everett L. Morgan, who has retired, Pratt & Whitney Division, Niles-Bement-Pond Co. Ernest J. Meuten, at present assistant secretary, now becomes also assistant treasurer. Edward S. Morehouse remains as assistant treaurer, a position he has held for several years.

-0-

Benjamin S. Dowd has been elected president and general manager, Vulcan Iron Works, Wilkes-Barre, Pa. J. F. O'Brien has been named director of purchases, George W. Walter, works manager, Joseph Lehnert, production manager and C. A. Netter is in charge of planning.

Frank E. Nutt has been named assistant sales manager, Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., a division of Joshua Hendy Iron Works. He is replaced as manager of Crocker-Wheeler's Washington office by A. M. R. Lawrence.

-0--C. L. Ipsen, manager, Industrial Heating Division, General Electric Co., Schenectady, N. Y., announces the following organization for that division: R. D. Ketner, manager of sales, industrial heaters and devices section; O. S. Haskell, manager of sales, electric furnace and oven section; K. E. Kjolseth, manager of sales, induction and dielectric heating section; and R. M. Cherry, assistant manager of the division. The company's Electric Welding Division is organized as follows: C. I. MacGuffie, manager; W. L. Immer, assistant manager; W. W. Churchill, in charge of the equipment group; H. O. Westendarp Jr., electrode group; B. C. Tracey, accessory group; R. F. Wyer, application engineering group. -0-

Arnold J. Reardon has joined the engineering staff, Dearborn Chemical Co., Chicago, as aeronautical maintenance engineer.

#### -0---

A. J. Fazio recently was appointed general superintendent, Braeburn Alloy Steel Division, Braeburn, Pa., Continental Industries Inc. In past years he has served as assistant general superintendent for the Braeburn organization.

Irving M. Smith, who has been acting general manager of sales, Central Iron & Steel Co., Harrisburg, Pa., was appointed general manager of sales Jan. 1.

John B. Mitchell has been appointed assistant to the operating vice president, Jones & Laughlin Steel Corp., Pitts-



DR. S. G. FLETCHER

burgh. For the past eight years Mr. Mitchell has been superintendent of the rolling mills of the company's Pittsburgh works.

-0-

Dr. Stewart G. Fletcher has become associated with the Latrobe Electric Steel Co., Latrobe, Pa., as chief research metallurgist. In recent years Dr. Fletcher has been a research associate at Massachusetts Institute of Technology, Cambridge, Mass., where he conducted special metallurgical research projects.

Edmund S. Murrah, formerly of the steel mill section, Industrial Engineering Division, General Electric Co., Schenectady, N. Y., has become associated with the research department, Morgan Construction Co., Worcester, Mass.

-0-

Harry S. Walker recently was appointed manager of the Radiant Heat Division, C. M. Hall Lamp Co., Detroit, replacing Thomas P. Cusack Jr., who has become manager of the Sales Development Division for the entire company.

-0-

L. A. Davies, owner, Davies Supply & Mfg. Co., St. Louis, has been appointed distributor in Missouri, Oklahoma, Kansas, Texas and Louisiana for the Udylite Corp., Detroit.

Victor L. Persbacker has been elected assistant comptroller of the American Brake Shoe Co., Canadian Ramapo Iron Works Ltd., and the Dominion Brake Shoe Co. Ltd.

-0

-0-

Clarence E. Abbott has retired as vice president, Tennessee Coal, Iron & Railroad Co., Birmingham. Mr. Abbott has spent 43 years with subsidiaries of United States Steel Corp. Douglas J. Early has been appointed manager of sales in the Tennessee Coal, Iron & Railroad company's Birmingham district sales office.

# SPEEDS-UP ROUGHING

# AND FINISHING

# SUNOCO EMULSIFYING CUTTING OIL...

Specified for cutting high-carbon steel castings with Stellite Tools

Production-engineers are keen judges of the performance of modern cutting-lubricants. Shown above is a case where the engineers picked Sunoco Emulsifying Cutting Oil to help speed-up roughing and finishing of high-carbon steel castings.

Operation:	Roughing and finishing 81/2"
	wheel-hub
Machine:	Gisholt 2L production turret-
Contract of the second	lathe
Material:	High-carbon steel casting
Feed:	.017" roughing;
	.009" finishing
Spindle Speed:	29 R.P.M.
Surface Cutting-Speed:	64.5 feet per minute
Type of Tool:	Stellite
Cutting Lubricant:	1 part Sunoco to 20 parts
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	water
and a second sec	

This case is just one of thousands in which experienced production - engineers have picked Sunoco for heavy cuts at high speed ... long tool-life with minimum time-out for regrinding and resetting ... high finish and close tolerances.

Sunoco is recommended by leading manufacturers and users of machine-tools for a wide variety of cutting-operations . . . on lathes, drill-presses, boring-machines, milling-machines, hobbers, and grinders.

**Consult** the Sun Cutting Oil Engineer near you for complete facts on Sun metal-working products. His services are yours to use to help you increase production and cut costs.

SUN OIL COMPANY . Philadelphia 3, Pa. Sponsors of the Sunoce News-Yolce of the Air-Lowell Thomas

#### SECRETS OF PETROLEUM SCIENCE REVEALED

At Booth E-605. National Metal Complete exhibit of making of petroleum products—producing, refining, transportation, and industrial application, Don't miss it

## SUN INDUSTRIAL PRODUCTS oils for American Industry

#### MEN of INDUSTRY



G. S. STARKE

He is succeeded as manager of sales in the Hot Rolled Products Division by William P. Gideon Jr. Irvin C. Kinney, formerly assistant manager of sales, Sheet & Wire Products Division, becomes assistant manager of sales in the Birmingham district office. Other appointments include: Rudolph A. Goldschmidt, manager of sales, Electrical & Wire Rope Division; Robert P. McGregor, manager of sales, Jacksonville, Fla., district sales office; and Roy C. Rhodes, manager of sales, Charlotte, N. C., district sales office.

George S. Starke has been named general sales manager, Sperry Gyroscope Co., New York, succeeding Hugh H. Willis, who recently resigned as vice president and general sales manager.

-0-

-0-

Henry E. Perry, New York, has been elected executive vice president, Commercial Solvents Corp., New York. Mr. Perry formerly was vice president in charge of production, in which position he is succeeded by Maynard C. Wheeler.

Robert M. Whitney has been named assistant advertising manager, Automatic Transportation Co., Chicago, a division of Yale & Towne Mfg. Co.

-0-

Paul L. Goldstrohm has become general manager of the Lewis Pump Co., Philadelphia, factory representative of the Pump Division, Geo. D. Roper Corp., Rockford, Ill.

#### -0--

Charles W. Doerr has been elected vice president in charge of erection, American Bridge Co., Pittsburgh, succeeding Curtis S. Garner, who is retiring after 50 years with the company. Also retired is L. D. Reilly, general manager of the Ambridge, Pa., plant; George E. Shepard, assistant general contracting manager; Walter G. Zimmermann, who



J. D. CLOKEY JR.

is succeeded by Newton O. Holt as senior contracting manager, Chicago district. Leland E. Grafft becomes a Chicago contracting manager and Frank D. Rideout, contracting manager in Cleveland, has retired and is succeeded by Charles A. Harris. Mr. Reilly is succeeded as general manager at Ambridge, Pa., by Oscar Seidel, formerly manager of the Structural Fabricating Division there.

J. D. Clokey Jr. has been appointed general manager of sales, Washington Steel Corp., Washington, Pa. Mr. Clokey formerly was associated with Superior Steel Corp., Carnegie, Pa., and during the war was chief, Special Projects Division, Steel Recovery Corp.

#### -0-

W. T. Ayer, with the engineering department of the Hercules Powder Co., Wilmington, Del., 27 years, has retired.

James White recently was promoted by the Tomkins-Johnson Co., Jackson, Mich., to controller of materials.

Henry C. Baumgartner has been elected a director and secretary, Plomb Tool Co., Los Angeles. He succeeds James E. Mills who retired due to ill health.

-0--

John C. Whiddett has been named sales manager, Automatic Temperature Control Co. Inc., Philadelphia, succeeding the late J. D. Andrews. Mr. Whiddett returned recently from service with. the Seabees in the South Pacific. R. H. Mccklenborg has returned to the company's engineering staff from two years overseas service with the Army.

Thomas C. Ford his been appointed district manager, Pittsburgh office, Electro Metallurgical Sales Corp., New York.

-0-

Robert M. Zeller, formerly with Carpenter Steel Co., Reading, Pa., now



ALLEN HURT

is associated with Aetna-Standard Engineering Co., Youngstown, as roll engineer in the company's Roll Sales Division.

------

Allen Hurt has joined the Ohio Stainless Steel Co., Cleveland, recently as sales manager. From 1941 to 1944 he was Cleveland district sales manager, Eastern Stainless Steel Corp., Baltimore, and since 1944 he has been associated with Federal Telephone & Radio Corp., Newark, N. J.

J. S. Gowdy, for the past 38 months with the Seabees, has returned to Wyatt Metal & Boiler Works, Houston, Tex., to become purchasing agent. He replaces C. L. Williams who has left the company to enter business for himself.

-0-

Cleo E. Gustafson his been appointed superintendent of the Gary, Ind., plant, Union Drawn Steel Division, Republic Steel Corp., succeeding George E. Yarnold who has been transferred to a similar plant in Los Angeles, recently acquired by Republic.

Fred J. Woodburn has been appointed manager of pig iron sales, American Steel & Wire Co., Cleveland, and G. W. Crowl has been named assistant manager. The pig iron sales offices are being moved from Pittsburgh to the Union Commerce Bldg., Cleveland, effective about Feb. 1.

-0-

Harry R. Gilchrist, for 23 years with Carnegie-Illinois Steel Corp., in the Youngstown district in engineering and maintenance, has joined K. W. Atwater Engineering, Pittsburgh. He will be employed in the further development, servicing and sales of roll neck bearings and associated products manufactured by the Atwater company.

V. W. Bergenthal, treasurer Wagner Electric Corp., St. Louis, has retired, but

250 Bent Street, Cambridge 41, Mass. • TROwbridge 7000 • Teletype: Cambridge 547

## This Catalog

### For More Information, Write For This Catalog

INDUSTRIAL

STEELS, Inc.

## For anything in stainless steel, it will pay you to get in touch with INDUSTRIAL STEELS, INC. ... and let one call do it all.

STEELS, INC. maintains complete stocks of stainless sheet, bars, tubes, wire, valves, and welding electrodes ... ready for prompt deliveries. You pay no price premium for this convenient service.

line of the hardware and fittings shown above, in all sizes and types. Any of these standard parts can be shipped immediately on receipt of your order. In addition to stainless hardware and fittings, INDUSTRIAL STEELS INC maintains complete stocks of stainless

INDUSTRIAL STEELS, INC....with America's largest warehouse

stock of stainless shapes and parts...carries a complete

CAMBRIDGE, MASS. TROWBRIDGE 7000

## ...and one call will do it all

IN STAINLESS STEEL



did you know

that you can

get this Hardware



ATTENTION OF

and the second se

77

JMLCo CI-M1

#### MEN of INDUSTRY

will continue to serve as a director of the company. He is succeeded by J. D. Eby who recently was elected secretary-treasurer of the corporation.

-0-

M. J. Anderson recently joined the Aro Equipment Corp., Bryan, O., as sales and service engineer. D. J. Nelson has joined the company's sales organization, to sell its pneumatic tools in the New York state territory.

Fordyce Coburn, vice president in charge of operations, E. &. G. Brooke Iron Co., Birdsboro, Pa., has been elected a director of that company and Richard Ore Co., a subsidiary.

-0-

\_0\_

M. R. Denison has joined Bendix Home Appliances Inc., South Bend, Ind., as purchasing agent. He has been in charge of purchasing in the Unit Division, White Motor Co., Cleveland.

Paul G. Jacka his been elected president, Goslin-Birmingham Mfg. Co. Inc., Birmingham, succeeding George M. Morrow Jr., who retired in November.

T. E. Dela Court has been elected president, Tracy Mfg. Co., Pittsburgh.

Nicholas Fenger, formerly of the Welded Tube Division, Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been appointed chief engineer, General Tube Co., Newark, N. J.

B. A. Springer, hydraulic press and power tool engineer, has become a sales engineer for the Baldwin Locomotive Works, Philadelphia. Mr. Springer will be with the Chicago office of the company' Southwark Division and he will specialize in hydraulic presses.

E. R. Nary has been appointed assistant to Walter Evans, vice president, Westinghouse Electric Corp., Pittsburgh, and will be responsible for operations of

-0-

Industrial Electronics and X-Ray Divisions, Baltimore, and Home Radio Division, Sunbury, Pa.

-0-

Walter F. Nessen has been appointed chief industrial designer, Product Designers, Chicago. Mr. Nessen previously was engaged in development and design for General Motors Corp., Edw. G. Budd Mfg. Co., and Sears-Roebuck & Co.

S. T. Smith, Consolidated Steel Corp. Ltd., Los Angeles, has been re-elected president of the Southern California Industrial Safety Society.

-0-

-0-

Julian K. Sprague and Dr. Preston Robinson recently were elected vice presidents of the Sprague Electric Co., North Adams, Mass. Mr. Sprague, a member of the board of directors, has been associated with the company since 1926, and Dr. Robinson, also a director, has been with the company since 1929.

W. H. Foster and C. W. Enstrom, formerly with Illinois Tool Works, have been named sales and service representatives for the National Tool Co., Cleveland, in the Wisconsin-Minnesota territory with headquarters in Milwaukee.

\_0\_

James E. Burke, formerly plant manager, Daystrom Corp., Olean, N. Y., has been appointed assistant plant manager, Barcalo Mfg. Co., Buffalo.

-0-

W. A. Umlauf has been named sales manager, Holland-Rieger Division, Sandusky, O., Apex Electrical Mfg. Co., Cleveland. C. D. Thomas has joined the Apex company to handle sales promotion and sales training under the direction of Frank S. Ryan, advertising and sales promotion manager.

-0-

Logan Miller has been appointed general superintendent of the Ford Motor



E. R. NARY



LOGAN MILLER

Co. Rouge plant, Dearborn, Mich. He has been with Ford since 1914 when he started as a die-maker in the plant tool room, later becoming superintendent of the motor building at the Rouge plant and then assistant general superintendent. He was superintendent of the Willow Run bomber plant during the war.

Stanley A. Richardson has been named direct mill representative for the Cleveland and northern Ohio district, Rigid-Tex Corp., Buffalo.

Jerome K. Jelin has been appointed general manager, Plant & Equipment Purchasing Co., Cincinnati.

-0-

Frank J. Feely, manager, specialty products shops in New Jersey, Western Electric Co., New York, has been appointed manager of the company's electronic components manufacture. The operations will be moved into a new plant to be built during the coming year at Allentown, Pa.

Harry W. Boorman, formerly in charge of the Rochester, N. Y., office, Commercial Controls Corp., has been named manager of a new branch in Buffalo.

-0-

J. O. Speed, past chairman of the Alabama chapter, American Society of Safety Engineers, has been made safety counselor for the Birmingham Electric Co., to co-ordinate all safety activities of that organization.

A. F. Watters, former employment manager of the Victor Division at Indianapolis, Radio Corp. of America, has been named the plant's personnel manager, succeeding R. Edward Hays.

-0-

-0-

A. W. Sikes has become metallurgical advisor, L. A. Cohn & Bro. Inc., Chicago, smelter and refiner of nonferrous metals and alloys. Recently returned to inactive status, Mr. Sikes served in the Army for nearly five years as lieutenant colonel, Chemical Warfare Service. His work with the L. A. Cohn company will include metallurgical investigations, quality control and technical contacts with industry.

-0-

R. L. White, president, Landers, Frary & Clark, New Britain, Conn., has been elected president, National Electrical Manufacturers' Ass'n for the coming year, succeeding A. C. Streamer, vice president, Westinghouse Electric Corp., Pittsburgh. Vice presidents are: H. E. Blood, president, Norge Division, Borg-Warner Corp., Detroit; W. C. Johnson, vice president, Allis-Chalmers Mfg. Co., Milwaukee; J. K. Johnston, vice president, National

#### MEN of INDUSTRY



F. M. GILLIES

Who has succeeded J. H. Walsh as works manager, Inland Steel Co., Chicago, noted in STEEL, Dec. 31, 1945 issue, p. 50.

Vulcanized Fibre Co., Wilmington, Del.; Everett Morss, president, Simplex Wire & Cable Co., Cambridge, Mass.; R. W. Turnbull, president, Edison General Electric Appliance Co., Chicago. R. Stafford Edwards, president, Edwards & Co. Inc., Norwalk, Conn., was re-elected treasurer.

James D. Mooney has resigned as vice president and member of the board of directors, General Motors Corp., Detroit. Mr. Mooney, who has been prominent for many years in the development of General Motors' foreign business, is joining Technical Managers Inc., New. York, an engineering-management organization,

OBITUARIES ....

Harry B. Royer, 64, manager of warehouse operations with the New York office, Jones & Laughlin Steel Corp., Pittsburgh, died Jan. 6 in New York. Following graduation from Rensselaer Polytechnic Institute, he became associated with the National Bridge Works, Long Island City, N. Y., and remained with that concern as manager and later as president until that company was merged with Jones & Laughlin in 1936.

#### -0-

Carl E. Jones, 71, hand saw polisher and maintenance supervisor of that department, E. C. Atkins & Co., Indianapolis, died recently.

Charles Borland, 67, president, Federal Electric Co., Chicago, died Jan. 3 in Charleston, S. C.

-0

-0-

George W. Cox, 41, superintendent of industrial relations, Waukegan works, Waukegan, Ill., American Steel & Wire



THOMAS C. PHILLIPS

Who has been appointed assistant general manager of sales, Pittsburgh Steel Co., Pittsburgh, noted in STEEL, Jan. 7 issue, p. 426.

as chairman. E. F. Johnson, Detroit, who retired Dec. 31 as a vice president of the corporation and a member of its administration committee, has been elected a member of the board. ----

Martin J. Brophy has been appointed general manager and assistant treasurer and H. Leon Frantz has been appointed treasurer, Richard Ore Co., Wharton, N. J.

General American Transportation Corp., Chicago, announces the following changes among its officers: LeRoy Kramer, first vice president, retired; W. J. Woodward, director and treasurer, re-

Co., died Jan. 7 in that city from injuries he received in an automobile accident two days earlier.

J. Hilding Johnston, 56, vice president and sales manager, New City Iron Works, Chicago, died Jan. 6 in Riverside, Ill.

Clarence A. Fisher, 71, sales manager, Osborne & Sexton Machinery Co., Columbus, O., died recently in that city. He had been associated with the company 30 years.

Frank B. Floyd, 67, former secretary and chief engineer, Smith & Caffrey, Syracuse, N. Y., a structural steel fabricating company, died recently.

-0-

Dr. Stanley A. Trengove, 47, editor, Mining Congress Journal, died Dec. 28 in Washington.

George Bridges, 58, pump application engineer, associated 40 years with Worthington Pump & Machinery Corp.,



DON L. ORTON

Who was named manager of engineered and industrial sales, Clark Controller Co., Cleveland, noted in STEEL, Dec. 31, 1945 issue, p. 46.

tired; Edward E. Schulz becomes treasurer and assistant secretary; H. E. Coyl and W. J. Stebler, vice presidents, have been elected to the board of directors.

William D. Truesdale, vice president in charge of Gnance, Inland Steel Co., Chicago, retired from active service Dec. 31, after 38 years with the company.

\_0\_

John C. Barnes, former manager of the branch at Washington, National Radiator Co., Johnstown, Pa., has assumed new duties as branch manager at Phildelphia. Huber F. Seltzer replaces Mr. Barnes as manager of the Washington branch.

Harrison, N. J., died recently at his home in Nutley, N. J.

Earl L. Mefford, 58, for the past 15 months manager of the Western Division at Los Angeles, Goodyear Tire & Rubber Co., died Dec. 30 at Mineola, Long Island, New York.

Gerhardt C. Krueger, 48, sales manager in Milwaukee for Allegheny Ludlum Steel Corp., died recently in Milwaukee following a three months' illness.

-0-

William S. Peele, 62, purchasing agent, J. D. Adams Mfg. Co., Indianapolis, died recently.

George W. Ansted, 68, secretary-treasurer, Rex Mfg. Co., Connersville, Ind., died at his home in that city recently.

Raymond W. Retterer, 57, superintendent of equipment, Big Four Division, New York Central Railroad, Indianapolis, died Dec. 28 in that city.

-0-

# SAE TECHNICAL PAPERS

Developments in honing, synthetic lubricants, tin substitutes, atomic energy, high temperature alloys, air fixtures and controls, engineering of involute splines, internal engine combustion and methods of specifying materials as reported Jan. 7-11 before Society of Automotive Engineers in Detroit

#### Latest Developments in Honing

By L. S. Martz D. T. Peden Micromatic Hone Corp., Detroit

This paper shows how new developments in the honing process provide necessary reproducibility in production processing, as related to the final forming, sizing, and finishing of cylinder bores in power generating, power transmission, and other force and material conserving mechanisms.

New developments comprise generation of finer accuracy; low tolerance control of uniform size; rapid, heavy stock removal; and, generation of any desired kind or type of functionally characterized cylinder bore wall quality.

Modern honing now removes from 25 to 30 times as much metal as was formerly practicable; and, in some applications it can do this much work up to six or eight times as fast as was formerly possible. These developments were installed in many war production jobs; they have now been successfully adapted to a number of postwar applications.

Heavier, faster stock removal in hone abrading has been accomplished by two developments: additive treatments of bonding material, and multiple and progressing honing using two-and-three spindle machines, equipped with rotating, indexing fixtures.

Additive treatment of bonding material compensates for variations of grit condensations and bond densities which occur in some varying degree in all vitrified structures. They further serve to reinforce softer, vitrified bonded stones, and thereby increase their cutting efficiency and stone life by as much as several hundred per cent.

#### **New Synthetic Lubricants**

- By J. C. Kratzer, Linde Air Products Co.,
- D. H. Green, National Carbon Co., Inc., and D. B. Williams, Carbide & Carbon Chemicals Corp., New York

This paper describes the characteristics of two series of synthetic lubricants having certain unusual properties and until recently subject to an order of secrecy. The new synthetic lubricants are synthesized from natural or other hydrocarbon gases as raw materials. They contain no petroleum oils. They are inherently more expensive to produce than the best petroleum lubricants now sold.

Oxidation products of the synthetic lubricants are for the most part low molecular weight volatile compounds.

In addition to use in internal combustion engines there are many places where the special properties of the LB series of synthetic lubricants such as low pour point, high viscosity index and nonsludging characteristics can be utilized to advantage. These include powdered metal bearings, transmission and differential lubricants, electric motors, textile machinery, wire drawing, metal rolling and stamping, and many others.

#### Substitutes for Tin in Automobiles

By C. E. Heussner, Materials Engineer and E. T. Johnson, Project Engineer Chrysler Corp., Engineering Department, Detroit

Reasons for the scarcity of tin, and steps taken to meet it in the automotive field, is the subject of this paper.

United States consumes approximately 40 per cent of the world's supply of tin in the manufacture of tin plate, bronze and brass, solder and babbitt.

A relatively easy post-war tin supply has not materialized. The best available information indicates that even an adequate tin supply is questionable and that we will probably face this serious situation for a number of years. It is advisable, both for the present and for the unpredictable future, that the industry continue its efforts to become increasingly independent of an uncertain tin supply.

The greatest savings of tin have been made by the following steps:

- 1. Redesigning parts to eliminate entirely the use of tin.
- 2. Improvement of processing to require the least amount
- of tin, particularly where ease of application is a major factor in using more than the minimum of tin, to attain required performances.
- 3. Development of alternate materials, preferably ones which can be domestically produced, to be used with current design and processing.

By these three methods, tin consumption per automobile was cut from over 4 lb in 1940 to 2 lb or less in 1945. While, in some cases, such a policy may call for painful cost decisions, this is expected to be the exception rather than the rule.

#### **Development of Atomic Energy**

By Dr. J. R. Dunning Pupin Physics Laboratories Columbia University

This paper examines the fundamental nuclear physics behind atomic energy. Security limitations still prevent a revelation of the details of processes.

Concentration of U-235 on a large scale has been the largest single industrial undertaking ever attempted. It required the team work of industry, science and the government on an unprecedented scale. Over 100,000 men were directly involved and many more indirectly. The city of Oak Ridge, Tenn., with over 75,000 people grew from nothing, primarily for the U-235 separation plants.

#### ENGINEERING NEWS

Immediate applications seem to be in the premium fuel field, and where the special advantages of atomic power outweigh costs.

Much development must be done before atomic power finds wide application. Many problems must be overcome, and it will be a number of years before definite practical utilization is made. How soon depends on the effort and funds expended. Big strides forward have been made and the long term future is certain to be interesting.

#### Air Fixtures and Air Controls

By S. Johnson, Jr., Assistant Sales Manager Bendix-Westinghouse Automotive Air Brake Co., Elyria, O.

Highspotting air-operated fixtures is discussed by the author. Chief advantage of air-operated fixtures is labor economy as compared to manual or mechanical operation. Air controls are positive and have proven their worth from a standpoint of increasing production per man hour and have indirectly contributed a great deal to safety in the shop.

The main item used for clamping in the fixtures is known as a brake chamber. These are preferable to cylinders for three reasons:

- 1. Since a diaphragm is employed instead of a packing cup, no leakage problem is involved.
- 2. Since a diaphragm is employed there is no friction problem involved.
- 3. Because of these two reasons there is no maintenance problem since these diaphragms have an average life of about 1,000,000 cycles.

The paper describes 17 uses of air-operated fixtures at various departments at the plant of the author.

#### **Engineering of Involute Splines**

By G. L. McCain, Staff Engineer-Research Chrysler Corp., Detroit

The author compares straight and involute splines and points out that in the new standards proposed for involute splines, almost any diameter can be found in some diametral pitch. Involute spline capacity is worked out by formulae and methods of fitting splined parts are submitted.

Procedures for developing the tooth form, measuring splined fittings and flattening of pins are explained in detail. The specified maximum actual tooth thickness provides a basis to check the shaft spline while it is still in the machine and thus make sure that the finished part will have an effective tooth thickness which does not exceed the specified maximum. On the other hand, if difficulties arise in the final inspection of the part spline, the specification of a maximum actual tooth thickness will make it possible to determine whether the interference error, or the tooth thickness is excessive.

#### **Aircraft Engine Deposits**

By W. J. Sweeney, Research and Development Dept. and J. F. Kunc, Jr., and W. E. Morris, Research Division Standard Oil Development Co., New York

Based on field experience and experimental test work any increase in the nonvolatile viscous, resinous or solid

January 14, 1946

constituents in the fuel is favorable to deposit formation and should be avoided to the maximum extent possible. Such nonvolatile constituents might be gum, inhibitors or their degradation products, and components of ethyl fluid such as dye and nonvolatile impurities.

Various types of inhibitors used to stabilize fuels against deterioration in storage differ radically in their deposit forming tendencies. Oxidized or degraded inhibitors are particularly bad from the standpoint of deposition.

For a given engine and a given fuel, there appears to be an induction system temperature which will give maximum deposit formation, or conversely, for a given operating temperature there appears to be a fuel volatility which gives maximum deposition. Over the ranges studied in present investigation, deposit formation was greatest with relatively volatile fuels at high operating temperatures.

Addition of a solvent oil to the fuel tends to prevent deposit formation. The rare cases where sufficient quantities of induction system deposits are formed in service to result in a deterioration of engine performance characteristics are probably due to the coincidence of a number of conditions which are favorable to deposit formation.

#### **Methods of Specifying Materials**

By J. L. McCloud Ford Motor Co., Dearborn, Mich.

This paper is principally concerned with the application of and only incidentally with the writing of specifications.

To know the cost effect, the materials engineer needs to know, not only the material cost, at least in a relative sense, but also needs the assistance of the production engineer who will manufacture the finished part.

Fundamental qualification of a successful materials engineer includes wide experience, a memory that will function automatically, a fertile imagination and the faculty of seeing similarities, noting analogies and detecting differences between situations that now arise and situations previously encountered. In short, all the specifications ever written can only be the type which the engineer selects to express the result arrived at by the use of his own judgment.

We should only as a temporary expedient specify that the material "be approved by the Engineering Department." When we know what we want we'll specify it. The specifications must, however, be susceptible of change by our engineers so that we invite progress by material suppliers, not freeze progress.

#### Rubber! Where Do We Stand?

By J. L. Collyer, President B. F. Goodrich Co., Akron, O.

Natural rubber is no longer indispensable. The utility of synthetic rubber as an alternative has been amply demonstrated. There is still the uncertainty as to how fast large-scale production of natural rubber can be attained. No one can say with certainty how soon, or to what extent, the production cost of synthetic rubber will be further reduced or the quality improved.

Potential annual rubber supply of the world will be: 3,000,000 tons, if all producing units were operated re-(Please turn to Page 92)
Novel methods at Reynolds Metals, using three different processes, are detailed. Aluminum powders find increasingly important applications in coatings, chemical processes, pyrotechnics, powder metallurgy, silicosis treatment, aerated concrete

Aluminum Powder Production

#### By G. W. BIRDSALL Associate Editor, STEEL

FINELY divided particles of aluminum possess unique properties that make them exceptionally useful for certain applications. Minute polished flakes as used in aluminum paints "leaf" (pack like fallen leaves) to form numerous layers of vehicle between the painted surface and the overlying layers of metallic particles, cushioning the paint film against cracking, distortion and flaking off.

At the same time, they afford a high degree of protection to the underlying surface because of their unusual efficiency in reflecting light and heat waves. Such paints also are highly resistant to severe moisture, corrosive atmospheres and high temperatures (as on smokestacks, etc.).

Importance of the heat reflective feature was demonstrated by a test where a thermometer inserted between the first and second layers of felt on a built-up asphalt roof registered 150° F when it was 95° in the shade. Yet

only 15 minutes after applying aluminum roof coating, the thermometer registered 112°, an actual reduction of 38°. This indicates why all structures that house or transport highly evaporative substances, refrigerated goods, or people should be coated-at least on the roof-with aluminum paint. Evaporation losses, as well as cost of refrigeration and air conditioning can be greatly reduced by this simple expedient.

Pyrotechnics: In finely divided form, aluminum combines very readily with oxygen (burns). Aluminum has an exceptionally high heat of combustion, burning even more intensely than magnesium. In fact the extremely fine grades of flake aluminum easily become suspended in the

Fig. 1-Plant of Aluminum Pigment Division, Reynolds Metals Co., Louisville, reveals use of individual buildings to segregate machines handling various steps in production, thus minimizing explosion and fire hazards

Fig. 2-Enclosed gyratory silk cloth screen machine employs covered feed and discharge ducts to hold down powder content in the room atmosphere

Fig. 3-First step in making powder from foil is to burn off lubricant and anneal in pit-type kilns at 800°F. Heating is done in containers shown



Because of their aluminum powder content, the small "flash" fire crackers of recent July 4ths burst with a large white flame and noise fully equal to that of the big "cannon" crackers of a decade ago.

This characteristic proved valuable during the war. Aluminum powder added to the TNT content of a shell or bomb greatly increases the heat of the gas produced upon explosion, doubling the effective blast area. As a result, huge quantities of aluminum powder were used for military pyrotechnics and explosives. In normal peacetime, considerable quantities of alum-







Fig. 1

atmosphere to form an extremely hazardous mixture, as the aluminum particles will burn so rapidly than an explosion results. In powder production, considerable precautions are taken to avoid this hazard, as will be pointed out.

inum powders are used for fireworks, railroad signals, air-

Fig. 4—Primary vertical type hammer mills have 12 hammers arranged in a circle on each machine. Air jets move material under hammers, discharge it continuously as desired fineness is attained. Output is 20-mesh

Fig. 5-Two atomizing heads working from single melting furnace in building at left, discharge into ducts leading to bag houses at right where granulated aluminum powder is collected









Fig. 6-Final hammering employs machines with 16 hammers, four pots with four hammers each. Output here is as fine as 300-mesh. Continuous air agitation and ejection

Fig. 7-Certain powder types are polished in these drums by bristle brushes which revolve at 100 rpm, polish powder for periods up to 24 hr

Fig. 8-Particles are measured by sifting a sample through multiple screen stack in mechanically vibrated units shown here in the control laboratory

Fig. 9-Vacuum driers can reduce spirit content to any value desired. Dry powder can be obtained in 6-7 hr

Fig. 10-Aluminum pastes are made by grinding foil or granulated powder in ball mill, several tons of small steel balls reducing the material to desired size. A liquid serves here as a lubricant

Fig. 11-Slurry from ball mill goes through filter press as first step in removing excess liquid. Filter cake contains about 30 per cent spirits

craft signals and explosives. In all such applications, it is extremely important that the apparent density and burning rate be controlled accurately. Such control is a feature of the improved production methods employed at Reynolds Metals.

Chemical Reactions: Aluminum powders are also utilized as reducing agents in chemical processes, including preparation of alums, thermite welding and other applications where it reacts chemically to produce the desired results. In aerated concrete, the aluminum powder reacts chemically with the alkali, creating a gas which reduces weight of the concrete substantially below 120 lb per cu ft without detracting greatly from its strength. Likewise, aluminum powder in rubber dispersions forms aluminum oxide, liberating hydrogen and producing bubbles which in turn give us "foam" rubber-the new material for auto seats, davenports, chairs and beds.

By reacting chemically with dust in the lungs, aluminum powders enable the body to free itself of this dust, and thus provide a means of treating silicosis.

Calorizing: To alloy metal surfaces with aluminum by diffusion, the article to be treated is packed in a mixture of aluminum powder (5-50 per cent), aluminum oxide and aluminum chloride (about 1 per cent) and the whole heated in an inert atmosphere. Result is that aluminum is absorbed by the surface of the metal part being treated, forming an aluminum alloy.

Subsequent heat treatment at 1500-1800° F for 12-48 hr diffuses the aluminum to depths of 0.025 to 0.040-in. At the same time, it reduces the aluminum content at the surface to 25 per cent or less, sufficient to provide excellent heat enduring and sulphur corrosion resisting qualities, while providing a surface alloy that is tough and ductile.

Types of Powders: Aluminum powders can be divided into two broad classifications-flake and granulated. The length or width of a flake particle may be several hundred times its thickness; whereas the length, width and thickness of a granulated particle are all of approximately the same order, the length dimension probably not exceeding two or three times the thickness dimension. Flake particles thus are essentially flat, while granulated are more or less spherical.

Flake particles, when polished, are not easily "wetted" by usual paint vehicles, so tend to float and become paral-

When especially treated, the flakes are wetted by the vehicle and do not leaf. Such nonleafing flakes are used as pigments in production of metallic polychromatic coatings which contain a colored pigment. In these relatively new and very striking finishes, the aluminum powder particles tend to stay in the body of the lacquer, adhering to the metal surface rather than floating to the top.

Aluminum paints, inks, and other coatings utilize flake particles. Powder metallurgy, explosives, chemical reactions and similar applications employ granular particles. Paste, of course, is simply a powder mixed with a liquid. Because of the convenience in handling, many of the finer powders are used in paste form. There are many grades of powders and pastes. Space precludes a full discussion. Manufacturing Methods: At the Louisville plant of the Aluminum Pigment Division of Reynolds Metals Co., three different methods of producing aluminum powders are in use. Flake powder is produced dry by stamping or hammering extremely thin aluminum foil. Or it is produced as a paste by ball milling in a liquid, subsequently dried if a powder is wanted. Granulated powder is produced by atomizing molten aluminum. Since all three methods have novel features, each will be described in detail.

Atomization: All granulated powder produced at Reynolds is made by atomization. Pig is melted in a reverberatory type furnace, fired by a single oil burner. The stack outlet is located directly under the burner. Flame thus travels across top of furnace, turns downward at the far end to sweep across the metal bath as it returns to the stack. Furnaces comprise welded structural steel plates and shapes lined with firebrick and insulating brick.

lel with the surface. Result is that flakes "leaf" to produce overlapping flat metal surfaces that form a substantially continuous metal coating, thus being exceptionally valuable as a protective paint.

Metal is melted continuously to provide a constant level at two outside wells where the atomizing heads are immersed in the molten metal. As molten aluminum flows through a small orifice in the atomizing head, it strikes a stream of compressed air. This forms a spray of metal which is directed vertically up a stack. There it freezes to form fine particles, roughly teardrop or spherical in shape. These are then collected in bags as granulated aluminum powder.

(Please turn to Page 98)



# ASSEMBLING SMALL PARTS

While this setup in the Mansfield Works of the Westinghouse Electric Corp. is for an ordnance item, it provides manufacturers with excellent suggestions for the more efficient assembly of peacetime products and closer control over quality



86

Fig. 1-General view of production line in the Mansfield, O. works of the Westinghouse Electric Corp. for assembling the AN-M103A1 and M163 bomb fuses. None of the operations requires workers to reach more than a few inches and the entire line is unique in that many of the devices were improvised when materials were short. Conveyors were made from motorcycle

chains and sprockets. Wood blocks were mounted on the chain to carry fuses individually. Plywood turntables serve other sections of the line. A quality control manual mounted on large panels (Fig. 13) shows workers just how each step in the assembly operation is to be performed. The description which follows covers only one side of the line but it should be pointed out that it functions as a "twin" up to the soldering operation



Fig. 2-First operation requires assembly of a bearing and strap to a cup in riveting fixture with two eccentric pins. After parts are assembled in the fixture, pins are riveted over on outside of cup. Inclined rack at left holds carton of cups within easy reach of operator. Hopper, close to operator's left hand, holds enough straps for entire day's production and requires only 18-in. reach. Equally handy is bearing hopper at right of machine. Hopper for gear pins is set up on riveting machine and is within 6-in. reach. All three hoppers hold enough parts for a day's production. Parts are ejected by a lever after riveling and then tossed on the inclined tray at the right for the next operation



Fig. 3-Second operation requires assembly of a drive gear and vane holder with a locking pin which is staked after assembly. Vane cups, received from the first operator, on the inclined tray at the left, slide down into position so that standard reach for operator is 10 in. Hoppers for the drive gear and vane holders hold enough for a day's production and feed parts to 18-in. reach for operator. Pan under press holds enough pins for several days and also catches any dropped in assembly. The air press has a locating fixture providing simple, fast positioning of the assembly for the staking operation. After this operation, assembly is placed on inclined tray at operator's right. Red top tray, visible in Fig. 1, is for rejects



Fig. 4-Third operation requires assembly of two eccentric drive gears and an external gear into the vane cup assembly which arrives from the second operator on the inclined tray at the left. Standard reach is 10 in. Assembly fixture holds two cups. Gear hopper holds enough for a day's operation, feeding them to 18-in. reach of operator. Completed assembly is set aside on the motor driven turntable 10 in. to the right. In immediate foreground may be seen portable motor-driven conveyor which brings strikers from across aisle. As the fourth operation, these are fitted into the vane cups on the turntable. Note tray above gear hopper for rejects



Fig. 5-Fifth operation requires the assembly of three screws through the cup into the groove of the internal gear. Cup assembly is taken from the turntable at the left, screws are placed in holding collar on air motor and cup assembly is placed in slider on assembly fixture. Screws are then assembled with air driver. Hopper holds enough screws, within 7-in. reach, for day's operation. Assembly is placed on second power-driven turntable at right. Slide pallet above the screw hopper, painted red, is used for rejects



Fig. 6-Two keys and two screws are added to the cup assembly in the sixth operation. Cup assembly is taken from turntable at left and placed in fixture. Screws are placed in holding collar on air motor and keys attached. Assembly then is placed on top chain conveyor and taken to battery of air testing devices next in line. Enough keys and screws are within 6-in. reach for day's operation. Slide tray above hopper is for rejects



Fig. 7-Next, air test operators take the assembly from the top conveyor and place it in an air test fixture. After testing, it is placed on bottom conveyor carrying it to the fluxing and soldering station. Red pallets beside the air test machines are for rejects

Fig. 9-Prior to sealing, it is necessary to "set" the vane cup assembly with the proper number of turns. Assemblies are picked up from conveyor as they come from the left, set on machine in background and placed back on the conveyor



Fig. 8-The bottom chain conveyor carries the assemblies from the air testing station to the soldering station. As the seventh operation, flux is applied to the five screw heads with a brush as the assemblies pass the operators without removing the assembly from the line. The eighth operation requires the soldering of the five screw heads to the vane cup. The cups are removed from the line as they arrive at the operator's left, soldered by means of conveniently placed irons and placed back on the line. All excess flux is removed in the ninth operation by the next operator. After wiping, the assemblies again are placed back on the conveyor. Note that the hood used for carrying away excess fumes also serves as mount for soldering iron



from the turn setting operation by the bottom conveyor and a car seal attached while the conveyor is in motion. The hopper for the car seals running the full length of the conveyor enables operators to secure car seal from any position along the line

Fig. 10-For the next operation, the vane cups are brought

Fig. 11-The unit then is removed from the conveyor and the seal secured by an air press. This press has a positioning yoke eliminating the necessity of an accurate location of the seal



Fig. 12—The vane cup assembly is brought from the sealing operation by the top conveyor to the next operator for packing. Note that top of carton is only slightly above bench level. Tape machine is located at right of operator. All items are within 18-in, reach



Fig. 13-Shown here is a close-up of the large quality control panel at the left in Fig. 1. This and other sections of the quality control manual placed in full view of operators aid in maintaining close control over dimensions, fit, finish and other factors necessary in producing an acceptable finished product



HIGH damping capacity of gray cast iron in tool shanks or bodies of milling cutters, boring tools, etc., contributes to the smooth cutting and finishing operations necessary to produce a fine finish. Rigidity, as expressed by greater resistance to deformation or loading, combined with the corresponding resistance to compressive and shear loads which the high strength alloyed cast irons possess, make them especially suitable for tool holder service in maintaining an accurate cut.

There are three grades of cast iron based on tensile strength which combine desirable properties and are procurable under existing ASTM specifications. These may be designated or specified as shown in table on page 124. Cast irons can be readily cast to necessary shapes, they lend themselves to machining and little difficulty is encountered in brazing them. In addition, they possess the ability to conduct heat and have a rate of thermal expansion not appreciably different from that of machine steel or ordinary cast iron. These high test irons may be made in any well managed foundry capable of delivering castings to meet any specification of strength properties established by the American Society for Testing Materials.

Data made available by International Nickel Co. and makers of tools covers recommended high strength irons and methods for applying various types of cutting materials

/T.E.E.L

Shank dimensions may be designed to correspond to shapes required or to dimensions outlined for tipped tools as illustrated in the American Society of Tool Engineers' data sheets listed under tool manufacturers such as Haynes-Stellite Co., McKenna Metals Co., Carboloy Co., Firth-Sterling Steel Co., Vanadium-Alloys Steel Co., etc.

It is often worthwhile to carry in stock a wide range of tool shapes suitable for the more common cutting operations. When necessary, special modifications may be rapidly prepared from them. The rough castings may be machined to accommodate tool steel tips or carbide tips, depending upon machining operation which is to be performed. For heavy roughing cuts, tool steel tips may be used; for light, high-speed cuts carbide tips may be preferable. Seats can be machined to accommodate cutting tips and to provide desired cutting angles. Cast iron of the types referred to in the table is particularly suitable for high-speed cutting where the damping capacity or vibration-absorbing properties of the material assist in delivering a smooth finish. Vibrations which might produce chatter, which in turn lead to roughened finishes and reduced tool tip life, are absorbed and thus a smooth cut is provided.

In general, the practice of fastening tool tips to high test cast iron shanks and bodies consists of machining the

described.

cooling.

Fig. 2-After all surfaces have been cleaned with a grease solvent such as carbon tetrachloride, the recess in the tool shank or tool body is coated with a thin layer of silver brazing flux

Fig. 3-In a Sandwich Braze, a sheet of ductile metal (such as constantan) is inserted between two sheets of silver-brazing allow



\* January 14, 1946

casting to proper shape for receiving the tip and, frequently, joining the tip and casting by furnace brazing with silver, brass or copper.

A recess in shank or body should be machined or ground to match the tip. Both the recess and tip to be brazed should have fairly smooth surfaces-a milled surface or its equivalent is satisfactory. Also, they should be cleaned with a good grease solvent such as carbon tetrachloride, and dried before joining.

Tool tips may be either the carbide types such as Carboloy, Kennametal, etc.; cast alloy tips such at Stellite, forged high-speed steel or high-carbon tool steel types, depending upon the severity of the cutting operation for which the tool is intended.

Fragments of broken high-speed steel or carbide tools may be ground to suitable shape to form tool tips, and brazed on to high test cast iron shanks in the manner to be

There are five important steps in applying tipping tools: (1) Cleaning, (2) fluxing, (3) heating, (4) brazing and (5)

Heating methods include: (a) Oxyacetylene torch, (Please turn to Page 124)

Fig. 1-(a) The tip is secured to the shank by brazing. (b) A strip of 0.003-0.005-in, thick silver-brazing alloy is cut slightly larger than the bottom and side contact surfaces and fitted to the recess

Fig. 4-Heat is applied to the Sandwich Braze as for the ordinary braze. If the tip moves, a holding rod is used to keep the tip in place until the flux stops bubbling

Fig. 5—The practice for furnace brazing follows the same general procedure as for torch brazing except that the brazing metal is pre-placed and the tips are wired into position with nichrome wire

## SAE Technical Papers

#### (Concluded from Page 81)

gardless of economic factors. Yet the most careful estimates of world demand for rubber during the immediate postwar years indicate that it will be approximately 1,500,000 tons annually. So the world will be confronted with a vast over-supply as natural rubber production increases.

It is estimated that for the next five years, America's rubber needs will average 825,000 tons a year, or over 25 per cent greater than in 1940. Thus, after providing 200,-000 to 300,000 tons of security synthetic rubber, there will be left an average of 525,000 to 625,000 tons a year—a high prewar total rubber consumption level—where the choice of materials should be governed by competition.

These three considerations—military security, greatest consumer value, and expansion of rubber uses are the keys to an enlightened rubber policy for the United States and for the world.

The reality of low cost, high value American synthetic rubbers is the pivot on which postwar rubber developments will turn.

# **Combustion Studies of Diesels**

By E. W. Landen Research Dept., Caterpillar Tractor Co., Peoria, Ill.

Part I of this paper presents some quantitative results on fuels having specific characteristics. Thermally and catalytically cracked fuels for diesel engines have the desirable quality of low pour point but the autoignition quality is not comparable to the normal paraffin fuels. Ignition promoters, when added to these cracked fuels, may make a highly desirable product.

Exhaust smoke measurements were made from each fuel sample while burning in the 12 to 1 compression ratio engine. Fuels having a distillation range of 400 to 500° F produced little smoke. Exhaust smoke from low distillation range fuels was black while that from high distillation range fuels had a bluish cast.

Data show that rate of pressure rise is lower for higher cetane fuels and is higher in the direct injection engine as the timing is advanced.

Peak cylinder pressure became higher: As the cetane of the fuel was lower, as the timing was advanced in the direct injecting engine, as the compression ratio was increased.

The volatility of these fuels seemed to have a very slight effect either on the rate of pressure rise or the peak pressure as measured in these experiments.

Part II of this paper is more qualitative in nature because the work is still in progress. The author discusses flame temperature, emission spectroscopy and absorption spectra in detail.

# **Development of Jet Engine**

By F. C. Mock Bendix Products Division Bendix Aviation Corp., Detroit

This paper sets forth the more essential factors of jet engine combustion and gives some idea of the broad possibilities of improvement that exist in the use of graduated air velocity, controlled turbulence, and impact heating of the fuel spray.

One of the most effective factors determining the propagation rate is the initial air temperature, and this in turn follows the compression rise, and consequently the engine speed. It is believed that one reason why critical conditions of combustion affect the intermediate rather than the high speed range with certain burners, is this difference in compression temperature.

To achieve the desired high liberation of energy within small volume of combustion, it is necessary to employ a fairly high degree of air turbulence; and since turbulence under certain conditions will oppose the spread of flame, turbulence control is one of the most vital and difficult problems in burner development.

Major requirement in obtaining a quick start is to positively assure fuel spray at the spark gap. This is largely a matter of nozzle study, modified somewhat by the airflow effect in the burner.

Of equal importance is provision for consistent positive sparking, with provision against rapid carbon deposit, and against general flooding with fuel in the region where the points issue from the insulator.

# **Combustion in Diesel Engines**

By H. F. Bryan International Harvester Co., Chicago

This paper discusses some of the characteristics of the precombustion chamber type diesel engine under full load at 550 to 600 rpm. This engine has a normal governed speed of 1300 to 1400 rpm.

Although considerable progress has been made in the standardization of the ignition quality of diesel fuels, the demand for smoother, cleaner, diesel engine operation is increasing. Evidently combustion control will become as important a factor in diesel engine design as it is now in the spark ignition engine.

Combustion in the precombustion chamber type diesel engine follows the turbulent motion of the fuel spray and air and it is not possible to clearly define the boundries of the burned and unburned gases once the mass of fuel and air is ignited. Combustion proceeds at approximately constant pressure because of the large ratio of air to fuel in the chamber. The rate of flame propagation is comparatively slow. No signs of intense radiation usually associated with diesel combustion can be observed. Combustion is practically smokeless. The point in the chamber at which combustion starts has a great influence on smoke.

Maximum rate of burning must occur in the first onethird of the combustion period for satisfactory detonation control and optimum smoothness of operation in the spark ignition engine. Data now available indicate that for best diesel performance the maximum rate of burning should occur in the last half of the combustion period, also that the position of top center in relation to the maximum rate is of prime importance.

Recording of accurate indicator cards and accurate determination of the rate of fuel injection under engine operating conditions are essential to this work. Lack of satisfactory instruments has been a serious handicap in the past.



42" Five Stand Tandem Cold Mill for Rolling Tin Plate Gauges

First in the industry with the Four-High Tandem Cold Tin Mill, Mesta has constantly maintained its position of leadership, and is building mills with delivery speeds which yesterday were considered impossible. These mills feature new types of drives and control systems which maintain synchronization during acceleration, deceleration and at normal operating speeds.



# BUY VICTORY BONDS

# MESTA MACHINE CO., PITTSBURGH, PA.

Fig. 1 (right)—Electronic tracing equipment installed on Oxygraph cutting machine. It may be installed in place of usual manual tracing device on any pantographtype machine

Fig. 2 (below)—Cut steel shapes such as these show ability of electronic control to follow any angle, contour or corner with accuracy



# ELECTRONIC TRACING DEVICE

Control of cutting torch is absolute with "electric eye" which follows outline of drawn patterns, thus eliminating metal and wood templates and other mechanical or auxiliary guiding devices formerly used

control box. Tracing head is a self-contained unit replacing the manual or magnetic device and is attached in the same manner to the bar on standard pantograph type machines. Control box, which contains thyratron and amplifier tubes and electronic circuit, is attached to the machine base.

Shapes are cut quickly and without mechanical aids or human assistance. Tracing head controls torch movement by following the outline of a drawing or silhouette of the desired pattern. Templates required for electronically controlled cutting are simple outline drawings or silhouettes which may be prepared by a variety of methods from paper, cardboard or plastic material. Black ink, or heavy pencil lines on white paper, silhouettes inked on white background or the paper doll method of mounting the design cut from black paper on a white background are methods which give satisfactory results. If a line is used for the outline method, it should be approximately 1/8-in. wide. In addition to the white background, other color combinations may be used providing that sufficient contrast is obtained.

New fields of application have been opened in machine production cutting through the chain method of reproduction. In this method, a series of identical shapes are drawn on the template and connected with a continuous line, making production cutting of several pieces possible in a single operation.

Operation of steering motor is controlled by light emitted from base of tracing head which is reflected back from the drawing or silhouette and picked up by phototubes. This light which follows the outline of the drawing or silhouette is projected in the form of a (Please turn to Page 128)

ease turn to rage 120)

ACCURACY of tracing with the Electronic Bloodhound, a device employing photoelectric cell or "electric eye", is within a very few thousandths of an inch. In addition, this electronic tracing device for pantograph type oxyacetylene cutting machines simplifies steel cutting operations, makes intricate design cutting practical, and expands the present application of torch cutting machines in industry. This control device is made by Air Reduction Sales Co., 60 East 42nd Street, New York.

Tracing equipment, developed by General Electric and Air Reduction, consists of two units—the tracing head and

# Hot-Dip Galvanized Tanks *last longest*



PROTECT your steel storage tanks—and all other exposed installations against the ravages of rust and corrosion with *molten zinc*—the best possible rust preventive—when applied by the Hanlon-Gregory method of Hot-Dip Galvanizing. For longer life, greater uninterrupted service and substantial savings in maintenance, specify Hot-Dip Galvanizing.

Hanlon-Gregory places the facilities of the world's largest job galvanizing plant at your disposal. We shall be glad to discuss the application of Hot-Dip Galvanizing to your products—regardless of the quantity.

THE WORLD'S LARGESTAJOB GALVANIZING PLANT



Physical properties and processing methods are presented for zinc in wide variety of new forms and shapes in which it now is available

> By L. E. BROWNE Associate Editor STEEL

operations necessary and then to the cutting department for cutting to specified lengths. After inspection, extrusions are turned over to the shipping department for shipment to the customer.

Extreme density is obtainable with extrusion; finish is smoother, less machining is necessary and polishing is easier. In the production of round wire, the minimum fa-in. diameter coincides with the development of a production metallizing gun taking that size for the first time.

Extruded shapes are produced in commercial grades, special high grade, in the following alloys: ZC-1, zinc 99.00 per cent, copper 1.00 per cent; ZC-2, zinc 98.00 per cent, copper 2.00 per cent; Z-3 (identical to Zamak No. 3 alloy), aluminum 4.30-3.90 per cent, copper 0.03 per cent max, magnesium 0.06-0.03 per cent, iron 0.075 max, lead 0.003 per cent max, cadmium 0.003 per cent max, tin 0.001 per cent max, and zinc, balance; Z-5 (identical to Zamak No. 5 alloy) aluminum 4.30-3.90 per cent; copper 1.25-0.75 per cent, magnesium 0.06-0.03 per cent, iron 0.075 per cent max, lead 0.003 per cent max, cadmium 0.003 per cent max, tin 0.001 per cent max, zinc, balance.

Rods, wire, bars and rectangles are extruded in these grades and coiled strip in the commercial grades and ZC-1 (Please turn to Page 130)

These are some of the new forms in which zinc now is being produced commercially. Zinc extrusions have extremely dense grain

inc Extrusions

EXTRUDED zinc and zinc alloy products in a wide range of shapes, rods, wire, bars, rectangles, coiled strip, welding rods and special forms are now in production on a commercial basis, broadening industrial application of that metal. Extrusions in identical grades and alloys used in die castings, as well as high-grade and commercial types of zinc are now produced by the White Metal Rolling & Stamping Corp., Brooklyn, N. Y.

From hot round billets extrusions are produced by the vertical inverse method —solid metal being forced by great pressure through a steel die orifice corresponding to the finished shape desired. The affinity of zinc to steel, notably under severe pressure required in extrusion practice, made the solving of die problems a difficult one.

The production cycle for zinc extrusions begins in the melting room where all required billets are produced. Melting is accomplished in a refractory lined furnace to prevent iron absorption or contamination. The furnace is so constructed to permit tilt-pouring of clean sound metal into special designed molds. After cooling, the casting head or gate is removed by sawing and then delivered to the extrusion room.

Prior to the actual extrusion operation, billets are preheated in ovens to elevated temperatures. These temperatures are wholly dependent on the nature of the extrusion—that is, the general size or shape to be produced.

After preheating billets are placed into the container of the extrusion press. Subsequently hydraulic pressure on the press ram forces the solid metal through the die orifice. When the extrusion has reached the maximum length, the loft operator cuts the section with an airoperated circular saw and passes same into an inclined trough for cooling.

Later, lengths are placed on racktrucks and delivered first to the straightening department for any straightening





# Light Bite

# ora

# Mouthful

# Hy-Draulic Shaper-Planer Work Is ACCURATE • FAST • EASY

Handy, powerful, durable, the Hy-Draulic Shaper-Planer is particularly effective on pieces that are too big for large shapers yet too small for economical production on planers. Accurate, fast, easy to operate. It handles such a wide variety of work, light, medium and heavy, that it quickly becomes one of your most profitable investments. Investigate the advantages of hydraulic drive and feeds in the Rockford Hy-Draulic Shaper-Planer. Write, today, for Bulletin 2909.



- Above, left . . . . A 120' stroke Hy-Draulic Shaper-Planer, planing dovetails on cast-iron slides. Extra crossrail head reduces planing time.
- Above, right.... Same Shaper-Planer roughing a gang of cast steel steering gear parts. Note crossrail head and side head are both working on intermittent cuts.



**ROCKFORD HY-DRAULIC SHAPER-PLANERS** Available in stroke-lengths of 42°, 66°, 90°, 120° and 144°. Hy-Draulic Shaper-Planer speeds and feeds are infinitely adjustable in specified ranges. Economical standard constant speed electric motor drives bydraulic unit.



# Aluminum Powder

(Continued from Page 85)

Each of the two outside wells contains two atomizers which use heated compressed air at 1200° F which is forced out of a <sup>1</sup>/<sub>8</sub>-in. jet or nozzle opening. The two atomizing heads in each well discharge into a common duct which rises vertically for about 20 ft and then extends horizontally to the bag house, a distance of approximately 100 ft.

Large Output: A single furnace with its four atomizers produces some 25,000 lb of aluminum powder every 24 hr. However, operation is not continuous, being broken up into three shifts with time out to clean dross from the furnace and to empty the bags at end of each shift. Usual operation is from 8 a.m. to 2:30 p.m. without stopping. Then furnace and bags are cleaned up ready to start the second run from 4 p.m. to 10:30 p.m.; with the subsequent cleanup followed by the third run from midnight to 6:30 a.m.

Atomization is also a suitable method for the production of powders of other metals that melt below 1300° F, including lead, cadmium, tin and zinc. Another method of producing granulated aluminum powder is to stir the molten metal as it freezes. This causes it to form a coarse granular material like sugar. However, these other metals and this latter method are not used at Reynolds.

At the extreme left in Fig. 5 can be seen a portion of the small building containing one of the melting furnaces with its atomizers. The two ducts lead from this structure to the two bag houses at the right.

Special Plant Construction: Regardless of the extreme precautions to guard against an explosion, there is always that possibility when working with powdered aluminum. So the entire plant is planned to minimize the damage that might result and to reduce the hazard to the workmen.

As can be seen in Fig. 1, the most important factor is the separation of the individual manufacturing operations and their segregation into individual buildings. In turn, the buildings are spaced sufficiently far apart to localize any damage that might occur. Too, the buildings are constructed with rather solid walls and exceptionally light roofs so that most of the effect of a blast would be directed upwards, again minimizing damage.



OVERLAPPING rubber lips applied to a slide fastener (see accompanying diagram) to provide an effective and complete seal to any pressures which can be withstood by structural strength of fastener is a development of B. F. Goodrich Co., Akron. Seal will not let gases or liquids through even under high pressures.

Among potential uses for the pressure sealing zipper are: Pressure ducts, such as those on commercial dust collectors, which can be tightly sealed and yet be easily accessible for maintenance and cleaning; dark room tents which can be kept lighttight and airtight without cumbersome flaps; carrying cases where sealing against water is important; weather scals, where zipper keeps out both air and water; and doorways, where dust, dirt and moisture must be excluded.

Zippers are reported to be effective in a wide temperature range, the rubber not cracking at minus 70° F nor becoming soft or tacky at 150° F, and weatherability is good, the compound having stood up well in aging tests. There are three styles: No. 400, a nonseparating type which seals throughout entire length but is open at top, with slider operated from either or both sides; No. 410, separating type, which seals for entire length but not at ends, with slider operated from either or both sides; and No. 420, nonseparating type, which seals at both ends and along entire length, with slider operating from side.



Bag houses at right in Fig. 5 utilize another means of minimizing blast effects. These structures have large windows which are kept open to aid natural ventilation and afford ready outlet. Too, the walls are covered with light sheet metal panels which can be replaced easily.

Of course, rather elaborate precautions are taken to avoid hazardous conditions. All motors, switches, lights, etc. are the explosion proof type. Every workman in the plant is given ample time to do his job. This is an important factor because handling of aluminum powder must be done leasurely for it is so light that it easily becomes suspended in air when poured or moved about rapidly.

Besides being careful to avoid explosive mixtures of powder in the air, every means is taken to prevent any condition that would ignite the powder. Flake aluminum powder can be ignited with a match or spark and will burn fiercely. The use of water, carbon dioxide and other conventional fire extinguishers on such fires is almost sure to result in an explosion.

Fire hazards are controlled by good plant housekeeping and by keeping the powder in small amounts in individual covered containers, thus reducing amount of material at any single point. A ground wire is attached to every container.

All buildings are equipped with numerous lightning rods to reduce lightning hazards. And each machine is carefully grounded. Since each individual powder particle has an oxide coating which insulates it electrically, it is possible for static charges to build up in a powder to a point where a spark can result. For this reason, in certain operations, the powder is allowed to remain in the machine for a sufficient period of time to dissipate any charges that may have built up.

Many operations can take place without supervision, once the machines have been loaded and started. This permits the operators to retire to another area, thus minimizing hazard to personnel. Since some people may be allergic to the mineral spirits used in paste production, employees are examined periodically. In general, powder production involves no health hazards.

Stamping Flake Powder: Whereas production of powder by atomization is a fairly simple process involving essentially a single operation, producing flake powder by stamping requires a number of operations. Particle size and character is controlled in atomizing by adjusting the temperature of the molten metal and the air blast and by regulating the air pressure. In stamping, many more factors enter the picture. Thickness of original foil material, length of time in



GUARANTEED

TO OUT-WEAR

OUT-LAST

ANY SHOVEL MADE

Moly Shovels, spades and scoops are made in all required types, styles, sizes and weights.

REG. U.S. PAT. OFF

Unconditionally SUPER-TOUGH ... LONGER WEARING Mo-lyb-den-STEEL

> A Plus-Premium Quality Product of THE WOOD SHOVEL AND TOOL CO. PIQUA, OHIO

> > A national organization specializing exclusively in Shovels, Spades and Scoops



each of the various stages of hammering, amount of air agitation and polishing, etc., all have an influence.

Raw material for stamped flake powder is largely pure aluminum foil that comes from the Reynolds foil plants. This foil is extremely thin, ranging from 0.001 down to 0.00017-in. in thickness.

First step in the powder plant is to anneal the baled foil in pit type kilns at a temperature of about  $800^{\circ}$  F. This is sufficient to burn off any lubricant remaining from rolling and also removes effects of work hardening so the material is soft as it comes from the furnaces shown in Fig. 3. Bales measure  $18 \times 18 \times 30$  in, and weigh about 200 lb each. An overhead hoist on a monorail bridge helps in loading and unloading the bales from the furnaces and handling the sectional furnace covers.

Stamping Sequence: The clean annealed foil now goes to a rotary type hammer mill which reduces the foil so it will all pass through a screen with ¾-in, openings.

Now material goes to a second building where the next step is hammering in the vertical mills shown in Fig. 4. These have 12 individual piston-like hammers with weights on their upper ends. Hammers are lifted by a rotary cam and allowed to fall by their own weight. Resulting blows against the material placed in the work chamber reduce the size of the foil pieces rapidly. Foil particles now will pass through a screen with 20 openings to the inch (20-mesh screen). Additional material is loaded into the mill at frequent intervals, while discharge from the mill is continuous. Air directed continuously against the material in the mill agitates it and carries it away when proper fineness has been reached.

From here, the material goes to a third building and into another type of mill shown in Fig. 6. These units have 16 hammers with 4 hammers per pot. They operate somewhat faster. Material is charged into the pots every hour, discharge being continuous. Powder coming from these units will pass through 40 to 300-mesh screens, depending upon the time treated.

Air is also used in these hammer mills to convey the material from point to point, providing the means for agitating and moving the material around in the pot to assure that all portions of it are worked equally. The air helps to keep the temperature down, also. Size of par-

Simple Fixture FOR Tapers

#### **ELIMINATES COMPUTATION**

A fixture to hold t a p e r e d parts in a measuring m a c h i n e has been devised to simplify the checking of tapers and to eliminate also necessity of a long mathematical process for e a c h part.

The clamping fixture, worked out at General Electric's Pittsfield Works, consists of a base with an attached upright block, and a holding clamp. To use the fixture the taper is clamped into place, two identical rollers measure the diameter of the taper at the bottom and, setting the rollers on identical Jo-blocks, a measurement is made at another diameter.

With the known diameter of the roller and the height, obtained by raising the rollers, the angle of taper per foot can be found in any machinist's



handbook. If the values found agree with the required values, the indicator readings will show any variation in each succeeding taper. ticles discharged is influenced by the air pressure and size of jet or nozzle opening.

To prevent the small particles from becoming welded together under the hammer blows, a lubricant in the form of stearic acid is employed.

Screening To Grade: Coming from the hammer mills, the powder contains certain oversize pieces that are screened out by passing the material through a silk cloth held in a frame and given a fast, powerful gyratory motion by an eccentric motor drive. As seen in Fig. 2, the silk screen is set at an angle with the material to be screened fed in at the top through a funnel-like arrangement.

Discharge or under side of the screen is fully enclosed to prevent the fine material from becoming suspended in the air in the screen house, this operation, of course, being done in an individual building separated from the others in the plant.

A typical silk screen will be 100 mesh; that is, it will have 100 openings to the inch. Screens measure about  $3 \times 7$  ft working area. Some 150 lb of powder can be put through such a screen in an hour. Note cloth spout connecting both input and output of screen to containers. Static wires to all containers are specially important because no matter how much care is taken in handling the powder, some will become suspended in the air.

Material that does not pass through the screen is taken back and reworked in the hammer mills. The hammering produces flake type powder, the characteristics of which can be varied considerably according to the hammering or stamping cycle.

The powder is now ready for use for explosives and other special applications. But for aluminum paints where the leafing characteristic is important, the powder goes through another operation.

Polishing The Powder: Yes, the powder particles are actually polished. This is done in drums shown in Fig. 7. These drums are 4 ft long, 3 ft in diameter. Each drum is equipped with six bristle brushes that revolve at 100 rpm. Particles are polished for a period varying from 16 to 24 hr. About 100 lb of powder is charged into each drum. Due to length of time required for this stage of the work, a large number of drums are employed to afford the output desired.

Because of the friction inherent in polishing with brushes, static charges tend to collect on the individual powder particles. Although metallic themselves, each particle is always covered with a layer of thin oxide that is an insulator. To prevent possibility of sparks from these accumulated static charges when removing the powder from the drum, it is allowed to rest quietly in the drum for a considerable length of time after brushing to



to lower foming costs

# ... and you get them all with Heppenstall Die Blocks

Heppenstall Die Blocks start you off with a substantial, competitive advantage. Heppenstall's *patented* analysis steel, heat treated by Heppenstall's *exclusive* Hardtem process assures (1) easier machinability, (2) adaptation for use without heat treatment by the user, (3) an impression that can be resunk repeatedly without annealing, (4) a block that can be replaced in service without hardening, and of course, (5) *more forging per sinking*... This may be your answer to stiffer competition. Contact your nearest Heppenstall salesman.





Heppenstall Co. Pittsburgh 1, Pa.

The most dependable name in forgings

# ALL 10 TYPES OF OZALID PRINTS are made in <u>SECONDS</u>!





YOU ORDER the type of Ozalid print best suited for the job at hand... whenever you want a reproduction of an engineering drawing, specification sheet, typed report, or other original. Each type of print has its advantages!

YOUR PRINT is made in seconds-no matter what your choice. For all OZALID

PRINTS

prints are produced in the same manner -Exposed and Dry Developed-that's all. And, no stopping when you change from one type of print production to another.

**EACH PRINT** is a positive—not a negative —reproduction of the original. Easier to read and check! Identifying colors may be assigned to prints of different departments...and prints made on paper, cloth, foil, or film to suit job conditions. Ozalid Chartfilm, for example, is oilproof, waterproof. Can be cleaned with a damp rag.

**ROUTINE WITH OZALID**—impossible with any other printmaking process: 1. Continuous tone prints of photographic subjects; 2. Transparent film prints which can be overlaid to show separate details; 3. "Intermediate" prints which simplify design changes; 4. Ten types of prints instead of I, which save time, labor, and materials.

See all 10 types of Ozalid prints... and learn complete story. Write for free catalogue No. 31





DIVISION OF GENERAL ANILINE & FILM CORPORATION JOHNSON CITY, NEW YORK

Ozalid in Canada-Hughes-Owens Co., Ltd., Montreal

dissipate any accumulated static charges.

Brushing also changes the apparent density of the powder. A 55-gal container that will hold 250 lb of unpolished powder will hold 300 lb of the same powder after polishing. Thus polishing affords another means of controlling density.

Whereas granular powder of 100 mesh may have an apparent density of about 1 (same weight as water, per unit of volume), flake powder for certain explosive applications may have an apparent density ranging from 0.2 to 0.5 with most paints using polished aluminum flake powder of 0.2 to 0.3 apparent density value.

Another screening occurs after polishing. Then inspection and grading follow before shipment.

Checking Particle Size: "Mesh fineness" or "particle size" can be extremely misleading unless exact testing procedure is specified. A standard 100-mesh powder will have 90 per cent through a 200mesh screen and 80 per cent through a 325-mesh screen. Yet the percentage retained on these two screens may vary widely for other so-called "100-mesh" powders. Variations in size of sample used, length of sifting period, use of mechanical sifting devices, etc.—all seriously affect results.

For example, on a mechanical sifter run for many hours with a small sample, retention on a certain screen may be only 1 or 2 per cent. Yet this same powder tested by a recognized method may show 16 to 20 per cent retention on the same screen. For this reason, Reynolds engineers recommend the proposed method of the ASTM as offering the most consistent and truest evaluation of particle size.

Similarly, leafing properties must be checked by a standardized method if results are to be consistent. This also applies to stability tests for aluminum pastes and checks for opacity, smoothness, sag and color of aluminum paints.

**Production Control:** Reynolds control methods, in addition to complete facilities for checking particle size, leafing qualities, etc., also include "filing" of samples from every batch for a permanent record that can be checked again at any time. Fig. 8 is a view showing a portion of the control laboratory and three of the mechanical screening units. Note that screens are stacked 12-high, facilitating simultaneous multiple screening of a sample.

A good portion of the successful application of the many different types and grades of aluminum powders and pastes by Reynolds engineers is due to the extremely effective control methods employed and the ability to produce exactly the right powder for a particular job. Space here prevents detailed discussion of this phase of powder production. However, some idea of the close control given every stage can be had from the fact that a sample is taken from each room (every stage of production) at the end of each shift and carefully checked.

**Producing Aluminum Pastes:** This review of Reynolds production methods would not be complete without looking at paste production. Most pastes are made by reducing foil or granulated powder by grinding with steel balls in a ball mill like that in Fig. 10.

As grinding progresses, the aluminum particles are flattened out and additional surface area produced. If this paste were then dried to powder in an inert atmosphere, it would result in flash oxidation and an explosion upon exposure to the atmosphere, due to aluminum's great affinity for oxygen. To prevent any such possibility, air is supplied continuously to oxidize the new surfaces as fast as they are formed.

From the ball mills, the slurry goes through a filter press to begin the removal of excess liquid. The operator in Fig. 11 is holding a filter cake just taken from the plate and frame type filter press. It contains about 70 per cent aluminum with 30 per cent spirits. When the filter is first started, some powder comes through, but the cake builds up rapidly and that coming through first is re-run to be caught in the cake.

Vacuum driers, Fig. 9, then reduce the spirit content to any value desired. A very high vacuum equivalent to 1 mm of mercury can be produced in these driers, each of which handles 500 lb of paste at a time. Operation for 2 hr will remove 90 per cent of the remaining spirits while 6-7 hr will completely dry the mixture when dry powder is desired. Thus powder as well as paste can be made in this manner.

# Correction

In the opening sentence of "Carbon Lining for Blast Furnace," page 62, of the Dcc. 31, 1945, issue, STEEL, reference was made to Carnegie-Illinois Steel Corp. This should have read "a Pennsylvania operator."

Cushioned Movement

## ... on dial indicators improves precision gaging

TESTS made on available type of shock absorbing mechanisms as applied to dial indicators have resulted in a new mechanism, termed cushioned movement, for improving precision gaging. Its function is to absorb the impact of sharp blows or rough handling so that the force is cushioned before it reaches the small gear teeth, jewels, pivots or other intricate parts of the indicator mechanism. Indicator movement, size, and appearance have not been changed.

Use under various trying conditions has shown the value and practicability of cushioned movement. One manufacturer was said to check the depth of more than 40,000 fuse parts a day without trouble or repairs on the indicator. An indicator, used 16 hr per day, 6 days per week, was claimed to be in perfect condition and its repetitive accuracy unimpaired.

Regular indicators also manufactured by Federal Products Corp., Providence, R. I., having AGD. range in C, D and E sizes (English dials) and P, Q and R sizes (metric dials) are furnished with company's cushioned movement. Exceptions are models E3BS and Q6IS. Regular indicators now in use, with exception of B sizes, may be returned to the company for installation of the movement at nominal cost.





By JAMES F. SMYTHE Applied Engineering Dept. Air Reduction Sales Co.

Technique devised to eliminate machining in semifinishing breechblocks suggests economies to be obtained in peacetime production

DOUBLING potential production of breech blocks was made possible during the war through application of electricallycontrolled flame-cutting machines which eliminated machining operations in semifinishing the blocks. This precision equipment combined into a single integrated operation the formerly separate machining operations of severance and profiling, thus bringing about a 53 per cent increase in actual production and a 50 per cent reduction in man-hours, with an impressive decrease in costs.

Analysis of the job under broaching showed that the procedure was broken down into two stages. Three  $1\frac{1}{4}$ -in. square bars were cut into 6-in. lengths by the use of three friction cut-off saws. Second, the  $1\frac{1}{4} \times 1\frac{1}{4} \times 6$ -in. pieces were shaped into rough outlines by two successive broaching operations.

A cost-time study indicated that production at the first stage was 50 pieces per saw, or a total of 150 pieces per hr at an expenditure of four man-hours plus the replacement cost of the friction cutoff wheels. This last ran about \$925 per saw per month. In the second stage, production averaged 35 semifinished pieces per machine or a total of 70 pieces per hr at a cost of two man-hours of labor plus the replacement cost of the broaches, which ran about \$1350 per month for each of the four broaches.

#### Semifinishing One Operation

By utilization of flame-cutting techniques, it was apparent semifinishing could be transformed into a single operation. Steel cams for automatic tracing were constructed, and a sample operation was conducted on an Oxygraph at another company in order to establish a basis for reliable comparison and calculation. A trial run of 50 pieces showed that flame-cutting was particularly well suited for the operation in both relative costs and mechanical aspects.

As rate of production had to be increased to a point obviously beyond the capacity of the original plant setup, the eight-torch No. 6A Oxygraph, shown in Fig. 1, was procured. Fig. 2 shows the positioning jigs on the Oxygraph that made possible a high rate of production. Lateral positioning was provided by pressure of individual coil springs on a transverse bar. These provided a constant thrust which held the bars tightly against fixed stops at the left edges of the bars. Longitudinal positioning was provided by an angle-iron stop erected in front of the machine. Therefore, after each successive cut, the bars were brought into position for the following cut by merely bringing the bars forward until they were in contact with the angle-iron stop. Another positive feature of the setup was the roller table which extended back of the cutting table. This provided for the use of very long bars and progressive feeding. In this way, materials handling and interrupted operations were reduced to a minimum.

After the machine was placed in operation, production rose to 230 profiled picces per hour, as compared to the (*Please turn to Page* 131)

# Important Message

# to all interested in production of precision flat form contours

Contours like these can be produced more economically and accurately by a proven crush form grinding process known as Thompson Truforming. (REGISTERED TRADEMARK) The ONLY machine that is completely engineered and built for crush form grinding precision contours is the new Thompson Truform Grinder.



To meet individual requirements, various types of automatic Thompson Truform Grinders are available. For advantages and complete Crush Form Grinding pictorial production explanation send for this new book. Send coupon for free copy COPYRIGHT 1945 THE THOMPSON LABORATORY CONTOU ORM The Thompson Grinder Co., Inc., Dept. 13, Springfield, Ohio Gentlemen: Please send me your new 16 page pictorial book describing Thompson Truforming (Crush Form Grinding on Surface Grinders). Name\_\_\_ Position Company. Address

Zone\_

State

City\_





EVALUATION of either solution or metal is feasible with a recently developed, accelerated total-immersion corrosion test. A wide latitude of conditions is obtainable with the apparatus employed to circulate the solution and the test conditions of total immersion and of motion simulate conditions met in practice.

Left tube, Fig. 2, is one of several tubes clamped to beam A of Fig. 1, held in suspension at each end by rods pivoted at the upper end to a rocker frame. Part B, Fig. 1 is the rack for tubes holding the samples; C, in the same figure is the support for fixed tubes. The rocker-frame is oscillated by a rigid member attached to the periphery of a drive wheel D connected to an electric motor E. The speed of rocking can be adjusted by the sizes of the pulleys on the motor and gear reducer F, Fig. 1. Vertical motion of the tube circulates the solution through the system.

Sample to be tested is inserted through the tapered joint which is closed and sealed with a thin layer of water repellant grease. The test piece rests on its edges in the glass tube. In a discussion before the Electro Chemical Society describing the apparatus, Morris Cohen of the National Research Council, Canada, reports that 400 cu cm of water were used. This brought the solution level in both vertical tubes to about the 150 cu cm mark. Speed of rocking, adjusted by means of pulley sizes and gear reducer, was six times per minute. The change in height of solution in the tube was 90 cu cm, corresponding to a total movement of 1080 cu cm per min.

The whole apparatus was kept in a constant temperature room at 90° F and about 40 per cent relative humidity. Rubber tubing used was semipressure type, the larger piece of which was 16 in. long.

The specimens used were prepared as follows: They were degreased in petroleum ether and ethyl alcohol, heated at 1000° F in an air oven for 1 hr and allowed to oven cool; descaled in 6 N hydrochloric acid containing 2 per cent rodine 60 inhibitor, abraded with No. 1 and No. 0 emery paper and pickled for 1 min in 6 N hydrochloric acid and then washed in running water, ethyl alcohol and methyl alcohol, dried and weighed. This process gave a clean bright panel which corroded evenly. At the conclusion of this test the panels were cleaned by scrubbing and then pickling in 6 N hydrochloric acid plus 2 per cent rodine.

According to Mr. Cohen, the described apparatus gives results of that magnitude and reproducibility which are sufficient for most corrosion measurements. Repeated runs made over a period of a year gave values which agreed both as to order of magnitude and standard deviation.



# CLEEREMAN JIG BORER .... THE MACHINE FOR PRECISION DUPLICATION OF PARTS

The extreme precision of a Cleereman Jig Borer enables the M. P. Heinze Machine Company, Chicago, to bore holes in die sets and punches, and later to make duplicate parts—all of which match perfectly. Each part made on this Cleereman Jig Borer is a separate operation, performed without jigs or fixtures, or previous layout.

Whatever your requirements in the manufacture of fine tools, jigs, fixtures, or small lots of piece parts, the Cleereman Jig Borer will save time and give you maximum precision.

Write for the Cleereman catalogs!

Cleereman Machine Tool Co. of Green Bay, Wisconsin, organized in 1908 and affiliated with Bryant Machinery & Engineering Company, manufactures fine machine tools including Cleereman Precision Jig Borers and Cleereman Drilling Machines. BRYANT Machinery & Engineering **Company** = General Office 400 West Madison Street, Chicago 6 Representatives In Principal Cities Recently reported production figures demonstrate the remarkable results that are being realized with B&W Junior Firebrick—results like increasing furnace output 4½ times before rebricking was required.

OR FIREBRIC

REASE

In a furnace heating billets up to nine inches square, a suspended roof, built of first quality firebrick, had to be replaced after 45,000 tons of steel were put through. When the roof was rebuilt, B&W Juniors were used—and the roof stood up during a run of 207,000 tons! The roof then was thin, but otherwise in good condition.

B&W Junior Firebrick can help you increase steel output and save money by reducing refractory replacement rate, cutting cost of brick per ton of steel heated, and by eliminating charges for outages during refractory replacements.

Your local B&W Refractories Engineer will gladly supply additional information.

TIMES

JUNIOR





# Various Methods Employed for

# BLOUING OUT BLAST FURNACES

# DOMESTIC COKE BLOWOUT METHOD

By W. H. BURNETT Superintendent Blast Furnaces Carnegie-Illinois Steel Corp. Youngstown, O.

DOMESTIC coke has been used at our plant since early 1943 for blowing out six blast furnaces—all with excellent results. Details of the procedure follow:

Use standard clean-out blanks daily for several days prior to blowout. Cut 25 per cent of limestone from the burden 24 hr before starting to charge domestic coke. Cut another 25 per cent of limestone from burden 12 hr before starting to charge domestic coke. Prepare water connections on furnace top.

At the predetermined time, start charging domestic coke only, using enough water in the skip to maintain top temperature of furnace minus 600° F. Keep furnace full at all times until wind is off on the last cast. Water added by skip is sufficient to hold top temperature to desired limits, so that no top sprays are employed during blowout period.

Wind is regulated according to furnace movement and top temperature, 10 to 12 lb pressure being maintained throughout the last cast. The furnace is left on line until the last cast is finished. Wind is then taken off and furnace isolated in the usual manner. The furnace top is then opened and full steam turned into dust catcher. This steam is left on until stack is empty.

Water may next be introduced through the top to cool the stack, this being supplied by two pumps of 80 gpm capacity each. At this rate, the stack is sufficiently cooled in about 18 hr.

Two coolers are then removed and chutes placed so that they discharge into railroad cars. These cars are placed on a long, straight track, so that they may be serviced by a car mover. Ordinarily Last cast of iron from Republic's No. 3 stack at Cleveland before blowing out



coke is flushed from only one cooler at a time.

After cooler holes are well opened, the domestic coke flows with the aid of a stream of water at only 25 lbs pressure, with auxiliary nozzles at the same pressure directed down the chute to maintain flow. In this manner coke is washed out to tuyere level in 16 to 24 hr. The following advantages are found in blowing out with domestic coke:

1. Far cleaner bosh and stack walls.

2. Lower bottom due to blowing out at 10 to 12 psi pressure. This is particularly advantageous when furnace is to resume operations on the old bottom. Material is removed with ease for 2 ft below iron notch.

3. Although the furnace is full at the finish, economies are effected over the regular blowout.

4. Domestic coke is reused as such as it is recovered.

We believe the following points render blowing out with domestic coke a safe method in our plant:

1. Always see that furnace is moved before taking wind off at last cast.

2. Introduce water into top relatively slowly—in our case less than 160 gpm.

3. Maintain top temperature less than 600° F during blowout.

4. Turn steam into dust catcher at the end of last cast and leave it on until stack is empty.

5. Block large bell so that it can not possibly close.

# NUT COKE

#### HYDRAULIC WASHOUT METHOD

By J. R. BARNES

Superintendent Blast Furnaces Republic Steel Corp. Cleveland

USE of the nut coke method for the blowing out of blast furnaces appears to offer several decided advantages. However, there are certain considerations which require further interpretation before this method can be recommended without qualification.

Experience of Republic Steel Corp. in the use of the nut coke-hydraulic wash-out method in blowing out five of its blast furnaces gives testimony to this conclusion.

During the past 2 years the following Republic furnaces were blown out for relining:

Stack identification	Hearth diameter	Date of blowout
Cleveland No. 4	25' 6"	12/23/43
Cleveland No. 3	17' 0"	5/22/44
Canton	18' 4"	June 44
Cleveland No. 2	17' 0"	8/15/44
Cleveland No. 1	25' 6"	11/6/44

Cleveland's Nos. 3 and 4 furnaces were blown out for complete relining and the BECAUSE of the importance attached to present-day procedures of blowing out blast furnaces, STEEI. is herewith presenting the practice followed by three blast furnace superintendents as explained in detail at the joint meeting of the Blast Furnace and Coke Association of the Chicago District and the Eastern States Blast Furnace and Coke Oven Association which was held at Hotel Carter, Cleveland, Nov. 9, 1945.

Additional articles pertaining to blast furnace blowouts and presented in STEEL deal with the following phases: Tapping a salamander from the No. 1 stack of the Youngstown Sheet & Tube Co., Indiana Harbor, Ind., STEEL, Sept. 7, 1942, p. 67. First use of oxygen lance for drilling salamanders for dynamite charge; method for draining the furnace of iron on the blowout inaugurated in 1912 at the plant of the Sloss Sheffield Iron Co., Birmingham; method employed at Central Furnaces, American Steel & Wire Co., Cleveland, for drilling subjacket preparatory to draining salamander; methods used in 1935 by Jones & Laughlin Steel Corp., at its Pittsburgh division and in 1943 at its Otis division, Cleveland, for draining salamanders and emptying the furnace; and the procedure followed by the Republic Steel Corp. for salamander drainage and hydraulic flushout—STEEL, April 24, 1944, p. 110. Blowout practice at the Sparrows Point, Md. plant of the Bethlehem Steel Co., STEEL, Nov. 19, 1945, p. 135.

The Editors.

remaining stacks for relining from the mantel up.

Practically the same procedure was used for all furnaces. The volume of each stack was first computed so that sufficient coke would be available to completely fill the space from the hearth to the stockline after the final cast. Republic standard nut coke, minus 2 in., plus 7 in., was used for all operations.

Particulars of the blowing out of the Cleveland No. 4 furnace were as follows: On the morning of Dec. 22, 1943, at 6 a. m., all miscellaneous materials, i.e., open-hearth slag, roll scale, and scrap, were taken off the furnace burden and replaced by 2000 lb of ore.

At 10 a.m., 10,000 lb of Tilden silicious ore were charged as an extra and, at 12 noon, an additional charge of 10,-000 lb of this ore was made. At 2 p. m. 300 lb of stone was taken off the burden and at 4 p. m. the stone was completely removed.

Water sprays were placed in three of the gage-rod holes at 9:30 p.m. One spray was connected with steam as well as water as a precautionary measure in the event the top heat should rise too high. However, no steam was used during the course of the blowout. Each spray consisted of a 1-in. pipe, 16 ft long, the lower 5 ft of which were drilled with 3%-in. holes. Water was supplied to the furnace top by a turbinedriven centrifugal pump with a capacity of 1500 gpm and a discharge pressure of 110 psi. A steam pump, ordinarily used as an emergency pump to the furnace bosh, was used as a standby in case of pump failure.

At the time of installation of the spray pipes, the remainder of the regular burden was taken off and the charging of straight nut coke started. This was done at the rate of four 6000-lb skips per charge. The burden was kept at the regular stockline level and with each skip approximately 150 gal. of water were added.

At 11:30 p. m., 2 hr after starting the nut coke, the wind was cut from the usual 68,000 to 58,000 cfm and each hours, for the next 5 hr, it was reduced an additional 2000 cfm until 48,000 cfm was reached. A check was made on the furnace each hour to see that it kept moving. The top heat of the furnace stayed between 350 and 750° F and the top sprays were not used until about 6 hr after the nut coke was started. Although the top heat gradually increased, each dump of the large bell caused it to recede. Both bleeders on the furnace top were opened to waste excess gas, but the furnace was not isolated from the other furnaces and the gas was used at the stoves and boilers throughout the blowout period.

The furnace was cast on schedule every 5 hr. At 2:30 p. m., on Dec. 23, the calculated last cast was made, totaling 50 net tons of iron. Another cast wast made 2 hr later to make sure that the coke had reached the center of the hearth. No iron came on this cast, but a 330-cu ft ladle was filled with slag. During this cast, the wind was increased to 60,000 cfm and, with a blast pressure of 16 lb, a clean hard blow was obtained.

Immediately following the last cast, the furnace was drafted, the blowpipes taken down, and the tuyeres plugged. The fourth gage-rod was removed and another spray was inserted. Both bells were opened. The salamander was then drained for about 8 hr.

Approximately 4 hr after the wind was taken off the furnace, a little

The long lines of freight car side frames shown above, and our other railroad products-bolsters, couplings, locomotive drivers and frames, etc.-have qualities of high uniform strength, soundness and dimensional accuracy that you can bet on . . . the direct result both of PSF's rich experience in railroad work, and of our completely modern foundry practice, testing methods and finishing facilities. In any field, "Castings by PSF" is a sure specification for quality.

CASTING



THE

THAT KEEP

**ROLLING STOCK** 

STEEL

OF

YEARS

4 7

ry corporatio 1 Glassport, Pa. - Fort Pitt Steel Casting Div., McKeesport, Pa. - Pittsburgh Spring and Steel Co. Div., Pittsburgh, Pa.

Sales Offices: NEW YORK . PHILADELPHIA . CHICAGO . CLEVELAND . CINCINNATI . AKRON . WASHINGTON

KNOWLEDGE

water appeared at the bosh. The sprays were left on all night and on the following morning, two coolers were pulled and chutes were installed in the cooler openings. These chutes extended into hopper cars, one on each side of the furnace. Pipes, 1¼ in. diameter, carrying water at about 125 psi pressure were inserted into the cooler openings, about 12 in. from the inside of the brickwork. With this water pressure the coke was washed into the chutes at a rate of about two cars per hour per cooler.

Cleveland No. 3 furnace was the next one blown. The same method and schedule were used with the exception that the salamander was drained and the coke was flushed a trifle faster. The last cast was made at 12:30 p. m. and, immediately after the pipes were down, the salamander was drained and the coolers were pulled for flushing the coke. Both of the operations occurred simultaneously and, by 5:30 p. m., when the salamander had finished running, the first two cars of flushed coke were being charged into another furnace.

Cleveland No. 2 and the Canton furnaces were blown out a short time later. No difficulties were encountered with either one. However, with the blowing out of Cleveland No. 1, in Dec. 1944, an incident occurred which raised some doubt concerning the safety of nut coke blowing.

#### Flames Shoot from Top

The same procedures and methods were used with this furnace as was used with the other four. After the last cast was made, the furnace was drafted and the tuyeres were plugged as usual. The fourth spray was put into place and the bells were opened. But this time, instead of steam coming through the open bells, gas flames shot into the air. Although little damage was done, this fire, for a few hours, caused no little concern before it subsided.

Upon examination of the furnace, it was found that about three fourths of the stockline was gone, the remainder being in fair shape. It was concluded from this that the state of the stockline would permit the channeling of the cooling water down one side of the furnace. Since water appeared about 2 hr after the wind was taken off, at the bosh and tuyeres on the side of the furnace where the stockline had disintegrated, and did not appear on the other side of the furnace until the following day, it seems highly probable that the water reached the hearth on one side too fast. A furnace scab might cause this same thing, but, on this furnace, no scabs were in evidence.

On Cleveland's No. 3 furnace, 8 hr after the wind was off, the furnace was cleaned to the tuyere level. On mantel relines it was found possible to go 5 ft below the iron notch using only picks to remove the burden. On complete relines only picks were required to remove the small amount of remaining iron. If definite safety is assured, it is evident that nut coke blowouts can eliminate a lot of hand work, and, with manpower conditions as they are, offer an expedient and economical means of furnace cleaning.

# FULL FURFACE BLOWDOWN METHOD

#### By OTTO BECKER Superintendent Eastern Gas & Fuel Associates Blast Furnace Division Everett, Mass.

PROPER blowing-out of a blast furnace is a significant operation, requiring careful planning of all details. Preparations must leave nothing to chance and the sequence of the necessary manipulations must be such that the largest possible degree of safety to men and equipment is unquestionably assured. Absolute necessity for a safe blowout should make the cost of it a secondary consideration.

When based on a 60-million-tons yearly pig iron production, blast furnaces are blown out at the rate of almost a furnace per week in the United States. This fact leads one to believe that careful planning and execution of the blowout performance must be the rule in today's well-managed furnace plants.

One method employed only infrequently is to blow out on a full furnace. The stack is kept full with nut coke. Coke of nut size will not be carried over by the gas to any great extent, will readily run out of the furnace later on, and is of sufficient size to be used again in the furnace.

The coke is wetted profusely in the skip and no water on top of the furnace is required. The blast is gradually reduced as the pressure drops and after the last cast is made, the gas is drafted back, blowpipes are removed and tuyeres plugged. During the blowing-down the gas becomes progressively richer in CO and burns quietly in stoves and under boilers to the last minute. No preparations of any kind are necessary for the blowing-down procedure, and since a possible interruption requiring a shutdown of the furnace does not differ from any other shutdown during normal operation, there is no particular excitement during the period of blowing down.

The coke may now be quenched with

water from above or below, but prefer<sub>7</sub> ably and more safely, with steam. The reasons for considering steam the safer quenching medium are as follows:

After the furnace is shut down the coke may be hanging and may have formed an arch somewhere in the bosh or elsewhere, particularly if the furnace has not been blown down sufficiently. Because of the possibility of packing and the lightness of the coke it may not settle readily and completely into the cavity from the last cast or from the tapping of he salamander. If water is now used for quenching and is fed at the furnace top, it will have the tendency to run down through channels and not distribute itself very well. Portions of the coke may then be thoroughly wetted while other portions remain dry and hot. The coke may then contract and suddenly drop into the cavities, where rapid steam and water-gas development will create pressures too great to be released in a normal manner through the overlying stock. One may also visualize that even puddles of water could form and be held in dense sections of the coke or near shelves and accretions at the furnace wall, there they may suddenly release their contents with similar effects. To diminish these effects, slow feeding and adequate distribution of the quenching water should be the remedy.

#### Steam Fed Through Tuyeres

When quenching with steam, which may be considered a dry-quenching method, steam is introduced through the tuyere openings, and water gas is formed at first and discharged at the top. This water gas progressively changes in composition until finally the temperature of the coke is such that only steam passes out the top. The steam distributes itself according to the well-known regenerative principle whereby the gaseous cooling medium entering from below will most readily pass through the hottest part of the coke. Of course, care must be taken to maintain a slight pressure on top at all times, and this is best accomplished by having top bleeders closed and bells open. The top bleeders will then not act as chimneys and draw air down past the large bell, when for any reason there is a deficiency of steam at the top. Since there are no shutoff devices between the top and dust catcher, the latter must also be kept under pressure with steam so no air can enter. This portion of the steam will help to keep the top cool and dilute the rich water gas from the initial quenching period.

The rate at which steam can be fed is to be governed by the allowable top temperature. Some heat will at first This radiograph helped a foundry save \$50,000 on one jobby stopping wasteful production of internally unsound castings

# a careful look at <u>your</u> costs will show you how much Radiography can save <u>you</u>

O NLY YOU can determine where and how radiography can be profitable in your business. It will pay you to take a careful look at your present manufacturing methods... at losses you've been charging to overhead. For example ...

If your field is machining, radiography can eliminate the man-hours and machine time wasted on internally unsound castings. Even the most modern machine tools can't give fast, efficient, low-cost service if you let internally unsound castings get into your production line.

Or, if you run a foundry, radiography can indicate more efficient technics to get your plant into production faster ... can help you produce consistently sound castings from start to finish. This will cut customer rejects, lower costs, and bring repeated re-orders. It will also attract new business—business you'll need later.

And, if you fabricate weldments, radiography can create acceptance for your work . . . enables you to compete for work on high-pressure equipment and other jobs where radiographic inspection of weldments is mandatory.

Radiography does other things, too: It shows your designers how to reduce weight safely . . . helps your engineers specify less costly processing technics . . . guides your fabricators to better construction methods.

Why not get your x-ray dealer to show you now—how radiography can help you cut overhead, increase production, build better products. Or write to

Kodak

EASTMAN KODAK COMPANY, X-ray Division, Rochester 4, N. Y.

Radiography

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

# WHY FARREL ROLL GRINDERS MAINTAIN OPERATING ACCURACY

# FARREL ROLLING MILL MACHINERY

Rolls Rolling Mills Rod Mill Tables and Manipulating Equipment Universal Mill Spindles Rod Coilers Gears Gear Drives of any Capacity Mill Pinions Pinion Stands Flexible Couplings Roll Grinding Machines Roll Calipers Lead Presses for Pipe or Rod

These five vital features are typical of the precision design and construction which give Farrel Heavy Duty and Type TT Roll Grinders their ability to maintain extreme accuracy with a high rate of output:











1. GRINDING WHEEL SPINDLE — Of large diameter for rigidity under working load made of high grade alloy steel, heat-treated and precision ground—mounted in adjustable bearings, automatically lubricated.

2. WHEEL SPINDLE AND HEADSTOCK DRIVES — Work and wheel are both driven through multiple V belts. Their smooth, vibrationless transmission of power safeguards precision.

3. TWO DEAD CENTERS—Dead center in the headstock as well as in the footstock insures concentric rotation of the work, which contributes to precision grinding of journals and bodies.

4. AUTOMATIC CROWNING AND CONCAVING DEVICE — This built-in "brain" automatically produces a mathematically accurate curve for either a crowned or concaved roll, with both halves perfectly symmetrical. The same setting invariably produces exactly the same curvature.

5. INVERTED V WAYS — Cast separately from the bed, of hard alloy iron, they are exceptionally resistant to wear, maintaining their accuracy for a long life. Automatically flood-lubricated and covered by flexible metal guards to exclude dirt and grit.

Write for catalogs giving complete information.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y. Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte.



be transferred from the lower to the upper zones of the coke bed until finally the temperatures of gas and coke will drop.

The complexity of the progressively changing reactions of steam with a coke bed of varying temperature, as present immediately after the shutdown, makes the theoretical calculation of total steam requirements somewhat difficult. Assuming an average temperature of the coke bed of from 1800 to 2000° F, and considering that true water gas formation diminishes rapidly below 1400° F, leaving further cooling to be done largely by simple heat exchange, one arrives at an approximate steam consumption of from 2 to 3 lb per lb of coke for quenching purposes only. Considering the cooling efficiency of the steam it is advantageous to use low-temperature steam where possible. Quenching with steam recommends itself particularly when the lining is to be preserved.

When the furnace is to be dismantled, the coke may be run out of a hole made in the bosh, and the furnace will empty itself in a few hours, the rate of coke removal being limited only by the size of the hole. After the furnace has been emptied to the tuyere level there is still the part below that level to be cooled. Water is then the most practical means for cooling, although objections could be raised for the same reasons that water is considered less safe for the upper part of the furnace. Nevertheless, the wide-open bells, bleeders, and tuyerecooler apertures represent a large open area, and with a sensible rate of quenching and the water well distributed, any sudden pressure development should have ample free space to be safely released. During this final quenching operation men should be kept away from the immediate vicinity of the stack.

The method of blowing down on a full furnace is not new. The use of this method combined with the subsequent cooling with steam rather than water originated from a keen desire to protect and preserve the furnace lining through many shutdowns. It was then found that this procedure was a simple and reliable one for any shutdown, regardless of whether the lining had to be preserved or not. Cooling with steam may take a little more time and is somewhat more expensive, but the increase in cost is not of a large order. If other methods in use today are considered reasonably free from any hazards, then the quenching with steam and blowing down on a full furnace offers no particular advantage, except in its function to preserve the furnace lining.



# New Instrument Performs Variety of

Wheel Dressing Operations

COMPLETE wheel dressing service, including the facility for dressing an angle tangent to a radius, is possible with an instrument shown in Fig. 1. With it the operator can dress (1) a radius, (2) an angle, (3) a compound-complex angle, and (4) an angle tangent to a radius.

When these four operations are performed the primary diamond holder position is used, but provision has also been made for forming extremely small or large radii, in the section of the wheel where the radius has up to  $180^{\circ}$  of arc. For this work, an accessory is used which consists of a special diamond holder mounted in the secondary position. (See "thumbnail" illustration Fig. 1.)

To make it practicable to dress in

one continuous operation an angle tangent to a radius and the radius too, the dressing arm is provided with a calibrated rack adjustment. This makes the matching of radius and tangent to within "tenths" a routine matter with the diamond in either primary or secondary positions, as illustrated in Figs. 2 and 3, respectively, and projected over Jones & Lamson shadowgraph.

The instrument, made by U. S. Tool & Mfg. Co., Dearborn, Mich., dresses from underneath the wheel which because of its sturdy construction, assures stability which eliminates chatter and further contributes to authentic radius or angle. Standard diamonds are used in the holder or the accessory equipment.



# INDUSTRIAL EQUIPMENT

# **Broaching Machine**

Improved design of 20 in. hydraulic horizontal broaching machine, built by Zagar Tool Co. Inc., 23880 Lakeland boulevard, Cleveland 17, called for cutting away upper righthand corner of cab-



inet to permit broaching larger bars and other stock.

Size of piece is limited only by depth; i.e., distance from center of adaptor down to pan. This distance has been increased to 10 in. Also, pull has been doubled—from 6000 to 12,000 lb. Maximum cutting speed is now 20 fpm. *Item No.* 9995

# **Tilting Hot Saw**

Simplicity in principle and operation, and compactness that makes it readily adaptable for installation where space is limited, are features of a new 50-in. tilting hot saw produced by Mackintosh-Hemphill Co., Pittsburgh.

The saw is powered by a 150 hp motor through a V-belt drive and has a peripheral cutting speed of 22,000 fpm. It is particularly well adapted for cutting billets, rails and similar types of sections. One of the many new construction departures is the incorporation of a new mandrel with Timken bearings having a force-feed circulating oil system. Mandrel head is removable to facilitate the changing of V-belts. It has variablespeed drive with a wide range of feeds. *Item No.* 9901

# **Expanding Mandrel**

A precision expanding mandrel with eccentric sleeve which can hold total tolerance of eccentric parts to be ground or machined to 0.0005-in. or less, is annnounced by Erickson Tools Division of Erickson Steel Co., Cleveland. With this mandrel, eccentric parts can be turned or finished in a concentric plane with the



same tools and equipment as for concentric parts, such a bushings or bearings, thus eliminating the usually greater cost of building many special arbors for every diameter or taper required. All that is required with the mandrel is a special sleeve. Shank is standard.

Designed to operate on principles of expansion or contraction as utilized on standard Erickson expanding mandrel or



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

collet chuck, this unit is effective in saving handling time due to its important self-releasing features. Sleeve collapses the moment nut shown is released. (See accompanying drawing.)

New mandrel can be adapted to air or hydraulic operation and to drawbar, or cantilever locknut types, as well as to locknut type shown. A mating within 0.0001-in. of cam surfaces of both shank and sleeve permits equal expansion of open-slotted sleeve throughout its length. Results are 0.0005-in. guaranteed accuracy and greater gripping power, because gripping surface extends along entire length of sleeve. Interchangeable sleeves are available.

Item No. 9946

# Air Blow Gun

The re-designed Heco Flex-Tip air blow gun, in production by Heckethorn Mfg. & Supply Co., Littleton, Colo., is adaptable to all applications using air. By flexing the elastic tip, the valve is con-



trolled to release the desired amount of pressure. Connections are brass, except the hardened steel nose. A larger size for ½-in. pipe thread, will also be manufactured.

Item No. 9900

# **Gear Shaving Unit**

Gear shaving process producing gears of superior finish and high accuracy is announced by National Broach & Machine Co., 5600 St. Jean avenue, Detroit 13. Red Wing shaver operates on



the proven crossed axes shaving principle.

A fast simplified loading process and semiautomatic clamping and ejection mechanisms make possible speed production. Change of setup can be made in 15 to 30 min. Automatic feeds are easily set and power traverse of cutter head slide completely clears the work spindle THE FINISHING TOUCH

SECOND SERIES—NUMBER SIX

# DIPPING SUPPLANTS SPRAYING IN 75% OF ALL FINISHING JOBS

FOR many years spray painting has been used to obtain a fine finish on parts which required a smooth, uniform coating, free of tears and fatty edges. Dipping, a faster



Before, during and after. These photos show a graphic demonstra-tion of electrostatic deteoring in action.

- PHILADELPHIA, PA. 18 WEST CHELTEN AVE. BLDG. VICTOR 2900
  DETRDIT, MICH. 642 New CENTER BLOG. MADISON 1032
  CHICAGO. ILL. 1609 BANKERS' BLDG. STATE 3363

January 14, 1946

JAPANNING, ENAMELING AND PHOSPHATE COATING

5103 LAKESIDE 'AVE.

and more economical process, could not be employed in many such cases.

Today, electrostatic detearing of dipped parts has made it possible for the Japan Company to convert 75 percent of all jobs previously done by spraying to the simpler, speedier process of dipping. This means that our customers get earlier delivery and lower prices along with a highly superior job of finishing.

Electrostatic detearing removes excess paint from the drain-off points of freshly dipped objects by passing them over a metal grid charged with approximately 130,000 volts of electricity. As the dipped parts enter the electrostatic field above the grid, the powerful attraction between them and the grid draws the excess paint off in thin streams. The work is then



A laboratory study of the effects of detearing. At the left is a part which has been dipped in heavy enamel and allowed to dry without de-fearing. At the right is the same part after electrostatic detearing and baking.

conveyed through an infra-red oven at a baking schedule suited to the entire coating, and a smooth, even paint film results.

While speedy and automatic in function, the detearing process requires consider-able skill and experience if optimum re-sults are to be obtained. The Japan Company, long a pioneer in the industrial finishing field, possesses that skill and ex-perience in this as in other finishing

> -Reprints of other advertisements in this series sent free upon request. NEW YORK CITY 156 EAST 42ND STREET LEXINGTON 2-6964
>  ROCHESTER, N. Y. 75 WINTON ROAD, SOUTH MONROE 5392
>  ST. LOUIS, MO. 1905 CONTINENTAL BLDG. NEWSTEAD 6075

THE JAPAN CO. INDUSTRIAL FINISHERS HARRY FORSBERG, PRESIDENT

**HENDERSON 5153** 

processes. If you are using older methods, why not compare your costs and quality with ours? Perhaps you will want to make a change.

Work which must be sprayed (because contours, color combinations or other factors make dipping impossible) is finished by electrostatic spraying, another auto-matic process which has been brought to a high degree of effectiveness by the Japan Company. It is to your advantage to learn the full

story about both electrostatic deing, and we shall be glad to help you do so by seed you do so by sending you a copy of our article, "Electrostatic Spraying and Detearing", from reprinted Iron Age. Just drop us a line.



# What Else Do We Do?

The Japan Company has more than 50,000 square feet of space devoted to the many branches of industrial finishing. Following is a list of our services:

Etching of metals.

- Phosphate coatings.
- Steel pickling.
- Lacquering, enameling, japanning, graining.
- Wrinkle, hammer, and other deco-rative finishing.
- Roller coating.

ROLLER COATING

ELECTROSTATIC FINIS

CLEVELAND 14,

119

- Silk screen lettering and designing. Assembly work before or after finish-
- ing. Processing and packaging for export shipment.
- Prompt shipping from our own railroad siding.

NOTE: The Japan Company is solely an industrial finishing concern and does not manufacture or sell electrostatic spraying or detearing equipment.

for loading and unloading. It will shave internal gears for automatic transmissions, speed reducers, home appliances and similar mechanisms.

Item No. 9967

# **Milling Machine**

Designed especially for a wide range of production and general purpose milling applications, the No. 2 heavy milling machine of Van Norman Machine Tool Co., Springfield 7, Mass., has many new engineering features. Column and base are heavier and larger, with scientific internal ribbing to assure solid rigidity for the heavy duty spindle and spindle transmission as well as the knee.

An important feature is a heavy largediameter flywheel, mounted on the in-



side of the column, assuring smooth, uniform application of power to cutter. Cutter spindle is exceptionally large and is mounted on double-opposed Timken bearings at front, double Timken in center and straight roller in rear. New spindle transmission incorporates wide face-hardened alloy steel gears mounted on multisplined shafts rotating on taper roller bearings. Front and rear direcional control of all power feeds, actuated in direction of desired movement, permit operation of the miller from front or rear position for convenience and safety. Manual hand feeds are provided in both front and rear of miller for ease of lining up work.

Exclusive single lever speed and feed selectors provide quick, easy selection of 18 speeds and 18 feeds. Improved ramtype overarm is large and has dove-tail bearing on column, with locking means on front and rear. Pilot wheel enables operator to quickly position overarm in any desired position. Other features include conveniently located spindle operator lever which is easily positioned for front or rear operation, safety devices in knee to eliminate strain on any unit of mechanism should feed overload occur, large diameter feed screw, automatic lubrication, hardened alloy steel gears and shafts, large dials graduated in thousandths and multisplined shafts operating on antifriction bearings.

Tool has table 58 x 13 in. Drive motor is  $7\frac{1}{2}$  hp. Longitudinal range 28 in., cross 10 in. and vertical 17 in. Eighteen speeds are available from 30 to 1500 rpm; 18 feeds from % to 32 in. Miller is available with plain or universal saddle. Universal saddle permits table to be swiveled 45° to right and 45° to left. *Item No.* 9953

## **Boring Bar**

According to Behr Products Co., Warren, Mich., development work has been completed on the Behr boring bar which eliminates chatter, takes a faster feed



and up to four times wider cut than average tools.

This tool is designed in two standard head diameters, 2 in. and 3½ in., for use on vertical or horizontal lathes, screw machines and all types of precision boring machines. The boring bar is rigid and rugged in construction and has an accurate micromatic blade adjustment. Blades are available in a full range of sizes either tungsten carbide tipped or faced, or in high speed steel.

Blades are quickly interchangeable, a half turn of the blade releases mechanism. Regular blades bore or face from 134 to 12½ in. holes down to ¼-in. or less.

Item No. 9938

### **Tool Holder**

A floating tool holder of new design is included in the line of chuck and floating tool combinations being introduced



by Kett Tool Co., 5 East Third street, Cincinnati 2.

These chucking tools embody the Kett "three jaw power grip" as an integral part. Accuracy gripping power and long life of these tools, combined with their small size, make them ideal for use with screw machines, lathes and drill presses. The chuck will satisfactorily hold shank sizes from No. 80 drill to a full ¼-in. eliminating necessity for many sizes of bushings and collets for machine set-up requirements.

Included are the taper arbor and straight shank chucks in various shank sizes, and two types of floating tool holders; model KFTM, and model KBSM. Model KFTM uses a smaller size floating tool holder and incorporates a single locknut.

Item No. 9947

# **Boring-Milling Machine**

Model 3-B Jigmil, made by De Vlieg Machine Co., 450 Fair avenue, Ferndale, Mich., maintains accurate relation between the spindle and platen in the full range of its travel. Design of its slides and spindle provides an accuracy between bored holes controllable to the fourth and fifth decimal place.

Machine utilizes automatic positioning. To change from one position to another in the horizontal or vertical plane, the



end measure gage is adjusted to length and put into position. A single pushbutton operation will cause the slide to move by rapid traverse to an approach location, then complete its positioning cycle, stopping the slide within less than 0.0001-in. of the position determined by the end measure gage. At the position of final location, the machine automatically releases the tension of the screws and mechanisms so that application of the locks will secure the slides in their selected position.

Bar movement has a screw actuated power feed and rapid traverse responsive to a four-position lever. It has a wheel for hand operation and a micrometer dial for accurate depth control.





Centerless grinder driven by a Century 30 horsepower 3 phase motor.

Their Remarkable Freedom from Vibration Contributes to Greater Accuracy

Century Motors for machine tools are built to match the precision of the machines they drive.

They are accurately constructed with plenty of material where necessary to maintain rigidity well balanced mechanically and electrically.

> Century's wide range of types and sizes of motors from 1/20 to 600 horsepower enables you to match a Century Motor to your machine.

> Century Motors may be a vital factor in producing a better product at a lower cost — Specify Century.

**CENTURY ELECTRIC CO.** 1806 Pine Street • St. Louis 3, Missouri Offices and Stock Points in Principal Cities Work can be retracted from the cutting position and automatically returned, positioned and relocked uniformly within 0.0002-in.

Diameter of the bar is 3 in., its length of feed is 16 in. Longitudinal travel is given as 48 in., range of the spindle above the table as 36 in. There are 24 quick change spindle speeds ranging from 23 to 1200 rpm, and 12 quick change feeds for horizontal and vertical movements from 0.3 to 15 ipm.

Item No. 9948

## **Punching Units**

Heavy-duty type BJ hole punching units, designed to pierce metal up to ¼-in. thick, are announced by Wales-Strippit Corp., 345 Payne avenue, North Tonawanda, N. Y. Each unit consists of a holder that carries the punch, die and stripping mechanism. This patented design eliminates the necessity of attaching



punch to press ram and assures permanent alignment of punch and die.

Setups are made on T-slotted plates or templates for stamping presses and on rails for press brakes. The press ram is said to require only one adjustment regardless of how many hole punching patterns are placed in operation because of the uniform shut height of these units.

Type BJ units are available in three holder widths with maximum punch diameter of ¾-in. for use with metal up to ¼-in. thick. Illustration shows staggered pattern set-up of Wales heavy-duty BJ units placed in press brake with pierced work in foreground. Item No. 9920

## Welding Electrode

Harcast, an all-position mild steel electrode for welding and repairing cast iron, is announced by Harnischfeger Corp., Milwaukee. It fuses with either mild or medium carbon steel, suiting it to joining cast iron with other types of steel. With a yield point of 50,000 psi, deposited metal has an ultimate tensile strength of 60,000 lb.

Either alternating current or direct current machines (straight or reverse polarity on direct current) may be used. Electrode works well at low amperage, thus minimizing dilution effect at fusion zone and permitting higher quality machining. Reverse polarity on direct current produces a smooth bead with deep penetration. On direct current straight polarity, penetration is less, higher beads are built, and there is less spread in the fusion zone.

Item No. 9971

# Lift-Truck

It is reported that Lyon-Raymond Corp., 2442 Madison street, Greene, N. Y. have added a 2000 lb capacity hydraulic high-lift truck to their line. It employs light-weight welded tubular and formed plate construction.

The standard stock model has a platform 30 in. wide by 36 in. long with an



elevating range from 6 in. to 60 in. above the floor. Ease of movement is provided by Timken equipped 10 in. diameter front and 5 in. diameter rear wheels. A foot operated floor lock, making two-point contact with the floor, will hold the truck firmly in position when desired. A twospeed hydraulic hand pump is standard equipment, or a motor driven hydraulic pump may be furnished.

### Item No. 9935

## X-Ray Timer

Accuracy in x-ray film processing is offered by a floating thermometer and an interval timer produced by General Electric X-Ray Corp., 175 Jackson boulevard, Chicago 4, Ill. Housed in an all-metal case, black or ivory finished, the lever-type timer accurately times any interval from 15 sec to 2 hr. Hands are easily set at the front. Timer is started and clear-toned alarm is wound merely by giving lever a quarter-turn downward. Heavy, crystal-clear glass thermometer, specifically designed for darkroom use, is calibrated in Fahrenheit, showing onedegree solution temperature variations throughout its scale.

Item No. 9940

# **Voltage Regulators**

Improved three-unit, vibrating type, heavy-duty voltage regulators for low voltage direct current generator application are being produced by R-B-M Mfg. Co., Division of Essex Wire Corp., Logansport, Ind.

Compact and sturdily constructed, these regulators are especially suitable for stationary or mobile gas-engine or



motor-driven generators. All three units (reverse current relay, voltage control, and current limiter) are designed to work in any position and withstand external vibration and shock normally encountered in mobile apparatus. Complete assembly is sealed in gasketed, drawn steel enclosure-dust-tight and waterproof. Regulators are available in maximum capacities of 30 amp at 6 to 32 v and 45 amp at 6 to 12 v dc. Maximum field current rating is 3 amp at 6 v; 0.5 amp at 32 v dc. Approximate dimensions are: Width, 7¾ in.; depth, 4 in.; height, 3½ in. Average weight is 3.25 lb. Item No. 9954

## **Selenium Rectifiers**

High-voltage selenium rectifier stacks, hermetically sealed in glass, have been developed by Federal Telephone & Radio Corp., New York, affiliate of International Telephone & Telegraph Corp.

No larger around than a fountain pen and constructed like a cartridge fuse, stacks may be installed quickly and easily. Electrical connection is made through heavy silver-plated ferrules at each of the glass tube. Ferrules are of a size to permit mounting in 30 amp fuse clips

# Do All's 1946 Gift to Industry

Gage Blocks

1 LIFETIME BLOCK =

Most Outstanding Achievement in 50-Year History of Gage Blocks

> Yes, one Lifetime block outlasts 60 steel blocks or 20 chrome blocks. DoALL Lifetime blocks were primarily designed for use in the shop. They are extremely wear resistant and practically unbreakable.

60-STEEL BLOCKS

By using Lifetime blocks your gaging costs will be reduced to one-twenty-sixth that of the best steel blocks obtainable.

Lifetime blocks also are time savers. Being acid resistant and corrosion proof, you don't waste any time greasing and cleaning them.

Unlike all other blocks, Lifetime blocks can stand heat up to 500°F. without being affected in dimensions, flatness and wringability.

You can get more amazing facts by 'phoning or writing for our Lifetime gage circular



# INDUSTRIAL EQUIPMENT

unpolarized or polarized by addition of a simple member to the fuse clip assembly. Especially designed for operation in high ambient temperatures, rectifiers are available in several tube lengths and in various voltages up to 4000 w. Rectifiers incorporate advantages such as light weight, long life



and silent, trouble-free operation. These compact units are planned for application to cathode-ray tubes in television, as well as in high-voltage, low-current rectifiers for a wide range of electronic devices.

Item No. 9949

# **Crane Cab Conditioner**

Lintern Corp., Berea, O., is offering a complete air-cooled unit known as the Aire-Rectifier. It operates successfully in ambient temperatures up to 170°F, such as encountered on open pit, stripper, and ladle cranes.

Two models cover requirements for air conditioning crane cabs. They have complete filtering equipment for removing dust, smoke, vapors and noxious gases. They will hold the cab (properly insulated) at 80 to 85°F in ambient temperatures up to 170°F with a relative humidity of from 30 to 50 per cent. Furthermore, they offer automatic electric heat to keep cab at 72 to 75° F for winter operation.

Larger model, 145 ac-24, is for large cabs of 200 to 350 cu ft capacity such as soaking pit, stripper, open hearth and ladle cranes. Small model, 145 ac-12, is intended for small circular cabs, such as developed by Cleveland Crane & Engineering Co., and cabs of conventional type up to 200 cu ft capacity.

Aire-Rectifiers are exceptionally rugged, with framework of heavy gage steel,



all welded construction—for long life under heavy vibration to which they are exposed in crane duty. *Item No.* 9955

# Light Weight Torch

A light-weight torch for welding, which can be effectively used with na-



tural or manufactured gas, acetylene, butane, or other low temperature gas,

combined with oxygen, has been made available.

The torch is specially adapted to silver brazing, aluminum welding, lead burning, aircraft production, and wherever a small, lightweight torch is required.

Employable tips are from 0 to 6 inclusive. Overall length is 8½ in. and weight, complete, is 7 oz. This torch, designated as Weldit model UN-45, is made by Weldit Inc., 648 Bagley avenue, Detroit 26. Item No, 9898

## **Multiple Spot Welder**

Typical of the many recent developments which may reduce production costs in coming months is this dual hydromatic multiple spot welder built by Progressive Welder Co., 3050 East Outer drive,



Detroit, for assembly of ammunition boxes. Combining several operations in one, this dual welder (there is a duplicate welding station in back of the vertical panel) permitted output of some 220 containers per hour.

Economy of equipment is secured by using only a single transformer for both welding stations and using standardized parts for the various "guns." Simple air shuttling fixtures reduce loading time. These have interlocking controls. *Item No.* 9931

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

Circle numbers below correspond-ing to those of items in which you are interested: COMPANY ..... 9995 9938 9940 9900 9947 9954 PRODUCTS MADE ..... 9946 9948 9949 9901 9920 9955 9967 9971 9898 STREET ..... 9953 9935 9931 1-14-46 

Mail to: STEEL, Engineering Dept.-1213 West Third St., Cleveland 13, Ohio
# OVEN ENGINEERING



# Write for These Technical Bulletins on Oven Engineering Installations

The battle of costs is a battle that never ends. Present day problems dictate the policy of constantly surveying your existing facilities for materials-handling as well as your oven-processing systems, in order to keep your manufacturing costs at a profitable level.

The Industrial Oven Engineering Company designs, engineers, manufactures and installs complete materials-handling and oven-processing systems for many different industries.

These installations are described in the pamphlets listed below. They are well illustrated with photographs and drawings. A good many of these installations are probably applicable with slight variation, to your own processing problems.

These pamphlets are free. They are briefly described below. Check off the ones you want and drop us a line.

**Blueprint for Industry, Part III**— Complete engineering information on our constant-speed, constant-tension windup machine for wire, cable, textile, tape, coated fabrics and other continuous materials, the only machine of its kind on the market.

□ Lacquering of Insulated Wire and Cable—A 16-page reprint of a thoroughgoing article on cable lacquering techniques and equipment, originally published in the trade magazine "Wire and Wire Products". Illustrated with drawings.

**How Will You Choose Your Drying Oven?**—A description of the role of the infra-red lamp in modern drying ovens.

☐ **Blueprint for Industry, Part II**— A comprehensive 18-page brochure on high-production ovens for many batch and continuous heating processes. In addition to detailed descriptions and engineering details of many efficient ovenmaterials-handling systems, it contains two pages of engineering data on gases and other materials, along with fan engineering data. ☐ High-Speed Handling and Drying in the Cementing of Tire Fabric—A description of a continuous, safe method of fabric cementing in which high-calendering speeds were obtained by the designing of equipment which would fit into limited manufacturing space.

☐ Flexibility of Automatic Systems Shows Saving—A description of a 3zone automatic conveyer oven installation which increased production speed, reduced the number of necessary attendants without loss of floor area.

Conveying & Baking Systems for the Finishing Industry—A thorough discussion of the different types of conveyer and baking systems with an analysis of their respective advantages.

**Four-Zone Conveyor Oven**—This reprint describes a four-zone conveyor oven through which products are conveyed successively through ventilation, preheating, baking and cooling zones at production speeds and free from all dust.

### Get This Unusual Story of Wire Lacquering



We have in our last four advertisements described several different cable lacquering systems that we have engineered and installed. For those interested in securing a more complete picture of the basic IOE cable lacquering sys-

cable lacquering systems there is available, Lacquering of Insulated Wire and Cable, a 16-page reprint of a thorough-going article on cable lacquering technique and equipment, originally published in WIRE AND WIRE PRODUCTS. Our work on cable lacquering systems in particular, represents new basic lhinking on an old problem, that has a wide number of new applications. Perhaps some of your own problems would benefit by the application of our engineering experience.

(This is No. 25 of a series. Reprints of previous advertisements sent free upon request.)



# THE TOUGHER THE JOB THE MORE REASON TO "BUY AMERICAN"



Notwithstanding the current great demand for American loading chains, sling chains, coil chains, conveyor chains, logging chains, railroad chains, machine chains - in fact, all types of welded and weldless chains - we will take no short cuts in manufacturing, inspection, or testing ... We will not compromise with American Chain quality, for that is something which our customers have depended on for many, many years, and we want them to continue depending on it for many years to come. Any chain made by American Chain must be safe, must be dependable ... We are making all we can, as fast as we can, under these principles.



York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

> AMERICAN CHAIN DIVISION AMERICAN CHAIN & CABLE

In Business for Your Safety

#### **Cutting Tools**

(Continued from Page 91) (b) furnace gas or electric or oil, (c) induction.

Torch brazing is most commonly used, especially in the smaller shops. Torch tips should be selected with holes in the range of 1/32 to 3/32-in., the sizes increasing with the size of the tool shank or body, so that tool shanks under 1/2in. in thickness use the 1/32-in. tip while shanks over 1 in. in thickness use 3/32-in. tips. Intermediate sections may be heated with tips of intermediate size.

#### Joining

A strip of 0.003 to 0.005-in. thick silver-brazing alloy slightly larger than the contact surface is cut and fitted to the recess. An alloy with a melting point in the range of 1175-1325° F is used as the joint material. For carbide tips, the higher melting point material may be

Will m	eet In	co.	Tensil	e		
AST	M SI	pec.	Streng	th	Total	
Grade I	No. N	lo.	psi	(	Carbon	
40	A.	-41	40.000	)	3.30	
50 A		-49	50,000	)	2.90	
60	K-	-21	60.000		2.85	
	Ту	pical C	ompositi	on®		
Grade		-	-		Max	
No.	Si	Ni	Mo	Cr	Mo+Cr	
40	2.10	1.50	0.40	0.20	0.60	
50	1.70	1.50		0.20	0.60	
60	2.20	1.50	0.60		0.60	
°Fro	m Amer	ican So	ciety of	Tool	Engineers	

used. For high speed steels and tools likely to soften at high brazing tempero tures, a lower melting point alloy shoul be employed. Recess in the tool shank ( tool body is coated with a thin layer on the silver brazing flux after all surfaces have been cleaned with the solvent referred to above.

A reducing oxyactylene welding flame is used to heat the assembly, beginning at under side of the tool body. The flame is moved slowly around to the tip and tool shank to heat the parts uniformly. As assembly comes up to a dull red heat, attention should be directed to the tool tip to seat it into the recess with a sliding and fitting motion as alloy begins to melt, then pressure is applied by means of steel rod until the brazing metal is distributed evenly under the tips. Finally, pressure is increased slightly to firmly set the tip into place, while the flame is withdrawn slowly to prevent too rapid chilling of the assembly. As soon as the brazing metal has solidified, the tool may be embedded in dry sand, ashes, or any other inert material to permit slow cooling and avoid the risk of cracking.

High speed steel tool tips are usually brazed to shanks or bodies with a lower melting point braze to preserve the hardness of the tips. The procedure in torch brazing then follows the same procedure

# IS YOUR INFORMATION UP-TO-DATE ON AUTOMATIC PRODUCTION?

The First CLEVELAND AUTOMATIC—1888



Today's CLEVELAND MODEL A 534"

CHICAGO (6): 1408h Civic Opera Building DETROIT (2): 540h New Center Building NEW YORK (6): 1806h Singer Bldg. CINCINNATI (12): 4932h Beech Street HARTFORD (1): 529h Capital National Bank Bldg.



If you have never had a clear explanation of the cost cutting advantages of the exclusive universal camming feature of Cleveland Automatics, you do not have the full picture of the great advances made in automatic production since we made the first industrially practical machine in 1888. Set-up on a Cleveland Automatic is much faster than usually credited to fully automatic machines. Combined with the high rate of production with multiple tooling, this means cost savings over other types of machine production ON SHORT RUNS AS WELL AS MASS PRODUCTION. Let us give you the down-to-earth proof of Cleveland Automatic cost cutting...

# Get this Bulletin

describing the wide range of Cleveland Automatic capacities, from  $9_{16}''$  to  $10\frac{1}{2}''$  bar and tube stock. Other bulletins available include one describing Cleveland High-Pressure Hydraulic Die-Casting Machines.

2279 Ashland Road

THE CLEVELAND AUTOMATIC MACHINE



CLEVELAND 3, OHIO

CO.



# S-T-R-E-T-C-H-I-N-G A BOXCAR

IN THE EARLY STACES OF THE WAR, a serious shortage of shipping space threatened supply lines to Europe and the Pacific. Aiding in the urgent search for a solution to the problem, The Cambridge Tile Manufacturing Company, Cincinnati, successfully completed an experiment in compressing three carloads of dried whole egg powder and loading them into a single boxcar.

Presses that had been used to compress clay into Suntile were quickly converted into food-compression equipment through the use of new dies designed and built in Cambridge Tile's own shops. Facilities were rapidly expanded to meet the ever increasing demand of the Armed Service Forces for compressed emergency rations. But the conversion created handling problems that throttled production and prevented full utilization of the extra shipping space made available by the new food compression method.

So Towmotor engineers were called in to install a modern materials handling system. 100-pound bags of dried food powders were loaded on pallets in the receiving room and fed to the production line in a continuous, controlled stream. The finished cakes of compressed food were packed into shipping cartons, assembled into large unit loads, and moved directly into the boxcars by one girl and a Towmotor. Work schedules were accurately timed to provide maximum output per man and machine. Closer inventory control eliminated delays and tie-ups. Production speed was increased to machine capacity, freed from the limitations imposed by slow handling methods. Most important, Towmotor made possible immediate and full utilization of every foot of shipping space.

The results achieved at Cambridge Tile are typical of Towmotor installations throughout industry. The know-how and experience that contributed numerous opportunities to increase productive output also enabled Cambridge Tile to effect savings of \$1,000 a month in handling costs alone. The Towmotor Materials Handling Analysis Guide, a product of know-how and experience, will greatly simplify your handling problem; send for a copy today. Towmotor Corporation, 1223 East 152nd Street, Cleveland 10, Ohio.



as outlined above except that pretinning the recess with a silver brazing wire (such as Handy & Harman's Easy-Flo) shortens the period for which the highspeed tool tip is at temperature. The procedure, then, is summarized as follows: (1) Clean, (2) flux, (3) pre-tin, (4) heat, (5) braze, (6) cool. A chart showing tool tipping procedure appeared in a supplement to STEEL, p. 106, July 5, 1943.

The sandwich braze is used where irregularly shaped tips, or tips over 3/4in. in any dimension introduce stresses caused by differences in contraction or heat flow in the assembly. In this process a sheet of ductile metal such as Constantan (procurable from Driver-Harris Co.) which does not melt at brazing temperatures is used to absorb the brazing strains. Shank and tip are prepared as outlined above. Then two layers of silver-brazing alloy with one layer of Constantan between them, (each layer 0.003 to 0.005-in. in thickness) are made ready and the process of cleaning, fluxing, heating, brazing and cooling is again repeated.

#### Use of Induction Heating

Induction heating may be used to heat the assembly and melt the silver solder as an alternate to heating with oxyacetylene flame.

Furnace brazing is employed where large numbers of tools are processed. The practice used follows the same general procedure outlined except that the brazing metal is pre-placed and the tips wired into position with nichrome wire. A closed muffle-type furnace, or controlled atmosphere furnace is used to reduce the risk of oxidation. The procedure then can be summarized as follows: (1) Clean, (2) flux, (3) bind or tie tips to shanks with nichrome wire, (4) heat, (5) braze, (6) cool.

### Aircraft Heating Device Made of Glass Cloth

An aircraft heating and ventilating device called Airtran, made of glass cloth and rubber, serves as a ducting for hot or cold air. It provides very high insulation qualities as well as flexibility, and withstands temperatures from minus 60 to plus 300° F without change in properties and will stand well over 50 psi internal pressure at all temperatures. It is unaffected by air, light, water, gasoline, oil and all but contentrated mineral acids. Manufactured in shapes where required for unusual installations, the ducting can be adapted to any equipment as a replacement or an original installation, according to Arrowhead Hubber Co., Dept. A-86, 2244 East 37th street Los Angeles II.

# Here's the FIRST Hydratrol Lathe Ever Sold –*It's Still Going Strong!*

# 10 Years of Grueling Service for Lathe #5155



30" Heavy Duty Lathe with 13" Hale in Spindle

### 5 SIZES-18" to 36"

Small	18"	vp	to	7 1/2"	Hole
Medium	24"	UP	to	12"	Hole
Large	27"	vp	to	13″	Hole
Large	30"	vp	to	14"	Hole
Large	.36"	up	to	161/2"	Hole

(Standard type lathes, 16" to 36")

THIS HYDRATROL LATHE was used by the original purchaser 9 years, most of that time 24 hours a day, 7 days a week. During this period the purchaser bought and used \$700,000.00 of HYDRATROL LATHES!

Having a surplus of this particular size, the owner sold Lathe #5155 in 1944, to the Corpus Christi Machine Shop, Corpus Christi, Texas, in whose shop the above photo was taken.

The new owner recently wrote us: "Hydratrol Lathe #5155 has given excellent service, and has never given any trouble. It is rugged enough to handle heavy work and still maintain the extreme accuracy originally built into the machine."

LEHMANN MACHINE CO., St. Louis 3, Mo.





# Aluminum Bronze Rods-extruded by Ampco

#### ... for higher strength...good surface finish...compact structure

# • • • result in a better product for your customer

Two grades of Ampco Metal and two grades of Ampcoloy bronze are produced in extruded form at Ampco Metal, Inc.

Extruded Ampco products are available from a modern extrusion mill, with the largest extrusion press in the Middle West and one of the few in the world devoted exclusively to the extrusion of aluminum bronze.



Specialists in engineering production — finishing of copper-base alloy parts. Barstock, heavy walled tubing, and various shapes are provided to meet your needs—from a mill that contains all the modern equipment required to handle this type of work.

The quality of Ampco extruded stock reflects care and consideration of detail in each step of the process—controlled melting and alloying, exact billet casting and billet heating technique, plus careful inspection of the finished product.

### Write for Bulletin 64A

It gives you valuable information about Ampco extruded products.

#### Ampco Metal, Inc.

Department S-1 Milwaukee 4, Wisconsin Ampca Field Offices in Principal Citles

### **Electronic Tracing Device**

(Concluded from Page 94) spot from a light bulb through an optical unit containing lenses and a prism. The optical unit is in the form of a tube supported by a vertical bearing and is free to rotate about its vertical axis.

Light gathered by the optical system is concentrated so that when focused on the surface of the template a light spot about 3/32-in. in diameter is formed. This small light spot is deflected by the prism in the optical unit so that the center of the light spot is offset from the center of the optical unit. When the optical unit is rotated about its center the small spot of light on the surface of the template in a path having a 3/32in. radius or 3/16-in, pitch circle. This freedom of movement permits the spot of light to continually seek to position itself half on the black line and half on the white line and gives the electronic tracing head its ability to follow any curve or angle.

Intensity of this reflected light controls movement of the steering motor and for this reason the drawing or silhouette used in place of a template must be made in black against a white background or another color combination of sufficient contrast. The reflected light picked up by phototubes produces an electric signal, the strength of which depends on intensity of this reflected light; this signal is then amplified to provide the current which flows through steering motor armature and causes its rotation.

### Tube Emits Rays Throughout Solid Angle

An x-ray tube which emits rays from a hemispherical window throughout an entire 180° solid angle with an intensity in excess of 5,000,000 roentgen units per minute has been produced experimentally by Machlett Laboratories Inc. Springdale, Conn. It is equal in radiation intensity to 86.4 lb of radium, and is said to create possibilities for research, particularly in the field of x-ray photochemistry and biophysics.

A smaller version of this tube, providing over 2,000,000 roentgen units, is already commercially available.

### Acid Open-Hearth Shops Report 1944 Tonnage

Steel produced by the acid openhearth industry in the United States for the calendar year of 1944, with 40 producers represented, was 2,107,493 tons. Of this amount 51.85 per cent was in ugot form and 48.15 per cent in castingi-

R. S. DEAN · J. R. LONG · R. G. FEUSTEL · DR. E. S. ROWLAND · S. R. LILL G. CUTTON • J. ROBERT STROHM • W. E. JOMINY • D. NICONOFF • H. H. JOHNSON • L. H. ARNER • DR. H. A. SCH. CHWARTZ • DR. D. J. MCADAM, JR. • G. W. GEIL • DR. R. W. MEBS • CAPT. JOHN H. HOLLOMON • M. E. FINE • PROF. L DOWDELL • B. N. IANNONE • VERNON H. PATTERSON • JAMES O. VADEBONCOEUR • W. C. KAHN • J. OSTER WACHTELL . DR. TAYLOR LYMAN NFORD · L.P. TARASOV · W. T. RO NOTE . D. M. FINCH . S. P. WILSO GARVEY · VICTOR PASCHKIS · BENJ OWMAN · GEORGE F. COMSTOCK ROGERS • P. E. CAVANAGH • JAMES V. A. PENNINGTON · M. A. HUGHES D. M. FINCH . S. P. WILSON . DR. J. NSON • L. H. ARNER • DR. H. A. SCH DR. R. S. DEAN · J. R. LONG · R. G. SCHWARTZ · DR. D. J. McADAM, JR. · G. W. GEIL · DR. R. W. MEBS · CAPT. JOHN H. HOLLOMON · M. E. FINE · PROF J. G. CUTTON . J. ROBERT STROHM R. L. DOWDELL • B. N. IANNONE • VERNON H. PATTERSON • JAMES O. VADEBONCOEUR • W. C. KAHN • J. OSTE WACHTELL • DR. TAYLOR LYMAN • DR. A. R. TROIANO • N. A. ZIEGLER • W. L. MEINHART • R. A. GRANGE • T. N WEALK . DR. M. GENSAMER . JAMES R. BENFORD . L.P. TARASOV . W. T.

# Listen to Industry Leaders ... METAL SHOW · CLEVELAND · FEBRUARY 4-8

Group meetings...round table discussions...educational courses...technical research papers—all these will bring YOU new developments of vast interest to all the metal industry during the National Metal Congress in Cleveland the week of February 4—Monday through Friday.

More than a hundred leading metal authorities will discuss and describe processes and production techniques that until now — have not been available. The time you spend here will be regained many times over in improved operations and production-line savings to your company.

Visitors whose attendance may be limited will find that sessions have been grouped for their convenience. They may attend the first three days — February 4, 5 and 6 and sit on selected technical sessions of the American Society for Metals. During the evenings of these first three days, they may participate in the round table discussions. Or they may come to Cleveland February 7 and 8 for the



extensive educational lectures that will deal with magnesium, induction heating, corrosion and surface stressing.

In any event, plan to attend and see, at the same time, the big National Metal Exposition in Cleveland's Public Auditorium. 400 companies are exhibiting their products for YOUR inspection.

If you do not have hotel reservations, you may still obtain rooms — possibly in hotels, but more probably in apartments or private homes. A special Housing Bureau has been set up by the Cleveland Convention and Visitors' Bureau to handle YOUR requirements — so fill out the coupon and come to Cleveland.

Mr. Edward Brennan, Executive Vice President
Cleveland Convention and Visitors' Bureau, Inc.
1604 Terminal Tower, Cleveland 13, Ohio
Dear Mr. Brennan: I plan to attend the 27th National Metal Congress and Ex- position and will require type of room checked below. I will arrive February and leave February Single room, approximate rate Double room, approximate rate I prefer accommodations in a hotel but will accept room in private home.
NAME
FIRM
ADDRESS
CITY ZONE STATE



Urinding—Sanding—Rotary filing—Wire brushing—Buffing and Polishing—all are machine operations. There are many more.

All can be done better and faster, with a greater degree of efficiency, by using a Haskins Flexible Shaft Machine. And this with much less strain and faligue on the part of the operator.

Write for Catalog 45, showing many ways to speed production with flexible shaft equipment. And remember save your hands for work a machine can't do.

#### R. G. HASKINS 616 S. California Ave., Chicago 12



#### Zinc Extrusions

(Concluded from Page 96)

alloy. Round rod limits are  $\frac{3}{16}$  to 2 in. in straight lengths to 14 ft and in coiled up to 3/8-in., round wire from 3/16 to 3/8-in. in 80-lb coils. Rods for welding and soldering die-cast alloys are extruded in both round and square shapes of various alloys.

Bars include squares, hexagons, octagons and other special shapes, maximum dimension being that inscribed by a 2 1/16-in. circle, the range same for flat rectangles.

Smooth and round edge coiled strip is produced by extrusion without burrs or roughness; maximum width is 2 in., thickness 0.050-0.125 per cent. While commercial pure zinc has been available in rolled rods, zinc alloy products have not been made on that basis until now.

### COMMERCIAL TOLERANCES

Plus	or Minus	
Dimension	Rods-Wires-Bars	Shapes
0.1875" to 0.500"	0.007"	0.015"
0.501" to 1.000"	0.010"	0.020"
1.001" to 2.000"	0.012"	0.025"
COILI	ED STRIP	
Dimension	Thickness	Width
050"-0 80"	4%	3/32"
.081"125"	4%	1/8″

#### APPROXIMATE PHYSICAL PROPERTIES. (Psi)

Ultimate Tensile Strength

Commercial Grades	30,000
Special High Grade	25,000
ZC-1 Alloy	40,000
ZC-2 Alloy	42,000
Zamak No. 3 Alloy	47,000
Zamak No. 5 Alloy	50,000
The second se	

•Figures based on properties at normal room temperature.

For machining, high speeds with light cuts with high-carbon sharp steel tools suffice for most work. Proper rake and clearance angles on tools to eliminate chip loading is important to avoid drag, reducing surface contact on the work; also highly polished tool surfaces and clearance angles lower friction. Use of lubricant makes for smoother, faster cutting and higher finish; mixtures of lard oil and kerosene, equal parts, or mineral oil and kerosene, three to two, are satisfactory for most machining. All traces should be removed if the finished part is to be plated and further surfacefinished.

To avoid fractures or cracking during blanking, forming or cutting, operations should be at temperature above 70°-F for extruded zinc and zinc alloy: Warm soapy water suffices for lubricant during most forming work. For cutting extruded rods, bars and shapes, highspeed metal cutting equipment and saws are recommended with tallow or wax for saw lubricant.

Zinc's excellent resistance to corro-

sion reduces the need of protective finish to a minimum, but for decorative purposes the metal will take practically all electro-deposited metal finishes. Chromium plate is most widely employed and best results are attained by coatings of copper and nickel with a finish coating of chromium. Many organic finishes can be applied in a variety of colors and textures and surface finishing, electroplated or organic, offers no serious problem.

For the prevention of electrolysis of steel, the U. S. Navy is an important user of extruded zinc rod; machined into pencils, the extruded metal is placed in heat exchangers of numerous types of ships and submarines and in other integral parts of vessels. Zinc combats electrolysis by itself dissolving and protecting the steel from attack and disintegration. For galvanic protection of pipe lines, zinc rods have another important application. The extruded rod is buried adjacent to the pipe line, and, exerting an electric potential reduces corrosion of the pipe. Identical physical properties and color-matching to die castings, and galvanic corrosion elimination, are potential factors in broader application of extruded zinc products in the future.

### Power Truck Equipped With Horizontal Boom

Simple speedy and economical lifting and transporting of many types of loads in manufacturing operations is afforded by power trucks equipped with a horizontal, non-swivel type boom, moving vertically with its shoulder riding in the upright columns of the truck. This mechanism has proved particularly useful for single, heavy and bulky objects to which a hook, chain, rope or cable may be attached. No muscle-power is required beyond securing a chain or cable to object and to hook on the boom. Boom functions somewhat as a boom on a crane, but the complete unit is more compact and can be maneuvered within more limited areas.

Suspended by a short length of chain, an object can be swung around easily for passage through narrow aisles or doors, or for positioning for finishing operations, or shipping. Truck, developed by Elwell-Parker Electric Co., Cleveland, can carry loads up to 3000 lb. Boom is available in lengths of 72, 66 and 60 in. from face of uprights. At lowest point hook is 22 in. above floor level; at highest, 8 ft. Boom may be made interchangeable with a platform with which a still greater variety of loads may be transported. Machine is adaptable to many jobs where there is still a minimum of manpower available.

#### Flame Cutting

#### (Concluded from Page 104)

former 150, constituting an increase of 53.3 per cent in output.

This job required an instantaneous shut-off for the oxygen upon the completion of a cut, in order to avoid "nicking" of the bar or piece. This, in turn demanded that sufficient control be maintained to halt the flow of gas at a given moment. To meet this requirement, a solenoid valve was installed at each of the eight torches, and connected directly into the high-pressure line, as shown in Fig. 2. In addition to increased control of the cutting action itself, this arrangement provided advantages in instantaneous starting and complete centralized control of gas flow and motor operation.

After the operations were converted to flame-cutting, a second cost-time study indicated that the conversion produced an increase in output of 53.3 per cent. Costs were reduced 40 per cent, 50 per cent less labor was required, and material wastage was cut to 0.05 per cent.

HYDRO-PNEUMATIC Z ushion

. . provides draw ring holding pressure in excess of available shop air line pressure, and is easily installed on most punch presses

WHEN draw ring holding pressure in excess of the available shop air line pressure is desired, the self-contained hydropneumatic die cushion shown in the accompanying illustration may be used to good advantage. Through use of hydraulic principles, it is possible to get ring holding pressures on the hydro-pneumatic cylinder up to 400 psi from an 80 psi air line.

By applying regulated air pressure against the oil in the surge reservoir P from the regulating valve M, the oil is pushed through the check valve J into the die cushion cylinder D, thereby maintaining the predetermined height or resting position of the die cushion cylinder D. When the die cushion cylinder is expanded to its normal resting position ready for use, the cushion cylinder D, as well as part of the surge reservoir P, is filled with oil, as shown, and held in suspension by the hydraulic check valve J.

A given pressure is maintained on the hydraulic relief valve F by increasing or decreasing the applied air pressure in the air cylinder G which is controlled by the combination reducing regulating valve  $M_2$ . On the up cycle of the die cushion the relief valve F remains closed and the check valve J is open, allowing the fluid to return into the pneumatic die cushion cylinder D, bringing it back to its original resting position.

Ring holding pressure in pounds per square inch developed by cushion cylinder D is dependent on the air pressure applied against air cylinder G, and the difference in size of hydraulic relief valve F and air cylinder G. For example, assume the area of relief valve F to be 2 in., and the area of air cylinder G to be 10 in., or a ratio of 1 to 5. If 80 psi air pressure is applied against air cylinder G, the pressure developed by hydraulic relief valve F will be five times this figure or 400 psi. This pressure in turn is exerted against the die cushion cylinder, making it possible to obtain 400 psi ring holding pressure instead of the 80 lb available from the shop air line.

Self-contained die cushion unit is mounted to the press bed, as shown in photo, and the pin pressure pad B is in direct contact with the bottom side of the bolster plate. The hand wheel adjustment feature H makes it possible to stop the pin pressure pad at a predetermined position below the bottom side of the bolster plate when required. This not only compensates for variation in bolster plate thicknesses but also simplifies positioning of the draw ring relative to the dies used at all times.

This hydro-pneumatic die cushion, made by Dayton Rogers Mfg. Co., Minneapolis, is especially adapted for high ring holding pressure, particularly in the drawing of thin stainless steel and other thin stocks when the wrinkling of such material is excessive. Overall height of this unit is held to a minimum, making it possible to install it quickly on practically any punch press without the necessity of providing for a pit.







INDUSTRIAL production has risen from the slackened rate of the recent holiday season, but its, continued progress is endangered by widespread strikes scheduled to start in mid-January.

STEEL's industrial production index for the week ended Jan. 5 rose to 108 per cent, considering the 1936-1939 weekly average as 100. This increase from the previous week's 98 per cent resulted largely from a rise in steelmaking and automobile assemblies.

Reflecting the great strength of demand, steel ingot output has bounded from a holiday low of 65 per cent in the final week of 1945 to a current level of slightly above 80 per cent of capacity.

AUTOS—Although hamstrung by strikes, the automobile industry in the holiday week ended Jan. 5 produced 13,-920 cars, 3230 more than in the previous week, also a holiday period. Seventy-five per cent of the latest week's output came from plants of Chrysler Corp. and Ford Motor Co.

CARLOADINGS—The ending of war is reflected in a 3.5 per cent decline in railroad carloadings in 1945 compared with 1944. In 1945, loadings totaled 41,901,051 cars, 1,507,244 fewer than in the previous year.

COAL—Prospective 1946 requirements of the United States for bituminous coal are 525 million tons, says the National Coal Association. This includes 25 million tons for shipment to Canada and overseas. Consumption of bituminous coal in the U. S. and exports in 1945 totaled 574 million tons. However, total mine output for 1945 was only 570 million tons. The excess of consumption plus exports over mine output was reflected in lower reserve stocks of coal at the end of 1945 compared with stocks at the beginning of that year.

EMPLOYMENT—Little change is noted in employment in manufacturing establishments in November. The U.S. Department of Labor reported that the seasonally unadjusted total of such employment was 12,015,000 in November compared with 11,974,000 in October.

PRICES—A new postwar high in the U. S. Bureau of Labor Statistics index of commodity wholesale prices was registered in the week ended Dec. 29. The index, rising 0.2 per cent above the previous week because of higher prices for agricultural commodities, reached 107 per cent of the 1926 average. Wholesale price index for raw materials in the week ended Dec. 29 rose 0.7 per cent over that of the previous week, while the index for manufactured products was stationary.

CASTINGS—Shipments of malleable iron castings in October totaled 59,096 tons, 26 per cent over September shipments. New orders booked, less cancellations, in October were 88,382 tons, nearly three times the September figure which reflected many cancellations of war orders.



#### THE BUSINESS TREND



FINANCE	Latest Period*	Prior Week	Month	Year	
Bank Clearings (Dun & Bradstreet—millions)	\$11,918	\$9,599	\$15,265	\$11,374	
Federal Gross Debt (billions)	\$278.7	\$278.4	\$270.0	\$232.4	
Bond Volume, NYSE (millions)	\$27.1	\$19.9	\$40.9	\$79.7	
Stocks Sales, NYSE (thousands)	5,054	4,388	12,375	7,873	
Loans and Investments (billions)†	\$67.7	\$68.1	\$62,4	\$59.7	
United States Gov't. Obligations Held (millions)†	\$48,541	\$48,827	\$45,501	\$43,803	
PRICES					
STEEL's composite finished steel price average	\$58.27	\$58.27	\$58.27	\$56.73	
All Commodities†	107.0	106.8	106.8	104.7	
Industrial Raw Materials†	120.6	119.8	120.1	115.7	
Manufactured Products†	102.6	102.6	102.5	101.3	

Since the Days of the

HORSE-DRAWN BINDER

# HAS **PIONEERED** IN FURNACE ENGINEERING

Holerofi

BACK in the days of the old twohorse-powered binder, when "farmer" and "laborer" were well nigh synonymous, Holcroft developed such heat treat furnace innovations as alloy conveyors for continuoustype furnaces and the removable electric heating unit. In succeeding years, Holcroft has pioneered many other improvements in furnace design—improvements which have helped lower the cost and increase the durability of today's laborsaving farm equipment and other essential metal products.

Every Holcroft furnace is individually engineered by an organization of specialists who have been a step ahead in furnace design for nearly 30 years. That's one reason you can be confident that, whatever your requirements in produc-

MPANY

Modern Holcroft gas-fired radiant tube furnace for malleable annealing of small parts in farm implement plant.

tion heat treating, Holcroft furnaces designed for the job will give you the quality and volume of production desired, with the utmost economy obtainable under your own particular conditions.

Before you invest in furnace equipment for production work of any type, we invite you to take advantage of the specialized knowledge of our executives and engineers.



# HELPFUL LITERATURE

#### 1. Industrial Ovens

Gehnrich Oven Div., W. S. Rockwell Co.--4-page illustrated bulletin No. 116 describes construction and heating methods employed in line of industrial ovens which includes gas, oil, electric, steam, coke and infra-red lamp type heating. Various methods of heat distribution which provide uniform heating are described.

#### 2. Protective Metal Coating

Farker Rust Proof Co.—12-page illustrated technical bulletin entitled "Bonderite for Zinc and Cadmium" describes this process for pro-ducing on zinc, cadmium and their alloys a phosphate coating which inhibits corrosion and applied finishes. Properties, application, typi-cal uses and specifications for operation are described. Methods of handling coated sheets are covered.

#### **3. Inspection Equipment**

North American Philips Co.-Three illus-trated bulletins contain descriptions of the new Geiger-Counter x-ray spectrometer, self-con-tained electronic Searchray model 150 x-ray unit for internal inspection of castings and parts; and x-ray diffraction apparatus for identifying, comparing and analyzing materials.

#### 4. Stainless Steel

Rustless Iron & Steel Corp.--Accordion foldansuless from or Steel Corp.—Accordion fold-ing chart correlates all standard analyses of stainless steels with trade names, AISI type numbers and common government specifica-tions. Trade names and manufacturers are listed listed.

#### 5. Air Separator

Swartwout Co.-4-page illustrated bulletin No. S-13 describes Airfuge combination air separator and trap for users of compressed air tools and operations. Need for clean dry air for protection of pneumatic equipment is covered.

#### 6. Welding Electrodes

Arcos Corp. — Illustrated wall chart is re-ference guide for high and Iow alloy welding electrodes. Data include tables on corrosion resistance, heat resistance and weld metal sur-facing. Chemistry of weld metal is covered. Welding current and voltage tables give valu-the information able information.

#### 7. Materials Handling

Phillips Mine & Mill Supply Co. - 2-page Phillips Mine & Mill Supply Co. — 2-page illustrated folder describes complete line of skid platforms, deck pallets and nesting rings which includes sizes for use with any type of lift truck. Phil-Skid platforms feature cor-rugated deck and welded construction. Wood deck skid platforms employ welded frame. Double corrugated steel deck pallets are welded also. Corrugated deck Phil-Pallets have pipe understructure. Junior Phil-Skids are of lightunderstructure. Junior Phil-Skids are of light-weight wood deck construction. Nesting rings can be used with any skid or pallet of corresponding size.

#### 8. Diamond Wheels

Precision Diamond Tool Co. — 16-page illus-trated catalog No. 44 presents data on recently developed metal bonded diamond wheel for internal and external grinding applications. Di-mensional and application information are given on diamond mounted points and wheels, straight grinder wheels, cup and dish types, hand hones, single and multiple point dressing tools and special shape tools.

## 9. Corrosionproof Cement

Pennsylvania Salt Mfg. Co.—S-page illus-trated folder "Pennsalt PRF Cement for Cor-rosives" shows service and installation advantages of this resin type cement which is quickleges of this resin type cement which is quick-setting, cold-hardening material that resists convoion from alkali, acid and solvents. It is used for constructing floors, drains or tanks, and a protection for structural supports.

#### **10. Surface Grinding Abrasives**

Norton Co. — 8-page illustrated folder "Norton Cylinders and Segments for Surface Grinders" shows typical forms and suggests applications. Case studies cite application, ab-rasive used and results obtained on specific grinding operations.

#### **11. Cutting Tools**

Spo-D-Cut Tool Co.---38-page illustrated catalog No. R-10 describes carbide tipped cutting tools including end mills, milling cutters, reamers, drills, counterbores, lathe centers, router bits, boring tools, fly cutters and special tools. Prices are given. Engineering data on selection and use of proper tools completes book.

#### 12. Test & Research Facilities

American Cast Iron Pipe Co.—20-page illus-trated brochure entitled "ACIPCO Testing and Research Facilities At Your Service" describes laboratories, equipment and personnel, avail-able to industries, schools and individuals for scientific testing and research work on contract basis.

#### 13. Collets

Sutton Tool Co.—6-page illustrated folder shows standard draw-in and push-out collets. Details are given on new Full-Floating collet with interchangeable and replaceable jaws de-veloped especially for handling hot-rolled stock. Diamond serrated principle is described and advantages outlined.

#### 14. Earthmoving Equipment

R. G. LeTourneau Inc,-12-page illustrated bulletin form No. TP-122 covers equipment se-lection and job methods in connection with earthmoving operations. Tournapull applica-tions on roads, airports, dams, reservoirs, rail-roads, mines and other jobs are shown.

#### 15. Cellular Rubber

Sponge Rubber Products Co. — 4-page illus-trated pamphlet No. 845-21 describes forms in which sponge rubber, bonded fiber and other subdensity materials are manufactured. Ninety-eight molded, die cut and fabricated shapes of flexible, elastic compressible prod-ucts used for cushloning, shock absorption, vibration dampening, scaling, insulating and gasketing are illustrated.

#### 16. Aluminum Alloy

Reynolds Metals Co. — 8-page technical bulletin No. 50-A covers R 301 high strength aluminum alloy sheet and plate. Specifications, characteristics, uses and other data are presented.

#### 17. Locomotive Cranes

Orton Crane & Shovel Co. — 16-page illus-trated catalog No. 76 describes line of air controlled Orton steam locomotive cranes. Four and eight-wheel models can be supplied with boom lengths of up to 50 feet. Capacities when handling various materials and different operating radii are listed.

#### 18. Power Press Guard

Junkin Safety Appliance Co.-12-page illus-trated booklet "Junkin Safety Guard-The Key to Protection" discusses basic principle of power press safety guard, mechanical interlock, re-ciprocating barrier gate, lifter disc assembly, pedal detachment, operation, flexible adjustments and other features of unit.

#### **19. Aircraft Fuel Pump**

Pesco Products Co.—12-page illustrated cata-log No. 9 lists specifications and describes Pesco booster fuel pumps for aircraft. These tank mounted pumps are electric motor driven units that deliver bubble free fuel to engine.

> FIRST CLASS PERMIT No. 86 (Sec. 510 P.L.&R. Cleveland, Ohio



# STEEL

**Londors' Service Dent**.

Penton Building CLEVELAND 13, OHIO



1213 West Taird St., Cleveland 13, Ohio

11	21	31	41	NAME
12	22	32	42	
13	23	33	43	COMPANY
14	24	34	44	
15	25	35	45	PRODUCTS
16	26	36	46	MANUPACTURED
17	27	37	47	
18	28	38	48	ADDRESS
19	29	39	4	
20	30	40	80	BITT AND STATE
	12 13 14 15 16 17 18 19	2     22       3     23       4     24       15     25       16     26       17     27       18     28       19     29       20     39	2     22     32       3     23     33       14     24     34       15     25     35       16     26     36       17     27     37       18     28     38       19     29     39       20     33     49	2       22       32       42         3       23       33       43         4       24       34       44         5       25       35       45         16       26       36       46         17       27       37       47         18       28       38       48         19       25       39       49       50

#### 20. Drilling & Boring Units

National Automatic Tool Co.-20-page illustrated catalog describes drillers, borors and toppers which are designed for drilling, reaming, boring, tapping, facing, chamfering, hollowmilling and trepanning operations. Standard and special types of machine tools are described and typical work produced by each shown.

#### 21. Tool Steels & Forgings

McInnes Steel Co.—12-page illustrated booklet and supplementary high speed and tool steel extra lists present data on typical analyses, applications, hardening and tempering of hammered high speed, hot work, high carbon high chrome, vanadium crucible tool, air, oil and water hardening carbon, chrome nickel and other type of steel.

#### 22. Hardness Testing

Nitralloy Corp. — 106-page illustrated technical book entitled "Hardness" by D. Landau, industrial applications engineer, is critical examination of hardness and dynamic hardness, and attempts to reduce hardness to dimensional analysis. Testing methods and other data related to subject are covered. Bibliography is included.

#### 23. Welded Products

National Annealing Box Co.-24-page illustrated brochure No. 456 describes welded products from open hearth, stainless alloy and clad steels for chemical, petroleum chemical refining and steel industries. Plant facilities are described for producing pressure vessels, galvanizing kettles, annealing covers and wide range of special plate work on custom made, production basis.

#### 24. Conveyor

Steel-Parts Mfg. Co. — 8-page illustrated folder "This Is News!" announces new conveyor employing steel belt which is adaptable for handling light or heavy loads and which is flexible in design. Positive nonslip motion is imparted to conveyor belt by drive sprocket. Typical applications of unit are shown.

#### **25. Steam Platens**

Lukens Steel Co.—4-page illustrated folder form No. 265 describes steam platen which is single homogeneous rolled steel plate with internal labyrinth in which steam passage is rectangular in shape.

#### 26. Metal Spraying Equipment

Metallizing Co. of America—4-page illustrated circular No. F-1-A describes Mogul model F metallizing gun. Exploded view of gun, information on construction features, discussion of complete metallizing equipment and prices complete folder.

#### 27. Management Engineering

Methods Engineering Council—20-page fllustrated brochure describes functions of modem management engineering. Council's work in methods engineering, training, plant layout and design, job evaluation, wage incentive plans and personnel appraisal are covered. Ninetynine services offered are discussed.

#### 28. Oil Burning System

Peabody Engineering Corp. — 4-page illustrated bulletin No. 109 describes Constant Differential Wide Range oil burning system. How system achieves efficient combustion over range in capacity as great as 50 to 1, controlling any number of burners throughout all variations in capacity, is explained.

#### 29. Grinding Wheels

Dayton Grinding Wheel Div., Simonds Worden White Co. — 12-page booklet entitled "101 Grinding Questions Answered", second edition, gives answers to typical grinding questions. Forms are included for convenience of readers in submitting their questions for solutions.

#### **30. Testing Machine**

Steel City Testing Laboratory—2-page illustrated catalog sheet describes and gives specifications of model MP-10 Universal hydraulically operated testing machine. Machine is design for making tensile, transverse and compression tests up to 60,000 pounds.

1			2-6		
	1 2	31	41	NAME TITLE	
	2 22	2 32	42		
H	3 2	3 33	43	COMPANY	1910
		34	44		
	5 Z:	5 33	40	PRODUCTS MANUFACTURED	3
	7 15	5 AU	14		
	2 21	1 11	4	ADDRESS	
1	9 21	> 39	49		
2	0 30	0 40	50	CITY AND STATS	
	****				
				FIRST CL. PERMIT No. (Sec. 510 P.L	A55 
***				FIRST CL PERMIT No (Sec. 510 P.I Cleveland,	A55 >, 80 &R. Ohio
	BI	JS	INE String	FIRST CL PERMIT No (Sec. 510 P.I. Cleveland, Neccessary if Mailed in the United States	A55 &R. Obio

#### **31. Twist Drills**

Republic Tool & Drill Co.—40-page illustrated manual No. S-4 presents information about Shankless roll-forged drills. Advantages are set forth and descriptions of their manufacture, use and maintenance are given. Engineering data and recommendations for use are included.

#### 32. Gravity Conveyor

Rapids-Standard Co. — 16-page illustrated catalog No. C-142-C describes Rapid-Wheel gravity conveyors, presents information concerning construction features and uses of eight models and gives complete specifications and data on standard accessories. Installation piotures show these portable, lightweight units in use.

#### 33. Manufacturing Sites

#### 34. Counting Devices

Production Instrument Co. — 8-page illustrated catalog, form No. 50, describes stroke and revolution counters, electric counters, coil winding counters and predetermined electric counters. Application information and prices are given.

#### 35. Chucks

Skinner Chuck Co.—96-page illustrated wirsbound catalog No. 58 describes standard chucking equipment including hand and power operated chucks and machine vises. Data on all types of vises are indexed both by type and numerical index for convenience. Prices are given.

#### **36. Fabricated Metal Products**

Stanwood Corp. — 12-page illustrated bulletin No. 15 describes design and construction of made-to-order baskets, carburizing bores, crates, electric heating elements, fixtures, off bath furnaces, retorts, quenching and degreasing tanks, trays and special equipment. Engineering service is offered.

#### **37. Barometric Condensers**

Ross Heater & Mfg. Co.—4-page illustrated bulletin No. 4509 presents useful data and information on Parallel Flow barometric condensers designed for use as intercondensers and aftercondensers in connection with steam jet ejectors. Explanation of nonclogging spray nozzle is given. Engineering data cover duty, temperature rise, terminal difference, condensing water requirements and a table for solection of correct size unit. Dimensions and weights are given.

#### 38. Globe & Angle Valves

Ohio Injector Co. — 4-page illustrated bulletin, form No. S57, describes OIC cast steel globe and angle valves. Design details are covered and cutaway drawing shows construction. Specifications, service recommendations and list prices are included.

#### **39. Variable Speed Drive**

Reeves Fulley Co.—48-page illustrated catalog T-443 describes line of variable speed transmissions. Design, operating principle, epplications and engineering data are given on manually and remotely controlled units. Complete information is presented to aid in selection and application of proper unit for any given operating conditions.

#### 40. Cleaning Machine

Constanting of

Hydra Electric Products Co.---S-page illustrated bulletin describes HydraLectric cleaning and adhesive application unit which is designed to facilitate cleaning and servicing of cell banks of the Westinghouse Precipitron electronic air filter. Unit delivers hot emulsifying solution at 5 gallons per minute and 300 pounds per square inch to remove dirt from collector plates. Unit is then used to replace adhesive on plates.

# MARKET SUMMARY

# Steel Industry Set To Go Ahead Under Labor Peace

Mills prepare for strike or continued operation... Raw material suspensions less than expected.... Output high

WORKING under the uncertainties of threat of a general strike at the beginning of this week steelmakers last week took such actions as were possible, to soften the blow if it came and at the same time to maintain a strong position for steel production if the threat passed without interruption,

Aside from the possibility of the strike the industry is well prepared for the future, with order books filled to an almost unprecedented degree and plant in position to produce at high speed with augmented labor forces. As far as possible in the time since the war closed the ravages of high production for armament have been repaired and the steady rise in output in the past few weeks has indicated the effort being made to meet the pressing demand of industry in its reconverted form.

Various suspensions of shipments were made last week, particularly in pig iron and scrap moving to steel mills, though they were not nearly as heavy as had been expected. Growing hope that a major strike might be averted or delayed, was a factor, accompanied by urgency for getting materials in and the understanding for the first time in many quarters that demurrage on strike-bound cars would be subject to relief under master tariff regulations, by which a consignee whose plant is forced down by strike can appeal within 30 days after the end of the stoppage for reduction in demurrage to \$1.20 per day for the full term of the suspension.

Some consumers later in the week actually lifted prior suspension orders in their urgency to get in steel scrap. Some consumers held that regardless whether the strike developed they probably would have to curtail their melt within another month because of insufficient scrap.



#### DISTRICT STEEL RATES

	Week		Same	Week
	Jan. 12	Change	1945	1944
Pittsburgh	. 89.5	+13.5	89	97
Chicago	. 88	+ 1	91 2	101
Fastern Pa	. 80	+7	90	96
Youngstown	. 85	+ 2	81	95
Wheeling	. 95	None	98.5	94
Cleveland	. 84	None	86	90.5
Buffalo	. 81	None	70	90.5
Birmingham	95	+10	95	95
Now England	80	None	92	89
Cincinnati	81	+ 9	92	90
Childhiada	68	None	75	85.5
Detroit	88	+ 7	84	91
Denon			-	-
Average	86	+ 5	94	99
•Based on s	teelmakin	g capacit	ies as o	of thes

Confidence is strong that once labor difficulties are out of the way highly active conditions will prevail for most of the remainder of the year. This is reflected by persistent efforts of consumers of many products, especially of light flat-rolled steel, to get on mill books despite extended deliveries. Various mills refuse to accept further orders for the present as they can make no firm promises and believe that many changes in specifications would be desired before shipment.

Steel production last week was pushed hard and the estimated national rate rose 5 points to 86 per cent of capacity, highest since V-J Day. Operations rose in seven districts, the greatest gain being in the Pittsburgh district, a rise of 13½ points to 89½ per cent of capacity. Chicago gained 1 point to 88, Youngstown 2 points to 85, eastern Pennsylvania 7 points to 80, Detroit 7 points to 88, Cincinnati 9 points to 81 and Birmingham 10 points to 95. Rates were unchanged in the other districts, as follows: Wheeling 95, St. Louis 68, New England 80, Buffalo 81, Cleveland 84.

Output of ingots and steel for castings in 1945 was 79,745,-581 net tons, almost 10 million tons below the record output of 89,641,600 tons in 1944. Of this decline practically 8 million tons came in second half, which included the end of the war and the soft coal strike. In spite of the drop from 1944 the tonnage of steel made in 1945 was well above the best peacetime year in the industry's history. Fourth quarter production was poorest of the year at 17,884,091 tons. December output was 6,084,929 tons, one of the lowest of the year.

In common with other raw materials uncertainty has prevailed in pig iron the past week on the eve of the date set for the general steel strike. Melters have sought to get as much tonnage delivered as possible to tide over the strike period in foundries not affected by the walkout. Supply has not been free and producers have continued quota plans to give as good distribution as possible.

Average composite prices of steel and iron products continue unchanged at ceilings prevailing for several months, finished steel at \$58.27, semifinished steel \$37.80, steelmaking pig iron \$24.80, steelmaking scrap \$19.17.

# COMPOSITE MARKET AVERAGES

	Jan. 12	Jan. 5	Dec. 29	Month Ago Dec. 1945	Months Ago Oct. 1945	Year Ago Jan. 1945	Years Ago Jan. 1941
Finished Steel	\$58.27	\$58.27	\$58.27	\$58.27	\$58.27	\$56.73	\$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron.	24.80	24.80	24.80	24.80	24.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	18.95	21.00

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; other, gross tons.

# COMPARISON OF PRICES

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

	T 10	-	· · · ·	-		* 10	-		
Finished Material	Jan. 12,	Dec.,	Oct.,	Jan., 1945	Pig Iron	Jan. 12,	Dec.,	Oct.,	Jan.,
Steel hars Pittshurgh	0.050	0.050	9.950	9 150	Bessemer del Pittsburgh	\$26 04	1010	\$96 10	605 10
Steel bars, Philadelphia	2.57	2.57	2.57	2.47	Basic, Valley	25.25	25.25	24.50	23.50
Steel bars, Chicago	2.25	2.25	2.25	2,15	Basic, eastern del. Philadelphia	27.09	27.09	26.34	25.34
Shapes, Pittsburgh	2.10	2.10	2.10	2.10	No. 2 fdry., del. Pitts., N.&S. Sides	26.44	26.44	25.69	24.69
Shapes, Philadelphia	2.215	2.215	2.215	2.215	No. 2 foundry, Chicago	25.75	25.75	25.00	24.00
Blates Bitteburgh	2.10	2.10	2.10	2.10	Southern No. 2, Birmingham	22.13	22.13	21.38	20.38
Plates, Philadelphia	2.30	2.20	2.30	2.10	No. 2 fdry. del. Philadelphia	27.59	20.03	28.84	25.84
Plates, Chicago	2.25	2.25	2.25	2.10	Malleable, Valley	25.75	25.75	25.00	24.00
Sheets, hot-rolled, Pittsburgh	2,20	2.20	2.20	2.10	Malleable, Chicago	25.75	25.75	25.00	24.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	.3.05	Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.50	Gray forge, del. Pittsburgh	25.94	25.94	25.19	24.19
Sheets, not-rolled, Gary	3.05	3.05	3.05	3.05	Fentomanganese, del. Fittsburga	140.00	140.00	140.33	140.00
Sheets, No. 24 galv., Garv	8.70	8.70	3.70	8.50	Seran				
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60	serap				
Tin plate, per base box, Pittsburgh	\$5.00	\$5.00	\$5.00	\$5.00	Heavy melting steel, No. 1, Pittsburgh	\$20.00	\$20.00	\$20.00	\$20.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.55	Heavy melt, steel, No. 2, E. Pa	18.75	18.75	18.45	18.75
					Bails for rolling Chicago	10.70	18.75	10.75	99.25
					No. 1 cast. Chicago	20.00	20.00	20.00	20.00
Semifinished Material						20100	20100		
41 · 1 · Du. 1 · Du					Coke				
Sheet bars, Pittsburgh, Chicago	36.00 \$	36.00	\$36.00	\$34.00	Compatibulity ( )				67.00
Berolling billets Pittsburgh	36.00	36.00	36.00	34.00	Connelleville, founday, ovens	\$1.50	\$1.50	\$ 25	7 75
Wire rods, No. 5 to st-inch, Pitts.	2.15	2.15	2.15	2.00	Chicago, by-product fdry., del.	13.35	13.75	13.75	13.85

#### STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron pristeel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

#### Semifinished Steel

Gross ton basis except wire rods, skelp. Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand, analysis, \$31.00. (Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at \$33 gross ton, f.o.b. mill.

ton, f.o.b. mill. Alloy Steel Ingots: Pittsburgh, Chicago, Buffa-lo, Bethlehem, Canton, Massilion; uncrop, \$45. Berolling Biliets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$36; Detrolt, del. \$38; Duluth (bil) \$38; Pac. Ports, (bil) \$48. (Andrews Steel Co., carbon slabs \$41; Continental Steel Corp., billets \$34, Kokomo, to Acme Steel Co; Northwestern Steel & Wire Co., \$41, Sterling, Ill.; Laclede Steel Corp., \$36 base, billets for lend-lease, \$34, Ports-mouth, O., on slabs on WPB directives, Gran-tie City Steel Co. \$47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. \$58,64, Pac. ports.) Forging Quality Blooms, Slabs, Billets: Pitts-

Forsing Quality Blooms, Slabs, Billets: Pitts-burgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$42, Detroit, del. \$44; Duluth, billets, \$44; forg. bil. f.o.b. Pac. ports, \$54.

(Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points: Follansbee Steel Corp., \$49.50 f.o.b. Toronto, O. Geneva Steel Co. \$64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birm-ingham, base 1000 tons one size and section; 3-12 in., \$52; 12-18 in., excl., \$54.00; 18-in. and over \$56, Add \$2.00 del. Detroit; \$3.00 del. Eastern Mich.

Gel. Eastern Mich.
Alloy Billets, Slabs, Blooms: Pittsburgh, Chi-caro, Buffalo, Bethlehern, Canton, Massillon, \$54, del. Detroit \$56, Eastern Mich. \$57.
Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$36. (Wheeling Steel Corp. \$37 on lend-lease sheet bars, \$38 Portsmouth, O., on WPB di-rectives; Empire Sheet & Tin Plate Co., Mans-field, O., carbon sheet bars, \$39, f.o.b. mill.) Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham,  $5-\frac{3}{23}$  in. inclusive, per 100 lbs., 52.15 Do., over  $\frac{3}{23}-\frac{4}{21}$ -in., incl., 52.30; Galveston, base, 52.25 and 52.40 respectively. Worcester add \$0.10; Pacific ports \$0.50 (Pitts-burgh Steel Co., \$0.05 higher.) Bars

Bars Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; De-trolt, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Guil Ports, dock 2.62c; Pac. ports, dock 2.90c; (Calumet Steel Division. Borg-Warner Corp., and Jos-iyn Mig. & Supply Co., may quote 2.55c, Chi-cago base; Shefield Steel Corp., 2.75c, f.o.b. St. Louis.) Hail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons. (Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33e f.o.b. mill.)

Hull.) Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI	("Basic	AISI	(*Basic
Series	0-H)	Serles	O-H)
1300	\$0.10	4100	(.1525 Mo) 0.70
			(.2030 Mo) 0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130	or 5152 0.45
3400	3.20	6120	or 6152 0.95
4000	0.45-0.55	6145	or 6150 1.20

\* Add 0.25 for acid open-hearth; 0.50 electric. Add 0.25 for acid open-nearth; 0.30 electric. Cold-Finished Carbon Bars: Pittsburgh, Chi-cago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.) Cold-Finished Alloy Bars: Pittsburgh, Chicaso, Gary, Cleveland, Buffalo, base 3.35c; Detroll. del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Spar-rows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Guif ports, dock 2.50c; Pacific ports, dock 2.55c.

dock 2.55c.
Reinforcing Bars (Rail Steel): Pittsburgh, Chl-cago, Gary, Cleveland, Birmingham, Youngs-town, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf porta, dock 2.50c.
Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

#### Sheets, Strip

Sheets, Strip Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granita City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del 2.44c; Pacific ports 2.75c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.) Cold-Bolled Sheets: Pittsburgh, Chicago, Cleve-land, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c, Gaty, Birmingham, Buffalo, Youngstown, File City, base 3.50c; New York del. 3.94c; Phila. del. 3.75c; Pacific ports 4.25c. (Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.) Corrugated Galv, Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c

Corrugated Galv. Sheets: Pittsburgh, Chicaro, Gary, Birmingham, 29 gage, per square 3.36c Culvert Sheets: Pittsburgh, Chicago, Gar Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; inc-coated, hot-dipped, heat-treated, No. 24, Pitts-burgh, 4.25c.

Enameling Sheets: 10-gage; Plitsburgh, Chl-cago, Gary, Cleveland, Youngstown, Middle-town, base 2.85c; Granite City, base 2.95c; Deirolt, del, 2.95c; eastern, Mich. 3.00c; Pa-cific ports 3.50c; 20 gage; Plitsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c. Electrical Sheets No. 24:

LIGGINGING AND	N L C			
J	Pittsburgh	Pacific	Granite	
	Base	Ports	City	
Field grade	. 3.30c	4.05c	3.30c	
Armature	. 3.65c	4.40c	3.75c	
Electrical	4.15c	4.90c	4.25c	
Motor	5.05c	5.80c	5.15c	
Dynamo	. 5.75c	6.50c	5,85c	
Transformer				
72	6.25c	7.00c		
65	7 950	8 000		

#### Tin, Terne Plate

**Tin, Terne Plate** Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, 85.00; Granite City \$5.10. Electrolytic Tin Plate: Pittsburgh, Gary, 100-b. base box, 0.25 lb. tin, \$4.35; 0.50 lb. tin, \$4.50; 0.75 lb. tin \$4.65; Granite City, \$4.45, \$4.60, \$4.75, respectively. Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed, .450c. Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c. Manufacturing Ternes: (Special Coated) Pitts-burgh, Chicago, Gary, 100-base box \$4.30; Granite City \$4.40. Plate

#### Plates

Plates Roofling Ternes: Plitsburgh base per pack-age 112 sheets; 20 x 28 in., coating I.C. 8-1b. 12.00; 15-1b. \$14.00; 20-1b. \$15.00; 25-1b. \$16; 30-1b. \$17.25; 40-1b. \$19.50. Carbon Steel Plates: Plitsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c. (Granite City Steel Co. may quote carbon plates 2.35c f.0.b. mill; 2.65c f.0.b. D.F.C. mill; Central Iron & Steel Co., Provo, Utah, 3.20c, f.0.b. Pac. ports,) Floor Plates: Plitsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c. "pen-Hearth Alloy Plates: Plitsburgh, Chi-cago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c. Shapes

Shapes

Shapes Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports. 2.75c; Gulf ports. 2.45c. (Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.25c on beams and channels from 4t o 10 inches.) Steel Piling: Pittsburgh, Chicago, Buffalo, 2.40c; Pacific ports, 2.95c. Wirc Products, Naile

#### Wire Products. Nails

Wire: Insham	to manufacturers	ro, Cleveland,	Birm-
Spring	basic, bessemer w	/ire	•\$2.75

T one	roducts	to the	Trade	1	
standa	rd and	cement-	coated.	wire nall-	e
and	staples.	100-lb	kor	Dittahung	3,
Chi	- Person I		ACE,	FILLSDUCK	1,

and staples, 100-1b. keg. Pittsburgh, Chica go, Birmingham, Cleveland, S2.90; Pac. ports, \$3.40; galvanlzed, \$2.55 and \$3.05, resp. Annealed Merchant quality wire, 100-hb, Pittsburgh, Chicago, Cleveland, Birmingham b, Pittsburgh, Chicago, Cleveland, Birmingham Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barbless wire, column 72; twisted barbless wire, solor Worcester, \$0.05 for Duluth; add \$0.50 for bright, annealed, agivanized and \$0.70 for other finishes for Pacific ports. Same bases as for bright basic except Bir-mingham.

\* Same pases as for Worcester; 50 cents for #1 Add 10 cents for Worcester; 50 cents for all other annealed, bright basic and 70 cents for all other finishes for Pacific ports.

#### **Tubular Goods**

Welded Pipe: Base price in carloads, threaded and coupled to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought from pipe. Butt Weld

		Dutt	rr Cru		
	Ste	el		Iro	n
n.	Blk.	Galv.	In.	Blk.	Galv.
6	56	33	14	. 24	31/4
1 8 1/4	59	4016	5/4	. 30	10
4	6314	51	1-14	. 34	16
4	6614	55	114	38	181/
3	6816	5716	2	. 3716	18
0		Lan	Weld		
	Ste	el .		Irc	n
n	Blk.	Galv.	In.	Blk.	Galv.
- main	61	4916	14	. 23	316
14-3	64	5414	114	2816	10
11/6	66	5412	2	3016	12
g	65	5216	216-316	3116	1414
-10	6414	52	- /1 0 /1	3316	18
1.12	6312	51	416-8	3216	17
1 14.1.1	0072	0.	9-12	2816	12
toller T	nhes:	Net ha	se prices	De: 100	) feet
obfo	h Piti	shurgh i	n carload l	ots min	imum
vall cut	lengt	hs 4 to 5	4 feet, incl	usive.	
tun, cur	TOTAL.			-Lan V	Veld-
				- ap 1	

	1.201	-Seat	mless-	102 1	Char-	
0.D.		Hot	Cold		coal	
Sizes	B.W.G.	Rolled	Drawn	Steel	Iron	
1"	13	\$ 7.82	\$ 9.01			
11/4"	13	9.26	10.67			
146"	13	10.23	11.72	\$ 9.72	\$23.71	
1.1.11	13	11.64	13.42	11.06	22.93	
2"	13	13.04	15.03	12.38	19.33	
214"	13	14.54	16.76	13.79	21.63	
214"	12	16.01	18.45	15.16		
216"	12	17.54	20.21	16.58	26.57	
21/11		18.59	21.42	17.54	29.00	
3"		19.50	22.48	18.35	31.38	
316"	11	24.63	28.37	23.15	39.81	
4"	10	30.54	35.20	28.66	49.90	
416"	10	37.35	43.04	35.22		
5"		46.87	54.01	44.25	73.93	
6"	7	71 96	82 93	68 14		

#### **Rails**, Supplies

Standard rails, over 60-lb., fo.b. mill, gross ton, \$43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, \$45.00. "Relaying rails, 35 lbs, and over, f.o.b. rail-road and basing points, \$31-\$33. Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates \$46 net ton, base, Standard spikes, 3.25c.

•Fixed by OPA Schedule No. 46, Dec. 15, 1941.

#### **Tool Steels**

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per Ib.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oll-hardening 24.00c; high car.-chr. 43.00c.

				Base,
Fung.	Chr.	Van.	Moly.	per lb.
18.00	4	1		67.00c
1.5	4	1	8.5	54.00c
	4	2	3	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

#### Stainless Steels

Base, Cents per lb.

CARACONA		CORE OF IS	01000	H.R.	C. R.
Tune	Bars	Plates	Sheets	Strin	Strip
302	24 000	27 00c	34 00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
209	29.00	94.00	41.00	28 50	35.00
300	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48 75	56.00
312	34.00	40.00	49.00		
ate	40.00	44 00	48.00	40.00	48.00
+301	20.00	34.00	41.00	29.25	38.00
1347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRATO	HT CH	ROMILE	Y STEE	L	
403	21 50	24 50	29.50	21.25	27.00
##410	18 50	21 50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
11420	24.00	28 50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
++430F	19.50	22.50	29.50	18.75	24.50
4404	24 00	28.50	33.50	23.75	36.50
449	22 50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINL	FAS CI	AD STI	EEL (20	%)	
304		1118.00	19.00		

•With 2-3% moly. \$With titanlum. #With columblum. ••Plus machining agent. #High carbon. ##Free machining. \$\$Includes anneal-ing and pickling. High

#### **Rivets**, Washers

Birmingham 5c St

#### **Bolts**, Nuts

F.o.b.	Pittsburgh	, Cleve	land, E	firmingham,
Chicago.	Discoun	ts for	carloads	additional
-	5%, full (	container	, add 1	0%
	Condo	fore on	Machine	

Gradene and Mashine	
Carriage and afactine	11 011
1/2 x B and smaller	77 04
Do., A and % x 6-in, and shorter - 03	2 011
Do., % to 1 x 6-in. and shorter	61 OII
1% and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step holts	56 off
Plow holts	65 off.
Stove Bolts	- A
In poolengos with puts separate 71-10 off	bulk
n packages with hats acparate in 10 ont	or or
SO DII ON 13,000 OI D-MCH and MORE	
buou over b-m.	
AUTE TO D	
Semifinished hex 0.5.5.	#4
1-inch and less 62	01
1/2-1-inch	60
1¼-1¼-inch 57	28
1% and larger 56	Sec 1
Hexagon Cap Screws	
Upset 1-In., smaller	64 01
Milled 1-in., smaller	60 off
Sungra Hand Set Screws	
Unset 1-in smeller	71 off
Hundloon 1/ in largon	60 off
Heauless, A-m., larger	70 off
NO. 10, smaller (1) those ann	heoni
Rasing Point Prices are (1) those and	- firet
by U. S. Steel Corp. subsidiaries for	DA1 at
quarter of 1941 or in effect April 10, 13	PEL AL

quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other pro-ducers at the some designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940. Extra mean additions or deductions from Highlight for the extra mean additions are deemed basing points except in the case nearest basing point price plus all-rall freight may be charged. Domestic for the extent profest price for (2) extra

basing point price plus all-rain friend may be charged. Domestic Celling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. Govern-ing hasing point is basing point nearest the consumer providing the lowest delivered price. Seconds, maximum prices: flat-rolled rejects of prime press, wasters 75%, waste-wasters 65% except plates, which take waster prices: in plate \$2.80 per 100 lbs.; terns plate \$2.25; semifinished 85% of primes; other grades limited to new material cellings. Expert celling prices may be either the ag-gregate of (1) governing basing point or emer-gency basing point (2) export extras (3) ex-port transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

#### Metallurgical Coke

#### Price Per Net Ton

the second second	
Connellsville, furnace	°7.50
Concellsville, foundry	8.00- 8.50
New Piver, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago outside delivered	13.00
Chicago delivered	13.75
Terre Haute, delivered	13.50
Milwaukee ovens	13.70
Now England delivered	14.65
St Touis delivered	+18.75
Rimingham delivered	10.90
Indiananolis delivered	13.50
Cincinnati delivered	13.25
Cloueland delivered	13 20
Duffalo delivered	13 40
Detroit delivered	13 75
Dell'olt, dell'elettet	19 28
Filladelpina, denvered	10.40

•Operators of hand-drawn ovens using trucked coal may charge \$8.00; effective May 26, 1945. 14.25 from other than Ala., Mo., Tenn.

#### Coke By-Products

Spot and freight allowed east of (	Imaha
Spot, gai., iteixint anowed east of t	Jinana
Pure and 90% benzol	15.00e
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.23c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to job-	
bers	8.00c
Per ton, bulk, f.o.b, port	
Sulphate of ammonia	\$20.00

Aster 1

F.o.b.	Pittsburgh,	Cleveland,	Chicago
ructural			3.7

# WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, s ubject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston New York Jersey City Philadelphia Baltimore	4.044 <sup>1</sup> 3.853 <sup>1</sup> 3.853 <sup>1</sup> 3.822 <sup>1</sup> 3.802 <sup>1</sup>	3.912 <sup>1</sup> 3.758 <sup>1</sup> 3.747 <sup>1</sup> 3.666 <sup>1</sup> 3.759 <sup>1</sup>	$3.912^{1}$ $3.768^{1}$ $3.768^{1}$ $3.605^{1}$ $3.594^{1}$	$5.727^{1}$ $5.574^{1}$ $5.574^{1}$ $5.272^{1}$ $5.252^{1}$	$3.774^1$ $3.590^1$ $3.590^1$ $3.518^1$ $3.394^1$	$\begin{array}{r} 4.106^1\\ 3.974^1\\ 3.974^1\\ 3.922^1\\ 3.902^1\end{array}$	$\begin{array}{c} 5.106^1 \\ 3.974^1 \\ 3.974^1 \\ 4.272^1 \\ 4.252^1 \end{array}$	5.224 <sup>14</sup> 5.010 <sup>13</sup> 5.010 <sup>13</sup> 5.018 <sup>15</sup> 4.894 <sup>1</sup>	4.744 <sup>14</sup> 4.613 <sup>14</sup> 4.613 <sup>14</sup> 4.872 <sup>25</sup> 4.852 <sup>25</sup>	4.244 <sup>21</sup> 4.203 <sup>21</sup> 4.203 <sup>22</sup> 4.172 <sup>22</sup> 4.152 <sup>22</sup>	4.715 4.774 4.774 4.772	6.012 <sup>23</sup> 5.816 <sup>28</sup>	6.012 <sup>30</sup> 5.860 <sup>34</sup>
Washington Norfolk, Va. Bethlehem, Pa. <sup>•</sup> Claymont, Del. <sup>•</sup> Coatesville Pa. <sup>•</sup>	3.941 <sup>1</sup> 4.065 <sup>1</sup>	3.930 <sup>1</sup> 4.002 <sup>1</sup> 3.45 <sup>1</sup>	3.796 <sup>1</sup> 3.971 <sup>1</sup> 3.45 <sup>1</sup> 3.45 <sup>1</sup>	5.3411 5.4651	3.596 <sup>1</sup> 3.771 <sup>1</sup>	4.0411 4.1651	4.391 <sup>1</sup> 4.515 <sup>1</sup>	5.196 <sup>17</sup> 5.371 <sup>17</sup>	4.965*	4.141ª 4.265 <sup>2</sup>			
Buffalo (city) Buffalo (country) Pittsburgh (city) Pittsburgh (country) Cleveland (city)	8.35 <sup>1</sup> 3.25 <sup>1</sup> 3.35 <sup>1</sup> 3.25 <sup>1</sup> 3.35 <sup>1</sup>	3.40 <sup>1</sup> 3.30 <sup>1</sup> 3.40 <sup>1</sup> 3.30 <sup>1</sup> 3.585 <sup>1</sup>	$3.63^{1}$ $3.30^{1}$ $3.40^{1}$ $3.30^{1}$ $3.40^{1}$	$5.26^{1} \\ 4.90^{1} \\ 5.00^{1} \\ 4.90^{1} \\ 5.188^{1}$	$3.35^{1}$ $3.25^{1}$ $3.35^{1}$ $3.25^{1}$ $3.35^{1}$	$\begin{array}{c} 3.819^{1} \\ 3.81^{1} \\ 3.60^{3} \\ 3.50^{1} \\ 3.60^{1} \end{array}$	$\begin{array}{c} 3.819^{1} \\ 3.50^{1} \\ 3.60^{1} \\ 3.50^{3} \\ 3.60^{1} \end{array}$	4.75 <sup>18</sup> 4.65 <sup>18</sup> 4.75 <sup>13</sup> 4.65 <sup>12</sup> 4.877 <sup>13</sup>	4.40 <sup>10</sup> 4.30 <sup>10</sup> 4.40 <sup>24</sup> 4.30 <sup>21</sup> 4.40 <sup>24</sup>	3.85 <sup>21</sup> 3.75 <sup>23</sup> 3.85 <sup>24</sup> 3.75 <sup>24</sup> 3.85 <sup>21</sup>	4.669 4.35 4.45 <sup>21</sup>	5.60 <sup>33</sup> 5.60 <sup>33</sup>	5.65×
Cleveland (country) Detroit Omaba (city, delivered) Omaha (country, base) Cincinnati	$3.25^1$ $3.450^1$ $4.043^1$ $3.943^1$ $3.611^3$	3.661 <sup>1</sup> 4.043 <sup>1</sup> 3.993 <sup>1</sup> 3.691 <sup>1</sup>	$3.30^{1}$ $3.609^{1}$ $4.093^{1}$ $3.993^{1}$ $3.661^{1}$	5.281 <sup>1</sup> 5.693 <sup>1</sup> 5.593 <sup>1</sup> 5.291 <sup>1</sup>	$\begin{array}{r} 3.25^1 \\ 3.450^1 \\ 3.793^3 \\ 3.693^1 \\ 3.425^1 \end{array}$	$3.50^{1}$ $3.700^{1}$ $4.143^{3}$ $4.043^{1}$ $3.675^{1}$	$\begin{array}{r} 3.50^1 \\ 3.700^1 \\ 4.215^1 \\ 4.115^1 \\ 3.675^1 \end{array}$	5.000 <sup>13</sup> 5.615 <sup>13</sup> 5.515 <sup>13</sup> 4.825 <sup>12</sup>	4.30 <sup>24</sup> 4.500 <sup>24</sup> 5.443 <sup>24</sup> 4.475 <sup>24</sup>	3.75 <sup>21</sup> 3.900 <sup>21</sup> 4.543 <sup>12</sup> 4.111 <sup>21</sup>	4.35 4.659 4.711	5.93 <sup>23</sup> 6.10	5.93 <sup>10</sup> 6.20
Youngstown, O. <sup>•</sup> Middletown, O. <sup>•</sup> Chicago (city) Milwaukee Indianapolis	3.50 <sup>1</sup> 3.637 <sup>1</sup> 3.58 <sup>1</sup>	3.55 <sup>1</sup> 3.687 <sup>1</sup> 3.63 <sup>1</sup>	3.55 <sup>1</sup> 3.687 <sup>1</sup> 3.63 <sup>1</sup>	5.15 <sup>1</sup> 5.287 <sup>1</sup> 5.23 <sup>1</sup>	$325^{1}$ $3.25^{1}$ $3.387^{1}$ $3.518^{1}$	3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.737 <sup>3</sup> 3.768 <sup>1</sup>	3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.737 <sup>1</sup> 3.768 <sup>1</sup>	4.40 <sup>13</sup> 4.65 <sup>18</sup> 5.231 <sup>18</sup> 5.272 <sup>16</sup> 4.918 <sup>15</sup>	4.20 <sup>24</sup> 4.337 <sup>24</sup> 4.568 <sup>24</sup>	3.85 <sup>11</sup> 3.987 <sup>21</sup> 4.08 <sup>21</sup>	4.65 4.787 4.78	5.75 <sup>22</sup> 5.987 <sup>23</sup> 6.08 <sup>28</sup>	5.85 <sup>30</sup> 6.087 <sup>30</sup> 6.18 <sup>34</sup> 6.19 <sup>30</sup>
St. Paul St. Louis Memphis, Tenn. Birmingham New Orleans (city)	3.76 <sup>2</sup> 3.647 <sup>1</sup> 4.015 <sup>8</sup> 3.50 <sup>1</sup> 4.10 <sup>4</sup>	3.81 <sup>2</sup> 3.697 <sup>1</sup> 4.065 <sup>5</sup> 3.55 <sup>1</sup> 3.90 <sup>4</sup>	3.81 <sup>2</sup> 3.697 <sup>1</sup> 4.065 <sup>5</sup> 3.55 <sup>1</sup> 3.90 <sup>4</sup>	5.41 <sup>2</sup> 5.297 <sup>1</sup> 5.78 <sup>4</sup> 5.903 <sup>1</sup> 5.85 <sup>4</sup>	3.51 <sup>2</sup> 3.397 <sup>1</sup> 3.965 <sup>8</sup> 3.45 <sup>1</sup> 4.058 <sup>4</sup>	3.86 <sup>3</sup> 3.747 <sup>1</sup> 4.215 <sup>3</sup> 3.70 <sup>1</sup> 4.20 <sup>4</sup>	3.86 <sup>3</sup> 3.747 <sup>11</sup> 4.215 <sup>5</sup> 3.70 <sup>1</sup> 4.20 <sup>4</sup>	5.2574 5.172 <sup>15</sup> 5.265 <sup>16</sup> 4.75 <sup>15</sup> 5.25 <sup>26</sup>	4.46 <sup>2*</sup> 4.347 <sup>2*</sup> 4.78 <sup>2*</sup> 4.852 <sup>2*</sup> 5.079 <sup>10</sup>	4.461 <sup>21</sup> 4.131 <sup>21</sup> 4.64 4.70 <sup>21</sup>	5.102 4.931 5.215 5.429	6.1312	6.281**
Houston, Tex. Los Angeles San Francisco Portland, Oreg. Tacoma Scattle	3.75* 4.40* 4.15* 4.45* 4.35* 4.35*	4.25* 4.65* 4.35* 4.45* 4.45* 4.45*	4.25 <sup>*</sup> 4.95 <sup>*</sup> 4.65 <sup>7</sup> 4.75 <sup>*</sup> 4.75 <sup>*</sup> 4.75 <sup>*</sup>	5.50 <sup>3</sup> 7.20 <sup>4</sup> 6.35 <sup>7</sup> 6.50 <sup>37</sup> 6.50 <sup>6</sup> 6.50 <sup>6</sup>	3.763 <sup>8</sup> 5.00 <sup>4</sup> 4.55 <sup>7</sup> 4.65 <sup>27</sup> 4.65 <sup>9</sup> 4.65 <sup>6</sup>	4.313 <sup>6</sup> 4.95 <sup>4</sup> 4.50 <sup>7</sup> 4.75 <sup>37</sup> 4.25 <sup>6</sup> 4.25 <sup>9</sup>	4.313* 6.75* 5.75* 6.30** 5.45* 5.45*	5.313 6.00 <sup>12</sup> 6.35 <sup>14</sup> 5.75 <sup>15</sup> 5.95 <sup>15</sup> 5.95 <sup>15</sup>	4.10 <sup>16</sup> 7.20 <sup>6</sup> 7.30 <sup>18</sup> 6.60 <sup>13</sup> 7.60 <sup>15</sup> 7.05 <sup>16</sup>	5.683 <sup>21</sup> 5.433 <sup>21</sup> 5.633 <sup>18</sup> 5.883 <sup>21</sup> 5.883 <sup>21</sup>	5.613 7.333	5.85 <sup>23</sup> 8.304 <sup>26</sup>	5.95 <sup>m</sup> 8.404 <sup>m</sup> 8.00 <sup>33</sup> 8.00 <sup>m</sup>

\*Basing point cities with quotations representing mill prices, plus warehouse spread. NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES \*400 to 1999 pounds; \*-400 to 14,999 pounds; \*-any quantity; \*-300 to 1999 pounds; \*-400 to 8999 pounds; \*-300 to 9999 pounds; \*-400 to 39,999 pounds; \*-under 2000 pounds; \*-under 4000 pounds; \*-500 to 1499 pounds; \*-one bundle to 39,999 pounds; \*-150 to 2249 pounds; \*-150 to 1499 pounds; \*-three to 24 bundles; \*-450

Indian and African

to 1499 pounds; <sup>24</sup>—one bundle to 1499 pounds; <sup>37</sup>—one to nine bundles; <sup>23</sup>—one to six bundles; <sup>39</sup>—100 to 749 pounds; <sup>38</sup>—300 to 1999 pounds; <sup>24</sup>—1500 to 39,999 pounds; <sup>32</sup>—1500 to 1999 pounds; <sup>33</sup>—000 to 39,999 pounds; <sup>34</sup>—400 to 1499 pounds; <sup>33</sup>—1000 to 1999 pounds; <sup>33</sup>—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; <sup>37</sup>—300 to 4999 pounds.

Lake Superior Iron Ore Gross ton, 51½% (Natural) Lower Lake Ports	48% 2.8:1 48% 3:1 48% no ratio
Old range bessemer       \$4.95         Mesabi nonbessemer       4.55         High phosphorus       4.55         Mesabi bessemer       4.70         Old range nonbessemer       4.80         Endme       Vacel Ore	South African (Transval)           44% no ratio           45% no ratio           48% no ratio           50% no ratio
Cents, units, del. E. Pa. Foundry and basic 56- 63% contract	Brazilian—nominal 44% 2.5:1 lump 48% 3:1 lump
Foreign Ore Cents per unit, c.1.f. Atlantic ports Manganiferous ore, 45- 55% Fe., 6-10% Mang. Nom. N. African low phos. Nom. Spanish, Ne. African bas- ic, 50 to 60% Nom. Brazil iroa ore, 68-69% f.o.b. Rio de Janeiro 7.50-8.00	(Extras for alloy cont
Tungsten Ore Chinese Wolframite, per short ton unit, duty paid	Desig- nation         Carbon           NE         8612         .1015           NE         8720         .1823           NE         9415         .1318           NE         9425         .2323

48% 2.8:1 48% 3:1 48% no ratio	\$41.00 43.50 31.00
South African (Transvaal)	
44% no ratio	\$27.40
45% no ratio	31.00
50% no ratio	32.80
Brazilian-nominal	

#### 33.65 43.50 ....

3.30 1.00
3.50
2.80

#### Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Balti-more, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif.,

Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on im-ported ore and are subject to pre-miums, penalties and other prov-sions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manga-nese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

· P

#### Molybdenum

Sulphide conc., lb., Mo. cont., 30.75 ................ mines

#### NATIONAL EMERGENCY STEELS (Hot Rolled)

Spanish, No. African bas- ic, 50 to 60% Nom.	(Extras for a	illoy conte	ent)					Basic of	pen-heartl	a Electric	furnace
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro 7.50-8.00			- Chemical	Compositi	on Limits,	Per Cent		Bars	Billets	Bars	Billets
Tungsten Ore	Desig-	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	100 lb.	per GT	100 lb.	per GI
Chinese Wolframite, per short ton unit, duty paid	nation           NE         8612           NE         9720           NE         9415           NE         9425           NE         9442           NE         9722           NE         9830           NE         9912           NE         9920	.1015 .1823 .1318 .2328 .4045 .2025 .2833 .1015 .1823	$\begin{array}{c} .7090\\ .7090\\ .80-1.10\\ .80-1.20\\ 1.00-1.30\\ .5080\\ .7090\\ .5070\\ .5070\end{array}$	.2035 .2035 .2035 .2035 .2035 .2035 .2035 .2035 .2035 .2035	$\begin{array}{r} .4060\\ .4060\\ .3050\\ .3050\\ .3050\\ .1025\\ .7090\\ .4060\\ .4060\end{array}$	$\begin{array}{c} .4070\\ .4070\\ .3060\\ .3060\\ .3060\\ .4070\\ .85-1.15\\ 1.00-1.30\\ 1.00-1.30\end{array}$	$\begin{array}{c} .1525\\ .2030\\ .0815\\ .0815\\ .0815\\ .1525\\ .2030\\ .2030\\ .2030\end{array}$	\$0.65 .70 .75 .75 .80 .65 1.30 1.20 1.20	\$13.00 14.00 15.00 15.00 16.00 13.00 26.00 24.00 24.00	\$1.15 1.20 1.25 1.25 1.30 1.15 1.80 1.55 1.55	\$23.00 24.00 25.00 25.00 28.00 23.00 36.00 31.00 31.00
coma, Wash. (S S paying for discharge; dry basis, subject to penalties if guar- antese are not met.)	Extras are in semifinished stee on vanadium alle	addition ( major b by.	to a base p asing points	and are	.70c, per in cents	pound on per pound	finished and dol	products lars per g	and \$54 ross ton.	per gross No prices	quoted

0-

**Pig Iron** Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Ex-ceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	leablo
Bethlehem, Pa., base	. \$26.75	\$26.25	\$27.75	\$27.25
Newark, N. J., del.	28.28	27 78	29.28	28 78
Brooklyn, N. Y., del.	29.25	20110	20.20	29 75
Birdshoro, Pa., hase	26.75	26.25	27 75	27 25
Birmingham, haso	20.10	20.25	26.75	21.20
Baltimora del	. 22.10	20.10	20.10	
Boston del	. 21.30			
Chicago del	. 20.09			
Cincinnati dal	. 20.97	01.40		
Clausland del	. 20.81	24 48		
Cieveland, del.	. 25.87	24.99		
Newark, N. J.	. 27.90	11111		
Philadelphia, del.	. 27.21	26.71		
St. Louis, del.	. 25.87	24.99		
Buffalo, base	. 25.75	24.75	26.75	26,25
Boston, del.	. 27.25	26.75	28.25	27.75
Rochester, del.	. 27.28		28.28	27.78
Syracuse, del	. 27.83	and shear to	28.83	28.33
Chicago, base	. 25.75	25.25	26.25	25.75
Milwaukee, del.	. 26.85	26.35	27.35	26.85
Muskegon, Mich., del.	. 28.94		in the second	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, del	27.14	26.64	27.64	27.14
Detroit, hase	25 75	25 25	26.25	25.75
Saginaw, Mich del	28.06	27 56	28.56	28.06
Duluth, hace	26.00	25 75	26 75	26.25
St Paul del	20.20	27.88	28.88	28 38
Erle, Pa , hasa	26.00	25.00	26.00	26.00
Everett Mass boss	. 20.10	20.20	97 75	27 25
Boston dol	. 20.10	20.40	21.10	27.75
Crupite City, Till been	. 21.20	20,10	20.20	05 75
St Touls del	. 20.10	20.20	20.25	20.10
Hamilton O hand	. 26.25	23.13		20.20
Maninton, U., Dase	. 25.75	25.25		20.10
Chichinati, del	. 26.19	26.30	00.05	20.00
Mevine Island, Pa., base	, 25.75	25.25	26.25	25.75
sPitisburgh, del.				
No. & So. sides	. 26.44	25.94	26.94	26.44
Provo, Utah, base	. 23.75	23.25		1.1.1.1
Sharpsville, Pa., base	. 25.75	25.25	26.25	25.75
Sparrows Point, base	. 26.75	26.25		
Baltimore, del.	. 27.74			
Steelton, Pa., base		26,25		27.25
Swedeland, Pa., base	. 26.75	26,25	27.75	27.25
Philadelphia, del.	. 27.59	27.09		28.09
Toledo, O., base	. 25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	. 27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry Iron, § For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Allquippa, 64; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24. Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%. Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., \$2 per ton; for each additional 0.25% nickel, \$1 per ton.

High Sillcon, Silvery

High Silicon, Silvery 6.00-6.50 per cent (base) ..., \$31.25 6.51-7.00., \$32.25 9.01-9.50. 37.25 7.01-7.50., 332.25 9.51-10.00. 38.25 7.51-8.00., 34.25 10.01-10.50. 39.25 8.01.8.50., 35.25 10.51-11.00. 40.25 8.51-9.00., 36.25 11.01-11.50. 41.25 F.o.b. Jackson courty, O., per gross ton, Buffalo base \$1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, \$45.50; each addi-tional .50% silicon up to and includ-ing 18% add \$1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add \$1.

Bessemer Ferrosilicon Prices same as for high silicon sil-very iron, plus \$1 per gross ton.

#### Charcoal Pig Iron

Southern Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. \$33.00 (For higher silicon irons a differ-ential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

#### Gray Forge

Neville Island, Pa. .....\$25.25 Valley base ..... 25.25 Low Phosphorus

Low Phosphorus Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., \$31,25 base; \$32,49, del. Philadel-phia. Intermediate phos., Central Furnace, Cleveland, \$28,25. Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts. districts.

assuriets. Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduc-tion of 38 cents a ton for phos-phorus content of 0.70% and over.

Celling Prices are the aggregate of (1) governing basing point (2) dif-ferentials (3) transportation charges

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, \$135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; S140 f.o.b. cars, Pittsburgh, where Carnegie-Tilinols Steel Corp. is producer; add \$6 for packed c.l., \$10 for ton, \$13.50 for less ton; \$1.70 for each 1%, or frac-tion contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained man-ganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; west-ern, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed. Spiegeleisen: 19-21% carlots per tross ton, Palmerton, Pa., \$36; Pittsburgh \$40.50; Chicago, \$40.60. Electorize Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents. Ferromanganese (Low and Medium

Jess ton lots, per 1b. 37.6 cents. Chromium Metal: 97% min. chromi-um, max. 55% carbon, eastern zone, per 1b. contained chromium bulk, c.l. 79.50c, 2000 lb. to c.l. Suc; central Sic and 82.50c; west-erm 82.25c and 84.75c; f.o.b. ship-ping point, freight allowed. Fertneelumblum: 50.60% per 1b

For contained columbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, \$2.25; less-ton lots \$2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern

January 14, 1946

Perroallo zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and 65c; western, add le and 1.85c-high nitrogen, high carbon ferro-chrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. ship-ping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices: all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-65%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%,) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed: 14.40c, i4.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang.

4-6% and carbon 1.25% max.) Con-tract, carlot, bulk, 20.00c, packed 20.43c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract car-lots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight al-lowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c. Siltaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11%, and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c. 25c.

Silvar Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11%, and boron 0.55-0.75%), per 1b, of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern. freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 4c. C^SZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract car-lots, buik, 11.00c and packed 11.50c; icn lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c. up .25c.

up .22C. CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb, of alloy. Contract, carlots, bulk, 10.75c,

from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer. Exceptions to Celling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Found-ry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by §1 per ton.

#### Refractories

er 1000	f.o.b. W	orks,	Net	Prices
	Fire Clay	Brick	κ.	
a., Mo.,	Ky			\$68.50
	First G	uality	11-1	
Pa., Ill.,	Md., Mo.	, Ky.		54.40
labama,	Georgia			50.35
New Jerse	ey			47.70
	Second (	Juality	v	
a., Ill.,	Md., Mo.	, Ky.		49.35
labama,	Georgia			40.30
New Jers	ey			38 15
0110	allachle B	ung B	rick	00.10
all hases	Interpre 19	ung is		63.45
III DUDDO	Silica 1	Brick		
Pennsylva	nia			. 54.40
Ioliet, E.	Chicago			. 62.45
Birmingha	am, Ala.			. 54.40
(70-	Ladle.	Brick	Mo	
Dry Pres	S	¥ d.,		32.90
Vire Cut				30.80
	Magn	osite		
Domestic	dead-bur	ned 2	rains	
net to	n I.O.D.	bulk	weian	22.00
net ton	, bags			. 26.00
	Basie .	Brick		
net ton,	f.o.b. Bal	timor	e, Pl;	ymouth
Me	eeting, Cl	iester,	Pa.	54.00
Chom bo	nded chro	me .		54.00
Magnesit	e brick			. 76.00
Chem. bo	onded Ma	gnesit	e	. 65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF<sup>3</sup> content, 70% or more, \$33; 65 but less than 70%, \$32; 60 but less than 65% \$31; less than 60%, \$30. After Aug. 29 base price any grade \$30.00 war chemicals.

packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c. Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max, and car. 0.50% max.) per lb. of alloy contract ton lots, \$1.20, less ton lots \$1.30; eastern, freight al-lowed; \$1.2075 and \$1.3075 central; \$1.229 and \$1.329, western; spot add 5c.

aud 3C. Manganese-Boron: (Mang. 75% ap-prox., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.623, central, \$1.935 and \$2.055 western; spot up 5c.

spot up 5c. Nickel-Boron: (Bor. 15-18%, alum. 1% max., sll. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract. 5 tons, or more, \$1.90, 1 ton to 8 tons, \$2.00, less than ton \$2.10, eastern. freight allowed; \$1.9125. \$2.0125 and \$2.125, central; \$1.9445, \$2.0445 and \$2.1445, west-ern; spot same as contract. Chromum-Copper: (Chrom. 8-11%,

ern; spot same as contract. Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. all. 0.50% max.) contract, any quan-ity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to des-tination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c. Vanadium Oxide: (Fused: Vana-

Vanadium Oxide: (Fused: Vana-dium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vana-dium oxide 85% approx. sodium ox-ide, approx. 9% and water approx.

#### Ferroalloy Prices

2.5%) Contract, any quantity, \$1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, \$1.105, less carlots, \$1.108, central; \$1.118 and \$1.133, western; spot add 5c to contract in all cases. Calcium metal; cast: Contract ton lots or more \$1.80, less, \$2.30, eastern zone, freight allowed, per pound of metal; \$1.809 and \$2.309 central, \$1.849 and \$2.349, west-ern; spot up 5c. Calcium-Manganese-Silicon; (Cal.

Calcium-Manganese-Silicon; (Cal Calcium-Manganese-Silicon; (Cal. 16-20% mang. 14-18% and sil. 53-55%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; whether offer

16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; pot up .25c. Calclum-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c; 17.40c and 18.40c, western; spot up .25c. Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing ex-actly 2 lbs. mang.) per lb. of bri-quets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c. Briquets: Ferrochrome, containing exactly 2 lb. cr. eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and 5c for 2000 lb. to c.l.; western, add .7%c for c.l., and .2c for 2000 lb. to c.l.; siliconnauganese,

Pastern, containing exactly 2 lb.
suiteon, bulk, c.1, 5.80c, 2000 lbs. to c.i. (6.30c; central, add .25c for c.i. and 1c for 2000 lb. to c.i.; vestiver of the second state of the second st

to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. ship-ping point, freight allowed. Prices per lb. contained silicon. Gratmal: Vanadium Grainal No, 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance

allowance.

f.o.b. Bridgeville, Pa., usual freight allowance. Silicon Metal: Min. 97% silicon and max. 1% fron, eastern zone, bulk. c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% fron, eastern, bulk. c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon. Manganese Metal: (96% min. man-ganese, max. 2% fron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c. Ferrotungsten: Spot, carlots, per lb. contained tungsten, \$1.90; freight allowed as far west as St. Louis. Tungsten Metal Powder: Spot, not less than 97 per cent, \$2.50-\$2.60; freight allowed as far west as St. Louis freight allowed as far west as St.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots \$1.23; less-ton lots \$1.25; castern. Spot up 5 cents per lb. Ferroitianium: 20-25%, 0.10 maxi-mum carbon; per lb. contained ti-tanium; ton lots \$1.35; less-ton lots \$1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight al-

lowed to destination east of Missis-sippi River and North of Baltimore and St. Louis, 6.8% carbon \$142.50; 3-5% carbon \$157.50. Carbortam: Boron 0.90 to 1.15% net ton to carload, & b. f.o.b. Suspension Bridge, N. Y., frt. al-lowed same as high-carbon ferro-titanium

Alsifer: (Approx. 20% aluminum, 40% silicon. 40% iron) contract ba-sis f.o.b. Niagara Falls, N. Y., per 1b. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; car-lots 8c; ton lots 8.75c; less ton lots 9.25c.

Boreall: 3 to 4% boron, 40 to 45% Sl., \$6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quetations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

#### PH

PHILADELPHIA:	BOSTON:	Solid Steel Axles 24.00	Machine Turnings 10.50
(Delivered consumer's plant)	(F.o.b. shipping points)	Cupola Cast 20.00	Shoveling Turnings 12.50
No. 1 March 1 March 1 March	NO. J HEAVY MEIL SLEEL \$14.00	Lung Turnings 850, 900	Steel Car Ayles 21.50-22.00
No. 2 Heavy Melt. Steel \$18.7	No. 1 Bundles	Cast Iron Borings	Sieel Rails, 3 ft 21.50
No. 2 Bundles	5 No. 2 Bundles 14.06	Iron Car Wheels 16.50-17.00	Steel Angle Bars 21.00
No. 3 Bundles 16.7	5 No. 1 Busheling 14.06	CHICAGO:	Cast Iron Wheels 20.00
Mixed Borings, Turnings 13.7	5 Machine Shop Turnings 9.06	(Delivered consumer's plant)	No. 1 Machinery Cast. 20.00
Machine Shop Turnings 13.7 Billot Former Court	Short Shovel Turnings 11.06	No. 1 R.R. Heavy Melt. \$19.75	Breakable Cast 16.50
Bar Crops Plate Scrap 21.0	Chemical Borings 13.31	No. 2 Heavy Melt. Steel 18.75	Stove Plate 19.00
Cast Steel 21.2	Low Phos. Clippings 16.56	No. 1 Ind. Bundles 18.75	Grate Bars 15.20
Punchings	5 No. 1 Cast	No. 2 Dir. Bundles 18.75	Brake Shoes
Elec. Furnace Bundles 19.7	Stove Plate 19.00	Baled Mach. Shop Turn 18.75	Stove Plate 18.00
Heavy furnings 18.2	Heavy Breakable Cast 16.50	Machine Turnings 13.75	
Cast Grades	Boston Differential 99 cents high-	Mix, Borings, Sht. Turn. 13.75	CINCINNATI:
(Fob Shipping Boint)	er, steel-making grades; Providence	Short Shovel Turnings 15.75	(Delivered consumer's plant)
(F.O.D. Shipping Fomt)	S1.05 Ingnet.	Cast Iron Borings 14.75	No. 1 Heavy Melt. Steel 18.50
Heavy Breakable Cast. 16.2	0 PITTSBURGH:	Cut Paule 3 feet 22.25	No 1 Comp Bundles 18.50
Cupola Cast 19.0	(Delivered consumer's plant)	Cut Ralls, 18-inch 23.50	No. 2 Comp. Bundles 18.50
Unstripped Motor Blocks 17.5	9 Rairoad Heavy Melting \$21.00	Angles, Splice Bars 22.25	Machine Turnings 9.50-10.00
Malleable 22.0	0 No 2 Heavy Melt Steel 20.00	Plate Scrap, Punchings 21.25	Shoveling Turnings 11.50-12.00
Chemical Borings 16.2	1 No. 1 Comp. Bundles 20.00	No 1 Cast 22.75	Mixed Borings Turnings 10.50-11.00
	No. 2 Comp. Bundles 20.00	ILR Malleable 22.00	No. 1 Cupola Cast 20.00
NEW YORK:	Much Shop Turnings 15.00	(Cast grades f.o.b. shipping point,	Breakable Cast 01 00 21 50
(Deplans' building palace)	Mixed Burings, Turnings 15.00	failroad grades f.o.b. tracks)	Low Phosphorus 21.00-21.00
(Dealers buying prices)	No. 1 Cupola Cast 20.00	BUFFALO:	Stove Plate
No. 1 Heavy Melt. Steel \$15.3	3 Heavy Breakable Cast. 16.50	(Delivered consumer's plant)	
No. 2 Heavy Mell. Steel 15.3	3 Cast from Borings 16.00	No. 1 Heavy Melt. Steel \$19.25 No. 2 Heavy Melt Steel 10.25	LOS ANGELES:
No. 3 Hyd. Bundles 13.2	3 Sheet Bar Crops 22.50	No. 1 Bundles	(Delivered consumer's plant)
Chemical Borings 14.3	3 Plate Scrap, Punchings 22.50	No. 2 Bundles 19.25	No. 1 Heavy Melt. Steel 13.00
Machine Turnings 10.3	3 Rallroad Specialties 24.50	No. 1 Busheling 19.25	No. 1 2 Deal Bundles 12.00
No 1 Cupola 200	3 SCrap Rall	Short Shovel Turnings 14.25	Machine Turnings 4.50
Charging Box 19.0	0 Rall 3 ft. and under 23.50	Mixed Borings, Turn	Mixed Borings, Turnings 20.00
Heavy Breakable 16.5	0 Railroad Malleable 22.00	Cast Iron Borings 15.25	No. 1 Cast 20.00
Unstrip Motor Blocks 17.		Low Phos 21.75	CAN EDANOISCO.
Stove Plate 19.0	(Delivered consumer's plant)	DETROIT:	(Delivered consumer's plant)
	No. 1 R.R. Heavy Melt. \$21.00	(Dealers' buying prices)	No 1 Heavy Melt Steel \$15.50
CLEVELAND:	No. 1 Heavy Melt. Steel 20.00	New J Busheling Steel \$17.32	No. 2 Heavy Melt. Steel 14.50
(Delivered consumer's plant)	No. 1 Comp. Bundles 20.00	Ilydraulic Bundles 17.32	No. 1 Busheling
No 1 Hanny Malt Stool S10 5	o Cast Iron Borings 16.00	Flashings 17.32	No. 1, No. 2 Bundles . 9.00
No. 2 Heavy Melt. Steel 19.	Machine Shop Turnings 15.00	Machine Turnings 12.32	Machine Turnings 7.00
No. 1 Comp. Bundles 19.5	0 Low Phos. Plate 22.50	Cast Iron Borings 13.32	Billet, Forge Crops 15.50
No. 2 Comp. Bundles 19.	O MANSELET D. O.	Low Phos. Plate 19.82	Bar Crops, Plate 15.50
No. 1 Busneiing 19:	(Delivered consumer's plant)	No. 1 Cast 20.00	Cast Steel Date
Short Shovel Turnings	Machine Shop Turnings 15.00	lleavy Breakable Cast. 16.50	1", under 18.00
Mixed Borings, Turnings 14.5	0	ST. LOUIS:	Alloy-free Turnings 7.00
No. 1 Cupola Cast 20.0	0 BDGMINGHAM:	(Delivered consumer's plant)	Tin Can Bundles 14.50
Cast Iron Borlings 12 50.14	0 Billot Forge Crops \$22.00	No. 1 Locomotive There 20.00	NO. 2 Steel Wheels 23.00
Billet. Bloom Crops 24.	0 Structural, Plate Scrap. 19.00	Misc. Ralls	No. 2 Cast Steel 15.50
Sheet Bar Crops 22.0	0 Scrap Ralls Random 18.50	Rallroad Springs 22.00	Uncut Frogs, Switches.
Plate Scrap, Punchings 22.0	0 Rerolling Ralls 20.50	Bundled Sheets 17.50	Scrap Rails 15.50
Elec. Furnace Bundles. 20.5	O Angle Splice Bars 20.50	Axie Turnings 17.00	Locomotive Tires

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12,12¼c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 ibs. to carlots add 0.15c; 10.000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corrod-ing, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Mil-waukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Rich-mond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del, plgs 14.00c del; metallurgical 94% mln. 13.50c del. Base 10,000 lbs, and over; add ¼c 2000-9999 lbs.; Ic less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (924% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-971%%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.75c; any other ingot contain-ing over 1% iron, except PM 754 and hard-eners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ¼c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices in-clude freight at carload rate up to 75 cents per hundred. Secondary Aluminum; All grades 12.50c per lb. per hundred.

Magnesium: Commercially pure (99.8%) stand-ard ingots (4-notch, 17 lbs.) 20.50c lb., add lc for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 mag-nesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or 5-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, 10.b. plant, any quantity; carload freight al-lowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 14/c 1000-2239. 24/c 500-999, 3c under 500. Grade A. 99.8% or higher (includes Straits), 52.00c; Grade B. 99.8% or higher, not meeting specifications for Grade A. with 0.05 per cent maximum arsenc, 51.87/4c; Grade C, 99.65-99.79% incl. 51.624/c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.124/c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. La-redo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14 50c; 99.8% and over (arsenic, 0.05%, max, and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10.000 lb.; ½c for 999-224 lb.; and 2c for 223 lb, and less; on sales by dealers, distribu-tors and jobbers add ½c, 1c, and 3c, respec-tively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c. Mercury: Open market, spot, New York, \$108-\$110 per 76-lb, flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllum Copper: 3.75-4.25% Be., \$17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes.

#### NONFERROUS METAL PRICES

balls, discs and all other special or patented shapes 95,00c lb. del.

Cobalt: 97-99%, \$1.50 lb. for 550 lb. (bbl.); \$1.52 lb. for 100 lb. (case); \$1.57 lb. under 100 lb.

Indium: 99.9%, \$7.50 per troy ounce.

Gold: U. S. Treasury, \$35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: \$35 per ounce.

Iridium: \$165 per troy ounce.

Palladium: \$24 per troy ounce.

#### **Rolled, Drawn, Extruded Products**

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv, 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manga-nese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubler: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37%c, less-carlots 15.87%c; weather-proof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less car-lots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28,50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
09 04	21-2411	25 600	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boller plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boller plate nrices plate prices.

#### **Plating Materials**

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs, to 1 ton 17.75c; under 400 lbs, 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nicket Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del. Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zine Cyanide: 100-lb. kegs or bbls. 33.00e f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add %c for 15,000-40,000 lbs.; lc for 40,000 or more.

#### Scrap Metals

	Clean Heavy	Ends	Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze	9.375	9.125	8.625
90%	9.500	9.250	8.750
95%	9.125	8.875	8.375
Red Brass, 85% Red Brass, 80% Muntz Metal	9.125 9.125 8.000 9.250	8.875 7.750 9.000	8.375 7.250 4,625
Phos. br., A, B, 5% Herculoy, Everdur or	11.000	10.750	9.750 9.250
Naval brass	8.250	8.000	7,500
Mang. bronze	8.250	8.000	7,500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add %c for shipment of 60,000 lbs. of one group and %c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, alumi-num bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, ilead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c borings (lead 1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of ship-ment, truckloads of 5000 pounds or over; Seg-regated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less there screeness and than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal,

Zine Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New dle-cast scrap, radiator grilles 4.55c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monei Scrap: Prices f.o.b. point of shipment: add the for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20.000 lbs. or more of Monel. Converters 20.000 lbs. or more of Mos (dealers) allowed 2c premium,

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per 15. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

# Watch usur forgings nurry past... When cleaned by Airless **ROTOBLAST**

**ROTOBLAST** cleans by centrifugal force ... without the use of compressed air ... means faster cleaned forgings, stampings and heat-treated parts. It means better cleaned surfaces for faster, lower cost machining, grinding and processing. Cost-reductions over former cleaning methods are as much as 50% to 90%.

Because Pangborn Special ROTOBLAST Machines (like the one illustrated above which cleans more than 250 blocks an hour) are the answer to faster and cleaner production at lower cost, they are being ordered by forward-looking manufacturers. One of the leading automobile manufacturers recently purchased five additional Special ROTOBLAST Machines to clean cylinder blocks, transmission cases, transmission housings, etc... and a well-known farm implement company just ordered three Special ROTOBLAST machines. Both these companies have used ROTOBLAST equipment for years.

Let a Pangborn engineer make a survey of your cleaning room problems. You profit when you "come to Pangborn".

\* TRADEMARK OF THE PANGBORN CORPORATION



#### Sheets, Strip . . .

#### Sheet & Strip Prices, Page 138

Sheet demand shows no lessening and with most mills booked for months some producers are out of the market, refusing to take further orders. Others simply alle orders for later scheduling. Freight absorption is being avoided as far as possible, shipment being confined to nearby areas by some producers.

Pittsburgh — Increased pressure for prompt delivery developed last week, from consumers seeking to build inventories before the strike deadline. Reflecting the narrowing profit margins on some steel products and heavy losses sus-tained on others, a number of steel companies are no longer shipping into west-ern districts, due to large freight ab-sorption involved. This situation brings up the possibility of a reinstatement in some manner of shipping steel on a dis-located tonnage basis as was in effect during the war. No suspensions of steel shipments have been received from General Motor Corp.'s plants. However, it appears inevitable that such a move will occur soon for excessive stockpiling of inventories is prohibitive under Directive 6 to PR-32. Nonintegrated mills are still maintaining operations at a fair level. Apparently they are obtaining adequate tonnage of semifinished to complete commitments. In at least two instances no new orders have been booked for over six weeks.

Chicago — Sheetmakers see no easing in consumer demand and orders continue heavy despite extended delivery. Situation also is confused over prospect of a steel strike which has caused users to push for quick deliveries. Mill shipments in some instances are 30 days behind schedule. One mill, previously taking business only through arst half, now is taking third quarter orders. Another producer reports the following delivery schedule on new business: Hot, coldrolled and galvanized sheets, March; strip mill sizes, May; and hot-rolled pickled, July; narrow and wide strip and hot-rolled strip, April; and hot-rolled pickled, July. New York — Sheet sellers generally

New York — Sheet sellers generally have been spending much time recently turning down tonnage and devoting as nuch effort as possible to shipping steel before operations were curtailed by a possible strike. Practically all producers have been behind anywhere from a month to six weeks on current commitments and indications are that they have made little progress in getting caught up, despite urgent appeals of consumers.

Many producers, particularly since the first of the year, have been practically out of the market. Those selling on a quarterly quota basis have not yet opened books for second quarter and those who have been accepting some tonnage well ahead have reached the stage, and especially with possibility of a steel strike being called Jan. 14, where they are not interested in booking further tonnage. Despite the fact that delivery schedules are so extended in a number of instances, many consumers are neverthless anxious to get tonnage on mill books.

Producers who have been taking tonnage for future shipment are well booked into third quarter on hot-rolled sheets and into fourth quarter on cold-rolled and galvanized sheets. Certain sellers are out of the market for the year on all three grades. The situation in elec-trical sheets also is far extended, some sellers quoting fourth quarter. This is also true in polished stainless steel sheets, although on unpolished deliveries are being offered for late second quarter.

st. Louis - Sheet and strip production continues to decline after a peak of 87 per cent of capacity in November, when it reached 21,000 tons, dropping to 16,000 tons in December. Post-holiday recovery has not materialized, though manpower and materials are satisfactory. Mill schedules are filled through 1946, except for a few gaps in tin plate, reserved for can manufacturers. No orders are being accepted for 1947.

Cincinnati - Sheet mills are besieged for more liberal allotments under the quota plan and for early shipments. Such pressure, combined with the undimin-ished new buying, is indicative of the tight situation. Minor openings in first quarter schedules are developing through cancellations and deferments from strikebound customers, but in practice some of this tonnage is not replaced because schedules were overloaded. The aim is to avoid carryover into second quarter when allocations for export and further progress toward reconversion may create severer pinch on sheet producers.

Boston-Narrow cold strip producers are sold second quarter and are booking orders for third, with some tonnage delayed and included in carryover, due to further extensions in maintaining deliv-eries on hot-rolled. On the whole, how-ever, volume to rerollers has held well in view of the extended position of hot mills. Sheet mills operating on monthly production basis have scheduled for March tentatively, while others are filled through second quarter on definite schedule. Few promise definite ship-ments beyond second quarter, but all have tonnage on books awaiting schedule well beyond that period. Consumer inventories are generally limited and any delays in scheduled shipments will be reflected soon in fabricator operations. Surplus sales of strip include 444 tons, of which 151 tons went to Reliance Steel Corp., Worcester, Mass., and 293 tons to Dulien Steel Co., New York.

-IRAL Cher

and the state of t

Here's what Packard says

about their trucks:

Cleveland-General Motors Corp. and other firms whose plants have been closed by work stoppages occurring before Dec. 6 have requested postponement of sheet and strip deliveries during the balance of this month.

This is required by direction 6 to priorities regulation 32, as amended Dec. 29, if receipts of such deliveries would raise inventories above a 45-day supply. Production of materials in process will be completed in most instances and de-liveries made as scheduled, however. The amount of sheet and strip made available to mills for January shipment to other customers will be comparatively small, therefore, and at best will aid in reducing only carryover from fourth quarter. Some companies have removed from schedules all orders from companies whose plants are still closed by work stoppages while others will continue to place material in production as sched-uled, up to the 15th of each month for delivery in subsequent months. On the 15th of each month, as long as the work stoppage continues, the customer will request suspension or cancellation of orders for delivery in the subsequent

Anticulated **"BAKER** FORK TRUCKS

were an invaluable aid in production of aircraft engines"

Says Packard Motor Car Co.

slowed up carloading and required the services of several employees. Because Baker Articulated Fork Trucks

blob their trucks: "Baker articulared fork trucks were and invaluable aid to the Packari Notor Car Company in produce in of aircraft engines for five in the planes. While adaptable for authors, they were particularly for loading and unloading cars, for loading and unloading cars, in though use of the Baker truck "Through use of the Baker truck and 26 motors into a car in the in and and their flexibility authors full and orderly utilization in the full and orderly utilization of available space." A STATE OF THE STA require less clearance for spotting loads and can be easily maneuvered in conjested areas, one operator quickly loaded the complete car without resort-ing to hand methods. These same advantages also produced similar savings on other material handling operations in production and storage departments. Baker Articulated Fork Trucks have been in service at the Packard Motor Car Company since 1941. Before that, boxed aircraft engines were loaded into railroad cars with conventional fork trucks. These trucks could load the ends of the car, but to complete the ended If you have a problem of moving mate-rial where space is limited, or if you Mai where space is infitted, or if you would like to use warehouse space to better advantage, let a Baker Material Handling Engineer show you what this revolutionary new truck can do. Or write us direct. of the car, but to complete the carload-ing, boxes had to be placed on rollers and pushed into place. This obviously

THE BAKER INDUSTRIAL TRUCK DIVISION of The Baker-Raulang Company 2167 West 25th Street • Cleveland, Ohio In Canada: Railway and Power Engineering Corporation, Limited EITA Member: Electric Industrial Truck Association Ret INDUSTRIAL TR

Profit Presenter

# INSURANCE POLICY

for

\* II you haven't a copy of the Thred-Kut Chart, write us we will gladly send you one, without obligation.

**D**TUART'S ThredKut Heavy Duty Cutting Oil has played an important part in solving many of industry's toughest metal working problems. Reference to the time-tested ThredKut Chart\* has insured the proper application of this versatile product in many production emergencies. Alert production executives will find these aids of great help in answering troublesome metalworking problems. D. A. Stuart Oil Co., Ltd., 2735½ S. Troy Street, Chicago 23, Illinois.

LIMITED

ESTABLISHED 1865

Stocks in Principal Metal-Working Centers

1

15

month but will receive delivery of material which already is in process on the 15th. Due to tightness of supply and uncertainty of future volume of production, producers generally are not booking any additional business for delivery beyond midyear.

#### Steel Bars . . . Bar Prices. Page 138

Bar producers generally are booked through first half on hot-rolled carbon material. In view of possibility of the steel strike further business is being accepted with caution. Small diameters are in especially heavy demand, including supply for cold drawers. Distribution to the latter is being revised to meet needs.

New York — Hot carbon bar sellers have little to offer in any size before third quarter, and under present disturbed conditions, with the steel strike looming, are moving more cautiously than ever in acceptance of new tonnage. Demand for small sizes is especially pressing, particularly from converters, such as cold drawers. Most sellers of cold-drawn carbon bars are well sold for first half. Hot alloy bar sellers are quoting March.

Pittsburgh -Cold rolling schedules continue high with limited hot-rolled bar supply chief retarding factor. Producers are gradually revising distribution pattern of hot-rolled bars to cold finishers located within reasonable radius of their plants. Rising costs and ceiling prices have forced careful scrutiny of freight absorptions on nearly all tonnage. Deliveries are becoming further extended on cold-finished bars, with late second quarter now the earliest opening in schedule in some instances. Carbon bar backlogs are extended into third quarter on smaller sizes, while large rounds can be had early in second quarter. Alloy production schedules are somewhat more extended, with some interests now booked into late February and March. General Motors Corp. parts suppliers continue to accept all shipments and no suspensions are indicated for the next two weeks. Pressure has been acute for early delivery of all bar items in preparation

for the steel strike. Boston—A sharp increase in surplus offerings of both alloy and carbon grades includes a rather high ratio of sizes over 2 inches. More than 1500 tons are offered, mainly alloys. This is war material and demand is limited, due to the swing to smaller sizes since the end of terminated contracts. New buying of carbon bars has slackened because of extended deliveries and forward coverage, but pressure for tonnage has not slackened. On wanted sizes of carbon bars second quarter schedules are filled but alloys in hot-rolled still are available in February. St. Pierre Chain Corp., Worcester, Mass., is still buying carbon stock from surplus, taking 102 tons in good condition during the last period of compilation.

Cleveland—Reflecting the strict quota and allocation systems which have been in force by most companies for several weeks, the bar market is now more orderly than most other product markets. While sheet and strip mills at the yearend were as much as ten weeks behind schedule on shipments, many bar mills completed 1945 shipping schedules on time. Bar producers generally make no delivery promises on new business, although many have informed customers of quotas allotted them and which they will receive barring interruption in operating schedules.

Philadelphia—Hot carbon bar schedules continue to expand, with one large producer booked through June and July on sizes over 2 inches and September and October on 2 inches and less. Various producers are out of the market cntirely for first half on most carbon bars. Most sellers of hot alloy bars quote March and April. Some suspensions have been reported in sheets for the automotive industries because of work stoppages, but have not been reflected to any appreciable extent in delivery schedules. In fact, most producers are six weeks or more behind on current commitments. Where hot and cold-rolled sheets are being offered late third quarter appears about the best delivery and in galvanized late fourth quarter.

Chicago—New bar business is as heavy as before yearend, and many consumers are unable to place requirements to the degree they would like. Backlogs are heavy, and most barmakers are a month behind in deliveries. During the past month deliveries on some sizes of carbon bars have moved from February to April, while others have improved, to be available in March. Even alloy grades have tightened appreciably. March is now freely quoted on new orders. Strike-bound General Motors plants are suspending further shipments from mills, in some instances this being forced by the recent CPA directive that inventories in struck plants shall not exceed 45 days.

St. Louis — Pressure on merchant bars continues to increase, with schedules filled six to seven months. Backlogs are discouraged and have not yet extended into 1947. Pressure in recent weeks has increased from consumer goods manufacturers.

#### Steel Plates ... Plate Prices, Page 139

Plate backlogs continue to grow far beyond expectations and now are generally large enough to cover first half production, with lighter gages booked even further. Demand is growing faster than production can increase and deliveries are extending. Tank work, railroad cars and warehouse needs take arst place in inquiry.

New York — Most plate mills are now sold through first half and in the case of certain lighter gages, around  $\frac{1}{10}$  and  $\frac{1}{4}$ -inch, are booked into third quarter. Tank fabricators and railroad equipment shops are particulqarly active. A brisk demand also continues from abroad. Jobbers are steady buyers, although are not pressing as hard for tonnage as they were. There is still a fair amount of ship work, although nothing compared with a year ago.

Pittsburgh — Fabricators' plate inventories have been relatively low for some months as sellers have been unable to increase output to meet expanding requirements, as emphasis is on sheets and strip. In most instances sellers are booked well into second quarter, with heaviest demand noted in light gages. The Navy's Material Redistribution and Disposal office here opened bids last week on 312,-287 pounds of %-inch plates; 799,016



# Get Samples of This New and Different Disk with the Bonded Triple-ply Backing!

Amazingly durable! That's what grinder operators say about Weldisk! And they find that this modern, in-built durability is matched by other amazing qualities.

- ★ Out-performs ordinary disks by as much as two-to-one! Reason - a remarkable new cold-setting cement bond - not glue or resin - developed in the wartime electronics program assures a permanence that actually improves with age!
- ★ Lies flat without curling or warping! *Reason* a new seasoning technique that produces absolutely flat disks which grind evenly during long service life!
- ★ Does not soften up at the shoulders, break up and endanger the operator with flying pieces. Reason it's the only disk with triple-ply backing of fibre for stiffness and two layers of cloth for strength.

**PROVE IT WITH A SAMPLE** – Make your own "show me" trial. See how Weldisk cuts rapidly, does not load, runs cool, will not "blue" the work, gives a fine finish with less labor. State size of disk, grade of grit, and brief description of work to be done – and a sample disk will be sent without obligation to you.



pounds, 9/16-inch; 634,968 pounds, 7/16-inch; and 1,589,665 pounds of ½inch plates. All material is located at Dravo Corp., Neville Island, Pittsburgh. The same office will open bids Jan. 17 on over 150 tons of sheared and universal mill plates located at Carnegie-Illinois Steel Corp.'s Homestead Works, Munhall, Pa.

Boston—Bath Iron Works, Bath, Me., has a tentative contract for 32 steel trailers for the French government, the first important postwar ship award. Part of plate requirements will be filled from surplus materials. Increase in demand for plates is also reflected in heavier specifications, including low-alloy for car building. Plate mill schedules are tightening, notably in smaller gages, with April quoted by several mills, although some



Philadelphia — Current plate demand s being increased by further substantial export inquiry, including large connages .ssued by the Treasury Department. vhile at least one large producer still can promise May delivery on sheared and universal plates most producers have l'ttle tonnage for first half and one seller is booked solidly into August except for a little universal capacity. Light gages continue in special demand.

Chicago — In spite of the fact that l'ttle shipbuilding is now under way, plate demand is suprisingly strong. This consists principally of requirements of pipeline, tank and heavy construction



### New Comparator Gage Saves Time — Gives 6 Inspections in One!

Even the most inexperienced operator can obtain accurate inspection of externally threaded parts, with the Limitrol Comparator Gage—in many instances, increasing the rate of inspection as much as 400%<sup>1</sup>. The Limitrol, proved in hundreds of war plants. permits 6 visual checks in one: pitch diameter, lead. taper, out-of-roundness, angle, and straightness. Its use reduces inspection and production costs, cuts scrap waste while increasing speeds of operation. If a part passes the Limitrol, it will assemble accurately.

Graduated dials are furnished as standard equipment. These dials are graduated in increments which approximate .0005 inch when the magnification is 250 to 1, and serve as a guide in determining just how far over or under the limits the part might be.

Another "help on the job" is chewing gum. Chewing seems to make work go easier, time go faster. Good chewing gum is available, but there's still a shortage. That's why we at Wrigley wish we could make Wrigley's Spearmint now, to help increase the available supply. You may be sure we will, just as soon as sugar restrictions are lifted. Meanwhile, chew any good available brand, because it's the chewing that really does you good.

You can get complete information from N.A. Woodworth Co., Sales Division, 1300 E. Nine MileRd. Detroit 20, Michigan



Hand Model used for "in process" gaging



AA-51

industries. New orders is some instances can be scheduled for February on narrow sheared and universal plates, while May is the date for wide sheared.

**Birmingham** — Plate output holds to the yearend schedule of approximately 80 per cent of capacity. Demand would warrant a larger output, but mills continue diversion of some ingots to round out schedules as far as possible.

Seattle — Two contracts involving steel plates were up for consideration last week. Tacoma, Wash., received low bid of \$177,044 from Western Pipe & Steel Co., Los Angeles, for 11,053 feet of 48-inch steel water pipe, for which award is pending. Eugene Ruedy Co., second low bidder, at Portland, Oreg., received the contract for 35 miles of ¾ to 10-inch diameter steel pipe for the Aloha water district. Plate fabricators are receiving considerable business for tanks, calling for small tonnages.

#### Wire . . .

#### Wire Prices, Page 139

-Nonintegrated wire producers Bostonhave asked OPA to grant an increase in red prices to attract the return of several mills to the Worcester, Mass., base. Several have withdrawn and semifinished supply has become increasingly endangered. This is being reflected in acceptance of some drawn wire orders. Uncertain as to rod supply, some detached mills are restricting new business. Fabricators with branch plants in other districts located in other base points are attempting to buy rods and wire for delivery to those points with a view of transhipping to this area. Selectivity as to products is also a factor in the tightening supply of less profitable products. One eastern mill is curtailing output of basic wire in coarser sizes drastically.

#### Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 139

New York - Strong demand prevails for stove bolts, machine screws and, in fact, all light screw products, both here abroad, with deliveries running 10 and and 12 weeks and beyond. On the other hand, demand for heavy products, such as structural bolts and ship bolts, is relatively easy, with deliveries ranging four to six weeks and with surplus government sales assisting in relieving the pres-sure for this type of material. Surplus offerings have been heavy and in some instances include as much as 3,000,000 pieces of a single size. Decline in shipbuilding is the principal cause for easiness in the heavy bolt field. However, when building construction gets under full swing this situation should stiffen appreciably.

Over recent weeks bolt and nut makers have been bending every effort to building up inventories because of the threat of a steel strike Jan. 14. In some cases they have been able to increase them to a point where they now have 45 to 60 days supply in most of the more important items.

#### Structural Shapes . . . Structural Shape Prices, Page 139

Pittsburgh — Mills are booked into second quarter, with angles  $6 \times 6$ -inch and under, and channels 15-inch and under somewhat more extended. Little headway has been made against backlogs recently. Bidding on many structural projects is held up because of uncertain labor and steel costs. Much proposed municipal work, primarily for bridges, is not likely to reach the bidding stage until early spring. Many contractors are shopping without success to obtain deliveries before strike deadline. Fabricators are booked into second quarter and report some work delayed by lack of steel. Availability of materials, skilled construction workers and extent of government restrictions likely will be the major factors determining the volume of 1946 construction.

New York — Shortage of draftsmen and steel and other materials is holding back much structural demand. Much building construction is in prospect, with the principals in most cases now willing for contractors to go ahead on a costplus basis, but with shape mills now booked a half year ahead in many cases actual orders are rather spotty. The largest projects placed locally involve two of 800 tons each. New bids are expected to be asked by the end of this month on the Lackawack, N. Y., water project of the New York City Board of Water Supply, involving 5500 tons of fabricated shapes and 1000 tons of reinforcing bars.

Cleveland—Fabricated structural situation has tightened. Bottleneck is still chiefly in estimating and detailing department. Fabricators are not soliciting business and are selective on jobs for which they enter bids. Fabricating facilities, however, are more than adequate to cover present requirements and plain materials are in fair supply. If a large percentage of building materials is channeled into the moderate-cost housing program, availability of materials and manpower for other types of construction will decline, thus retarding activity in the structural market. Demand for structurals is still originating in industrial plant expansion plans. Highway and other public works generally have not yet reached the inquiry stage and probably will be held in abeyance through 1946.

Chicago — Awards for fabrication of structural steel are lighter than at yearend, although considerable volume awaits placing. Inquiries also are lighter and involve smaller tonnages. One important producer of plain shapes is quoting February delivery on all sizes. Philadelphia — Shape sellers have little first half tonnage left and this induces in schedules to retard new

Philadelphia — Shape sellers have little first half tonnage left and this tightness in schedules helps to retard new awards, combined with shortage of draftsmen and uncertainty with respect to deliveries of materials in general.

Boston—Second quarter schedules are filled on mere sizes of small structural shapes; one large producer is becoming crowded for third quarter on angles, channels and sizes under 10-inch. Only a small fraction of potential structural mill capacity is engaged, for a combination of reasons, unbalanced backlogs, limited semifinished, profit margin m shapes, more pieces per ton and other minor factors. Some mills are not rolling shapes, and one large producer is on sharply reduced schedule; load is unevenly distributed among mills and quotas are operative. Given steel and productivity, however, the large capacity for production of structural shapes could



# REMOVES WELDING FUMES At the Source!

No longer need your employees inhale welding fumes. A Ruemelin Fume Collector solves the problem, quickly and efficiently. It produces a powerful suction that draws out noxious gases, smoke and heat at the source. Guards employee health, resulting in less welder fatigue, therefore greater plant output. Has many exclusive features: (1) Clears shop air with minimum loss of building heat. (2) Exhaust snout can be positioned instantly and conveniently. (3) Covers maximum welding territory, vertically, horizontally and by circle swing. (4) Shipped completely assembled, easy to install. Thousands of Ruemelin Fume Collectors now serving war industries. 9 ft. and 15 ft. sizes (radius of swing).

We gladly offer engineering service for your fume collector installation. Write for Bulletin 37-C.



149.

soon improve supply of this material; backlogs and delivery for the most part are based on current production rather than possible potential.

Denver — Contributing heavily to backlogs and new inquiry on which West Coast shops are low for the most part, are miscellaneous heavy equipment installations and structures on which the Bureau of Reclamation has estimates. Cranes, gates, hoists, dam and power plant with other structures add up to approximately \$30 million in recent estimates, the largest being the Davis dam and power plant, Kingman, Ariz., in excess of \$22 million; Utah Construction Co., San Francisco, is low. Large tonnage of steel plate pipe is also required by the bureau.

## Reinforcing Ears ...

Reinforcing Bar Prices, Page 139

New York — Scarcity of steel is primarily responsible for lack of activity in the reinforcing bar market here. Jobs are fairly numerous, but little work is going ahead. The largest pending project involves 1000 tons for the Lackawack project of the New York City Board of Water Supply, on which new bids are likely to be taken around the end cf this month. Approximately 200 tons are active for a job for the Hercules Powder Co., Gillespie, N. J., on which the Walsh Construction Co., New York City, has the general contract. Boston — Demand for concrete rein-

Boston — Demand for concrete reinforcing bars is retarded by slack public



To operate continually at desired performance, a cooler *must* incorporate factors of safety to allow for the effects of fouling, as well as fluctuations in

load and operating conditions. Otherwise, performance can drop below practical limits, and shutdowns can be excessive.

Ross always stresses a thorough analysis of the fouling tendencies of the fluids being circulated, the velocities to be maintained, temperature ranges and anticipated fluctuations in load as well as changing climatic or operating conditions . . . and in your particular installation, you may prefer to avail yourself of Ross' experience in determining and analyzing your operating problems.

This service, cheerfully given by Ross Engineers, assures the selection

of a lube oil or jacket water cooler best suited to your needs. Remember—your conditions can be met exactly by Ross, through the tailor-made features of Types "CP" and "BCF" Coolers, for large and small H.P. requirements, respectively.

THESE BULLETINS WILL HELP YOU



Ross equipment is manufactured and sold in Canada by Horton Steel Works Ltd., Fort Erie, Ontario

ROSS HEATER & MFG. CO., Inc.

1431 WEST AVENUE

BUFFALO 13, N. Y.

work inquiry, bridges and highways, but is well maintained in small lots for industrial building; ratio for small sizes is somewhat above normal. Output of reinforcing steel is up from last year. Larger tonnages placed here are for work outside this district by several contractors. Postwar highway and bridge contracts have required around 500 tons to date. Veterans' hospitals will take substantial tonnages but delays loom because of uncertain costs. One low bid in the East was nearly double the appropriation and the only other was well above double; project will be readvertised.

Pittsburgh — December reinforcing bookings continued the moderate downward trend initiated during November. Numerous projects are held up by inability to estimate future wage rates and steel prices and extended mill deliveries are another major factor. Fabricators seek protection on rolling schedules, but mills already have a large backlog of unscheduled tonnage. At present rate of output, restricted considerably because of production emphasis on more profitable steel items, mill backlogs average 5 to 6 months for domestic tonnage and in some instances producers are sold for 18 months on export tonnage.

#### Pig Iron . . .

Pig Iron Prices, Page 141

Pig iron supply continues short, with possibility of severe cut in case the strike of steelworkers comes off. Foundries in general have small inventories, few being up to the allowable limit. Loss of tonnage during the coal strike is impossible to make up and this cuts into supply to melters. Heavy orders are being offered, with few takers. Pittsburgh — Current limited pig iron

Pittsburgh — Current limited pig iron supply is expected to be critically short through most of this quarter. A number of foundries employing AFL workers, are expected to operate during the strike period. These units, as well as nearly all foundries, have relatively low iron stocks, while merchant producers have not been able to make up the 250,000 ton inventory loss during the coal strike. Merchant iron sellers have been swamped with new orders in recent weeks for delivery prior to the strike deadline. However, practically none of this new business has been accepted for producers are having difficulty meeting former commitments. Considerable tonnage of export business also continues to go begging.

American Steel Wire Co.'s Carilleo merchant pig iron, formerly handled by J. S. McKesson, deceased, of Pittsburgh, will be sold, beginning Feb. 1, through a new division of the company's general sales department located in the Union Commerce building, Cleveland. Fred J. Woodburn, acting manager for Mr. McKesson the past ten years, will head the new department.

Latest export inquiry involves 10,000 tons of foundry, malleable and low phos pig iron for Yugoslavia.

pig iron for Yugoslavia. Cincinnati — Pig iron shipments are sufficient to support the current rate of melt, which has been gradually expanding in recent months. Foundries have been unable, however, to build inventories and any check in pig iron receipts, temporary or prolonged, would show quick reaction in output of castings. Demand for castings is still not satisfied despite some curtailments due to strikes.

Juffalo — Despite a continued suspension in shipments to large Michigan motor casters and some holdups in anticipation of a steel strike, pig iron producers report a firm market and a complete clearance of current production. Sellers have seized the opportunity to ease pressure for shipments to other consumers. Several melters still feel effects of the recent snowstorm as substantial quantities of iron remain where it was piled when railroad cars were not available. Some foundries, uot signed to USW-CIO contracts, have notized sellers that they will not be forced to halt operations, if they have iron on hand, even if the union walkout does materialize.

Boston—Although suppliers are making some progress in catching up with delivery schedules, pressure for January tonnage against first quarter commitments is strong. Furnaces have allocated first quarter tonnage and few melters will get all the tonnage requested. Several additional consumers who were over the 30-day inventory limit are back on shipping schedules. Some will require more tonnage for årst quarter but have been unable to place all the requirements they estimate. Foundry backlogs frequently extend into third quarter and several automobile builders, including Ford and Chrysler, have not been successful in placing much casting tonnage offered in this district. Subcontracting by textile mill equipment and shoe machinery manufacturers continues high.

manufacturers continues high. Cleveland—Civilian Production Administration's aggressive campaign to force compliance with provisions of its inventory restriction order is having a beneficial effect on the market. CPA has supplied all pig iron producers a list of companies in violation and has instructed producers to withhold shipments. Consumers in violation also have been notified that they cannot accept deliveries until inventories have been reduced below the 30-day limit. Other consumers are exercising caution in making commitments and are canceling delivery orders in many instances. As a result, producers are increasing shipments to customers who still have low inventories. No appreciable relief has been realized so far by CPA's ruling that in the case of work stoppages occurring before Dec. 6, pig iron consumers must postpone or cancel all such orders for delivery in January if inventories would be increased by such receipts above the 30-day limit. On the same basis, plants must cancel or postpone by Jan. 15 all February shipments.

Birmingham — Still retarded by furnaces under repair, pig iron production is hard pressed to keep abreast of demand for merchant and steelmaking iron. Tennessee Coal, Iron & Railroad Co. last week faced banking of a blast furnace, a move prevented by timely arrival of an additional trainload of Lake Superior ore.

#### Scrap . . .

#### Scrap Prices, Page 142

Based on current consumption scrap is scarce and melters are in need of large tonnages. However, uncertainty as to the possibility of the steel strike eventuating clouds the situation as buyers seek to avoid the possibility of having

cars strikebound, with demurrage running indefinitely. Once the strike starts or is called off or deferred the situation will clear. Prices are at ceilings on all grades.

New York — While some consumers of heavy melting steel started suspending shipments around Jan. 7 because of possibility that the cars might become strikebound with resultant heavy demurrage charges, others actively specified throughout the greater part of the week. This was true of some of the larger consumers, and apparently their stocks were so low they did not dare to take a chance on holding up shipments, preferring to pay demurrage in the event a steel strike did develop. Meanwhile, foundries have been specifying heavily on the possibility that even though a general steel strike did occur it would not extend to their plants at least for a while, even though employees were CIO members.

mains at east for a wine, even independence employees were CIO members. Pittsburgh — Scrap supply is becoming steadily tighter. Production scrap continues disappointingly low, with automotive and other civilian goods production programs behind schedule. Leading consumers are taking all quality scrap available. Brokers are falling behind in meeting delivery schedules, while manpower shortage and adverse weather restrict movement of scrap through dealers' yards. Despite willingness of consumers to pay \$3 springboard on open-hearth grades, \$1 on machine shop turnings and \$5.50 on cast scrap, little improvement has developed. An indication of





scarcity is the recent high bid of \$18.18 a gross ton on 5700 tons of bomb bodies and components at Marion, O. Nearest ceilinng base price is \$20 at Canton and freight from there to Marion is \$2.82 a ton.

Buffalo — Although leading consumers have informed dealers to hold up shipments in the event of a steel strike, strength underlies the scrap market. Limted offerings and the fact that mills have been digging into reserves indicate that some difficulty may be experienced maintaining capacity ingot operations through the winter if there is no work stoppage. One mill reported a high iron charge to avoid cutting into reserve stocks. Rail shipments are reported from the Detroit area. Some dealers express apprehension over the manner of bidding on government surplus scrap. In one instance a diversified lot of scrap was reported sold in its entirety at the low phos ceiling, including grades selling below the low phos ceiling.

Chicago — If a steel strike materializes as scheduled activity in the scrap trade will come to a virtual halt. Indications are that the unions will stop movements of freight cars into and out of steel plants. In view of this, the past few days have found consumers pressing for quick delivery. Inventories are light and the immediate area for weeks has been falling short of satisfying demand. Result has been substantial buying outside the district and free use of springboard in computing delivered prices. All grades of material are commanding ceiling. For several weeks, one district steelmaker has been obliged to hold down its production for lack of scrap.

St. Louis — Steel mills in this area, served with union notices that scrap will not be allowed to enter during the impending steel strike, have ordered scrap shipments held up virtually 100 per cent. Brokers in turn have stopped their shipments from outside points. Mill reserves are lowest in many months, most from 15 to 30 days.

Cleveland — At the close of last week the scrap situation was filled with uncertainties as possibility of the steel strike stopping scrap shipments to mills had not been cleared. Efforts were being made to allow material to be accepted and unloaded, but it was not clear that this could be assured. General Motors Corp. foundries continued to accept shipments, as was the case with foundries supplying castings to that interest. Aside from the steel strike uncertainty the situation continued tight, with mill needs greater than supply and tonnage slow to appear.

Washington — U. S. Commercial Co., an RFC subsidiary, room 1434 Temporary T Building, Washington, will open bids Jan. 15 on 18,270 gross tons of scrap iron and steel stockpiled two years ago at various points in the Caribbean area. Cincinnati — The scrap market is so strong, and demand so pressing that

Cincinnati — The scrap market is so strong, and demand so pressing that it bears resemblance to some wartime periods. This is attributed partly to reduced supply of production scrap. Country scrap has dropped drastically, partly due to unfavorable weather. Overall demand is heavy and pressing despite suspension of shipments to two or three melters who may be awaiting settlement of labor controversies. All grades are at ceilings.

Seattle - The scrap market is in a

STEEL RIVERUUT NOW AVAILABLE



# New addition to line broadens field of Rivnut applications

HERE IT IS . . . in stainless or plated steel—the one-piece blind rivet complete with screw threads that can be used both to fasten *with*, and to fasten to.

Standard Rivnut hand tools, with a slight adjustment, can be used to install 6, 8 and 10-32 sizes.

All Rivnuts, used as rivets, can be sealed with a drive plug (hammered in place) or with a plug screw, which keeps the threads intact. If used for attachment, cadmium-plated attachment screws are available.

## WRITE FOR HANDBOOK

Principle of Rivnuts, installation procedures, complete test data on lighter aluminum Rivnuts and new supplement on brass and steel Rivnuts, available free. Ask for Rivnut Data Book. The B. F. Goodrich Company, Dept. S-1-14, Akron, Ohio



state of uncertainty, with supplies ample in best grades. In view of possible steel strike buying has practically ceased, ship-ments are being suspended and inven-tories are not being increased. Eastern interests which recently bought 60,000 tons of shipyard scrap in the Portland, Oreg., area have withdrawn from the market. The expected reduction in overland freight rates has been suspended by ICC. Previous purchases are being shipped at the former rail rate but no further interest is shown in the Pacific Coast market.

### Rule May Be Invoked To Reduce Demurrage Charge

A master freight tariff regulation has come to the understanding of many industrialists that demurrage on strikebound cars is subject to relief. Under these regulations, it is pointed out, a consignee whose plant is forced down because of a strike can appeal within 30 days after the end of the work stoppage for a reduction in demurrage to \$1.20 per day per car for the full term of the suspension, instead of having to pay on the general run of commodities \$2.20 per day for the first two days and \$5.50 per day per car thereafter.

#### Warehouse . . . Warehouse Prices, Page 140

Pittsburgh - Shipments from distributors' stocks continue unusually heavy, in some instances above wartime peak volume. Pending steel strike has accentuated this situation in recent weeks with warehouses flooded with new orders and inquiries from old line customers and new interests endeavoring to take part in the reconversion program. Threatened steel strike is another major factor behind sharply augmented warehouse steel requirements. Distributors' stocks have held up fairly well in face of this heavy demand, although on some items as wide flange structural sections and galvanized sheets inventories are deplet-Warehouse steel customers are ed. forced to take alternate substitutes on a temporary basis in some instances, but as a whole this group has obtained its share of mills shipments despite the overall very tight supply situation.

St. Louis --- Warehouse inventories are low and threaten to become worse. Farm implement manufacturers' demand is heavy, with fabricators, railroads and sheet metal shops also active. Shipments for maintenance are increasing but are smaller. Sheets, strip, small shapes and hot and cold-rolled bars are in heaviest demand. Alloy steel is easier. Truck deliveries are delayed by a strike.

#### Canada . . .

Toronto, Ont. - With mills now accepting orders for second quarter buy-ing has developed considerable action. On practically all materials producers report solid bookings through arst quar-ter and it will only be a short time be-fore second quarter conscity is fully fore second quarter capacity is fully booked. Demand for most lines of steel has reached a rate in excess of capacity of Canadian producers and there is little hope of relief coming from the United





# Air cylinders built to stay on the job!

Hannifin Cylinders combine precision construction and simple outside adjustment of the piston packing—for long, dependable service and greatest useful work from air power. Cylinder interiors are bored and honed, producing a smooth, round, perfectly finished cylinder bore. Because the piston packing can be easily adjusted from outside the cylinder, high efficiency piston seal is easily maintained.

Hannifin Air Cylinders are built in a full range of sizes and mounting types, with or without cushion. Write for Dulletin 57 with full descrip. tion.

Hannifin Manufacturing Company, 621-631 South Kolmar Avenue, Chicago 24, Ill.







States. According to word from Hamilton the Steel Co. of Canada Ltd. is now operating its new strip mill and is expected to increase output of sheets substantially during first quarter.

## Ford Says Problem of Human Relations Must Be Solved

#### (Concluded from Page 56)

was major emphasis on substitute materials and on production methods. At this, the first major meeting since the collapse of the Axis countries, there was a marked swing toward consideration of technical advances which will affect peacetime vehicles and aircraft. As was inevitable, Bill Stout was on the program with his latest thoughts on the subject of "What Motor Cars Could Be"based on years of successful experience with his rear-engine scarab models. His belief is that such cars will come only when the public wakes up to their advantages and demands them. He did not undertake to predict when or by whom they would be built for sale.

Atomic power came in for an evening of consideration and clarification by Dr. John R. Dunning of Columbia University. His was no abstract presentation. He had uranium on the platformquite a chunk of it. Somewhat to the consternation of the big audience, he established fission with the help of radium. However, everything was under control, and the power released by the smashed atoms merely flashed on an oscillograph screen, operated lights and rang a gong. It was a striking and clear presentation which indicated that while atomic energy may not be too far away as far as stationary power plants and ship propulsion are concerned, it will be a long, long time before automobiles are powered by it.

It is apparent that many of the new things and wartime developments whose peacetime possibilities were discussed at this meeting will be adapted first to commercial vehicles, that is trucks and busses. While some important changes in passenger car design may be possible, they are too far in the future to mention here. The average motorist might as well be resigned to something much like the 1942 model—if he can get it.

Gas turbines, fully automatic transmissions, new methods of suspension and vibration-damping, improved steering (including power steering), synthetic lubricants, improved diesel engines, new body designs for driving convenience and passenger comfort, all are potent factors as far as commercial vehicles of the immediate future are concerned. Eventually they will bring about revolutionary changes in passenger vehicles, but even Bill Stout admits that that will be a matter of years rather than months.



For moving bales, boxes, crates, drums, barrels with limited manpower, the Reading Multiple Gear Chain Hoist provides a practical solution.

Loads up to 2 tons can be lifted by one man. The load brake holds positively till released. Where I beam trolleys are used, loads can be moved with ease by one man.

Long life is insured by the sealed-in-oil gear unit—an exclusive feature. The all steel construction from hook to hook gives high overload capacity—guaranteed 25% over rated capacity.

See your nearest Reading Hoist distributor for help on your materials handling problems or write direct.

#### READING CHAIN & BLOCK CORPORATION 2102 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS OVERHEAD TRAVELING CRANES



#### STRUCTURAL SHAPES ....

#### STRUCTURAL STEEL PLACED

- 6200 tons, assembly plant and administration building, Van Nuys, Calif., for Chevrolet Motor Division, General Motors Corp., to Bethlehem Steel Co., Bethlehem, Pa.; bids Dec. 17.
- 2300 tons, bakery, Loose-Wiles Biscuit Co., Dayton, O., awarded through James Barnes Construction Co., Cincinnati, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.
- 1700 tons, warchouse and manufacturing buildings, Calco Chemical Co., Willow Island, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.
- 800 tons, brewery, Charles Pfizer, Brooklyn, through W. J. Barney, New York, to the Phoenix Bridge Co., Phoenixville, Pa.
- 800 tons, race track and club house, Oceanport, N. J., to the Harris Structural Steel Co., New York.
- 750 tons, 14-story building for M. Shapiro & Son, 7 East 71st St., New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.
- 560 tons, St. Luke's Hospital, Bethlehem, Pa., to Bethlehem Steel Co., Bethlehem, Pa.
- 500 tons, utility plant additions, New Bedford Gas & Edison Light Co., New Bedford, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Theo. Loranger & Sons, New Bedford, general contractor; Fabricated Steel Inc., awarded 75 tons reinforcing bars.
- 460 tons, asphalt tile plant, Kankakee, Ill., for Armstrong Cork Co., to Midland Structural Steel Co., Cicero, Ill., for fabrication by Allied Structural Steel Co.'s; J. L. Simmons Co., Decatur, Ill., contractor; bids Nov. 7.
- 300 tons, building for Tennessee Textile Co... Morristown, Tenn., through Leo F. Caproni, New Haven, Conn., to Virginia Bridge Co... Roanoke, Va.
- 300 tons, plant building, General Electric Co., Pittsfield, Mass., to Haarmann Steel Co., Holyoke, Mass.
- 250 tons, building for General Electric Co., Lynn, Mass., to Ingalls Iron Works, all welded.
- 250 tons, building for Magnus Metal Division, National Lead Co., at Fitchburg, Mass., to West End Iron Works, Cambridge, Mass.
- 200 tons, factory, Bedford Park, Ill., for General Scientific Co., to Duffin Iron Co.
- 175 tons, bracing for power station cofferdam, Tyrone, Ky., for Kentucky Utilities & Power Co., to Inland Steel Co., Chicago; Bates & Rogers Construction Co., Chicago, contractor.
- 175 tons, manufacturing building, Chicago, for Pyramid Metals Co., to Duffin Iron Co., Chicago,
- 135 tons, building, Anglo Fabric Co., Webster, Mass., to Bethlehem Steel Co., Bethlehem, Fa.
- 125 tons, one-story 129 x 200 plant addition Locke Steel Chain Co., Bridgeport, Conn., to Leake & Nelson, Bridgeport; Gellately Construction Co., Bridgeport, general contractor.
- 120 tons, bridge for Reading railroad, Philadelphia, to American Bridge Co., Pittsburgh.
- 100 tons, estimated, Panama, sch. 8104, to Vulcan Rail & Construction Co., Wheeling, W. Va., delivery 60 days; other deliveries ranged to 180 days

#### STRUCTURAL STEEL PENDING

28,800 tons, sheet piling, Puerto Rico, for Ochea Fertilizer Corp.

- 5500 tons, Lackawack, N. Y., water project, Bureau of Water Supply, New York City, new bids expected to be asked around the end of the month; this project will also require 1000 tons of bars.
- 1800 tons, office building, Mobile, Ala., for. Waterman Steamship Lines.
- 1271 tons, sheet piling for shore protection, 53rd street beach, Chicago, for Chicago Park District; bids taken Dec. 14 rejected.



In plants using soap-base lubricants for wet drawing brass, bronze and copper wire, extra care should be taken to assure complete removal of all acid used in the pickling operation following annealing. Otherwise, the soap-base lubricant will break down and as a result a troublesome green scum will form on the wire. One successful way to eliminate a slime formation is to immerse wire in a hot solution of

#### OAKITE COMPOSITION NO. 29

By this method acid effectively neutralizes after pickling. Greater life of lubricants, brighter wire, and a substantial saving of productiontime results.

For further details write for FREE technical data or ask us to have our Oakite Technical Service Representative call at your convenience. There is no obligation. Act today!



OAKITE PRODUCTS, INC.

January 14, 1946



How different where C-F Positioners rotate great weldments under push button control. Here welders can spend their time welding—welding all sides and all angles as they should be welded "down hand," There are C-F Positioners in capacities from 1200 lbs. to 30,000 lbs. Manual or motor driven. Write for Bulletin WP-22.

CULLEN-FRIESTEDT CO.

1308 S. Kilbourn Ave.

Chicago 23, Illinois

- 1166 tons, sheet piling, shore protection, Calumet Park, Chicago, for Chicago Park District; general contract to Great Lakes Dredge & Dock Co., Chicago; bids Dec. 11.
- 1100 tons, building for production of prefabricated houses, Anchorage Home, Westfield, Mass.
- 1600 tons or more, Davis dam and power plant, bureau of reclamation, Kingman, Ariz., Utah Construction Co., San Francisco, low, \$22,805,940.
- 750 tons, huilding, Doubleday Doran & Co., Long Island City, George A. Fuller, New York, general contractor.
- 500 tons, building for New England Confectionery Co., Cambridge, Mass.
- 500 tons, research laboratory, Air Reduction Co., New Providence, N. J., bids asked.
- 300 tons, plant addition, Magnus division, National Lead Co., Fitchburg, Mass.
- 250 tons, building, Winsted Hardware Mfg. Co., Winsted, Conn.
- 190 tons, coffee warehouse for William S. Scull Co., Camden, N. J.
- 175 tons, building for Stegmair Brewing Co., Wilkes-Barre, Pa.
- 135 tons, textile mill for Natona Co., Dallas, Pa. 105 tons, bus terminal at Lakewood, N. J.
- 105 tons, shapes and bars, highways and bridge, Vermont; bids Jan. 18, H. E. Sargent commissioner of highways, Montpelier, Vt.
- 100 tons, plant for Universal Dyc Works, Philadelphia.
- 100 tons or more, one 230-ton double-trolley overhead traveling crane and lifting beam, Keswick power plant, Central Valley project, Calif.; bids Jan. 17 to bureau of reclamation, Denver; government will install equipment.
- Unstated tonnage, four-motor driven gate hoists, Keswick dam, Calif., bureau of reclamation, Denver, Western Machinery Corp., Portland, Oreg., low, \$183,910.
- Unstated, two 190-foot truss spans and 133foot truss bridge, Oregon state; bids to Oregon Highway Commission, Portland, Jan. 17-18.

#### REINFORCING BARS ...

#### REINFORCED BARS PLACED

- 800 tons, Kentucky Utilities & Power Co., Tyrone, Ky., to Bethlehem Steel Co., Bethlehem, Pa., through Bates & Rogers, Chicago.
- 500 tons, Eastern States Cooperative Milling Corp., Tonawanda, N. Y., to unknown producer, through James Stewart Corp., Chicago.
- 400 tons, buildings, East Lansing, Mich., for Michigan State College, to Capitol Steel Corp., Lansing, Mich.
- 300 tons, Carrier Corp., Syracuse, N. Y., to Truscon Steel Co., Youngstown, O.
- 135 tons, Copley hospital, Aurora, Ill., to Concrete Steel Co.; Sumner S. Sollitt & Co., Chicago, contractor; bids Dec. 3.

#### REINFORCED BARS PENDING

- 1000 tons, Lackawack project, New York Board of Water Supply, new bids expected to be asked shortly.
- 300 tons, oil refinery, Marcus Hook, Pa.
- 700 tons, apartment hotel, Evanston, Ill., for Northwestern University; R. C. Wieboldt Co., Chicago, contractor.
- 240 tons, packing plant addition, Fort Dodge, Iowa, for Tobin Packing Co.
- 209 tons, bins, Superior, Wis., for Great Northern railroad.
- 100 tons, asphalt tile plant, Kankakee, Ill., for Armstrong Cork Co.; J. L. Simmons Co., Decatur, Ill., awarded general contract; bids Nov. 2.
- 200 tons, building, Hercules Powder Co., Gillespie, N. J., Walsh Construction Co., New York, general contractor.

175 tons, Fruehauf Trailer Corp., Avon Lake, O.



Here, in the Bendix-Weiss Constant Velocity Universal Joint, Strom Balls do their part in making military vehicles, from Jeeps to 14-ton Armored Cars, the efficient fighting equipment that they are. This is only one spot in our great war production effort where the high degree of perfection of Strom Balls serves industry, enabling it to provide the finest bearing equipment towards its great contribution to total victory. Strom Steel Ball Company, 1850 South 54th Avenue, Cicero 50, Ill.





# Kester has the RIGHT FLUX for Every Solder Job

• You can always get the right flux, from Kester.... a flux you *know* will properly clean, prevent oxidation, make way for a tight bond that will resist shock, vibration or bending as desired, and eliminate soldering failures.

• During Kester's 47 years of experience, hundreds of Kester flux formulas have been time-tested in laboratory and industry, to establish exact specifications for every flux need. Among them is the ideal flux formula for you.

• Write us, and Kester engineers will consult with you, without obligation.





It's impossible for you to drag your welding machine down in the double-bottom of a "Victory" ship or high in the air on a big construction job . . . however, with a Hobart you can have the same fine adjustments of welding heats as if your machine was right at your side. Hobart's "Remote Control" is small and convenient enough to be carried anywhere. It allows you to make the correct heat adjustments for every application, whether it be overhead, vertical or horizontal welding . . assuring you of sound, ductile welds at all times.





160 tons, bridge over Spa creek, Annapolis, Md. Unstated, Arthur Street viaduct, Portland, Oreg.; Marine Construction Inc., Portland, general contractor.

Unstated, approaches for several state bridges; bids to Oregon Highway Commission, Portland, Jan. 17-18.

Unstated, building additions for Crown-Zellerbach Corp.; general contract to L. H. Holfman, Portland.

#### PLATES ...

#### PLATES PLACED

- 250 tons including shapes, two 110-foot steel tuna fishboats, for Sun Harbor Packing Co., San Diego, Calif., to Pacific Boat Building Co., Tacoma, Wash.
- 100 tons or more, eight steel rock barges, U. S. engineer, Omaha, Neb., to American Bridge Co., Pittsburgh, at \$21,950 each; total \$175,600; same builder low on 11 for U. S. engineer, Kansas city on combination bid, \$20,500 each.
- Unstated, 35 miles ¾ to 10-inch, 10-gage, steel water pipe for Aloha Huber Water district,

Fortland, Oreg., to Eugene Ruedy Co., Portland, general contractor.

#### PLATES PENDING

- 100 tons or more, furnishing one lot of plate steel pipe, laying lengths, including fabrication, coating, testing and delivery, Bureau of Reclamation, Denver, Utah Construction Co., \$532,900 f.o.b. Salt Lake City; Consolidated Steel Corp., Los Angeles, \$546,500 f.o.b. American Fork, Utah.
- Unstated, 11,053 feet 48-inch steel pipe for Tacoma, Wash.; Western Pipe & Steel Co., Los Angeles, low, \$177,044.

#### PIPE . . .

#### STEEL PIPE PLACED

125 tons, 8 and 6-inch water pipe for Lewiston, Idaho, to Pacific States Pipe Co., Provo, Utah.

#### RAILS, CARS ...

#### RAILROAD CARS PLACED

West Virginia Railway, 100 fifty-ton box cars, to American Car & Foundry Co., New York.

# CONSTRUCTION AND ENTERPRISE

#### MICHIGAN

- DETROIT—Keystone Mfg. Co., 3143 Bellevue Avc., has been incorporated with \$100,000 capital to manufacture machinery and equipment, by Herman Brodsky, 4053 Elmhurst Ave.
- DETROIT—Eagle Screw Machine & Production Co., 2126 Howard St., has been incorporated with 50.000 shares no par value to do a general manufacturing business, by R. E. Cecil, 3844 Iroquois Ave.
- DETROIT Web-Vapor Burner Inc., 2030 West Fort St., has been incorporated with \$10,000 capital to manufacture oil burners and parts. by Milton G. Alexander, 1042 Audobon Rd., Grosse Pointe Park, Mich.
- DETROIT—Workrite Tool & Die Co., 7207 McNichols Rd., has been incorporated with \$25,000 capital to do tool and die work and general manufacturing, by Carl Huchzermeyer, 19210 Tracey Ave.
- DETROIT—American Alloy Metals Co., 6432 Cass Ave., has been incorporated with \$20,000 capital to deal in ferrous and nonferrous metals, by Alvin G. Skelly, 3307 Clairmont Ave.
- DETROIT—Heat Treat Inc., 2619 David Stott Bldg., has been incorporated with \$3000 capital to process metal parts, by Earl B. Brink, Book Bldg.
- DEXTER, MICH.—Scio Mfg. Co., has been incorporated with \$100,000 capital to manufacture dies, tools, jigs and instruments, by Edward F. Conlin, 512 Ann Arbor Bldg., Ann Arbor, Mich.
- GRAND RAPIDS, MICH.—McInerny Spring & Wire Co. has plans under way for a plant addition costing about \$40,000. B. Hertel, 38 Pearl St., is architect.
- GRAND RAPIDS, MICH.—Super-Aire Co. of America, 129 Michigan Ave. NW, has been incorporated with \$200,000 capital to manufacture electric suction cleaners and appliances, by Lewis A. Geistert, 328 Auburn St.
- GROSSE POINTE FARMS, MICH.—Transmotive Engineering Sales Inc., 206 Fisher Rd., has been incorporated with 100 shares no par value to manufacture industrial products, by Clyde L. Savage, same address.
- HIGHLAND PARK, MICH.—Behr Products Co., 13732 Woodward Ave., has been incorporated with \$50,000 capital to manufacture tools, jigs, gages, etc., by Albert Behr, 29985 Lorraine Rd., Warren, Mich.
- HOUGHTON, MICH.—Ornamental Copper Co. Inc., 700 Shelden St., has been incorporated

with \$16,000 capital to manufacture metal articles, by Emile Sanregret, same address.

- HOWELL, MICH.—R. & B. Freight Elevator Co., 207 East Grand River Ave., has been incorporated with 10,000 shares no par value to manufacture light electric freight elevators, by Donald E. Bleakley, 307 North Main St., Milford, Mich.
- JACKSON. MICH.—Master Appliance Co., 1100 Jackson City Bank Bldg., has been incorporated with \$75,000 capital to do a general manufacturing business, by Herbert J. Kline, 210 East High St.
- JACKSON, MICH.—Jackson Drop Forge Co., 213 East Cortland Ave., has been incorporated with \$250.000 capital to manufacture forgings, by W. R. Spencer, 1101 South Grinnell St.
- LINCOLN PARK. MICH.—Lincoln Automatic Products Inc., 860 Southfield Ave., has been proprograted with \$50,000 capital to manufacture machinery, by Charles E. Hemingway, 4479 Webster Ave., Ecorse, Mich.
- RIVER ROUGE, MICH.—May Bros. Mfg. Co. Inc., 1533 Coolidge Highway, has been incorporated with \$40,000 capital to manufacture motor vehicle parts and accessories, by Fred May, 46 Orchard St., River Rouge.
- ROYAL OAK, MICH.—Baird, Smith Gauge & Machine Co. Inc., 3307 Rochester Rd., has been incorporated with \$25,000 capital to manufacture gages and related devices, by Willis J. Baird, 522 North Blair Ave., Royal Oak.

#### PENNSYLVANIA

- PITTSBURGH-E. L. Wiegand Co., Thomas Blvd., has plans by Prack & Prack, Martin Bldg., for a two-story plant 98 x 161 feet, to cost about \$100,000.
- SHARON, PA.—Westinghouse Electric Corp., Union Bank Bldg., Pittsburgh, plans a warehouse costing about \$250,000. L. C. Mecheling, Maloney Bldg., Pittsburgh, is architect.

#### ОШО.

- ASHLAND, O.—F. E. Myers & Bros. Co., pump manufacturer, Grace St., will build a fourstory plant on site of present factory, which will be razed.
- CLEVELAND—Gogan Machine Co., Joseph Gogan, president, 1440 East 55th St., is building a one-story plant addition 60 x 63 feet costing about \$20,000.
- CLEVELAND-Bage & Ford Construction Co., 4538 West 130th St., plans four one-story




# FULLERGRIP Spiraled BRUSHES

as well as Horizontal Brush Strips are used on Scrubbing machines, or to remove foreign material from sheet or strip metal; used on continuous sheet scrubbers, galvanizing and bran removal operations.



# THE FULLER BRUSH COMPANY INDUSTRIAL DIVISION, 3582 MAIN STREET, HARTFORD 2, CONN.

# GRINDING WHEELS AND THEIR USES

Second Edition — Second Printing



By Johnson Heywood

• The New Book of "KNOW HOW" that "TELLS HOW"-a practical valume for every man interested in modern grinding methods and applications.

Today's production, with a premium on "Know How", depends on men that can do a job, or know where to find out hew to do it.

"Grinding Wheels and Their Uses" covers the entire field of grinding ... a study of the twenty-nine chapter heads will show how broad its scope really is.

Shop executives can turn to this book for practical help on everyday grinding problems; grinding machine operators, or apprentice operators, can us it to good advantage. Students in trade and technical schools and colleges can profit from the operating experience of engineers, designers, foremen and employes as set forth in this new volume.

This 436 page book, with 29 chapters and 436 illustrations and figures is the only up-to-date book of its kind on the market today. Fifteen tables of Wheel Recommendations and 4 other appendices provide working data that every operator must have

URDER YOUR COPY TODAY1-Orden will be filled the same day received ... Order your copy now and have this valuable handbock ready for immediate reference STEEL - BOOK DEPT. - PENTON BLDG. CLEVELAND. 0, Used in America's Leading Industrial Plants for the Past 10 Years! PERMANENTLY REPAIRS DAMAGED GALVANIZED

# SURFACES-good as NEW! USED BY SUCH INDUSTRIAL LEADERS AS:

DuPont, Swift, Electric Boat, New York Ship, Jos. P. Cattie & Son, U. S. Navy Yards, Hanlon-Gregory Galvanizing Co., Amer. Car & Foundry, many others.

Bonds perfectly and permanently to base metal without damage to surrounding galvanizing. Meets U. S. Army & Navy specifications, including 600 hour 20% salt spray test. Easily applied in few minutes by your own unskilled workmen. Costs only 2c to cover square foot. Absolutely guaranteed!

AMCO GALVANIZING
COMPOUND
MAIL THIS COUPON TODAY
AMERICAN SOLDER & FLUX CO.
2153 E. Norris St., Philadelphia 25, Pa.
Please mail us free Bulletin 52 giving full details on AMCO.
Individual
Nome of Company
Street
City

January 14, 1946

50 x 120-foot factory buildings on West 130th St., to be leased for light manufacturing.

- CONNEAUT, O.—Conneaut Plating Indust-ies Inc. has been incorporated with \$500 capital and 1000 shares no par value to electroplate metals and manufacture tools, dies and jigs, by Arthur Fullerton, R.F.D. No. 2, Kingsville, O.
- CONNEAUT, O.—Art Casting Co. has been incorporated with \$500 capital and 1000 shares no par value to manufacture die castings by Arthur Fullerton, R.F.D. No. 2, Kingsville, O.
- TOLEDO, O.—Commercial Metals Treating Inc., 1345 Miami St., has let contract to George W. Lathrop & Sons Inc., 1501 Montclair St., for a plant addition estimated to cost \$60,000.

#### **ILLINOIS**

- CHICAGO—Great Lakes Plating & Japanning Co., 1715 North Bosworth St., has plans by V. Charn, 4744 West Rice St., for a onestory plant addition 100 x 180 feet.
- PALATINE, ILL.—M. E. Plate superintendent of public works, is having surveys made for sewage disposal plants costing about \$165,-000. C. Ashley, Wells Engineering Co., Geneva, Ill., is consulting engineer.
- PEORIA HEIGHTS, ILL.—Pabst Brewing Co., 3431 Prospect Rd., has plans by Harley, Ellington & Day, 1507 Stroh Bldg., Detroit, architects and engineers, for a laboratory, brewhouse and office, to cost about \$150,000.

#### INDIANA

CARLISLE, IND.—Martin Tool & Mfg. Corp., care Joseph T. Martin, has been incorporated with 1000 shares no par value to manufacture tools and other steel products.

COLUMBUS, IND. - Hamilton Mfg. Corp.;

1603 Cottage Ave., has been incorporated with 5000 shares preferred stock at \$100 per share, to manufacture metal stools, by Bertis F. Hamilton and associates.

- COLUMBUS, IND.—V. E. Sprouse Co. Inc., Cottage Ave. and 22nd St., has been incorporated with 1000 shares no par value, to manufacture metal products, by V. E. Sprouse and associates.
- EVANSVILLE, IND.—George L. Mesker Steel Corp., 400 Northwest First St., has been incorporated with 4000 shares preferred at \$100 per share and 1500 shares no par common stock, to fabricate steel, by Robert J. Stumpf and associates.
- INDIANAPOLIS—Winsten Machine Co., B. A. Winston, president, 1102 Burdsal Parkway, plans a plant addition costing about \$75,000.

#### WEST VIRGINIA

WHEELING, W. VA.—Westinghouse Flectric Supply Co., 575 Sixth Ave., Pittsburgh, has plans by Hunting, Davis & Dunnells, 1150 Century Bldg., Seventh St., Pittsburgh, for a one and two-story plant costing about \$200,000.

#### MISSOURI

ST. LOUIS—Mesker Brcs. Iron Co., 424 South Seventh St., has let contract to Fruin-Colnon Contracting Co., 1706 Olive St., for a onestory plant and office building 140 x 275 feet, at 4340 Geraldine Ave.

#### CALIFORNIA

- EURBANK, CALIF.—General Controls Co., 801 Allen Avc., Glendale, Calif., will build a plant at 1320 South Flower St., 98 x 120 feet, to cost about \$27,000.
- BURBANK, CALIF.—Hydro-Aire Co. is having plans drawn for a plant at 3000 West Winona St., 100 x 100 feet. Plans are by R.



Benedict Brout, 1709 West Eighth St., Los Angeles.

- EL MONTE, CALIF.—Electric Household Utilities Co., has permit for office and factory building 150 x 260 feet at 2900 Valley Blvd., to cost about \$145,000.
- HOLLYWOOD, CALIF.—Hollywood Hardware & Metal Co., care Louis B. Minter, agent, 6253 Hollywood Blvd., has been incorporated with \$204,000 capital, by Alfred Ames and associates.
- LONC BEACH, CALIF.—All-American Aircraft Inc., care Henry D. Lawrence, 1115 Security Bldg., has been incorporated with \$1 million capital, by Rudolph G. Adler and associates.
- LOS ANGELES—William Juvonen is building a machine shop 50 x 80 feet at 1733 East Slauson Ave., to cost about \$15,000.
- LOS ANGELES-Utility Trailer Mfg. Co. is building a metal body shop at 3900 Medford St., Belvedere District, to cost about \$40,000.
- LOS ANGELES—Ferro Enamel Corp. is building a plant unit at 5309 Riverside Dr., Florence Dist., to cost about \$36,000.
- LOS ANGELES-American Smelting & Refining Co., 4010 East 26th St., is building an addition costing about \$35,000.
- LOS ANGELES—Boston Iron Works, 228 West 37th Place, is building a plant addition costing about \$15,000.
- LOS ANGELES—Steamaster Auto Boiler Co., 5819 South Compton Ave., is building a plant addition 22 x 128 feet, cost about \$7000.
- LOS ANGELES—Continental Can Co. will build a one-story plant and recondition structure on site on East 50th St., recently purchased, at cost of about \$1,700,000.
- LOS ANGELES—Industrial Design Laboratories, care Hindon, Weiss & Girard. 111 West Seventh St., has been incorporated with \$25,000 capital, by Paul A. Palmer and associates.
- LOS ANGELES—California Pop-Up Sprinkler Co., care Chenoweth & Whitehead, 318 West Ninth St., has been incorporated with 2500 shares no par value, by R. M. Chenoweth and associates.
- SANTA ANA, CALIF.—General Mailing Machine Corp., care W. Maxwell Burke, 214 Moore Bldg., has been incorporated with \$50.000 capital, by Harry D. Benson, Fresno, Calif.
- SAN DIEGO, CALIF.—Research Mfg. Corp., care George Fisher, 618 San Diego Trust Bldg., has been incorporated with 2500 shares no par value, by Roland Tyce, Chula Vista, Calif., and associates.
- SOUTH GATE, CALIF.—Armstrong Corp. Co. has permit for a new plant at 5037 Palata St., to cost about \$85,000.
- VAN NUYS, CALIF.—General Motors Corp. has permit for erection of a warehouse at 7800 Van Nuys Blvd., 240 x 360 feet, to cost about \$375,000.
- VAN NUYS, CALIF.—Production Aids Inc., 6373 DeLongpre Ave., will build a plant at 6842 Beck Ave., 50 x 144 feet, to cost about \$20,000. W. B. Whisenand, 440 Douglas Bldg., Los Angeles, is contractor.
- VERNON, CALIF.—Coultor Sibbett Steel Co. is building a warehouse 73 x 135 feet, costing about \$30,000 at 5524 Alcoa Ave.
- VERNON, CALIF.—American Can Co. has permit for erection of an office and plant at 2231 East 49th St., with 62,000 feet floor space, to cost about \$270,000.

#### OREGON

PORTLAND, OREG.—Mercer Steel Co. Inc., Kearney St. and NW 13th Ave., has bought a site at Nicolai St. and 25th Pl. and will build a unit 100 x 200 feet with high ceiling, craneways and electric cranes. Reimers & Jollivette are general contractors. Cost is about \$100,000.









# EQUIPMENT ... MATERIALS



# EQUIPMENT ... MATERIALS

# GOVERNMENT TERMINATED SURPLUS LOT M-127

# SERVICEABLE MATERIAL

Steel, Brass, Aluminum procured for Caterpillar Tractors consisting of:

Sheets, Plates, Strips, Bars, Channels, Angles, Special Section, Wire Screen

Sale by competitive sealed bidding

Terms of sale---"as is" f.o.b. cars or trucks, ACF Plant, Berwick, Pennsylvania

Bids will be opened at 10:00 a.m., January 15, 1946

Material available for inspection daily

Bids and inquiries should be directed to

MR. G. E. THOMPSON

AMERICAN CAR AND FOUNDRY COMPANY Berwick 6, Pennsylvania Telephone Berwick 1144

# FOR SALE

One lot of 50,000 lbs. of FXS-318 Steel .429/.433 Round. Centerless ground, in 12-foot lengths, made by the Crucible Steel Corp.

One lot of 46,000 lbs. Cold Drawn Steel made by Bethlehem Steel Co. .252-256" dia. x 12 ft. lengths.

MILLER JUNK & WASTE CO. S. Prince and Hazel Sts., Lancaster, Pa-

GERDING BROS. SE THIRDVINE ST. . CINCINNATI 2, OHIO



Recirculating type.  $8' \times 13' \times 6'$ . To 1250° F. Has been used in war work, but in perfect condition. Now set up and can be inspected, but must be moved to vacate plant within short time. This is really a bargain both in value and in price, but must have fast action. Wire, write or phone

Sales Dept. MAHR MANUFACTURING CO. Div. of Diamond Iron Works, Inc. 1728 North 2nd St. Minneapolis 11, Minn.

WANTED --- STEEL 50 tons--8' channels 11-5/2 lb. 100 tons--12' wide itange I beams 99 lb. 100 tons--12' some Any quantity of low carbon billets or bars suitable for rerolling. Please offer substitutes. Wire or Call GLAZER IRON & METAL CO. 520-610 Chamberlain St. Knoxville, Tenn. Telephone 3-0738

# WANTED ONE ELECTRIC FURNACE

For melting steel—1, 2 or 3 ton capacity. Address Box 365, STEEL, Penton Bldg., Cleveland 13, O.



to the A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN. designers and builders of wire and ribbon stock forming machines. We also solicit your bids for cam milling



ton Bldg., Cleveland.



# Opportunities

Help Wanted

PRODUCTS NEW WANTED

Our client, an established manufacturer, wants new products or new ideas that might be developed into new products. Experienced in steel casting, welding and machining in any combination— large sizes, great precision.

Selling industrial and manufacturing markets.

Please write Dept. 16. Communications in confidence. We are fully com-pensated by our client.

Charles H. Welling & Co., Inc. 52 Vanderbilt Ave., New York 17, N. Y.

New Products - New Processes

# Positions Wanted

MANUFACTURING SUPERINTENDENT SEEK-MANUFACTURING SUPERINTENDENT SEEK-ing connection where the following experience would be of mutual interest: 8 years General Shop Experience. 3 years Purchasing, 3 years Chief Engineer Tool and Die Shop, 2 years Pro-duction and Material Control. At present and for past 2½ years, Manufacturing Superintend-ent of Ferrous and Nonferrous materials, in plant of approximately 5000 employes in middlewest. Age 34. height 6'3", weight 220 lbs. Married, one child. Address Box 367, STEEL, Penton Bldg., Cleveland 13, O.

RESEARCH METALLURGIST OR PROCESS engineer. 9 years of broad steel mill experience including hot rolling, cold drawing, resistance welding, heat treating, mechanical properties, metallography, and contact work. College gradu-ate. Minimum salary \$5000. Address Box 360 STEEL, Penton Bldg., Cleveland 13, O.

COMBUSTION ENGINEER DESIRES SALES engineering or plant position in Northern Ohio area, Has had two years' plant experience and aven years of field work in industrial furnace and allied lines. Address Box 358. STEEL, Pen-ton Bldg., Cleveland 13, O.

ELECTRIC MELTER. TEN YEARS' EXPERi-ence with carbon and alloy steels. Seeks position with reliable concern. Prefer small town. Ad-dress Box 364, STEEL, Penton Bldg., Cleveland 13. Q.

### CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 7,00, each addi-tional word .14; all capitals, minimum 50 words 9,00, each additional word .18; all capitals leaded, minimum 50 words 11,00, each additional word .22. "Positions Wanted" set solid, mini-mum 25 words 1.75, each additional word .07; all capitals, minimum 25 words 2.25, each additional word .09; all capitals, leaded, mini-mum 25 words 2.75, each additional word .11. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" adver-tisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio. All classifications other than "Positions Wanted,"

# WANTED

# **Machine Designers**

Men experienced in the design of heavy machinery who wish to asso-ciate themselves with one of the world's leading builders of self-contained oil-hydraulic presses. Contained oil-hydraulic presses. Company established in 1877, is now engaged in regular peacetime manufacturing, with large backlog of orders. Excellent opportunities for advancement in a growing industry. All replies confidential.

# THE HYDRAULIC PRESS MANUFACTURING COMPANY MOUNT GILEAD, OHIO, U.S.A.

WANTED PATTERN DEPARTMENT FOREMAN To operate department constructing and maintain-ing wood and metal pattern equipment used in our production foundry, making enamel cast iron plumbing fixtures. Plant located in Northeastern Ohio.

Address Box 362 STEEL, Penton Bidg., Cleveland 13, 0.

# STRUCTURAL STEEL DETAILER **OR CHECKER**

Must have previous experience in structural steel fabrication. Excellent opportunity for the man who qualifies.

Write Personnel Dept. 2632 Birmingham, Ala. P. O. Box 2632

# CHIEF DRAFTSMAN

By large heavy structural steel firm in western Pennsylvania. Permanent position, good salary. Must be engineering graduate—and thoroughly famillar with heavy building and steel construction. State age, experience, salary desired in writing Box 366, STEEL, Penton Bids., Cleveland 13, Ohio. All replies in strict confidence.

WANTED: DISTRICT SALES MANAGER WA-WANTED: DISTRICT SALES MANAGER WA-ter treating and process equipment for liquids. Must be familiar with these lines and have held similar positions. Location New York City. Write stating experience, education, age, companies worked for, references, positions held, salary expected, etc. Address Box 351, STEEL, Pen-ton Bldg., Cleveland 13, O.

DIE CASTING SUPERINTENDENT. EXCEL-lent opportunity for man with die and casting experience, to start and grow up with vigorous, alert organization in southern Ohio city of 60,000. Address Box 369, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: TOOL STEEL SALESMAN FAMIL-iar with accounts in Cleveland area. Excellent proposition and prospects for the future. Address Box 363, STEEL, Penton Bldg., Cleveland 13, O.I.

Accounts Wanted

# A SELLING ORGANIZATION

With close contacts in the automotive, domestic appliance, and other large indus-tries of Michigan, Ohio, Indiana, Illinois and Wisconsin-will consider two or three more accounts for representation in all or part of these states-for development out of Detroit or Chicago.

Their personnel have been corporation or business executives, not order-takers, and over eleven years have established a volume business and a respect for their policies. They are trained in the energy and resourcefulness of the automobile industry.

This is not a "one-man-and-stenographertype" of office. Eight producing principals, supported by well-organized internal customer service, costs no more than the standard prevailing commission. Two of the group are experienced in national cistribution as well.

They prefer to represent a few mills and plants and satisfy them. They consistently foster the long-time relations of their customers and mills.

Accounts need not be large-their quality being most important.

They are prepared to undertake the distribution of the entire output of a manufacturer, or of any one product that may not fit the regular sales facilities of a manufacturer.

They prefer raw materials, and in fabricated materials, particularly heavier stampings-molded rubber-automobile body textiles including carpeting.

Address Box 370

STEEL, Penton Bldg., Cleveland 13, O.

# Manufacturer's Representative

State of Ohio or Northern section. Cleveland Office. Forgings, castings, screw machine parts, plastics, etc. Must be hi-grade account.

Address Box 338 STEEL, Penton Bidg., Cleveland 13, O.

MANUFACTURER'S REPRESENTATIVE LO-cated in Chicago for ten years, requires addi-tional account, quality product only, requiring metallurgical engineering experience in selling and servicing. Address Box 339, STEEL, Pen-ton Bidg., Cleveland 13, O.

# **Employment Service**

SALARIED POSITIONS \$2,500-\$25,000. RE-conversion is creating lifetime opportunities now. This thoroughly organized confidential service of 85 years' recognized standing and reputation car-ries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, INC., 110 Delward Bidg., Buffalo 2, N. Y.

# ADVERTISING INDEX

Abrasive	Products, Inc.	147
Aetna-Sta	ndard Engineering Co., The	
• • • • • • •	Inside Front C	over
Albert &	Davidson Pipe Corp	165
Albert Pip	be Supply Co., Inc	165
Allegheny	Ludium Steel Corp	16
Allis-Chal	mers Mtg. Co	, y
American	Chain & Cable, American Chain	
Division	• ••••••	124
American	Chain Division, American Chain &	
Cable		124
American	Foundry Equipment Co.	43
American	Magnesium Corporation	40
American	Petrometal Corp.	164
American	Pipe Bending Machine Co., Inc.	162
American	Society for Metals	129
American	Solder & Flux Co.	159
Ampco M	letal, Inc	128
Arcos Co	orporation	32
Atlas Dra	op Forge Co.	164

A

Babcock & Wilcox Co., The, Retractories	108
	100
Baker-Raulang Co., The	145
Barnes, Wallace, Co., Division of Associated	
Spring Corp	42
Basis Refractories, Inc.	5
Basler, E. J., Co.	166
Beall Tool Co	161
Belmont Iron Works	164
Benedict-Miller, Inc	164
Bethlehem Steel Co.	1
Bison Forge Co.	164
Bixby, R. W., Inc	167
Brooke, E. & G., Iron Co	164
Bryant Machinery & Engineering Co	107
Buttalo Forge Co.	41

### С

Century Electric Co.	119
Chester Electric Steel Co	10
Chicago Perforating Co.	162
Cincinnati Grinders, Inc	63
Cincinati Milling Machine Co 62,	13
Cløereman Machine Tool Co	107
Cleveland Automatic Machine Co., The	125
Cleveland Twist Drill Co., The	28
Climax Molybdenum Co	69
Cohen, M., Co., The	164
Commercial Metals Treating, Inc	160
Cowles Tool Co	163
Cross Co., The 30,	:11
Cullen-Friestedt Co.	156

#### D

Different	ial Steel Car Co	163
DoAII C	o., The	121
Dodge /	Manufacturing Corp	23
Dulien 3	Steel Products, Inc	165

# E

Eastman Kodak Co. 113 Engineering & Construction Division Kappers Co., Inc. 34, 35

airbanks, Morse & Co Front Co	ver
arrel-Birmingham Co., Inc	114
lash-Stone Co	163
oster, L. B., Co	165
uller Brush Co., The	159
G	

General Electric Co12,	13
General Engineering & Mfg. Co	151
Gerding Bros	166
Gisholt Machine Co	. 17
Goodrich, B. F., Co., The	152
Greenspon's Jos., Son Pipe Corp	165
Gult Oil Corporation	37
Gulf Retining Co	37

н

Hagan, George J., Co. ..... 161 Hanlon-Gregory Galvanizing Co. ..... 95 Hannitin Manutacturing Co. ..... 153 Harbison-Walker Retractories Co. ...... 25 Harrington & King Pertorating Co., 1he ... 154 Haskins, R. G., Co. ..... 130 Heil Engineering Co. ..... 164 Hendrick Manufacturing Co. ..... 162 Heppenstall Co. ..... 101 Hevi Duty Electric Co. ..... 22 Hobart Brothers Co. ..... 158 Holcroft & Co. ..... 134 Hubbard, M. D., Spring Co. ..... 162 Hyatt Bearings Division, General Motors 66 Corp. ..... ny-Test Division, International Shoe Co. ... 8

- min

 Industrial Oven Engineering Co.
 123

 industrial Steels, Inc.
 77

 Inland Steel Co.
 49

 International Nickel Co., Inc., The
 46

 International Shoe Co., Hy-Test Division
 8

 Iron & Steel Products, Inc.
 166

1

#### J

Japan Co., The ..... 117

# к

### L .....

McGill Manufacturing Co., Inc. ..... 11

# 14

Mahon, R. C., Co., The	.14
Manufacturers Screw Products	164
Master Electric Co., The	29
Mesta Machine Co	93
Midwest Steel Corp	165
Modern Engineering Co., Inc.	161

Morse Chain	Co	36
Muehlhausen	Spring Corporation	39

### N

N

N

ational Acme Co., The	27
lew Britain Machine Co., The	6
ilson, A. H., Machine Co	166
orton Co	33
lox-Rust Chemical Corp	152

#### O

Oakite Products, Inc	155
Dhio Galvanizing & Mfg. Co., The	163
Dhio Locomotive Crane Co., The	162
Ozalid Division of General Aniline & Film	
Corp	102

# Р

Pangborn Corporation 144	\$
axson Machine Co 15	5
Peninsular Grinding Wheel Co., The18, 1	9
Pittsburgh Coke & Chemical Co 15	3
Pittsburgh Commercial Heat Treating Co 16	3
Rittsburgh Steel Foundry Corp 11	1

#### R

Reading Chain & Block Corp	155
Rockford Machine Tool Co.	97
Ross Heater & Mtg. Co., Inc	150
Ruemelin Mtg. Co	149
yerson, Joseph T., & Son, Inc	,50

#### 5

Saunders, Alexander, & Co	163
Scovill Manufacturing Co	15
Simonds Gear & Mtg. Co., The	163
Sonken-Galamba Corp	165
Strom Steel Ball Co	157
Stuart, D. A., Dil Co	146
Sturtevant, B. F., Co	, 21
Sun Oil Co	75

### T

 Thompson Grinder Co., Inc., The
 105

 Timken Roller Bearing Co., The
 Back Cover

 Toledo Stamping & Manutacturing Co.
 164

 Towmotor
 Corporation
 126

### U

United Engineering & Foundry Co. ..... 36

### W

# Zeh & Hahnemann Co. ..... 162

z

Table of Contents Page 45 Classified Advertisers, Pages 165, 166, 167