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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 25 JUNE 24, 1946

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Deep Drawing and "Bulging" of Stainless Steel

Lowering Handling Costs with Aluminum Pallets

Air Powered Assembly Tools Speed Production

Precision Drilling Achieved with Duplex Trunnion Fixtures

Use of Scrap in the Blast Furnace

As the EDITOR VIEWS the NEWS

Confusion Is Worldwide

After examining Japan's late arsenal for war, one is impressed by the large tonnage of materials and parts that is strewn over the broad area in which the defeated nation operated. From the dismal piles of bombed structural steel on the three tiny islands of Wake to work-in-process in the plants of Korea, Manchuria and North China are great stores of ferrous metals ranging from pig iron, steel ingots and potential scrap to wire products, bars, sheets, forgings and stampings.

This residue from the war is found everywhere. In shipyards on Honshu are impressive stocks of plates, left stranded by the sudden ending of the war. In the congested manufacturing centers of Japan proper incendiary bombs frequently stopped production suddenly, leaving substantial inventories of bar stock alongside batteries of fire-warped lathes and screw machines. In Japanese occupied portions of the Asiatic mainland in rolling mills, locomotive and car shops and manufacturing plants are thousands of tons of billets, wire rods, forging blanks, pig iron, scrap and odds and ends of stampings, partly machined parts and unfinished assemblies—all orphaned by the end of hostilities.

But this does not tell the whole story. When Japan capitulated, the rigid discipline of the aggressor was relaxed suddenly. For the first time in years, millions of people were on their own. One of the results of this sudden change was a curious dispersion of metal resources. It is not uncommon to see several lengths of heavy seamless tubing or die block behind the hut of a poor farmer. On rough country roads beasts of burden pull carts laden with steel channels and angles. Where they are going nobody seems to know.

What this confusion means in relation to the difficult task of rehabilitating the Far East is not clear at the moment. For one thing, the very obvious over-abundance of scrap, semifinished steel and partially processed products and parts is offset by scarcities of certain essentials—notably coal. Also, with refugees and repatriates overrunning the land, patterns and templates have been removed from shops to be used for firewood. Because of long neglect of motive power, rolling stock and road bed, railroad transportation still is inadequate.

From this sketchy outline of conditions in East Asia, it is apparent that tremendous problems of organization must be solved before a balanced economy can be restored to the area. Unfortunately, a large part of the industrialized world shares the same formidable problem.

STEEL
June 24, 1946

PRICE CONTROL: So much heated discussion was generated during the debate over continuance of government price control, it is difficult for the ordinary person to properly evaluate the arguments, for and against, and come to a firm conviction on the issue. John Q. Citizen's confusion is understandable. Even the economists are as far apart in their viewpoints on the subject as are Washington and Moscow in the making of the peace.

Chester Bowles and other government price controllers have done the nation a distinct disservice through their disconcerting propaganda in support of unrelaxed bureaucratic domination of the peacetime economy. Their alarmist predictions of wild inflation have only served to befuddle the public. It is not stretching the point to say their immoderate stand, as much as anything, contributed to the independence of Congress in enacting extender legislation.

It is not clear what kind of price control we are going to have after June 30. The compromise measure which finally emerges is expected to be

(OVER)

stronger than the bills passed by either the Senate or the House. Also, there is the possibility President Truman may veto the extender leaving the country without any kind of governmental price regulation. In event of this there is the possibility the existing price control law will be temporarily extended by congressional resolution.

Modified price control legislation, if adopted, will put businessmen on a hot spot. Their's will be the job of restraining inflation. Should they fail, Congress will not delay reinstituting rigid regulations from which the economy may be a long time squeezing out from under. Nobody wants that to happen.

—p. 70

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SALE APPROVED: Approval by the Justice Department of sale of the government-owned steelworks at Geneva, Utah, to the United States Steel Corp. was not unexpected. For one thing it was assumed the War Assets Administration, before announcing acceptance of U. S. Steel's bid, had prior informal approval of Attorney General Clark.

In approving the sale as not in violation of the antitrust laws, Attorney General Clark pointed out addition of Geneva to U. S. Steel facilities will not materially change the latter's position relative to other segments of the steel industry.

In 1939 national steelmaking capacity was 81,828,958 net tons of ingots, of which 28,885,000 tons, or 35.3 per cent, was controlled by U. S. Steel. By Jan. 1, 1946, however, although national ingot capacity had risen to 91,890,560 net tons, U. S. Steel's share, including certain government facilities, represented only 31.4 per cent of the total. Addition of Geneva's capacity of 1,283,000 tons will raise U. S. Steel's proportion of national ingot capacity to 32.7 per cent, still considerably less than in 1939.

—p. 68

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FOUR-IN-ONE-PROCESS: Smooth, bright finishes are given parts made of various metals and edges are deburred by Roto-Finishing, one of the relatively new techniques to reach a high degree of engineering precision in recent years.

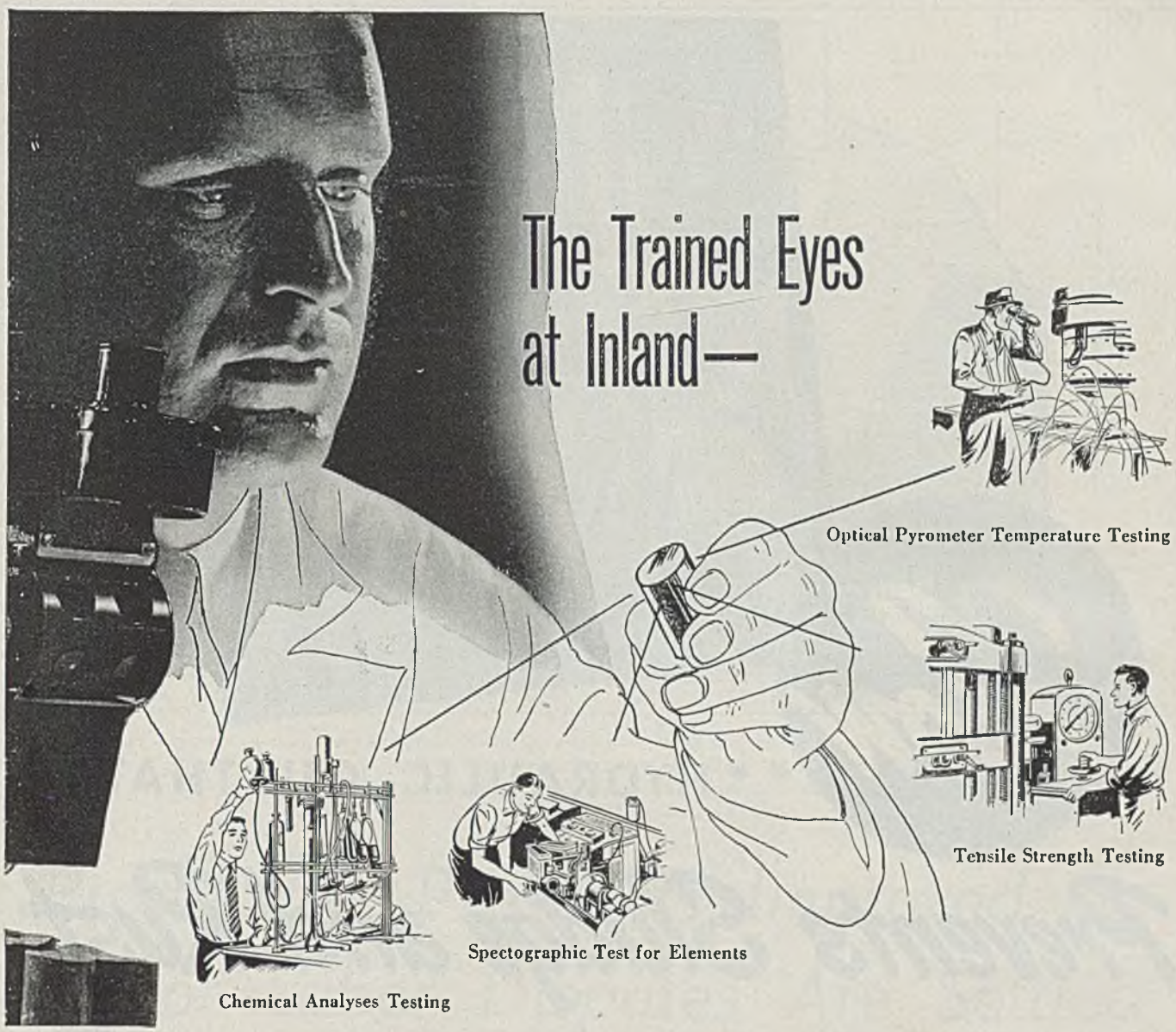
Using limestone or granite chips, honing compounds and steel balls in water-tight tumbling barrels, this four-in-one process can be made to embrace grinding for deburring, polishing, honing and wet coloring. The latter is a kind of bonus operation done with various sizes of steel balls or other coloring media after parts are prepared by any of the preceding methods.

Its manifest economy for large volume brightening of die castings, removal of parting lines and uniform rounding of edges of many small cast or stamped parts assuredly will call attention of production men to the process. —p. 98

SIGNS OF THE TIMES: Peak wartime exports of iron and steel (p. 62) were registered last year, which, incidentally, was the second highest export year in the industry's history, being topped only by record shipments in 1940. Products shipped almost exclusively reflected military expediency. . . . Forty cents of every sales dollar of the iron and steel industry (p. 63) went into payrolls last year, increase of 3 cents over the amount paid out in 1937, a representative prewar year. Only 2.5 cents per sales dollar were paid out as dividends in 1945 compared with 5 cents in 1937. . . . April shipments of steel into consumption (p. 63) reflected improvement in wake of steelworkers' strike, but the betterment was shortlived since May movement is believed down as result of production curtailment due to the coal miners' work stoppage. . . . Use of nuclear energy for power and detailed analysis of gas turbines for ground and air installations highlighted discussions (p. 64) at the semiannual meeting of the American Society of Mechanical Engineers in Detroit. Convention program of this organization, third oldest technical society in the nation, was extremely broad in scope with some 84 papers and addresses by 91 authors being presented at 38 technical sessions. . . . First full-scale meeting of the Drop Forging Association since end of the war (p. 65), held at Chicago, devoted chief attention to reconversion topics. . . . Industrialists are giving increasing consideration to suitability of plant locations as they seek to improve efficiency as a means of offsetting ever rising costs. Among factors influencing search for new locations (p. 66) are desire to be near markets; accessibility of raw materials and sources of components; need of buildings suitable for mass production; and, desire to avoid congested urban conditions. . . . In attempting to determine relationship between torsional and tensile properties of steel (p. 92) the tensile test is found a better means of determining yield points, but the torsional test measures strength and ductility in a more fundamental manner. . . . Major strikes affecting the metalworking industries apparently have subsided for this year (p. 61) and these industries will enter the second half with fair prospects for accelerating production. Pipelines to fabricating companies, however, remain to be filled and raw material shortages will continue through third quarter. Many companies see September as the month in which they will achieve a high production rate—more than a year after our guns were silenced in Europe and Asia.

E. L. Shaner

EDITOR-IN-CHIEF



Every day, year in and year out, ton after ton of steel passes the scrutiny of Inland's "trained eyes" . . . Samples are gathered from all operations and subjected to exacting tests before the steel is permitted to be rolled into final form.

Chemical analysis maintains a careful control over all elements . . . holds them in proper proportion and within rigid tolerances. Further control is possible by means of the spectograph and the comparator, that present a graphic record of the exact composition. Optical Pyrometers eliminate guesswork . . . allow operators to control temperatures accurately at all times. In addition, tensile, hardness and metallographic tests are conducted to maintain satisfactory properties. The combined control exerted by these tests is assurance of the quality fabricators can expect . . . and get from Inland Steels.

Inland steelmakers working together closely, carefully on each individual order means *that* order will "measure up" to every requirement when delivered.

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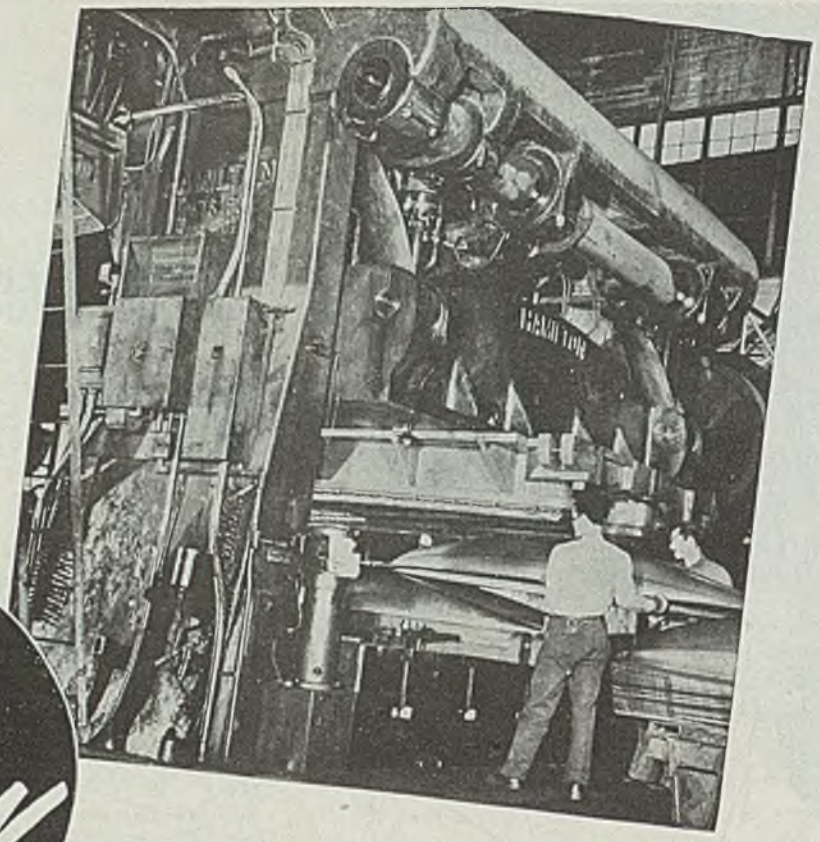
INLAND STEEL



Now . . HYDRAULIC OIL THAT

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STOPPAGES of hydraulic mechanisms may occur at any time, and they generally come suddenly, with no apparent warning. Most stoppages are caused by: 1) *sludge,* due to oxidation of the hydraulic oil, and 2) *rust,* due to moisture that gets through ordinary oil film onto the metal parts. Rust is particularly likely to form during periods when the machine is idle.

Texaco Regal Oils (R & O) are strongly inhibited against both rust and oxidation. They stand up under high temperatures and agitation—preventing sludge formation. They "plate" the surfaces of valves, gears and other parts with a rust resisting film so that moisture does not reach metal surfaces. In addition, *Regal Oils (R & O)* will not foam. This means smooth, dependable operation.

Texaco Regal Oils (R & O) have proved themselves in service on all types of hydraulic units, from giant presses to small machine tools. One nationally famous user writes that they *". . . . have eliminated the difficulties formerly experienced with oil varnish in the hydraulic system."* Leading hydraulic equipment manufacturers use and recommend *Texaco Regal Oils (R & O).*

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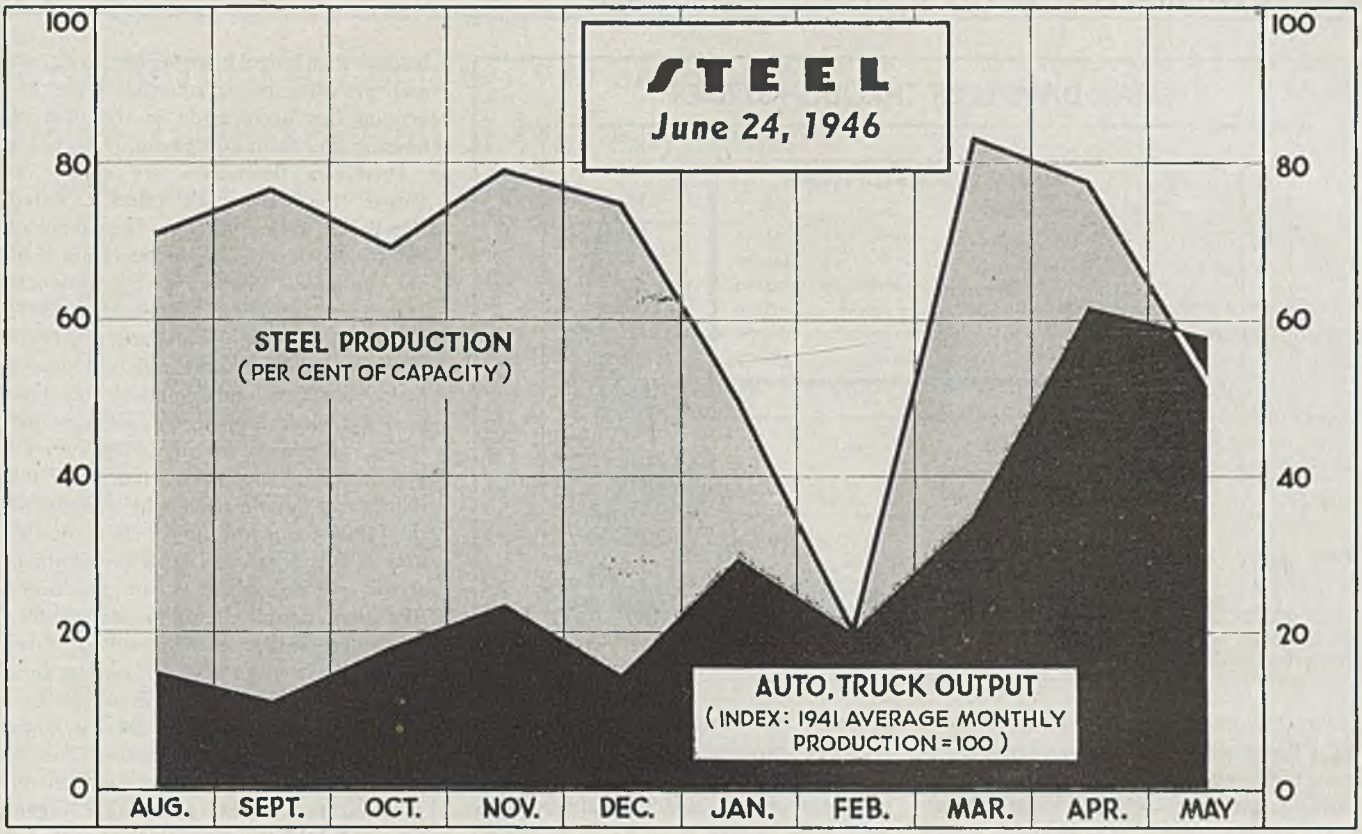
FOR ALL HYDRAULIC UNITS

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS



Losses to steel and automobile production caused by work stoppages since V-J Day are portrayed in the chart above. Steel ingot loss is estimated at nearly 20 million tons. Loss in automobile output is difficult to calculate, but postwar production to date is a couple million units under "what could have been"

Production Prospects Improved as Major Labor Disputes Are Settled

Nearly 20 million tons of steel lost in postwar work stoppages. Effects of shortages born of strikes to be felt for many months. Hundreds of minor disputes pending, but impact will be less severe than industry-wide walk-outs

WITH the great cycle of major "reconversion" strikes in subsidence, the iron, steel and metalworking industries will enter the second half of 1946 with good prospects for steadily accelerating operations.

Minor strikes still loom in many industries and will continue to hamper production, but for the first time since last autumn the country is free of paralyzing, industry-wide stoppages, such as the steel, coal, railroad and electrical strikes.

Small labor unions have scheduled 700 strikes during the next 30 days to enforce demands for wage concessions already granted the big unions. Many of these disputes, however, will be settled before work actually stops and the impact of the total stoppages will not be comparable with the steel and coal strikes. Currently the U. S. Labor Department is working to settle 311 work stoppages involving 162,000 persons.

Indicative of the upturn that should be experienced during the last six months of this year is the recent recovery in basic industries. Steel ingot production has climbed to 85 per cent of capacity, a gain of 10 points last week and 42 points since the low of 43 per cent of capacity reached during the coal strike. Soft coal production is at a higher rate than before the strike started. A major automobile producer, down for six weeks, has resumed.

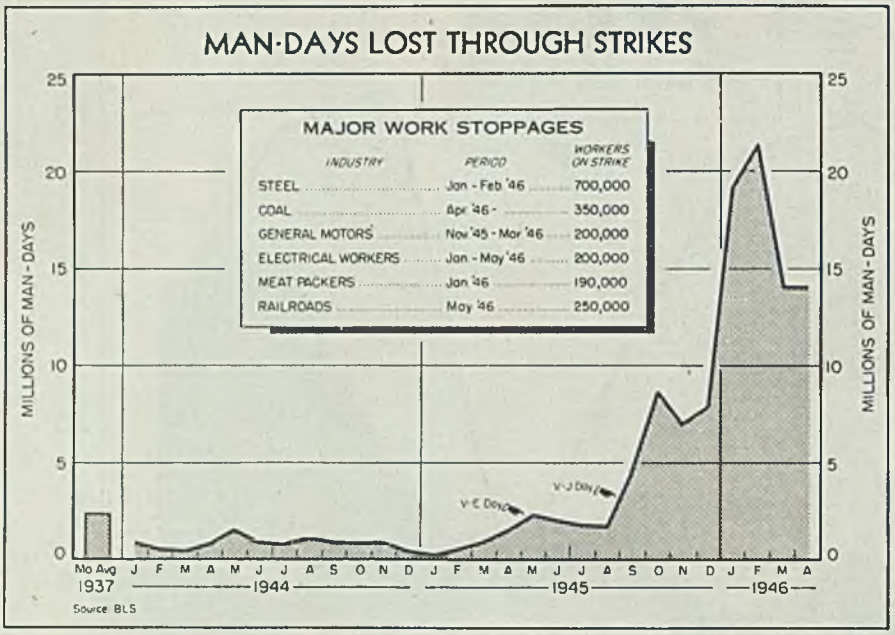
If the basic industries are permitted to continue production, unhampered by further work stoppages, many metalworking companies now stymied by shortages of materials expect to reach a fairly high rate of operations by September.

Although major strikes may be out

PRICES GOING UP

Higher coal prices, imminent freight rate increases, greater costs of mining iron ore and other advances in operating costs are expected to lead to upward adjustment of steel prices within a matter of weeks. A revision in pig iron prices reportedly was being drawn up in Washington last week.

Approximately $3.70 of the $5 increase granted steel producers this spring was required for the 18½-cent hourly wage increase granted at that time. This left producers only $1.30 to compensate for cost increases absorbed during the war and which were estimated to require a price increase of $2 to $2.50 a ton, prior to the wage increase.



of the picture for the remainder of the year, the effects left by those which have been held will be felt throughout the third quarter and perhaps longer. The steel and coal stoppages especially have emptied the pipelines to consumers' plants and many weeks will be required to refill these pipelines and balance stocks. The strikes in the copper mines and refineries, now in process of being settled, will be felt for from two to six months.

The losses caused by the various strikes since V-J Day have been more tremendous than generally admitted. In the ten months since the war ended in Asia, United States mills have produced 51 million tons of steel ingots. Had the industry not been hampered by the coal strike in October, 1945, the industry-wide steel strike in January and February, and the coal strike in April and May, plus the scores of minor strikes which plagued various companies, it is reasonable to assume the industry could have operated at about 90 per cent of capacity during the past ten months and produced about 70 million tons of ingots. Thus the loss in steel ingots may be counted at upwards of 20 million tons, or more than enough to produce 10 million automobiles.

During the ten months from August, 1944, through May, 1945, ingot production was 22,036,000 tons greater than in the first ten months following the war's end.

In many lines of consumer goods, the loss is much greater. In automobiles, for example, the production in the ten months since the war ended has been 1,163,000 units, including trucks. Had the 1941 rate of production prevailed during these ten months, output would have been more than 4 million units. Discounting the latter part of 1945 as necessary for reconverting plants, the same comparison shows 830,000 units built in the first five months of 1946 compared with 2,225,000 in the comparable 1941 period.

The strike losses, particularly those in steel, coal, copper, lumber and lead, will be felt critically during the next two or three months. The steel shortage is particularly bad, because inventories everywhere have been reduced to the vanishing point.

Mills are under tremendous pressure for tonnage and practically all products are being sold on a monthly quota basis under which old-time customers are allotted a percentage of the total monthly output.

This famine in steel has given rise to pressure for reinstitution of a priorities system for distributing the available production. Civilian Production Administration is resisting this pressure, however, on the ground that the mills are doing a good job under their voluntary allocation programs and because CPA officials believe that "regulation begets regulation and priorities beget priorities." An exception has been made in the case of housing and farm equipment.

Producers themselves are unable to answer the consumer's often repeated question, "When can we get delivery on steel?" Generally, producers are sold out for all of 1946 on carbon products and have not opened books for 1947.

This picture could be changed quickly in favor of the consumer seeking tonnage, however, if steel production is unhampered by work stoppages and raw materials shortages for the next several months. For one thing, much of the tonnage of producers' books is believed duplicate tonnage, subject to cancellation as deliveries ease. Such cancellations would create vacancies in producer's schedules, permitting shipments to other consumers earlier than promised. Steel companies have no way of knowing how much of their backlog is duplicate tonnage, but suspect that the total is large.

The loss in steel production due to the coal and steel strikes has caused the program for providing steel for urgent war rehabilitation requirements abroad to be postponed for the remainder of this year. The program originally called for 850,000 tons for shipment abroad during first half. When the steel strike was called the program was dropped, only to be revived on a reduced scale calling for about 650,000 tons. The coal strike caused the reduced program to be dropped. Because the need for steel in this country is so great, it now is reported the entire program will be held over until next year, although there is a chance for revival late this year.

Tin plate has been excepted in the export cancellation and this product has been moving out of the country on a quarterly directive basis. For the third quarter, 112,000 tons of tin plate have been allocated for export and probabilities are that the fourth quarter quota will be even larger.

Wartime Steel Exports from U.S. Totaled 35,800,000 Tons; 1945 Was Peak Year

NINETEEN forty-five was the peak wartime year for United States iron and steel exports, when 7,911,711 net tons were shipped to foreign users, according to figures compiled by the American Iron and Steel Institute, based on reports by the Department of Commerce. Figures include lend-lease tonnages and, in some cases, steel that was sent overseas for the use of our military forces.

Last year was also the second highest export year in the industry's history, topped only by record shipments in 1940 of 8,752,712 tons.

In the five-year period from 1941-1945, total exports amounted to 35,800,000 net tons, only slightly less than the total tonnage of steel used in this country to build ships during the same time.

In 1944, the last year for which figures are available, the United Kingdom took 24 per cent of all our exports of iron and steel. Canada followed with 15.4 per cent, and Russia with 14.6 per cent.

Payrolls Take 40 Cents of 1945 Steel Sales Dollar; Dividends Half of 1937 Payments

PAYROLLS and materials accounted for 82½ cents of the steel industry's sales dollar in 1945, according to the American Iron & Steel Institute. Forty cents of every dollar received last year from sale of products went into payrolls. This was an increase of 3 cents over the amount paid out in 1937, a representative prewar year.

Compared with 1937, exactly half as much of the 1945 steel dollar remained after costs to be paid out as dividends for investors. Two and one-half cents were paid out for this purpose in 1945, compared with 5 cents in 1937.

The amount per dollar paid out in taxes during 1945 shows a drop of 2¾ cents from this same cost in 1944.

The amount per sales dollar set aside in 1945 as a reserve for future contingencies was ¾ of a cent. This figure represents an increase of ¼ of a cent from the amount set aside in 1944.

Of the 1945 dollar, 6 cents were earmarked for depletion and depreciation. This compares with 4½ cents in 1944, and 5 cents in 1937. The 1945 cost of materials and supplies, 42½ cents, was up ½ cent from 1944.

The amount of each dollar received by the industry that was paid out for selling and general administrative costs was up ½ cent in 1945.

April Steel Shipments Up Slightly from March Figures

Shipments of steel made for sale in April totaled 4,698,081 net tons, slightly larger than the 4,644,988 tons shipped in March, according to the accompanying tabulation by the American Iron & Steel Institute. Of the 64,059,000 net tons effective steel finishing capacity, 82.3 per cent was used in April, compared with 77.4 per cent in March. However, comparison with April, 1945, is much less favorable, shipments in that month being 5,769,768 tons, representing 94.9 per cent of capacity.

During April 362,387 tons of steel were shipped to other members of the industry to be converted into further finished products, compared with 431,075 tons in March and 515,722 tons in April, 1945.

April shipments differed little from those of March in most products. Comparisons are as follows, April figures being given first: Structural shapes, 340,055 tons and 326,787 tons; sheared and universal plates 383,584 and 396,538 tons; standard rails, 152,385 and 168,889 tons; hot-rolled bars, 723,826 and 733,853 tons; cold-rolled bars, 141,100 and 126,343 tons; wire rods, 95,954 and 99,194 tons; nails and staples, 55,620 and 48,523 tons; hot-dipped tin and terne plate, 170,910 and 178,605 tons; electrolytic tin and terne plate, 93,821 and 70,315 tons; hot-rolled sheets, 550,724 and 530,865 tons; cold-rolled sheets, 325,609 and 311,685 tons; galvanized sheets, 129,374 and 128,696 tons; hot-rolled strip, 117,304 and 141,314 tons; cold-rolled strip, 118,200 and 105,892 tons.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period APRIL - 1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	39	1	xxxx	xxxx	xxx	314,037	146,161	xxxx	xxx	1,036,502	500,289
Structural shapes (heavy)	12	2	9,421,550	313,555	42.6	340,055	xxxx	898,553	30.4	944,443	xxxx
Steel piling	4	3		16,779		12,580	xxxx	42,460		33,863	xxxx
Plates (sheared and universal)	27	4	17,080,770	358,745	25.5	383,584	22,373	1,151,779	20.5	1,151,223	78,446
Skelp	5	5	xxxx	xxxx	xxx	41,504	20,529	xxxx	xxx	124,061	52,441
Rails—Standard (over 60 lbs.)	4	6	3,657,000	153,126	50.9	152,385	xxxx	460,208	38.3	453,923	xxxx
—All other	5	7	392,000	11,807	36.6	13,575	xxxx	38,642	30.0	38,457	xxxx
Splice bars and tie plates	12	8	1,745,960	62,518	43.5	66,931	xxxx	176,417	30.7	190,777	xxxx
Track spikes	10	9	349,400	13,031	45.3	13,926	xxxx	38,477	33.5	41,681	xxxx
Hot Rolled Bars—Carbon	33	10	xxxx	593,758	xxx	497,859	59,269	*1,862,986	xxx	1,548,646	203,442
—Reinforcing—New billet	14	11	xxxx	83,901	xxx	85,339	xxxx	* 240,491	xxx	262,298	xxxx
—Rerolled	12	12	xxxx	6,569	xxx	9,760	xxxx	34,372	xxx	* 37,101	xxxx
—Alloy	22	13	xxxx	161,773	xxx	130,868	14,618	430,418	xxx	348,154	37,050
—Total	39	14	21,906,660	846,001	46.9	723,826	73,887	2,568,267	35.6	*2,196,199	240,492
Cold Finished Bars—Carbon	24	15	xxxx	124,057	xxx	122,893	xxxx	370,079	xxx	369,175	xxxx
—Alloy	23	16	xxxx	20,087	xxx	18,207	xxxx	59,123	xxx	52,396	xxxx
—Total	31	17	* 2,851,510	144,144	61.4	141,100	xxxx	429,202	45.8	421,571	xxxx
Tool steel bars	18	18	255,010	10,049	47.9	10,113	xxxx	32,075	38.2	31,459	xxxx
Pipe & Tubes—Butt weld	14	19	2,176,520	136,058	76.0	130,511	xxxx	381,436	53.3	371,416	xxxx
—Lap weld	9	20	730,200	30,714	51.1	32,148	xxxx	78,092	32.5	87,119	xxxx
—Electric weld	10	21	1,536,900	74,545	58.9	60,944	xxxx	202,636	40.1	169,687	xxxx
—Seamless	13	22	3,169,600	214,320	82.2	176,714	xxxx	594,710	57.0	523,922	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	9,062	xxxx	xxxx	xxx	24,970	xxxx
—Mech. tubing (cap. & prod. incl. above)	11	24	xxxx	xxxx	xxx	47,883	xxxx	xxxx	xxx	121,088	xxxx
Wire rods	25	25	7,293,670	414,508	69.1	95,954	35,341	1,198,289	49.9	298,963	109,702
Wire—Drawn	39	26	* 5,702,890	319,359	68.1	182,127	13,894	928,205	49.5	530,894	38,348
—Nails and staples	18	27	1,260,360	54,071	52.1	55,620	xxxx	155,449	37.5	155,036	xxxx
—Barbed and twisted	15	28	543,610	21,106	47.2	21,180	xxxx	61,848	34.6	60,472	xxxx
—Woven wire fence	15	29	1,121,860	36,556	39.6	37,318	xxxx	112,936	30.6	113,514	xxxx
—Bale ties	12	30	149,700	7,851	63.7	8,276	xxxx	21,336	43.3	23,142	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	68,408	104	xxxx	xxx	232,879	665
—Chemically treated	8	32	465,000	12,679	33.1	13,988	xxxx	43,531	28.5	42,562	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	162,935	52.7	170,910	xxxx	477,242	38.6	531,980	xxxx
—Electrolytic	9	34	2,231,850	91,474	49.8	93,821	xxxx	234,206	31.9	248,596	xxxx
Sheets—Hot rolled	30	35	19,353,320	1,230,095	77.2	550,724	33,172	3,675,919	57.7	1,609,016	114,944
—Cold rolled	13	36	7,127,460	448,763	76.5	325,609	xxxx	1,449,227	61.8	1,036,626	xxxx
—Galvanized	16	37	2,924,130	134,792	56.0	129,374	xxxx	413,655	43.0	410,141	xxxx
Strip—Hot rolled	25	38	7,180,030	196,085	33.2	117,304	16,926	644,341	27.3	418,944	63,097
—Cold rolled	34	39	* 3,067,450	127,770	50.6	118,200	xxxx	365,680	36.2	359,641	xxxx
Wheels (car, rolled steel)	5	40	315,400	22,852	88.1	24,246	xxxx	68,748	66.3	* 72,857	xxxx
Axles	6	41	398,170	11,891	36.3	13,569	xxxx	34,814	26.6	35,050	xxxx
All other	3	42	169,510	4,480	32.1	575	xxxx	13,902	24.9	* 1,408	xxxx
TOTAL STEEL PRODUCTS	140	43	xxxx	xxxx	xxx	4,698,081	362,387	xxxx	xxx	*14,144,091	1,198,424
Effective steel finishing capacity	140	44	64,059,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	140	45	xxxx	xxxx	xxx	82.3%	xxxx	xxxx	xxx	61.4%	xxxx

* Adjusted.

Hold ASME Convention At Detroit

Approximately 1200 attend 38 technical sessions featuring 84 papers and addresses. Nuclear energy among subjects discussed

DETROIT

HIGHLIGHTED by discussions of nuclear energy for power and detailed analysis of gas turbines for ground and air installations, the semiannual meeting of the American Society of Mechanical Engineers unfolded a panoply of 38 technical sessions featuring 84 papers and addresses compiled by 91 authors, requiring the combined facilities of the Statler and Book Cadillac Hotels in Detroit for four days last week.

Ushered in by intense heat and humidity, a tornado and an unending deluge of rain, the meeting was attended by an estimated 1200 persons. The Engineering Institute of Canada was a joint participant.

In addition to the maze of technical sessions, there were scheduled seven inspection trips, four general luncheons, two general dinners of similar character and a formal banquet. At the latter K. T. Keller, Chrysler Corp., was toastmaster, General Jacob L. Devers, head of the Army Ground Forces, spoke on "America's Security" and Lieut. Gen. W. S. Knudsen, General Motors Corp., received honorary membership in the society.

The Navy Department's interest in nuclear energy for power use was touched upon at a dinner meeting Monday by Rear Admiral H. G. Bowen, chief of research and inventions for the Navy. He recommended approach to the use of atomic power "in the grand manner, lest we fall flat on our faces," and cited the Navy's recognition of its possibilities in ships, submarines and aircraft.

Other contributors to the "atom" dinner were Senator Brien McMahon who explained provisions of his bill on atomic energy; and A. L. Baker of the once-mysterious Kellex Corp. and still associated with the Manhattan District Project. He disclosed the first "atomic pile" for industrial use is now in process of being harnessed to a power generating source.

PRESSED METAL INSTITUTE MEETING: At the speaker's table at the spring meeting of the Philadelphia district of the Pressed Metal Institute June 11 were, left to right: Harry Cutler, general manager, Cutler Metal Products Co., Camden, N. J.; George Sokolsky, writer and lecturer; Walter A. Gorrell, president, E. J. McAleer Co., Philadelphia; William J. Meinel, president, Heintz Mfg. Co., Philadelphia; and Tom J. Smith, executive vice president of the institute, Cleveland

A second dinner meeting, on Tuesday evening, was devoted to industrial planning for airpower in the postwar period. Maj. Gen. B. W. Chidlaw, deputy commanding general of engineering activity at Wright Field, presented his views, and a paper by J. Carlton Ward Jr., president, Fairchild Engine & Airplane Corp., was read by Dean C. Smith. Principal emphasis of these experts was in the direction of providing sufficient government funds for pursuing aircraft research to its fullest extent in the years ahead.

Air transportation and its relation to a better understanding among the world's peoples were reviewed at a luncheon meeting by J. Parker Van Zandt, director, aviation research, Brookings Institution.

Some plain talking for management on the subject of labor problems was provided by Albert E. Meder, attorney for Beaumont, Smith & Harris, Detroit. He urged management to meet the issue of production standards head on, and "if strikes over such matters are necessary, then let's have them." His further words had a familiar ring, especially to Detroit industrialists: "The most important issue facing management today is getting a fair day's work. Employees either will not work a full eight hours or, if they do, slow down on the job. Labor leaders admit it, but cannot do anything about it."

Eight technical sessions were devoted to research in metal cutting procedures, and to modern production methods. The heliarc welding process, resistance welding with storage batteries, arc welding of alloy steels and photoelastic investigation of residual stresses in welds were among the techniques discussed. Four papers dealt with general aspects and economies of modern materials handling methods.

The automotive flavor of the meeting was emphasized by four papers dealing with use of special types of power plants in ordnance vehicles—the Chrysler five-bank tank engine, General Motors 2-cycle diesel engines for ordnance vehicles, special Ford engines developed for tanks, and the Cadillac twin V-8 power plant.

Other subjects included noise control in aircraft, details of special Great Lakes ship designs, induction and high-frequency dielectric heating, centrifugal casting, springs, chains, locknuts, rubber and plastic developments, education and training of industrial workers, and four discussions of steam boiler problems met within generating stations.

The fall meeting of the society will be held in Boston, Sept. 30 to Oct. 3, and the annual meeting will be held in New York, Dec. 2 to 6. No decision was made on the site of the 1947 semiannual meeting, but Chicago has preference.

Reconversion Topics Featured at Convention of Drop Forging Group

THE FIRST full scale meeting of the Drop Forging Association since the end of the war drew large attendance of leaders in the drop forging industry June 14 and 15. This eleventh annual meeting, held at Edgewater Beach Hotel, Chicago, dealt particularly with subjects of importance in conversion from wartime to peacetime conditions.

Taking as his title "Forgings in Germany after the War," Victor F. Braun, president, Ladish Drop Forge Co., Cudahy, Wis., reported his impressions as a representative selected by the War Production Board to study the art of forging as developed during the war in Germany. Edwin Hodge Jr., president, Pittsburgh Forgings Co., gave a talk on "How the Steel Situation Looks to Us," embodying many helpful suggestions based on experience in Pittsburgh and Washington.

Following a round-table discussion on June 15 the use of chronologs in the drop forging industry was dealt with on the basis of practical experience with more than 100 installations of these instruments.

Use of Chronologs Discussed

Panel chairman of this session was Ralph R. Root, sales manager, Electrical Manufacturing Division, National Acme Co., Cleveland. Chronolog applications to shears and board hammers were covered by R. G. Hale, Cape Ann Tool Co., Pigeon Cove, Mass. Joseph Varga, Ladish Drop Forge Co., Cudahy, Wis., dealt with applications in connection with trimming presses, steam hammers and Maxipresses. D. E. Johnson, Steel Improvement & Forge Co., Cleveland, told of the help that chronologs can give to machine operators and also of organized labor's reception of them.

New officers and directors of the association were introduced at the annual dinner June 14 by the retiring president, Charles E. Letts, who is president, Letts Drop Forge Inc., Detroit. These 1946-47 officers and directors are: President, Roland J. Ahern, president, Billings & Spencer Co., Hartford, Conn.; vice president, Ralph A. Mitchell, vice president, Pittsburgh Forgings Co., Coraopolis, Pa.

Directors, Walter S. Story, vice president and general manager, Maine Steel Inc., Portland, Me.; Raymond D. Moore, general sales manager, St. Pierre Chain Corp., Worcester, Mass.; W. O. English, manager, Forge Division, National Lock Washer Co., Newark, N. J.; Ray B. Tripp, vice president, Ohio Forge & Machine Corp., Cleveland; K. E. Walter, president, Alliance Drop Forging Co., Alliance, O.; Elmer W. Cress, vice president and treasurer, Buchanan Steel Products Corp., Buchanan, Mich.; Barney C. Cox, president and general manager, Melling Forging Co., Lansing, Mich.; R. Robert Smith, president, Milwaukee Forge & Machine Co., Milwaukee; and L. M. Fehrenbach, vice president and general manager, Indianapolis Drop Forging Co., Indianapolis.

Blast Furnace and Coke Oven Group Elects Officers

More than 250 persons attended the annual spring meeting of the Eastern States Blast Furnace Coke Oven Association at the Pittsburgh Field Club, Aspinwall, Pa., June 14. C. L. Potter, manager of coal and coke research, Jones & Laughlin Steel Corp., Pittsburgh, delivered a paper on "The Preparation of Coal and Coke for Coke Ovens and Blast Furnaces."

L. A. Kraemer, superintendent, by-product coke plant, Pittsburgh Steel Co., Monessen, Pa., was elected president of the association for the 1946-47 term; Gorden R. Baer, superintendent of blast furnaces, Bethlehem Steel Co., Johnstown, Pa., was elected vice president; and John J. Cavett, superintendent of coke plant, Aliquippa works, Jones & Laughlin Steel Corp., was named secretary-treasurer.

Electroplaters Convention Held at Pittsburgh

Over 1100 attended the thirty-third annual convention of the American Electroplaters' Society, at the William Penn Hotel, Pittsburgh, June 17-20. Technical sessions included papers on "Tin Plating of Strip Steel at High Speed," by G. C. Jenison and S. S. Johnston, Weirton Steel Co.; "Examination of Electro-Cleaned Steel by the Electron Diffraction Technique," by C. W. Smith and I. L. Karle, Detrex Corp.; and "Corronizing Wire Screen Cloth Using Radiant Heating," by J. Edward Bemiller, Hanover Wire Cloth Co., and Damon C. Antel, formerly of Standard Steel Spring Co.

Present, Past and Pending

■ BETHLEHEM STEEL NAMES CLARKE TO NEW POSITION
BETHLEHEM, PA.—C. E. Clarke succeeds Frank Robbins Jr., retired, as general manager of Bethlehem Steel Co.'s plant at Steelton, Pa., effective July 1. W. E. Grainger succeeds Mr. Clarke as assistant general manager at Sparrows Point.

■ BERNO REPLACES WYSOR IN GOVERNMENT POST
WASHINGTON—Harry L. Berno has been named chief, Metals Section, Industry Branch, Economics Division, United States Office of Military Government for Germany, succeeding Rufus J. Wysor.

■ ELECTRO METALLURGICAL CO. BUYS OHIO PLANT
NEW YORK—Electro Metallurgical Co. has purchased for $5,050,000 the government's ferrosilicon and calcium carbide plant at Ashtabula, O.

■ FIRM HAS $4 MILLION MACHINE TOOL ORDER BACKLOG
SPRINGFIELD, MASS.—Unfilled orders of Van Norman Co., machine tools and automotive repair service equipment producer, exceed $4 million, James Y. Scott, president, said last week.

■ PORTSMOUTH BLAST FURNACE ORE BRIDGE DAMAGED
PORTSMOUTH, O.—Wheeling Steel Corp.'s blast furnace here, part of property sold to Portsmouth Steel Corp., was banked for 48 hours last week when an ore bridge was damaged.

■ STRIKE NOTICES SERVED ON GREAT LAKES SHIPPERS
CLEVELAND—CIO National Maritime Union has served 30-day strike notices on 10 Great Lakes vessel operators. Union seeks reduction of the work week and wage increases.

■ STEEL BAR STANDARD APPROVED FOR PROMULGATION
WASHINGTON—Simplified practice recommendation for hot-rolled carbon steel bars and bar-size shapes, effective June 30 and identified as R222-46, has been approved for promulgation by the National Bureau of Standards.

■ WSA REVISES VESSEL TRANSPORTATION CHARGES
WASHINGTON—War Shipping Administration will increase vessel transportation charges 3 per cent June 24 on shipments from Atlantic and Gulf ports to the Pacific Coast.

Industry Looks for New Plant Sites

Rising production costs spur industrialists to seek plant locations that are conducive to higher efficiency in manufacturing and distribution. Backlog of plant demand plus current needs give promise of high level of new construction

By VANCE BELL
Associate Editor, STEEL

INDUSTRY'S constant effort to lower production costs through increased efficiency has inspired industrialists to give considerable thought to new locations for plants. In fact, the striving for increased efficiency of plants takes on new significance now that wages of production workers and costs of raw materials are climbing.

Proof that some of that thinking has jelled into action are numerous new plants on which construction was started or planned after the ending of war last August but before building materials shortages and restrictions became acute this year.

While this new plant construction represents decentralization of some companies' operations it is not strictly decentralization in all cases. With some companies which are expanding operations, new plant construction amounts to establishments of branch plants. But the significant point in both instances is that the action is opposite to centralization.

Among principal factors influencing industrialists to search for new locations for plants are: 1. Desire to be near markets; 2. desire to be near to raw materials or sources of components; 3. need of buildings suitable for housing new, efficient facilities for mass production; and 4. desire to avoid congested urban conditions.

A graphic example of the desire to be near markets was pointed out recently by J. L. Perry, president, Carnegie-Illinois Steel Corp., Pittsburgh, who said that "for several years now, the density of consumption of steel has been moving away from Pittsburgh. As transportation costs rose, not only in absolute cost per ton shipped, but also in proportion to the value of the product shipped, other centers of steel manufacture developed closer to the main growing centers of steel consumption. All these trends, together with changes in marketing methods and increases in freight rates, worked toward more and more restriction of the marketing areas in which Pittsburgh steel manufacturers can compete advantageously."

A recent factor in the shifting of markets was the war. Through its activities in the war the West Coast, for example, gained in population, and industrialists are taking that into consideration in studying new locations for plants. The West Coast also is getting consideration as a location for plants to serve markets in the Pacific area and the Orient.

In many instances, new industrial plants are being located outside congested urban areas. This is done, not with the thought that prevailing wage scales in the industry or unionism can be escaped, but with the belief that in the less crowded areas there is less unrest among workers than in congested urban districts.

One argument for locating plants in small and uncrowded communities is that workers in close proximity to the soil are apt to be more contented at their work than workers who live in cramped and often none too pleasant living quarters in congested city areas where living costs are high and where shut-downs find many workers without savings to tide them over a "rainy day." In the smaller, uncrowded areas, factory workers often can turn to their gardens during their time off and be partly self-sustaining during plant shut-downs.

Workers in the industrial plants in the smaller communities are paid approximately the same wages as in the plants of the larger cities and are therefore often able to maintain a higher standard of living than workers in the large cities, inasmuch as normally a smaller segment of the weekly payrolls in the small towns is absorbed by rent and food items.

Prominent in establishing new plants is General Motors Corp. Some time before V-J Day, General Motors officials announced that the corporation had earmarked $600 million for extension and improvement of manufacturing facilities, with the general aim to eliminate bottleneck plants and to obtain extra capacity so that a production level 50 per cent beyond the previous peak could be achieved.

There have been some revisions in the GM program because of unexpected increases in costs, restrictions on building programs, and lack of building materials, but the following have been projected: A new Fisher Body heavy stamping plant at Hamilton, O.; a new Fisher Body light stamping plant at Columbus, O.; a new Chevrolet manufacturing and assembly plant at Van Nuys, Calif.; two new Chevrolet manufacturing and assembly plants at Brook Park and Parma, O.; a new Buick-Oldsmobile-Pontiac assembly plant at Framingham, Mass.; a new $10 million technical center at Van Dyke, Mich.; a new small parts plant at Elyria, O.; and a new parts plant at Sandusky, O.

Beyond these, various additions and extensions to present GM facilities throughout the United States have been proposed.

Ford Building New Plants

Ford Motor Co. has under way several new assembly plants in the East and on the West Coast. A major unit is the new Lincoln-Mercury plant at Metuchen, N. J.

Another auto producer, Willys-Overland Motors Inc., Toledo, O., is contemplating facilities on the West Coast to serve markets there and in the Orient.

In view of the tremendous rate at which industrial plants were constructed during the recent war period there existed for a time a rather widespread belief that the nation's industrial plant would be overbuilt when the war ended. From 1940 to 1944, more than $25 billion of new plant and equipment was added to American industrial capacity, according to figures from the former War Production Board.

"This expansion was very unevenly distributed among industries," WPB pointed out. "Steel ingot capacity expanded by less than 20 per cent while nonferrous metal capacity rose by well over 200 per cent. For some important branches of the metal industries, such as shipbuilding and aircraft, the rate of expansion was very much greater.

"Figures on machine tools in place contribute supporting evidence of the vast expansion of plant and equipment in the metalworking industries. At the end of 1939, there were 934,000 machine tools in place," WPB said. "Four years later, the number had increased about 50 per cent to nearly 1,400,000. This includes the prewar tools that had been placed in storage in the reconversion; but, on the other hand, the new tools were generally larger and very much more efficient than those displaced, so that the rise in actual operating capacity was at least as great as the rough numerical comparison indicates.

"The modern industrial economy has always been characterized," WPB pointed out, "by the low degree of utilization of its existing plant. In 1939, factories probably operated not more than 40 hours per week on the average out of a theoretical maximum of 168; this indicates how closely our economic system and our social institutions were geared to single shift operation. This fact, however, provided wide scope for expanding output in all but a few continuous process industries, well in excess of additional investment in facilities, once the exigencies of war compelled the abandonment of peacetime habits.

Currently prominent in establishing new factories, General Motors Corp., Detroit, has projected for Framingham, Mass., the Buick-Oldsmobile-Pontiac assembly plant shown above in an architect's drawing

However, the nation's industrial plant had been sufficiently expanded at the end of the war to cause considerable expression of belief that the absorbing of the hundreds of new structures built for war industry would preclude large-scale new building of peacetime factories for some years to come. The amount of structural steel which went into the nation's industrial war plant building, says the American Institute of Steel Construction, New York, provides a good index of its extent. The average industrial building tonnage from 1940 through 1945 ran approximately a million tons a year, compared with total average bookings for the previous six-year period of about 1,320,000 tons.

"But," says that institute, "as we face the actuality of postwar industrial building demand, it is obvious that as fast as steel becomes available for the purpose, it will be in heavy demand for at least the next five years." Many of the war plants are unsuitable for peacetime industries on anything like the wartime basis.

During the war, construction of plants for peacetime products was through necessity neglected. This backlog of plant demand plus current demand give promise of a high level of new plant construction over the next several years.

During the war, regional shifts in industry were not of great significance, the WPB pointed out. "Although the Pacific states made the most striking advance, the center of U. S. manufacturing has remained where it was before the war—in the northeastern and north central states.

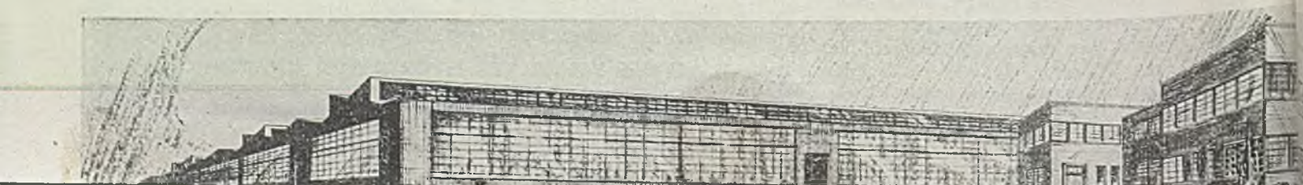
Although regional shifts of industry were moderate during the war there was considerable use of the branch plant system, and "today," says Graham Woodward Parker of the consulting firm of Parker & Strackbein, New York, "one of the foremost indications of postwar policy was given in a recent statement by the president of General Motors that his company intends to decentralize many of its main operations, establishing smaller plants in smaller communities in various parts of the country.

"The practicality of branch plant production," Mr. Parker asserts, "has increased hand-in-hand with the development of the automatic precision machines. Metalworking offers many examples—the evolution of the turret lathe from a mechanic's instrument to a production machine that can be set up any place for an 18-year-old girl to operate is an obvious case.

"It has already been suggested that much credit for the decentralization of industry must be given to the American machine designers and builders who have sought to integrate in compact, automatic units the advantages of low-cost production. Credit must also be given to our great progress in standardizing and disseminating a concrete body of management methods—the production control, storeskeeping, cost accounting, operations analysis—which have made it possible for the branch plant in Oklahoma or in Brazil to be administered as effectively as the mother plant in Detroit," Mr. Parker pointed out.

"As for the future, we may expect," Mr. Parker stated, "that the next ten years will see a more equal distribution of manufacturing throughout the United States and an abundance of manufactured products that we have never known."

For its new plant, costing $7½ million for construction and equipment, Fruehauf Trailer Co., Detroit, chose a site on farm land in Avon Lake, O., near Cleveland. The architect's drawing below shows the half-mile long plant where mass assembly techniques will be applied to building of truck trailers. This plant will be the largest of Fruehauf's facilities



Utah Steel Plant Sale Is Approved

Justice Department finds no anti-trust law violation in proposed disposal of government-owned Geneva works to U.S. Steel

SALE of the government-owned steel plant at Geneva, Utah, to United States Steel Corp., New York, for $47½ million was approved last week by U. S. Attorney General Tom Clark.

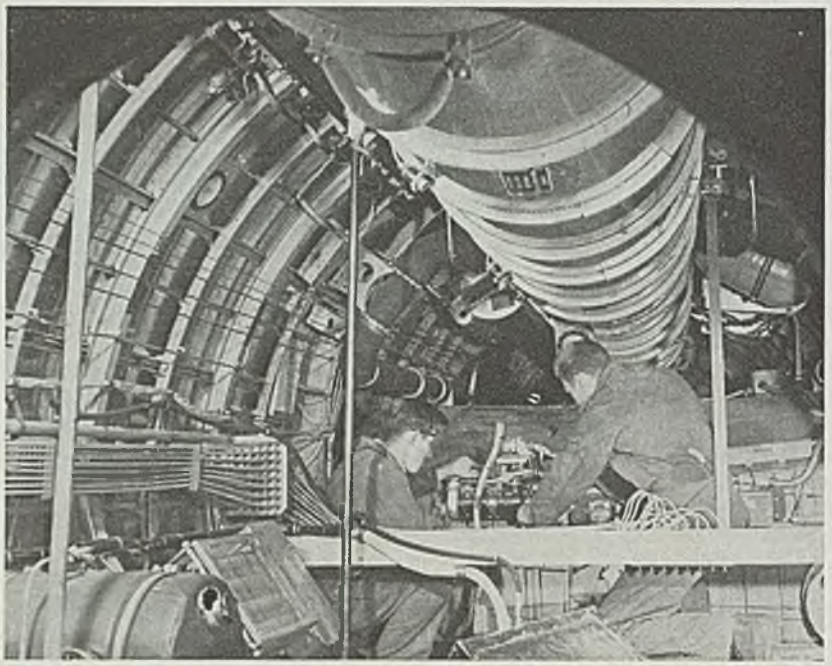
In a letter to Lt. Gen. E. B. Gregory, War Assets administrator, Attorney General Clark said: "I do not view the sale, as such, of this property by the War Assets Administration to the United States Steel Corp. as a violation of the antitrust laws."

"This advice," Attorney General Clark asserted, "does not extend to the conduct or the practices of the United States Steel Corp. in its use of the property, nor do I express herein an opinion concerning the legality or illegality of any acts or practices in which the United States Steel Corp. or its subsidiaries may have engaged or may hereafter engage.

"It appears," Attorney General Clark's letter said, "that on Jan. 1, 1939, the steel industry in the United States had a total ingot capacity of 81,828,958 net tons, of which United States Steel Corp. had a capacity of 28,885,000 net tons, or 35.3 per cent of the national capacity. On Jan. 1, 1946, the steel industry had a total ingot capacity of 91,890,560 net tons, of which United States Steel Corp. had a capacity of 28,813,200 net tons, including government facilities at Homestead, Pa., of 1,895,000 tons, or 31.4 per cent of the national capacity.

"If the capacity of the Geneva plant amounting to 1,283,000 tons, is added to the present capacity of the United States Steel Corp., that corporation's share of the national capacity will rise from its present 31.4 per cent to 32.7 per cent of the national total," Attorney General Clark said.

"This," he pointed out, "is to be contrasted with the position of the United States Steel Corp. at the time of its formation in 1901, when it produced 50.1 per cent of the nation's iron and steel output.



FLYING LABORATORY: General Electric engineers are shown installing a GE jet propulsion engine in the bomb bay of a B-29 Superfortress. Operational characteristics will be checked at various altitudes. The plane was shown June 21-22 in connection with the opening of GE's new flight test center at Schenectady County Airport, N. Y.

Attorney General Clark pointed out statistics show the Far West, exclusive of Geneva, has an aggregate annual ingot capacity of approximately 3,619,000 tons, of which United States Steel Corp. has a capacity of approximately 628,000 tons, or 17.3 per cent. Total far western capacity, including Geneva, amounts to approximately 4,900,000 tons. If United States Steel Corp. acquires the Geneva plant it would have 1,911,000 tons or 39 per cent of the capacity of the West.

Schwartz Heads New Portsmouth Steel Corp.

APPOINTMENT of Elmer A. Schwartz as president of the newly formed Portsmouth Steel Corp., Portsmouth, O., was announced last week by Cyrus Eaton, organizer and chairman of the firm.

Mr. Schwartz, 45, comes to his new post from Republic Steel Corp. for which company he has been assistant manager of the Youngstown district since 1943.

Additional details on the Portsmouth works purchase by the new company have come to light through registration statement with the Securities & Exchange Commission. The $12 million which the new company will pay Wheeling Steel for the plant is made up of $3,775,000 for the plant; $25,000 for a coal company; $4 million for inventories; and $4 200,000 for working capital.

The Portsmouth-Wheeling Steel conversion agreement runs for three years and provides that Wheeling roll sheets at Steubenville up to 6950 tons of slabs per month prior to Oct. 1, 1946, and up to 9300 tons of slabs per month thereafter. Kaiser-Frazer and Graham-Paige will buy from Portsmouth for three years: Sheets, slabs and wire, at regular prices, plus standard extras. They will purchase all their sheets used up to 54 inches wide and such additional tonnages of greater width as they may desire up to 5900 tons per month prior to Oct. 1 and 7900 tons per month thereafter. The deal on slabs is up to 7900 tons per month and on wire products up to the equivalent of 7100 tons of slabs.

Portsmouth also has several three-year deals with Wheeling providing for the sale of slabs, coke, stirring rod billets and silicon sheet bars. The price of the slabs is the Pittsburgh base, fob barges, Portsmouth, plus $3.78 per gross ton; and of the silicon sheet bars, the Pittsburgh base, fob barges, Portsmouth, plus $27.50 per gross ton. The price of the coke is the OPA ceiling.

It is estimated Portsmouth will have 10,000 tons per month of tie plates and wire products available for sale to others.

CPA To Control Distribution of Pig Iron Supply

Plan considered to channel iron into critical civilian consumption. Price rise, subsidies proposed to stimulate output

HIGHER prices on pig iron, as well as subsidies for certain producers and partial allocation of output, was reported in immediate prospect last week as government agencies took under consideration a program for relieving the acute pig iron supply situation which is holding back a number of critical reconversion programs.

Extent of the price increase, or the amount of the subsidies suggested, could not be learned, but some details of the overall program under consideration were announced by the Civilian Production Administration.

The plan to channel pig iron into veterans' housing, farm machinery and certain other critical lines was presented for consideration to the Pig Iron Industry Advisory Committee at a recent meeting. It was pointed out by CPA Administrator John Small and Housing Expediter Wilson Wyatt the need for pig iron for products used in housing and in farm machinery was critical.

Plan for funnelling pig iron to these critical requirements would follow generally the "certified purchase plan" applicable to steel, recently effected by issuance of direction 12 to steel preference order M-21. Proposals to increase pig iron production were incorporated in plan, but CPA officials stated these were subject to further consideration.

Upon determination of foundries' requirements of pig iron for preferred programs, CPA will issue "a certified purchase authority" setting forth definite tonnages which manufacturers will receive in each given period from designated blast furnaces. "Must" programs will take about 25 per cent of production of foundry and malleable grades, most of which already has been ordered.

Blast furnaces shipping malleable and foundry grades will be expected to distribute equitably among their other customers the proportion of their production not "certified."

Requirements for critical products are principally in foundry and malleable grades. In 1945 these grades accounted for about 8 per cent of the 50 million tons of pig iron produced.

A representative of the Solid Fuels Administration told the committee that despite settlement of the coal strike, the outlook for pig iron production for steelmaking in June is uncertain, because the Solid Fuels Administration may find it necessary to allocate coal from captive mines for shipment via boats to the upper lakes to stockpile coal there for winter use and for public utilities.

Proposed pig iron certification will apply to the following types of equipment: Building materials; cast iron soil pipe and fittings; cast iron low pressure boilers for residential heating; bath tubs; sinks; lavatories; warm air furnaces; floor furnaces; water closet bowls; cast iron radiators; pressure pipe and fittings; agricultural equipment; grain and corn binders, corn pickers, corn shellers, harvesters, combines, potato diggers, potato pickers, bean cutters, sugar beets and cane harvesters, silo fillers, haying machinery, etc., fruit and vegetable graders and similar machinery; wheel type tractors, and repair parts; brake shoes for railroad use only.

The current scrap shortage is also placing an additional demand upon pig iron, CPA officials said. A scrap production drive is expected to get under way shortly. Meeting of scrap dealers has been called for June 26 to discuss plans.

CPA made no announcement with respect to its proposal on pig iron prices. In informed Washington circles, however, it was reported that in addition to recommending an adjustment in the base prices on pig iron acceptable to merchant producers, it also proposed premium payments to merchant iron producers as a means of stimulating production, such payments to be arranged through the National Housing Administration; capital expenditures and special subsidies to encourage the bringing into production of certain high cost marginal furnaces; and government payments of any "excessive freight charges" incurred by a foundry conforming with OPA instructions to purchase pig iron from specified merchant furnaces.

It was reported the foundries will be asked to provide CPA with data as to the source and amounts of their iron supplies in the past, their production schedules over coming months, amounts of iron required to meet such, their estimated inventory as of July 31, and the amounts of iron to be used in making short items.

GOVERNMENT CONTROL DIGEST

OFFICE OF PRICE ADMINISTRATION

Windows: Iron and steel window prices increased, effective June 14, 13 per cent over Oct. 1, 1941, prices. (MPR-591; OPA-T-4660)

Plumbing Fixtures: An additional increase of about 15 per cent over previous ceiling prices granted to manufacturers of brass plumbing fixtures, waste fittings and trimmings, effective June 14. Additional increases varying from 10 to 20 per cent and averaging 14 per cent over previous prices for brass plumbing fixture supply fittings and trimmings were also announced. (MPR-591; OPA-T-4661)

Fans and Blowers: Following price increases were effective June 14: 14 per cent for specified fans and blowers, when furnished complete with a power unit of less than 1 horsepower; 9 per cent for the specified fans and blowers, when furnished complete with a power unit of 1 horsepower or over. (MPR-136; OPA-T-4662)

Construction Machinery: Sellers of construction machinery and equipment, who have been selling under interim price ceilings 10 per cent above base prices in effect Oct. 1, 1941, may continue to sell at these price levels through July 15. (MPR-136; OPA-T-4664)

Aluminum Utensils: Manufacturers of sheet aluminum cooking utensils authorized to increase prices between three and four cents on the dollar; those of cast ware, a little under six cents, effective June 17. (MPR-188; OPA-T-4667)

Baking Machinery: Manufacturers' maximum prices for baking machinery and equipment increased 9 per cent over base date "freeze" levels, effective June 18. (MPR-136; OPA-T-4669)

Screen Cloth: Manufacturers of bronze and copper insect screen cloth may sell these products on an adjustable pricing basis beginning as of June 14. This is applicable only on sales to other manufacturers who incorporate this type of screen cloth in other products. (MPR-40; OPA-T-4675)

Business Machines: Manufacturers of business machines have been provided with a formula which allows them to recapture their March, 1942, gross dollar margin between the hourly rate charged customers for repair and maintenance services and the average hourly rate paid mechanics. The average increase, effective June 24, will not exceed 7 per cent. (MPR-165; OPA-T-4670)

Industrial Materials: Dead-burned dolomite and magnesite, raw dolomite and fluxing limestone, railroad ballast and several high-temperature insulating materials have been suspended from price control, effective June 19. Suspension action covers dead-burned dolomite for basic open-hearth dressing, dead burned magnesite for furnace use; fluxing limestone for blast furnaces and open hearths and for smelting of copper and other minerals; limestone for use as glass stone; raw dolomite for refractory uses and as fluxstone in blast furnaces, glass stone, and other similar furnace uses. Also dropped from price control are lime silica and molded smosite high-temperature insulating materials, 85 per cent magnesia and diatomaceous silica insulating materials, sold exclusively to industrial users as heat insulation in power plants and industrial heating equipment. (SO-129; OPA-T-4680)

Power Transmission Equipment: Interim price increase of 7.8 per cent over Oct. 1, 1944, prices given manufacturers of industrial power transmission equipment, including drive shafts, pulleys and similar parts on April 19, has been increased to 11.6 per cent, effective June 19. (MPR-136; OPA-T-4681)

CIVILIAN PRODUCTION ADMINISTRATION

Tin Mill Products: Producers of certain farm machinery products, critical products for the housing program, and brakeshoes for railroad cars, as well as certain government agencies, are entitled to emergency priority assistance for the purchase of tin mill products. Any certified purchase order must be treated as a rated order and accepted accordingly. Where a conflict exists between certifications, preference is given to the certification received first, irrespective of when the purchase order was placed. (M-21; CPA-LD-103)

Foreign Trade Development Seen Urgent Need in Some Industries

Layoffs reported threatened in certain heavy lines, including machine tools, and railroad equipment, unless export business develops to keep war-built facilities occupied. Formula must be found to stimulate trading

MANY Americans probably will be startled to learn that although the nation has scarcely got started on the tremendous job of satisfying the pentup demand for civilian goods for the home market, distress signs already are threatening in some divisions of the economy which are in need of business to keep plants engaged. Last week, addressing a meeting of business paper editors, Arthur Paul, director, Office of International Trade, Department of Commerce, made this clear, speaking about the urgency of developing foreign trade outlets for certain of our manufactured goods.

Segments of heavy industry soon face the threat of cutbacks and layoffs unless ways and means are found for foreign trade to absorb surplus manufacturing capacity mushroomed by the exigencies of war, according to Mr. Paul.

This threat of layoffs, furthermore, is not something of concern just for the distant future. It is with us today, surplus capacity already being apparent in some lines such as railroad equipment and machine tools. It promises to be serious in others, such as power and communications, equipment and chemicals, in one or two years, Director Paul said, pointing out that greatly expanded manufacturing facilities are filling the postwar vacuum rapidly.

Heavy Equipment Needed

Priority demands of war-torn nations, aside from food and clothing, call for heavy equipment of which we soon will have an over-abundance, Mr. Paul declared. Foreign trade can utilize our capacity, he added, if a formula can be found whereby our economic system based upon private enterprise with a minimum of controls can be harmonized with nationalization of industry and rigid export-import controls as practiced in other nations.

Favoring divestment of controls as rapidly as possible, Mr. Paul said the primary function of his department is to aid private industry in opening up foreign markets. While expressing confidence that a free economy can engage in trade with countries that have nationalized industry, he pointed out that negotiation between governments is the only way to break down the strangulating trade practices created by war.

Director Paul recently returned from western and central Europe which he visited to accomplish three objectives: 1. To encourage a freer exchange of economic information; 2. to assist in export and import control problems, in accordance with the Potsdam Agreement, in the American occupied zone of Germany; 3. to appraise the effect of nationalization of industry in Czechoslovakia and Poland.

He reported progress on all three counts.

JOHN R. STEELMAN

President Changes Mind

Appointment of John R. Steelman as director of the Office of War Mobilization & Reconversion came as a surprise to Capital newsmen and many others. Most everybody had been led to believe President Truman was going to let the office die on the vine as it were. At any rate when the President had announced he was nominating John W. Snyder to the post of Secretary of the Treasury to succeed Fred M. Vinson, elevated to Chief Justice of the United States, he told reporters there would be no successor to Mr. Snyder who held the post of reconversion director, since most of the country's reconversion problems had been solved and, consequently, OWMR would be gradually liquidated.

Within a week after this announcement, however, the President appears to have changed his mind. At any rate at a later conference with newsmen he announced appointment of Mr. Steelman to the reconversion post with the explanation that virtually all of the Cabinet as well as members of the OWMR advisory committee had argued for continuance of the office.

In his new job Steelman will also continue to function as labor adviser to the President, this being at the request of Secretary of Labor Schwellenbach. Steelman has served as government intermediary in hundreds of labor disputes since 1934. In view of the fact many of the difficulties of reconversion since the end of the war are directly traceable to labor difficulties, his background, it is believed, may serve him extremely well in administering his new office.

House and Senate Conferees Hold Fate of Price Control as Compromise Is Sought

FATE of government price control last week was in the laps of 14 weary members of Congress composing the conference committee named to iron out the differences in the bills passed by the House and the Senate. The gentlemen of the House named to handle this hottest of hot potatoes are: Representatives Brent Spence (Dem., Ky.); Paul Brown (Dem., Ga.); Wright Patman (Dem., Tex.); William B. Barry (Dem., N. Y.); Jesse P. Wolcott (Rep., Mich.); Fred L. Crawford (Rep., Mich.); and Ralph A. Gamble (Rep., N. Y.). For the Senate: Robert F. Wagner (Dem., N. Y.); Alben W. Barkley (Dem., Ky.); Sheridan Downey (Dem., Calif.); George L. Radcliffe (Dem., Md.); Robert A. Taft (Rep., O.); Charles W. Tobey (Rep., N. H.); Eugene D. Millikin (Rep., Colo.).

As a general thing it was thought the complexion of the conference committee strengthened the chances for a much stronger bill finally being adopted than either the House or the Senate versions. Eight of the Democrats on

the committee have been strong supporters of the OPA while several of the Republican members have tended to view price control with at least lukewarm sympathy.

Administration leaders are hopeful a bill will emerge from the committee acceptable to the President. As a matter of fact, some members of Congress are apprehensive that should the bill in its final form prove unacceptable, the President will veto it, thus leaving the country without control of any kind. What would happen in event such transpires is anyone's guess but it is clear that should wild price inflation follow, with accompanying labor difficulties, the public might express its wrath by taking it out on Congress.

On the other hand the more hardy members of Congress are confident they have served the best interests of the nation in pulling some of the teeth from price control. Many of these hardy individuals sincerely feel the present scourge of scarcity will quickly vanish once the way is opened for manufacturers to see their way to make a reasonable profit on production.

Furthermore, they feel that business should be given a chance to demonstrate its ability to keep prices reasonably in check. As one prominent congressman points out, "It will be just too bad for business if wild price inflation follows upon termination of price control, or even the relinquishing of some of OPA's powers. If prices rise to inordinate heights and continue to advance despite increased production there is little question Congress will immediately take up the question and enact a price control measure from which business will be a long time getting out from under. If business is given the chance to go it without bureaucratic domination and fails to live up to its responsibility to hold back inflation, there will be no alternative for the Congress but to institute price control, which it will do quickly, and effectively."

Underground Industry

Next war will find much of the nation's vital industrial facilities dispersed and underground if the advice of Maj. Gen. Everett S. Hughes, chief of Army Ordnance, is heeded by industry executives. Speaking at a meeting of business paper editors, General Hughes warned that in another war the nation's plants would be the primary target of enemy attack and he urged business to start planning now to disperse plants or go underground.

The general declared many wartime problems cannot be solved by the Army in peacetime. Much progress is dependent upon industry co-operation in such matters as standardization if the nation is to move quickly from peace to war in event hostilities break out. It will be too late to standardize effectively after war starts.

Heads Metallurgy Division

Dr. J. G. Thompson has been appointed chief of the Metallurgy Division of the National Bureau of Standards. Receiving his doctorate in chemistry from Cornell University in 1920, he has been in government service since 1921 except for one year with the Cerro de Pasco Copper Corp. He has been with the Metallurgy Division since 1930, directing the work on the preparation of "pure iron," on special refractories for high-temperature service and on study of the effects of gases in metals. From 1942 through 1945 he directed the bureau's work on uranium.

W. F. Roeser, chief of the section of Mechanical Metallurgy, has been designated assistant chief of the Division of Metallurgy.

Other promotions in the Metallurgy Division include the appointments of G. A. Ellinger as chief of the section of Optical Metallurgy, and H. E. Cleaves as chief of the section of Chemical Metallurgy.

Mr. Ellinger has specialized in co-operative work with the Navy Department on development of welding processes and techniques for the fabrication of ships and accessory equipment.

Mr. Cleaves is well known for his work on the production of "pure iron" by the bureau.

H. C. ANDERSEN

Former chief of the Danish Ministry of Finance Office, Mr. Andersen has been appointed chief of the United Nations Finance Department

Unfinished Business

Rapid recovery of bituminous coal production since the ending of the miners' strike is encouraging the view in Washington much output lost during the strike will be recovered by the end of the year. Indicative of this is the fact that in the week ended June 8 approximately 12,635,000 tons were produced compared with 11,973,000 in the corresponding week of 1945. This gain is expected to be bettered in succeeding weeks. Production to date this year of 198,125,000 tons is about 24 per cent behind that in the like period of last year. The miners will have to dig at a mighty fast pace if the difference is to be made up over the next six months.

Meanwhile, interest centers in government policy with respect to coal mine operation. The mines still are under government control pending acceptance of the strike settlement terms by the operators. Such acceptance is dependent upon the granting by OPA of a coal price increase to compensate for the higher costs resulting from the wage boost. Last week it was indicated the price question would not be settled for at least two weeks. The mine operators are reported pressing for an increase of 35 to 50 cents per ton to offset the 18½ cents per hour wage concession, and they also feel additional price relief will be necessary to make up for the 5 cents per ton welfare fund royalty which was granted and which it is claimed is equivalent to a pay raise of three cents an hour. Until the price question is settled there is little chance the mines will be returned to their owners. Washington officialdom close to the coal situation, however, is of the opinion the mines will be restored to the operators within 45 days at the latest. Incidentally, it is said the coal operators, in the main, are not too unhappy about the whole thing.

Reilly Quits

James J. Reynolds Jr., Beverly, N. J., has been appointed by President Truman to succeed Gerard R. Reilly as a member of the National Labor Relations Board. Mr. Reilly is returning to private law practice. Mr. Reynolds, a brother of Quentin Reynolds, the war correspondent, is now on terminal leave as a Navy commander.

Public Hearings on Foreign Trade Agreements Will Be Held in 1947

United States businessmen and manufacturers will have opportunity to express thoughts as to what trade concessions this country should demand from and give to foreign nations. Dates for hearings will be determined after Oct. 15

FIRST SERIES of public hearings under the Trade Agreements Act of 1934 since before the war is expected to be held by the State Department early in 1947. Then, United States businessmen and manufacturers will have opportunity to voice thoughts as to what trade concessions the United States should demand from and give to foreign countries. Last December the State Department invited 15 countries to negotiate trade agreements with the United States, and of them 14 have accepted.

Preliminary studies are under way by two committees appointed by the State Department's Division of Commercial Policy. Both are interagency committees and their membership includes representatives of the State, Commerce, Agriculture, and Treasury Departments, and the Army, the Navy and the Tariff Commission. One of them is the Trade Agreements Committee, whose chairman is Winthrop G. Brown, chief of the State Department's Commercial Policy Division, with headquarters at 1818 H Street N. W., Washington. The other is the Committee on Reciprocity Information, with headquarters in the Tariff Commission's building in Washington; this committee is headed by Lynn Edminster, vice chairman, Tariff Commission.

Concessions Now Under Study

The Committee on Reciprocity Information now is studying the products involved in the trade agreements to be negotiated with 14 countries, and it is drawing up a preliminary blueprint of the concessions the United States should be prepared to grant on certain imported products, and on the concessions the United States should request on products exported to those countries. Only after the public hearings have been held will the Committee on Reciprocity Information make its recommendations to the Trade Agreements Committee. Subsequently the Trade Agreements Committee will make recommendations to the Secretary of State and the latter will transmit them to the President for approval.

Dates for the public hearings will not be established until after the first meeting of the Preparatory Committee of the United Nations Economic and Social Council has been held. This committee was appointed by the council last December to prepare plans for a World Trade Conference to be held under sponsorship of the United Nations "not later than the summer of 1946." This plan was set back because of a lack of readiness on the part of the representatives of a number of countries to enter into formal commitments. Initial meeting of the Preparatory Committee now has been scheduled to be held in London starting Oct. 15.

The State Department proposes to await the outcome of the meeting of the Preparatory Committee before proceeding with its trade agreements program. It will want to know whether 51 nations will attend the World Trade Conference as originally expected and, more particularly, what sort of an agenda the committee will draw up for discussions at the conference. After the report of the Preparatory Committee following the London meeting has been received, the State Department will pave the way for the public hearings.

In the meantime, the State Department is taking action when it can to protect American foreign trade against discriminatory agreements between other powers. Following State Department protests, the proposed British trade agreement with Greece has been abandoned. The State Department construed the proposed agreement as giving the British a monopoly over the Greek import and export trade; Britain would have exercised veto power over Greek foreign trade through a proposed Commercial Corp. of Greece under joint Greek-British control. Formulation of a British-Greek trade agreement has been deferred until after the October meeting of the World Trade Conference Preparatory Committee.

Various Units of Army Take Over Work Of ASF, "World's Biggest Business"

ARMY SERVICE Forces passed into history at 12 p.m. June 10 with a record for a stupendous and unprecedented logistical undertaking which put the American Army into almost every imaginable type of business activity. With a peak personnel numbering 2,697,051 persons, both military and civilian, its primary mission was to provide the soldier with everything he needed from food to weapons. In addition, ASF transported him across the seven seas and, up to the time of its disbanding, brought him home again.

To carry on its huge program, the ASF incurred expenditures of more than $70 billion. Although it has completed the overall job for which it was created, many of the activities initiated by it will be continued over a considerable period. Contract termination and renegotiation will take at least until the end of 1946, and redistribution and disposal of surplus property will require an even longer period. These and other tasks will be carried to completion by other Army components.

Army Service Forces was designated popularly as "the biggest business activity the world has ever known." It obtained for the American soldier 17,255,000 hand and shoulder weapons, 87,325 tanks, 2,437,000 trucks, 4,560,000 tons of aircraft bombs, 4,756,000,000 atabrine tablets, 476,000 bazookas. It processed 10,352,000 overseas. It conducted 7500 research projects including the atomic bomb development. It purchased 13 billion pounds of meat and 17 billion pounds of processed and fresh vegetables. It operated as many as 1765 ocean ships at the peak. It did a lot of other important things like constructing the Alcan highway, developing the Persian Gulf supply line, maintaining 822,947 miles of communication lines.

ASF had but two commanders since it was organized in March, 1942. First was Gen. Brehon B. Somervell, and the second was Gen. LeRoy Lutes who succeeded General Somervell when the latter retired last spring. General Lutes had served previously as General Somervell's deputy.

Basic reason for doing away with the ASF is the desire to have as small a War Department general staff as possible in order that its members may not be burdened with an enormous amount of detail which would hamper them in setting up overall policies. Details are to be handled by the general staffs of the components in the new setup. Unfinished work of the ASF will be redistributed to the Army Ground Forces, Air Forces, and Technical Services, while some of it will be handled direct by the War Department general staff.

Engineers' Committee Offers Plan For Curtailing Japanese Industry

Iron and steel production would be limited to 1,600,000 metric tons. Aluminum and magnesium production facilities would be removed. Nonferrous capacity would be limited. Machine tools in arsenals would be eliminated and tool capacity cut

PROGRAM for the industrial disarmament for Japan has been formulated by the National Engineers Committee, representing the engineering and technical societies, and has been presented to the departments of State, War and Navy.

The plan would: 1—Prohibit the synthetic fixation of nitrogen; 2—prohibit the production of synthetic liquid fuels; 3—prohibit the production of aluminum and magnesium; 4—prohibit the production of sulphuric acid and calcium carbide; 5—prohibit the use of nuclear energy; 6—limit the capacities and production of steel and steel products plants; and, 7—limit the capacities and production of copper.

The engineers committee has been engaged since November, 1945, in evaluating the critical war potential elements of Japanese industry to be controlled or eliminated so as to permit industries without war potential to function safely in a free enterprise economy. Application of the plan would effect a reduction of about 5 per cent in peacetime employment in Japan, but it is felt that country's peacetime agriculture and consumer goods industries should absorb this small percentage without difficulty.

Recommendations for Metals

Specific recommendations for the metals and minerals industries are:

1—Iron and Steel: Production to be cut from 9,000,000 metric tons annually to 1,600,000 metric tons. This would be in harmony with the average peacetime production (for the years 1926-1930) of 1,627,000 metric tons.

2—Aluminum: All production facilities to be removed or eliminated; 4000 tons to be imported annually for essential domestic needs. In 1943 Japan produced 312,000,000 pounds of aluminum.

3—Magnesium: All production facilities to be removed or eliminated. In 1944 Japan produced 10,600,000 pounds of magnesium.

4—Copper: Smelting and refining facilities to be limited to production of 85,000 metric tons. During the war Japan produced annually 150,000 metric tons of copper.

5—Lead: To be limited to an annual production of 20,000 metric tons. During the war years Japan produced annually about 78,000 metric tons.

6—Tin: Annual production of tin to be limited to 750 tons. However, she may import 35,000 tons annually.

7—Zinc: Refining capacities to be reduced from 178,600 metric tons annually to 40,000 tons.

The committee further recommended that machine tools in arsenals and aircraft plants be entirely eliminated and capacity in the entire machine tool industry be reduced by about 50 per cent. It recommended pegging Japanese sulphuric acid production at 3,000,000 metric tons and calcium carbide at 360,000 metric tons annually. It further recommended preventing Japanese individuals or business groups from getting control or a financial interest in any nitrogen fixation plant abroad.

Coal production would be commensurate with the growth of Japanese industry and with requirements for exchange for imports. Oil storage capacity would be reduced from 55,000,000 to 6,000,000 to 7,000,000 barrels and synthetic oil capacity in Japan would be completely destroyed.

As to scientific research to be permitted in Japan the committee urged dismantling of laboratories which served the war purposes and prohibition of any construction for scientific research which might be converted to military purposes. Special emphasis was placed on elimination and prohibition of all activities relating to research and development of materials utilized in the construction of atomic bombs.

Membership of the National Engineers Committee is: Chairman, Carlton S. Proctor, Dr. H. Foster Bain, Charles W. E. Clarke, Sidney D. Kirkpatrick, Dr. R. E. Zimmerman, Dr. Harry S. Rogers. Task committee members are Dr. T. T. Read, W. B. Heroy, A. C. Fieldner, James Rabbit, C. O. Brown, T. R. Harney, J. H. Critchett, H. R. Lee, W. K. Fowler, K. M. Irwin, R. D. McManigal, W. E. Mitchell.

Research of Commerce Department Under Study

Dr. Walter Rautenstrauch, professor emeritus, Industrial Engineering Department, Columbia University, will serve for about a month as a consultant to the Department of Commerce at the invitation of Secretary Wallace. He is to survey the various types of research and development normally conducted at the National Bureau of Standards "to

ATOMIC PLANNERS: Bernard M. Baruch, left, ponders the atomic bomb question with Sen. Brien McMahon (Dem., Conn.), chairman of the special Committee on Atomic Energy. Mr. Baruch took his seat as United States member of the UN Atomic Energy Commission last Friday. NEA photo

determine which of them provide the most promising basis for stimulating new business, increasing employment, and raising the standard of living." He also is to make recommendations on the best means of transmitting the results of government research and other scientific information to small and medium-sized business firms. He also is to recommend new types of scientific and technological development work which could be undertaken by the Commerce Department.

Monopolies' Effect on Small Business To Be Investigated

A new subcommittee to investigate the effect of monopolies on the competitive position of small business has been formed by the House Committee on Small Business. Chairman is Rep. Estes Kefauver (Dem., Tenn.) who will use the subcommittee to whip up support for H. R. 5535, introduced by Mr. Kefauver to close loopholes in the Clayton Act. This bill now is before the House Judiciary Committee.

Working largely with government agencies, particularly the Federal Trade Commission, Department of Justice and Department of Commerce, the subcommittee plans to explore the concentration of economic power in the hands of very large firms, which has "increased alarmingly" during the war. Goal is to determine means of making it possible for "small firms to compete on even terms with industry groups which now exercise undue control over lines which could and should be competitive."

In particular, the subcommittee will investigate charges that monopolistic groups have succeeded in placing men partial to their interests in certain key federal agency positions "where their recommendations and directives operate to the definite disadvantage of small firms." It also will seek to ascertain whether certain so-called "small business organizations" are in effect "fronts" for larger and monopolistic interests, and are thus traveling under "false colors."

Other members of the subcommittee are Reps. J. W. Robinson (Dem., Utah), Henry M. Jackson (Dem., Wash.), Leonard W. Hall (Rep., N. Y.) and Walter C. Ploeser (Rep., Mo.).

Federal Agency Seeks Labor Contracts for Use as Guides

To increase its effectiveness in replying to hundreds of employers and labor union officers who write to the Labor Department for information on prevailing practice in handling moot points in existing labor-management contracts, the Industrial Relations Branch, Bureau of Labor Statistics, desires to obtain copies of all contracts now existing.

Acting on a suggestion by Dr. Boris Stern, chief of the Industrial Relations Branch, the Labor-Management Advisory Committee of the U. S. Conciliation Service has endorsed the request. Dr. Stern says that his office now is receiving copies of collective bargaining contracts at the rate of 1200 to 1500 a month but that this is merely "a drop in the bucket." For the work to be really effective, says Dr. Stern, copies of all contracts must be received and analyzed.

In the meantime, to attempt to satisfy the rapidly increasing number of demands for information, Dr. Stern and his staff have started a revision and expansion of the Industrial Relations Branch book which has attempted to describe provisions of labor contracts in the United States. First section of the revised book will be on "union security," and will show to what extent and in what ways union security is provided for in labor contracts. This is to be ready about the end of June. Another section covering employment and seniority rights of veterans under union contracts should be ready in July. The completed revised book, Dr. Stern expects, should be ready early next year.

Record Sales of Surplus Consumer Goods Reported

Disposals of surplus consumer goods reached a new monthly high during May of $200,149,000 in reported cost, an increase of about 15 per cent over disposals of this type of goods in the previous month and an increase of about 400 per cent since the first of this year.

Senate Committee Criticizes U.S. Policy In Aircraft Research and Development

THE United States has not yet developed a clear and farsighted national policy in aircraft research and development.

While the aircraft industry has demonstrated ingenuity in converting to peacetime aircraft production and in switching to other civilian products, it is a fact that the airplane industry has been deflated to the approximate size it was in December, 1940. It would take two years to rebuild the industry to its productive capacity of September, 1945.

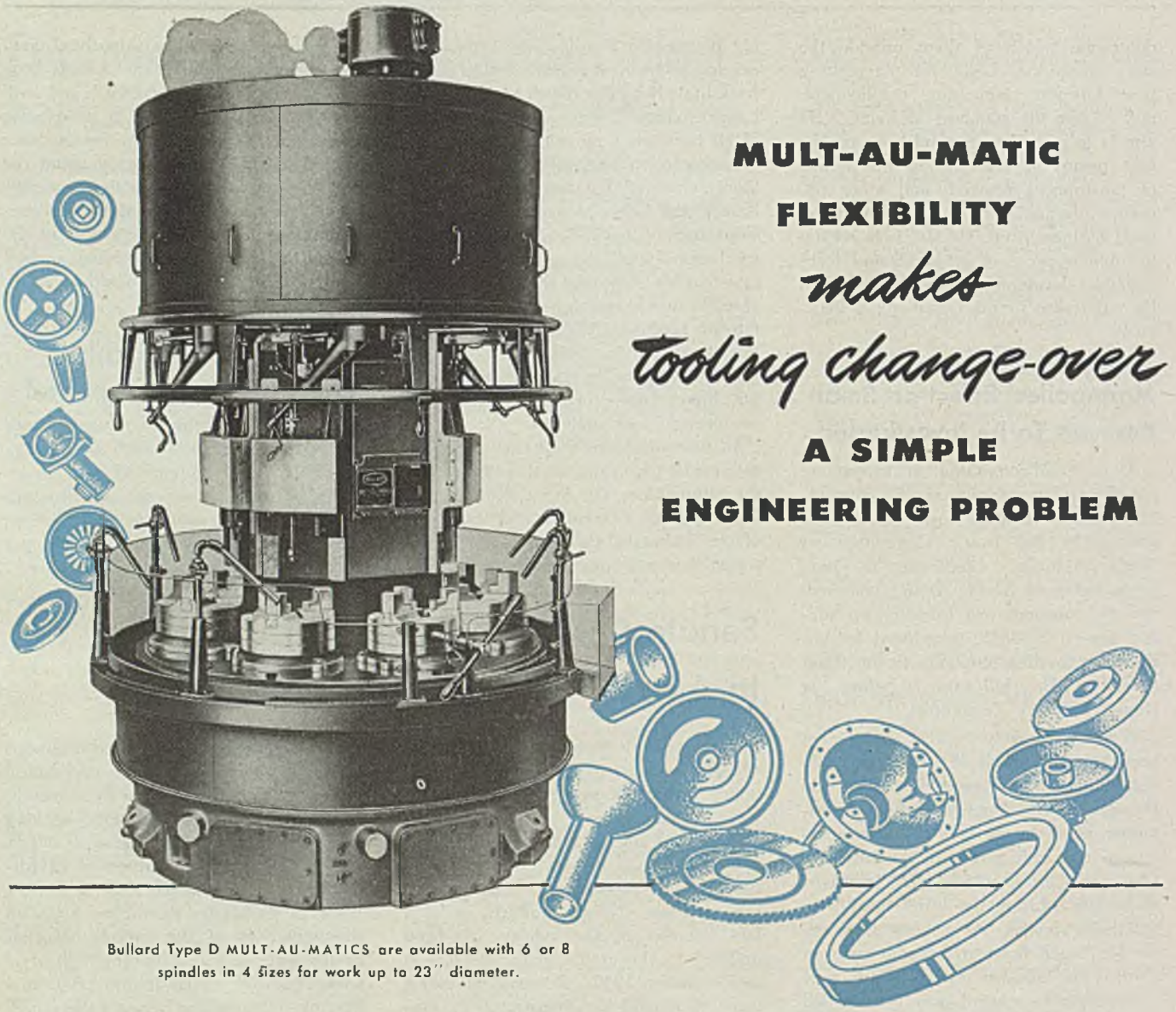
We have not even set a policy for the level of production of military-type aircraft and the aviation production capacity to be maintained in stand-by condition—a policy that should have been established prior to the drastic cuts and termination of contracts on V-J Day.

These are some of the conclusions of the Senate Special (Mead—formerly Truman) Committee Investigating the National Defense. It finds, in general, many instances of "too little planning, too late" in our national policy in regard to the aircraft industry.

The committee finds that the National Advisory Committee for Aeronautics has made many valuable contributions to aviation during the past 30 years but has failed to exercise leadership over the past decade. NACA is found guilty, along with the armed forces, of being slow in initiating and conducting research and development in such important phases of aviation as jet propulsion and guided missiles. The National Advisory Committee for Aeronautics should be modified and expanded in the light of our wartime experience, the investigating committee recommends. Represented on NACA's policy-making body, the Senate committee says, should be all of the groups interested in furthering aviation science and "a greater voice in its affairs should be given to representatives of the various branches of the aircraft manufacturing industry." Clear lines of responsibility, co-ordination and relationships between the armed services and the NACA and other governmental agencies and private industry concerned with air development should be established, the Senate committee recommends.

Our present facilities for aeronautical research and development are inadequate, the Mead committee report goes on. This is a matter calling for remedial action by the government. In particular, the committee says, military procurement during peacetime should allow for the purchase of a sufficient quantity of models to conduct experimental and service tests, and to afford manufacturers an opportunity to work out problems of production engineering, planning and tool design.

"Actual and projected improvements in aircraft and missiles threaten to dissipate our historic natural defenses," says the committee. "We must, as a matter of vital national defense, devote sufficient attention and effort to scientific research and development in aviation and adequate aircraft productive capacity."



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BULLARD

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

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

Ford swings back into production after 6-week shutdown. Assemblies may reach 20,000 weekly soon. General Motors and Chrysler plan sharp increases in schedules in July. Upholstery spring wire supply still critically short

DETROIT

FINAL assembly lines at the Ford Rouge and branch plants swing back into production this week after a shutdown of six weeks, longest interruption since the start of postwar operations last July 3. A week earlier, about 60,000 were recalled to manufacturing departments at the Rouge and backlogs of parts and subassemblies are gradually being built up to a balance which will permit moving assemblies in the next few weeks to new high ground—perhaps in the vicinity of 20,000 per week. At the present time, the other two of the Big Three, General Motors and Chrysler, are averaging about 19,000 and 14,000, respectively, but both are planning sharp increases in schedules after July 1. Their realization is dependent almost entirely upon the upholstery spring wire situation which sources say should be greatly improved within 30 days. Thus a nip and tuck race for the high weekly total is in prospect among the three principal producers, and Ford, with a six weeks loss to recoup, is going to be exerting every ounce of pressure to outdistance GM and Chrysler. Chances are good that for a while the effort will be successful.

A recent issue of the *Ford News*, a new publication for employees, took considerable pains to explain in detail the entire parts shortage picture, illustrating graphically just what parts Ford buys on the outside and listing all the major suppliers whose plants were tied up by strikes. There was no effort made to justify or denounce these strikes; the information was a plain recitation of the facts as they stood.

Value of parts, both rough and finished, purchased on the outside by Ford was given as $465 and they include all body trim materials, moldings, side body and door assemblies, rear windows, ventilator windows, seat frames and springs, instruments, ornamental die castings, headlights, radiator grille moldings, bumpers, scores of body stampings, all body hardware, axle forgings, muffler assemblies, hydraulic tubing, torque tubes, timing gears, gear shifting mechanism parts, horn rings, steering wheels, wiring assemblies, ignition coils, starter solenoid switches, batteries, oil filler caps, air cleaners, fuel pumps, 50 per cent of all carburetors, radiator hose and clamps, spark plugs, fans, fan belts, rough forged connecting rods, rough piston pin tubing, rough cast pistons, piston rings, nuts, bolts, etc.

Of the 42 supplier interruptions counted by Ford buyers early in May, some 17 had been adjusted as of last week, and those remaining did not involve vital parts. Engineers are making continuous studies of the feasibility of bringing into the Rouge plant the manufacture of parts bought on the outside. This is often a tedious proposition, and involves extensive tooling, new equipment and other shifting of facilities. Little progress has been made as yet, but it appears certain Ford is moving in the direction of buying fewer parts on the outside and becoming more self-contained, despite the fact the company probably has been more highly integrated than any other manufacturer.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

	1946	1941
January	121,861	524,073
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	242,322°	545,321
Week ended:		
June 1	31,895°	106,395
June 8	43,175°	133,645
June 15	46,393°	134,682
June 22	48,000°	133,565

°Preliminary

Considerable talk has been heard of difficulties between Ford and major steel companies in re-establishing prewar lines of supply. One version is that in the early postwar period Ford buyers combed the ranks of smaller steel producers to establish new connections, discarding former ties with larger producers. When it was found impossible to obtain sufficient material from the new sources, buyers went back to the larger mills whose books by that time were jammed, resulting in a minimum of interest in catering to Ford's needs.

Steel from the Rouge mills has been dispatched to a number of suppliers unable to obtain material from their accustomed sources. One example is in the case of springs. Another is terne plate for gas tanks. According to Ford, integrated steel mills would no longer sell sheet bars to the company's source for terne plate, so a tonnage was sent from the Rouge plant. Other recent expediencies included the purchase of a million sandbags from India to get needed burlap for spring covers and coil wraps. The bags all had to be opened out and sewed together before they could be used. A shortage of galvanized strip steel compelled the redesign of the entire system of scuff plates to use synthetics and aluminum.

Parts Supply Situation Improving

The gradual cleaning up of scores of stoppages among materials and parts suppliers should prove of early benefit to the entire industry and should bring a ray of hope to drivers of new cars which are short certain parts like bumpers, clocks and whatnot. End of the tieup in scattered plants of Houdaille-Hershey Corp. is particularly encouraging as far as bumpers are concerned, and the return to production of one division forging crankshafts may facilitate bringing the Lincoln division of Ford back into functioning.

Hayes Mfg. Corp. in Grand Rapids was scheduled to start production of bodies and body parts last week, schedules calling for 500 bodies daily for Willys-Overland and 500 sets of door stampings a day for Kaiser-Frazer. The latter company, incidentally, has been unable to effect anything more than pilot production of a handful of Frazer models, because of parts shortages, inex-

perienced workers and the usual bugs encountered in getting a new assembly line into operation. Representatives of K-F are scouting around the Middle West to line up a suitable source for gray iron castings, come the time when output at Willow Run will have mounted to 1000-1500 per day. They are not having much success, for the castings picture is about as dark as it has ever been.

The gloomy foundry outlook was emphasized in a recent protest registered by Packard against the government's diversion of merchant pig iron from automotive accounts to the soil pipe manufacturing industry, in the interests of the housing program. Packard's gray iron foundry has been operating at 25 per cent of capacity and at that level required 200 tons of pig iron per week. Suddenly these shipments were cut to 50 tons per week, or one car, and the foundry was really up against it, since stockpiles of pig had been exhausted. Pig iron sources, incidentally, have been virtually in hiding from insistent buyers the past few weeks, and when you can finally manage to flush one out he will offer the guess that supplies may be considerably easier within the next three to four weeks.

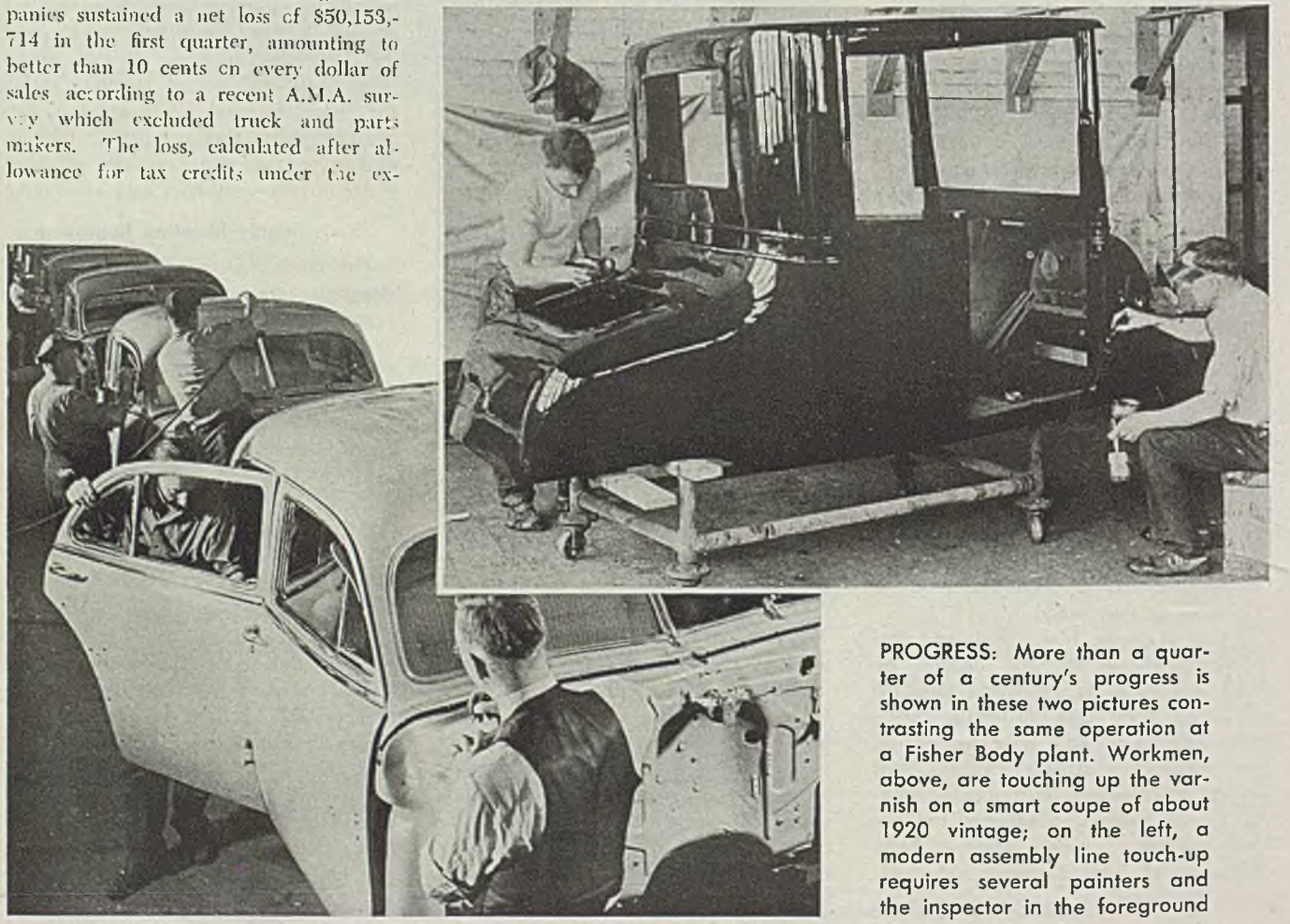
Passenger car manufacturing companies sustained a net loss of $50,153,714 in the first quarter, amounting to better than 10 cents on every dollar of sales according to a recent A.M.A. survey which excluded truck and parts makers. The loss, calculated after allowance for tax credits under the excess profits tax carryback provisions, is greater than that suffered in any similar period in the history of the industry, although it must be remembered all divisions of General Motors were strike-bound during the interval. The depression year of 1932 showed the second greatest deficit, with a loss of 6.7 cents on every sales dollar.

In contrast with the poor showing of this year, motor vehicle companies averaged returns, after taxes, of 3.97 per cent in 1945, 2.6 per cent in 1944, 3.1 per cent in 1943, 3.56 per cent in 1942, 6.45 per cent in 1941, 7.07 per cent in 1940, and 8.25 per cent in 1939. An indication of the cost of operating a large automotive company while tied up by strikes or parts shortages was given in a recent comment by Henry Ford II, who estimated it cost Ford $500,000 a day to operate, even though production was suspended.

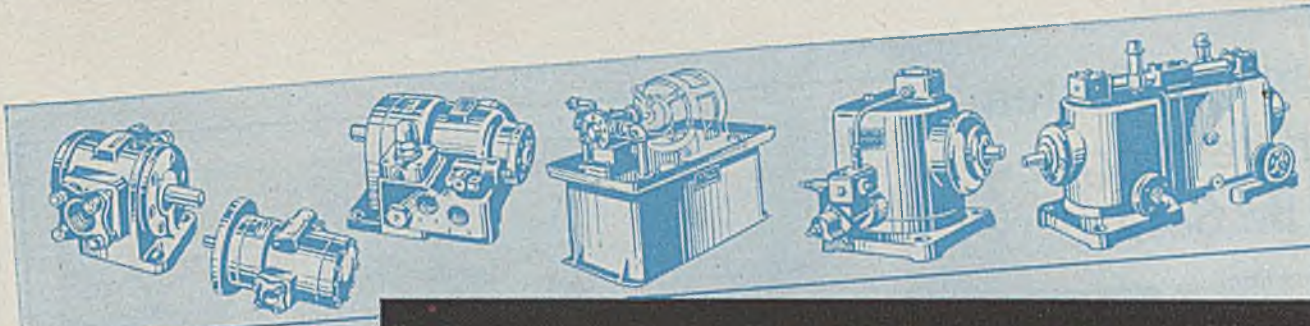
In a letter accompanying the 79th cash dividend paid by Chrysler Corp. in 21 years, K. T. Keller, president, said that shipments of cars and trucks to dealers has been at a rate of less than 50 per cent of capacity. Total passenger cars delivered since the start of production in December, through June 13, was 198,000, and trucks 103,000.

New truck sales registrations for 43 states during the first quarter totaled 74,811, compared with 142,260 for the same states in the 1941 three-month period, according to figures compiled by R. L. Polk & Co.

Heavy-duty tires for trucks and tractors are now in full production in an addition to the Detroit plant of United States Rubber Co., although there was a brief interruption of output recently because of labor disaffections. The new four-story structure was started late in 1944 as a war project. Entirely conveyorized, it has electrical switchgear rooms, tire mold storage space and eight latex storage tanks in the basement; mill and calender room on the ground floor, featuring a four-roll calender train for applying rubber stock to the tire fabric; three Banbury mixers on a mezzanine, charged from the second floor; tire building machines on the third floor, and individual unit vulcanizers on the fourth floor which has 24-ft ceiling height. To reduce dust and smoke in the area outside the plant as well as throughout the interior, precipitators have been added as part of modernization of the power plant, which also includes two new high-pressure steam boilers, each with rated output of 110,000 lb per hour.



PROGRESS: More than a quarter of a century's progress is shown in these two pictures contrasting the same operation at a Fisher Body plant. Workmen, above, are touching up the varnish on a smart coupe of about 1920 vintage; on the left, a modern assembly line touch-up requires several painters and the inspector in the foreground



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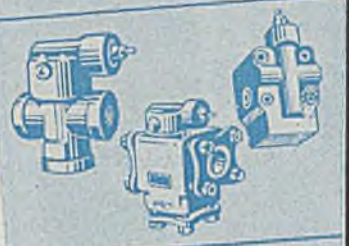

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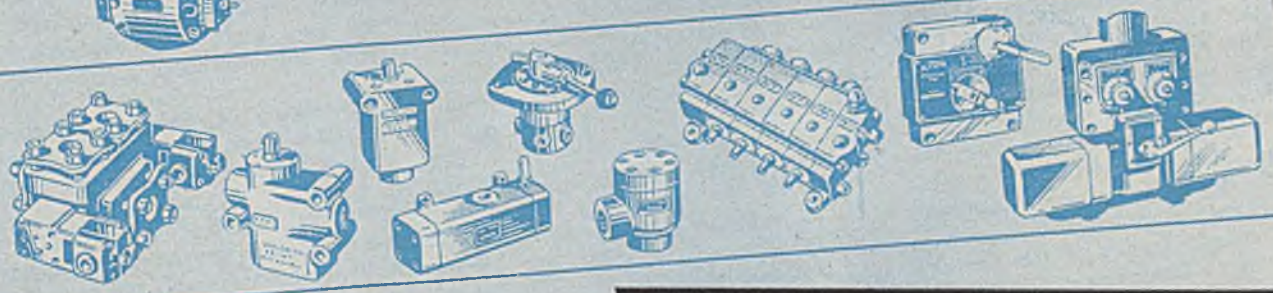

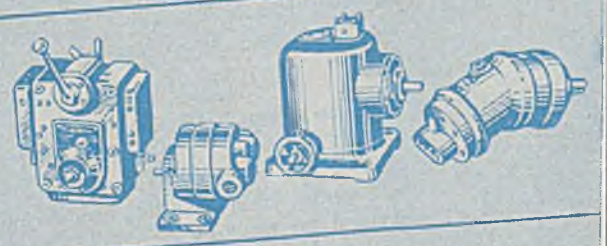

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Number System For Bearings To Be Set Up

Committee to prepare recommendations for numbering of antifriction bearings will be appointed by A.S.A.

ESTABLISHMENT by the American Standards Association of a uniform numbering system for antifriction bearings to replace the multitude of systems currently in effect was unanimously agreed upon by representatives of diversified industries, engineering groups, governmental agencies and the Army and Navy meeting in New York recently.

Action was taken in response to a suggestion by Secretary of the Navy James Forrestal last March.

Association spokesmen said that the Council of Standards of ASA will delegate a committee to draw up recommendations for a standard numbering system, adding that representatives from groups present at the conference will probably be designated to serve. The association stated that the American Society of Mechanical Engineers, which did not have a delegate at the meeting, will probably be represented on the committee.

Groups which authorized establishment of a uniform numbering system by the ASA are the Aeronautical Board, the American Transit Association, the Anti-Friction Bearing Manufacturers Association, the Association of American Railroads, the Automobile Manufacturers Association, the National Electrical Manufacturers Association, the National Elevator Manufacturing Industry Inc., the National Machine Tool Builders Association, the Power Transmission Association, the Society of Automotive Engineers, the Standards Branch of the Treasury Department's Procurement Division and the Army and Navy Departments.

Instrument Society To Hold First Exhibition Sept. 16-20

"Instrumentation for Tomorrow" will be the theme of the first National Instrument Conference and Exhibit which will be held Sept. 16-20 in the William Penn Hotel, Pittsburgh.

During the show, which is sponsored by the Instrument Society of America, joint meetings with the Instruments & Regulators. Division, American Society of Mechanical Engineers, will be held.

INSTRUMENT COMMITTEE: Members of the local committee in charge of the "Instrumentation for Tomorrow" conference and exhibit sponsored by the Instrument Society of America are: Standing: A. Shafer, chairman, finance committee; S. Prince, chairman, publicity committee; L. Susany, secretary, Pittsburgh section, ISA; M. Jacobs, chairman, reception committee. Seated: M. F. Behar, liaison representative of instruments and regulators committee, American Society of Mechanical Engineers; Clarke Fry, treasurer, ISA; Paul Exline, chairman, exhibit committee; and R. Rimbach, national secretary, ISA.

BRIEFS . . .

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

Ingalls Iron Works Co., Birmingham, has begun construction of a three-story building to house the executive and administrative offices of the company, Ingalls Shipbuilding Corp., and Birmingham Tank Co.

—o—

Monroe Auto Equipment Co., Monroe, Mich., has developed a testing procedure for hydraulic shock absorbers which crams the 12 million jolts given an automobile in its lifetime into a month-long test.

—o—

Kelco Mfg. Co., Baltimore, has acquired land opposite its present plant and will erect a 25,000 square foot building, enabling it to double its output of dust collecting, conveying, and ventilating systems and other metal and stainless steel products.

—o—

Barnes & Reinecke, Chicago, designers and engineers, have incorporated and are planning an expansion of services.

—o—

Franklin Metal Products, Baltimore, has plans to erect a larger building to house its welding and machine work and will soon begin production of a wallpaper trimming machine.

—o—

Association of Steel Re-Distributors Inc., New York, has changed its name to Association of Steel Distributors Inc.

—o—

National Roll & Foundry Co., Avonmore, Pa., has discontinued operations in its steel foundry and will concentrate on production of iron rolls. The foundry and equipment are being offered for sale.

—o—

Hagan Corp., Pittsburgh, has acquired plant No. 1 of Willburt Co., Orville, O., in which Hagan combustion control equipment has been manufactured for the past 27 years. Hagan Corp. will take possession on July 1 and will begin an expansion program at the plant.

—o—

Size Control Co., Chicago, a division of American Machine & Gage Co., has moved to 2500 W. Washington Blvd., Chicago, and Walsh Press & Die Division of American Machine has moved

into Size Control's old plant at 4718 W. Kinzie St., Chicago.

—o—

Andrews Lead Construction Co., Long Island City, N. Y., subsidiary of American Smelting & Refining Co., New York, has moved its lead burning equipment in Baltimore to the rear of the plant of American Electric Welding Co., Baltimore.

—o—

Conlon Corp., Chicago, has purchased the thermostat division of Soreng Mfg. Corp., Chicago, and will manufacture thermostats for its line of household ironers and for other uses.

—o—

Animal Trap Co. of America, Lititz, Pa., has purchased the Molded Products Division of Wm. L. Gilbert Clock Corp., Winsted, Conn., and will produce molded cellulose and plastic products at its Lititz factory.

—o—

Champion Transportation Sales Inc., 9 South Clinton St., Chicago 6, has been organized to handle sales of railway supplies on a national basis.

—o—

Hammond Iron Works, Warren, Pa., has appointed D. D. Foster Co., Pittsburgh, as its Pittsburgh district representative for the full line of Hammond services.

—o—

Fox Engineering Co., Jackson, Mich., multiple-spindle drilling and tapping machines and hydraulic press maker, has appointed Bert Carpenter Co., Birmingham, Mich., as representative for eastern Michigan, northern Ohio and northeastern Indiana.

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Pittsburgh Steel Foundry Corp., Glassport, Pa., has appointed Ward Weller Co., Cambridge Mass., as New England representative.

—o—

Lester-Phoenix Inc., Cleveland, maker of die casting and plastic molding machines, has completed a plant addition adjacent to its existing plant at 2711 Church Ave.

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Dearborn Stove Co., Chicago, has tentative plans to double its facilities in Dallas, Tex. The company is adding 5000 square feet to its plant and plans to add about 60,000 square feet more.

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American Car & Foundry Co., New York, has extended its welding activities by establishing a Welded Products Division.

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Ekco Products Co., Chicago, has organized a wholly owned subsidiary, Ekco Products Co. (Canada) Ltd. Robert Mitchell Co. Ltd. will manufacture the Ekco items for the new Canadian company.

—o—

Weddell Tools Inc., Rochester, N. Y., has consolidated its sales and manufacturing activities in a three-story building at 37 Centennial St., Rochester 11.

—o—

Lucas Machine Tool Co., Cleveland, has plans to construct a plant in Cleveland which will house its factory operations and offices.

—o—

Chicago Flexible Shaft Co., Chicago, has changed its name to Sunbeam Corp., and its Stewart Industrial Furnace Division has been renamed Sunbeam Industrial Furnace Division.

—o—

Levinson Steel Sales Co., Pittsburgh, has been appointed exclusive distributor for Thorn steel windows and doors.

—o—

American Brakeblock Division, American Brake Shoe Co., New York, has purchased 40 acres of land in Winchester, Va., and plans to erect a factory, cost of which will be $500,000 with equipment.

Glenn Martin Co. To Build Resin Plant Near Cleveland

Plans for construction of a vinyl type synthetic resin manufacturing plant in Lake county, O., thirty miles east of Cleveland, have been disclosed by Glenn L. Martin Co., Baltimore, through its president, Glenn L. Martin.

The $1.5 million plant has been approved by the Civilian Production Administration and will be built by Chemical Plants Division, Blaw-Knox Construction Co., Pittsburgh.

Kropp Forge Leases Plant To Make Large Forgings

Kropp Forge Co., Chicago, has leased from War Assets Administration for a period of five years the aircraft forging plant it operated for the government during the war. Minimum rental is $50,000 a year, with additional return payable on a sales percentage basis. The lease agreement also carries an option to purchase at any time in the first four years of the proposed lease. The Kropp company plans to convert the plant to general commercial forging at a cost of more than $500,000. The facilities will be used for production of automotive, tractor and other larger forgings required on a large volume basis.

New Warehouse Being Built for National Tube

Quarter-mile long structure being erected at company's Lorain, O., mills to speed delivery of pipe

CONSTRUCTION of a quarter-mile long warehouse to help speed delivery of small-size pipe essential to housing and other important work has been started at the Lorain, O., pipe mills of the National Tube Co., subsidiary, United States Steel Corp.

The new building, latest in the company's postwar improvement program, will permit efficient and systematic stocking of standard and line pipe and will insure prompt shipments in widely varying classes and sizes from these pipe mills, largest in the world.

Contract for the warehouse has been awarded to American Bridge Co., another U. S. Steel subsidiary.

The warehouse will house pipe racks, cranes, and other new equipment necessary to stock and ship the many different kinds of steel pipe in carload lots.

Previously announced projects in the Lorain program are installation of three additional by-product coke oven batteries, which will increase the plant's coke-making capacity to 1,650,000 tons annually, and concentration of the company's buttweld pipe manufacture and galvanizing facilities at Lorain.

Metal Fastener Company Acquires Prestole Division

Prestole Corp., Toledo, has been organized to take over the assets and business of Prestole Division, Detroit Harvester Co., and will begin operations as an independent unit about July 1 at an undisclosed location in Toledo, Harold W. Kost, president of the new corporation and formerly manager, Prestole Division, Detroit Harvester Co., has announced.

The company will make and sell metal fasteners used by the automotive, radio, electronics and other industries. It is engaged in this manufacture at present in the facilities of the Harvester company.

Officers of the company, in addition to Mr. Kost, include: John C. Wright, Grosse Isle, Mich., vice president and treasurer; and William H. Black Jr., secretary. The officers, with John A. Hill, constitute the board.

Stabilized Employment Program Advocated by NAM Chairman

Year-round pay for maintenance of living standards, despite temporary shutdowns or cutbacks, should be worked out by businessmen. Sees continuous jobs as industry's most effective answer to critics

LOS ANGELES

STABILIZED employment that would provide industrial workers year-round sustenance pay for maintenance of living standards during temporary shutdowns and cutbacks was advocated by Ira Mosher, chairman of the board of the National Association of Manufacturers, before a Los Angeles audience last week.

Mr. Mosher's indorsement came during a speech before 500 Californians. He said he expected the declaration to provoke debates far and wide.

"I maintain," he said, "that we should provide year-around employment for our workers. If there must be temporary shutdowns and cutbacks in industry, then industry should figure out some way to carry its workers through such periods.

"Most workers want more than any synthetic security the government can offer them," he asserted. "And while businessmen are the only ones who can give it to them, the government and the unions are doing everything in their power to see that credit goes to them.

"Perhaps," he averred, "continuous employment is the most deadly weapon we can ever forge against the subversive forces who would tear down our productive economy and destroy our form of government. We must learn to treat persons in our employ as human beings. That's the way for business to keep out of the doghouse."

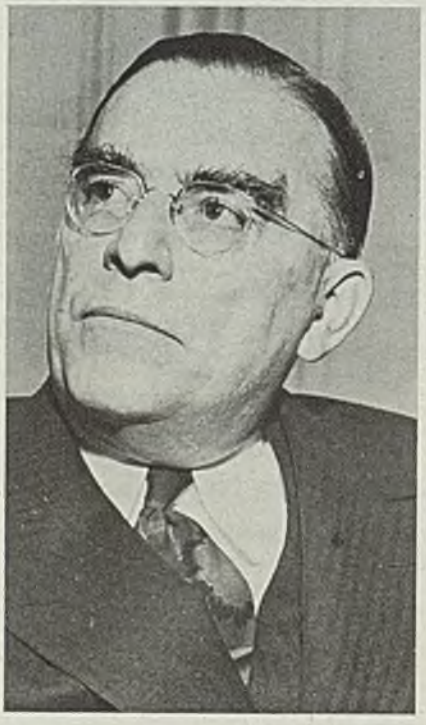
Earlier, during his visit in Los Angeles, Mr. Mosher told reporters: "Most businessmen have a story to tell that they can be proud of, and it's time they told it. They've never effectively tried to answer their critics so that the public will understand.

"Despite President Truman's veto of the Case bill, which I believe was political expediency on his part, and other gloomy happenings, I have the utmost faith in this nation. We've muddled through tough situations before and we'll do it again."

In advocating removal of all price controls, Mr. Mosher said:

"Rent ceilings are included. These are not being maintained, in many cases, anyway. Putting a lid on a can over a fire doesn't stop the can from exploding. After the last war more than 400,000 homes were built in the New York city area within nine months after controls were lifted.

"Sure—rentals will go up temporarily. They're going up legally or otherwise, anyway. But the moment they do, building houses and apartments will be such



IRA MOSHER

an attractive proposition that, as in every other business, contractors will build so furiously that normalcy will soon prevail.

"It is just a case of taking our medicine in one big gulp than in small sips. One thing is certain: We've got to take our medicine now or later."

Mr. Mosher declared that government controls, regardless of the motives back of them, have slowed production.

Bureau of Reclamation Lets Large Equipment Orders

SEATTLE

Bureau of Reclamation has awarded six large pumps to irrigate 400,000 acres in the Columbia basin area at $1,062,975 jointly to Pelton Water Wheel Co., San Francisco, and Byron Jackson Pump Co., Los Angeles. The Bureau also has let contract to Morgan Engineering Co., Alliance, O., at $264,234 for a 250-ton traveling crane. A contract also has been let to Worthington Pump & Machinery Corp., Harrison, N. J., at $19,800 for pumps at Pasco, Wash., plant of the Columbia basin project. Shoshone Co., Twin Falls, Idaho, is low at $104,145 for pipe lines, earthwork, etc., for the Roza project in Washington.

United States Engineer at Portland, Oreg., has let a joint contract to Leonard & Slate and E. C. Hall, Portland, at $1,248,249 for preliminary work on the proposed $6 million Dorena dam in Oregon.

GE Plans To Boost Production in West

EXPANSION of eastern manufacturers into West Coast production has been a well-publicized postwar fact. However, the extent of this planning was emphasized here recently by disclosure of General Electric Co.'s plans to increase its output of electrical equipment and products in California. These plans were outlined by Ralph J. Cordiner, GE vice president, at a San Francisco meeting of the Pacific Electrical Association.

GE's plans for the West, he said, envision approximately 5000 employees in 11 factories and numerous service facilities in California, Oregon and Washington.

Eventually the company plans to make the San Francisco Bay area the center of its western operations. In this area it will triple the factory employment and double the number of all employees, including office forces, salesmen, etc. The total number of workers is expected to reach 2100 at its San Francisco Bay plants.

GE's plant at Ontario, in Southern California, has been growing steadily and now produces all General Electric flatirons. It has three plants at Oakland, Calif. Two of these are in operation now, and the third will be producing soon. One Oakland plant now produces 130,000 light globes daily, and this output is to be raised to 206,000 a day. The Oakland apparatus plant now is producing motors and transformers, and the third factory there is expected to be converted to production of electrical cable soon. This latter plant was operated for production of Navy cable during the war. However, at the close of the war it was padlocked and output will not be resumed until

new equipment and machinery are installed.

In addition to these existing factories, the company soon will start construction of a large factory on a 57-acre site at San Jose, 50 miles south of San Francisco. Some of the Oakland operations will be transferred to the new San Jose plant, but it will supplement rather than replace the Oakland operations.

GE expects the western market to grow steadily. "The nine western states comprise one of the nation's largest markets for household electrical appliances," he said.

Mr. Cordiner predicted that in the first year of full production, consumers in the West will buy 5,653,550 household appliances costing $218 million valued at 1941 retail price levels.

Los Angeles Warehouse Stocks Virtually Depleted

LOS ANGELES

Los Angeles chapter of the American Steel Warehouse Association announced last week that area warehouse stocks of steel are virtually depleted.

"Since the settlement of the national steel strike, we have been selling more than was being delivered," was the substance of the announcement. "There are shortages on every item with the one exception of heavy bars. Sheets are nonexistent; so, virtually, are pipe and structurals and light bars."

Aircraft Exposition To Be Held in Los Angeles

Los Angeles is the site of one of two national aircraft shows to be staged this fall by the Aircraft Industries Association of America Inc. The exhibition here will follow a similar one slated in Cleveland Oct. 4-12.

Private and commercial plane fabricators, military air services and engine and accessory manufacturers will be exhibitors at the show, first of its kind on the West Coast.

Announcement of the plan was made by Clyde M. Vandeburg, executive director of the show.

Sheet Mill To Be Constructed by Seidelhuber Company in Seattle

New facilities intended to alleviate shortage of rolled steel on West Coast. Plant will roll black, galvanized, cold finished and corrugated sheets and tin plate. Capacity to start will be 50,000 tons annually; maximum of 300,000 tons planned

SEATTLE

ESTABLISHMENT of a steel sheet rolling mill in the center of Seattle's industrial district, which will mean an investment of $3,500,000, a yearly payroll of $2,400,000, and production of $5 million to $7 million annually, has been announced by Frank V. Seidelhuber Jr., vice-president, Seidelhuber Iron & Bronze Works.

The Seidelhuber steel rolling mill will be a division of Seidelhuber Iron & Bronze Works, manufacturer and structural steel fabricator. The Seidelhuber family will finance the project, which will employ 800 workers and produce a minimum of 50,000 tons of steel sheets and merchant bars annually, to start. Facilities to produce up to 300,000 tons maximum will be installed.

George Nickum, Engineering Associates Inc., Seattle, is preparing the designs for the three mill buildings and administration building. Consulting with the Seattle firm in the preparation of surveys and plans is Freyn Engineering Co., Chicago.

Engineering Associates expect to call general construction bids early in 1947. Freyn Engineering will handle designing, purchasing, acquisition and installation of all mill equipment.

Preliminary plans call for three buildings, with two 25-ton craneways in each structure, a separate administration building, warehousing, work yards and ship and rail loading facilities.

The mill will consist of three buildings 66 x 1200 ft each, of steel and reinforced concrete construction. It will have five conveyor-type oil-fired furnaces, and complete hot roll, cold roll, annealing, pickling and galvanizing equipment.

Officers of the new enterprise are Frank J. Seidelhuber, president; Frank V. Seidelhuber Jr., chairman; F. L. Cassidy, vice-president; Henry R. Seidelhuber, general manager; W. T. Williams, secretary-treasurer; and Fritz Hofstetter, operations manager. All are associated with Seidelhuber Iron & Bronze Works.

The plant will be served by Great Northern Railway on one side and the Milwaukee Road on the other; and frontage on Duwamish waterway furnishes the mill with transportation connections for potential export trade.

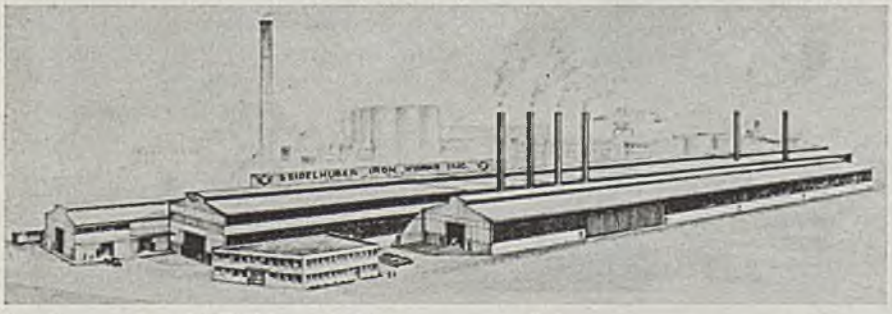
The plant will roll black, galvanized, cold-finished and corrugated steel sheets and tin plate, as well as produce its own sheet bars from billets made from ingots supplied by other Northwest plants.

The sheets will be used for regional manufacture of hot water heaters, refrigeration units, electric ranges, corrugated siding, furnaces, electric appliances, trucks, tanks and other items.

Twenty per cent of the output of the mill will be consumed by Seidelhuber Iron & Bronze Works, with the balance available to other Northwest manufacturers and the export trade.

An aggressive bid for exports markets is being planned. President Frank J. Seidelhuber is at present on a six-month tour studying South American markets. His younger son, Henry R. Seidelhuber, is conducting a similar survey in the Orient. Frank V. Seidelhuber Jr. has concerned himself with the domestic market, and has just returned from an extensive trip throughout the Middle West and California, inspecting existing steel rolling mills of similar type.

Inability to obtain sufficient sheet steel from eastern mills was the impetus for the building of a mill here.



Architect's drawing of projected Seidelhuber rolling mill at Seattle

Kaiser Opens New York Export Sales Office

Kaiser Export Sales, which represents industrial interests of Henry J. Kaiser, has opened a New York office which the company says is a move to round out its foreign sales service. The New York office will be under the direction of William F. Pelletier.

MEN of industry

J. F. Mac Enulty has been elected chairman of the board of directors, Pressed Steel Car Co. Inc., Pittsburgh, succeeding Lester N. Selig who resigned as chairman and a director of the company. Walter J. Curley also resigned as a director. Mr. Mac Enulty had been vice chairman of the board of the company and, previously, president.

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Robert H. Owens has been elected vice president in charge of engineering and manufacturing, Roots-Connersville Blower Corp., Connersville, Ind., one of the Dresser Industries. Mr. Owens joined the engineering staff of the company in 1925.

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Ernest L. Hartig, since 1933 vice president and treasurer, Joseph T. Ryerson & Son Inc., Chicago, has retired after 45 years with the firm. He will continue as a director. Merle A. Miller has been elected treasurer of the company. He has been with the Ryerson organization for 24 years, and was formerly assistant treasurer and manager of the credit department. Frank H. Ziebell has been elected to the new office of controller. He has been assistant secretary, and has been with the company 29 years. Thomas G. Miller has been elected assistant secretary, and George W. Geiger assistant controller.

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Edwin M. Allen has retired as chairman of the board, Mathieson Alkali Works Inc., New York. He will continue as a director of the company. Mr. Allen joined the Mathieson organization as president in 1919. He was elected chairman of the board of directors in 1934, and continued as president of the company too, until 1944.

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L. O. McLean has been appointed sales manager, General Excavator Co., Marion, O., succeeding Don B. Smith, who has resigned. He became associated with the company in 1920.

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Lloyd C. Smith has been promoted to vice president and general manager, Heller Bros. Co., Newcomerstown, O.

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Harry Costello, mechanical designer and engineer, has joined Advance Pressure Castings Inc., Brooklyn, N. Y. He will be in charge of the company's Estimating Division, and will head the planning board of the Selectively Processed Division.

—o—

R. L. Wahl, since 1935 superintendent of iron mines, Inland Steel Co., Chicago, has resigned after 31 years with the company. Though he has retired to inactive status, the company still expects to turn to Mr. Wahl for advice and counsel from time to time. R. D. Satterley has been appointed general superintendent of iron mines, and A. J. Cayia has been named manager of ore mines and quarries.

—o—

George T. Lundberg has been named assistant to H. S. Eberhard, vice president in charge of manufacturing, engineering, research and training, Caterpillar Tractor Co., Peoria, Ill. Mr. Lundberg, who has been with the company 23 years, had been supervisor of transmission design in the company's engineering department for several years. N. E. Risk will assume supervision of transmission design in addition to his other responsibilities with the company.

—o—

Dr. Rex H. Wilson, recently released from the Army, has been named medical director, B. F. Goodrich Co., Akron, O., succeeding Dr. Donald B. Lowe who died recently. G. A. Geer has been appointed manager, Seattle district of the company's Replacement Tire Sales Division. He succeeds Harry M. Baker, who has retired after 33 years of service with the organization. Mr. Baker had been Seattle district manager since 1931. Mr. Geer joined the company in 1924.

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Charles B. Bryant has been appointed chief engineer, Technical Board of the Wrought Steel Wheel Industry, Chicago, replacing C. T. Ripley, who has resigned.

—o—

E. Stewart Riggs, formerly with J. F. Corlett & Co., Cleveland, now discontinuing business, has opened his own office in that city. Mr. Riggs will represent Alan Wood Steel Co., Conshohocken, Pa.; Champion Rivet Co., Cleveland; Franklin Steel Works, Franklin, Pa.; and Phoenix Iron Co., Phoenixville, Pa. Mr. Riggs had been with J. F. Corlett & Co. for the last 25 years, handling sales for the steel companies he will continue to represent.

—o—

R. Nevin Watt has been appointed general manager of sales, Baldwin Locomotive Works, Eddystone, Pa. J. M. Sturges has been named district manager of the firm's northeastern district, with headquarters in New York. He will report to Mr. Watt.

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Dr. Edmund S. Rittner has joined the research staff of Philips Laboratories Inc., North American Philips Co. Inc., New York, as associate chemist. His work will be conducted in the photocell laboratory.

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Walter C. Weigle, representing Superior Steel Products Corp., Milwaukee, has in addition been appointed sales agent, Richard Brothers Division, Allied Products Corp., Detroit.

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Robert H. McCracken has been appointed manager of sales of the new Cleveland branch sales office, Lukens

ERNEST L. HARTIG

MERLE A. MILLER

Steel Co., Coatesville, Pa., and subsidiary, By-Products Steel Corp. Mr. McCracken was district manager of sales of the Lukens organization's Boston office. **J. F. Coburn** has joined the Cleveland office of the Lukens and By-Products companies. He had been a member of J. F. Corlett & Co., whose territory is now being handled by Lukens and By-Products. **W. B. Harris**, previously manager, Cincinnati office, J. F. Corlett & Co., has been named representative in that city for the Lukens and By-Products companies.

—o—

W. Bertram Weiss, recently released from the Army, has been elected president, Weiss Steel Co. Inc., Chicago, formerly a partnership. **Roy C. Anderson**, formerly with South Chicago works, Republic Steel Corp., Cleveland, has been named vice president. **Joseph F. Walsh** has been named secretary of the company, **J. I. Weiss**, treasurer and **Irving S. Toplon**, general counsel.

—o—

Marvin W. Maschke has been elected to the board of directors, Metal Specialty Co., Cincinnati. Mr. Maschke is chief engineer of the company, and was formerly production engineer, Ternstedt Mfg. Division, General Motors Corp.

—o—

Florence M. Sayle has been elected president, Cleveland Punch & Shear Works Co., Cleveland, and has assumed active management of the organization, succeeding her late husband, W. Chichester Sayle, who died last fall.

—o—

Recently released from military service, eight engineers have rejoined Bailey Meter Co., Cleveland, and after completing a refresher course at the company's Cleveland factory, have resumed their activities in instrumentation, combustion, and automatic control engineering. They have been assigned as follows: **J. A. Lucas** to his former position, Cincinnati office; **J. W. Herrington** to his former position, Atlanta office; **J. E. Zimmerman**, Detroit office; **A. L. Danielson**, Denver district; **S. T. Novak**, quality engineer, Cleveland factory; **H. R. Jamison**, proposition department, Cleveland; **H. C. Schink**, Boston office; and **Vincent Beno** to development work in the company's research department. Two engineers, recently released from the Canadian army, have returned to the company's Canadian subsidiary, Bailey Meter Co. Ltd. They are **W. L. Thompson**, manager, Toronto branch office, and **W. A. Nelson**, Canadian head office, Montreal.

—o—

Elwin H. Schnitzler, recently released from the Navy, has been appointed sales manager, Manufacturing Division, Wheeling Machine Products Co., Wheeling, W. Va.

—o—

George A. Rentschler, who was president, General Machinery Corp., Hamilton, O., has been elected to the new office of chairman of the board. **Walter Rentschler**, vice president and treasurer of the company, has been named president. **J. E. Peterson** and **A. C. Wais** have been appointed vice presidents.

—o—

John Douglas James has been appointed superintendent, Grove City, Pa., foundry, Cooper-Bessemer Corp., Mt. Vernon, O. Mr. James, former assistant foundry superintendent, Erie City Iron Works, Erie, Pa., succeeds **George Johnstone**, who recently resigned.

—o—

R. P. Hendren has been named director of sales, heading the new Coatings Division, R. M. Hollingshead Corp., Camden, N. J. Mr. Hendren had been general sales manager, Industrial Finishers Division, Pittsburgh Plate Glass Co., Pittsburgh. **Dr. William Holst** and **Russell Hersam** have been appointed to head the division of the Hollingshead Research Laboratories which now is engaged in development of new types of coatings and moisture proof packaging for industrial applications.

—o—

K. A. DeLonge has been elected vice chairman, Metropolitan chapter, American Foundrymen's Association, to serve during the year, 1946-47. Mr. DeLonge is a chemical and metallurgical engineer, Development & Research Division, International Nickel Co. Inc., New York.

—o—

Albert L. Fairley has joined the Shenango Furnace Co., Pittsburgh. Mr. Fairley, recently released from the Army, served as assistant deputy director, Steel Division, War Production Board, from 1941 to 1943.

—o—

Sterling Morton has been elected chairman, Morton Salt Co., Chicago, succeeding **B. W. Carrington**. Mr. Morton has been vice president of the company for a number of years. He was once president, Illinois Manufacturers' Association, and is now chairman of its advisory board.

—o—

Howard J. Mullin has been appointed manager of sales, St. Louis district, Carnegie-Illinois Steel Corp., Chicago, subsidiaries of United States Steel Corp. He succeeds **Robert J. Korsan**, retired, who was recently awarded the gold Gary service medal, emblematic of 50 years of continuous service with United States Steel Corp. Mr. Mullin has been with the corporation since 1927, Mr. Korsan since 1896.

—o—

Joseph O. P. Hummel, consulting engineer and professor of industrial engineering, Pennsylvania State College, State College, Pa., has been appointed in charge of the labor section, Indus-

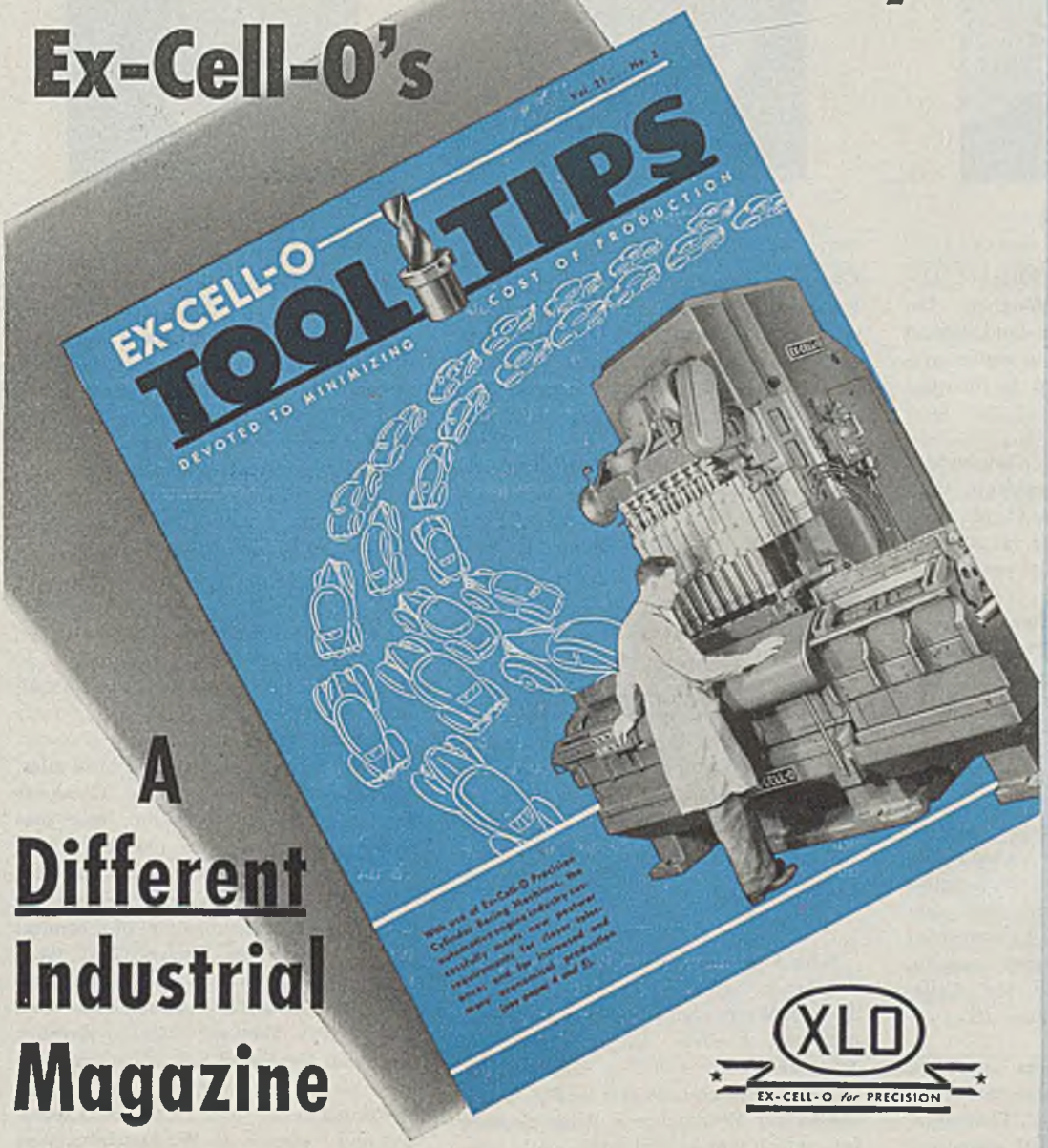
FLORENCE M. SAYLE

JOHN DOUGLAS JAMES

HOWARD J. MULLIN

IDENTIFIED with American Industry...

Ex-Cell-O's



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46—49

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J. C. VIGNOS

R. L. CUNNINGHAM

L. D. SIMONSON

trial Incentive Division, Office of Domestic Commerce, Washington. Dr. Hummel will investigate and report on the various types of incentive systems and their relationship to the productivity of labor.

—o—

J. C. Vignos and **R. L. Cunningham** have been elected vice presidents, Ohio Ferro-Alloys Corp., Canton, O. Mr. Vignos has been general sales manager of the company for a number of years.

—o—

Stanley W. Cochrane has been appointed director of purchasing, Briggs Mfg. Co., Detroit, succeeding the late **W. J. Cleary.** Mr. Cochrane, with the company since 1926, lately has been sales manager and comptroller of the Turret Division.

—o—

John C. Callaghan, works manager, Canada works, Steel Co. of Canada Ltd., Hamilton, Ont., has retired from active service after 38 years with the company. He will continue to be associated with the firm in an advisory capacity. **John C. Aiken** succeeded Mr. Callaghan as works manager, June 15.

—o—

L. B. McGrew has been appointed assistant manager in charge of warehouses, Williams & Co. Inc., Pittsburgh. He will be in charge of all operations in the company's five warehouses, Pittsburgh, Cleveland, Cincinnati, Columbus, O., and Toledo, O. **Carl C. Kleinschmidt** has been named manager, brass, copper and aluminum department.

—o—

C. N. Bristol has been appointed superintendent, York, Pa., Boundary Avenue works, Wiring Device Division, General Electric Co., Schenectady, N. Y. Mr. Bristol has been with the company since 1935, and was named general foreman of the York works in April of this year. **Karl H. Keller** has been named manager, Akron office, General Electric Co., succeeding **G. R. Barclay.** Mr. Keller was formerly east central district control and electronics specialist for the company's apparatus department. He has been with General Electric since 1926. Mr. Barclay had been manager of both the Akron and Canton, O., offices of the company, but has relinquished his Akron responsibilities because of the increasing demands on his time in the Canton territory.

—o—

Gilbert Hallam, representative, Edgar Allen & Co. Ltd., Sheffield, England, has retired. He joined the company as a boy, and for 43 years has represented it in Sheffield and district. **B. Blackwell Green,** formerly works manager of the trackwork department of the company, has been appointed representative to cover approximately the same area. He will still be available to maintain contact with users of trackwork department products.

—o—

John A. Holman, recently released from the Army, has been appointed business director, Westinghouse Stratovision, Westinghouse Electric Corp., Pittsburgh. Since his return to civilian life, Mr. Holman has been co-ordinator of FM broadcasting for Westinghouse Radio Stations Inc., which post he will retain while serving as business director of Stratovision. He will have headquarters in Baltimore. **H. A. Klug** has been appointed merchandise manager, and **J. B. Baughman,** product supervisor, refrigeration specialties department, East Springfield, Mass., works of the Westinghouse corporation. Mr. Klug had spent eight years with General Motors Corp., Detroit, in refrigeration and air conditioning work. Mr. Baughman has been filling varied field and headquarters assignments in the refrigeration sales department of Westinghouse for several years. **Frederick P. Walter** has been named products supervisor, table appliance department, Westinghouse Electric Appliance Division, Mansfield, O. He had been a war products service engineer at the Mansfield, O., and Springfield, Mass., plants of the division. **James E. Crum** has been appointed merchandise manager, table appliance department of the division.

—o—

L. D. Simonson has been appointed plant manager of Birmingham operations, Rheem Mfg. Co., New York, succeeding Earle R. Merrill who resigned recently. Mr. Simonson had been plant manager, Atlas Steel Barrel Corp., Bayonne, N. J., for 12 years, before that company's acquisition by Rheem Mfg. Co.

—o—

R. W. Sanborn, manager of hose sales, Mechanical Goods Division, Goodyear Tire & Rubber Co., Akron, was presented with his 30 year pin at the mechanical goods conference in that city.

—o—

C. S. Venable, director of chemical research, American Viscose Corp., Wilmington, Del., has been elected president, Industrial Research Institute Inc., New York. **N. A. Shepard,** chemical director, American Cyanamid Co., New York, has been elected vice president, and **C. G. Worthington** has been reappointed secretary and treasurer. **E. W. Engstrom,** vice president, RCA Laboratories Division, Radio Corp. of America, New York, and **J. H. Schaefer,** vice president, Ethyl Corp., New York, were elected to serve three year terms on the board of directors.

—o—

Walker Penfield has been appointed manager of manufacturing, Pennsylvania Salt Mfg. Co., Philadelphia. Mr. Penfield, with the company since 1928, had been works manager since 1943. That position has been discontinued in a reorganization of the company's manufacturing department. **Claude S. Beldin,** regional superintendent, has been

DR. R. M. REICHL

Who has been appointed vice president, Hydropress Inc., New York, noted in STEEL, June 17 issue, p. 100.

A. C. CURRAN

Recently named general purchasing agent, American Chain & Cable Co. Inc., Bridgeport, Conn., STEEL, June 17 issue, p. 100.

ALVAH SMITH

Who has been named advertising manager, machinery department, R. D. Wood Co., Philadelphia, noted in STEEL, June 17 issue, p. 105.

appointed to the newly created post of production manager. He has been with Pennsalt since 1926. **Henry G. Meyer,** formerly assistant to the works manager, has been named assistant to the production manager. **Russell E. Cushing,** director of chemical engineering, now reports to **W. F. Mitchell,** superintendent of the company's Wyandotte, Mich., plant.

—o—

Dr. Fred C. Koch, director of biochemical research, Armour Laboratories, Chicago, has been appointed general chairman of the 110th national meeting, American Chemical Society, which will be held in Chicago Sept. 9 to 13. **A. E. Schneider,** Armour Laboratories, has been named general assistant to Dr. Koch.

—o—

John G. Mapes and **Bert C. Goss** have been named partners in the public relations firm of Hill & Knowlton, New York. For the last 12 years Mr. Mapes has been in charge of the public relations department, American Iron & Steel Institute, New York. Mr. Goss acts in a similar capacity for Aircraft Industries Association, Washington. The firm of Hill & Knowlton is public relations counsel for both organizations. Mr. Mapes also serves as general manager of the firm's New York office.

—o—

J. L. Stone has been appointed New York district sales manager, Copperweld Steel Co., Warren, O. He had been a metallurgical sales engineer for the company. **Harry Gafke** has been named Chicago district sales manager for Copperweld. He had been a contact metallurgist for the organization.

—o—

Raymond F. Bradshaw, treasurer and assistant secretary, South Chester Tube Co., Chester, Pa., has been elected director, Philadelphia Control, Controllers Institute of America, New York, for the fiscal year 1946-47.

—o—

Walter C. Kerrigan has been appointed manager, nickel sales department, International Nickel Co. Inc., New York, to succeed the late **Rudolph L. Suhl.** Mr. Kerrigan joined the company in 1930, and was assistant manager, nickel sales department, since January, 1933. **F. L. LaQue,** metallurgist with the company, has been elected to the executive committee, metropolitan section, Electrochemical Society, New York. He joined International Nickel in 1927.

—o—

James L. Brownlee, general procedure supervisor, Tennessee Coal, Iron & Railroad Co., Birmingham, has been elected national director, National Association of Cost Accountants, New York.

—o—

Milton B. Steinmetz has been appointed to the newly created post of industrial sales manager, Snap-On Tools Corp., Kenosha, Wis. Mr. Steinmetz is at present manager of the corporation's railroad sales department, and will remain in charge of that department in addition to assuming his new responsibilities. Mr. Steinmetz joined the organization in 1944.

OBITUARIES . . .

Jack L. Carmitcheal, vice president in charge of sales, Lincoln Engineering Co., St. Louis, died in that city, May 31.

—o—

William Howard Lane, president, Atlantic Stamping Co., Rochester, N. Y., died recently in that city. He joined the company in 1908, and had been president since 1941.

—o—

Dr. Charles E. Albright, 79, who resigned recently from the board of directors, Allis-Chalmers Mfg. Co., Milwaukee, died in that city, June 14. He had served as a member of the company's board for 27 years. Dr. Albright was also a director of Globe Steel Tubes Co., and Milwaukee Forge & Machine Co., both of Milwaukee.

—o—

Harry N. Curd, 61, vice president, Pacific Car & Foundry Co., Seattle, died in that city, June 14.

—o—

Edgar L. Feininger, 56, of Schenectady, N. Y., assistant general manager, chemical department, Pittsfield, Mass., General Electric Co., Schenectady, N. Y., died June 9. He had been with the company since 1912.

—o—

Edwin H. Ehrman, 79, chief engineer, Chicago Screw Co., Chicago, a division of Standard Screw Co., Hartford, Conn., died recently in Oak Park, Ill. Mr. Ehrman helped found Walker-Ehrman Co., Chicago, later a branch of Standard Screw Co.

—o—

Charles E. Cummings, 79, assistant secretary, Raybestos-Manhattan Inc., died June 6. Mr. Cummings was one of the pioneers of the company's Manhattan Rubber Division, Passaic, N. J.

—o—

Jackson Reuter, 88, president and general manager, Madison Plow Co., Madison, Wis., died in that city, June 15.

—o—

William O. Hall, 56, purchasing agent, Williamson Heater Co., Cincinnati, O., died recently. He had been with the company since 1934.

Shaped Wire AND ITS APPLICATIONS

High accuracy of size, smooth surface and relatively low cost of producing almost any conceivable cross section makes shaped wire highly attractive to its users.

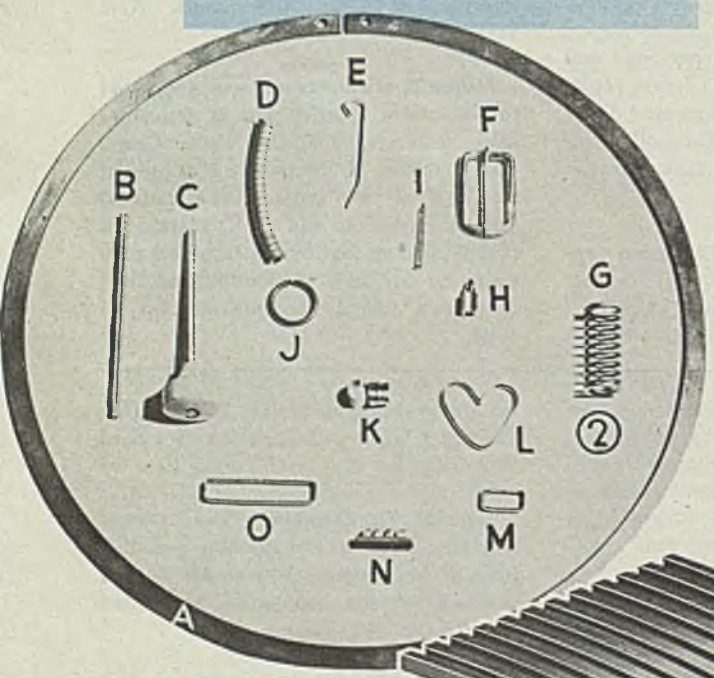
By VINCENT H. GODFREY
Sales Engineer
Page Steel and Wire Division
American Chain & Cable Co. Inc.
Monessen, Pa.

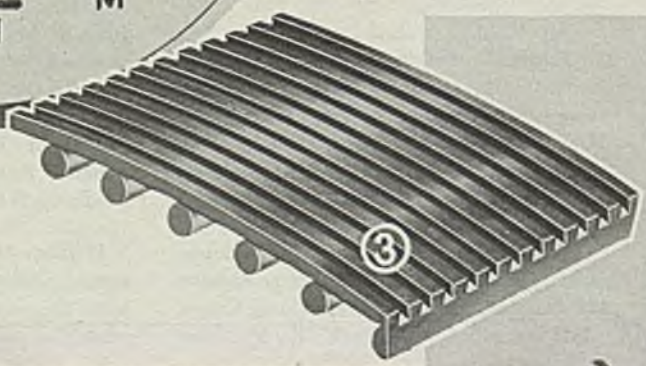
Fig. 1—Various shapes produced by Page Steel and Wire Division

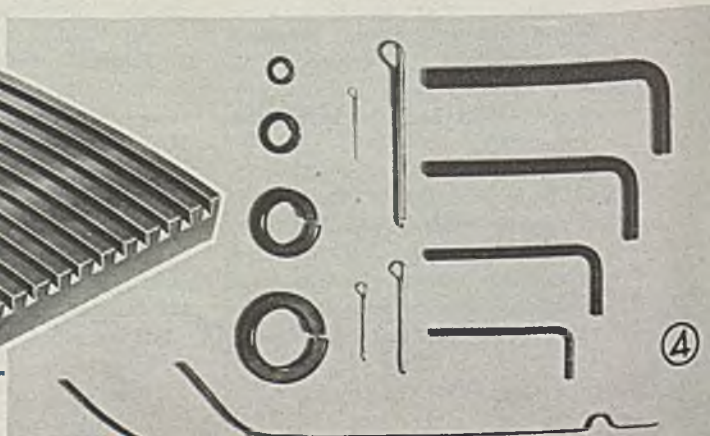
Fig. 2—Articles formed from shaped wire: (A) beveled rectangle retaining ring for B-29 aircraft engine, (B) double groove control wire, (C) single groove control wire for auto choke, (D) special D shape and triangle speedometer cable casing, (E) half oval buckle tongue, (F) Round wire belt buckle, (G) round edge flat spring, (H) special shape stainless hypodermic holder, (I) pear shape nail, (J) round wire snap ring, (K) special shape automotive valve stem keys, (L) full oval costume jewelry, (M) half oval belt slide, (N) beveled square boiler tube brush back segment, (O) full oval wire belt retainer

Fig. 3—Portion of well screen used to keep gravel and sand from entering water pump. Two shapes are used in its construction, a wedge or keystone shape with the large end outside to form the screen and a pear shape for the supporting members

Fig. 4—Articles and shaped wire from which they were drawn are as follows: Keys are from hexagonal or octagonal drawn wire, cotter pins from a half-round rolled, lockwashers from a keystone shape—either rolled or drawn, lawn rake teeth of oil tempered flat wire







"SHAPED WIRE" refers to any wire that is not of a circular cross-section, which has been cold drawn or rolled to attain its present shape. It may have been drawn to wire first, or it may have come directly from hot rolled rods, but the process of changing the original cross-section to that desired is always done in the cold state to insure arriving at the exact size and contour. This article deals primarily with ferrous material—pure iron, low, medium and high carbon steel, and low alloys, as well as stainless steel of the 300 and 400 series. Shaped wire, especially in nonferrous grades, is also produced by the extrusion method, but Page Steel and Wire Division of American Chain & Cable Co. Inc., only draws or rolls its shapes.

Shaped wire is no recent development; shaped gold wire, crudely formed by hammering, was found in a necklace on the mummy of a Pharoah at Denderah, belonging to an Egyptian Dynasty of about 2750 BC. Since those primitive beginnings, shaped wire has found steadily increasing use wherever it could supplant a contour formerly achieved by expensive removal of metal. A round wire may be drawn or rolled into almost any conceivable cross-section provided the allowed tolerances are not too exacting. Wires of similar shapes but arrived at by other means are infinitely more costly in time and wasted material; hence, whenever the wire engineer can tool up to achieve the desired contour, shaped wire is indiacted foi the job.

There are two basic methods of developing this type of wire: By drawing through dies so constructed that the wire emerges in the proper contour, or by rolling, usually between two pairs of parallel rolls at right angles—occasionally between a single pair—which form the wire to the desired shape. In the Turk's head method, the wire is pulled through rolls; in the common method the rolls are power-driven. In general, sections approaching a square or circle are drawn, while sections approximating a rectangle or flat oval, are rolled. Sometimes it is necessary to both roll and draw a shape to arrive at some peculiar cross section. Fig. 4 shows various shapes which are normally produced.

Physical properties of the wire after processing present another problem. Wire, when worked in any manner, acquires different properties, usually greater hardness and tensile strength, with loss of ductility. Different chemically constituted metals respond differently and the ultimate use of the shaped wire may require a soft, easily handled wire. In this case it is necessary to anneal or soften the wire, usually by heating it above its critical range, and cooling slowly; if ultimate hardness and spring qualities are desired, over and above those properties obtained by drawing or rolling may be obtained by a suitable heat treatment involving quenching and tempering.

The following finishes are in common use on shaped wire, depending on the properties and analysis required by the ultimate fabricator:

1. Plain Bright—varying with increasing carbon content from silver bright to a light dull gray.
2. Liquor Bright Finish—Where subsequent heat treating, lacquering or patenting is desired this wet drawn finish is admirably adapted for those operations due to its clean surface.
3. Liquor Copper Finish—
   (Copper Coated Wire, Drawn Wet)
   Various shades of this finish are available depending on the ultimate use of the finished shape. As the color is of paramount importance on these applications the shape is either formed only or given a coating of clear lacquer to preserve the original liquor color of the wire.
4. Dry Copper Finish—
   (Copper Coated Wire, Drawn Dry)

(*Please Turn to Page* 117)

FINISHED PRODUCTS PRODUCED FROM VARIOUS TYPES OF SHAPE WIRE

Type of Shape	Low Carbon	Medium Carbon	High Carbon	Alloy Steels	Stainless Steels—Type 400 Series	Stainless Steels—Type 300 Series
Flat Wire Rounded or Square Edged	Armoring Baskets Staples Zipper Wire Wrapping Cage Wire Clips	Bobby Pins Armoring Clips Staples Wrapping Brushes	Springs Corsets Clips Snap Rings Brushes Tape Lines Hat Wire Rakes	Springs Snap Rings Valves	Nuts Radio Tubes	Dental Wire Springs Trim Handles Nuts
Half Round and Half Oval Wire	Cotter Pins Bag Frames Clips Trim Snaps Stopper Wire Armor Wire	Hose Wire Bobby Pins	Springs Hose Wire Bobby Pins Conduit	Springs Clips	Springs Clips	Cotter Pins Dental Wire Trim Handles
Square Wire	Handles Cores Trim Nails	Wrapping Wire Rings	Springs Screw-Drivers Keys Rings Needles	Springs Screw-Drivers Generators Wrapping Keys Needles	Springs Needles	Springs Trim
Miscellaneous Shapes not included in above	Chains Buckle Wire Armoring Model RR Track Welding Strip Casing Wire Wrapping Wire Grille Wire Tab Stops	Wrenches Casing Wire Keystock Conduits Rope Cores Springs Retainers	Wrenches Springs Clips Lockwashers Rings Rope Cores Speedometer Sections Keystock Retainer Rings Needles	Wrenches Springs Clips Rings Pumprockers Governors Needles Retainers	Well Screens Springs Needles Molding Strip	Well Screens Springs Switches Needles Dental Wire Wrapping Trim

TORSIONAL VS. TENSILE PROPERTIES of Steels

Steels representing typical microstructures were tested and results analyzed to determine relationship between torsional and tensile properties. It was found that tensile test is a better means of determining yield points, but that torsional test measures strength and ductility in a more fundamental way

By DR. MAURICE C. FETZER
Metallurgical Department
Carpenter Steel Co.
Reading, Pa.

THE LATE Professor Albert Sauveur in his Edgar Marburg Lecture before the American Society for Testing Materials in 1938[1] stated that "It has been the custom from time immemorial to consider the tension test as the most satisfactory method and to depend chiefly upon its results for the selection of metals and alloys and useful application of these metals to our many needs." Continuing, he said, "Why have we selected the tension test as the one best suited to our needs? Probably because of its apparent simplicity.

"To hang increasing weights at the end of a rope until it breaks—is that not the obvious way of ascertaining the strength of the rope? We realize that faith in the tension test has been so deeply rooted by custom that strenuous efforts will be required to convince the public that the torsion test may be its equal, if not its superior."

Tests to be described were made with the purpose of throwing more light on torsional tests by determining the torsional characteristics of several steels and comparing these results with those of tensile results on the same steels. By critically analyzing the results of the two kinds of tests it is hoped that the field of usefulness of each may be made more clear. In addition, the torsional properties of steels of various microstructures are given. The torsion machine used is the one described by Professor Sauveur in the paper cited.

Armco iron, steels of various carbon contents, and 18 per cent Cr—8 per cent Ni stainless steel were chosen for tests. These were heat treated to produce such common structures as ferrite, pearlite, sorbite, troostite, and various mixtures of these micro-constituents, as well as austenite as exhibited by stainless steel. Table I shows steels and heat treatment that were used.

Specimens for the torsional tests used were solid cylinders 0.75-in. in diameter and 4 in. long into which was machined a gage section 0.350-in. in diameter and 1-in. long. Solid specimens were used rather than thin walled tubes because of the more practical aspects of the former regards both availability of specimens and practical usefulness of the results. It is realized that the stress conditions in a hollow cylinder are more readily calculated after plastic flow begins but they also collapse with relatively little deformation unless supported with a core. Standard 0.505-in. tensile specimens were used.

Results

Tensile properties of the several steels are given in Table II; each value being the average of three or four tests. All of the normalized and annealed steels showed a drop in load at the yield point in tension, as did the quenched and tempered SAE-1030 steel. For the steels which showed no load drop the first deviation from Hooke's law, as measured with an Ames dial, was taken and listed under yield point.

The torsional properties including torsional yield point, torsional strength, and angle of twist in deg./in. to fracture for the 0.350-in. diameter specimens are given in Table III. Yield points were calculated from equation:

$$q_m = \frac{16\,T}{\pi\,d^3} \qquad (1)$$

Fig. 1—Tensile specimen of 18-8 stainless showing 120° splitting due to radial stresses caused by the neck notch

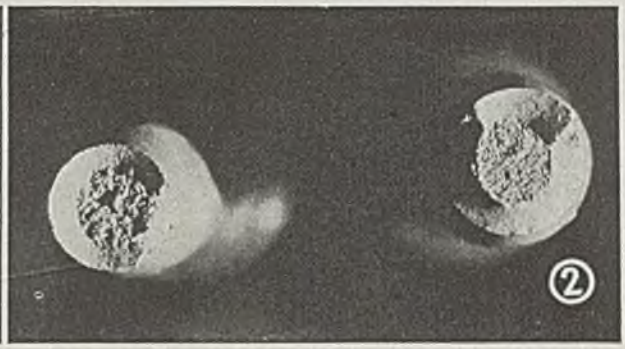


Fig. 2—Cup and cone fracture caused by introduction of radial principle stresses due to neck notch. Specimen at left 0.20 C steel, right 0.40 C steel

TABLE I
HEAT TREATMENTS AND DESIGNATIONS OF STEELS USED

Material	Designation Tensile Bars	Torsion Bars	Heat Treatment
Armco Iron	M1-M3	M1-M8	Normalized by air cooling from 950° C.
SAE-1010	K1-K4	K1-K8	Water quenched from 930° C.
SAE-1010	K5-K8	K9-K16	Normalized by air cooling from 930° C.
SAE-1020	J1-J4	J1-J8	Normalized by air cooling from 880° C.
SAE-1030	A	A	Annealed by furnace cooling from 840° C.
SAE-1030	N	N	Annealed by furnace cooling from 840° C. Reheated to 840° C and normalized by air cooling.
SAE-1030	T	T	Annealed by furnace cooling from 840° C. Reheated to 840° C and oil quenched. Tempered by holding at 645° C for 45 min.
0.40%, C; 0.90% Mn	R1-R4	R1-R8	Normalized by air cooling from 880° C.
0.40%, C; 0.90% Mn	R5-R7	R9-R16	Oil quenched from 840° C. Tempered at 480° C for 1 hr.
SAE-1095	L1-L3	L1-L8	Normalized by air cooling from 815° C.
SAE-1095	L4-L6	L9-L11 L14-L15	Normalized by air cooling from 815° C. Water quenched from 760° C. Tempered at 330° C for 45 min.
18% Cr, 8% Ni Stainless Steel	KA2-A-B	KA2-A-B-D	As received.

TABLE II
TENSILE DATA

Material	Yield Point	Tensile Strength	% Red. of Area	% Elong.
Armco Iron	22,070	44,900	72	40.5
SAE-1010 Normalized	44,000	63,700	64	35
SAE-1010 Water Quenched	39,000	85,970	61	23
SAE-1020 Normalized	41,130	64,870	67	37
SAE-1030 Annealed	36,600	62,000	57	35
SAE-1030 Normalized	40,900	65,110	59	34
SAE-1030 Oil Quenched and Tempered	55,740	78,600	69	29
0.40, C; 0.90 Mn Steel Normalized	66,570	103,930	44	22.5
0.40, C; 0.90 Mn Steel Oil Quenched and Tempered	100,900	128,670	56	17
SAE-1095 Normalized	57,030	119,170	25	15
SAE-1095 Water Quenched and Tempered	.....	232,750	19	2
18 Cr, 8 Ni Stainless Steel	24,400	96,400	60	55

TABLE III
TORSIONAL DATA

Material	Yield Point	Torsional Strength	Angle of Twist Deg./in.
Armco Iron	17,200	43,700	985
SAE-1010 Normalized	30,700	53,500	549
SAE-1010 Water Quenched	35,900	65,200	674
SAE-1020 Normalized	29,500	54,200	479
SAE-1030 Annealed	21,900	51,400	552
SAE-1030 Normalized	25,500	53,800	547
SAE-1030 Oil Quenched and Tempered	34,100	60,900	672
0.40 C; 0.90 Mn Steel Normalized	41,500	76,800	372
0.40 C; 0.90 Mn Steel, Oil Quenched and Tempered	92,100	102,670	200
SAE-1095 Normalized	41,950	85,250	166
SAE-1095 Water Quenched and Tempered	.....	.....	...
18 Cr, 8 Ni Stainless Steel	24,400	96,400	990

TABLE IV
RELATIONS BETWEEN "YIELD POINTS" IN TENSION AND IN TORSION
(As Determined Directly From Measurements On the Torque-Twist Curves)

Material	Yield Point In Tension	Yield Point In Torsion	Ratio Torsion To Tension
Armco Iron (N)*	22,070	17,200	0.78
SAE-1010 (N)	44,000	30,700	0.70
SAE-1020 (N)	41,130	29,500	0.72
SAE-1030 (N)	40,900	25,500	0.62
SAE-1040 (N)***	66,570	41,500*	0.62
SAE-1095 (N)	57,030	41,950*	0.73
SAE-1030 (A)	36,600	21,900	0.60
SAE-1010 (T)	39,000*	35,900*	0.92
SAE-1030 (T)	55,740	34,100	0.61
SAE-1040 (T)***	100,900*	92,100*	0.91

* First deviation from Hooke's Law. No level stretch.
** (N) normalized; (A) annealed; (T) heat treated (Table I).
*** High manganese steel — 0.90%.

TABLE V
TENSILE STRENGTHS AND TORSIONAL STRENGTH
(For the SAE Steels and 18-8 Stainless)

Steel	T_b Torsional Strength	TS_n Nominal Tensile Strength	TS'_b True Breaking Strength	TS'_n True Tensile Strength
Armco	43,700	44,900	111,000	57,300
1010 (N)*	53,500	63,700	129,000	79,300
1020 (N)	54,200	64,870	141,000	81,700
1030 (N)	53,800	65,110	124,000	79,900
1030 (A)	51,400	62,000	113,000	76,800
1040 (N)	76,800	103,930	168,000	115,700
1095 (N)	85,250	119,170	152,000	130,500
1010 (T)	65,200	85,970	162,000	92,300
1030 (T)	60,900	78,600	167,500	88,500
1040 (T)	102,670	128,600	213,000	137,000
1095 (T)	.....	232,750	239,000	234,000
18-8	96,400	95,500	245,000	149,000

where q_m = shear stress in lb/in.² at the periphery of the specimen.

T = torque applied in in./lb where the torque twist curve first departs from a straight line, shown in Figs. 3 and 4.

d = diameter of the specimen in inches.

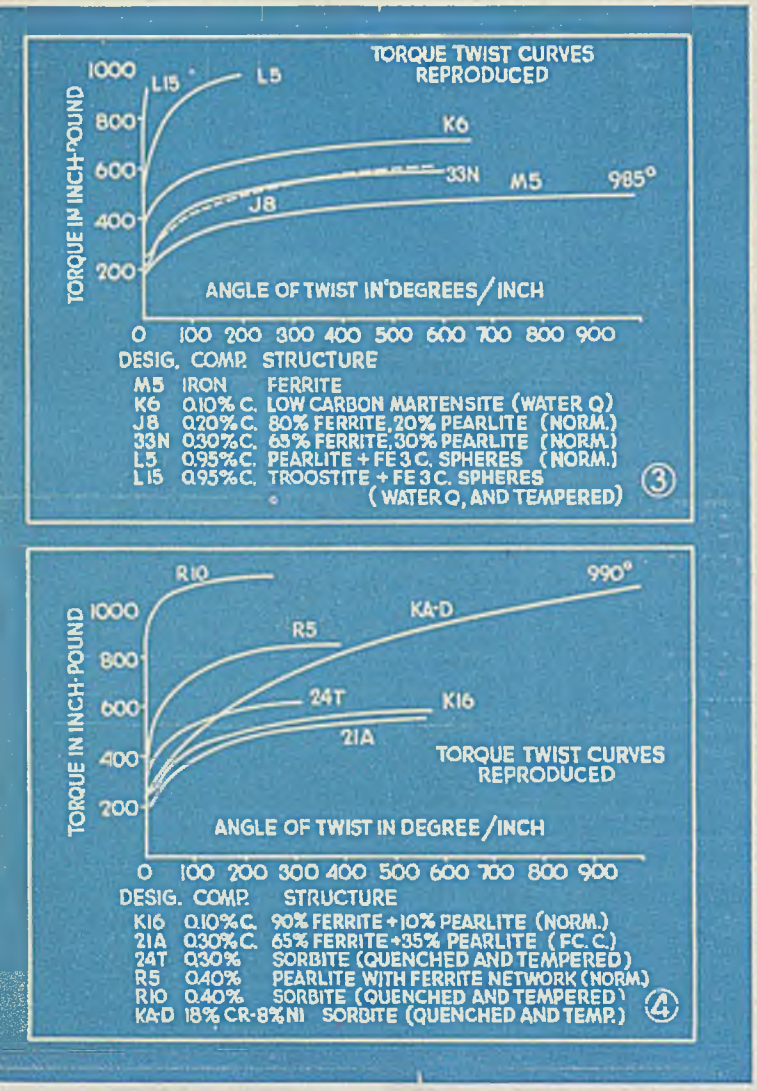
The torsional strengths on the other hand were calculated from the equation:

$$q = \frac{12\,T}{\pi\,d^3} \qquad (2)$$

where q = torsional strength in lb/in.²

T = torque in in./lb required to break the specimen.

Use of equation (2) is based on the assumption that the stress is uniform from the center to periphery of the specimen at the instant just before breaking. This is most likely the case for ductile metal where the torque twist curve is running horizontally prior to failure. When the curve is not running horizontally prior to failure the true torsional strengths are slightly higher than given by equation (2). Reference to the actual curves, Figs. 3 and 4, for the steels discussed in this article show them to have only a slight slope prior to failure. Thus the use of equation (2) is justified. For those more brittle steels such as the SAE-1095, quenched and tempered, where the curve is nowhere near horizontal, no torsional strengths are considered in this paper.



Figs. 3 & 4—Curves for steels discussed in article show them to have only a slight slope prior to failure thus justifying use of equation (2) for calculation of torsional strengths of steel

With the complete tensile and torsional data available (Tables II and III) it is of interest to compare properties and endeavor to state whether one test is better than the other regarding each of the properties.

Torsional Vs. Tensile Yield Point

In comparing yield points it is noteworthy that those structures which show distinct yielding in tension also show it in torsion. Thus those steels which are composed of ferrite and pearlite, in which the ferrite predominates, as in the 0.10, 0.20 and 0.30 per cent carbon steels whether air cooled (normalized) or furnace cooled (annealed), show marked yielding in both types of test. More sluggish yield points were shown in each type of test by the following structures: Ferrite (armco); austenite (18-8); pearlite with a thin ferrite envelope (0.40 carbon steel normalized); low carbon martensite (0.20 carbon steel water quenched); and sorbite (0.30 carbon steel quenched and tempered).

The tensile test is a better means of determining yield points than the torsion test when solid torsional specimens are used. The reason for this is that the lesser stressed interior of a solid bar when twisted supports the outer layers thereby hindering the yielding action and decreasing sensitivity. Better results may be had by using hollow torsion specimens but these are less practical. According to common shear theories for elastic failure, the yield point of hollow specimen in torsion should be 0.5 that in tension. Actually Seely and Putman[3] found values more nearly around 0.85. From the data of the present paper for solid bars it is seen that ratio of yield points, as shown in Table IV, ranges from 0.60 to 0.91 but eight of ten steels listed show a closer grouping—between 0.60 and 0.78.

Torsional Vs. Tensile Strength

Common tensile strength of a metal is equal to the maximum load which can be applied divided by the original cross sectional area. Let us call this TS_n, the subscript n being used because maximum load is reached just before the specimen begins to neck. The amount of plastic deformation undergone by the specimen upon attainment of maximum load is relatively small and does not represent the strength that the metal does attain when it actually does break. Thus, much more plastic deformation takes place in that portion of the specimen which is necked down and the true tensile strength becomes much greater than TS_n. This true tensile strength is obtained by taking the actual load at time of failure and dividing by the reduced area of the fractured specimen. Let us call this true breaking tensile strength TS'_b. Now the torsional strength of a metal if properly calculated is a much more fundamental properly than the tensile strength for two reasons:

1. The torsional strength is based on the highest load

(*Please turn to Page* 118)

Microscopic electronic parts —by the Million

Minute steel, copper and other metal components for electronic tubes are produced at rate of 117 million per month at Sylvania's Emporium, Pa. plant

MINIATURE miracles of production are performed with regularity in the manufacture of tiny metal parts by Sylvania Electric Products Inc. With headquarters at Emporium, Pa., the parts department maintains nine other plants where small stampings and formed wire items used in the manufacture of electronic tubes and lamps, both incandescent and fluorescent, are made.

These ten plants are the answer to a tremendously expanded demand for radio tubes which grew out of the war. "We took the work to the people", is the way they explain their sudden jump from one plant to ten, and their whole answer to the production problems is speed of output.

A combination of mechanical ingenuity and sound engineering has made it possible not only to increase the rate of production on these microscopic examples of the art of precision metal forming, but also to make tremendous cost reductions.

Take one specific part as an example.' It's a minor part in a very small electronic tube, and its maximum dimensions are 0.1 by 0.09-in., stamped from nickel-plated steel of 0.005-in. gage thickness, with a tolerance of plus 0.0005 minus 0.0015-in. It is formed on an automatic inclinable press with a progressive four-stage die, four parts at a time and 9000 strokes per hour, for an hourly pro-

(*Please turn to Page* 124)

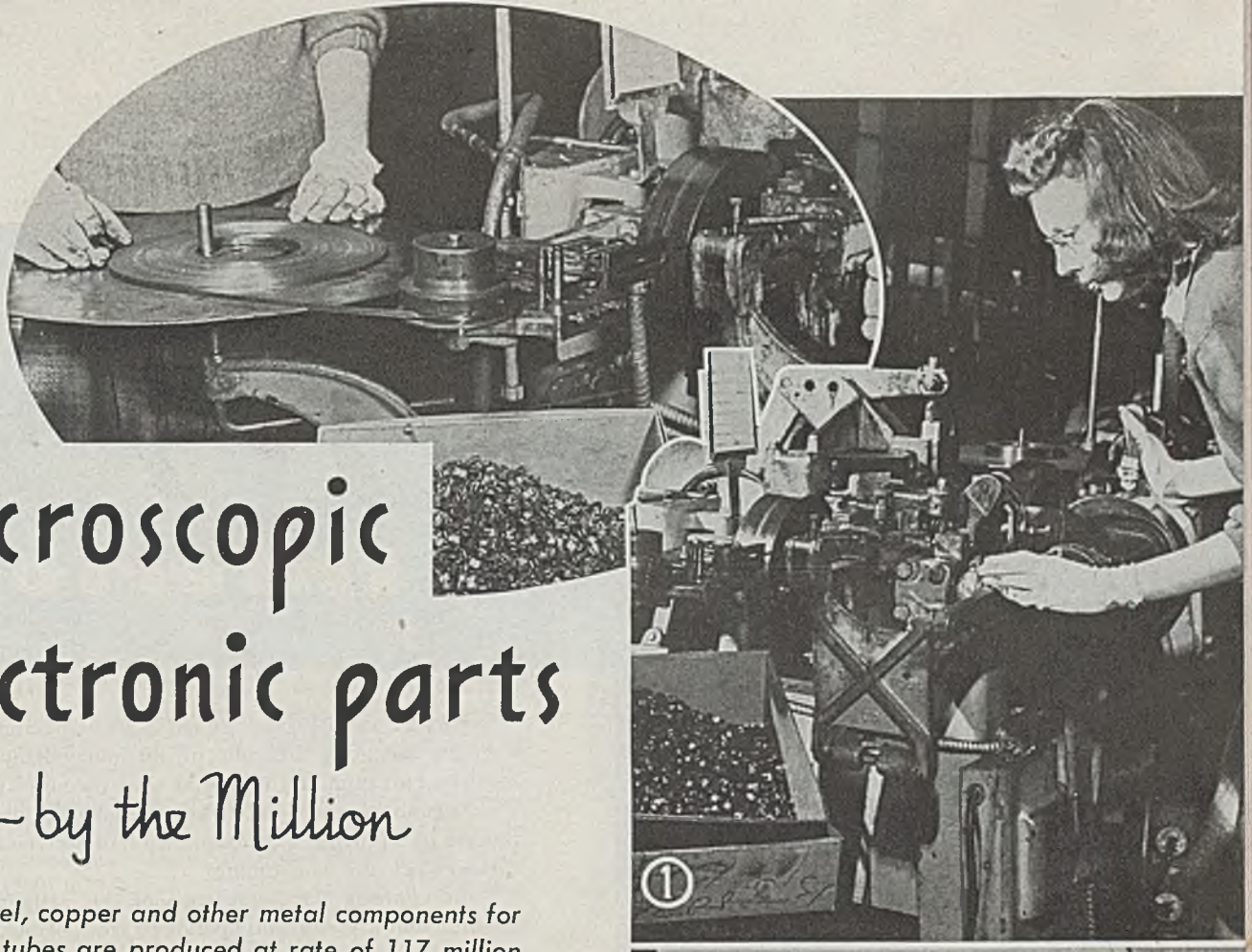


Fig. 1—*Operator here has completed loading operation on a multislide machine, and is about to release lever to set machine in motion. Hundreds of thousands of radio tube parts are run daily in this section of plant.* (*Inset*)—*closeup of machine*

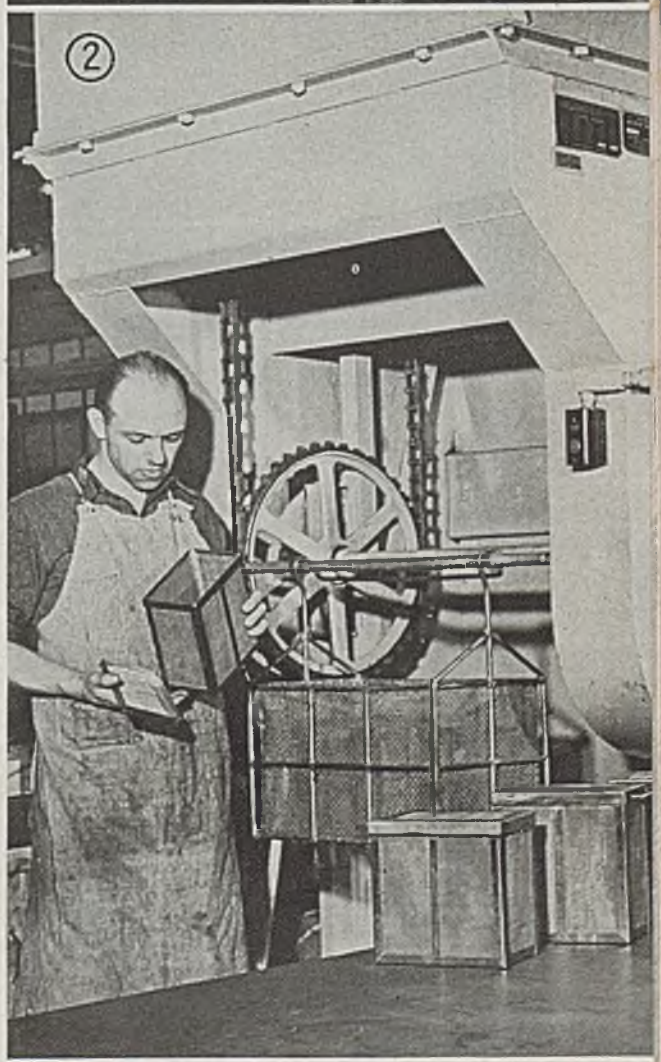
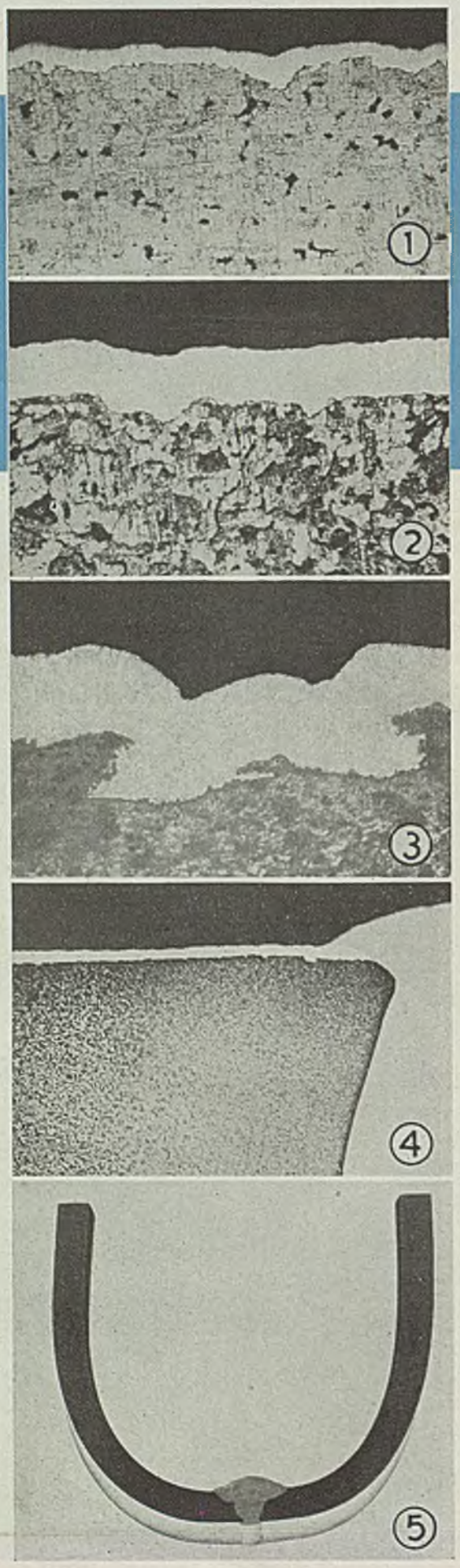


Fig. 2—*Parts not carbonized must be given a bath in solution of trichlorethylene to remove all grease and dirt. Operator is shown removing parts from a completely automatic degreasing machine*



Electroplated Pipe Interiors

EARLY in 1943, the United States Government was faced with the mounting difficulty of obtaining vitally needed corrosion-resistant pipe and tubing in sizes up to 18 in. in diameter. This organization was asked to undertake the development of a process for applying a corrosion-resistant surface of ordinary low carbon steel pipe and tubing.

Recognizing the importance of this assignment, extensive research and experimental operations were begun. After months of research, the Lectro-Clad process was developed to enable the processing of more than 500,000 ft of material from March 1944 to August 1945. All of this material was cut, bent, welded, and fabricated into a huge piping system.

The process, for which several patents are pending, electrolytically deposits a predetermined thickness of nickel or other corrosion-resistant metals on the inside surface of pipe, tubing, fittings, etc. The process, which is commercially practical in every respect, develops a smooth, ductile, pore-free deposit, fully adherent to the base metal in thicknesses of from 0.005 to 0.100-in.

In order to obtain these results, it was necessary to develop and perfect a new plating machine, involving principles new to the field of electrodeposition. These principals were a radical departure from the conventional methods of plating and made it possible to control all the essential characteristics necessary to the successful processing of pipe by this method. This meant that good control of solution composition, temperature, pH, surface speed, current density, and other variables was accomplished.

It is possible to produce, by following the electroplating process, such satisfactory deposits of nickel as shown by Fig. 1. Close observation of this photomicrograph, taken of the deposit of 0.0035-in. of nickel on steel, at magnification of 60 diameters, will disclose that depressions in the steel are more heavily coated than high spots, thus tending to even the surface and resulting in smoother deposits.

Generally in electrodeposition, the high points or points of closest proximity to the anode receive the most deposit. This is readily apparent since the amount of metal deposited varies inversely as the square of the distance from anode to cathode. However, by using the technique described, the reverse occurs. Much discussion has arisen regarding this result; however, it is generally believed that a sound reason for this effect exists. One of the explanations which has been given and seems plausible is

Technique for electrodeposition of a predetermined thickness of nickel or other corrosion-resistant metals on inside surfaces of pipe, tubing, fittings, etc., produces smooth, ductile, pore-free deposit closely adhering to base metal throughout later processing

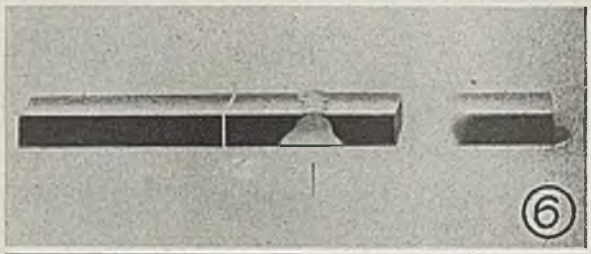
By S. G. BART
President
Bart Mfg. Co. Inc.
Belleville, N. J.

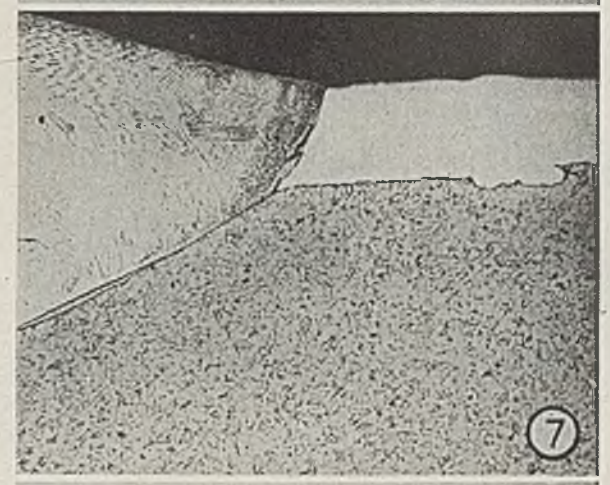
that because of the high current density involved in electro-cladding pipe (of the order of 200 to 250 amp per square foot) the points of closest proximity to the anode become polarized, thereby decreasing the efficiency and causing less nickel to be applied at these points.

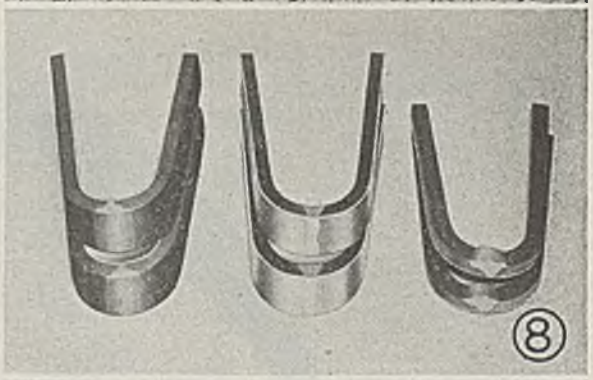
In Fig. 2 another example of the nickel covering depressions with greater thicknesses than high spots can be closely seen. In this case, the deposit was somewhat thicker than in Fig. 1—of the order of 0.0045 to 0.0050-in. at 100X. In Fig. 3 the photomicrograph at 100X magnification shows a remarkable effect in that plating is thrown into sharp, deep ridges and covers them with such even thicknesses that the outstanding qualities of this method are clearly portrayed. This deposit is about 0.006 to 0.007-in. thick.

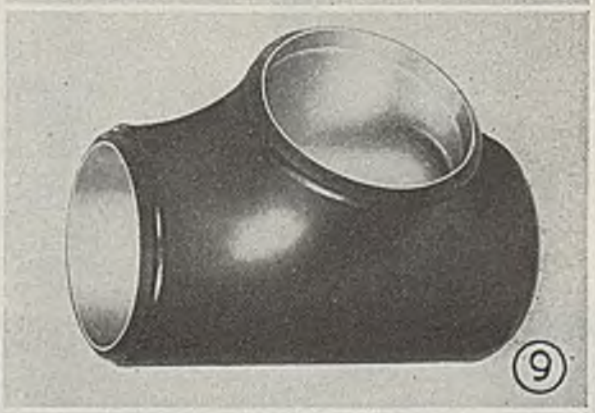
The adherence between the nickel and steel is so perfect that the bond is not ruptured during heating, bending, or even under the tremendous stress and change undergone during a cold reduction, as shown in Fig. 12. The pipe shown in this figure was drawn from a standard wall thickness of 4 in. (iron pipe size) with a coating of nickel of about 0.028 in., was reduced by a ratio of 4 to 1, resulting in an iron pipe 3½ in. OD with a thickness of 0.060-in. of steel, and a nickel thickness of about 0.007-in. The reduction of the nickel and steel differed by only fractions of a per cent. The resulting properties of this electro-clad pipe enabled it to be welded and fabricated as simply as low carbon steel pipe, chiefly because the physical properties of

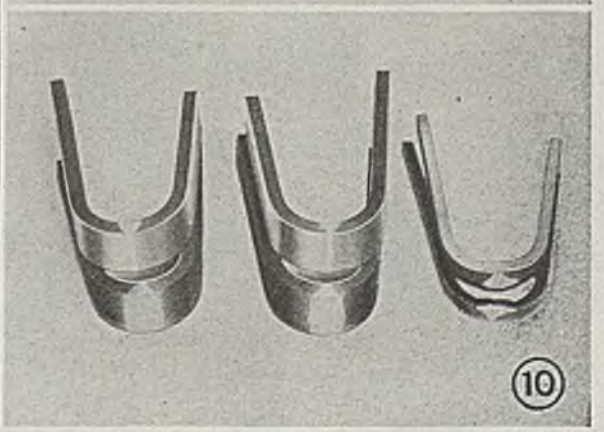
(*Please turn to Page* 148)

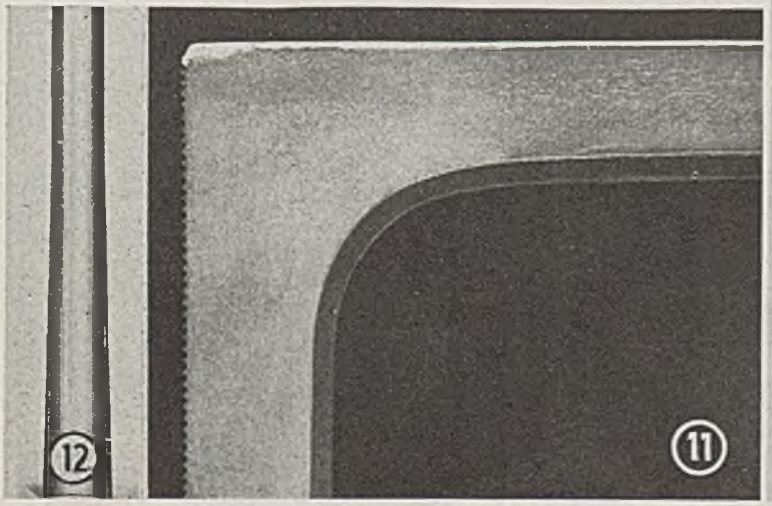








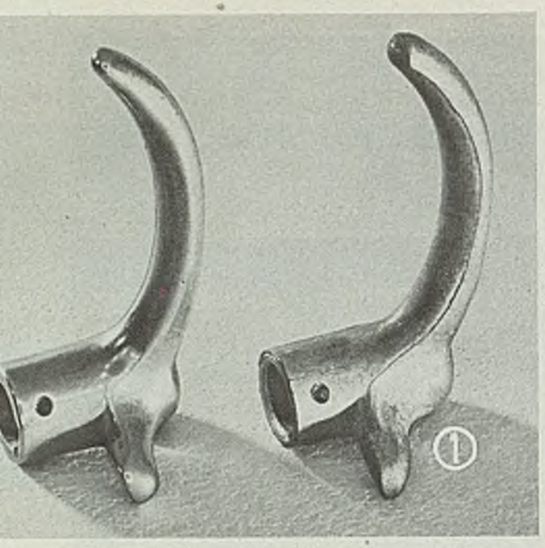


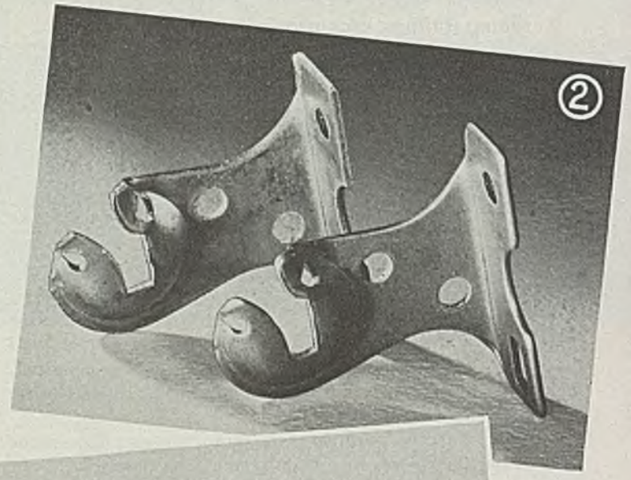


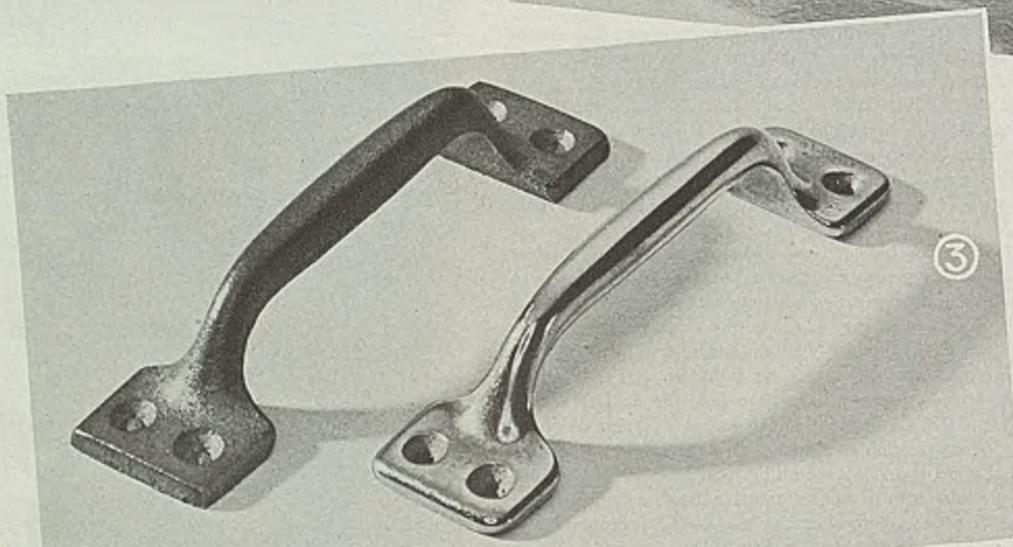
ROTO-FINISH PROCESS

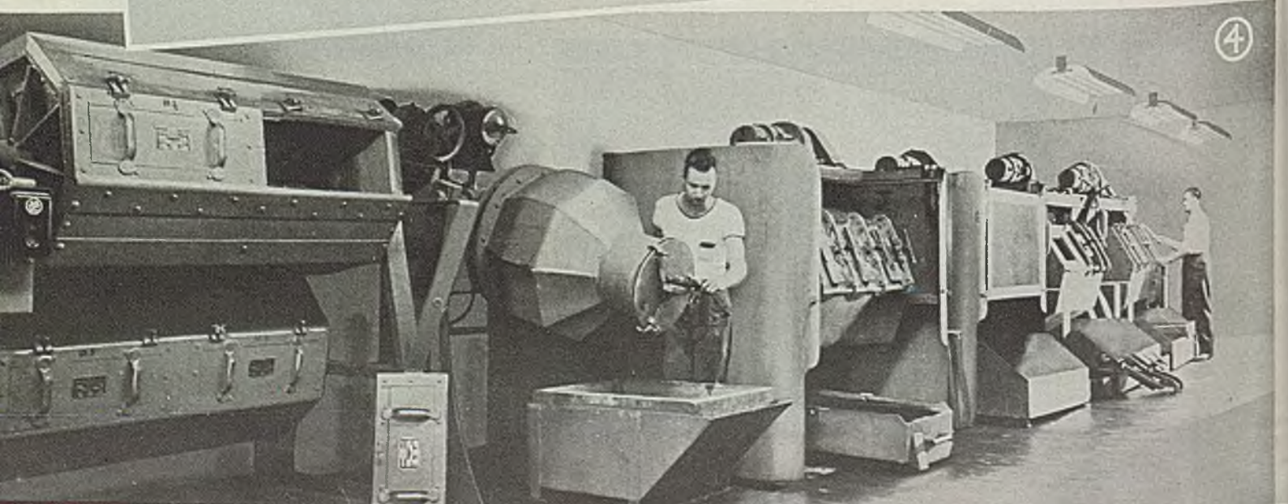
By A. H. ALLEN
Detroit Editor, STEEL

Smooth, bright finishes are imparted to parts made of various metals and edges are deburred by using limestone or granite chips, honing compounds and steel balls in this tumbling barrel process









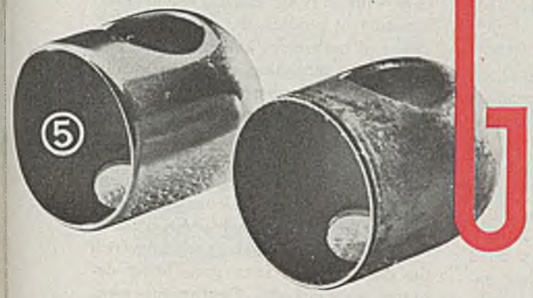


Fig. 1—Brightening of finish, removal of parting line and uniform rounding of edges can be noted in this processed zinc die casting

Fig. 2—Deburring of steel stampings, such as this small bracket, is accomplished quickly by wet tumbling with granite chips and compound

Fig. 3—Brass handle at right had finish of other handle before finishing in wet mixture of mineral chips and compound by this process

Fig. 4—General view of processing laboratory operated by Sturgis Products Co. to determine proper chips, compound and cycling for finishing different types of metal parts

Fig. 5—Improved finish and smoother edges are visible on brass stamping at left after tumbling process as compared with stamping at right before process

GRINDING, polishing and honing all types of metal parts by tumbling them in wet mixtures of mineral chips and compound is a relatively new technique which has been brought to a high degree of engineering precision during the war years, and promises to hold interesting possibilities in the finishing of numerous parts going into peacetime products. In the ensuing discussion the process will be reviewed in detail and an analysis presented of the various materials and compounds used in the operation, as well as recommended types of equipment.

Originator of the Roto-Finish process, Sturgis Products Co., Sturgis, Mich., pioneered its application in war production and at the behest of the War Production Board permitted unlimited use of the method by manufacturers. With war production terminated, the company is offering its services and advice on finishing on the basis of an agreement which provides essentially that the user will purchase processing materials from Sturgis Products. Along with this goes a consulting service to recommend specific processing details and to trouble-shoot production difficulties.

Four basic types of finishing possible with the Roto-Finish method are:

1. Grinding for deburring with granite chips or grinding chips and compounds.
2. Polishing with limestone or bright honing chips and the same compounds as in (1).
3. Honing, used in conjunction with (2) as a two-part process, with a special honing compound.
4. Wet coloring, using various sizes of steel balls, or other coloring media, after parts are prepared by any of the preceding methods.

Grinding for Deburring

One of the most serious bottlenecks and high-cost operations is the deburring and finishing of metal parts, quantities often running into the billions, with polishing and buffing wheels, files, scrapers and flexible shaft tools. They are tedious and time-consuming, and any method which can circumvent them and yield comparable finishes on mass quantities will at the same time permit important economies.

Dry tumbling of the parts on themselves is of course one possibility, but is not nearly so efficient or controllable as wet tumbling with specially sized and prepared mineral chips used in conjunction with carefully selected chemical compounds. The work may be carried out in conventional types of water-tight tumbling barrels, although there have been perfected improved types of machines, especially adapted to the Roto-Finish processes to allow quick loading and unloading, maximum life, minimum drippage, etc. Machines recommended for the work are the wood lined type, having 2 in. of hard maple lining, either the single or multiple compartment types. The table gives average figures on compartment sizes and work loads recommended for various types of machines for the grinding or deburring operations.

The conventional type of machine uses a horizontal octagonal-shaped cylinder ball bearing mounted, powered by a 3 hp motor, with or without a variable-speed drive. Speed of rotation depends upon the type of work being handled but in general a cylinder with 32-in. inside diameter is operated at 20 rpm. If the machine travels too fast, the parts become separated from the mass of chips and tend to become marred by impingement; if speed is too slow, the time of finishing is extended. On the basis of extended experiments the time cycles on page following have proved suitable.

It will be observed there is an appreciable range indicated in the table, for the reason that each individual job must be studied and processed according to its hardness, size, shape, amount of deburring desired, speed of barrel and size of chip used. Small pieces, with uncomplicated shapes, are finished much more quickly than larger pieces of intricate contour. It is for this reason that Sturgis Products has a processing laboratory equipped to study individual jobs and recommend processing sequences which, once determined, will insure duplication of desired results.

The action of the granite chips on the work within the machine is the key to the finish ultimately attained and hence is worthy of examination in some detail. In the first place, the chips must be carefully presized and prepared for use before they will perform satisfactorily. Beyond this, not all types of granite are suitable and hence only the recommended chips can be used successfully. Before being in shape for use in finishing, they are prepared to smooth all surfaces without destroying the irregular contours. They are then washed, cleaned, sized, dried, bagged and shipped to users. They are available in 17 different sizes, ranging from 1⅜ in. in longest dimension, down to 1/16-in. They are identified by number, the largest being No. 1 and the smallest No. 7. Actually, most parts can be processed by nine sizes ranging from No. 3—⅞ to ⅝-in.—down to No. 5B—3/16 to ⅛-in.

Chips must be selected which do not lodge in holes, recesses, or slots, in parts being processed, and which will also produce the desired finish. Large chips, cut faster but are inclined to produce a rougher surface. Smaller chips produce a finer, smoother finish, but cut more slowly. A combination of large and small chips often is a good choice to reduce the time cycle and at the same time produce a superior finish. Such a mass is recommended to deburr small slots and recesses, such as those encountered in many types of steel stampings. In this case, the smaller chips will usually flow through the openings without lodging therein. Where a low microinch surface finish reading on unhardened steel parts is desired, a combination of small chips often is advisable, while somewhat larger chips can be used on hardened pieces. In general it is considered possible to bring down a 60-40 microinch surface finish to 30-25 microinches by use of the granite chips and ten to 10-5 microinches with limestone chips.

Material	Time range
Aluminum, stampings, die castings	1/6-8 hr
Machined brass	1/4-8 hr
Sand, die castings, brass	3-24 hr
Steel stampings, machined parts	1/4-12 hr
Iron, steel castings and forgings	5-24 hr

In the wet grinding and deburring operations, the use of compounds, along with chips and water, is an important factor. In general, the compounds, which are specially prepared soap powders with varying alkalinity and abrasive content produce the necessary lubrication of both chips and work, and also prevent the tarnishing, etching or rusting of the work. Further they help to maintain cleanliness in the compartment and chip mass, and in some cases provide the degree of abrasive action necessary to give the desired finish. Another important function of the compound is to prevent the chips from becoming glazed or loaded with fine metal particles which the chips remove from parts being deburred or finished. Finally, the compounds correct deficiencies in water when this is a factor.

The company produces six types of wet grinding compounds—Nos. 10, 11, 12, 13, 100, and 101. No. 10 is a mildly alkaline, abrasive compound for general use where a fine matte surface is desired or where deburring, cutdown or metal removal is not as important as is surface blending or the production of a uniformly dull finish on the part. This compound also may be used with bright honing chips for polishing prior to the honing operation. It is not suitable for

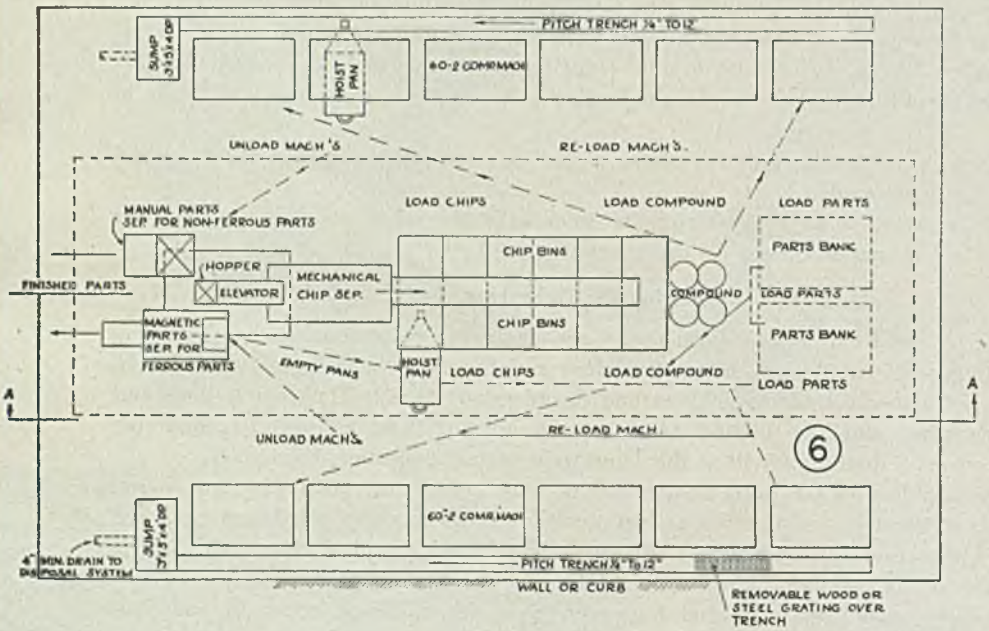


Fig. 6—Suggested plan view for high-production finishing department located in a space 40 x 60 ft. Two rows of six two-compartment barrels each and central chip separating equipment and storage bins are served by overhead cranes

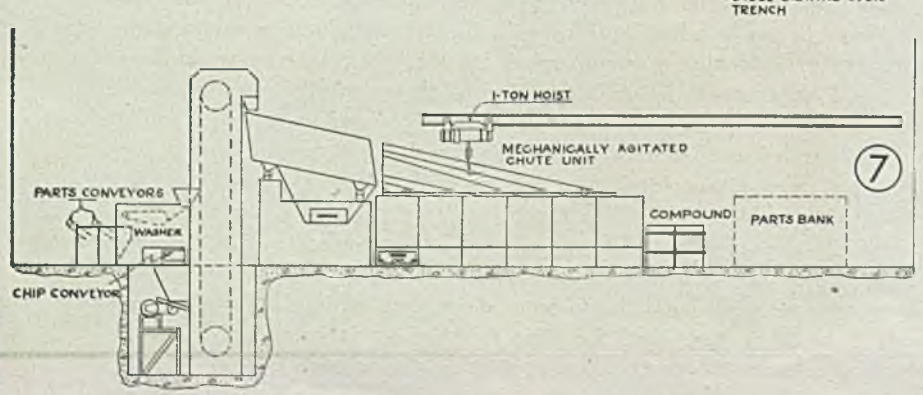


Fig. 7—Elevation layout for finishing department along 60 ft dimension shown here

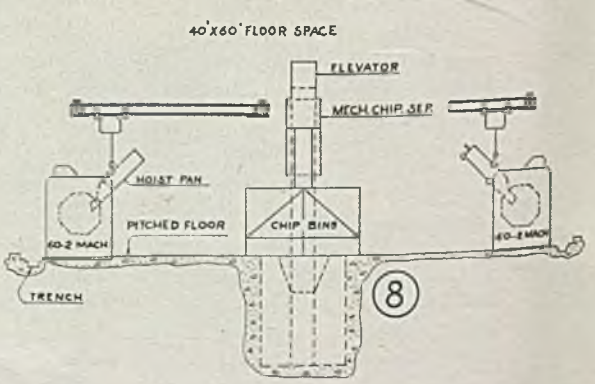
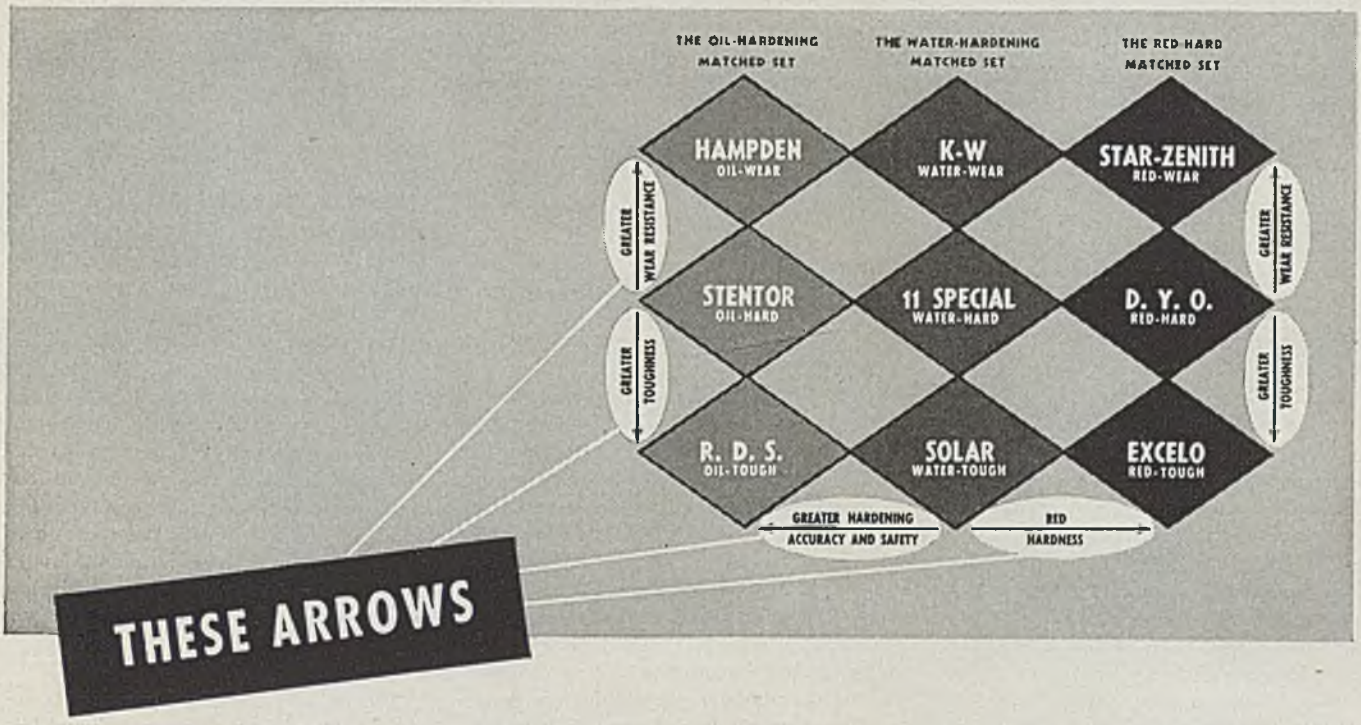


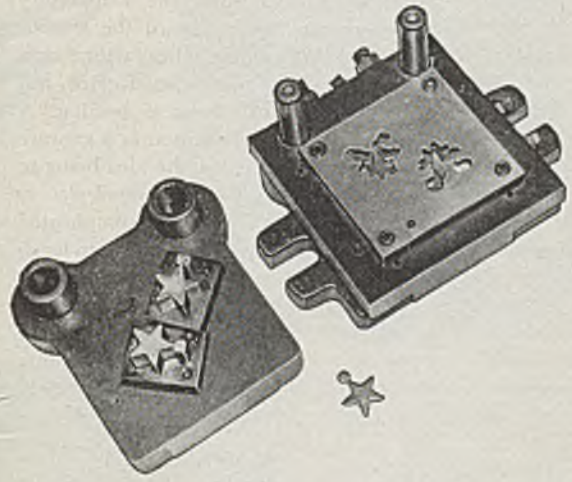
Fig. 8—Elevation layout along 40 ft dimension of department



POINT YOUR WAY TO LOWER COSTS, MORE OUTPUT PER TOOL

The arrows shown here are your signposts on a four-lane highway to lower unit costs and increased output per tool. When you "follow the arrows" on the Carpenter Matched Set Diagram, you're "custom-fitting" the tool steel to the job—assuring yourself that the tool you make will cut costs and increase output because you know it's "right for the job". And with the help of the Carpenter Matched Tool Steel Manual, you get accurate, complete heat treating instructions for all nine steels listed on the diagram.

HERE'S ONE EXAMPLE OF THE RESULTS YOU CAN GET BY FOLLOWING THE MATCHED SET DIAGRAM



Delicate points on a Blanking and Trimming Die frequently "sheared off" when punching out Bronze Alloy Stars made from .085" thick work-hardened material. The tool maker decided to follow the arrows on the Matched Set Diagram and selected Carpenter *R.D.S.* Tool Steel for greater toughness. The new die outlasted the old one 4 to 1 and with fewer tools to make, the company saved considerable time and money on the job.

Put this cost-reducing Matched Set Method of tool steel selection to work in your plant. "Follow the Arrows" and you'll follow the trend to lower costs and increased tool output. Ask your nearby Carpenter representative or write us on your company letterhead, indicating your title, for your free copy of the 168-page Carpenter Matched Tool Steel Manual. Get in touch with us today.

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Carpenter MATCHED TOOL STEELS

CAPACITY OF FINISHING MACHINES

Model number	Number of compartments	Compartment size, in.	Compartment capacity, cu. ft.	Recommended chip mass, lb.	Recommended work load for grinding, lb. Steel, Brass, etc.	Aluminum
BW 60-2	2	27 x 32	13½	700	150	90
BW 60-3	3	15½ x 32	7½	400	80	50
BW 60-4	4	10½ x 32	5	300	60	35
BW 45-2	2	19½ x 32	9½	500	100	60
CW 22-1	1	19½ x 32	9½	500	100	60
AJ 23-1	1	23 x 21	3¾	100	25	15
AMV-2	2	8 x 12	½	25	5	3

finely threaded parts or those with tapped or blind holes, since its abrasive will lodge in these places and is difficult to remove without special flushing facilities.

No. 11 compound is a nonabrasive, alkaline material, for producing a semibright finish on both hardened and unhardened iron and steel parts. It may be used with either grinding or bright honing chips, and is especially compounded to provide good protection from rust and tarnish on ferrous parts. It is completely water soluble and free rinsing.

No. 12 compound is similar to No. 10 except that it contains a coarser and harder abrasive, and is recommended where a dull matte finish is desired for blending purposes on unhardened iron or steel parts.

No. 13 compound resembles No. 12 except for a larger proportion of the hard, coarse abrasive. It is particularly useful in processing castellated nuts or similar pieces where it is necessary for a small chip of the mass or an abrasive particle of the compound to pass through small openings in order to finish the surface areas in such opening or corners formed by slots cutting the surface of the part. A limiting consideration is that the slots must be wide enough to allow the abrasive particles free passage.

No. 100 compound is mildly alkaline, nonabrasive material, particularly suited for grinding, deburring, or producing radii when brass, copper alloy or zinc-base die cast parts are being processed with granite chips. It also is used in the polishing operation with limestone chips for light deburring and surface improving nonferrous parts.

No. 101 compound is nonabrasive and designed to maintain or develop a bright, lustrous finish on aluminum parts, with granite chips. It must be completely dispersed in the water of the charge, and will provide lubrication of the type necessary for producing a smooth finish, free from surface impingement which often accompanies processing of the softer metals.

Procedures and accessory equipment have been developed to permit incorporation of these finishing methods in regular mass production manufacturing operations. A typical cycling of a batch of parts might be as follows:

1. Load mass into machine, simp'est means being with a hoist pan attached to electric hoist on an over head crane bridge.

2. Clean the mass (chips) by thorough washing after loading into the compartment. This is important to free the mass from any adhering spent compound which might eventually build up a sludge in the machine and coat the chips and parts.

3. Level off the mass by reversing the machine until door openings are on top, then returning until door openings are at loading position.

4. Load parts, preferable free from oil or grease, level them off and add enough water to cover the entire mass 2 in. deep.

5. Add compound and disperse in water if necessary. Clamp loading doors.

6. Start rotation of machine, and proceed with other unloading or loading operations.

7. When cycle is complete, remove door covers and disperse foam with water spray.

8. Lower door openings by inching the machine ahead until all solution is drained.

9. Separate chips from parts by emptying part of load at a time onto proper size screen which either will retain parts and pass chips or vice versa.

For mass production, chips and processed parts are discharged into a hoist pan and taken to a central separation unit where parts and chips can be separated either magnetically or mechanically.

10. Rinse parts in cold water.

11. Avoid rust on ferrous parts by delaying rinsing until entire load is removed, after which parts are rinsed in cold water and immediately transferred to hot oil bath.

It is advisable at regular intervals to screen the chips so that those which have worn down to a smaller than recommended size may be removed. A series of square-mesh screens, ranging from 1¼ in. down through ¼-in., is suitable for accomplishing such separation.

Polishing

This type of work is done similarly to the grinding and deburring, except that it involves a somewhat softer action and calls for the use of a less abrasive type of chip, referred to as "bright honing" chips. Their action is slower due to a milder "cut" on the part, although the resultant finish will be smoother than in the case of deburring.

The chips are a limestone type, processed and screened similarly to the granite chips. They are supplied in eleven sizes—Nos. 3, 3A, 3B, 4, 4A, 4B, 5, 5A, 5B, 6, and 7 in steps ⅞ to ¼-in. Chip depreciation is at a somewhat higher rate than in grinding, figuring to about 5 per cent per 24 hours of operation compared with 1 per cent per 24 hours of operation for the same size granite chip.

The time cycle to be used in polishing is again a matter of special determination for each individual job, although in general it will fall in the range 6-12 hours, except where polishing follows a grinding operation, in which case the time drops to 4-8 hours. Compounds identical with those used in the grinding and deburring process are used.

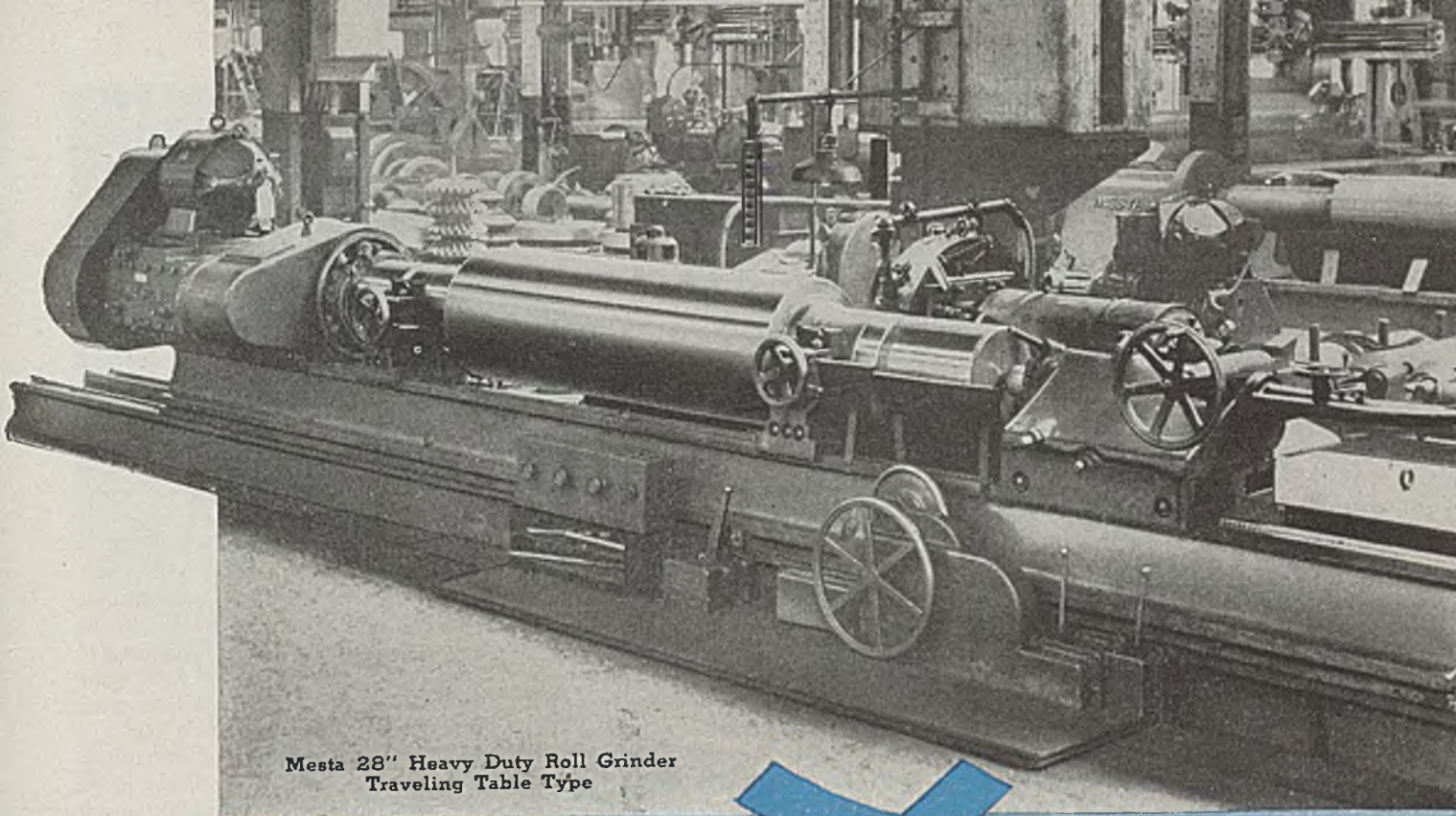
Honing

This recently developed operation is the second step of a two part process and follows the initial polishing operation under the procedure just described. After the polishing, parts are not removed from the mass but are thoroughly washed along with the chips in the compartment. A special compound No. 203, known as a wet honing compound, is added. Its principal action is to induce them to act as a honing rather than polishing medium, producing a semilustrous finish on parts of zinc or zinc alloy, brass and other copper alloys, aluminum or iron and steel.

Time cycle in the honing or second step of the two part process runs from 2 to 3 hours. Most of the brightening action takes place in the first hour, after which the change tapers off. As an increasingly lustrous finish is desired, the adaptability of the process tends toward the smaller size parts, although the other factors, such as hardness of the parts, size of chips, and cylinder speed still have a bearing. A variation which is often used in a mixture of large and small chips, the idea being to have chips of a sufficiently small size to enter recesses on parts of complicated shape, while the larger chips serve to finish open surfaces and to drive the smaller chips into restricted sections. This process is adaptable to thousands of different types of parts, particularly as a finishing method prior to bright nickel plating, anodizing or painting.

Wet Coloring

Wet coloring is the fourth type of treatment which can be used in the production of peacetime civilian goods. Its application is recommended after preliminary treatments by any one of combination of previously described finishing operations. Instead of chips, the mass is comprised of steel balls, or other highly polished media.



Mesta 28" Heavy Duty Roll Grinder
Traveling Table Type

MESTA

Roll Grinders

MESTA Roll Grinders of simplified design are the most accurate and dependable grinding machines available today. Built with precision for the finest finishing and with ruggedness for the heaviest roughing.

MESTA MACHINE CO.

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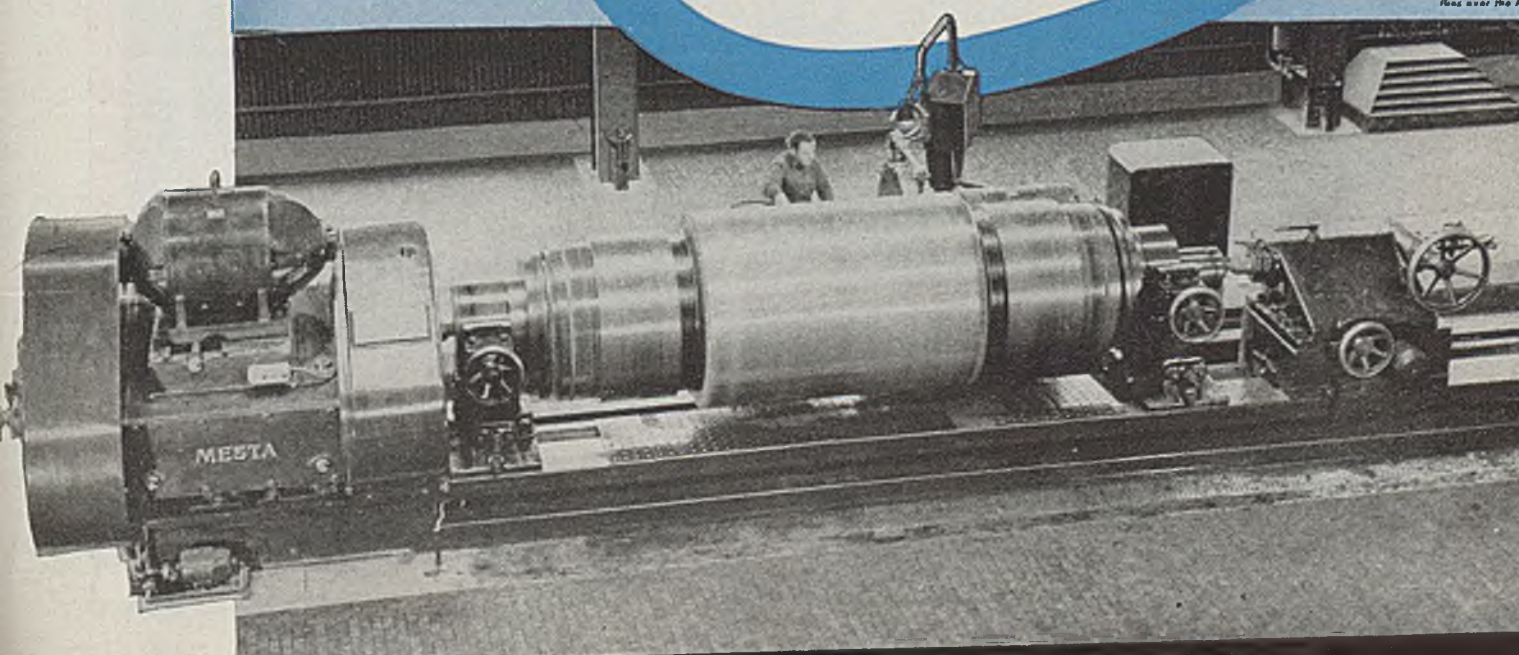


Ratio of mass to workload varies according to the size of the compartment. Selection of ball size is determined by the size and hardness of the part, the larger balls being used with the harder parts. Experimental processing is advisable before a final selection is made.

Two special types of compound No. 300 and No. 301, have been developed for the wet coloring work. No. 300 is a highly alkaline blend of water soluble materials which aids in developing a high luster on iron, steel, nickel alloys or stainless steel parts. It can also be used with Roto-Finish chips for scale removal on heat treated steel parts. It must be handled carefully, and should not be used on nonferrous metals or alloys, particularly aluminum where pressure of explosive proportions could develop within the tumbling compartment.

No. 301 compound is recommended for producing a high luster on nonferrous metals and alloys. It was developed primarily for brass and copper alloys, but is also satisfactory on aluminum. It should not, however, be used in conjunction with limestone or bright honing chips because it reacts with these chips.

Sturgis engineers have made detailed studies, resulting in designs for equipment best suited to the Roto-Finish process, and productive of optimum results, all of which are sold under its own trademark. The standard unit features an octagonal shaped cylinder with welded ends and can be lined easily by removal of a back panel (opposite the door panel) which is bolted in place. The cylinder has a tight fitting door, fitted with cam-lock handles equipped with spring relief, and other safety features, so that if unexpectedly high pressure should develop within the compartment it can be relieved through the doors and no explosive hazard is involved.

Another example was the development of the hoist pan method of handling the processing masses. Before this was developed a great deal of shoveling and handwork was necessary in order to load and unload the machines. By using extra hoist pans and proper planning the overhead hoist now replaces the older methods of handling the chips and workload.

The regular machine consists of a cylinder mounted horizontally in a frame, with sheet metal sides and a sliding wire screen front safety guard. It is equipped with a 3-hp, reversible, geared-head motor, forward-reversing switch and magnetic brake. At the user's option it may also carry a variable-speed drive and timer controls. Guide rails on the base permits the hoist pan to slide into position quickly, under the compartment doors.

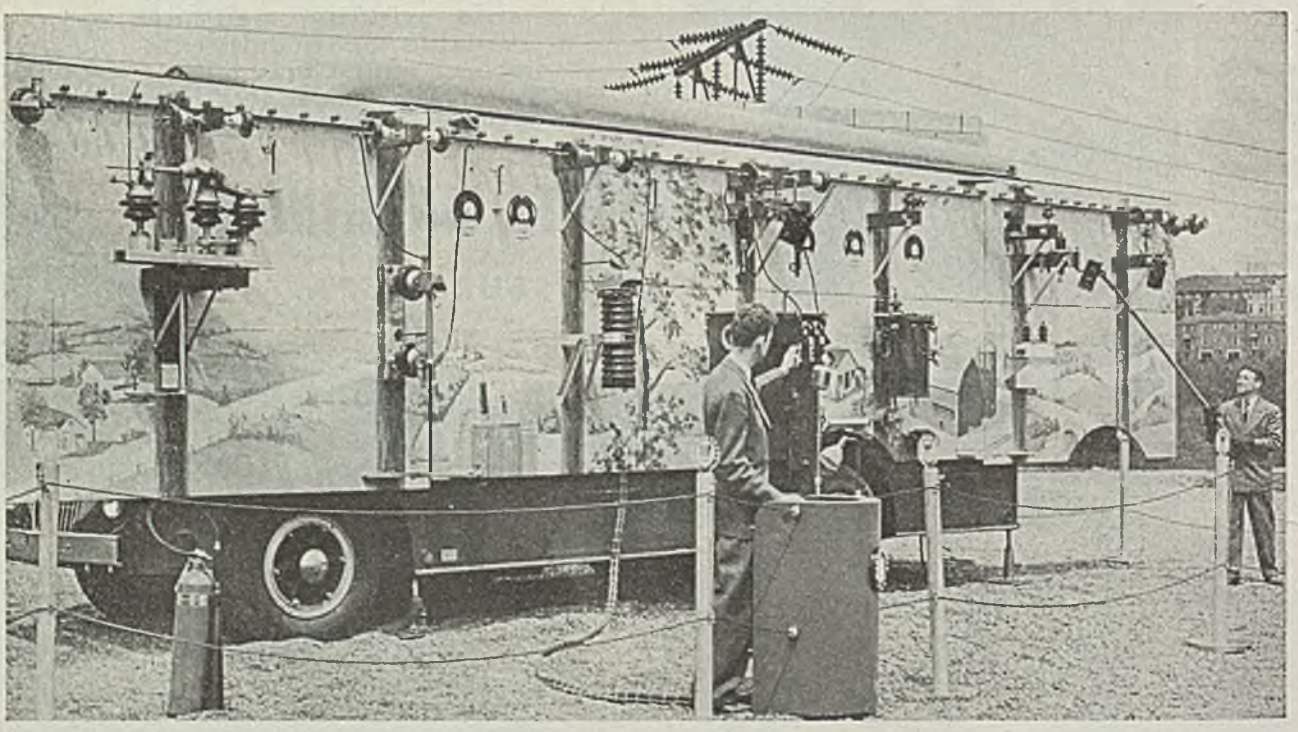
Other auxiliary equipment the company has designed includes parts and chip separating screens, hoist pans, separating tables, chip bins, unloading boots, hot oil and water dip tanks, and hoppers. Hand electromagnets for separating work, a magnetic parts separating machine, mechanical chip separator, etc., are also available. The accompanying sketch shows a typical installation adapted to the mass production type of operation.

A feature of the company's operations is a sample process department equipped to do all types of Roto-Finishing work and to determine the recommended procedure on various types of parts. As a sample part is received, it is cataloged and prejudged for a suitable type of finishing treatment. Then the processing is started and carried to the point where the desired type of finish can be matched. Details of the treatment are recorded in a permanent file of all parts processed, and results thereby can be duplicated at will. Full information is obtained on the types of materials to be used, approximate cost figures, procedures, etc. As many as 125 individual studies have been going on in this laboratory at a single time.

While service engineering on finishing problems is supplied by the Sturgis plant, materials and equipment are sold through distributors.

—o—

Solid carbide drills in diameters ranging from 1/16 to ½ in., and in lengths 2½ to 6 in. are now available from Willey's Carbide Tool Co., 1340 West Vernor Highway, Detroit.



ELECTRICAL DEMONSTRATOR: This specially designed truck will demonstrate Westinghouse electrical distribution equipment to public utility organizations throughout the United States. Demonstration is based on operation of power line energized at 2400 v. Line simulating some 5 miles of construction, is complete with disconnect switches, boric acid fuse, step-voltage regulator, self-protected distribution transformer and other devices. Cutaway sections showing interior construction are mounted on other side of truck

Jones and Laughlin winds over 4000 miles of wire per day

with redesigned equipment and use of electronic controls

OVER 4000 miles of 0.041-in. wire, or between 80 to 125 thousand pounds of it, are wound in a 24-hour period at Jones & Laughlin's Wire Rope Division, Muncy, Pa., as a result of redesigned mechanical equipment and the use of electronics, it was reported recently.

Wire production at the plant was more than tripled on each winding line, it is said, with the use of General Electric Thy-mo-trol units plus four 1-hp and four 2-hp motors in the new setup.

Previously, all wire at this plant had been wound on group-winding machines, each consisting of six winding bobbins and six unwinding swifts. Bobbins were driven by one constant-speed induction motor, through line shafts, gears and individual disconnecting clutches so that the wire speed increased as the wire continued to build up on the bobbin.

Biggest disadvantage of this arrangement was that a breakdown on one machine put six lines out of order.

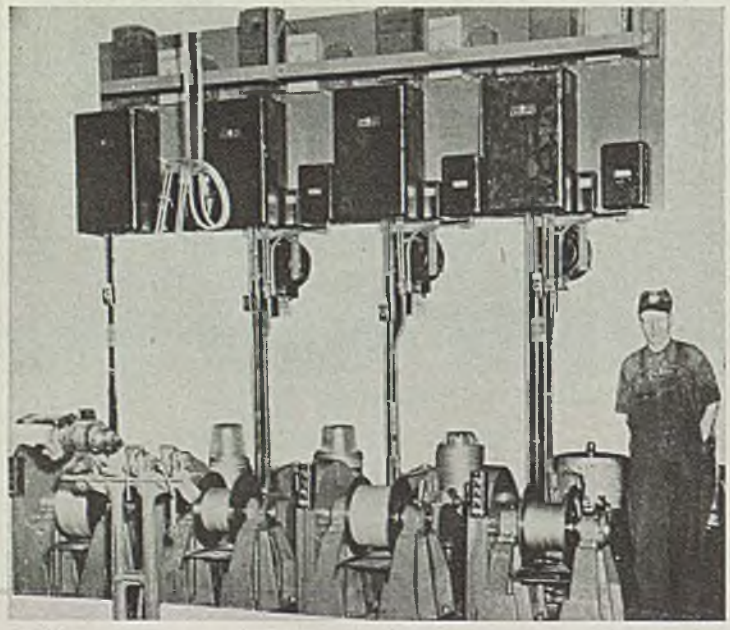
With the new equipment, the bobbin motor on each of four lines is rated 1 hp, 690/1380 rpm, 230 v, direct current, while those on each of the four lines used for winding heavier wire are rated 2 hp, 1150/2300 rpm, 230 v. The swift motor, which normally functions as a drag generator, is normally rated from one-fourth to one-third the rating of the bobbin motor.

The wire leaves the swift at an almost constant unwinding radius. That is, the loose wire coil is thrown on the swift in such a manner that the inner wrap of the coil is "peeled" off the swift at the bottom inside "corner" of the swift core at a linear wire speed directly proportional to the revolutions of the swift. The swift generator is loaded on an adjustable braking resistor. Thus, the swift generator controls wire tension and indicates wire speed. Fig. 1 shows arrangement of rewinding equipment.

The electronic equipment regulates the speed of the bobbin motor, making it possible not only to operate at higher wire speeds, but to hold wire speed constant throughout the full bobbin build-up.

The new controls are mounted directly above each of the lines, Fig. 2, which are side by side and parallel to each other. This arrangement also effected a 50 per cent saving in floor space over the previous group drives.

Another advantage of the equipment is that wire is wound more tightly and uniformly, with more wire per bobbin and fewer breaks. Moreover, limit switches stop each line when the end of the wire leaves the swift, relieving operators for other duties.



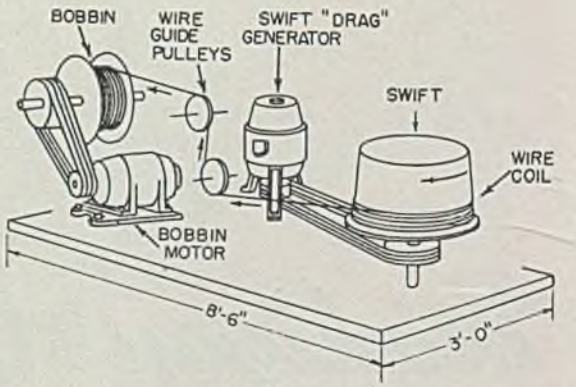
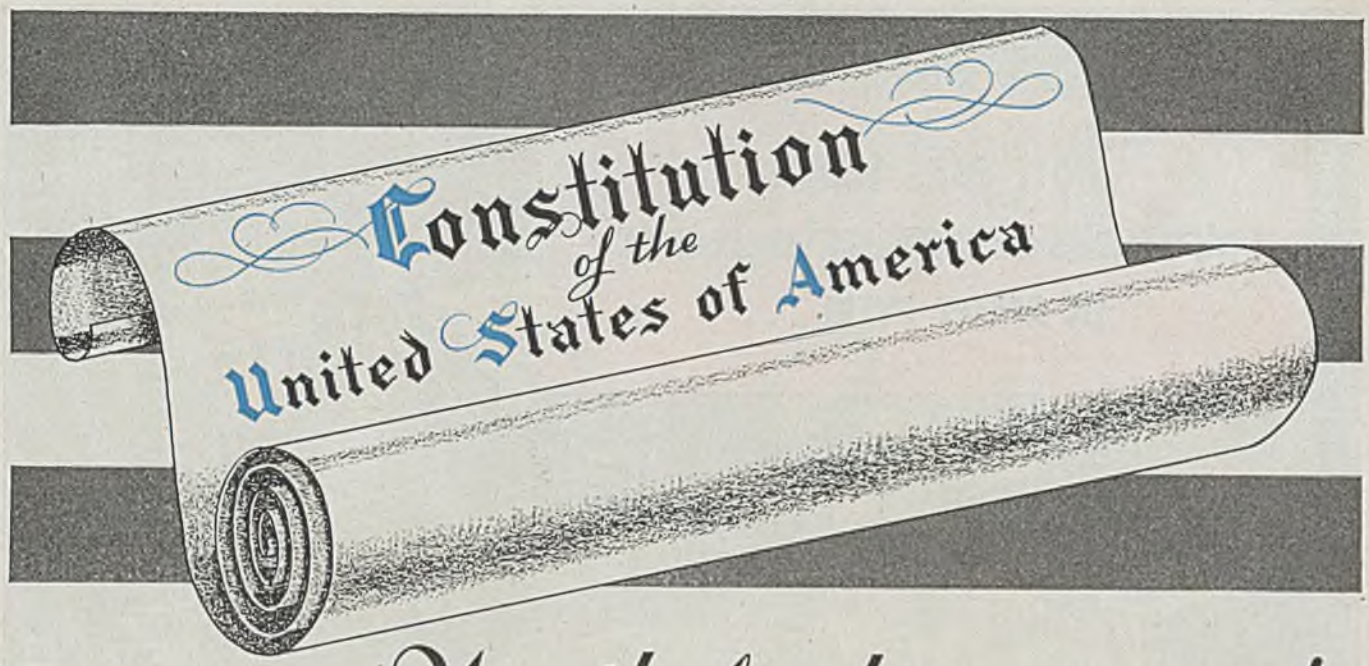


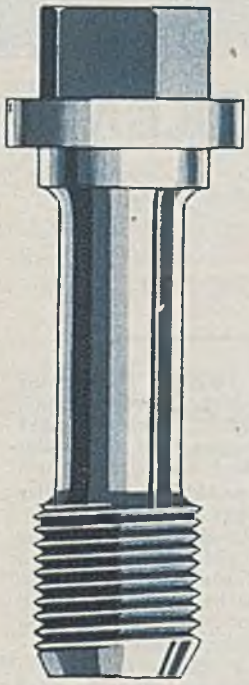
Fig. 1 (above)—Diagram showing arrangement of rewinding equipment

Fig. 2 (left)—Four typical wire rewinding lines, showing bobbins in front and unwinding shafts in rear. GE Thy-mo-trol control cabinets are mounted overhead as shown here



Worth looking up to!

The Constitution of the United States is one of the most important works ever conceived by the mind of man. It has no equal in the documentary annals of governmental society because it recognizes and guarantees the liberty and dignity of man. A public declaration of the principles of the United States, it has guided our Republic during a period of over 150 years, through revolution, rebellion, expansion, panic and world conflict. In a world blighted by incalculable greed and darkened by fear, the United States Constitution is a bright beam of hope.

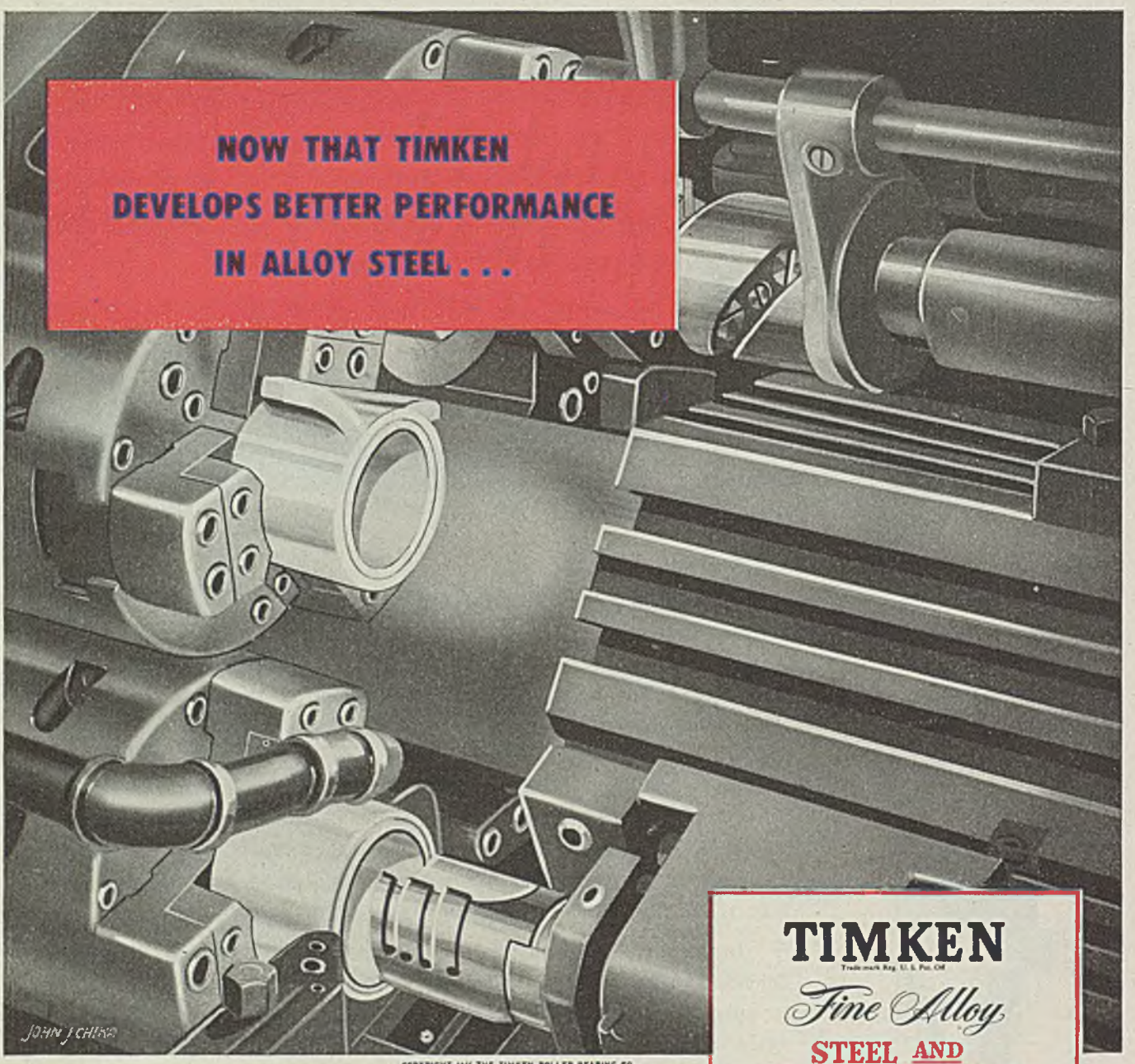


In the harsh and shouting times of war the Constitution never lacked defenders. When it trembled before determined assault the nation rallied to uphold it. Today, in the lee of an uneasy peace, the Constitution again trembles. Selfish politicians, greedy demagogues and pliant jurists tamper with it, warp its meaning, advance brazen misinterpretations, and craftily seek to undermine this supreme authority of the United States.

The CHANDLER PRODUCTS CORPORATION reaffirms its loyalty to the Constitution. Through the wisdom of our founding fathers and the grace of the Constitution we are a beneficiary of private incentive and free enterprise. And while our success is attributed to the fine quality of our products, our security is backed by the U.S. Constitution. May it forever safeguard American liberty!

CHANDLER PRODUCTS CORP.

1491 CHARDON RD. CLEVELAND 17, OHIO



— machine tool builders have new ideas!

From wartime experience of machine tool users, designers are working to improve further the performance of machines already considered miraculous. New plans call for more extensive use of Timken Alloy Steels; to provide increased strength, greater fatigue life, and those special performance qualities obtainable only through long experience with alloying agents and unusual processing methods.

Such steels originate logically in Timken mills where intensive work with special steels as well as standard analyses is going on all the time. Machine tool builders are making good use of fine grained Timken forging steel for gears and power transmission shafts. Highly alloyed Timken steels for great core strength in heavy sections. Timken Graphitic Steels for spindles, ways, slides, lathe centers and parts requiring unusual hardness and frictional properties. And these are only a few.

No other steel producer has equivalent experience in so wide a range of alloy steel applications. Write the Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio. *Timken Bearings, Timken Alloy Steels and Seamless Tubes, Timken Removable Rock Bits.*

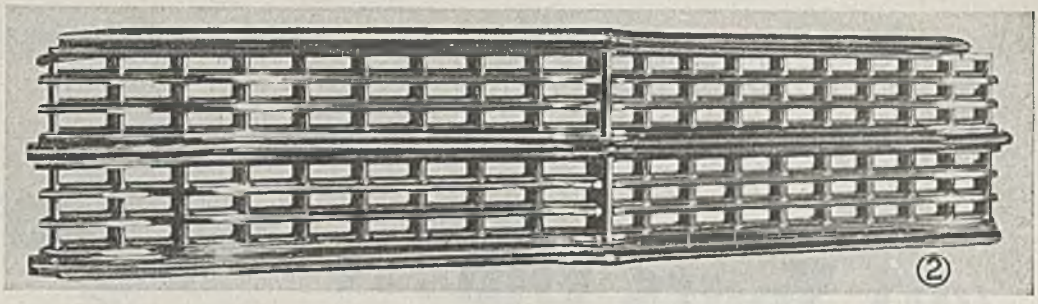
TIMKEN
Trade-mark Reg. U. S. Pat. Off.
Fine Alloy
STEEL AND SEAMLESS TUBES

TIRELESS STEEL FINGERS. Hardly any part of an automatic screw machine, lathe, or milling machine takes greater punishment than the collet which grips and holds the work.

When one machine tool builder wanted to make an exceptional collet, he searched far and wide for an alloy steel which would supply the great strength, hardness and high resistance to fatigue he required. Of all steels tested, none performed so well as a certain Timken Alloy Steel.

Not a special steel either—just a standard Timken analysis processed under the direction of metallurgists who know how to develop desired properties and combinations of properties in alloy steel. Proving again that in alloy steel making there is no substitute for specialized skill and experience.

★ YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



Die Castings

. . . are back on most new automobiles

By C. R. MAXON
Market Development Division
New Jersey Zinc Co.,
New York

DIE CASTINGS are used in a variety of both mechanical and decorative applications on the 1946 automobiles and will be similarly used on 1947 models. This is due primarily to such factors as the ability of the metal to assume intricate shapes while meeting structural requirements, fine finish that lends itself to the popular chromium plating, and resistance to weathering.

Bright chromium plated surfaces are liked because they contribute in marked degree to modern styling. As styling depends largely upon shape and surface finish, the designer selects the type of product that is available in the precise shapes desired and with the smooth, easily plated surfaces required.

Naturally the die casting also must meet the necessary structural requirements and must withstand severe weathering in such a way as to retain fine appearance indefinitely. These conditions have been and are being fulfilled, especially as zinc die castings are not stained by their own corrosion products.

While these may appear to be minor considerations, they are in fact prime factors in the return of zinc die castings to prominence. The case for die casting is a strong one when, in addition, their contribution to economy of manufacture and suitability for creating wanted shapes hard to make by other processes are contemplated.

The die casting is not quite so prominent in the cheaper cars, especially for large grille and front end components. This is because — when quantities required are very large—stamping dies for parts of certain shapes become feasible and overall costs can be decreased if stampings are chosen.

But even where grilles are largely stamped some die-cast center moldings or other trim often are added, if their cost can be justified, because the die casting does afford some appearance advantages. Moreover, the die casting is available in shapes and with integral lugs or other integral fastenings needed.

Where parts that perform purely mechanical or structural functions are concerned, and appearance is of secondary or negligible importance, the die casting retains all its prewar popularity and has found some new uses. None of the other casting processes have noticeably encroached on the field of the die casting, and there are no well defined indications of any substantial inroads upon automobile die castings by either

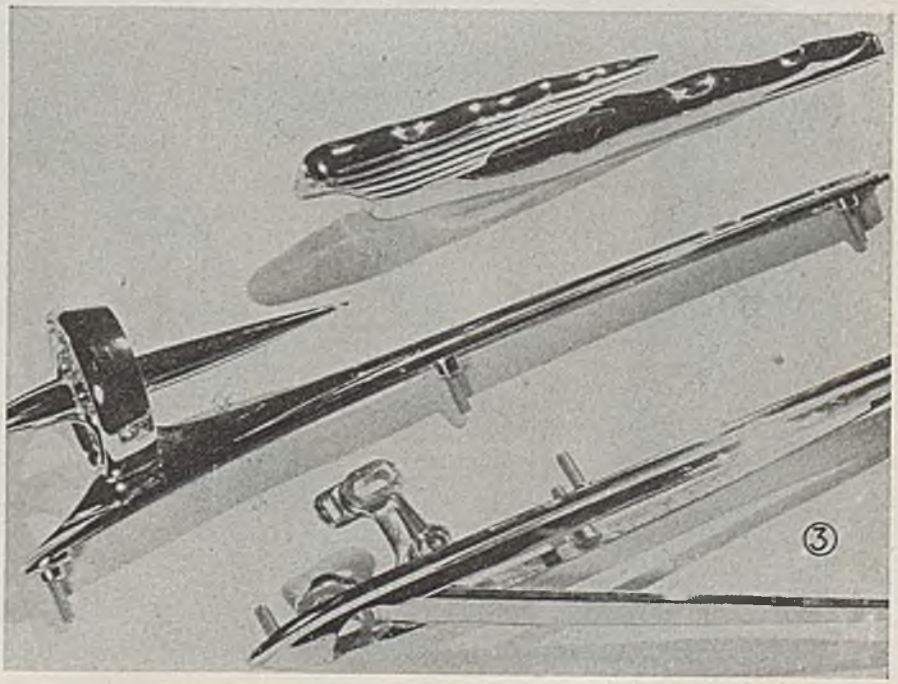


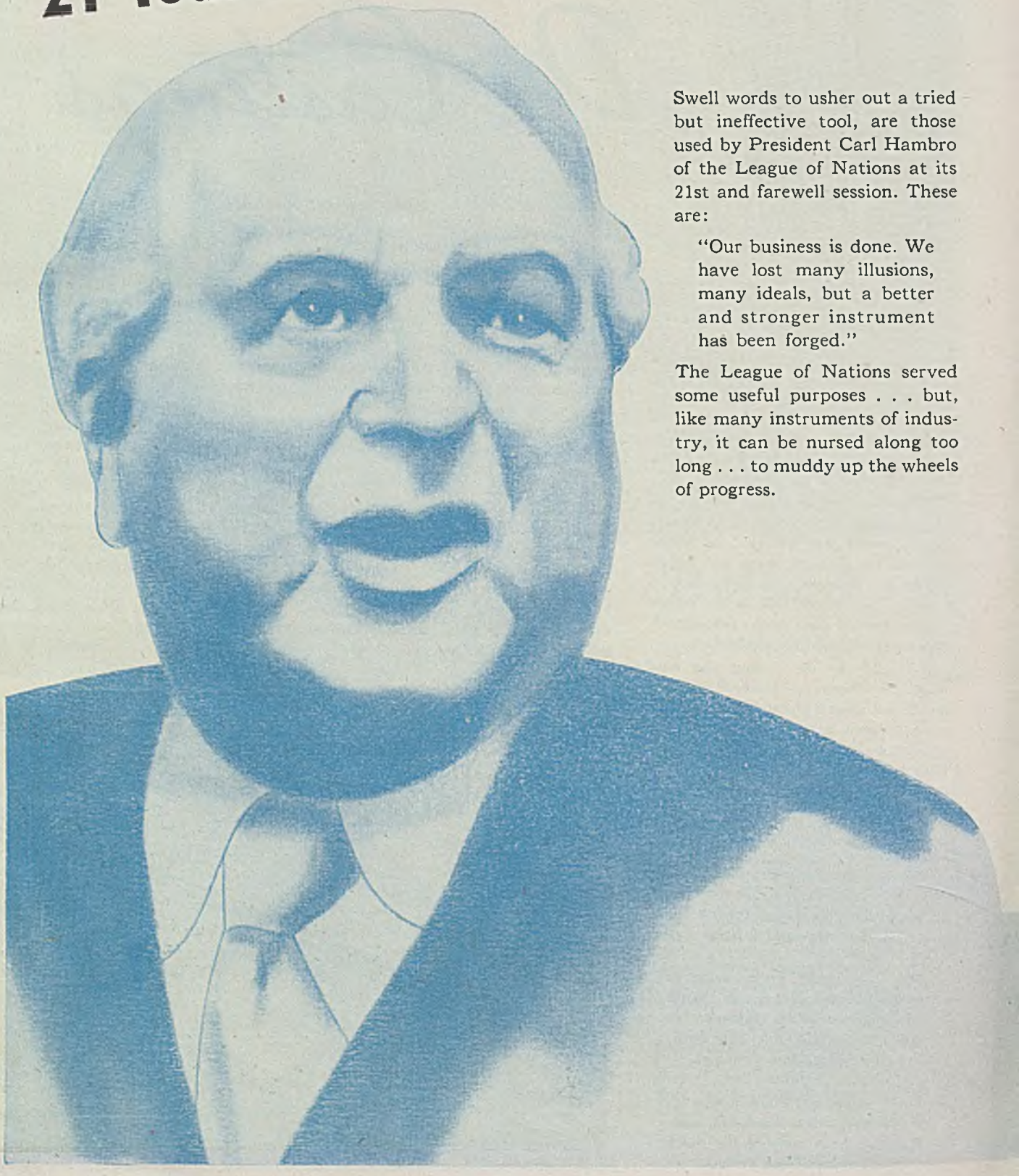
Fig. 1—The Packard grille. Outer sections of grille (not shown) are notched in one upper corner to fit around the parking lights

Fig. 2—Chrysler grille, made in several sections, has its major horizontal moldings extended in separate castings that run backward along front fenders

Fig. 3—Nash and Buick hood ornaments and, below them, die castings that form parts of the Buick hood lock

then he said to himself:

"21 Years Old . . . Still Toothless"



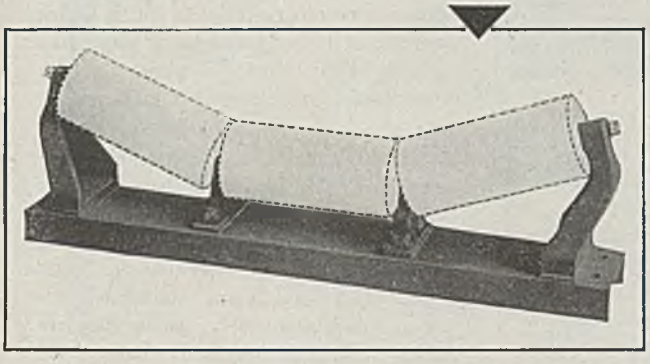
Swell words to usher out a tried but ineffective tool, are those used by President Carl Hambro of the League of Nations at its 21st and farewell session. These are:

> "Our business is done. We have lost many illusions, many ideals, but a better and stronger instrument has been forged."

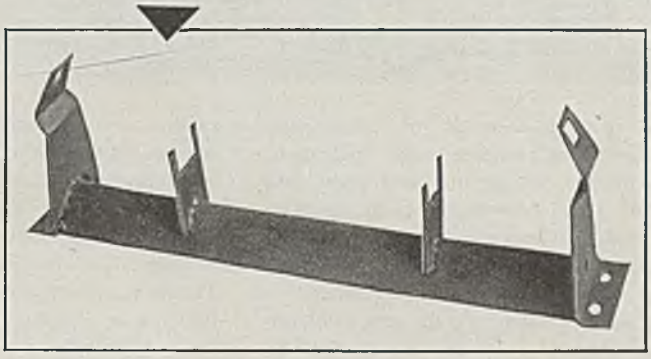
The League of Nations served some useful purposes . . . but, like many instruments of industry, it can be nursed along too long . . . to muddy up the wheels of progress.

HERE, MR. HAMBRO, **are results obtained by one manufacturer with an instrument for better products at lower cost:**

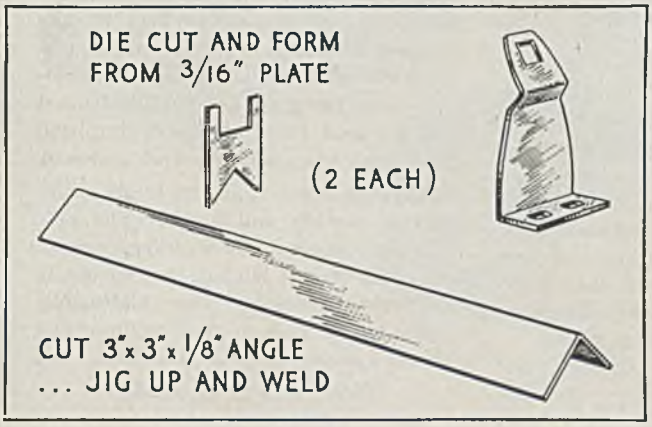
FORMER DESIGN
$4.97



WELDED DESIGN
$1.48



WELDED DESIGN IMPROVES THIS PART ... CUTS ITS COST 70%



Pioneer Engineering Works, Minneapolis, reports these benefits by changing over to welded design for the troughing idler units of their portable conveyors:

SAVES $3.49 EACH. Former unit of conventional design cost $4.97. Today's unit of welded design costs $1.48, including material, labor and factory overhead. Saves $3.49 or 70%.

IMPROVES DESIGN. Welded design is 66% lighter, cutting dead weight on conveyor frame. Shape of angle base prevents spilt material from collecting under rollers as it did formerly.

SIMPLIFIES PRODUCTION. Component parts of welded design (see sketch, left) are made from standard steel stock . . . cut, formed and welded to any specification, when needed.

The Lincoln Engineer nearby will gladly help you study the application of arc welding to *your* problems. Machine Design Studies free on request to engineers and designers.

THE LINCOLN ELECTRIC COMPANY • DEPT. 24 • CLEVELAND 1, OHIO

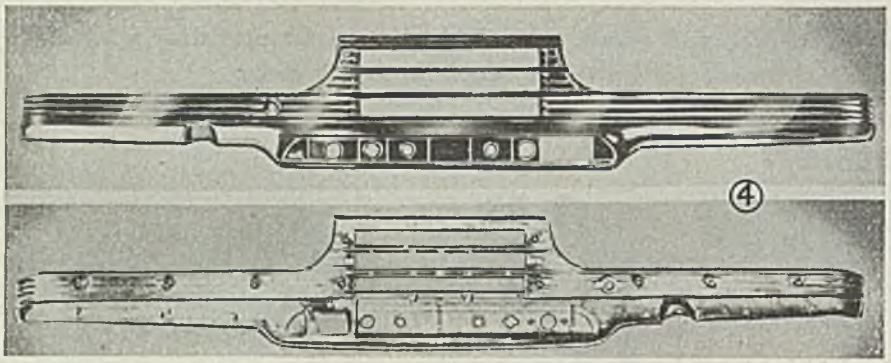


Fig. 4—Front (above) and back of die-cast portion of Oldsmobile instrument panel

new or old methods of fabricating.

There are, however, some indications that the die casting, in combination with certain types of wrought parts, is gaining added importance, especially in larger engine parts. In any event, crankcase and cylinder units for engines of average size have been die cast in aluminum alloy, at least on an experimental basis, some with steel insert cylinder barrels. Such units require casting machines of extreme size. They have not been used in passenger cars (except, many years ago, in lower crankcase sections) but there are possibilities in that direction that will bear watching.

Zinc die casting has a dominant position (probably exceeding 95 per cent of the total die casting tonnage) in passenger car applications, even though alloys used are higher in price than before the war, and aluminum alloy prices are substantially lower than in prewar days. Some predicted that with this price shift, aluminum die castings would displace many in zinc alloy, especially where no plating is required, as costs per casting might be lower, but such predictions have not been realized, at least to a perceptible degree. Factors that continue to favor the zinc alloys are: Fast and easy casting, excellent mechanical properties, larger casting facilities, and availability of dies for zinc castings that require little or no alteration to meet current needs. Weight per casting is considerably greater than aluminum, but this factor has not been of controlling significance in most instances.

Where plated die castings are required, the zinc alloys have been favored, as they plate readily at moderate cost. Platers have not yet worked out systems for plating aluminum die castings on a scale approaching that for zinc alloys. Thus zinc die castings not only retain their popularity, but probably will be plated on an even larger scale.

There is, however, a considerable production of aluminum die castings, especially for certain transmission and brake parts. Some of these are for use where hydraulic fluids may attack zinc. In other cases, lighter weight aluminum castings are desirable and costs also may favor this type.

During the war, there was a marked increase in the demand for aluminum die castings, especially for aircraft and for other applications where light weight was required. This led to a corresponding increase in cold chamber machines for die casting aluminum and some machines for zinc were converted to use aluminum. Many of these machines have been reconverted to zinc and many new machines for zinc have been added.

Die castings are being applied very much as in prewar cars except that details of design, especially for styling or appearance purposes, have been altered. Radiator grilles continue in die cast form on nearly all cars in the medium and higher price ranges (Fig. 1). Such grilles consume a larger tonnage of zinc than do any other individual parts, but the total of other uses exceeds that in grilles.

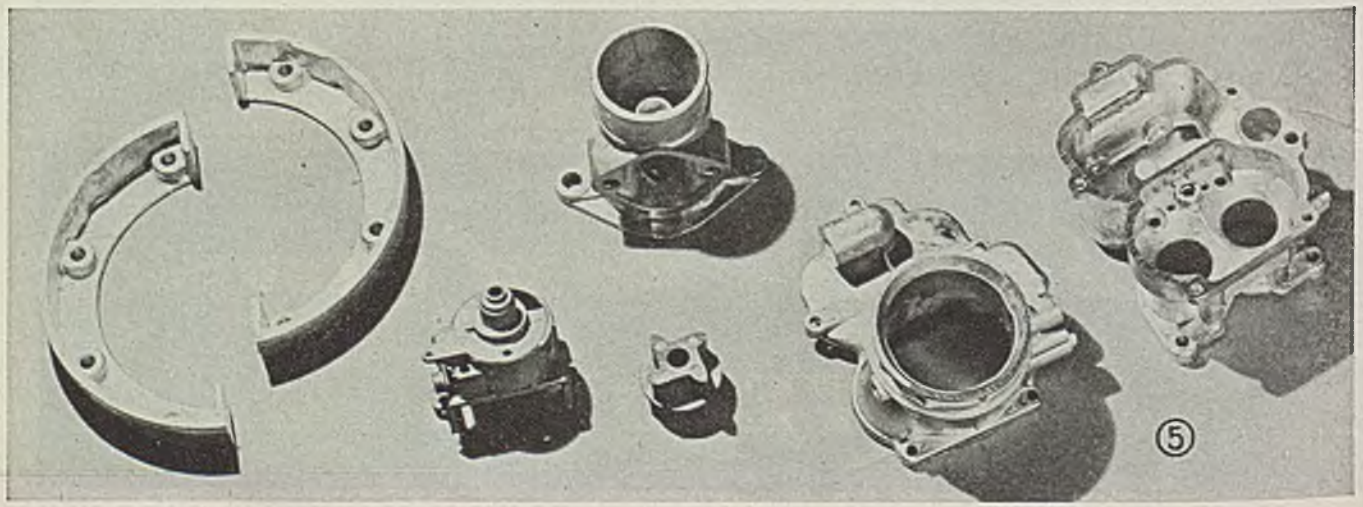
It is quite common to die cast grilles in several sections, and nearly all grille assemblies are low and broad rather than high and narrow, as in many earlier years, the Packard grille shown being an exception. Many grilles that are largely die cast have some stamped components and, conversely, grilles that are largely stamped frequently have some die cast trim. The particular forms chosen are controlled in part by whims of designers and, in part, by requirements in production, including production equipment available.

Some headlamp bezels are stamped, often from stainless steel, but others are die cast. Choice in this respect has been influenced in some cases by the availability of dies rather than by any inherent advantage in either type. Somewhat the same is true of external moldings, these being applied in both die cast and stamped form, usually with plated finish even when stainless steel is chosen.

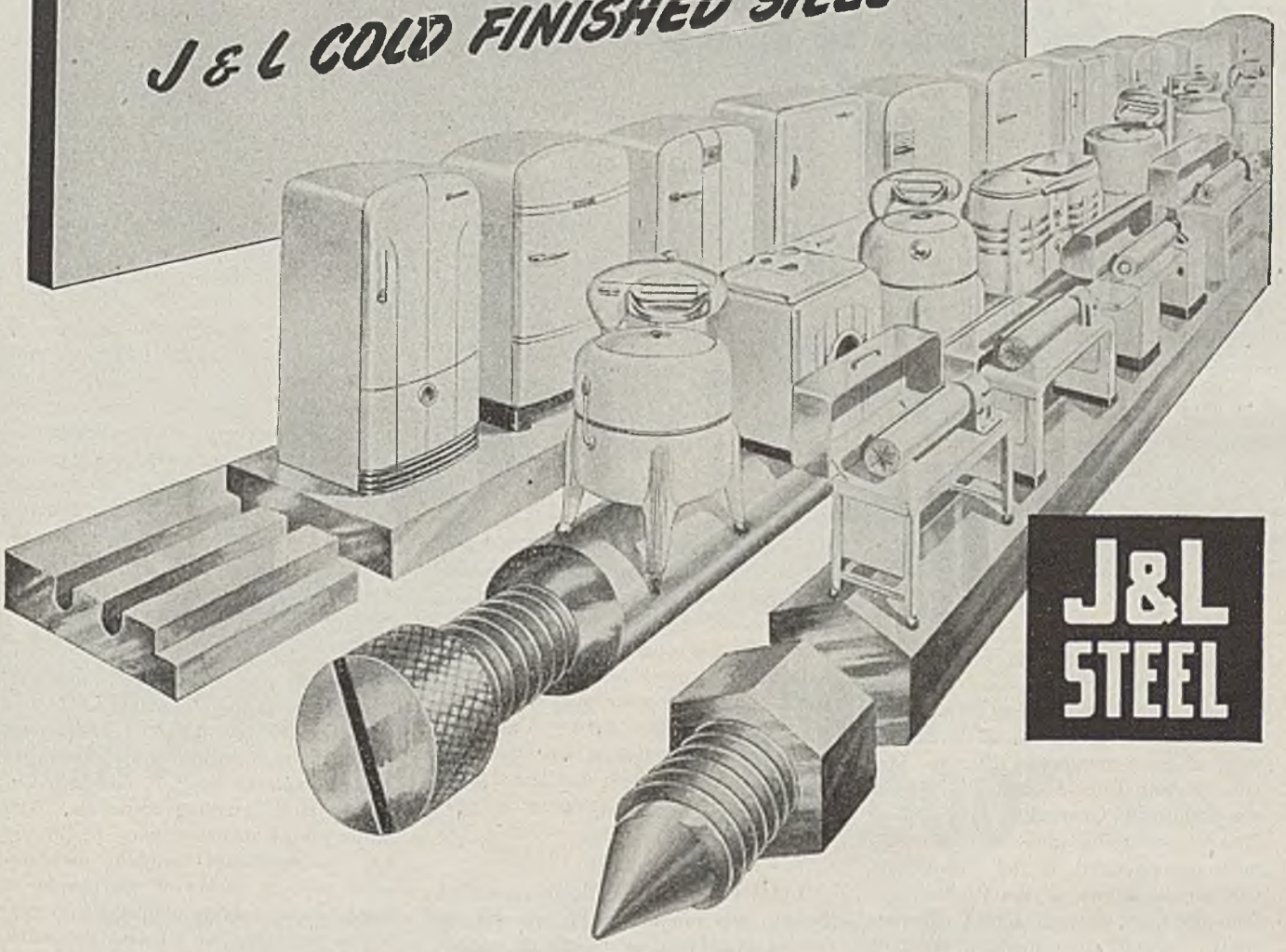
There is extensive use of bright moldings on fenders and hoods. The new Chrysler carries grille moldings around onto the front fenders in separately die cast elements. The Oldsmobile grille is die cast in five sections that appear somewhat like moldings, but

(*Please turn to Page* 148)

Fig. 5—Typical zinc die castings for purely mechanical as opposed to partly decorative applications. Included are parts for grease seals, speedometer frame, door latch, fuel pump, and carburetor



For Accurate Machine Parts at Reduced Cost ... use J & L COLD FINISHED STEEL



Your machine parts can be made at lower cost from J&L Cold Finished steel because it is uniform. This means faster cutting speeds, less tool wear for you.

At J&L, steel for cold finishing is made expressly for that purpose. The required quality and grade are specifically outlined when the iron is made in the blast furnace, converted into steel at the Bessemers or open-hearth furnaces and rolled into bars or special shapes. The long experience of Jones & Laughlin in the production of Cold Finished steel from the time the process was invented by them further assures the uniform quality of the product—a quality that will enable you to step up your production of accurate machine parts. Write for further information.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

ENGINEERING NEWS *at a glance*

WORKERS attending oil baths and furnaces are permitted to perform other duties when their equipment is equipped with the new temperature regulator now in production at the plant of Washington Glass Laboratory & Instrument Co. The development is equipped with a signal light which glows brilliantly while temperature of the equipment is rising, and shuts off when proper temperature is reached. According to the Washington company, the regulator handles temperatures from minus 30 to plus 500°F. It has a sensitivity of plus or minus 0.02°F or better.

ONE way operators in plants processing corrosive liquids can eliminate spillage and fumes—those of foremen included—is to use a Monel device developed by Pennsylvania Flexible Metallic Tubing Co. According to "Process Industries Quarterly" International Nickel Co. publication, the development manufactured by the Philadelphia company is known as the Penflex filler that stops the flow of liquid automatically, "telling" the operator about it with a metallic click. The device also is equipped with a fume ejector that keeps harmful vapors away from the operator. It handles concentrated caustic solutions, hydrochloric and sulphuric acids and numerous other corrosive liquids.

AT a recent meeting of the Detroit section of American Institute of Engineers in that city, Don P. Caverly, commercial engineer for Sylvania Electrical Products Inc., explained to engineers how electron tubes work and where they are applied to perform exact tasks in industry, communication and transportation. In one of the demonstrations at the meeting, Mr. Caverly showed how industrial electron tubes, called strobotrons, are used to stop motion for the study of stresses in high-speed rotating machinery and airplane propellers. He also explained how they are used to study and record mechanical vibration, radio active metals and cosmic radiation.

STAINLESS steel parts by the powder metallurgy process are now being offered on a mass production scale by Micro Metallic Co., Forest Hills, N. Y. The company reports the process is well adapted to making machine parts where corrosion resistance or self-lubrication are advantages sought, or where the particular combination of high strength and ductility is desired. According to the concern, advantages common to the powdered metal process, when applied to other metals, also are shared by stainless steel. These include mass production at low unit cost. Latter is more so with stainless due to the elimination of machining in producing parts.

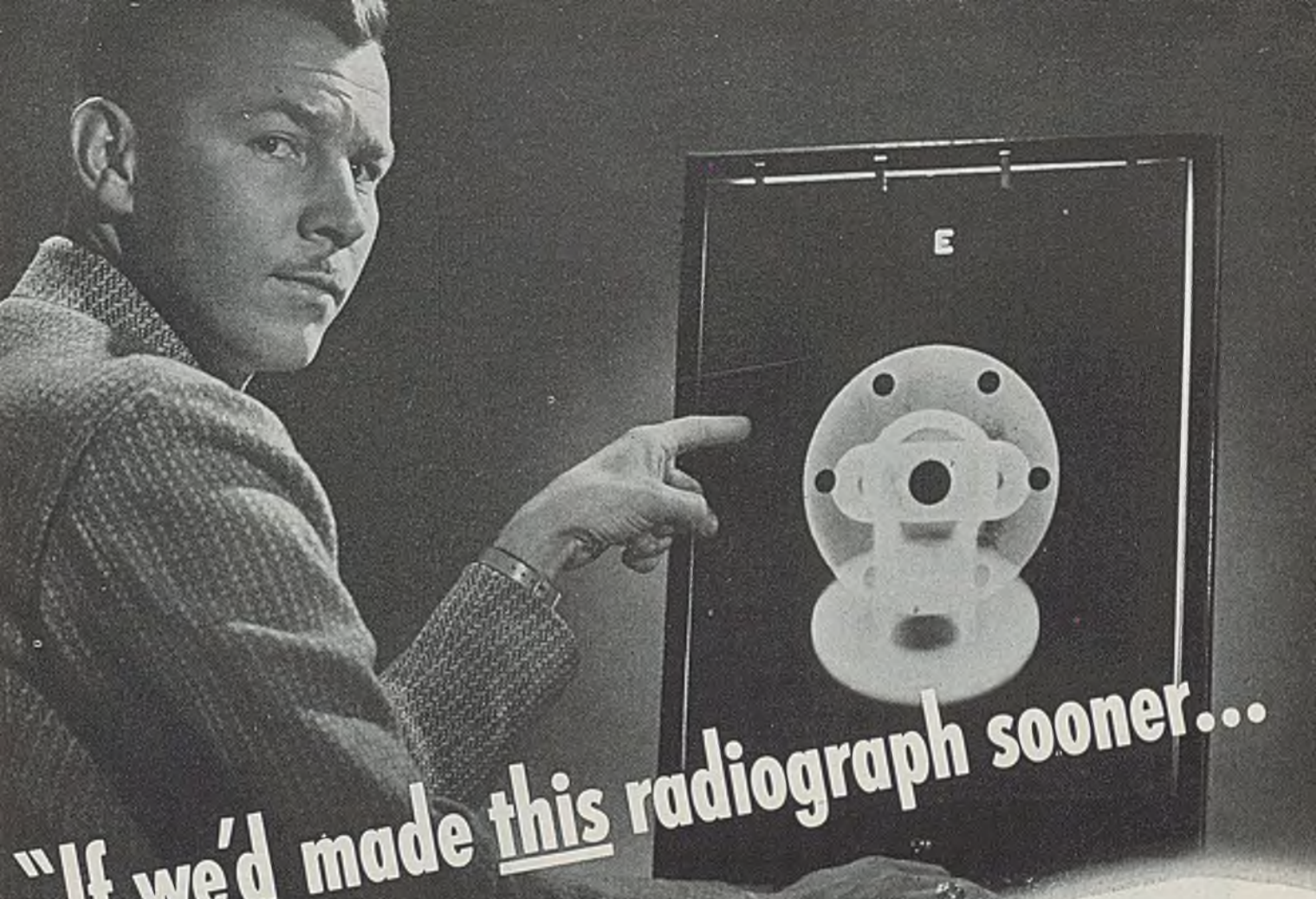
LOADING operations involving several freight cars are materially speeded by use of portable dock boards of magnesium which can be shifted in place by one man. Although they weigh 77 lb, lengthy service of the boards proved they can bear a motorized plant truck with load totaling 1600 lb. Boards measure 42 x 66 in. and are built of ¼-in. magnesium plate, reinforced with 2-in. I-sections with side pieces of 3-in. channels. The magnesium boards, manufactured by Edw. S. Christiansen Co., Chicago, were designed with the aid of Dow Chemical Co.

DEW point of high-pressure noncorrosive gases can be taken through a pressure reducing valve by means of a model 8 indicator now in production in Chicago at the plant of Illinois Testing Laboratories Inc. The instrument is said to take samples from surrounding air or any enclosed space—tank or gas cylinder—quickly providing an accurate determination. Especially useful in connection with air conditioning and refrigeration work and with controlled atmospheres in furnaces, the indicator is accurate below 32°F as well as above. Indications take place in an enclosed observation chamber under conditions which can be controlled and reproduced.

HUNDREDS of magnetic links, called "lightning spies," are being used on a wide scale in Peru to aid General Electric Co. in planning protection against direct lightning strokes in transmission systems. Latest installation in the company's research program is one to be made on top of the Andes, where main power lines cross at an altitude of nearly 16,000 ft. According to Dr. John G. Hutton of GE's high-voltage and electromagnetronics division at Schenectady, N. Y., data gathered on the behavior of lightning currents at high altitudes will enable engineers to design better transmission lines, electrical apparatus and protective devices to render them more effective in the presence of lightning. Magnetic links are magnetized by the lightning in proportion to the highest value of the current in the stroke. Magnitude of current in the stroke is determined by placing the link in a surge crest ammeter.

RUBBER can be attached directly to the surface of metals with an adhesion exceeding 500 psi, in practically an integral union by means of the Vulcalock process employed by B. F. Goodrich Co. to line tanks handling corrosives. The Akron rubber company states the process has "revolutionized" handling of corrosives since it makes it practicable to combine the stability of metal with corrosion and abrasion resistant properties of flexible rubber. The process makes it possible to handle successfully such liquids as 50 per cent hydrofluoric and sulphuric acids in addition to muriatic, phosphoric and hydrofluosilicic acids.

HOLLYWOOD, it seems, still is a colorful city in more ways than one. Krieger Color & Chemical Co. reports from that city it is making a dye bound to solve the color problem for a lot of plastics people. The dye solution is used at room temperature, and procedure for coloring plastic products is simple. Parts are merely dipped in the solution and completely immersed for 1 to 10 min, depending on the depth of shade desired, removed, washed with plain water. Colors available include red, rubin, blue, yellow, orange and a number of others.



"If we'd made this radiograph sooner...

...we'd have saved $30,000"

A manufacturer of valves, whose foundry technic seemed "okay," decided pilot radiographs weren't needed. But when machining was done and the valves assembled, enough were found defective to cause a loss of many thousands of dollars.

Radiography, put to work at the right time and place, pays off. Men who have figured *cost-wise* what it can do for them . . . to improve design, speed production, and lower costs . . . make full use of x-ray.

Radiographs show your engineers where to correct faulty design . . . how to reduce weight safely . . . how to cut costs at many stages of manufacture . . . how to build in extra dependability.

Order-jammed foundries get a welcome production spurt when radiography shows how to get into sound casting production fast. High-value, high-volume machine shops operate at rock-bottom cost when radiographic inspection keeps internally unsound castings off the production line.

Welding gains acceptance . . . new markets . . . higher volume . . . because radiographs prove weldments sound.

And these are only a few high spots in radiography's list of industrial functions. You can find more—if you look for them—right in your own plant. Why not get together with your radiographer or the local x-ray dealer and see if you are missing any chances to make radiography pay extra dividends? Or write to

Eastman Kodak Company, X-ray Division
Rochester 4, New York

Radiography —another important function of photography

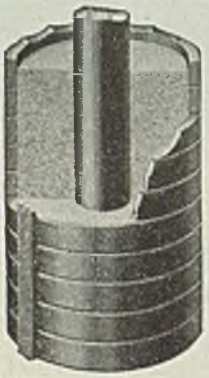
Kodak

Exide

IRONCLAD BATTERIES

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

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



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

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

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

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

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

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

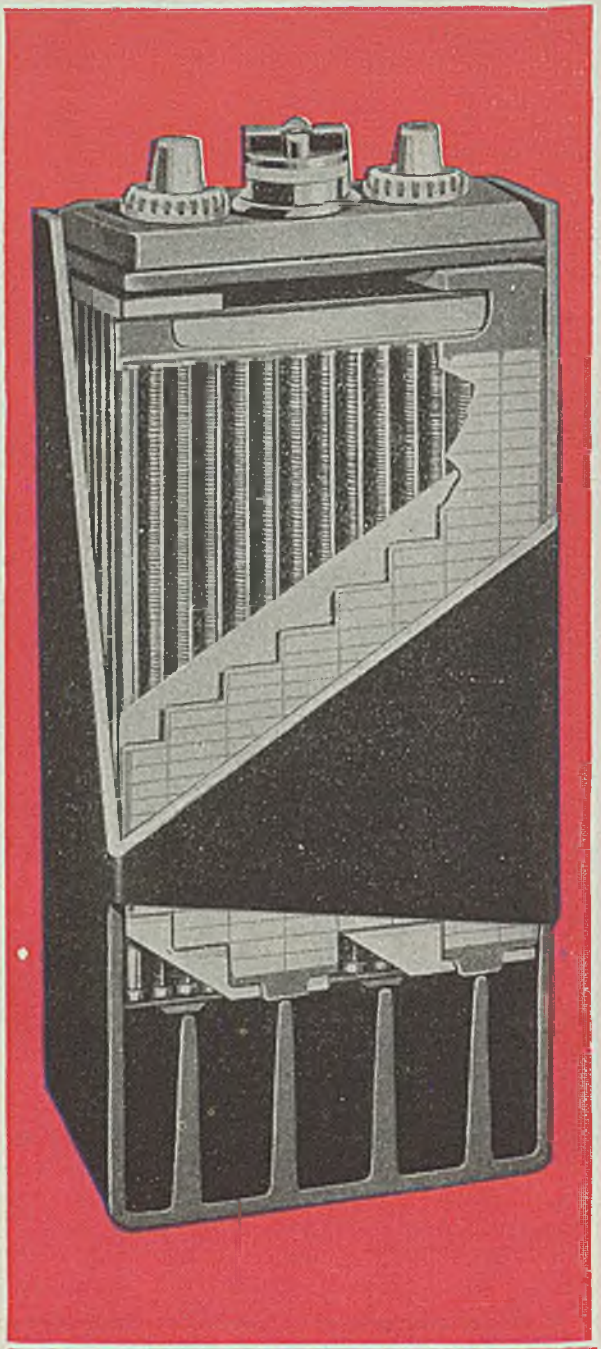
★ ***HIGH MAINTAINED VOLTAGE*** throughout discharge.

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

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

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

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



Shaped Wire

(*Concluded from Page* 91)

If cold coiling is to be performed on the shape, e.g. coiling springs or keystone shaped lockwasher wire, this finish containing a dry soap film acts as a lubricant in the dies and prevents galling. Subsequent heat treatment removes this coating.

5. Galvanized (zinc coated) Finish—
   Some types of finished shapes in outdoor applications, such as cotter pins and armor wire, are exposed to atmospheric attack. The use of a zinc coating on these shapes prolongs their useful life in direct proportion to the weight of coating applied.
6. Tin Coating—
   This type of coating is used primarily for the brilliant luster that can be obtained. It should be pointed out that the normal metal potential of tin is electro-negative with respect to iron and consequently cannot be considered a good protective finish.
7. Cadmium Coated Finish—
   Cadmium is also like tin in that it should not be used for its protective value alone.
8. Lead Coated Finish—
   This finish is usually offered in the stainless grades to facilitate coiling of shaped spring wire. After coiling the lead is removed by acid treatment.
9. Brown Oxide Finish—
   The lubricating values of stainless oxide with dry soap surface are well known. The finish permits coiling of stainless spring shapes without galling in the dies and in hidden applications does not need to be removed.
10. Pickled Finish—
    In stainless applications where a dead soft and clean shaped wire is required, the manufacturer can anneal, clean, and passivate the wire as a final operation. The pickled shape has a dull or satin appearance. By strict control of the acid bath and the use of electricity a bright electro-polished surface can also be obtained.

The testing and inspecting of shaped wire is a specialty field in itself. The contour of various shapes must be accurately determined and the tolerances checked by the use of suitable electrical projector equipment. Magnification of the smaller sizes of shaped wires permits observation and measurement of radii, angles, and curves that cannot be controlled otherwise, yet which must be absolutely correct for the future use of the wire. Special gages and bending fixtures are employed to put the wire through the various tests it is required to meet. Testing must be continuous throughout the processing, and final checks must guarantee that the finished product meet all specifications before shipment.

The consumer can help in the manufacture of shaped wire by allowing the widest tolerances and the greatest spread in analysis, together with the highest range in physicals that will enable him to employ the shaped wire in the manufacture of his completed article, thus enabling the shaped wire maker to give him satisfactory material at a reduced cost. To this end, free interchange of information as to processes, necessary working, and end use is essential between shaped wire maker and final processor, in order that user will be satisfied.

Turning Wire Into Bobby Pins

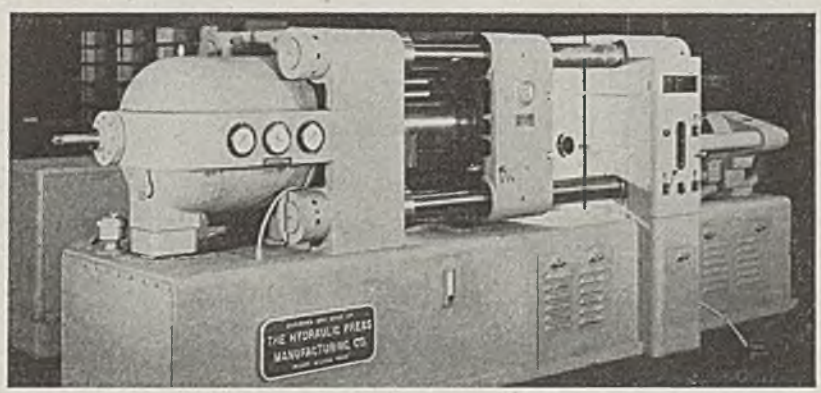
It may seem a far journey from a blonde with an up-swept hair-do to a flame-red billet of steel, but two stages in that journey (each stage consisting of many small steps) are taken by the wire mill that rolls the rods, draws the wire, and draws or rolls the shapes, and the fabricator who takes his specified shapes and, sometimes with the most intricate machines, turns the shaped wire into bobby pins for keeping in place the lady's hair. So it is with many other uses of shaped wire; through the skill of the shaped wire department the manufacturer is able to turn out a constant quality product in quantity, at prices that would seem unbelievable to anyone following the metal through the manifold steps it takes to reach its end use.

Shown in Fig. 4 are every day articles formed from the following shaped wires: Keys from hexagonal or octagonal drawn wire; cotter pins from a half-round rolled; lockwashers from a keystone shape, either rolled or drawn.

The portion of a well screen shown in Fig. 3 is used to keep gravel and sand from entering the water pump. Two special shapes are employed—a wedge or keystone shape with the large end outside to prevent clogging of the screens, and the supporting members having a teardrop or pear shape to facilitate welding of the assembly. Other end uses of shaped wire are shown in Fig. 2, with name of each article and type of shaped wire employed given in the attending caption. Fig. 1 illustrates the standard shapes produced by Page Steel and Wire Division.

While standard shapes such as squares, half rounds, rectangles, cotter pin sections, and ovals, are produced without special tooling-up charges, it must be realized that any new shape ordered will have to be carefully engineered and will require often special dies or rolls, finally developed after extensive exprimentation to produce the desired contour. The tendency for metal to flow under pressure must be carefully guided in order that the entire area of the die or rolls be filled.

Accompanying table shows the general types of shapes and lists, for various metals, some of the uses that are made of each type. This table could be continued indefinitely as the great degree of accuracy as to size and section and the clean, smooth surface offered by shaped wire makes it most attractive to a constantly increasing host of users of shaped wire.



HIGH-PRESSURE DIE CASTER: Above is one of two new high pressure die casting machines developed by Hydraulic Press Mfg. Co., Mt. Gilead, O., for casting magnesium, aluminum and copper alloys by the cold chamber process. Mold clamping, metal injecting, core pulling and ejecting units are all operated by direct hydraulic means. Main difference in two machines is plunger speed, higher speed being necessary for magnesium than aluminum. Injection capacities may vary from 12½ to 100 cu in. per cycle with pressures from 6000 to 50,000 psi, depending upon plunger diameter. Control of machine is semiautomatic

Torsional Properties

(*Continued from Page* 94)

the metal will stand when the metal is completely exhausted regarding plastic deformation, i.e., the metal is twisted until it will twist no more and the torque required to do this determines the torsional strength using equation (2).

2. During the torsional test the dimensions of the specimen change relatively little so that the original dimensions of the specimen are valid for calculating true torsional strength. In the tensile test once necking starts a notch effect is set up at the location of the notch and three principle stresses instead of one act on the specimen. This complicates the determination of TS'_b but has little effect on TS_n. Fig. 1 shows how these radial stresses, developed by the necking notch, caused a tensile specimen of 18-8 stainless to split longitudinally at 120° angles.

Let us call the torsional strength calculated from equation (2), using the maximum torque and original diameter, T_b.

From the above it is clear that no constant relationship for various metals should exist between T_b and TS_n, because the latter is based on the original area of the specimen which is usually greater than that obtained when TS_n is measured. Likewise no constant relationship would be expected between T_b and TS'_b because of the complicated stress conditions brought about by necking when the TS'_b value is obtained. The measure values of T_b, TS_n and TS'_b are given in Table V and the ratios T_b/TS_n and T_b/TS'_b are given in Table VI. It is seen that the ratio T_b/TS_n varies from 1.01 to 0.71 and is related to some extent to the reduction of areas; decreasing as the reduction of area decreases. This is probably due to the fact that reduction of area reflects the amount of elongation just before necking λ_n which in turn determines how much the actual area differed from the true area at the time TS_n was obtained. Values of λ_n are given in Table VII. The ratio T_b/TS'_b shows just the opposite relation to the reduction of area; increasing as reduction of area decreases. This is perhaps due to the fact that as the per cent reduction of area increases, the notch effect increases thus decreasing TS'_b.

The reasons why TS_n would not yield a constant ratio relative to T_b is that (1) TS_n is measured after very little plastic deformation compared with T_b and (2) the area used in calculating TS_n was not the true area at time of stress.

If corrections are made regarding these two items one might expect better relationships. If instead of using the original specimen area the actual area at time of maximum stress is used a true value which will be called TS'_n is obtained to correct item (2). To correct for the greater deformation mentioned a new torsional strength value, which we shall call T_n, needs to be determined. Then, T_n will be the stress necessary to twist the torsional specimen to give the same amount of shear strain that the tensile specimen has undergone when TS'_n was measured. In effect, this consisted of finding the elongation just prior to necking (λ_n) and then finding the torsional stress at a shear strain γ_n equal to twice this tensile strain. (A shear strain of a certain quantity is equivalent to a tensile strain of one half that quantity). The method employed was to measure the diameter of the tensile specimen at a distance of about ½-in. from the fracture on completion of the test, and then after calculating the reduction of area, q_n, the elongation, λ_n, was calculated from the formula:

$$\lambda_n = \frac{q_n}{1-q_n} \qquad (3)$$

At a distance along the torsional curve equal to $2\lambda_n$ the torque was determined and from this the torsional strength value T_n was calculated using a modified form of equation (2). Equation (2) was not applicable because the torque twist curves showed an appreciable slope at $2\lambda_n$. The equation used was:

$$q = \frac{12\,T}{\pi d^3} + \frac{4}{\pi d^3}\gamma_n \frac{dT}{d\gamma_n} \qquad (2a)$$

The values of λ_n, γ_n, T_n and the ratio T_n/TS'_n are given in Table VII. The ratio is quite constant for most of the steels being around 0.55, which is 10 per cent greater than the theoretical value of 0.50. This is in agreement with the results of Ludwik and Scheu who found a deviation of about 12 per cent for soft copper. Better agreements with the theoretical were found by Ludwik and Scheu for metals which did not work harden to as great an extent as copper. They found deviations of not over 7 per cent for hard copper, annealed aluminum, ingot iron, brass, packfong° and tombak.°° The results of the present paper show to the contrary that the best agreement is had with the metal showing most work hardening, 18-8.

There is one other torsional-tensile strength relationship which is of interest, that is the ratio T_b/TS'_n. In 1922 Sunatani[4] found that if he divided the maximum T_b, by the maximum true tensile strength based on the existing specimen areas (TS'_n) an amazingly consistent ratio was obtained for various metals as follows:

Annealed mild steel	0.67
Wrought iron	0.72
Annealed brass	0.65
Annealed copper	0.69

Table VI gives the ratios of T_b/TS'_n

TABLE VI

RATIOS OF T_b TO TS'_n, TS'_n AND TS'_b

Steel	Red. of Area %	T_b/TS_n	T_b/TS'_b	T_b/TS'_n
18-8 Stainless	72	1.01	.39	.65
Armco	72	.97	.39	.76
1030 (T)°	69	.77	.36	.69
1020 (N)	67	.84	.38	.66
1010 (N)	64	.84	.41	.67
1010 (T)	61	.76	.40	.71
1030 (N)	59	.82	.43	.67
1030 (A)	57	.83	.45	.67
1040 (T)	56	.80	.48	.75
1040 (N)	44	.74	.46	.66
1095 (N)	25	.71	.56	.65

° (N) normalized; (T) quenched and tempered; (A) annealed.

TABLE VII

VALUES OF T_n/TS'_n FOR STEELS

(Arranged in Decreasing Values of λ_n.†)

Steel	% Tensile Strain of Necking λ_n	Twist at $\gamma_n = 2\lambda_n$ in deg./in.	T′ Torsion Strength (at $2\lambda_n$) lb/in.³	Ratio T_n/TS'_n
18-8	56.2	368	73,500	.49
Armco	29.2	191	34,200	.59
1020 (N)	27.6	180	45,000	.55
1010 (N)	26.4	173	44,600	.56
1030 (A)	24.2	158	43,000	.56
1030 (N)	22.6	148	44,000	.56
1030 (T)	12.5	83	50,000°	.56
1040 (N)	12.5	83	64,000	.55
1095 (N)	10.6	70	77,600°	.60
1010 (T)	9.6	63	51,000°	.56
1040 (T)	8.3	55	101,000°	.74

°Approximate values. †Diameter of test bars was 0.350-in.

°Packfong or paktong is an alloy of zinc, nickel and copper used in China.

°°Tombak is any one of several copper-zinc, alloys used to make gongs and bells in the Orient, and cheap jewelry in Europe.

This is FALK

...its Greatest Asset is the Morale of its People

OUTSTANDING achievement and leadership in manufacturing gears, motor reducers, couplings and a host of other items mean much to many industries in higher efficiency and lower production costs.

These accomplishments would never have been possible without the continued loyalty and active interest of the men who are Falk.

It is the men who work at furnace and lathe, with welding torch, in a crane, or at a desk; for they make it possible to apply in such full measure all Falk experience and skill in metallurgy, in design, and in manufacture. It is the morale of these men that makes "Falk a good name in industry."

For fifty-four years Falk people have been working *with* Falk management. This has been expressed in the loyalty of its people and the keen interest in their work that have become a tradition at Falk.

This attitude is directly traceable to the loyalty of Falk management to its people, and to the sympathetic understanding of people and their problems by Falk management.

This mutual loyalty and respect have made Falk products what they are today. That is why "It always pays to consult Falk."

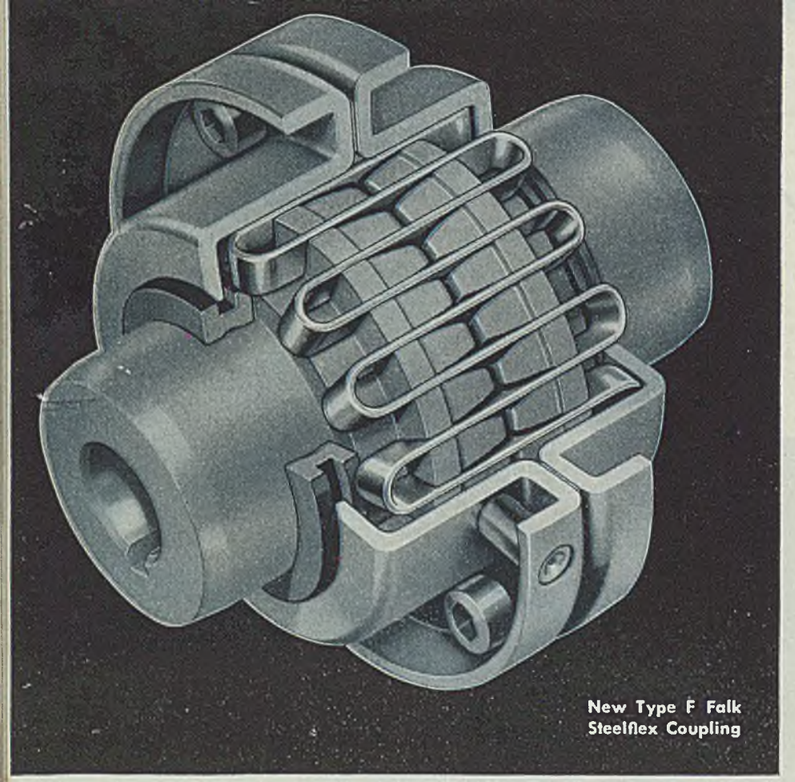
*To personnel directors and executives only, who will request it on their business stationery, we will be pleased to send a copy of "This is Falk" —a booklet prepared for new employes which contains a brief outline of the Falk philosophy.

**We suggest that executives and engineers write us for the book, "The Story of 'A Good Name in Industry' "—an interesting history of Falk and Falk progress for over fifty years.

It always pays to consult...

FALK

...a good name in industry



New Type F Falk Steelflex Coupling

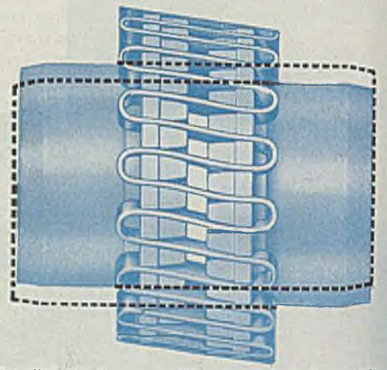
Only the FALK Steelflex Coupling Provides all the advantages of the GRID-GROOVE design

Falk Steelflex Couplings are notable for their grid-groove design. The grid-groove is the net result of long experience in gear design. This is important, because in most cases a coupling is used in conjunction with a driven machine involving the use of gears.

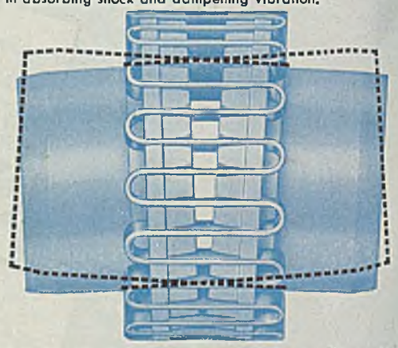
The long experience of Falk engineers in designing gears has been responsible for coupling design which not only provides the flexibility long considered essential but also provides the torsional resilience which enables Falk Steelflex Couplings to transmit power smoothly, efficiently, with an almost total elimination of the effects of shock, to dampen vibration, and to cushion the load even under severe peaks.

How and why only the Falk Steelflex Coupling provides all the advantages of grid-groove design is described at the right. If you are skeptical, so much the better. Then you will study this data with a greater appreciation for the unusual performance and life provided by Falk Steelflex Couplings.

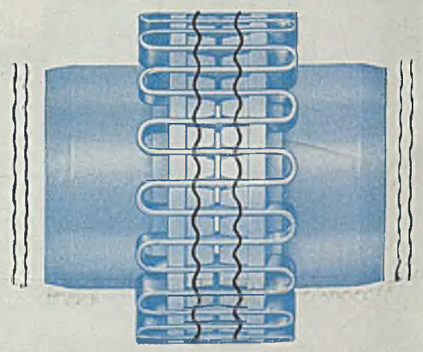
A Checklist for Skeptical Coupling Buyers...



Parallel Misalignment. When parallel misalignment is involved, the grid-groove combination comes into full play. The movement of the grid in the lubricated grooves accommodates the misalignment, while still permitting full functioning of the grid-groove action of the coupling in absorbing shock and dampening vibration.



Angular Misalignment. Under angular misalignment the design of the Falk Steelflex Coupling permits a rocking and sliding action of lubricated grid and hubs that allows the greatest freedom of accommodation to angular misalignment, while at the same time transmitting the power through the resilient grid.



Free End Float. Because the grid member slides freely in the lubricated grooves, the Steelflex coupling permits unrestrained end float for the shafts of both the driving and driven members, or of either one. If it is desired that end float be restricted, provision can be made to limit it to any required amount.

✓ Flexibility

✓ Torsional Resilience

✓ All Steel Construction

✓ One type fits 90% of all Applications

The new improved type F Falk Steelflex Coupling offers even greater evidence to convince the intelligently skeptical buyer. It offers one type of coupling that fits 90% of all installations, horizontal or vertical. It offers new ease of alignment . . . misalignment flexibility . . . floating cover sealed with wider Neoprene seal rings to afford even better protection against loss of lubricant . . . identical cover halves . . . identical hubs, each of which can be bored and key seated for various shaft diameters.

In addition to the standard type F coupling Falk offers a line of large Steelflex Couplings and couplings featuring the Steelflex principle but used for special service and dual-purpose applications. For specific information and recommendations, call the nearest Falk representative or distributor.

A new Falk Coupling Bulletin contains full information on the design of this new coupling, a simplified method for selection, load classification, service factors, and dimensions. Send for your copy.

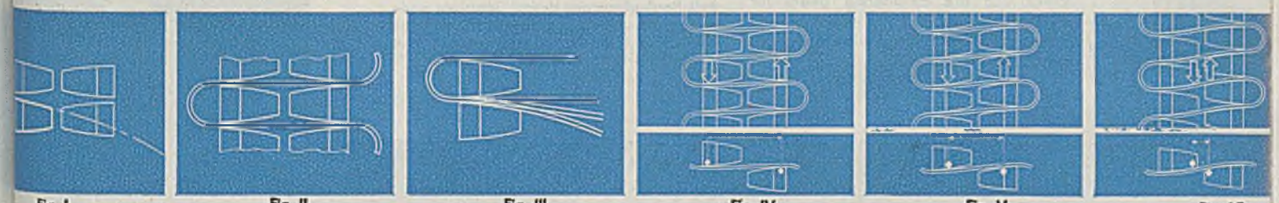


Fig. I Fig. II Fig. III Fig. IV Fig. V Fig. VI

Fig. I. Grooves, in a precise arc, and with a radius and length proportional to the capacity of the coupling, are cut into two identical hubs of moderately high carbon steel—forged of Falk alloy cast steel . . . *Fig. II.* These grooves provide a slot for a grid member made of chrome alloy steel with an elastic limit of 180,000 pounds per square inch and an ultimate strength of 220,000 pounds per square inch . . . *Fig. III.* This grid fits snugly into the curved grooves cut into the hubs of the coupling. The grooves provide a scientifically cut bearing surface for the grid. This bearing surface extends from the outer to the inner edge of the grooves. The grid bears on the grooves in proportion to the load . . . *Fig. IV.* Under light loads, the grid bears only at the outer edges of the grooves. This permits a long, free, elastic span between the outer edges of both hubs. Power is transmitted through almost the entire length of the grid rung . . . *Fig. V.* Under normal loads, the grid bears on a larger area of the grid grooves and the span of the grid run is shortened. It transmits more power and maintains its capacity to absorb shocks and dampen vibration . . . *Fig. VI.* Under peak loads, the grid rungs bear over almost all of the curved surfaces of the grooves. The span of the grid rung becomes very short. Under the impact of shock loads the grid flexes and continues to transmit power smoothly.

THE FALK CORPORATION

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Some Falk Research Contributions

1896: Falk gear research began in Falk's chemical laboratory, which soon included metallurgy.

1906: Harold S. Falk, now president, graduated from the University of Wisconsin as the first student to major in metallurgy.

1910: Falk designed and built its own gear hobbing machines for manufacturing an improved type of herringbone gear developed by Falk.

1927: Inauguration of extensive research into gear performance and capacity brought results of wide significance to industry.

1934: Announcement of the Schmitter Rational Gear Formula, now accepted by the industry as the basis of gear design and rating.

1938: Further research led to the famous Falk Marine Reverse Drive, used in navy barges, army cargo boats, tugs, and exclusively in LST's.

TODAY: Now in progress are gruelling tests with gear speeds up to 30,000 RPM to determine gear capacities and requirements at such speeds.

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found in the present investigation. They too are remarkably constant to about 0.67, very close to that reported by Sunatani.

Inasmuch as such a good relationship between T_b and TS'_n would not be expected, what can be the explanation? The answer is to be found in the work strengthening of these metals. Thus the stress necessary to twist the steel to a shear strain equivalent to the tensile strain necessary to reach the tensile strength (TS_n) is always about 83 per cent of the torsional breaking stress and the stress increase from that strain to torsional fracture is additional 17 per cent.

Angle of Twist Vs. Elongation and Reduction of Area

Ductility is measured in the tensile test in terms of per cent elongation and reduction of area. Ductility in the torsional test is measured in terms of number of degrees of twist to failure. Perhaps then the tensile test, because it produces two constants, is the better way to measure ductility, or is the one torsional constant better than the two tensile constants? Analysis of what these constants mean will show that angle of twist is more fundamental and indicative.

In the tensile test the specimen stretches quite uniformly until the maximum load is reached, at which time the specimen begins to neck down locally. Thus the only part of the metal which is completely plastically exhausted is that adjacent to break. The elongation, therefore, is made up mainly from metal which is nowhere near completely exhausted and only partially from completely tested metal.

When a piece of metal is pulled the first position to begin flowing plastically decreases in diameter because of that flow; if that section did not become stronger because of the flow the piece would continue to reduce and finally break at that point. Actually the metal does become stronger and the flow is transferred to another location thus working the whole specimen. This action continues until the metal no longer work hardens sufficiently to compensate for the decrement of area.

Therefore, work hardenability determines elongation up until necking starts. Subsequent necking contributes some more to elongation but this increase is dependent upon how much plastic flow metal will undergo before breaking, and only a small fraction of the metal contributes to this. It is seen then that elongaion is complex and measures a combination of at least two more fundamental properties. The elongation then should bear no simple relationship to the angle of twist because the latter measures the plasticity only. Column 1 of Table VIII gives the tensile elongation, λ_b, for these steels; Column 4 gives the angle of twist, θ_b and Column 1 of Table IX gives the θ_b/λ_b ratio. This ratio varies from 11.1 to 29.3 showing the lack of constancy.

TABLE VIII

VALUES OF TWIST, ELONGATIONS, AND REDUCTIONS OF AREA FROM TENSILE TESTS OF STEEL

Steel	(1) λ_b in %	(2) λ'_b in %	(3) q_b in %	(4) θ_b/in.	(5) Shear Strain γ_b in %
KA2 Stainless	66	257	72	990	300
Armco Iron	40	257	72	985	300
1030 (T)	29	222	69	672	205
1020 (N)	37	203	67	599	182
1010 (N)	35	178	64	549	167
1010 (T)	23	156	61	674	205
1030 (N)	34	144	59	547	166
1030 (A)	35	133	57	550	167
1040 (T)	17	127	56	200	60
1040 (N)	22	78	44	372	113
1095 (N)	15	33	25	166	51

TABLE IX

RATIOS OF ANGLE OF TWIST TO ELONGATIONS AND REDUCTION OF AREA

Steel	(1) θ_b/λ_b	(2) θ_b/q_b	(3) θ_b/λ'_b
KA2 Stainless	15.0	13.7	3.82
Armco Iron	24.3	13.7	3.83
1030 (T)	23.2	9.7	3.03
1020 (N)	16.2	8.9	2.95
1010 (N)	15.7	8.6	3.08
1010 (T)	29.3	11.0	4.31
1030 (N)	15.8	9.3	3.79
1030 (A)	15.7	9.6	4.14
1040 (T)	11.8	3.6	1.58
1040 (N)	16.9	8.4	4.71
1095 (N)	11.1	6.6	5.03

The tensile reduction of area is perhaps a better measure of plasticity than is elongation but it too is complicated because of the notch effect produced by necking. As a matter of fact the notch effect generally becomes so great that when failure takes place the center of the piece breaks in tension whereas the peripheral part breaks in shear to produce the typical cup and cone type fracture as shown in Fig. 2. The reduction of area, therefore, probably should show no simple relationship to the angle of twist. Column 3 of Table VIII gives the reduction of area, q_b, for these steels; and Column 2 of Table IX gives the ratio θ_b/q_b. This ratio varies from 6.6 to 13.7 excepting one low value of 3.6 with a spread as expected although the ratio constancy is better than for the θ_b/λ_b ratio.

One other comparison of interest may be made. That is, if instead of taking the ordinary elongation we calculate what the elongation would have been had the whole tensile gage length been reduced as much as that at the break. This elongation λ'_b, may be calculated from the reduction in area q_b, using equation (3). The results of this calculation are given in Column 2 of Table VIII and the ratios θ_b/λ'_b are given in Column 3 of Table IX. The ratio varies from 2.95 to 5.03 excepting one low result of 1.58. This spread in values is to be expected because λ'_b would be subject to the same limitations as q_b.

Slope of torque-twist and tensile stress-strain curves during plastic flow indicate the work hardenability. This slope in the torque-twist diagram is solely due to the hardening of the metal because the specimen dimensions remain practically constant. In the tensile stress-strain diagram, both hardening and dimensional changes contribute up until necking and after that still further complications arise due to notch effect of necking.

A comparison of the torque-twist curves Figs. 3 and 4 clearly show the difference in work hardenability of Armco Iron and 18-8 stainless. The much greater work hardenability of the 18-8 is shown by the much greater slope of its curve. This is also reflected in the tensile elongations for these two metals which is only 40 per cent for the Armco but is 66 per cent for the 18-8. The torsional data are, however, better in this respect than tensile data. The angle of twist for these two metals is practically the same at about 990 degrees and that the tensile reductions are also practically the same being 72 per cent, indicating not too remote a relationship between the two tests. Both the degree of twist and reduction of area are better indications of plasticity than they are of work hardenability.

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Electronic Parts

(*Continued from Page 95*)

duction of 36,000 parts. About 69,000 of these parts weigh 1 lb.

That's a typical job. Most of the equipment used in the manufacturing processes is designed and built in the shop, although some of it is standard equipment which has been torn down and rebuilt, usually to get greater speed and more complex operations. The company operates its own tool and die shop, which produces between $750 thousand and $1 million worth of equipment per year.

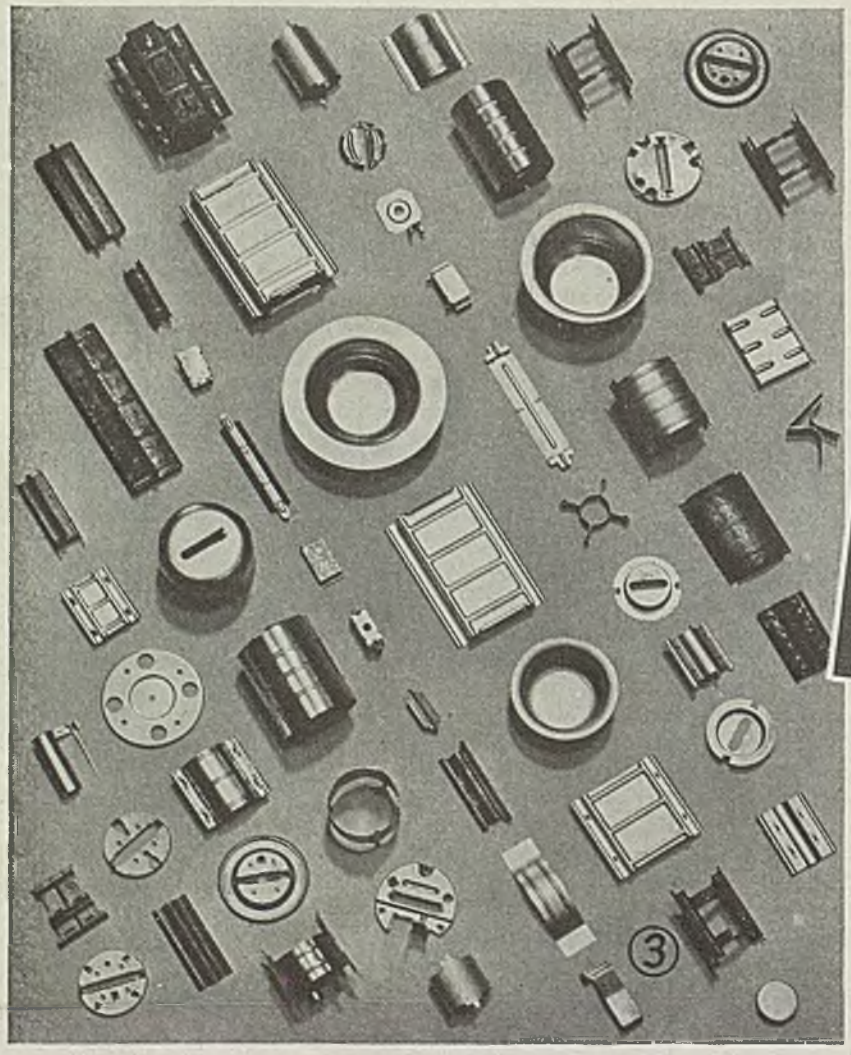
Figures involved are astronomical. The Emporium plant produces some 117,000,000 parts per month, with the total for all plants topping the 600,000,000 mark. This plant works two shifts, 16 hours per day, and will produce some 4,500,000 parts in that period. Most parts orders are for 500,000 units or more, since it is uneconomical to make dies and set up a run for quantities much below that figure. As might be expected, the unit cost of these items is so small that normal quotations are for units of a thousand parts. An order for a million of a typical item, for example, was billed at $2.10 per thousand, or $2100.

Under these conditions, manufacturing costs, particularly non-labor costs, are the paramount item. A separate cost department is maintained to keep a watchful eye on these figures. Some idea of the job done here can be realized from the fact that a cost check is made on each part every month, and price revisions made every three months if necessary. No part made by the company now sells for more than its prewar price, and a large majority of the more than 8300 separate items produced sell for considerably less than prewar levels.

Parts are fabricated from carbon steel, alloy steel, copper, copper clad steel, phosphor bronze, beryllium copper, nickel and nickel alloys, and tungsten. In addition, some 50,000 lb of mica parts are made each month. The largest customer for these parts is, of course, the manufacturing division of the Sylvania company. Parts are sold to any intra-company unit at cost, but a large volume of parts are sold to other manufacturers, and these are sold at a fixed profit margin above cost level.

The primary operation itself is remarkably simple and compact. Automatic inclinable presses, hand presses, bench automatics and multislide automatics with four slides are the primary machines, and virtually all fabrication is done on these specialized units. The automaticity of the operation has been stepped up immeasurably by the special equipment added to the machines. In the Emporium plant, a force of 51 operators on two shifts maintains operations on the entire battery. In some cases, all the operator has to do is throw a switch. Automatic feeding devices, controlled so they will shut off the machine in case of any interruption to the feed, maintain a flow of strip from coils. The press operation is entirely automatic, with safety controls to prevent any damage to dies or to the machine itself. An automatic counting device stops the operation when the desired number of parts has been made.

The bench automatics are used largely for fabrication of minute wire parts, some so small their details cannot be seen by the naked eye, but which must be held to unbelievably close tolerances. For the most part, these wire gadgets



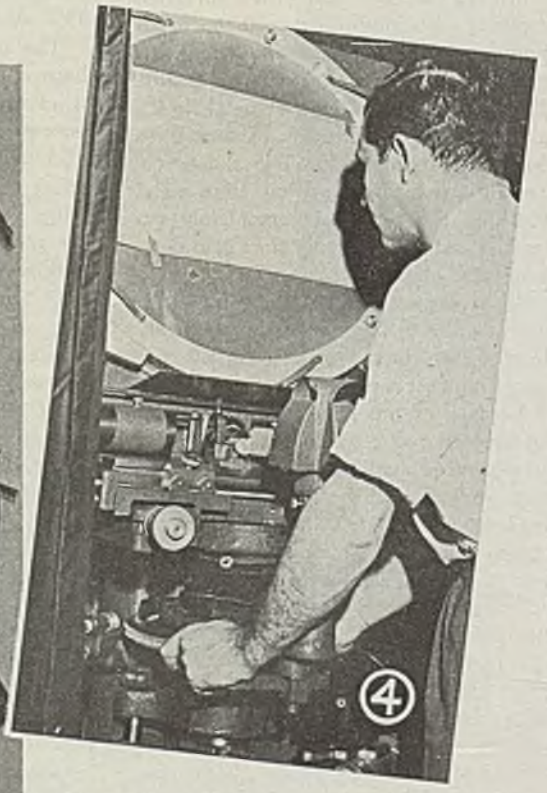


Fig. 3—None of these parts has a dimension as great as 2 in. They are made by the million from metal strip on automatic machines at Sylvania

Fig. 4—Comparators such as this Jones & Lamson unit, are used not only in production of dies but also in checking dimensional accuracy of finished parts

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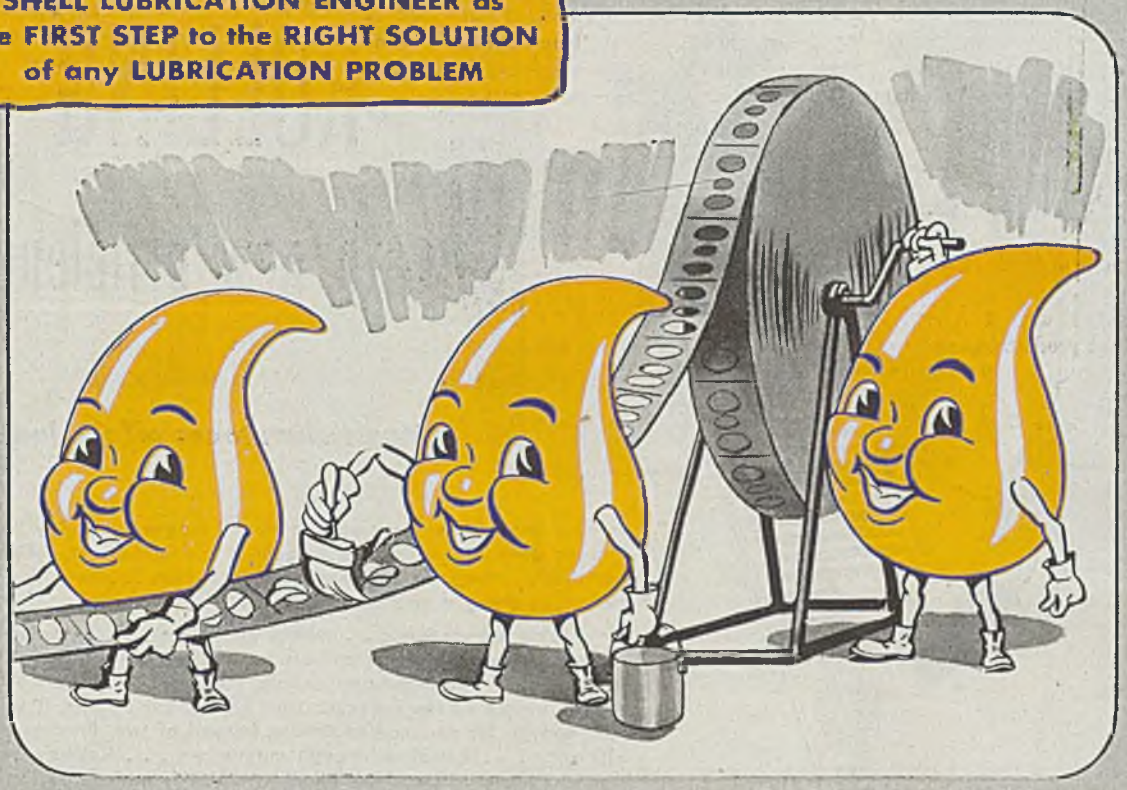

High-Carbon Strip Steel PROTECTED with a SHELL RUST PREVENTIVE

PROBLEM: Lubricant used in machines perforating high-carbon safety razor steel had to be removed before etching. "Batch" production made storage of clean coils necessary. This manufacturer of razor blades sought a rust preventive that would protect coils during storage period, but which could be easily washed off just before etching.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem, he recommended a Shell Ensis product, a rust preventive that can be applied by dipping at room temperature and which washes off in cold water. The manufacturer was delighted, especially when Ensis-coated coils showed no ill effects after being stored in an area contaminated with acid fumes.

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. Write for a copy of Shell's 40-page booklet on Rust Preventives. Shell Oil Company, Incorporated, 50 West 50th Street, New York 20, New York; or 100 Bush Street, San Francisco 6, California.

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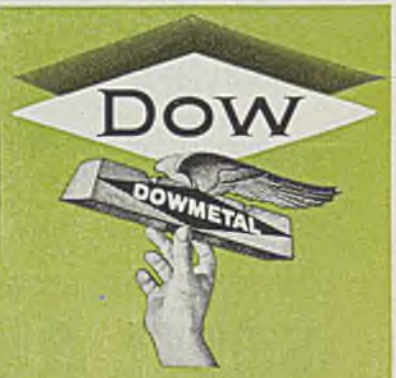

MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

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are used for supporting the elements in electronic tubes. The trend in tubes is toward smaller and smaller dimensions, and some of the current models used by the armed forces require the accurate positioning of as many as six elements in a space totalling less than 1 cu in. This precision work must be done so tubes can be assembled by the thousands with a minimum of rejects. Variation of a fraction of a thousandth in any critical dimension would prevent proper operation of the tubes.

Type of Machine Determined

When a new design of stamped metal part is ordered, the mechanical department decides on which type of machine it is to be made. Then the die work begins. Some of these dies are exceptionally complicated. Because of the complexity of the dies, as well as the extremely high ratio of die cost to product cost, the dies are generally made in sections. If one section is damaged or shows wear it can be replaced without the whole die. This leads to indefinite die life and, in the case of some progressive dies, up to 12,000,000 parts have been made with only partial replacement. Strict cost records are kept on the dies, and the operation has shown that carbon steel parts wear dies the least, and mica the most, with other metals strung in between these two extremes. Mica fabrication, which produces a fine abrasive dust, wears dies rapidly and mica die maintenance is one of the biggest jobs of the die shop.

Typical of the cost-reducing methods, combined with clever metalworking techniques, is the case history of the 807 plate. This is one of the larger parts produced, and it is, as its name implies, the plate of a type 807 electronic tube, generally used in low power transmitters. The part is made from carbonized nickel strip, and is shaped like a hollow box, cylindrical but with two rectangular shoulders jutting out at the sides, and with two fins running from top to bottom on diameter 90 degrees revolved from the rectangular shoulders. Dimensions are 1.322-in. high, 0.968-in. wide, and with major depth 0.750-in. and minor depth 0.561-in. Two ribs run horizontally across the part, and four vertical slots are required.

Standard practice on this part was to form in two pieces by blanking on a punch press, stake the two halves and then spotweld the fins together by hand. The process required three operators and produced 500 per hour. As it was finally engineered for automatic production, a dual feed was devised for an automatic machine. Two coils of strip were fed synchronously through vertical ribbing dies where the two ribs were formed into notching dies, then around an arbor, through a preform and a finishing form, and finally the two halves were staked together. Problems in setting up this neat little job were many, and several false starts were made, but the present setup requires only one machine for the entire operation from strip to finished product, and one operator handles four such machines. The machine rolls out 9000 finished 807 plates per hour. Total—one-quarter of one operator for 1 hour, or 15 min labor per 9000 parts, as against three operators at 500 per hour or 54 hours labor per 9000 parts.

Proper application of metalworking know-how not only brings about a reduction in costs like those cited, but it also can solve some tough production problems. Take, for example, the contact pins used in the bases of some of the newer type high frequency tubes. As contrasted to the old type pins, which were formed from hollow tubing, these new pins are formed from solid nickel-chrome alloy wire. About 1 in. long and 0.051-in. in gage, these minute wires must be rounded on the end in order to fit well in the socket and make positive contact. Solution—an automatic machine, fitted with a ring-shaped tool driven on its outside circumference and carrying carbide tools on its inner circumference. The wire is fed from a reel through the tool which, in revolving around the wire, cuts off pins in the required length and with the round end that is required.

These pins are the largest size of wire gage fabricated. From that 0.051-in. stock the sizes run down to 0.0015-in., and materials formed on the bench automatics into wire parts are tungsten, molybdenum, stainless and other alloy steels, silver, platinum, copper and beryllium copper. Some of these wire products require absolutely straight wire, and it was necessary to design and build a wire straightener which would handle the tiny wires, and feed slowly enough to match the speed of the fabricating operation. A specially designed rotary wire straightener did the job, and is now in successful operation at speeds of 1000 fpm.

Despite the tremendous volume of parts which can be made from a pound of metal strip, the plant manages to chew up in excess of 70,000 lb per month. In many of the operations, the scrap weight is equal to or greater than the product weight, so the total parts production is probably less than 35,000 lb per month. Since much of the production requires carbonized strip, or strip with oxide coating, the plant operates two coating lines for this purpose. Acetylene or Pyrofax gas, introduced into a continuous gas-fired furnace, provides the carbon coating, as well as an oxidizing atmosphere for oxide coats. Close furnace control provides a uniform coat of the desired thickness.

New Products

Dipwrap—Hot dip protective compound for sharp edged metal objects. Bulletin No. 14 available Paisley Products Inc., 1770 Canalport avenue, Chicago 16, or 630 West 51st street, New York 19.

Spraying, Buffing, Compound—Nu-Spra-Glu comes in paste form and is applied with a semi-automatic spray gun to produce mirror finish on metals. J. J. Siefen Co., 5657 Lauderdale, Detroit 9.

Floor Machine—An "all-purpose" drum-type, that accommodates 8 and 16 in. accessories. G. H. Tennant Co., 2530 North Second street, Minneapolis 11.

Transparent Rustproofing—A coat that dries to a hard, transparent film for use on bits, drills, wire, sheet steel, etc., is called Clear Coat. It comes in three grades and does not crack or peel even if metal is bent. Nox-Rust Chemical Corp., 2463 South Halsted street, Chicago 8.

Plastics Dyes—For coloring plastics of all types, 14 shades of Kriegr-O-Dip dyes can be used in the cold dip or hot water processes. The colors are even and stable and greatly simplify the coloring job. Krieger Color & Chemical Co., 6531 Santa Monica boulevard, Hollywood 38, Calif.

Drawing Compound—Chemically inert and of high film strength, Superdraw can be applied by brush, spray or dip for use on ferrous and nonferrous alloys. It is unaffected by heat or atmosphere, and its organic composition resists chemical and physical deterioration. Northwest Chemical Co., 9310 Roselawn, Detroit 4.

Self-Welding Flux—Chanite Flux restores broken electrical connections by dipping the end of the wood stick containing the flux in water and holding it on the joined section as current is turned on. The flux welds the wires together. Chanite Sales Co., 914 South Main Street, Fort Worth, Tex.

Washfountain—A two-person fixture for general use in washrooms of offices, etc. Bradley Washfountain Co., North 22 & West Michigan streets, Milwaukee 1.

Instrumaster—Floating triangles made of clear, non-inflammable plastic stock, available in 4, 6, 8, 10 and 12 in. sizes. Instrumaster Industries Inc., Greenwich, Conn. Distributers, John R. Cassell Co. Inc., 110 West 42 street, New York 18.

Replaceable-Face Hammer—Designed to speed construction and repair operations involving surfaces that must not be marred. Green, Tweed & Co., Bronx boulevard at 238 street, New York.

Goggles—New, all-plastic type, Model 7, for general industrial use. Features one piece lens of shatterproof methacrylate and is resistant to pitting by sparks. Watchemoket Optical Co. Inc., Providence 3, R. I.

HANDLING 23,000-pound coils AT COLD STRIP MILLS

Bulk of product coming off cold mills at Pittsburgh stripmaker is handled by battery-powered trucks. Loading coils of black plate in box cars is facilitated by ram-type units. Trucks capable of handling 30-ton loads are now being considered

HOW the orderly flow of material in a basic heavy industry—from production through shipment—is made possible through the use of battery-powered industrial trucks, is exemplified in the $30,000,000 strip mill of the Jones & Laughlin Steel Corp., Pittsburgh. Here, a fleet of 18 trucks of various types, sizes and capacities safely lift, move and place large coils of strip steel, or sheet and plate, in weights up to 23,000 lb, at a speed geared to the production schedule. Coils are moved from the rolls to cooling piles, thence through the finishing departments to stock piles or to trimmers, again to stock and finally to loading docks and box-cars.

Many of these battery-powered trucks were designed and built for the specific heavy duties they are called upon to perform in this mill. They augment cranes that shuttle back and forth overhead, but certain of their functions—such as the loading of box-cars with coils destined for tinning at the corporation's works at Aliquippa, Pa.—can be performed by no other type of mechanized, material mover, nor could these functions in any way be performed by purely manual means.

The cranes, too, carry plates or sheets, both to stock and to the packaging department where wrappers and banders prepare them for shipment; or move the heavy rolls for replacement in the mill housings; or move heavy slabs of metal, but it is the electric truck, moving about in runs of from 75 to 200 ft, that is relied upon to move and handle the bulk of the mills' product.

One operation alone—that of loading box-cars with coils of tin plate gage—is performed by two battery-powered ram trucks. One delivers the coils just inside the car's doorway, the other places the coils in position inside the car. The coils held in position by wooden bars and chocks nailed to the car's flooring are ready to be transported to their destination.

This work could not be handled in any other way than by electric trucks, according to one of the mill's departmental superintendents. Coils could not be loaded manually. Most of the trucks placed in service with the mill in January, 1937, were designed for the specific operations they perform. It might be said they were designed with, and for, the mill.

Originally the trucks were equipped with rams from 36 in. to 6 ft long and carried loads not much in excess of 6000 lb, although their rated capacity was much greater. Weights of individual loads have increased during the intervening years, however, so that now coils weighing 15,000 to 20,000 lb and even more, are being handled.

Up to the time the various type trucks for this mill were specified and their duties outlined, no electric trucks were available in rated capacities as large as those required. The original trucks, although still in use, are now out-rated by new acquisitions to the strip mill, some in use having rated capacities that permit them to carry loads ranging from 23,000 to 25,000 lb at one time.

Large as these trucks are, and despite the heavy loads they carry, most of them are being operated by women at this particular strip mill. It was found during the war that women proved to be most efficient in their operation of the trucks, and take excellent care of the equipment they are given to handle. All freight car loading is done by male operators, however.

Consideration is being given to the construction of a battery-powered truck that will have a rated capacity of 60,000 lb. This would mean that the wheels would have to carry not only the full 60,000-lb load, but a counterbalancing weight of a similar amount, while the frame and mechanism to lift and move such loads would weigh at least 10,000 lb more. This would mean a weight on the forward wheels at full load of 130,000 lb. The wheels for this talked-of, battery-powered, truck would be 20 in. wide and 36 in. diameter, and it would be the highest rated, as well as the largest and heaviest battery-powered industrial truck ever constructed. Flooring adequate to stand up under such loads would have to be especially constructed, but the cost of such construction, it is believed, would be insignificant when compared to the cost of construction of material movers of other types that would have an equal capacity, such as an overhead crane.

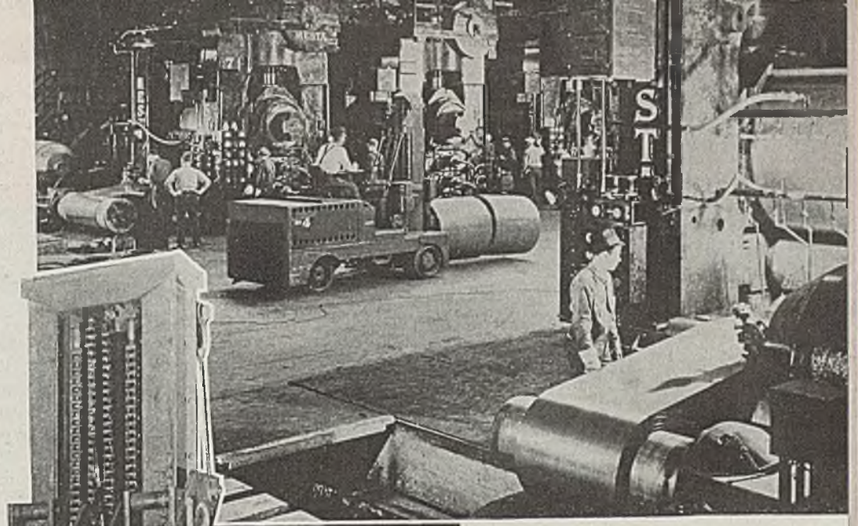


Fig. 1—Cold strip department showing method of handling 22,000-lb coils

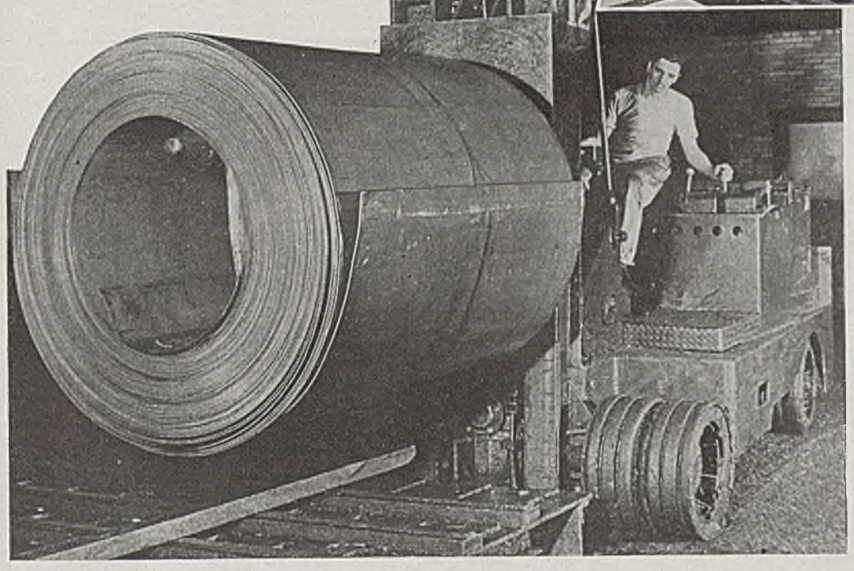


Fig. 2—Coil of pickled strip weighing 20,000-lb being placed on front table of tandem cold mill

Since the loading of tin plate coils has never been done manually at the strip mill, no comparison of costs between hand and electric truck loading methods is obtainable. Nor are costs for the loading of box-cars with pallet loads, or "flats" of plate and sheet, readily available. However, when the mill first was started, such loading into box-cars was done by a 4-man crew, who handled a plate or a sheet at a time. These were piled, inside the car then wrapped and banded. It required approximately 4 hours to so load a car. Now, material is moved in an integral load by a battery-powered fork truck of 4000-lb rating, to the packaging station at the loading dock. After wrapping and banding, the flats are positioned within the box-car by the same truck, this work of loading being done by the truck's operator in approximately 45 min.

Within the cold strip mill, several of the ram trucks are kept busy feeding coils to the 54 and 90-in. tandem mills, while others move the trimmed coils to the stockpiles. Because of the extreme weight of these coils, it has been found necessary to stock them not more than two tiers high. Thus, long distances are taken up with horizontal storage, rather than the usual vertical method of storage.

The same system of storage is applied to plates and sheets. These, while they are piled three or four tiers high, with wooden spacers between the flats, are spread out horizontally.

Despite the large area occupied by the strip mill, space still is at a premium. Therefore overhead cranes are utilized to store, or move from storage, the flats within the center of the storage pile, the fork trucks working only at the outer edges. Man-width aisles are left between the tiers of flats to permit passage of floor helpers who work with the crane operators in attaching or releasing slings or grabs used in transporting the flats to and from the center of the storage areas. In some instances, when the flats have been moved from the center of the stockpiles, they are placed at points where they can be handled by the battery-powered trucks. In other instances they are moved by crane to the packaging stations, and then are loaded, also by overhead crane,

into the gondolas ready for shipment.

Battery-powered trucks are operated about 20 out of 24 hours, their only down-time being for a change of battery—(once every 8-hour shift)—during the customary lag between shifts, and possibly when they are arbitrarily taken aside for examination once every day. Spare batteries, one for every truck in operation, are provided so that a sufficient number are always on hand to provide for changeovers, or other emergencies.

Despite the size of the batteries needed for these supertrucks, they are charged by a simple, inexpensive method, in a reasonable time. Power for charging is taken from the plant's power lines and converted to provide direct current, there being several types of battery charging generators in use.

For simple cost accounting, a reserve account is used for all charges in connection with powering the truck fleet. This account is accrued on a truck-hour basis. All charges for primary power metered to the battery chargers is cleared through the reserve account, as well as the labor charges and materials used for cleaning, flushing, and placing batteries on charge. As batteries come up for replacement, the cost of the new batteries is charged against the reserve account, and salvage received from scrap is credited to the account. While accruals have been $0.20 or less per truck-hour for this "overall power cost," there has always been adequate reserve for the replacement of batteries and adequate funds to cover power and labor charges.

The down-time for a change of battery is liberally figured at 10 min per truck. The truck is positioned on a runway in the range of a small, floor-operated, overhead crane, by means of which the spent battery is removed and freshly-charged one replaces it.

The 18 battery-powered trucks at the J & L strip mill consist of fork and ram trucks of from 6000 to 10,000 lb, from 12,000 to 15,000 lb, and from 16,000 to 20,000 lb. There also is a battery-powered, articulated platform car-loader with a tilt device. This carries loads of 10,000 lb, and is loaded by fork trucks or cranes. Two battery-powered crane trucks also are used in the mill.

Higher Strength Alloy Iron Powder Needed, Metal Powder Industry Told

PRODUCTION of an alloy iron powder that will improve physical properties, particularly hardness, of parts into which it is pressed was presented as a desirable objective to manufacturers attending the spring meeting, Metal Powder Association, June 13 in New York.

F. V. Lenel, Moraine Products Division, General Motors Corp., the speaker, said alloys added to present powders are not satisfactory for hardness due to slow diffusion of the alloy elements to iron in sintering. The needed alloy powder should be truly homogeneous and capable of being used under present sintering conditions, he said.

Powder metallurgy involves a small tonnage compared with other metalworking industries; consumption of iron powder averages about 6.4 tons per day and not all goes into pressed metal parts. Under current costs, producers cannot sell less than an average of 15 cents a pound, according to B. T. DuPont, Plastic Metals Division, National Radiators Co.

Quantity and quality will be the basic factors in any future lower prices. Volume will increase, it was agreed, but how much and how soon is conjectural. Involved in quality are uniformity, with at least six variables to be controlled, including size, grade, mesh, shape, density and screen analysis.

Not more than 25 per cent of the iron powder being produced is of one grade or specification that can be used in present development and application. Citing large production by Germany during the war, Mr. DuPont said 90 per cent was of one grade for rotating bands for shells, and a low grade at that.

General utilization of most efficient hot-coining equipment, sintering furnaces and higher-power presses, has not taken place. The automobile industry and a few others have this equipment, declared C. G. Goetzel, American Electro Metal Corp., but use is not broad; the furnaces and presses have not been built. Attainment of improved physical properties in pressed metal parts has been steady to the hot-coining point, but this progress has not been made without trial. Density is closely identified with higher tensile strength, elongation and other improvements and porosity with low ductility and impact. Better impact showing may be expected in powder metallurgy. In connection with potential increased use of metal powder, Andrew J. Langhammer, Amplex Division, Chrysler Corp., said one application for a part under consideration would require 1 lb per car, possibly 1,000,000 lb in all.

Uniformity in Testing Urged

Uniformity in testing methods in determining properties of powders was urged by J. E. Drapeau, Jr., Metals Refining Co.; some standardization of the microscopic count may be worked out. Compressibility test will be important in developing standard. Standardizing of tests was unanimously favored, with some implied doubt as to progress. Importance of knowing what type of part and application the powder is to be used for is also stressed.

Natural graphite supplies its own lubrication in pressing and some flake and crystalline types more rapidly diffuse in the iron when sintered than other carburizing materials. E. S. Glauch, mechanical engineer, Joseph Dixon Crucible Co., discussed use of graphite in powdered iron compacts, and reported on tests and experiments at the Stevens Institute of Technology, Hoboken, N. J. Sintered density, hardness, tensile strength and elongation were observed with eight variable types and sizes of graphite powders.

Optimum values were obtained using No. 444 flake graphite with reduced iron powder in a closed graphite tube container. All natural flake and crystalline graphites showed tensile strength values above the one synthetic graphite used. The amorphous graphite No. 0703 showed lower values than all other grades.

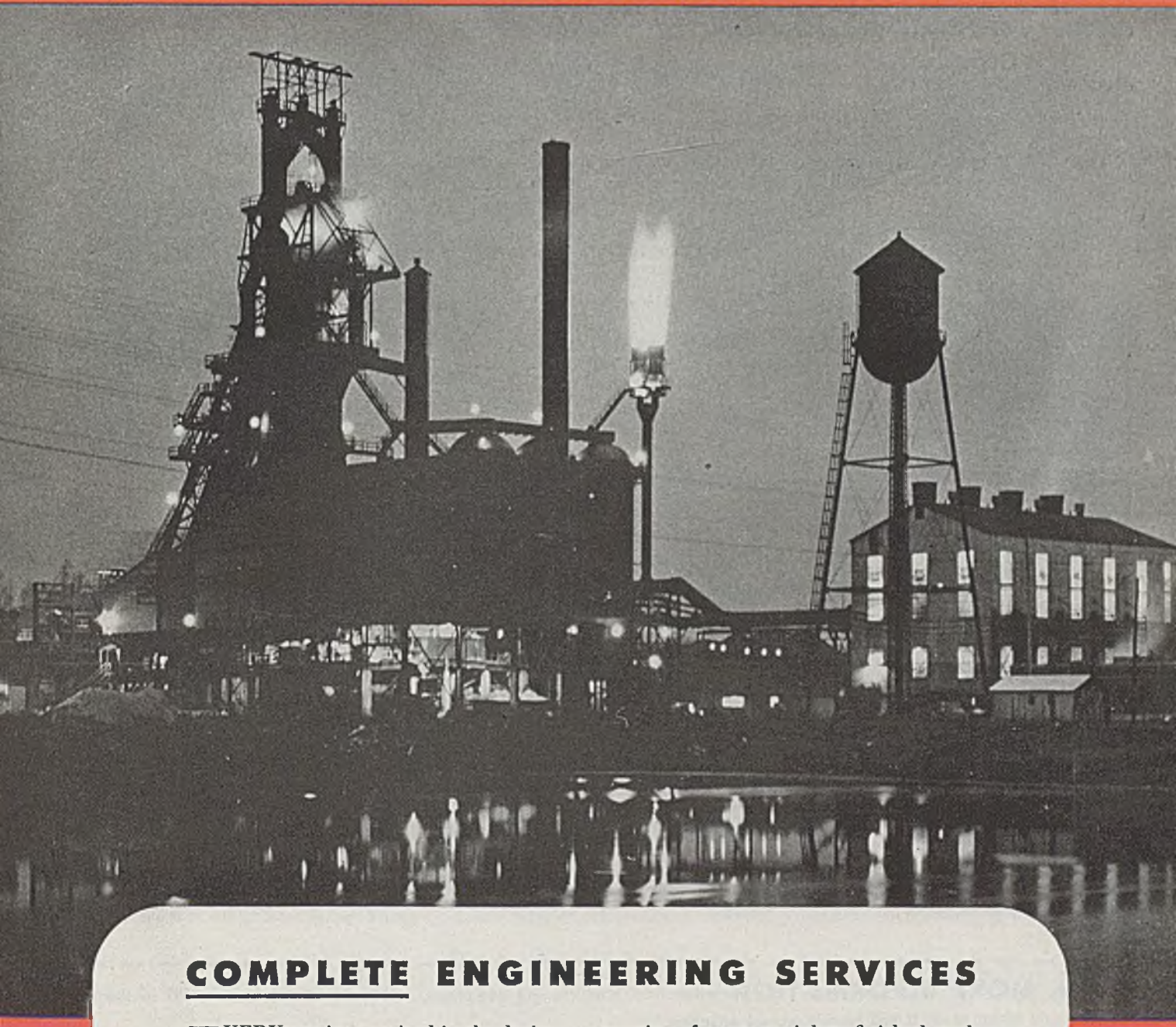
The loss of graphite in sintering is reduced considerably by the use of a closed graphite container. Unreduced iron powder produced compacts of lower tensile strength values than those made with reduced iron powder. The loss in tensile strength is apparently due to the reaction of graphite with iron oxide.

"Furnace Atmospheres for Sintering" was the subject of a paper by H. M. Webber and A. G. Hotchkiss, General Electric Co. Sintered high density tungsten and tungsten alloy parts were discussed by Jack Kurtz, Callite Tungsten Corp., and Fred P. Peters, editor, *Materials and Methods*, gave "An Editor's View of Ferrous Powder Metallurgy."

—o—

Story of the industrial and cultural growth of Lebanon County in eastern Pennsylvania is the subject of a 36-page illustrated booklet published by Lebanon Steel Foundry Co., Lebanon, Pa. Entitled "Lebanon County Through the Centuries," book reviews development of this industrial district from the discovery of iron ore at Cromwell in 1734.

UNDIVIDED RESPONSIBILITY IN ONE ORGANIZATION



COMPLETE ENGINEERING SERVICES

EVERY service required in the design, engineering and construction of facilities for the Iron and Steel Industry is available in the McKee organization. McKee experience covers every step of iron and steel production from the treating of raw materials to finished steel. All phases of engineering and construction are handled under a single contract by specialized technical experts and skilled construction personnel within our own organization.

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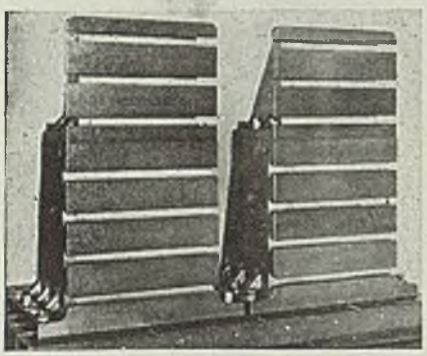
INDUSTRIAL EQUIPMENT

Matched Angle Blocks

A combination of matched angle blocks for accurately locating and chucking work in boring, milling and planing operations was announced recently by DeVlieg Machine Co., Detroit.

Machined from box-section castings with T-slots and flat surfaces in precise



alignment, the matched units may be used singly or in combinations suitable for a wide range of large and small work. Each set includes T-slot nuts, studs and screws ready for application.

Steel 6/24/46; *Item No.* 9324

Pressure Gage

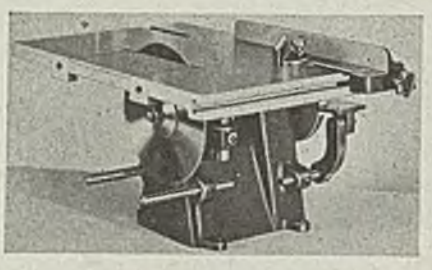
Manning, Maxwell & Moore Inc., Bridgeport, Conn., announces a new bellows type low range pressure gage for indicating draft or low pressures of gases or liquids that are not corrosive to bronze.

Pressure element is self-draining bronze bellows with a phosphor-bronze calibration spring which makes an extremely sensitive and accurate gage. Adjustable stops protect bellows from excess pressure or vacuum. It is supplied in pressure ranges from 10 in of water up to 10 lb pressure, and as a low range vacuum gage in ranges from 10 in. of water up to 20 in. of mercury vacuum.

Steel 6/24/46; *Item No.* 9240

Combination Power Tool

A combination power grinder, sander, buffer and power saw for light manufacturing is announced by Parlec Tool Co., 919 East Redondo boulevard, Inglewood, Calif. The basic tool is an



abrasive grinder on one end and sanding disk with adjustable work rest on the other, either interchangeable with buffing or polishing wheels.

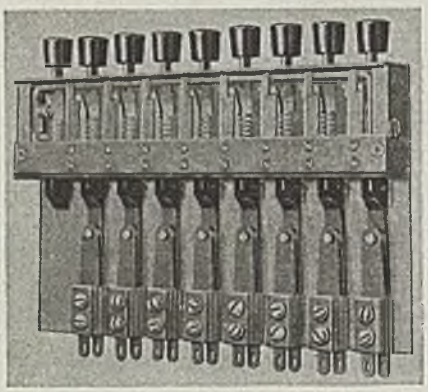
By adding an 8-in. saw blade and a saw table, an adjustable height and tilt angle saw is provided, complete with guides for angular and parallel cutting. It is also possible to attach a dado head for routing.

Base of unit is cast iron with self-lubricated bearings incorporated. Saw table is cast aluminum reinforced with longitudinal ribs.

Steel 6/24/46; *Item No.* 9281

Nine-Position Switch

General Control Co., 1200 Soldiers Field road, Boston, is announcing a new master model MPB, nine-position push button switch made in both locking and nonlocking frame types. Locking frame type has eight positions and one reset



position. In this type, any switching combination which has been set can be released by one operation of reset button.

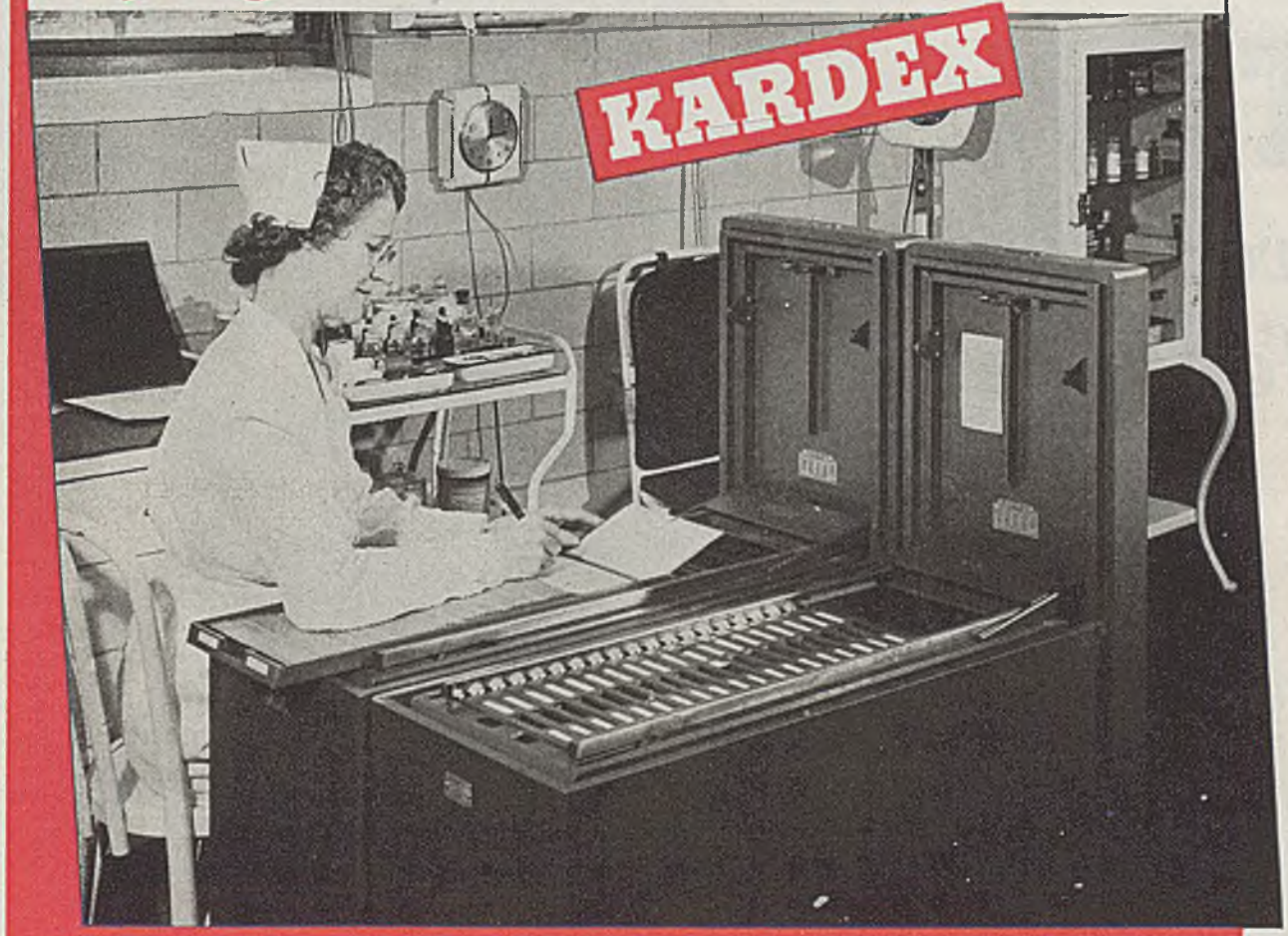
All parts are made of noncorrosive materials and contacts are of fine silver, permanently riveted to phosphor-bronze contact springs. Both types are rated at 5 to 10 amp, 125 v, 60 cycles, alternating current (noninductive load).

Steel 6/24/46; *Item No.* 9373

Battery Charger

A single-circuit battery charger for 60-cycle, 3-phase power supplies is announced by Electric Products Co., 1725 Clarkstone road, Cleveland. Consisting of a vertical motor-generator, full-voltage magnetic starter and unit-mounted automatic panel with 6-ft charging cable,

Rx ...for "Man-Maintenance"



EASTERN STAINLESS STEEL CORPORATION says

"Medical Records Pay in Health and Safety!"

● The Eastern Stainless Steel Corporation, Baltimore, has found that complete and effective employee medical records promote health and safety within the plant, remove needless causes of delay in production and help to reduce overall cost.

The set-up they are using so successfully is a Kardex Visible System, combining in one alphabetic file each employee's physical examination, health, accident and absence records.

This record insures that every individual requiring medical department attention can receive the best possible care based on data revealed by his physical examination and past history.

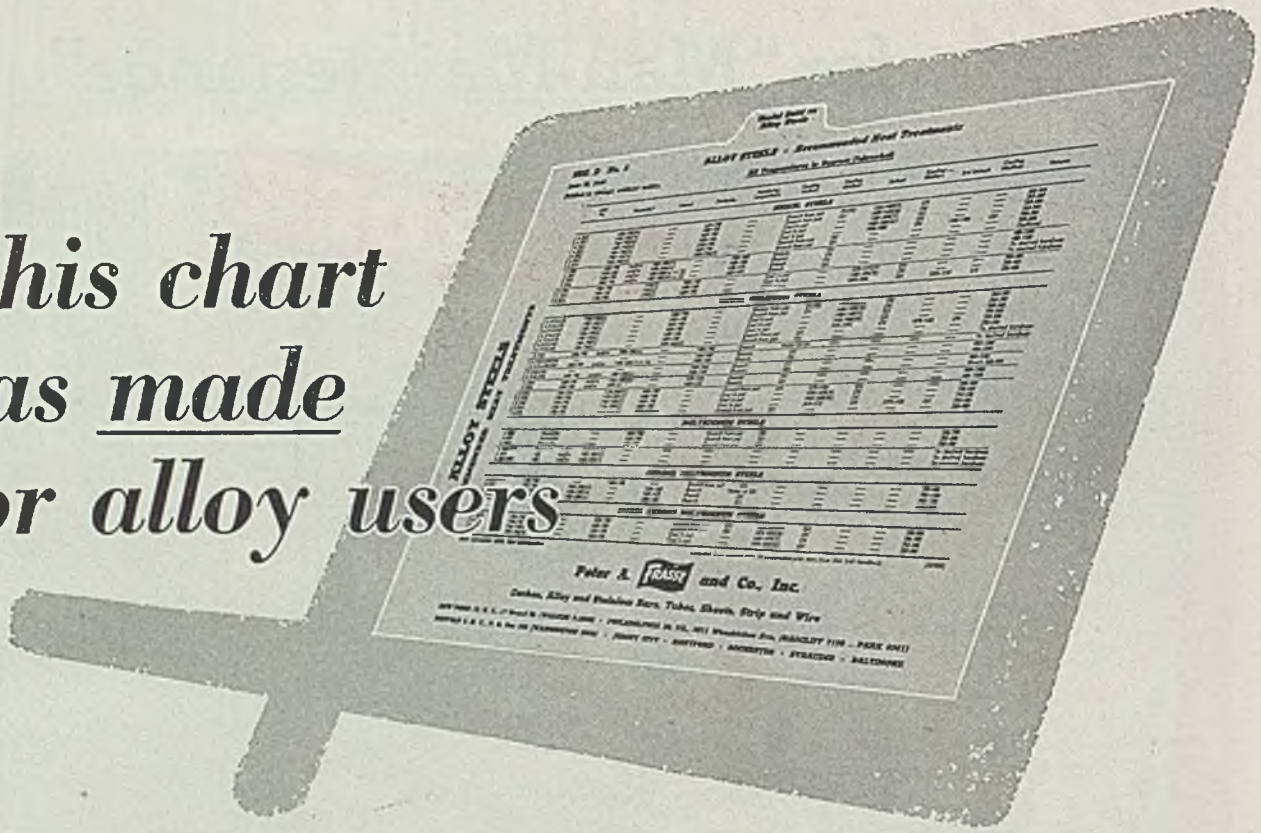
It helps to reduce the need for medical care, and to improve its quality, by providing a clear insight into the causes of illness and accidents. And it also furnishes effective protection against unjustified insurance claims.

Kardex supplies maximum information about each individual at the least cost in time and effort. Visible margins and signal control assure rapid and accurate reference, and cards can be posted without removal from the file!

Why not talk over your medical department record needs with us? Ask our nearest Branch Office, or write to us for our valuable 80-page study, "Personnel Administration — Records and Procedure."

SYSTEMS DIVISION **Remington Rand** 315 Fourth Avenue New York 10, N. Y.

This chart was made for alloy users



In this new chart, Frasse has *condensed* alloy heat treat procedure to a *single* file size card. With it, you can check heat treatment for any one of 60 standard steels — in 30 seconds flat!

How is 4615 treated for automatic quenching? What's the normalizing temperature for 4130 . . . the recommended cooling rate for annealing 6145? With this new chart, you can answer hundreds of similar questions with *speed* and ease.

The single card gives all salient data for normalizing, annealing, hardening, carburizing and reheat. Shows recommended cooling medium, tempering ranges and precautions to follow. Slip it under glass or tack it on the wall — and you have alloy heat treatment summarized at a glance!

Here's a handy checking tool for metallurgists and heat treaters . . . an invaluable guide for technically-minded buyers. Before you mislay the coupon—mail it for your free copy today!

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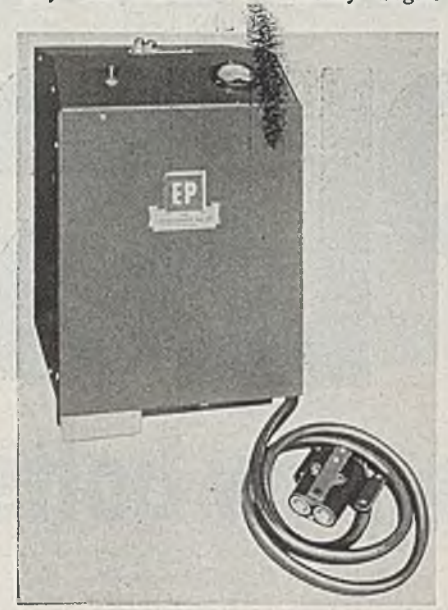
X 4130
A 4150
X 4340
A 4615
A 6145
A 6150
A 8620
NE 8630
A 8735
NE 8740
A 8742

charger will charge 6-cell lead batteries in 8 to 9 hours or 10-cell Edison batteries in 7 hours.

Charging cable is plugged into battery and current automatically begins

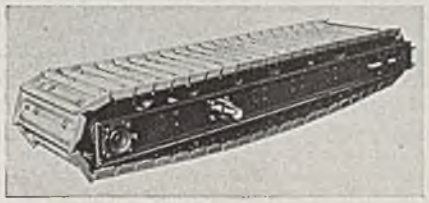


at proper value. Current is controlled throughout charge at rates established by electric truck and battery industry, shutting down in case of power failure and when charging is complete.

Steel 6/24/46; *Item No.* 9355

Apron Conveyor

Chain Belt Co., 1600 West Bruce street, Milwaukee, is announcing a self-contained, factory assembled, heavy-duty apron conveyor for use under bins and hoppers for heavy lump material such as ore and pit-run gravel. Having a large



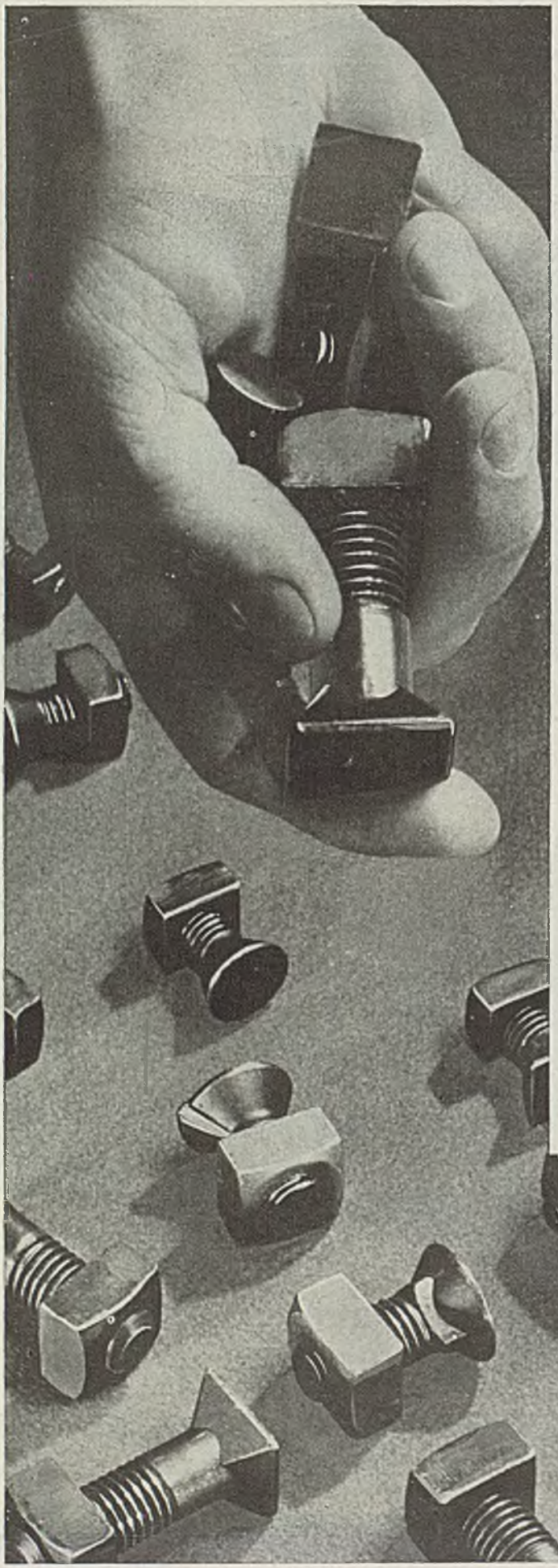
capacity, it handles 100 lb of material at a normal speed of 10 fpm.

Roller-supported apron feeder of conveyor is furnished in several widths and with centers ranging from a minimum of 4 ft 7 in. to a mximum of 9 ft 1 in. varied by 18 in. increments. Chain belt rides on large diameters traction rollers.

Steel 6/10/46; *Item No.* 9264

Midget Spring Jig

A new, midget-type spring jig is now offered by the Siewek Tool Division, Domestic Industries Inc., 231 South La-Salle street, Chicago, for handling small items. Weighing only 6½ lb, the jig has a powerful, positive locking action. Other

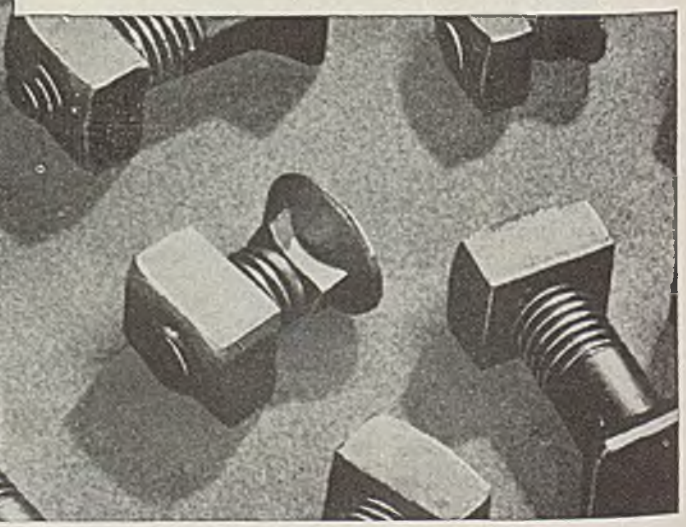


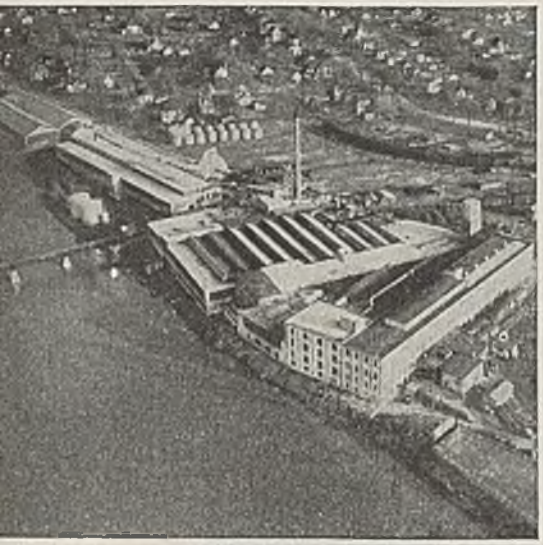
RB&W puts a PLUS in plow bolts

RB&W makes more plow bolts than anybody else in the world. Such volume production on an article of special usage suggests that RB&W must build into its plow bolts refinements that the users consider of major value.

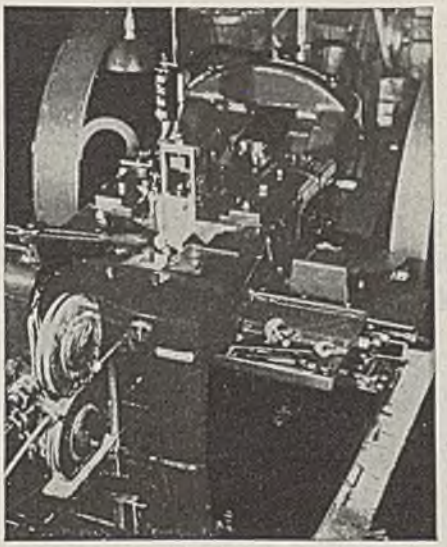
Most of the world's largest manufacturers of farm machinery who for years have standardized on RB&W EMPIRE, recognize the fact that RB&W engineers into its product extra strength and accuracy and fine finish . . . uniformity and dependability.

When you use RB&W EMPIRE Plow Bolts . . . or any other products in the complete quality line of bolts, nuts, screws, rivets and allied fastening products . . . you will appreciate how RB&W's 101 years of experience and technical advancement translate themselves into terms of fastest assembly, maximum holding power and superior appearance.

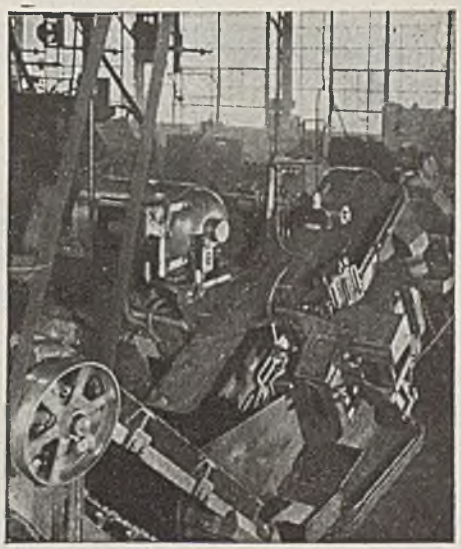




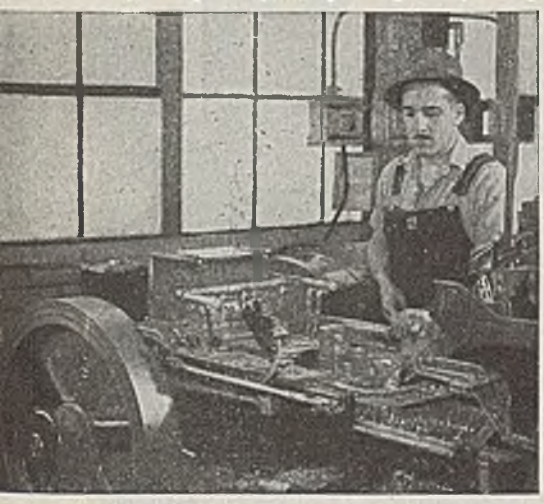
MILLIONS A DAY — One of RB&W's three high-capacity plants is located at Rock Falls, Illinois, close to many of the great manufacturers of farm equipment. In recent years, this plant has been greatly expanded, now delivers all types of bolts, screws, rivets and allied fastening products to the other industries that have grown up in the middle west.



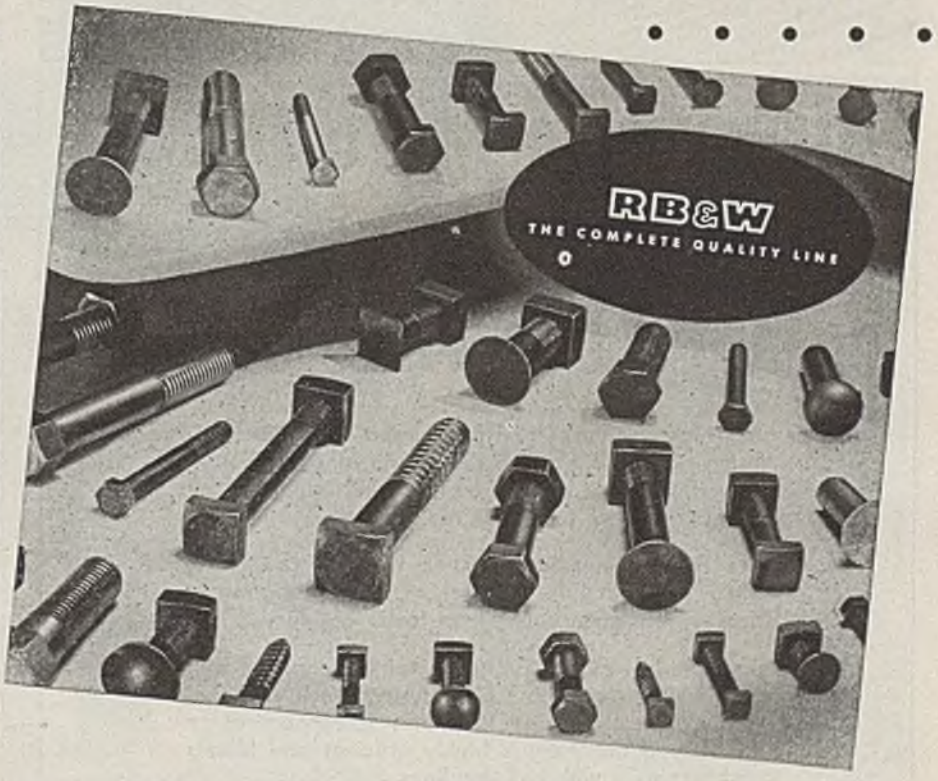
COLD-HEADING—RB&W Empire Plow Bolts are headed by cold-forming — a method in which RB&W specializes. Much of RB&W's development work has been in the direction of cold-heading which, experience has proved, results in a product of increased strength, greater accuracy, almost perfect uniformity, improved appearance.



ACCURATE THREADING — After the length of the body to be threaded has been reduced to proper diameter (an operation which also increases tensile strength), the threads are cold-formed on this machine. This thread-forming method eliminates tear in the metal and provides an accurate-lead, close-tolerance thread and stronger metal structure.



CLOSE FIT — Accurate shape and diameter of the head — in order to insure a perfect fit in the cast or countersunk hole — are provided by the extra operation of trimming, which removes excess "flash" and leaves a smooth, accurate head surface. This extra step saves the customer extra grinding and the danger of the bolt heads being loose.



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Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales Offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. *Distributors* from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. Also, the industry's most complete, easiest-to-use catalog.

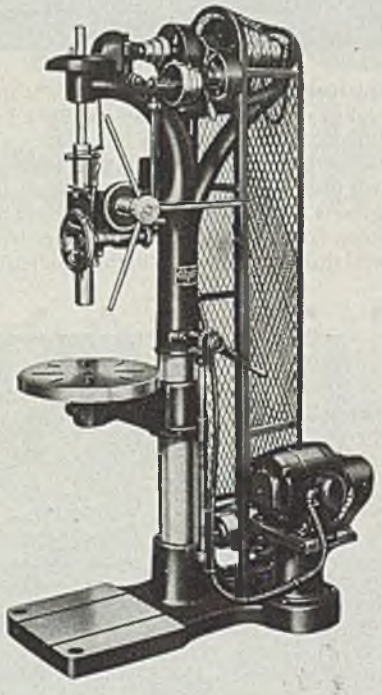
RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

features include absence of back lash and provision for right and left hand operation. Spring tension is quickly adjusted by lock nuts at head of posts. Interchangeable top plates save time on re-tooling operations.

Steel 6/24/46; *Item No.* 9155

Drilling Machine

A 20 in. drilling machine is announced by Sibley Machine & Foundry Corp., South Bend 23, Ind. for drilling up to 1¼ in. in cast iron. Unit is equipped with motor drive and belt guard or



where it is necessary to operate machine from a line shaft, with tight and loose pulley drive.

Machined part of main column is 5¼ in. in diameter. Drill table rotates on an arm which swings on column to provide maximum working space. Both power and hand feed are furnished. Adjustment is provided for wear between worm and worm gear. Motor is mounted on a pedestal, supported by a integrally cast rigid base.

Steel 6/24/46; *Item No.* 9425

Riveting Hammer

A new line of pneumatic riveting hammers of small, light-weight and rugged construction is announced by Ideal Commutator Dresser Co., 5076 Park avenue, Sycamore, Ill.

Features include well balanced, hand fitting grip design, ease of operation and controllable speed. Cooling is attained by expansion of air which is exhausted from front at operating head. Barrel is of one piece, all steel construction with a

Wire ahead

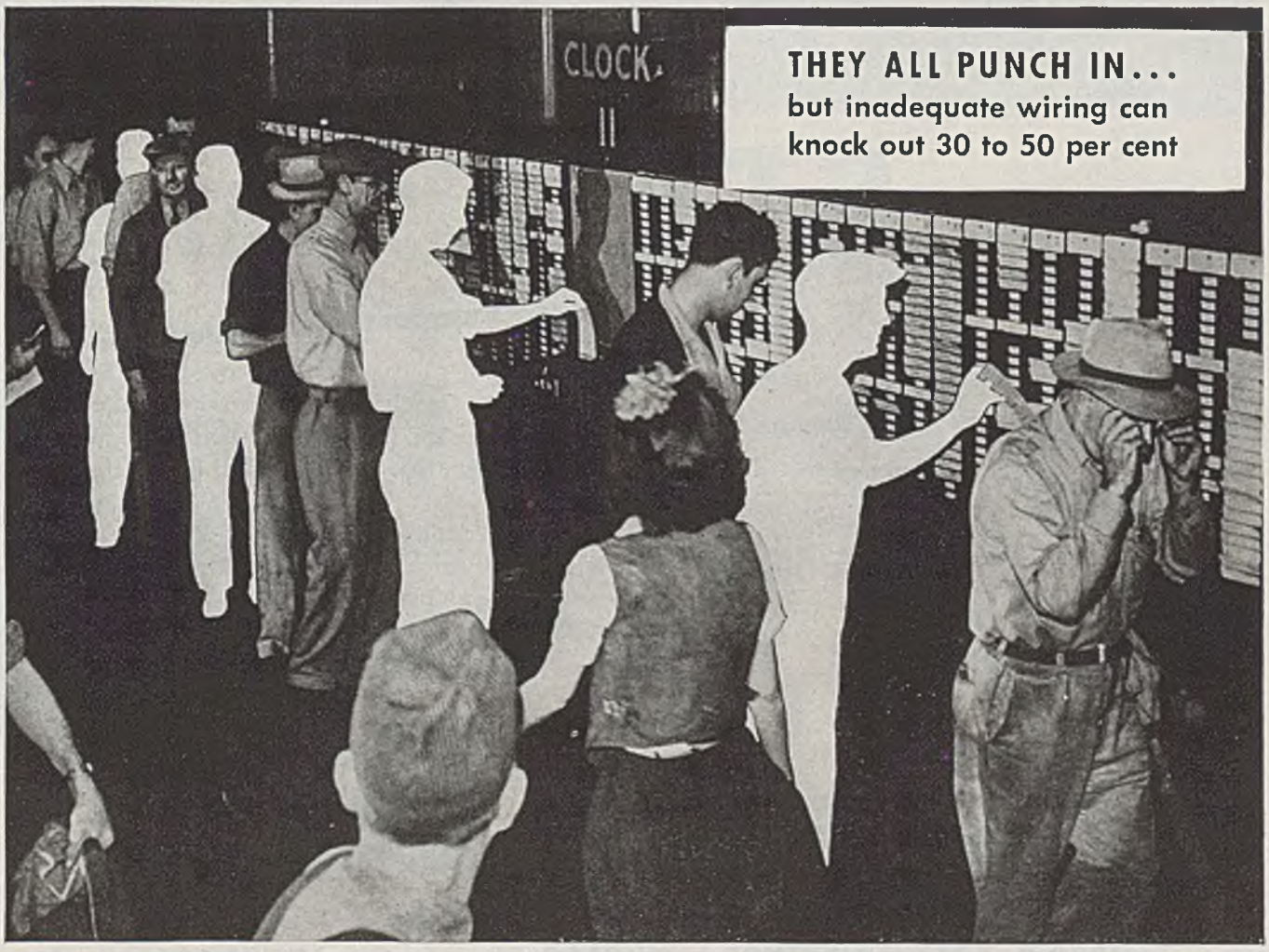
No matter how good a man is, he can't work *ahead* of his machine. And all too frequently overtaxed, over extended, obsolete wiring chokes off low-cost electricity from an efficient operator.

Is your plant safe against this threat to production and morale?

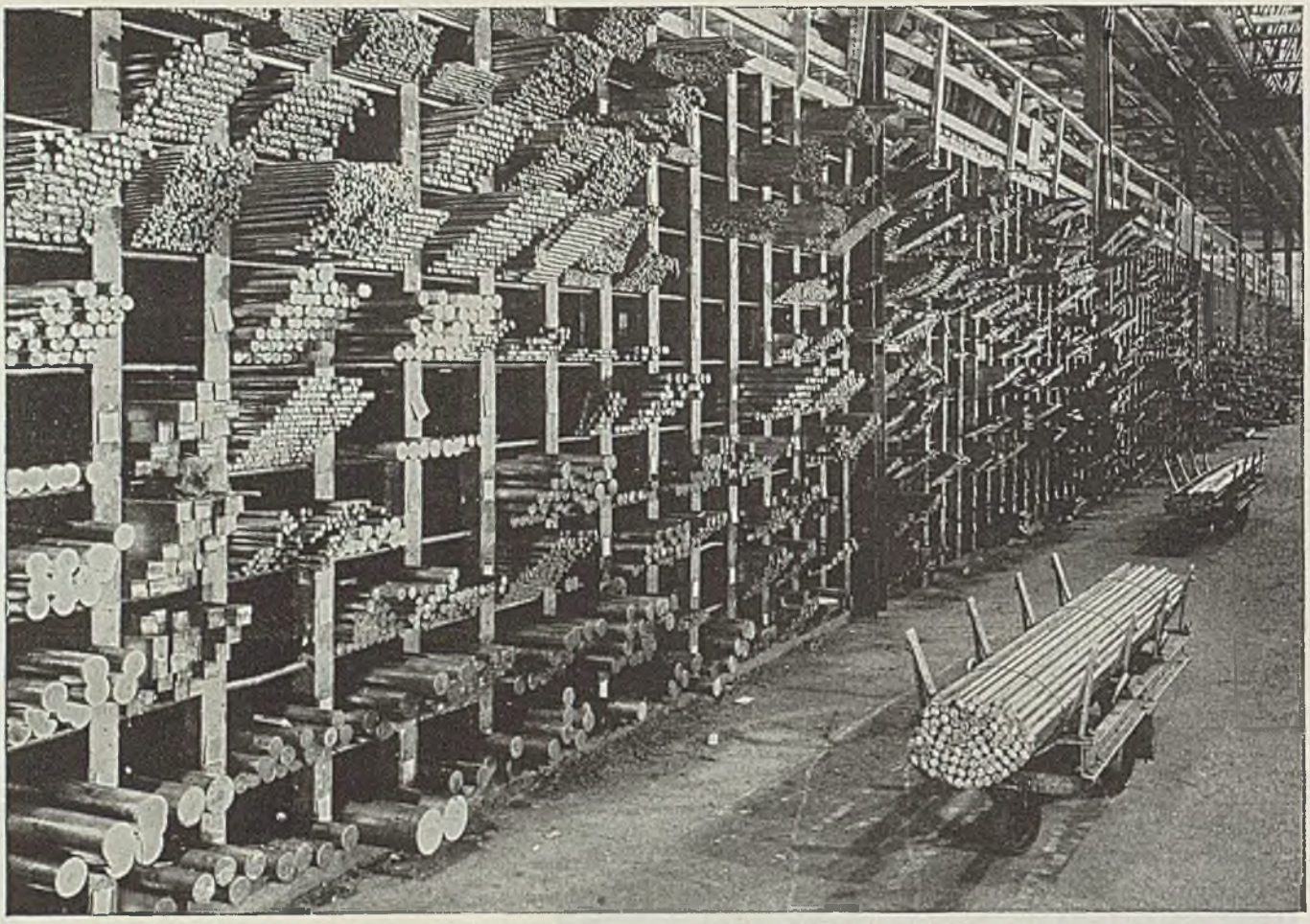
Why not check with your plant power engineer, your consulting engineer, electrical contractor or power salesman? It may save costly shut-downs and expensive alterations later.

Today, more than ever before, full production depends on adequate wiring.

FOR FULL PRODUCTION



ANACONDA **ANACONDA WIRE & CABLE COMPANY**



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Cold Rolled Strip Steel—Coils and Straight Lengths • Sheet Steel • Cold Finished Bars • Shafting • Tempered and Annealed Spring Steel • Round Edge Flat Wire • Round Wires • Shim Steel • Aircraft Strip Steel • Feeler Gauge • Drill Rod • Steel Balls.

GENSCO Specialized Steel Service is all that the expression implies—whether you are a large or small user of steel shipped from warehouse.

One of the outstanding features of GENSCO service is a special crew of workmen whose duty is to prepare stock for shipment. Being specialists in packaging, these men help assure the safe arrival of steel—steel that can be put in process the instant it is received by you.

GENERAL STEEL

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441 Lexington Ave.	56 E. Mitchell Ave.	208 E. Wisconsin Ave.	9301 Bonhomme Road	100—17th Ave., North
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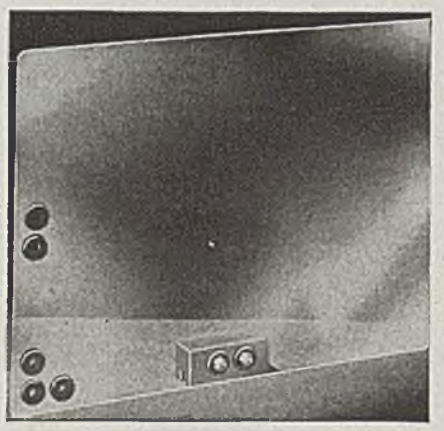
reinforced end to take alloy steel piston impact without breaking.

Air throttling regulator valve permits adjustment to accommodate all kinds of riveting. It is also suitable for caulking, scaling, chipping and other work.

Steel 6/24/46; *Item No.* 9318

Magnetic Grip Shield

A powerful magnet of horseshoe type is embodied in the latest grip shield developed by Dilley Mfg. Co., 10228 Euclid avenue, Cleveland. As a result the shield now can be used to provide protection to personnel working on machines

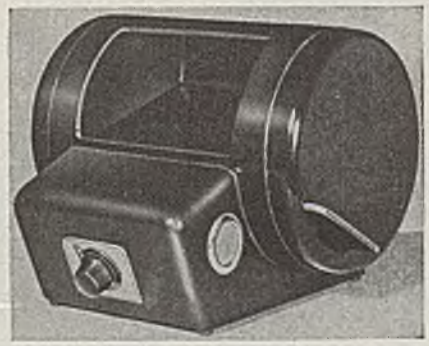


developing excessive vibration. The new shield is of 0.100-in. thick plastic and comes in sizes 10 x 12 x 16 and 16 x 20 in.

Steel 6/24/46; *Item No.* 9168

Photographic Viewer

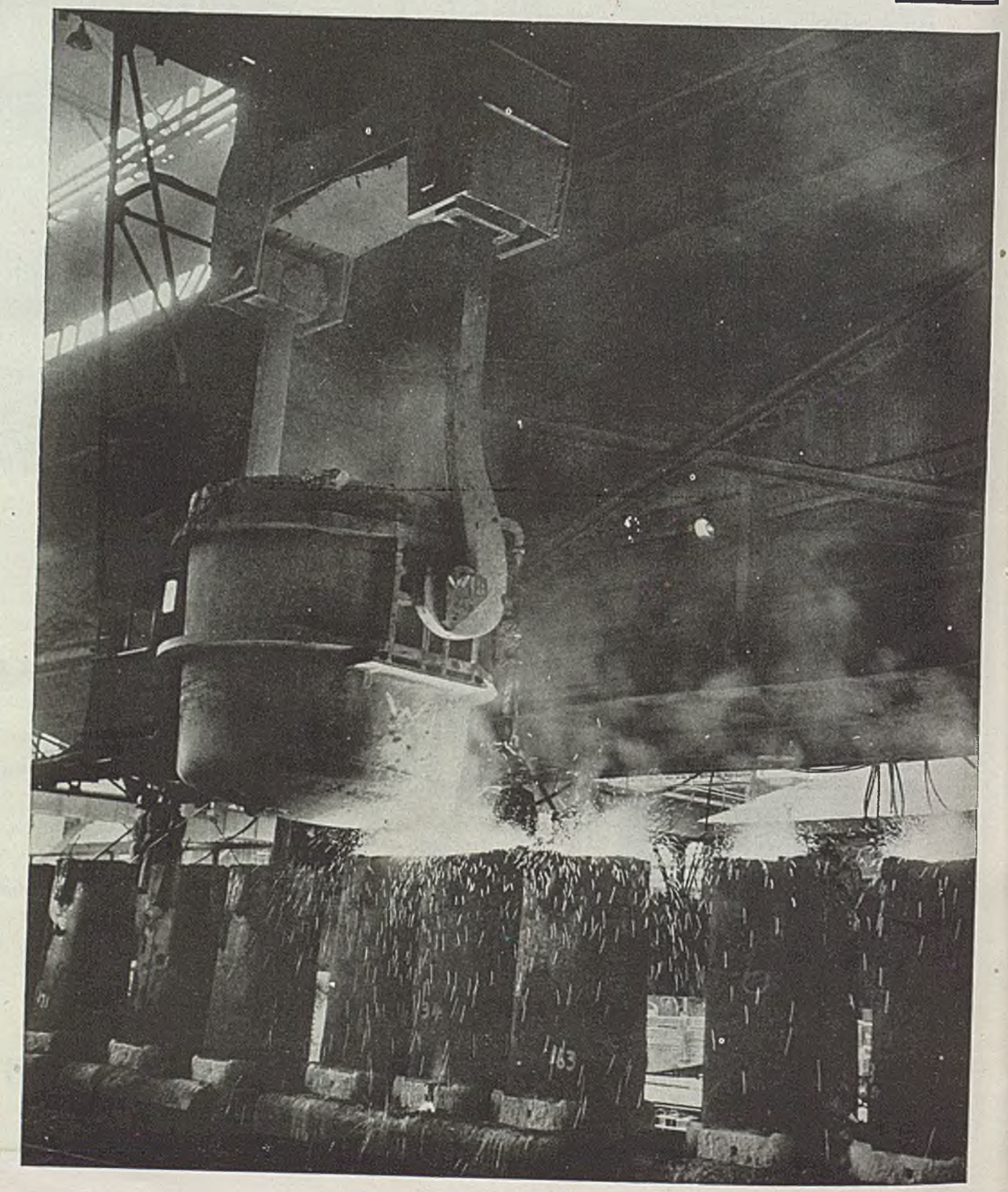
True-to-life images and 3-dimensional effects are provided by a new photographic viewer, the Super Viewer, developed by Barnett Optical Laboratories, Chi-



cago, for industrial research departments. According to the maker, images viewed in the instrument are completely free from color fringes or chromatic aberration.

Two slide carriers embodied on the instrument allow slides measuring 2 x 2 and 3¼ x 4¼ in. to be accommodated. Optical system is housed in a rotating cylinder

FERROCARBO-S



Produces Steel of Uniformly High Quality

Acting as the final deoxidizing agent in the ladle, FERROCARBO-S provides:

1. Thorough deoxidization.
2. Prolonged increase in fluidity.
3. Reduced number and extent of inclusions in fine-grained as well as normal steels.
4. Better dispersion of remaining inclusions plus elimination of stringers.
5. Increased strength while maintaining or improving ductility.
6. Increased hardenability under controlled conditions.

Photomicrographs, step-down tests, macro-etch tests and other analysis show the improvements effected. Inclusions are practically eliminated while the few that do remain agglomerate and become widely dispersed. Ingots of unusual soundness are produced. Superior castings and forgings are secured. Fine-grained steels are cleaner.

FERROCARBO-S proves equally effective for both open hearth and electric furnace steels. Simple to use, it provides added economies. For complete details, write Dept. J-66 today. The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

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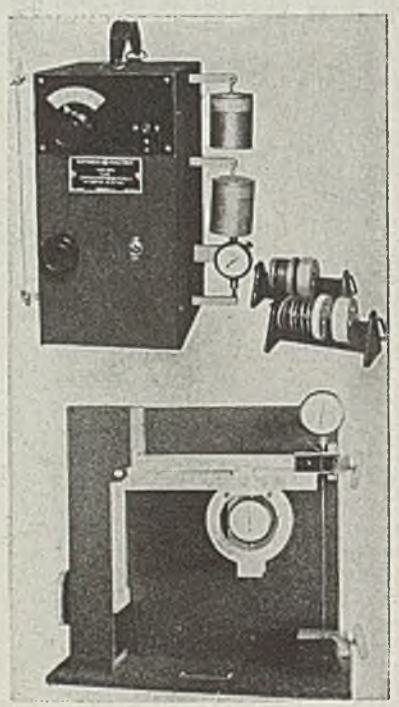
"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company

which permits adjustment of the viewing angle. A rheostat controls the lighting and acts as the on-off switch.
Steel 6/24/46; *Item No.* 9172

Elongation Testers

Two low-stress elongation testers for measuring stiffness or springiness of large and fine copper wire are announced by General Electric Co., Schenectady, N. Y. One of them, the large-wire tester, measures elongation of wire from 17.9 to 80.8 mills diameter, and the other, a



portable fine-wire instrument tests wire from 3.1 to 17.9 mills diameter.

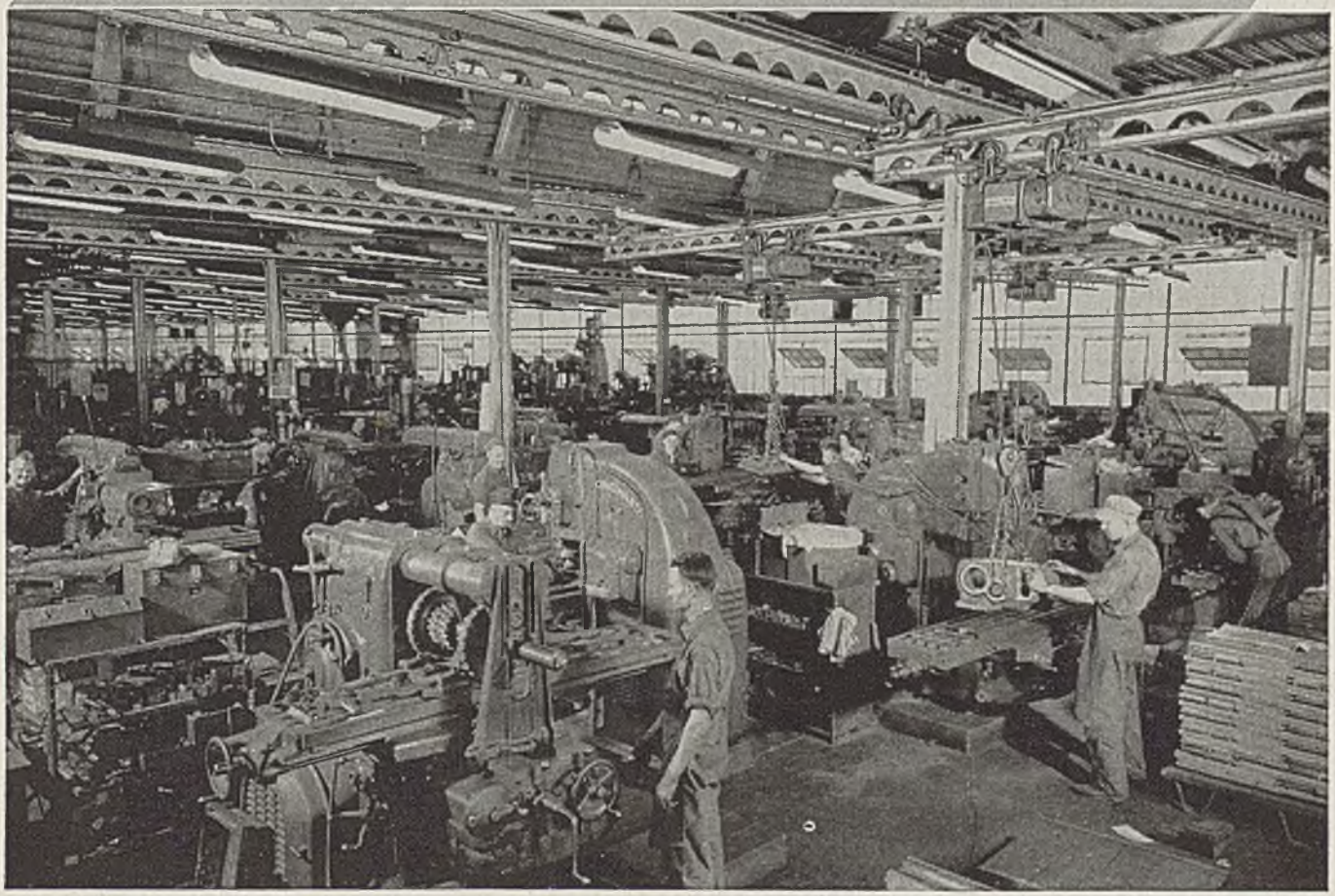
When large tester is used, wire is stretched between two clamps, one stationary and one movable, and a unit stress of 15,000 psi is applied by means of a jackscrew operated lever arm. Only 30 sec are required for adjustment. Elongation is recorded on a large micrometer dial.

With fine-wire tester, wire is clamped between vises located on ends of two movable arms, and stress is applied by weights which are furnished with equipment. Adjustments are made with dials on face of instrument and with help of a small neon light which indicates whether wire sample is under correct stress. Stretch is indicated on a dial page.
Steel 6/24/46; *Item No.* 9428

Self-Locking Cable Grips

A new self-locking cable clamp which utilizes the compound leverage principle has been developed by Maxwell A. West, consulting engineer, Trenton, N. J. Quickly installed or removed, having no nuts

TRAMRAIL CRANES SPEED PRODUCTION . . . and AID SAFETY



WHEN adequate overhead crane equipment is provided there is no waiting for materials, no loss of time of either skilled men or costly machine-tools, for want of a lift. That means improved efficiency and greater production.

Workers are usually enthused when Cleveland Tramrail Cranes are installed, for it lightens their load. Instead of hard, often back-breaking lifts, their work is reduced to the mere pushing of buttons. Electric hoists and easy rolling carriers do the heavy lifting and hauling.

Safety, too, is given a tremendous boost. Hernias, mashed fingers and toes and more serious accidents are greatly reduced or eliminated entirely.

There is little other industrial machinery that returns as large dividends and raises employees' good will as much for the amount invested as Cleveland Tramrail. It will pay you to learn why thousands of leading companies have installed this modern cost-reducing equipment.

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THE CLEVELAND CRANE & ENGINEERING CO.
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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

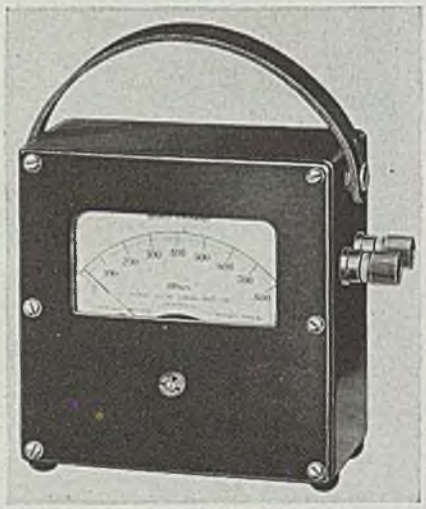
and bolts, it can be reused without any additional repair. The clamp is designed to fit and hold on three different size cables or strands ranging from ⅛-in. to 2½ in.

Steel 6/24/46; *Item No.* 9144

Portable Pyrometer

The compact, lightweight Alnor type 1500 pyrometer is mounted in a magnetically shielded metal case, providing accurate temperature readings in shop and general industrial use as well as in the laboratory. It is manufactured by Illinois Testing Laboratories Inc, 420 North La Salle street, Chicago.

Movement is double air gap type, with an Alnico magnet. It may be used on steel



top table, near other magnetic instruments, or in strong alternating fields.

Pyrometer is available as a single circuit unit with a choice of ten scale ranges, 0-400° F to 0-3000° F, and as double or triple range instrument built to order with scales as specified. Centigrade scales can be furnished.

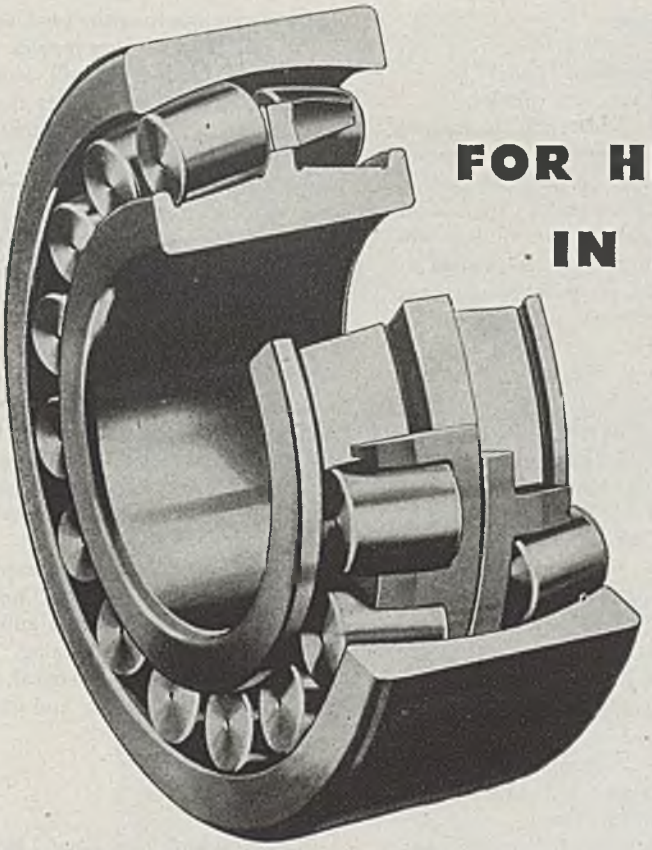
Steel 6/24/46; *Item No.* 9322

Mine Roof Jack

A new "tailored to fit the job," mine roof jack which eliminates necessity for large stocks of various height jacks, is announced by the Duff-Norton Mfg. Co., Pittsburgh. It makes it possible to meet all height requirements by cutting standard 2 in. pipe in lengths needed, and attaching jack base and top fittings. For different heights, fittings can be changed quickly and easily.

Jacks are available in two sizes; one of 8-ton capacity with a raise of 17 in. for standard 2 in. pipe; the other of 16-ton capacity, 17 in. raise, used with double strength 2 in. pipe. Heads for both models are made in ball and socket type and types for H-beams, square and round timbers.

Steel 6/24/46; *Item No.* 9265

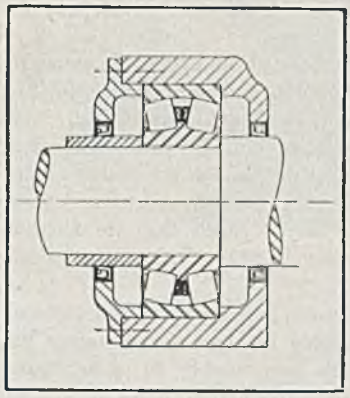


FOR HEAVY-DUTY SERVICE IN MANY INDUSTRIES

In every industry where the efficient operation of heavy-duty machinery is of major importance, difficult friction problems are being solved with the versatile Torrington Self-Aligning Spherical Roller Bearing.

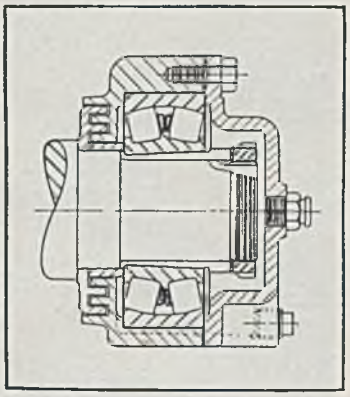
For your specific requirements, the engineering staff of Torrington's Bantam Bearings Division will be glad to offer expert assistance in adapting the Self-Aligning Spherical Roller Bearing to machinery you design, build or operate. For further information, contact your nearest Torrington Representative or write for our Bulletin No. 100A.

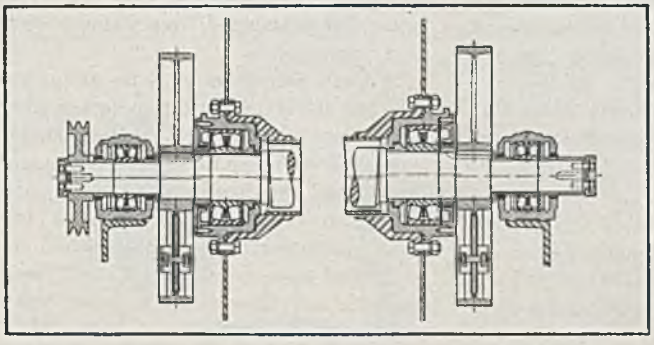
THE TORRINGTON COMPANY
BANTAM BEARINGS DIVISION, SOUTH BEND 21, INDIANA



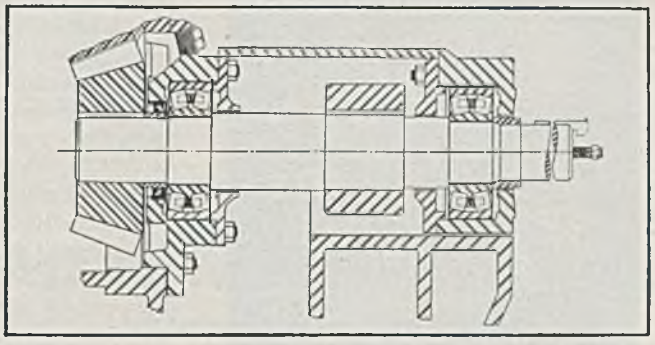
STEEL... X-section drawing shows a typical arrangement for the Torrington Self-Aligning Spherical Roller Bearing in modern, high speed auxiliary equipment for steel mills. Temperature changes, misalignment and high load stresses do not affect the free-rolling action within the bearing. Its greater inherent capacity under variable conditions provides wide adaptability.

PAPER... This X-section shows an application of a taper bore Spherical Roller Bearing to a press roll, where it is mounted on a straight shaft by means of an adapter. Through the use of this tapered sleeve, the internal running clearance is controlled by the amount of expansion given the inner race. Proper roller contact with both races assures full capacity under all conditions.





CONSTRUCTION... This X-section drawing shows a mounting of four Torrington Self-Aligning Spherical Roller Bearings on the main eccentric shaft of a shaker screen. The self-aligning feature of the bearings easily compensates for distortion and satisfactorily handles heavy shock loads.



OIL... Shown in X-section above are two Torrington Self-Aligning Spherical Roller Bearings applied to a pinion shaft as used in oil field rotary table drives. Heavy shock loads and shaft deflections do not affect the efficient free-rolling self-alignment of the bearing in this application.

TORRINGTON BEARINGS

SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

Pipe Interiors

(*Concluded from Page* 97)

nickel and steel are very similar.

Welding and fabrication techniques have been fully developed. Bending can be performed successfully hot or cold within ordinary limits of minimum recommended radii. Therefore, the erection of piping systems completely lined with corrosion-resistant material and meeting all conditions required by the ASA code for pressure piping are possible. As shown in Figs. 4 and 7, it is possible to maintain 100 per cent continuous corrosion-resistant internal surface by using welding electrodes of Monel or 25/20 chromium-nickel. The brinell hardness of weld metal is between 150 and 185. Fig. 5 shows a reverse bend of a section of pipe welded with Monel welding rod.

A number of alloys and metals were used in the tests before arriving at the welding procedure which is now recommended. The welding procedure which was finally arrived at was to use stainless steel or 25-20 chromium-nickel, as shown in Figs. 8 and 10. Fig. 8 shows front-bends, reverse bends, and side bends of test coupons welded with stainless steel welding rod, and Fig. 10 shows the same type of test on coupons welded with 25-20 chromium-nickel alloy welding rod. It is also possible for use in some services to maintain complete continuity of nickel surface by laying down a first pass of nickel and the following passes with Monel, stainless steel, 25-20 chromium-nickel or even straight carbon steel welding rod.

It might be well to remark here that under the described method of deposition the applied nickel becomes an integral part of the base metal. Consequently, there is no peeling or cracking when the heat is applied for flame cutting, bending, welding, or fabrication. A large quantity of electroplated pipe was welded on the automatic welding machines, requiring three passes under flux. Even the tremendous heat generated and held in by the flux did not cause a failure of the plating.

As a further evidence of this remarkable property, clad tubing has been upset for a lap (Van Stone) flange without affecting the applied metal on the internal surface (Fig. 11). This, of course enables the fabricator to produce flange joints, gasketed with full face gaskets, and obtain protection against corrosion. In this figure, it can be seen that the lining has been worked back, forming a heavier thickness of nickel for a short distance near the edge of the lap (Van Stone) flange. This severe working at extreme heat did not cause the lining to blister, crack, or peel.

Another method of obtaining a lap joint without upsetting the pipe, as shown in Fig. 11, is to use lap nipples already electro-clad welded to mill lengths of pipe so plated. This enables the fabricator to use lap joints completely coated and may offer more protection than the previous method. Fittings and other pipe line accessories can be similarly processed for use in conjunction with Lectro-Clad pipe. (See Fig. 9). This last figure shows a 4-in. tee, nickel lined with from 0.005 to 0.006-in. of nickel, and is typical of the fittings which can be plated by this process. There will be available soon valves which can be used in conjunction with clad piping systems and lending themselves to this technique. Vessels and receivers of all types have already been fabricated, thus providing a complete piping system.

Lectro-Clad materials find application in equipment for the following industries: paint and varnish, food, pulp and paper, dye stuffs, petroleum—refining, glass—ceramics, water works, chemical, textile, plastic, power plants, coke and gas products, and glue and gelatin.

Die Castings

(*Continued from Page* 112)

front fender moldings of this car are separate pieces.

Other external die cast components include hood or radiator ornaments (Fig. 3), side hood latch panels, tail lamp parts, license bracket parts, rear deck trim and plates having the maker's name or model in attractive letters. Some castings have recesses that are filled in with enamel after plating the whole casting.

Hardware, both external and internal, is commonly die cast as heretofore but there are new motifs in some cases, partly to provide new notes in styling. Some of the low-priced cars use hardware that is stamped from stainless steel and assembled.

A large proportion of radio grilles are die cast and so, too, are many other parts for instrument panels, including knobs, ash receiver and control parts, instrument bezels and the like. Quite often, such units are combined with plastics but most plastic parts are quite small and are not relied upon to take much stress, both strength and dimensional stability being inferior to die castings.

Olds has a die cast instrument panel (Fig. 4) that includes the radio grille and recesses for several accessories and extends nearly the full width of the car. Some recesses are filled in over the plating and the effect is striking but in keeping with adjacent parts. Although this panel is 48 in. long and 7 in. high at its widest point, thickness averages only 1/16-in. except at bosses, ribs and bars. A similar panel could be built up from

Wire rope "architect" at work ... for YOU!

To give the finished product maximum service, safety and economy, Macwhyte Wire Rope is carefully blueprinted by "architects" before any actual manufacturing starts. These men are Macwhyte's highly skilled design engineers.

Such things as size and quality of wires and strands, degree of flexibility, bearing surface, core, etc., must be accurately determined. The engineer's calculations must be perfect to produce a rope in which all parts fit uniformly and work together as a team to best meet operating conditions.

Proper designing is just one example of the thoroughness Macwhyte exercises at every step in planning and producing wire rope. No effort is spared to make it the *correct* rope for your equipment.

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Contains 170 pages of valuable information; lists Macwhyte's complete line. Ask any Macwhyte representative or write Macwhyte Company.

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San Francisco · Los Angeles · Distributors throughout the U. S. A. and other countries

★ ★ ★ ★

MACWHYTE PREformed and Non-PREformed Wire Ropes — Internally Lubricated . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . Braided Wire Rope Slings . . . Aircraft Cables, Assemblies and Tie-Rods . . . Stainless Steel Wire Rope, Monel Metal Wire Rope, Galvanized Wire Rope.

MACWHYTE COMPANY 50th Year 1896 – 1946

NO. 858

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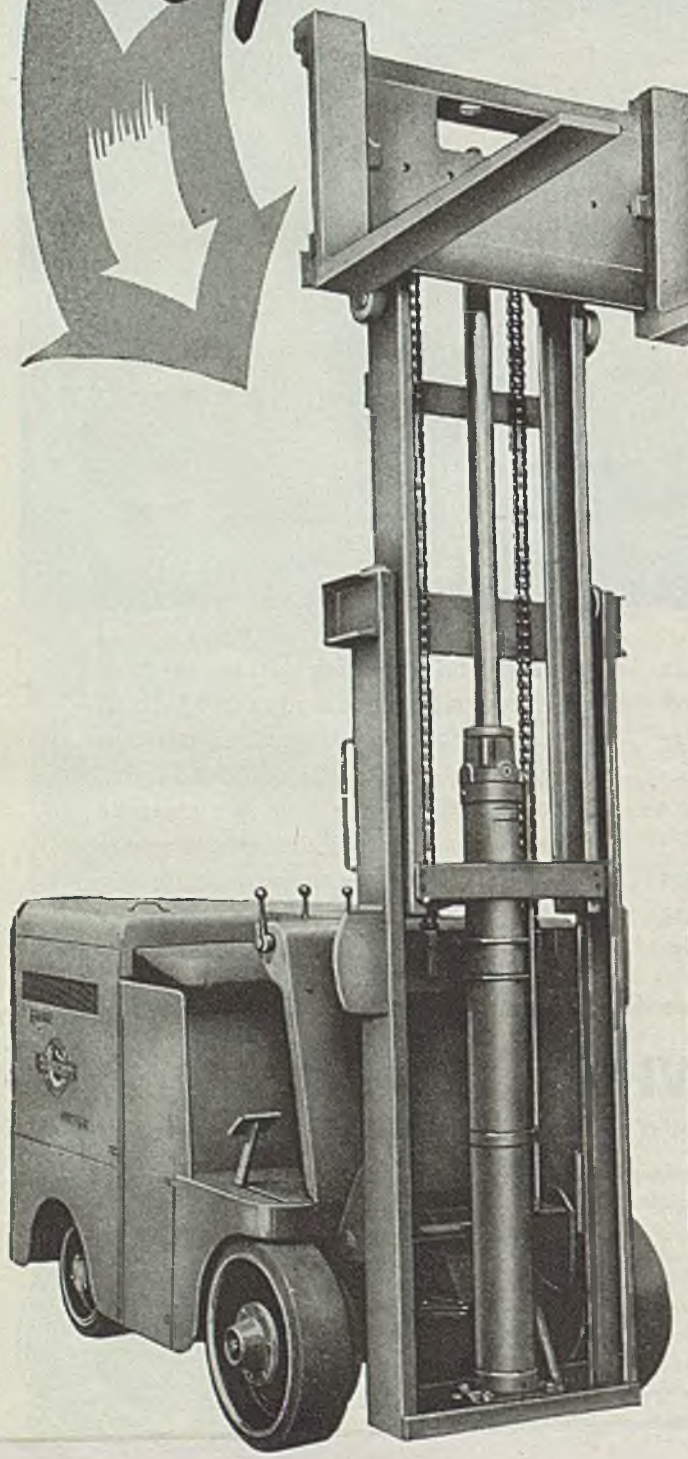
Speedy Low Cost Handling



Step *up* your materials handling efficiency and step *down* your materials handling costs by transporting your loads as a unit. The Crescent Electric PALLETIER picks up, totes, tiers and detiers palletized goods . . . quickly and economically . . . safely and easily.

The PALLETIER speeds every operation from receiving to shipping . . . negotiates a seven-foot car door . . . stacks material 108 inches above the floor (132½ inches with forks inverted) . . . utilizes more cubic feet of storage space in stock room and warehouse . . . reduces accidents and damage to merchandise.

The Crescent Electric PALLETIER is the right truck to increase your handling efficiency . . . reduce your handling costs. Initial price is low. Maintenance expenses are minimum. Send for the PALLETIER bulletin today.

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QUICK FACTS

The PALLETIER—result of almost eight years of research—is the ultimate in efficiency. An operator can now spot and tier without straining or stretching. All control levers are on the dash—right at the driver's fingertips. Exceptional stability is provided by the location of the hydraulic tilting cylinder. Carriage tilts backward 15 degrees and forward 5 degrees. Protection against forced acceleration is provided by full magnetic controls—an outstanding and exclusive PALLETIER feature. Ready access to all mechanisms facilitates replacements, inspections and adjustments.

CRESCENT *Electric* **PALLETIER**

several stampings, but would not equal the die casting in details of appearance that are significant and probably would cost more, take more labor, involve higher tooling cost and lack the integral fastening lugs and precision in dimensions realized in the die casting.

Horn rings are die cast on many cars and so, too, are some other components of the steering wheel assembly, including hubs. Here again, smart appearance is important and is enhanced by plastic parts that afford a pleasing contrast with the plated die casting.

There is little need to particularize here on the purely mechanical and structural parts that are die cast much as in many prewar years. Some in aluminum alloys have already been mentioned. Those in zinc alloy include such parts as are used in carburetors, fuel pumps, window regulators, oil seal components, wipers, horns, speedometers, electrical accessories, locks, transmission control units and the like (Fig. 5).

Most of these are cheaper in die-cast form than in any other, and meet all other requirements, or they would have been replaced long since with other products. Some horn parts that were converted to stampings when zinc was scarce or restricted are now back in die-cast form, partly because horn tone is better when die castings are used. Ford has added an expansion chamber die casting to help make wipers quieter in operation, but this is a minor part.

That die castings are proving of extreme utility to the motor car maker cannot be doubted. He has found them much too useful to be regarded lightly, and signs point to more general rather than to more restricted application.

New Standard for Sine Bars Available

Producers, distributors, testing laboratories, government agencies have been offered for consideration a Commercial Standard, TS-4066. National Bureau of Standards' proposal incorporates a consensus of comment on a draft circulated on Aug. 10, 1945, originally requested by WPB.

This standard covers the major essential requirements for sine bars, blocks and plates, sine bar fixtures and sine plate fixtures, in the following classifications and with particular reference to the following sizes: (a) Sine bars, commercial and laboratory classifications; (b) blocks, plates, commercial and laboratory; (c) sine bar fixtures and sine plate fixtures, commercial and laboratory classifications; groups are in sizes of 5, 10, and 20 in.

Sine bars, blocks, plates and fixtures are defined, general and detail requirements set forth.

the BUSINESS TREND

INDUSTRY has made considerable recovery since the return to work of the bituminous coal miners, with the result the rate of industrial activity has climbed back near the year's high point attained in the week prior to the soft coal strike.

Greatest portions of the weekly gains have come from rises in steel ingot production.

STEEL's industrial production index for the week ended June 15 registered 126 per cent (preliminary), compared with 112 per cent in the previous week and 94 per cent in the week ended June 1, low point in the coal strike period.

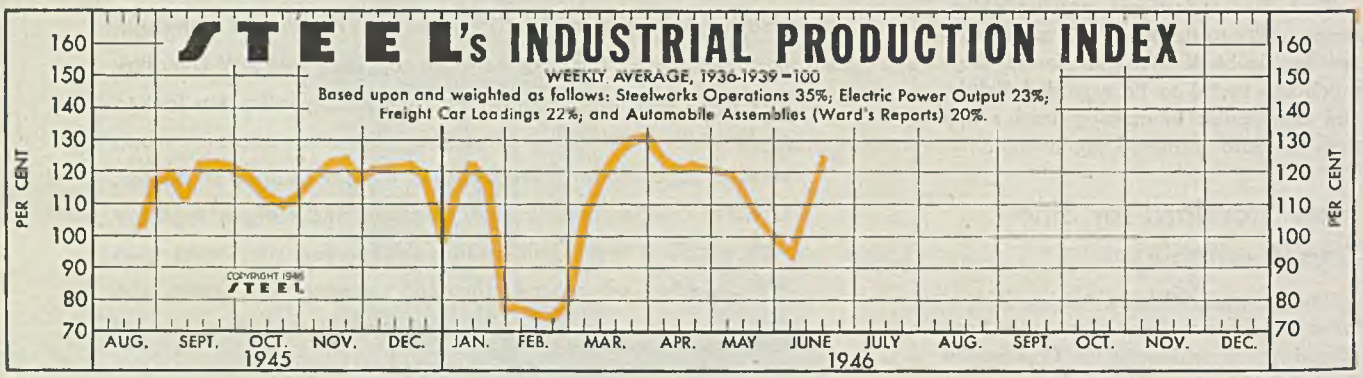
COAL—Among the segments of industry making rapid recovery in production are bituminous coal mines. In the week ended June 8, first week after end of the miners' strike, production bounded back to 12,635,000 tons.

ELECTRIC POWER—Production of electric power for the week ended June 15, a prophetic week as to summer demand for electricity, totaled 4,030,058,000 kilowatthours, compared with 3,920,444,000 kilowatthours in the preceding week. Largely because of strikes that curtailed industrial operations, electric power production during recent weeks has not been following the seasonal uptrend customary at this time of year. Electricity demand in the last two or three weeks in June usually is indicative of demand during the summer, for in June many manufacturers set operating rates to be followed until fall.

CASTINGS—Shipments of steel castings in April totaled 146,327 tons, highest since June, 1945, and 44,931 tons greater than in March, 1946. Unfilled orders at the end of April amounted to 392,790 tons, a decrease from the 412,325-ton backlog at the end of March. Shipments of malleable iron castings during April totaled 65,010 tons, up 29 per cent over March.

FORGINGS — Steel forgings shipments during April totaled 140,495 tons, 15 per cent above the 122,609 tons shipped during March. Unfilled orders for steel forgings for sale to the trade at the end of April totaled 620,284 tons, slightly above the backlog of 611,565 tons at the end of March.

NEW BUSINESSES—The nation had 400,000 more business firms at the beginning of 1946 than at the end of 1943, the U. S. Department of Commerce reports. This rapid recovery of the greater part of the wartime loss of 560,000 firms results from opening of 695,000 new businesses offset by only 295,000 discontinuances. The high rate of business turnover undoubtedly will continue, said the department, which added that rapid expansion of the business population ultimately will be checked more by a rise in the rate of discontinuance than by a fall in the number of entrants.



The Index (see chart above): **Latest Week (preliminary) 126** **Previous Week 112** **Month Ago 106**

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)§	75	55	49	88
Electric Power Distributed (million kilowatt hours)	4,030	3,920	3,939	4,348
Bituminous Coal Production (daily av.—1000 tons)	2,106	615	77	1,995
Petroleum Production (daily av.—1000 bbls.)	4,961	4,896	4,751	4,888
Construction Volume (ENR—Unit $1,000,000)	$138.9	$182.2	$137.8	$59.2
Automobile and Truck Output (Ward's—number units)	46,393	43,175	48,565	19,600

*Dates on request. §1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

TRADE

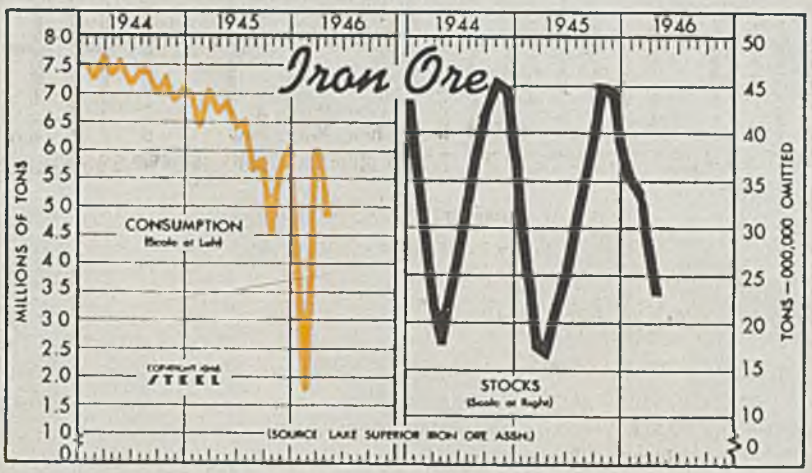
Freight Carloadings (unit—1000 cars)	840†	830	688	873
Business Failures (Dun & Bradstreet, number)	12	13	16	13
Money in Circulation (in millions of dollars)‡	$28,128	$28,159	$27,950	$26,533
Department Store Sales (change from like wk. a yr. ago)‡	+39%	+32%	+40%	+14%

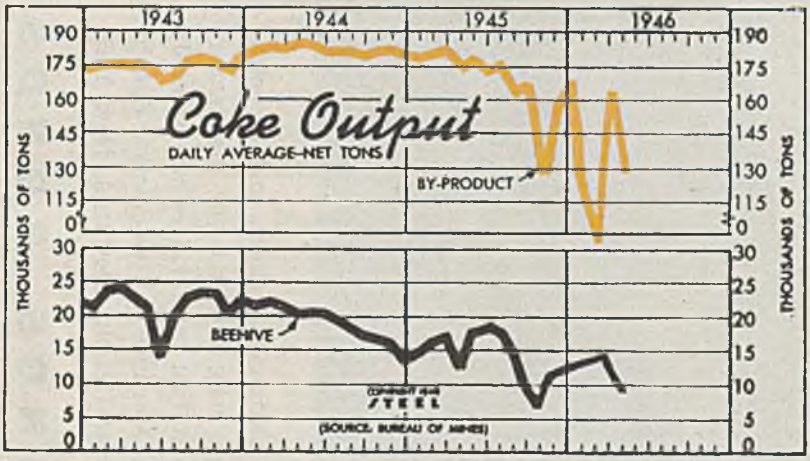
†Preliminary. ‡Federal Reserve Board.

Iron Ore

(Lake Superior Iron Ore Assn.)
Gross tons—000 omitted

	Consumption		Stocks at Lake Erie docks and furnaces	
	1946	1945	1946	1945
Jan.	3,719	6,983	35,342	30,889
Feb.	1,748	6,371	33,647	24,577
Mar.	6,021	7,082	27,601	17,304
Apr.	4,769	6,642	23,079	16,429
May	....	6,872	.....	20,715
June	....	6,397	.....	24,847
July	....	6,532	.....	29,485
Aug.	....	5,658	.....	34,781
Sept.	....	5,837	.....	39,549
Oct.	....	4,491	.....	45,090
Nov.	....	5,611	.....	44,706
Dec.	....	6,099	.....	39,059
Total	....	74,576	.....	.....





Coke Output

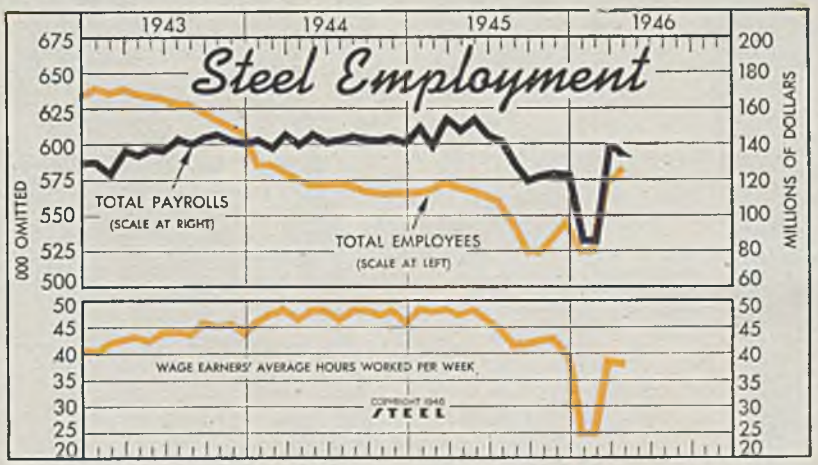
Bureau of Mines
(Daily Average—Net Tons)

	By-Product		Beehive	
	1946	1945	1946	1945
Jan.	122,570	179,879	13,069	14,745
Feb.	93,985	180,727	13,064	16,210
Mar.	161,290	182,120	14,897	17,115
Apr.	128,394	174,239	878	12,554
May	.....	178,338	.....	17,963
June	.....	172,201	.....	18,616
July	.....	175,163	.....	17,682
Aug.	.....	163,567	.....	14,669
Sept.	.....	166,559	.....	9,924
Oct.	.....	127,173	.....	6,407
Nov.	.....	159,646	.....	12,218
Dec.	.....	166,648	.....	12,659
Ave.	.....	168,855	.....	14,230

Steel Employment

	—Employees†— (000 omitted)			—Total Payrolls— (Unit—$1,000,000)		
	1946	1945	1944†	1946	1945	1944
Jan.°	522	564	583	$84.9	$150.3	$141.8
Feb.°	522	566	583	84.9	138.4	137.6
Mar.	570	570	578	138.8	155.0	145.3
April	582	567	573	134.3	147.0	138.9
May	....	565	569	....	154.0	145.4
June	....	562	570	....	144.1	140.5
July	....	557	571	....	141.0	141.8
Aug.	....	543	569	....	128.1	143.9
Sept.	....	521	565	....	119.1	142.2
Oct.	....	522	564	....	121.3	141.7
Nov.	....	533	564	....	122.8	143.1
Dec.	....	545	564	....	122.5	139.9

† Monthly average. ° Figures for January and February, 1946, are merely averages derived from a report that combined those two strike-affected months.



FINANCE

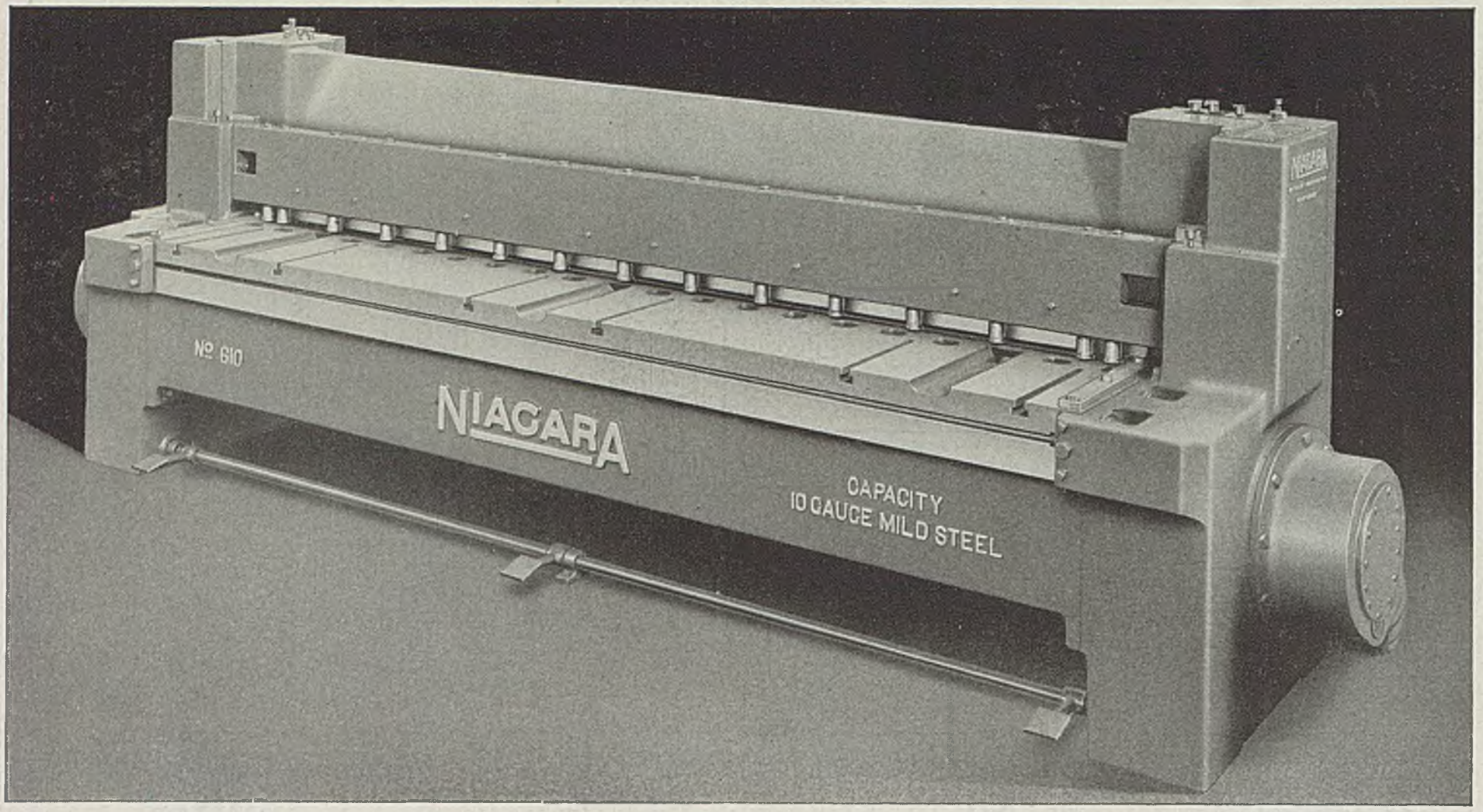
	Latest Period°	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,395	$10,769	$11,289	$10,835
Federal Gross Debt (billions)	$271.2	$271.4	$273.0	$242.8
Bond Volume, NYSE (millions)	$25.3	$19.1	$18.7	$60.5
Stocks Sales, NYSE (thousands)	5,192	5,582	5,947	9,254
Loans and Investments (billions)†	$63.3	$63.9	$64.1	$58.3
United States Gov't. Obligations Held (millions)†	$45,222	$45,593	$45,777	$43,296

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$64.45	$63.54	$63.54	$58.27
All Commodities†	115.1	111.1	110.1	106.0
Industrial Raw Materials†	125.5	125.1	123.2	118.8
Manufactured Products†	106.6	106.5	105.6	102.0

†Bureau of Labor Statistics Index, 1926 = 100.



Plants are obtaining more production per man-hour with Niagara Power Squaring Shears because of accurate cutting, quick setting, ball bearing, self-measuring parallel back gages, full visibility of cutting line, instant acting Niagara sleeve clutch and other modern features.

Enclosed drive with gears, clutch and eccentrics running in oil assure long life and low maintenance cost. Four-edge, solid tool steel knives are standard equipment. Niagara Machine & Tool Works, Buffalo, N. Y. District Offices: Detroit, Cleveland, New York.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory regrinding service by the same skilled men who grind new Niagara knives.

HELPFUL LITERATURE

1. Broaching Machines

Zagar Tool, Inc.—4-page illustrated bulletin entitled "Production Broaching" describes horizontal and vertical broaching machines with capacities of 20 and 10 inches respectively. Typical tooling setups are shown and features of machines are outlined.

2. Chain Link Fence

Wickwire Spencer Steel—36-page illustrated guide booklet "How to Erect Chain Link Fence" gives step-by-step procedure to be used in installing this type of fence on industrial property. Complete data are given on gates, fixtures, H-post construction, end and corner posts, and fittings.

3. Aluminum

Reynolds Metal Co.—8-page illustrated catalog No. 102 discusses new importance of aluminum in processing operations. Table of applications and forms available is presented.

4. Car Bottom Furnaces

W. S. Rockwell Co.—4-page illustrated bulletin No. 422 lists advantages of company's car bottom furnace in mass or bulk loading on cars or of handling large, heavy irregularly shaped pieces. Work can be heated in batches on one or more cars. Firing methods and specifications are listed.

5. Carbide End Mills

Super Tool Co.—4-page illustrated folder "Solid End Mills" reveals detailed information regarding proper selection of correct carbide tipped end mill for specific work. Charts contain information on proper feeding and speeds at which tools should be run to obtain maximum results.

6. Resistors & Rheostats

Ward Leonard Electric Co.—16-page illustrated catalog No. D-2 describes Vitrohm resistors and rheostats for wide range of uses in industrial and electronic equipment. Technical data and specifications of many types of units are presented.

7. Rotary Pumps

George D. Roper Corp.—4-page illustrated bulletin No. 10 covers series No. K rotary pumps as unit easily adapted to wide range of jobs. Applications for diesel fuel oil transfer work, pressure lubricating jobs, hydraulic service and others are given.

8. Water Coolers

Sunroc Refrigeration Co.—20-page illustrated bulletin No. A-45 describes complete line of water coolers. All models are illustrated and full specifications for each are given.

9. Grinding & Lapping Machines

Norton Co.—24-page illustrated catalog No. 1843-S presents detailed and descriptive information on line of grinding and lapping machines. Specifications and illustrations for each model are complete with suggested applications and design features.

10. Spot Welding

Tweezer-Weld Corp.—4-page illustrated folder titled "Greatest Recent Development in Spot Welding" describes efficient productive and portable unit for spot welding of wire, tack welding and joining parts from 0.0005 through 0.015-inch in thickness.

11. Precision Casting Equipment

I. Shor—10-page illustrated list on suggested equipment for precision casting gives prices of casting machines, vulcanizers, ovens, wax injectors, mold frames and other precision investment casting accessories.

12. Electric Controls

United Electric Controls Co.—28-page illustrated catalog "Electric Temperature & Pressure Controls" lists specifications and application data on line of controls for marine, industrial, aircraft and special uses. Fixed and adjustable type thermostats and pressure switches are shown and complete details of each presented.

13. Plate Punch & Table

Thomas Machine Mfg. Co.—4-page illustrated bulletin No. 125 covers plate punch and table for punching of all kinds of plates for ships, tanks, boilers and car. Unit is one-man operated, gives positive control and can handle rectangular and odd shapes. It is equipped with roller bearings throughout.

14. Collet Line

Sutton Tool Co.—28-page illustrated catalog titled "Diamond Grip Collets and Feed Fingers" describes collets and feed fingers for automatic and hand screw machines, lathes and milling machines. Specifications and prices for each size of round, square or hex and master collets are included.

15. Carbon Restoration

Surface Combustion Corp.—4-page illustrated bulletin No. SC-125 titled "Skin Recovery" covers carbon restoration process by use of controlled gas atmosphere. Bulletin describes value of maintaining carbon content on surface. Photomicrographs indicate effect of process on assorted types of steel.

16. Motor Service Plans

Westinghouse Electric Corp.—12-page illustrated booklet No. B-3711 describes three plans for assuring proper servicing of fractional horsepower electric motors. Details are presented on over-the-counter motor exchange plan, shop repair plan and national service plans. How plans operate and results obtainable are explained.

17. Optical Pyrometer

Pyrometer Instrument Co.—4-page illustrated bulletin is entitled "Pyro, the Simplified Optical Pyrometer". Models are available in ranges from 1400 to 3700 F. Radiation, surface and immersion pyrometers in line are described also.

18. Air Control Valves

Valvair Corp.—94-page illustrated composite catalog presents information on pneumatic knob, lever, clevis, cam, foot single diaphragm and double diaphragm operated valves. Parts and price lists are included.

19. Shop Equipment

Standard Pressed Steel Co.—40-page illustrated brochure titled "Hallowell" presents wide range of sizes, types and styles of benches, chairs, stools, cabinets, dollies, drawers, desks, locker room benches, tables, stock carts, tool stands, tote boxes, welding tables and work benches.

20. Ball Bearings

Split Ballbearing Corp.—28-page illustrated catalog No. 84 presents engineering and installation information, design and construction features of standard divisible types of ball, roller and thrust bearings. Special construction for unusual designs or engineering requirements are covered.

21. Retaining Rings

Waldes Kohinoor, Inc.—48-page illustrated catalog No. 4 highlights new developments in retaining rings and lists technical data concerning applications of seven basic types of retaining rings. Sketches of basic and unusual applications in "before and after" views show savings in space, weight, machining and assembly costs. Charts cover material characteristics, dimensions, thrust loads and impact tests.

22. Mechanical Pickler

Youngstown Welding & Engineering Co.—4-page illustrated bulletin "The New Weldco Mechanical Pickler" gives data on this unit. How equipment can increase profit in pickling operations is explained. Procedure for pickling tubes prior to cold drawing or galvanizing is outlined.

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23. Chucking Machine

National Acme Co.—12-page illustrated bulletin No. SC-46 gives information concerning design and construction features, work capacities, methods of operation and size specifications of 12-inch single spindle Chuck-Matic chucking machine. It is adapted to heavy duty high production metal turning operations on castings, forgings and tubing parts.

24. Hydraulic Planer

Rockford Machine Tool Co.—14-page illustrated bulletin No. 290 includes design and construction features of Rockford hydraulic open-side planer. Specifications are given for all of four rated sizes, each available with choice of five different strokes from 10 to 20 feet.

25. Testing Machines

Tinus Olsen Testing Machine Co.—56-page illustrated bulletin No. 30 presents data on line of machines for testing tension, compression and flexure. Principles of operation, design and construction are discussed.

26. Vane Pumps

Vickers Inc.—8-page illustrated bulletin No. 40-25a describes single vane pumps for oil hydraulic systems. These units are of constant delivery type and can be supplied with foot, flange or no mounting. Displacements range from 1 to 60 gallons per minute.

27. Design Rolling Process

Rigid-Tex Corp.—16-page illustrated bulletin is entitled "Rigidized Metals for Strength, Utility, Texture". Process rolls design in ferrous and nonferrous sheet and strip and imparts mechanical, textural and utility values. Bulletin discusses advantages, uses and characteristics of such processed metal.

28. Exhaust Fans

B. F. Sturtevant Co.—24-page illustrated catalog No. 430-3 gives uses, construction and sizes of exhaust fans which are designed particularly for dust control and conveying materials which can be carried on current of air. Performance tables, specifications and capacities are included.

29. Pit Jacks & Tables

Watson-Stillman Co.—12-page illustrated bulletin No. 510-A gives data on line of hydropneumatic pit jacks and drop pit tables for railroad shops. Hand operated telescopic, air-engine driven, and special types are described.

30. Adjustable Speed Drive

Reliance Electric & Engineering Co.—8-page illustrated bulletin No. 311 describes V°S electric adjustable speed drive for alternating current systems. Typical applications are shown and described. Advantages of use are discussed.

31. Refractory Specialties

Ramtite Co.—36-page illustrated catalog and data book describes refractory products for furnace construction. Cross-sectional drawings, charts, graphs, technical illustrations, definitions of terms, formulas, temperature conversion tables, properties of gases and other data are included.

32. Belt Conveyor

Rapids-Standard Co.—4-page illustrated bulletin No. PV-N-46 presents data on improved Press-Veyor portable, power driven, endless belt conveyor for use in press rooms and adaptable to other varied uses. Design features, dimensional data, models available, specifications and applications are presented.

33. Fire Fighting Material

Pyrene Mfg. Co.—16-page illustrated booklet No. AD-323 describes Air Foam which is material for use in killing flammable liquid fires. Material smothers flames and can be used wherever water can be used. Typical fires extinguished, characteristics and recommended uses of material are covered.

34. Copper Alloy Welding

C. E. Phillips & Co.—32-page illustrated handbook titled "Welding and Brazing of Copper and Copper Alloys" is divided into three sections covering definitions and properties, common copper alloys and suitability for given working conditions, and lastly a final section on welding, brazing and composition of materials.

35. Respiratory Equipment

Pulmosan Safety Equipment Corp.—36-page illustrated catalog describes Pulmosan respirators, masks, helmets and hoods for protection in dusts, fumes, vapors, paint sprays, gases, acids, sandblasting, babbitting, boiler cleaning and firefighting. Care and use of equipment are discussed.

36. Wear of Metals

Nitralloy Corp.—85-page illustrated technical discussion of mechanism of wear phenomena and influencing factors written by D. Landau, industrial applications engineer, discusses all phases of history and development of metals from standpoint of wear. Bibliography is included.

37. Metalworking Compounds

Northwest Chemical Co.—24-page illustrated loose-leaf type catalog contains information on 39 cleaning and drawing compounds. Electrolytic, immersion, solvent, spray and water wash types are included. Compounds for all metals are discussed.

38. Selector Valve

Pesco Products Co.—2-page loose-leaf sheet describes briefly selector valve which is positive holding, has three-way control, is sealed against dirt, has integral relief valve and is of open center construction.

39. Automotive Body Sections

Parish Pressed Steel Co.—32-page illustrated catalog A presents information on universal automotive body sections, including posts, slats, lintels, corners, carlines, brackets, rub-rails, cross-sills, door sections and mounting gussets. Dimensional drawings are included.

40. Shaving Machines

National Broach & Machine Co.—8-page illustrated bulletin "Red Ring Roto Shaving Does a Better Job Faster" describes close tolerance finishing operation for circular, flanged, cylindrical and conical parts. Various types of machines and cutters are shown.

41. Tread Grinder

American Car & Foundry Co.—12-page illustrated folder "A.C.F. High Speed Wheel Tread Grinder Operating Manual" describes unit specifically designed as production tool to accommodate shop tool arrangements where grinder is in line of operations between wheel press and assembly track. Operational data and installation suggestions are listed. Large diagrams and cutaway photos show specific features of unit.

42. Welding Rods

Eutectic Welding Alloys Corp.—8-page illustrated publication which is war production review issue of "Eutectic Welder," shows varied applications of low temperature welding rods. Reference list of rods is presented.

43. Pipe Fittings

Bonney Forge & Tool Works—16-page illustrated bulletin No. WT 45 covers design features, applications, structural data, construction details, installation instruction, sizes, weights, dimensions and list prices of WeldOlet branch pipe outlets.

44. Jacketed Pumps

Worthington Pump & Machinery Corp.—4-page illustrated bulletin No. W-487-B11 gives full design and application information on line of steam jacketed rotary pumps for handling melted materials or highly viscous liquids requiring preheating. Sizes, displacements and typical fluids handled are listed.

45. Deodorizing Disinfectant

Oakite Products, Inc. — 20-page illustrated pamphlet on Tri-San describes this chemical for deodorizing, cleaning and disinfecting in one operation. Economy of use, ease of application and adaptability to special sanitation problems are among features discussed.

46. Cranes

Orton Crane & Shovel Co.—16-page illustrated catalog No. 73 describes one-man Aero cranes. Models are pneumatic-tired and engineered for plant-yard uses. Cranes can travel from job to job under own power. Table listing weights of rehandling and excavating clamshell buckets loaded with loose materials is given.

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MARKET SUMMARY

Little Prospect of Easing Scarcity in Steel Products

Regulations to aid housing put new pressure on sheets . . . Scrap, pig iron shortage handicaps steelmaking but operations gain

WHILE steel production is being increased rapidly, an early leveling off is in prospect as a result of shortages of pig iron and scrap, supply of these materials being more acute.

Coincidentally the feeling is growing in the trade that higher steel product prices as a result of increased costs, due to impending coal price advances, as well as higher freight rates, are likely to be effected in the near future. Currently, government agencies are working on a program which would permit pig iron producers to advance prices. Also an increase of as much as 50 cents per ton is reported pending on iron ore. Prices on other products entering into steelmaking also are expected to rise, influencing the higher trend in steel quotations.

Meanwhile, with producers far behind on current commitments, scarcity of important rolled products, sheets, pipe, shapes, small carbon bars and plates in particular, show few signs of easing. Impact of recent regulations designed to relieve the housing shortage and facilitate other urgent needs has put pressure on sheets seldom before encountered.

These regulations embodied in Direction 12 to Order M-21, applying to third quarter, have placed special pressure on galvanized sheets because of their importance to home building, and in somewhat less degree on enameling sheets for stoves, bathtubs and other household appliances. It is estimated that 20 per cent of the total order book in sheet products in third quarter will go to meet needs of the housing program and agricultural equipment manufacturers, as outlined in Direction 12.

Next in importance, but well behind sheets, is pipe, with carbon bars third and light shapes probably next. Plates are well down on the list. In fact platemakers expect few certified orders under this regulation as household boilers and water heaters are not included in end-use products.

So far the experience of producers of the principal items has varied with respect to the receipt of certified orders, some having received a large number and others relatively few. However, the number is increasing, especially as consumers become more familiar with the new system. It now is too late to do anything more for July as the June 17 deadline for certification of orders is past, but buyers have until July 1 to certify for August and until Aug. 1 to certify for September.

An increasing number of requests for the right to certify is being received in Washington. Under the ruling, preference consumers who already had unfilled orders with mills at the effective date of the direction and which had been placed at any time since the beginning of the year, are permitted within the limits of the regulation to certify their orders, while those who did not must apply to CPA for permission, which may or may not be granted.

While direction 12 applies only to third quarter it is thought probable in some quarters that a program of assistance will also be set up for fourth quarter. Whether it would be expanded in scope or held closely to present limitations is not yet clear, but if such a program develops at all, much will depend on what strides mills can make in production during third quarter, what freedom they have from labor disturbances and what supply they can obtain of scrap and pig iron.

Continued rise in the national steel production rate is encouraging, a gain of 10 points to 85 per cent of capacity being estimated for last week, bringing the rate back well toward the 89½ per cent achieved in the upswing after the end of the steel strike at the end of March. Pittsburgh gained 18½ points to 88 per cent, Chicago 6 points to 85, Youngstown 36 points to 78, eastern Pennsylvania 5 points to 86, Detroit 4 points to 90, Cleveland 2½ points to 88, Cincinnati 4 points to 91 and Wheeling 1½ points to 80½. Rates were unchanged as follows: Birmingham 95, Buffalo 86, St. Louis 54½, New England 80.

Except for the increase in average composite price of finished steel, caused by a rise of $10 per ton in nails, steel composite prices are the same as have prevailed for several weeks. The new finished steel composite is $64.45, up 91 cents. Semifinished steel composite is $40.60, steelmaking pig iron $25.50, steelmaking scrap $19.17.

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended June 22	Change	Same Week 1945	Same Week 1944
Pittsburgh	88	+18.5	89	92
Chicago	85	+ 6	95.5	100.5
Eastern Pa.	86	+ 5	90	94
Youngstown	78	+36	90	96
Wheeling	80.5	+ 1.5	90.5	95.5
Cleveland	88	+ 2.5	91.5	90
Buffalo	86	None	90.5	90.5
Birmingham	95	None	65	95
New England	80	None	86	85
Cincinnati	91	+ 4	55	76
St. Louis	54.5	None	75	79.5
Detroit	90	+ 4	75	83
Estimated national rate	85	+10	90	97.5

Based on weekly steelmaking capacities of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

COMPOSITE MARKET AVERAGES

	June 22	June 15	June 8	One Month Ago May, 1946	Three Months Ago March, 1946	One Year Ago June, 1945	Five Years Ago June, 1941
Finished Steel	$64.45	$64.45	$63.54	$63.54	$63.54	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	25.50	25.50	25.50	25.50	25.125	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.07	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

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

Finished Material and Wire Rods, cents per lb; coke, dollars per net ton; others dollars per gross ton.

Finished Material

	June 22, 1946	May, 1946	Mar., 1946	June, 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.82	2.82	2.82	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.465	2.465	2.465	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.55	2.55	2.55	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot-rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.25	3.25	2.90
Tin plate, per base box, Pittsburgh	$5.25	$5.25	$5.25	$5.00

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	June 22, 1946	May, 1946	Mar., 1946	June, 1945
Bessemer del. Pittsburgh	$27.69	$27.69	$27.315	$26.19
Basic, Valley	26.00	26.00	25.625	24.50
Basic, eastern del. Philadelphia	27.84	27.84	27.465	26.34
No. 2 fdry., del. Pgh. N. & S. sides	27.19	27.19	26.815	25.69
No. 2 foundry, Chicago	26.50	26.50	26.125	25.00
Southern No. 2, Birmingham	22.88	22.88	22.505	21.38
Southern No. 2 del. Cincinnati	26.94	26.94	26.565	25.44
No. 2 fdry., del. Philadelphia	28.34	28.34	27.965	26.84
Malleable, Valley	26.50	26.50	26.125	25.00
Malleable, Chicago	26.50	26.50	26.125	25.00
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.000	33.00
Gray forge, del. Pittsburgh	26.69	26.69	26.315	25.19
Ferromanganese, del. Pittsburgh	140.00	140.00	140.000	140.33

Scrap

Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.45
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace ovens	$7.50	$7.50	$7.50	$7.50
Connellsville, foundry ovens	8.25	8.25	8.25	8.25
Chicago, by-product fdry., del.	13.75	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA schedules, except those for stainless steels which are now exempt from price control. Price schedule No. 6 covers semifinished and finished iron and steel products; by-product foundry coke, No. 29; relaying rails, No. 46; beehive oven coke, No. 77; bolts, nuts and rivets, No. 147; coke by-products, GMPR, except sulphate of ammonia, No. 205. Finished steel quoted in cents per pound and semifinished steel in dollars per gross ton, except as otherwise noted. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Fob mill base, rerolling quality, standard analysis, $33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41; Duluth (billets), $41; Pac. ports (billets), $51. (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49; Duluth, billets, $49; forging billets fob Pac. ports, $59.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 fob Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.43; eastern Mich. $61.43.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lb, $2.30. Do., over ⅜—$\frac{47}{64}$-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.82c; Gulf ports, dock, 2.85c; Pac. ports, dock, 3.15c. (Sheffield Steel Corp., 2.75c, fob St. Louis) Joslyn Mfg. & Supply Co., may quote 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.021c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
		6145 or 6150	1.298
3400	3.462	8612	0.703
4000	0.487	8720	0.757
4100 (.15-.25 Mo)	0.757	9830	1.407
(.20-.30 Mo)	0.812		

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.725c, eastern Mich., 3.755c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich. del., 2.575c; Phila., del., 2.595c; New York, del., 2.665c; Pacific ports, 2.975c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.60c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del. 3.425c; New York, del., 3.615c; Phila., del., 3.595c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.29c; Phila., del., 4.22c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths, 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c.
20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4.75c	5.50c	4.85c
Motor	5.425c	6.175c	5.525c
Dynamo	6.125c	6.875c	6.225c
Transformer			
72	6.625c	7.375c	.....
65	7.625c	8.375c	.....
58	8.125c	8.875c	.....
52	8.925c	9.675c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.55c; eastern Mich., del., 2.60c; Pacific ports, 3.10c. (Superior Steel Corp. may quote 3.30c, Pitts.)
Over 6-in.: Base, 2.35c; Detroit, del., 2.45c; eastern Mich., del., 2.50c; Pacific ports, 3.00c. (Superior Steel Corp. may quote 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)
Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box, 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point, $4.65.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.69c; Phila., del., 2.55c; St. Louis, 2.74c; Boston, del., 2.82-3.07c; Pacific ports, 3.05c; Gulf ports, 2.85c.
(Granite City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c, base)
Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.273c; Pacific ports, 4.49c.
Clad Steel Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.52c; Phila., del., 2.465c; Pacific ports, 3.00c; Gulf ports, 2.70c.
(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c, Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)
Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads	
Bright basic or bessemer	*$3.05
Spring (except Birmingham)	*$4.00
Wire Products to Trade	
Nails and staples	
Standard and cement-coated	†$3.75
Galvanized	††$3.40
Wire, Merchant Quality	
Annealed	§$3.50
Galvanized	§$3.85
(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)	
Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	79
Barbless wire, twisted	79
Fence posts	74
Bale ties, single loop	72½

*Add $0.10 for Worcester, $0.05 for Duluth and $0.50 for Pacific ports.
†Add $0.30 for Worcester, $0.50 for Pacific ports.
††Add $0.50 for Pacific ports.
§Add $0.10 for Worcester, $0.70 for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	53	30	½	21	0½
¼ & ⅜	56	37½	¾	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	--Elec. Weld— Hot Rolled	Cold Rolled
1"	13	.....	$9.90	$9.36	$9.65
1¼"	13	.....	11.73	9.63	11.43
1½"	13	$10.91	12.96	10.63	12.64
1¾"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2¼"	13	15.50	18.42	15.06	18.03
2¼"	12	17.07	20.28	16.57	19.83
2½"	12	18.70	22.21	18.11	21.68
2¾"	12	19.82	23.54	19.17	22.95
3"	12	20.79	24.71	20.05	24.02
3½"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4½"	9	43.16	51.29	.....	.....
5"	9	49.96	59.36	.....	.....
6"	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, $54 per net ton, Birmingham; $59, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.
*Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.
Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $51 net ton, base, Standard spikes, 3.65c.

* Fixed by OPA Schedule 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb: Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W.	Cr.	V.	Mo.	Base, per lb.
18.00	4	1		72.49c
1.5	4	1	8.5	58.43c
.....	4	2	8	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.
(Ceiling prices advanced 7 per cent, effective Apr. 1, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	..	64
½-in. and smaller	62	
½-in.-1-in.	..	60
⅞-in.-1-in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Stainless Steels

(Open market prices. OPA price control suspended Oct. 11, 1945.)
Base, Cents per lb

CHROMIUM NICKEL STEELS

	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.08	50.85
310	53.02	56.26	57.35	52.74	60.59
312	38.95	43.28	53.02	.....	.....
*316	43.28	47.61	51.94	43.28	51.94
†321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.86

STRAIGHT CHROMIUM STEEL

403	23.93	26.51	31.92	22.99	29.21
**410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	33.49
430	20.56	23.80	31.38	18.94	24.38
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	33.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.49	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.48

STAINLESS CLAD STEEL (20%)
(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304	....	19.48	20.56	....	....
410	....	17.31	18.39	....	....
430	....	17.85	18.94	....	....
446	....	19.48	20.56	....	....

* With 2-3% molybdenum. § With titanium. † With columbium. ** Plus machining agent. †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.55
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.00
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.25
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.25

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 28, 1945.
†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal, freight allowed east of Omaha	
Pure and 90% benzol	15.90c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c
Per pound fob works	
Phenol (car lots, returnable drums)	10.50c
Do., less than carlots	11.25c
Do., tank cars	9.50c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to jobbers	8.00c
Per ton, bulk, fob port	
Sulphate of ammonia	$20.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on OPA mill prices announced March 1, 1946.

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.294[1]	4.162[1]	4.162[1]	5.977[1]	3.999[1]	5.456[1]	4.356[1]	5.674[14]	4.969[14]	4.594[11]	4.965
New York	4.103[1]	4.008[1]	4.018[1]	5.824[1]	3.815[1]	4.324[1]	4.224[1]	5.460[13]	4.838[14]	4.553[31]	5.024
Jersey City	4.103[1]	3.997[1]	4.018[1]	5.824[1]	3.815[1]	4.324[1]	4.224[1]	5.460[13]	4.838[14]	4.553[31]	5.024
Philadelphia	4.072[1]	3.916[1]	3.855[1]	3.768[1]	3.743[1]	4.622[1]	4.522[1]	5.468[13]	5.097[31]	4.022[31]	5.022
Baltimore	4.052[1]	4.009[1]	3.844[1]	5.502[1]	3.619[1]	4.252[1]	4.152[1]	5.344[1]	5.077[34]	4.502[31]	.....
Washington	4.191[1]	4.180[1]	4.046[1]	5.591[1]	3.821[1]	4.391[1]	4.291[1]	5.646[17]	5.066[34]	4.491[31]	.....
Norfolk, Va.	4.315[1]	4.252[1]	4.221[1]	5.715[1]	3.996[1]	4.865[1]	4.415[1]	5.821[17]	4.490[34]	4.615[31]	.....
Bethlehem, Pa.*	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.60[1]	3.65[1]	3.88[1]	5.51[1]	3.575[1]	4.169[1]	4.069[1]	5.20[13]	4.625[10]	4.20[31]	4.919
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[11]	4.525[16]	4.10[31]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[34]	4.20[31]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[13]	4.525[34]	4.10[31]	4.60
Cleveland (city)	3.60[1]	3.838[1]	3.65[1]	5.438[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[34]	4.20[31]	4.70
Cleveland (country)	3.50[1]	.....	3.55[1]	.....	3.475[1]	3.85[1]	3.750[1]	.....	4.525[34]	4.10[31]	4.60
Detroit	3.70[1]	3.911[1]	3.859[1]	5.531[1]	3.675[1]	4.050[1]	3.950[1]	5.450[13]	4.725[34]	4.25[13]	4.909
Omaha (city, del.)	4.293[1]	4.343[1]	4.343[1]	5.943[1]	4.018[1]	4.493[1]	4.393[1]	5.965[13]	5.668[34]	4.893[31]	.....
Omaha (country)	4.193[1]	4.243[1]	4.243[1]	5.843[1]	3.918[1]	4.393[1]	4.293[1]	5.865[13]	.....	.....	.....
Cincinnati	3.861[1]	3.941[1]	3.911[1]	5.541[1]	3.650[1]	4.025[1]	3.925[1]	5.275[13]	4.700[34]	4.461[31]	4.961
Youngstown*	.....	.....	.....	.....	.....	.....	.....	4.85[13]	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.475[1]	3.85[1]	3.750[1]	5.10[13]	.....	.....	.....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	‡5.40[13]	4.425[34]	4.20[31]	4.90
Milwaukee	3.887[1]	3.937[1]	3.937[1]	5.537[1]	3.612[1]	4.087[1]	3.987[1]	5.722[13]	4.562[34]	4.337[31]	5.037
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.743[1]	4.118[1]	4.018[1]	5.368[13]	4.793[34]	4.43[31]	5.030
St. Paul	4.072[2]	4.122[2]	4.122[2]	5.722[2]	3.797[2]	4.272[2]	4.172[2]	5.635[13]	4.747[34]	4.811[31]	5.352
St. Louis	3.897[1]	3.947[1]	3.947[1]	5.547[1]	3.622[1]	4.097[13]	3.997[1]	5.622[13]	4.572[34]	4.481[31]	5.181
Memphis, Tenn.	4.265[1]	4.315[1]	4.315[1]	6.03[1]	4.190[1]	4.565[1]	4.465[1]	5.715[13]	5.005[34]	4.78[31]	..
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[13]	5.077[34]	4.99[31]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	.....	5.808[13]	5.304[34]	5.079[31]	.....
Houston, Tex.	4.00[3]	4.50[1]	4.50[1]	5.75[9]	3.988[3]	4.663[3]	4.563[3]	5.763[30]	5.819[16]	4.10[33]	.....
Los Angeles	4.65[4]	4.90[4]	5.20[4]	7.45[4]	5.225[4]	5.30[4]	5.200[4]	6.55[12]	7.425[4]	6.033[31]	5.863
San Francisco	4.20[7]	4.15[7]	4.15[7]	5.85[7]	4.125[7]	5.35[7]	4.50[7]	6.35[12]	6.875[12]	5.783[31]	7.583
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[13]	6.825[13]	5.983[13]	.....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[13]	6.55[13]	6.23[31]	.....
Seattle	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[13]	6.55[13]	6.23[31]	.....

* Basing point cities with quotations representing mill prices, plus warehouse spread; ‡ open market price.
NOTE—Ceiling prices fixed by Office of Price Administration in Revised Price Schedule No. 49, as amended. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles.. [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [30]—300 to 1999 pounds; [31]—1500 to 39,999 pounds; [32]—1500 to 1999 pounds; [33]—1000 to 39,999 pounds; [34]—400 to 1499 pounds; [35]—1000 to 1999 pounds; [36]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [37]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.95
Mesabi nonbessemer	4.55
High phosphorus	4.55
Mesabi bessemer	4.70
Old range nonbessemer	4.80

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, cif Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	Nom.
Spanish, N. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):
Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.
(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended MPR No. 248, effective May 15, 1944. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnace

Designation	Chemical Composition Limits, Per Cent: Carbon	Mn	Si	Cr	Ni	Mo	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c, per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Maximum prices per gross ton fixed by OPA schedule No. 20, last amended March 15, 1946; placed on adjustable pricing basis May 29, 1946. Producers may collect present ceiling prices on deliveries after that date, subject to condition that purchaser agrees to pay also amount of any increase that may be granted later by OPA. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$27.50	$27.00	$28.50	$28.00
Newark, N J., del.	29.03	28.53	30.03	29.53
Brooklyn, N. Y., del.	30.00	.....	.....	30.50
Birdsboro, Pa., base	27.50	27.00	28.50	28.00
Birmingham, base	22.88	21.50	27.50	.....
Baltimore, del.	28.11	.....	.....	.....
Boston, del.	27.64	.....	.....	.....
Chicago, del.	26.72	.....	.....	.....
Cincinnati, del.	26.94	26.06	.....	.....
Cleveland, del.	26.62	25.74	.....	.....
Newark, N. J.	28.64	.....	.....	.....
Philadelphia, del.	27.96	27.46	.....	.....
St. Louis, del.	26.62	27.54	.....	.....
Buffalo, base	26.50	25.50	27.50	27.00
Boston, del.	28.00	27.00	29.00	28.50
Rochester, del.	28.03	.....	29.03	28.53
Syracuse, del.	28.58	.....	29.58	29.08
Chicago, base	26.50	26.00	27.00	26.50
Milwaukee, del.	27.60	27.10	28.10	27.60
Muskegon, Mich., del.	27.69	.....	.....	27.69
Cleveland, base	26.50	26.00	27.00	26.50
Akron, Canton, del.	27.89	27.39	28.39	27.89
Detroit, base	26.50	26.00	27.00	26.50
Saginaw, Mich., del.	28.81	28.31	29.31	28.81
Duluth, base	27.00	26.50	27.50	27.00
St. Paul, del.	29.13	28.63	29.63	29.13
Erie, Pa., base	26.50	26.00	27.50	27.00
Everett, Mass., base	27.50	27.00	28.50	28.00
Boston, del.	28.00	27.50	29.00	28.50
Granite City, Ill., base	26.50	26.00	27.00	26.50
St. Louis, del.	27.00	26.50	.....	27.00
Hamilton, O., base	26.50	26.00	.....	26.50
Cincinnati, del.	27.61	27.11	.....	27.61
Neville Island, Pa., base	26.50	26.00	27.00	26.50
*Pittsburgh, del. N. & S. sides	27.19	26.69	27.69	27.19
Provo, Utah, base	24.50	24.00	.....	.....
Sharpsville, Pa., base	26.50	26.00	27.00	26.50
Sparrows Point, base	27.50	27.00	.....	.....
Baltimore, del.	28.49	.....	.....	.....
Steelton, Pa., base	.....	27.00	.....	.....
Swedeland, Pa., base	27.50	27.00	28.50	28.00
Philadelphia, del.	28.34	27.84	.....	28.84
Toledo, O., base	26.50	26.00	27.00	26.50
Youngstown, O., base	26.50	26.00	27.00	26.50
Mansfield, O., del.	28.44	27.94	28.94	28.44

*To Neville Island base add: 55 cents for McKees Rocks, Pa.; 84 cents, Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97 cents (water), Monongahela; $1.11, Oakmont, Verona; $1.24, Brackenridge.

Exception to Ceiling Prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon, Silvery

6.00-6.50 per cent (base) $32.00
6.51-7.00..$33.00 9.01- 9.50. 38.00
7.01-7.50.. 34.00 9.51-10.00. 39.00
7.51-8.00.. 35.00 10.01-10.50. 40.00
8.01-8.50.. 36.00 10.51-11.00. 41.00
8.51-9.00.. 37.00 11.01-11.50. 42.00

Fob Jackson county, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01 to 14.50%, $48 Jackson co.; each additional 0.50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus.

Fob furnace, Lyles, Tenn., $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $26.00
Valley base 26.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $32.00 base; $33.24, del. Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, $29.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point. Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $76.05

High Heat Duty

Pa., Ill., O., Md., Mo., Ky. 60.40
Ala., Ga. 60.40
N. J. 65.90

Intermediate Heat Duty

Ohio 50.60
Pa., Ill., Md., Mo., Ky. 54.80
Ala., Ga. 49.15
N. J. 54.80

Low Heat Duty

Pa., Md., Ohio 42.35

Malleable Bung Brick

All bases 70.45

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press 36.45
Wire Cut 34.15

Silica Brick

Pennsylvania 60.40
Joliet, E. Chicago 69.30
Birmingham, Ala. 60.40

Magnesite

Domestic dead-burned grains, net ton fob Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick 54.00
Chem. bonded chrome 54.00
Magnesite brick 76.00
Chem. bonded magnesite 65.00

Fluorspar

Metallurgical grade, fob Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29, 1944, base price any grade $30.00.

Ferroalloy Prices

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Chromium Metal: 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; fob shipping point, freight allowed.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points. **Low carbon, high nitrogen:** Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Special Foundry Ferrochrome (Cr 62-66%, C about 5-7%): Contract, lump, packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon (Cr 60-65%, Si, Mn and C 4-6% each): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Prices are per lb of contained chromium: spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S.M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c, 13.00c, central; 13.25c, 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Ferro-Boron: (B 17.50% min., Si 1.50% max., Al 0.50% max and C 0.50% max.) per lb of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, $1.85, less $2.01, eastern; freight allowed; $1.903 and $2.023, central; $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Briquets Ferromanganese: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Briquets, Ferrochrome: Containing exactly 2 lb Cr, packed, eastern zone, c.l. 9.50c, ton lots 9.80c, less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb and containing exactly 2 lb Si, or about 2½ lb and containing exactly 1 lb Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are f.o.b. shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Ferromolybdenum: 55-75% per lb contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher. Deduct 0.85c for bulk carlots.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Ferrotungsten: Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Ferrovanadium: Va 35-55%, contract basis, per lb contained Va, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: Zr 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.88c; ton lots 6.38c; less 6.88c. Spot up ½c.

Siminal: (Approx. 20% each Si, Mn, Al) Contract, freight not exceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to maximum price regulation No. 4. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25
Cast Grades	
(Fob Shipping Point)	
Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices)	
No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstripped Motor Blocks	17.50
Stove Plate	19.00

BOSTON:

(Fob shipping points. Boston differential 99c higher, steelmaking grades; Providence, $1.09 higher)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

BUFFALO:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

PITTSBURGH:

(Delivered consumer's plant)	
Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	*20.00
Heavy Breakable Cast	*16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

* Shipping point.

CLEVELAND:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

VALLEY:

(Delivered consumer's plant)	
No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD:

(Delivered consumer's plant)	
Machine Shop Turnings	$15.00

CINCINNATI:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
Machine Turnings	10.50-11.00
Shoveling Turnings	12.50-13.00
Cast Iron Borings	11.50-12.00
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-22.00
Scrap Rails	20.50-21.00
Stove Plate	18.50-19.00

DETROIT:

(Delivered consumer's plant)	
Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

CHICAGO:

(Delivered consumer's plant; cast grades fob shipping point; railroad grades fob tracks)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Rerolling Rails	22.25
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

ST. LOUIS:

(Delivered consumer's plant; cast grades fob shipping point)

Heavy Melting	$17.50
No. 1 Locomotive Tires	21.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Street Car Axles	24.50
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

BIRMINGHAM:

(Delivered consumer's plant)	
Billet Forge Crops	$22.50
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	11.00
Cast Iron Borings	13.00
Iron Car Wheels	20.00

LOS ANGELES:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Dlr. Bundles	12.00
Machine Turnings	5.50
Mixed Borings, Turnings	5.50
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	17.00
No. 1, No. 2 Bundles	17.00
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate 1 ft and under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	21.50
Iron, Steel Axles	24.00
No. 2 Cast Steel	20.50
Uncut Frogs, Switches	18.00
Scrap Rails	18.50
Locomotive Tires	20.50

SEATTLE:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$14.12
No. 2 Heavy Melt. Steel	14.12
Heavy Railroad Scrap	14.50
(Fob shipping point)	
No. 1 Cupola Cast	20.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½c, del. Conn.; less carlots 14.50c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½c, refinery, 20,000 lb or more; 14.37½c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 15.25c; 88-10-2 (No. 215) 18.50c; 80-10-10 (No. 305) 18.00c; No. 1 yellow (No. 405) 12.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, high grade 9.25c, E. St. Louis, for carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.40c; under 2000 lb 0.50c.

Lead: Common 8.10c, chemical, 8.20c, corroding, 8.20c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 11.25c; No. 12 foundry alloy (No. 2 grade) 11.00-11.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 12.50c; grade 2 (92-95%) 11.50c; grade 3 (90-92%) 10.00-10.25c; grade 4 (85-90%) 9.50-9.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, $101-$103 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb, del.; anodes, balls, discs and all other special or patented shapes 95.00c per lb delivered.

Cobalt: 97-99%, $1.50 lb, for 550 lb (bbl.); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y. 70.625 per ounce.

Platinum: $53-$56 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 25.81c; yellow brass 23.67c; commercial bronze, 95% 26.14c, 90% 25.81c; red brass, 85% 24.98c, 80% 24.66c; best quality 24.38c; phosphor bronze, grade A 4% or 5%, 43.45c; Everdur, Duronze or equiv., hot rolled, 30.88c; naval brass 28.53c; manganese bronze 31.99c; muntz metal 26.78c; nickel silver 5% 32.38c.

Rods: Copper, hot rolled 22.16c, cold drawn 23.16c; yellow brass 18.53c; commercial bronze, 95% 25.83c, 90% 25.50c; red brass, 85% 24.67c; 80% 24.35c; best quality 24.07c; phosphor bronze, grade A 4% or 5% 43.70c; Everdur, Duronze or equiv. cold drawn, 29.82c; naval brass 22.59c; manganese bronze 25.93c; muntz metal 22.34c; nickel silver 5% 34.44c.

Seamless Tubing: Copper 25.85c; yellow brass 26.43c; commercial bronze 90% 28.22c; red brass 85% 27.64c, 80% 27.32c; best quality brass 26.79c; phosphor bronze, grade A 5% 44.70c.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89c, less carlots 20.39c; weatherproof, fob eastern mills, carlot 22.07c, less carlots 22.57c; magnet, delivered, carlots, 23.30c, 15,000 lb or more 23.55c, less carlots 24.05c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 11.25c; cut sheets 11.50c; pipe 9.90c, New York, 10.00c, Philadelphia, Baltimore, Rochester and Buffalo, 10.50c Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 13.15c; 36,000 lb and over deduct 7%; Ribbon and strip 12.25c, 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lb 12.50c; 100-500 lb 13.00c; under 100 lb 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: Base 2000-5000 lb, del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels 20.50c.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls 34.00c, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb bbls 39.00c fob Grasselli, N. J.; 100-lb kegs 39.50c.

Sodium Stannate: 100 or 300-lb drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lb fob shipping point. Add ¼c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.000	12.000	11.250
Yellow brass	9.875	9.625	9.125
Commercial bronze			
95%	11.250	11.000	10.500
90%	11.125	10.875	10.375
Red brass			
85%	10.875	10.625	10.125
80%	10.875	10.625	10.125
Best quality (71-79%)	10.500	10.250	9.750
Muntz metal	9.250	9.000	8.500
Nickel silver, 5%	10.500	10.250	5.250
Phos. br., A, B, 5%	12.750	12.500	11.500
Naval brass	9.500	9.250	8.750
Manganese bronze	9.500	9.250	8.750

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lb of one group and ½c for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 11.50c; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50c

(Group 2) Soft red brass and borings, aluminum bronze 10.75c; copper-nickel solids and borings 11.00c; lined car boxes, cocks and faucets 9.50c; bell metal 17.25c; babbitt-lined brass bushings 14.75c.

(Group 3) Admiralty condenser tubes, brass pipe 8.75c; muntz metal condenser tubes 8.25c; old rolled brass 8.25c; manganese bronze solids: (lead 0%-0.40%) 8.00c; (lead 0.41%-1%) 7.00c; manganese bronze borings, 7.25c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb, 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50c, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.75c, fob point of shipment, add ½c for 10,000 lb or more. New die cast scrap 4.95c, radiator grilles 4.95c, add ½c for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.80c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20,000 lb or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb contained nickel, plus 8.00c per lb contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 158

Sheetmakers are revising third quarter schedules to conform to new regulations based on aid to housing. Galvanized and vitreous enameled sheets are particularly affected. Some consumers affected by this action complain but in most cases lack of other materials entering into consumer products eases the blow. Cold-rolled strip producers are in need of more hot-rolled steel to allow full output. Sheet output is being increased as mills recover from effects of strikes.

New York — Sheet producers are revising third quarter order books, particularly on galvanized sheets and cold vitreous enamel, as a result of certified orders received under the new emergency distribution plan, set up under Direction 12 to Order M-21.

As galvanized sheets are sold principally in standard sizes, 36 by 96 inches and 36 by 120 inches, certified orders will not disrupt schedules in any particular degree, but they will result in various changes in names on the books. Much the same will be true with respect to vitreous enameling stock. Inclusion of shower stalls in the order has accounted here in the past few days for certified orders for bonderized zinc coated sheets.

Jobbers, it appears, will benefit rather substantially by the order, most distributors counting upon receipt of more tonnage in third quarter than they had actually anticipated.

As cancellations are resulting, sheet sellers are in receipt of complaints from some affected, their grievances seeming to boil down to why they should be singled out instead of others. These consumers point out that their requirements are urgent and that in most cases they are awaiting shipments long since behind promised delivery dates. However, a number, if not the majority, are taking the situation more or less philosophically. As a matter of fact, certain consumers are so far behind on receipts of other raw materials and components that a cut in their sheet quotas will not hurt as badly as might appear on the surface.

Boston—Not before July will narrow cold-rolled strip mills get hot-rolled in sufficient volume to set up revised production schedules with any degree of stability. Cold strip steel production is drastically curtailed; one mill is down for two-week vacations and many consumers will follow suit in July. Enough narrow strip, notably high carbon, is booked and unscheduled to carry well into first quarter, although what and how much is forthcoming in the way of hot material by Labor Day, will be a factor in the ultimate shake-out of backlogs. Repeated inquiries for large lots of strip steel by the Springfield arsenal have brought no tenders.

Cincinnati — Steel mills in the district are stepping up production of coke, hot metal and steel partly to replenish reserves which were nearly exhausted during major strikes. Sheet rolling schedules had not been curtailed in the same proportion but they, too, are being pushed to capacity. Nevertheless, the outlook for adequate tonnage to meet demands this year is dark. Mills have not had a reaction in applications for more tonnage, following govern-

ment moves to channel more sheets to help the agricultural implement and housing programs.

Cleveland — Production of flat-rolled products dropped about 40 per cent in northern Ohio during the first six months, indicating that some producers will be unable to complete shipments on 1946 business before March of next year. Rolling schedules for July were not disturbed by the certification of orders under Direction 12 to order M-21. Certifications were being received last week for August delivery which will displace some uncertified orders now on mill schedules. Automobile, automotive parts, and household appliance manufacturers will probably receive smaller shipments in third quarter than had been expected prior to establishment of the emergency distribution program.

Philadelphia — Although galvanized sheets are in particularly urgent demand there is little prospect for capacity expansion before next March, certainly none for this year. Expansion in capacity for silicon sheets, another scarce item, is not likely to start materializing before late fourth quarter, with the major portion of the program, as embodied in plans of three producers, probably not completed before first quarter.

Pittsburgh — Many orders on mill schedules will be pushed back further to permit rolling of preference rated tonnage under Direction 12 to M-21 and to meet increased steel production load. Overall tonnage involved for the critical programs covered by the direction approximates 600,000 tons quarterly. Most preference orders likely will involve galvanized and hot-rolled sheets, special bar sections and light structurals. Production of strip and sheets continues to tend upward and should attain normal pace sometime this week. Seriousness of the tight supply in sheets and strip is indicated by the frequent appeals to producers from customers to effect that production schedules will have to be curtailed unless given prompt relief.

Chicago—Return of steelmaking operations to a nearly normal level has brought heavy new pressure from consumers for delivery of sheets and strip. These products suffered less than some others from strikes, but backlogs are tremendous and congestion will prevail for weeks. One producer observes that it has a bottleneck for oiled and pickled sheets and strip, a situation which may grow worse. In this connection, some users are revamping production lines to take this material in coil form.

Steel Bars . . .

Bar Prices, Page 158

Barmakers are revising rolling schedules on steel bars in conformity with recent regulatory action. Small sizes, most in demand, will be most affected and producers are booked through the year, with substantial carryover to next year. Books have not been opened for next year, though pressure is exerted to obtain place on schedules for that delivery.

New York — While bookings of bars will not be hit nearly as hard as sheets by the recently announced Direction 12, affecting particularly housing and agricultural equipment requirements, a number of revisions in third quarter or-

ders are being made. Orders on small sizes of bars will be particularly affected and as it so happens these sizes, in the carbon grades, are scarcest, producers generally being booked up over the remainder of the year and with a probable substantial carryover into 1947.

In addition to certified orders, pressure continues for tonnage from industry not on the preferred basis. As a matter of fact, producers of carbon bars are not only out of the market on the small sizes, but on most larger sizes as well—sizes ranging from 1½ to 2 inches and over. This applies not only to hot carbon bars but cold-drawn.

In no case have books been officially opened for next year and until some of the existing confusion with respect to schedules is cleared away there is little likelihood that any such action will be taken. Only in alloy bars does the situation appear at all easy. Hot alloy bars can be picked up in August, and possibly in one or two cases in late July.

Philadelphia — Except on wide flats, possibly 3½ inches and over, and rounds 1½ inches and over, books are virtually filled for this year and much the same situation prevails in cold-drawn bars. Most sellers are behind two to three months on present commitments and see no prospect for catching up this year. However, there is not the pressure generally that prevails for light flat products nor for merchant pipe, due particularly to current housing requirements.

Chicago — Barmakers are booked solidly through 1946 and are being pressed to accepting business next year. So far, producers are unwilling to commit themselves that far ahead. Right now, with all indications that steelmaking can run near capacity mills are revamping schedules for the balance of this year. It is not anticipated that the new voluntary priority program for housing and farm implemens will result in new business but rather it may involve some rescheduling for third quarter. Forgers are operating on greatly restricted basis and have fairly substantial inventories.

St. Louis — Production of merchant bars remains at capacity. Demand is unabated and size of order backlogs is curbed only by general refusal to accept new orders for definite delivery beyond first quarter. Reinforcing bars are available for quicker delivery but a developing shortage of old rails is likely to set them back soon. Barmakers here anticipate the new CPA priority order may entail some changes in mill schedules, but foresee little time loss in production.

Steel Plates . . .

Plate Prices, Page 159

While plate production is being increased as mills get back closer to normal operation backlogs accumulated during the major strikes cover output for the remainder of the year, with a carryover to next year. Books have not been opened for next year. Consumer inventories are not being built up and until this can be done there will be delay in fabrication.

New York — As plate producers generally are out of the market for this year and have not as yet opened books

for 1947, trading is largely at a standstill, despite considerable inquiry. Most activity, however, both by sellers and consumers, is being directed toward shipment of tonnage already on order. Platemakers are about three months behind on current commitments and some express the opinion that they will probably go into next year with a somewhat similar arrearage. Demand from shipyards is still tapering but this is being offset by increased requirements in other directions, especially from tank fabricators. The situation in light plate, 3/16 and ¼-inch, is as tight as ever.

Pittsburgh — Gradual increase in plate production at Carnegie-Illinois Steel Corp. plants here is indicated for this week, with near normal output expected early next month. Mills report about nine weeks' carryover tonnage due to steel and coal strikes, which accounts for fact fabricators have not been able to make much headway against heavy backlogs in recent months. Until nearly depleted fabricators' inventories can be increased somewhat, many important construction programs will remain well behind schedule.

Boston — Plate inventories with fabricators are not being built up to any extent by resumption of slightly heavier shipments; deliveries against back orders are mounting gradually, but some tonnage due for shipment in April is included. Plate mills will concentrate through next quarter in rolling delinquent volume and beyond that are generally filled for the remainder of this year. Chicago Bridge & Iron Co. has booked standpipes for Hudson and Weston, Mass., and Walsh-Holyoke 635 tons for penstocks for export. Small tank demand is holding brisk, notably underground units for gasoline distribution. Largest active plate project requires 3200 tons for a 49-inch steel pipeline at Springfield, Mass., on which contractor estimates are in.

Philadelphia — One eastern plate mill is reliably reported to have opened books for a limited tonnage for first quarter delivery. Other plate mills have not taken such action, although they point out that carryovers probably will be sufficient to absorb first quarter production. At present most plate producers are behind about three months and see little opportunity for reducing this arrearage this year.

Cleveland—Plate mills have been somewhat slower increasing production than sheet, strip and bar mills, as producers diverted steel to products having the largest backlogs and most important in the industrial economy. Although output has improved gradually, some mills have remained closed for over two months. Despite heavy demand for plates, War Assets Administration recently sold about 40,000 tons of heavy steel ship plates and structurals to the Italian government for about $2 million. Located on the West Coast, the material was in excess of normal requirements of that area, and transportation costs to the East were prohibitive. A similar quantity of this material was previously sold to the Netherlands.

Wire . . .

Wire Prices, Page 159

New York — An estimated 8000 tons of nails a month will not be produced by high-cost nonintegrated producers

under the price advance of $10 a ton; an advance of $15 was requested. Nail machine schedules are being stepped up in other cases in an effort to meet heavy demand. Hampered by limited rod supply, mills are again revising orders and quotas, with backlogs heavy but unbalanced. High carbon fine specialties and better margin products have backed up in volume, through the year for many; basic and other low margin wire backlogs are smaller. Mills have not been taking this volume, not that demand is not there, but because of border-line margins. Demand for wire for upholstery springs is in excess of supply and the automobile industry is pressing for this and valve spring wire.

Cleveland — Certification of wire orders under Direction 12 to order M-21 had little effect on July drawing schedules. Orders for August delivery are being certified now and may be sufficiently large by the month end to force postponement of some uncertified shipments to September. War Assets Administration anticipates that the emergency period in nails will be over by the end of third quarter, when industry will have had time to catch up on production. The Civilian Production Administration has frozen up to 30,000 kegs of cement-coated and bright box nails held by WAA as surplus material. The nails are being allocated through the Department of Agriculture to manufacturers of food containers and to food processors. Leading producers of merchant wire products are completely sold out for 1946 and do not expect easing in demand for months.

Birmingham — Although all wire products are short, nails present the most acute situation. Farmers in many instances are unable to find material and nails for general building purposes are virtually unobtainable, with wire fence a close second. The leadng producer here is reaching full capacity on wire products.

Tin Plate . . .

Tin Plate Prices, Page 159

Pittsburgh — Distribution of the 15 per cent of tin mill products production, which is not affected by CPA regulations channeling output into making cans for packing perishable food products, is not expected to be altered much as result of Direction 12 to M-21 for little tin plate is used by manufacturers granted preference ratings under this direction. About 35 per cent of the 112,000 tons involved in third-quarter export quota is scheduled to be shipped during August and the remainder in September. This tonnage was screened down from 302,000 tons. Survey by the production branch of CPA indicates imports of tin this year probably will not exceed wartime average of 45,000 tons. In view of this the agency urges full co-operation in complying with its conservation order.

Structural Shapes . . .

Structural Shape Prices, Page 159

Reduction in CPA approvals for building projects has cut deeply into tonnage offered fabricators. In spite of this, demand is heavy and mills are booked well ahead. Shape mills are able to cut into accumulated backlog and are

increasing output, limited only by supply of semifinished steel. Some mills are attaining capacity production.

New York — Structural inquiry continues to decline, because of the increasing difficulty of getting CPA approval on nonhousing construction. Indication of the trend is revealed in the recent statement by CPA Director Small to the effect that rate of authorizations for this type of construction had been cut by about $22,000,000 a day in the first 10 days after the order of May 29, which reduced construction approvals by two-thirds. Construction cost of approvals granted from May 31 to June 10 averaged $7,551,000 a working day, compared with the rate of $29,110,000 from May 10 through May 23.

Pittsburgh—During three weeks ended June 13, CPA officials approved only 20 per cent of 160 construction projects. In sharp contrast with this the agency had denied only 61 out of 557 proposed structural jobs from Apr. 2 to May 23.

Structural mills reached near normal output toward close of last week. Fabricators have near record backlogs and most promising potential business in years, but many will have to be delayed due to intermittent mill operations.

Boston — Aggregate volume of small industrial construction holds surprisingly well, notably in southern New England, with steel erecting delayed less than might be expected. Largest recent contract is for 1200 tons placed with Bethlehem Steel Co. for additional paper mill buildings at Berlin, N. H., by Rust Engineering Co., Pittsburgh. Bridge inquiry is heavier, approximating 1500 tons, including beam spans, with the Sheldon Springs, Vt., 605-foot four-span continuous deck girder job, 475 tons, readvertised to close June 28; Massachusetts closes, June 26, on several bridges, including the Slades Ferry and Brightman street bridges, Fall River-Somerset.

If semifinished is available, structural mills might soon dent the large backlog despite the heavy balance in smaller sizes. The combined rolling capacity, if operated, could bring shapes out of the morass of delinquent tonnage as one of the first steel products to attain that distinction. Signs are not wanting this may develop. One eastern structural mill hit 104 per cent of capacity last week and will reach at least that rate with another this week; by early July structural rolling rate is pointed at 125 per cent of capacity by this producer.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 159

Pittsburgh — Producers report a downward trend in orders the past two months, reflecting postponements because adequate tonnage of reinforcing bars is not available. One interest states cancellations exceeded new business the past month. Sales reported by producers east of the Rockies totaled 106,000 net tons during April, declined to about 60,000 during May and the downward trend is continuing this month. One producer reports steel allotted for July production is about half the tonnage allotted last December. This interest is no longer scheduling new orders, as firm commitments represent eight months' output at the projected July production rate. Another producer, whose plants are favorably located with respect to basing points, has substan-

tially increased output of fabricated concrete bars and is actively seeking new customers on basis of being able to help them out of the current situation.

New York — Inability to obtain reinforcing bar tonnage is placing many distributors virtually out of the market and is causing them to spend most of their time in a rather fruitless effort at present in trying to get caught up. As a result of this situation builders of various projects, including some fairly sizable work, are being forced to mark time.

Pig Iron . . .

Pig Iron Prices, Page 161

Pig iron shortage is not being relieved materially, although some progress is being made in increasing production, additional stacks being lighted as fuel and ore supplies increase. Expectation in some quarters is that preference will be given soil pipe, stoves and other materials for housing. Heavy demand is coming from all melters, with supply inadequate.

New York — As a substantial tonnage required for soil and pressure pipe and castings for furnaces and stoves, among other appliances, pig iron sellers are awaiting word from Washington on establishment of an emergency distribution program, such as was recently announced for rolled products for expedition of the national housing program and the production of agricultural equipment and brake shoes for transportation.

One Buffalo producer has recently resumed production at one stack, bringing the total up to two, although full output has not yet been achieved on the second furnace. A third is awaiting a more adequate supply of coke. Integrated steel producers generally are stepping up their output of iron, but have little available for outside consumption.

Philadelphia—With the housing program and farm machinery and other critical products estimated to take 25 per cent of foundry and malleable iron during third quarter, pig iron sellers expect continued shortage for some time, especially in view of the fact that increase in output since the end of the coal strike has not been as rapid as some had anticipated, due to scarcity of coke. The furnace at Swedeland, Pa., scheduled to resume about the middle of the month was forced to delay, although it now is expected to resume this week, with production for a while devoted exclusively to No. 2 low-silicon iron, on which a higher production can be obtained. Certain other furnaces, especially some in the South are following this policy.

Buffalo — While pressure for pig iron deliveries is increasing, merchant iron suppliers state efforts are being made to supply foundries working on building requirements. With better ore supply one merchant producer plans to relight a furnace on silvery iron early in July. Continuance of a miners' strike in the Adirondacks is holding a midstate operator idle. Downstate melters report labor shortage still restricts operations.

Pittsburgh — Some foundries are alarmed over prospect of pig iron allocation to interests making castings for the housing, farm implement and railroad brake shoe programs. These allo-

cations, scheduled to become effective Aug. 1, are expected to absorb nearly half the output of the merchant producer here until high cost units can be brought into production under a proposed subsidy arrangement. It will likely take 60 to 90 days before these high cost units can be put into operation. CPA is expected to handle the channeling of pig iron under the proposed allocation system on basis of inventory and two months pig iron requirements data submitted to the agency by foundries given preference under the order.

On June 15 last producers of electric furnace silvery pig iron, containing 14 per cent or more silicon, advanced prices $2.50 per gross ton on spot orders, and for those orders under contract the increase is effective July 1. Usual differentials or unitage in silicon, phos and manganese remain in effect. This is the first price advance since June, 1941, and matches the increase in coke silvery prices since that date. Authorization for the price advance is granted under OPA amendment 26 to Suspension Order 129 dated June 12, which provides suspension of price control on ferrosilicon metal under MPR-405.

Chicago — Pig iron supply continues critically tight. Coke supply is nearing normal, but it is thought that six months may elapse before iron will be near balance with demand. With 34 district blast furnaces operating last week, the precoal strike level was resumed, but because of the current scrap shortage more iron must go into steel, thereby reducing iron available to the foundry trade.

Boston — Although both are short, pig iron supply is more critical than scrap with numerous New England melters. There is slight improvement in deliveries, but higher blast furnace output is not fully reflected in shipments, which are spread thin to cover as many emergency cases as possible. Foundry melt, already retarded, is making slow recovery.

St. Louis — Pig iron supplies continue extremely tight with no easing of demand. Danger of curtailment due to coke shortages is regarded as past. Although the strike shutdown of the largest consumer here eased the pressure on production, there still is no free iron and ground inventories are virtually nonexistent. Output in this district has been at capacity many weeks but has been unable to gain on demand.

Scrap . . .

Scrap Prices, Page 162

No easing in scrap supply has appeared and none is expected until steel is provided to manufacturers in sufficient volume to start the flow of production scrap. In absence of new auto, railroad and agricultural units old equipment is not being scrapped at a normal rate, further holding down tonnage. Melters are unable to accumulate reserves and in many cases use material direct from cars.

Pittsburgh—Little evidence is seen of relief in the acute shortage of scrap as possibility of enlarged collections is slight. With steel supply to fabricators of consumer goods at a low point production scrap will be low and scrapping of equipment, automobiles and railroad roll-

ing stock is retarded by lack of new units. Some dealers are selling on the basis of price prevailing at time of shipment as a hedge against possible price adjustments. Surplus government material volume has declined in recent weeks.

Buffalo—Concern has developed over the fact that some scrap dealers have diverted efforts to handling nonferrous materials and government surplus material rather than material for mills and foundries. It is pointed out that the margin for preparation is narrow and wages have absorbed most of this. Material from auto wreckers, railroads and rural areas are light. One melter has been using material direct from cars at a time when reserves should be replenished. Water receipts have improved, a consignment of about 2500 tons being enroute by the canal and two cargoes are expected by lake.

New York — Scrap trading has partially recovered from the inactivity which prevailed recently, pending action by OPA on dealers' appeal for higher prices, but demand far exceeds available supply. This is true not only of cast grades, which are scarcest, but of all terms of steel scrap. Eastern Pennsylvania district and Sparrows Point consumers are getting fairly substantial shipments, however, and sizable tonnages are moving into the Pittsburgh area. Continued shortage of pig iron is adding to pressure for scrap.

Cincinnati—Production scrap has not reappeared in any quantity, and market interests look for a lag of 30 days at least before this source can help to any degree. Early July shutdowns in some foundries, for holidays and vacations, may lift some of the pressure on supply sources. Some mills have fair reserves, others are dependent on current shipments.

Philadelphia — While pressure for scrap in the Philadelphia district is strong, movement is still limited, shipments recovering slowly from the low point of about 10 days ago, when sellers generally marked time pending OPA decision on appeal for higher prices. That no increase was granted has caused considerable disappointment among dealers, some of whom, while shipping against old orders, are showing little interest in new business, being disposed to wait at least the outcome this month of pending OPA legislation.

Chicago — Now that no increase in ceiling prices is in prospect in the near future, scrap appears to have come out in slightly better volume this week. There are those who still believe material is being held for higher price, particularly in view of the prospect that OPA will be curtailed in its power after July 1, by virtue of pending legislation in congress.

Boston — Scarcity in all grades of steelmaking and cast scrap grades continues, with shipments light against strong demand. There is slight evidence any tonnage is being withheld for higher prices, although an increase might move some remote scrap. Production of industrial volume is restricted with likelihood little improvement will develop until mid-third quarter and yard operations are held down by limited supply of unprepared. Keen competition and high bidding are expected on 1900 tons of steel scrap offered at the Boston navy yard this week, notably for the 1000 tons of unprepared heavy melting.

St. Louis—Scrap shipments have improved a trifle but not enough to gain on the sharp demand. Shortages continue in cast grades, which can be explained only by melters' concern over the future and desire to build reserves. The area's largest rolling mill is out of the market and nine foundries remain on strike, but demand for scrap has not dropped correspondingly. Reserves generally are around 90 days.

Seattle — Increased tonnages of steel scrap are arriving at mills since the price was raised to ceiling, previously many sellers having declined to ship. Mills are buying sufficient to offset consumption and inventories are not being increased. Grade of scrap is satisfactory. Scrap from shipyards is nearly exhausted and buyers are returning to normal sources for supplies.

Birmingham—Dealers find the situation deteriorating, scrap supply being practically unobtainable in tonnage, with demand greater than during the war years. Little material is being processed in yards.

Rails, Cars . . .

Track Material Prices, Page 159

New York — A leading car award involves 1500 freight cars and 6 sleepers for the Delaware, Lackawanna & Western, the business being placed as follows: 1000 hopper cars, divided equally between American Car & Foundry

Co., New York, and Bethlehem Steel Co., Bethlehem, Pa., and 500 box cars, placed with Magor Car Corp., New York, and 6 sleepers, placed with American Car & Foundry Co. Outstanding in the way of passenger car buying is the distribution of 117 coaches, purchased jointly by the Atlantic Coast Line, the Pennsylvania railroad, the Richmond, Fredericksburg & Potomac and the Florida East Coast.

Warehouse . . .

Warehouse Prices, Page 160

New York—If authorized, warehouse distributors do not expect to do much back-billing on alloys sold between the price advances from 4 to 8.2 per cent; nor do they expect to be back-billed by producers. Skeptical also are distributors for additional tonnage in third quarter from the emergency CPA distribution plan. Under the directive mills must ship the same tonnage to jobbers delivered fourth quarter last year, but this is industry-wide and not on an individual basis. Nothing is said as to products. Shipments to warehouses in that period were unbalanced and low, most claim. Rebuilding of depleted and broken inventories is slow thus far and warehouse volume is retarded, with demand heavy except for most alloys.

Boston — Demand for lighter stock and smaller gages of heavier products is far in excess of supply; mill deliveries have been slow to improve, but are expected to flow in heavier volume next month. Demand for alloys is below ratio with carbon products and there is still uncertainty in pricing the advance to 8.2 per cent and back-billing policy. Of the heavier products, shape inventories are low, while flat-rolled, notably galvanized sheets, are practically exhausted.

Pittsburgh — Increased mill shipments to warehouse are expected as result of Direction 12 to M-21, which states producers must ship to warehouses during third quarter not less than the same proportion of total tonnage of steel produced by them in that quarter as they shipped to warehouses during fourth quarter, 1945. Distributors must not accept any purchase order, whether certified or not, in excess of 10,000 pounds if delivery would deplete inventory to point of impairing their function in the distribution of steel.

Philadelphia — Warehouse demand is limited by small mill shipments and some leading jobbers report that daily average sales are far behind the May rate. When third quarter opens distributors expect a fair number of certified orders under the recently announced Direction 12. Meanwhile they are speculating on effects of this ruling on their own mill shipments in that quarter, which are supposed to compare at least in total with fourth quarter, 1945.

Iron Ore . . .

Iron Ore Prices, Page 160

Consumption of Lake Superior iron ore in May totaled 2,990,189 gross tons, compared with 4,768,718 tons in April and with 6,872,461 tons in May, 1945, according to figures by the Lake Superior Iron Ore Association, Cleveland. Cumulative consumption for five months this year was 19,247,352 tons, compared with 33,949,212 tons in the comparable period last year.

Ore at furnaces and on Lake Erie docks June 1 totaled 23,904,998 tons, compared with 23,078,989 tons May 1 and with 20,714,738 tons as of June 1, 1945. Furnaces in blast in June numbered 76, compared with 108 a month earlier and 164 a year earlier.

Nonferrous Metals . . .

Nonferrous Prices, Page 163

New York — Depleted inventories of semi-manufactured and completed brass and copper products will not be refilled to balanced supply levels until late this year at least. Gradual improvement in supply of primary copper and other nonferrous raw materials may be expected to begin next month, but losses in production the first six months, in copper, estimated at around 125,000 tons, can not be erased without scars.

With the volume of imported copper below expectations by 30,000 tons during that period, only heavier withdrawals from the stockpile have softened the impact and maintained balance in estimated requirements, which for the year were 1,200,000 tons of primary copper.

Fabricating and distribution have experienced the hardest blows and it will take longer to fill pipelines, reserves are still sufficient to balance the raw material end for some time. Newly mined

copper will not be available in fabricated forms for at least two months.

Where necessary to keep in operation marginal copper and lead mines confronted with higher costs from wage adjustments, office of economic stabilization has authorized extension of subsidies.

Based on outlook for resumption of normal production of Straits tin, government production officials have revised estimates as to when supply of tin will be ample. Full balance will not be attained before 1948; an earlier estimate was mid-1947. Apparent slight improvement in tin supply has been due to lower requirements by several consuming industries in second quarter because of production stoppages. Applications for release of tin have been less. Nevertheless a fundamental improvement in the shortage will be gradual over the balance of this year and some step-by-step easing of curbs on use of the metal may be expected to follow.

Refractories . . .

Refractories Prices, Page 161

Supply of silica brick for construction of new and repair of old steelmaking facilities tightened considerably during first half and the shortage is viewed as serious. Some interests believe the situation will remain acute at least through 1947. Deliveries are now extended 10 to 12 weeks.

Many coke ovens and open hearths were ruined during the steel and coal strikes when they were allowed to cool below the critical point. This increased repair work far above the normal rate.

Demand for refractories in general, however, is smaller than a year ago. Chemically bonded chrome and magnesite basic brick, for instance, are available for shipment on short notice. Regular chrome and magnesite basic brick, and fire clay brick are available for delivery within a month to six weeks on large orders and can be picked up in small lots for prompt delivery.

Lifting of price controls on fire clay and silica refractories and basic refractory brick has not resulted in higher prices on products made in the St. Louis district and east of the Mississippi river, although some consideration is being given insulating refractories which did not share in price advance of 11 per cent this spring.

However, prices on Texas refractories have been advanced by Harbison-Walker Refractories Co., Pittsburgh, to bring them up to a point equivalent on a percentage basis with those of Pennsylvania and Missouri. The price advance, effective June 15, is as follows: High heat duty brick, fob company's Athens, Tex., plant, from $55 to $61; on intermediate heat duty brick, from $46.55 to $55. Although no official announcements have been made, other interests are expected to increase prices correspondingly on refractories produced west of the Mississippi, for producers in that section did not share in recent price advance granted eastern sellers.

Dead-burned dolomite and magnesite, raw dolomite and fluxing limestone, and several high-temperature insulating materials were suspended from price control as of June 19. Office of Price Administration also authorized, as of June 21, an increase of 24.2 per cent over March, 1942, prices for electric furnace refractories.

Canada . . .

Toronto — Steel sheets are in critical short supply, with producers reporting order backlogs in excess of possible production for third quarter. Inquiries continue to pour in but sheetmakers hesitate to add to bookings.

Demand for steel bars exceeds supply and while some barmakers are accepting orders for third quarter others state that books now are filled to the end of September. Demand centers mostly on carbon bars, but inquiries for alloy bars also are appearing and books are filling for third quarter.

Plate demand is steady with delivery against new orders extending three to four months into the future. While steel plate is not as tight as sheets and bars, no surplus tonnage is reported and some larger users report insufficient to enable full production schedules.

No impovement is reported in nails and wire. All types of wire are in short supply and no fencing wire is available. Nails have been critical for more than two months and there are no indications of immediate improvement. Nail output has been curtailed for June but there are hopes that additional steel will be available for that purpose later. Warehouse and retail stores also have been cleaned out of nails.

Merchant pig iron sales are at high level but supply is limiting shipments to around 7000 tons per week. Pig iron production has been hard hit by coal shortage with the result that output now is more than 25 per cent under former rates. The pig iron shortage is affecting steelmaking activities as well as foundry operations.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3100 tons, plant, Baltimore, for National Gypsum Co., to American Bridge Co., Pittsburgh.

3000 tons, New Jersey state vertical lift bridge, over Passaic river, Route-25-A, to Mt. Vernon Bridge Co., Mt. Vernon, O.

1200 tons, additional paper mill buildings, including dryer and sulphite mill, Brown Co., Berlin, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Rust Engineering Co., Pittsburgh, general contractor-engineer.

400 tons, additional buildings, Wilcox-Crittenden & Co., Inc., Middletown, Conn., to Lehigh Structural Steel Co., Allentown, Pa.; Mott-Mohr Construction Co., New Haven, Conn., general contractor.

175 tons, sheet piling, dam, Algonquin, Ill., for state division of waterways, to Carnegie-Illinois Steel Corp., Chicago; H. H. Maas, Algonquin, Ill., contractor; bids April 4.

100 tons, dormitories, Valparaiso, Ind., for Valparaiso University, to Wendnagel & Co., Chicago; J. W. Snyder Co., Chicago, contractor.

STRUCTURAL STEEL PENDING

1500 tons, nylon plant for duPont interests at Chattanooga, Tenn.

1300 tons, bridge, Alameda county, Calif.

710 tons, two Pennsylvania state bridges, one in Clearfield county 360 tons, another in Washington county 350 tons; bids June 28.

475 tons, 605-foot, four-span continuous deck girder bridge, Sheldon Springs, Vt., previous bids rejected; readvertised for June 28, H. E. Sargent, state highway commissioner, Montpelier, Vt.

300 tons, highway bridge over Snake river, Burley, Idaho.

270 tons, two-span through girder bridge, Warren Point, Rt. 4, Sec. 5A, East Paterson-Fairlawn, N. J.; bids July 10, Spencer Miller Jr., state highway commissioner, Trenton; also

30 tons for temporary trestle and 25 tons, mesh and bars.

190 tons, sheet piling, dock, South Chicago, Ill., for Wisconsin Steel Division, International Harvester Co.

180 tons, Pennsylvania state bridge, Montgomery county; new bids June 21.

180 tons, building for Delaware Floor Products Co., Wilmington, Del.; bids closed June 20.

140 tons, warehouse, M. Tose & Son, Bridgeport, Pa.; bids asked.

120 tons, automobile sales and service building, Hollywood-Perkins Inc., Wilmington, Del.; bids June 19.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2000 tons, Merriman dam, Delaware aqueduct, Lackawack, N. Y., to Carnegie-Illinois Steel Corp., Pittsburgh; S. A. Healy Co., Chicago, contractor.

800 tons, navy inactive piers, Tacoma, Wash., to Bethlehem Pacific Coast Steel Co., Seattle.

770 tons, relocation of right of way between Newark and Zanesville, O., for Baltimore & Ohio railroad, to Bethlehem Steel Co., Bethlehem, Pa.; Bates & Rogers Construction Corp., Chicago, contractor; bids May 21.

414 tons, including 154 tons bars and 260 tons wire mesh, highway construction, Proj. R-2686, Johnson county, Ind., for state, to Laclede Steel Co., St. Louis; William D. Vogel, Indianapolis, contractor; bids May 21.

400 tons, refrigerator plants and grain elevators in eastern Washington state, to Northwest Steel Rolling Mills, Seattle.

400 tons, additional paper mill buildings, Brown Co., Berlin, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Rust Engineering Co., Pittsburgh, contractor-engineer.

268 tons, including 88 tons bars and 180 tons wire mesh, highway construction, Proj. R-2661, Johnson county, Ind., for state, to Laclede Steel Co., St. Louis; Reith-Riley Co., Indianapolis, contractor; bids May 21.

240 tons, including 90 tons bars and 150 tons wire mesh, highway construction, project R-2689, Marion county, Ind., for state, to Laclede Steel Co., St. Louis; McCalman Construction Co., Danville, Ill., contractor; bids May 21.

REINFORCING BARS PENDING

1380 tons, Bureau of Reclamation, Denver; bids in, Inv. F-38,499-A-2.

500 tons, science building, Lansing, Mich., for Michigan State College.

300 tons, New Jersey state bridge, Bergen county; bids July 10.

270 tons, power station, Lansing, Iowa, for Interstate Power Co.

250 tons, bridge and highway, Great Barrington-Sheffield, Mass.; bids June 25. State Department of Public Works, Boston, R. W. Coburn, chief engineer.

210 tons, addition A-1 and research building, North Chicago, Ill., for Abbott Laboratories; bids June 22.

200 tons, home economics building, Lansing, Mich., for Michigan State College.

200 tons, plant, Augusta, Mich., for Augusta Milling Co.

105 tons, roadway and bridge, Sheldon Falls, Vt., previous bids rejected, readvertised for June 28, H. E. Sargent, state commissioner of highways, Montpelier, Vt.

Unstated, two-story addition, Chicago, for Underwriters Laboratories Inc.; bids July 1.

PLATES . . .

PLATES PLACED

635 tons, penstock, British West Indies (Jamaica) to Walsh Holyoke Boiler Works, Holyoke, Mass.; Stone & Webster Engineering Corp., contractor-engineer.

155 tons, standpipe, Hudson, Mass., to Chicago Bridge & Iron Co., Chicago.

115 tons, standpipe, Weston, Mass., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

500 tons estimated, tanks for ordnance vehicle storage, including 183 units, 55 feet diameter by 11 feet high and 27 units, 38 x 11 feet; bids in to U. S. Engineer, Cincinnati. also 209 automatic dessicant dehumidifiers and 691,000 square feet, 3 x 3-inch mesh of 0.212-inch wire.

265 tons, standpipes, Seekonk and Westboro, Mass.; taking bids.

Unstated, 7000 feet steel water pipe for Tacoma, Wash.; American Pipe & Construction Co., Portland, low at $144,199.

Unstated, steel tank for Commission of Public Docks, Portland, Oreg.; Pittsburgh-Des Moines Steel Co. low.

Unstated, 19 fishing vessels each 82-feet in length; general contract to Bellingham Iron Works, Bellingham, Wash.

PIPE . . .

CAST IRON PIPE PENDING

1360 tons, 12 to 3-inch cast iron water pipe for Everett, Wash.; H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J. sole bidder.

Unstated, 40,000 feet 12 to 2-inch cast pipe for Alderwood Manor, Wash.; bids to Wernecke & Wolff, engineers, Seattle, June 27.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atlantic Coast Line has placed 117 coaches, consisting of 71 sleeping cars, 30 passenger cars, 13 dining cars and 3 baggage cars; joining in the purchase are Pennsylvania Railroad, Richmond, Fredericksburg & Potomac and Florida East Coast; Pullman-Standard Car Mfg. Co., Chicago, will build 95 and the American Car & Foundry Co., New York, 22.

Continental Carbon Co. and Panhandle Carbon Co., 20 covered hopper cars, to General American Transportation Corp., Chicago.

Delaware Lackawanna & Western, 1500 freight cars, comprising 500 box cars, placed with Magor Car Corp., New York, 1000 hoppers divided equally between the American Car & Foundry Co., New York and Bethlehem Steel Co., Bethlehem, Pa.; also 6 sleepers placed with American Car & Foundry Co.

Missouri Pacific, 4 sleepers, to Budd Co., Philadelphia.

Pennsylvania, 6 sleepers, to Budd Co., Philadelphia.

Seaboard Air Line, 6 sleepers, to Budd Co., Philadelphia.

RAILROAD CARS PENDING

Chicago & North Western, 140 seventy-ton covered hopper cars and 46 coaches, comprising 27 passenger cars, 9 parlor cars, 4 tap-diner-lounge cars, 4 baggage-mail cars, 1 cafe-passenger car and 1 dining car; contemplated.

New York Board of Transportation, 100 to 200 trolley buses, for operation in Brooklyn, action indefinitely postponed; Marmon-Herrington Co., Indianapolis, was originally, low, but with deliveries too far extended, it is understood.

LOCOMOTIVES PENDING

Chicago & North Western, one 1000-horsepower and fifteen 2000-horsepower passenger diesel electric locomotives and eight 4500-horsepower freight diesel-electric locomotives; contemplated.

Egyptian State Railways, ten to thirty 4-6-0 type, eight 2-4-2 type, and two 2-8-2 steam locomotives; bids asked.

WAA Denied Right To Pay Sales Commission

Washington — The arrangement under which the War Assets Administration has been selling government-owned machine tools and other production equipment through some 2400 approved dealers has been suspended indefinitely as a result of a decision by the comptroller general of the United States, Lindsay C. Warren, that the WAA has no authority under the Surplus Property Act to pay out money in the form of sales commissions.

The comptroller general has ruled that approved dealer appointments made prior to March 25 by the Reconstruction Finance Corp. or the War Assets Corp. are legal, and commissions may be paid to approved dealers on sales during the contract period, which in all cases expires June 30. But the War Assets Administration, the comptroller general has found, has no authority to enter into such contracts, so that there is no authority for making payments to dealers whose contracts were signed after the WAA took over government surplus sales March 25.

Not only is the WAA prevented from making further payments to approved dealers as commissions on sales made up to this time, but the WAA may be forced to demand the return of payments which it already has made to hundreds of dealers. Thrown into a dither by the ruling, WAA officials now are conferring with the comptroller general and his legal staff in an effort to determine how the mess can be straightened out. They are hopeful that some way out will be discovered so as to make it unnecessary for approved dealers to go through the trouble of collecting claims against the government.

The WAA was highly pleased with the acceleration to its sales program that resulted from the efforts of approved dealers, and had scheduled a number of meetings with a number of industry committees to discuss ways and means of helping the dealers to act even more effectively. These meetings now have been cancelled.

But WAA officials are hoping to find some other basis for utilizing services of dealers. In his decision, the comptroller general held that the WAA has authority to make payments, in the form of salaries and per diem compensation, to individuals who are under its direction and control under either a full-time or part-time arrangement. It is hoped that a way will be found for construing this definition of authority in such a way as to permit the WAA not only to pay dealer commissions already earned, but to make continued use of the services of dealers in selling government surplus equipment.

Buffalo—Interruptions to production schedules make it difficult for machine tool and machinery makers to figure extended delivery dates. Franklin A. Reed, sales manager of the Niagara Machine & Tool Works, reports bookings stretching over 12 to 18 months. He said inadequate supplies of castings and steel plates were the most important drawbacks to production.

Detroit—Sales and inquiries for machinery and equipment are low and scant prospects are seen for early improvement. Tool and die shop activity is slow and these interests show no eagerness to make equipment changes. Programs for Chevrolet and Ford light cars are about the only exception, buying for both proceeding actively. The Ford project is perhaps somewhat farther along than the Chevrolet, although the latter is somewhat larger in scope, as far as new tools are concerned. Deliveries are improved, although one important interest, strikebound for 13 weeks, has been forced to make further deferments. Sales of surplus equipment by War Assets Corp. is gummed up completely by so-called "priority pressure."

Long talked-of gear and axle plant being projected by Chrysler Corp. may have met a postponement, since it is understood about one-third of the non-productive help on jobs at the Lynch Road plant, where the project was taking shape, has been laid off, many taking jobs at Kaiser-Frazer Corp.

St. Louis—Demand for machine tools remains brisk, with calls for used equipment predominating in the more expensive types and new in the lower classes. Dealers are having some difficulty working off the hundreds of tools declared surplus in the Pratt & Whitney plant in Kansas City. Sale of another large quantity in the Boeing plant at Wichita is to start July 15. Until these are assimilated new tool trade is expected to lag. A saving factor for new business is the lack of variety in machines declared surplus. Late deliveries discourage sales of new tools somewhat, ranging from four to 18 months behind schedule. Some shops, expected to be in the market for new tools, are buying surplus special presses and converting them to standard at considerable expense, to avoid delay on new equipment.

San Francisco — Machine tool movement from eastern manufacturers has increased recently after reaching a low point after the steel strike. Demand exceeds supply. Roadmaking and construction machinery are also arriving in larger quantity. Repair parts also are in better supply.

Chicago — Shortage of electric motors, castings and in some cases steel, is holding back machine tool and industrial machinery delivery. Order backlogs are heavy and many companies which are expanding their production facilities are being delayed. The motor deficiency stems from shortage of both copper and castings.

Boston — Metalworking industries in New England, notably textile mill equipment, one of the largest in the district, are better tooled. Not only have purchases of relatively new surplus machines, installed for war production, been active, but to balance production lines and improve efficiency with lower costs, new orders for special and higher speed machine tools have been placed. The effect is wide-spread modernization of productive metalworking equipment. Among others this has also taken place in the foundry industry and also in forge shops.

CONSTRUCTION AND ENTERPRISE

ARKANSAS

HELENA, ARK.—Helena Cotton Oil Co. has let contract to Muskogee Iron Works, Muskogee, Okla., for a solvent method cottonseed processing plant to cost about $225,000, including equipment.

CALIFORNIA

ALHAMBRA, CALIF.—Alhambra Machine & Tool Co. has been formed by Edwin H. Johnson and associates and operations have been established at 157 North Garfield Ave.

LOS ANGELES—California Steel & Construction Co., 3833 East Medford St., has CPA approval for a shop building at that address, 60 x 200 feet, to cost about $18,000.

LOS ANGELES—Pacific Brake Co. is building a machine shop at 3656 Ninth Ave., 100 x 200 feet, to cost $60,000. Buttress & McClellan, 1013 East Eighth St., are contractors.

LOS ANGELES—Garbo Wheel Co. has been organized by Leslie H. Garlinghouse and associates and operations have been established at 2416 East Sixteenth St.

LOS ANGELES—Utility Trailer Co. is building a plant at 3900 Medford St., East Los Angeles, 49 x 125 feet, to cost about $14,500.

LOS ANGELES—Steel Products Co. is having plans prepared by Saul H. Brown, 2412 West Seventh St., for a mill building 80 x 230 feet and has let contract to J. P. Stein, 116 West Temple St. W. D. Treadway, 2412 West Seventh St., is engineer.

LOS ANGELES—Peerless Pump Division of Food Machinery Corp. is building a plant addition at 301 West 26th Ave., covering 21,850 square feet, to cost about $66,000.

SAN DIEGO, CALIF.—Solar Aircraft Corp. is building a plant structure at 2303 Pacific Tidelands, contract being let to Trepte Construction Co. at $200,000.

VAN NUYS, CALIF.—General Motors Corp. will build an office building at 7800 Van Nuys Blvd., 52 x 300 and 65 x 81 feet, to cost $260,000.

VERNON, CALIF.—Norris Stamping & Mfg. Co., 5215 South Boyle Ave., is building a plant addition and loading dock costing about $30,000.

COLORADO

DENVER—Phillips Petroleum Co., Bartlesville, Okla., and Shamrock Oil & Gas Co., Mercantile Bank Bldg., Dallas, Tex., have plans under way for a gasoline pipeline terminal to cost about $100,000.

CONNECTICUT

DANBURY, CONN.—Master Rule Mfg. Co. Inc., 615 East 186th St., New York, has let contract to Thompson Starrett Co., 444 Madison Ave., New York, for a plant on South St. to cost about $450,000.

MERIDEN, CONN.—Cuno Engineering Corp., 80 Vine St., plans a two-story, 110 x 145-foot plant addition to cost about $125,000. Malcolm R. Knox, 805 Main St., Hartford, Conn., is architect.

FLORIDA

BERTOW, FLA.—International Minerals & Chemical Co., 20 North Wacker Dr., Chicago, has plans completed for a phosphate processing plant near here, to cost about $2,500,000.

JACKSONVILLE, FLA.—Miller Electric Co., 247 Riverside Ave., has had plans drawn for a plant and office building to cost about $400,000.

JACKSONVILLE, FLA.—Ivy H. Smith Co., 1525 San Marco Blvd., plans erection of plant for manufacture of prefabricated houses, to cost about $125,000.

JACKSONVILLE, FLA.—Niagara Sprayer & Chemical Division of Food Machinery Corp. has let contract to E. C. Kenyon, Jacksonville, for construction of a chemical plant. (Noted June 10.)

SARASOTA, FLA.—Southern Gas & Electric Corp. has let contracts to Stacey Bros. Construction Co., Cincinnati, for gas manufacturing plants with capacity of 1,200,000 cubic feet, costing $125,000, here and at Bradenton, Fla.

TAMPA, FLA.—Tampa Electric Co., Cass Ave., is having plans prepared for a power plant to cost about $5 million.

ILLINOIS

CHICAGO—Dole Valve Co., 1923 West Carroll St., is taking bids on a two-story 125 x 200-foot plant building. Sessions Engineering Co., 1 North LaSalle St., is engineer.

CHICAGO—Rheem Mfg. Co., 7600 South Kedzie Ave., plans a one-story 150 x 300-foot plant to cost about $700,000. Plans are by Brown & Mathews Inc., 122 East 42nd St., New York. (Noted May 21.)

IOWA

DAVENPORT, IOWA—Aluminum Co. of America, 918 Kahl Bldg., plans construction of a plant for rolling aluminum sheets near here, to cost about $30 million.

GREENFIELD, IOWA—Southwestern Federated Co-Operative has let contract to Interstate Machinery & Supply Co., 1006 Douglas Ave., Omaha, for power plant improvements, inculding two 1575 hp diesel engines, to cost about $182,000. Stanley Engineering Co., Hershey Bldg., Muscatine, Iowa, is engineer.

MASSACHUSETTS

ASHLAND, MASS.—Warren Telechron Co. has let contract to J. W. Bishop Co., 109 Foster St., Worcester, Mass., for rebuilding a plant building, at cost of about $160,000.

MICHIGAN

BAY CITY, MICH.—General Lift Corp., 606 South Arbor St., has been incorporated with $30,000 capital to manufacture automobile lifts and machinery, by Ernest J. Kolenda, 410 James St., Saginaw, Mich.

DEARBORN, MICH.—Superb Industries Inc., 22547 Michigan Ave., has been incorporated with 15,000 shares no par value to manufacture machinery and machine products, by Alfred H. Pip, 6621 Thiesen St.

DETROIT—Central Steel & Wire Co., 5035 Bellevue Ave., plans construction of a boiler house, warehouse and office, to cost over $500,000.

DETROIT—Season Aire Furnace Corp., 3234 Gratiot Ave., has been incorporated with $25,000 capital to manufacture oil and gas-fired furnaces, by Frank Gordert, 300 Parkview Dr.

DETROIT—Tools & Dies Inc., 3247 Wight St., has been incorporated with $10,000 capital to manufacture tools, dies and machine products, by Henry E. Martin, same address.

DETROIT—Vesco Drill Co., 821 Penobscot Bldg., has been incorporated with $50,000 capital to manufacture drills, by Norman Ross, 14350 Cloverdale Ave.

DETROIT—Triangle Broach Co., 1010 Ford Bldg., has been incorporated with $25,000 capital to manufacture broaches, broaching machines and tools, by Evelyn Hershberger, 24500 Strathmore St.

DETROIT—Ace Wrench Co. Inc., 14350 Cloverdale St., has been incorporated with $50,000 capital to manufacture wrenches and similar products, by Norman Ross, same address.

MUSKEGON, MICH.—Universal Camshaft Co., 350 East Broadway, has been incorporated with 20,000 shares no par value to manufac-

ture parts for internal combustion motors, by Carl W. Neddermann, 1500 Clinton St.

ROCHESTER, MICH.—Troy Tool & Mfg. Co., 6191 John R St., Detroit, and RFD No. 3, Rochester, has been incorporated with $30,000 capital to manufacture tools, dies and fixtures, by Alex Kokanovitch, same address.

MINNESOTA

MINNEOTA, MINN.—Village plans sewage disposal plant and sewers, to cost about $132,400. Hitchcock & Estabrook, 521 Sexton Bldg., Minneapolis, are engineers.

MISSOURI

SLATER, MO.—City, L. A. Brown, city clerk, plans complete sewage disposal plant, to cost about $200,000, for which bonds have been voted. E. T. Archer & Co., 114 West Tenth St., Kansas City, Mo., are engineers.

ST. LOUIS—Industrial Engineering & Equipment Co., 711 South Theresa St., has plans in preparation by Shapiro & Tisdale, 705 Chestnut St. for a plant and warehouse at 901 Hodiamont St.

NEW HAMPSHIRE

BERLIN, N. H.—Public Service Co. of New Hampshire, 1087 Elm St., Manchester, N. H., has let contract to Sanders Engineering Co., 415 Congress St., Portland, Me., for a plant, dam and penstock to cost about $55,000.

NEW JERSEY

NATIONAL PARK, N. J.—Texas Co., 135 East 42nd St., New York, plans petroleum refining plant to cost over $1 million. D. W. Carswell, 205 East 42nd St., New York, is engineer.

NEW YORK

BROOKPARK, N. Y.—General Motors Corp., General Motors Bldg., Detroit, will let contract soon for a manufacturing plant costing $10 million, Albert Kahn Associated Architects & Engineers Inc., 345 New Center Bldg., Detroit, are architects.

OHIO

CARDINGTON, O. — Cardington Machine Works Inc., North Marion St., has bought 5½-acre site at Third St. and New York Central railroad and will build a plant 60 x 140 feet, costing about $30,000, including overhead crane. O. D. Jackson is in charge.

EAST CLEVELAND, O.—City, L. C. Carran, manager, has plans completed for an incinerator to cost about $175,000.

LORAIN, O.—Iroquois Tool & Machine Co., Detroit, has taken over plant formerly occupied by Falbo Construction Co., Vine and 28th Sts., which will be remodeled and equipped for heavy castings and forgings for truck-trailer and automotive use. Detroit plants will continue operation.

PAINESVILLE, O.—Plant for production of electrolytic iron powder for Butler Bros. will be located between the Magnesium and Diamond Alkali plants and will be operated by Bu-El Metals Co., an affiliate, as experimental plant. Plant will be 75 x 220 feet. Harold V. Trask, engineer for Butler Bros., is engineer. (Noted June 10).

STRUTHERS, O.—Township plans sewage disposal plant to cost over $150,000. H. P. Jones & Co., Toledo Trust Bldg., Toledo, O., are consulting engineers.

TOLEDO, O.—National Supply Co., 3320 Bishop St., is having plans drawn by Bellman, Gillet & Richards, 518 Jefferson St., for plant additions to cost about $1 million. L. A. Ringman, care owner, is engineer.

OREGON

NYSSA, OREG.—Avoset Inc., Mahlon K. Jones, president, is having plans prepared for a plant to manufacture milk specialties, negotiations being under way for a site. Bechtel Bros, McCone Co., San Francisco, will design and construct the plant at estimated cost of $750,000.

PORTLAND, OREG.—Grand Metal Products Corp. has let contract to George H. Buckler Co., Lewis Bldg., for a sheet metal plant 145 x 200 feet, at 2324 SE Gladstone St., to cost $60,000.

PENNSYLVANIA

ALLENTOWN, PA.—Western Electric Co. Inc., 195 Broadway, New York, is having plans made for a plant here, to cost about $500,000.

ALLENTOWN, PA.—Asbestos Cement Inc., Morecraft Bldg., Bound Brook, N. J., has plans under way for plant additions estimated to cost about $600,000, in Whitehall township.

EMAUS, PA.—General Machine Co. is having plans drawn for plant additions to cost about $200,000.

IVY ROCK, PA.—Alan Wood Steel Co., Ivy Rock, will build a boiler plant to cost about $100,000. H. M. Wilson, Eighteenth and Brandywine Sts., is consulting engineer.

LANSDALE, PA.—Philco Corp., Tioga St., Philadelphia, has plans by the Ballinger Co., 105 South Twelfth St., Philadelphia, for a plant addition to cost about $160,000.

PHILADELPHIA—A. M. Collins Mfg. Co., 226 West Columbia Ave., has had plans prepared for a plant and office building to cost about $400,000.

ROYERSFORD, PA.—Diamond Glass Co., Royersford, has let contract to W. W. Lindsay, 4 South Fifteenth St., Philadelphia, for additional plant buildings, to cost about $250,000.

SCRANTON, PA.—Murray Corp. of America, 7700 Russell St., Chicago, is having plans drawn for a plant here to cost about $700,000.

SWEDELAND, PA.—Rainey Wood Coke Co., Conshohocken, Pa., has plans under way for enlargement of its coke plant, to cost about $125,000.

TEXAS

MIDLAND, TEX.—Frontier Chemical Co., Box 5311, Curtis W. Cannon, vice president and manager, will start erection about July 1 of a plant for production of hydrochloric acid and caustic soda, to cost about $400,000.

VIRGINIA

COVINGTON, VA.—West Virginia Pulp & Paper Co., Covington, is having plans made for a manufacturing plant to cost about $1 million.

WASHINGTON

BELLINGHAM, WASH.—Puget Sound Pulp & Timber Co., Bellingham, plans a pulp mill 120 x 500 feet, to cost about $500,000.

SEATTLE—Morrison-Knudsen Co., Seattle, has been given a contract by Idaho Power Co. for a $6,500,000 expansion program involving hydroelectric power plants on the Snake river and in Gooding county, Idaho.

WEST VIRGINIA

WEIRTON, W. VA.—Manufacturers' Light & Heat Co., local subsidiary of Columbia Gas & Electric Corp., will build a propane-air plant here and lay 75 miles of 20-inch pipe from Wheeling to Ellwood City, Pa., at cost of about $4,500,000. Parent company's three-year program is estimated to cost $50 million.

WISCONSIN

RACINE, WIS.—Racine Iron & Wire Works, 901 Prospect St., has let contract to Nelson & Co., Inc., 1550 Yont St., for a one and two-story 78 x 100-foot plant addition. F. J. Hoffman and William Schnieder, 201 Sixth are architects.

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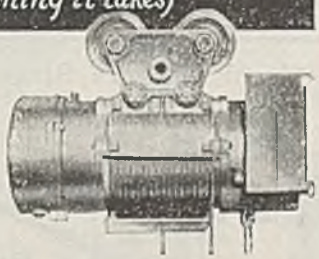

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1	31000 lb.	.008" (34 ga.)	32" x 72"	Type 302
2	44600 lb.	.016" (28 ga.)	30-11/16" x 117"	Type 302
3	42000 lb.	.025" (24 ga.)	35-1/2" x 61-1-2"	Type 302
4	9500 lb.	.016" (28 ga.)	48" x 120"	Type 302
5	40120 lb.	.078" (14 ga.)	34" x 116"	Type 316
6	2288 lb.	.078" (14 ga.)	29" x 36"	Type 316
7	1150 lb.	.078" (14 ga.)	34" x 108"	Type 316
8	3293 lb.	.078" (14 ga.)	34" x 108"	Type 316
9	1300 lb.	.078" (14 ga.)	24" x 94"	Type 316
10	28345 lb.	.062" (16 ga.)	22" x 108"	Type 316
11	9466 lb.	.032" (22 ga.)	25" x 108"	Type 316
12	2688 lb.	.032" (22 ga.)	25" x 144"	Type 316
13	72 lb.	.032" (22 ga.)	30" x 84"	Type 316
14	4644 lb.	.032" (22 ga.)	30" x 90"	Type 316
15	605 lb.	.010" (32 ga.)	12" x 120"	Type 316
16	3200 lb.	.010" (32 ga.)	36" x 114"	Type 321
17	488 lb.	.0625" (16 ga.)	36" x 96"	Type 347
18	714 lb.	.0625" (16 ga.)	48" x 120"	Type 347
19	1860 lb.	.032" (22 ga.)	36" x 96"	Type 347
20	930 lb.	.032" (22 ga.)	36" x 96"	Type 347
21	2062 lb.	.018" (26 ga.)	18" x 120"	Type 347
22	2880 lb.	.015" (29 ga.)	18" x 120"	Type 347
23	630 lb.	.014" (29 ga.)	18" x 120"	Type 347

Item 1 is only item ¼ Hard. Items 2 and 3 are ½ Hard

PLATES - HOT ROLLED - ANNEALED - PICKLED

24	235 lb.	.312"	31" x 78"	Type 321
25	200 lb.	.312"	30" x 70"	Type 321
26	220 lb.	.312"	31" x 72"	Type 321
27	230 lb.	.312"	31" x 79"	Type 321
28	210 lb.	.312"	29" x 80"	Type 321
29	380 lb.	.312"	34" x 106"	Type 321
30	360 lb.	.312"	37" x 100"	Type 321
31	340 lb.	.312"	37" x 98"	Type 321
32	1310 lb.	.312"	35" x 72"	Type 321

STRIPS

Item No.	Approx. Quantity	Gauge	Size	Type and Description
33	303 lb.	.055"	1-3/16" x Coil	Type 302 ¼ Hard, CR, 2B Finish
34	416 lb.	.055"	1-1/16" x Coil	
35	500 lb.	.050"	7" x Coil	Type 302, CR, Soft, Commercially Pickled
36	2875 lb.	.187"	25-1/2" x Coil	Type 302, CR, ¼ Hard, Annealed and Pickled, 2B Finish
37	3156 lb.	.156"	14-1/2" x Coil	
38	3268 lb.	.156"	14-3/8" x Coil	
39	2748 lb.	.1379"	17" x Coil	Type 310, HR, Annealed and Pickled
40	22502 lb.	.017"	1" x Coils	Type 321, Soft, CR, 2D Finish
41	1282 lb.	.050"	21-1/2" x Coil	Type 321, Soft, CR, No. 1 Finish
42	3850 lb.	.049"	27-1/2" x Coil	Type 347, CR, Medium Soft, Dull Finish
43	12100 lb.	.140"	24" x Coils (6)	Type 347, HR, Annealed and Pickled
44	5780 lb.	.060"	23" x Coil	
45	18175 lb.	.060"	8-13-16" x Coil	Type 347, CR, Hard, Bright Finish
46	213 lb.	.120"	27/64" x Coil	Type 410, Soft to 1/4 Hard, Annealed, CR

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48	10070 lb.		1" Dia.	Type 347, CR, mill lengths

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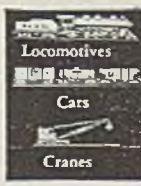

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PRODUCTION MANAGER, 12 YEARS MILL experience, scheduling, planning, stock control, supervision. BS degree Accounting and Administration. Post graduate Metallography. Age 30. Desires opening for advancement over present position. Address Box 584, STEEL, Penton Bldg., Cleveland 13, O.

FACTORY MANAGER—MECHANICAL ENGINEER. Age 38. Good appearance, personality. Understands labor relations. Can get production with minimum of friction. Address Box 575, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $2,500-$25,000. THIS thoroughly organized confidential service of 36 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

Accounts Wanted

SALES ENGINEERING ORGANIZATION COVering the Middle Atlantic States out of Philadelphia, wants additional high grade account,—drop forgings, die castings, stampings, castings, etc. Straight commission, exclusive territory. Only first quality lines considered. Write Box 572, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

FOUNDRY ENGINEER

Must be experienced in layout, foundry design, time and motion study, incentive systems and malleable iron operations. Experience with duplexing not pre-requisite, but helpful.

In replying, please send full information: education, experience, and salary expected.

All correspondence will be held in strict confidence. Our employees know of this advertisement.

Address Box 583,
STEEL, Penton Bldg., Cleveland 13, O.

CHIEF ACCOUNTANT

We desire to obtain services of Cost Accountant and Auditor experienced on American steel plant costs and accounting for service with large integrated iron and steel concern in the Far East. Living conditions are excellent. Compensation will be adequate and commensurate with ability of individual. Give full information as to experience, age, salary expected, etc. All replies will be considered confidential.

Address Box 571,
STEEL, Penton Bldg., Cleveland 13, O.

WANTED: TRAINED TUBE SALESMAN FOR Pacific Coast territory sales position, to be an employee only, not a sales agent. Must have previous tube selling experience carbons, alloys and stainless. Preferable applicant be presently located Los Angeles area. Apply by letter stating qualifications fully and requirements to Box 556, STEEL, Penton Bldg., Cleveland 13, O.

METALLURGIST AND MELTING SUPERvisor. Long established Los Angeles area Electric Steel Foundry has opening for experienced working Metallurgist and Melting Supervisor. State experience and salary expected in first letter. Address Box 566, STEEL, Penton Bldg., Cleveland 13, O.

DEPARTMENT SUPERVISORS. LONG ESTablished Los Angeles area Electric Steel Foundry has openings for experienced Department Supervisors. State experience and salary expected in first letter. Address Box 567, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

WANTED
Industrial Furnace Designer

NATIONALLY KNOWN MANUFACTURER REQUIRES DESIGN ENGINEER WHO HAS HAD A MINIMUM OF FIVE YEARS INDUSTRIAL FURNACE DESIGN EXPERIENCE. MUST HAVE IMAGINATION AND CREATIVE ABILITY. QUALIFICATION BASED ON PATENTS ISSUED AS PART OF PREVIOUS EXPERIENCE. PERMANENT POSITION. GIVE FULL DETAILS IN LETTER. INTERVIEWS WILL BE ARRANGED IN NEW YORK, CLEVELAND AND CHICAGO.

ADDRESS BOX 582,
STEEL, Penton Bldg., Cleveland 13, O.

WANTED
SALES MANAGER
HIGH GRADE ONLY

For large STRUCTURAL STEEL fabricating company. State engineering experience, education, age and references first letter.

Address Box 576
STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER WANTED, PREFERABLY located in Cleveland area. Young man interested in selling metal cutting tools throughout Ohio and Pennsylvania territory. Experience advisable, but unnecessary. Good opportunity for the right man. Address Box 581, STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER WANTED: WE ARE INterested in securing the services of a good, reliable man for the sale of metals and alloys, principally to the major steel companies, but will only consider a man of experience and good record. Address Box 636, Niagara Falls, New York.

WANTED: PURCHASING AGENT, TECHnical knowledge desirable, heavy industry. Give complete information, age, experience, references in first letter. Address Box 579, STEEL, Penton Bldg., Cleveland 13, O.

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