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STEEL

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PRODUCTION • PROCESSING • DISTRIBUTION • USE



**BATTERED BUT
TOUGHNESS...
NOT BROKEN**

**ALLOY
NICKEL
STEELS**

Twelve years ago engineers of Automatic Transportation Co., Chicago, specified SAE 3135 Nickel-toughened steel for pinions in their industrial trucks. After

12 years' service, this Nickel alloyed material retained ductility and toughness to deform rather than break when ball bearings fell into the teeth.

WHAT you need for dependable service — at lowest cost per year — is a tough material combining ample strength and hardness with unusually high ductility. A significant example of such a metal, which deforms rather than breaks, is this pinion pictured above. Balls from a shaft bearing of an industrial truck escaped from their race and fell into the teeth of this pinion gear.

After twelve years' service, this pinion — forged from heat treated SAE 3135 Nickel chromium steel — was still strong enough to stand up under crushing stress. Despite their ductility, these teeth proved too hard for redressing. Make sure of metals which will be strong and tough after twelve years' economical service. Specify Nickel alloyed materials for all vital parts which must resist stress and wear.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views

The News

■ STEEL buying has recovered further from the sharp slump at the turn of the year but (p. 71) continues well below shipments. Production last week (p. 14) dropped 1½ points to 84½ per cent of ingot capacity and appears headed for lower levels over the next few weeks. Scrap prices are slightly easier. A test of sheet quotations is expected when automobile builders again come into the market. Steel buying for export definitely is improved. . . . STEEL's survey (p. 13) shows steel inventories at consuming plants increased 8.6 per cent in the last two months of 1939, 21.8 in the last four months; 77 per cent of companies replying had less than 90 days' supply of steel on hand Jan. 1. Current trend is to reduce inventories.

Business advisory council of department of commerce (p. 24) unanimously favors extension of reciprocal trade treaty powers of the state department.

Revises

Pension Plan

. . . United States Steel Corp. has revised its pension plan to correlate it with provisions of the social security and railroad retirement acts. Future benefits (p. 17) will be reduced by the amount received under federal plans. . . . All space for Industrial Tools and Equipment Exhibition, to be held in Bridgeport, Conn., March 6-9 (p. 23) has been sold; 128 companies will participate. . . . Machine tool buying (p. 27) has passed the crest and some builders report new business lower than current shipments; backlogs extend far into 1940.

Bonneville Project (p. 18) reports to Secretary Ickes a small iron and steel plant should be established in Oregon, based on low-cost power from Bonneville and Grand Coulee dams. . . .

Steel Plant

For Oregon?

. . . The case against the national labor relations board (p. 15) gained in strength as the special house committee unearthed further damaging evidence. . . . Every steelworker a dues-paying member—that (p. 22) is SWOC's goal. . . . Canada's

war supply board (p. 16) is awarding contracts at \$1,500,000 weekly rate; this is to be stepped up to \$4,000,000. . . . First casualty of the 1940 drive for federal economies is the collapse (p. 26) of the move to create a joint congressional committee to investigate government expenditures and revenue.

Many plants (p. 36) can benefit from modern lighting methods. They bring lower production costs, better quality of work, reduced accident rates and improved working conditions and employe morale. . . . New car dumper at Edgar Thomson works (p. 45) unloads twenty-five 120-ton cars of iron ore per hour. . . . All-automatic temperature control (p. 46) features a new car-type annealing and normalizing furnace. . . . White chromium solution (p. 46) is said to have greater throwing power and to permit a wider bright plating range with lower current densities to reduce burnt edges and rejections. . . . Tappets (p. 54) are hardened, 6000 per hour, on a new electric induction machine.

A year ago 1800 feet per minute was considered the maximum rolling speed; today (p. 48) several tin plate mills projected and ordered will have maximum speed above 2500 feet per minute.

2500 Feet

Per Minute

. . . Available is a new finish (p. 53) for plastics. . . . New industrial finish (p. 56) speed-bakes at low temperatures. . . . Improved product and less time out are said to result (p. 49) with a new drive to obtain speed changes on cable-forming and wrapping operations. . . . Mercury switches permit better control (p. 53) of the unloading machine in the hold of a river barge. . . . A new machine (p. 56) tests lubricating properties of oil films one-tenth of one-millionth of an inch thick.

EC Krenzberg



"Soft as Steel"

"Hard as steel" is a more common phrase. But he lacks imagination, if not also experience, who thinks only of steel's hardness. Today's streamlined designs and production economies, too, are made possible by steel's softness, its ease of forming.

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understands your problems. By working *with you*, he makes steel work *for you* to better advantage.

There is more flexibility in steel today. Let an Inland metallurgist demonstrate the full meaning of this fact by developing a sheet especially suited to your purpose. This suggestion may help to cut your costs, to improve your product, or both—without any obligation or expense to you.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Buyers' Steel Inventories Continue To Grow, but at Slower Pace

Increase during November-December 8.6 per cent, against 12.2 in September-October. Major consumers make heaviest additions. Small users show decrease

STEEL inventories of buyers increased 8.6 per cent in November and December, 1939. Since Sept. 1, stocks have expanded 22 per cent.

This is indicated by results of the latest survey conducted by STEEL to ascertain the trend in steel users' inventories.

Representative companies of all sizes were questioned in compiling this study. The sampling of several hundred firms gave total steel inventories as follows:

Oct. 31	\$14,444,846
Dec. 31	\$15,687,469
Per cent increase	8.6

A previous survey, undertaken in November, disclosed that between Aug. 31 and Oct. 31 stocks rose 12.2 per cent. While the lists of companies participating in these two surveys were not identical, there was only a small difference. Further, there is evidence that inventories of the two groups experienced a common trend during the periods under consideration. On the basis of the separate increases recorded in September-October and in November-December, it may be calculated that consumers have built up their inventories approximately 21.8 per cent since Sept. 1.

During this period ingot production showed a monthly average increase of 34.5 per cent, compared with August, and finished steel shipments—as measured by data of United States Steel Corp.—had an average gain of 48.6 per cent.

The increase in amount of material on hand apparently may be attributed to inventory additions by larger buyers. Major consumers, designated as those having inventories on Dec. 31 of \$100,000 or more, boosted their stocks 10.9 per cent between Oct. 31 and the end of the year. Companies having inventories between \$50,000 and \$100,000 recorded a gain of 7.7 per cent; those in the \$25,000-\$50,000 classification had only a 2.4 per cent increase, while the smallest users showed a reduction of 3.9 per cent in stocks

during the two months. In all cases inventories on Dec. 31 remained higher than on Sept. 1, but the average for small buyers was an increase of only 3 to 4 per cent.

Inventory totals for groups:

	Oct. 31	Dec. 31	% Increase
Over \$100,000	\$9,633,037	\$10,683,926	10.9
\$50,000-\$100,000	2,694,920	2,902,243	7.7
\$25,000-\$50,000	1,069,752	1,095,123	2.4
Under \$25,000	1,047,137	1,006,177	*3.9

* Decrease.

Numerically, 41 per cent of all companies carried less steel on hand Dec. 31 than they did Oct. 31. Little or no change was shown by 6 per cent of the reporting buyers and 53 per cent enlarged their holdings. By contrast, only 26 per cent lowered their inventories between Aug. 31 and Oct. 31, while 68 per cent were bolstering their supplies to support a rising tide of steel consumption.

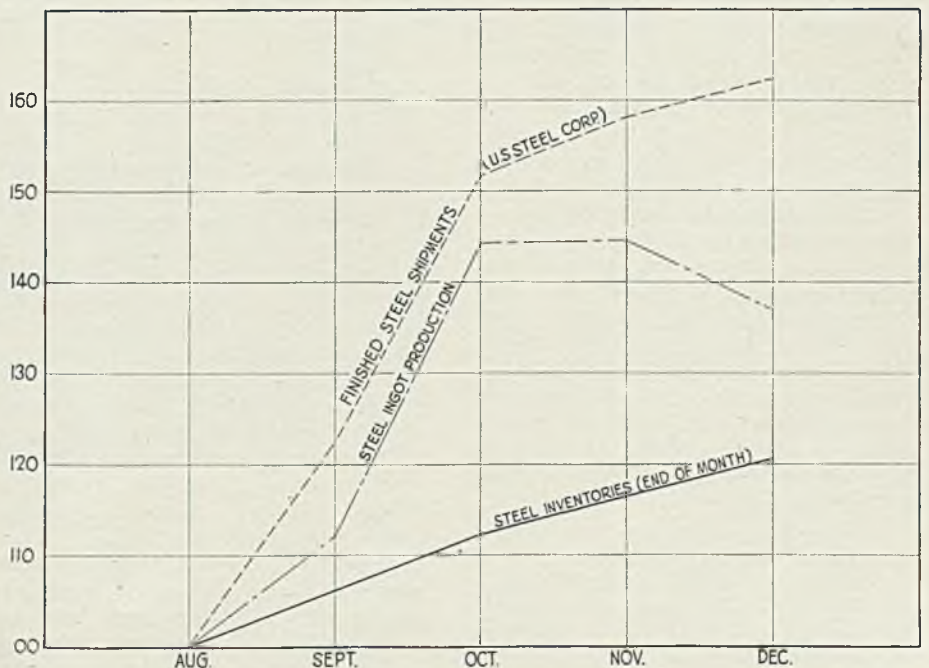
Indicative of sustained steel use during a period of heavy shipments and expanding inventories is the fact 77 per cent of the responding companies estimated material on hand Dec. 31 would last them 90 days or less. Two months ago 76 per cent of the replies indicated stocks of this duration.

The following table lists the percentage of total companies reporting stocks as expressed in number of months such inventories will last at the present and anticipated rate of consumption:

	Per cent
One month or less	14.3
One to two months	29.1
Two to three months	34.0
Three to four months	11.3
Four to six months	8.9
Over six months	2.4

It is obvious, of course, that what

Steel Output, Shipments Rise Faster Than Inventories



While consumers' steel inventories increased approximately 21.8 per cent from Sept. 1 to Dec. 31, production of steel ingots showed a monthly average gain of 34.5 per cent, and finished steel shipments, 48.6 per cent

is considered a normal inventory varies according to the type of consumer as well as with the rate of consumption. Likewise, presence of a three or four months' supply of steel on hand does not necessarily mean that subsequent buying will be deferred three or four months. In many cases manufacturers attempt to maintain a constant ratio of inventory to amount of business being done.

As one company, in reporting a 35 per cent increase in stocks, puts it: "We normally have sales 12 times our total inventory. Based on present operations our inventory is normal." Another firm remarks: "It is necessary to keep steel coming in all the time in order for us to operate, as \$30,000 is the minimum amount of stock we can carry and still operate."

Special circumstances, such as the crowded condition of producers' order books last fall, with accompanying delays in mill deliveries, or an unexpected business pickup, may cause extraordinary variations in consumer inventories. Some buyers report their stocks still lower than expected, because of delays in shipment of steel on order, while others indicate their supplies are somewhat excessive. The latter condition largely is the result of protective measures that were taken late in 1939, when deliveries were backing up rapidly.

Inventories May Be Curtailed

Possibility that inventories will be curtailed in coming weeks is seen from comments by several large steel users that stocks are greater than normal because of the recent situation in mill shipments. One company, with an inventory estimated good for 120 days, states: "We will continue to buy but will let the inventory reduce probably 20 per cent by May 31."

In similar vein is the remark by a large user having a stock of four to five months. It says: "We do not contemplate increasing inventory except as orders going through our shops increase. Ordinarily we carry approximately three months' inventory, but at the present time this is larger, due to lengthened delivery from suppliers. Once this situation rectifies itself and gets back to normal we will gradually cut down on our inventories and go back to three months' supply."

With steel shipments steadily being shortened, buyers soon will be in a position to adjust purchases more closely to early needs. Meanwhile, orders may be expected to continue moderate, pending completion of previous commitments and a reduction in those inventories now regarded as above normal.

District Steel Rates

	Percentage of Ingot Capacity Engaged in Leading Districts		Same week	
	Week ended Jan. 20	Change	1939	1938
Pittsburgh	82	- 6	42	26
Chicago	92	+ 1.5	48	27.5
Eastern Pa.	80	- 2	34	31
Youngstown	74	- 6	52	28
Wheeling	96	+ 7	64	51
Cleveland	82.5	- 2.5	59	26
Buffalo	70	- 2	44	23
Birmingham	94	None	77	60
New England	83	None	70	20
Cincinnati	74.5	None	55	32
St. Louis	83	+ 8	40	21
Detroit	91	- 2	88	52
Average	84.5	- 1.5	51.5	30.5

PRODUCTION

RATE DROPS TO 84½; SIX DISTRICTS REDUCED

■ STEELWORKS operations last week declined 1½ points to 84½ per cent. Three districts made moderate gains, six were lower and three were unchanged. Last year the rate was 51½ per cent; two years ago 30½ per cent.

Youngstown, O.—Off 6 points to 74 per cent. Fifty-eight open hearths and three bessemer were active. Carnegie-Illinois Steel Corp. added an open hearth but reduced its bessemer output slightly. Republic Steel Corp. banked a blast furnace at Youngstown, Wednesday. Indications are the rate will drop to 71 per cent this week.

Chicago—Up 1½ points to 92 per cent, the pre-holiday rate. Four steelworks increased output, one reaching the highest point in years. Youngstown Sheet & Tube Co. lighted its new 140-ton open hearth.

Cleveland—Down 2½ points to 82½ per cent, one open hearth being taken off for repairs.

Cincinnati—Unchanged at 74½ per cent. One producer is preparing to add another open hearth.

St. Louis—Increased 8 points to 83 per cent. Three furnaces recently repaired have been relighted.

Birmingham, Ala.—Steady at 94 per cent, with 22 open hearths in production.

Central eastern seaboard—Reduced 2 points to 80 per cent.

Pittsburgh—Off 6 points to 82 per cent, several producers curtailing output slightly. Schedule for this week is on the same basis.

Wheeling—Gained 7 points to 93 per cent as an idle plant went into production. The same rate is scheduled for this week.

New England—Held at 83 per cent for third week.

Detroit—Lost 2 points to 91 per cent. Producers' backlogs are esti-

mated sufficient for a month at this rate.

Buffalo—Dropped 2 points to 70 per cent as Republic Steel Corp. took off an open hearth for repairs.

Sub-Zero Weather Cuts Industrial Operations

■ Sub-zero weather late last week disrupted industrial activity in a number of centers. Outdoor work of various types was suspended or sharply curtailed, including scrap yard operations.

At Cleveland and nearby cities, domestic gas consumption was double the normal load, forcing curtailment in supplies of industrial fuel furnished by East Ohio Gas Co., subsidiary of Standard Oil Co. of New Jersey. Among plants affected by the shortage, which resulted in reduced operations and some layoffs of workers, were American Steel & Wire Co., Otis Steel Co., Republic Steel Corp., Timken Roller Bearing Co. and Youngstown Sheet & Tube Co.

Legalized Race Betting Stimulates Steel Demand

■ Horse racing is mildly stimulating structural and reinforcing steel demand in New York and New Jersey. Both states legalized pari-mutuel betting at the tracks at the last election and this is expected to result in more grandstands, club houses and parking areas.

Pending enabling legislation for New York may give the green light to proposed additions to facilities. Several racing associations near New York are going ahead with construction without waiting for the enabling act, which confronts bitter opposition at Albany.

New Jersey has not had legalized horse racing for many years, and if pending enabling legislation is passed in that state, several tracks and grandstands will be erected.

Foundry Equipment Shipments Up, Sales Off

■ Foundry equipment orders in December, reported by Foundry Equipment Manufacturers' association, Cleveland, were less than in November, but shipments were heavier, thus reducing backlogs. All indexes were higher than in December, 1938. Comparison follow, indexes based on 1922-24.

	Dec. 1939	Nov. 1939	Dec. 1938
Net orders	164.8	203.1	141.5
Shipments	200.1	170.1	102.8
Unfilled orders	222.4	257.8	126.0
3 mos. av. gross orders	196.5	202.9	106.5

* Revised.

More Witnesses Disclose Labor Board's Hostility to Industry

WASHINGTON

■ INCREASING sentiment for reforming the national labor relations board and the Wagner act appeared in several places last week.

A survey by the American Institute of Public Opinion (Gallup poll) revealed 71 per cent of the people having an opinion on the Wagner act favored either outright repeal or revision. Poll was taken after the Smith committee started its investigation of the act's administration last December. The majority favoring repeal or revision is the largest shown in the five Gallup polls taken since May, 1938, although every poll has revealed a majority in favor of change.

A showdown on the Walter-Logan bill to curb federal administrative agencies in the exercise of quasi-judicial powers became a distinct probability. The house judiciary committee is expected to ask the rules committee to give the measure legislative right-of-way this week. Bill would limit the labor

board, securities and exchange commission and some other agencies.

Special house committee investigating the Wagner act's administration uncovered more shenanigans by labor board's employes, which, receiving wide publicity, spurred public insistence for a housecleaning in the board and the act.

Efforts of a labor board examiner to drop a hot potato in the form of the board's case against the American Rolling Mill Co., Middletown, O., were described before the committee. Philip G. Phillips, board's regional director at Cincinnati, (who threatened to "get" employes: STEEL, Dec. 25, p. 13), accused the trial examiner in a letter of "almost getting on his knees" to company attorneys in his endeavor to settle the case.

An Armco official, commenting last week, said the board was "trying to get out of an embarrassing situation."

"The company was approached

on numerous occasions by representatives of the board who seemed very anxious to settle the case," C. H. Murray, the company's personal relations director, stated. "However, at no time did they offer a settlement which could be accepted. We refused to compromise.

"To have accepted would have been equivalent to admitting we were guilty of violating the labor relations act when we were not. The board knew it had a poor case against Armco and was trying to get out of an embarrassing situation."

The Armco case still is pending before the trial examiner, who has not yet filed a report on the 25,000 pages of testimony. Hearings ended last July.

Settlement attempts bogging down, the frustrated Mr. Phillips wrote his superiors: "I see no hope in doing anything but going and making 'little steel' realize that we are just a little bit bigger than they are."

Other committee sessions brought out more evidence of the type revealed in earlier weeks, of pro-CIO bias, incompetence, protection of communist board employes and witnesses, hostile and antagonistic attitude toward employes.

The committee announced it will give Charles Fahy, board's general counsel, an opportunity to call members of the board and other personnel to present the board's side at hearings beginning Jan. 29. It is expected J. Warren Madden, board chairman, and Edwin S. Smith, a member, will be among witnesses called.

Meanwhile, the United States chamber of commerce is polling its members to determine views on four supplementary changes in the act. Proposed changes, as recommended by the chamber's committee on manufacture: Elimination of the majority rule provision; withdrawal of protection of the act from employes so long as they continue in a position of violating the terms of agreements; extension of the act to cover unfair labor practices on the part of employes.

FOUNDRY EMPLOYES HIT NLRB, ASK CITY'S INTERVENTION

Disturbed by the long delay of the national labor relations board in determining whether the Congress of Industrial Organizations or the American Federation of Labor has jurisdiction in their case, employes of the Muncie Foundry Co., Muncie, Ind., have asked city officials to use influence to obtain an early ruling. The employes' resolution points out they have been unemployed since Oct. 9, through no fault of their own, while the jurisdictional dispute has gone unsettled. Muncie Foundry is a unit of Borg-Warner Corp., Chicago.

Spinning Cable for 6303-Foot Tacoma Bridge



■ Tacoma, Wash., officials last week watched the wheel as it took the first steel strand across the toll bridge that will connect Tacoma with the Olympia peninsula and Puget Sound navy yard. Spinning apparatus that was in service on the Golden Gate and Bay bridges in San Francisco is being used. The bridge when completed will be 6303 feet long; requiring 11,440 tons of struc-

tural steel, 2000 tons of reinforcing steel; 5000 tons of cables, casting and other specialties. Structural steel, from Bethlehem Steel Co., cables, John A. Roebling's Sons Co. General contracts: General Construction Co., Seattle; Pacific Bridge Co., San Francisco, and Columbia Construction Co., Bonneville, Oreg., joint bidders at \$5,949,730. *Wide World photo.*

Canada Marks \$500,000,000 for War; Floats \$200,000,000 Loan

TORONTO, ONT.

■ CONTINUED, upswing in Canadian industrial activity is indicated by C. D. Howe, minister of transport, who stated last week that \$500,000,000 of the national income has been set apart for war use. Of this total \$150,000,000 was employed in repatriation of securities to finance British war purchases in Canada while the remainder is to back Canada's war effort this year.

Announcement has been made in Ottawa that part of the \$200,000,000 war loan now before the public, more than half of which was subscribed the first day of offering, also will be used for direct war supply purchases and army requirements.

While awarding of contracts by the war supply board holds at a rate of \$1,500,000 per week, it is stated that this will be increased to about \$4,000,000 weekly or more when placing of munitions contracts start for the British government.

During the past week orders placed had a total value of \$1,482,065, of which \$884,339 was for aircraft supplies. Aircraft orders went to Trans-Canada Aid Lines Ltd., Montreal, for four Lockheed Electra 10A planes, \$180,800; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., \$399,256; Parmenter & Bulloch Co. Ltd., Gananoque, Ont., \$38,075, and Noorduyn Aviation Ltd., Montreal, \$137,534.

Britain To Take Metals

Marine equipment contracts went to Halifax Shipyards Ltd., Halifax, N. S., \$19,344; and to Frank Leslie Anderson, Dingby, N. S., \$7700. Metal purchases were as follows: British Metal Corp. (Canada) Ltd., Montreal, \$38,719 and Consolidated Mining & Smelting Co. Ltd., Montreal, \$38,719.

Ottawa officials say Britain is relying on Canada for the supply of base metals for war needs. It is reported officially Britain has purchased Canada's entire exportable surplus of aluminum. The contract was negotiated with representatives of Aluminum Company of Canada Ltd., Montreal, and calls for delivery to Britain of 90,000 short tons of aluminum annually, the company's entire exportable surplus and about 90 per cent of its yearly production.

Soon after the outbreak of the European war the British government contracted with Canadian producers of copper, lead and zinc, for their output in excess of domestic require-

ments. Under these contracts Canadian mining companies will supply 420,000,000 pounds of electrolytic copper within a year, this being 80 per cent of the total Canadian production.

Noranda Mines Ltd., Noranda, Que., made the first shipment of pyrite to the United States under contract with an American acid manufacturing company on Jan. 1. Since then the company has been making deliveries at the rate of 100 tons per day.

Canadian Car & Foundry Co.,

Current Events In Chicago . . .

By J. F. POWELL, Chicago Editor, STEEL

■ REPLACEMENT of old skyscrapers by one and two-story "taxpayers"—structures designed to pay taxes on desirable properties until erection of new skyscrapers is warranted—continues in Chicago loop district.

Latest building marked for razing is the 15-story Great Northern hotel, built in 1891 at a cost of more than \$1,000,000. Demolition will begin within 45 days, and a new one-story taxpayer will be erected on the site.

The new building will include perhaps the most extensive use of stainless steel yet noted in modern construction. Three exterior sides will be entirely clad with stainless, covering an area of 5000 square feet, in addition to stainless steel trim on a large, modernistic "fin," jutting up on one side of the building and to be used for advertising. It is expected to accelerate the trend toward use of stainless steel for exteriors.

Decision to raze the hotel was hastened by construction of the loop subway. About \$150,000 would have been required to reinforce its foundations. Cost of the taxpayer is estimated at \$175,000.

Trend toward greater use of stainless steel in industrial machinery construction is seen in completion by Goodman Mfg. Co., 4834 South Halsted street, Chicago, of a new continuous pickling machine for use in latest-type brass mills. Cited as a decided improvement over similar machines built a year ago, the pickler requires 3 to 4 tons of stainless steel in its construction.

One-hundred forty locomotives, most of them built at the turn of the century, have been sold by the

Montreal, for the year ended Sept. 30, last reports net operating loss of \$504,815 against net profit of \$1,177,314 in the preceding year. Operating loss was \$50,798 against profit of \$1,967,694 in the previous year.

The president attributed the poor showing to the scarcity of new car orders. Since the end of the 1939 fiscal year, however, Canada Car & Foundry, has received large rolling stock orders for the Canadian National and Canadian Pacific railroads, in excess of \$2,000,000, which will keep the plant at capacity production until early in June. The president states that deliveries on the British contract for first line aircraft will be made on schedule and that additional contracts for the Fort William plant are under negotiation.

North Western railroad to a leading scrap iron and steel firm here and are being dismantled in the proviso railroad yards. The road, which dismantles about 3000 cars annually, estimates cost of dismantling a locomotive and sorting the scrap at \$4 per ton, and usually prefers to sell equipment on track and let the buyer do the tearing down.

Practically 100 per cent of the material in a locomotive is salvaged as scrap iron and steel in a wide variety of grades. Locomotives now being scrapped originally cost about \$40,000 each. Average value as scrap, before dismantling and sorting, is about \$1400. Average weight of iron and steel in each is 100 tons.

Railroad states scrapping of these obsolete engines is no indication of early intentions to buy a like amount of new locomotives. Most of the old ones had been retired years ago and had been rusting on tracks since. Their retirement, one railroad official stated, was caused in part by competition from truck lines.

Honor 50-Year Companies

■ Indianapolis chamber of commerce will give a dinner Jan. 26 for officials of companies which have been in operation in that city 50 years or more including National Malleable & Steel Castings Co., J. D. Adams Mfg. Co., E. C. Atkins & Co., W. J. Holiday & Co., Indianapolis Castings Co., Indianapolis Stove Co., and Van Camp Hardware & Iron Co. The companies will be presented with scrolls commemorating their services to the city. At the same time the chamber's own golden anniversaries will be celebrated.

How U. S. Steel Adjusts Pensions To Federal Security Benefits

■ UNITED STATES Steel Corp. has revised its 29-year-old pension plan to correlate it with provisions of the social security act and the railroad retirement acts.

Provisions of the corporation's plan will continue to be applied in the case of employes retiring after 1939 with respect to service up to Jan. 1, 1940, but benefits will be reduced by the amount received under federal plans.

Provisions are made for eligible women employes and for eligible employes retiring after Dec. 31, 1939, on account of permanent incapacity or discontinuance of operations, who are not eligible for public pensions until they become eligible for public pensions.

Long recognized has been the fact that company pension plans would have to be adjusted to federal plans when the latter became effective. The amended social security plan commences payments to eligible workers of retirement age this month. Railroad retirement benefits have been in effect since March, 1936.

Many other industrial and business organizations have adjusted or are adjusting pension plans to the federal system.

In 1935, United States Steel amended its pension rules to provide that payments under its plan be reduced by the amounts of public pensions, when and if payments

under federal or state laws started. It was then recognized that as state or federal plans came into operation, they would take the place of the corporation's plan to the extent they provided retirement incomes.

Both the social security act and the railroad retirement acts have schedules of old-age retirement benefits which, under varying conditions, give consideration for service before Jan. 1, 1940, as well as service thereafter.

Payments To Be Reduced

For employment after Dec. 31, 1939, the social security's act's old-age pension provisions provide benefit schedules on earnings within \$3000 a year maximum taxable wage limit; in the railroad retirement act the maximum taxable salary is \$3600.

For service before Jan. 1, 1940, the United States Steel plan will continue in effect, but with payments reduced by the amount of federal benefit payments. The corporation's plan also will continue to make provision with respect to special retirement conditions and to certain groups of employes retiring after Dec. 31, 1939, until the persons affected qualify for federal or state old-age retirement benefits.

A new feature of corporation's plan will be a provision for old-

age retirement annuities with respect to employe earnings which are in excess of the maximum taxable limits covered by the federal laws. Such annuities will be provided by joint contribution of employer and participating employes. Participation will be voluntary.

All employes, regardless of earnings, will receive credit upon retirement under the corporation's pension plan for years of employment before Jan. 1 this year, provided their years of continuous employment total 25 or more, and that they otherwise are eligible for pension.

To illustrate how this will be done, the company's magazine, *US Steel News*, cites the following:

"An employe retiring at age 65 with average earnings of \$115 a month and with 33 years continuous service, 30 of which were before Jan. 1, 1940, and three of which were after Dec. 31, 1939, would have a pension credit of \$34.50 a month for the 30 years of service prior to Jan. 1, 1940. Upon retirement, such an employe would be entitled to a federal old-age retirement benefit of \$28.09 a month. Accordingly, the United States Steel pension payable would be the amount of the excess of the pension credit over the federal old-age benefit, or \$6.41.

Pension Totals \$48.55

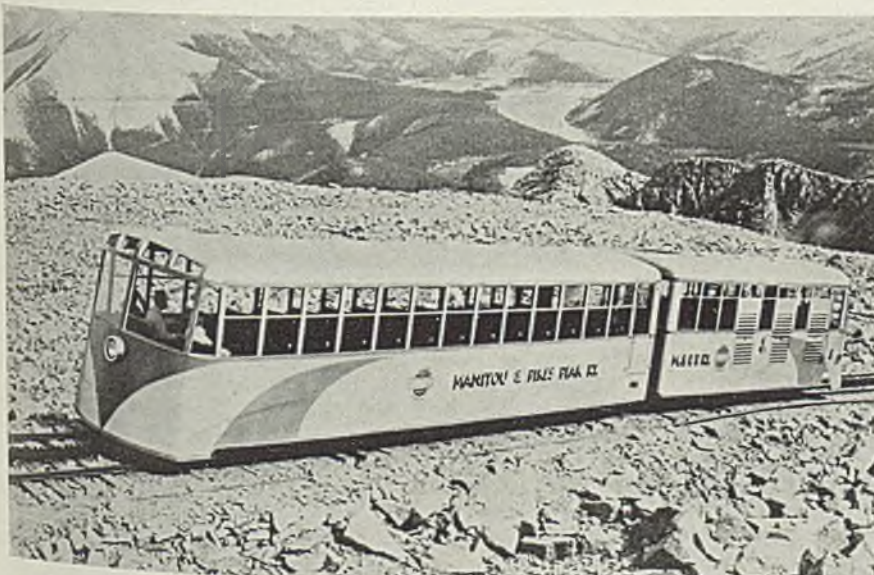
"If the employe's wife has also reached the age of 65, she too would be eligible to a federal old-age benefit of one-half \$28.09, or \$14.05, and so their joint federal benefit would equal \$42.14. This amount combined with the U. S. Steel pension payment of \$6.41 would thus provide a total retirement benefit of \$48.55.

"Broadly stated the revised United States Steel pension plan will be applied, in the case of employes retiring after Dec. 31, 1939, as follows:

"(a) Employes, who upon retirement qualify for a public pension, will be eligible to receive a steel pension equal to the amount of the excess, if any, of the steel pension, limited to creditable service accumulated prior to 1940, over the public pension.

"(b) Employes, who upon retirement do not qualify for a public pension, may be pensioned (1) on the basis of the social security act schedule (primary benefit at age 65) or, (2) on the basis of the steel pension plan with creditable service limited to years prior to 1940, whichever is greater, such steel pension to continue, so long as such retired employes continue to be eligible, and until they become eligible to public pension; thereafter, such em-
(Please turn to Page 67)

First Diesel-Electric, Rack-Rail Locomotive



■ A 20-ton diesel-electric, rack-rail locomotive, at right in illustration, was placed in service recently on the Manitou & Pike's Peak railroad, Colorado. Built by General Electric Co., it is reported to be the first of its type

Bonneville Dam Project Seeks Iron, Steel Plant for Oregon

WASHINGTON

■BONNEVILLE Dam Project has recommended to Secretary of Interior Harold L. Ickes the establishment of a small iron and steel plant with rolling mill in the Columbia river area in Oregon.

The report by the administration's Bonneville authorities said feasibility of such a plant was assured by the availability of low-cost power from the government's \$51,000,000 improvement and by the accessibility to essential raw materials.

Negotiations with several iron and steel companies regarding the building of a steelworks are reported underway. Aluminum Co. of America is said to have signed a 20-year contract for Bonneville power and proposes to build a plant in the district.

The report to Ickes followed by several weeks the suggestion by President Roosevelt that a steel industry should be established on the West Coast. Defense factors as well as power and western ore deposits were the basis for the President's suggestion.

Steelmaking capacity on the Pacific coast at present is approximately 835,000 tons annually. Practically all is controlled by the United States Steel Corp. and Bethlehem Steel Corp.

The report to Ickes stated:

"Establishment in the Columbia river area of a small iron and steel plant with a rolling mill to produce iron and finished steel products for the local market is believed to be feasible at this time, especially in view of the availability of low-cost power at such plants as Bonneville and Grand Coulee and ready availability also of the essential raw materials.

Defense Awards Are Factor

"Success of such a plant would be doubly assured, and the capacity could be increased, if the operation were tied into the national defense program and could depend upon contracts for steel for merchant marine and naval ship construction in this area, or for the manufacture of army and naval ordnance and munitions for Pacific coast defenses.

"Feasibility of a large operation integrated with pig iron plant, steelworks, rolling mill and castings plant is subject to various uncertain factors. Most of these uncertainties, however, would disappear, if a financially strong company, interested in establishing a plant in this area, would consider installa-

tion of equipment for one or more of the heavy tonnage products required by Pacific markets, and now substantially supplied by rail or water shipments from eastern plants.

"With a tin plate market of several hundred thousand tons, only about 10 per cent of which is supplied by a western steel mill, careful consideration should be given to the possibility of a continuous strip mill for this product. However, it is recognized that availability of this market would be a matter of business arrangements with can manufacturers, and would depend upon a comparison of the costs of a western tin plate mill with the present cost of delivering eastern tin plate to the western market.

Raw Materials Available

"It is concluded from a consideration of the problem that steel interests, adequately financed, could establish successfully a large integrated iron and steel works and tin plate mill in the Columbia river area, if a steady outlet for the tin plate could be assured; and further provided that the company could gain control of the most suitable and lowest cost iron ore, coking coal and limestone deposits available to the area."

Prior to stating these conclusions, the Bonneville Project summarized its study of materials and markets concerned in such production as follows:

"All raw materials required for iron and steel production are available in or to the Northwest, and can be assembled at some point along the Columbia river or along the federal Columbia river power transmission network now under construction. If a plant were to be located at a tidewater site, many more western sources of iron ore, coal and limestone would be available by water shipment, and such location and means of transportation would automatically widen the market outlets for the products.

"The ores available are principally magnetite, but a few hematite and limonite deposits are known. Some magnetite deposits are known to have substantial tonnages, although quite generally the extent is as yet unknown. Other deposits in which the tonnages reported are small or unknown may be minor occurrences, or may have possibilities for development of a much larger reserve.

"The coals are located within

easy transportation distance to various points on the Columbia river. A large tonnage on Vancouver island and Crowsnest, B. C., and in Pierce county, Washington, is of coking grade, reported to be suitable for metallurgical coke. However, the principal part of the coal reserves of the Northwest are of sub-bituminous and noncoking bituminous rank unsuited for blast furnace operation.

"Electric furnace methods of ore reduction do not require the high-quality coke demanded by the blast furnace method.

"Several high-grade limestone deposits are accessible to the Columbia river area. These are in northeast Oregon, northeast Washington, northwest Washington and southwest Oregon. The tonnage available is adequate for any industrial purpose.

"Scrap iron in the past has made up nearly 90 per cent of the open-hearth charge in Pacific coast steel mills, but with increasing production of steel in this region, the scrap supply will be inadequate to maintain this proportion. Thus, if Pacific coast iron and steel capacity increases to any appreciable extent, more pig iron will be required to maintain it. This is particularly true if new capacity includes the production of cast-iron pipe, which requires a high ratio of new iron to scrap iron in its manufacture.

"Refractories of various types are available to the Pacific Northwest from local deposits.

Tin Plate Big Market

"The Pacific coast markets for pig iron are chiefly in the manufacture of cast iron pipe and other foundry products, only a relatively small amount going into steel making. New pig iron capacity would be needed if additional cast iron pipe production or new steelmaking capacity were contemplated. The Provo, Utah, blast furnace supplies the present requirements.

"The commercial steel market on the Pacific coast is principally in steel bar and structurals, steel pipe and tubing, sheet and tin plate, and miscellaneous rolled, drawn, forged and cast products. Steel pipe and tubing and tin plate are heavy tonnage products for the production of which western steel mill capacity is totally inadequate.

"The tin plate market is chiefly in the plants of the American Can Co., and the Continental Can Co., who supply the cans for Pacific coast, Alaska and Hawaiian canning industries. The market is stable and could be advantageously supplied from a western steel mill, although it is now supplied by overland rail and intercoastal water shipments of eastern tin plate mills."

MEN of INDUSTRY

■ J. G. CARRUTHERS, formerly assistant general manager of western sales, Bethlehem Steel Co., with headquarters in Cleveland, has been appointed manager of sales, tin plate division, Republic Steel Corp., Cleveland. He entered the steel industry as assistant manager of sales for Cambria Steel Co. at Cincinnati. In 1906 he joined the former Carnegie Steel Co., becoming manager of sales in Cincinnati, and later being transferred to Chicago. In 1922 he became general manager of sales, and a director, Otis Steel Co., and subsequently was made vice president. He joined Bethlehem in 1935 as special representative.



J. G. Carruthers

James C. Vignos has been appointed director of research, Ohio Ferro-Alloys Corp., Canton, O.

G. J. Keady, general sales manager, Sharples Corp., Philadelphia, has been elected executive vice president.

Thomas J. Quinn has been elected president, W. F. Potts, Son & Co. Inc., Philadelphia. He succeeds the late E. M. Balderston.

Harry H. Swan has been named district sales manager of the Houston, Tex., office recently established by Texoma Supply Co., Tulsa, Okla.

R. Lehr, associated with Quincy Compressor Co., Quincy, Ill., since 1933, has been appointed sales manager, succeeding J. T. Conder, resigned.

Fred E. Haker has been appointed general manager of purchases, Allis-Chalmers Mfg. Co., Milwaukee. He joined the company in 1900 as a stenographer, at the age of 18. He



Fred E. Haker

and two other men then composed the purchasing department; today it employs more than 100 people, spends about \$45,000,000 a year.

William S. Wood and C. E. Macklem have been elected vice presidents, Beloit Iron Works, Beloit, Wis. They have been with the company many years.

Edgar W. Trecker, heretofore sales manager, Kearney & Trecker Corp., Milwaukee, has been named general works manager. He succeeds the late George E. Gustafson.

W. A. Parrish, formerly engine designer, Caterpillar Tractor Co., Peoria, Ill., has joined the engineering department of Cummins Engine Co., Columbus, Ind.

N. E. MacEwan, General Motors building, Detroit, has been named sales representative in that area for Stolper Steel Products Corp., Milwaukee.

Dr. A. Lloyd Taylor, the past six years director of the department of chemistry, Pease Laboratories, New York, has resigned that post to join the technical staff of Oakite Products Inc., New York.

J. Homer Platten has been elected a vice president, American Car & Foundry Co., New York. He will continue as comptroller, but will relinquish the office of executive assistant to the president.

Charles M. Schwartz, physical chemist, recently joined the staff of Battelle Memorial institute, Columbus, O., and will investigate problems in surface chemistry. He

was formerly on the technical staff of King Laboratories Inc., Syracuse, N. Y.

George W. Hoover has been appointed export sales manager, Duff-Norton Mfg. Co., Pittsburgh, with headquarters at 30 Church street, New York. He will direct sales in Latin America and the Far East.

Victor Brook, 433 Rockingham street, Rochester, N. Y., has been appointed exclusive representative for Van Keuren Co., Watertown, Boston, covering up-state New York from Jamestown to Schenectady.

W. W. Williams, general manager, Babcock & Wilcox Tube Co., Beaver Falls, Pa., will resign March 1 to go into business on the Pacific coast. He has been with Babcock & Wilcox since 1929, first as sales counsellor and then as general sales manager and general manager.

D. C. Peterson, the past five years associated with Continental Can Co. Inc., New York, has been appointed plant manager in charge of all manufacturing operations, Buda Co., Harvey, Ill. He succeeds E. C. Conant, who recently resigned as vice president in charge of manufacturing.

Paul A. Blackwell, since 1922 chief engineer, Virginia Bridge Co., Roanoke, Va., will retire Feb. 1. C. W. Ogden, assistant chief engineer since 1922, will succeed Mr. Blackwell as chief engineer, and W. N. Woodbury will become assistant chief engineer.

R. C. Norberg, vice president and general manager, Electric Storage



R. C. Norberg

Battery Co., Philadelphia, has been elected president. He succeeds John R. Williams, retired. Frank T. Kalas, general sales manager, has been elected third vice president.

W. D. Haylon, publicity representative for the Pittsfield, Mass., works of General Electric Co., has been named advertising manager of the company's plastics department. He will remain in Pittsfield where the department is located. Mr. Haylon replaces N. S. Stoddard, resigned.

Howard R. Hafferkamp has been named supervisor of purchases, Bendix-Westinghouse Automotive Air Brake Co., Pittsburgh. He will make his headquarters at the company's manufacturing division at Wilmerding, Pa. He formerly served in a purchasing capacity with Steel & Tube Co. of America, Yellow Truck & Coach Mfg. Co., Pontiac, Mich., Fairbanks Morse & Co., Chicago and Independent Pneumatic Tool Co., Chicago.

H. R. Norgren has been made assistant general sales manager in charge of special accounts, Detroit Rex Products Co., Detroit. D. E. Williard has been named assistant general sales manager in charge of regions and branch offices, and R. A. O'Reilly, manager of dry cleaning division.

R. K. Haughton, formerly resident manager, Birmingham, Ala., plant of United States Pipe & Foundry Co., Burlington, N. J., has been transferred to Burlington as general works manager. J. S. Bridges, heretofore superintendent, has been appointed acting resident manager at Birmingham, replacing Mr. Haughton.

Sidney D. Williams has been appointed vice president and in charge of sales of Copperweld Steel Co.'s new steel division at Warren, O. Following graduation from Lehigh university in 1913 he worked in various departments at Homestead steelworks of the former Carnegie Steel Co., subsequently serving as superintendent, open hearth department, Central Iron & Steel Co., Harrisburg, Pa.; superintendent of open hearth department and chief metallurgist, Pittsburgh Crucible Steel Co., Midland, Pa. From 1926 to the present, he has been, respectively, metallurgical sales engineer, assistant director of sales, manager of tube sales and director of sales for Timken Steel & Tube division, Timken Roller Bearing Co., Canton, O.

D. P. Davies, vice president in charge of tractor engineering, J. I. Case Co., Racine, Wis., has been made vice president and consulting



Howard R. Hafferkamp

engineer, with supervision of the patent department and testing of all new units. Detailed engineering work at Racine has been assigned to the tractor works and the main works, respectively, which

places it under direction of W. G. Thompson, tractor works manager. H. F. Griswold has been transferred from Burlington, Iowa, to Racine as main works manager. J. L. Ferguson, main works superintendent, has been transferred to Burlington as works manager and supervisor of the engineering department there.

George E. Halpin, formerly with Crystal Refrigerating Co., Fremont, Nebr., has become associated with Richard De Cou Co., Philadelphia, exporter of iron and steel products. Richard De Cou Co. recently moved from Eleventh and Hamilton streets, where it had been located approximately 70 years, to 1524 Chestnut street.

George W. Plaisted, vice president in charge of West coast operations the past seven years, the Austin Co., Cleveland, engineers and builders, has been named vice president and general sales manager, with headquarters in Cleveland. A. E.

Automotive Engineers Announce New Officers

Arthur Nutt, vice president for engineering, Wright Aeronautical Corp., Paterson, N. J., was announced new president of the Society of Automotive Engineers at the annual meeting of the group in Detroit, Jan. 15-19. He succeeds W. J. Davidson, General Motors Corp., Detroit, who continues as a member of the SAE Council, as does H. T. Woolson, executive engineer, Chrysler Corp., Detroit, who was president of the society in 1937. Mr. Nutt is an authority on air-

division of Bendix Aviation Corp., South Bend, Ind., who has served seven consecutive terms as treasurer of the society was re-elected.

Murray Fahnestock, editor, *Ford Field*, Pittsburgh; James B. Fisher, vice president Waukesha Motor Co., Waukesha, Wis.; and Austin M. Wolf, automotive consultant, New York, have been elected to the SAE Council for two years.

Vice presidents heading the society's ten professional activities for the coming year are as follows: Aircraft—S. J. Zand, consulting engineer, Sperry Gyroscope Co. Inc., Brooklyn, N. Y.; aircraft engines—N. N. Tilley, Lycoming division of Aviation Mfg. Corp., Williamsport, Pa.; diesel engines—C. G. A. Rosen, assistant chief engineer in charge of diesel research, Caterpillar Tractor Co., Peoria, Ill.; fuels and lubricants—Neil MacColl, research engineer of the Texas Co., Beacon, N. Y.; passenger cars—J. C. Zeder, chief engineer, Chrysler Corp., Detroit; passenger car bodies—John Oswald, Olds Motor Works division, General Motors Corp., Lansing, Mich.; production—E. R. Smith, vice president and general manager, Seneca Falls Machine Co., Seneca Falls, N. Y.; tractor and industrial power equipment—J. M. Davies, research engineer, Caterpillar Tractor Co., Peoria, Ill.; transportation and maintenance—G. W. Laurie, manager, automotive transportation, Atlantic Refining Co., Philadelphia; truck, bus and rail car—B. Frank Jones, chief engineer, truck division, White Motor Co., Cleveland.



Arthur Nutt

craft engines, both air and liquid cooled, and during his 23 years' service with Curtiss-Wright and its predecessors, has been active in developing some of the world's best known aircraft engines.

David Becroft, Bendix Products

Phelps, associated with the company since 1919, has been appointed general purchasing agent.

W. J. Crowley, formerly with United States Steel Products Co. as branch manager for 16 years, has joined Otto Kafka Inc., New York, exporter of iron and steel, as general sales manager. R. M. Marshall, also with the United States Steel Products Co. a number of years, has been made assistant to Mr. Crowley, in charge of the Asiatic and African division. Charles W. Townsley, previously assistant advertising director, Sears, Roebuck & Co., will serve as publicity and advertising manager; David Reid, formerly with Steel Rolling Co., Brooklyn, N. Y., has been placed in charge of the order and traffic department; R. R. Macaya, in charge of Latin-American division, and E. F. Cassidy, office manager.

J. C. Argetsinger, vice president and general counsel, Youngstown Sheet Tube Co., Youngstown, O., has been elected president, Ohio



R. A. Cannon
Whose appointment as vice president in charge of sales, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., was reported in STEEL, Jan. 15, page 27

Manufacturers' association, succeeding Philip O. Geier, chairman and treasurer, Cincinnati Milling Machine Co., Cincinnati, who declined re-election. Vice presidents are: Mr. Geier; Charles R. Hook, president, American Rolling Mill Co., Middletown, O.; R. C. Brower, Canton, O.; John E. Calvin, Lima, O.; and H. S. McLeod, Delphos, O.

Joseph G. Shryock has been elected president and chief engineer, Belmont Iron Works, Philadelphia. A graduate of Pennsylvania Military college, he joined Belmont in 1904; was appointed chief engineer in 1922, and later became vice president, chief engineer and sales manager. John A. Mitchell has been made vice president and general



David K. Miller
Who has been appointed manager, Baltimore branch, Crucible Steel Co. of America, as noted in STEEL, Jan. 15, page 29

manager. A graduate of University of Pennsylvania, he advanced to superintendent of the company's Eddystone plant, and then production manager of all plants.

Oscar C. Schmitt, vice president in charge of sales, Emerson Electric Mfg. Co., St. Louis, has been elected executive vice president. Raymond E. Otto, manager of motor sales, has been promoted to manager of sales, and William R. Fraser, district manager at New York, has been made manager of motor sales, with headquarters at St. Louis.

Died:

■ **GEORGE E. GUSTAFSON**, 39, general works manager, Kearney & Trecker Corp., Milwaukee, Jan. 8 in an automobile accident near Mukwonago, Wis. After serving an apprenticeship at Simonds Saw & Steel Co., Fitchburg, Mass., he was associated with Niles-Bement-Pond Co., Hartford, Conn., as service man, and later was a salesman for Manning, Maxwell & Moore Inc., Bridgeport, Conn. He joined Kearney & Trecker 13 years ago; was salesman in Philadelphia, and later in Chicago and Detroit, followed by positions as sales engineer, advertising manager and the past three years as works manager.

John W. Bos, 64, president, Bos-Hatten Inc., Buffalo, steel fabricating firm, in Buffalo, Jan. 15.

Jacob Peter Andrae, 66, vice president and director, Aluminum Industries Inc., Cincinnati, in that city Jan. 2.

George R. Simons, 56, assistant secretary-treasurer, Clark Controller

Co., Cleveland, in that city, Dec. 5. Until four years ago, Mr. Simons was associated with Electric Controller & Mfg. Co., Cleveland.

C. E. Beach, 77, chairman, Whitlock Coil Pipe Co., and president of Beach & Co., West Hartford, Conn., Jan. 12 in that city.

Frank Stanley Cole, 55, sales manager, Metal Door & Trim Co., Laporte, Ind., in Laporte recently.

Francis T. Bundy, 73, general superintendent, Muncie Gear Co., Muncie, Ind., in Houston, Tex., recently.

Mansell J. Phillips, 41, many years a machine designer in the plant of Ex-Cell-O Corp., Detroit, in that city Jan. 10.

George W. Niedringhaus Jr., formerly associated with Granite City Steel Co., Granite City, Ill., of which his brother, Hayward Niedringhaus is president, in St. Louis Jan. 8.

John J. H. Phillips, 55, the past four years associated with Richard De Cou Co., Philadelphia, exporter of iron and steel products, in that city Jan. 12.

George A. Gunn, well known in the steel casting industry on the Pacific coast, in San Francisco, Dec. 23. Prior to establishing his own offices as a steel casting and forging broker in 1936, he was associated with Union Iron Works, Columbia Steel Co., and Best Steel Casting Co., later consolidated with General Metals Corp.

Lewis J. Brown, 49, the past eight years president, International-Stacey Corp., Columbus, O., hoisting machine manufacturer, in that city, Jan. 11. In recent years he had been a director, Columbus Corp., Columbus, O., and chairman of the board, International Derrick & Equipment Co. of California, and Roots-Connersville Blower Co., Connersville, Ind.

Philip G. Lang Jr., 56, engineer of bridges, Baltimore & Ohio railroad, Baltimore, in that city, Dec. 9. A graduate of the University of Pennsylvania in 1905 in civil engineering, he was first employed as draftsman in the Pencoyd, Pa., works of American Bridge Co. He entered railroad service in 1906 as bridge designer with the Carolina, Clinchfield & Ohio railroad, Johnson City, Tenn. In 1907 he was affiliated with the Baltimore & Ohio and since 1921 had been engineer of bridges. He was president, American Welding society in 1937-38.

What's New at Pittsburgh . . .

By R. L. HARTFORD, Pittsburgh Editor, STEEL

■ FORTY Monongahela valley lodges of the Steelworkers Organizing committee met in Homestead, Pa., last week and proposed three amendments to the national labor relations act to eliminate two obstacles in the path of organized labor. First amendment would impose criminal penalties on any employer who violated the act. The second would forbid the government to award contracts to any such employer, and the third would prevent the labor board from changing any union established by the CIO.

Delegates represented plants of Pittsburgh Steel Co., Jones & Laughlin Steel Corp., United States Steel Corp. subsidiaries and many small companies. Philip Murray, SWOC chairman, announced the beginning of a new organization campaign in the valley to make every steelworker a dues-paying member. He stated SWOC will ask for a labor board election at Inland Steel Co., Chicago.

One result of the new campaign occurred at the Donora, Pa., plant of American Steel & Wire Co. About 200 pickets stopped workers reporting for night duty and demanded to see paid up membership buttons before allowing them to enter the plant.

Moltrup Steel Products Co., Beaver Falls, Pa., was ordered, by the NLRB, to recognize SWOC and to sign a contract with the union if so requested. Order also requires disestablishment of an independent union and reinstatement with back pay for five workers laid off allegedly for union activities in 1938.

Findings made by an examiner last year following a seven-week hearing here after a strike marked by violence and the death of one picket were upheld. Company probably will take the case to the Philadelphia circuit court.

May Complete Three Reservoirs

United States army engineers have asked for \$206,000,000 for next year's flood control work, \$15,000,000 of which is slated for this district. Administration proposes a total of \$70,000,000 for the nation. Last year the engineers asked \$195,000,000, the President \$110,000,000. Compromise finally reached by congress was about \$135,000,000.

It is believed Pittsburgh's share will be sufficient to complete three reservoirs already under way. Completion of the Tionesta, Crooked creek and Mahoning creek systems

will cost \$3,700,000. There is doubt three additional units still in the planning stage will be included. These are the Conemaugh, Loyalhanna and Youghiogeny, which would cost \$12,000,000 during the year, without being finished.

Although the three projects now nearing completion will aid in stemming flood damage here, the Monongahela watershed remains without control measures since all three are on the Allegheny-Ohio system, north of Pittsburgh. They will probably eliminate major disasters, such as the St. Patrick's day flood of 1936, but frequent minor floods on the Monongahela are a constant source of loss. It will require completion of the entire program to eliminate the hazard.

Record Barge-Building Year

Dravo Corp. reports its largest

barge-building year was 1939, topping the previous record, 1929, by more than 10,000 tons. During the year 136 hulls aggregating 65,904 gross tons slid off its ways at Neville Island, Pittsburgh and at Wilmington, Del. Trend toward larger units is evident in that 1929 produced 163 hulls with tonnage of only 55,230.

Expect 1200 at Engineers' Meeting

About 1200 members and guests of the Engineers Society of Western Pennsylvania will come to Pittsburgh, Feb. 5 for the society's meeting which will feature a speech by Philip D. Reed, newly elected chairman of the board of General Electric Co. Congressman Charles A. Eaton, New Jersey, will also speak. Avery C. Adams, vice president in charge of sales, United States Steel Corp. of Delaware, will be toastmaster, while Frank J. Chesterman, vice president, Bell Telephone Co. of Pennsylvania and newly elected president of the society will act as chairman.

New Building Houses San Francisco Bar Mill



■ This modern fireproof building has been erected to house the 9-inch bar mill at Bethlehem Steel Co.'s San Francisco plant, replacing a building of partly wooden construction.

The mill has facilities for efficient handling of output from seven mill stands, which at present are delivering products to cooling beds at a rate of 15,000 tons per year on single turn operation. Increased floor area, with addition of an electric crane, made possible an improved arrangement of finishing

equipment. A total of 248 different sections are rolled at this mill.

Bethlehem Steel also is adding new facilities to the Lehigh division of its plant in Bethlehem, Pa. Property on New and Second streets has been purchased, buildings on the site will be razed and a structure 200 x 450 feet will be erected for storage, inspection, and such operations as scarfing, grinding and polishing. Additional heat treating furnaces will be installed to double the plant's capacity of producing fully heat treated steels.

Bridgeport Tools and Equipment Exhibit Attracts National Interest

ALL SPACE for Industrial Tools and Equipment Exhibition, Bridgeport, Conn., March 6-9, has been sold, 128 companies and sales organizations having contracted for locations. Widespread interest in the event is due in large part to postponement of the National Machine Tool Show which was to have been held in Cleveland last October. Considerable equipment developed for the latter has not yet been displayed.

The exhibition will be in the State Armory and its limited facilities have forced restrictions on space allotments. R. T. Phipps, 271 Grovers avenue, Bridgeport, is exhibition manager.

The list of exhibitors follows:

-A-

Ace Drill Co., Detroit.
Ace Valve Co., New York.
Air Reduction Sales Co., Jersey City, N. J.
Allen Mfg. Co., Hartford, Conn.
Louis Allis Co., Milwaukee.
American Pulley Co., Philadelphia.
Ameco Metals Inc., Milwaukee.
Anderson & Sons Co., Springfield, Mass.
Apex Tool & Cutter Co. Inc., Shelton, Conn.
Armstrong-Blum Mfg. Co., New York.
Automatic Transportation Co., New York.

-B-

Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bantam Bearing Co., South Bend, Ind.
Barrett-Cravens Co., Chicago.
John Bath & Co., Worcester, Mass.
Bauseh & Lomb Optical Co., Rochester, N. Y.
Bay State Tap & Die Co., Mansfield, Mass.
Bergram Mechanical Engineering Co., New Britain, Conn.
Billings & Spencer Co., Hartford, Conn.
G. S. Blakeslee Co., Chicago.
Bridgeport Machines Inc., Bridgeport, Conn.
Bristol Co., Waterbury, Conn.
Brown & Sharpe Mfg. Co., Providence, R. I.
Buol Machine Co., New Britain, Conn.

-C-

Carboloy Co. Inc., Detroit.
Carborundum Co., Niagara Falls, N. Y.
Carpenter Steel Co., Hartford, Conn.
Chrysler Corp., Amplex Division, Detroit.
Circular Tool Co., Providence, R. I.
Cleveland Twist Drill Co., Cleveland.
Clover Mfg. Co., Norwalk, Conn.
Cuno Engineering Co., Meriden, Conn.

-D-

H. G. Davis Co., Bridgeport, Conn.
Dayton Rogers Mfg. Co., Minneapolis.
Dayton Rubber Mfg. Co., Dayton, O.
Delta File Works, Philadelphia.
Detroit Power Screwdriver Co., Detroit.
L. Heres De Wyk & Co., Ansonia, Conn.
Diamond Chain & Mfg. Co., Indianapolis.
Dodge Steel Co., Philadelphia.

-E-

Eastern Cutter Salvage Co., Newark, N. J.
Eclipse Counterbore Co., Detroit.
Egyptian Laquer Mfg. Co., New York.
Elbert Steel Co., New York.
Ellsworth Steel & Supply Co., Bridgeport, Conn.

-F-

Falk Corp., Milwaukee.
Federal Products Corp., Providence, R. I.

Ford Motor Co., Johansson Division, Dearborn, Mich.
Peter A. Frasse & Co. Inc., New York.

-G-

General Electric Co., New Haven, Conn.
L. H. Gilmer Co., Philadelphia.
Goddard & Goddard Co., Detroit.
Greenfield Tap & Die Co., Greenfield, Mass.
Grob Bros., Grafton, Wis.

-H-

William Halpern, New York.
Hartford Special Machinery Co., Hartford, Conn.
Hawley Hardware Co., Bridgeport, Conn.
Haynes Stellite Co., New York.
Hevl Duty Electric Co., Milwaukee.
A. F. Holden Co., New Haven, Conn.
Holo-Krome Screw Corp., Hartford, Conn.
Huot Mfg. Co., St. Paul.
Hunter & Havens Inc., Bridgeport, Conn.
William T. Hutchinson, Newark, N. J.

-I-

Industrial Supply Service, Bridgeport, Conn.
Ingersoll-Rand Co., Boston.
Iron Age, New York.

-K-

Korfund Co. Inc., Long Island City, N. Y.
Kron Scales Co., Bridgeport, Conn.

-L-

K. O. Lee & Sons, Aberdeen, S. D.
Lee Spring Co., Brooklyn, N. Y.
Leeds & Northrup Co., Philadelphia.
Lincoln Engineering Co., Boston.
Lindberg Engineering Co., Chicago.
Lindquist Hardware Co., Bridgeport, Conn.

-M-

McCallum Hatch Co., Buffalo.
McCrosky Tool Corp., Meadville, Pa.
McKenna Metals Co., Latrobe, Pa.
Marburg Bros., New York.
Marlew Mill & Shaper Co., Los Angeles.
James H. Matthews Co., New York.
C. S. Mersick, New Haven, Conn.
Metalizing Engineering Co., Long Island City, N. Y.
Monitor Control Corp., Baltimore.
Moore Special Tool Co., Bridgeport, Conn.
Morse Twist Drill Co., New Bedford, Mass.
Motor Improvements Inc., Newark, N. J.
O. A. Muenz, Newark, N. J.

-N-

Nassau Smelting & Refining Co., New York.
National Tool & Salvage Co., Detroit.
Nicholson File Co., Providence, R. I.
Norton Co., Worcester, Mass.

-O-

O. K. Tool Co. Inc., Shelton, Conn.
Oakite Products Inc., New York.
Owatonna Tool Co., Owatonna, Minn.

-P-

Parker-Kalon Corp., New York.
O. E. Pfannkuch Co., Bridgeport, Conn.
Progressive Tool Co., Detroit.

-Q-

Quigley Furnace Co., New York.

-R-

Ready Tool Co., Bridgeport, Conn.
Rhode Island Tool Co., Providence, R. I.
Stanley P. Rockwell Co., Hartford, Conn.

-S-

A. Schrader's Son Division, Scovill Mfg. Co., Brooklyn, N. Y.
Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Muskegon, Mich.
Simonds Saw & Steel Co., Boston.
R. B. Soderberg, Hartford, Conn.
Sparton Saw Works, Springfield, Mass.
Sprague Supplies Inc., Bridgeport, Conn.
Standard Gage Co., Poughkeepsie, N. Y.

Standard Mailing Machine Co., Everett, Mass.
Standard Pressed Steel Co., Jenkinstown, Pa.
Standard Tool Co., Cleveland.
Stewart Die Casting Corp., Bridgeport, Conn.
D. A. Stewart Oil Co., Chicago.
Sunnens Products Co., St. Louis.

-T-

John C. Tarbell, Springfield, Mass.
Tishken Products, Detroit.
Torrington Co., Torrington, Conn.
Triplex Machine Co., New York.

-U-

Union Twist Drill Co., Athol, Mass.

-V-

V & O Press Co. Inc., Hudson, N. Y.
Vanadium-Alloys Steel Co., Latrobe, Pa.

-W-

Weldon Tool Co., Cleveland.
Wellington-Kincaid Co., Bridgeport, Conn.
Wells Mfg. Co., Three Rivers, Mich.
Wetmore Reamer Co., Milwaukee.
Whitman & Barnes, Detroit.
Wilson Mechanical Instrument Co., New York.

COLLABORATE IN MEETING ON PROTECTIVE COATINGS

Franklin institute, Philadelphia, and the Bakelite Corp., New York, will collaborate in sponsoring a technical meeting on protective coatings at the institute, Jan. 30. Subject will be "New Developments in Protective Coatings for Industry." The meeting is one of a series to be held in conjunction with the Bakelite Plastics Travelcade, installed in the institute for six months.

Subjects and speakers are as follows: "Improved Heat-Hardenable Coatings and New Methods of Applying Them," by A. J. Weith, research laboratories, Bakelite Corp.; "Vinylite Resins for Can and Container Coatings," by A. K. Doolittle, director of surface coating research, Carbide & Carbon Chemicals Corp.; and "Synthetic Resins in Maintenance Paints," by Dr. R. J. Moore, varnish-resin division, Bakelite Corp.

CLEVELAND EMPLOYERS TO MARK TWENTIETH YEAR

Associated Industries of Cleveland will celebrate its twentieth anniversary at its annual luncheon-business meeting at Hotel Carter, Cleveland, Jan. 24. Principal feature of the meeting will be an address, "The American Way in Labor Relations," by William Frew Long, general manager of the organization.

STEEL FOUNDRIES MEETING IN CHICAGO IN FEBRUARY

Annual meeting of the Steel Founders' society of America will be held at Edgewater Beach hotel, Chicago, Feb. 14-15. Scheduled speakers include W. J. Cameron, Ford Motor Co., Dearborn, Mich.; John W. Hill, American Iron and Steel institute, New York, on public relations; C. S. Ching, United States Rubber Co., New York, on employee relations; and A. L. Kress, National Metal Trades association, Chicago, on job evaluation.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON
■ TRADE agreements extension program of the administration is attracting considerable attention on Capitol Hill. Hearings on this subject continued last week before the house ways and means committee and the end is not yet in sight as proponents only have been heard. Opponents to the bill will be given an equal opportunity to testify.

General feeling seems to be the present trade agreements act will be extended, without change, for a 3-year period. Passage in the house is a foregone conclusion, but there is belief the way will not be as easy in the senate.

One interesting sidelight on the situation last week was that the business advisory council of the department of commerce unanimously agreed to support extension without change. This despite the fact it includes some of the largest business executives in the country, of whom practically as many are Republicans as Democrats.

"Trade Agreement Beneficial"

The council made public its report on this subject, a procedure followed but once since the council was organized under the Hoover regime. Report was presented to the ways and means committee by Undersecretary of Commerce Noble.

In the report council states the unconditional most-favored nation principle, "introduced into our commercial treaty structure by Charles Evans Hughes when secretary of state has become under Cordell Hull an active instrument for the establishment of equality of commercial treatment in world commerce."

Henry F. Grady, assistant secretary of state, was one of those who declared himself, last week before the house committee, in favor of extending the program "as is."

He told the committee that "the purpose of the trade agreements act

is to contribute to national economic welfare by re-establishing conditions favorable to a sound and profitable expansion of our foreign trade. It is to be emphasized that the objective is an increase in economic activity to the common benefit of all concerned."

Foreign trade of the United States, said Mr. Grady, "is a vast and intricate business, closely interwoven into the whole web of our entire national economic activity." He called attention to the fact that in 1938, as in 1929, about one-half our exports consisted of fully manufactured products "representing a fair cross-section of American industry. This demonstrates that a great many of our industries, despite high wage levels and shorter working hours, are able to compete successfully in world markets where they do not have protection of the American tariff."

Undersecretary of Commerce Noble told the committee that in his opinion the trade agreements lowering tariffs here and abroad "had benefited American commerce."

Freely admitting he was a Republican, Mr. Noble said there are limitations in the merit of the trade agreements system of negotiating instead of legislating tariff changes and stated that in some concessions the negotiators "have made mistakes." He added, however, "it would be a miracle if there were not a few mistakes."

Secretary of Agriculture Wallace urged continuation of the administration's trade agreements program as an aid to prosperity of the American farmer. He told the committee that to end the trade agreements program would be "extremely unfortunate for the farmer."

TNEC STEEL HEARING MAY BE DELAYED

Resumption of the temporary national economics committee steel hearing, scheduled for Jan. 22, may

be postponed due to serious illness of Senator Borah, member of the committee.

Unless there is some change in the committee's plan for the hearing, Benjamin F. Fairless, president, United States Steel Corp., and Avery Adams, vice president, United States Steel Corp. of Delaware, will be included as witnesses. Dr. Theodore Yntema, University of Chicago, will appear for the Steel corporation and will present the extensive survey he has completed for the corporation on the steel industry.

Others scheduled to appear before the committee include M. G. De Chazeau, department of justice, who prepared the report for the recent steel questionnaire; Mordecai Ezekiel, economic adviser to Secretary of Agriculture Wallace; Louis Bean, price analyst of the department of agriculture; W. B. Wooden and Hugh White, federal trade commission. Theodore Kreps, economic consultant of TNEC, will have charge of the presentation of the case.

HARRISON RESOLUTION HAS LITTLE CHANCE IN HOUSE

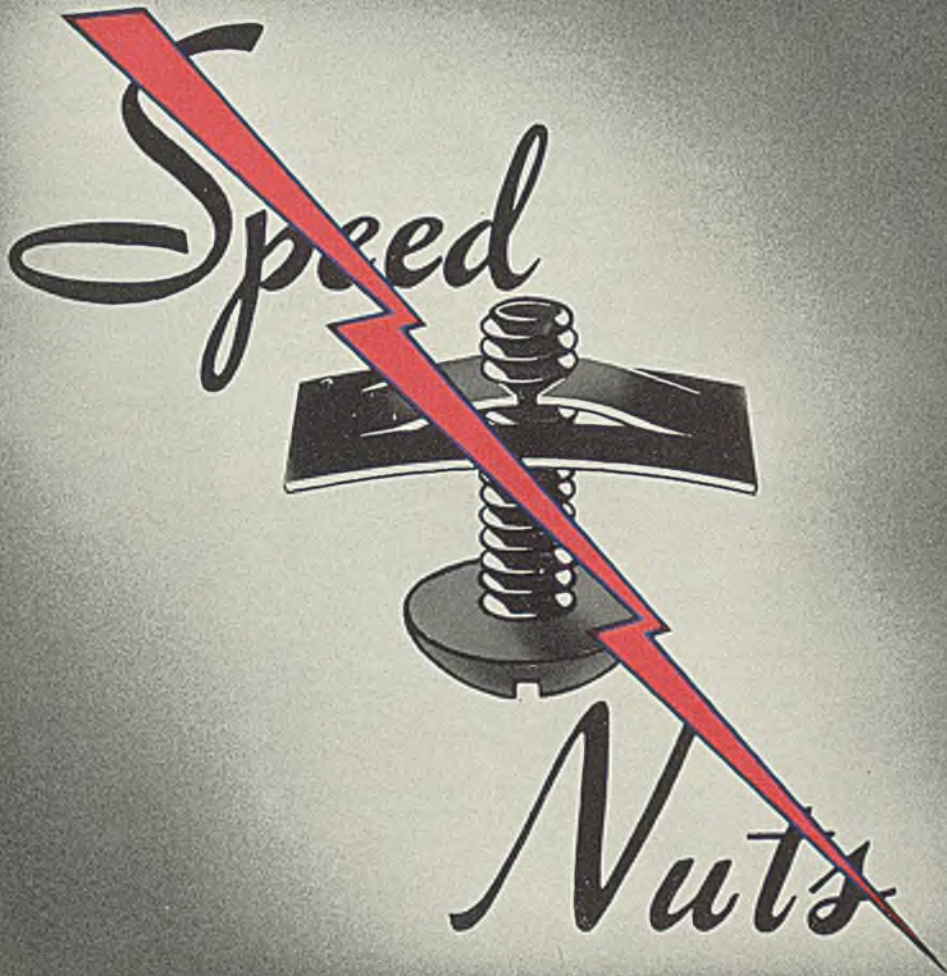
House members who favored the Harrison plan to create a joint congressional committee to investigate government expenditures and revenues now concede the resolution will not pass the house. It is believed the President has been notified resolution has no chance of passing the lower house and that this is the reason he has made no objection to it.

Reports in the senate last week were that a senate committee might be appointed to carry on the program proposed by Senator Harrison, but this now has been given up.

However, subcommittees of the house committee on appropriations have been instructed to keep the government expenditures well within the President's budget estimates.

Belief the Harrison plan might be

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IN ENGLAND: Simmonds Aeroaccessories, Ltd., London

900 MILLION SPEED NUTS ALREADY USED

adopted later to apply to next year's budget was advanced by Representative Rayburn, Texas, majority leader.

Economy-minded legislators said they would make their fight on the basis of holding spending down to the \$8,400,000,000 total proposed by Mr. Roosevelt.

One of the economy leaders, Senator Adams, Colorado, told reporters there was little chance of reducing the President's total, and that it would be difficult to hold appropriations to that level.

The President's budget proposed curtailed expenditures for many domestic purposes, but included a record national defense total of \$1,800,000,000. Adams and some other senators have contended the defense allotment should be whittled down and the money diverted to farm relief or other domestic programs.

TNEC FINDINGS TO COMPRISE FROM 55 TO 60 VOLUMES

Theodore J. Kreps, chief economic analyst for the temporary national economic committee, last week told a group of editors many of the studies by the committee point against legislative action.

Among TNEC studies are how to increase production; benefits of technological improvement which will lower prices; and how the employment situation can be stabilized. Mr. Kreps said the completed findings of the committee will comprise 55 to 60 volumes.

Among the studies on which recommendations will finally be made by the committee will be a volume devoted to taxation and one devoted to industrial policy. Others will include the antitrust law study, consumer protection, government purchasing, housing, labor monopoly, patents, and international trade.

Mr. Kreps said that undoubtedly some committee findings will not be palatable to industry. He told the editors that there is no complete agreement among TNEC members and it may not be easy for the committee to get together on final recommendations.

Mr. Kreps discussed cartels in the various countries last week before the committee. He said in France recently there have come into existence a number of vertical selling organizations of a regional or local character "handling a wide range of iron and steel products of a number of concerns, and generally controlled by them. Thus there is the 'Longovica,' handling not only the export trade of iron and steel but also tubes and screws and bolts, rolled products and machinery; the 'Nortrilor', handling for export iron ore, iron and steel, and bars."

He also said that "the Comptoir

Siderurgique, revived in 1925, is now the most important association in the French steel industry, handling until recently the sales or administration for the international rail cartel, the Continental steel entente, the machine-wire cartel, and the recently organized domestic cartel for beams and ingots, blooms, etc."

Discussing English cartels, Mr. Kreps said that "at present the iron and steel industry is completely controlled by a super cartel, a federated organization of some 35 price-fixing and quota associations together with probably 40 additional informal price and output groups, covering practically every iron and steel material and product in the British Isles. Agreements are enforced by such devices as the deposit of pre-paid fines and substantial 'loyalty discounts' not given to recalcitrants or outsiders."

The committee was advised by Mr. Kreps, still speaking of the British situation, that other products characterized by effective cartel controls "are tin plate, galvanized sheets, and various metal products such as fittings, tools, saws, files and drills." In Italy, Mr. Kreps said cartelization developed after the war in the iron and steel industry. He stated that cartels in Italy were forced on rolling mills.

NO DOMESTIC MANGANESE ORE BOUGHT BY GOVERNMENT

No manganese ores of domestic origin have been purchased yet under the strategic materials act despite the fact the domestic manganese interests were instrumental in obtaining the bill's passage in congress.

The bill authorized an appropriation of \$100,000,000 over a 4-year period for purchase of strategic materials, of which manganese is listed as No. 1. At the first session of this congress, \$10,000,000 was appropriated for immediate expenditure. Objectives outlined in the act included accumulation of stockpiles and development of American resources. To carry out the act's full purpose, preference was to be given domestic ores.

Purposely, to allow domestic producers time to develop, install machinery and ship, the law permits allowance of one year for delivery. All government requests for bids so far have required delivery within six months, which domestic interests claim is insufficient.

Law provides that "in the case of any such material available in the United States but which has not been developed commercially, the secretary of war and the secretary of the navy may, if they find that the production of such material is economically feasible, direct the purchase of such material without re-

quiring the vendor to give bond. All government requests for bids so far have required bond. Few, if any, domestic bidders can get bond for delivery of ore still in the ground, it is claimed. For ores of domestic origin bond should be waived in accordance with the provisions of the law, the domestic interests claim.

COMMITTEE RE-ESTABLISHES SCREW THREAD STANDARDS

Interdepartmental screw thread committee has re-established the screw thread standards prepared by the now defunct national screw thread commission, according to Lyman J. Briggs, committee chairman and director of the bureau of standards.

Committee was created by the secretary of commerce Sept. 14, 1939, to safeguard government's interests in purchase of bolts, nuts, and other threaded and related products such as wrenches, threading tools and limit gages. It is composed of two representatives each from departments of war, navy and commerce, and four advisory or liaison representatives from the American Society of Mechanical Engineers, Society of Automotive Engineers, American Standards association, and the Sectional Committee on Standardization of Screw Threads.

Abolishment of the national screw thread commission in 1933, left the status of its standards in some doubt, although its report, now out of print, has been in great demand as the most practical and comprehensive work on screw thread standards.

A more complete revision to bring the standards up to date in certain important respects now is underway. Lack of time and the urgency of supplying manufacturers and government officials with the old standards prevented more thorough revision in the manuscript which has just been completed.

GOVERNMENT IRON, STEEL AWARDS TOTAL \$256,680

During the week ended Jan. 6, the government purchased \$256,679.79 worth of iron and steel products under the Walsh-Healey act as follows: The Mosler Safe Co., Hamilton, O., \$16,635; San Miguel & Co. Inc., San Juan, Puerto Rico, \$37,251.08; the Stanley P. Rockwell Co. Inc., Hartford, Conn., \$16,000; Brandt Iron Works, San Antonio, Tex., \$14,413; Schacht Steel Construction Inc., New York, \$10,080 (estimated); American Abrasive Metals Co. Inc., New York, \$12,529.20; Keystone Steel & Wire Co., Peoria, Ill., \$10,758.93; Lukens Steel Co., Coatesville, Pa., \$14,378.98; Consolidated Supply Co., Portland, Oreg., \$101,194.73; Delaware Tool Steel Corp., Wilmington, Del., \$23,438.87.

AVIATION

EASTERN AIRCRAFT MAKERS MAY STANDARDIZE PARTS

■ **RECOMMENDATIONS** by the national advisory committee for aeronautics in its annual report relative to engine research, and the action of ten major eastern aircraft companies towards standardization, center around one point—co-ordination of facilities.

The committee recommends that an engine research laboratory accessible to the aircraft engine industry be constructed as soon as possible. It calls attention to the fact that "reasons for foreign leadership in certain important types of military aircraft are due in part to the superiority of foreign liquid-cooled engines."

It urges an investigation of engine research facilities which may be available at universities and other scientific organizations, with a view to co-ordinating these facilities.

Engineering representatives of eastern planemakers are holding a series of meetings in an effort to work out a system whereby airplane parts may be standardized. At the first meeting recently at the Glenn L. Martin plant, Baltimore, it was disclosed only minor differences existed in certain parts.

Brewster Aeronautical Corp., Long Island City, N. Y., late last week was negotiating with the British government on an order for pursuit planes valued about \$8,000,000.

Engineers for KLM Royal Dutch air lines have been studying several large American commercial trans-

ports that are now flying or are in an advanced state of construction, but immediate purchase of new equipment is not indicated. According to Albert Plesman, president, present world conditions make an early decision unwise. Only recent orders placed by this company have been for four 16-passenger Douglas

STEEL Index Is Ready

The index to Volume 105, STEEL, for the last six months of 1939, now is ready for distribution. Copies will be sent to all subscribers requesting them.

DC-5 transports to be delivered in February, and 4 twin-engined Fokkers.

Eleven thousand workers were added to the payrolls of Los Angeles county aircraft factories in 1939, according to the Los Angeles chamber of commerce. This resulted in an increase of \$1,600,000 in monthly payrolls. Plane manufacturers' backlogs rose to \$104,692,616. Value of plane production in 1939 was \$96,086,320, an increase of \$45,000,000 over 1938.

Private investment in civil aviation in the United States totals almost \$600,000,000, Robert H. Hinckley, chairman, civil aeronautics authority told the house appropriations committee during hearings on the CAA appropriation bill. In addition, investment in airports is estimated at \$340,000,000, and in airways \$23,000,000.

A new 22-ton, B-17B army bomber

is leaving the assembly line of Boeing Aircraft Co.'s plants in Seattle, every fourth day. The 4-engined planes are of the same type that recently flew nonstop from Los Angeles to New York in 9½ hours. Company is completing the delivery of 39 bombers for the army.

The Boeing assembly line is similar to an automobile production line, with parts built in two plants and assembled in a third. Work is going on day and night, and the payroll lists about 6000.

North American Aviation Inc., Inglewood, Calif., announces construction of a new "midget" super-airplane for military training. It is all metal and weighs 1760 pounds.

December Tool Output At 93.3% of Capacity

■ Machine tool builders operated at 93.3 per cent of capacity during December, according to the National Machine Tool Builders' association, Cleveland, December rate compared with 91.2 per cent in November, and 52.5 per cent in January, 1939. Each month during 1939 recorded an increase over the preceding month.

While the association no longer reports on new orders, reports from builders and dealers indicate bookings have declined since the peak in September, and for some builders new business now is lower than shipments. Backlogs of most manufacturers still extend far into 1940; many are operating at capacity.

China Makes Coins from Scrap Kerosene Cans

■ Tin plate from old kerosene cans is being used by the Chinese government to make two-cent pieces and brass for five-cent coins, indicating the expedients resorted to under war conditions.

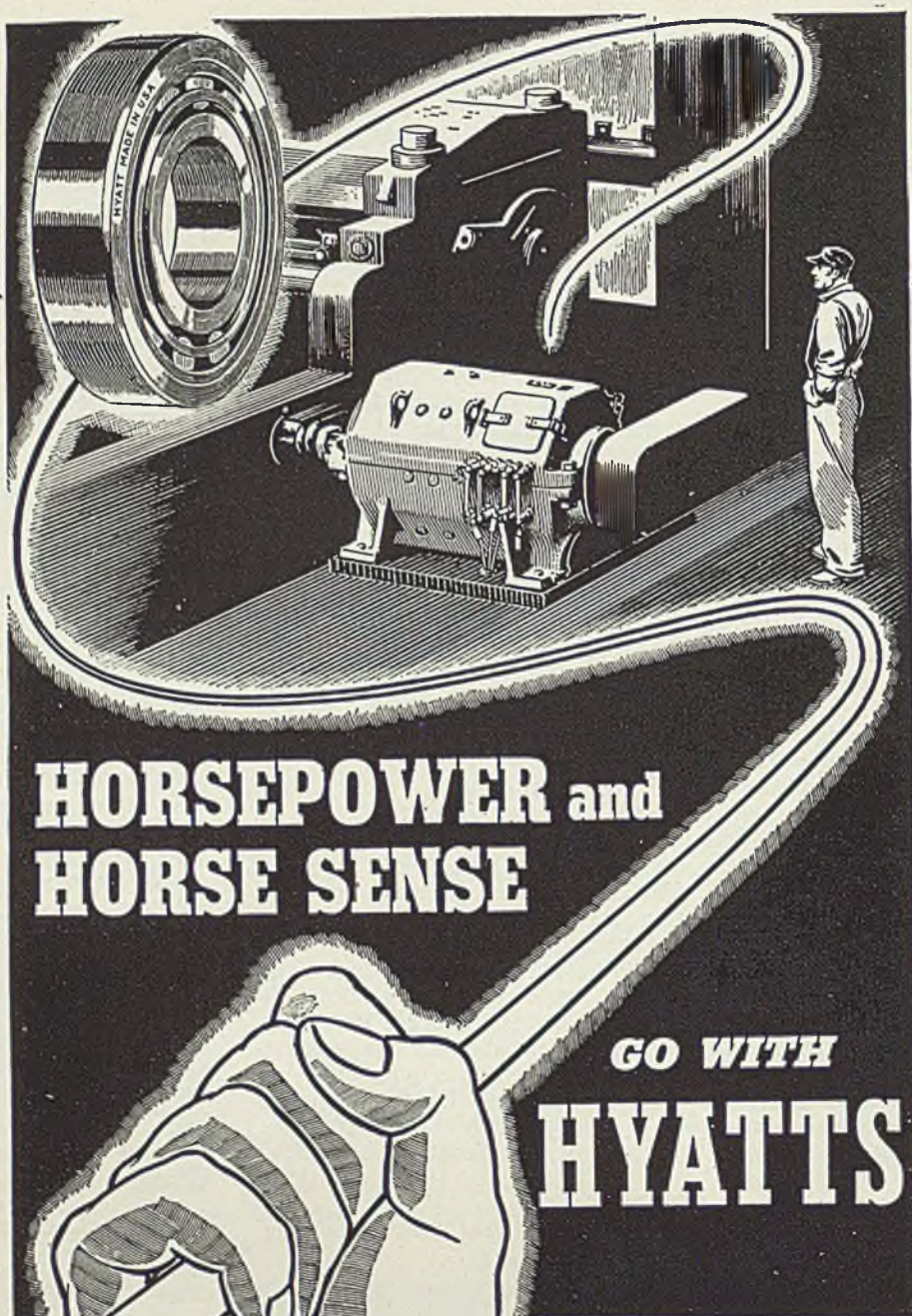
Factories have been removed from the Yangtze valley region to West China, especially Szechwan province. Mechanical and metal-working plants in the Chunking region now number 85, compared with 25 before the war. Skilled labor has been supplied from the Yangtze valley.

World Tin Stocks Down

■ World stocks of tin decreased 200 tons during December, according to a cable to the American Iron and Steel institute from the International Tin Research and Development council, The Hague, Holland. Stocks at the end of December were 50,407 tons, compared with 50,607 at the end of November and 39,497 at the close of July, 1939. The position was little changed from Dec. 31, 1938, when stocks were 49,448 tons.



■ View in wing assembly section of a factory "somewhere in England," where Whitley bombers are under construction. These war planes have a range of 1900 miles with a top speed of 240 miles per hour. They are equipped with two engines developing 2000 horsepower. NEA photo



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HYATT *Roller* BEARINGS

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL



DETROIT
■ **ENGINEERING** brains of the nation's motor industry—about 2500 strong—exchanged ideas here last week at the annual meeting of the Society of Automotive Engineers. As might be expected, the subjects of aircraft and aircraft engines dominated the technical program, eleven of the 30-odd papers presented during the week dealing with various phases of aviation, suggesting that perhaps for the time being the S. A. E. might consider itself the society of aircraft engineers.

Examination of corrosion problems in aluminum fuel tanks for aircraft was made by E. H. Dix Jr. and Dr. R. B. Mears, Aluminum Co. of America. Such tanks have been used widely over a period of two decades, they pointed out, and cases of corrosion have been reported only in isolated instances where evidence indicated corrosion was caused by water lying in the bottom of the tanks for extended time. This water was shown to be contaminated by chlorides or bromides and heavy metal compounds which led to corrosion.

Corrective measures suggested were seven in number: Designing tanks to permit free drainage of water; selecting materials to avoid electrolytic action; handling fuel to prevent picking up water, iron rust or other heavy metal corrosion products; applying suitable coatings to tank interiors; use of Alclad sheet; employing corrosion inhibitors in the form of capsules or fuel additives; and periodic flushing and cleaning of tanks.

■ **PROMISING** future for diesel engines in aircraft was envisaged by Paul B. Wilkinson, consulting en-

gineer, who in the past year has made a study of diesel developments in England, France, Germany and this country. He cited advantages of aircraft diesels as reduced fire hazard, low fuel operating costs, large payload and flight-range possibilities, reliability and efficiency. He urged lifting the veil of secrecy which now envelops aircraft diesel projects in the United States for the benefit of a new industry, and suggested the S. A. E. establish a separate aircraft diesel activity to

promote interest and discussion in this specialized engineering work.

Mr. Wilkinson undoubtedly can get a lot of argument as to the efficacy of diesels in aircraft. Development work on new types of gasoline engines for aircraft conceivably could revolutionize current conceptions of airplane power plants, for one thing, and could place diesels at a serious disadvantage as far as weight is concerned.

As a matter of fact, one such project is nearing the production

Celebrate General Motor's 25,000,000th Car



■ Seldom have so many high executives of General Motors Corp. gathered in the plant as on Jan. 11 when production of the corporation's 25,000,000th car was celebrated. Here Fred Brown, veteran Chevrolet employe, stands by the car displaying a scroll which he and fellow employes delivered to W. S. Knudsen, GM president, to commemorate the

occasion. Behind him, left to right, are C. E. Wetherald, Chevrolet general manufacturing manager; M. E. Coyle, Chevrolet general manager; H. H. Curtice, Buick general manager; Alfred P. Sloan Jr., GM chairman of the board; C. S. Mott, GM vice president; C. E. Wilson, GM executive vice president, and Mr. Knudsen.

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stage in a little laboratory on the west side of this city. This is the Holmes two-cycle barrel type aircraft engine, designed to develop in excess of 1000 horsepower at 4000 r.p.m. from two banks of nine cylinders each in an engine which has a total weight of but 725 pounds and a frontal area of a 20-inch circle.

Yet to be proved in service, this engine nevertheless has attracted attention of a number of local engineers, and its progress is being guarded carefully. Aircraft engineers consider such an engine, involving only 0.725-pound per horsepower and small in size, to be little short of revolutionary. Tests on the plant are being awaited eagerly. Secret of the design's success is said to lie in the fact that side thrust on connecting rods is eliminated by being absorbed in two large trunnion bearings. Connecting rod bearings are eliminated in favor of a ball and socket bearing assembled in the torque housing. Using the two-cycle principle means further elimination of valves, a notoriously weak point in high-speed four-cycle aircraft motors.

The barrel-type engine is not new, but the Holmes concept of it is new. It can be understood essentially by visualizing two groups of nine cylinders grouped radially about a central shaft. Pistons are on opposite ends of nine connecting rods which are connected to an inclined disk on the mainshaft through the ball and socket bearings mentioned previously.

Total displacement of the engine is 721 cubic inches, bore is 3 3/4 inches, stroke 3 1/2 inches. Compression ratio of around 9 1/2 to 1 is used, resulting in 1.39 horsepower per cubic inch displacement. Fuel of 100 octane rating or better is used.

Manufacturing costs of the engine are estimated to be considerably below those of conventional motors for aircraft which currently are figured at from \$15 to \$25 per horsepower. Further details will be presented in an early issue of STEEL.

■ ONE of the best chronological surveys of the development of plastics in this country ever compiled was presented to the S. A. E. by Gordon M. Kline, national bureau of standards. He outlined in great detail all the various types of plastics, their properties, forms in which they are available, methods of fabrication, typical applications and trade names and manufacturers. Included were cellulose nitrate, shellac, bitumen, phenol-formaldehyde resin, laminated phenolic, casein, cellulose acetate, urea formaldehyde, cast phenolic, vinyl

resin, styrene, acrylic resin, cellulose mixed ester, ethyl cellulose, lignin, and alkyd resin plastics. Review of various molding methods also was given, including compression, injection, transfer, extrusion and direct hydraulic molding, together with descriptions of equipment involved.

Significantly, Dr. Kline observed that despite vast gains in the volume of plastics used by the automotive industry, there has been little extension in automotive applications of plastics since 1925. Materials used have changed and improvement has been accomplished in esthetic appeal and durability as well as eco-

is recirculated, some taken from outside and heated before delivery; heating in which all air through heater is taken from outside; and systems which include means for heating, cooling by refrigeration and incidental ventilation.

"Since air conditioning is a comparatively new art," Mr. Chase said "there is great difference of opinion as to how it should be effected even in homes where a relatively simple set of conditions applies. As compared with these, the conditions encountered by a passenger car may involve travel, even within our own country, through areas where subzero to 120 degrees Fahr. may be encountered along with wide extremes in humidity, precipitation, wind velocity and other meteorological conditions."

Today's heating and ventilating systems in cars are in a state of flux and future equipment likely will far surpass the average now and probably will be superior even to the best today, in the opinion of Mr. Chase.

He concluded his remarks with comment on structural considerations involved in heating and ventilating equipment. Produced largely from sheet metal and die castings, these units have pioneered in the field of thin-walled die castings for shells and housings, some only 0.040 to 0.050-inch in thickness. Naturally the old question of stampings versus die castings has appeared. Mr. Chase stated that piece price is likely to be less for steel stampings than for die castings if quantities required are large, but when quantities run below, say, 100,000 or thereabout, the materially lower investment in dies which almost always is realized with die castings often brings total cost well below that for the stamping, besides affording other advantages such as integral louvre shapes, bosses for mountings and other decorative forms not so readily included in steel stampings.

■ COMMENTING on growing interest in direction signals for passenger cars, Harry C. Doane, engineer, Buick Motor division, described the system developed for the 1940 Buick models and the factors entering into its design. He contrasted manual, automatic and semi-automatic operation of control switches, indicating limitations of the fully automatic type. Difficulties with such a system, actuated when steering apparatus has been moved to a certain degree, center around the fact that this arrangement does not give sufficient time for those observing the signal to anticipate

(Please turn to Page 67)

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	226,952	356,950
Feb.	383,900	202,597	317,517
March	519,022	238,447	389,489
April	553,231	237,929	354,263
May	540,377	210,174	313,214
June	521,153	189,402	324,235
July	456,909	150,450	218,478
Aug.	405,072	96,946	103,343
Sept.	175,630	89,623	192,672
Oct.	337,979	215,286	323,017
Nov.	378,629	390,405	370,194
11 mos.	4,669,088	2,248,211	3,263,372
Dec.	347,349	406,960	.....
Year	5,016,437	2,655,171	.....

Estimated by Ward's Reports

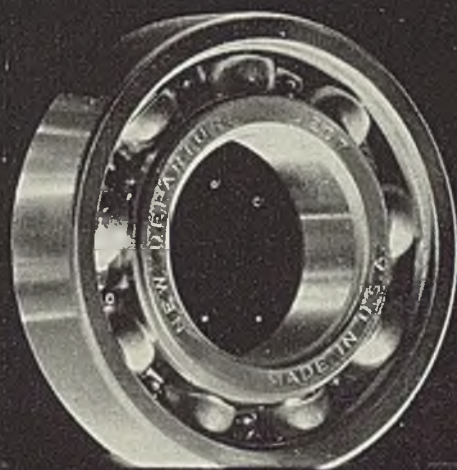
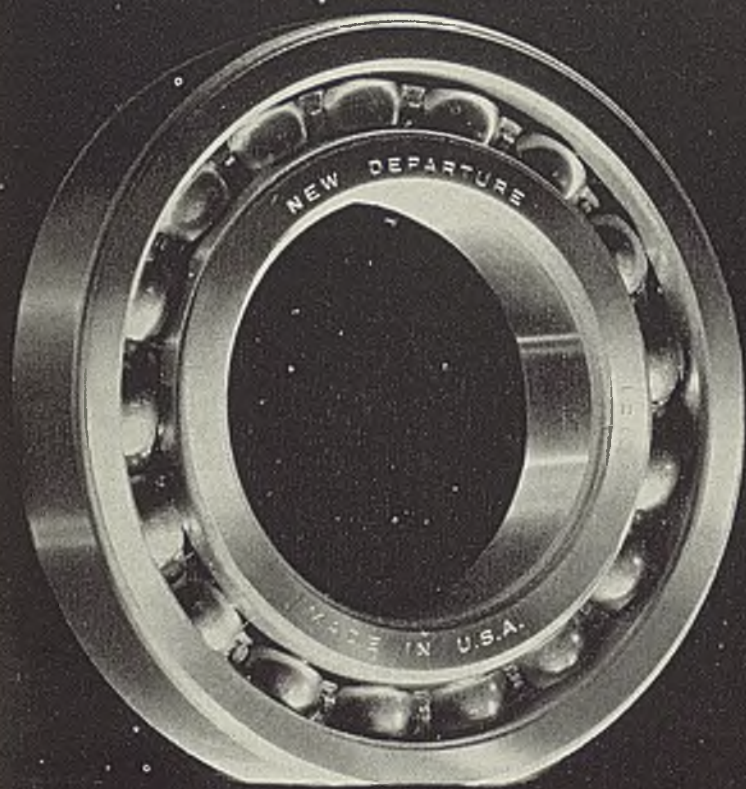
Week ended:	1940	1939†
Dec. 23	117,705	92,890
Dec. 30	89,365	75,215
Jan. 6	87,510	76,685
Jan. 13	111,330	86,925
Jan. 20	108,545	90,205

†Comparable week.

	Week Ended	
	Jan. 20	Jan. 13
General Motors	45,140	46,790
Chrysler	27,105	27,115
Ford	25,650	25,550
All Others	10,650	11,875

nomical production of various plastic parts, but advances beyond merely decorative moldings have been chiefly in window frames, glove compartment doors and headlamp shells. Plastic fenders and a molded body still remain as the greatest prospective field for extension of the use of plastics in automobiles, he concluded.

■ AN INTERESTING compilation and description of various types of equipment for heating, cooling and ventilating passenger cars was offered by Herbert Chase, engineering consultant and journalist. Classification of present systems shows four general types: Heating by recirculation only, ventilation incidental; heating in which some air



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DIVISION OF GENERAL MOTORS

BRISTOL, CONNECTICUT

Reciprocal Trade Agreements

■ BUSINESSMEN are observing with much interest the warfare now getting under way in congress as to whether the authority empowering the secretary of state to negotiate reciprocal trade agreements will be allowed to expire as of June 12 or be extended beyond that date.

Under this authority reciprocal trade pacts have been signed with 20 countries, Cuba, Belgium, Haiti, Sweden, Brazil, Canada, the United Kingdom, Switzerland, Honduras, Colombia, Guatemala, France, Nicaragua, Finland, El Salvador, Costa Rica, Czechoslovakia, Ecuador, Turkey and Venezuela.

Many Advantages Over Usual Method Of Tariff Tinkering and Compromise

These trade treaties have been subjects for sharp controversies and widespread criticism. Many manufacturers have seen in them provisions they believed harmful to their export trade. Especially has hostility to the program been encountered from farmer spokesmen. At the same time, it generally is admitted that the state department has exercised its authority with great care, holding hearings and taking all viewpoints into account. To so great an extent has it attempted to cater to prevailing viewpoints that it felt itself unable to meet Argentina's demands for lowered tariffs and more favorable treatment of its farm products.

Despite the many individual objections and criticisms, the trade agreements pro-

gram in general seems to reflect the most intelligent treatment of the foreign trade problem in our history. For the first time, import tariff rates and quotas have been established dispassionately, in a conscientious effort to improve our position in foreign trade and contribute to this country's best interests in other ways, such as improving Pan-American solidarity and enhancing the influence of the Americas in world affairs.

This represents a pleasing contrast with the tariff procedure of other days, when stormy debates finally resulted in schedules representing compromises between selfish pressure groups. Another fault of the tariff acts of other years is that they were based on a false conception. Foreign trade was seen as a one-way proposition, exports were highly desirable but imports were bad. There is no reason to believe that the present congress is any more competent to legislate a sound tariff law than the congresses of the past.

Industry Should Urge Extension Of State Department Powers

The existing reciprocal trade treaties may be criticized in some respects. They could be improved on. But they do reflect the most scholarly approach so far made on the problems of foreign trade. It would be a mistake to abandon the new method and go back to the old. Industry will do well to lend its support to extension of the existing powers of the state department.

The BUSINESS TREND



Order Backlogs Sustain Industrial Activity

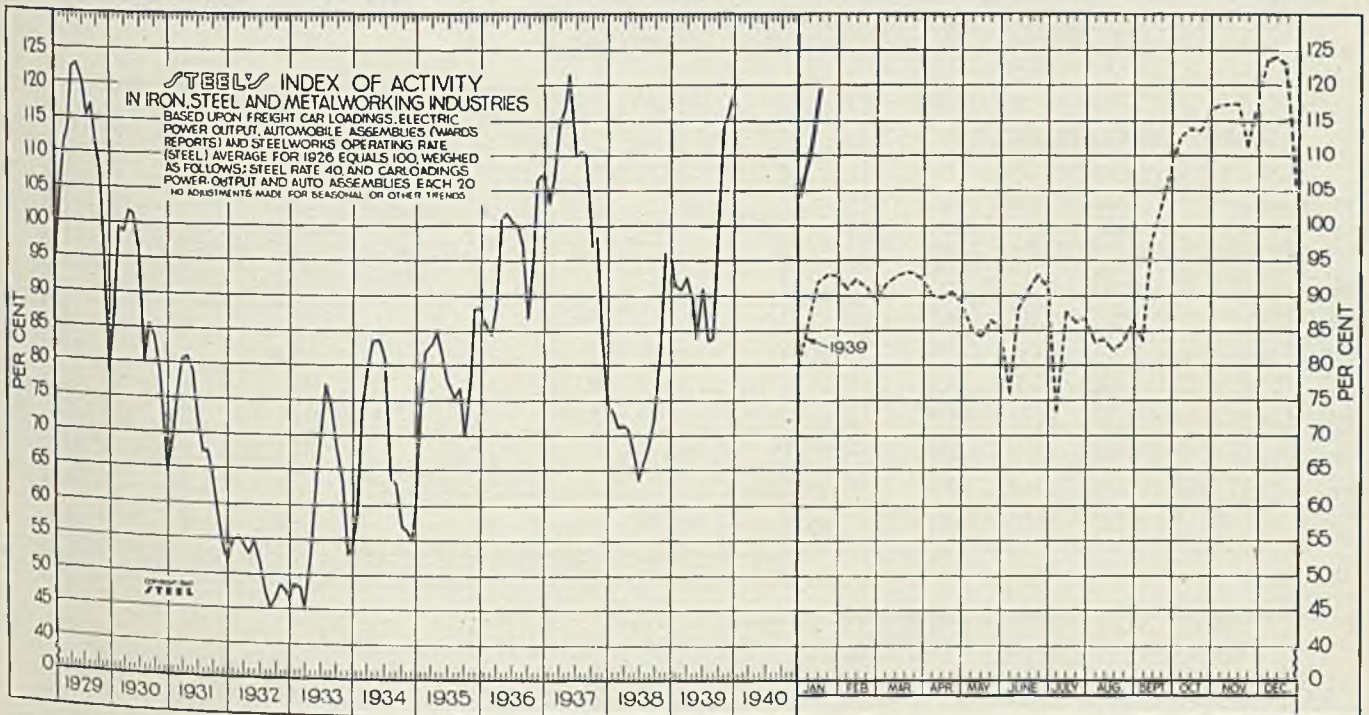
■ Despite the lag in new business since the first of the year, industrial activity is well sustained by large order backlogs. Most industries report shipments exceeding new demand by a substantial amount, in some instances by over 50 per cent. This is particularly noted among the heavy equipment group. Unless the expected resumption of new demand materializes within the near future it appears probable that industrial

activity will recede from the current high levels.

STEEL'S index of activity in the iron, steel and metalworking industries, advanced to 119.2 during the week ended Jan. 13; the first full week this year not affected by holiday influences. This represents a gain of 8.9 points over the 110.3 recorded by the index in the preceding week and also compares favorably with the 91.9 in same 1939 week.

The national steel rate during the week ended Jan. 13 averaged 86 per cent, down 0.5 points from the level recorded in the preceding week. The steel industry was operating at 52 per cent this time last year.

Automobile production during the week ended Jan. 13 reached the highest level for any January week in history. Output in that week totaled 111,330 units, compared with 87,510 during week ended Jan. 6.



STEEL'S index of activity gained 8.9 points to 119.2 in the week ended Jan. 13:

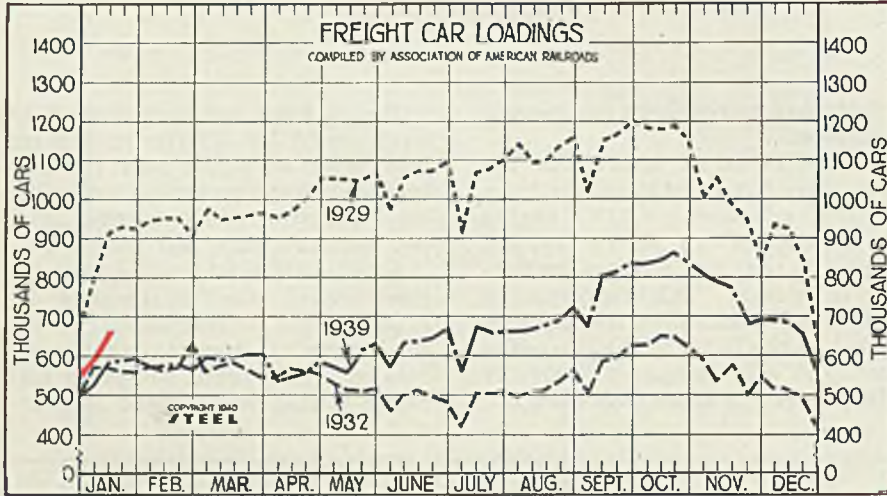
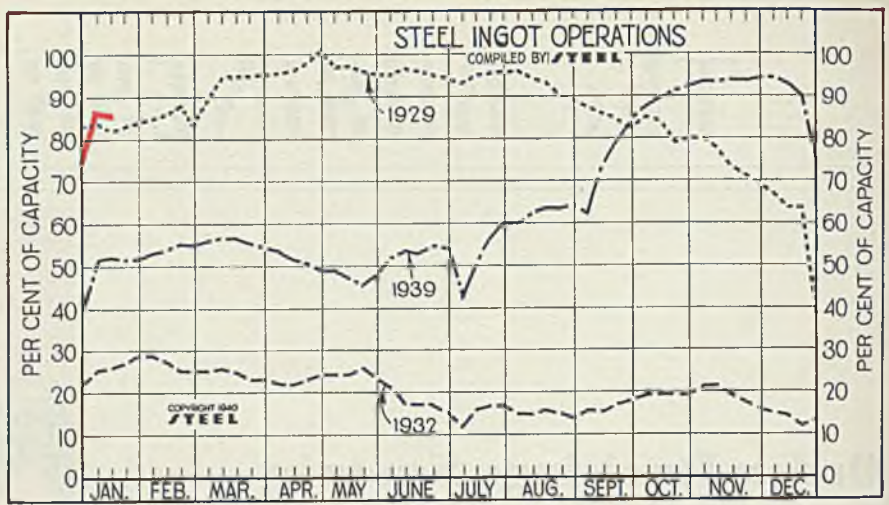
Week ending	1939	1938	Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Nov. 11	117.2	95.9	Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Nov. 18	117.3	100.4	Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
Nov. 25	111.4	93.9	March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
Dec. 2	117.9	100.1	April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
Dec. 9	123.9	100.7	May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
Dec. 16	124.2	99.8	June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
Dec. 23	123.4	94.8	July	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Dec. 30	104.0	79.9	Aug.	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
			Sept.	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Week ending	1940	1939	Oct.	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Jan. 6	110.3	86.5	Nov.	116.2	95.9	84.1	106.4	88.1	34.9	52.8	47.5	54.4	71.0	92.2
Jan. 13	119.2	91.9	Dec.	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

Steel Ingot Operations

(Per Cent)

Week ended	1939	1938	1937
Oct. 14	89.5	51.5	63.0
Oct. 21	91.0	51.5	53.0
Oct. 28	92.0	54.5	51.0
Nov. 4	93.0	57.5	47.0
Nov. 11	93.0	61.5	39.0
Nov. 18	93.5	63.0	35.0
Nov. 25	93.5	62.0	31.5
Dec. 2	94.0	61.0	30.5
Dec. 9	94.0	61.0	27.0
Dec. 16	92.5	58.0	27.0
Dec. 23	90.5	52.0	23.0
Dec. 30	75.5	40.0	21.0

Week ended	1940	1939	1938	1937
Jan. 6	86.5	51.5	26.0	79.5
Jan. 13	86.0	52.0	29.0	79.0



Freight Car Loadings

(1000 Cars)

Week ended	1939	1938	1937
Oct. 14	845	727	810
Oct. 21	861	706	773
Oct. 28	834	709	772
Nov. 4	806	673	732
Nov. 11	786	637	690
Nov. 18	771	637	647
Nov. 25	677	562	559
Dec. 2	689	649	623
Dec. 9	687	619	622
Dec. 16	681	606	603
Dec. 23	655	574	460
Dec. 30	550	500	457

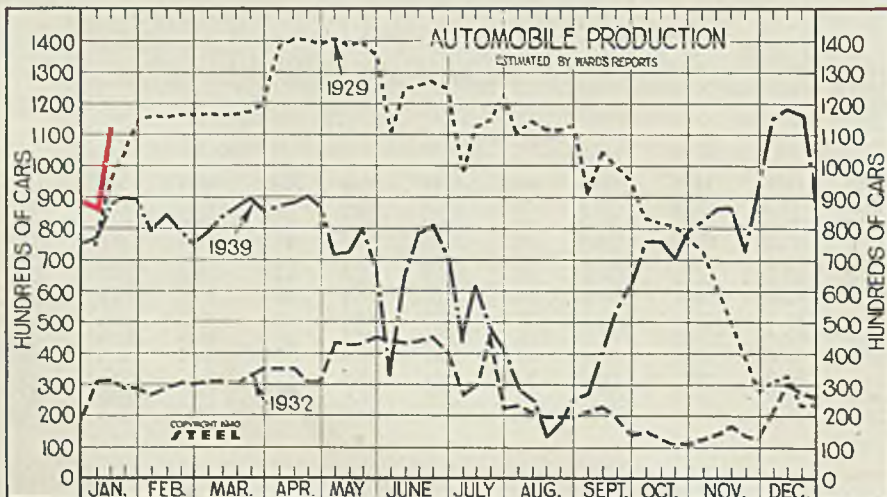
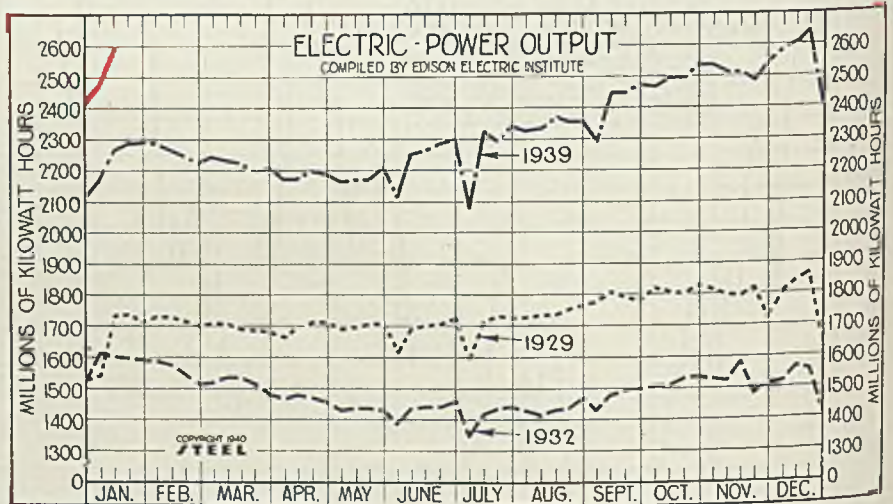
Week ended	1940	1939	1938	1937
Jan. 6	592	531	552	699
Jan. 13	668	587	581	700

Electric Power Output

(Million KWH)

Week ended	1939	1938	1937
Oct. 14	2,495	2,183	2,276
Oct. 21	2,494	2,214	2,232
Oct. 28	2,539	2,226	2,255
Nov. 4	2,537	2,207	2,202
Nov. 11	2,514	2,209	2,176
Nov. 18	2,514	2,270	2,224
Nov. 25	2,482	2,184	2,065
Dec. 2	2,539	2,286	2,153
Dec. 9	2,586	2,319	2,196
Dec. 16	2,605	2,333	2,202
Dec. 23	2,641	2,363	2,085
Dec. 30	2,404	2,121	1,998

Week ended	1940	1939	1938	1937
Jan. 6	2,473	2,169	2,140	2,244
Jan. 13	2,593	2,270	2,115	2,264

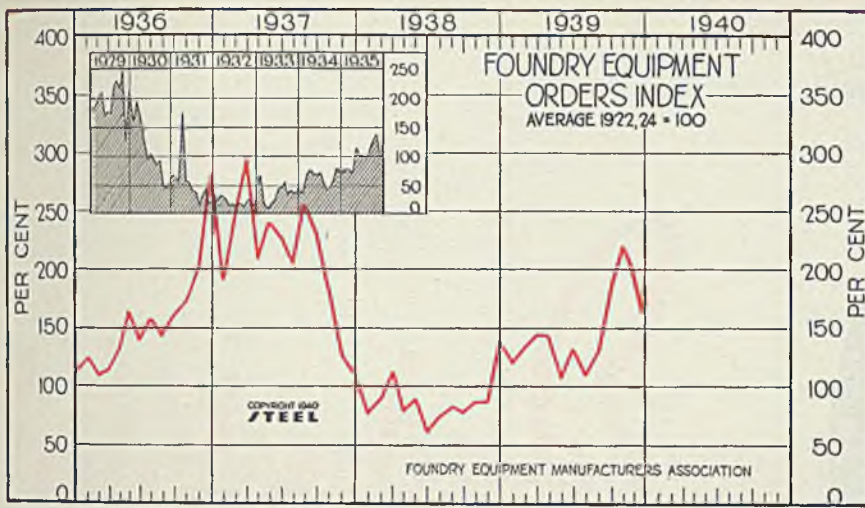


Auto Production

(1000 Units)

Week ended	1939	1938	1937
Oct. 14	75.9	50.5	89.7
Oct. 21	70.1	68.4	91.9
Oct. 28	78.2	73.3	90.2
Nov. 4	82.7	80.0	89.8
Nov. 11	86.2	86.3	85.3
Nov. 18	86.7	96.7	85.8
Nov. 25	72.5	84.9	89.0
Dec. 2	93.6	97.8	86.2
Dec. 9	115.5	100.7	85.8
Dec. 16	118.4	102.9	82.0
Dec. 23	117.7	92.9	67.2
Dec. 30	89.4	75.2	49.6

Week ended	1940	1939	1938	1937
Jan. 6	87.5	76.7	54.1	96.5
Jan. 13	111.3	86.9	65.7	91.7



Foundry Equipment Orders Index

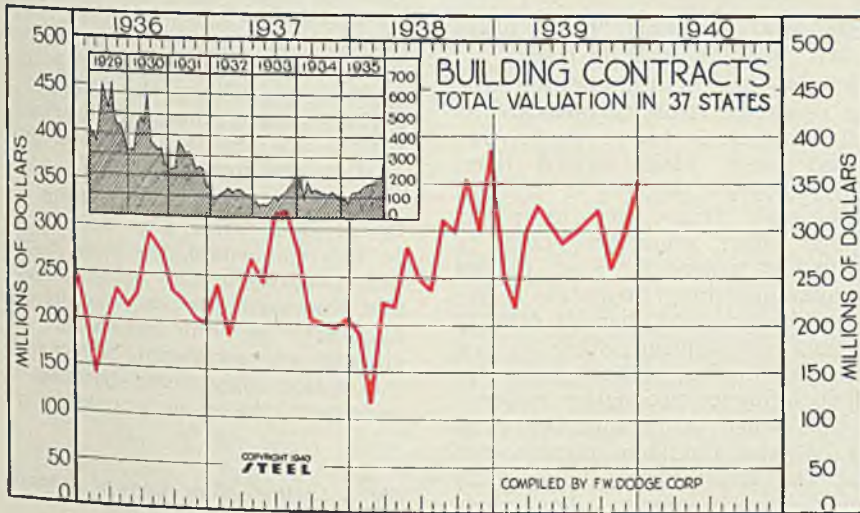
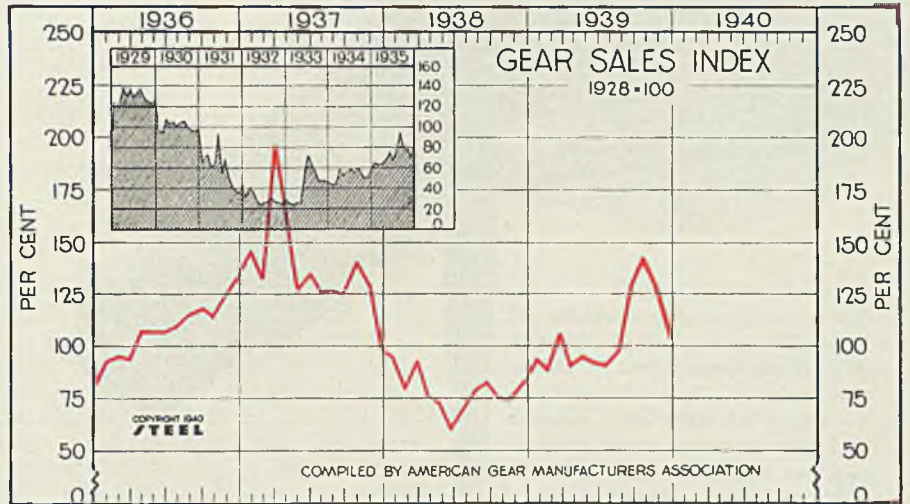
1922-24 = 100

	1939	1938	1937	1936
Jan.	122.3	76.8	190.9	127.0
Feb.	135.3	90.4	249.5	110.4
Mar.	146.6	114.6	294.2	115.0
April	146.0	79.3	208.3	134.0
May	108.8	90.6	242.0	165.4
June	134.6	61.2	228.2	141.4
July	111.9	74.2	204.0	159.5
Aug.	131.4	83.3	257.5	144.8
Sept.	184.4	78.7	231.8	161.0
Oct.	220.4	87.9	185.2	173.8
Nov.	203.1	89.7	128.0	200.4
Dec.	164.8	141.8	111.2	283.3
Average ..	150.8	89.4	210.9	159.7

Gear Sales Index

(1928 = 100)

	1939	1938	1937	1936
Jan.	91.0	93.0	144.0	90.5
Feb.	86.0	77.0	130.5	93.0
Mar.	104.0	91.0	195.0	92.0
April	88.0	74.0	164.0	105.0
May	93.0	70.0	125.5	105.0
June	90.0	58.0	134.0	105.0
July	89.0	67.0	124.0	107.5
Aug.	96.0	76.5	125.0	113.0
Sept.	126.0	80.5	123.0	115.5
Oct.	141.0	72.5	139.5	112.5
Nov.	126.0	72.0	127.5	122.5
Dec.	111.0	81.0	97.0	132.5
Average	103.5	76.0	135.5	107.5



Construction Total Valuation In 37 States

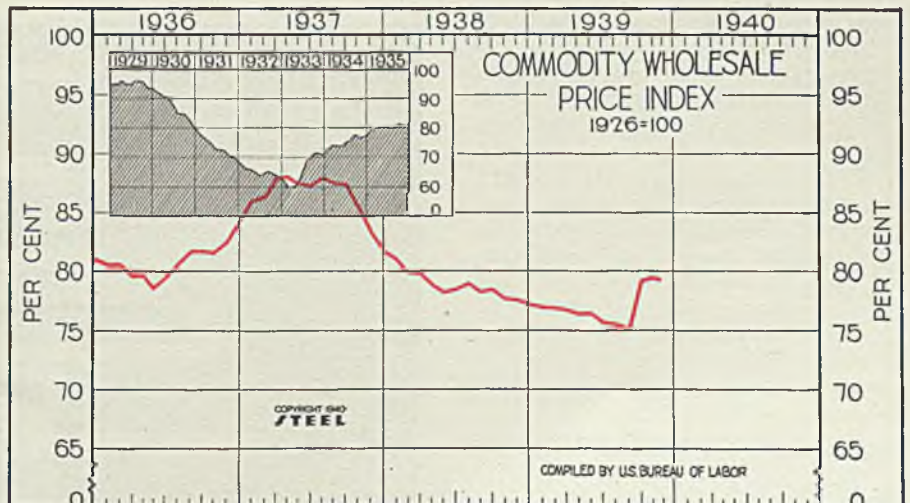
(Unit: \$1,000,000)

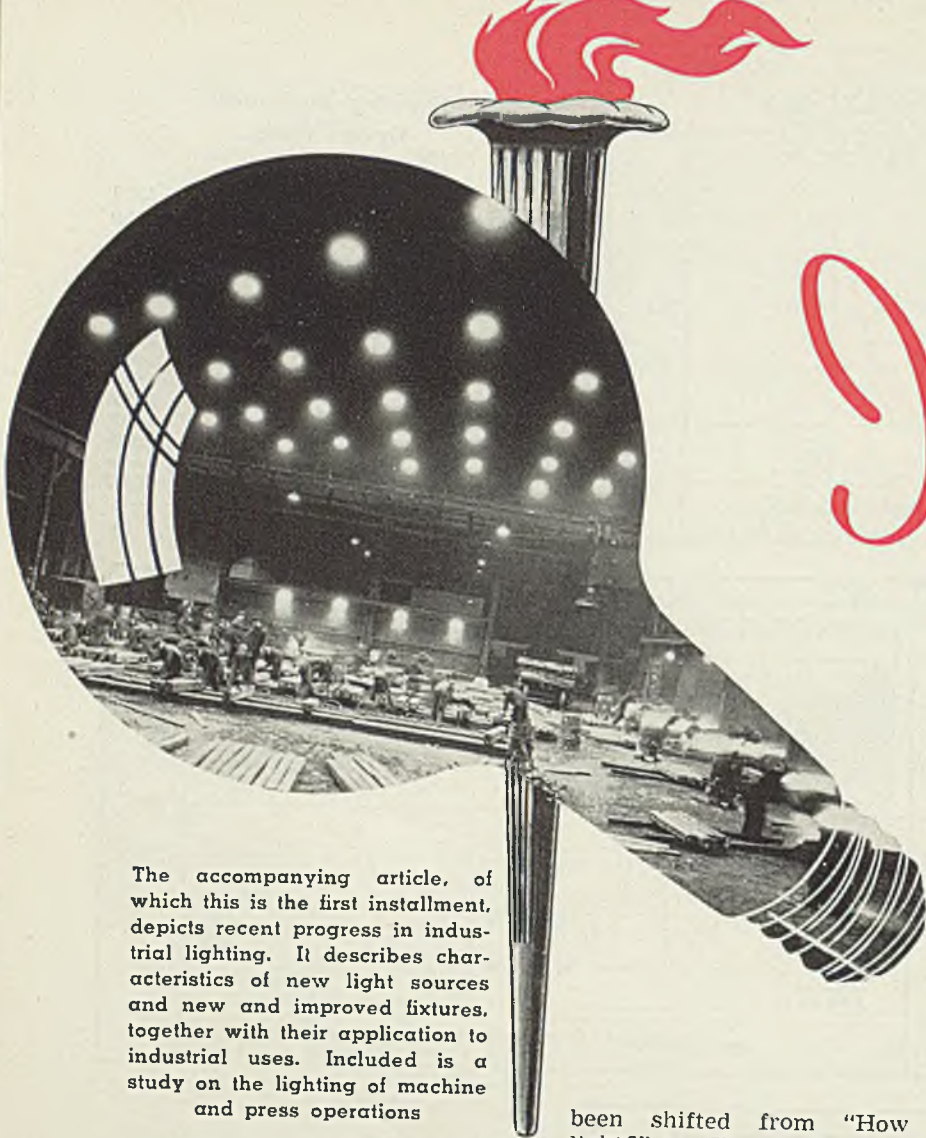
	1939	1938	1937	1936
Jan.	\$251.7	\$192.2	\$242.7	\$204.8
Feb.	220.2	118.9	188.3	142.1
Mar.	300.7	226.6	231.2	199.0
April	330.0	222.0	269.5	234.8
May	308.5	283.2	243.7	216.1
June	288.3	251.0	317.7	232.7
July	299.9	239.8	321.6	294.7
Aug.	312.3	313.1	281.2	275.3
Sept.	323.2	300.9	207.1	234.3
Oct.	261.8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

All Commodity Wholesale Price Index
U. S. Bureau of Labor

(1926 = 100)

	1939	1938	1937	1936
Jan.	76.9	80.9	85.9	80.6
Feb.	76.9	79.8	86.3	80.6
March	76.7	79.7	87.8	79.6
April	76.2	78.7	88.0	79.7
May	76.2	78.1	87.4	78.6
June	75.6	78.3	87.2	79.2
July	75.4	78.8	87.9	80.5
Aug.	75.0	78.1	87.5	81.6
Sept.	79.1	78.3	87.4	81.6
Oct.	79.4	77.6	85.4	81.5
Nov.	79.2	77.5	83.3	82.4
Dec. ....	...	77.0	81.7	84.2
Average ..	...	78.6	86.3	80.8





Industrial

The accompanying article, of which this is the first installment, depicts recent progress in industrial lighting. It describes characteristics of new light sources and new and improved fixtures, together with their application to industrial uses. Included is a study on the lighting of machine and press operations

Part I

■ CONCEPTS of industrial lighting have undergone considerable refinement in the last few years. Where once light was light and on a difficult visual task was measured only for quantity, today both the quality and quantity of lighting are regarded as prime considerations. Light sources have been improved in efficiency of performance and quality of light emitted, and distribution of light has been improved by increasing numbers of reflectors, light shields, diffusers, etc.

Since visibility achieved is not necessarily proportional to footcandles of light expended, the ease of seeing an object or a task has been given detailed study by the Illuminating Engineering society and other organizations. The popular but erroneous idea that the brighter the light source, the better the quality of light, largely has been eliminated. Low-brightness, large-area light sources, for example, are becoming more prevalent, especially for inspection operations requiring a high degree of visibility. In other words, emphasis in industrial lighting has

been shifted from "How much light?" to "How well do I see?"

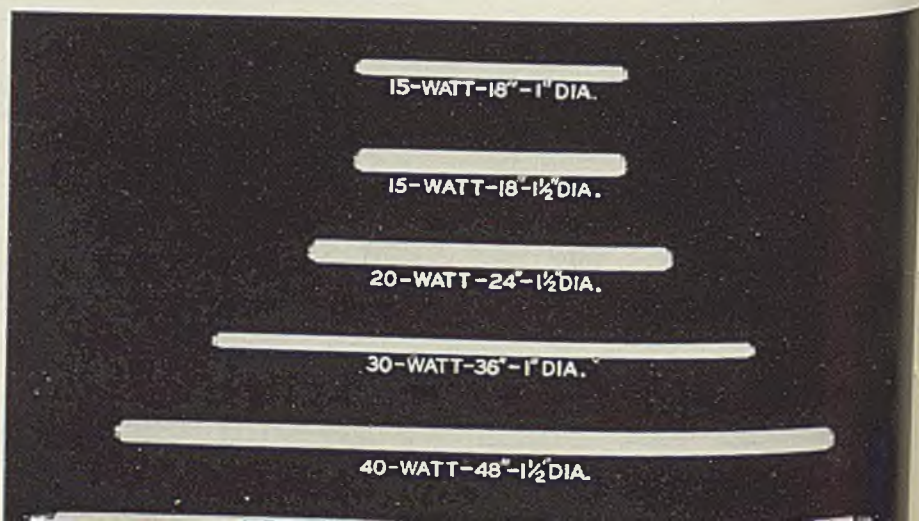
Footcandles of illumination and the resulting visibility now are as definite factors in production as skilled labor, since skilled labor nearly always involves a difficult seeing task. Improved lighting conditions affect production both directly and indirectly. Such factors as handling time, inspection, accuracy of work, etc., benefit directly by improved lighting; other factors, such as morale, accident rate, etc., which influence production indirectly, also benefit from improved lighting. It also should be remembered that any improvement in working conditions will sooner or later show

up in production costs. An improvement in the lighting system, one of the most noticeable that could be made, is bound to have a stimulating effect on the personnel.

A shop can be equipped with very bright lights and yet working conditions with regard to lighting may be very poor. Here's a shop, for example, in which it is difficult to distinguish a brass collar from the steel shaft on which it is fitted. There is difficulty in reading cylindrical scales of micrometer and beveled scales of machine tools. Workmen's eyes are fatigued easily, lights seem to be a nuisance rather than a help, rejects increase and production costs rise. Another shop, although it appears to have less light, actually may be a much better place in which to work. There is a higher morale among the workers, rejects are less and costs of production are lower.

The effect of proper lighting on the accident rate is likewise notable. In this connection, the close correlation between the accident rate and illumination is not generally understood. In many cases where accidents are attributed to poor illumination they occur because of improper quality or practically no

Fig. 1. (Below)—Size range of standard fluorescent lamps



Illumination

Modern lighting methods bring lower production costs, better quality of work, reduced accident rates and improved working conditions and employe morale. Many plants can benefit

illumination at all. Poor or indifferent lighting as a contributing cause of accidents apparently has been overlooked as an industrial safeguard. Many factors that make for poor quality, such as glare, both direct from the lighting unit and reflected from the work, or dark shadows, hamper seeing and will cause the after-images and excessive visual fatigue which are an important contributing cause of industrial accidents. Accidents attributed to the individual's carelessness many times can be traced to difficulty of seeing.

One of the great losses to industry is the minor accident where the

employe may or may not report for first aid, but in either case continues his work. Condition of illumination at point of accident should always be reported in accident investigations. It is significant that a large accident insurance company finds the industrial accident rate much higher in winter than in summer—significant because the hours of daylight are much less in the winter than in the summer.

Accident Rate Reduced

An official of a metalworking company recently stated that following the installation of a general lighting system of Glassteel Diffusers, the most immediate result was a gratifying decrease in the number of accidents treated in the dispensary. Since the work done was mostly blanking and shearing of sheet steel, there always was a risk of infection from cuts and deep scratches resulting from sharp edges of the metal. In addition to a decrease in the number of cases

treated in the dispensary, morale of men in this plant was noticeably improved due to decreased accident hazard and more cheerful working conditions.

Besides reduced accidents, further benefits are derived from improved lighting.

Among these is better utilization of floor space. Dark corners are eliminated. A uniform level of general lighting makes possible the most efficient arrangement of machinery and conveyors regardless of the natural lighting facilities. The outmoded necessity for placing all difficult seeing tasks close to a window has been responsible for much waste motion and for crowded work rooms with the inefficiency that crowding causes.

Neatness and cleanliness are much more easily maintained

* Mr. Warren is secretary, committee on light and safety, and a member of the committee on public information of the Illuminating Engineering society and a member of the NELA Park engineering department of General Electric Co., Cleveland. Mr. Finley is assistant editor of STEEL.

Fig. 2. (Below Left)—Brightness meter used to measure contrasting brightness of work with background

Fig. 3. (Below Center)—Visibility meter used to measure relative visibility of visual tasks

Fig. 4. (Below Right)—Light meter. Quantity of light falling on work is measured in footcandles

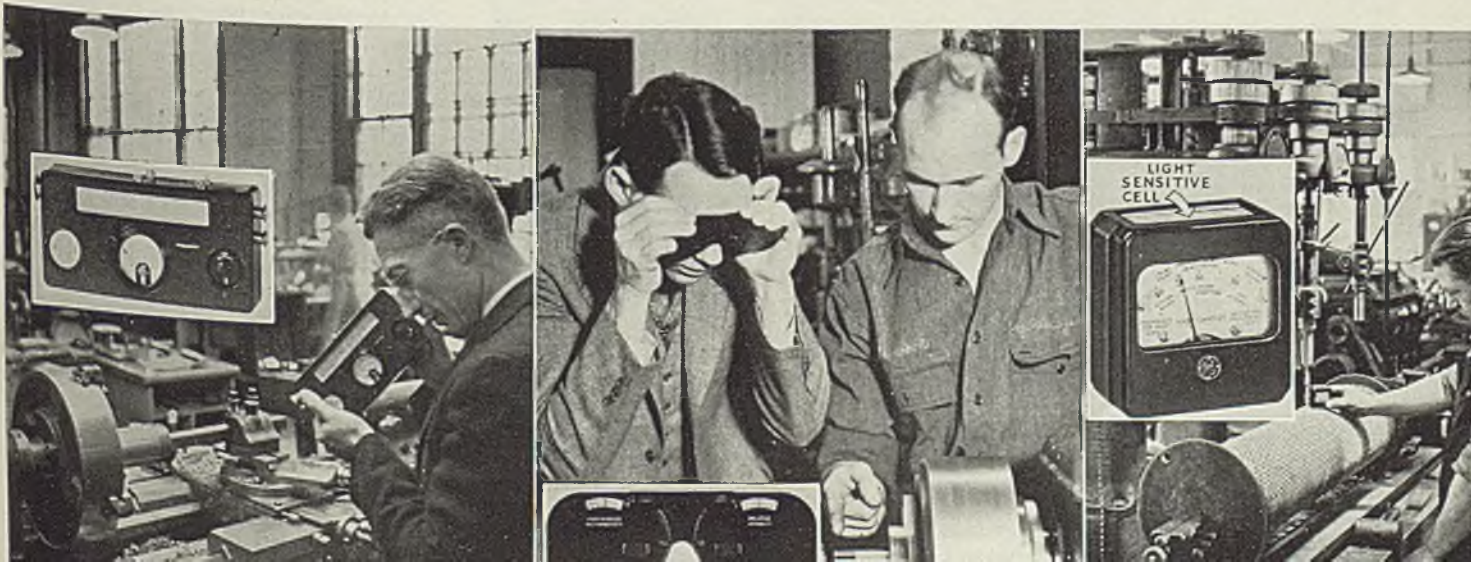
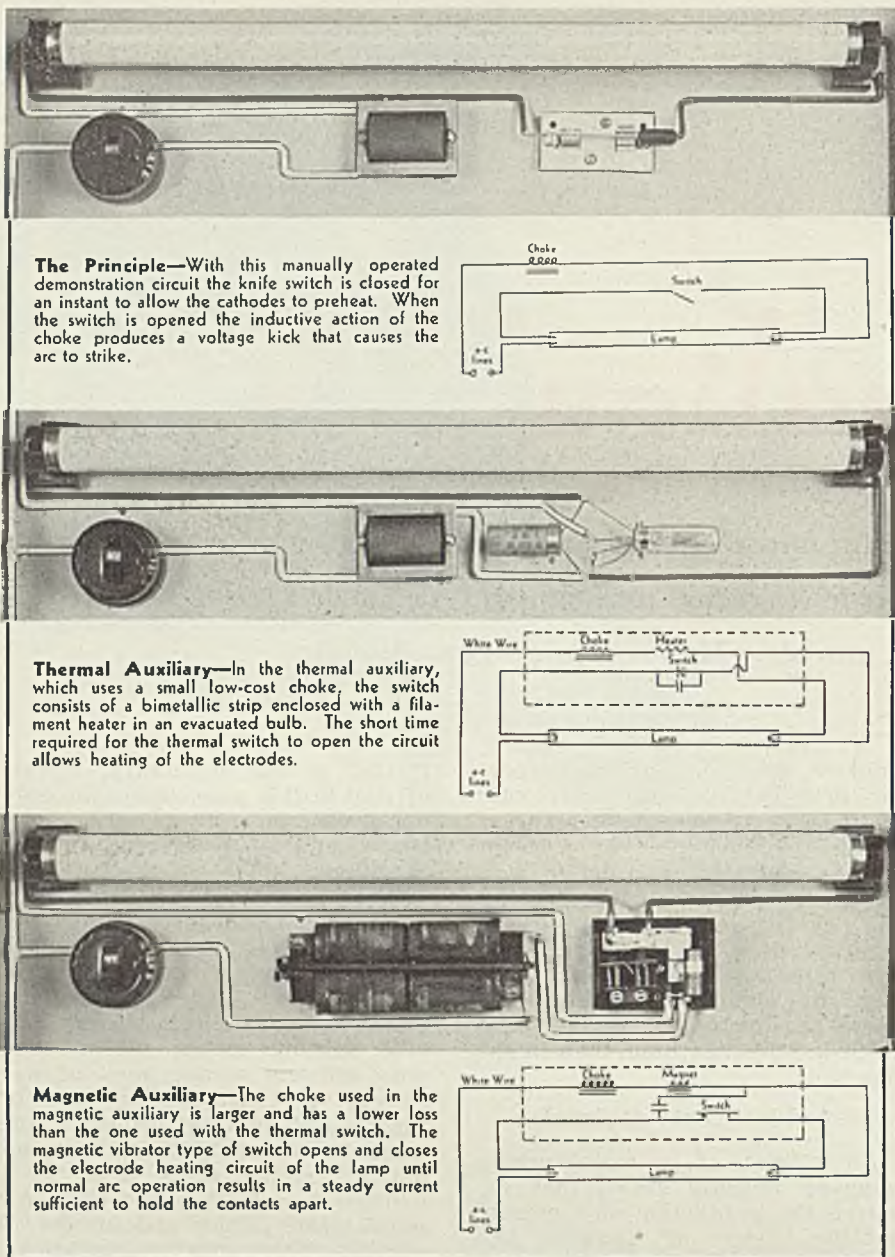
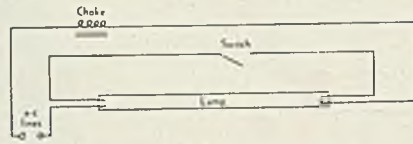


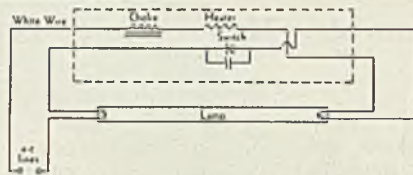
Fig. 5—Fluorescent lamp circuits showing operation of magnetic and thermal auxiliaries



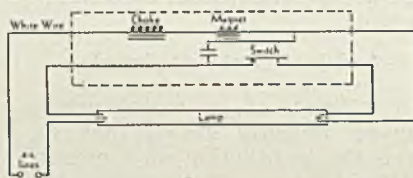
The Principle—With this manually operated demonstration circuit the knife switch is closed for an instant to allow the cathodes to preheat. When the switch is opened the inductive action of the choke produces a voltage kick that causes the arc to strike.



Thermal Auxiliary—In the thermal auxiliary, which uses a small low-cost choke, the switch consists of a bimetallic strip enclosed with a filament heater in an evacuated bulb. The short time required for the thermal switch to open the circuit allows heating of the electrodes.



Magnetic Auxiliary—The choke used in the magnetic auxiliary is larger and has a lower loss than the one used with the thermal switch. The magnetic vibrator type of switch opens and closes the electrode heating circuit of the lamp until normal arc operation results in a steady current sufficient to hold the contacts apart.



throughout a properly lighted plant. Dirt and debris that can be seen are more likely to be removed.

Proper lighting is especially helpful to older employes. Very frequently the employe in his fifties and over, although well fitted physically and mentally for the responsible work for which his years of experience have prepared him, in many cases suffers from impaired vision, thus slowing him down on exacting work. With increased age, the eyes lose their adaptability. Accommodation or focusing power decreases materially so that at about the age of 45 it frequently becomes necessary to wear bifocal glasses which permit the eye to focus upon near objects and far objects with little change in the accommodation of the eye itself. The pupil of the eye gradually becomes smaller and its ability to change rapidly in size to compensate for various illuminations is decreased. It is apparent that the

smaller the inlet to the eye, the more light is required for the same visibility. Light definitely is not intended as a substitute for eye-glasses since these are often prescribed for other purposes in addition to improving visibility of the tasks, however, the use of both is obviously better than either alone.

Poor Eyes Benefit

In an interesting laboratory test conducted some time ago with two groups of workers, one with good eyes, the other with poor eyes, the first group increased their rate of working 14 per cent when the lighting was raised from 3 to 12 foot-candles and those with poor eyesight increased their rate of working by 22 per cent.

Thus light tends to balance the inequalities in the human seeing machine, which means many valuable, skilled, older workmen can continue to perform efficiently under exacting conditions if the sim-

ple expedient of assisting their eyes with good illumination is adopted.

Proper lighting is an important factor in improving morale among workers. An important psychological effect springs from cheerful, pleasant, modern working surroundings. Investigations reveal poor lighting, on the other hand, as a cause of minor frustrations which harass the workmen—such matters as difficulty in reading scales, or using certain tools. These frustrations, if continued day after day, may instill in the workman a spirit of defeatism, which is bad for the morale of the factory personnel. In the opinion of a large number of employers who have recently improved their lighting, the better morale noticed after the relighting was one of the most important benefits obtained. Employees definitely like better lighting. With adequate lighting the plant also becomes more attractive to visitors and appears more up-to-date.

Recent developments in lighting consist of:

- New instruments for measuring.
- New light sources.
- New equipment.
- New methods of applying light.

New Instruments Help

Progress in industrial illumination in no small measure has been due to three instruments making possible the application of laboratory methods to the practical job in the shop. These are the light meter, the Luckiesh-Moss Visibility Meter and the Luckiesh-Taylor Brightness Meter, developed by Dr. Matthew Luckiesh, Frank K. Moss and A. H. Taylor of General Electric Co., NELA Park, Cleveland. These instruments aid the lighting engineer in providing the proper type of lighting for the job.

The light meter, inset Fig. 4, measures the amount of light falling upon it. When placed upon a lighted object, it measures up to 750 footcandles when a multiplier shield is placed on its light-sensitive cell. It is important that the measurement be made at the point and in the plane in which the seeing task is performed, whether it be horizontal, vertical or at some intermediate angle. Light on an object usually comes from both natural and artificial sources, and that part from the natural source should be measured separately from that from the artificial source. This is important because in many cases a great amount of natural light may available at a certain hour of the day and later fail entirely.

The light meter cannot measure

other factors such as glare, diffusion and distribution which have marked influence on visibility and the ability to see easily, accurately and quickly.

Evaluation of these factors is the function of the Visibility and Brightness Meters. Both deal with reflected light of an illuminated object. The Visibility Meter, Fig. 3, measures the relative ease of seeing objects which vary in size, shape and detail. It integrates the complex factors concerned in visibility so that a single reading with known footcandles of light on the object will indicate the footcandles necessary to see the object as easily as any given standard which has been selected. Thus direction of light and the degree of diffusion for maximum visibility can be measured. This last helps to fix the type of light source and the reflector to be used.

Often the quality of light and the ease of seeing will depend on the brightness of the light coming from an illuminated object and its contrast with background illumination. The Brightness Meter, Fig. 2, can be used to measure the brightness of light on the object and the surrounding brightness. Measurement is by comparison of the surface under observation with a surface inside the meter under controlled illumination. Its range covers the lowest brightness at which visual measurements are practicable up to the brightness of a 100-watt inside-frosted lamp bulb. This type of measurement is of the greatest value in insuring comfortable contrasts between the work and surroundings.

To understand latest developments in light sources and lighting equipment, it must be remembered that lighting of industrial interiors falls into two classifications, general and supplementary lighting. The purpose of general lighting, as the name implies, is to provide a reasonably uniform illumination throughout the interior to eliminate accident-causing shadows. It is well known that every worker engaged in a task involving an intense visual effort will, at intervals, glance up from his work

to rest his eyes. If the surrounding area is quite dark the pupillary adaptation of his eyes is likely to prove quite tiring, particularly if the task is prolonged.

A high level of general illumination also helps to utilize every square foot of space and, over stock areas especially, saves workmen's time in finding and handling stock. Similarly, it is good practice to install adequate lighting on all parts of the production line, instead of merely at final inspection. This reduces spoilage to a minimum as defective elements often are rejected at once rather than after time and expense have been expended upon a product which must be rejected at the final inspection.

Supplementary illumination, as the name implies, supplements general lighting to provide the amount of light required for difficult seeing tasks more economically than could be provided by the general lighting alone. It is further distinguished from general lighting because its direction is controllable and is not necessarily fixed once installed. It also is referred to as "tailored" lighting for it is in this sphere that the most careful analysis is required from the lighting engineer.

New Light Sources

Improved or newly developed light sources discussed here, and their principal applications, are:

Fluorescent lamps, supplementary and general, mainly supplementary;

Projector lamps, supplementary;

Silvered bowl lamps, general;

Vibration, service lamps, supplementary;

Rough service lamps, supplementary;

Type H mercury lamps, general.

The fluorescent lamp, the newest of them all, has been used mainly for supplementary lighting, but since introduction of the 48-inch and the 58-inch sizes its applications are extending into the field of general lighting. It produces daylight and colored light at the highest efficiencies ever achieved by lamp manufacturers and at low operating temperatures. It often is called "cold light" and has found particular application where the light source must be near operators, such as in inspection benches, assembly of small machine, etc.

Wide Range of Sizes

Tubular in form, the lamps are made in overall lengths of 18, 24, 36, 48 and 58 inches in 15, 20, 30, 40 and 85-watt sizes, respectively. The 18-inch lamp is available in either 1 or 1½-inch diameters, the 24-inch in 1½-inch diameter, the 36-inch in 1-inch diameter, the 48-inch in 1½-inch diameter, and the 58-inch lamp in 1½-inch diameter.

The lamps, illustrated in Fig. 1, are coated on the inside with a fluorescent substance and have an electrode at each end. The tube contains a small drop of mercury and a small amount of argon gas to facilitate starting the arc.

An advantageous feature of the fluorescent lamp is its lesser sensitivity to line voltage fluctuations than that of the filament type. One per cent change in socket voltage results in only two per cent lumen change as compared with the usual three per cent lumen change of the filament type lamp.

When operating on 60 cycles the flicker in light due to current reversal is barely noticeable and remains acceptable on 50 cycles. At 25 cycles, however, flicker is very pro-

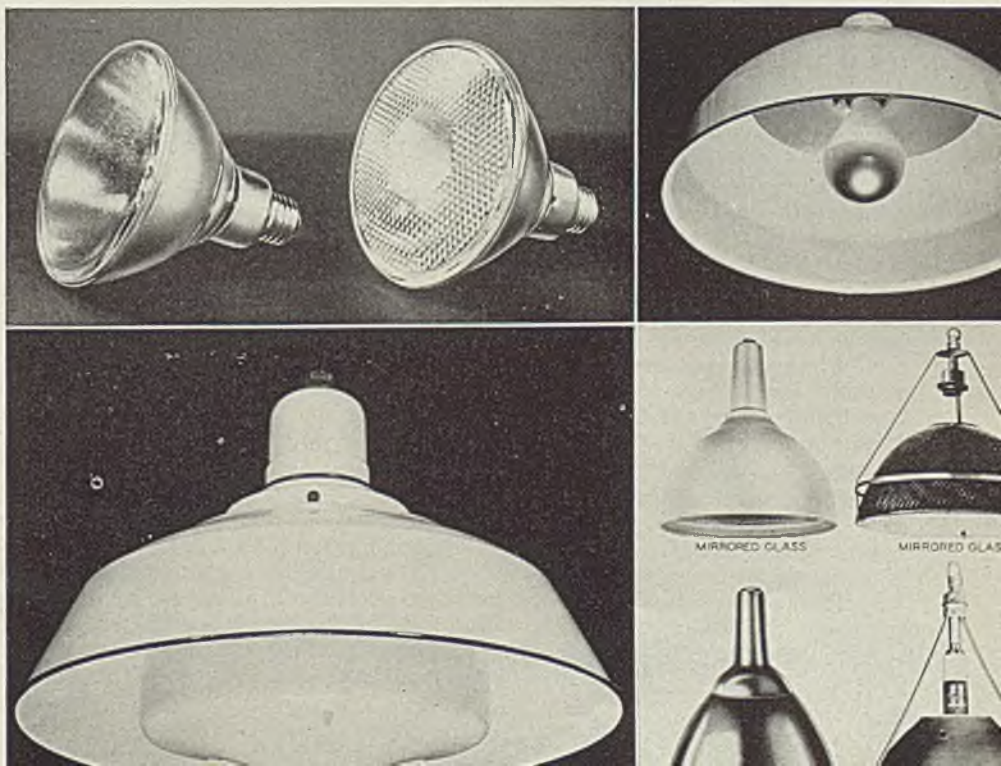


Fig. 6. (Upper Left)—Mazda projector lamp with hermetically sealed lens and accurately positioned filament

Fig. 7. (Upper Right)—Silver Bowl Diffuser for general illumination

Fig. 8. (Lower Left)—Glassteel Diffuser. Opal glass diffusing globe completely encloses lamp

Fig. 9. (Lower Right)—High Bay Reflectors. These units have a relatively concentrated distribution of light and are recommended for installations 20 feet or more above ground

nounced. Although the light in the arc itself is almost out at zero current, the phosphorescent coating on the tube has a persistence of glow which helps to reduce flicker. This is particularly true in the case of the white lamp. With lamps operating on two or three phases of a three-phase circuit or on two circuits placed out of phase by a transformer, the fluctuation in light output is further reduced and becomes comparable to that of low-wattage filament lamps.

Fluorescent lamps were designed especially for alternating-current circuits, but may be used on direct current if a resistor is provided. Direct-current operation, however, greatly reduces the high overall efficiencies for which these lamps are noted.

Auxiliary Controls Required

In common with all electric discharge light sources, fluorescent lamps require auxiliary control equipment. This consists of an iron-

costs more. Fig. 5 explains operating principles of the lamp and auxiliary.

Another practical distinction between the magnetic and thermal auxiliaries is the response of lamps using them to fluctuations in line voltage. Because of more iron in the magnetic auxiliary, it produces less current fluctuation and hence a greater resultant lamp efficiency. In installations where there is the likelihood of a marked rise in voltage, as in off-peak periods where voltage regulation is poor, the magnetic auxiliary is recommended.

An optional element of an auxiliary is a capacitor for power factor correction. Due to inductance of the choke coil, the lamps may have an operating power factor down to 50 per cent. In plants where many fluorescent lamps are in use and where there is a penalty for low power factor on the line, such a capacitor included in the same metal container with the choke and starting switch will pay for itself by cor-

sidered to be from 110 to 125, 199-216 and 220 to 250 volts.

Lamp life is determined more by decrease in light output than by failure of the lamp to light. It is characteristic of fluorescent lamps to have a noticeably lower light output after about 100 hours of operation. This is due to the effect of the vaporized mercury and the matter given off by the electrodes on the opacity of the fluorescent coating of the lamp. Although light output diminishes throughout life of the lamp, the falling off during the first 100 hours (about 10 per cent) is not exceeded during the following 1000 hours. Rated light output is based on performance at 100 hours, and for this reason newly installed lamps produce much more light than the uninitiated expect.

Frequency of starting also influences lamp life. A lamp started once a minute, for instance, will have a shorter life than normal while a lamp turned on once and let burn continuously will have a longer life than normal. When active material on the electrodes is exhausted, required voltage for starting may be greater than is available and the lamp may not light.

Continuing with developments in light sources, the next three lamps on the list, of the filament type, offer improvements resulting in better light concentration, diffusion and longer life under vibration.

Projector Lamp

The Mazda projector lamp, Fig. 6, has an accurately-positioned filament hermetically sealed within a molded glass reflector to which is fixed a precisely made lens. The positioned filament makes possible an accurately controlled light beam for use in supplementary lighting of operating and inspection areas of machinery, benches, etc. Available with a narrow beam for spotlighting and a wide beam for floodlighting, the lamp at present is made in the 150-watt size fitted with a medium screw base to fit the conventional porcelain socket.

When mounted five feet above work area, the lamp places on the work a 20-inch circle of light of about 400 footcandles intensity. With lamp mounted 10 feet from work, resultant illumination is 100 footcandles over a 40-inch circle. Since the lamp is unaffected by rain or moisture, it may be used outdoors. Its small size has made it particularly useful in installations where size of light source is an important consideration.

The silvered-bowl lamp, made in 60- to 500-watt sizes, has been developed in connection with special reflecting units described later. These are filament lamps that have

(Please turn to Page 52)

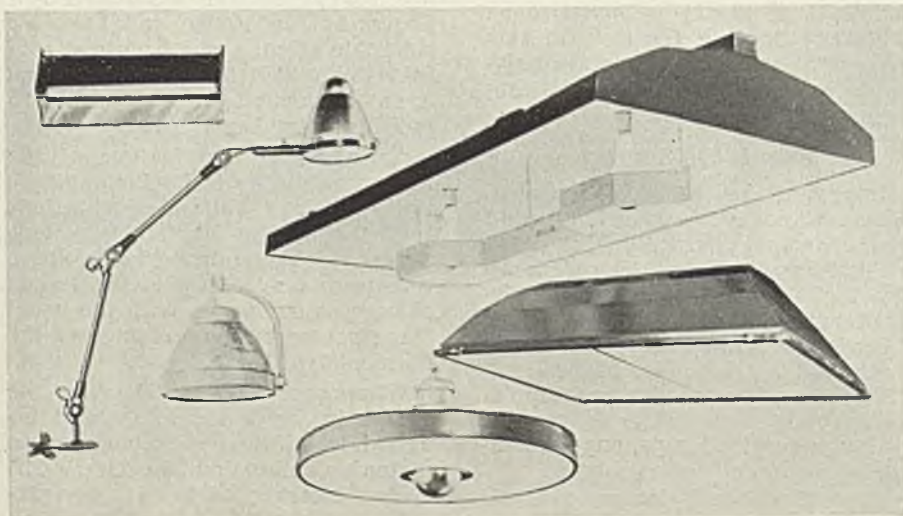


Fig. 10—Typical supplementary lighting units for use where a high level of illumination is required

core choke coil as a ballast to limit current to design value and a starting switch used to heat up electrodes. Each lamp requires a separate auxiliary, and in some models the ballast and switch are placed in the same metal container. In the newer types the ballast and switch are separate so that the switch may be replaced if necessary without installing a new ballast. Specifically designed auxiliaries are required for each wattage size, frequency and voltage range.

Thermal and magnetic are the two principal types of auxiliaries commercially available. This distinction is aside from the choke coil furnished with each, although in the magnetic the choke is larger, has a lower power loss in operation and

recting power factor to practically 100 per cent.

Lamp auxiliaries are available which are designed for use with two fluorescent lamps. For the 30- and 40-watt lamps these ballasts are more economical than individual ones for each lamp, correct power factor to 95-100 per cent, and make it possible to reduce stroboscopic effect by causing the two lamps to operate out of phase with each other.

In contrast to filament lamps, lowering the line voltage on the fluorescent lamp does not increase life of the lamp. A lower voltage places a greater burden on the electrodes, causing them to operate at too low a temperature and to be bombarded too severely. An increase in voltage, on the other hand, tends to decrease life because of the rapid use of material on electrodes. At present the operating range is con-

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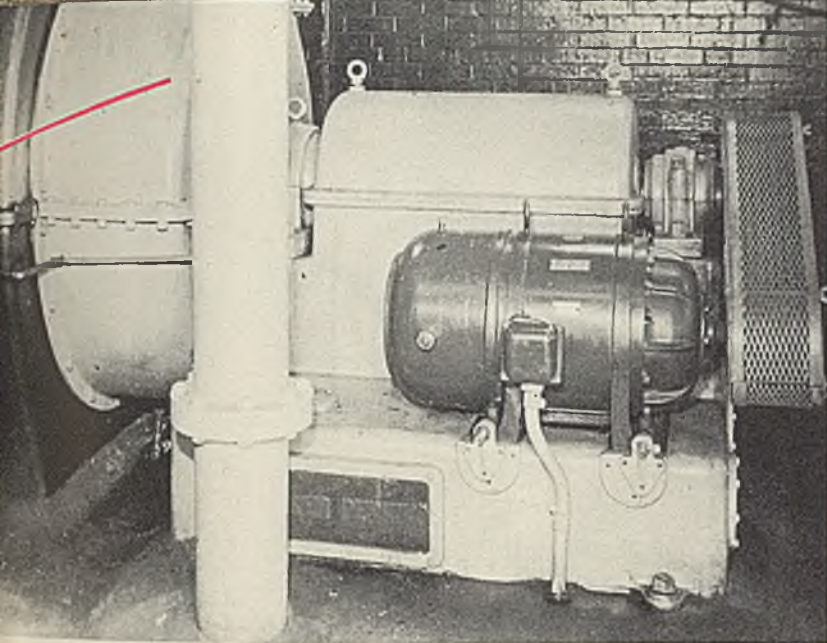
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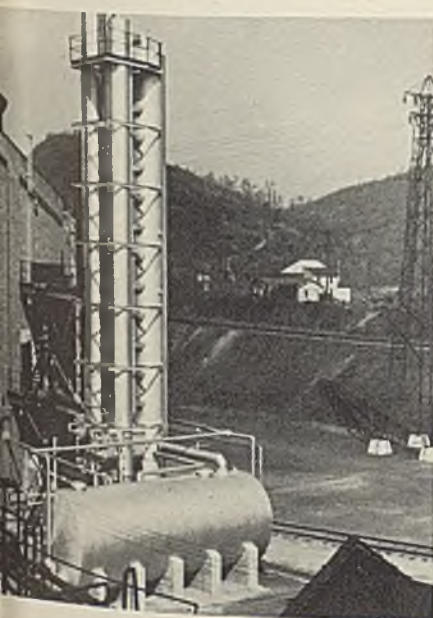
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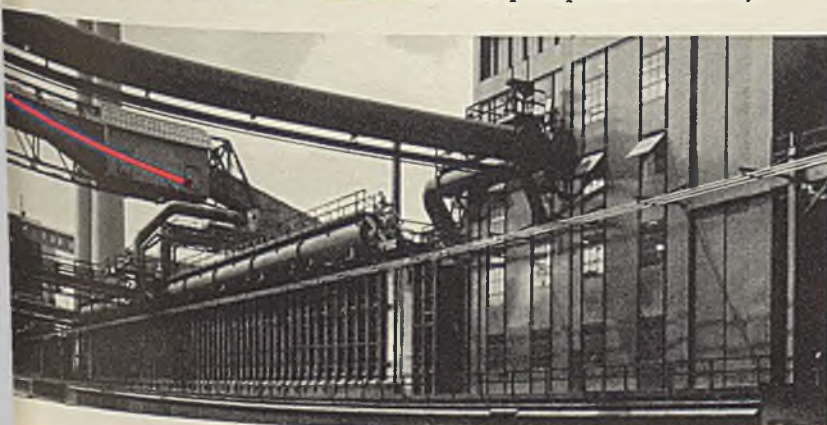
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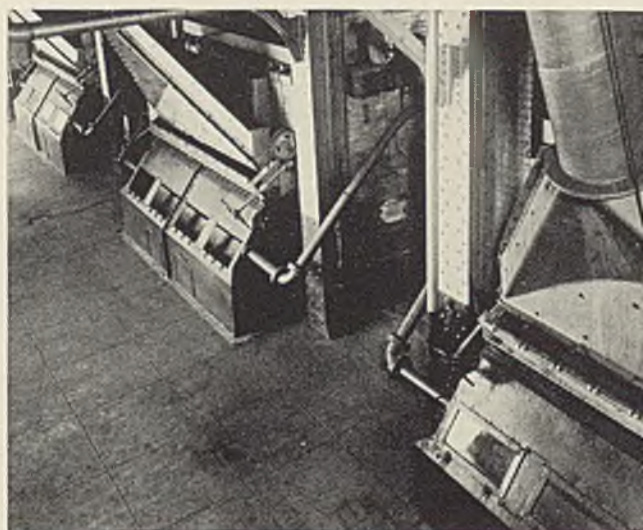


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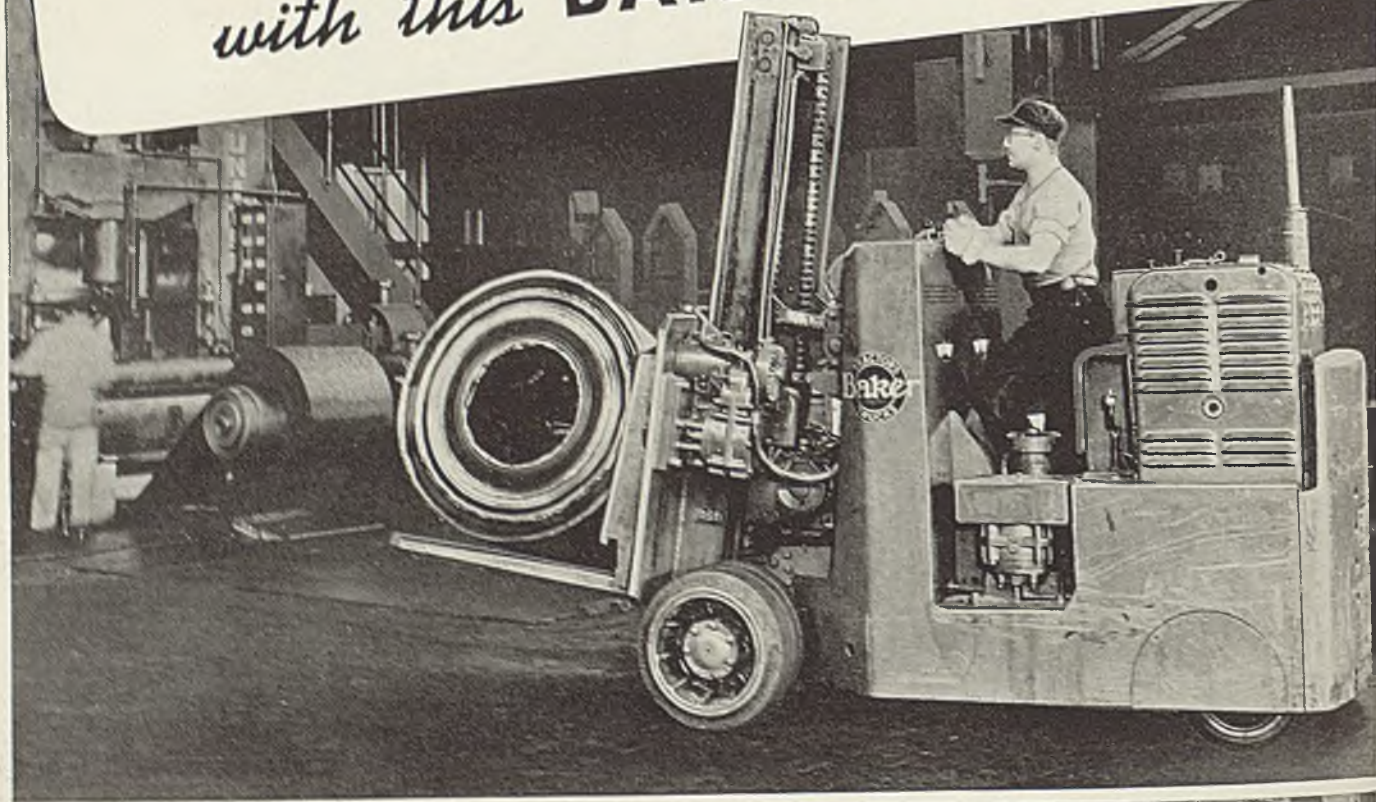
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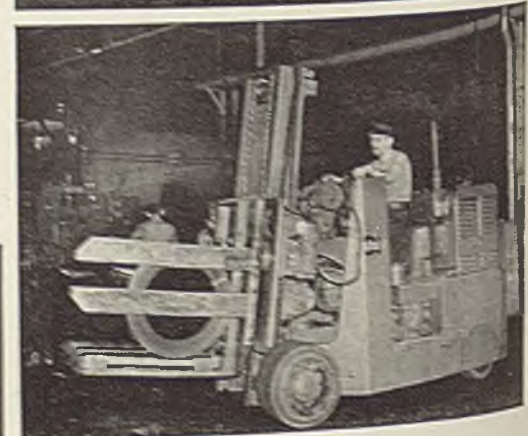
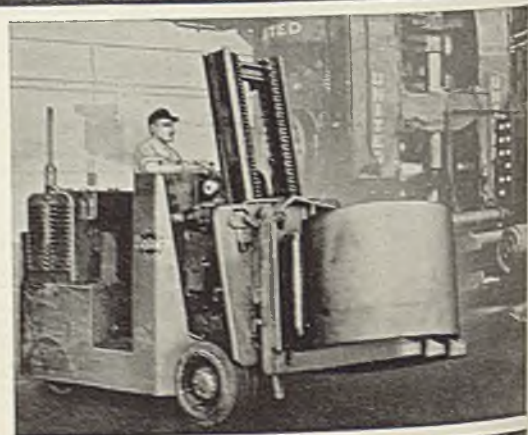
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Mass Handling of Ore Cars

New car dumper handles twenty-five 120-ton ore cars per hour.

Swinging cradle lifts cars 35 feet, then tilts to dump contents.

High pressure water jets clear car. Unit is electrically operated

■ WITH THE accent on volume production, mass handling of ore has become of greater importance in the industry. One expert handling job is being done at Edgar Thomson works, Carnegie-Illinois Steel Corp., Braddock, Pa. What is probably the largest ore car dumper ever built is in operation there, handling twenty-five 120-ton ore cars per hour. This newest ore car dumper in the industry was constructed by Heyl & Patterson Inc., 50 Water street, Pittsburgh.

Of particular interest in the construction of this unit were restricting local factors. Since it was found impractical to build a grade to raise the ore cars above the transfer car level, the dumper itself was built to do this job. As a result, this unit is the highest of its kind. Cars are lifted to a height of 35 feet by a swinging cradle and the

contents then dumped into the transfer car. Powerful streams of water clean the car of all remaining ore before it is returned to the level position.

The entire unit is electrically controlled, from the small pusher locomotive, known to the operators as "Mickey Mouse," to the blowers which supply filtered air to the two 300-horsepower motors which operate the cradle.

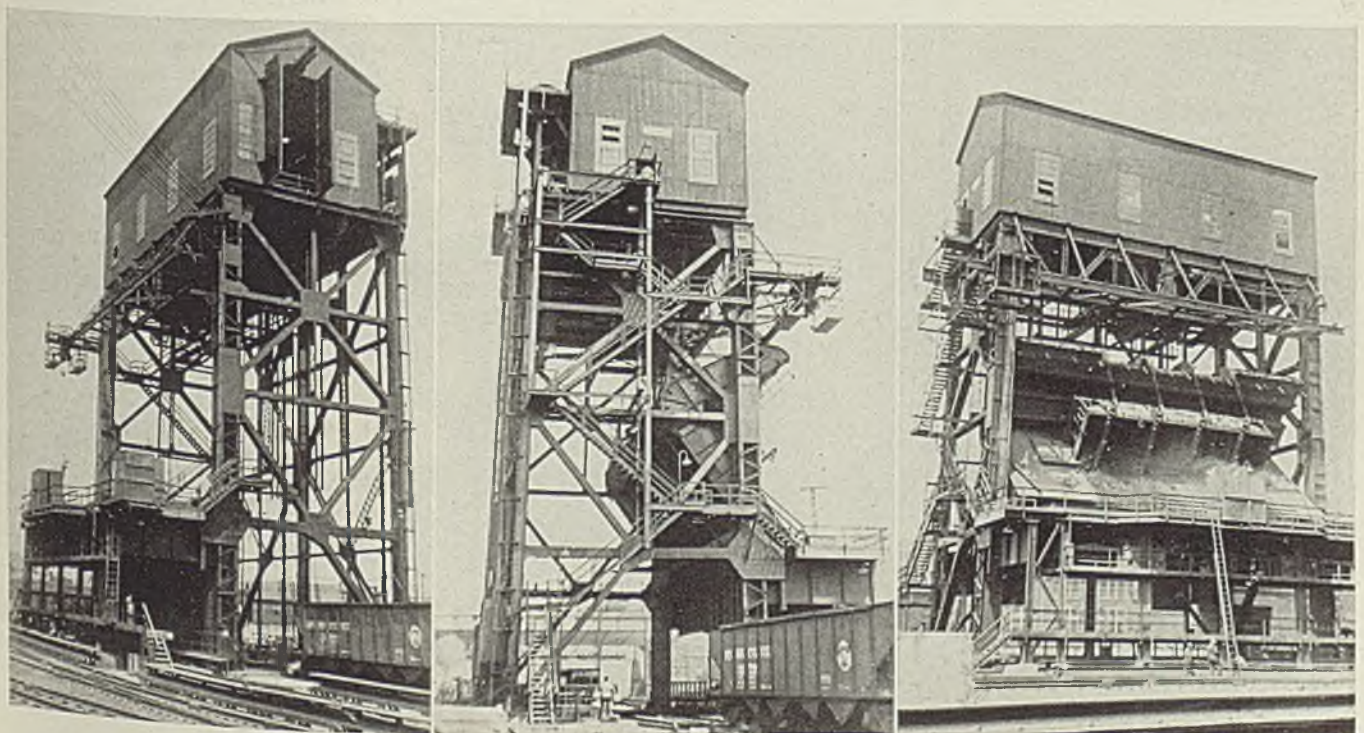
Cradle hoisting motors have a 5-hour capacity of 300 horsepower at 500 revolutions per minute. Hopper gates are driven by two 33-horsepower motors. The electric pusher locomotive is a 40-ton four-

wheel Atlas unit. A long wheel-base has been adopted to overcome side thrust due to pushing. It is propelled by two 100-horsepower, totally enclosed, series wound, mill-type motors. Total weight of the unit is 80,000 pounds, and it exerts a drawbar pull of 20,000 pounds.

Because of the level tracks and the fact that power of the pusher locomotive is self-contained and not supplied by cables, the locomotive can take cars onto the cradle and spot them wherever desired, thus evening the material in transfer cars instead of producing a load centered in one large pile. This enables the transfer cars to carry larger tonnages without additional hand labor for balancing and leveling.

The dumper is 115 feet high, including the motor house atop the structure. Base dimensions are 70

Left, platform lowered, car being run on. Center, platform lifts car and tilts it as shown here, dumping contents as at right



feet long and 36 feet wide, center to center of the main columns, or 70 feet wide overall, including counterweights and supporting structure for the hopper.

Because of the relatively high lift required of the cradle, it was built with a height of 23 feet 3 inches from tracks to the pivot. This height requires a proportionately large arc through which to move, accounting for the unusual width of the structure.

The motor room houses blower motors equipped with filters to eliminate dust and dirt from the cooling air supplied to the main motors. The power is controlled from two sources on the dumping platform. These dual controls are located on the platform itself and in a small pulpit erected at the back of the car dumping platform.

Car-Type Annealing Furnace Has Automatic Program Control

■ A car-type annealing and normalizing furnace with an all-automatic temperature control has been installed in plant of Johnston & Jennings Co., 877 Addison road, Cleveland.

Built by Gas Machinery Co., 16100

A screen having openings 16 inches square is provided on the hopper to prevent large blocks of ore from going into transfer cars. This screen is constructed of hard-faced material to minimize wear. The platform also is equipped with a small overhead hoist for repair and maintenance work.

Cars are delivered to the unit in groups by steam locomotive from the adjacent tracks of the Union railroad. The electric pusher then moves the cars one at a time onto the cradle. After dumping, the car is moved on through the dumper, the process being repeated until the entire group is dumped. The empties then are picked up again by the Union locomotive and returned to the track, making the entire operation a straight-line process.

Waterloo road, Cleveland, the furnace anneals and normalizes heavy forgings and has a net working

In this furnace the cooling rate is closely controlled by automatically throttled burners

space above car 4 feet wide, 15 feet long and 3 feet high to spring of furnace arch. Furnace is lightweight insulating fire brick throughout to permit required rapidity and accuracy of heating and cooling.

Heat is applied by natural gas burners firing above the charge, staggered with respect to each other on opposite furnace walls. Hot combustion gases must circulate completely around forgings supported on alloy rails laid on car hearth before they are vented to flues at hearth level. These flues are in side walls, rear wall and door lining for a correct balance of heat application over entire charge.

Control of heating and cooling cycles is completely automatic. Furnace operator has only to throw a switch to start heating cycle, and a reset switch after cooling cycle is completed.

When starting switch is thrown, burners are automatically lighted by pilots and heating proceeds until desired annealing or normalizing temperature is reached. A motorized gas valve of the two-position type then holds charge at temperature until charge is thoroughly soaked, length of soaking period being preset by an electric time clock.

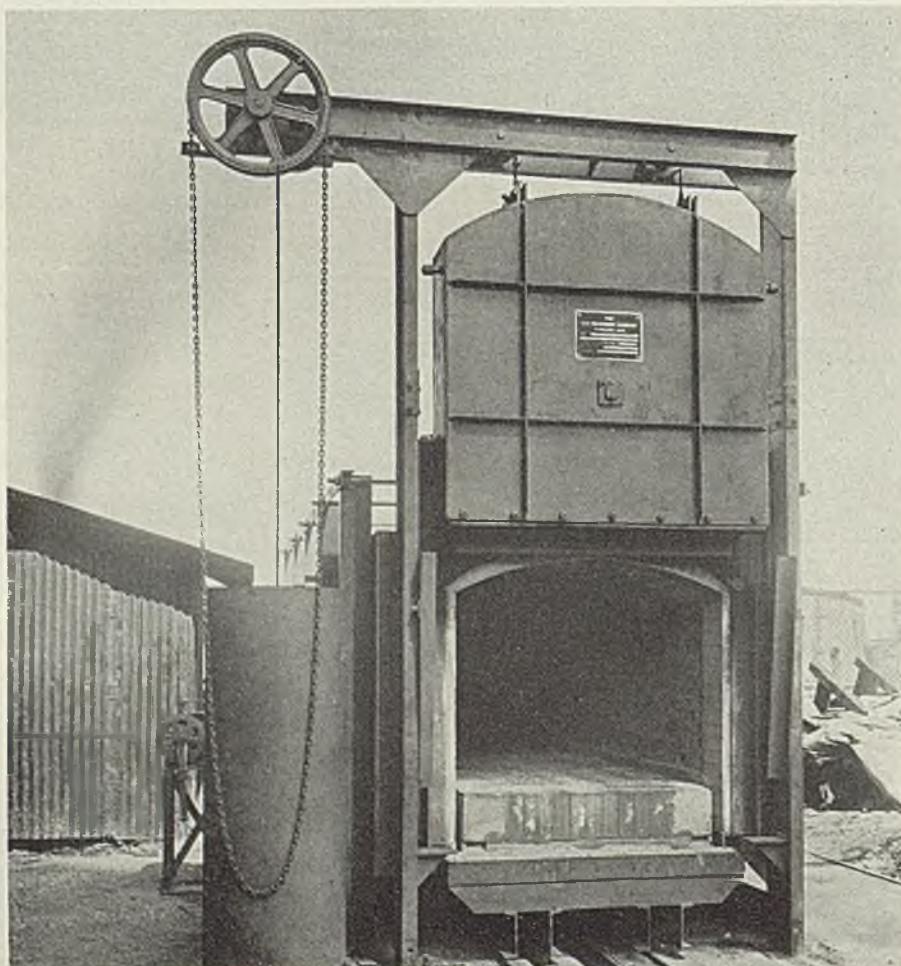
Burners are shut off automatically and furnace cools by natural air circulation or by withdrawal of car from furnace to a temperature slightly above upper critical temperature of forging being treated. At instant this temperature is reached, burners are turned on automatically at a throttled rate.

The two-position valve takes control again and automatically cools furnace slowly to a predetermined temperature by burners which maintain a uniform drop in temperature.

After burners are shut off automatically, furnace is allowed to cool by natural air circulation to a point sufficiently low to permit furnace car to be removed.

White Chromium Plating

■ Addition of "Triskalite" developed by Triskalite Corp., 67 Wall street, New York, to an ordinary chromium solution will under certain conditions convert it to a white chromium solution. Advantages of such a white chromium solution for plating work are said to include a wider bright plating range with lower current densities to reduce burnt edges and rejections, and greater throwing power. Tests by Dr. Pan's cavity scale test instrument show 55 per cent throwing power compared to the 30 per cent of ordinary chromium solutions. White chromium also is claimed to be flexible, resistant to peeling, rust-proof and nontarnishing.



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1939 Electrical Developments

Larger motors, accurately controlled gage, standardization of tensiometers between tandem stands, checking of strip defects electrically and new oilless circuit breakers are featured

■ WHILE rate of steel operations was low in first half of 1939, numerous developments were made or conceived. One hot strip mill was built and put in service, several 10 to 12 years old were modernized and some were widened. All were speeded up to compare favorably with up-to-date mills. Provisions were made to roll heavier and longer slabs to increase weight of coils. Changes involved use of additional

By L. A. UMANSKY

Industrial Department
General Electric Co.
Schenectady, N. Y.

stands and larger driving motors, which in turn called for more generating capacity and modern switching equipment. Notwithstanding the large number of new strip mills built

in recent years, new electrical equipment for hot strip mills was very much in the picture during the past year.

Auxiliary drives also present many points of interest. Runout tables and coilers for all strip mills built since 1937 were equipped with direct-current drives employing Ward Leonard control. One new strip mill installed additional equipment to coil strip in which the strip, after coming from finishing stands, is turned on edge, passed through a "vibrator" on a conveyor table and then coiled on a vertical coiler.

Rolling Speeds Increasing

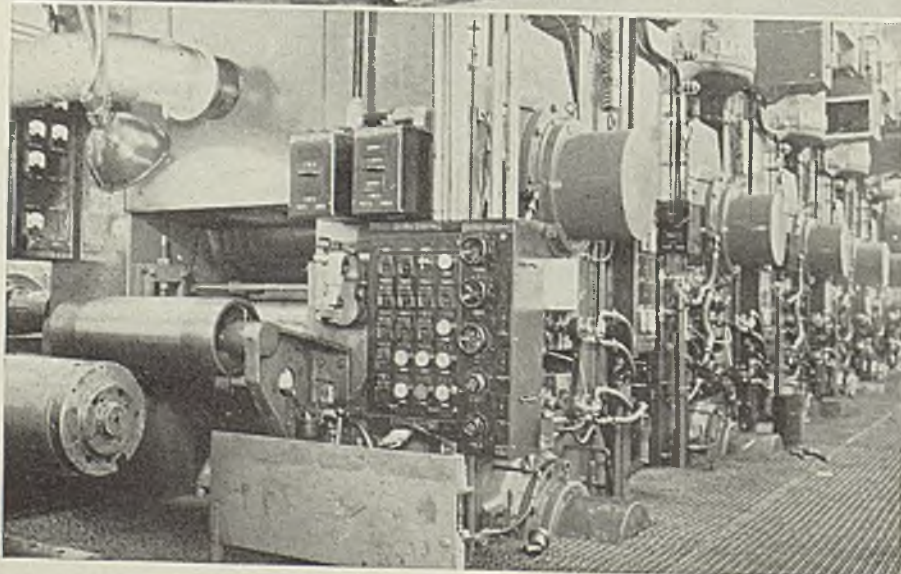
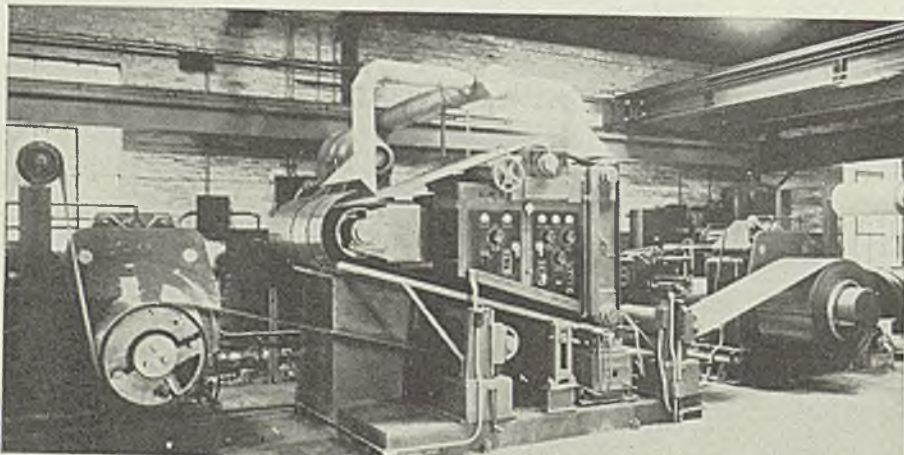
Trend toward increasing rolling speeds continues. While a maximum speed of 1800 feet per minute was a practical limit a year ago, several tin plate mills have been projected and ordered with a maximum speed above 2500 feet per minute. Motors of 2500 and 3000 horsepower are required on the stands, and a 7000-kilowatt or larger motor-generator set will be needed to supply direct-current power.

Greater refinements in control of cold mills were introduced, primarily for maintaining accurate gage. Automatic gage control was provided on at least one mill. Effect of tension between tandem stands on gage of strip was recognized and electrical tensiometers are fast becoming standard equipment.

Fig. 2 shows general view from delivery end of a 5-stand 48-inch tandem cold-strip mill installed in 1939. Motor ratings are: Stand 1,

Fig. 1. (Upper)—Steel strip grinding and polishing machine with tension reels at Wallingford Steel Co., Wallingford, Conn.

Fig. 2. (Lower)—Tandem 48-inch cold strip mill at Youngstown Sheet & Tube Co., Indiana Harbor, Ind. Tensiometers are used between all stands



1500 horsepower, 300 to 600 revolutions per minute; stands 2, 3 and 4, each 1750 horsepower, 300 to 600 revolutions per minute; stand 5, 1750 horsepower, 175 to 437 revolutions per minute; tension reel, 400 horsepower, 300 to 1200 revolutions per minute. Power is supplied by 5000-kilowatt 600-volt motor-generator set. Tensiometers are used between all stands.

Several continuous pipe mills have installed or have ordered continuous butt-weld pipe mills of the Fretz-Moon type. Strip is fed through furnace at a speed up to 400 feet per minute in a continuous flow, consecutive coils being welded end-to-end at entering side of furnace. The strip, heated to welding temperature, passes from furnace to a mill with several sets of forming, welding and shaping rolls arranged in tandem. Finished welded pipe then is sawed "on the fly" into required lengths. Electrical equipment, while not spectacular in size, was very carefully laid out to take care of the uninterrupted and smooth flow of this continuous process.

Strip Finishing More Important

Strip finishing acquired a growing prominence. Electrical equipment for pickling, cleaning and shearing lines was more closely integrated with mechanical equipment.

Defects in strip now are being checked electrically. One device, the photoelectric pinhole detector for tin plate, is gaining in importance. Benefits from its use are so great that original investment is repaid several times over each year.

To obtain desired finish, many grades of stainless steel and some grades of low-carbon steel strip require grinding and are passed slowly back and forth at constant speed and tension between two reels under a fast-running abrasive belt. To maintain this constant, speed and tension, an interesting electric system employing the "Amplidyne" exciter has been developed and applied successfully. The Amplidyne has been used to regulate voltage, current, strip tension, rate of acceleration, speed and other important factors. It is a special exciter with a very high ratio of output to control power (ratio between armature output and excitation), and with an extremely high rate of response. It combines a regulator and a pilot exciter through which a regulator ordinarily controls a larger machine.

Fig. 1 shows front view and operator's controls of a steel-strip grinding and polishing machine with tension reels, installed in 1939. Grinding belt runs 1000 to 4000 feet per minute, drive is by 40-horsepower 1750-revolutions-per-minute direct-current motor supplied with adjustable-potential power from 40 kilo-

watt 250-volt generator, and strip speed is 7 to 35 feet per minute. Reels are driven by 10-horsepower 575 to 1150-revolutions-per-minute direct-current motors supplied with adjustable-potential power from 5-kilowatt 250-volt generator and 1.5-kilowatt 40-volt booster generator. The Amplidyne tension control is used here. All generators and exciters are driven by 75-horsepower 1750-revolutions per minute 550-volt 3-phase 60-cycle induction motor. Reel and grinding-belt motors have enclosed forced ventilation.

Two new types of oilless high-voltage circuit breakers were introduced. For moderate interrupting capacities up to 150,000 kilovolt-amperes and for system voltages up to 5000 volts, the "Magneblast" breaker was developed in which the arc is quickly diverted into chutes where it is effectively cooled and extinguished. These breakers are electrically operated and are usually built as metal-clad, vertical lift units.

For larger interrupting capacities and system voltages of 6600 volts and higher, breakers using the "air-blast" principles have been found particularly suitable. Compressed air also is used for closing and tripping. These breakers ordinarily are supplied in metal-clad compartments.

Adjustable-Speed Drive Speeds Cable Making

■ A new drive, "Reliance V*S Drive", has been installed by Reliance Electric & Engineering Co., 1088 Ivanhoe road, Cleveland, to obtain speed changes on cable-form-

ing and wrapping operations at plant of Crescent Insulated Wire & Cable Co., Trenton, N. J. These are operations requiring accurate speed control of three principal units: A rotating table carrying supply reels, a taping head and a capstan drawing finished cable through taping head and discharging it onto reels.

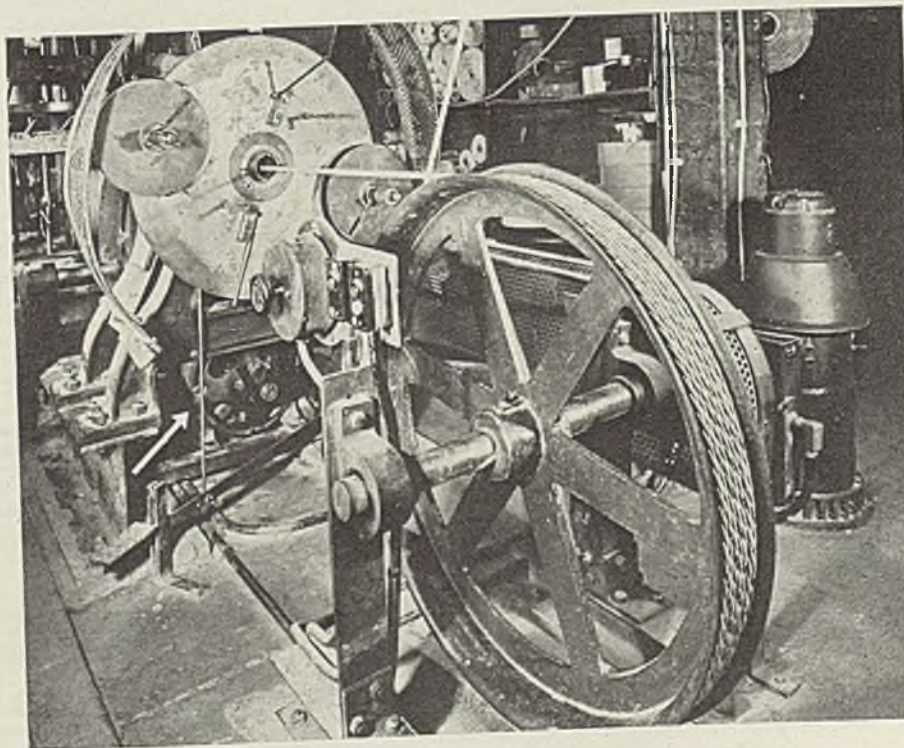
To insure an even twist to the finished cable, insulated wire drawn simultaneously from supply reels mounted on rotating table must move at a uniform speed through wrapping head and onto capstan. For this reason, a constant-speed motor and same chain drive operate both rotating table in background of illustration and capstan seen in foreground.

To vary diameter of cable and amount of wrapping, speed of the wrapping head or speed of cable through it is changed. The taping head carrying two spools of cable tape is independently driven to permit a wide range in operating speeds. This speed control is available by turning a handle beside start-stop buttons.

Increased uniformity of product is claimed to have been made possible by this drive, and time out for making speed changes has been eliminated.

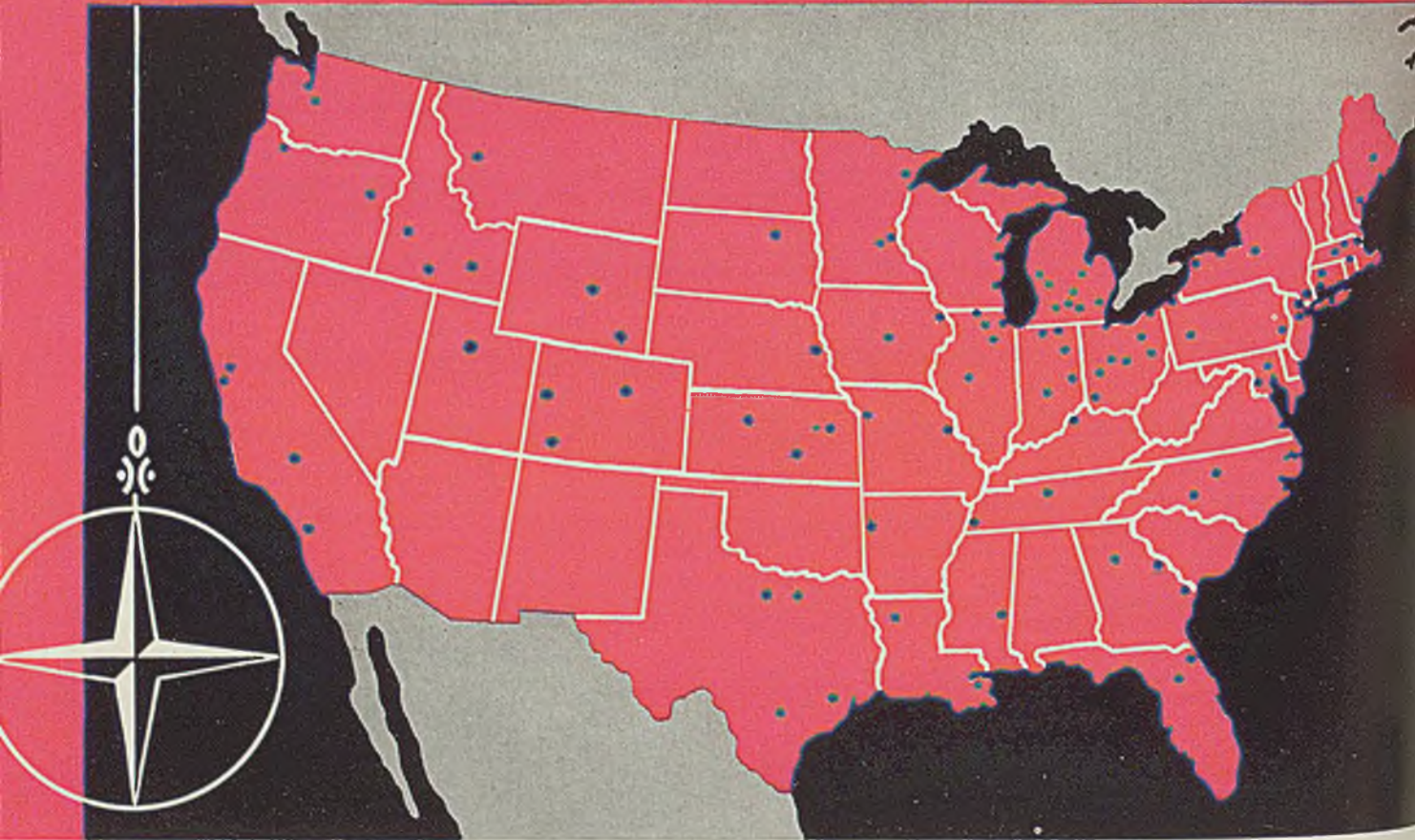
Although both motor and adjustable-speed unit operate in an atmosphere heavily laden with talc and soapstone dust, no unusual maintenance has been reported.

Cable forming and wrapping is speeded with application of an adjustable-speed electric drive which combines wide range of speed with ease of control



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Rockford.....Mid-States Industrial Corp.</p> <p>Indiana
Elkhart.....Borneman & Sons Inc.
Fl. Wayne.....The National Mill Supply Co.
Indianapolis.....Yonnegut Hardware Company
Richmond.....The Queen City Supply Company
South Bend.....The South Bend Supply Company</p> <p>Iowa
Des Moines.....Globe Machinery & Supply Co.
Dubuque.....A. Y. McDonald Manufacturing Co.</p> <p>Kansas
Salinas.....Merrill Supply Company
Topeka.....W. A. L. Thompson Hardware Co.
Wichita.....The Motor Equipment Company</p> <p>Kentucky
Louisville.....Neill-LaVielle Supply Co. Inc.</p> <p>Louisiana
New Orleans.....Dixie Mill Supply Company Inc.
Shreveport.....Dixie Mill Supply Company Inc.</p> <p>Maine
Bangor.....N. H. Bragg & Sons
Portland.....Edwards & Walker Company</p> <p>Maryland
Baltimore.....The L. A. Benson Company</p> <p>Massachusetts
Boston.....Chase, Parker Company Inc.
Worcester.....Brierly, Lombard & Company Inc.
Springfield.....Stacy Supply Company</p> <p>Michigan
Battle Creek.....Kendall Hdwe. & Mill Supply Co.
Detroit.....The Boyer Campbell Company
Detroit.....Bull Sons Company
Detroit.....The Chas. A. Streflinger Company
Grand Rapids.....Manufacturers Supply Company</p> | <p>Jackson.....Smith Winchester Company
Kalamazoo.....Bond Supply Company
Kalamazoo.....Kendall Hdwe. & Mill Supply Co.
Lansing.....Schaberg-Dietrich Hdw. Co.
Muskegon.....Muskegon Hardware & Supply Co.
Saginaw.....Morley Brothers</p> <p>Minnesota
Duluth.....Kelley-How-Thomson Co.
Minneapolis.....Minneapolis Iron Store Co.
Minneapolis.....Vincent Brass & Copper Company
St. Paul.....Nicols Dean & Gregg</p> <p>Mississippi
Meridian.....Soule' Steam Feed Works, Inc.</p> <p>Missouri
Kansas City.....Richards & Conover Hdw. Co.
Kansas City.....Stowe Hardware & Supply Co.
St. Louis.....Calcard-Wright Machinery & Supply Co.
St. Louis.....Rubelman-Lucas Hdwe. Company</p> <p>Montana
Missoula.....Missoula Mercantile Company</p> <p>Nebraska
Omaha.....Interstate Machine & Supply Co.</p> <p>New Jersey
Newark.....Banister & Geyer, Inc.
Newark.....Squier, Schilling & Skiff
Passaic.....H. W. Mills Co.
Patterson.....H. W. Mills Co.</p> <p>New York
Buffalo.....Beals, McCarthy & Rogers Inc.
Garden City.....Air Associates, Inc.
New York.....Guarantee Specialty Co.
New York.....Neal & Brinker
New York.....Patterson Brothers
Rochester.....Sidney B. Raby Company
Syracuse.....Syracuse Supply Company</p> <p>North Carolina
Charlotte.....American Hardware & Equipment Co.
High Point.....Kester Machinery Company</p> <p>Ohio
Akron.....Manufacturers Rubber & Supply Co.
Canton.....The Canton Hardware Company</p> | <p>Cincinnati.....The Queen City Supply Company
Cleveland.....The W. Bingham Company
Cleveland.....The Strang, Carlisle & Hammond Co.
Columbus.....The Ross Willoughby Company
Dayton.....The Klinger Dills Company
Springfield.....The Ross Willoughby Company
Toledo.....The National Supply Co.</p> <p>Oregon
Baker.....Basche-Sage Hardware Company
Portland.....Woodbury & Company</p> <p>Pennsylvania
Erie.....Erie Concrete & Steel Supply Co.
Philadelphia.....Casanova Supply Company
Philadelphia.....Maddock & Company
Philadelphia.....Sanborn & Company
Philadelphia.....Theo. C. Ulmer
Pittsburg, Pa.....C. A. Tomlinson</p> <p>Rhode Island
Providence.....Rayhill and Greene Supply Co.</p> <p>South Dakota
Aberdeen.....The Jackson Hardware Co.</p> <p>Tennessee
Memphis.....The Reichman Crosby Company
Nashville.....Keith, Simmons & Co.</p> <p>Texas
Dallas.....Valdez Screw Products Co.
Fort Worth.....John Muller Company
Houston.....Jos. F. Meyer Company
San Antonio.....Alamo Iron Works
Tyler.....Wadel-Connally Hardware Co.</p> <p>Utah
Salt Lake City.....The Salt Lake Hardware Co.</p> <p>Washington
Seattle.....Campbell Hardware & Supply Co.</p> <p>Wisconsin
Manitowoc.....J. J. Stangel Hardware Company
Milwaukee.....Wrought Washer Company</p> <p>Wyoming
Casper.....Casper Supply Company
Cheyenne.....Casper Supply Company</p> |
|---|---|--|--|

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Lock Washers

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SHAKEPROOF

the Standard of Locking Efficiency because:



1. Only Shakeproof Lock Washers have tapered-twisted teeth which on initial

contact, bite into both surfaces and set up a powerful "strut" force to resist any loosening movement.



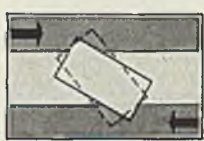
3. After initial contact, it takes only about 1/4 turn to lock any nut or screw tight with

a Shakeproof Lock Washer. This assures easier and faster assembly.



2. Made of high carbon steel, hardened and tempered, each lock washer has exceptional

spring-tension which keeps the teeth in constant locking contact.



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in deeper, increasing the locking power which prevents loosening regardless of the degree of vibration.

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. . . Locking and Plain Terminals

Thread-Cutting Screws . . . Bolting Screws
Self-Locking Washers . . . Special Stainless

Industrial Illumination

(Continued from Page 40)

a built-in reflector extending over the half of the bulb that is farthest from the base. In addition to re-directing the light the reflector serves to shield the filament from view. These lamps are used mainly in general lighting where an indirect lighting effect is desired.

Regularly available in the 50-watt size, vibration-resisting lamps are designed to withstand high-frequency vibration produced by high-speed machinery. The lamps are not recommended for horizontal burning nor for operations where there is a great deal of shock.

The rough service lamp, capable of withstanding severe shocks and bumps, is especially suited for extension cord service. It is available

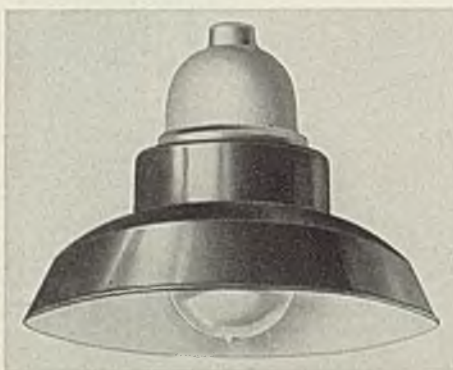


Fig. 11—Explosion-proof units for use where moisture or vapors are present

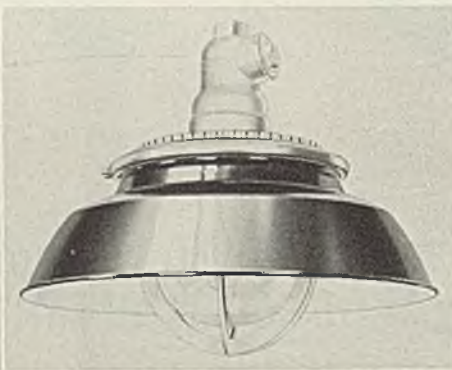
in 50- and 100-watt sizes and higher for special work.

Type H mercury lamps are a radical departure from the incandescence filament type, both in operation and color quality of the light produced, but are applicable to a wide range of general lighting installations. They represent an improvement over the ordinary electric discharge light source in that they come with conventional screw bases and are adaptable to standard reflectors. Auxiliary equipment consists of a regulating device for starting and operation. A "Tulamp" transformer sometimes is used for operating two of these lamps to reduce flicker and minimize stroboscopic effect found with one lamp or a group on single phase. With this transformer, overall power factor is above 90 per cent; one lamp will remain lighted with a line drop of as much as 40 volts and transformer loss and cost is less than that of two lamps using single unit auxiliaries. It is a characteristic of these lamps to require several minutes to come up to brilliance. The lamps are available in 250- and 400-watt sizes for general use. Their application in conjunction with

standard filament lamps will be discussed later.

The bipost filament-type lamp, so named because of two prongs in its base which serve to make the connection in the socket, is smaller, more rugged than the ordinary filament lamp and is made of a hard glass not affected by moisture. Its seating in the socket also makes it possible to position its filament more accurately with respect to the reflector used. To maintain a high light efficiency, there is a small screen on each lead inside the bulb to catch blackening shed by the tungsten filament which would otherwise darken the bulb. Lamps of this type now are available in 500-, 750-, and 1000-watt sizes.

The Glassteel Diffuser, Fig. 8, is a porcelain enameled steel reflector fitted with an opal glass diffusing globe that completely encloses the



lamp. In effect the globe and reflector become the light source and, being much larger than the bulb, give out a softer, more diffused light than the bulb alone. Openings in top of reflector allow about 6 per cent of the light to illuminate ceiling and thus lend a more cheerful aspect to the room. Color-correcting globes to give whiter light also are available. An installation of Glassteel Diffusers can give a high level of illumination without excessive brightness, harsh shadows, and direct or reflected glare.

The Silvered Bowl Diffuser, Fig. 7, is a porcelain-enameled, steel reflector equipped with a semi-diffusing Alzak aluminum insert which makes possible a more even distribution of illumination than has been possible with standard porcelain-enameled luminaires. The unit is designed for and must be used with a silvered bowl lamp. It combines the efficiency and ease of maintenance of the RLM Standard Dome reflector with the low brightness of the Glassteel Diffuser. It is very comfortable to look at, particularly at angles where direct glare is ordinarily most noticeable; but reflected glare and shadows from it are more pronounced as it does not provide the same degree of diffusion that is

provided by the Glassteel Diffuser. The High-Bay reflectors shown in Fig. 9 are luminaires having a relatively concentrated distribution of light. Units of this type are recommended in bays which are narrow in comparison to their height so that a maximum of light can be directed to the working plane without wasting it on the upper side-walls. Ceiling height alone is not the governing factor, but as a rule these reflectors are applied at heights of more than 20 feet from the working surface. They now are available in prismatic glass, mirrored glass and Alzak aluminum. Higher initial equipment cost proves an actual economy when balanced against the unit cost of light delivery to the working plane.

Supplementary Units

Reflecting units used for supplementary lighting fall into two classes: (1) small, relatively concentrating units and (2) large-area, relatively low-brightness sources. The latter, in addition to supplying supplementary lighting, are used to provide general lighting for restricted areas such as inspection tables, workbenches, etc.

Since they represent the tailor-made part of industrial lighting, supplementary lighting units are found in a variety of shapes to suit an increasing number of applications. Some of these, shown in Fig. 10, may be attached to the machine, ceiling, sidewall or conduit 4 or 5 feet from the work. It is desirable that the concentrating type be properly placed and louvered to eliminate the possibility of direct glare.

The projector lamp described previously is mounted on an extension arm and may be pointed in a number of directions. It also may be mounted on a permanent base some distance from the work and once adjusted may be left in position. In either case, if the unit is not aimed properly it may be a nuisance to other workmen.

Large-area diffusing units may be used for supplementary lighting, or if of adequate length or properly spaced, may be used as the entire lighting system itself, providing a high level of illumination of excellent quality on the work area and enough lighting throughout all sections of the room to keep contrasts from becoming uncomfortably pronounced. Mounted 3 to 5 feet above the work, these units produce a quality of lighting similar to that of the indirect unit. Such luminaires may be of several varieties. They may be designed around fluorescent lamps and have suitable reflecting surfaces of more or less uniform brightness; they may incorporate luminous elements of white diffusing glass mounted in a box containing fila-

ment lamps; or they may consist of a matte white surfaced canopy or hood illuminated by filament lamps in a trough reflector suspended below it or by silvered bowl lamps suspended in the same general position as the trough. Because of fewer dust-catching surfaces to reduce light output, the suspended-canopy type of luminaire using silvered bowl lamps requires less maintenance and is said to be more efficient than that employing the trough reflector. Each of the types just discussed has advantages which recommend it for particular purposes.

Of importance also is the vapor-proof and explosion-proof equipment, for locations where corrosive vapors, flammable gases, corrosive dust or moisture-laden atmospheres are encountered. Typical units are shown in Fig. 11.

"Daylight" Available

Sometimes it is desirable to provide light resembling daylight in color quality. Most of the reflecting units described can be provided with light sources that will give light that is an approximation to daylight in color quality. One is the daylight fluorescent Mazda lamp which has a color temperature meeting the standard for white light of the national bureau of standards. Because of the low amount of heat emitted, the fluorescent lamp is very suitable for color work because it can be located close to the task with no heat discomfort to workmen. In operations requiring color discrimination or color matching, filters can be used with filament lamps to produce light of almost any desired color quality. Common commercially available color filters include Mazda daylight filament lamps, noon sunlight and north skylight filters. Filters, however, represent the subtractive method of obtaining colored light and hence color-corrected light produced by the use of filters is produced much less efficiently than when the additive methods are employed. Fluorescent lamps, of course, produce colored light by the additive method.

Another additive method of obtaining fairly white light is the combination of filament lamps with low-pressure mercury lamps. Type H mercury lamps also may be used in combination with filament lamps to produce a white-appearing light, but extremely careful judgment must be exercised in choosing such combinations for color work as the resulting light may emphasize certain colors in preference to others. These combinations are not recommended for color matching. In general, for industrial interiors where the matter of color rendition is not important, equal wattages of filament and mercury lamps give satisfactory results for general lighting since the

daylight quality has a cool effect, psychologically, upon work and in many cases has increased employee efficiency.

(To be Continued)

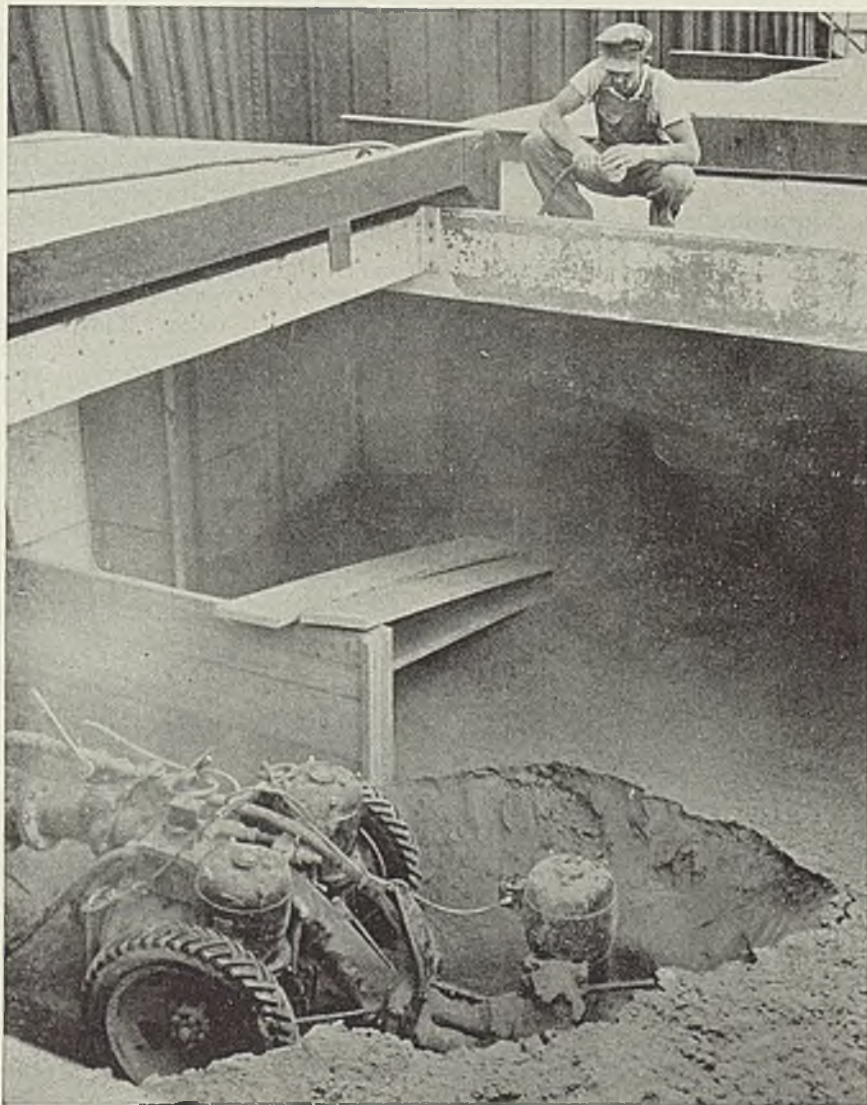
Finish For Plastics

■ Sherwin-Williams Co., 601 Canal road, Cleveland, announces Kem Plastite enamel for finishing plastic materials. It is said to provide thorough adhesion and to withstand

severe abrasion and impact without marring or chipping.

Advantages claimed for use of color finishes on brown plastics in place of using color plastics are: Saving in spray used in applying colors to cheaper brown plastic material; richer colors are possible; manufacturers are able to produce all plastic objects in the one cheaper compound and spray on whatever color is in current demand, thus avoiding danger of over-producing an unpopular color.

Remote Control Facilitates Unloading



■ A novel and simple remote control switch developed by Fuller Co., Catasauqua, Pa., and Durakool Inc., Elkhart, Ind., is shown here controlling an unloading machine in the hold of a river barge. Device consists of four mercury switches arranged 90 degrees apart. To operate, a button is pressed on handle to make electrical connection and device is pointed in direction machine is to move: Forward, backward, right turn, left turn. Tilting in pointing causes mercury to close

the switch which will cause a corresponding movement in unloader. Wheels of unloader are driven separately and are controllable from operator's station. Right and left turns are executed by reversing direction of rotation of wheels. On a right turn, left wheel rotates forward and the right wheel backward. In addition to providing safety from dust hazard, remote control allows operator to sit comfortably at a vantage point and direct the machine at will.



Hardening Tappets

Induction hardening machine raises tappet inserts of SAE 314 steel to 60 Rockwell C at rate of 6000 per hour. Revolving fixture heats and quenches parts on an automatically controlled cycle

■ LOCALIZED hardening of steel by electric induction heating and rapid quenching in water sprays has been carried out for several years on a number of automotive parts such as camshafts and crankshafts. A new adaptation in 1940 model production is the redesigned tappet for Chevrolet engines, shown in cross section in Fig. 1.

This tappet cylinder is of chilled iron made in a permanent mold as in the previous design, but a steel "flower pot" cap or insert is brazed to the open top of the tappet cylin-

der casting. This "flower pot" is the seat for the pushrod which has been shortened and stiffened—contributing to smoother and quieter operation with greater durability.

Fig. 1 is a cross section showing the redesigned tappets and a 1939 unit inserted at upper right for comparison. Note pushrod seats have been moved from bottom to top of the tappet, permitting shortening of pushrod.

Use of induction heating and rapid quenching for treating the pushrod seat gives a high degree of selective

hardening. Seat and shoulder of the insert are hardened without affecting body of tappet. The insert is of SAE 1340 steel and is hardened to 60 Rockwell C.

Production equipment is shown in Figs. 2 and 3. Occupying a floor space of only 45 by 48 inches, the unit employs the familiar Tocco process. In tests, as high as 6000 tappets per hour have been treated although the actual rate at which the machine is operated is somewhat below this figure.

Machine Stops For Loading

Essentially the machine comprises two large insulated drums turning in opposite directions, the one at the left moving clockwise and the other counterclockwise. Holes are drilled in the outer rim of the drums to receive the tappets and the steel ends are passed through inductor blocks at the center of the machine. Drums do not revolve continuously but have an intermittent travel obtained through a Geneva-motion drive. In this way, the drums are stationary for an instant so they can be loaded more conveniently.

The operator in Fig. 2 is placing unhardened tappets in the drum as it is done in production. In Fig. 3, the guards have been removed from the front of the machine to show detail of the drums, inductor blocks and the chutes into which the tappets drop after being quenched by water sprays through holes in the inductor blocks. The conveyor shown at the right in Fig. 2 removes the processed tappets from a soluble oil

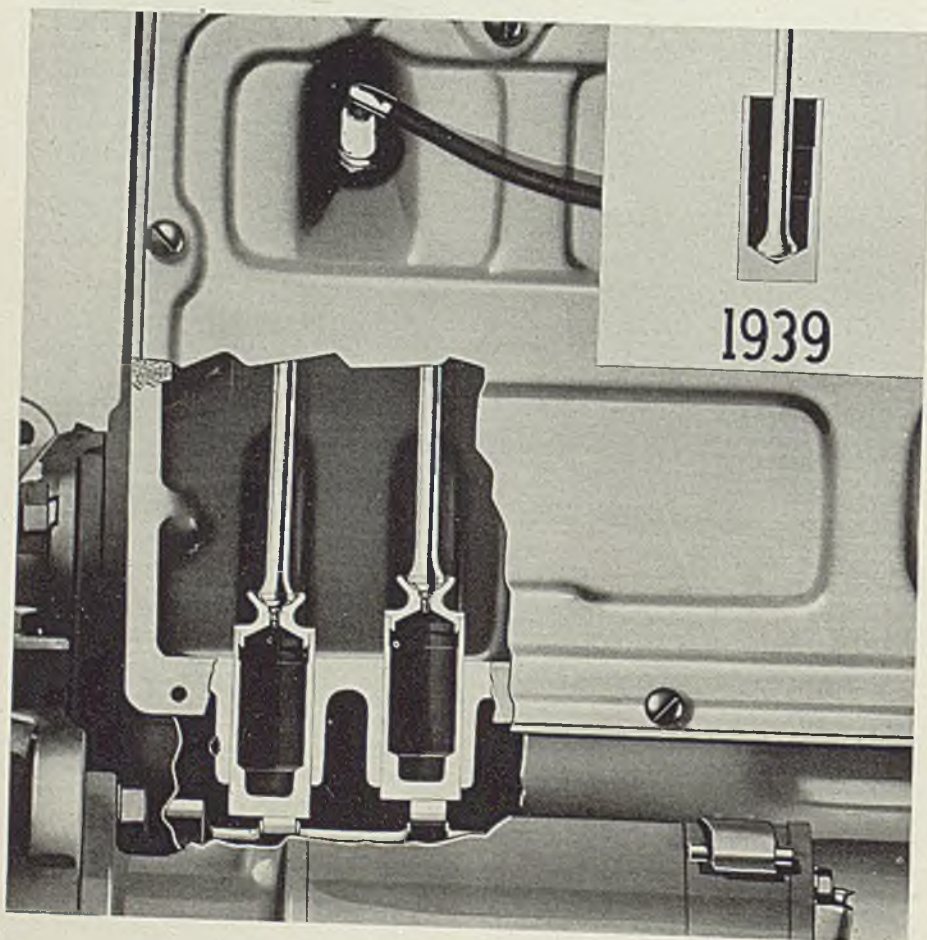
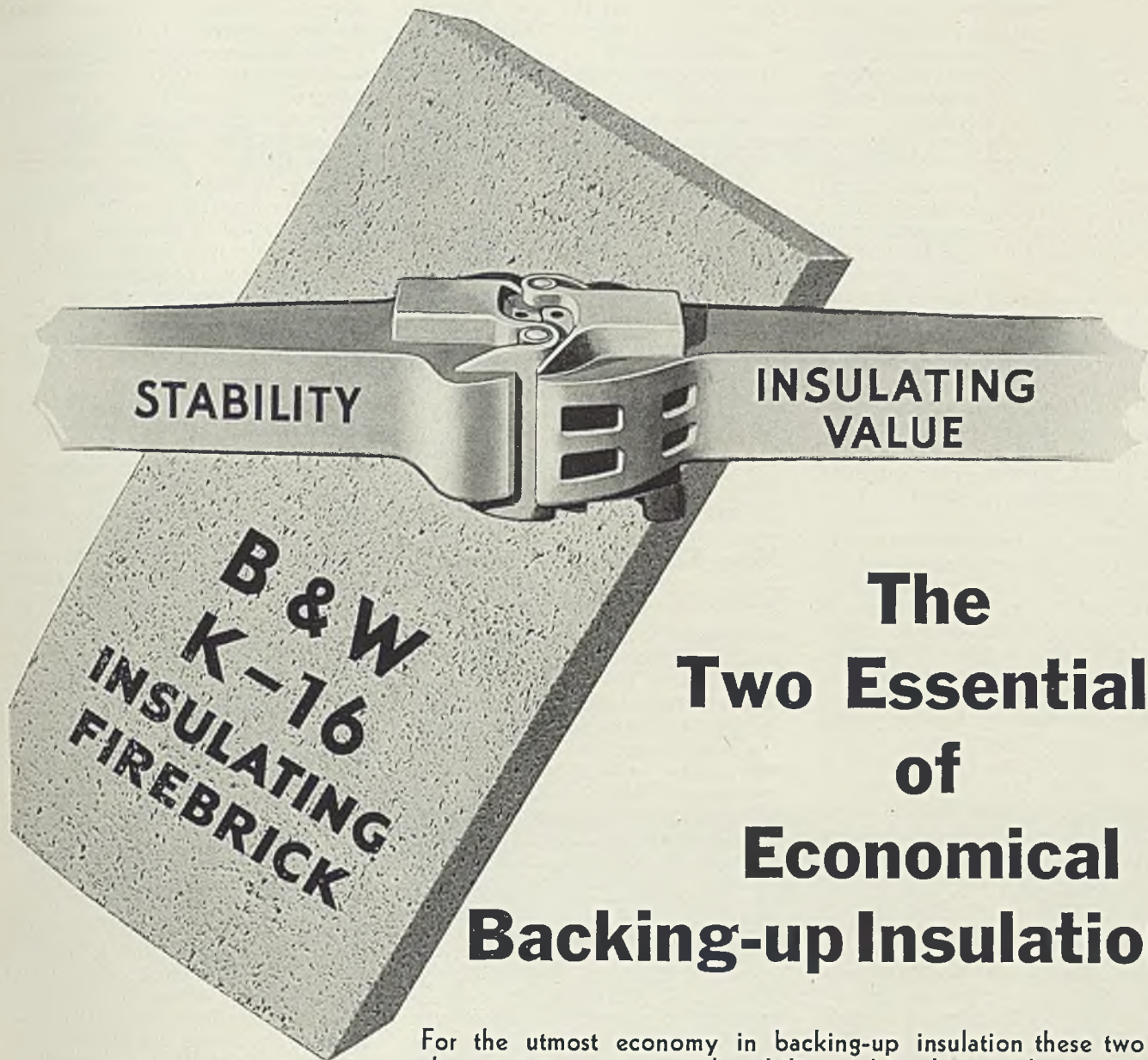


Fig. 1—Cross section shows redesigned tappets compared with previous design. Pushrod seats are now at top of tappet in hardened steel "flower pots" brazed to chilled iron tappet cylinder and then heat treated by induction process to 60 Rockwell C



The Two Essentials of Economical Backing-up Insulation

For the utmost economy in backing-up insulation these two characteristics are essential: stability and insulating value.

B&W K-16 Insulating Firebrick have the all-important stability of a fired-clay refractory product. They retain their structure, show negligible shrinkage and can withstand great loads—with interface temperatures to 2000 F.

Their exceptional insulating value is due to their light weight—averaging 1.1 lb. per nine inch straight. About 90% of their volume is air in small cells or pores distributed uniformly throughout the material.

Because of their unequalled stability and high insulating value their use cuts the cost of backing-up insulation as much as 40 per cent for the same heat flow in a given installation.

A B&W Refractories Representative will be glad to show you the proof; now, or at any future date that you may care to set.

THE BABCOCK & WILCOX COMPANY
Refractories Division

19 Rector Street

New York, N. Y.



Write for new Bulletin R-18, which gives engineering data on B&W K-16 Insulating Firebrick.

BABCOCK & WILCOX

bath in which they travel after falling from the revolving drums.

High-frequency current at 3000 cycles is generated by a motor-generator set. Then it is stepped down through a transformer built into the hardening machine from high voltage and low current to low voltage and high current. The high current flowing through the inductor blocks creates a strong magnetic field which causes heating in the "flower pot" by the combined action of hysteresis and eddy-current heating effects. The temperature to which the end of the tappet is heated—1500 degrees Fahr.—is determined by both the power input to the machine and the speed at which the tappets are passed through the inductor block. In practice, the tappets pass through the magnetic field of the inductor in about 3 to 4 seconds.

In addition to the water sprays directed on the heated tappet from the inductor block, there are additional sprays which play on the part as it is traveling to the drop-off point directly below the axis of the rotating drums. These auxiliary quench sprays are provided to prevent the residual heat from drawing back the hardened "flower pot."

The machine is provided with a cut-out switch to stop the action if the operator should inadvertently place the tappet upside down in the

Fig. 2. (Left)—Operator placing unhardened tappet in revolving drum of electric induction hardening machine. Ends of tappets are carried through inductor blocks, heated to 1500 degrees Fahr., quenched by water sprays and then dropped out into base of machine from which they are removed by conveyor at right

Fig. 3. (Right)—Here steel guards have been removed from front of machine to show the complete drums with inductor blocks between them and the chutes at bottom for removing the hardened parts

drum or not all the way into the hole provided for it. There is also a cutout switch to stop operation if water pressure drops below a predetermined level. A third control is a pushbutton on the machine to permit the operator to start or stop at will.

Cutting Speed Tables

■ McKenna Metals Co., Latrobe, Pa., announces cutting speed conversion tables showing revolutions per minute required for turning bar stock at surface speeds of 90 to 550 feet per minute with Kennametal steel-cutting carbide tools. Printed on both sides of heavy paper, tables permit quick determination of nearest spindle speed to best cutting speed when using Kennametal for turning various diameters of work.

New York University Is Offering X-Ray Courses

■ Because of increasing importance of X-ray procedures in testing materials, New York university, New York, is scheduling three courses in industrial radiography as part of the science program of its division of general education. The new courses will begin Feb. 1, and are believed to be the first of their kind in any university in this country. Herbert R. Isenburger, president, St. John X-Ray Service Inc., Long Island City, N. Y. will be in charge.

Designed primarily for engineers and others whose work involves the scientific testing of materials, the courses will include a series of 15 evening lectures and an opportunity for those who desire laboratory work to familiarize themselves with actual practice in an industrial X-ray laboratory. To accommodate out-of-town engineers, provisions are being made to enable the labora-

tory work to be taken in 30 hours on five consecutive days.

The lecture course will comprise, in addition to a study of the various parts of an X-ray machine intended for metallurgical use, an explanation of photographic procedure and a description of the use of X-ray in welding, in foundry practice, in various other industries and in the arts. Interpretation of exographs will be discussed as well as the principles and applications of gamma-ray techniques. Questions of cost will also be illustrated by lantern slides. Field trips to X-ray laboratories be taken up in the lectures which also have been scheduled.

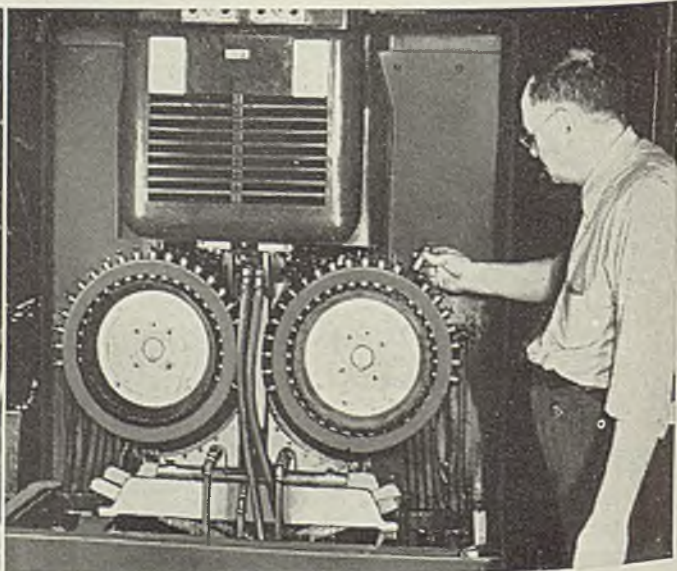
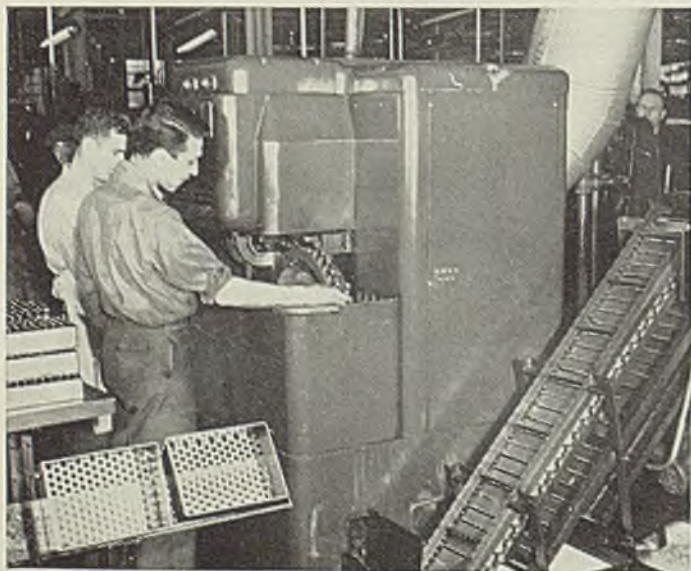
Lubricant Investigation

■ A machine said to be capable of testing lubricating properties of oil films one-tenth of one-millionth of an inch thick has been invented by William Claypoole, first holder of a fellowship established by the Texas Oil Co., New York, for research in lubrication at Columbia university school of engineering, New York.

By measuring friction of diamonds and sapphires rubbed over highly polished and thinly lubricated surfaces of steel, gold, platinum and rhodium, university engineers hope to discover some of the unknown properties of lubricants, including effect of surface finish on metal parts rubbing together in machinery.

Low-Bake Finish

■ A new industrial finish, Polymerin-100, developed by Ault & Wiborg Corp., 75 Varick street, New York, speed-bakes at as much as 100 degrees below curing temperature of original Polymerin and extends this type of speed finish to the low-bake field. This finish is said to resist the common deteriorants and to have excellent film hardness, luster, adhesion, and hiding power.



All-Welded Boiler Approved



Unit passes both Lloyd's Class I code and insurance company's requirements, similar to A.S.M.E. code. Plate edges planed for single-U butt welds. Longitudinal, circumferential seams total 111 feet

By HUGH B. FERGUSON
And

EDWARD F. BURFORD

G. A. Harvey & Co. Ltd.
London, England

■ TO OBTAIN approval of insurance companies and other authorities for the first all-welded boiler of any size to be constructed in England, a number of difficulties had to be overcome. The major new insurance risks requiring consideration were the larger diameter of shell and flat ends, breathing of the ends due to expansion and contraction of the welded flues, this latter necessitating weld metal capable of withstanding fatigue stresses.

Only by extremely thorough preparatory work was approval obtained.

It was felt that departure from standard practice in design and dimensions of riveted boilers was not advisable or necessary in this first effort to obtain an insurance company's permission to make an all-welded boiler. Changing the design from a riveted structure to welded fabrication presented no difficulty.

Shortly before undertaking the construction of the welded boilers, this company produced four large all-welded evaporator units now in successful operation. Accompanying illustration shows one of these large units. From experience gained with these, a large accumulation of welding data was obtained and it was largely due to successful construction of these high-pressure evaporators that the all-welded boiler was considered. This preparatory work also was deemed important by the

With experience gained in welding four large high-pressure evaporators, one of which is shown here, the all-welded boiler was undertaken successfully

insurance company so it will be briefly described to furnish background for details of the boiler construction itself.

These four evaporators were some of the largest welded pressure vessels made to Lloyd's Class I code.

From paper receiving award in contest sponsored by James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland:

Designed for pressure of 250 pounds per square inch on 11-foot diameter, all four units are similar so it will suffice to describe a single evaporator. This one has an internal diameter of 11 feet, a total height of 26 $\frac{3}{4}$ feet and is composed of two shells, each 10 $\frac{1}{3}$ feet high with a domed bottom just over 3 feet deep. A domed cover has same depth. Bottom shell has two tube plates, each



in one piece about 1 inch thick welded with fillet welds inside and out to the shell about 7 inches from each end.

There are 1792 tubes, 1½ inches diameter of No. 8 gage material and 9 feet long connecting the two tube plates. Tubes protrude ¼-inch above the plates; each is welded all around. A central tube between the plates is 2½ feet in diameter with ¾-inch thick walls. Bottom shell is 1 15/32 inches thick; top shell, 1¼ inches thick. The bottom and top dished and flanged ends are 1¾ inches thick, have an 8-foot radius of dish and a 10-inch corner radius. Both shell plates are in one piece with one longitudinal seam; and ends are made from one plate. Before dishing and flanging, the plates for these ends had a width of 13½ feet, the maximum width of plate rolled in England.

Five Main Welds

Each vessel has five main welds, two vertical welds of bottom and upper shells and three horizontal circular welds. One of the latter connects the two shells; the other two join the top and bottom ends of the shell. Working pressure of calandria section, or bottom shell, is 250 pounds per square inch, test pressure being 375 pounds per square inch. Upper shell and two ends are subjected to 190 pounds per square inch working pressure and were tested to 285 pounds. Weight of completed vessel is 48 tons.

All four vessels were built to conform with Lloyd's Class I code and also were surveyed independently

by another insurance company to conform with A. S. M. E. code.

Accompanying illustration shows one of these evaporators. Plates for checking welds were welded at both ends of longitudinal seams. On each coupon plate, one pull was made across the welds; two bend tests—an inner bend and an outer bend—were made giving 60 per cent elongation of the outer fibers. Two Izod tests and one all-metal test were made. About 1200 X-ray photographs were taken in welding the four vessels. Where an occasional imperfection occurred, a stereo exograph was taken to show the distance in from the outer surface as this permitted the intrusion or defect to be removed without cutting a hole completely through the vessel.

Heat treatment of longitudinal seams was fairly simple. For the circular seams a special gas ring containing gas nozzles spaced about 1 inch apart was used to extend all the way around the 35-foot circular seams. The ring had eight sections, each with its own air and gas supply. The gas was made to impinge on a refractory concrete lining which reflected the heat back onto the weld.

Elements of four pyrometers were tack welded to inside of the weld and readings recorded every five minutes. Each of the eight gas-ring segments was controlled by valves permitting adjustment of temperature all the way around the seam.

At the request of the insurance companies, lacing straps were omitted. Welded seams were given a hammer test with a 7-pound ham-

mer at full swing. With maximum test pressure on, no leaks developed in any of the welded seams.

Edges of flanges of dished-and-flanged ends were machined to same thickness as the shell on which they butted. Also they were machined to form a double U-joint to facilitate good exographs, a gap of ¼-inch being left at all welded joints to allow for good penetration at the center. Flanges, naturally, had to be perfectly round so they would machine truly to afford this double U-section. At least ½-inch was planed off the edges of all sheared plates which then were planed to admit the double U-weld. After they had been drilled, the two plates were machined truly to 3/16-inch less diameter than inside of the calandria shells. To permit insertion of tube plate, the shells were rounded up a second time after welding of longitudinal seams.

Weld Metal in Heavy Layers

Type of welding rod used permitted easy flotation of slag, complete lack of porosity, good penetration and ductility. A heavy outer and inner layer of weld metal was always deposited to insure good annealing of the weld metal underneath. Subsequently this heavy outer layer was chipped off and welds ground flush with the plates before application of the X-rays.

From experience in construction of these evaporator units, sufficient confidence was gained to consider the all-welded boiler. This unit is 9 feet 9 inches in diameter, is designed for 180-pound steam working pressure and 9600 pounds evaporation per hour.

Welded joint efficiency allowed by Lloyd's register of shipping on a welded boiler is 85 per cent. This is as high as that of a triple-riveted butt joint. The vessel conforms with Lloyd's Class I requirements for fusion-welded vessels intended for land purposes, requirements quite similar to the A. S. M. E. code. As boiler had to match existing riveted units, design was somewhat restricted. Shell plates are 15/16-inch thick, all joints butt-welded using a single U-type joint. End plates are flat, being flanged around the edge and for the furnace tubes. Thickness is 15/16-inch. To take up expansion, 50 per cent of the length of furnace tubes is made as a corrugated flue. Remainder is electrically welded tube eliminating circumferential riveted joints which would occur in the flanged flue rings in a riveted boiler. Compensation for the plain flue tube is provided by rings of flat bar section welded around the outside of the tubes in the water space, the diameter of

Service Station Has Porcelain Enameled Front In Color



■ Porcelain enameled steel sheet in a red and white color scheme is featured on the front of Craig Service Station, Erie, Pa. Station is 26 x 48 feet and was designed and built by Erie Enameling Co., Erie, Pa. Illustration courtesy "The Ceramic Forum," 209 Fourth avenue, Pittsburgh

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these rings permitting the flue to be withdrawn through the front flue hole for replacement when needed.

Standpipes are forged steel without base flange but compensated around the openings cut in the shell plate by external compensating plates welded on. In connection with smoke tubes and stay bolts, it was decided to adhere to the practice of expanding in the plain tubes, screwing in and expanding the stay tubes, screwing and nutting the stay bolts, although the welding in of all these items could have been carried out effectively.

All plate edges were planed for welding, using a single U-type butt weld. Both longitudinal and circumferential seams were X-ray examined, the total footage being 111 lineal feet. Correct exposure was assured by using a penetrometer 0.01-inch thick attached to the shell and showing clearly on each exograph.

Welding operators who did this work had three years of continual practice in Class I X-rayed welding. Result was, except for two small inclusions of slag, no weld metal had to be cut out. In no place did any of the exographs show lack of penetration or porosity.

Two coupon plates were welded simultaneously with longitudinal welds of the boiler shell seams, one

at each end. These coupons were heat treated with the boiler at 650 degrees Cent. and then were machined and tested. Specimens under tensile tests broke in weld, showing a silky fracture at 30.7 tons ultimate strength per square inch of original area.

All weld-metal specimens withstood maximum stress of 30 tons per square inch with yield point at 18.9 tons per square inch, gave 25 per cent elongation in 2 inches with 54.7 per cent reduction in area and a silky fracture.

Izod impact tests on 10-millimeter square specimens, 75 millimeters long with 2-millimeter deep notch, $\frac{1}{4}$ -millimeter bottom radius, showed energy absorption of 74 to 54 foot-pounds.

Bend specimens, $\frac{3}{8}$ -inch thick and $1\frac{1}{4}$ inches wide after polishing, were bent around a former of a radius $1\frac{1}{2}$ times thickness of the plate until limbs were parallel. Both inside and outside bend specimens showed no signs of fracture after bending.

Fatigue tests were made on the weld metal using a push-pull type machine. Specimen was 0.495-inch diameter and stress applied was plus and minus 10 tons per square inch. Endurance value was 0.616 million stress cycles. Fracture originated at a small gas hole close to the surface. Another specimen was

unbroken after 56.794 million stress cycles, using an applied stress of plus and minus 8 tons per square inch.

Chemical analysis of plate showed carbon 0.21 per cent, phosphorus 0.044 per cent, sulphur 0.031 per cent, silicon 0.06 per cent and manganese 0.38 per cent. Chemical analysis of weld metal showed carbon 0.14 per cent, phosphorus 0.031 per cent, sulphur 0.031 per cent, silicon 0.08 per cent, manganese 0.38 per cent, nitrogen 0.014 per cent.

After tubes were welded, boiler was subjected to hydraulic tests of $1\frac{1}{2}$ times working pressure, equivalent to 320 pounds per square inch.

All tests as well as construction were supervised by a boiler insurance company and passed for service.

Advantages of welded boiler such as this are important. Piercing of the shell is confined to holes for end plates and fittings, reducing possibility of leakage to a minimum. This is particularly true when boilers are started up continually from cold.

Embrittlement Eliminated

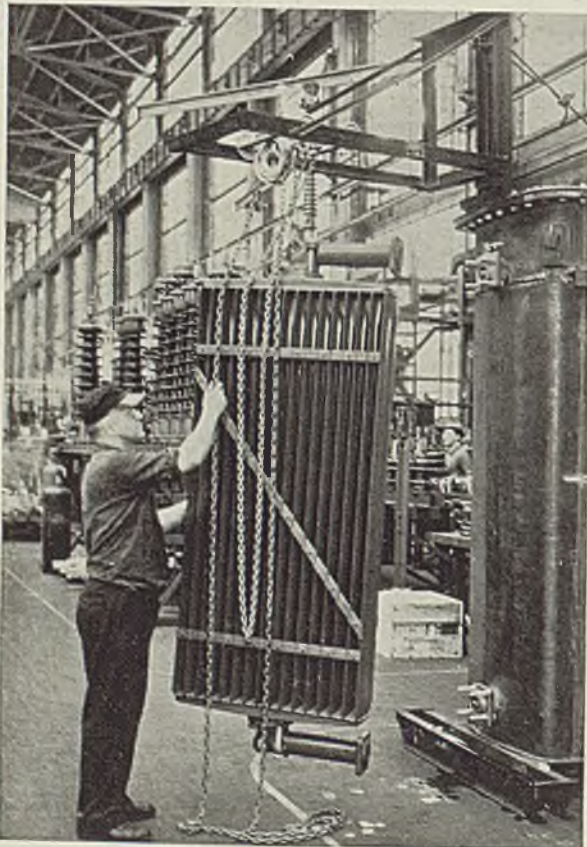
Trouble with embrittlement of plates around and adjacent to rivet holes where the plate has been work hardened is eliminated.

Since all shell and flues for the boiler were heat treated at 650 degrees Cent. before boiler was installed, practically all locked-up stresses were relieved, thus eliminating that corrosion of steel which has been noted as much more severe in the neighborhood of high locked up stresses.

A considerable saving in cost of the welded construction was obtained. Actual cost of riveted boiler was about 1386 pounds sterling, which means a profit of only about 10 per cent in selling at 1525 pounds. Compare this with cost of the welded boiler, about 1188 pounds, which means a profit of 20 per cent can be obtained on a welded boiler when it is sold for only 1434 pounds. Thus the welded boiler can be sold for less money and at a greater profit.

This matter of price is extremely important as there is a large market for these boilers with resulting keen competition. Hence our firm has an excellent position due to its complete testing facilities, heat-treating equipment and trained welding personnel. The acceptance of the welded boiler by the insurance companies is expected to open up a large new field for our company. It was to produce this new field for welding that we took so much pains with the preparatory work for this job as detailed in first part of this article.

Hoist Facilitates Handling of Transformer Radiators



■ This light-weight, portable hoist is attached to top of power transformers to facilitate handling of radiators or other external parts of transformers. Hoist consists of a mounting post bolted to top of transformer tank, a swinging crane fastening to post and a trolley assembly for lifting. Total weight is 210 pounds. Lifting capacity is $\frac{1}{2}$ -ton. Photo courtesy Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Have You Seen This

HELPFUL LITERATURE?

Here are the latest industrial publications reviewed for your benefit. They are yours for the asking. There is no charge or obligation. Simply fill in the convenient coupon and return.

(1)—Roller Bearings

Shafer Bearing Corp. — 85-page illustrated catalog No. 15. Radial-thrust roller bearings and self-aligning ball and roller bearing units are discussed. The adapter, press fit and super sealed types of mounted bearings, pillow blocks, flange and cartridge units are described. Engineering data, applications, specifications and list prices are given.

(2)—Valves and Fittings

Crane Co. — 56-page illustrated circular No. 312, covering corrosion-resistant valves and fittings. Contains 8 pages of colored charts to indicate whether solutions and metals are compatible. Nearly 200 chemical solutions used in process manufacturing are listed. Also mentions the chemical and physical properties of some alloys and their behavior in process piping.

(3)—Machine Tools

Cincinnati Milling Machine & Cincinnati Grinders Inc. — 64-page illustrated bulletin, "Life at the Mill," a limited edition commemorating the 55th anniversary of this company. Its history, apprentice school and products, are discussed.

(4)—Collet Chuck

Erickson Steel Co.—4-page folder describing the new precision collet chuck which affords close accuracy on drilling and end-milling work. Dimensions are given.

(5)—Low-Bake Finish

Ault & Wiborg Corp.—4-page folder covering "Polymerin-100," a new finish with low-temperature speed baking characteristics. It makes possible curing temperatures which are as much as 100 degrees below those of the original "Polymerin." Features include adhesion, flexibility, color retention and toughness.

(6)—Tool Steel

Carboloy Co. Inc.—12-page engineering bulletin No. GT-120, covering the fundamentals of cutting steel with carbide tools. Charts giving specific carbide grades to use, recommended starting speeds, range of practical speeds and recommended tool rakes and clearances for a wide range of steels are provided.

(7)—Refractory Mortar

Babcock & Wilcox Tube Co. — Bulletin No. R-17, covering "Smoothset" mortar which was especially developed for use with highly porous insulating firebrick. This mortar is claimed to be smooth, plastic, cold-setting, easy to trowel, and to have a high degree of water retention and a high bond.

(8)—Engineering Data

Niagara Machine & Tool Works—Metal bound wall chart providing tables showing circumferences and areas of circles, formulas for estimating weight of metal for rectangular and round duct work and a standard U. S. gage of sheet iron.

(9)—Vibrating Screens

Ajax Flexible Coupling Co.—6-page illustrated bulletin No. 28. Vibrating screens driven by Ajax-Shaler Shakers, which eliminate blinding, shut downs and waste of material, are described. The Ajax-Shaler drive confines all the vibration to the screen box itself, imparting none to the supporting frame. "Vibroplane" and "Angleplane" screens are also covered.

(10)—Arc Welding Generator

Wilson Welder and Metals Co. — 18-page illustrated bulletin No. ADW-15. Operating and construction details of a new electric arc welding generator are given. Features of the "Hornet" include its simple adjustment, self-contained exciter, locked polarity reversal and portability. Specifications and electrical and magnetic features are included.

(11)—Flame Cleaning

Air Reduction Sales Co.—8-page illustrated booklet No. ADG-1067, discusses the use of flame cleaning and dehydrating for eliminating paint flaking on new structural steel and plate. Applications, specifications, procedure of operation, etc., are included.

(12)—Safety Tools

Ampco Metal Inc.—20-page illustrated catalog and price list No. 116. Non-sparking safety tools, including many types of pliers, wrenches, chisels, shears, hammers, mallets, etc., are discussed and their prices are listed.

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(13)—Aluminum

American Nickeloid Co. — 4-page folder covering a new development in nickel and chrome aluminum. Two samples, one of nickel aluminum with a satin finish and the other of chrome aluminum with a bright finish, are included. Available in sheets 24 x 96 inches to 36 x 96 inches in gages from 0.010-inch to 0.0625-inch—in a full range of tempers. Applications are described.

(14)—Compressors

Chicago Pneumatic Tool Co.—12-page illustrated bulletin No. 767, describing Class W-CO diesel-driven compressors which are capable of continuous, heavy-duty operation in either stationary or semi-portable service. Features include high compression efficiency, low fuel consumption, complete accessibility, etc.

(15)—Flexible Couplings

Farrel-Birmingham Co. Inc. — 44-page illustrated catalog No. 443, containing information on means of compensating for misalignment of connected machine shafts. "Gearflex" couplings, their applications, rating, dimensions and weights, are discussed. Installations are shown.

(16)—Stainless-Clad Steel

Jessop Steel Co. — 24-page illustrated booklet, describing Silver-Ply stainless steel, which is a composite sheet or plate consisting of a layer of stainless steel which has been welded to a mild steel backing. Its physical properties, fabrication, advantages and applications are given.

(17)—Materials Handling

Robins Conveying Belt Co. — 4-page illustrated bulletin No. 109, describing their complete line of equipment, including many types of conveyors, idlers, pulleys, bucket elevators, screens, hoists and crushers. Applications and features are included.

(18)—Steel Stitcher

Seybold Div., Harris, Seybold, Potter Co. — 6-page illustrated folder describing various types of steel stitchers. These stitchers will drive wire stitches through 0.060-inch of steel and in fastening various materials to sheet steel, a total thickness of 3/4-inch can be stitched. No pre-punching is necessary. Applications and specifications are given.

(19)—Turbine Well Pumps

Worthington Pump & Machinery Corp. — Illustrated bulletin No. H-450-B29, presenting new line of turbine well pumps. For use in bored wells, these units feature vacuum molded impellers. Available with either oil-lubricated or water-lubricated shaft bearings. Details of construction are illustrated.

(20)—Scoop Trucks

Elwell-Parker Electric Co.—4-page illustrated bulletin No. A-8571, describing power scoop industrial trucks which are designed to load, transport and dump loose materials in friable condition or in sizes suitable for ready handling. Power may be either electric or gas-electric. Three motors which furnish operating power are described.

(21)—Wrinkle Bending Pipe

Linde Air Products Co. — 4-page illustrated bulletin, "Wrinkle Bending," which describes the wrinkle-bending method for bending pipe. This process is finding wide application wherever pipe must be "tailored" to fit. Suggestions are also given for the mechanical bending of the pipe.

(22)—Hard-Facing Rods

Dymonhard Corp. of America—8-page bulletin covering their complete line of flux coated rods for hard-facing, which are available for both electric arc and oxy-acetylene applications. All rods are 18 inches long. They are heat, wear and acid-resistant.

(23)—Die Castings

New Jersey Zinc Co. — 24-page illustrated booklet, "Zinc Alloy Die Castings in Small Tools," presents in pictorial form, products wholly or partly composed of zinc alloy die castings, such as various hand tools, air compressors, grease guns, lathes, etc. Tables giving specific gravity, melting point and electrical conductivity of metals are included.

(24)—Gas Generator

Wellman Engineering Co.—16-page illustrated bulletin No. 97, describing the Wellman-Galusha clean gas generator. This fully water-jacketed gas generator with rotary grates is a self-contained unit requiring no accessory equipment and has an automatic fuel feeding system. Operation and performance are covered.

(25)—Abrasives

General Abrasive Co. Inc. — 12-page illustrated bulletin, "Lionite, King of Abrasives," covering the manufacture and uses of many types of "Lionite" and "Carbonite" grinding wheel grains, and the chemical and heat treatments necessary in their production. Abrasive paper and cloth grains are also discussed.

(26)—Chemical Paint

American Chemical Paint Co. — 4-page illustrated bulletin No. 6-2. "Kemick," a chemical paint for metal surfaces subjected to high temperatures, is described. "Kemick" is rust-preventing and may be applied to engine manifolds, exhaust lines, boilers, etc. Directions are given.

(27)—Lock Nuts

Elastic Stop Nut Corp. — 56-page illustrated catalog and data book which explains graphically the "Elastic Stop Nut" principle. Contains illustrations of applications in various industries, comparative test data and a complete listing of standard nuts.

(28)—Speed Reducers

D. O. James Mfg. Co.—Catalog covering a complete line of motorized speed reducers. Selection tables, dimensions and prices are given.

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Saw Frame

■ Saw frame No. 158 of Stanley Electric Tool division, New Britain, Conn., is said to make it possible to cut many pieces of lumber to exact size without having to lay out and mark each piece separately.

Frame is structural steel and is used with Stanley safety saws Nos.

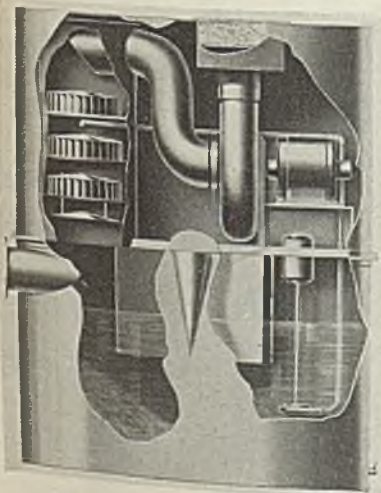


W7, W8, W9 for square, bevel and bevel mitre cuts. It is adjustable for height from minimum to maximum capacity of saw by moving clamp nuts on each end of frame. Stop pin in front clamp drops into bored holes in bench at any angle for other than straight cuts.

Dust Collector

■ Claude B. Schneible Co., 3951 West Lawrence avenue, Chicago, has placed on the market a portable-type wet-method dust collector, Midget Multi-Wash Collector, in six sizes ranging from 300 to 1500 cubic feet per minute. Midget functions the same as standard Schneible collector, and is suitable for collection and disposition of dust and fumes arising from isolated operations that cannot economically be tied into a central dust-collection system.

One of six sizes is applicable to from one to five machine operations. Fouled air is drawn into miniature scrubbing tower where dust and fumes are scrubbed out by spray walls and become impinged on

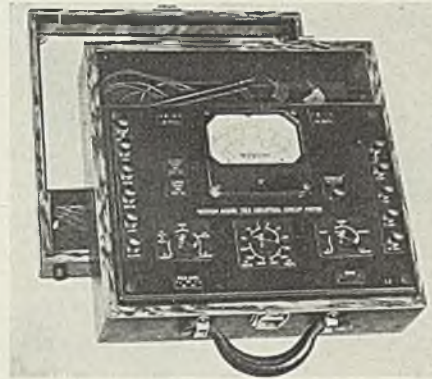


curved wet vanes arranged in tiers. Impinged matter is washed down to a sludge chamber by action of water introduced above impingers. Washed air next passes through entrainment separator to remove excess moisture and then is delivered to plant atmosphere, passing through metal-wool diffuser and sound deadener as it leaves unit.

Circuit Tester

■ Weston Electrical Instrument Corp., Newark, N. J., has developed Model 785 circuit tester for measurements on all types of control and signal equipment and electronic apparatus. Tester has 27 complete ranges for voltages, current and resistance measurements and its sensitivity permits these measurements on oscilloscope circuits.

Instrument provides direct-current measurements at a sensitivity of 20,000 ohms per volt in ranges of 0-1,



0-10, 0-50, 0-200, 0-500 and 0-1000 volts; alternating-current voltage measurements at a sensitivity of 1000 ohms per volt in ranges of 0-5, 0-15, 0-30, 0-150, 0-300 and 0-500 volts; direct-current measurements in ranges of 0-50 microamperes; 0-1, 1-10 and 0-100 milliamperes; 0-1 and 0-10 amperes; alternating-current measurements (available through a self-contained current transformer) in ranges of 0-0.5, 0-1, 0-5 and 0-10 amperes; and resistance measurements in ranges of 0-3000, 0-30,000 and 0-300,000 ohms; 0-3 and 0-30 megohms. Resistance measurements are obtained in conjunction with self-contained stock batteries.

Temperature-compensated rectifier circuit is claimed to permit accuracy on alternating-current voltage of within 3 per cent. On alternating-current ranges, accuracy is said to be within 3 per cent on 60-cycle approximate sine wave measurements; on 25 cycles or on frequencies above 60 cycles up to 133 cycles, slightly larger errors may be found. Accuracy on all resistance ranges is reported to be within 2 per cent of linear arc length on ohmmeter scale.

Case is 5½ x 12½ x 13 inches. Weight of device in oak carrying



case, including batteries, is 13½ pounds.

Marking Device

■ New Method Steel Stamps Inc., 143 Jos. Campau street, Detroit, introduces its universal marking device for marking directly on shafts, rods, etc. Bottom of guide holder is a wide "V", and sides of V-guides are said to rest against almost any round shaft, providing a support on both sides to align type and insure clear marking on center.

Type retainer floats in guide, but its travel is limited by pin in guide extending into elongated hole in type retainer, thus holding retainer in guide. To remove type retainer from holder, pins are retracted against spring pressure by knurled knobs. Individual type is held in re-

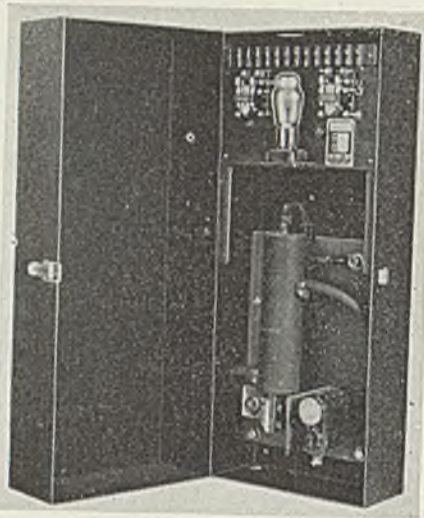


tainer by set screws. Hardened and ground anvil in type retainers prevents type from sinking.

Weld Timer

■ Weltronic Corp., 2834 East Grand boulevard, Detroit, has developed a weld timer model 90-1 said to control welding time to a half cycle on any resistance welder. Built as a separate unit, timer may be resistance welding machine and is suitable for welding thin-section stainless steel, aluminum, brass screen, copper lugs and similar applications where unusually high heat and closer control of welding time than offered by conventional timers is essential. Full positive half-cycle is provided, relay closing on minus half cycles, to permit use of highest heat in shortest possible time.

Timer consists of two moving parts (the relays) in addition to one electronic and one rectifier tube, all adapted to virtually any standard



of which are panel mounted and enclosed in a hinged-cover case. Timer is available in 220 to 550 voltages with frequencies of 25, 50 and 60 cycles. Amperage range of 150 to 600 is also available.

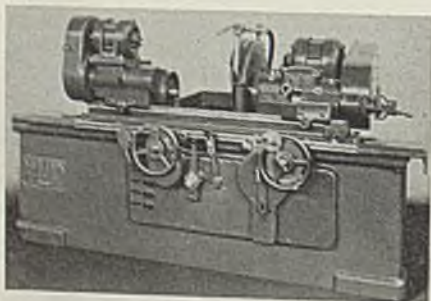
Portable Power Plant

■ Kato Engineering Co., Mankato, Minn., has introduced models KE-400 and KE-600 portable Katolight plants for stand-by service in case of power line failure. Model KE-400 weighs 65 pounds and is 14 x 16½ x 20 inches. Model KE-600 weighs 105 pounds and is 14 x 16½ x 23 inches.

Units are completely self-contained and each is driven by a four-cycle air cooled engine. They come equipped with hand lever starter, high-tension magneto, pilot lamp (which lights area around plant) and guard, three twist lock receptacles and two standard receptacles, convenient carrying handles, etc., and are suitable for operating portable floodlights, electric drills, saws, lights, etc.

Cylindrical Grinder

■ Norton Co., Worcester, Mass., in redesigning its 10 x 36 inch Type C hydraulic traverse cylindrical grinders, has oil and coolant pumps suspended vertically on springs so pumps run submerged. Oil and coolant reservoirs are an integral part of base. At rear of base is large, cored receptacle in which all motor starting equipment is mounted, isolated from dust and moisture. Sheet metal cover is easily lifted off, ex-



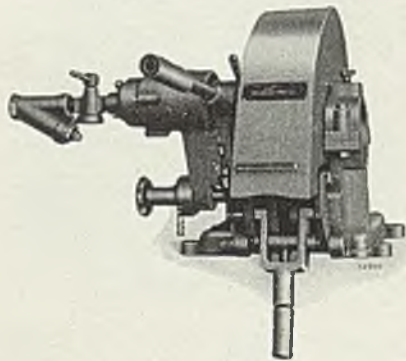
posing equipment for inspection and servicing.

Wheelslide and table ways are pressure lubricated from separate system, permitting use of oils of different viscosities for strictly lubricating purposes and as hydraulic fluid for operation of various units so controlled. Vee belts and silent chain running in oil drive redesigned headstock. Control can be converted from manual to automatic by turning switch on front.

Cutter And Grinder

■ Ingersoll-Rand Co., Phillipsburgh, N. J., announces Size 500 combination drill steel cutter and shank grinder. Designed to handle solid or hollow steels up to and including 1¼-inch hexagon, round or quarter octagon, it is said to cut the steel cleanly and squarely in only a few seconds without burning. A quick acting, self-locking vise holds the steel rigidly on both sides of the cut.

Unit can be changed readily from



a cut-off machine into a shank grinder by removing cut-off wheel and substituting a grinding wheel. As a grinder it can be used for squaring up striking faces of the shanks of drill steel,moil points, chisels and the striking end of rock drill pistons. It is powered with an Ingersoll-Rand "Multi-Vane" air motor.

Boring Machine

■ Redesign of precision boring machines is announced by Ex-Cell-O Corp., 1200 Oakman boulevard, Detroit. All hydraulic operating controls are concentrated in one panel at front, and table movement is controlled automatically after starting by adjustable table dogs. Hydraulic system provides constant rate of rapid traverse and two adjustable feed rates in each direction of table travel, choice of either immediate table return or, with use of table stops, adjustable dwell and then return, and automatic jump feeding or rapid traverse between two feeding cuts.

Provision is made on machine base for connecting hydraulically operated fixtures and spindle chucks



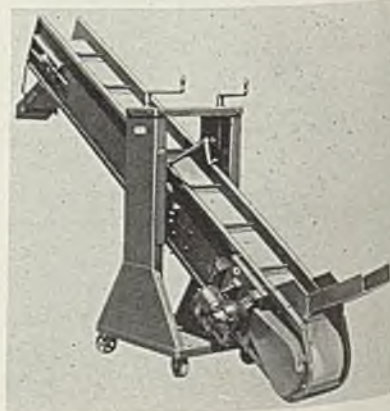
to pressure and exhaust line to ordinate their operation automatically with table cycle. Dogs on r of table may also be used to c trol starting and stopping spindles and of coolant flow. Cell-O universal fixture can be used for handling wide range parts and for small lots and frequent changeover.

Characteristics of the "Junior" boring machine are: ¾-inch minimum and 6-inch maximum diameter hole; 12-inch maximum table travel; ½ inch per minute table feed; and 15 feet per minute rapid traverse. Characteristics of the "Senior" are: 8-inch maximum and ¾-inch minimum diameter hole bored; 16-inch (single end) and 15-inch (double end) maximum table travel; ¼ to 1 inch per minute table feed; and 10 feet per minute rapid traverse.

Work Loader

■ Mechanical Handling Systems Inc., 4601 Nancy avenue, Detroit, offers a portable belt-type work loader adjustable for both height and angle of incline. Known as the Eleveyor, this loader is a cleated endless belt conveyor assembly 9 feet long mounted on a castor-equipped stand for mobility.

Loading chute can be placed to receive parts as they are discharged from a machine. Height of conveyor assembly and angle of incline is adjusted to discharge parts into either a bin or hopper. For interoperation storage, Eleveyors discharge into a hopper which has a feed tray



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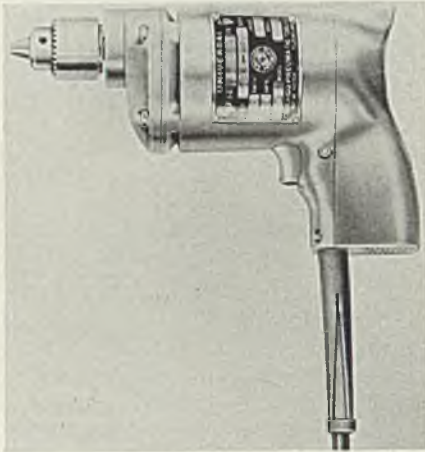
WORTH STEEL COMPANY

January 22, 1940

so operator at next station receives his material at the most convenient height. Usual speed of 12-inch belt is 60 feet per minute.

Electric Drill

■ Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, announces a universal electric drill designed for compactness and resistance to wear and abuse, drills metal or wood up to 1/4-inch capacity. All bearings are ball bearings mounted in steel inserts. Bump on handle is



claimed not to distort bearing alignment since there is no connection between handle and bridge supporting rear armature bearing. Air intakes are on ends of handle where they will not be covered by the hand or pick up dirt and chips. Casting is perforated with small holes, eliminating need for screens. Switch is oversize two-pole enclosed mechanism with die-cast close-fitting trigger.

Same tool can be supplied as screw driver for No. 8 wood or 3/16-inch machine screws and also as nut runner for 3/16-inch nuts or bolts.

Fire Gun

■ Two new fire-guns are announced by Hauck Mfg. Co., 124 Tenth street, Brooklyn, N. Y. No. 251 with giant burner delivers a 2000-degree Fahr. flame 4 x 36 inches. Five-gallon capacity all-welded steel fuel tank has bottom deeply recessed to provide a strong wearing edge and is fitted with a handle and quick-acting heavy, brass, long-stroke air pump.



Pump does not have to be removed when filling fuel tank because a "hand-tite" filler plug (requiring no wrenches) and air pressure release are provided. Sixty-pound pressure gage and six-foot length of oil-resisting hose with brass couplings are furnished. Overall length of burner is 36 inches. Average fuel consumption is 1 2/3 gallons per hour. Shipping weight in 30 pounds and price \$24.75.

No. 249 fire-gun delivers a 2000-degree Fahr. flame 2 x 20 inches and has a 2-gallon capacity fuel tank tested at 100 pounds pressure. Average fuel consumption is 2/3-gallon per hour. Shipping weight is 18 pounds and price \$15.

Safety Goggle

■ No. 303 Super Duralite-50 safety goggle with nonrubber headband is announced by American Optical Co., Southbridge, Mass. Eyecups are molded from strong light material claimed to be unaffected by water, oil, grease and perspiration. It can be sterilized by any method. Eyecups have broad bearing surfaces and are low set for wide-angle vision.

Headband consists of a spring and ball chain covered by cloth sleeve.

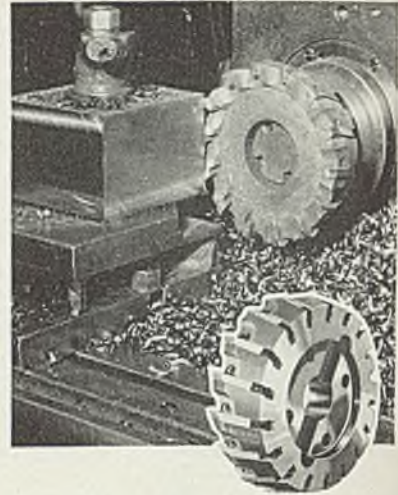


Chain prevents over-extension of spring, yet permits adjustment to any desired head size. When adjusted, it maintains same tension indefinitely but may be readjusted for different head sizes.

Lenses regularly supplied are 6.00 curve clear Super Armorplate type. Caps holding lenses in place are threaded for easy removal. Metal screens provide ventilation.

Milling Cutters Have Kennametal Tips

■ McKenna Metals Co., Latrobe, Pa., announces a new series of milling cutters equipped with Kennametal-tipped blades, developed in co-operation with McCrosky Tool Corp., Meadville, Pa. Cutter illustrated is 7-inch diameter standard McCrosky Jack-Lock shell-end mill tipped with Kennametal grade KM milling, an SAE 4150 steel forging that was heat treated before machining to a hardness ranging from 28 to 32 Rockwell C. Cutter is run at 92 revolutions per minute, or approximately five times as fast as was possible before. Feed is 3 5/8 inches per minute and depth of cut 0.125-inch. An average of 160 faces

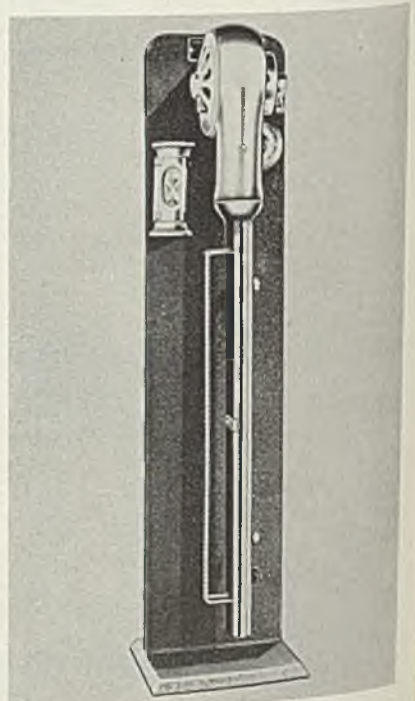


was milled before regrinding was necessary.

Series comprises nine standard sizes in each of the following types of cutters: Medium-duty face mills, heavy-duty face mills and shell-end mills. Jack-Lock wedge locks and unlocks blade without pounding. Adjusting screw in back of each blade permits accurate forward adjustment that holds to a minimum amount of carbide material which must be removed to align all blades when regrinding. Blades may be moved forward as little as 0.002-inch. These design features are shown in 18-blade facing mill illustrated.

Film Dryer

■ Harry W. Dietert Co., 9330 Rose-lawn avenue, Detroit, has developed a dryer said to dry photographic and spectrographic film or plate in two minutes. Air heated by an electric heater to a predetermined temperature is blown rapidly over surface of film or plate, held vertically in dryer.



South African Steel Adds Bessemer Plant

■ South African Iron & Steel Industrial Corp. Ltd., Pretoria, South Africa, is adding a bessemer plant, including two 25-ton acid bessemer converters, a 750-ton inactive mixer and turbo blower. Two 110-ton cranes will be provided, one in the charging bay, the other in the casting bay.

The new plant will be used in connection with the open-hearth department in a duplexing system. Contract for the plant has been placed with Duncan Stewart & Co., Glasgow. Cranes will be supplied by Sir William Arrol & Co. Ltd., Glasgow, and the blower by Brown Boveri Co., Switzerland. Buildings will be erected by Dorman Long (Africa) Ltd., Germiston, South Africa.

The company will add a plant for production of steel wire in all commercial grades. Survey is being made and erection will depend on war conditions.

Adjusts Pension Plan to Social Security Act

(Concluded from Page 17)

ployees will be eligible to receive only the excess, if any, of steel pensions over public pensions."

These provisions provide benefits to various classes of retired employees during periods in which they cannot qualify for benefits under federal laws. They will affect women employees with 25 years or more continuous service who, under the United States Steel pension plan, retire before age 65.

They also cover employees with 25 years or more service who have become, through no fault of their own, permanently and totally incapacitated. Also provided for are 25-year employees who are prevented from continuing at work because of the permanent closing or disposal of a company property or plant.

Mirrors of Motordom

(Concluded from Page 30)

the driver's intentions, and furthermore the signal may be actuated inadvertently when the driver turns his wheel simply to pass another vehicle and does not intend to make a turn.

One type of direction signal which is popular on European cars but which has gained little interest in this country is the illuminated semaphore type, operated mechanically and intended to be seen from front and rear of the vehicle.

■ CLYDE R. PATON, chief engineer, E. C. Pickard and V. C. Hoehri,

Packard Motor Car Co., presented an analysis of seat cushion designs in passenger cars, and emphasized the close relationship between car suspension and "passenger suspension" in the overall ride problem confronting engineers. They urged cushion design be accepted as a dynamic rather than static problem, and suggested that in the future the potential possibilities of a leaf-type cushion spring may be realized and further "we may find advantage in a means for elastically suspending the seat assembly as a whole with respect to the car body."

Aiming Beam Remains Problem

Granting that recent improvements in headlighting (sealed-beam system) have standardized and greatly simplified the service and usage problems in the field, P. J. Kent, Chrysler Corp., pointed out in his paper on headlamps that there still remains an optical system which is sensitive to aim and, until such time as the objectionable property of glare can be divorced from the desirable property of illumination, the greatest of all headlamp problems—aiming of the beam—will remain. He credited to the sealed-beam headlamp development two important improvements in electrical systems—universal adoption of shunt-type voltage-regulated generators which have enough capacity to carry the full lighting and accessory load without drawing current from the battery, and the refinement of switches through the use of silver contacts.

Appraising the possibilities of eliminating glare through use of polarized lenses and windshields, he said the principle offered interesting angles, but its application presents difficult problems, among which would be the need for 90,000,000 polarizing screens involved in universal adoption of the system; headlamps with 2½ times the light output of present designs for the same degree of illumination, and 50 to 65-ampere generators instead of the 35-ampere units which now are used.

Furthermore extensive studies would have to be made to determine whether the polarizing material will retain its efficiency under all conditions and over extended periods of time.

■ SIX principal factors affecting the quality of spot welds in low-carbon autobody sheet steel were enumerated by Dr. Wendell F. Hess and Robert A. Wyant, Rensselaer Polytechnic institute, as follows: Electrode pressure; time of current flow, amount of current; size, shape and alignment of electrodes; surface

condition of the material; and consistency in maintaining the foregoing factors at predetermined optimum values.

Their work was a part of an investigation planned by the resistance welding section of the industrial research division of the welding research committee, and experiments were made on cold-rolled and annealed auto body stock, 0.05 per cent carbon and 0.036-inch thick.

They found dome-shaped electrode tips to give somewhat better results than flat tips, principally longer life of electrodes between dressings. Oily stock was found to give welds somewhat deficient from those obtained on degreased stock. The authors suggested that the danger of welding oil stock is not due to any action of the oil but to the dirt which it may have picked up in handling and exposure.

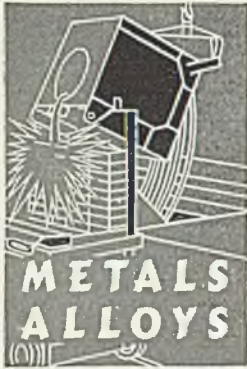
Further it was found that fine-grain steel gave welds 10 per cent stronger than those in coarse-grain material, an effect probably resulting from inherently greater strength of the fine-grain steel and the greater heat effect. Future phases of spot welding research were suggested, along the lines of investigating different gages of material, studying effects of time of electrode pressure dwell, factors affecting water cooling of electrodes and a more intensive analysis of dome-shaped electrode tips.

■ IMPORTANT points in the manufacture and care of gear hobs, elements to be watched for in regard to accuracy of hobs, care to be exercised in sharpening and mounting hobs on hobbing machines, and the importance of accuracy in hobbing machines and gear blanks were emphasized by Charles R. Staub, Michigan Tool Co., as contributing factors in the production of quiet and efficient gears. Use of relief-ground hobs instead of machine-relieved hobs also was recommended for optimum results.

The former type are ground after hardening.

Mr. Staub also discussed in detail such factors as hob contours, sharpening, hob centering gages, hob setting for precision gears, hob runout, composite effect of hob cutting teeth and recording of hob positions.

New officers for the S. A. E. are listed on page 20 in this issue. The were announced formally at the business session of the meeting, Jan. 16, at which time presentation of a life membership was made to H. T. Woolson, Chrysler Corp., Detroit, past president of the society and a member of its council.



Steel Selection Guide

Tables of unusually wide scope afford ready means of selecting machinery steels, save weight by giving better picture of comparative strengths, show steel to use for greater strength when parts fail

■ RECENTLY in working a problem involving machinery steels, a plan was developed for showing tensile properties in sizes up to 8 inches instead of the customary single 1-inch test. Advantage of such figures is that the designer can save weight because he has a better picture of the strength of the steels in various sizes. Perhaps he can cut the cost of the actual steel used through knowledge of what steels of higher diameters can do. Also, if a manufacturer or user of a machine has a parts failure, he can quickly determine what steel to

By **ALLAN W. AINSWORTH**
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 Philadelphia

street, Boston; and Beals, McCarthy & Rogers Inc., Buffalo. Abstracts from this chart, known as "Machinery Steel Selector", appear here in Tables I and II.

Selection of the right steel for the job in hand is a daily problem of the engineer, designer and maintenance man. It is most perplexing in many instances. Often analyses of various steels on a basis of "ready-to-use physicals" may not be available. Every engineer knows steels are being tested for tensile strength and knows that these tests are available, but often such data

use for greater strength in the size needed.

These facts and others are incorporated in a most usable chart, 9 x 10 inches in size and published jointly by Horace T. Potts Co., East Erie avenue and D street, Philadelphia; Brown-Wales Co., 493 C

TABLE I—MACHINERY STEEL SELECTOR

Steel	Physicals	For Bar Sizes as Listed						
		Up to 1"	Up to 2"	Up to 3"	Up to 4"	Up to 5"	Up to 6"	Up to 8"
Elastuf JJ Hot Rolled (0.15 to 0.25 per cent carbon, a soft steel)	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	60-70,000 35-45,000 25-35 50-60	60-70,000 35-45,000 25-35 50-60	55-65,000 30-40,000 25-35 50-60	55-65,000 30-40,000 25-35 50-60	55-65,000 30-40,000 25-35 45-55	55-65,000 30-40,000 25-35 45-55	50-60,000 25-35,000 20-30 40-50
Cold Finished Screw Stock (SAE 1112)	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	70-90,000 55-70,000 8-18 35-50	65-80,000 50-60,000 12-20 35-50	65-80,000 50-60,000 12-20 35-50	50-65,000 35-50,000 20-30 35-50	50-65,000 35-50,000 20-30 35-50	50-60,000 30-45,000 20-30 35-45	50-60,000 30-45,000 20-30 35-45
Elastuf Media Hot Rolled (SAE 1045)	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	80-95,000 45-60,000 15-25 30-45	80-95,000 45-60,000 15-25 30-45	75-90,000 40-55,000 15-25 30-40	75-90,000 40-55,000 15-25 30-40	70-80,000 40-50,000 15-25 30-40	70-80,000 40-50,000 15-25 30-40	65-75,000 35-45,000 15-20 25-35
Elastuf Media Precision Finish (SAE 1040)	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	90-105,000 75-90,000 10-20 35-50	75-90,000 40-55,000 15-25 30-45	75-90,000 40-55,000 15-25 30-45	65-80,000 35-50,000 15-25 30-45	65-80,000 35-50,000 15-25 30-45	60-70,000 35-45,000 15-25 30-40	60-70,000 35-45,000 15-25 30-40
Elastuf Penn Hot Rolled (0.40 per cent carbon, special analysis, closely controlled)	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	100-125,000 60-75,000 15-25 30-45	100-125,000 60-75,000 15-25 30-45	95-110,000 55-65,000 15-25 30-45	95-110,000 55-65,000 15-25 30-45	95-105,000 55-65,000 15-25 30-40	95-105,000 55-65,000 15-25 30-40	90-100,000 50-60,000 15-20 25-35
Elastuf Penn Cold Finished (Same as above)	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	105-130,000 95-110,000 12-22 35-50	95-115,000 80,95,000 12-22 30-45	95-115,000 80-95,000 12-22 30-45	90-100,000 50-60,000 15-25 30-45	90-100,000 50-60,000 15-25 30-45	85-95,000 50-60,000 15-20 30-40	85-95,000 50-60,000 15-20 30-40
Elastuf Chro-Moly Heat Treated (Chromium - Molybdenum, 0.40 carbon up to 4", 0.50 carbon over 4")	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	120-135,000 110-120,000 18-22 50-60	120-135,000 110-120,000 18-22 50-60	120-135,000 100-115,000 16-20 50-60	120-135,000 100-115,000 16-20 50-60	115-130,000 95-115,000 16-20 50-60	115-130,000 95-115,000 16-20 50-60	110-130,000 85-105,000 16-20 50-60
Elastuf Type A Heat Treated (Chromium-Vanadium, 0.35 carbon up to 2", 0.50 carbon over 2")	Tensile str., lb. per sq. in. Yield point, lb. per sq. in. Elongation in 2 inches, % Reduction of area, %	125-135,000 115-125,000 18-22 57-64	125-135,000 115-125,000 18-22 57-64	140-150,000 120-135,000 16-20 52-60	140-150,000 120-135,000 16-20 52-60	145-160,000 120-135,000 15-20 42-52	145-160,000 120-135,000 15-20 42-52	130-150,000 105-125,000 15-20 42-52

TABLE II—MACHINABILITY, COST, APPLICATION, HEAT TREATMENT

Steel and Grade	Selection Aids Other Than Tensile Properties	Heat Treatment	Notes on Heat Treating
Elastuf JJ Hot Rolled Guaranteed 0.15/ 0.25 carbon. An improved analy- sis Soft Steel.	Recommended for all general soft steel uses. Ex- cellent for forging, welding, hot and cold forming. Machinability and physicals better than common soft steel with no premium in cost. Heat treatment not essential.	Carburize at 1650/1700°F. Cool in Box. Reheat to 1400/1450°F. Quench in water. Draw to 250/500°F.	This treatment most common, although quenching from car- burizing temperature or double quench may also be used. Ab- sorbs Carbon rapidly and when case hardened has a tougher core and harder case than pos- sible with common Soft Steel.
Cold Finished Screw Stock SAE 1112.	Good for automatic screw machines and general cold-finished steel uses. Machines very easily. Has smooth, bright surface, straight and accurate to size. Heat treatment not essential.		
Elastuf Media Hot Rolled 0.40/0.50 Carbon. SAE 1045.	Uniform quality for all medium carbon steel uses. Tensile properties higher than ELASTUF JJ. Good machinability. Cost little over soft steel. Heat treatment not essential.	Normalize at 1650/1700°F. Cool in air. Heat to 1500/1550°F. Quench in water. Draw to desired hardness.	Hardness as quenched 534 Brinell for 1" dia. A draw of 350°F. relieves hardening strains. Heat treatment in- creases tensile properties, hard- ness, impact value, etc., but being a straight carbon steel, penetration and response is limited. For maximum heat treating response use ELASTUF Alloy Steels.
Elastuf Media Precision Finish 0.35/0.45 Carbon. SAE 1040.	Recommended where greater accuracy to size and straightness than cold finished steel is needed. Turned, ground and polished to extreme accuracy and mirror-like finish. Good machinability and freedom from warping. Cost slightly higher than cold finished steel. Heat treatment not essential.		
Elastuf Penn Hot Rolled Approximately 0.40 Carbon. Spe- cial analysis. Uniform quality, with process closely con- trolled.	For use instead of untreated or annealed alloy steels. Tensile properties equal or better untreated or annealed alloy steels, almost double soft steel. Unusually good machining qualities taking fine finish, with practically complete elimination of warping and distortion. Cost slightly more than carbon steels, much less than alloy steels.	Normalize at 1650/1700°F. Cool in air. Heat to 1550/1600°F. Quench in oil. Draw to desired hardness.	A draw of 350/500°F. relieves hardening strains and shows approximately C-50/55 Rock- well for 1" dia. Penetration and response not as great as for Alloy Steels. Minimum dis- tortion in hardening. Develops good toughness. Uniform heat treating results.
Elastuf Penn Cold Finished Same as above grade.	Same characteristics as hot rolled ELASTUF PENN with better machinability and higher tensile prop- erties in cold drawn sizes (up to 3" Rd. Incl.). Smooth, bright surface, accurate to size and straight. Cost slightly more than cold finished steel. Heat treatment not essential.		
Elastuf Chro-moly Heat Treated Process Con- trolled. Chrome- Molybdenum 0.40 Carbon up to 4". 0.50 Carbon over 4".	A low cost heat-treated alloy steel of high phys- icals. Excellent ductility, high impact values and shock resistance. Good creep resistance. Machines well. Use generous fillets at sharp corners and pre- vent tool marks in machining. Do not heat over 1100°F. in working or in service.	Heat treatment unneces- sary.	Furnished ready to use.
Elastuf Type A Heat Treated Special Analysis. Chrome-Van- adium. 0.35 Car- bon up to 2". 0.50 Carbon over 2".	A moderately priced heat-treated alloy steel of un- usual characteristics, with maximum physical prop- erties in machinable condition. Excellent ductility and remarkable toughness. High shear, torsion and compression strengths. High endurance limit and fatigue resistance. Unusually good wear resistance. Uniform hardness and strength throughout cross section of all sizes. Machines well, with minimum warping and distortion. Use generous fillets at sharp corners and prevent tool marks in machining. For high temperature service, will retain a good portion of its strength up to 1200/1250°F. Should not be heated over this temperature in working or in service.	Heat treatment unneces- sary.	Furnished ready to use.
Elastuf SAE 2335 Hot Rolled 0.30/0.40 Carbon. 3% Nickel. SAE 2335.	Should be heat treated after machining.	Normalize at 1650/1700°F. Cool in air. Heat to 1450/1500°F. Quench in oil. Draw to desired hardness.	A standard medium Carbon, 3½% Nickel Steel with close and uniform chemical and quality control, insuring uni- form response to heat treat- ment. Hardness as quenched 578 Brinell for 1" dia. Good hardness penetration and re- sponse. Develops high physicals with great toughness.
Elastuf SAE 3140 Hot Rolled 0.35/0.45 Carbon. Chrome-Nickel. SAE 3140.	Should be heat treated after machining.	Normalize at 1650/1700°F. Cool in air. Heat to 1500/1550°F. Quench in oil. Draw to desired hardness.	A standard medium Carbon, Chrome-Nickel Steel with close chemical and quality control, insuring uniform response to heat treatment. Hardness as quenched 601 Brinell for 1" dia. Has good hardness penetration and response where volume is not too great. Develops high strength and hardness com- bined with good toughness.
Elastuf Type A No. 9 Annealed 0.50 Carbon. Special Analysis. Chrome- Vanadium.	Should be heat treated after machining.	Normalize at 1650/1700°F. Cool in air. Heat to 1550/1600°F. Quench in oil. Draw to 300/350°F.	This drawing temperature shows C-56/60 Rockwell and develops maximum torsional impact toughness. Rigid con- trol insures uniform heat treat- ing results. Minimum distor- tion in hardening. Develops great toughness with high hardness. Excellent hardness penetration and response even in large sections.

are not readily accessible when wanted.

Published lists of steels show hundreds of kinds from low-carbon to high-tensile heat-treated alloys, as well as carburizing steels. Also countless special steels add to the job of selection.

When replacing a part, a reliable record of the steel previously used may not be at hand. Due to residual stresses in the form of fatigue and fiber failure, a test made on a portion of the failed structure cannot be considered entirely reliable, so the user often has to guess as to the proper steel to use.

Helps Repair Work

In the event there is a complete record of the physical characteristics of the steel previously used, the problem of repair, design and intelligent specification is largely solved. Such detailed data as presented here in tables abstracted from the "Selector" contain much valuable information on the machinability, comparative cost and other useful data bearing on steel selection.

Table I shows available steels needed to meet current requirements of most shops. Confusion is avoided by covering this broad field with a few steels and giving complete data as to tensile strength, yield point, elongation and reduction in area in each instance for the complete range of sizes up to and including 8-inch. This information is given on three grades of hot-rolled bars covering a yield-point range from 25,000 to 75,000 pounds per square inch, three grades of cold-finished bars having a yield point range from 30,000 to 110,000 pounds and two heat-treated steels ranging from 85,000 to 135,000 pounds.

This information appears on one side of the Selector and the information from which Table II is abstracted appears on the reverse side. Here are shown guides to heat-treating specifications and information bearing on heat-treating results.

While much data exist on tensile properties, hardness and uses of steel obtained through heat treatment, little information appears available covering use of steels in the "as purchased" condition. Most information on such steels is confined to physical properties as shown by a 1-inch round. This gap is filled by the Selector as it embraces all bar sizes up to and including 8-inch; see Table I. Also, it presents information on use of steels in the "as purchased" condition showing ready-to-use physicals over the entire range of sizes.

It has been demonstrated that there is a connection between toughness, shock resistance, per cent elongation and reduction of area as de-

termined by tensile tests. Short of testing parts to destruction, there probably exists no better method of selection than by use of tensile figures.

Use of information from the Selector may be the means of considerable savings. Often a change is made from carbon steel to a more expensive alloy steel without complete data being considered. Not infrequently it has been found that even after changing to a higher price steel, breakage continues. In such cases, additional experimental work results in rapidly mounting costs. Such groping may in many cases be eliminated by use of information found on the "Selector." Referring to such tables as shown in the accompanying material may often permit a steel to be selected for replacement which can be used in the "as purchased" state, thus eliminating extra cost of heat treat.

Designers may find such condensed information valuable in quickly affording an accurate guide. Often it is unnecessary to increase the diameter of a part when full facts are known.

Maintenance and repair men will find such readily available information will enable them to make a more intelligent use of steel. Also, it will permit them to make a record of the type of steel specified on their material requisitions. Such records will prove of value often. They not only permit production continuity, but also afford a guide for the selection of a higher strength steel when this becomes necessary.

The importance of yield point is sometimes forgotten. This is the actual working limit of the steel, and permanent deformation will result if exceeded. Comparative yield points of various available steels are shown and should be used when selecting a steel to carry a heavier load, to resist taking a permanent set or to withstand higher fiber stresses successfully.

Iron Ore Shipments in 1939 Double 1938 Total

■ Bureau of mines, Washington, estimates iron ore output in the United States in 1939 as 51,830,000 gross tons, 82 per cent over 1938 and except for 1937 highest since 1930. Ore shipped from mines in 1939 amounted to 54,825,000 tons valued at \$159,066,000, an increase of 107 per cent in quantity and 114 per cent in value, compared with 1938.

Shipments from Lake Superior mines totaled 44,800,000 tons valued at \$138,143,000; from southeastern states 6,006,000 tons valued at \$10,157,000; from northeastern states 3,103,000 tons, \$9,259,000; western states 916,000 tons, \$1,507,000.

FINANCIAL

LACK OF VENTURE CAPITAL "UNFAVORABLE FACTOR"

■ CHIEF among the less favorable conditions in the economic outlook is the failure of the expansion in durable goods production to stimulate any large new inflows of venture capital, says Col. Leonard P. Ayres, vice president, Cleveland Trust Co., Cleveland, in the bank's current bulletin.

"The present condition is an unusual one," he writes, "for generally when business enterprises demand largely increased volumes of durable goods they use them for plant expansion and equipment, and they sell new notes, stocks and bonds to pay for them."

Favorable factors include a volume of industrial production approximately 30 per cent above the average for first half 1939. This is encouraging because it presages a fairly good first quarter, and because the increase has been due mainly to gains in durable goods production.

KEYSTONE EARNINGS UP

Keystone Steel & Wire Co., Peoria, Ill., reports net profit of \$418,489, equal to 55 cents a share, for fourth 1939 quarter, compared to net income of \$115,728 or 15 cents a share for the corresponding 1938 period. In third 1939 quarter, net profit was \$273,923 or 36 cents a share.

For six months ended Dec. 31 net income totaled \$692,412, equal to 91 cents a share. In same 1938 period net profit was \$198,952 or 26 cents a share.

W. H. Sommer, president, stated that although operations since Jan. 1 have continued at capacity orders have shown a tendency to slacken.

INLAND RETIRES BONDS

Inland Steel Co., Chicago, paid off \$1,000,000 of its series C, 3 per cent serial bonds Jan. 1. Amount outstanding was thus reduced to \$6,000,000, according to a report to the securities and exchange commission. The bonds mature from 1941 to 1946.

Landis Machine Co., Waynesboro, Pa., has declared four quarterly payments of \$1.75 each on par \$100 preferred 7 per cent stock, payable March 15, June 15, Sept. 16 and Dec. 16. Also quarterly of 25 cents on par \$25 common, payable Feb. 15 to record of Feb. 5.

M. A. Hanna Co., Cleveland, declared regular quarterly of \$1.25 per share on \$5 cumulative preferred, payable March 1 to Feb. 15 record.

Great Northern Iron Ore Properties, St. Paul, declared 75 cents in arrearages on capital stock, payable Jan. 31 to record of Jan. 16.

Steel Orders Gain; Operations Decline

Prior Coverage Causes Expected Lag in New Buying

■ STEEL buying has recovered further from the sharp slump at the turn of the year but continues well below shipments.

Ingot production, off 1½ points to 84½ per cent, appears headed for lower levels the next few weeks.

The relatively small volume of new business in the face of sustained steel consumption in most directions largely is a reflection of previous coverage. To a lesser extent it results from the desire of some users to curtail inventories, now that earlier deliveries are available. Business generally is in line with expectations and is marked by few cancellations of orders placed last quarter.

Consumer inventories are below a level that would suggest any more abrupt curtailment in buying, so long as requirements hold near their current rate. A survey by STEEL indicates that in the period of sharp expansion in industrial activity between Sept. 1 and Jan. 1, buyers' steel stocks increased about 22 per cent. Further, that in the last two months of 1939 more than 40 per cent of all buyers reduced their inventories, although there was a net gain of 8.6 per cent in total supplies during November and December.

Heavier orders have brought bookings in some products from 50 per cent of producing capacity to between 60 and 70 per cent, although the average for all products remains below this latter range. Sheet buying shortly is expected to be heavier with re-entry of automobile companies into the market. Backlogs of flat-rolled material still extend 30 days or more in some grades but are being reduced steadily. Heavier production of rails booked last fall is in early prospect and will help to support steelmaking.

Automobile assemblies declined 2785 units to 108,545 last week but were 20 per cent larger than a year ago. Operations of Chrysler and Ford were steady, the drop resulting from lower schedules of General Motors and the independents. A further seasonal letdown is expected the next several weeks.

A flurry of activity in railroad equipment and track material markets is in contrast to recent dullness in this respect. Rail orders of 13,850 tons include 9150 tons for the Delaware & Hudson, 2700 tons for the Bessemer & Lake Erie and 2000 tons for the Western Maryland. Baltimore & Ohio has placed 100 hopper cars, Norfolk & Western 100 auto cars and Wheel-

ing & Lake Erie four steam switching locomotives. Pending business includes 200 stock cars for the Missouri Pacific, seven diesel-electric switchers for the Northern Pacific and five steam switchers for the Terminal Railroad of St. Louis.

Steel buying for export is definitely improved, most active purchasers being Turkey, Holland and Scandinavian countries in Europe and Brazil and Argentina in South America. England may become a heavier buyer of pig iron and semifinished steel but not of finished products, it is reported. It is also understood England plans to compete more actively for finished steel business in South America, now offering late February delivery.

Tin plate production has slid further to 69 per cent. Additional curtailment before the spring upturn starts is not improbable, although mills now operating are expected to be back near capacity before the end of February. Difficulty in arranging financing is a factor in restricting export business in tin plate.

Seasonal quiet in building and engineering construction is apparent in the moderate tonnages involved in structural shape and reinforcing bar orders.

December consumption of Lake Superior iron ore was the heaviest for any month in 1939 and left stocks at furnaces and on Lake Erie docks as of Jan. 1 only 8 per cent larger than a year ago.

Finished steel prices generally are steady. A test of sheet quotations will come on subsequent purchases by the automotive industry. Larger producers of flat-rolled products have declined meeting a \$2 concession offered at Detroit by some hand mills recently. Scrap markets continue dull in the absence of active mill demand, and prices disclose little strength. Further weakness at Philadelphia reduces the scrap composite 8 cents to \$17.38.

Six districts had lower steelmaking schedules last week, headed by 6-point reductions to 82 per cent at Pittsburgh and 74 per cent at Youngstown. Declines of 2 points each brought eastern Pennsylvania to 80, Detroit to 91 and Buffalo to 70. Cleveland was off 2½ points to 82½. Chicago rose 1½ points to 92, Wheeling was up 7 points to 96 and St. Louis gained 8 points to 83. Unchanged were Birmingham at 94, New England at 83 and Cincinnati at 74½.

MARKET IN TABLOID ★

Demand

Active despite restricted rate of new bookings.

Prices

Steady on most products; scrap irregular.

Production

Down 1½ points to 84½ per cent.

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast points	2.75c

Iron

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

Reinforcing

<i>New Billet Bars, Base*</i>	
Chicago, Gary, Buffalo,	
Cleve., Birm., Young.,	
Sparrows Pt., Pitts....	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base*

Pittsburgh, Gary Chi-	
cago, Buffalo, Cleve-	
land, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

*Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.

Wire Products

<i>Pitts-Cleve.-Chicago-Birm. base</i>	
<i>per 100 lb. keg in carloads</i>	
Standard and cement	
coated wire nails	\$2.55
(Per pound)	
Polished fence staples ..	2.55c

Galv. barbed wire, stand-	
ard 12 1/2 gage two-	
point hog, 80-rod spool	
\$2.88; two-point cattle,	
80-rod spool	\$2.70
Annealed fence wire	3.05c
Galv. fence wire	3.30c
Woven wire fencing (base	
C. L. column)	67.00
Single loop bale tier,	
(base C. L. column)	56.00

To Manufacturing Trade

<i>Base, Pitts. - Cleve. - Chicago-</i>	
<i>Birmingham (except spring</i>	
<i>wire)</i>	
Bright bess., basic wire ..	2.60c
Galvanized wire	2.65c
Spring wire	3.20c
Worcester, Mass., \$2 higher on	
bright basic and spring wire.	

Cut Nails

Carload, Pittsburgh	\$3.85
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Cold-Finished Bars

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

Alloy Bars (Hot)

(Base, 20 tons or over)			
Pittsburgh, Buffalo, Chi-			
cago, Massillon, Can-			
ton, Bethlehem	2.70c		
Detroit, delivered	2.80c		
Alloy			
S.A.E. Diff.	S.A.E.	Alloy	Diff.
2000	0.25	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20
4100 0.15 to 0.25 Mo.			0.55
4600 0.20 to 0.30 Mo. 1.50-			
2.00 Ni.			1.10
5100 0.80-1.10 Cr.			0.45
5100 Cr. spring flats			0.15
6100 bars			1.20
6100 spring flats			0.85
Cr. N. Van.			1.50
Carbon Van.			0.85
9200 spring flats			0.15
9200 spring rounds, squares			0.40
Electric furnace up 50 cents.			

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less	
Pittsburgh, Chicago,	
Gary, Cleveland,	
Youngstown, Middle-	
town, Birmingham....	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast points..	2.70c
Cooperage hoop, Youngs.,	
Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon	
and under, Pittsburgh,	
Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c
Carbon Cleve., Pitts.	
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c
Worcester, Mass. \$4 higher.	
Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c
Lamp stock up 10 cents.	

Rails, Fastenings

<i>(Gross Tons)</i>	
Standard rails, mill....	\$40.00
Relay rails, Pittsburgh	
20—100 lbs.	32.50-35.50
Light rails, billet qual.,	
Pitts., Chicago, B'ham.	\$40.00
Do., rerolling quality ..	39.00
Cents per pound	
Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts.,	
Chicago, Birmingham.	3.15c
Tie plates, base	2.15c
Base, light rails 25 to 60 lbs.,	
20 lbs., up \$2; 16 lbs. up \$4; 12	
lbs. up \$8; 8 lbs. up \$10. Base	
railroad spikes 200 kegs or	
more; base plates 20 tons.	

Bolts and Nuts	
<i>F.o.b. Pittsburgh, Cleveland,</i>	
<i>Birmingham, Chicago. Dis-</i>	
<i>counts for carloads additional</i>	
<i>5%, for full containers addi-</i>	
<i>tional 10%.</i>	
Carriage and Machine	
1/2 x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1 1/2 and larger	64 off
Tire bolts	52.5 off
Stove Bolts	
In packages with nuts separate	
72.5 off; with nuts attached	
add 15%; bulk 83.5 off on	
15,000 of 3-inch and shorter,	
or 5000 over 3-in.	60 off
Step bolts	68.5 off
Plow bolts	68.5 off
Nuts	
Semifinished hex. U.S.S. S.A.E.	
6-inch and less	67 70
3/4-1-inch	64 65
1 1/2 and larger	62 62
Hexagon Cap Screws	
Upset, 1-in., smaller	70.0 off
Square Head Set Screws	
Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling	
Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c
Rivets, Washers	
Structural, Pittsburgh,	
Cleveland, Chicago	3.40c
3/4-inch and smaller,	

Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts.,	
Chi., Phila., to jobbers	
and large nut, bolt	
mfrs. l.c.l. \$5.40; c.l. \$5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2 1/2 and 1 1/2 less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld			
Steel			
In.	Blk.	Galv.	
1/2	63 1/2	54	
3/4	66 1/2	58	
1-3	68 1/2	60 1/2	
Iron			
1/2	30	13	
1-1 1/4	34	19	
1 1/2	38	21 1/2	
2	37 1/2	21	

Lap Weld			
Steel			
2	61	52 1/2	
2 1/2-3	64	55 1/2	
3 1/2-6	66	57 1/2	
7 and 8	65	55 1/2	
9 and 10	64 1/2	55	
11 and 12	63 1/2	54	
Iron			
2	30 1/2	15	
2 1/2-3 1/2	31 1/2	17 1/2	
4	33 1/2	21	
4 1/2-8	32 1/2	20	
9-12	28 1/2	15	

Line Pipe			
Steel			
1 to 3, butt weld	67 1/2		
2, lap weld	60		
2 1/2 to 3, lap weld	63		
3 1/2 to 6, lap weld	65		
7 and 8, lap weld	64		
10-inch lap weld	63 1/2		
12-inch, lap weld	62 1/2		
Iron			
1/2 butt weld	25	7	
1 and 1 1/4 butt weld	29	13	
1 1/2 butt weld	33	15 1/2	
2 butt weld	32 1/2	15	
1 1/2 lap weld	23 1/2	7	
2 lap weld	25 1/2	9	
2 1/2 to 3 1/2 lap weld	26 1/2	11 1/2	
4 lap weld	28 1/2	15	
4 1/2 to 8 lap weld	27 1/2	14	
9 to 12 lap weld	23 1/2	9	

Boiler Tubes			
<i>Carloads minimum wall seam-</i>			
<i>less steel boiler tubes, cut</i>			
<i>lengths 4 to 24 feet; f.o.b. Pitts-</i>			
<i>burgh, base price per 100 feet</i>			
<i>subject to usual extras.</i>			
Lap Welded			
Sizes	Gage	Steel	Char-
1 1/2 "O.D.	13	\$ 9.72	\$23.71
1 3/4 "O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2 1/4 "O.D.	13	13.79	21.68
2 1/2 "O.D.	12	15.16	.....
2 3/4 "O.D.	12	16.58	26.57
3" O.D.	12	17.54	29.00
3 1/4 "O.D.	12	18.35	31.36
3 1/2 "O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless			
Sizes	Gage	Hot	Cold
1" O.D.	13	\$ 7.82	\$ 9.01
1 1/4 "O.D.	13	9.26	10.67
1 1/2 "O.D.	13	10.23	11.79
1 3/4 "O.D.	13	11.64	13.42

2" O.D.	13	13.04	15.03
2 1/4 "O.D.	13	14.54	16.76
2 1/2 "O.D.	12	16.01	18.45
2 3/4 "O.D.	12	17.54	20.21
3" O.D.	12	18.59	21.42
3 1/2 "O.D.	12	19.50	22.48
3 3/4 "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4 1/2 "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

<i>Class B Pipe—Per Net Ton</i>	
6-in., & over, Birm.	\$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe \$3 over Class B Std. ftgs., Birm., base \$100.00

Semifinished Steel

Rerolling Billets, Slabs	
<i>(Gross Tons)</i>	
Pittsburgh, Chicago, Gary,	
Cleve., Buffalo, Young.,	
Birm., Sparrows Point.	\$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00
Forging Quality Billets	
Pitts., Chi., Gary, Cleve.,	
Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars	
Pitts., Cleveland, Young.,	
Sparrows Point, Buf-	
falo, Canton, Chicago ..	34.00
Detroit, delivered	36.00

Wire Rods	
Pitts., Cleveland, Chicago,	
Birmingham No. 5 to 3 1/2-	
inch incl. (per 100 lbs.)	\$2.00
Do., over 3 1/2 to 1 1/2-in. incl.	2.15
Worcester up \$0.10; Galves-	
ton up \$0.25; Pacific Coast up	
\$0.45.	

Skelp	
Pitts., Chi., Youngstown,	
Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, fur.	\$4.50-4.75
Connellsville, fdry.	5.00-5.75
Connell. prem. fdry.	5.75-6.25
New River fdry.	6.25-6.50
Wise county fdry.	5.50-6.50
Wise county fur.	5.00-5.25

By-Product Foundry	
Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens.	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

<i>Spot, gal., freight allowed cast</i>	
<i>of Omaha</i>	
Pure and 90% benzol.	16.00c
Toluol, two degree	25.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
<i>Per lb. f.o.b. Frankford and</i>	
<i>St. Louis</i>	
Phenol (less than 1000	
lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c
<i>Eastern Plants, per lb.</i>	
Naphthalene flakes, balls,	
bbts. to jobbers	6.75c
<i>Per ton, bulk, f.o.b. port</i>	
Sulphate of ammonia	\$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	\$24.00	\$24.50	\$23.50	\$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.	19.38	19.38	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	22.00	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	23.50
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	21.00	20.00	21.00
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	24.00	23.50	24.50
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

†Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	24.78	23.66	24.66
Boston from Birmingham	24.12	24.12	23.00	24.00
Boston from Everett, Mass.	24.50	24.50	24.00	25.50
Boston from Buffalo	24.50	24.50	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	26.50	25.00	26.00
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	23.22	23.22	22.00	23.00
Cincinnati from Hamilton, O.	23.24	23.24	23.61	24.61
Cincinnati from Birmingham	23.06	23.06	22.06	23.06
Cleveland from Birmingham	23.32	23.32	22.82	23.82
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	25.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	25.15	24.15	25.15
Newark, N. J., from Bethlehem	25.53	25.53	26.03	26.03
Philadelphia from Birmingham	24.46	24.46	23.96	24.96
Philadelphia from Swedeland, Pa.	24.84	24.84	24.34	25.34
Pittsburgh district from Neville Island	25.45	25.45	24.95	25.95
Saginaw, Mich., from Detroit	25.45	25.45	24.95	25.95

	No. 2 Fdry.	Malle-able	Basic	Besse-mer
St. Louis, northern	23.50	23.50	23.00	23.00
St. Louis from Birmingham	23.12	23.12	22.62	22.62
St. Paul from Duluth	25.63	25.63	25.13	25.13
†Over 0.70 phos.				

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$28.50, base; \$29.74 delivered Philadelphia.

Gray Forge

	Charcoal
Valley furnace	\$22.50
Pitts. dist. fur.	22.50
Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base; 6-6.50 per cent \$28.50; 6.51-7—\$29.00; 7-7.50—\$29.50; 7.51-8—\$30.00; 8-8.50—\$30.50; 8.51-9—\$31.00; 9-9.50—\$31.50; Buffalo, \$1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus \$1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices	Ladle Brick (Pa., O., W. Va., Mo.)	
Fire Clay Brick	Dry press \$28.00	
Super Quality	Wire cut \$26.00	
Pa., Mo., Ky.	Magnesite	
First Quality	Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00	
Alabama, Georgia	net ton, bags 26.00	
New Jersey	Basic Brick	
Second Quality	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Pa., Ill., Ky., Md., Mo.	Georgia, Alabama	Chrome brick \$50.00
Georgia, Alabama	New Jersey	Chem. bonded chrome 50.00
Ohio	Ohio	Magnesite brick 72.00
First quality	39.90	Chem. bonded magnesite 61.00
Intermediate	36.10	
Second quality	31.35	
Malleable Bang Brick		Fluorspar
All bases	\$56.05	Washed gravel, duty pd., tide, net ton \$25.00-\$26.00
Silica Brick		Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail. 22.00
Pennsylvania	\$47.50	Do. barge 22.00
Joliet, E. Chicago	55.10	No. 2 lump 22.00
Birmingham, Ala.	47.50	

Ferrolloy Prices

Ferromanganese, 78-82%, lump and bulk, carlots tide, duty pd.	\$100.00	carlots 11.00c	Do, spot 145.00	¾-in., lb. 14.00c
Ton lots	110.00	Do, ton lots 11.75c	Do, contract, ton lots 145.00	Do., 2% 12.50c
Less ton lots	113.50	Do, less-ton lots 12.00c	Do, spot, ton lots 150.00	Spot ¼c higher
Less 200 lb. lots	118.00	67-72% low carbon:	15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50	Silicon Briquets, contract carloads, bulk, freight allowed, ton \$69.50
Do., carlots del. Pitts.	105.33	Car-loads loads tons	Do, spot 160.00	Ton lots 79.50
Spiegel Eisen, 19-21% dom.		2% carb. 17.50c 18.25c 18.75c	Do, contract, ton lots 160.00	Less-ton lots, lb. 8.75c
Palmerton, Pa., spot	32.00	1% carb. 18.50c 19.25c 19.75c	Do, spot, ton lots 165.00	Less 200 lb. lots, lb. 4.00c
Do., 26-28%	39.50	0.10% carb. 20.50c 21.25c 21.75c	Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c	Spot ¼-cent higher.
Ferrosilicon, 50% freight allowed, c.l.	69.50	0.20% carb. 19.50c 20.25c 20.75c	Do, ton lots 8.00c	Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Do., ton lot	82.00	Spot ¼c higher	Do, less-ton lots 8.50c	bulk freight allowed, lb. 5.50c
Do., 75 per cent	126.00	Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95	Spot ¼c higher	Ton lots 5.75c
Do, ton lots	142.00	Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80	Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c	Less-ton lots 5.75c
Spot, \$5 a ton higher.		Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots \$1.23	Do., ton lots 7.50c	Spot ¼c higher
Silicomanganese, 2½ c. 103.00		Do., less-ton lots 1.25	Do., less-ton lots 7.75c	Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton \$97.50
2% carbon, 108.00; 1% 118.00		20-25% carbon, 0.10 max., ton lots, lb. 1.35	Do., less 200 lbs. 8.00c	Do, spot 102.50
Contract ton price \$12.50 higher; spot \$5 over contract.		Do. less-ton lots 1.40	Spot, ¼c higher.	34-40%, contract, carloads, lb., alloy 14.00c
Ferrotungsten, stand., lb. con. del. cars 2.00-2.10		Spot 5c higher	Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. \$2.50	Do, ton lots 15.00c
Ferovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90		Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls... \$2.25	Do., smaller lots 2.60	Do, less-ton lots 16.00c
Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% \$3 unitage 75.00		Do., less-ton lots 2.30	Vanadium Pentoxide, contract, lb. contained \$1.10	Spot ¼c higher
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del.		Spot is 10c higher	Do, spot 1.15	Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. \$2.60
		Technical molybdenum trioxide. 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80	Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome \$4.00c	Do, 100-200 lb. lots 3.00
		Ferro-carbon-titanium, 15-18% tl., 6-8% carb., carlots, contr., net ton \$142.50	Do, spot \$9.00c	Do, under 100-lb. lots
			88% chrome, contract \$3.00c	Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c
			Do, spot \$8.00c	
			Silicon Metal, 1% iron, contract, carlots, 2 x	

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Struc- tural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	SAE 2300	SAE 3100
Boston	3.98	4.16	5.16	3.85	3.85	5.66	3.81	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.23	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.75	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.98	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.95	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.68	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.40	3.40	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
Seattle	4.00	4.00	5.35	3.40	3.50	5.75	3.95	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.65	9.80
San Francisco	4.00	4.45	6.00	4.00	4.00	5.60	3.85	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed)		SAE Hot-rolled Bars (Unannealed)		
	1035-1050 Series	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 0-1499 pounds in New York, 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis, Tulsa; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Jan. 18

Export Prices f.o.b. Port of Dispatch—
By Cable or Radio

Domestic Prices at Works or Furnace—
Last Reported

	British gross tons U. K. ports		Continental Channel or North Sea ports, gross tons		Quoted in dollars at current value	**Quoted in gold pounds sterling	£ s d	French Francs	Belgian Francs	Reich \$§Mark
	£ s d	Quoted in dollars at current value	gross tons	**Quoted in gold pounds sterling						
Foundry, 2.50-3.00 Si.	\$23.82	6 0 0	\$29.82	3 10 0	....	....	....	....	....	....
Basic bessemer.	....	....	19.59	2 6 0	....	....	....	....	....	....
Hematite, Phos. .03-.05	24.81	6 5 0	....	....	....	....	....	....	....	....
Billets	\$29.28	7 7 6	\$31.95	3 15 0	....	....	....	....	....	....
Wire rods, No. 5 gage.	45.16	11 7 6	60.71	7 2 6	....	....	....	....	....	....
Standard rails	\$37.72	9 10 0	\$48.99	5 15 0	....	....	....	....	....	....
Merchant bars	2.17c	12 5 0	2.93c	7 14 0	....	....	....	....	....	....
Structural shapes	1.97c	11 2 6	2.92c	7 13 6	....	....	....	....	....	....
Plates, ½ in. or 5 mm.	2.10c	11 17 6	3.75c	9 17 6	....	....	....	....	....	....
Sheets, black, 24 gage or 0.5 mm.	2.76c	15 12 6	3.75c	9 17 6°	....	....	....	....	....	....
Sheets, gal., 24 ga., corr.	3.21c	18 2 6	4.66c	12 5 0	....	....	....	....	....	....
Bands and strips	2.17c	12 5 0	2.81c	7 8 0	....	....	....	....	....	....
Plain wire, base	3.45c	19 10 0	3.04c	8 0 0	....	....	....	....	....	....
Galvanized wire, base	4.12c	23 5 0	3.61c	9 10 0	....	....	....	....	....	....
Wire nails, base	....	....	3.52c	9 5 0	....	....	....	....	....	....
Tin plate, box 108 lbs.	\$ 6.25	11 6	....	....	....	....	....	....	....	....
British ferromanganese	\$100.00	delivered Atlantic seaboard duty-paid.	....	....	....	....	....	....	....	....

†British ship-plates. Continental, bridge plates. \$24 ga. \$1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions. **Gold pound sterling not quoted. §§Last prices, no current quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	16.50-17.00	Buffalo	10.50-11.00	Buffalo	17.50-18.00	Eastern Pa.	23.50-24.00
Bos. dock No. 1 exp.	15.00-15.50	Chicago	10.00-10.50	Chicago	16.25-16.75	St. Louis, 1 1/4-3 3/4"	18.50-19.00
New Eng. del. No. 1	15.50	Cincinnati, dealers	6.50-7.00	Cleveland	21.00-21.50	CAR WHEELS	
Buffalo, No. 1	17.00-17.50	Cleveland, no alloy	10.50-11.00	Pittsburgh	22.00-22.50	Birmingham, iron	19.00-20.00
Buffalo, No. 2	15.00-15.50	Detroit	7.50-8.00	St. Louis	16.00-16.50	Boston dist., iron	†14.50-15.00
Chicago, No. 1	16.50	Eastern Pa.	12.00-12.50	Seattle	18.00-18.50	Buffalo, steel	21.50-22.00
Chicago, auto, no alloy	15.00-15.50	Los Angeles	4.00-5.00	FROGS. SWITCHES			
Chicago, No. 2 auto	13.00-13.50	New York	†7.00-7.25	Chicago	16.00-16.50	Chicago, iron	17.00-17.50
Cincinnati, dealers	14.00-14.50	Pittsburgh	12.50-13.00	St. Louis, cut	15.50-16.00	Chicago, rolled steel	18.50-19.00
Cleveland, No. 1	17.00-17.50	St. Louis	7.00-7.50	ARCH BARS, TRANSOMS			
Cleveland, No. 2	16.00-16.50	San Francisco	5.00	St. Louis	16.50-17.00	Cincinnati, iron, deal.	17.00-17.50
Detroit, No. 1	†13.00-13.50	Toronto, dealers	6.50	PIPE AND FLUES			
Detroit, No. 2	†12.00-12.50	Valleys	11.50-12.00	Chicago, net	11.00-11.50	Eastern Pa., iron	20.00-20.50
Eastern Pa., No. 1	18.00	SHOVELING TURNINGS				Eastern Pa., steel	22.00-22.50
Eastern Pa., No. 2	16.50-17.00	Buffalo	13.50-14.00	Chicago, net	11.00-11.50	Pittsburgh, iron	19.50-20.00
Federal, Ill.	14.00-14.50	Cleveland	11.50-12.00	Cincinnati, dealers	11.00-11.50	Pittsburgh, steel	23.00-23.50
Granite City, R. R.	15.00-15.50	Chicago	10.00-10.50	RAILROAD GRATE BARS			
Granite City, No. 2	14.00-14.50	Chicago, spec., anal.	12.50-13.00	Buffalo	12.00-12.50	Birmingham	16.00
Los Angeles, No. 1	16.00-16.50	Detroit	†9.50-10.00	Chicago, net	10.50-11.00	Boston, No. 1 mach.	†15.00-15.25
Los Angeles, No. 2	15.00-15.50	Pitts., alloy-free	14.00-14.50	Cincinnati, dealers	9.00-9.50	N. Eng. del. No. 2	14.00-14.50
L. A., No. 1 f.a.s.	17.00-18.00	BORINGS AND TURNINGS				N. Eng. del. textile	18.25-18.75
L. A., No. 2 f.a.s.	16.00-17.00	<i>For Blast Furnace Use</i>				Buffalo, cupola	17.00-17.50
N. Y. dock No. 1 exp.	14.50	Boston district	†5.65-6.00	Birmingham	15.00	Buffalo, mach.	18.00-18.50
Pitts., No. 1 (R. R.)	19.50-20.00	Buffalo	11.00-11.50	Boston district	†9.50-10.00	Chicago, agri. net.	13.50-14.00
Pittsburgh, No. 1	17.50-18.50	Cincinnati, dealers	5.00-5.50	Eastern Pa., No. 1	18.00-18.50	Chicago, auto net	15.00-15.50
Pittsburgh, No. 2	16.50-17.00	Cleveland	11.00-11.50	St. Louis No. 1	11.00-11.50	Chicago, railroad net	14.00-14.50
St. Louis, R. R.	15.00-15.50	Eastern Pa.	11.00-11.50	St. Louis No. 2	15.00-15.50	Chicago, mach. net.	14.50-15.00
St. Louis, No. 2	14.50-15.00	Detroit	†7.50-8.00	RAILROAD WROUGHT			
San Francisco, No. 1	16.50-17.00	New York	†7.00-7.50	Birmingham	15.00	Chicago, mach. net.	14.50-15.00
San Francisco, No. 2	15.50-16.00	Pittsburgh	12.00-12.50	Boston district	†9.50-10.00	Cincinnati, mach. deal.	16.50-17.00
Seattle, No. 1	14.50-15.50	Toronto, dealers	6.00	Eastern Pa., No. 1	18.00-18.50	Cleveland, mach.	20.00-21.00
Toronto, dlrs., No. 1	11.00	AXLE TURNINGS				Detroit, cupola, net.	†14.50-15.00
Valleys, No. 1	18.00-18.50	Buffalo	17.00-17.50	Boston district	†7.00	Eastern Pa., cupola	20.50-21.00
COMPRESSED SHEETS							
Buffalo, new	15.00-15.50	Boston dist. chem.	†9.00-9.25	Chicago, heavy	19.00-19.50	E. Pa., No. 2 yard.	15.50-16.00
Chicago, factory	15.50-16.00	Buffalo	11.00-11.50	FORGE FLASHINGS			
Chicago, dealers	14.00-14.50	Chicago	9.50-10.00	Forge district	†11.25-11.50	E. Pa., yard fdry.	17.00-17.50
Cincinnati, dealers	13.50-14.00	Cincinnati, dealers	5.00-5.50	Buffalo	15.00-15.50	Los Angeles	15.50-16.00
Cleveland	16.50-17.00	Cleveland	11.00-11.50	Cleveland	16.00-16.50	Pittsburgh, cupola	18.50-19.00
Detroit	†13.50-14.00	Detroit	†7.50-8.00	Detroit	†12.00-12.50	San Francisco	15.50-16.00
E. Pa., new mat.	18.00	E. Pa., chemical	14.50-15.00	Pittsburgh	16.50-17.00	Seattle	16.00-16.50
E. Pa., old mat.	14.00-14.50	New York	†7.00-7.50	FORGE SCRAP			
Los Angeles	13.50-14.00	St. Louis	6.00-6.50	Boston district	†7.00	St. Louis, breakable	14.00-14.50
Pittsburgh	17.50-18.50	Toronto, dealers	6.00	Chicago, heavy	19.00-19.50	St. Louis agri. mach.	17.25-17.75
St. Louis	11.50-12.00	CAST IRON BORINGS				St. L., No. 1 mach.	18.25-18.75
San Francisco	13.50-14.00	Birmingham	8.50	LOW PHOSPHORUS			
Valleys	17.50-18.00	Boston dist. chem.	†9.00-9.25	Cleveland, crops	22.50-23.00	San Francisco	16.00-17.00
BUNDLED SHEETS							
Buffalo, No. 1	15.00-15.50	Buffalo	11.00-11.50	Eastern Pa., crops	23.00	Toronto, No. 1 mach., net dealers	15.50
Buffalo, No. 2	13.00-13.50	Chicago	9.50-10.00	Pitts., billet, bloom, slab crops	24.50-25.00	HEAVY CAST	
Cleveland	13.50-14.00	Cincinnati, dealers	5.00-5.50	LOW PHOS. PUNCHINGS			
Pittsburgh	16.50-17.00	Cleveland	11.00-11.50	Buffalo	20.00-20.50	Boston dist. break.	†15.00-16.00
St. Louis	10.00-10.50	Detroit	†7.50-8.00	Chicago	19.00-19.50	New England, del.	15.00-15.50
Toronto, dealers	9.75	F. Pa., chemical	14.50-15.00	Cleveland	18.50-19.00	Buffalo, break	15.00-15.50
SHEET CLIPPINGS, LOOSE							
Chicago	10.50-11.00	New York	†7.00-7.50	Eastern Pa.	22.50-23.00	Cleveland, break, net	15.25-15.75
Cincinnati, dealers	9.50-10.00	St. Louis	6.00-6.50	Pittsburgh	22.50-23.00	Detroit, auto net.	†15.50-16.00
Detroit	†9.25-9.75	Toronto, dealers	6.00	Seattle	15.00	Detroit, break	†11.00-11.50
St. Louis	9.50-10.00	RAILROAD SPECIALTIES				Eastern Pa.	18.00-18.50
Toronto, dealers	9.00	Chicago	18.25-18.75	ANGLE BARS—STEEL			
RUSHING							
Birmingham, No. 1	14.00	Chicago	18.50-19.00	SPRINGS			
Buffalo, No. 1	15.00-15.50	St. Louis	16.00-16.50	Buffalo	21.00-21.50	Chicago, coll.	19.50-20.00
Chicago, No. 1	15.00-15.50	STEEL RAILS, SHORT				Chicago, coll.	19.50-20.00
Cincinnati, No. 1, deal.	11.50-12.00	Birmingham	17.50-18.00	Buffalo	22.00-22.50	Chicago, leaf	18.00-18.50
Cincinnati, No. 2	5.00-5.50	Buffalo	22.00-22.50	Chicago (3 ft.)	19.00-19.50	Eastern Pa.	23.00
Cleveland, No. 2	11.50-12.00	Chicago (2 ft.)	19.50-20.00	Chicago (2 ft.)	19.50-20.00	Pittsburgh	23.00-23.50
Detroit, No. 1, new	†12.50-13.00	Cincinnati, dealers	20.50-21.00	Detroit	†19.50-20.00	St. Louis	16.50-17.00
Valleys, new, No. 1	17.00-17.50	Detroit	†19.50-20.00	Pitts., 3 ft. and less	23.00-23.50	STEEL RAILS, SCRAP	
Toronto, dealers	5.00-5.50	St. Louis, 2 ft. & less	19.75-20.25	Birmingham	15.50	Birmingham	6.00
MACHINE TURNINGS (Long)							
Birmingham	6.00	Eastern Local Ore					
Ores							
Lake Superior Iron Ore							
<i>Gross ton, 51 1/2 %</i>							
<i>Lower Lake Ports</i>							
Old range bessemer	\$5.25	<i>Foundry and basic 56-63%, contract. 9.00-10.00</i>					
Mesabi nonbessemer	4.95	Foreign Ore (Prices nominal)					
High phosphorus	4.85	<i>Cents per unit, c.i.f. Atlantic</i>					
Mesabi bessemer	5.10	<i>Manganiferous ore, 45-55% Fe. 6-10%</i>					
Old range nonbessemer	5.10	<i>Mn. 14.00-15.00</i>					
Swedish low phos. 14.00							
North African low phos. 14.00							
Spanish, No. African basic, 50 to 60% 14.00							
Chinese wolframite, short ton unit, duty paid \$23.75-24.00							
Scheelite, imp. \$24.00-25.00							
Chrome ore, 48% gross ton, c.i.f. \$25.00-26.00							
Manganese Ore							
<i>Including war risk but not duty, cents per unit cargo lots</i>							
Caucasian, 50-52% 48.00-50.00							
So. African, 50-52% 48.00-50.00							
Indian, 49-50% 46.00-48.00							
Brazilian, 48-52% 46.00-48.00							
Cuban, 50-51%, duty free 61.20							
Molybdenum							
Sulphide conc., per lb., Mo. cont., mines \$0.75							

Sheets, Strip

Sheet & Strip Prices, Pages 72, 73

Pittsburgh—The lull in buying apparently will be followed by renewed activity. Second quarter inquiries have been received from auto companies with heavy tonnages indicated involved. Shipments remain heavy, sheet mills operating about 75 per cent, but incoming orders are about 50 per cent of capacity. Strip output also is fairly steady, averaging about 65 per cent. While reports of a \$2 cut on hot-rolled sheets by hand mills for Detroit delivery have circulated for several weeks, there is no evidence that large producers have quoted below the market.

Cleveland—Buying continues to trail shipments, but 30 days' delivery frequently is necessary on hot-rolled sheets. However, backlogs are declining steadily. Automotive companies are expected to re-enter the market soon. Chief interest in this buying is connected with prices. Sheet and strip quotations recently have been steady, except for the \$2 concession offered the automotive trade on hot-rolled sheets by some hand mills.

A new list of extras on hot-rolled strip, dated Jan. 12, incorporates revisions in charges for shearing or blanking circles. Other extras are unchanged. The former extra for circles of 50 cents per 100 pounds has been succeeded by varying charges, according to gage of material involved, ranging from 10 cents for 16 gage or heavier to 55 cents for 22 gage or lighter. These are added to the base price of the rectangular blank after multiplying the latter by 125 per cent to cover scrap loss.

Chicago—Sheet and strip producers show little anxiety over the lull in buying, in view of previous active coverage. Small improvement in forward buying is expected until later this quarter for second period needs. Current orders are chiefly small lots for fill-in requirements.

New York—Sheet consumption is fairly well sustained, despite some reduction from the fall peak. Users with the most favorable operations or prospects are stove, refrigerator and electrical equipment manufacturers. Warehouses are specifying lightly. Sheet deliveries are improving.

Improvement in narrow cold strip buying last week has lifted the rate from 50 to close to 75 per cent of shipments. Little material has been subject to deferred deliveries. Rolling schedules are high and, while backlogs are being lowered, unfilled orders are impressive.

Boston—Narrow cold strip busi-

ness has improved from approximately 50 per cent to slightly better than 70 per cent of shipments. While well distributed as to users, volume emanating from the automobile industry is notable. Consumers report new orders for finished goods are appearing, this accounting for part of the resumption in buying. Deliveries on most specialties range from five to six weeks. January shipments will be the heaviest for that month in years. There have been few hold-up or deferred shipment instructions. Backlogs, still large, are declining less rapidly than earlier in the month.

Philadelphia — Some replacement buying is beginning to appear, especially from consumers who made large commitments last year at sharp price concessions. Consumption in most lines is holding up well, including automotive, railroad and government work. Mill deliveries are less extended.

Buffalo—Absence of active buying is without effect on sheet and strip production, in view of backlogs sufficient to support active operations the next 30 days. Mills look for additional automotive orders soon.

Cincinnati—Sheet mills are eating away backlogs. Recent bookings have not been much more than 40 per cent of capacity, although demand is tending to improve. Better automotive buying is seen within the next two to three weeks. Galvanized buying has been retarded by unfavorable weather.

Birmingham, Ala. — Sheets, despite some tapering from the high of a few weeks ago, are still in consistent demand. Roofing sheets, due to seasonal influences, are somewhat below manufacturers' although both remain comparatively satisfactory and are being turned out at better than 85 per cent of capacity.

Toronto, Ont.—Bookings continue active, backlogs extending through May. Most orders are for delivery at convenience of producers at prices effective at time of delivery. Warehouses are taking care of spot needs of smaller consumers and are reported buying more extensively from the United States.

Tin Plate

Tin Plate Prices, Page 72

Tin plate production last week is estimated at 69 per cent, off 5 points from the week before. Within the next 30 days mills now active are expected to be back near capacity operations, although it appears doubtful if it will be necessary to start any idle mills to meet demand. Early estimates on the principal food packs show increased acreage and

schedules for larger volume than last year. More export business is available than is being booked, principally because financing is difficult and because heavy bookings might work to the dissatisfaction of domestic consumers. Unchanged prices are indicated for next quarter. In fact, some 12-month contracts are being signed on the present basis.

Plates

Plate Prices, Page 72

New York—Spotty business is in line with expectations of sellers. Normally there is little business at this season, and in view of heavy purchases last fall, no sharp improvement is expected much before March. Meanwhile, car equipment builders and ship yards are consuming substantial tonnages against old orders and tank and boiler makers are still operating at a good rate considering the season. Oil company interest is livelier and should be reflected in improved inquiry. Deliveries average two or three weeks.

Philadelphia—Small-lot buying is more active, but deliveries continue substantially in excess of new business and some smaller mills have reduced operations. Air mail from Europe, delayed by storms, brought large specifications, reported involving several thousand tons for Holland and Scandinavia.

Birmingham, Ala.—Plate bookings are relatively high, even though much tonnage business carried over from 1939 has been worked off. Current demand is largely from tank manufacturers, although much is going into ship construction.

Seattle—Current orders are confined to small jobs for boilers, tanks and repair jobs. Proposed water system improvements at Leavenworth and Cle Elum, Wash., involve unstated tonnages of steel pipe. Bellingham, Wash., will invite bids soon for a small tonnage of 24, 36 and 48-inch arc welded steel water mains, Bear & Cunningham, Portland, engineers.

San Francisco—Consolidated Steel Corp. is low bidder on a wind tunnel for Moffet Field, Calif., calling for 2200 tons of plates. Western Pipe & Steel Co., San Francisco, has booked 12,000 tons for a 36 to 78-inch welded steel pipe line for Los Angeles. Other inquiries and awards were limited to less than 100 tons. To date this year 12,380 tons have been placed, compared with 2670 tons for the corresponding period in 1939.

Toronto, Ont.—Prospective demand will greatly exceed produc-

tion in this country. Placing of ship contracts shortly is expected to be followed by a rush to cover on plates. Inquiries already are appearing in large volume, but Canadian producers are booked through June.

Plate Contracts Placed

12,000 tons, for 36 to 78-inch welded pipe, San Fernando valley distributing system, Los Angeles, to Western Pipe & Steel Co., San Francisco.

120 tons, 26-inch water main, Western New York Water Co., Cheektowaga, N. Y., to Shelt Co. Inc., Elmira, N. Y.

Plate Contracts Pending

2200 tons, wind tunnel, Moffett Field, Calif.; Consolidated Steel Corp., Los Angeles, low.

Unstated, 24 to 48 in. are welded steel water pipe for Bellingham, Wash.; bids soon; Baar & Cunningham, Portland, engineers.

Bars

Bar Prices, Page 72

Cleveland — Deliveries on hot-rolled carbon bars vary materially. On certain sizes some producers ask four to six weeks, but backlogs of other mills permit shipment in two to three weeks. Size of material also is a factor in deliveries. Production is supported partially by backlogs, and a reversal in the downward trend of buying is not looked for before the middle or latter part of February.

Chicago—Bar prices continue rather slow but are more encouraging than demand for a number of other products. An increase in purchasing now is not expected before the middle of next month. Needs of a number of miscellaneous fabricators are off, but the trade continues encouraged by heavy requirements of automotive, tractor and farm machinery interests. The automotive interests are chiefly prominent in the alloy division.

Boston—Leading consumers and jobbers have slackened bar buying. Warehouse stocks of hot-rolled carbon are generally well balanced and ample to meet current demand. Deliveries are slightly improved, but specifications are down moderately. Alloy and cold-finished demand is well maintained, notably by machine tool builders, with extended deliveries continuing.

New York—Deliveries are improved, but most sellers are unable to do much better than four to five weeks on carbon bars and three to four weeks on cold-drawn. Alloy material takes six to seven weeks in many cases. Consumption is holding reasonably well, although

sellers look for a decline before the rate again moves upward.

Philadelphia—New extras which became effective last October are well maintained. Consumers covered for fourth quarter on the old basis, and new extras only now are beginning to encounter a real test. Machine tool builders continue to specify actively, as also do forgers of small tools.

Birmingham, Ala—Bar bookings are satisfactory, due in large measure to demand for concrete reinforcing bars. Merchant bar demand has held up even better than had been expected and production is better than 90 per cent.

Buffalo—Mills are cutting into heavy backlogs, but are forced to maintain practically capacity operations to meet consumer needs. Some buying is appearing, although most large consumers have substantial tonnage on books for current quarter delivery. Miscellaneous users continue to absorb most production, indicating light inventories in general.

Pipe

Pipe Prices, Page 73

Pittsburgh—Orders for oil country goods are somewhat better although still below expectations. This increase, together with a slight decline in tube mill operations, holds backlogs fairly well. Mechanical tubing demand is active, with standard pipe buying off slightly. Total business so far this month compares favorably with that of December.

Chicago—Cast iron pipe demand has been fairly active, considering cold weather adversely affecting construction. WPA requirements, chiefly carlots, have slackened. General outlook, though, is considered fair.

Boston — Government financed multiple housing projects account for most merchant steel pipe volume, close to 700 tons having been placed for four units in the Boston district with several hundred tons pending in other cities in this area. Plumbing supply, industrial and general construction needs are light. Resale prices are unsteady in spots, 10 per cent off appearing in some cases. Cast pipe buying is light and not much increase is expected in inquiry before next month.

New York—Merchant pipe sellers are discounting the present lull as seasonal and anticipate substantial improvement early in March, when building work should become more active. They also expect by

that time some fairly good inquiry for oil refinery equipment, and for the year as a whole, look for an increase of about 10 per cent in line pipe buying. Boiler requirements of utility companies are thought likely to be stepped up soon.

Philadelphia—A nearby maker of welded pipe for oil country use is resuming operations this week after a shutdown for repairs. Domestic oil countries apparently are well covered, but a substantial demand is reported for seamless pipe from South America which formerly bought large tonnages from Germany.

Birmingham, Ala. — Pipe production continues to be maintained mainly because of scattered orders, relatively small. One plant is still engaged on a 26,000-ton order received early in the fall, but bookings are light. Operations for the district as a whole are at three to four days a week.

Seattle—Dealers expect little interest before March. Seattle will receive bids Jan. 22 for 2196 feet of 16-inch cement lined cast iron pipe, class 200, totaling 135 tons. F. L. Odom, Portland, has the contract for a water and sewer system at the navy base, Tongue Point, Oreg. The job went transite, 256 tons involved had cast iron been selected. Marysville, Wash., has a WPA allocation and plans replacing 8-inch pipe with 12-inch cast iron.

San Francisco—While inquiries for tonnage of cast iron pipe have not developed, bookings of lots under 100 tons hold up well. Awards to date total 1027 tons, compared with 847 tons for the same period last year.

Cast Pipe Pending

590 tons, waterworks improvement, Marion, Ind.
135 tons, 16-inch cement lined, class 200, for Seattle; bids Jan. 22.
100 tons, waterworks, Peru, Ind.

Wire

Wire Prices, Page 73

Boston—Wire buying has improved. New business is reaching mills at 65-70 per cent of shipments. This compares with approximately 50 per cent two weeks ago. Finishing operations are near capacity in numerous finishing departments and this rate is gradually lowering backlogs, although the better buying has narrowed the decline. With few exceptions buying is well diversified. There are no surplus stocks of wire rods, and mills are well booked.

New York — Bookings of wire

products are approximately 20 per cent above volume placed the first two weeks this year. Incoming business is now estimated at 60 to 70 per cent of shipments. Deliveries are heavy, finishing departments in most cases operating close to capacity.

Birmingham, Ala.—Wire products shipments, as for several weeks, continue with little abatement since the leveling off process from the active buying of last quarter. Production is steady at 90 per cent or better despite the fact that some headway has been made into backlogs from last year.

Rails, Cars

Track Material Prices, Page 73

Norfolk & Western has awarded 100 auto box cars, 50 to be equipped with automatic loaders, to Greenville Steel Car Co. This, combined with 100 box cars which the Baltimore & Ohio has placed with its own shops, features a generally quiet car market.

Domestic freight car buying in December proved light. Orders involved only 35 units, the second poorest month of the year.

Total for the year was 57,775, compared with 16,303 in 1938. The heaviest buying came in September, when 23,000 cars were placed.

Further comparisons follow:

	1939	1938	1937	1936
Jan.....	3	25	17,806	2,050
Feb.....	2,259	109	4,972	6,900
March.....	800	680	8,155	632
April.....	3,095	15	9,772	4,427
May.....	2,051	6,014	4,732	8,900
June.....	1,324	1,178	548	5,200
July.....	110	0	1,030	7,229
Aug.....	2,814	182	1,475	225
Sept.....	23,000	1,750	1,216	1,750
Oct.....	19,634	2,537	1,355	2,210
Nov.....	2,650	1,232	275	1,550
11 mos....	57,740	13,722	51,336	41,073
Dec.....	35	2,581	275	23,450
Total...	57,775	16,303	51,611	64,523

Chicago, North Shore & Milwaukee has ordered from St. Louis Car Co., St. Louis, two four-car streamlined all-electric passenger trains for use between Chicago and Milwaukee. Each train will weigh about 160,000 pounds and be about 157 feet long, capable of 80 miles per hour with maximum load of 133 passengers. Eight 125-horsepower, 300-volt Westinghouse motors supply power to each unit. Switch control allows operation from either end. Entire train is air-conditioned.

Baltimore & Ohio will finance purchase of 2100 freight cars by sale to RFC of \$5,330,000 in equipment certificates. Contracts were placed in October and November,

subject to approval by interstate commerce commission of the certificate issue.

Interstate commerce commission has authorized American Car & Foundry Co. and E. I. du Pont de Nemours & Co. to build 36 fusion welded tank cars for handling corrosive materials, and American Car & Foundry Co. and General American Transportation Co. to build 75 for the same purpose.

Steel purchases for ten locomotives recently placed with Baldwin Locomotive Works, Philadelphia, by Chilean state railways are being

delayed by negotiations for credits by Chile.

Rail Orders Placed

Bessemer & Lake Erie, 2700 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.

Delaware & Hudson, 9152 tons, to Bethlehem Steel Co., Bethlehem, Pa.

Western Maryland, 2000 tons, divided equally between Carnegie-Illinois Steel Corp., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Placed

Baltimore & Ohio, 100 seventy-ton hop-



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ARMCO STAINLESS STEELS

pers, to own shops.

Norfolk & Western, 100 fifty-foot auto box cars, 50 to be equipped with automatic loaders, to Greenville Steel Car Co., Greenville, Pa.

Car Orders Pending

Missouri Pacific, 200 forty-ton stock cars, bids asked.

Locomotives Placed

Northern Pacific, seven diesel-electric switchers.

Terminal Railroad of St. Louis, five steam switchers.

Wheeling & Lake Erie, four steam switchers, to own shops.

Locomotives Pending

Navy, 500-horsepower diesel-electric locomotive for delivery to Indian Head, Md., bids Jan. 30.

Buses Booked

American Car & Foundry Motors Co., New York: Sixteen 31-passenger for Philadelphia Rural Transit Co., Philadelphia; five 42-passenger for Houston Electric Co., Houston, Tex.; three 25-passenger and one 30-passenger for Gary Railways Co., Gary, Ind.; four 36-passenger for United Electric Railways Co., Providence, R. I.; three 27-passenger for Cumberland & Westernport Transit Co., Frostburg, Md.; two 28-passenger for Southeastern Greyhound Lines, Lexington, Ky.; two 36-passenger for Toye Bros. Yellow Cab Co., New Orleans.

Twin Coach Co., Kent, O.: Thirty-four 31-passenger for Seattle Transit System, Seattle; two 24-passenger for Greenfield & Montague Transportation area, Greenfield, Mass.

Shapes

Structural Shape Prices, Page 72

Pittsburgh — Structural shape bookings are lighter. Inquiries for fabricated material are fairly heavy and pending tonnage is steady. Government jobs are less numerous, but several large lots have been placed recently.

Cleveland—Fabricated shape inquiries are slow and producers are able to make delivery within two weeks. Fabricators' backlogs are off materially from the fall peak, and operations are being affected. Bids close this week on 500 tons of piling for Cuyahoga river straightening here.

Chicago — Orders show little change, but industrial expansion, housing and highway work have a fairly good outlook. Backlogs of fabricators are declining. Several large tonnages are pending.

Boston—Awards for 1200 tons, two bridges in Connecticut and Massachusetts, remove from the market practically all active inquiries. Building construction is slack and miscellaneous small lots

placed are estimated under 500 tons. Inquiry is also lagging, including engineering projects. Fabricators in this district have small backlogs.

New York—State hospital and prison buildings account for approximately 2900 tons of structural steel contracts. Bids close Jan. 25 at Albany on grade crossings at Dunkirk, N. Y., the largest bridge inquiry thus far this year. Several small bridges in New Jersey on which bids closed last month are yet to be placed.

Philadelphia—Few large inquiries have appeared. Hughes Foulkrod Co., Philadelphia, is low on the material assembly shop, Philadelphia navy yard, taking 1500 tons. Prices are none too strong on larger jobs.

Buffalo—The structural market is stalemated, with even small jobs scarce. Considerable interest is manifested in the 3000-ton grade crossing program in Dunkirk, N. Y., which is up for bids Jan. 25.

San Francisco—Interest in the structural market centers around the outcome of the bids just opened on 16,595 tons in addition to 515 tons of steel castings, for the Pitt river bridge on the Central alley project, California, on which bids have been opened. Bids will be opened about Feb. 18 for 242 tons of bearing piles for the improvement of the Los Angeles river between Mariposa and Fletcher streets, Los Angeles. Pending business exceeds 40,000 tons.

Birmingham, Ala. — Shapes continue to lag somewhat behind other major specifications. Production is estimated at 75 per cent.

Shape Contracts Placed

1900 tons, hangar and air corps school No. 3, Rantoul, Ill., for United States government, to Bethlehem Steel Co., Bethlehem, Pa.

1500 tons, prison buildings, Greenhaven, N. Y., to American Bridge Co., Pittsburgh.

1400 tons, power plant and laundry building, Willowbrook state school for mental defectives, Staten Island, N. Y., to Belmont Iron Works, Eddystone, Pa.; Caye Construction Co., New York, contractor.

520 tons, bridge Sec. 3F, Springfield, Ill.,

to Illinois Steel Bridge Co., Jacksonville, Ill.

500 tons, state bridge RC-4091, Cornwall, N. Y., to American Bridge Co., Pittsburgh.

500 tons, navy base hangar, Sitka, Alaska, to Isaacson Iron Works, Seattle; materials furnished by Columbia Steel Co.; Siems, Drake, Puget Sound, Seattle, general contractors.

500 tons, building, for Ford Instrument Co., Long Island City, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, laboratory and solvents storage building, department of agriculture, New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh; A. J. Rife Construction Co., Dallas, Tex., contractor. Laclede Steel Co., St. Louis, awarded 60 tons reinforcing bars.

475 tons, state bridge, Huntington, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; B. A. Gardetto Inc., Boston, contractor, \$254,613.10, bids Dec. 27, Boston; contractor's bid on steel in place was 5 cents per pound.

368 tons, overpass, Branchville relocation, 4-span steel beam and concrete bridge over Delaware, Lackawanna & Western railroad, Frankford township, Sussex county, New Jersey, route S-31, section 4, to American Bridge Co., Pittsburgh; Highway Corp. Inc., Newark, contractor, \$128,698.50, bids Dec. 22, Trenton.

345 tons, floor, tank and lean-to building, Pittsburgh Plate Glass Co., Ford City, Pa., to Pittsburgh Bridge & Iron Works, Pittsburgh.

200 tons, addition to World's fair building, for Ford Motor Co., Flushing, N. Y., to American Bridge Co., Pittsburgh.

200 tons, bridge FAGM-35-3, Pike county, Mississippi, to Virginia Bridge Co., Roanoke, Va.

200 tons, bridge CU-322-154, Chagrin Falls, O., for state, to Fort Pitt Bridge Works, Pittsburgh.

195 tons, bridge Sec. 3F, Pulaski, Logan county, Illinois, to A. F. Anderson Iron Works, Chicago.

173 tons, over-crossing at Weed, Siskiyou county, Calif., for state, to Judson-Pacific Co., San Francisco.

170 tons, East Ninth street bridge, Cleveland, to American Bridge Co., Pittsburgh.

160 tons, frame for paper mill No. 5, St. Regis Paper Co., Deferiet, N. Y., to Smith & Caffrey Co., Syracuse, N. Y.

152 tons, high school stadium, Dunmore, Pa., for United States treasury department, to Pine Brook Iron Works, Scranton, Pa.

135 tons, store building, Enterprise Realty Co., Lynn, Mass., to West End Iron Works, Boston.

112 tons, Cuthbert road bridge over Cooper river, Camden county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.; Ole Hansen, Ventnor City, N. J., general contractor.

110 tons, state bridge LI-16-33, Pataskala, O., to Burger Iron Co., Akron, O.

110 tons, bridge FAGS-7-C, Farmer county, Texas, to Amarillo Iron Works, Amarillo, Tex.

110 tons, addition to office building, for Bell Telephone Co. of Pennsylvania, Dormont, Pa., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

110 tons, Safeway store, San Francisco, to Western Iron Works, San Francisco.

103 tons, shapes and bars, administration and recreation buildings, naval air station, Pensacola, Fla., shapes.

53 tons, to Southern Steel Works Co., Birmingham, Ala., bars, 50 tons, to Virginia Steel Co., Richmond, Va.

Shape Awards Compared

	Tons
Week ended Jan. 20	10,838
Week ended Jan. 13	17,013
Week ended Jan. 6	12,021
This week, 1939	33,035
Weekly average, year, 1940	13,291
Weekly average, 1939	22,411
Weekly average, December	18,393
Total, to date, 1939	103,778
Total, to date, 1940	39,872

Includes awards of 100 tons or more.

—The Market Week—

V. T. Loftis, Charlotte, N. C., contractor.

100 tons, ammonia oxidation houses, E. I. du Pont de Nemours & Co., Indian Head, Md., to Belmont Iron Works, Philadelphia.

100 tons, three small state bridges, Weir, N. H., to American Bridge Co., Pittsburgh.

Shape Contracts Pending

3800 tons, Central avenue viaduct, Chicago; Thomas McQueen Co., Chicago, low.

2000 tons, bottling plant for Acme Breweries Inc., San Francisco; bids soon.

1500 tons, material assembly shop, Philadelphia navy yard, Hughes-Foukrod Co., Philadelphia, low.

1350 tons, dining and kitchen buildings, Willowbrook state school for mental defectives, Staten Island; bids Jan. 24, Albany.

1000 tons, power house, West Terre Haute, Ind.; Dresser Power Corp., Indianapolis, Ind.

550 tons, bottling plant, for Hudepohl Brewing Co., Cincinnati.

500 tons, piling, Cuyahoga river straightening program, Cleveland; bids Jan. 25.

450 tons, grade crossing elimination, Croton, N. Y.; bids Jan. 25, Albany.

440 tons, north yard warehouse, for Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

399 tons, including 150 tons of sheet piling, viaduct near Los Gatos, Santa Clara county, Calif., for state; general contract to Heafey-Moore and Fredrickson & Watson Construction Co., 873 Eighty-first avenue, Oakland, Calif., at \$91,509.

300 tons, eight CB beam spans, Tucumari, N. M.

250 tons, lifting towers, etc., Kentucky dam, Gravel Switch, Ky., for Tennessee Valley authority, Knoxville, Tenn.

242 tons, bearing piles, improvement of Los Angeles river between Mariposa and Fletcher streets, Los Angeles; bids about Feb. 18.

210 tons, 81 catenary bridges, Winnetka, Ill.

200 tons, addition to office building, for American Rolling Mill Co., Middletown, O.

170 tons, state bridge, Rulo, Nebr.

170 tons, cooler boxes, Bayway refinery, for Standard Development Co., Linden, N. J.

150 tons, repairs to bridges, various locations, for Chicago, Milwaukee, St. Paul & Pacific railroad.

140 tons, extension to heat treating building No. 1, for Aluminum Co. of America, Cleveland.

136 tons, bridge, Rigby, Idaho.

100 tons, bearing piles and structurals, bridge, Milford, Conn.; bids Jan. 22.

view of the jobs already lined up for spring.

Chicago — Demand is little changed, with no large inquiries listed. Volume of small jobs continues fairly well sustained. Thomas McQueen Co., Chicago, was low on the Central avenue viaduct, Chicago, involving 870 tons of concrete bars.

Boston—Buying is moderately heavier, including 700 tons for a housing project, New Haven, Conn., and 175 tons, bridge, Stonington, Conn. Inquiry is light, most business being for small lots. High-

way requirements have not appeared in volume, and pending bridge needs are lagging. Prices are easier than last quarter.

Philadelphia—New work is seasonally slow, but a fair volume is indicated for spring. Prices are fairly steady, but more active competition from rerollers is reported.

New York — Contracts include more than 1500 tons of mesh for New York state highways and 350 tons for two buildings, airplane engine building plant, Paterson, N. J. New inquiry is slightly heavier, in-

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Reinforcing

Reinforcing Bar Prices, Page 73

Pittsburgh—Concrete bar prices remain firm, and reports from other sections indicate weakness has been eliminated in nearly all cases. Some rail bar tonnage has been placed below the market, but new billet steel has been steady. Seasonal dullness generally is evident, but this is regarded as temporary, however, in

Behind the Scenes with STEEL

The Shrill of the Night

■ Inhabitants of Pittsburgh's South Side last week thought the war was on in earnest when a tremendous whistling split the city's smog. It was the peaceful, usually placid Monongahela Connecting railroad letting off a few thousand cubic yards of steam by the way of a stuck whistle, and it lasted for an interminable 15 minutes. The MONCON, as the local boys know this unique road which hauls tremendous tonnages for J. & L. over its half dozen miles of track, made the Pittsburgh papers in an explanation of the whole thing, just to reassure and soothe southsiders. Not soothed was one out-of-town lad who works for a big electrical manufacturer. In the next mail to Normar Wilson, MonCon's president, came a letter with a clipping from the paper attached. The peddler had been on his toes. He suggested Mr. Wilson allow his company to sell the railroad a shiny new whistle, with locomotive attached!

Unlucky Number

■ One of our subscription salesmen had his confidence a bit shaken a few days ago on a call here in Cleveland, and figures now he was lucky to get out alive. In the little ante room of a local shop he found himself face to face with a sign that read: *We shoot every 10th salesman—and the 9th just left.*

Good Advice and True

■ Recently we ran across a letter written many years ago by Ralph Waldo Emerson to his young daughter containing this marvelous advice: "Finish every day and be done with it. For manners and for wise living it is a vice to remember. You have done what you could; some blunders and absurdities no doubt crept in; forget them as soon as you can. Tomorrow is a new day; you shall begin it well and

serenely, and with too high a spirit to be cumbered with your old nonsense."

Budding Einsteins

■ Answers are still coming in for the coconut problem and, according to Walter (Erie R. R.) Cronenwett it has "infinite solutions." Howard G. Taylor of Diamond Chain & Mfg. filled two pages with formulas and equations that look like an astronomer's nightmare after a ham on rye at bedtime. Less impressive but just as accurate was many another, but to the wild guesses (such as our own) goes a rousing boo.

New One

■ Margaret Pomatto of American Nickeloid says she'd call that thing last week a cow and a nice-looking cow it was. Now take another squint at it and you'll see it easily. But this week H. J. Hankins of the Mine & Smelter Supply Co. wants us to go technical again. He says: *From the south gate of a circular walled city, a man walks 9 miles due west and can just see a post 3 miles north of the north gate. What is the diameter of the city?* Another Yearbook is up for the first correct answer, so hurry, hurry, hurry.

Best Seller

■ If you're a Crime Club enthusiast you'll certainly want to get a copy of Crane's "The Mystery of the Fluttering Disc," previewed this week on page 3.

Highspot of the Week

■ Also, that's a honey of an ad by Basic Dolomite on page five this week and we understand it is only the beginning of a regular series that keeps getting better and better.

SHRDLU

cluding 640 tons, state hospital building, Staten Island, N. Y. The bulk of buying continues in small lots. Prices on larger tonnages are again being shaded.

Seattle—Backlogs are rapidly disappearing and local mills face drastic curtailment unless new business develops soon. Several major projects involve good tonnages but plans are not yet out. These include the state bridge at Kettle Falls, Columbia river, grain elevators at Longview and Vancouver, Wash., and the Seattle naval reserve armory. No important tonnages are immediately pending except an unstated amount for the Ampere, Wash., power substation. David Nygren, Seattle, has the general contract at \$126,949 for rearing ponds, etc., at the Leavenworth, Wash., fish hatchery, 142 tons of reinforcing awarded to Bethlehem Steel Co., Seattle. Unstated tonnages are involved in two Oregon state spans, W. D. Miller, Klamath Falls, low at \$13,315 for a bridge in Klamath county, and Barham Bros., Salem, low at \$30,697 for a viaduct in Clackamas county, Washington.

San Francisco—The reinforcing bar market is active and 3352 tons were booked, bringing the aggregate for the year to 5062 tons, compared with 8482 tons for the corresponding period in 1939. Pending business exceeds 17,000 tons.

Reinforcing Steel Awards

- 1400 tons, Sunnysdale housing project, San Francisco, to Gilmore Fabricators Inc., San Francisco.
- 1400 tons, Baxter housing project, Newark, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Frank Briscoe Co., Newark, N. J.
- 650 tons, Dixwell housing, New Haven, Conn., to Buffalo Steel Co., Tonawanda, N. Y.; William L. Crow Construction Co., contractor.
- 460 tons, housing project, Harrison, N. J., to Ceco Steel Products Corp., Jersey City, N. J., through J. A. J. Contracting Co., New York.
- 350 tons, two buildings, Wright Aeronautical Corp., Paterson, N. J., to Truscon Steel Co., Youngstown, O.; Mahoney-Troast Co., Newark, general contractor.

Concrete Bars Compared

	Tons
Week ended Jan. 20	6,036
Week ended Jan. 13	8,125
Week ended Jan. 6	12,149
This week, 1939	19,518
Weekly average, year, 1940	8,770
Weekly average, 1939	9,197
Weekly average, December	4,600
Total to date, 1939	35,868
Total to date, 1940	26,310

Includes awards of 100 tons or more.

- 320 tons, Smith river bridge, Del Norte county, California, for state, to Gilmore Fabricators Inc., San Francisco.
- 300 tons, highway project, Route 6, section 13, Morris county, New Jersey, to Solz-Sickles Co., Newark, N. J., through Lafero-Grecco Contracting Co., Newark, N. J.
- 270 tons, bars and mesh, highway project Route 4, section 41, Monmouth-Middlesex counties, New Jersey, to Joseph T. Ryerson & Son Inc., through Franklin Contracting Co., Newark, N. J.
- 178 tons, state bridge, Huntington, Mass., to Truscon Steel Co., Youngstown, O.; B. A. Gardetto Inc., Boston, contractor, \$254,613.10, bids Dec. 27, Boston.
- 165 tons, overpass over Delaware, Lackawanna & Western railroad, route S-31, sec. 4, Branchville relocation, Frankford township, Sussex county, New Jersey, to Faltoute Iron & Steel Co., Newark, N. J.; Highway Corp., Newark, contractor \$128,698.50, bids Dec. 22, Trenton.
- 130 tons, General hospital, Lawrence, Mass., to Truscon Steel Co., Youngstown, O.; James Stewart Co., contractor.
- 110 tons, state highway project 246, Medina and Summit counties, Ohio, to Pollak Steel Co., Cincinnati; A. J. Baltes, contractor.
- 103 tons, fire house, garage and shop building, naval air base, Alameda, Calif., specification 8618, to Truscon Steel Co., San Francisco.
- 100 tons, Queens-Midtown tunnel plaza, Gale avenue, New York, to Igoe Bros. Co., New York.
- 100 tons, traffic circle, Asbury avenue, Monmouth county, New Jersey, to Igoe Bros. Co., New York, through Janarone Contracting Co., Belleville, N. J.

Reinforcing Steel Pending

- 6000 tons, Panama Canal barracks; bids approximately Feb. 7.
- 3553 tons, bureau of reclamation, invitation B-38,088-A, Odair, Wash.; Bethlehem Steel Co., Seattle, low.
- 1100 tons, substructure of addition to St. Louis city hospital; H. B. Deal & Co., St. Louis, general contractor.
- 870 tons, Central avenue viaduct, Chicago, Thomas McQueen Co., Chicago, low.
- 650 tons, improvement Los Angeles river between Mariposa and Fletcher streets, Los Angeles; bids about Feb. 18.
- 640 tons, power plant and laundry building, Willowbrook state school for mental defectives, Staten Island, N. Y.; Caye Construction Co., New York, contractor.
- 600 tons, reservoir, army engineers, Blue Mountain, Ark.
- 580 tons, Maraville housing project, Los Angeles; B. O. Larsen, 1340 E Street, San Diego, Calif., low on general contract.
- 275 tons, mesh and bars, state highway projects, Suffolk county and Dunkirk, N. Y.; bids Jan. 25, Albany.
- 272 tons, grade separation, Winnetka, Ill., Decker-McDowell Co., Chicago, low.
- 250 tons, addition to teachers' college, Santa Barbara, Calif.; bids opened.
- 200 tons, bath and service building, New London, Conn.; Corsino Construction Co., Hartford, contractor.
- 200 tons, Wacker Drive parking facilities, Chicago.

- 155 tons, viaduct near Los Gatos, Santa Clara county, Calif., for state; general contract to Heafey-Moore and Fredrickson & Watson Construction Co., 873 Eighty-first avenue, Oakland, Calif., at \$91,509.
- 140 tons, highway and bridge projects, Connecticut; bids Jan. 22, Hartford.
- 131 tons, bridges, Cook county, Illinois, Superior Construction Co., Central West Construction Co., Chicago, low.
- 125 tons, building foundations, Chapman Valve Mfg. Co., Indian Orchard, Mass.
- 125 tons, floor for structural assembly shop, Philadelphia navy yard; bids Jan. 31.
- 125 tons, N. W. hospital, Minneapolis.
- 101 tons, bridges in Alameda and Contra Costa counties, California, for state; bids Jan. 31.
- 100 tons, bridge, 147th and Calumet streets, Chicago.
- 100 tons, navy store house, Pearl Harbor, specification 9544; Hawaiian Contracting Co., Honolulu, T. H., low at \$101,559.

Pig Iron

Pig Iron Prices, Page 74

Pittsburgh—Despite slow buying, deliveries continue heavy. Output is steady, with 42 furnaces active. Outlook among foundries is good but most consumers are well covered for this quarter and little additional buying is expected. Beehive coke activity continues to moderate, ovens in operation being about 2800, against approximately 5000 last fall. New buying may make it necessary to relight some of these.

Cleveland—Foundry operations are close to the pre-holiday rate. Sustained consumption of iron is without major influence on buying, the result of previous coverage and



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stocks on hand. Softening in scrap prices the past few months also is a retarding influence.

Chicago—Releases are off and January shipments may be 20 per cent below December, although earlier they were expected to be on a par. Chief cause is a decrease in needs of mills using merchant pig iron. Little or no further decline in shipments is anticipated this month. New buying remains quiet.

Boston—Buying continues small, the result of substantial shipments. In view of the current rate of melt, considerable covering for second quarter is expected soon. Producers of castings for the machine shop trade and most jobbing shops remain active. Mystic furnace, Everett, Mass., is still in blast, but having accumulated considerable stock, continuance is uncertain. It was originally planned to take the furnace out last fall, but business improvement prevented this.

New York—While pig iron buying has picked up but little, consumption has expanded noticeably since the holiday and inventory season, with a result that sellers anticipate a much livelier demand within the next month. Certain larger consumers, however, have sufficient stocks on hand or under contract to meet the great bulk of their first quarter needs. Export demand is featureless.

Philadelphia — Buying continues light, most consumers being well covered for most of this quarter. The melt is slightly better. Export demand is fair, with Sweden in the market for round lots and South America inquiring for smaller quantities.

Buffalo—Shipments have recovered from year-end lull. Melter's stocks are fairly large, but consumption is active and foundries are expected to take practically all the tonnage placed for delivery this quarter. Pig iron production holds at 78.5 per cent.

Toronto, Ont.—Sales continue to drag although shipments of better than 1000 tons weekly are reported against spot orders. Forward booking is comparatively light. The melt is steady, with indications of early gain. Pig iron output holds at its peak of about 85 per cent.

Iron Ore

Iron Ore Prices, Page 76

Cleveland—Lake Superior iron ore consumption reached a 1939 peak in December. The total of 5,538,374 gross tons compares with 5,477,969 tons in November and 3,040,700 tons a year ago, according to the Lake Superior Iron Ore association. This brought 1939 con-

sumption to 44,361,289 tons, against 25,703,050 tons in 1938.

Stocks of ore at furnaces and Lake Erie docks Jan. 1 declined 3,354,186 tons from the month before and were only about 8 per cent larger than a year ago. Comparisons follow:

	Gross Tons Iron Ore on Hand		
	At furnaces	On docks	Total
Jan. 1, 1940 . . .	32,743,035	4,634,875	37,377,910
Month ago	35,515,600	5,216,496	40,732,096
Year ago	29,455,818	5,123,031	34,578,849

Scrap

Scrap Prices, Page 76

Pittsburgh—The market is unsteady. New buying is absent, and shipments against contracts are only moderately active. Inclement weather has been a steadying influence, cutting down loadings and river shipments. Some smaller buyers, including foundries, have been maintaining purchases. Prices are unchanged.

Cleveland—Extreme cold hampers scrap gathering and consumers are out of the market, prices remaining nominally steady. Recent railroad closings brought 50 to 75 cents above previous sales, indicating steadiness.

Chicago—Brokers are paying from \$16.50 to \$17 for No. 1 steel, although the last known mill purchases were at \$16.50. Steelworks are resisting higher prices. Weather conditions lately have been conducive to strengthening in the market.

Boston—Buying continues to lag. Shipments to district and eastern Pennsylvania consumers are light and buying for export against orders has reached a low point, due to lack of shipping.

New York—Buying is slow, although most mills are taking shipments against old orders. Foundries also are buying sparingly. Prices appear to have leveled off, but lack of trading makes some grades nominal. Less material is being bought to fill export orders, although recent heavy accumulations on barges have moderated somewhat.

Philadelphia—Cast grades have been reclassified by STEEL to take into account mixed cast used by pipe foundries as distinguished from No. 2 cast for steel mill use. Demand is slow and shipments are tapering in some directions. E. G. Budd Mfg. Co. sold 2500 tons of new compressed sheets at a reported price of \$17.25, f.o.b. This is in addition to 5000 tons sold earlier this month at \$18.

Buffalo—No. 1 heavy melting steel

is unchanged at \$17 to \$17.50, a recent sale of 2000 tons substantiating this range. Meanwhile a leading consumer continues to bid well under the current market.

Detroit—Steel grades are off 25 to 50 cents. Buying continues light, consumers looking for lower prices. At the same time steelworks see possibility of reduced operations next month unless finished steel orders come to the support of dwindling backlogs.

Cincinnati—Scrap consumers remain out of the market for large lots. Mill supplies are declining, giving dealers hope that resumption of buying is near. Offerings are fairly heavy but are without serious effect on prices.

St. Louis—Purchase of 12,000 tons of No. 2 heavy melting steel by two east side mills represents an advance of 50 cents a ton over the most recent quotation on this material.

Toronto, Ont. — Dealers have marked up several buying prices 50 cents, offering \$15.50 for machinery cast, \$14.50 for dealers' cast and \$11.50 for stove plate. Other items are unchanged. Offerings have dropped sharply from rural districts, but fair supplies are being received locally.

San Francisco—The scrap market at Los Angeles and at San Francisco is stagnant. Some shipments are being made on contracts for export but no new orders have been placed recently. Steel foundries overbought when prices were high and at present are temporarily out of the market. No. 1 heavy melting steel at yards is \$13.50 to \$15 a gross ton and \$12.50 to \$14 for No. 2. Quotations on these two classes for export, f.a.s. are \$15 to \$16.50 and \$14 to \$15.50, respectively. Compressed sheets are quoted at \$12 to \$13.50 a ton, cast iron at \$14.50 to \$15.50 and machine turnings \$3 to \$4 a ton.

Warehouse

Warehouse Prices, Page 75

New York—Buying has eased slightly, being approximately 10 per cent below last month. With mill deliveries on most products improving, warehouse stocks are well rounded and in some instances rather large.

Cincinnati—Sales are slightly below levels of last quarter. Shrinkage is most noticeable in sheets, mill schedules enabling prompter deliveries.

Chicago—Orders have picked up further but as yet there is no assurance January business will exceed December's. Only small variations are indicated for the near future.

Detroit—Sales show little change.

although warehouses are benefiting from die work for government armament programs. No important automotive die work has been released.

Philadelphia—Sales are rising slowly following a quiet first half this month. Both volume and number of orders show improvement.

Nonferrous Metals

New York—Lack of any substantial buying interest in nonferrous metals recently was emphasized last week by the reduction of ¼-cent in electrolytic copper and the steady decline in tin prices to below pre-war levels.

Copper—Electrolytic was available from custom smelters at 12.25c while mine producers maintained quotations on the basis of 12.50c, Connecticut. Brass and bronze ingots declined ¼ to 1 cent while smelters' bids for copper and brass scrap eased ½-cent to the basis of 10.50c for No. 1 heavy copper, or the equivalent of 12.00c for refined metal. Rolled and drawn product prices are based on mine producers' quotations and, therefore, were not revised. After heavy sales over the Jan. 13 weekend, part of which was done at 12.25c, sales dropped well under the average 1000-ton daily turnover. Kennecott Copper Corp. announced that production may be curtailed March 1.

Lead—Moderate sales were reported at the unchanged 5.35-cent East St. Louis level but daily intakes were not balanced.

Tin—Straits spot declined steadily, closing at around 46.00c. The report was cabled from London late in the week that England may lift its bar on tin exports due to increasing supplies and lightness of trade demand.

Steel in Europe

Foreign Steel Prices, Page 75

London—(By Cable)—Increasing war contracts and export allocations take precedence over domestic commercial users in Great Britain. The raw materials situation is satisfactory except in the case of scrap. Imports of Spanish ore have been resumed through the recently-appointed foreign ores control department. Belgian semifinished steel deliveries are increasing but still are insufficient. All works are booked several months ahead.

Belgium reports losing business to American manufacturers in distant markets, owing to tonnage limitation and high freights. French industrial production index for November was 83, compared with 50 in September. This is the first official announcement since June, when the figure was 100, equal to that of 1928.

Nonferrous Metal Prices

Jan.	Copper		Straits Tin		Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99% Spot	Antimony Amer. Spot	Nickel Cathodes	
	del. Conn.	del. Midwest	Casting, refinery	Spot New York Futures							
13	12.50	12.50	12.12½	47.25	45.62½	5.50	5.35	5.75	20.00	14.00	35.00
15	12.50	12.50	12.12½	47.12½	45.75	5.50	5.35	5.75	20.00	14.00	35.00
16	12.50	12.50	12.12½	47.00	45.50	5.50	5.35	5.75	20.00	14.00	35.00
17	12.25	12.50	12.00	47.00	45.50	5.50	5.35	5.75	20.00	14.00	35.00
18	12.25	12.50	12.00	46.62½	45.12½	5.50	5.35	5.75	20.00	14.00	35.00
19	12.25	12.50	12.00	46.00	44.62½	5.50	5.35	5.75	20.00	14.00	35.00

*Nominal.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.50c Conn. copper

Sheets	
Yellow brass (high)	19.31
Copper, hot rolled	21.12
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	11.00c
Tubes	
High yellow brass	22.06
Seamless copper	21.62
Rods	
High yellow brass	15.23
Copper, hot rolled	17.62
Anodes	
Copper, untrimmed	18.37
Wire	
Yellow brass (high)	19.56

OLD METALS

Nom. Dealers' Buying Prices	
No. 1 Composition Red Brass	
New York	7.87½-8.00
Cleveland	8.50-8.75
Chicago	8.50-8.75
St. Louis	8.25-8.50
Heavy Copper and Wire	
New York, No. 1	9.50-9.75
Cleveland, No. 1	9.75-10.00

Chicago, No. 1	9.75-10.00
St. Louis	9.25-9.75

Composition Brass Turnings

New York	7.50-7.75
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Light Copper

New York	7.50-7.75
Cleveland	7.75-8.00
Chicago	7.62½-7.87½
St. Louis	7.25-7.50

Light Brass

Cleveland	4.50-4.75
Chicago	5.37½-5.62½
St. Louis	5.00-5.50

Lead

New York	4.85
Cleveland	4.37½-4.50
Chicago	4.25-4.50
St. Louis	4.00-4.25

Zinc

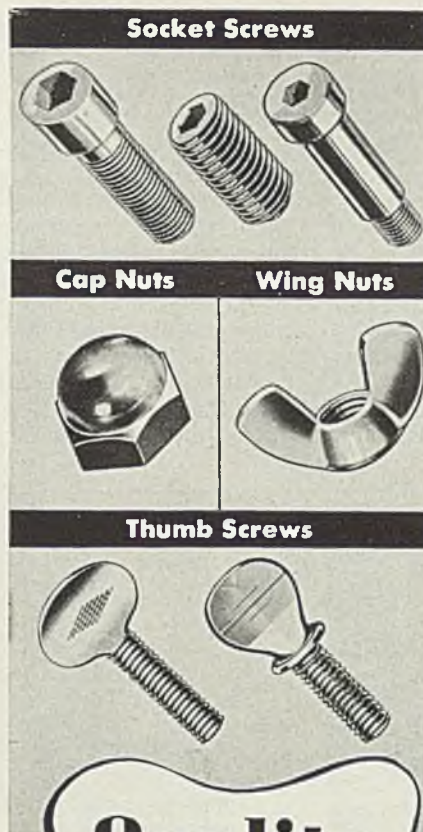
New York	3.00-3.25
Cleveland	3.00-3.25
St. Louis	3.25-3.50

Aluminum

Mixed, cast, Cleveland	10.25-10.50
Borings, Cleveland	7.25-7.50
Clips, soft, Cleveland	15.75-16.00
Misc. cast, St. Louis	8.75-9.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	12.75
Standard No. 12 aluminum	15.00-15.50



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Equipment

New York—Machinery and equipment buying continues brisk. Incoming orders, foreign and domestic, hold, although subject on many lines to extended deliveries. While some industrial inquiries are held up, plenty of purchases are being closed on a long-term shipment basis. Shop backlogs are heavy and despite high production schedules are mounting rather than declining. Buying by airplane interests is brisk.

INSTANT ADJUSTMENTS



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South Bend Lathe Works, South Bend, Ind., is low on 40 small-type engine lathes for the navy, delivery Philadelphia; bids Jan. 9.

Boston—With machine building shops on capacity schedules, volume of new orders is sufficient to maintain large backlogs. Deliveries are further extended on some units and orders are on books for shipment late this year and in some instances business is being taken for 1941 delivery. Both domestic and foreign bookings are active.

Chicago—Machinery bookings and inquiries show an increase, with volume heavy. Some interests an-

ticipate better sales this month than last, as considerable business is pending and expected to close the next ten days. Railroad inquiries have increased, but not buying. General bookings last week were above those of the week previous, a large interest states.

Seattle—Public works projects continue to furnish most demand electrical items and automotive equipment leading. Westinghouse Electric & Mfg. Co. has the general contract from reclamation bureau for furnishing a 6000 kv ampere generator for the Minidoka dam, Idaho, low at \$76,420.

Construction

Ohio

CLEVELAND—City, division of water and heat, city hall; furnish and deliver various water meter parts; taking bids due noon Jan. 26; certified check required.

COLUMBUS GROVE, O.—Village, E. J. McCrate, mayor, Smith B. Williams, clerk, contemplates sewage improvements; Champe, Finkbeiner & Associates, engineers, 725 Nicholas building, Toledo; cost \$86,000; holding special election for \$22,000 bond issue Feb. 13.

LONDON, O.—Waterworks; owner Mrs. Frank Bridgeman; fire damage; loss \$25,000.

Pennsylvania

GROVE CITY, PA.—Contracts were awarded for welding shop building for Cooper-Bessemer Co., general contract, W. J. Camline Co., 68 Waldo street, Newark, O.; structural steel, Keystone Engineering Co.

Michigan

BAY CITY, MICH.—Bay City Freezer Inc. is erecting a \$35,000 addition to its plant on North Johnson street.

DETROIT—Superior Tool & Die Co., Detroit, contemplates construction of a factory building in Charlotte.

GRAND RAPIDS, MICH.—Plans for construction of a new 1500-barrel straight-run oil refinery have been announced; Luke C. Leonard, Detroit, heading group which will incorporate as Grand Rapids Refining Co.

HOLLAND, MICH.—Holland Precision Parts Co., will construct 1-story building here, 200 x 360 feet; Buckheit & Stuchell, Detroit, architects; Krieghoff Co., Detroit, contractors.

Indiana

INDIANAPOLIS—Fries Tool & Machine Works Inc., Fort Wayne, has been incorporated to manufacture machine tools, with 1500 shares \$100 par value. Incorporators are Nestor Fries, Nannie E. Fries, Ida J. Erickson and Charles F. Roembke.

Alabama

GADSDEN, ALA.—Republic Steel Corp., Cleveland, installing new slag heating furnace and extension of plate mill building; slab heating furnace will have capacity of 35 tons per hour; specifica-

and Enterprise

tions for extension to plate mill call for building 210 x 112 feet.

Maryland

BALTIMORE—Locke Insulator Corp. Charles and Cromwell streets, asks bids soon for \$20,000 addition to galvanizing building; 1-story; E. M. Skipper, plant engineer, handling details; W. S. Austin, consulting engineers, Maryland Trust building.

District of Columbia

WASHINGTON—Navy department bureau of supplies and accounts will receive bids until 10 a.m. Jan. 23, schedule 377, on one electric truck, low platform, tiering and lifting, 6000-pound capacity, complete with battery, delivery Mare Island, Calif.; schedule 385, involving 10 lift trucks, hand, delivery Alameda, Calif., schedule 387, 3 stacking or tiering machines, electric motor operated, delivery Alameda, Calif.; schedule 372, 1 precision jig borer, motor driven, with full equipment, delivery f.a.s. vessel various east and west coast points; Jan. 26, schedule 419, 2 machines, grinding, surface, hydraulic, motor driven and equipment, delivery Alameda, California; Jan. 30, schedule 422, 1 towing carriage, complete with structural frame, electro-hydraulic propelling plant, wheels, etc., delivery Carderock, Md.; schedule 443, 10,000 pounds nickel-copper-alloy, forged, class A, round bar, 5-inch diameter, hot finished in commercial lengths, delivery Mare Island, Calif.

Kentucky

BARBOURSVILLE, KY.—J. H. Black Saw Mills, box 283, seeking Caterpillar diesel engine; used; clutch and extended shaft, 100 horsepower, No. D11000; prefer skid end engine.

GILBERTSVILLE, KY.—Director of purchases, TVA, Knoxville, Tenn., receives bids Jan. 29 for furnishing, fabricating, delivering and installing if required, lifting tower, operating machinery, electrical equipment and accessories for Illinois Central relocation vertical lift bridge over Lock harbor at Kentucky dam, near Gilbertsville.

Georgia

ATLANTA, GA.—Southern Iron & Equipment Co. seeks two second hand, cross-compound locomotive air pumps, Westinghouse, 10 1/2-inch.

ATLANTA, GA.—William E. Dunn Jr. dealer, 409 Park avenue, wants used generator, 500 to 600 kilowatts, 440 volts.

alternating current, direct connected, one or two units; prefer unilflow condensing.

ATLANTA, GA.—Southern Bell Telephone & Telegraph Co., plans expenditure of \$4,285,000 in 1940 in Alabama, including new exchange at Tuscaloosa and enlargement of Montgomery exchange; convert both to dial system; remainder of state appropriation will be spent for additions and improvements to existing facilities.

Mississippi

FOREST, MISS.—City, C. H. Noblin, clerk, receives bids Jan. 26 for construction and materials for extension of sewer system; plans by Eugene Thomas.

NEW ALBANY, MISS.—Board of alderman rejected bids for construction of proposed 1-story industrial plant building, 100 x 200 feet; will revise plans and call for new bids; cost \$25,000.

North Carolina

BOON, N. C.—Big Burley Corp. opens bids about April for construction of tobacco warehouse; cost \$25,000; 1-story; 300 x 200 feet; built up roof.

South Carolina

GREENVILLE, S. C.—American Viscose Corp., Wilmington, Del., is reported to be planning \$7,000,000 rayon plant.

SPARTANBURG, S. C.—Slater Mfg. Co., will install 128 new looms; basement quarters being enlarged for storage.

Tennessee

CHATTANOOGA, TENN.—City, E. D. Bass, mayor, has PWA grant of \$1,557,000 for extending and rehabilitating city's electric power distribution system.

CHATTANOOGA, TENN.—Southern Chemical Cotton Co., Alton Park, has permit, excavation in progress, for erection of steel and concrete warehouse; cost \$10,000; owner awarding sub-contracts.

KNOXVILLE, TENN.—Electric power and water board, Max C. Bartlett, general manager, receives bids Jan. 26 for furnishing material and labor for improvement of electric distribution system; contract F, rural extension; estimated cost \$220,000; Burns & McDonnell Engineering Co., engineers, Kansas City, Mo.

MEMPHIS, TENN.—City commission will improve hangar, rebuild offices at municipal airport.

Louisiana

BATON ROUGE, LA.—Federal approval granted for construction of sanitary sewer system in district No. 4 of East Baton Rouge parish; WPA allotment of \$49,075; L. J. Voorhies, consulting engineer.

BATON ROUGE, LA.—Dixie Electric Corp. will construct 160 additional miles of power lines; cost approximately \$134,000; mostly in St. Helena parish and East and West Feliciana parishes; REA project.

LAKE CHARLES, LA.—Louisiana state board of education, Baton Rouge, opens bids Jan. 31 for furniture and equipment for Southwestern Louisiana trade school.

OPELOUSAS, LA.—Louisiana state board of education, Baton Rouge, opens bids Jan. 31 for furniture and equipment for T. H. Harris trade school.

RUSTON, LA.—J. A. Harper, Crowville, has contract at \$28,900 for construction of proposed 1-story reinforced concrete

and brick power station for town; J. W. Smith & Associates, Quachita National bank building, Monroe, architects.

West Virginia

BLUEFIELD, W. VA.—Contract for factory addition awarded to McCulloch & Gibson, First National bank building, Bluefield; Owner, National Electric Coil Co.; Alex M. Mahood, Law and Commerce building, Bluefield, architect.

FOLLANSBEE, W. VA.—Following approval of modified plan of reorganization in federal court, Pittsburgh, of Follansbee Bros. Co., \$1,270,000 will be spent by Follansbee Steel Corp. in further modernization of company's mill; new equipment to be installed at mill for manufacturing tin plate, terneplate and black plate.

Virginia

WAYNESBORO, VA.—Jesse C. Wood Construction Co. has contract, work started, on plant for Wayne Veneer Corp.; will include three buildings, one of shed type, 200 x 45 feet; brick boiler house and brick steaming house; J. V. Webb, president, will supervise construction.

Missouri

ST. LOUIS—St. Louis & San Francisco railway announced continuance of mechanical and roadway improvement in 1940 to entail total expenditures of \$3,444,010; net addition to capital account will amount to \$1,582,280; 60 miles of light-weight rail will be replaced by new 112-pound rail at cost of \$1,014,414, including cost of tie plates and fastenings; new trackage to be laid at various points along Frisco system; plan installation of collision strut braces on bridge over Meramec river near Ten Brook, Mo.; other major items include rebuilding 5 Sante Fe type locomotives for fast freight, reconstructing 5 passenger engines; additional items with total cost include; widening cuts and fill and bank protection, \$52,082; bridges, trestles and culverts, \$647,678; additional yard tracks,

sidings and industrial tracks, \$63,772; freight and passenger stations, office buildings and other station facilities, \$74,677; signal and interlockers, \$118,682; water stations and appurtenances, \$24,742; ballasting tracks, \$20,000; major mechanical improvements will include: Locomotives \$746,204; rebuilding and remodeling freight cars \$419,499; passenger cars \$198,778; new shop machinery and equipment, \$22,441.

Oklahoma

STROUD, OKLA.—City plans \$27,482 waterworks and sewerage expansion program; George Gillian, engineer, Chandler.

Minnesota

BEMIDJI, MINN.—Project for construction of rural transmission lines in Bemidji and Frohn townships has been submitted to REA for approval; project to serve Beltrami, Clearwater, Hubbard, Itasca and Becker counties in future; sponsored by Itasca-Man Trap association, M. B. Taylor, county agent.

MOORHEAD, MINN.—Clay county, J. C. Atkinson, auditor, has voted to take bids to close Feb. 6, on one new $\frac{3}{4}$ or 1 yard capacity drag line with trade in of old machine.

RED LAKE FALLS, MINN.—City, William Nieland, clerk, is submitting plans for construction of sewage disposal plant consisting of a trickling filter, primary and secondary chlorination and Imhoff tank to the state health department for approval.

TYLER, MINN.—Lyon-Lincoln electric co-operative, V. Ostergaard, president, has awarded a contract subject to REA approval to Acme Construction Co., St. Paul, at \$156,156 for construction of 250 miles of rural transmission lines in Lyon and Lincoln counties. United Engineering Service, 1406 West Lake street, Minneapolis, consulting engineer.

Texas

DALLAS, TEX.—Incorporated; Gaines County Water Co., Ted Bishop, W. K.

ABOUT SPRINGS

■ The FORT PITT SPRING CO. announces its new spring catalog, hot off the press. Here is an 8½ x 11 inch book containing 36 pages crammed with information concerning all types of springs, formulae, tables, weights, decimal equivalents and pertinent data. This is not an ordinary catalog; if it were for sale, it would be on the "must buy" list of every company that has the remotest interest in springs. However, it is not for sale—copies will be mailed free to responsible companies. Write for your copy now; it will make a valuable addition to your business library.



FORT PITT Spring CO.
P. O. BOX 1377 PITTSBURGH, PENNA.
WORKS—JOHN STREET—MCKEES ROCKS, PENNA.

Powell, 3135 Westminster street; drilling.

GARLAND, TEX.—City has WPA grant of \$13,345 for improvements to sanitary sewer system.

GRANBURY, TEX. — Incorporated; Hood Electric Co-operative Inc.; C. L. Drake, Travis Brazel, rural electric.

HOUSTON, TEX.—Stills, two compressors and two generators of Liquid Carbonic Co.'s plant; fire damage; loss \$150,000.

HOUSTON, TEX.—City has site of 15 acres of Milby street for one of proposed two incinerators; cost \$400,000; 150-ton capacity.

SHINER, TEX.—City, Edward Richter, mayor, construct \$70,000 waterworks extension and paving; J. J. Rady, engineer, Majestic building, Fort Worth.

SOUR LAKE, TEX.—City, F. H. Carpenter Jr., will vote soon on bonds for waterworks and sewage disposal plant; H. L. Thackwell, engineer.

TYLER, TEX.—Incorporated; Rose City Oil Co.; capital \$10,000; J. H. Calhoun, Luther F. Kay; Oil.

Kansas

CULLISON, KANS.—WPA to aid city with \$17,661 for financing construction of a waterworks system.

NORTONVILLE, KANS.—City, C. A. Leighton, mayor, is preparing final plans for the construction of a waterworks system including wells; 50,000 gallon tank and tower; distribution system; cost \$36,000; E. T. Archer & Co., 609 New England building, Kansas City, Mo., consulting engineers.

WINFIELD, KANS.—City, H. H. Hansen, clerk, is taking bids extended to Jan. 23, 7:30 p.m. on one deaerating feed water heater, platform, piping insulation and auxiliary equipment for its power plant. Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineers.

Nebraska

OMAHA, NEBR.—Nebraska Power Co., J. E. Davidson, president, Seventeenth and Harney streets, has made application to state railway commission for permission to construct 2½ miles of rural transmission lines near Murdock in Cass county and 2 miles near Plattsmouth; Clarence Minard, company engineer.

OMAHA, NEBR.—City, Harry Trustin, city engineer, has awarded a contract to Yant Construction Co., Omaha, at \$615,111 for construction of an activated sludge type sewage disposal plant; lawsuit, however, filed to enjoin award of contract. Gascolgne & Associates, 1140 Leader building, Cleveland, consulting engineers.

STROMSBURG, NEBR.—Polk county rural public power district, G. E. Ekstrand, superintendent, has announced that Scott & Swanson, Stromsburg, low bidders at \$26,380 for construction of 44 miles of rural transmission lines in Polk county; H. H. Henningson Engineering Co., 1904 Farnam street, Omaha, consulting engineers.

Iowa

ATLANTIC, IOWA — City has applied to WPA for aid to finance construction of a sewage disposal plant to cost \$120,000.

BURLINGTON, IOWA — Steel Craft Corp. has completed plans for construction of an addition to cost \$30,000.

CEDAR RAPIDS, IOWA—State com-

merce commission granted authority to Central States Electric Co. to construct 108 miles of rural transmission lines in Hamilton county.

GOWRIE, IOWA—Board of Electric Light & Power plant trustees, H. O. Hubbell, secretary, is taking bids to close Feb. 7, 7:30 p.m. on one diesel engine having capacity of not less than 300 horsepower nor more than 375 horsepower, complete with generator exciter, auxiliary equipment and piping; specifications obtainable from owner or consulting engineers, Stanley Engineering Co., Muscatine.

DES MOINES, IOWA—Northwestern Bell Telephone Co., I. G. Carll, vice president, and general manager, will spend about \$6,755,000 in 1940 for replacements, improvements and repairs to telephone plant and lines, including equipment.

GLIDDEN, IOWA—REA approved \$20,000 for financing construction of connecting lines and 13 miles of rural transmission lines contemplated by Glidden rural electric co-operative.

MAQUOKETA, IOWA—City council, J. C. Thorne, city manager, has conferred with its consulting engineers, Consoer, Townsend & Quinlan, 211 West Wacker Drive, Chicago, relative to a new sewage disposal plant to cost approximately \$60,000.

MARSHALLTOWN, IOWA—State commerce commission granted permission to Marshall county rural electric co-operative to construct 16 miles of rural transmission lines in Jasper county.

MARSHALLTOWN, IOWA—State commerce commission has granted permission to Marshall county rural electric co-operative to construct 125 miles of rural transmission lines in Marshall county; application for the construction of 74½ miles of lines in Story county continued until a hearing Jan. 23.

ONAWA, IOWA—State commerce commission has granted permission to the Monona county rural electric co-operative to construct 158½ miles of rural transmission lines in Monona county.

POSTVILLE, IOWA—Allamakee-Clayton electric co-operative, Kermit M. James, superintendent, is making a survey for construction of 150 additional miles of rural transmission lines in Allamakee, Clayton and Fayette counties; A. W. Grubb, Vinton, consulting engineer.

STEAMBOAT ROCK, IOWA—WPA has allotted funds which together with a bond issue approved recently enable construction of a waterworks system; cost \$20,000; Enno Luiken, city clerk.

Pacific Coast

GRANTS PASS, OREG.—California-Oregon Power Co. has budgeted \$1,000,000 for construction in northern California and southern Oregon; H. H. Cleland, president; plans include transmission line between Medford and Grants Pass; rebuilding Gold Ray dam; erection of 2 switching stations near Klamath Falls.

NESPELEM, WASH.—Nespalem Valley Electrical Co-operative Inc.; nonprofit; organized; Jacob M. Koontz and associates.

RONALD, WASH. — Washhouse and equipment of Patrick coal mine of Roslyn-Cascade Coal Co., fire damage; loss \$10,000.

SEATTLE—Priestly Mining & Milling Co. Inc., 1320 Alaska building; capital

\$250,000; incorporated; J. G. Priestly and associates.

SEATTLE—Union Wines Inc., 204 First avenue S., has awarded general contract to Victor Sandberg for remodeling structure at Renton for use as distillery; outlay \$35,000; Stanley Sandberg architect.

SEATTLE—Seattle Brewing & Malting Co., 3030 Airport way, is building a concrete 2-story storage building, 166 x 70 feet; A. W. Quilst, general contractor; W. H. Witt, structural engineer; Joseph H. Wohleb, Olympia, architect.

SPOKANE, WASH.—Washington Water Power Co. has plans prepared for proposed \$120,000 Sunset power sub-station, outdoor type for two 60,000-volt transmission lines also outgoing 110,000-volt line to east side sub-station.

WALLA WALLA, WASH.—Gus Njeman, manager, Inland Motor Freight Co.; fire damage; loss \$25,000; plans announced in preparation of a new structure, 180 x 120 feet; to be modernly equipped.

Canada

BARKERVILLE, B. C.—Caribou Gold Quartz Mining Co., 543 Granville street, Vancouver, will spend \$100,000 for addition to mill here to increase capacity by 100 to 200 tons per day; Dr. W. B. Burnett, Vancouver, president.

HAMILTON, ONT.—Canadian Industries Ltd., will start work immediately on erection of factory and installation of equipment for manufacture of ammonium chloride; cost \$200,000.

HAMILTON, ONT.—National Steel Car Corp. Ltd., Kenilworth avenue, has awarded steel contract to Hamilton Bridge Co. Ltd., Bay street N., in connection with 133 x 263-foot forge shop.

HAMILTON, ONT. — Union Drawn Steel Co. Ltd., has awarded additional contracts in connection with 1-story 64 x 145-foot plant addition; Pigott Construction Co. Ltd., 36 James street S., has general contract.

JOLIETTE, ONT.—Wall Chemical Ltd., 5725 St. Denis street, Montreal, will build factory to cost \$10,000 on Laval street here.

SAULT STE. MARIE, ONT.—Officials of Algoma Steel Corp., have awarded additional contracts for addition to tin plate and sheet mill; cost \$200,000; to double present capacity.

TORONTO, ONT.—Canadian Breweries Ltd., 297 Victoria street, has awarded general contract to Evan S. Martin, 16 Sautler street, for erection of \$100,000 addition to plant.

TORONTO, ONT.—Factory of Dominion Corrugated Paper Co., 142 Weston road; fire damage; loss \$150,000; machinery valued \$100,000 may be totally lost; plant to be rebuilt immediately.

ROCK ISLAND, QUE.—Corbitt & Cowley Ltd., will build addition to plant here; estimated cost \$50,000.

ST. LAURANTE, QUE.—Beaver Products Ltd., received bids and will award contracts soon for construction of factory; Paul M. Lemieux, 1260 University street, Montreal, architect.

THREE RIVERS, QUE.—National harbor board plans construction of shipyards here; W. F. Riddell, Ottawa, Ont., executive secretary.

VALLEYFIELD, QUE. — Canadian Bronze Powder Works, subsidiary International Bronze Powders Ltd., will add equipment and make additions; increase capacity of plant by 25 per cent.



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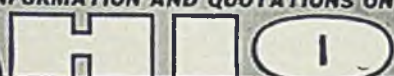
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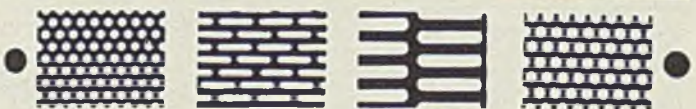


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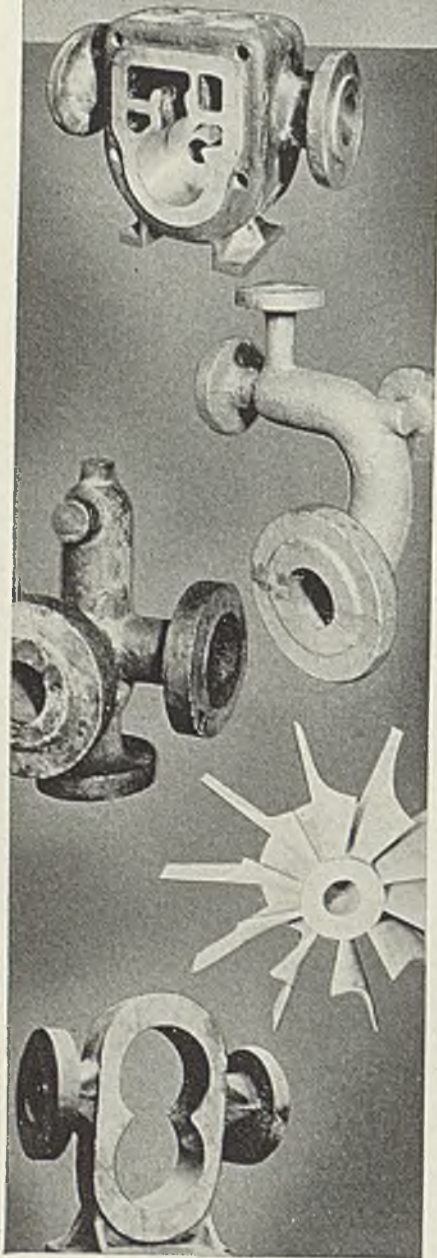
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