STEEL

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As the Editor Views the News

INDUSTRIAL America was treated to an extra stiff dose of "conventionitis" last week. Multiple conventions were staged in Atlantic City, White Sulphur Springs and Cleveland. In the last named city, five associations participated in the National Metal congress and exposition, which has become the outstanding annual event of its kind in the metalworking industries. The 1936 meetings and show reflect with startling vividness the energy and spirit with which industry is fighting its way back to sound prosperity. Companies and individuals seemed to be surer of their objectives—to have a more clearly defined sense of direction—than in previous years.

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One very clear objective is reducing the cost of production and manufacture. The National Metal show (p. 25) afforded scores of examples of recent achievements in this direction. Several companies displayed wide strip steel, the product of continuous mills, and it must have occurred to thousands of observers that this material, now available in widths suitable for automobile body tops, has been a factor in improving the quality of automobiles and in lowering their cost to the public. The new method of hardening crankshafts by induction heating and controlled quenching (p. 67) also is a spectacular development in the direction of lower costs.

Cutting Costs Is in Vogue

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If we analyze these and other similar illustrations of current progress in the metalworking industries, we find that they key in admirably with the objective of the automobile and other mass production industries. That objective is "more goods for more people," and the method by which it is to be attained is to use more efficient processes and equipment, lower the cost of manufacture and reduce the selling price so that progressively more people in lower income brackets may buy. This is the formula by which the automobile manufacturers hope to increase ultimately the number of car registrations from 25,000,000 to 35,000,000. Success in this undertaking has far-reaching implications. It affords possibilities for distributing goods more widely, equitably and practicably than any of the politically-sponsored panaceas now being peddled. The heavy industries do well to tie in with this movement among their mass production clients and customers.

More Goods for More People

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Meeting in the golden-tinged hills of West Virginia, structural steel fabricators (p. 26) listened to a series of impressive addresses on the approaching task of "rebuilding America." The "forgotten" bridges of the "horse and buggy" era—now hazardous bottlenecks in the nation's highway system—came in for extended comment. It was estimated that 25 per cent of the country's bridges are too weak or too narrow. "Reurbanizing" city areas also presents a great opportunity to the construction industries. Better planning probably is the key to both problems. For this reason, research on highway bridges and on the future need of city construction probably will pay attractive dividends in the near future.

Need Steel for Reconstruction

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While the approaching election was a live topic of conversation in convention hotel corridors, economic problems closely allied to political issues in the campaign received less attention in the formal programs than in previous years when no election was in prospect. In most cases the principal criticism of the government in regard to its relations with business was in connection with the tax law provision for penalizing undistributed earnings. Strangely enough, the current record of business (p. 42) furnishes only meager evidence of concern or postponement of commitments due to the approaching Nov. 3 election. Perhaps the disposition of industrial executives to work hard and to remain composed in the face of a momentous decision at the polls is a hopeful sign of returning economic sanity.

Not Jittery About Election

E. L. Shaner

Metal Congress and Show Reflect Renewed Confidence

IF ATTENDANCE and interest recorded at the eighteenth annual National Metal congress and exposition in Cleveland, Oct. 19-23, are a reliable criterion, and without doubt they are, the metalworking industry is well along on the road to recovery.

The exposition was the largest of all the metal shows. The 1926 show in Chicago and the 1927 show in Detroit occupied greater floor space but it is to be recalled that machine tool and machinery exhibits were included in these. Today the two industries conduct separate shows.

Registration Totals 12,000

Floor space in Cleveland last week aggregated over 70,000 square feet and exhibitors numbered 217. Actual registration for the week was in the neighborhood of 12,000. It is difficult to compare the attendance with previous shows for this year for the first time the general public was excluded. This restricted attendance proved beneficial to both exhibitors and visitors from the metalworking and allied industries.

Principal sponsor and originator of the congress and exposition was the American Society for Metals. Cooperating in the program of technical meetings were the American Welding society, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers and the Wire association.

Featuring the program of the American Society for Metals were 12 technical sessions, the annual business meeting, the Campbell memorial lecture, a five-period lecture course on physical testing of metals, a three-period lecture course on X-ray analysis, and the annual banquet. Morning technical sessions exceeded all previous attendance records.

Nearly 300 persons attended each of the two lecture courses. This is the third year that the society has conducted educational activities during the convention. The course on physical testing of metal was presented by H. D. Churchill, associate professor of mechanics, Case School of Applied Science, Cleveland, and the course on X-ray analysis by K. R. Van Horn, research metallurgist, Aluminum Co. of America, Cleveland.

Upwards of 500 members attended the society's eighteenth annual meeting at Hotel Statler, Wednesday morning. President Robert S. Archer, chief metallurgist, Chicago district, Republic Steel Corp., presided.

Medal Award Is Delayed

President Archer announced that no award of the Henry Marion Howe memorial medal for the best paper published in the society's TRANSACTIONS during the past year would be made at this convention. To allow a longer period of time for the consideration of papers, awards in the future will be made a year after the judging period closes.

The Robert M. Bird bell and gavel, awarded annually to the chapter which has shown greatest progress and has been of most service to the national society, was given to the Peoria, Ill., chapter. G. C. Riegel, metallurgist, Caterpillar Tractor Co., Peoria, Ill., chairman of the chapter in 1935-36, accepted the award. The Peoria chapter was established in November, 1934, with 89 members and during the past year has succeeded in raising its total membership to 243.

Acknowledging a resolution from the Rochester, N. Y., chapter, for the scheduling of a larger number of papers of technological and practical nature, in contrast with those of the research type, President Archer explained the difficulty always had been to obtain practical papers of high quality, however, a plan now is being formulated to stimulate preparation of this type of paper.

Membership At New High

In his report as treasurer, W. P. Woodside, vice president, Climax Molybdenum Co., Detroit, stated that the society has materially strengthened its financial position during the past year. Secretary W. H. Eisenman, Cleveland, reported that the society has reached a new all-time high in membership and that its 1936 exposition is the largest in history. He stated that the society's membership on Oct. 1, totaled 7691, this being a gain of 811 members, or 11.8 per cent, over the corresponding date a year ago. Since Oct. 1, another 1500 members have been added, bringing the present total to well over 8000.

New officers nominated last spring were declared elected and assumed their positions at the close of the convention. Edgar C. Bain, assistant to the vice president in charge of metallurgy and research, United States Steel Corp., New York, became the new president.

George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., succeeded Mr. Bain as vice president. William H. Eisenman, 7016 Euclid avenue, Cleveland, was elected to succeed himself as secretary for two years.

Two new trustees, elected to two years, are Ralph L. Wilson, metallurgical engineer, Timken Steel & Tube Co., Canton, O., and O. W.

PANORAMA view of upper level of exhibits at National Metal exposition in Cleveland last week. Displays of 217 companies filled the exhibition hall

Ellis, director of metallurgical research, Ontario Research Foundation, Toronto, Ont.

The board for the coming year will comprise the new officers, trustees and the following: Trustee R. L. Kenyon, supervising research engineer, American Rolling Mill Co., Middletown, O., and Trustee S. C. Spalding, metallurgist, American Brass Co., Waterbury, Conn.; retiring president, R. S. Archer and treasurer, W. P. Woodside.

At the close of the annual meeting James P. Gill, chief metallurgist, Vanadium Alloys Steel Co., Latrobe, Pa., presented the 1936 Edward De Mille Campbell memorial lecture. Arthur T. Clarage, president, Columbia Tool Steel Co., Chicago Heights, Ill., introduced Mr. Gill.

Tool Steel Is Discussed

"High Speed Steel Carbide Segregate and Grain Size" was the title of Mr. Gill's lecture. He dealt with only one composition of high speed steel, namely that containing almost exactly 0.70 carbon, 18.00 tungsten, 4.00 chromium, 1.00 vanadium, and with about 0.25 manganese and 0.30 per cent silicon.

The lecture was divided into five parts. Part I dealt with the nature and characteristics of the carbide segregate. Part II was concerned with segregate and grain size as they affect the physical properties. Subtopics were (1) Strength and plasticity; (2) thermal conductivity; (3) hardness at the elastic temperature.

Effect of segregate grain size was the topic of Part III; grain size as affected by repeated heating the subject of Part IV; and grain size as affected by furnace atmosphere and hardening made up Part V.

About 700 members of the society and their guests attended the banquet at the Statler hotel Thursday evening. President Archer presented the Past President's medal to B. F. Shepherd, manager, rock drill division, Ingersoll-Rand Co., Phillipsburg, N. J., who served as president in 1934-35.

W. R. Chapin
Recipient of the Albert Sauveur Achievement award of the American Society for Metals

Presentation of the Albert Sauveur Achievement award, established in 1934 in honor of the widely-known metallurgist to recognize outstanding contributions to metallurgical knowledge, was made to W. R. Chapin, director of testing department, E. C. Atkins & Co. Inc., Indianapolis. Dr. Zay Jeffries, consulting metallurgist, Cleveland, the 1935 recipient of the award, presented Mr. Chapin to Dr. Sauveur, the first recipient, who formally made the award.

Cites Basis of Award

Dr. Jeffries' citation of Mr. Chapin was as follows: "For his fundamental work in connection with two-stage quenching of steel, which has explained many mysteries of heat treatment results, has stimulated and guided many important researches, and has led to the clarification of theory and improvement in practices of steel treating."

Mr. Chapin's contribution was first presented before the Cleveland chapter in the winter of 1921-22, and was published in Vol. 2 of *Transactions* of the American Society for Steel Treating.

The American Society for Metals at its banquet gave recognition to six chapter secretaries who had served more than 10 years in their posts and whose total service aggregated 76 years. They were as follows: Alexis Caswell, Northwest chapter, 16 years; T. N. Holden, New York, 15 years; H. L. Walker, Pittsburgh, 13 years; C. G. Peterson, Rhode Island, 11 years; H. E. Handy, Boston, 11 years; and I. C. Mathews, Rochester, 10 years.

Special guests at the speakers' table included B. F. Fairless president, Carnegie-Illinois Steel Co., Pittsburgh; and R. J. Wysor, executive vice president and general manager, Republic Steel Corp., Cleveland.

Principal banquet speaker was H. V. Kaltenborn, radio commentator, who spoke chiefly of the Spanish civil war in an address "We Look at the World."

Gibson Heads Welding Society

WITH recent improvements in welding equipment and technique, this process for fabricating metal products and joining the members of heavy structures is assuming a commanding position in industry. This was clearly evident from proceedings of the seventeenth annual meeting of the American Welding society held at Hotel Cleveland, Cleveland, Oct. 19-23.

Good attendance marked all sessions, official registration approached the 400 mark.

At the opening session A. E. Gibson, executive vice president, Wellman Engineering Co., Cleveland, was elected president to succeed J. J. Crowe, engineer in charge, apparatus research and development

ATTENTION given to decorative treatment of exhibits was strikingly evident. Visitors agreed that from the standpoint of beauty the show had no equal

department, Air Reduction Sales Co., Jersey City, N. J.

E. R. Fish, chief engineer, boiler division, Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn., was named senior vice president. Divisional vice presidents were chosen as follows: New York and New England, J. H. Zimmerman, development engineer, Linde Air Products Co., Newark, N. J.; Middle Eastern, R. D. Thomas, president, R. D. Thomas & Co., Philadelphia; Middle Western, H. C. Boardman, director of research, Chicago Bridge & Iron Works, Chicago.

Directors for three years were elected as follows: I. T. Hook, research engineer, American Brass Co., Ansonia, Conn.; G. A. Hughes, electrical engineer, Truscon Steel Co., Youngstown, O.; R. E. Kinkead, consulting engineer on welding, Cleveland; H. S. Smith, consulting engineer, Union Carbide Co., New York; and A. Vogel, engineer, General Electric Co., Schenectady, N. Y.

For his work in the welding research division of the Emergency Fleet Corp. during the World war and his subsequent work in research in welding, Henry M. Hobart, consulting engineer, General Electric Co., Schenectady, N. Y., was named the 1935 recipient of the Samuel Wylie Miller memorial medal. Presentation was made by Dr. C. A. Adams, consulting engineer, Harvard university, Cambridge, Mass., and director, American Bureau of Welding.

Wire Group To Widen Activities

THIS year's meeting of the Wire association, held at Hotel Cleveland, Oct. 19-22, had the largest registration of any annual meeting since the inception of the organization. The total was 195 against 160 last year.

A paper entitled, "Steel for Arc Welding Electrodes," was acclaimed the best all-around paper submitted to the association for 1936. The author, Robert Notvest, is chief engineer, welding division, J. D. Adams Co., Indianapolis. In recognition of his meritorious contribution to the advance of the industry, the association awarded him its medal, a solid bronze plaque. A large group of metallurgists judged the merits of all papers submitted and it was agreed that Mr. Notvest had delved into a subject about which little is known.

The association also awarded an engraved certificate of honorable mention to B. L. McCarthy, metallurgist, Wickwire Spencer Steel Co., Buffalo, for his paper on "Plastic Deformation in Wire Drawing."

A. E. Gibson
Newly elected president of the American Welding Society

This work, an elaboration of his paper submitted a year ago, received wide acclaim following presentation at the technical session held Oct. 21 at Hotel Cleveland.

At the annual meeting of the association Wednesday afternoon, Mr. McCarthy pointed out that in view of the cold drawing industry being an outgrowth of metallurgical research of the cold working of metals the wire industry should consider its problem of cold working closely allied with those encountered in the cold heading industry. The speaker suggested that the Wire association broaden its activities to include cold working and allied subjects included in cold working. His suggestion was put in the form of a motion by J. C. Callaghan, works manager, Canada works, Steel Co. of Canada, Hamilton, Ont., and will be submitted to the membership for immediate acceptance.

Plans have been effected by the association to organize a nonferrous section along the lines of the steel section. Separate meetings will be held simultaneously at next year's annual meeting. E. W. Clark, mechanical engineer, wire and cable division, General Electric Co., Schenectady, N. Y. was appointed temporary chairman of the new section.

H. M. Hobart
Awarded the Samuel Wylie Miller Memorial medal of the American Welding Society

A.I.M.E Sessions Well Attended

ABOUT 400 members of the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers convened at the Statler hotel in Cleveland, Oct. 20-22, for the annual fall meetings of these divisions.

The Iron and Steel division conducted two interesting sessions on Tuesday, one devoted to blast furnace practice and the other on the open-hearth steel plant. A third session on Wednesday dealt with X-ray metallography.

Aging of metals and constitution of alloy systems were the subjects at two sessions of the Institute of Metals.

On Thursday, both divisions met jointly in two sessions in which round-table discussions of physical tests were heard. Tensile testing, impact testing and bend testing were considered.

The two divisions of the institute gathered for their annual dinner at the Statler hotel on Wednesday evening. The principal speaker was Albert Sauveur, Gordon McKay professor of metallurgy, Harvard university, Cambridge, Mass. Considered to be the dean of metallurgy in this country, he spoke entertainingly on "Metallurgical Reminiscences."

A.S.M.E. Studies Welding Practice

PARTICIPATION of the American Society of Mechanical Engineers in the National Metal congress consisted of a four-session welding practice symposium at the Cleveland hotel, Oct. 22-23. The meeting was arranged by the society's Machine Shop Practice, Iron and Steel and Petroleum divisions.

The first two sessions of the symposium on Oct. 22 were held jointly with the American Welding society which co-operated in preparation of the program. The purpose of the symposium was to provide mechanical engineers with information which would serve as a useful guide on welding technique and its effect on design and production.

Highlights of Metal Exposition

CROWDS of engineers and executives in a buying mood for five days last week filed through the Lakeside underground exhibition hall of Cleveland's public auditorium to inspect the 217 displays of material and equipment in the annual metal exposition of the American Society for Metals. Highlights as observed by STEEL'S editors are given in following paragraphs.

* * *

GENERAL CONSENSUS of opinion of those attending the exposition was that it represented the "most beautiful" show ever sponsored by the American Society for Metals. Exhibitors reached new heights in the use of light, colors, models and other decorative innovations.

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INTEREST in the congress and exposition is worldwide for among visitors in Cleveland last week were representatives from five European countries as well as Canada, Mexico and Australia. Countries abroad which sent representatives were England, Germany, Russia, France and Sweden.

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CENTRAL FEATURE of the elaborate display sponsored by United States Steel Corp. and subsidiaries, was a circular structure surmounted by a tall illuminated revolving shaft at the top of which was a small ladle from which molten metal appeared to flow. Around the lower part of the structure were 12 panels in which were large illustrations of various phases of steelmaking. On a track running around these panels was a 3-foot mechanical man in which was installed a loud speaker. This figure moved around the panels, stopping before each one to describe the operation.

* * *

AN ATTRACTION at the exhibit of Jones & Laughlin Steel Corp. was a small model of the pouring side of an open-hearth furnace. The model was continuously in operation, a ladle moving into position, an operator cleaning out the tap hole and the molten metal—in reality a light oil—streaming forth into the waiting ladle.

* * *

ALL LIVING PAST PRESIDENTS of the American Society for Metals, 13 in number, were present at the National Metal congress and exposition last week. They were as follows: A. E. White, Ann Arbor, Mich., 1921; F. P. Gilligan, Hartford, Conn., 1922; W. S. Bidle, Cleveland, 1925; R. M. Bird, Philadelphia, 1926; J. F. Harper, Milwaukee, 1927; F. G. Hughes, Bristol, Conn., 1928; Zay Jeffries, Cleveland, 1929; R. G. Guthrie, Chicago, 1930; J. M. Watson, Detroit, 1931; A. H. d'Arcambal, Hartford, Conn., 1932; W. B. Coleman, Philadelphia, 1933; W. H. Phillips, Pittsburgh, 1934; and B. F. Shepherd, Phillipsburg, N. J., 1935.

* * *

THE EFFECT of a modern streamlined stainless steel train speeding along the rails was cleverly accomplished by the Allegheny Steel Co., Brackenridge, Pa. Visitors passing this company's exhibit were compelled to pause for a good look. The train, which did not move, was a flat silhouette in a frame about 10 feet long and 2½ feet high. Background scenery was painted on a wide endless belt, which, moving rapidly, made it appear that the train was moving forward.

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NUMBERED AMONG English visitors to the National Metal congress and exposition was R. W. Barclay, president of the Institute of Metals. Mr. Barclay is consulting metallurgist, Mond Nickel Co. Ltd., London, the British affiliate of International Nickel Co. Inc., New York.

* * *

TWO SMALL RACING CARS attracted many to the booth of Republic Steel Corp. and testified to the exacting demands made upon alloy steels for automobiles. One car was No. 91 in the 1936 Soap Box Derby at Akron, O., and was also city champion in Cleveland for this class of racing. The other car was somewhat larger—97-inch wheel base—and was a four-cylinder racer with maximum speed of 160 miles per hour. This speedster placed seventh in the Vanderbilt Cup Race, Oct. 12, at the new Roosevelt Speedway on Long Island.

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OHIO CRANKSHAFT CO., Cleveland, drew large crowds throughout the week to inspect its new equipment for induction surface hardening of crankshafts. Actual production work at the rate of 30 shafts per hour was being carried out, the product for use in engines of White Motor Co. trucks.

* * *

AMONG EXPOSITION VISITORS from far distant points was John S. Kirkham, assistant factory manager, Australian Window Glass, Alexandria, New South Wales, Australia. This company operates a foundry and recently was licensed to manufacture high-strength gray iron by the Meehanite process.

* * *

A NEW TYPE of testing machine which attracted considerable attention at the exposition was a variable velocity impact tester shown by the Riehle Division, American Machine & Metals Inc., New York. In principle, this machine consists of two entirely separate and distinct parts; a pendulum as a means for measuring the energy required to rupture the test specimen, and a rotatable wheel and related parts which serve to develop the neces-

(Please turn to Page 73)

THESE widely-known metallurgists took a prominent part in the annual convention of the American Society for Metals in Cleveland last week. At the left is Retiring President Robert S. Archer; in the center is James P. Gill who presented the 1936 Campbell memorial lecture; and at the right is President-Elect Edgar C. Bain

Rebuilding America Will Aid Markets for Structural Steel

OPPORTUNITIES for a steadily increasing use of structural steel in "rebuilding America" were envisioned repeatedly in the program of the fourteenth annual convention of the American Institute of Steel Construction, held Oct. 21-23 at the Greenbrier hotel, White Sulphur Springs, W. Va.

Speaker after speaker referred to the great task ahead of replacing the "horse and buggy" bridges in the nation's highway system, to the necessity of "reurbanizing" city areas, to reducing the hazards of grade crossings and to modernizing or rebuilding other outmoded structures.

In the president's annual address, Clyde G. Conley, president, Mt. Vernon Bridge Co., Mt. Vernon, O., reviewed the work of the institute and stressed the importance of the industry's statistics.

"Our members should give these statistics their careful consideration," he said. "They can gage their operations properly only after such a study of them. Ours is an industry different from most. We never repeat the same manufacturing processes, therefore we develop no cost figures that can be repeated. Yet comparative cost studies are a fundamental need of our industry."

Cites Low Costs

Mr. Conley called attention to the prices at which the steel construction industry sells its services and products. "The steel in a building completely erected, if a simple building, will cost as little as 4 cents a pound. The steel in a bridge over a navigable stream, with all the hazards of erection, will cost the buyer as much as 7 cents a pound. . . . For this, the public receives a high grade of structural steel plates, shapes and bars, which we buy from the mills at an average of more than 2 cents a pound, including extras. For the difference, or from 2 to 5 cents, we pay freight and delivery charges which may run more than a cent a pound, make the detailed drawings, fabricate, erect, rivet and paint it, including all the hazards of erection.

"I looked up the costs of other methods. Copper is listed at 9.75 cents, and after rolled into sheets, 16 cents per pound, or into wire 13 cents. In other words, the rolling of copper into sheets costs 6.25 cents per pound more than the metal, which is more than we get for all our services."

Mr. Conley cited other metals. "Zinc costs 4.85 cents, rolled into sheets 9.50 cents, or a difference of 4.65 cents a pound. "Lead costs 4.45 cents and in sheets 8 cents; nickel 34 cents and in sheets 48 cents; aluminum 16.25 cents and rolled into sheets 26.8 cents; brass 7.75 cents and rolled into sheets 15.6 cents. All these prices are quantity prices. These facts, it seems to me, prove that we need make no apologies and the public can have no legitimate criticism of the prices for our products."

Tax Law Demoralizing

Mr. Conley warned his listeners of the consequences of the tax law which penalizes undistributed earnings. "In 1932," he said, "about 452,000 corporations made income tax returns, but only 83,000 showed profits. It is difficult to imagine the chaos which would have occurred if those 370,000 corporations operating at a loss had not accumulated surpluses to tide them over the period of depression, which continued not only for one year but for several years. The surtax with a penalty so heavy as to well nigh prohibit the accumulation of future surpluses will pave the way for demoralization during the next depression."

In presenting his annual report as secretary of the institute, V. G. Iden emphasized the need of greater effort on promoting markets for structural steel. The technical research and engineering services conducted by the institute, he declared, represent "raw material that can be thrown into the market hamper." By centralizing and coordinating the research for the fabricated structural steel industry, "we can better time it and develop it to meet the possibilities of the market. For instance, if we can foresee an enlarged program of road building, grade crossing elimination, etc., we can direct our special attention to the improvements essential to make structural steel a better agent in that market."

Mr. Iden discussed various phases of the economic situation, referring to the improvement in employment and the increase in national wealth. He quoted authorities who are convinced that the business trend will continue definitely upward "probably for three years to come, despite labor troubles, despite war, despite anything."

"The tide of depression," he concluded, "has spent itself."

John H. Van Deventer, editor of *The Iron Age*, New York, presented an original method for analyzing competitive problems in industry. The basic principle of the method can be illustrated by circles. Assume that one circle, designated as *A*, represents the business of Company A and another circle, *B*, the business of Company B. Undoubtedly there are some functions in which both companies are equally competent. In that case, they compete on equal terms, and that portion of their activities in which they are equally competent is represented by the area which is formed by the overlapping of the circles.

The portion of Circle A not overlapped by Circle B represents the market in which Company A has an advantage over Company B. The unoverlapped part of Circle B represents the market in which Company B can operate more advantageously than Company A. These areas are designated by Mr. Van Deventer as "areas of supremacy."

He contends that if management will use this method to analyze business, it will help to direct more attention to the "areas of supremacy", or in other words, to that part of the business which will yield most readily to cultivation. He declared that the method not only can be used by companies to solve their competitive problems, but is equally well adapted to determining whether certain activities should be carried on by individual companies or by their trade association, and to analyzing problems of competition between industries, products and and services.

Discusses Mill and Fabricator

In the absence of W. S. Tower, executive secretary of the American Iron and Steel institute, his address "The Mill and the Fabricator" was presented by R. B. Thomas, general counsel of the institute. Referring to the fact that the construction industries took 18 per cent of the tonnage of finished steel products in 1929 and the years immediately preceding, Mr. Tower states it is a commonplace to say that the fabricator is essential in the movement of much steel to its ultimate uses.

Alluding to mill and fabricator competition, Mr. Tower says, "It may seem odd to the superficial observer that the steel mill has been more or less in competition with some of the potential purchasers of its products. Over the years, however, the mill-owned shop probably has helped to a better understanding of fabricating problems, has contributed substantially toward improved methods and practices in fabricating steel and in general has worked constructively in the interests of both industries."

After citing ways in which the

rolling mills have contributed to progress in steel construction, Mr. Tower, in his address, stresses the importance of the role of the independent fabricators. "Efficient fabricators," he declares, "are an essential part of the complex organization through which steel products pass into use. Without the fabricating shops, which are scattered far and wide throughout the country, it would be difficult if not impossible for mills to meet the needs of construction jobs, which appear in endless variety when business is good. . . . With the large group of able, independent fabricators free to buy where they will, and exercising that privilege, strategically placed for serving great markets, no mill can ignore the importance of sound financial and commercial practices with and among fabricators."

Mr. Tower touches upon the abuses of the fabrication-in-transit feature of freight tariffs. "So long as freight rates provide for fabrication in transit," he says, "neither mill nor fabricator alone can fully determine the effects which it may have on their respective activities. On the other hand, mills and fabricators together, consistently working to create and keep healthy conditions of competition, undoubtedly could do much to remove any menace which lies in the misuse of the privilege. Here is a field that merits no less earnest effort than that which has brought such praiseworthy results in some of the technical and engineering aspects of mill and fabricator relations."

Important Gains In Buildings

IN DISCUSSING "The Building Outlook," T. S. Holden, vice president, F. W. Dodge Corp., New York, showed that impressive recovery gains have been made in construction. Total construction contracts in 37 eastern states in 1934 increased 23 per cent over 1933; a similar increase of 23 per cent was recorded in 1935; and during the first nine months of 1936 the contract total was 7 per cent ahead of the corresponding figure last year and 10 per cent ahead of the 12-month total for 1935.

Mr. Holden confined his discussion largely to construction in urban areas. The apartment house situation, he said, is vastly improved and new apartment house building is "very definitely on the upgrade." On the other hand, new city hotels and theater buildings are apt to come back rather slowly. He said, "We are likely to see an increased amount of modernization of existing buildings of these two classes before any great demand for new ones appears."

As for office buildings, vacancies now are about 22.71 per cent of all rentable area compared with 27.57 as of Jan. 1, 1934. A large amount of alteration work is being carried on in the office building field. The immediate outlook, according to Mr. Holden, is rather for increased modernization than for any sudden demand for large new buildings.

However two important classes of structures have begun to revive which offer an immediately bright outlook for steel construction. One is bridges and grade separation projects, which work is necessary in connection with the improvement of highways, and the second is factory building. At the end of September, factory construction contracts were 82 per cent ahead of last year in total dollar volume.

Trend Probably Between Extremes

Mr. Holden discussed various aspects of the so-called super-cities which were envisioned in 1929, embracing super-skyscrapers, three-decked streets, etc. He intimated that the probable trend in large city development lies somewhere between the extreme of congested ant-hill development on one side and complete flight to rural simplicity on the other. He cited several new urban developments which seem to point the way to a more sensible solution of the city problem. One is Rockefeller Center, in which provision is made for light and air, open spaces, traffic and parking. Another is the S. H. Kress & Co. store on Fifth avenue, which has truck unloading platforms within walls of the building.

Mr. Holden suggested that intelligent city planning is the key to the solution of urban building problems. Functional urban building, economically planned to serve definite specialized requirements, probably is the trend of the future.

In the absence of A. P. Greensfelder, president, Fruin-Colnon Contracting Co., St. Louis, his address "Rebuilding America" was presented by Henry Pann, district engineer for the institute in Chicago.

"As soon as man finishes a structure," he declares, "it begins to depreciate. This depreciation is caused not only by the natural elements but by lack of maintenance, change of use, migration of industry, destruction by fire and obsolescence." Mr. Greensfelder is of the opinion that "styling" should be added to the major causes of this devaluation of America's structural plants. He believes that the construction industry, by and large, is not "style conscious."

He suggests that there is a real opportunity in instituting a well planned program of "Modernizing Main Street." This might even embrace the renovizing periodically not only of individual buildings but the city streets or highways on which they face. He proposes that we "re-urbanize" the whole city area.

Fourth of Bridges "Hazardous"

ONE of the outstanding contributions to the program was an address, "Forgotten Bridges," by J. R. Burkey, chief engineer of bridges, Ohio state department of highways

Mr. Burkey began by describing the filing system by means of which the state highway department keeps informed of the principal characteristics and condition of the 7405 bridges of 10 feet or more in span and approximately 63,000 culverts This record of bridges enables the department to see at a glance the bottlenecks in the highway system. Many of these bottlenecks are bridges built in the "horse and buggy days" and which are inadequate for the highways of which they are a part. About 25 per cent of the bridges in Ohio are either too weak or too narrow to a degree which constitutes a serious hazard to traffic. Mr. Burkey believes this percentage probably represents the proportion of inadequate bridges to the total for the country.

Beauty Important

Mr. Burkey emphasized the fact that while economy is desirable in the majority of bridges, the factor of beauty also is important. He showed pictures of the Lorain road viaduct recently completed which spans the Rocky river valley and Metropolitan Park system in the western outskirts of Cleveland. This structure is of steel arch construction with no visible diagonal bracing. It received the institute's award for the most beautiful bridge of its class erected in the United States in 1935, and is an outstanding example of how steel is adaptable to aesthetic treatment when the designer and builder co-operate fully.

In his report as chief engineer of the institute, F. H. Frankland reviewed the technical activities of the institute during the past year. He referred to the valuable work done by the committees on technical research, manual and specifications, and declared that it is no exaggeration to say if the members of these committees were employed by the fabricating industry on a salary basis to do this work most of the members would be astonished at the sum represented.

Mr. Frankland read an editorial from *Engineering News Record* to emphasize the importance of bridge modernization. "The narrow bridge must be scrapped in the interests of safer highways, good engineering and sensible road administration."

In a symposium on building codes held Thursday morning, the district engineers of the institute reported in detail on the status of codes in the states and cities in their respective territories.

The annual banquet was held Thursday evening with President Conley presiding as toastmaster. Glenn Griswold, editor of *Business Week*, New York, spoke on business conditions. He declared that the business trend in the next year or two seems to point definitely upward. If there is anything in the indications to trouble us it is that some of them suggest the possibility of business accelerating too rapidly and going too far under an inflationary impulse. Frank Lovejoy, sales executive, Socony-Vacuum Co., New York, also was a banquet speaker.

One of the interesting features of the convention was the first showing of a sound-track picture showing the erection of the San Francisco-Oakland Bay bridge. Preceding the showing of the film C. F. Goodrich, chief engineer, American Bridge Co., spoke briefly on some of the important details regarding this structure, which is the largest bridge in the world.

Open $150,000 Laboratory For Research in England

A $150,000 research and development laboratory was opened formally Oct. 21, in Birmingham, England, by the International Nickel Co. of Canada Ltd. This is another link in the company's research development, which includes a laboratory at Bayonne, N. J., and another now under construction at Copper Cliff, Ont.

Robert C. Stanley, president of the company, who was unable to attend the opening, sent the following cablegram: "The object of this new laboratory is to provide facilities for co-operative work between ourselves as producers and the users of our product. We hope that the metal industry as a whole will come to regard the laboratory as a necessary and dependable source of information."

PWA Orders for Iron and Steel Total $336,814,082

Orders for iron and steel products valued at $336,814,082, financed by expenditures of PWA funds, created approximately 2,950,000 man-months of indirect labor in mines, mills, and transportation, according to a government survey to determine the ratio between direct and indirect employment brought about by PWA. It is estimated that more than 411,000 man-months of labor were financed directly or indirectly in foundries and machine shops by PWA orders.

Orders financed by PWA funds for machinery, exclusive of transportation equipment, are valued at $236,739,241; and orders for transportation equipment at $89,136,986. The value of orders for nonferrous metal products is $7,175,875. Up to the end of June, 1936, the value of PWA orders was $1,288,755,000.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 24	Change	Same week 1935	Same week 1934
Pittsburgh	70	— 7	47	21
Chicago	74½	— 1½	54	27½
Eastern Pa.	48	— ½	38	20
Youngstown	77	— 1	62	26
Wheeling	92	— 3	78	29
Cleveland	79½	None	64	38
Buffalo	84	None	40	24
Birmingham	61½	— 2½	58½	10
New England	75	— ½	68	40
Detroit	100	None	88	59
Cincinnati	96	None	†	†
Colorado	38	None	†	†
Average	73	— 2	52½	25½

†Not reported.

Production

STEEL production was off 2 points to 73 per cent last week, due mainly to furnaces being taken off for repairs. Details follow:

Wheeling—Off 3 points to 92 per cent, with 34 out of 37 open-hearth furnaces in production, compared with 35 the preceding week.

Detroit — Unchanged at 100 per cent based on operations in all 21 basic open-hearth furnaces.

Pittsburgh—Down 7 points to 70 per cent, due entirely to a ten-point drop in the operations of United States Steel Corp. subsidiaries which declined to 65 per cent. The average for the independents holds unchanged at about 80 per cent, with Jones & Laughlin Steel Corp. operating at 73 per cent. Forty-one out of 60 steelworks blast furnaces are active. Carnegie-Illinois has 18 of 32 on; Jones & Laughlin, all 11; National Tube, 3 of 4; Pittsburgh Steel, 2 of 2; and American Steel & Wire and Pittsburgh Crucible Steel, each 1 of 2. At Johnstown, Pa., Bethlehem has 5 of 7 stacks in blast.

Buffalo—Continued at 84 per cent with 31 open hearths on. Heavy bookings for the next five or six weeks assure operations at or near this level.

Cincinnati—Remained at practical capacity, with an occasional dip in rating because of necessary furnace repairs. All production of the 23 open hearths is for light rolled materials.

Chicago—Down to 74½ per cent, a decrease of 1½ points. Production at some mills has been restricted by the necessity of closing furnaces for repairs. Blast furnace schedules are unchanged, 25 of 38 stacks being active.

New England—A fractional decline brought the rate down to 75 per cent. It is estimated that this rate will hold steady this week.

Colorado—Unchanged at 38 per cent, for the third consecutive week, with six furnaces operating.

Central eastern seaboard—Off ½ point to 48 per cent with little early variation expected.

Birmingham—Down 2½ points to 61½ per cent as one less furnace in the district was melting. The rail mill which will resume operation next week will step operations up to about 71 per cent.

Youngstown—Declined 1 point to 77 per cent, due largely to several furnaces being down for repairs.

Cleveland-Lorain — Held at 79½ per cent with 31 out of 39 furnaces melting. Of this total, Corrigan, McKinney division of Republic Steel Corp. continues with 12 on, Otis Steel Co., with 8 and National Tube Co. at Lorain with 11.

SEPTEMBER SHEET OUTPUT UP

Daily average sheet sales in September, as reported by the National Association of Flat Rolled Steel Manufacturers, Pittsburgh, amounted to 8519 net tons, compared with 6926 tons in August. Production averaged 7124 tons, against 6749 tons in August, while shipments were 6810 tons in September and 6572 tons in August. Totals for September: Sales 255,557 tons; production, 213,706 tons; shipments, 204,285 tons.

Total sheet capacity in the United States for September was approximately 500,000 tons, and capacity on which the association's figures are based was 304,000 tons.

Russia Decides to Make Direct Sales Negotiations

Negotiations for the sale of products to the Russian government in the future must be carried on directly with the Soviet agency making the inquiry, rather than through the Amtorg Trading Corp., commercial agency in America for the U. S. S. R. In addition to the revision of policy, payments for goods no longer will be made through Amtorg, but directly from Moscow through a New York bank, and within 45 days after the necessary shipping documents have been obtained. Manufacturers who wish to sell to Russia may contact through Amtorg special delegations here to purchase.

Carnegie Refuses Outside Mediation

FOLLOWING upon Carnegie-Illinois Steel Corp. management's recognition of a central council of 18 to represent the company's 399 elected employe representatives, the small group made formal request for outside arbitrators to determine the company's ability to pay higher wages.

The management refused the request on the basis that such arbitrators might disclose the company's private business affairs to competitors and the general public. However, it made it plain late last week that this refusal did not set up a bar against an early wage increase.

A member of the central council was quoted as saying that Arthur H. Young, vice president and personnel director of the United States Steel Corp., informed the council that an increase "at this time" was impossible. According to these reports Mr. Young was asked whether an increase could be expected before Christmas, and Mr. Young replied: "I sincerely hope so."

While some premature reports referred to a "compromise" on the wage question, which the management denied, the central committee continued to conduct closed meetings. In accordance with the employe representation plan it is necessary for the employes themselves to vote the approval of the central committee. To do so, an amendment must be passed upon, and the council is understood to be pressing for early action.

Bar Iron Mill Wages Are Raised 2 Per Cent

Puddlers and bar mill workmen have been granted a wage advance of 25 cents a ton, amounting to 2.11 per cent, through the bimonthly wage settlement between the Western Bar Iron association and Amalgamated Association of Iron, Steel and Tin Workers.

The settlement disclosed a card rate for the November-December period of 2.05c on the boiling, bar and 12-inch mills, and 2.15c on the 10-inch mills. The new rate entitles puddlers to $12.05 a ton, which is about equivalent to a day's wage. This is an advance of 25 cents a ton over the former rate of 2.00c, or $11.80 a ton.

It is the first advance for bar mill workmen since January-February, 1935. At that time they were granted an advance of 5 per cent on the card rate. This is the first time, also, that the puddlers have worked on a 2.05c card rate since the May-June period, 1925. Under the sliding scale arrangement prevailing that year the rate of 2.05c entitled the puddlers to $11.63 a ton. Today's card rate, therefore, entitles the puddlers to an increase of 42 cents over early 1925.

General Committee Plan Voted by J & L Workers

Jones & Laughlin Steel Corp. employe representatives have approved the formation of a general committee of representatives, consisting of five members each from the Aliquippa, Pa., and Pittsburgh works. They state that the purpose of this committee is to bargain collectively with the general officials of the corporation, a move somewhat similar to the formation of a central governing committee by Carnegie-Illinois Steel Corp. employe representatives recently.

The Jones & Laughlin management, however, has not ratified this action of the employes. As in the case of the formation of the Carnegie-Illinois Steel Corp. central committee, such a revision involves a change in the entire employe representation plan and approval must be voted upon by employes.

Workers' Families Invited Into Carnegie-Illinois Plants

Tours of one and a half hours, accompanied by guides and explanatory pamphlets, were offered last week to families of Carnegie-Illinois Steel Corp. workers at Pittsburgh, marking the first time in its history that the Carnegie management has thrown open the doors of its plants in the Pittsburgh district to the general public.

"The families of our employes had never seen the mill in all its 63 years of operation," said F. F. Slick, Edgar Thomson works superintendent. "We want everybody in town to know what goes on inside the gates. We think it will help them, and help us through better understanding of what a steel man's life is like."

Similar inspections were held at Duquesne, Clairton and other divisions.

Marting Furnace Sold

The Big Etna furnace of the Marting Iron & Steel Co., Ironton, O., with buildings, equipment and ore, has been sold to the American Rolling Mill Co. The furnace was constructed in 1872 and last operated in 1924. Stockholders of the Marting company, confirming the sale, were told the furnace will be razed. Real estate was reserved.

Railroads File Proposed Rates With Commission

The proposed readjustment in the railroad freight rate structure to take effect after the expiration of the present emergency surcharge rates Dec. 31, was filed last week with the interstate commerce commission. In their petition the roads do not ask immediate approval of the proposed changes, but merely request that prior orders issued by the commission be modified to give them an opportunity to bring the suggested revision to its consideration. It was said that the general level of the new rates will be somewhat lower than now in effect. For comparisons of the present and proposed rates affecting iron and steel and raw materials see STEEL, Oct. 19, page 19, and Oct. 12, page 32.

Extends Time for Answers In Patman Complaints

Last week the federal trade commission extended the time for answers to its first complaints of violation of the Robinson-Patman act. The answers were due Oct. 22, but in the case of the Kraft-Phenix Cheese Corp., Chicago, the extension was granted to Nov. 10; in the case of Montgomery Ward & Co., Chicago, and Bird & Son Inc., East Walpole, Mass., to Oct. 29. No answer had been received from the Shefford Cheese Co. Inc., Syracuse, N. Y., but the commission said that if a communication was mailed by midnight Oct. 22 it would meet with its time requirements. These complaints were filed Oct. 2. (STEEL, Oct. 5, page 16).

Tennessee Company Orders Coke Ovens

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., subsidiary of United States Steel Corp., has placed an order for two batteries of coke ovens with the Koppers Co., Pittsburgh, in line with the expansion program as announced recently (STEEL, Oct. 19, p. 15). The units, each of 73 ovens, will be built at Birmingham, and will be of new low differential type according to Becker design, equipped with self-sealing doors and all accessories of the latest design.

Distributors Discuss New Laws, Trade Practices

TRADE practices in the steel distribution field came in for searching discussion at meetings of the National Association of Sheet Metal Distributors and the National Wholesale Hardware association in Atlantic City last week.

Measures were proposed to check the indiscriminate sale of galvanized sheet seconds without proper identification marking; to promote greater stability in the distributors' market for conductor pipe and eaves trough, and various other refinements in trade practice.

The Wholesale Hardware association conducted a "management clinic," in several sessions, covering a score of subjects. New business legislation was prominent in the discussions of both groups.

It was stated that the Robinson-Patman act will have no effect on the jobbers' functional differential, and that the Walsh-Healey law will not have any important repercussions in the trade.

The Sheet Metal association will resume its former schedule of annual meetings in the spring. Its next meeting will be in Cleveland in May, the first spring meeting since 1932. The association will continue to hold fall meetings in conjunction with the National Wholesale Hardware association. Election of officers was postponed until spring. Meanwhile, A. W. Howe, of the J. M. & L. A. Osborn Co., Cleveland, will continue as president.

Flays Government Waste

A convention highlight for many was a vigorous attack by former Comptroller General McCarl on waste in government. He called for the replacement of many persons in high office by men truly committed to economy and to "tried principles of government."

With the national debt now running up to $35,000,000,000, and an annual carrying charge of close to $1,000,000,000, the government, he said, has shown no evidence of retrenchment, or intention to do so. Meeting claims that the country is rich and can well afford such expenditures, Mr. McCarl asserted that the value of the assets of a nation depends upon the financial stability of its government, and this lack of stability makes the country's present indebtedness a matter of concern.

He condemned the government's constant interference with business and its "Santa Claus system of trying to run everything from Washington."

Declaring that the indiscriminate sale of galvanized seconds without proper identification is demoralizing the legitimate warehouse schedule for prime sheets in some districts, F. J. McNeive, F. W. Potts & Co., Philadelphia, chairman of the galvanized and black sheets and corrugated roofing committee, proposed that producers identify prime sheets with stencil. He suggested that the top or outside sheet be stenciled where the material is in bundle sizes, and each individual sheet where heavy gage stock is ordered.

He also pointed out that the distributor of hot-rolled annealed sheets is finding his market increasingly curtailed by the influx of cold-rolled seconds. He said he realized that the large increase in continuous sheet tonnage may be a contributing factor, and that the old-line sheet metal houses may have to adjust themselves accordingly.

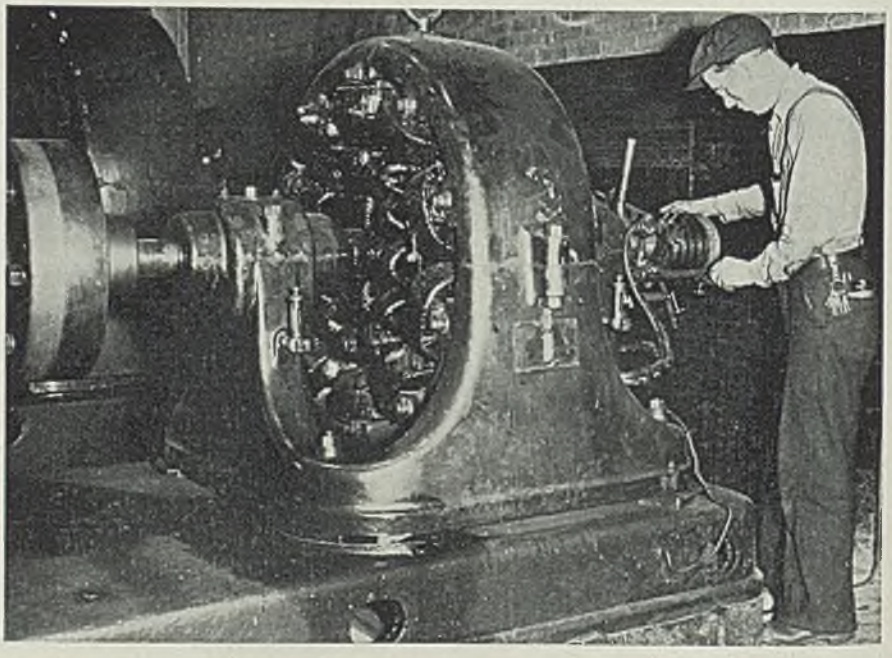
Sentiment among members with respect to mill differentials on galvanized flat sheets, galvanized roofing and hot-rolled black annealed sheets was sounded out by questionnaire, the results of which Mr. McNeive presented. The questionnaire referred particularly to the $2 differential allowed the distributor on flat galvanized, and the $4 and $2 differential granted on galvanized roofing in conjunction with the item and quantity extras now charged; and also to the item extras on black sheets.

Extras Found Helpful

In reply to one question relating to galvanized flat sheets, as to whether the establishment of the present quantity and item extras has been helpful, 33 of the 40 who responded, answered in the affirmative and seven in the negative. Question No. 2, to determine if the establishment of present quantity and items extras has brought any noticeable increase in direct mill shipments, resulted in 37 replies in the negative and three in the affirmative.

To the question as to whether a continuance of the present differential now granted by the mills is favored, 38 replied in the affirmative and two in the negative. To the question as to whether galvanized seconds were being distributed to

Steel Mill Generator in Service 41 Years



UNDAUNTED by the floods of last spring, this sturdy old Westinghouse generator, which is believed to be the first of the alternating current polyphase type ever installed in a steel mill, is still humming along in the Edgar Thomson works of the Carnegie-Illinois Steel Corp., at Braddock, Pa. Placed in service about 1895, it powered Tesla induction motors and lighted several of the steel company houses in Braddock, including Charles M. Schwab's. Its field coils have been changed only a few times since then and the armature has been rewound only three times

any extent eight replied in the affirmative and 32 negative.

Thirty-six members declared that the present differentials of $4 on galvanized roofing, 26 gage and lighter, and $2 on 24 gage and heavier were satisfactory; four said they were not. On the next question, as to whether the mills were confining the extension of the present differential to legitimate distributors in the respective territories, 26 replied in the affirmative and 14 in the negative.

On the subject of black sheets, the question was asked whether the present schedule of quantity and item extras was proving helpful, and to this 26 replied "yes," and nine "no."

Mr. McNeive explained that in the tabulation of votes in favor of present differentials on galvanized flat and roofing sheets, the committee considered all as being in the affirmative who expressed themselves as favoring a differential, even though they were not in favor of the amount allowed; this also applied to the method of recording answers to the question on quantity and item extras. In the main, more than 80 per cent of the membership were strongly in favor of the present schedules, the committee concluded.

Seek More Stable Market

An increase of 25 per cent in roofing terne business among members caused the committee on this product to suggest a resolution recommending that manufacturers advertise the product more actively. The committee, through its chairman, O. F. Murphy, Lyon Conklin & Co., Baltimore, also recommended that a differential be adopted by manufacturers of terne plate for less than carlot business, to afford better protection to jobbers.

E. H. Hoffeld, Ferdinand Dieckmann Co., Cincinnati, chairman of the committee on eaves trough and conductor pipe, declared that these products are rapidly becoming mill products, and recommended that the market for them be established by the mills. He asserted that these products were in the same category with sheets, and that the mills should set the market at the same time they establish prices on sheets.

This, he said, should develop a stable minimum market for jobbers and correct the evil of pipe and trough being offered at times for less per pound than the cost of the sheets from which they were made.

Concern over the possible growth of consumer co-operatives through federal aid was expressed by L. M. Stratton, Stratton-Warren Hardware Co., Memphis, Tenn., president of the National Wholesale Hardware association. It constituted a threat to the wholesale field, he said.

Discussing the new taxes on undistributed profits, George A. Fernley, secretary and treasurer of the two associations, told jobbers it would be necessary for them to gage their profits and take whatever dividend action may seem desirable so that dividends will be in the hands of stockholders not later than Dec. 31. He also advised jobbers in making their calculations for deducting the fixed percentage from their employes' incomes under the social security act to make sure that salaries and expenses of each employe are kept separately; otherwise, he said, the percentage deduction would be based on the total amount.

Steel Earnings Statements

WHILE Republic Steel Corp.'s official report of earnings for the third quarter will not be issued for several days, filing of a registration statement with the Securities and Exchange commission last week revealed that the corporation's net income for the nine months this year was $6,333,649, equivalent after dividend requirements on preferred to $1.10 a common share. Net in the comparable period last year was $3,264,295.

Republic proposes to issue bonds for $25,000,000 for plant betterment and equipment "when, as and if it seems advisable," but details have not been disclosed. Additional finishing facilities are being considered, and also improvements to coke ovens and blast furnaces.

Sharon Steel Corp., Sharon. Pa., has third quarter net profit of $342,418, equal after dividend requirements on the $5 convertible preferred stock to 79 cents per common share. This compares with $268,336 or 59 cents a share in second quarter of this year. For nine months ended Sept. 30, indicated net profit was $823,370.

Cleveland-Cliffs Iron Co., Cleveland, reports net increase of $1,437,757 for the third quater, and net income for the nine months of this year $2,022,196. E. B. Green, president, stated that since the third quarter is the only one wholly within the ore shipping season it is generally better from an earnings standpoint than any other.

Midland Steel Products Co. reports for the first nine months of 1936 net profit of $1,299,657, after all charges including reserves for employes' profit sharing in the amount of $151,086, but before provision for federal surtax on undistributed earnings. This compares with $743,311 for the first nine months of 1935.

Interlake Iron Corp., Chicago, for the quarter ended Sept. 30, has net profit of $99,311, or 5 cents a capital share, against net loss of $48,978 in the preceding quarter and net loss of $259,493 in September quarter last year.

M. A. Hanna Co., Cleveland, reports for the quarter ended Sept. 30 a net profit of $614,419, equal after dividend requirements on preferred stock to 44 cents a common share. This compares with $474,054, or 30 cents a share, in the preceding quarter, and $402,393, or 20 cents a common share, in the corresponding quarter of 1935. Nine months earnings were $1,518,845, compared with $1,351,214 in the like period last year.

Gulf States Steel, Birmingham, Ala., reports for the quarter ended Sept. 30, net profit of $201,314, against profit of $110,545 in the preceding quarter and $58,433 in the September quarter last year. No mention was made in the report of any provision for surtaxes and undistributed profits. The nine months earnings were $408,788, against $21,919 in the like period last year.

Optional provisional to use $1,500,000 of a $7,000,000 bond offering for improvement to its Gadsden, Ala., plant is made in a registration statement filed with the SEC. It is reported, unofficially, that the company is considering installing a tin plate mill.

Acme Steel Co., Chicago, reports for the quarter ended Sept. 30, net profit of $538,847, equal to $1.64 per share on 328,108 shares of capital stock. This compares with $513,774, or $1.57 a share, in preceding quarter, and with $384,479 or $1.17 a share in September quarter last year. For nine months ended Sept. 30 the company had profit of $1,444,474 against $1,319,817 in the same period last year.

Doehler Die Casting Co., Toledo, O., reports for the nine months ended Sept. 30, net profit of $710,552. This is equal, after dividend requirements on the 20,000 preferred shares and 7980 preference shares, to $2.98 a share on 206,195 shares of no par common. In the like period last year net profit of $499,345, equal to $1.95 a share, was reported.

Eaton Mfg. Co., Cleveland. reports net income of $501,431 for the third quarter, after all charges except surtax on undistributed profits, against $223,917 for the similar quarter last year. Total earnings on same basis for the nine months are $1,836,716, or $2.63 a share on 696,146 shares, compared with $1,265,877, or $1.82 a share on 694,244 shares in 1935.

Men of Industry

J. R. PATTERSON, formerly general manager of sales, has been made vice president in charge of sales for the Mackintosh-Hemphill Co., Pittsburgh.

F. C. T. Daniels, identified with the company for a number of years in engineering capacities, has been named vice president in charge of research and development.

C. Howard Paul, assistant treasurer, has been named assistant to the president. Mr. Paul retains his former position of assistant treasurer.

♦ ♦ ♦

H. A. Brassert, of H. A. Brassert & Co., Chicago, has sailed for a business trip to Europe.

♦ ♦ ♦

M. W. North, formerly connected with the Simplex Products Co., has been made office manager of the Pyrometer Service & Supply Corp., Cleveland.

♦ ♦ ♦

Harry Wilson Jr. has been appointed to the newly created position of works manager of Jessop Steel Co., Washington, Pa. Mr. Wilson has been with the company since 1906.

♦ ♦ ♦

J. E. Littleton has been appointed district representative in the Columbus, O., territory for the Peninsular Steel Co., Cleveland, maker of tool, die, cold drawn and high speed steels.

♦ ♦ ♦

W. J. Austin, president, Austin Co., Cleveland, industrial engineer and builder, sailed Oct. 21 for England where he will survey recent developments in the British motion picture and aviation industries.

♦ ♦ ♦

L. N. McDonald, general superintendent of the Youngstown, O., works of Carnegie-Illinois Steel Corp., is convalescing at his home in that city. He was at the Mayo clinic in Rochester, Minn., several weeks.

♦ ♦ ♦

Maurice B. Hull, formerly an executive in the tractor works of the International Harvester Co., Milwaukee, has been promoted to general superintendent of the new International tractor works, established at Neuss, Germany.

♦ ♦ ♦

Charles G. Thoma has joined the staff of Sheldon, Morse, Hutchins & Easton Inc., New York, advertising and public relations counsel. He formerly was advertising and sales promotion manager for Firth-Sterling Steel Co., McKeesport, Pa.

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Franklin R. Hoadley has resigned as vice president of the Farrel-Birmingham Co., Ansonia, Conn., to become president of the Atwood Machine Co., Stonington, Conn. He will continue his present duties at Ansonia until Jan. 1. He is vice president of the National Founders association, and past president of the Gray Iron Founders' society.

J. R. Patterson

F. C. T. Daniels

C. Howard Paul

♦ ♦ ♦

Timothy Burns, general manager of Bethlehem Steel Co.'s Lackawanna works, sailed Oct. 14 for Nassau, B. I., to remain during the winter months. Mr. Burns was stricken with a heart attack six months ago and has since been relieved from active duties.

♦ ♦ ♦

Theodore N. Pickering has been appointed manager of the Batavia, N. Y., plants of the Doehler Die Casting Co., Toledo, O., succeeding the late Charles I. Hodgson. Mr. Pickering has been in the company's employ for the past eight years, in sales and executive duties.

♦ ♦ ♦

Arthur J. Tuscany, of Tuscany, Turner & Associates, Cleveland, which firm engages in trade association organization and management problems, has been elected to a three-year term as director of the American Trade Association Executives.

♦ ♦ ♦

L. E. Geohegan, vice president and general manager, Gulf States Steel Co., Birmingham, Ala., will be the principal speaker and guest of honor at the annual meeting of the southern chapter of the Institute of Scrap Iron and Steel, at a dinner to be held at the Tutwiler hotel, Birmingham, Oct. 28.

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Roy A. Kropp has been elected president of the Kropp Forge Co., to succeed Charles A. Kropp, who has resigned. Charles Kropp will continue his active connection with the company as chairman of the board. Roy Kropp represents the third generation of the Kropp family to follow the forging business.

♦ ♦ ♦

Scott Follansbee has been named Cleveland district sales manager of Follansbee Bros. Co., succeeding Harold L. Dublin, who has joined the Cleveland office of Jones & Laughlin Steel Corp. Mr. Follansbee formerly represented the Follansbee company at Cleveland.

♦ ♦ ♦

James Y. Scott, general manager, Van Norman Machine Tool Co., Springfield, Mass., has been named executive vice president and treasurer, in addition to his present duties. Mr. Scott has been associated with the company for over 20 years. Leo F. Hunderup has been made assistant general manager.

♦ ♦ ♦

P. L. Bellaschi, section engineer, insulation development, whose headquarters are in the Sharon, Pa., works of the Westinghouse Electric Mfg. Co., was awarded the order of merit by Chairman A. W. Robertson, for work in lightning research which involved the development of micro-second switch that

permits the creation of laboratory lightning with all the elements of natural lightning. Others who received the award were A. C. Farmer, assistant manager of sales, and Edward Sloss, works instructor.

♦ ♦ ♦

Prof. Elihu Thomson was honored Oct. 16, when the Detroit section of the American Welding society dedicated its program to the fiftieth anniversary of one of his greatest inventions, that of resistance welding. Professor Thomson is one of the co-founders of the General Electric Co., Schenectady, N. Y.

♦ ♦ ♦

C. R. Messinger, president and chairman of the board, Oliver Farm Equipment Co., Chicago, has been elected president of the Farm Equipment institute. H. C. Merritt, Allis-Chalmers Mfg. Co., Milwaukee has been elected chairman of the executive committee, and R. A. Jones, of Chicago, has been elected secretary.

♦ ♦ ♦

William B. Terbeek, formerly with the shop engineering division of the White Motor Co. and later with the Great Lakes Aircraft Corp., Cleveland, as general factory superintendent, is now associated with the Cleveland Duplex Machinery Co. Inc., Cleveland, as sales engineer, specializing in production machine tools and allied equipment.

♦ ♦ ♦

L. Douglas Smith, who as noted in STEEL Oct. 19, page 23, has resigned as president of the Lewis Foundry & Machine Co., Pittsburgh, to become general manager of sales of the McKeesport Tin Plate Co., McKeesport, Pa., will retain his post as vice president of the Union Steel Casting Co., and as president of the Groveton Land Co., both subsidiaries of the Blaw-Knox Co., of which he is a director.

♦ ♦ ♦

Homer Addams, president, Fitzgibbons Boiler Co., New York, has been elected president of the Steel Heating Boiler institute, Middletown, Pa. Other officers elected at the annual meeting of the institute in Cleveland, Oct. 6, are: Vice presidents, C. N. Tull, president, Spencer Heater Co., Williamsport, Pa., and J. F. Johnston, president, Johnston Bros. Inc., Ferrysburg, Mich.; secretary and treasurer, R. A. Locke, Middletown, Pa.

♦ ♦ ♦

Frank Schubert, who for the past three years has been assistant to the president of the Bearings Co. of America, Lancaster, Pa., has become associated with the management of the Houde Engineering Corp., a division of Houdaille-Hershey Co., Buffalo. Before joining the Bearings Co. of America, Mr. Schubert was consulting engineer and works manager in charge of planning, equipping and operating the First State Anti-Friction Bearing Plant, Moscow, Russia.

♦ ♦ ♦

William C. Snyder Jr. has been elected vice president and manager of roll sales of the Lewis Foundry & Machine Co., Pittsburgh. Shortly after his college career, he went to work for the Wheeling Mold & Foundry Co., Wheeling, W. Va., and in 1927 he joined the Lewis company as metallurgist and rollmaker.

Frank O. Leitzell has been elected vice president in charge of machinery sales of Lewis Foundry & Machine Co. He became affiliated with Blaw-Knox Co., of which the Lewis company is a subsidiary, as an engineer-salesman in the sheet and tin mill specialties department in July, 1919.

R. E. Sturdy

Named general superintendent of the New Castle, Pa., works of Carnegie-Illinois Steel Corp., succeeding D. S. Pyle, as noted in STEEL, Oct. 5

♦ ♦ ♦

J. Thomas Barclay has been appointed chief metallurgist at the Vandergrift, Pa., works of Carnegie-Illinois Steel Corp. He has been employed at that division of the former American Sheet & Tin Plate Co. in the metallurgical department since 1912.

Edgar Marburg, metallurgist at the Vandergrift works, has been appointed assistant chief metallurgist. He was previously identified, prior to 1928, with the Aluminum Co. of America and Jones & Laughlin Steel Corp.

Saylor C. Snyder has been appointed chief inspector of the Vandergrift works. He has been identified with the division since 1928, previous to which he was employed by the Pittsburgh Electric Furnace Corp.

Died:

CHARLES H. VAN ALLEN, 61, assistant district manager of sales at Chicago for Pittsburgh Steel Co., in Chicago, Oct. 10. He had been affiliated with the company for over 25 years and was well known in railroad purchasing circles.

♦ ♦ ♦

Wilbur G. Bess, 54, general manager, Crescent Machine Co., Leetonia, O., in that city, Oct. 5.

♦ ♦ ♦

Charles S. Cameron, 80, vice president and director, Dominion Steel & Coal Corp. Ltd., in Montreal, Que., Oct. 14.

♦ ♦ ♦

Arthur Johnson, 73, president, William Johnson Inc., Newark, N. J., tool manufacturer, in Newark. Oct. 7.

♦ ♦ ♦

Charles W. Jones, 61, formerly purchasing agent, Bishop & Babcock Mfg. Co., Cleveland, in Waldron, Mich., Oct. 18.

♦ ♦ ♦

William T. Watkins, 76, chairman of the Joyce-Watkins Co., Chicago, and a pioneer in the railroad tie industry, in Marietta, O., Oct. 15.

♦ ♦ ♦

Theodore Kupfer Sr., 75, founder and president, Theodore Kupfer Foundry & Iron Works Inc., Madison, Wis., in that city, Oct. 11.

♦ ♦ ♦

Norman B. Chace, 68, who retired 10 years ago as president and general manager of the Fosdick Machine Tool Co., Cincinnati, at his home, in that city, Oct. 14.

♦ ♦ ♦

Elmer L. White, 75, one time treasurer for Standard Gas Heating & Ventilating Co. and Standard Underground Cable Co., both subsidiaries of Westinghouse Electric & Mfg. Co., at Pittsburgh, Oct. 17.

♦ ♦ ♦

George M. Wall, 66, former vice president and general manager of the Sheldon Axle & Spring Co. and a director of the Vulcan Iron Works, both of Wilkes-Barre, Pa., in that city. Oct. 13.

♦ ♦ ♦

Clinton F. Campbell, cost accountant for the Rotary Electric Steel Co., Detroit, and former vice president of the River Terminal Railway Co., a subsidiary of the former Corrigan, McKinney Steel Co., at his home in Cleveland, Oct. 20.

♦ ♦ ♦

Seth A. Crone, 77, founder and president, Buffalo Brake Beam Co., at Montclair, N. J., Oct. 16. He was president of the Acme Steel & Malleable Iron Co., Buffalo, and a director of Dominion Foundries & Steel Ltd.

Accuracy of Work with Minimum Spoilage is a natural order of things on Mult-Au-Matic Production.

This is so because of the Accuracy built into the machines themselves.

And besides—the human element of inaccuracy has been eliminated through design and automatic operation.

It, therefore, applies that alone through the Accuracy phase of manufacturing, the Bullard Mult-Au-Matic affords a means toward Improved Profits.

Bullard estimates on your work consider and assure machining Accuracy to your specified Standards.

Consider, Investigate, and Compare Mult-Au-Matics for your next order of plant Equipment.

◆

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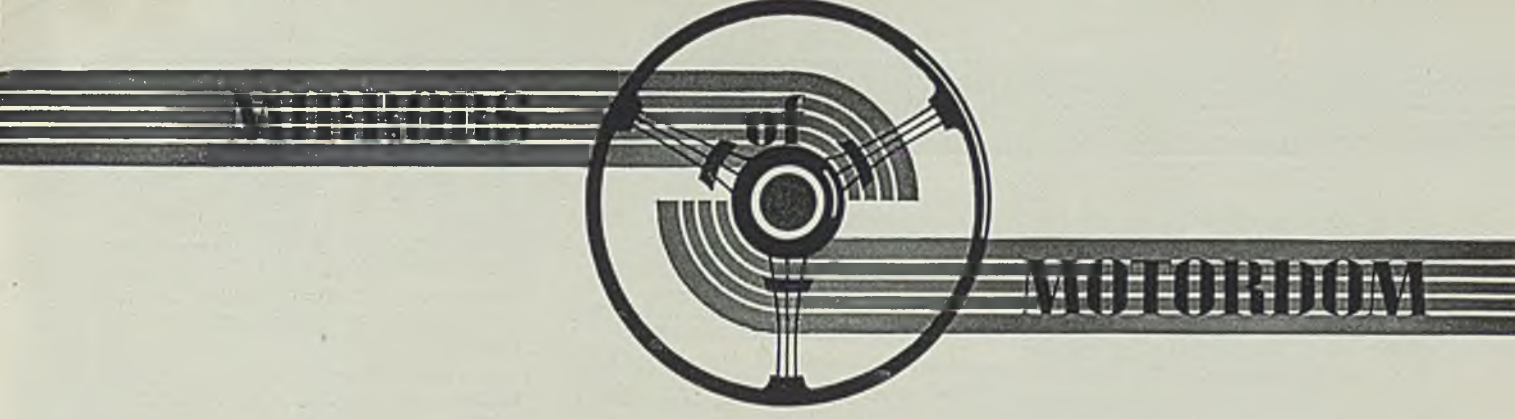


DETROIT

THE suspicion may be growing already, but when history is finally written, 1937's automobile models will go down in the books as attaining a peak in comfort for the rider.

Even ahead of faster motors, economy in operation, and a score of other sales clinchers used in other years, there will be a double check on the point that riding in a 1937 automobile is considerably less tiring.

In fact, the only tiring thing in connection with the new models may be the repetition that so-and-so "has brought out a car for 1937 that is longer, lower, roomier and more comfortable than ever before in its history."

The search for adjectives to describe these improvements has started automobile advertising writers combing their simile books and probably will result in a battle of words to get across the idea that riding contentment is 1937's three-starred feature.

Maybe the railroads in their campaign of "Take the train, it's safer" have had an indirect influence on the course of the automobile people. At any rate, features of the 1937 bodies are being emphasized over mechanical improvements. Fisher with its "Uni-Steel Body," Chrysler with its rubber float system of body mountings, Ford and its all-steel top, and so on, ad infinitum.

Hypoid Gears a Feature

Even those mechanical changes which have been adopted—and the outstanding one is hypoid gears—are secondary to the prime mover. Hypoids in the rear axle were taken on primarily to eliminate the driveshaft "tunnel" in the floor.

Hypoids permit dropping the car 2 to 3 inches closer to the road, giving that much more height in the body and more leg room. Some engineers say hypoids are quieter, but if they are it was a secondary consideration.

Briefly, this type of gear is nothing more than connecting the drive shaft to the rear axle at a lower point than we knew it before. The gear teeth mesh in the conventional manner, but simply lower than center.

Packard has had hypoid rear axle gears for a number of years. It has often been agreed that few engineering developments are inviolate in the motor world.

Studebaker in 1930 brought out free wheeling, which was quickly copied by almost all of its competitors, yet Studebaker did not retaliate by telling the world that it had free wheeling first. Cadillac introduced synchro-mesh transmissions in 1928. Buick sponsored four-wheel brakes in 1923. Fisher pioneered no-draft ventilation in 1933, and so on. There is no end to the individual mechanical developments that all of motordom soon picks up for its own.

Packard probably will not indulge in any self-glorification or crowing over the fact that it had hypoid gears first. The automobile industry's philosophy on this score is consistently meritorious.

Chrysler Juggles Names

The "Chrysler Royal" is the new name tagged to the low-priced Chrysler model which will be out formally just before the November show.

In name, it replaces the present Airstream models and continues with a six-cylinder motor on a 116-inch wheelbase. Since the Airstream will be dropped, those cars under the Chrysler name proper will be the Airflow, the Imperial Airflow and the Royal.

Chrysler phrases the advent of the Royal with: "We shall shortly invade the low-priced field with a big, roomy car that will set new Chrysler standards of performance, economy and comfort."

And thereby lies the virtual assurance that the lowest-priced Chrysler, soon to replace the Airstreams, will be less than an $805 list.

What effect this thrust at the price bracket tenanted already by Pontiac, Nash, Hudson and Olds (not to forget Brother Dodge) will have on an ambitious schedule of 600,000 Plymouths in 1937 is a matter of strong conjecture in Detroit today among those interested in Chrysler Corp.

Quite evidently, Chrysler is making a bold bid for a wide slice of what promises a 4,500,000-car year in 1937 and thinks the field can absorb more models, even though they are in price proximity.

At any rate, Chrysler will have the entire Jefferson avenue plant, out on the east side of Detroit next door to Hudson, to use for Royal production, as well as for the Imperial and Airflow. DeSoto now has its own home in the west end. In passing, they claim Chrysler dealer orders already amount to 11,000 on the new Royal.

Dodge put on another assembly line last week, simultaneously with the announcement of its 1937 models, and got up to just better than 6000 assemblies for the six days. The new Dodges are coming in ten body styles.

As with Plymouth, DeSoto and the Chrysler Royal, Dodge shows a family similarity. For instance, the new type "flush" instrument panel, with all panel knobs, levers and even the ignition key recessed or flush with the panel's surface, is common to all Chrysler Corp. models. This change, in the name of safety, is carried further into body hardware. Door handles are all redesigned to keep passengers' sleeves from entanglement.

Dodge Seeks Quiet Riding

The Dodge version of making the rider more comfortable by making the ride quiet centers around a system of rubber float body mountings. Rubber spools, placed at a number of points, prevent metal-to-metal contact between chassis and body.

Body sides and door panels are insulated with an asphalt material cemented to the metal. Heavy padding is used to insulate the roof, cowl and rear quarter panels. A gum material is used on the under side of the rear-deck lids.

All of these devices obviously are to cut off road noises. They say that Plymouth and DeSoto both will have the same slant on insulating and will highlight a 14-point rubber-float body mounting.

The use of rubber between chassis and body is not surprising in coming from Chrysler Corp. It is evi-

dently a broadened application of "floating power" which Chrysler inaugurated a few years ago through rubber mounting the motor.

Yet the idea for bodies seems a major contribution to silent riding if it cuts down road noise and tire hum, or the telegraphing of sound up through the frame to the body. But, perhaps the big problem in time will be whether the rubber retains its "live" qualities. That point has been a question before motor makers in the past.

Just in case you haven't already heard or guessed, hypoid rear axle gears are standard, as they are in DeSoto and Plymouth. In Dodge, the result (along with a 48½-inch width in the rear and a front seat 47 inches wide) is more height in the body.

Motor Set Farther Forward

The Dodge motor is set farther forward so that the rear-seat passenger won't have to ride over the axle—another institutional point for Chrysler Corp. in 1937. Hydraulic shock absorbers, four in number, double acting both front and rear, are patterned along the type used in large transport airplanes.

Dodge springing includes semi-elliptical parts of "Amola" steel with a feature in the rolling of the spring eyes on the ends of the two top leaves. The second leaf is split in the center. Rear mounting of the left front spring acts as a kick shackle.

The house of Chrysler is somewhat divided on flat or coiled springs. Dodge, as related, has the flat type, whereas DeSoto may be expected to come out with coils at the front and leaf springs in the rear. Plymouth is an adherent to the flat type; the same with Chrysler models.

The Dodge motor is unchanged dimensionally. The 3½ x 4⅜-inch bore and stroke developing 87 horsepower is the same as in 1936.

Plymouth, which will be an inch shorter in wheelbase for 1937, or down to 112 inches, which is the same as the 1936 Ford V-8, is using considerable "Amola" steel in its hypoid rear axle for hard-wearing parts.

In fact, Harold Wills, who has worked for some months on steel specifications out at the Dodge plant for the entire Chrysler lines, is said to have made many changes in the steel Chrysler buys for the coming models. Most of the changes have been directed at parts subjected to constant wear.

DeSoto, which is going to a single-piece all-steel top for 1937, wouldn't like repeated emphasis to that part being all-steel, but the fact that the top is seamless is something new for them.

Presses Exert 1500 Tons Pressure

Formerly they had used a solid plate welded into the top, but are now taking a 69 x 144 and a 69 x 146-inch sheet (depending upon the model) and stamping the top out to take in everything from the front cowl back to the rear trunk.

Triple-action presses, 15 feet wide between uprights and with 1500-ton pressure, are stamping this part. The same will be true for Plymouth, where Briggs, which is making many of these parts, turns out a seamless top.

In Plymouth's case, the one-piece steel top replaces a welded unit of 1936 that does away with the necessity of an inset mesh. The Plymouth sheet size is 69 x 142 inches for the two and four-doors and 69 x 162 inches on the seven-passenger model.

Speaking of all-steel bodies brings up the fact that tool and die costs run considerably more in this instance than they do for combination bodies. To a certain extent this heavier charge is amortized by using the same body for all lines, or at least by making as many major stampings interchangeable as possible.

It's like waving a red flag in front of most motor makers to bring this subject up, though. Take the case of General Motors which for years has been battling the fact that many parts are interchangeable through their lines. Or witness how Olds meets the issue squarely and comes out for 1937 by stating "The Olds eight is definitely and unmistakably the Olds eight. Likewise the Olds six has been endowed with a separate individuality that cannot be confused with the Olds eight or any other car."

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

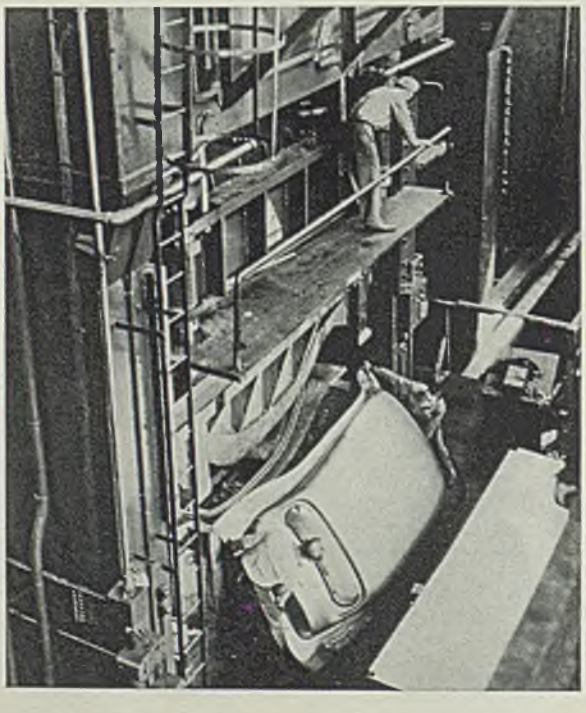
	1934	1935	1936
Jan.	155,666	289,728	364,004
Feb.	230,256	332,231	287,606
Mar.	338,434	425,913	420,971
Apr.	352,975	452,936	502,775
May	330,455	361,107	460,565
June	306,477	356,340	452,955
July	264,933	332,109	440,999
Aug.	234,811	237,400	271,291
Sept.	170,007	87,540	*119,073
9 mo.	2,384,014	2,875,304	3,320,239
Oct.	131,991	272,043	.....
Nov.	83,482	395,059	.....
Dec.	153,624	404,528	.....
Year	2,753,111	3,946,934	.....

Estimated by *Cram's Reports*

Week ended:

Oct. 3	22,800
Oct. 10	39,945
Oct. 17	48,195
Oct. 24	59,740

*Estimated.



ONE piece from cowl to rear trunk opening is this "Seamless Steel" top for the 1937 DeSoto, which is shown being removed from one of the powerful new presses, capable of exerting 3,000,000 pounds pressure. The tops are believed to be among the largest in the industry. The 69 x 146-inch sheets may be seen in the picture next to the workmen

Jack of one trade, and a master at it

★HOT *and* COLD ROLLED STRIP STEEL

Since 1897, West Leechburg has confined itself solely to the production of hot and cold-rolled strip steel of the very highest quality . . *dependable in delivery, exacting in detail.* We have the capacity to supply and satisfy *any demand, large or small.* We work with any steel, including all grades of Allegheny Stainless—to any size, from ½" to 24". For widths from 2½" to 8", we recently installed new equipment specially designed to produce long coils . less handling cost, less idle time for you. ● *Experience is a stern school, but it gets results!* Specify West Leechburg Strip, controlled for quality from open-hearth to finished product, backed by 40 years of "know-how"!

ALLEGHENY STEEL COMPANY - - - BRACKENRIDGE, PENNA.

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Warehouse Stocks carried by JOS. T. RYERSON & SON, INC., WAREHOUSES . . Union Hardware & Metal Co., Los Angeles . . . American Brass & Copper Co., San Francisco — Oakland

ALLEGHENY PRODUCTS: SHEETS FOR AUTOMOBILE BODIES, METALLIC FURNITURE, DEEP DRAWING; ALLEGHENY METAL, ALLEGHENY STAINLESS STEELS, ELECTRICAL SHEETS, STRIP STEEL, STEEL CASTINGS, SEAMLESS TUBING, BOILER TUBES, PIPE.

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/EST LEECHBURG . . . HEADQUARTERS FOR STRIP STEEL,

***including all grades of* ALLEGHENY STAINLESS**

Activities of Steel Users and Makers

STANDARD STEEL SPRING CO., with two plants at Coraopolis, Pa., and one at Racine, Wis., has bought the Gary Structural Steel Co. plant, Gary, Ind., as part of a general expansion program. Improving and enlarging of this plant to meet production needs of the new company were started many weeks before actual sale negotiations had been consummated. D. T. Gleason, vice president in charge of operations for the Standard company, will have charge of the new plant's operations. The new plant will make springs, but later on its operations will probably be extended to include production of bumpers. Steel flooring, principal product of the dissolved Gary company will continue to be manufactured under the new ownership, and Walter P. Ladd, president of the former Gary company, will supervise this production.

Standard Steel Spring Co. has called a special stockholders' meeting for Dec. 23 to vote on an increase in the authorized common stock from 100,000 shares to 300,000 shares, the additional stock to be used for the company's expansion program.

♦ ♦ ♦

Dearborn Chemical Co., Chicago, is completing an extension to its main manufacturing plant. This is the third major addition in 12 years and gives a 16 per cent increase in floor space, which will be utilized for the installation of new equipment and for a new modern machine shop.

♦ ♦ ♦

Wodack Electric Tool Corp., Chicago, has completed arrangements with the Climax Rock Drill & Engineering Works Ltd., 4 Broad street place, London, for the manufacture of Wodack portable electric tools in England. Distribution of the tools by the Climax organization will cover Great Britain and the British dominions, with the exception of Canada.

♦ ♦ ♦

Burden Iron Co., Troy, N. Y., is proceeding actively with its program of plant extension. All the old furnaces for the hand puddling of genuine wrought iron have been restarted and are now working on day and night shifts. Two new rolling mills have been installed, and other extensive plant alterations and additions are nearing completion.

♦ ♦ ♦

Oilgear Co., Milwaukee, maker of hydraulic machine tool feeds, broaching machines, etc., has a licensing agreement with Weatherlay Oilgear Co. Ltd., London, England, whereby it will supply primary equipment for manufacture of tools for the British market. This arrangement will enable Oilgear Co. to participate in foreign markets to a much greater extent than previously by direct export.

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Babcock & Wilcox Tube Co., Beaver Falls, Pa., announces changes in its representation in its southwestern sales territory, including the appointment of H. S. Dershimer as district sales manager at Tulsa, Okla., with offices in the Philtower building, and direct representation in Houston and Dallas, Tex. Dallas headquarters are at 728 Wilson building, in charge of Reid R. Lumsden, while Houston offices are at 1007 Electric building, in charge of O. E. Berg.

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Cutler-Hammer Inc., Milwaukee, maker of electric control apparatus, has established a new plant at 970 Folsom street, San Francisco. Special control constructions, dead front switchboards, panel boards, transformer cabinets and wiring troughs are being manufactured under the direction of R. R. Crooke, who has had over 30 years' experience in the production of this type of equipment. F. H. Oberschmidt is manager of the Pacific coast district.

♦ ♦ ♦

Western Malleables Inc., Beaver Dam, Wis., founded in 1892 as the Beaver Dam Malleable Iron Co., is planning to close its plant permanently and liquidate the business. Originally it specialized in railroad supplies but in more recent years it has handled contracts for castings from several large Detroit firms, including General Motors Corp. Transportation difficulties are said to have led to the loss of business to shops in closer proximity.

♦ ♦ ♦

Midwest Stamping & Enameling Co., Morrison, Ill., maker of refrigerator cabinets, display cases, sheet metal stampings and porcelain enamel products, has begun moving its equipment to Galesburg, Ill., where it will operate the plant formerly occupied by the Ingersoll Steel & Disc Co., now a division of Borg-Warner Corp. Over 100,000 square feet of floor space will be utilized at Galesburg and 400 or more employed. Officials state that moving will be completed by Jan. 1, 1937, and sufficient equipment has been purchased to permit operations in Galesburg before production ceases in Morrison. Work has also been started on three additions to the new Midwest factory. S. S. Battles is president of the company.

Convention Calendar

Oct. 29-30—Iron and Steel Institute (British). Special autumn meeting at Institution of Civil Engineers, London. K. Headlam-Morley, 28 Victoria street, London S. W. 1, is secretary.

Oct. 30-31—Foundry Practice conference. University of Iowa, Iowa City, Iowa. Sponsored by college of engineering. American Foundrymen's association Northern Iowa Foundrymen's association.

Nov. 18-19—National Founders' association. Fortieth annual meeting at Waldorf-Astoria hotel, New York. J. M. Taylor, 29 South LaSalle street, Chicago, is secretary.

Nov. 18-20—International Acetylene association. Thirty-seventh annual convention at Hotel Jefferson, St. Louis. H. F. Reinhard, 30 East Forty-second street, New York, is secretary.

Nov. 30-Dec. 4—American Society of Mechanical Engineers. Fifty-seventh annual meeting at Engineering Societies building, New York. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

Nov. 30-Dec. 5—National Exposition of Power and Mechanical Engineering. Thirteenth national exposition at Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, is manager.

Oct. 26-30—American Gas association. Annual convention and exhibit at Auditorium, Atlantic City, N. J. Kurwin R. Boyes, 420 Lexington avenue, New York, is secretary.

Oct. 26-27—Middle West Foreign Trade committee. Annual meeting at Cleveland hotel, Cleveland. Malcolm M. Stewart, Chamber of Commerce, Cincinnati, is chairman.

Nov. 10—Ohio Valley Improvement association. Annual meeting at Hotel Frederick, Huntington, W. Va. Lucilla Hock, 703 Chamber of Commerce building, Cincinnati, is executive assistant.

Nov. 11-12—Packaging Machinery Manufacturers' Institute. Annual meeting at Edgewater Beach hotel, Chicago. Helen L. Stratton, 342 Madison avenue, New York, is secretary.

Nov. 11-13—American Institute of Chemical Engineers. Annual meeting at Lord Baltimore hotel, Baltimore. Frederick J. LeMaistre, 808 Bellevue Court building, Philadelphia, is secretary.

Nov. 12-13—American Management association. Consumer and industrial marketing conference at Pennsylvania hotel, New York. Alvin E. Dodd, 330 West Forty-second street, New York, is president.

Nov. 12-13—Refrigerating Machinery association. Semiannual meeting at Congressional Country club, Washington. William B. Henderson, 915 Southern building, Washington, is executive vice president.

Nov. 18-20—National Foreign Trade council. Twenty-third annual convention at Stevens hotel, Chicago. Lindsay Crawford, 26 Beaver street, New York, is secretary.

Dec. 7-8—National Association of Manufacturers. Meeting of National Industrial council in New York. Noel Sargent, 11 West Forty-second street, New York, is secretary.

Dec. 9-10—National Association of Manufacturers. Annual meeting at Waldorf Astoria hotel, New York. Noel Sargent, 11 West Forty-second street, New York, is secretary.

WASHINGTON

THE love feast between the CIO and the executive council of the A. F. of L. apparently is stalemated. The peace negotiations between these two bodies have been difficult to follow during the past couple of weeks and there is every indication that the dove of peace has vanished—at least for the present.

After considerable correspondence between the A. F. of L. executive council and Max Zaritsky, president of the united hatters, cap and millinery workers in relation to the proposal for peace, John L. Lewis last week announced that further action would be withheld pending clarification by the council of its stand on the first point of the proposal. Having said this Lewis departed from Washington for some days.

Lewis Was Not Bluffing

In connection with repeated promises of William Green, his council finally did appoint a subcommittee to deal with Lewis consisting of Matthew Woll, Felix Knight and George M. Harrison, but no reference was made by Green to the first point, which involved lifting the suspension of the CIO unions. Of course, Lewis has contended that he would not consider any peace negotiations unless this suspension was lifted. Therefore the action of the A. F. of L. council was just so much bunk. That is, Green probably thought that Lewis was bluffing—but it is quite apparent he wasn't.

In discussing this matter last week Lewis said that "an analysis of the correspondence revealed that the executive council failed to advise of its action on point one of President Zaritsky's proposal. That first section deals with attendance of the suspended unions at the federation convention, which implies lifting of the suspension order.

"We do not know the attitude of the executive council on this point. It is vital and essential that we do. The CIO will withhold any further action on the proposition pending a clarification of this point by the executive council."

In the meantime, also, Philip Murray of the steel worker organizing committee went on the radio last week, talking for Major Berry's nonpartisan league and flaying Governor Landon as a puppet of the "economic royalists."

Among other things Murray said that the steel industry is now operating around 70 per cent of capacity; and that profits of 12 of the largest steel firms of the country increased 178 per cent for the first six months of this year, compared with the same period of last year. The policies of the Roosevelt administration were responsible for this improvement, he claimed.

"The steel that goes into railroads, farm machinery, construction, bridges, and automobiles, in large measure, is due to federal government expenditures," Murray said.

Says WPA Funds Helped

"Look at steel production," he declared. "In 1934 it increased 147 per cent over 1933, an increase of 600,000 tons. But 70 per cent of the increase resulted from purchases made by railroads with money loaned by the government. The federal government spent nine and a half million dollars for iron and steel products, exclusive of machinery, from July to December, 1935, with WPA funds."

Considerable interest and some concern is being shown here in connection with political activities of the labor unions—not only because of the so-called nonpartisan league of Major George L. Berry and his cohorts, but more recently because of the political analysis which was made public last week by the A. F. of L.

While no one has ever taken Major Berry seriously, either as a politician or for any other reason—it is true that John L. Lewis and other laborites are interested with the major in this alleged league.

Also there are many who have the feeling that the federation stepped outside its regular work in stating that President Roosevelt grades high as a labor ally.

Of course, the Berry league has come out unqualifiedly for the reelection of President Roosevelt. On the other hand the A. F. of L. committee which prepared the political analysis for that organization was headed by its president, William Green, and while he has several times stated that the federation is not in politics he has publicly announced that he would vote for Mr. Roosevelt.

Announcement was made here last week by Lewis that the CIO will hold a joint meeting in the Grant building, Pittsburgh, with the steel workers' organizing committee Nov. 9 and 10 to give special consideration to advancing the union organization campaigns in the steel, rubber and automobile industries.

AWAIT COURT RULING TO CLARIFY PATMAN MUDDLE

The fourth complaint under the Robinson-Patman act was issued last week by the federal trade commission, the administrative body. The complaint was against the United States Quarry Tile Co., Canton, O.

The commission charged that the company violated the law by discriminating in price between customers located in other states who are in competition with one another in the sale of tile to consumers. The company is alleged to have granted a 15 per cent discount to certain so-

called wholesalers, regardless of the quantity sold, which discount has not been made available to tile contractors, thus tending to injure, destroy or prevent competition by tile contractors with the so-called wholesalers who are, in fact, in many instances, acting as retailers by selling to the ultimate consumer.

Observers charged with watching developments are most anxious to get some kind of a court ruling on this law. Of course, they have nothing on commission officials. The latter are jittery about this law and, in fact, as already pointed out several times in these columns, officials of the commission do not agree about either the act itself or the way in which the commission has started to administer it. However, nothing but a court interpretation will settle the varying opinions both within and outside the commission.

NEW BRITISH IMPORT RULES TO HAVE LITTLE EFFECT

Word has been received by the department of commerce that a new licensing system for the importation of iron and steel into Great Britain will become effective Nov. 4.

While complete details are not available it is generally believed at the department that this new system will not materially affect American exports to Great Britain, inasmuch as they are of the cheaper grade of products and come within specific price ranges. It is believed here that the new order will have considerable effect on imports into Great Britain from some of the Continental countries.

The American commercial attache at London in this connection states that an "iron and steel import licensing system is effective Nov. 4. Quota certificate issued by the board of trade and certificate of origin issued by the iron and steel institute, any chamber of commerce, or British consul must be presented for customs clearance of each American quota shipment at the reduced duty of 20 per cent ad valorem; import of specified products in excess of quota or not accompanied by required documents, if within the quota, subect to the higher duties of 33 1/3 per cent ad valorem or varying specified rates."

ETHIOPIA VIEWED AS MARKET FOR STEEL AND MACHINERY

It is known here that at least one American firm has recently approached the Italian government seeking contracts for construction work in Ethiopia. The report is that the engineering company did not find conditions such as to interest it but that has led to speculation as to whether Ethiopia will be a possible market for American machinery and iron and steel.

This speculation has become rife in view of the repeated reports reaching here that Mussolini will send some 200,000 troops to Ethiopia for colonization purposes. It is pointed out by government officials that if that should be done it is certain that there will be need for irrigation machinery, farm implements, construction equipment, and an indeterminate amount of other machinery. Of course it has always been said that Italy would direct its principal exploitation work toward the development of available natural resources. The development of these resources, it is pointed out, will require a wide variety of machinery and equipment. It is believed that some of this, perhaps the bulk, will go direct from Italy, but it is thought that it is not unreasonable to assume that part of it will be purchased in this country.

Total exports from the United States to Ethiopia last year amounted to only $72,000, of which the largest part was for automobiles and other vehicles.

MORE TRADE AGREEMENTS ARE BEING CONSIDERED

No action by the administration in connection with the completion of further trade agreements has been taken for months. Word went out a long time ago that a soft pedal would be put on tariff matters until after the election. Now, however, with the election so near, government officials are becoming active again and it is expected here that as soon as the election is over that the government will proceed to negotiate further trade agreements.

No one doubts that American imports have risen more than exports in the trade with countries having trade treaties with this country. However, the contention of the administration is that no efficient industry has been substantially injured.

One of the countries with which the United States is anxious to negotiate a trade agreement is England and Secretary of Commerce Roper, who visited that country during the past summer, came back with the story that some British government officials with whom he talked unofficially, indicated they were anxious to make such an agreement.

Trade statistics comparisons for the first six months of 1935 with the same period of this year for the six countries with which we have concluded trade agreements show relatively more trade with those countries than American foreign commerce as a whole. However, the relative gain was confined almost entirely to imports.

The foreign policy association of Washington has recently concluded a study of this subject and says that "it is hardly necessary to state that the trade agreement program has not yet brought about profound economic changes in American life. Yet accomplishments under the program have not been inconsiderable. It is estimated that the United States has given assurances that it will retain on the free list roughly one-quarter of its non-dutiable imports. Approximately one-sixth of all American exports have received concessions. For the present, therefore, a term has been put to the steady whittling down of the free list and the general upward trend of duties in American post-war tariff and revenue acts."

NO PROFITS FROM WAR UNDER MUNITIONS PLAN

America must look to private industry for its munitions in a future war, according to Capt. W. D. Puleston, U. S. N., in an article in the official organ of the army ordnance association. "A sound munitions and shipbuilding industry," he declares, "is as essential to a modern state as is its army and navy."

Such supervision of industry as might be necessary would be exercised by a war industries board which would control factories, mines and plants, while leaving them under private management, according to Capt. Puleston. This board would derive its authority from the war-making powers of Congress but it would need the practically unanimous support of public opinion to become effective.

The government will also regulate industrial capital through a war finance board, control excess profits by taxation and prevent inflation by price fixing. These measures, the article says, "will insure that no capital is allowed to work in an unessential industry. In addition, by jut dicious use of an excess profits tax, the government can take the profit out of war. * * * On a given day, set by the President, the price structure of maximum prices would be frozen. * * * This would apply to the maximum prices; any economic influences that would tend to reduce these prices would be allowed to operate freely."

GERMANY ADMITS ALUMINUM FREE UNTIL APRIL, 1937

A German decree, effective Oct. 19, authorizes the minister of finance to admit aluminum in ingots, bars, pigs, grains or cast slabs, free of duty, until March 31, 1937, according to a cablegram received in the department of commerce from the acting commercial attache at Berlin.

The import duty on aluminum in the above forms is ordinarily 25 reichsmarks per 100 kilos, it was stated.

Editorial

Metal Industries Alert To New Opportunities

SOME evidence of the recovery that has come to the iron, steel and metalworking industries was discernible at the eighteenth annual National Metal congress and exposition in Cleveland last week.

More significant perhaps than the elaborate displays of materials and equipment was the renewed spirit of enthusiasm and confidence. It signified, clearly and foremost, a changed attitude toward the future; a transformation from hopeful waiting into action. These industries, it was apparent, see better prospects now than at any time in the last six years; they are preparing for the expansion to which business indicators point.

As for the exposition itself, the descriptive phrase generally heard among the many thousands of spectators was "the most beautiful metal show ever staged." Certainly it excelled in cleverness and brilliance anything heretofore attempted. It was the high-water mark of showmanship in steel; one of the greatest industrial exhibits ever staged.

Instead of the simple layouts of materials, on black velvet, and commonplace displays of machinery, characteristic of some expositions in the past, the show was spectacular with light, color, motion, and modernistic effects. Few of the more than 200 exhibits failed to attract and hold attention. There was nothing bizarre about the show, but "the goods" were set before the public to the best effect. These industries are learning more about how to dramatize their products and services.

Eliminating Crowds of Curious Reacts To Benefit of Both Exhibitors and Buyers

The large attendance was all the more notable in view of the fact that this year for the first time the number of visitors was purposely restricted by the issuance of invitation cards through the exhibitors. In this way, much of the commotion that results when crowds of merely curious persons swarm through the exhibition spaces was eliminated; it was a sellers' and buyers' mart.

All these indications of alert salesmanship on the part of the exhibitors were impressive, but probably more remarkable was the interest manifested in the technical sessions. As many as six meetings were in progress simultaneously, with attendance at some of them as high as 500. The fact that never before were such large groups assembled was heartening, for the papers and discussions arranged by the American Society for Metals, American Welding society, American Institute of Mining and Metallurgical Engineers, the Wire association and the American Society of Mechanical Engineers reached a new peak for diversity and value.

The National Metal congress is coming to be recognized as the foremost annual meeting of technical minds in this country. Each year the event expands in scope and contributions from all the leading research laboratories serve to stimulate thought and provoke discussions which eventually lead to noteworthy advances in the field of metals.

Numerous Reports of Research Projects Are True History of American Industrial Progress

So broad is the extent of the technical activities at these affairs that it is difficult if not impossible for a single observer to be in touch with all of them. But, generally speaking, it is possible to sense the far-reaching significance of the numerous reports of research projects being carried out in the nation's plants.

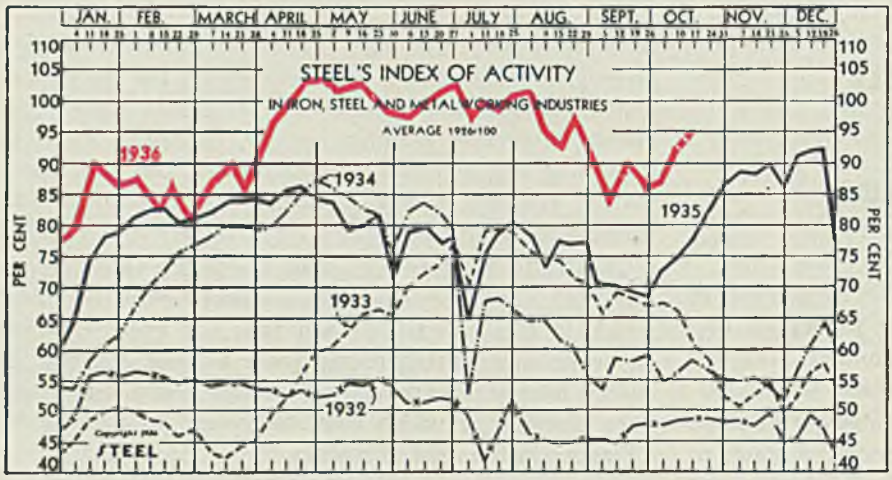
Whether it be the details of a new method for hardening steel or information on a new system of welding, these factual presentations pave the way for a better understanding of the properties and behavior of metals in service, which has the final result of supplying better products at lower cost to the buying public.

Only by listening to these ramified discussions is it possible to realize what the research worker in metals is giving to the world. The proceedings are a true history of industrial progress, reflecting the routine endeavors of hundreds of explorers in the practical and advanced phases of metals technology.

Proof was abundant that the $9,200,000 budgeted by major steelmakers this year for research would be a worthy investment toward improving the quality of the industry's products, lowering costs and finding new uses. Rapid strides in these directions are being made by the 2200 metallurgists, engineers, chemists and other technical experts devoting their time to this work.

A complaint frequently is heard that too many of the Metal congress papers are of the research or scientific type and too few are of the practical order. This may seem true, but it should be pointed out that papers of the latter class sometimes fail to meet the high standard for papers which has been established. Furthermore, research undoubtedly plays a more important part in the solution of practical problems than may be evident from cursory examination and, therefore, is more deserving of consideration.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries gained 2.1 points to 95.5 in the week ending October 17:*

Week ending	1936	1935	1934	1933
July 18	99.9	79.8	68.1	79.4
July 25	102.1	80.8	66.4	78.8
Aug. 1	102.5	78.4	64.8	75.9
Aug. 8	98.7	73.4	64.6	74.7
Aug. 15	92.6	77.5	61.4	74.2
Aug. 22	97.7	77.0	60.3	71.6
Aug. 29	94.0	77.3	55.1	70.3
Sept. 5	87.5	70.9	53.5	65.5
Sept. 12	83.1	70.1	58.7	69.1
Sept. 19	90.1	69.4	58.1	68.2
Sept. 26	86.2	68.5	59.3	66.9
Oct. 3	89.0	73.3	54.7	67.4
Oct. 10	93.4†	74.9	56.4	66.0
Oct. 17	95.5*	77.4	58.2	60.9

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Industrial Trend in October Ignores Election Factor

WHILE a week will elapse before the end of the month, the record to date indicates that October will rate as one of the best months of the year from the standpoint of balanced industrial activity.

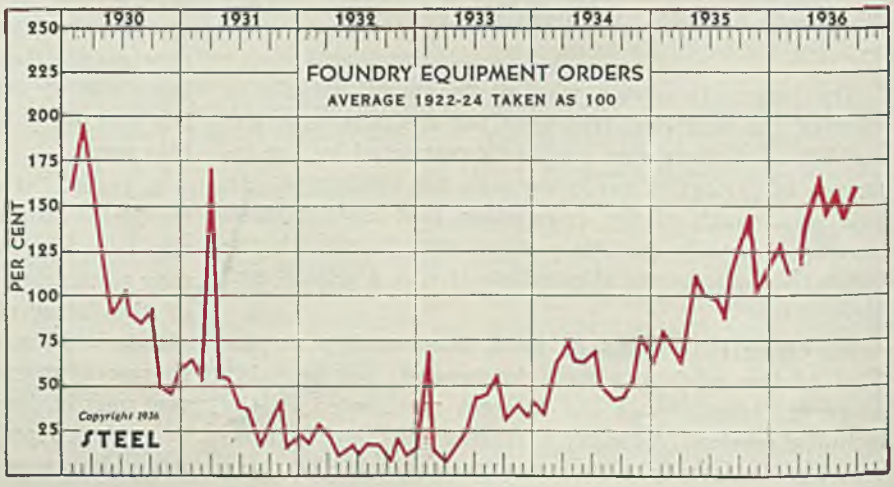
This is indicated clearly by the figures for electric power output and revenue freight car loadings, which reflect the activity of all industry more accurately than some of the barometers of more restricted significance.

Freight car loadings in October have remained comfortably above the 800,000 mark weekly. This is the most impressive showing since the fall of 1930, not only in point of traffic records for individual weeks but also for the sustained volume represented in the consecutive weeks of the current season. Electric power output, which for many weeks has continued at levels only fractionally below the all-time record, also reflects a well distributed rate of activity throughout industry.

Meanwhile, steelworks operations in October have been running at around 75 per cent of capacity, which rate is almost certain to result in a higher production of steel ingots in October than in any previous month of 1936.

However, the greatest impetus to balanced activity in the tenth month was furnished by the automobile industry. In the first three weeks, assemblies mounted from a season low point to nearly 50,000 weekly. Due in a large measure to gains in this barometer, STEEL'S index for the week ending Oct. 17 jumped to 95.5. A glance at the accompanying chart shows that the trend of the index is following closely the pattern traced in

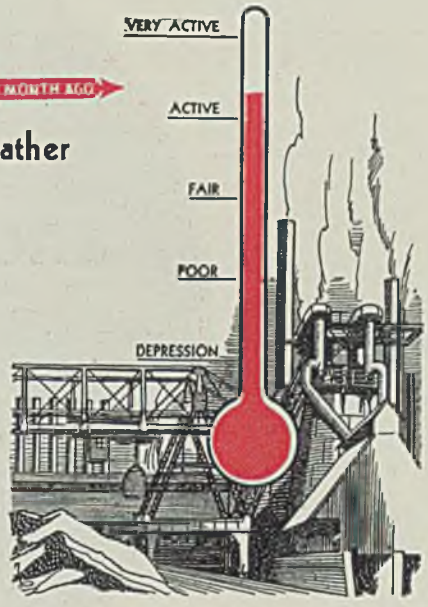
	Per Cent			
	1936	1935	1934	1933
Jan.	127.0	86.6	37.2	68.4
Feb.	110.4	75.7	65.8	16.1
March	115.0	69.4	75.4	9.8
April	134.0	113.2	67.9	19.4
May	165.4	100.7	66.5	25.6
June	141.4	100.2	70.4	45.5
July	159.6	94.0	50.7	48.8
Aug.	144.8	113.0	43.1	56.3
Sept.	161.0	128.5	46.4	34.9
Oct.	....	140.0	55.3	42.5
Nov.	....	100.4	80.4	36.6
Dec.	....	118.1	66.9	43.8



October, 1935, but, of course, at a higher level.

A significant aspect of business conditions in October is that not much tangible evidence of the influence of the election campaign has come to light. This is rather unusual, under the circumstances. Four years ago there was much talk about postponing business commitments until after the result of the election was known. This year comparatively little has been heard of hesitancy in this respect.

However, it is true that an undercurrent of uneasiness is beginning to manifest itself, but this probably is due more directly to anxiety over the tax prospect than to political considerations. The penalties on undistributed profits, the burden of the social security legislation, etc. are disturbing factors. When the report of the National Machine Tool Builders' association for September was released, showing a recession in machine tool orders after gains in 10 consecutive months, observers were quick to sense the possibility that this reversal may reflect a more cautious attitude among industrial executives fostered by concern over the impending tax situation.



Industrial Weather

TREND:
Steady

This point may be clarified before the end of the year. In the meantime, most authorities look for no marked change in the present rate of activity in the near future. Following on the heels of the national election, Nov. 3, will come the automobile shows which, as usual, should afford a good check on the attitude of the buying public.

This, undoubtedly, will be favorable. Combined with the present definite signs of shortages in certain materials, it should portend a strong position for industry throughout the remainder of 1936

Where Business Stands

Monthly Averages, 1935=100

	Sept., 1936	Aug., 1936	Sept., 1935
Steel Ingot Output	148.9	150.1	105.3
Pig Iron Output	157.6	151.6	102.3
Freight Movement	126.2	122.1	108.5
Building Construction	169.1	192.1	101.9
Automobile Production	35.9	79.0	27.3
Wholesale Prices	....	102.0	101.8

The Barometer of Business

Industrial Indicators

	Sept., 1936	Aug., 1936	Sept., 1935
Pig iron output (Daily average, tons)	90,942	87,475	59,009
Machine Tool Index	132.0	135.5	108.5
Finished Steel Shipments	961,803	923,703	619,933
Ingot output (Daily average, tons)	160,043	161,351	113,193
Dodge building awards in 37 states (sq. ft.)	35,448,000	40,285,100	21,365,700
Automobile output	*125,000	275,951	95,128
Coal output, tons	.....	32,818,000	24,886,000
Business failures; number	...	655	787
Business failures; liabilities	.....	$8,271,000	$17,002,000
Cement production, Bbls.	.....	12,535,000	7,173,000
Cotton consumption, bales	451,000	574,000	449,000
Car loadings (weekly aver.)	765,280	740,211	657,890

*Estimate.

Financial Indicators

	Sept., 1936	Aug., 1936	Sept., 1935
25 Industrial stocks	$222.14	$221.36	$183.21
25 Rail stocks	44.15	41.45	28.37
40 Bonds	88.95	83.74	81.97
Bank clearings (000 omit.)	.....	21,269,000	20,979,895
Commercial paper rate (N. Y., per cent)	¾	¾	¾
*Commercial loans (000 omitted)	8,753,000	8,454,000	7,512,000
Federal Reserve ratio, per cent	79.5	79.4	75.2
Railroad earnings†	64,680,717	61,773,765	42,074,108
Stock sales, N. Y. stock exchange	.....	26,564,032	34,748,340
Bond sales, par value	.....	$215,242,300	$250,189,800

*Leading member banks Federal Reserve System.
†August, July and August respectively.

Foreign Trade

	Sept., 1936	Aug., 1936	Sept., 1935
Exports	.....	$178,249,000	$195,537,000
Imports	.....	195,016,000	168,689,000
Gold exports	.....	32,000,000	86,000,000
Gold imports	.....	67,524,000	156,895,000

Commodity Prices

	Sept., 1936	Aug., 1936	Sept., 1935
STEEL's composite average of 25 iron and steel prices	$34.15	$33.88	$32.82
Bradstreet's index	....	10.19	10.17
Wheat, cash (bushel)	1.28	1.25	1.07
Corn, cash (bushel)	1.26	1.27	1.03
Petroleum, crude (Bbl.)	1.08	1.08	98c

Development and Metallurgy of Manganese Alloy Steels

AN ALLOY steel may be defined as one which contains one or more elements other than carbon and iron, purposely added in sufficient proportions to modify and improve substantially one or more of its useful properties.

Something like 30 years elapsed between the patenting of manganese steel and the time when alloy steels became established industrial materials. During the past 15 years, however, their influence has revolutionized engineering practice. Estimates indicate about 5,000,000 tons of alloy steel is produced annually throughout the world.

Alloys have given industry the hard-wearing toughness of manganese steel; the great strength at high temperatures and corrosion resisting qualities of the nickel-chromium alloys; and the special steels which made possible the automobile, the airplane, the high-speed steam turbine, and streamlined train.

The importance of alloy steels lies not only in special mechanical and physical properties, but also in the conservation of iron. The annual wastage of iron and steel by corrosion alone is placed at one third of the world's yearly production of pig iron—about 24,000,000 tons.

While there are thousands of possible combinations or alloys of iron and other elements, only 10 or 12 other elements are used commonly for the composition of alloy steels. These are manganese, nickel, chromium, silicon, molybdenum, tungsten, copper, cobalt, vanadium, aluminum, titanium and zirconium. Ordinary carbon steels, under modern methods, are so conditioned by heat treatment as to perform functions for which, 10 years ago, they were not suitable, but in most cases an alloy steel, even a relatively costly one, properly selected and treated, will show a superior performance at a lower final cost.

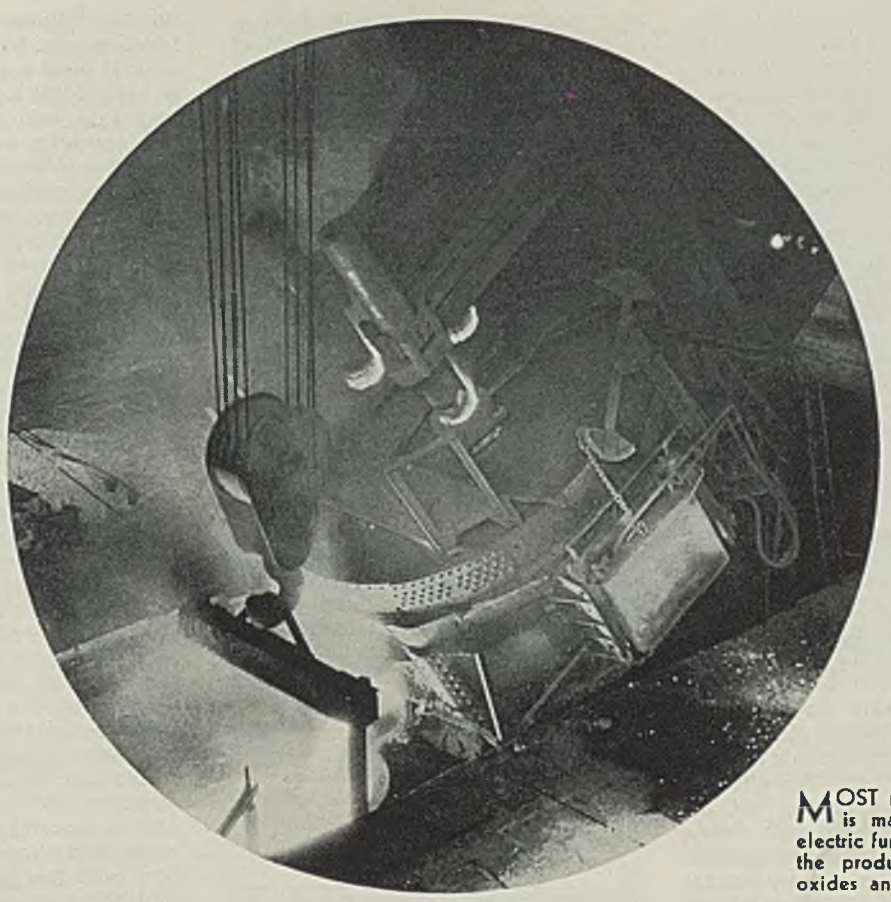
Manganese has been known from early times. The metal was isolated first in 1774, and is now usually prepared as ferromanganese by reduction in the blast furnace or electric furnace of mixed ores of iron and manganese. The principal sources of high-grade ores are India, Brazil, West Africa and the Caucasus. Probably more ferromanganese is smelted in the United States, chiefly from imported ores, than in any other country.

In modern tonnage steels, manganese is used as a deoxidizer, desulphurizer and alloy, and there is probably not a ton of such steels made today which does not contain manganese as the result of its introduction as an inexpensive agent for cleansing the melt of such impurities as would decrease the strength and ductility of the finished steel.

In the generally accepted sense, manganese steel describes an alloy of iron containing 10 to 14 per cent of manganese, and 1 to 1.4 per cent of carbon. The original patents covering such alloys ranged from 7 to 30 per cent of manganese, but only those between the limits of 10 to 14 per cent having the characteristic toughness, strength and work-hardening capacity associated with the name, are produced commercially.

This early alloy steel was discovered by Robert A. Hadfield, who as a young man was assisting his father in the management of his steelworks in Sheffield, England, in 1882. He wished to produce a steel that would possess both hardness and toughness (with its use for tramcar wheels particularly in mind), seemingly difficult combination to bring about because hard-

Prepared with collaboration of metallurgical department, American Manganese Steel Co., Chicago Heights, Ill.



MOST manganese steel today is made in the basic-lined electric furnace, since this enables the producer to keep sulphur, oxides and gases at a minimum

ness implies brittleness and toughness is accompanied by softness in ordinary metals.

There is an early reference (by Rinman in 1774) to a forerunner of austenitic manganese steel, wherein it was observed that the white brittle metal resulting from the combination of pig iron and manganese oxide was a nonmagnetic iron. About 1830, David Mushet (who also evolved a self-hardening tool steel patented in 1886) prepared alloys containing up to 30 per cent manganese, using manganese and iron oxide, cast iron, charcoal and flux. Some of these products were also nonmagnetic, but he missed the result of Hadfield by reason of a much too high carbon content. Later investigations, particularly in France and Germany, showed steels containing much over 1 per cent manganese were brittle, including an alloy with 11 per cent manganese content. Here, too, the excessive carbon content was responsible for the adverse results.

It was found by Hadfield that ingots containing 3 to 4 per cent manganese when forged gave a brittle compound as expected; but that in the case of 10 to 12 per cent, the material was hard, and yet comparatively tough, bending considerably in the forged bar. Water quenching the 3 to 4 per cent manganese material, then tried, did not change its brittleness, while the bars of 10 to 12 per cent, quenched from a high temperature, bent double when cold.

The first manganese steel castings in America were made in 1892 and since then the production has grown from a small tonnage of light castings, to the yearly total of perhaps 100,000 tons of castings, forgings and rolled products combined, ranging in size from chain pins weighing a few ounces, to dredge tumblers, pump shells and crusher heads weighing as much as 30,000 pounds each.

Early Production Processes

Until 1919 most manganese steel was made by mixing molten soft converter steel with separately melted ferromanganese. Low - phosphorus pig iron and steel scrap were melted in a cupola and blown in a bessemer converter. Ferromanganese, melted in crucibles or special furnaces, was mixed in a ladle with the purified soft steel in the proportions to approximate the correct analysis of manganese steel. This process is still used, but for the last 15 years most manganese steel has been produced in the electric arc furnace.

Distinctive characteristics of manganese steel are explained clearly by the microscope. In the as-cast state, the metal is composed of austenite and free cementite or carbides. The austenite is a solid solution of iron, manganese, and carbides of iron and manganese. Free cementite is hard and brittle, and when present at the grain boundaries of austenite, makes the casting likewise brittle. Heating the steel at about 1850 degrees Fahr. causes the austenite to absorb the free carbides into solid solution, which can be retained by rapid quenching in cold water, unless the metal section is too thick or the carbon content too high, in which cases some carbide separation will take place.

Manganese steel has a low heat and electrical conductivity, a low melting point, a high shrinkage from molten to solid (about 5/16-inch to a foot), and is nonmagnetic. It is characterized by a rather high tensile strength, a low yield point, great ductility and high impact strength. Rolling or forging may increase the tensile strength by about 20 per cent.

The great ductility allows the metal to peen or flow readily under impact, but the flow sets and hardens under repeated blows. This fact accounts both for the wear resistance of manganese steel and the difficulty encountered in cutting it with tools.

The most important factors that determine the life of a casting are wear and breakage. The first fac-

tor, wear, is a function only of the surface of the steel and nothing is gained by having a great hardness in the body metal. As a manganese steel casting goes into service, it is tough throughout. The surface hardness is not high (around 200 brinell), but under repeated impact or heavy pressure, it increases on the cold worked area to as high as 500 brinell. This induced wear hardness is continuously self-renewing, and the hard surface, of course, is supported by a tough backing not found in other alloy steels which are hard throughout the section. The degree to which this work hardening takes place is peculiar to austenitic manganese steel.

The second factor, breakage, involves the body metal and has to do only with strength and toughness. As we term toughness in describing the performance of manganese steel, it is the general ability to yield or deform under stress or impact without abrupt failure.

An instance of the value of the ductility or moderate flowing tendency in manganese steel is in its use for sheaves or pulleys operated with wire rope. The sheave groove instead of breaking off in splinters under pressure and wear, takes on instead a glass-like polish. This means that the groove wears out slowly and no metal particles imbed themselves between the rope strands to cut them away.

Most manganese steel today is made in the basic lined electric furnace, sometimes largely of manganese steel scrap but usually from a cold charge of low-phosphorus steel scrap and manganese steel scrap to which ferromanganese is added after melting.

The electric furnace with a basic lining enables the producer of manganese steel to keep sulphur, oxides and gases to a minimum. This purity of metal is brought about by the ability of the operator to control the conditions within the furnace at will. By making an oxidizing slag with ore, lime, etc., the steel can be exposed to an oxidizing condition. Then, since the furnace atmosphere can be made almost neutral, or nonoxidizing, by changing this slag to one of lime and silica and adding deoxidizers, such as powdered coke and ferrosilicon, conditions can be made as reducing as necessary. Moreover, the high temperature attainable makes possible the melting of slags composed of silicate of lime and free from metallic oxides—such slags deoxidize and desulphurize the steel almost completely.

The electric furnace can melt manganese steel scrap without much loss of manganese. It yields a metal of high quality which will run the lightest sections easily. The furnace can be run intermittently, since it need not be kept continuously hot. Skill and experience in the operators, high quality of materials, and specially adapted methods are essential to successful production of good manganese steel.

The furnace is thickly lined in the lower part with basic refractories inside the steel shell. A magnesite bottom is fused in and the walls are of magnesite brick in iron cases, the iron, of course, melting off and fusing with the brick. The roof is of silica brick.

When a heat has just been tapped and the furnace tilted back to vertical, a few shovels of granulated magnesite are thrown in on the white hot bottom to patch eroded spots, the melting stock is charged and the current turned on. The temperature of the furnace finally reaches about 3000 degrees Fahr., and the time of the melt is from 2 to 3 hours. After the melting has proceeded to a certain point—determined by preliminary chemical analyses and the practical experience of the operator—ferrosilicon is added for deoxidizing, and lime is supplied for a protective covering and to assist in removing the common impurities. At this point, 80 per cent ferromanganese is added, which has the double effect of removing oxides and of supplying the proper amount of metallic manganese.

When the heat is finished the entire furnace, electrodes and all, re-

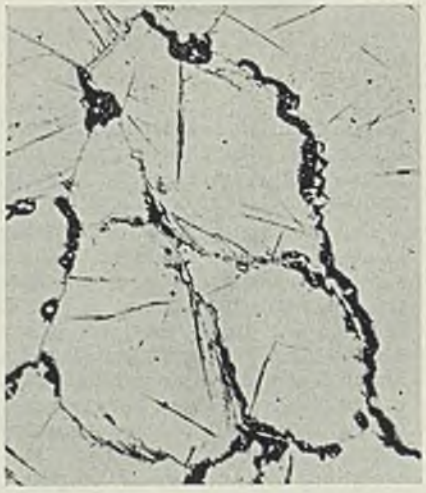


FIG. 1 (right)—Photomicrograph of manganese steel as cast. Fig. 2 (below, left) Same steel after heat treatment at 1850 degrees Fahr. and quenching

FIG. 3 (below, center) Austenitic steel reheated to 900 degrees Fahr. for two hours. Fig. 4 (below, right) Same steel reheated to 1000 degrees Fahr. for two hours

volves over a forward pit, and the liquid steel flows into a ladle suspended from a traveling crane. When the slag has been skimmed off, the hot metal is ready for the molds.

Accompanying photomicrographs show structural changes in manganese steel after different heat treatments, as they appear at 250 diameters magnification.

Fig. 1 shows manganese steel as in a casting slowly cooled in the mold from the liquid state. Notice the network of free or undissolved carbides, giving a nonuniform structure, making the steel as brittle as cast iron.

Fig. 2 shows the same steel after the casting has been held at 1850 degrees Fahr. for 1 hour and quenched in cold water. This high-temperature soaking has caused all carbides to be dissolved, and the rapid cooling has retained this uniform structure at normal temperatures. Such is the microstructure of a good manganese steel casting ready for service. *Slow cooling* from this high temperature, or *reheating after* this heat treatment will cause these dissolved carbides to reprecipitate. This will result in brittleness, since only manganese steel with a uniform austenitic structure possesses toughness and resistance to wear and impact.

Fig. 3 reheated to 900 degrees Fahr., and Fig. 4 to 1000 degrees Fahr. show how the tough, uniform structure of manganese steel breaks down more and more under increasingly higher temperatures. Even the amount of carbide separation occurring at 900 degrees Fahr. will cause brittleness.

Nickel Simplifies Treatment

By the addition of 3 to 5 per cent nickel to the standard manganese steel formula, it becomes possible to omit the quenching on thin sections, a simple normalizing being all the heat treatment required. Because of the added expense of the mix, however, nickel-manganese steel is only made when the casting is to be used at temperatures higher than 500 degrees Fahr.

A well-equipped manganese steel machine shop is able, by reason of special machines, to do with grinding wheels practically all varieties of precision work done on more easily worked metals with ordinary machines and steel tools. Boring, planing, keyway cutting, finishing and the like are done within small tolerances. In such equipment as centrifugal dredge pumps, crane wheels, gears and sheaves, manganese steel castings can be furnished ground to a precise fit. Where tooling must be done, it can be accomplished by the use of inserted carbide tools with heavy rigid equipment and a slow shallow feed.

The development of manganese steel for trackwork to its present state of almost universal adoption for the heaviest service was accomplished only through much experimental work and profiting by experience in its use. The first application in a large way of manganese steel trackwork was made in the United States in 1894 on street railways and in 1901 on steam roads.

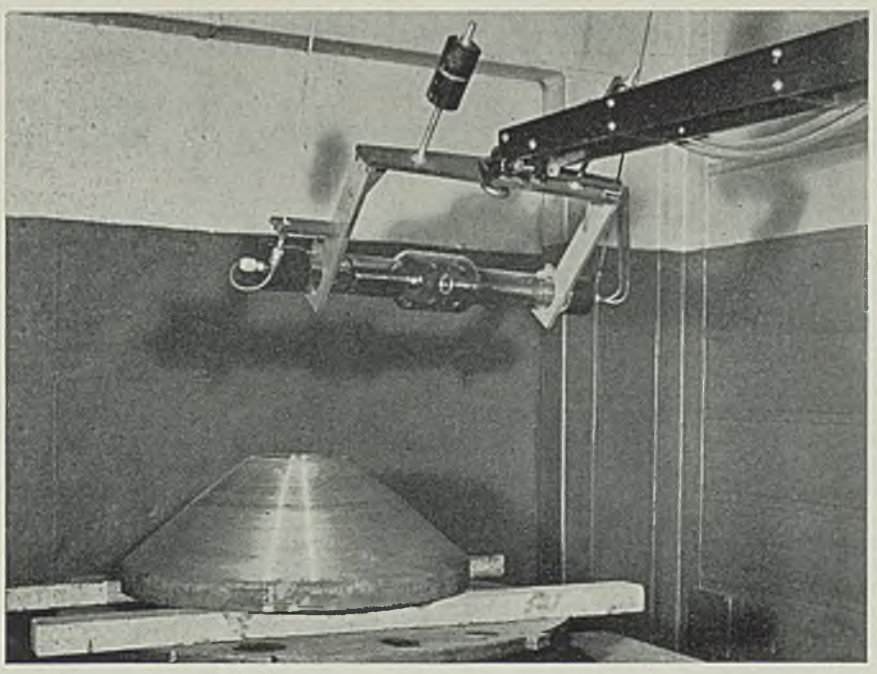
Use of manganese steel in trackwork has demonstrated not only increased economy, but also a higher degree of safety. The disadvantages and even danger in any complicated work from irregular wear of the members receiving variable thrusts, dictate the use of a tough, work-hardening metal where excessive wear takes place. Manganese steel construction in frogs, crossings, switch points and guard rails is standard practice among the railroads for heavy service.

Wearing parts of crushers require a wear and shock resistant metal of high quality. Manganese steel has proved to be well adapted for this purpose.

Manufacturers of power shovels and dipper dredges have been making manganese steel dippers and other parts a feature of their standard equipment. The application of manganese steel to the wearing parts of these machines has aided in the solution of the problems of continuous operation.

Among other industries using considerable quantities of manganese steel castings are blast furnace, brick, cement, contracting, clay mining, dredging, foundry, glass, gold mining, iron mining, lead mining, lumber, rolling mill, oil well, quarry, railroad and sand and gravel.

The chief disadvantage of the Hadfield composition of manganese steel relates to its welding properties, which are affected by its instability under heating. Welding standard manganese steel, using a rod of the same material, inevitably involves overheating of the adjacent parent metal and the heating to an undesirable intermediate temperature of the metal for some distance surrounding the weld. Even with the best practice such welds necessitate a complete re-heat treatment of the entire part, and occasionally break out.



ARRANGEMENT of X-ray equipment used in determining soundness of manganese steel casting

Develop New Welding Rod

To solve this problem a welding electrode of the nickel-manganese composition was developed which can be used satisfactorily not only on castings of the same material, but also on castings of standard manganese steel. Advantages of the nickel-manganese rod are:

1. Reliable welds can be made consistently with proper technique.
2. When this rod is melted in the air and applied to ferrous parts, the deposit shows essential properties of standard heat treated manganese steel.
3. The nickel content inhibits embrittlement under slow cooling. No quenching is necessary.

Producers of manganese steel confine their welding mostly to the routine filling-up of surface defects in new castings with the nickel-manganese steel weld metal. Users, however, employ a substantial tonnage annually in building up worn castings, both manganese steel and carbon steel; and for repairing fractured manganese steel parts.

Four New Alloy Steel Specifications Developed and Approved by A.S.T.M.

AT THE recent meeting of committee E-10 on standards of the American Society for Testing Materials, 260 South Broad street, Philadelphia, there were approved for publication as tentative a number of new specifications recommended by A. S. T. M. committees functioning in the ferrous metals field. Committee E-10 has the power of acting for the society in the intervals between annual meetings in approving for publication as tentative new specifications which may be recommended by the standing committees, and also of approving publication of revisions in existing standards.

Four of the new specifications were developed and approved by committee A-1 on steel. These cover high-strength rivet steel (A 195), seamless steel boiler tubes and superheater tubes for high-pressure service (A 192), alloy-steel bolting materials for high pressure at temperatures up to 1100 degrees Fahr. (A 193), and nuts and bolts for high-pressure and high-temperature service to 1100 degrees Fahr. (A 194).

Committee Meets Demand

In recommending the high-strength rivet steel specifications the society's steel committee is meeting persistent demands for an authoritative specification for this material to provide for the economical use for high-strength structural steel. The steel covered is, with proper riveting technique, suitable for use with structural silicon steel and equivalent steels. The steel provided for in the specification is a carbon-manganese-silicon type with carbon on ladle analysis not over 0.30 per cent, manganese not over 1.65 and silicon not over 0.25.

The tentative specifications provide that if it is desired to obtain the physical properties by the addition of alloying elements other than silicon or manganese the composition is to be agreed upon between the manufacturer and the purchaser. The physical properties required are a tensile strength range of 70,000-85,000 pounds per square inch; a minimum yield point of half the tensile strength, but in no case less than 38,000 pounds per square inch; and a minimum elongation in 8 inches of 1,600,000 ÷ tensile strength, but in no case less than 20 per cent. Two tension tests are required from each melt unless the finished material from a melt is less than 30 tons when one tension test is specified. One upsetting test is to be made from each size rolled from each melt.

The new specifications covering seamless steel boiler tubes provide for more rigorous and more numerous tests than in the existing standard covering lap-welded and seamless steel and lap-welded iron boiler tubes. The specifications cover boiler tubes and super heater tubes 2 inches in outside diameter or larger and heavier than 0.203-inch minimum wall thickness.

The new specifications for steel nuts cover five grades of nut material for services varying in degree of severity: Two grades for respective service under the least exacting and most severe conditions, with three classes for use between these two extremes. The chemical requirements provide for carbon steel for the first four grades and the chemistry for the grade for most severe service covers a 4-6 per cent chromium steel with the permissible addition of molybdenum or tungsten. Other types of alloy steel with their appropriate heat treatments approved by the purchaser may be submitted under this class. Three types of tests are provided: Brinell hardness, drift and stripping tests.

The new alloy-steel bolting material specifications for high-pressure and high-temperature service cover five classes of materials: A, B, C, D and E, class E being an austenitic steel. The minimum tensile strength, after final heat treatment, for bolting materials 2½ inches in diameter and under, ranges from 95,000 pounds per square inch for class A to 135,000 pounds per square inch for class D.

Selection Made from Five Steels

While the composition of the steel is to be agreed upon by the manufacturer and the purchaser, it may be selected from five steels listed in the body of the specifications which provide definite compositions. These steels are of the following types: Nickel-chromium-molybdenum, 4-6 per cent chromium, chromium-molybdenum, tungsten-chromium-vanadium, and tungsten-chromium. The committee has included in an appendix data relative to the chemical and physical properties of several alloy steel bolting materials in addition to those given in the body of the specifications. The data given are tentative and the committee plans to revise them or add to them from time to time.

A. S. T. M. committee E-3 on chemical analysis of metals which was organized in 1935 to take over and co-ordinate work formerly in the charge of the "A" and "B" groups of standing committees presented proposed tentative methods of chemical analysis of steel, cast iron, open-hearth iron and wrought iron. These revised methods which are based on the experience of the members of the committee replace the former standard methods covering chemical analysis of plain carbon steel, analysis of alloy steels, methods of sampling rolled and forged steel products for check analysis, and sampling and chemical analysis of pig and cast iron. At the same time, the committee recommended that 14 existing A. S. T. M. standards covering methods of chemical analysis of nonferrous metals and alloys and ferroalloys should be reverted to the tentative status since committee E-3 is working on revised methods.

New Monograph Presents Iron-Carbon Alloy Data

Alloys of Iron and Carbon, by Samuel Epstein; cloth, 476 pages, 6 x 9 inches; published by McGraw-Hill Book Co., New York; supplied by STEEL, Cleveland, for $5, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

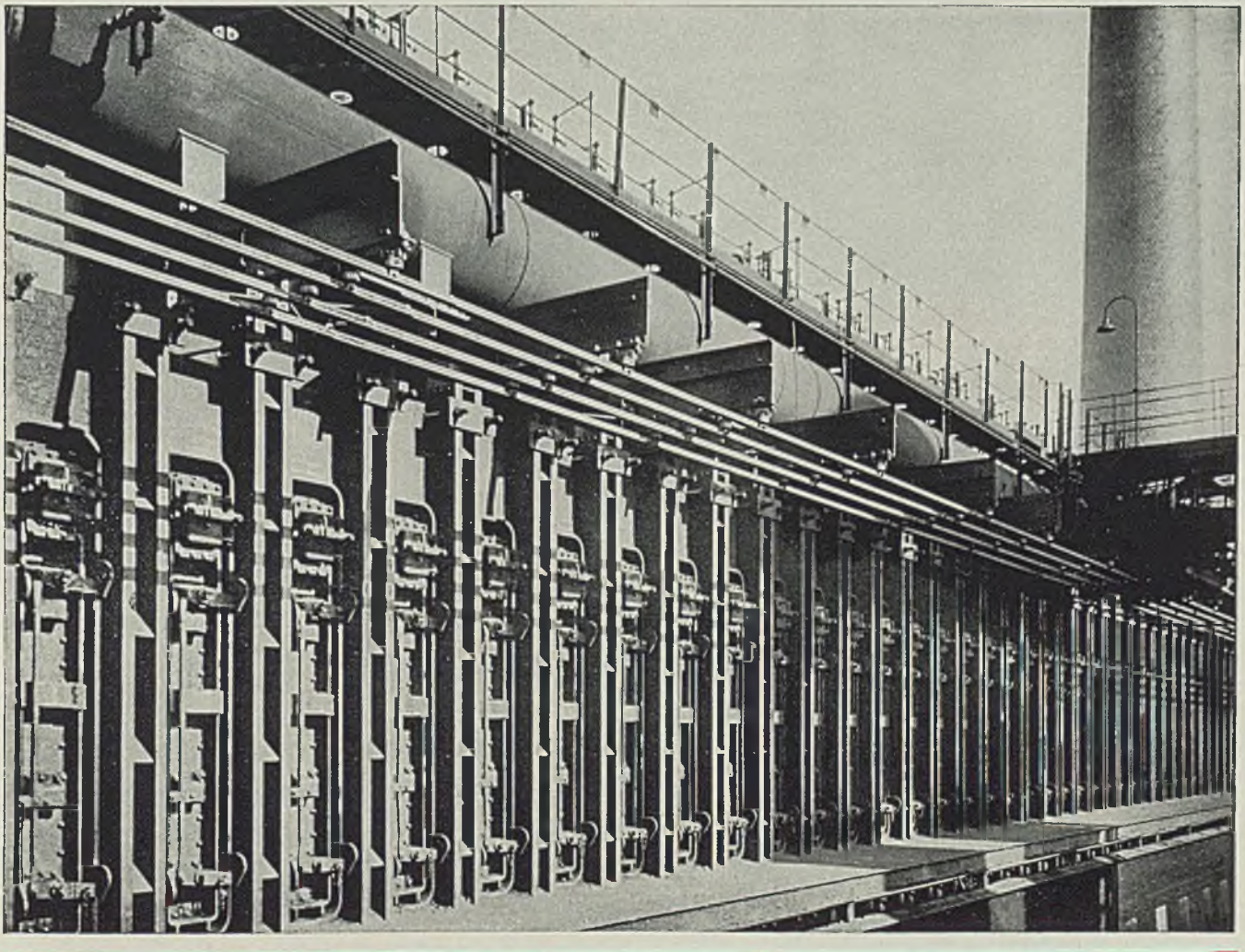
This is part of the monograph series on alloys of iron and is volume one, dealing with constitution of the alloys. It will be followed by another volume on properties of the alloys. It is the seventh in order of publication, of this series. It is designed as a correlation and critical summary of the world's knowledge on iron-carbon alloys. It was found impossible to place the large mass of material in a single volume hence the division.

Commercial iron-carbon alloys, the so-called plain carbon steels and cast irons, are the most important single group of metallic materials known and make up most of the metals used. They are important not only as industrial materials but also because the increasingly useful alloy steels are eventually carbon steels modified by addition of one or more alloying elements other than carbon.

The present volume contains less factual data and more theoretical discussion than others in this series and many interesting theories are under discussion as to the constitution of the alloys.

The author believes this volume will offer further approach toward solution of some of the puzzling questions that have not been fully answered in past experience.

BECKER TYPE LOW DIFFERENTIAL BY-PRODUCT COKE OVENS



KOPPERS OFFERS:

BECKER OVEN PLANTS . . . GAS PRODUCERS . . . WATER GAS PLANTS . . . LIQUID PURIFICATION PLANTS . . . PHENOL REMOVAL PLANTS . . . MATERIAL HANDLING PLANTS . . . BY-PRODUCT EQUIPMENT . . . BENZOL PLANTS . . .

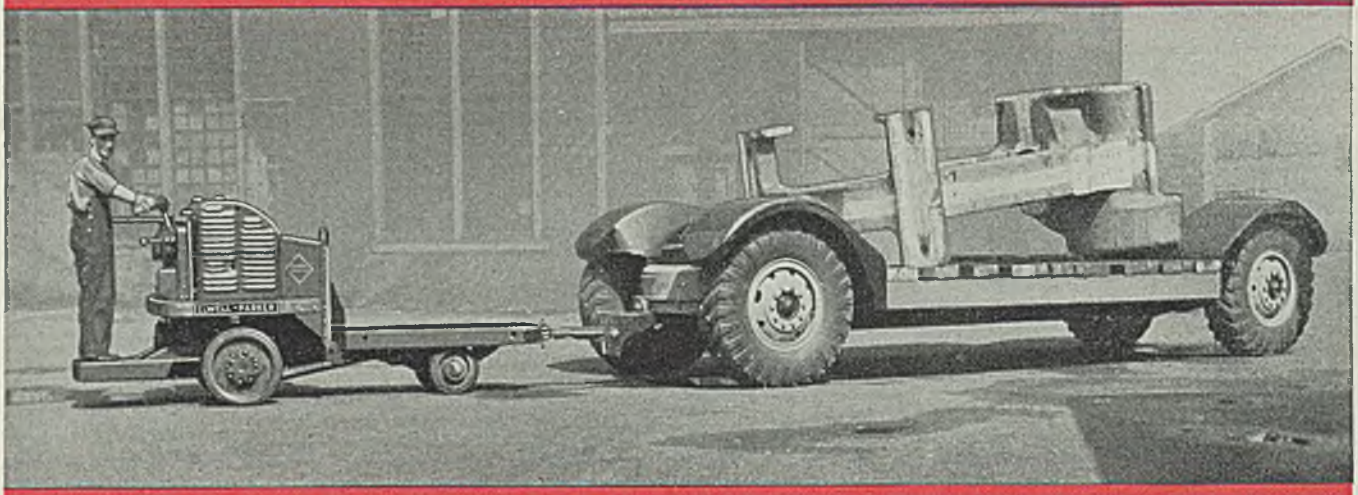
- The new BECKER OVENS, characterized by exceptionally low differential pressures represent an advance of prime importance in the economical production of steel. More precise control of coke and gas quality is characteristic of these ovens.
- The pioneer installation at Camden, New Jersey, placed in operation in October, 1935, has already demonstrated a distinct advance in the art of coking. The use of the Becker Type Ovens should be considered in every building and modernization program in the steel industry.

KOPPERS COMPANY

ENGINEERING and CONSTRUCTION DIVISION

PITTSBURGH, PA.

ANOTHER HEAVY JOB—*but*



CASTINGS TRUNDLE EASILY WHEN ELWELL-PARKER SAYS—"*Come on!*"

HERE is the plant yard of a nationally-famous builder of continuous strip mills and other heavy steel plant equipment. Here, too, are the Elwell-Parker Gas Lift Truck and suitable trailer with huge pneumatic tires. Elwell-Parker's abundant power negotiates heaviest inter-plant loads without visible effort.

Castings weighing 20 tons are loaded into trailer by overhead crane, and delivery to any other part of the plant is merely a matter of minutes and pennies, in spite of usual plant pavement conditions and variations in floor levels.

Formerly the Company spent $500.00 a month for transporting the same materials over the same routes —worse yet, it often waited 24 hours for delivery instead of 5 minutes as now.

The owners have other regular schedules of work to keep their Elwell-Parker profitably busy. It removes chips in high skid-boxes from beside lathes and other machine tools; scoots them into the yard and spots them in orderly rows until carloads have accumulated. It helps build up coal stock piles—even keeps shop yards scraped clear of snow in winter.

You try this: buy an Elwell-Parker for *one* job: you'll soon find it doing a flock of others—every one at a sizeable, separate profit. Now, with costs ballooning, you can make some deep cuts in materials-handling costs where perhaps your less progressive competitor *can't*.

Owners of older Elwell-Parkers, and those we've never served, are entitled to the services of a trained Elwell-Parker Engineer to make a survey of their plants, and are cordially invited to send for him now. No doubt he can help your own Engineers find new places where you, too, can realize major savings in transporting your loads.

The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland, Ohio, *and branches.*

New Type **ELWELL·PARKER** *Trucks*

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

Traveling Stockrooms Utilize Space Above Working Areas

BY DON F. SMITH
General Superintendent, Erie Works, General Electric Co.

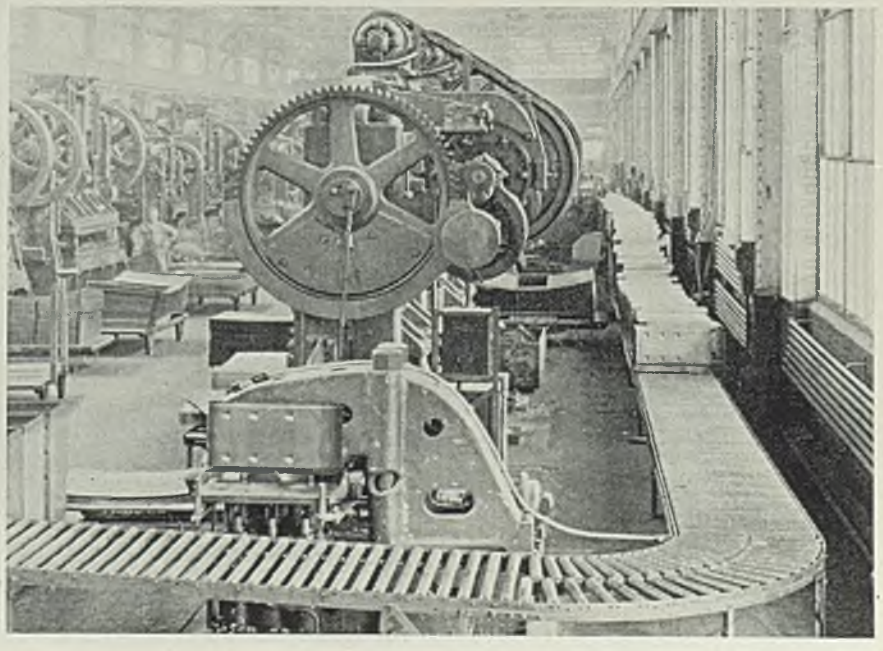
IN THE Oct. 12 issue of STEEL appeared a description of a new warehouse which was added recently at the Erie works of the writer's company. A more complete picture of the activities at the plant may be helpful, and at the same time may provide a valuable suggestion for other manufacturers who may have similar problems of production.

Refrigerator cabinet manufacture is carried out in a building previously constructed for foundry purposes. This building is 700 feet long and has a total floor space of approximately seven acres. Having been constructed for a foundry, the bays are much higher and wider than would be used ordinarily for refrigerator cabinet manufacture. These run from 30 to 47 feet from floor to roof trusses, and are from 45 to 90 feet in width. With this type of building, advantage was taken of the excess height in the construction of ovens and conveyor equipment. Several conveyors high above the working areas are using as traveling stockrooms to save floor space. Ovens are double decked in most cases. Incoming steel is conveyed on gravity roll conveyors through the machine shop as it is processed. There are approximately 2200 feet of this type of conveyor.

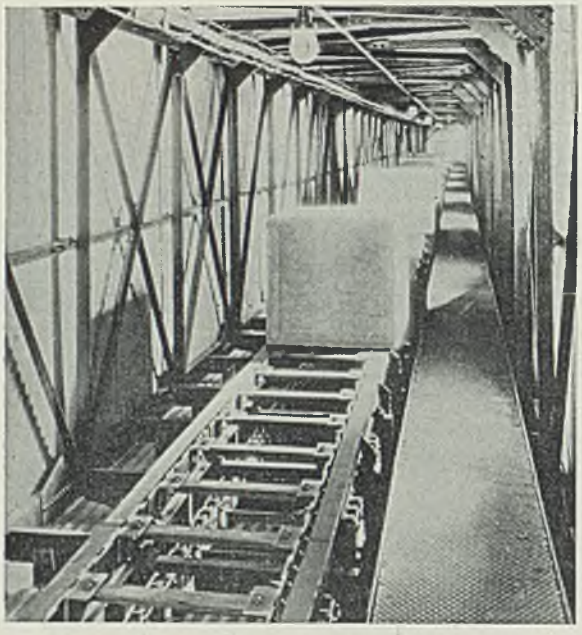
After fabrication, the outer case and the inner liner go to the finishing department. There are four separate chain conveyors in this area, which includes the double-deck baking ovens. These conveyors have a total length of approximately 7000 feet, the longest being 4400 feet and driven by five synchronized drives.

In the vitreous enamel department chain conveyors and belt conveyors carry the work through spray booths, drying ovens and continuous burning ovens. This department has 3300 feet of chain conveyor.

Insulation for the cabinets is received in cars, and unloaded into a



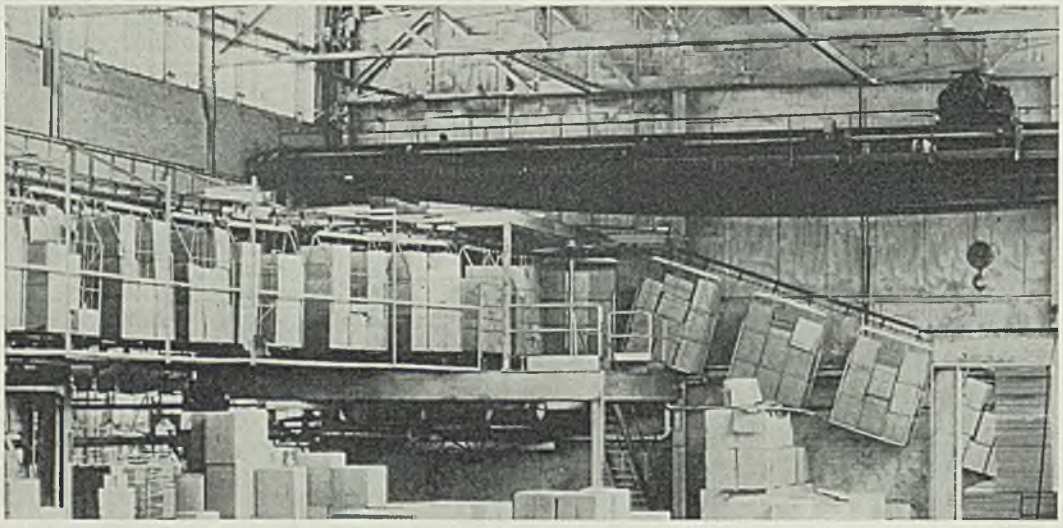
INCOMING steel is conveyed on gravity roll conveyors through the machine shop as it is processed. Lift trucks and skid platforms also are used extensively in this punch press section.



TRANSFER conveyor of slat type carries crated refrigerators 600 feet and is completely housed and on a trestle over the railroad tracks

long, acts as a moving stockroom for outer cases after they leave the finishing department. The various parts of the cabinets are delivered to the assembly floor by a series of chain conveyors having dips at the proper location. These conveyors total 4000 feet. The assembly conveyors are of the flat type, 24 inches wide in three parallel lines with a total length of 1200 feet. They connect with three shipping lines by hand switching, or the work may be sent to the warehouse by means of an automatic, alligator conveyor switch which connects the three assembly lines with the transfer conveyor, automatically connecting the latter with the assembly line on which the finished cabinets have accumulated.

The transfer conveyor carries the cabinets over the plant-yard railroad tracks, a distance of 600 feet to the warehouse. This is a slat-

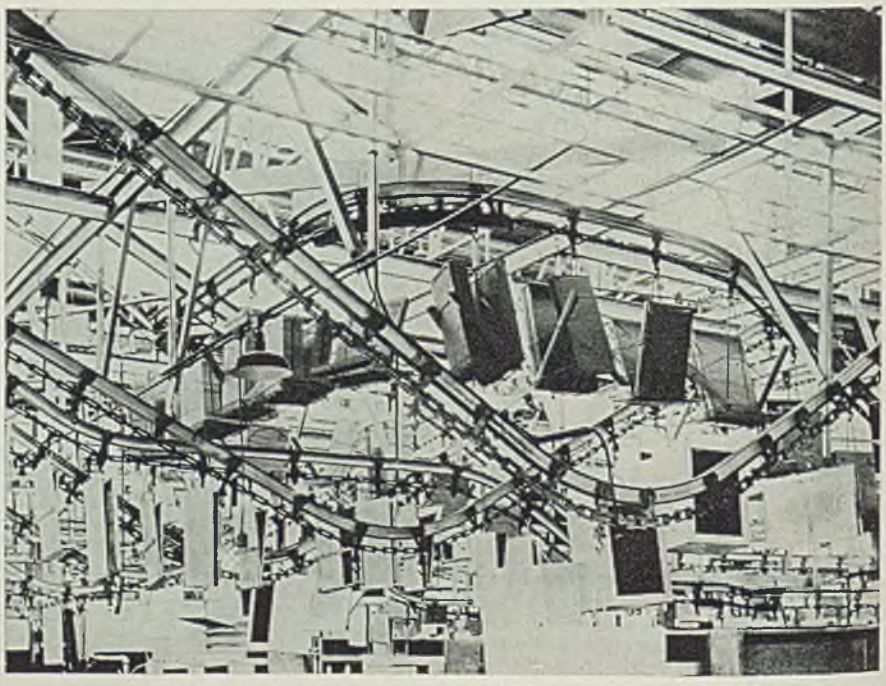


LARGE baskets containing insulation ride around on overhead chain conveyor which provides traveling stockroom in upper part of large bay. Note traveling electric crane with plenty of clearance above the conveyor

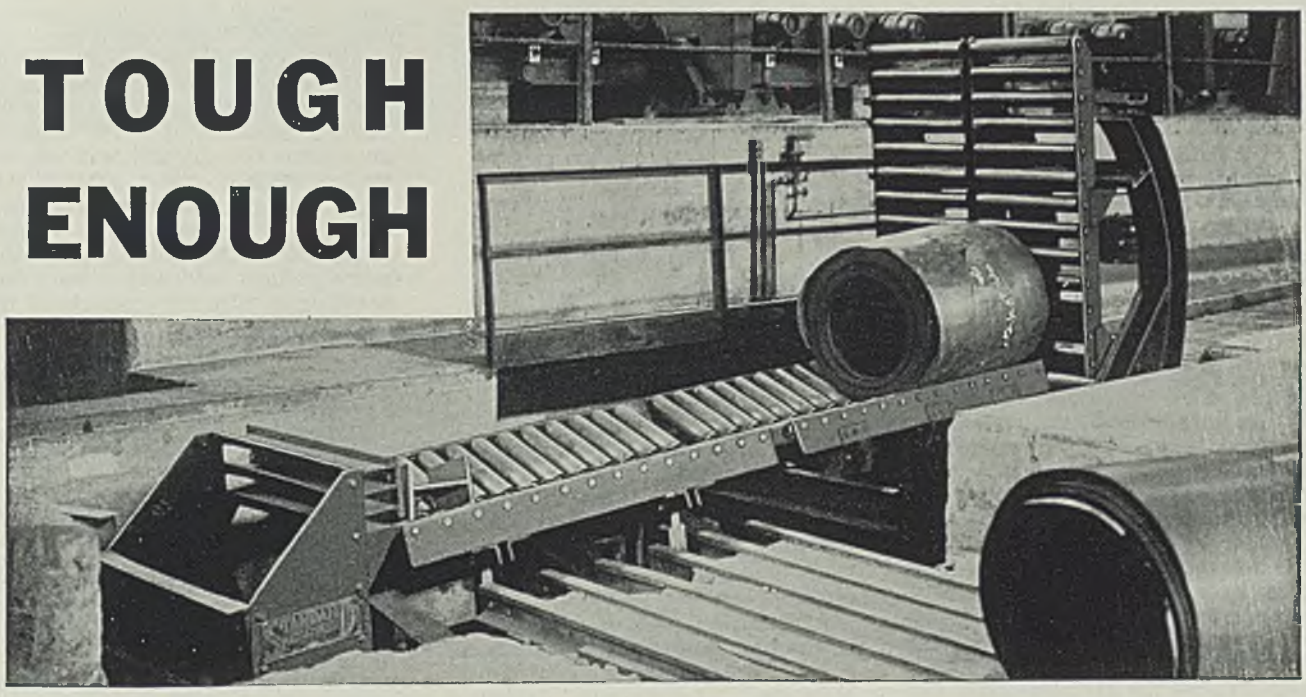
large moving chain conveyor which carries large baskets for insulation storage. This conveyor is located in the upper part of one of the large bays and is 1500 feet long. The insulation is taken from this traveling stockroom, sorted into sets and delivered by another chain conveyor to the assembly line. This second conveyor is 820 feet long.

Another chain conveyor, 1200 feet

THERE are four separate chain conveyors in the finishing department with a total length of approximately 7000 feet and driven by five synchronized drives



TOUGH ENOUGH



—TO STAND THE STRAIN
AND DO A LASTING JOB

MODERN, durable conveying equipment is playing a big part in the present struggle of the steel industry to speed up production and cut down the cost of material handling.

And, Standard Conveyors, nationally noted for building conveying equipment heavy and rugged enough to stand the heavy pounding of the steel plant's requirements, are ably doing their part of the job.

Standard Engineers have planned and installed conveyor systems for a great many steel plants—large and small. These engineers are experienced — they fully understand what is demanded. There is hardly a conveying problem they have not already had to analyze. We think that you will find a consultation with them regarding your plant's conveyor requirements quite interesting. Why not call one of them in—for, as you know, Standard maintains a national organization and has a specialized sales engineer right near you.

A NATION-WIDE SERVICE
IN CONVEYOR ENGINEERING

STANDARD
CONVEYOR COMPANY

General Offices: North St. Paul, Minn.

For specific information on what Standard Conveyors are doing for some of the country's leading steel companies, write for this factual, well-illustrated booklet S-10.

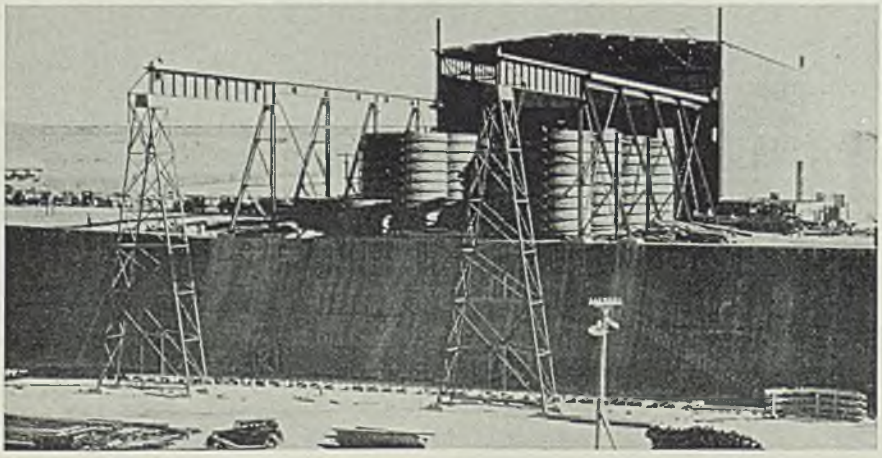
type conveyor on which the crated cabinets ride lengthwise. The conveyor housing is mounted on a trestle to clear trains operating on the tracks. The operation after the crates arrive at the warehouse was described in detail in STEEL for Oct. 12.

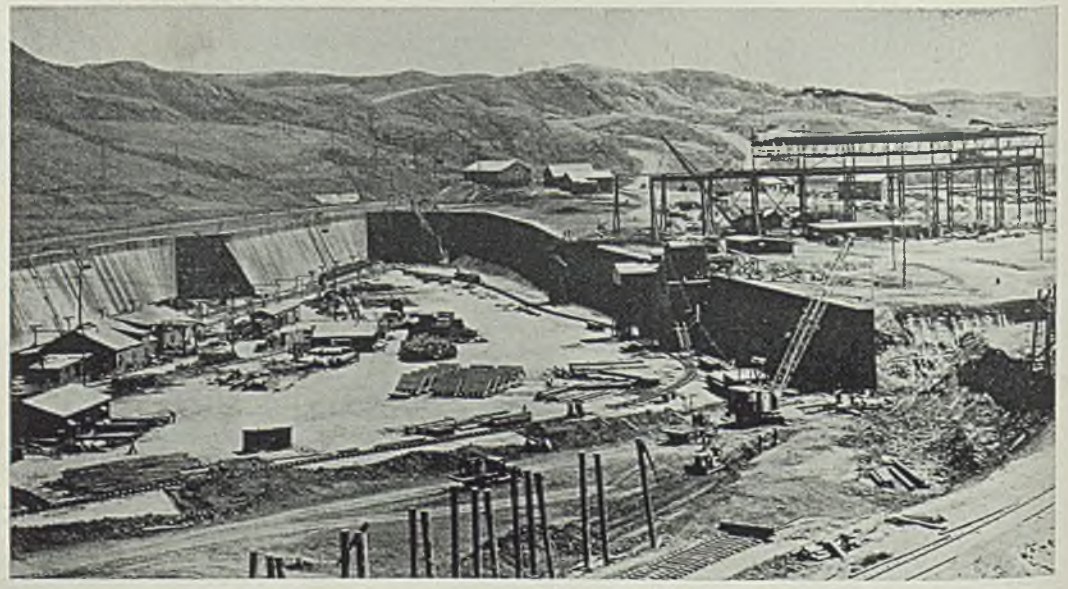
Crane Handling of Steel Pipe Sections at Fort Peck Dam

FEW persons ever stop to think of the countless materials handling operations which are involved in nearly every phase of human existence. They may have a rather vague idea that a variety of raw materials had to be brought together before the family automobile became a moving force in their daily lives, or before the new skyscraper in the center of their favorite shopping district was ready for occupancy. The finished, usable unit attracts the eye; its origin and the devious paths along which it had to be transported are hidden from view.

This procession of handlings is never-ending until the individual product reaches its ultimate point of use or of consumption. Particularly where the finished units are used as important parts of other structures, the materials handling task becomes increasingly vital as the work progresses. This is a distinguishing characteristic of many steel and allied products.

A recent example of this is found in the handling of steel sections for a tunnel at the Fort Peck dam in Montana. The Chicago Bridge & Iron Works was the successful bidder for this particular equipment. The pipe was used for lining the tunnel. This meant assembling sections of 24-foot 6-inch diameter pipe. To do this entailed construction of a temporary erection shop at the dam. This shop building is 100 feet wide and 170 feet long. There is a crane of 70-ton capacity on a crane runway 250 feet long extending 80 feet over a 100-inch railway. The latter leads into the channels. The accompanying illustrations tell, better than words, this story of how interwoven materials handling is with all products of the steel industry.





GENERAL view (right) during construction of erection shop built to house the crane runway and the assembly operations in handling steel pipe for one of the tunnels at the Fort Peck Dam. Above is a view of the completed erection shop, showing several rings of the tunnel lining ready for delivery to the government. Note that craneway extends across the railway tracks leading into the channel.

Prolonging Belt Life

THE chief engineer of one of the leading conveyor manufacturing companies, in discussing the protection of conveyor belts, pointed out that the life of an improperly trained belt will be greatly shortened, so much so that even the "highest grade belt will be a disappointment." On the other hand, he holds that belts usually run true for long periods after once being properly trained. It is essential that conveyor belts run true and central on the carrying and return idlers, whether loaded or empty.

• • •

Applying Conveyor Brakes

IN HANDLING steel sheet packs on conveyors, conditions often demand that the loads be stopped at certain points along the line for incidental operations, such as pack tying. In some mills this is accomplished by means of a brake mechanism fixed directly beneath the conveyor rolls and operated by conveniently located control. The mechanism consists of two arms to each of which are attached four brake shoes. When the brake is applied by the operator, each brake shoe contacts a single roll.

Variable-Speed Drives on Spring Coilers Increase and Control Production

BY A. H. BITZER
President, Illinois Coil Spring Co., Chicago

THE writer's plant is engaged in the manufacture of coil springs of all types on a jobbing or contract basis. In the past 8½ years of steady growth the original two-story plant became so badly crowded that more space became absolutely necessary. Therefore, a single-story addition, providing about 50 per cent increase in floor space, was built adjoining the original plant.

In planning the new layout it was decided to move into the new plant all automatic coiling equipment for wire springs in one row along windows where the light was best. Wire storage was provided opposite the row of coilers which had previously been hopelessly inadequate for easy handling, and new heat treating equipment with automatic temperature control was installed.

This provided more working space in the older part of the plant, some additional office space which was badly needed, and left some space for more equipment as it became necessary. This rearrangement has just been completed.

In jobbing production where an order may require from a half-day up to continuous operation, one of the most important operating factors is to be able to change quickly to the best speed on each of the varying jobs. This is of special importance on orders requiring a comparatively short time to complete.

Some of these machines had been provided with variable-speed control which permitted simple and quick variation and adjustments in speed with each change in product. On other machines it had been necessary to change the lineshaft pulley and add a piece of belt.

As it requires 25 to 30 minutes to change a pulley, with a change in overhead belt length, the groups were not stopped during working hours unless absolutely necessary. Usually it was possible to shift the machine on the floor to tighten the vertical belt from the countershaft to the machine without cutting this belt. Incidentally the operators still use this method of keeping vertical belts tight as the machines are not fastened to the floor.

If a mistake had been made in the calculations when the pulleys were changed and too high a speed obtained for the close tolerances required the pulleys had to be changed again.

In most cases the pulley was not changed (unless operating at too high a speed) on runs of 2 days or less. Obviously this resulted in considerable loss in production.

In many cases coiling units were operating 10 per cent or more below the best speeds. This means 10 per cent or more lost in production, which is an important item in a highly competitive line.

Some machines were provided with variable-speed transmission units which had proved their advantage. Therefore, in moving into the new addition the decision was made to equip all of the machines, except one, which is running constantly on the same job, with individual speed control. Improvements in production showed that variable-speed transmission units had been paid for several times over in lost production in the 8½ years of operation.

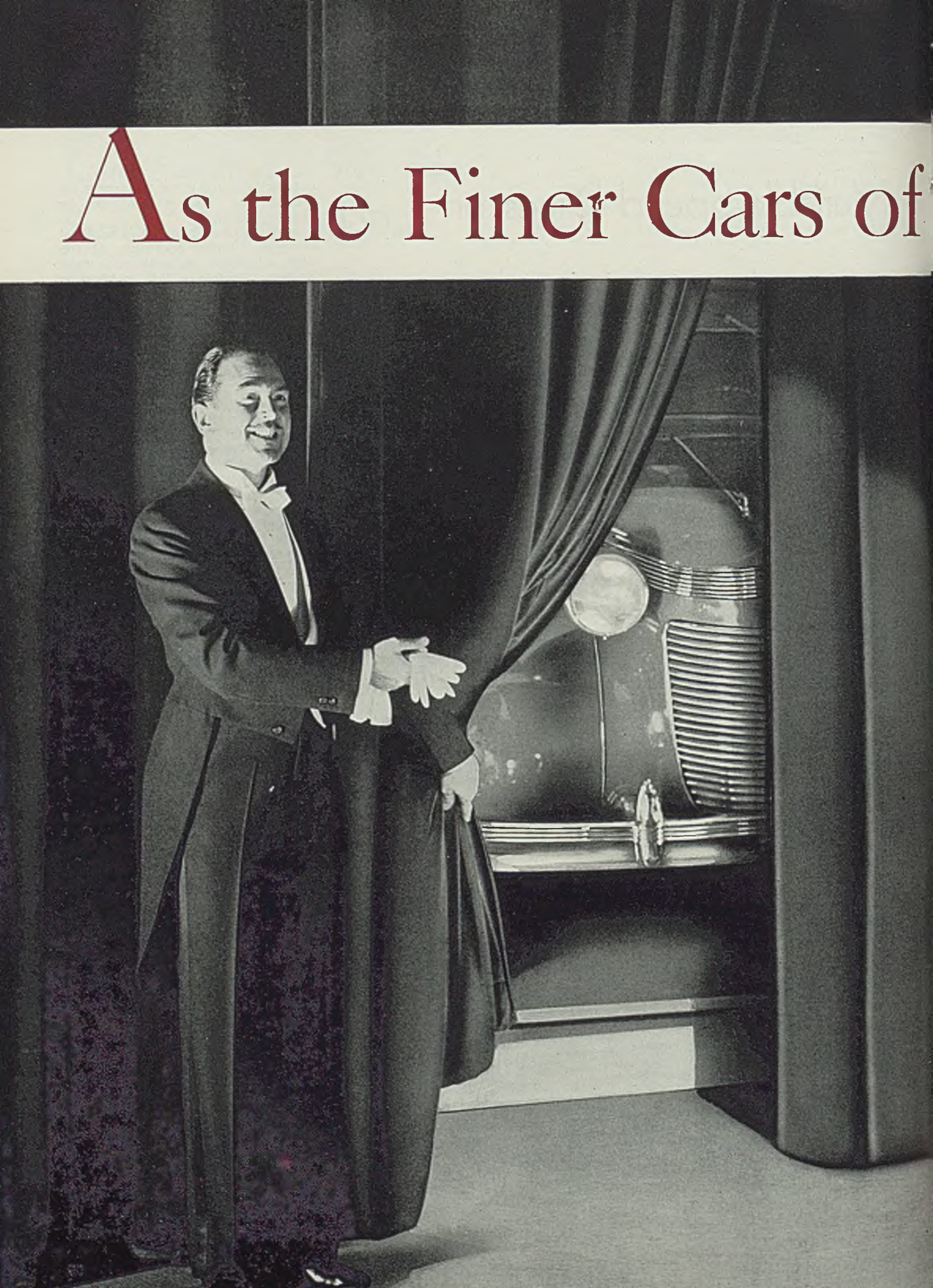
The coiling machines in the new layout are divided into two groups according to wire sizes. The first group consists of seven machines making springs of music or oil-tempered wire up to 0.062-inch diameter. The second group contains three coilers for large wire up to ¼-inch and the special coiling machine for coiling bars up to ⅝-inch, wound cold. This machine has built-in speed changing gears and is countershaft driven.

On all other machines except the one on continuous production the

(*Please turn to Page* 78)

INDIVIDUAL variable-speed drives are used on automatic spring coilers to handle varying job requirements.

As the Finer Cars of



1937 make their bow

give a thought to the better steels that helped to make them possible

SOON they'll roll back the curtain on the 1937 automobiles. What does the public expect?

Advances in styling? Mechanical and engineering improvements? Refinements in finish and accessories? Yes, they expect all of these. For the history of automobile development has taught the car buying public that each year they can anticipate always more value for their dollars—finer appearance—increased safety—greater comfort and convenience—better performance. And they have never been disappointed.

Each year this challenge, of a public never satisfied with last year's best, faces the automotive technician—puts new demands upon the resources of Steel. This year is no exception.

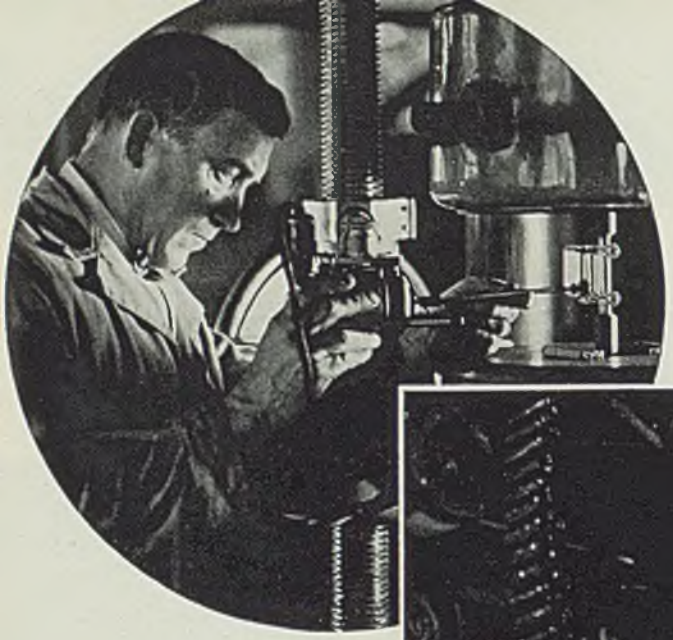
From the drawing boards of automotive designers—from automobile plants geared to stepped-up schedules has come the demand for special steels of infinite variety. Steels to meet requirements ever more specific and exacting. Steels to increase strength. To lengthen the useful life of parts. To decrease weight. To solve assembly problems. To cut costs. More steel than ever before enters into the car built for 1937.

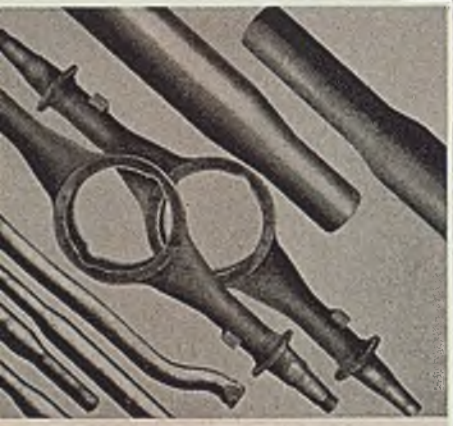
United States Steel has specially prepared to make the automotive manufacturer's job easier, more profitable. 1700 steel technicians (metallurgists, scientists, researchers), 81 steel research laboratories—the fastest continuous strip mill on earth—a completely modern alloy mill devoted exclusively to the production of alloy steels — a corps of metallurgical engineers trained and experienced to interpret your needs in terms of steel. These are representative of the service United States Steel places at your disposal.

AMERICAN STEEL & WIRE COMPANY, *Chicago and New York* . . . CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago* . . . COLUMBIA STEEL COMPANY, *San Francisco* . . . NATIONAL TUBE COMPANY, *Pittsburgh* . . . TENNESSEE COAL, IRON AND RAILROAD COMPANY, *Birmingham* . . . COLUMBIA STEEL COMPANY, SAN FRANCISCO, *Pacific Coast Distributors* . . . UNITED STATES STEEL PRODUCTS COMPANY, NEW YORK, *Export Distributors*

UNITED STATES STEEL

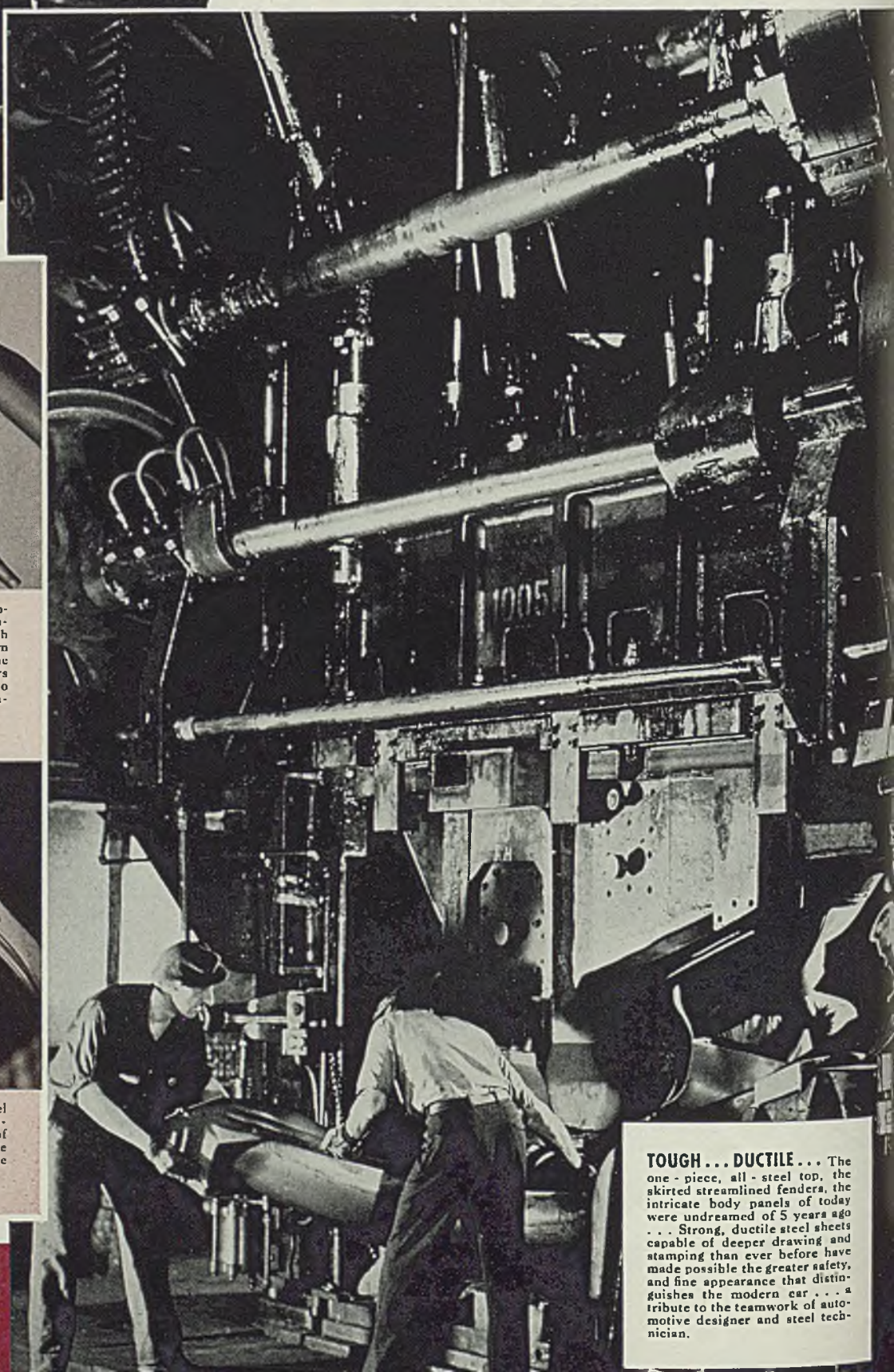
From these





ERSATILE . . . COST CUTTING . . . The auto-obile parts shown here are made of Shelby Seam-ss Mechanical Tubing, in both alloy and high arbon grades . . . heat treated to assure maximum rength with least possible weight. Made by the lational Tube Company, SHELBY has for years een "tops" in mechanical tubing. It fabricates so asily—minimizes grinding and machining opera-ons, cuts tool and labor costs.

ERMANENT BEAUTY . . . USS Stainless Steel hub caps, window trim, lamp shells, body mold-gs, etc. gives fine cars a distinguishing touch of eauty and refinement that remains immune to time nd weather. The lasting good looks it imparts are potent aid to sales.



TOUGH . . . DUCTILE . . . The one - piece, all - steel top, the skirted streamlined fenders, the intricate body panels of today were undreamed of 5 years ago . . . Strong, ductile steel sheets capable of deeper drawing and stamping than ever before have made possible the greater safety, and fine appearance that distinguishes the modern car . . . a tribute to the teamwork of automotive designer and steel technician.

USS STEEL

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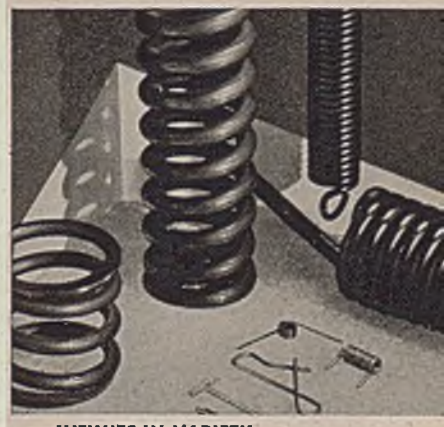

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UNITED STATES STEEL

New Developments in Metal Finishes Speed Automobile Production

BY J. B. NEALEY
American Gas Association

STARTLING changes which have taken place in automotive and other finishes in recent years, which have progressed from japan to lacquer and now to synthetics are not generally known. In the early days of automobile manufacture, japans, which are black pigmented varnishes based on drying oils, were used and it required 5 to 6 days to finish an automobile. These japans were composed of oils, gums, pigments, dryers and thinners. Linseed was the most popular oil; gums were from the sap of trees; lampblack gave the black color; turpentine was the universal thinner and salts of lead and manganese were the dryers.

Tung Oil Brings First Change

The first improvement in more than 100 years came in 1900 with the introduction of chinawood or tung oil, which gave a faster drying and more waterproof varnish with an accompanying reduction in cost. The finished japan was applied to the automobiles by spray or flow coating in two or three coats and baked at high temperatures in gas-fired ovens. (The term enamel in this sense is fast becoming obsolete.) When colored finishes were used, a more elaborate series of coatings was built up sometimes from ten to twelve coats and required from 20 to 30 days to finish. To make the varnish vehicles, resins like Kauri gum, rosin or the oil soluble synthetic resins were fused and dissolved in oils, such as chinawood or linseed, and then cooked.

Intensive research, over a period of years, finally resulted in lacquer wherein nitrocellulose was substituted for oil as the binder. This upset all existing traditions and was—and still is—an ideal finish. Its use, however, is restricted to all steel bodies of the pleasure car type, and it does not fill the needs of the truck and commercial body car builders. Research, however, has been continued and these efforts culminated in 1930 in an entirely different product, known as alkyd resins or glyceryl phthalate resins, or "synthetics". To make them naphthaline is oxidized to form phthalic acid and is combined with glycerine and fatty acids produced by the hydrolysis of linseed or chinawood oils.

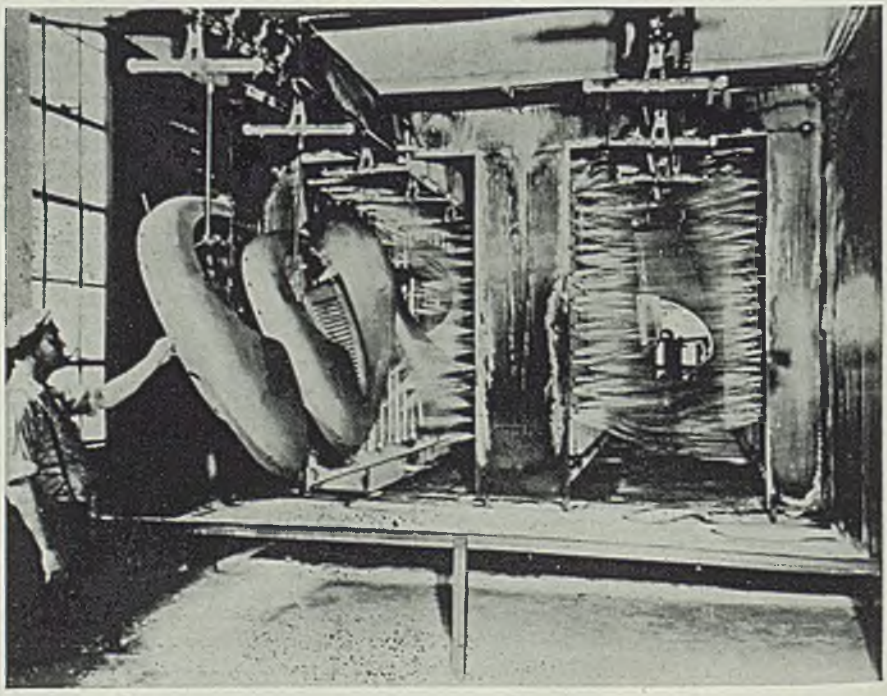
They are distinct chemical compounds and contain within themselves all the qualities necessary for the finishing material. They do not require blending with oils and are durable, tough and elastic. Finishes with a wide range of physical characteristics can be made from these resins which, in themselves, range from the tough, rubbery solids, to rather heavy, viscous fluids. From the former are made the faster and harder drying types of high temperature baking finishes used on automobiles while the latter provides the vehicle for the high solids, easy brushing paint type finishes. The drying time of these products is shorter than that of oleoresinous type products.

No matter how much has been cut from the time periods necessary for air drying with finishes formerly employed, mass production calls for immediate drying. For this reason, synthetic finishes are baked on, usually in gas fired ovens at 225 degrees Fahr. for one hour.

Synthetics Widely Used

Synthetics are used on the head lamps, tail lamps and brackets at the Flint, Mich., plant of the Buick Motor Co. They are received already primed for the spray coat. Here the practice is to spray on one solid wet coat with the single exception that colors in maroon and cream are given two solid wet coats. This is baked on in a gas fired oven with a peak temperature of 260 degrees Fahr. The work passes through the oven on a conveyor at a speed of 22 inches per minute and is in the oven for a period of 80 minutes. Heat is supplied by a series of gas burners located in the lower part of the oven.

For lacquer spraying, however,



Spray bonderizing in which parts are hung on a conveyor and subjected to eight separate spraying, rinsing and drying operations to prepare the surface for finishing with lacquer

the parts are first prepared by bonderizing and drying in gas fired ovens. The parts so treated include fenders, hoods, radiator shells, running boards, and chassis coil springs. Changes have been made in the process whereby the work is treated for a period of only 1½ minutes in the bonderizing solution where formerly an immersion of 4½ minutes was necessary. The solution tanks were formerly of 48,000 gallons capacity but now 10,000 gallon tanks suffice. The solution formula was altered and its strength changed to make this change possible.

The entire process is as follows:

1. Wipe parts with kerosene.
2. Clean in pressure spray washer at 150 deg. Fahr. and for 45 seconds.
3. Rinse with cold water by pressure spray for 30 seconds.
4. Repeat for 30 seconds.
5. Treat with bonderite by pressure spray for 1½ minutes.
6. Rinse in cold water by pressure spray for 45 seconds.
7. Chromic acid rinse by pressure spray for one minute.
8. Dry in gas fired, open flame oven for two minutes and 46 seconds. This oven is 60 feet in length.

All of these operations are performed while the work travels along on a moving conveyor consisting of two closed loop chains moving two parallel lines of work. Fenders and running boards are carried by one chain and the balance of the work by the other. This conveyor is 270 feet long and travels at a speed of 16 feet per minute.

Conveyors Speed Work

The separate units consist of sheet metal booths or hooded compartments (about 12 feet high) with the conveyor passing through all. The washer is 60 feet long and contains two rows of vertical perforated pipes through which hot water is forced in a multitude of sprays. A tank below serves as a reservoir in which the pumps work. The bonderizer is 75 feet in length, the first 24 feet containing the same type of spraying equipment but using the bonderizing solution. An 8-foot drain board follows and then a clear water spray rinse occupies a space of 12 feet and this also is followed by an 8-foot drain board. The chromic acid rinse, also a spray, comes last and occupies 16 feet. The dry off oven is 50 feet long and is heated with 9 perforated gas pipe burners.

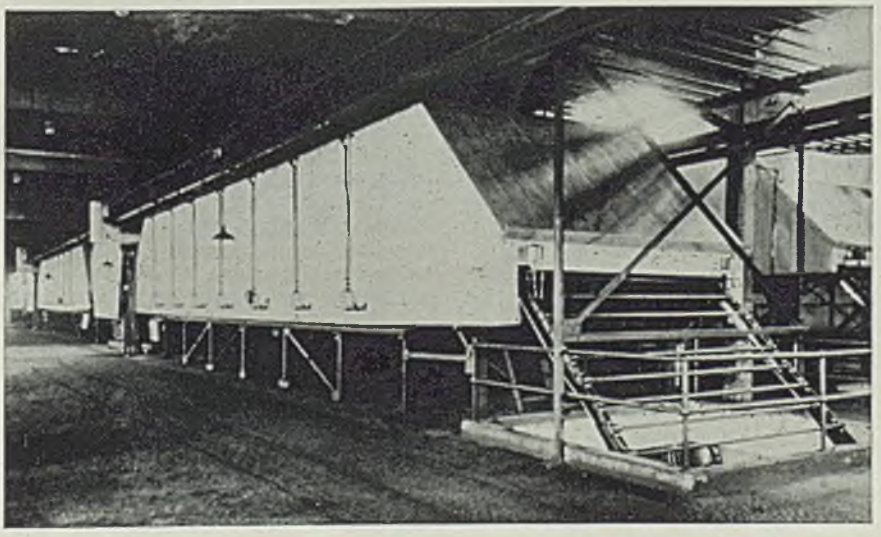
Another process used consists of a single coat of rubber enamel dipped on by conveyor and baked in a gas fired oven for 17½ minutes at a baking temperature of 475 deg. Fahr. This is followed by a dipped coat of black primer baked at a baking temperature of 390 degrees Fahr. For this there is a chain conveyor passing through two ovens with two dips. Each oven is about 50 feet long and 14 feet wide and is heated with drilled gas pipe burners located close to the bottom.

Latest Spray Equipment Used

Parts that are lacquered are given several coats in quick succession with a few minutes air drying in between, after the baking process described above. The finish is sprayed on in modern booths with flood lighting and positive ventilation. These booths are in pairs in tandem, one side of the booth being sprayed in the first and the other in the second. Along one side of the booth is a series of 10-inch vertical tubes about 4 feet long together with a curtain of falling water. Particles of lacquer are caught by the water while the vapors are drawn down and up the tubes by induced draft. The descending water is caught in a sludge tank and the floating lacquer skimmed from the top. The flood lights are above and back of frosted glass lamps which are protected from stray spray.

As ten standard colors are used, color control is effected by having them all mixed in one roof. They are then piped to the individual booths through ten separate pipe lines, each line having a valve in each booth. The work is baked for 32 minutes at 170 degrees Fahr.

A substitute process for bonderizing has recently been introduced and is known as the chromate process and is designed primarily for parts that may be subjected to bending after japanning. Parts treated acquire a thin coating of iron chromate. The equipment required is practically the same as for bonderizing. The chromate solution heated to 180-190 degrees Fahr. is either sprayed on or used as a dip, one minute contact only being necessary. This is followed by a cold rinse (dip or spray) and drying in a gas fired oven. Before japanning, however, the surface is wiped with a tack rag, which improves adherence.



Batteries of gas fired, continuous conveyor ovens are used to bake synthetic finishes on automobile parts. Peak temperature is approximately 260 degrees Fahr. and conveyor speed is 22 inches per minute

Test Kits for Plating Solution Control Developed

Grasselli Chemical Co., Wilmington, Del., announces that it is in a position to offer trade test kits for the control of cadmium and zinc plating solutions. Three kits have been developed for these purposes:

1. For determination of cadmium in cadmium-cyanide plating solutions.
2. For determination of zinc in alkali-cyanide or acid-zinc plating solutions.
3. For determination of total sodium-cyanide content in zinc or cadmium plating solutions.

As nearly all previous methods of determining these constituents were either inaccurate, unreliable or slow, the company sought to develop a method that would be an accurate, reliable and quick means of finding the concentration of these constituents in the plating bath.

It is stated that these test sets are easy to manipulate. In organizations where centralized laboratory control is available it has been ascertained that the plater finds these test kits of great value, especially when the information they can give is required in a brief period of time.

These test sets for solution control supplement the Hull and Strausser test sets announced by Grasselli a few months ago for determining the thickness of electrodeposited cadmium or zinc coatings.

WELDING, etc.—by Robert E. Kinkead

Progress in Welding Art On Display at Metal Show

MEMBERS of the welding industry found much to interest them both in the exposition and in the papers presented at the congress held in Cleveland last week. Progress in the industry was graphically demonstrated in the exhibits on display.

Welding enthusiasts commented favorably on the fact that one of the largest steel producers incorporated an operating welding exhibit in his show. A ton of steel which sells for about $40 becomes worth a hundred to a thousand dollars after it is fabricated. The old do-nothing policies of the steel producers have been thrown overboard and they are now taking part in the life going on about them. How steel is fabricated affects the matter of how much steel can be sold and it also affects what kind of steel the producer is to make. From being treated like a group of bad boys who were causing the steel producer a lot of trouble, the welding fraternity is now welcomed by the steel producers as a worthy partner.

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Motion pictures of the welding arc in operation attracted wide attention. The electric arc is a phenomonon that is little understood because of its extremely high temperature. Besides the fact that we do not know precisely how metal behaves in the arc, we do not know the reason for much of the behavior with which we are familiar. The high speed motion picture of the arc in operation is a scientific triumph which will be productive of much better understanding of welding arcs.

Welded steel machinery was discussed by men who have had first hand experience in its design and production. From a fad, the design and production of welded steel machinery has become a standard manufacturing practice which is advancing rapidly along rational lines. In some cases, a modern machine part is made of several different kinds of metal all fused into a continuous whole in which each area is made of a metal best adapted to the service requirements.

Multiple layer gas welding is shown to be commercially practical. In addition to the advantage of permitting thick metal to be welded, the practice is on the side of safety. With a weld made up of a multiplicity of layers, the mathematical probability of defects occurring in alignment in all the layers is remote. This advantage has been enjoyed by metal electrode arc welding from the beginning.

Machines Are Improved

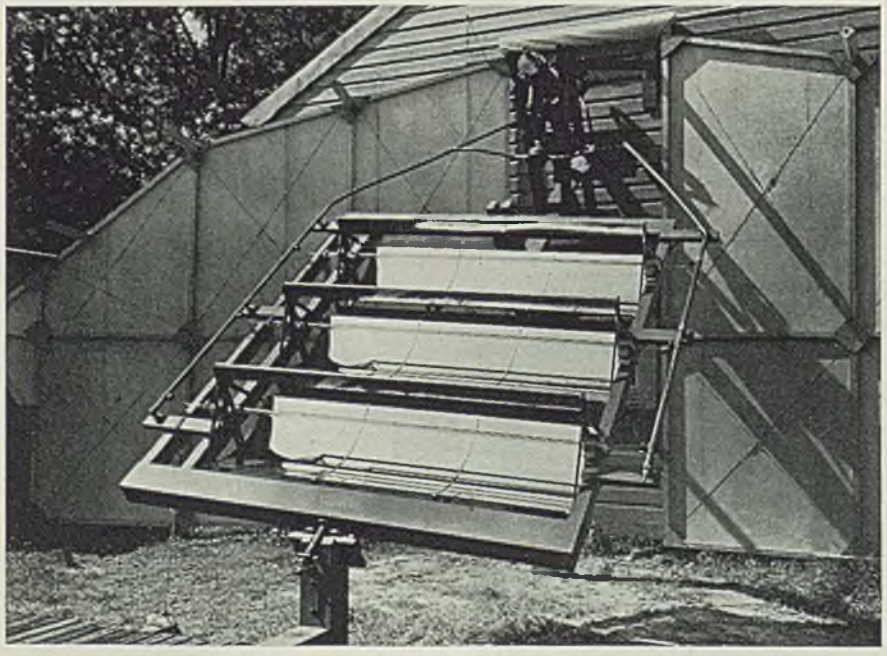
Among arc welding machine manufacturers, the accent is being placed on the direct current machines. Precision control is featured by all types. Alternating current arc welding machines and transformers still have a field in which they are superior to direct current equipment, particularly where arc blow is a determining factor.

Gas cutting machines have taken a long step forward in the last twelve months. Until recently, manufacturers of this type of equipment apparently have feared to use full automatic control. Most existing cutting machines are now obsolete and should be replaced with these modern machines which will pay for themselves in a few months from savings.

Fundamental research came into its own at this convention. Papers of two kinds were presented—new information about old ideas, and some entirely new ideas. Fresh minds are attacking the problems of welding and that is always productive of new information and new ideas.

Hard surfacing and alloy welding rods were featured at the show by all welding rod manufacturers.

Harnessing a Heat Wave



PARABOLIC mirror-like reflectors of highly polished aluminum focus rays of the sun on horizontal glass tubes containing a black liquid in this new solar heat collector invented by Dr. C. G. Abbot, Smithsonian Institution, Washington, and recently demonstrated to the World Power Conference there. The liquid was developed by the Monsanto Chemical Co., St. Louis. The apparatus shown here has been erected at the Institution and is in partially completed form. The heated liquid is carried through insulated tubes to a boiler at the top where steam is raised to 175 pounds per square inch pressure, sufficient to develop ½ horsepower, it is claimed

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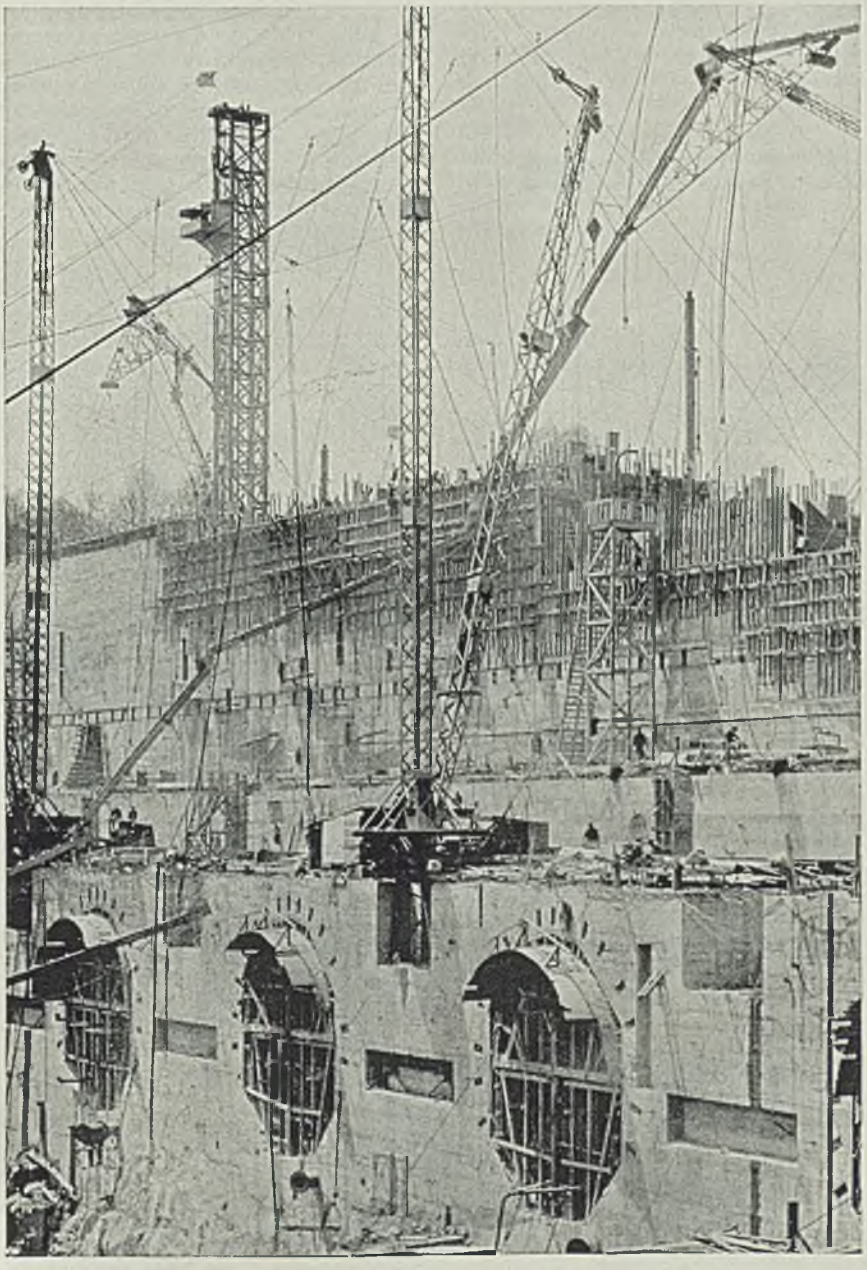

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UNITED STATES STEEL

Various Phases of Metallurgical Research Are Reviewed at Congress

SEVEN papers of highly technical nature and on seven unrelated subjects of metallurgy were presented at two research sessions of the American Society for Metals on Oct. 19, the first day of its five-day annual convention in Cleveland. These papers, involving both ferrous and nonferrous metals, represented long periods of laborious laboratory investigations in which the results thus far obtained may or may not be conclusive.

To study the influence of chromium, manganese, molybdenum and vanadium on the graphitizing reaction from the viewpoint of their effects on the graphite nodule number per unit volume and on the migratory rate of carbon in iron was the purpose of an investigation undertaken by H. A. Schwartz, manager of research, and H. H. Johnson and C. H. Junge, members of the research staff, National Malleable & Steel Casting Co., Cleveland, and reported by Dr. Schwartz.

An attempt, probably the first in literature, was made to correlate the expected, and observed retardation of graphitizing rate by these elements with the nuclear number and migratory rate. It was found that the addition of manganese increases the number of nuclei capable of growth at 1650 degrees Fahr. while additions of the other elements reduce this number. Additions were of little effect on nuclei capable of growth at 1290 degrees Fahr.

Effect of Alloys

Later experiments related this abnormal behavior to the melting method rather than to the particular element. The migratory rate of carbon in gamma iron was found to be retarded by all the alloying elements while the graphite solubility was not distinctly altered. The retardation is a function of the concentration added and does not differ greatly from the several elements studied, according to Dr. Schwartz.

Chromium greatly retards migration rate below A_1, the other elements having but little effect. It was stated as likely that the retarding effects of the elements are also functions of the carbon content of the metal. A warning was given that useful data as to the effect of other elements on graphitizing rate can be secured only by comparisons based on material of precisely similar history in the melting operation.

H. L. Anthony 3rd, research engineer, Midvale Co., Philadelphia, found this paper of particular interest in view of some recent work he had done in regard to graphitization of white cast iron below the A_1 point. Most of his low-temperature study was confined to unalloyed irons, with exception of one composition which contained 0.50 per cent nickel.

Many Variables Present

Such points as analogous melting scrap, method of melting, maximum bath temperature, the order of alloying additions and pouring temperatures are vital steps in the procedure to obtain alloys for direct comparisons, said Mr. Anthony. With such variables to contend with, it is difficult to arrive at definite facts which would apply universally, even to similar compositions. He hoped that the authors will present at some future time their final results in respect to the influence of manganese on the final nodule count for electric and fuel melting methods.

R. Schneidewind, University of Michigan, Ann Arbor, Mich., stated that in some fragmentary work done on pearlitic irons for brake drums it was found that raising the manganese content from 0.5 to 0.9 per cent had no appreciable effect upon graphitization at 1700 degrees Fahr. but that some retardation was noticeable below the critical temperature.

Although it is generally accepted that alloys such as chromium retard graphitization, Mr. Schneidewind warned it should not necessarily follow that the alloys retard the rate of atomic migration in gamma iron. The rate of carbon migration is most probably determined by the medium through which it travels, gamma iron, and the kinetic energy in keeping with the temperature of annealing. Carbide-forming alloys, especially in the quantities used in white iron, cannot appreciably affect the nature of the gamma iron.

Retardation of graphitization can be explained, however, by the following probable effects of the alloys: 1. Stabilization of the carbide; 2. formation of fewer graphite nuclei and hence increasing the mean migratory distance for the carbon atoms.

C F. SMART, metallurgist, Pontiac Motor Co., Pontiac, Mich., presented a paper recording data from laboratory tests indicating that the ternary alloys of cadmium-silver-copper possess desirable properties for bearing metal. Bearings tested in engines under severe operating conditions showed approximately three times the life of babbitted bearings. Furthermore, the alloy offers no particular manufacturing difficulties.

The authors stated: "Alloys of cadmium-silver-copper possess characteristics which appear highly desirable for bearing metals, for example, low frictional properties, high strength and toughness, relatively high melting point, good temperature stability, freedom from low melting point constituents, a wide range of hardness possibilities without too much sacrifice of toughness, no undue casting or machining difficulties. The selection of a particular composition is, of course, subject to operating requirements.

"The alloys offer a considerable range for the choice of physical properties to fit a particular bearing requirement. The optimum would appear, for best bearing fatigue life, to place silver content close to the upper limit of the primary solid solution, and to add to this the maximum of copper which would impart hardening and strengthening without excessive brittleness, both silver and copper contents to be consistent with variations to be expected in commercial practices. Accordingly, the selected composition was cadmium 97.5, silver 2.25 and copper 0.25 per cent.

"Requirements of bearing metals being as they are, experience may suggest variation from this compo-

sition where such items as cost, greater plasticity, higher dirt absorbing ability, etc., may be considered to be the main features. An alloy of 0.75 silver, 0.50 per cent copper is recommended by one bearing maker."

Discussing Mr. Smart's paper, O. E. Harder, assistant director, Battelle Memorial institute, Columbus, O., pointed out that silver, which is depended upon almost entirely to modify the matrix of the cadmium alloys, a solid solution of silver in cadmium, is a metal which has extremely low affinity for iron and steel; in fact, silver can be melted in iron containers without being contaminated with the iron. The low, or lack of, affinity of silver for iron may be of important significance with reference to the good performance of the cadmium-silver-copper alloys for bearings when worked against steel surfaces. Excellent bearings have been made of silver-cadmium alloys, and Mr. Smart's paper indicates that when the silver is not present in the cadmium base-alloys the performance as bearings is less satisfactory.

Pioneering Effort

Sufficient work has not been done on this ternary alloy to establish the exact limits of the various phases and identify the constituents developed, commented C. E. Swartz, metallurgist, Cleveland Graphite Bronze Co., Cleveland. It seems certain, however, that Mr. Smart is pioneering a new type of bearing alloy. Until the advent of this alloy, many, if not all, metallurgists interested in bearings were of the opinion that a successful bearing must be composed, not only of a polyphase alloy, but one in which the phases differed markedly in physical properties. The classical alloy structure in the 100 years since Sir Isaac Babbitt's time has been that of a relatively soft ductile matrix with one or more relatively hard phases imbedded in it.

Mr. Smart's recommended alloy of 2.25 silver, 0.25 per cent copper with cadmium is in all probability not of this type, continued Dr. Swartz. The second phase, if present, is present in minor amounts; and in hardness does not seem to be far different from the major phase, certainly not as different as the phases of other commonly used bearing materials. Metallurgists should congratulate Mr. Smart for his courage in pioneering a bearing alloy which is an exception to the commonly accepted theory of bearing metallurgy.

Concluding the discussion of Mr. Smart's paper, E. R. Darby, director of research, Federal-Mogul Corp., Detroit, dwelt at some length on the mechanics of work softening of soft metals and alloys used in bearing linings. Although this softening of the cadmium-silver-copper alloys is of technical interest, he was of the opinion it is also of practical importance, as in the early stages of engine operation the softening facilitates adjustment in bearing surface contour. A brinell hardness of 40 is fairly high for the average engine crankshaft, but in service these alloys will have this hardness so rapidly relieved that they really perform as a softer material.

CONSIDERABLE favorable comment followed the presentation at this session of a truly remarkable high-speed motion picture showing the quenching process. The picture was made recently at the Massachusetts Institute of Technology, Cambridge, Mass., and was shown and explained by I. N. Zavarine of the department of mining and metallurgy.

Contact between hot quenched metal and the quenching medium causes the formation of the vapor envelope around the quenched piece. The picture showed clearly that this film of vapor surrounds the quenched piece as long as its surface temperature remains above the boiling point of the quenching medium.

These vapor films were photographed at a rate of 1200 frames per second and their motion was shown on the screen slowed about 60 times, or at the rate of 20 frames per second. Under these conditions, to show a quenching operation which actually takes place in 5 minutes would require 5 hours. For this reason, Mr. Zavarine showed only the beginning and concluding stages of the operation. The camera used in making the pictures had no shutter, the exposures being made by projecting light on the specimen intermittently at high speed.

The picture was divided into four sections to illustrate quenching in mineral oil at room temperature, in water at room temperature, in water heated to 145 degrees Fahr., and in 20 per cent brine at room temperature. In all cases the sample was heated to 1550 degrees Fahr. Considering the handicaps under which the picture was made, the physical aspects of quenching were revealed clearly.

WR. HAM, department of physics, Pennsylvania State college, State College, Pa., described and explained the use of a highly complicated apparatus for determining the diffusion of hydrogen through nickel and iron. With nickel and iron the magnetic change at

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about 360 and 750 degrees Cent., respectively, are clearly defined by diffusion data. In addition, iron exhibits changes in the isobars at 945, 900 and at between 200 and 350 degrees Cent. A definite difference in temperature is observed between Ar_1 and Ac_3 and this appears to be a true hysteresis.

According to the speaker, the other points are all ascribed to electronic changes of the iron atom and it is suggested that the well-known maximum in the tensile value of iron at 200-350 degrees Cent. is explained in part by one of these electronic shifts. The general conclusion is reached that the isobars from hydrogen diffusion tests furnish an accurate means of tracing phase or electronic changes in iron and nickel, and that the change in slope of the isotherms provides a means in some instances of determining small amounts of foreign elements in solution in the metals.

Harden Crankshafts by New Induction Heating Method

DIFFERENTIAL hardening of automotive engine crankshafts by a newly developed induction heating method was outlined in a paper by M. A. Tran, Park Drop Forge Co., Cleveland, prepared in co-operation by W. E. Benninghoff, Ohio Crankshaft Co., Cleveland, and presented before the American Society for Metals. Brief announcement of this new process was presented in STEEL for Sept. 21, page 27 and a further detailed analysis will be published in an early issue.

The process was demonstrated at the metal exposition and proved a feature attraction. An accompanying illustration shows the production equipment required and the two men who developed the method, Messrs. Tran and Benninghoff.

Mr. Tran reviewed essential features of the "Tocco" process as it is now being applied to the surface hardening of crankshaft bearings. Essentially the equipment involves a frequency changer, transformer, a series of inductor blocks which are perforated to admit quenching water and various auxiliary equipment required for handling the product.

Heat Generated by Induction

Power output of the frequency changer, which is similar to those for induction melting, may be regulated automatically or manually. High frequency current at high voltage is transformed into low voltage with high amperage through a water cooled transformer from which it passes into the inductor blocks placed around the surface to be hardened. The inductor block in turn acts as the primary coil of a transformer inducing a current in the magnetic object to be heated through a minimum air gap which has been predetermined and is mechanically maintained. Heat generated in the steel is a result of two losses—hysteresis loss and eddy current loss.

Built into the inductor block and integral with it is a water jacket. Instantaneous quenching is accomplished by pressure spraying through orifices on the inner faces of the blocks. The contour of the inductor block controls the contour of the particular surface to be hardened.

With regard to preparatory thermal treatment preference is had for steel of the McQuaid-Ehn grain size rating of 6 to 8 with only a slight degree of abnormality. This slight abnormality together with the fine grain steel produces a martensitic structure in the hardening zone without the customary martensitic cracking.

To insure success of the process, particularly in producing a good bond the steel used should either be previously heat treated to a predominantly sorbitic structure or normalized to obtain a grain size that approaches the heat treated structure. The heating cycle used in the induction hardening process is so rapid that it permits little or no diffusion time which necessitates having the steel in proper condition before hardening.

After hardening the entire shaft is drawn at a low temperature to remove all stresses, and a finish grind to remove the 0.020-0.030 inch left on the diameter before hardening completes the shaft. It is then subjected to a thorough examination for surface defects by the magnaflux process and checked 100 per cent for hardness, the latter being held to a minimum of 57 Rockwell C.

Summarizing, Mr. Tran stated that as a result of the development of this process it is now practical to use properly cooled as-forged or normalized crankshafts in place of heat treated crankshafts in the automotive field. In the heavy-duty engine field he pointed out that carbon steels may be substituted for alloy steels and he suggested the possibility that less expensive steels will ultimately be used in aircraft engine crankshafts. He pointed out that there is no anticipation that the new method will replace completely other methods of producing high surface hardness but that it represents a new tool for the metallurgist and motor designer to be used at their discretion.

OBSERVATIONS on continuous gas carburizing were presented in a paper by R. J. Cowan, metallurgical engineer, Surface Combustion Corp., Toledo, O. He cited the results of an extensive series of tests on 10 different steels of the common carburizing variety

M. A. Tran (left) and W. E. Benninghoff demonstrate features of the machine they have developed for surface hardening of automotive crankshafts by induction heating, the equipment being exhibited in operation at the exposition

to ascertain the effect of gas flow upon the rate of carburization and on case depth. He also summarized a group of experiments using, in turn, city gas, cracked gas and natural gas under various operating conditions.

Mr. Cowan observed (1) that the matter of gas flow is important and should be carefully established for each insulation; (2) that carburizing gases need not be thoroughly dried but will function efficiently in the presence of considerable water vapor; (3) that alloy trays containing 35 per cent nickel and 15 per cent chromium have an effect upon the carburizing reaction; (4) that the alloy used in the muffle has but slight effect if any upon the carburized material and (5) that the presence of mill scale upon work to be carburized accelerates the carburizing rate.

J. F. Wyzalek, Hyatt Bearing division, General Motors Corp., Detroit, told of his experience with continuous gas carburizing and stressed the need for thorough cleaning of the product, preferably by a vapor method. He also stated that the introduction of the carburizing gas through four separate inlets, together with a special design of roof inlets, had improved the operation.

Effect of scale upon the carburizing rate in batch-type furnaces was studied by G. T. Williams, metallurgist, Cleveland Tractor Co., Cleveland, and from tests which he made it appeared that scale had little or no effect.

Continuous bright annealing of cold-rolled strip steel on a production basis was discussed in a paper by N. P. Goss, Cold Metal Process Co., Youngstown, O., and T. B. Bechtel, Electric Furnace Co., Salem, O. A furnace was described which was capable of bright annealing 8 to 10 tons of strip per day. Heating chamber measured 2 feet 6 inches by 10 feet. Cooling chamber was 45 feet in length; power consumption was 120 kilowatts. A chain drive operated all rollers, the latter being of nickel alloy steel in the heating zone and brass in the cooling zone.

Present Results of Studies On Structure of Welds

WELDING has become a firmly intrenched, widely accepted tool of industry," said E. L. Shaner, editor of STEEL, in his address of welcome at the seventeenth annual meeting of the American Welding society in Cleveland Oct. 19.

"We find our entire industrial structure rapidly adapting itself to the new philosophy of providing more goods for more people," he continued. "We see new developments in all lines of industry which, if we analyze them closely, represent a desire to key into this new American system of cultivating volume markets. Welding cannot escape the significance of this trend. In fact, welding finds itself right in the very path of this new march of progress." Mr. Shaner predicted a bright future for welding, especially if methods continue to improve as they have in the past.

METALLURGICAL Aspects of the Welding of Steel," by E. S. Davenport and R. H. Aborn, research laboratories, United States Steel Corp., Kearny, N. J., was the first paper to be presented before the society. Mr. Davenport, who presented the paper, explained the changes which take place in steel during welding with the air of iron-carbon constitutional diagrams and photomicrographs. For convenience of explanation, he divided the iron-carbon composition diagram into five zones and used this as a basis of explanation for the variation in structure of the metal from the center of the weld out toward the parent metal in the original state.

The more important factors which influence the final structure of the weld, apart from those which may alter the real composition of the molten metal were given as: (1) Composition and initial state of parent metal; (2) rate of heating; (3) maximum temperature attained, and time interval at this temperature; and (4) rate of cooling.

The effect of metallurgical treatment following welding was discussed and explained with the aid of the iron-carbon composition diagram. The welding of alloy steels and the effect of the various alloying elements upon the thermal properties of steel was covered briefly. The discussion was closed with a few notes on freezing of liquid steel in a weld.

PRACTICAL methods of obtaining desired ductility of welds were described in a paper entitled "Multi-Layer Oxyacetylene Pipe Welding," by R. M. Rooke, F. C. Saacke and A. N. Kugler, Air Reduction Sales Co., New York. Technique, results of tests, and recommendations with regard to specific applications of the process were among the subjects discussed.

LOCALIZED preheating of the edges of metal to be welded by means of induced electrical current is now being carried out in the laboratories of the department of electrical engineering. University of Wisconsin, Madison, Wis., according to Edward Bennett of that institution. In his experiments he has succeeded in raising the temperature of the metal to welding temperatures with the experimental equipment at hand.

Alternating currents with a frequency of 1000 to 20,000 cycles per second are required and some additional work in the design of heavy-duty apparatus to generate these high frequency currents is necessary before complete data of commercial scale operations will be available. The field of application is to industrial heating operations in which it is necessary to heat the edges or narrow surface strips of metallic conductors, particularly ferromagnetic materials, for such purposes as brazing, welding, annealing, hardening, enameling, or alloying.

AVIATION, refrigeration and railroad industries will find much of interest in "The Effect of Low Temperature on the Tensile Impact Resistance of Iron, Steel and Welded Joints," presented by Otto H. Henry, assistant professor of mechanical engineering, Polytechnic Institute of Brooklyn, N. J. The behavior of various types of material and the various types of welds at low temperatures does not conform with the usual conception that, other things being equal, an increase in tensile strength is achieved at the expense of ductility and vice versa. Tests were carried out at temperatures down to —80 degrees Cent. An interesting feature of these tests is that notched specimens were not used in any case.

A proposal to strain seat angles beyond the elastic limit was made in "Welded Beam-Column Connections" by Inge Lyse and G. J. Gibson, Fritz engineering laboratory, Lehigh University, Bethlehem, Pa. In the lively discussion that followed the authors defended their position by stating that they were dealing with certain end restraints and that in all tests the beams failed before the seat angles although the angles were permanently distorted as much at ½-inch before the beam failed. Further written discussion after a complete study of the paper was promised by those who opposed the authors' views.

Ingraham's new Lapel Watch is eclipsing all sales records—attributed to the smart new case created by Aristocrat Clock Co., N. Y., distributors, and to the remarkable beauty and durability of the finishes applied—S-W Kem Art Metal Finish in a fine, even texture and S-W Kem Baking Enamels in a high gloss.

Comments H. S. Products Finishing Co., Brooklyn, N. Y., "Kem Art Metal and Kem Baking Enamels are so far ahead of similar type finishes that they are in a class by themselves.

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Blast Furnace Practice Is Topic at A.I.M.E. Sessions

FEDERAL and state authorities are becoming more insistent on blast furnace plants keeping flue dust out of navigable rivers and harbors, so as to avoid periodic dredging. In fact, contamination of all streams and lakes is being prohibited more universally. Even small blast furnace plants, which make only a small amount of wet dust, insufficient to justify recovery economically, are taking steps to avoid further pollution and future trouble with the authorities.

This fact was brought out by T. B. Counselman, manager, industrial division, the Dorr Co. Inc., Chicago, in speaking on "Recovery of Blast Furnace Flue Dust from Scrubber Water" at the blast furnace session of the Iron and Steel division, American Institute of Mining and Metallurgical Engineers, Hotel Statler, Cleveland, Oct. 20.

The most widely used clarification device for the recovery of flue dust from scrubber water is the round thickener, with slowly revolving plow arms, which continuously rake the settled solids to a central discharge point. The speaker pointed out that there now are approximately 55 installations of these thickeners in this country and abroad, serving 120 blast furnaces. After describing the development of various types, the speaker described the improvement which has been made in the mechanism for large diameter single compartment flue dust thickeners. He referred to the Torq thickener originally developed for service in the desilting of Colorado river water for irrigation purposes. This mechanism, he explained, is carried on a central pier, the weight being carried on a large diameter ball bearing, as in the balanced tray thickener.

Handles Overloads

The Torq unit is driven from the center by an internal ring gear and practically all of the mechanism is submerged. The feature of this particular type unit consists of hinging the arms in such a way that in case of an overload or starting up a machine when the raking blades are partly buried in sludge, the arms swing backward and upward, riding over the settled solids but still carrying a full raking load. All this takes place, he explained, without increasing the torque on the motor, and without any attention on the part of the operator.

In describing two of these 70-foot machines recently installed at the Corrigan-McKinney plant of the Republic Steel Corp., M. T. Morgan, in charge of the installation, pointed out that the tanks are built above ground. Two outlets from the tanks start with an 8-inch pipe and valve which is reduced down to 2½-inch pipe before reaching the sludge tank. The material from the unit is discharged either on a conveyor belt leading to the pug mill in the sintering plant, or on an auxiliary belt which carries it to the ore yard.

Mr. Morgan, in speaking on the best way of adapting sludge to the operation of a sintering plant, warned that in handling sludge of 30 per cent moisture content, sufficient carbon must be present to effect sintering. The best practice, he explained, is to add the smallest amount of wet sludge to the sintering mixture. The speaker was of the opinion that wet sludge eventually will replace ore in the furnace burden to a large extent. The aim is to make a uniform sinter, inasmuch as blast furnace operation varies in line with the uniformity of sinter.

Labor Costs Mount

Considerable light was thrown on labor costs in the south by J. M. Hassler, engineer, Republic Steel Corp., Birmingham, Ala., who spoke on "Offsetting Increased Labor Costs in Southern Blast Furnace Operation." He presented figures to show how iron ore and coal mining and coke oven operation have slumped off during the last few years, all because of increased labor costs. Freight rates also narrowed down the market and there was nothing left except for firms to go out of business. In analyzing over 1000 wage rates, before and after the New Deal, the speaker pointed out that 40 per cent of the workers in the south made 30 cents or less in 1933 compared to 45 cents in 1935, an increase of 50 per cent.

Labor costs per ton of iron produced in the south is about the same now as in 1916, according to data presented by the speaker. During the interim, however, the costs rose and fell like a saw tooth, the reduction each time having been brought about by mechanization.

One of the ways in which the Republic company lowered its cost of ironmaking at the Thomas plant, was by the installation of a modern sintering plant, the only one in the south at the present time. This plant, the author pointed out, has a capacity of 60 tons an hour. Because of high carbon, the flue dust is mixed with ores before sintering. The mixture is composed of 40 per cent of pile flue dust, 10 per cent sludge and the remainder ores. The ore is first crushed and the ¼-inch size mixed with the flue dust. Other sizes of screened ore range from ¼ to 1-inch and from 1-inch and over, these uniform sizes having bettered the furnace operation. Moreover, the top of the furnace has been widened to reduce flue dust losses, the stack now being 17 feet in diameter at the top.

As a result of this alteration, capacity has been increased 60 tons per day, flue dust reduced 100 pounds and in addition, 200 pounds less coke is required in the burden. Many southern blast furnaces employ a triple skimmer at the pig machine and indirect cooling at the bottom of the pig mold as a means of producing uniform pig.

Must Use Leaner Ores

One of the things confronting blast furnace men in the Birmingham district, is the beneficiation of leaner iron ores, according to Mr. Bransford, manager, Republic Steel Corp., Birmingham, Ala. Many of the ores in this district, he pointed out, contain 26 per cent iron and 30 per cent insolubles. The time has come, he warned, when furnaces must use these ores. By fine grinding and floating off the insolubles, he explained, it is hoped to obtain an ore analyzing 50 per cent iron and 10 per cent lime and insolubles. But all this costs money, the speaker stated.

The best grade ores are fast becoming depleted in the south, and mining costs are high. Iron ore is transferred four or five times in the mine and is worn out by the time it arrives at the surface, the speaker contended. Approximately 20,000 tons of ore can be mined each month for about 80 cents a ton but by the time it is beneficiated, the cost is high.

Although we are paying about the same wage rate as is paid in the north, the speaker explained, wages gradually are getting into higher ground and it is impossible to get the same amount of work out of southern labor as is afforded by northern workers. Southern labor is good, the speaker emphasized, but on account of climatic conditions, the vitality of workers is sapped by the heat.

R. A. Lindgren, assistant superintendent, blast furnace department, Wisconsin Steel Works, International Harvester Co., South Chicago, Ill., in speaking of "Some Observations Regarding Refractories for Iron Blast Furnaces," concluded that the ideal firebrick for blast furnaces must be free of

all elements that possess catalytic properties that lead to deposition of carbon within the structure of the brick itself, which create internal strains that ultimately cause the brick to shatter.

Because of the importance of bricks being free from laminations and porous centers, the speaker was of the opinion that the de-airing of the blast furnace brick is one of the greatest advances made in the refractories industry during the past decade. The speaker pointed out that the answer to accurate size of bricks will be found not in more accurate methods of shaping the "green" bricks but in the firing of the bricks in the kiln.

Brick Life Will Vary

In commenting on this paper, Dr. John Unger, Pittsburgh, emphasized that to base the life of brick on the tonnage made is a great mistake. You may get 1½ million tons of pig iron off a lining but fall far short of this tonnage in the production of ferromanganese. The difference, he explained, lies in the intensity of reduction. The temperature in the manufacture of ferromanganese is higher. Furnaces in which ferromanganese is manufactured always show a much greater disintegration of lining than do furnaces burdened on iron.

Disintegration of refractory linings does not necessarily occur from carbon monoxide gas, the speaker pointed out. He explained there is not much disintegration in gas producer and stove hot blast stove linings.

Mr. Unger made a plea that blast furnace operators be more frank with brick manufacturers relative to the use to which brick is to be put.

The speaker cited an experiment in which finely ground iron ore and iron ore about the size of a raisin were added to clay free from iron. The mixture then was subjected to disintegration by being exposed to carbon monoxide averaging 80 to 90 per cent in order to give quick results. Brick made from the fine particles of iron ore showed fine cracks while those made from the larger particles of iron ore showed larger nucleus. In conclusion, Mr. Unger emphasized that iron in brick must be in a certain form to cause disintegration. That is, the iron must be in the form of a magnetic oxide which does not disintegrate like ferric oxide. He explained that the mixture of the two oxides produced disintegration. Other papers presented at the blast furnace session included "Iron Ores of France," by Francois Clerf, general manager, Acieries de Benain and Anzin.

At the afternoon session of the Iron and Steel division, three papers were presented dealing with open-hearth steel plant practice. In speaking on "Some Factors Affecting the Life of Ingot Molds," W. J. Reagan, open-hearth department, Edgewater Steel Co., Oakmont, Pa., pointed out that all ingot molds to which reference was made in his paper were used in the production of basic open-hearth killed steel. Bottom pouring practice was followed and all cold metal charged.

A striking example of the effect of manganese upon ingot mold life was shown by graphs. One mold containing about 1.20 per cent manganese stayed in service for 270 heats before being scrapped, compared with another mold containing about 0.60 per cent manganese which had a life of less than 150 heats.

Life of two large groups of molds, one containing 24 and the other 25 molds, was depicted by chart. The graph showed a striking difference between direct metal molds and cupola metal molds, as well as a difference between high and low manganese. The direct metal group with a much higher manganese content showed an increase in mold life over the cupola metal group of about 26 per cent. The graph also indicated that when the silicon content is 1.60 per cent or higher, it apparently has an appreciable effect in reducing mold life.

In conclusion, Mr. Reagan pointed out that two factors affected ingot mold life, namely, wall thickness or mold weight, and chemical analysis of the metal, particularly manganese. Manganese of approximately 1.50 per cent with silicon of about 1.60 per cent seemed to give maximum mold life. Silicon content of over 1.60 per cent results in a shortening of the life.

Wall Thickness Important

G. W. Putnam, open hearth department, Republic Steel Corp., Youngstown, O., in discussing Mr. Reagan's paper, emphasized that the most important item affecting the life of molds is the proper wall thickness at the right point. In the preparation of the mold, the speaker recommended a tar coating. Salt dip decreases the life of molds 25 per cent, whereas a water dip increases the life, the speaker pointed out. In his opinion, the two most important factors affecting the life of the ingot iron molds are design and the service which they render.

In replying to a question relative to what effect brinell hardness has on the life of molds, E. J. Kaufmann, vice president, Valley Mold & Iron Corp., Hubbard, O., cautioned that the brinell hardness test measures the suitability of the mold in a rough way but that it does not give a close control check.

The session was brought to a close by the presentation of a paper entitled "Speeding Up Steel Refining" by B. A. Rogers, senior metallurgist, metallurgical division, bureau of mines, Pittsburgh.

GENERAL view of a portion of the "gas section" of the exposition, in which manufacturers of furnaces, burners and related equipment demonstrated their products

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These and scores of other problems are vital in this recovery period. Preparedness for recovery is more important than preparedness for war.

STEEL's annual issue—the "Yearbook of Industry" number dated Jan. 4, 1937—will deal with these problems of preparedness. Every one of the more than 30 major articles will be pointed toward the single question "Is Industry Prepared?" By text, illustrations, statistics, tables and charts, STEEL will attempt to show wherein the industries it serves are weak or strong in their state of readiness for big business ahead.

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'YEARBOOK OF INDUSTRY' issue

Jan. 4, 1937

Straight-Line Type of Cleaning House Described Before Wire Technicians

ADVANTAGES of the straight-line method of cleaning house construction over the older or circular type were outlined by A. F. Anjeskey, Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., at an early session of the Wire association meeting in Cleveland, Oct. 19. The whole problem of a cleaning house breaks down into a consideration of materials handling problems, in the opinion of the speaker. His presentation covered the layout of an ideal cleaning house from the standpoint of dimensions; handling, storing and measuring acid; and type of materials handling equipment to be used for the greatest efficiency. According to Mr. Anjeskey, savings in labor ranged upward to 80 per cent with the installation of the straight-line method of cleaning. Problems of tank draining have been overcome in numerous cases, he said, through the use of siphons set in a special gutter which drains the liquids and all foreign matter without the disadvantages of holes in the bottom of the tanks. However, with the use of this method of drainage it is necessary to agitate the liquid as it drains to insure proper sludge disposal.

In the discussion following this paper, Curtis Voightlander, Union Wire Rope Corp., Kansas City, Mo., stated that in a process involving fine wire and many different alternating cleaning operations, the circular layout was the most efficient. K. B. Lewis, New York, noted that efficiency of the newer straight-line installations was due in part to the advancement in technique and not entirely to advantages of design. However, future developments along these lines point toward an advance in electrolytic cleaning process, in the opinion of Mr. Anjeskey, which will work to greatest advantage in the straight-line system. Generally discussed was the problem of pressure spray vs. hose cleaning, and advantages of the spray system in the new layouts were shown, instances being cited to further the conclusion that sprays have been proved satisfactory.

GENERAL review of the application of gas atmospheres to direct fired furnaces and prepared gas atmospheres to indirect heated furnaces as applied to ferrous and nonferrous materials was given in a paper by H. M. Heyn, Surface Combustion Corp., Toledo, O. Varying requirements of users of wire have demanded better metallurgical control in the wire producing industry, said Mr. Heyn. As a direct result of these demands, better heat treatment has been required. Advantages of application of prepared gas atmospheres to process furnaces are apparent in the resulting higher caliber of work obtained from the furnace. However, the speaker cautioned, each individual job must be decided after a consideration of all factors in order to determine sane costs.

VITAL metallurgical characteristics of wire to be used in the manufacture of shielded arc electrodes were outlined in a paper by Robert Notvest, J. D. Adams Co., Indianapolis, for which he was awarded the Wire association medal. Requirements of these wires differ greatly because of the superheating and freezing of the metal used in these electrodes. In commenting on this paper R. S. Simmons, Keystone Steel & Wire Co., Peoria, Ill., charged that only by extraordinary precautions from the charging of the open hearth to the straightening of the wire preparatory to coating can superior arc welding electrodes be prepared. Satisfactory electrodes which will serve in many applications can be made through the ordinary processes, but for uses which must meet rigid specifications such as the A. S. M. E. boiler code, high grade electrodes are essential.

Copper in electrodes volatilizes at low temperatures, with resulting loss, said Mr. Notvest. In French and German specifications, copper up to .16 or .21 per cent, is allowable, but in this country general practice has been to hold the limit to .12 per cent copper. Higher percentages affect the conductivity of the arc.

Glances at Metal Exposition

(*Concluded from Page 25*)

sary kinetic energy and velocity. These two systems have no interconnection or effect on each other except through the test specimen during the process of rupture. This machine, developed by H. C. Mann and Capt. R. K. Haskell, Watertown arsenal, Watertown, Mass., is capable of producing velocities up to 500 feet per second.

* * *

COMPETITION for the distinction of rolling the world's largest stainless steel sheet has been keen for several months. The latest claim for honors is made by the American Rolling Mill Co., Middletown, O., with the 18-8 chromium-nickel sheet which was shown in its exhibit. This sheet was 84 inches wide and 240 inches long. It was 10-gage and weighed approximately 1 ton. Surface finish was No. 4 polish.

* * *

WITH METAL FINISHING assuming more and more importance in the metalworking industries, two exhibitors last week demonstrated modern methods of electroplating. Bright zinc barrel plating was shown in operation by the R. & H. Chemicals Department, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. In connection with this process, the company introduced publicly for the first time a new brightening agent, a liquid which is claimed to be easy to handle and control and is noninflammable, nontoxic and noncorrosive. Grasselli Chemical Co. Inc., Cleveland, demonstrated a conveyorized tank model of cadmium plating equipment. Tanks were made of glass placed at such height that visitors could see the reactions taking place. Small objects were placed on conveyors and passed through the various cleaning, rinsing and plating operations.

* * *

CUSTOMARY procedure in electroplating is to immerse the parts to be plated in the plating bath. This procedure has been reversed by the Nickel & Chromium Products Co., New York, which demonstrated that it is not only possible but practical to take the bath to the work. Briefly, the process, which was developed in England, is unique for the electrolyte is brushed on the work. Equipment consists of a small transformer and rectifier which is plugged into any convenient 110-volt alternating current socket and a special brush which becomes the anode when connected to the rectifier. The cathode clip is attached to the work. It is said that 0.0005-inch of nickel can be deposited in 5 minutes; continued brushing increases the thickness of the deposit. The process is said to be applicable to any surface which can be reached with the bristles of the brush. Since the equipment is portable, work which cannot be moved can be plated. Metal storefronts have been plated in this manner.

Hydraulic Descaling Valve Facilitates Removal of Tight Surface Scale

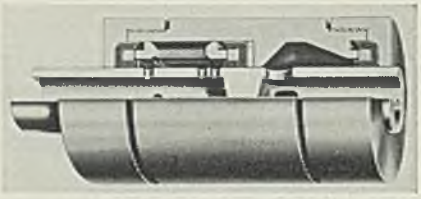
LONG life is one of the advantages of a recently developed hydraulic descaling valve which is constructed in such a manner that the water seal becomes tighter with the increase in pressure. Special ports in the valve body provide balanced pressure in the valve continually. The body or plunger, which is made of stainless steel, is the only moving part in the valve proper. It is operated by a specially mounted air cylinder which in turn is controlled by a double solenoid specially constructed pilot valve.

Assures Close Control

Special air valves with the two solenoids on a common base assure close control, high efficiency and safety in the operation of the unit. By the use of the double solenoid the current for the actuation of the cylinder in the forward or reverse direction is applied only momentarily. Both the descaling and pilot valves are constructed so that they can be removed for inspection and assembled quickly. All water passages are machined. Ryertex guides are used for valve body travel.

Water hammer is eliminated by reason of the fact that the operating speed of the valve can be controlled within wide limits, the opening and closing speeds being adjustable independently. Velocities through the valve are claimed to be 25 per cent lower than through pipe of corresponding size. Absence of metal-to-metal wear in the valve proper promotes long life.

A special high-pressure valving unit for pressure in excess of 250 pounds is shown in the accompanying cutaway illustration with the valve sleeve at the outlet end of the unit and the supply trapped by the middle packing. When the sleeve is moved to the inlet end to open the line, equalization of pressure is provided on both sides of the valve middle packings. The lower portions shown in the valve body are pressure equalizing ports and supply at all times to the inside of the two lower packings, thus maintaining a permanent pressure-tight seal.

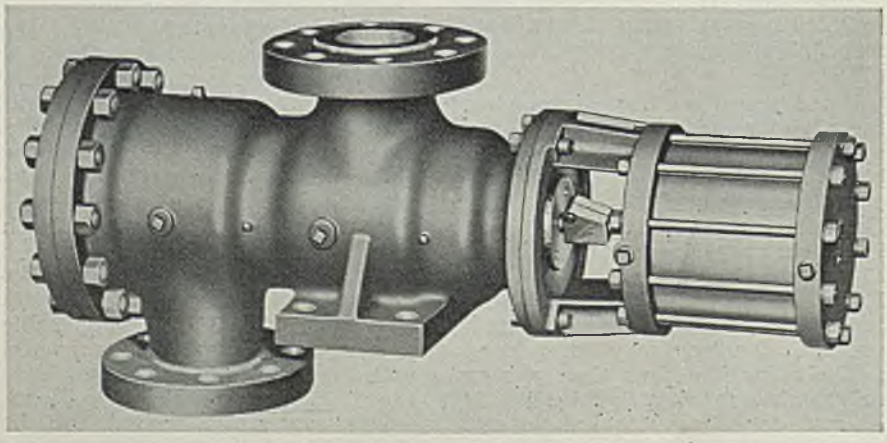


Cutaway view of special hydraulic valving unit

A hard stainless steel ring passing the valving ports cuts off practically all the flow and, consequently, takes all "wire-drawing" away from the packing. It is only necessary, therefore, for the packing to seal off the slight seepage which passes through this protecting ring.

Upper and lower stainless steel retaining rings protect the packing from possible destructive action where high pressure would exert itself ordinarily at the sealing surface. Operation of the valve unit is balanced at all times, the pressure acting constantly to maintain a tight seal.

Both the descaling and special hydraulic valve, which operates on the same principle as the descaling unit, are manufactured by C. B. Hunt & Son, Salem, O.



New type valve for controlling the spray in descaling operations

• • •

Produces Four Heats Daily

Bolt stock in the form of coiled wire rods now is being heat treated in furnaces of the radiant tube type. The unit includes a gas-filled bell type annealing cover, three bases, a cooling cover, two inner covers, heat control valves and temperature control instruments. Coils of rods are piled on an alloy steel base plate to a maximum height of 64 inches, the charge weighing 5830 pounds. Four heats are produced daily.

• • •

Markets Acidproof Cement

Construction of acidproof refractory linings for rubber-lined steel pickling tanks such as installed in many wide strip mills is greatly facilitated by the use of recently marketed sulphur cement. Advantages include unusual bonding strength and high resistance to vibration, mechanical shock and sudden temperature change, all of which are gained without sacrificing acid resistance or structural strength.

• • •

Furnaces Are Well Lighted

Investigation of lighting conditions in the open-hearth shop of an eastern steelmaker has led to the adoption of glass-lined lighting fixtures on the pouring side of the furnaces. In addition spot lights are mounted on the sidewall opposite the furnace. This arrangement enables the ladle crane operator to hook onto the trunnions more easily without jarring the ladle.

THE YEARBOOK ISSUE

January 4, 1937

Editorial:—

IS INDUSTRY PREPARED FOR REAL PROSPERITY ?

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Operators Endorse Coke Crushing and Screening

CRUSHING and screening of furnace coke was endorsed by the majority of operators who contributed to the discussion on this subject at the joint meeting of the Eastern States Blast Furnace and Coke Oven association and the Blast Furnace and Coke association of the Chicago district, held Oct. 16 at the Palmer House, Chicago.

One operator presented figures showing a reduction in coke practice of about 50 pounds per ton and flue dust of about 100 pounds per ton and an improvement in the average sulphur in the iron. These data were taken over a 4-year period. During the last two years of this period the plus 4-inch coke was crushed and all put over a 1-inch square mesh screen, the oversize going to the furnaces. This operator expressed the thought that increased attention should be paid to the sizing of other materials going into the furnace.

One operator who uses 2 to 3½-inch coke exclusively on his furnace rescreens again at the furnace and the fines are returned on a belt to the coke plant. He reported good furnace practice and attributed some of it to the uniformity of the fuel.

Another operator who has had extensive experience with the use of sized coke stated that he preferred to use some of the smaller size coke when it was charged in separate rounds. He secured the best results under normal operating conditions by the use of 10 per cent pea, 20 nut, and 70 furnace coke.

Uniformity Shows Results

At one plant where the coke is not crushed and sized but is screened over a grizzly section at the furnace, figures were presented for a period in which the grizzlies were out of operation, showing a decrease in tonnage and burden, an increase in flue dust and coke rate and tuyeres burned. A screening station was installed at one plant to meet a growing demand for domestic coke. However, due to the irregularity of shipments of this coke there were times when the smaller sizes were used on the furnace. Possibly due to the irregularity of its use, it was found that the furnace operation was not improved by the addition of these smaller sizes of coke. The thought was expressed by several of the operators that there was a greater financial return when the smaller sizes could be classed as furnace coke.

The following factors were suggested as the ones to consider in deciding on the extent of pulverization of coal:

1. Reduction of size of coal particles to effect the most complete mixing.
2. Control of density of prepared coal.
3. Reduction of segregation of prepared coal.
4. Cost of handling prepared coal.
5. Effect on other phases of operation.

The thought expressed by most of the men who discussed this question was that a pulverization of from 70 to 90 per cent through ⅛-inch mesh gave the best coke for furnace use. One operator reported that a series of tests showed that the power consumed rose rapidly when pulverizing beyond 65 per cent. In spite of this, he thought the finer pulverization was more economical.

Use is Only Sure Test

It was reported that at one plant one of the newer type crushers was installed this year which resulted in more uniform crushing, less fines, and a more even wear on the hammers. At another plant, a segregation so bad that the irregularity in the coke was apparent to the eye was entirely corrected by installing spreader plates in the bins, pulverizing the coal much finer, and adding water both before and after the crusher.

The suggestion was made that in a new or rebuilt plant the oven larry bins might well be done away with. The charge density then could be controlled by varying the pulverization over a wide range without being so concerned about segregation. Another suggestion was made that the fines should be kept out of the Bradford breaker.

The only positive test of the value of a coal is to coke and use it in a furnace, since the cost of a ton of pig iron is the final criterion, according to the opinion of many operators. At one plant the plastic range of the new coal is first determined and compared with the range of the other coals with which it would be used. If there is a too great variation, the coal is dropped from consideration. If the range is fairly close, they continue with other tests, among which is a distillation test and a box test with parallel box tests with the regular coals.

Control of the strength and hardness of coke by varying the percentage of high and low-volatile coals was reported by several. One operator who makes all types of coke uses the following proportions:

Grade of Coke	High volatile coal, per cent	Low volatile coal, per cent	Coking time, hours
Furnace	87	13	19
Domestic	75	25	19
Foundry	60	40	36

Another operator recently increased the low-volatile coal in his mix from 23 to 30 per cent although this raised the cost of the coal considerably. He obtained an improved quality of iron, 100 pounds per ton lower coke rate, and 60 to 100 pounds per ton lower dust. This more than compensated for the more expensive coal mix.

The point was made that in many cases the high-volatile coals have a higher ash content than the low-volatile coals, and the improvement noted when the percentage of low-volatile coal is increased may be due to some extent to the lower ash in the mix.

Discussion of physical testing of coke and correlation with furnace operation brought out considerable variation in the practice at different plants. At one plant a tumbler test is in constant use. Definite limits of strength, hardness, brittleness, and weight as expressed by the standard tumbler test formula are set up, and the coke is kept within these limits by varying coal mix, pulverization, and oven temperature. At this plant definite effects on furnace operation is noted if the coke gets out of the range established. At another plant a definite relation between swings on the furnace and swings in the tumbler test results have been found.

Variations Are Revealed

One operator told of an experience in making an abrupt change on a furnace from one coke to another of different characteristics. When the change came through, the furnace swung hot and 1800 pounds of burden was added before the furnace leveled out. The drum tests made beforehand on the two cokes showed considerable variation, but the operator pointed out that the screen tests showed the same variation. Other operators, however, thought that the drum test accentuated slight differences.

Several operators reported that they had abandoned tumbler tests when, after extensive trials, they had failed to prove their worth. It was suggested that at the larger plants there might not be the ap-

plicability for this testing method that there was in the smaller plants.

At one plant a combination of tests is used and a formula applied that gives a "Physical Fuel Value" from the results obtained from tumbler, shatter, and screen tests, and the porosity. They find that this formula gives consistent results, and they have determined within limits the effect of this factor on the cost of a ton of iron. Having calculated the effect of a variation in chemical analysis on the cost of the iron, they can show the net savings per ton of iron from any change in coal mix.

Theoretical consideration has not succeeded in definitely establishing the superiority of wide over narrow ovens or vice versa. On the practical side, few plants are equipped with both wide and narrow ovens, and a comparison between wide ovens in one plant and narrow ovens in another would have little value. It was reported that at one plant where both types of ovens are in use, tumbler tests failed to disclose any difference in the products. In fact, none of the operating force could tell, by looking at the coke on the wharf, from which battery it came.

Dusseldorf Plays Host to International Foundrymen

GERMANY, for the first time since international foundry congresses have been regularly organized, was the scene of the Sixth International Foundry Congress and Exhibition, held in Dusseldorf, Sept. 16-20. Over 2000 delegates from Germany and from more than 20 foreign countries were present.

Among the numerous foreign delegations, the American Foundrymen's association was represented by a number of prominent members, headed by Thomas W. Pangborn, president of the Pangborn Corp., and by Vincent Delport, European manager of STEEL, in his capacity as European representative of the association.

International committee of foundry technical associations held its annual meeting, with J. Leonard, president, in the chair. The American Foundrymen's association was represented by Mr. Pangborn and Mr. Delport. The calendar for forthcoming congresses was adopted as follows:

1937 Paris, France Congress C.
1938 Warsaw, Poland Congress C.
1939 London, England Congress A.
1940 Milan and Rome, Italy Congress C.

At the conclusion of the meeting, Mr. Delport was elected president of the Committee for 1937, and Germany was designated as the country to appoint the vice president.

Technical sessions were well attended. Official exchange papers were presented by the technical associations of Austria, Belgium. France, Great Britain, Italy, Poland, Czecho-Slovakia and the United States.

The exhibition held in conjunction with the congress was recognized as one of the finest and most comprehensive held to date. Space occupied was about 18,500 square yards, of which nearly 3500 square yards were taken up by educational and technical exhibits. There were 170 exhibitors.

Considerable importance was given to the educational and technical exhibits, the arrangement of which methodically planned under the supervision of Dr. Ing. Geilenkirchen, director of the German foundry association, and Dr. Ing. Otto Ebling. This technical exhibit was divided into four main parts, each of which was divided into sections. Each of these sections was arranged and supervised by a specialist in the particular branch dealt with.

METALLURGICAL principles of the manufacture of foundry pig iron by a new melting process were reviewed by Prof. Dr. Ing. Von Max Paschke and Eugen Peetz. The following procedure has been adopted for the utilization of poor acid ores: The ores are treated in the blast furnace with limestone added in such amounts that, besides a fluid acid slag, a pig iron high in sulphur is produced, which is desulphurized after tapping by a basic slag or other adequate means. By reducing the amount of limestone added, both the volume of the resulting slag and the coke consumption are considerably reduced. By means of this process, foundry pig iron and other grades can be produced.

It was recommended to desulphurize immediately after tapping by the use of soda ash, added in the cupola ladle before pouring the iron. In the case of high sulphur contents, desulphurizing is carried out in two stages, using the slag from the finishing desulphurization for the preliminary treatment. Densely-burnt fireclay bricks with medium alumina content are specially suited for lining the ladle. Synthetically-produced high-sulphur foundry pig iron shows, after desulphurization, a pearlitic structure with finely-distributed graphite.

Cast iron and its present position as a material of construction was considered by Prof. Dr. A. Thum, of Darmstadt, who pointed out that materials with ever increasing strength value are necessary to keep in step with the progress made in modern machine construction. Strength, however, is not the only important factor. The tensile strength of a structural part is not only dependent on the material itself, but also on the design. From this point of view, testing methods also have been subject to modifications. High tensile and elongation values give an indication of the soundness of the material only. For the determination of "design strength," or strength in relation to a particular design, the sensitivity to notch effect is of paramount importance. Another requirement in modern construction is that a material must be easily deformed into every desired shape, with a view to obviating local discontinuities in the flow of forces, which would cause internal stresses. It is pointed out, in particular, that in the case of fatigue failures, fracture occurs without any previous deformation.

Chromium Steel Discussed

Physical properties of high-chromium cast alloy steel were summarized by Dr. Ing. Roesch, of Remscheid. The most commonly used chromium cast alloys have the following composition: Chromium 25-32 per cent, carbon 0.30-1.50 per cent; and chromium 14-16 per cent carbon 0.10-0.30 per cent. The structure of the alloy with 25-32 per cent chromium consists of chromium ferrite and chromium carbide; it has been stated that this alloy does not undergo a structural transformation by annealing, and the properties cannot be improved in this way. The 14-16 per cent alloy responds to heat treatment.

A most important feature of chromium cast steel is its resistance to acids. The chromium and the carbon content account for this resistance. There are three groups of chromium alloys: The first comprises the ferrite-carbide-chromium alloys which are of the completely stainless type without heat treatment; the second group comprises alloys which are rendered resistant to corrosion by heat treatment or by polishing the surface; the third includes chromium alloys which cor-

rode heavily, but have good resistance to wear.

Creep tests have shown that the alloys are rather brittle at low temperature, but ductile at above 500 degrees Cent. The addition of nickel increases the creep strength. The bearing properties of chromium alloys are not good. As regards castability, the 30 per cent alloy, particularly with about 1 per cent carbon, resembles malleable cast iron. The 15 per cent alloy is more on the order of cast steel. For the melting of high-chromium alloys, the acid furnace, especially the high frequency furnace, is preferred, stated Dr. Roesch.

Character of the surface and the surface qualities of cast iron were considered by Professor Diepschlag, of Breslau. The surface characteristics of a gray iron casting are of great importance. A rough surface calls for increased cleaning costs. A good skin is a protection against chemical reactions; it has a relation to certain strength properties of the casting; it is of great importance when enameling or some other form of coating is to be effected.

The speaker discussed the results of surface examination from two aspects—the exterior metallic layer, and the nature of the skin of the casting. The exterior metallic layers are generally of a lower content in silicon and carbon, but the sulphur content is generally higher than in the body of the casting; as a result, the hardness and brittleness of the outer layers are somewhat higher than the inside.

Heat-Resisting Iron

Recent developments in the manufacture of heat-resisting cast iron in France were reported by A. Le Thomas, Saulnes, France, in the French exchange paper. In heating cast iron to temperatures between 600 and 1000 degrees Cent., the castings undergo changes, which act partly in the same and partly in opposite directions. These phenomena, such as cracks and growth, and their causes, were discussed, and a mechanical device was described which enabled these phenomena better to be understood.

For minimizing corrosion and all other causes of growth, relatively high amounts of silicon, aluminum or chromium are added to the cast iron, these elements forming either an adherent surface layer or producing a dense and largely unattacked structure. In addition, cast iron may be given a high resistance to corrosion at elevated temperatures by hardening it, thus producing a considerable amount of cementite; or an austenitic cast iron is resorted to, which contains as alloying elements nickel, manganese and copper, besides chromium.

"Studies of Casting Stresses in Chilled Iron Rolls," by J. Erler, chief metallurgist, Farrel-Birmingham Co., Inc., Ansonia, Conn., was the official exchange paper presented by the American Foundrymen's association. When using chilled iron castings, three major stresses determine the limits of its usefulness: (1) Stresses set up by the applied load; (2) stresses set up by temperature variance within various sections of the roll; and (3) stresses formed in the casting process. Sach's method and modified formula are means to study stresses of chilled iron rolls without any great difficulty if such stresses do not exceed approximately 25 per cent of the ultimate strength.

Vary Through Section

If the relative modulus of elasticity does not exceed 25 per cent of the ultimate, it will increase from the center of the roll to nearly double on the chilled zone. Tension and compression have the same relative modulus within those limts. If the relative modulus of elasticity does not exceed 25 per cent of the ultimate strength, the Poisson ratio --1/3—can be calculated.

The stresses are compressive in the surface and tensional within the roll when the rolls are stripped at a low temperature. The rate of solidification of the metal in the necks indicates an effect on the magnitude of the stress within the roll. Deeper chill will increase the tangential stress on the outer zone and the radial stress in the center of the roll.

Variable-Speed Drives Assist Production Control

(*Concluded from Page* 55)

variable-speed transmission replaces the countershaft. Extended constant-speed and variable-speed shafts on these units permit considerable leeway in positioning the driving pulleys.

The Reeves variable-speed transmissions vary from No. 0 to 00 rating for the smaller machines and No. 1 on all the others except the largest which has a No. 3 transmission. All give a 6 to 1 speed ratio. The maximum and minimum speeds, however, are seldom required. These units are not of the enclosed type as comparatively no dust is created in the coiling operations. All are provided with antifriction bearings.

All variable-speed units are floor controlled by an endless chain operating over a sprocket on the units. With the ease in changing speed and the close adjustments possible the operators can easily increase or decrease the speed in small increments so as to obtain the maximum possible output within the tolerances of spring length and tension specified. Testing equipment for checking springs against these specifications is placed in the shop so that frequent tests are easily and quickly made on the spot.

Speed of coiling machines is determined by size of wire, tolerance or accuracy, and length of wire feed. The determination of the best speed with these three variable factors requires considerable experience and judgment on the part of the operators, but with the ease in adjustment any error in judgment is quickly corrected merely by a slight pull on the speed-control chain. As the men operate on day rates there is no tendency to crowd the machines and thus not meet the specifications. Supervision and their appreciation that only if the plant meets competition profitably can the operators expect continuous employment prevents operation at too low speeds.

Shaft Mounted Overhead

The lineshaft is ceiling mounted with the ball bearing four-point adjustable drop hanger mounted on alternate rafters and so spaced every 6 feet. The lineshaft driving the larger machines operates at 240 revolutions per minute and is driven by a 10-horsepower motor. The smaller group shaft operates at 270 revolutions per minute from a 5-horsepower motor. Split steel pulleys are used on the lineshaft. All overhead bearings require only periodic lubrication, thus removing need for frequent overhead servicing.

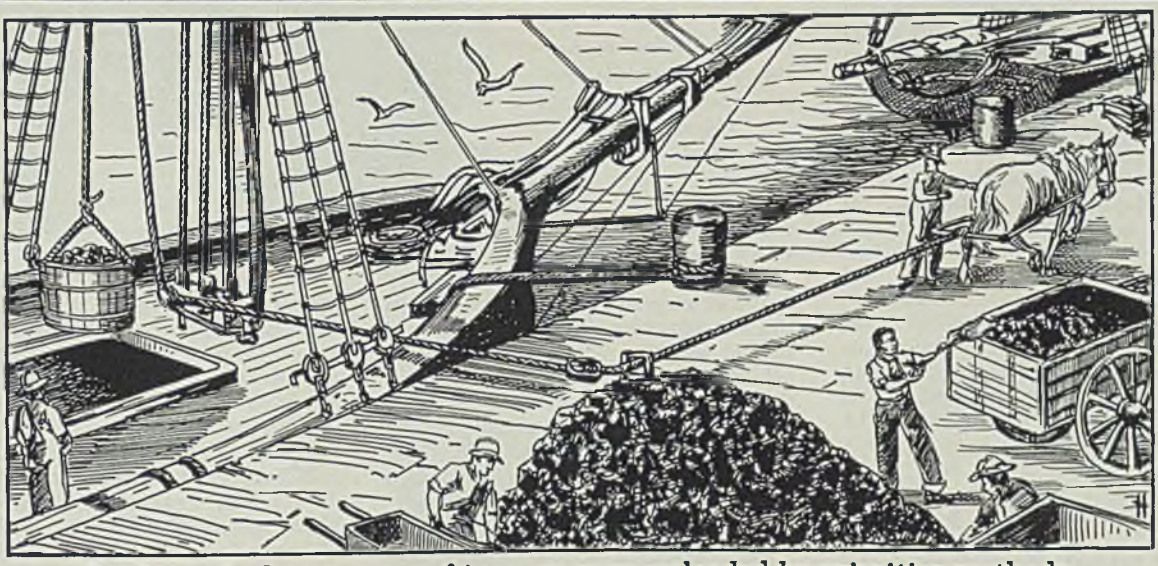
When it becomes necessary to add coilers, another row may be placed in the adjoining bay and driven from this same shaft by increasing the size of the driving motors.

Special racks are provided for wire storage along the wall opposite the machines. Large coils are stored on the floor. A mezzanine floor with racks is built above this for storing coils of smaller diameter wire, thus taking full storage advantage provided by the 13-foot ceiling.

Adequate lighting for dark days and the night shift is provided from 500-watt lamps in steel-glass diffusers spaced on 16-foot centers. In addition, each coiler is provided with an individual light on a flexible arm for use in making close adjustments.

An interesting feature of this addition is that the flat roof is planned so that the roofing may be removed and the floor added to the sheathing when it becomes necessary to add a story. Also, this roof is built to carry 4 inches of water before running off to cool the building in hot weather.

SINCE 1850



In the early days cargoes of iron ore were unloaded by primitive methods. A horse, block and tackle, and a bucket on a swinging boom made up the full equipment used in unloading iron ore cargoes.

CLIFFS SHAFT LUMP ORE
FOR OPEN HEARTH FURNACES

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Lake Superior Iron Ores of All Grades

•

COAL—Industrial . . . By Product . . . Domestic

THE CLEVELAND-CLIFFS IRON CO.

UNION TRUST BLDG. CCC CLEVELAND, OHIO

NEW EQUIPMENT

Horizontal Broach —

Oilgear Co., 1301 West Bruce street, Milwaukee, has built a horizontal surface broaching machine for rough and finish broaching the sides and bottoms of the main bearing cap surfaces that meet with the web of the crankcase in eight cylinder motors. Simplicity in operation, positive interlock for each step in the cycle, generative type tools with inverted mounting above work, tool slide with automatic lubrication, hardened steel ways and Oilgear fluid power are the principal features of this machine. All control mechanism is centrally located for the ease of the operator and so interlocked that if the cylinder block is not located properly or removed after being broached, it is impossible for the operator to shift the main control lever and actuate the broach slide and tools. The machine has a normal broaching capacity of 40,000 pounds, a stroke of 130 inches, broaching speed of 24 feet per minute and a return stroke of 60 feet per minute. Rate of finishing is 60 blocks per hour.

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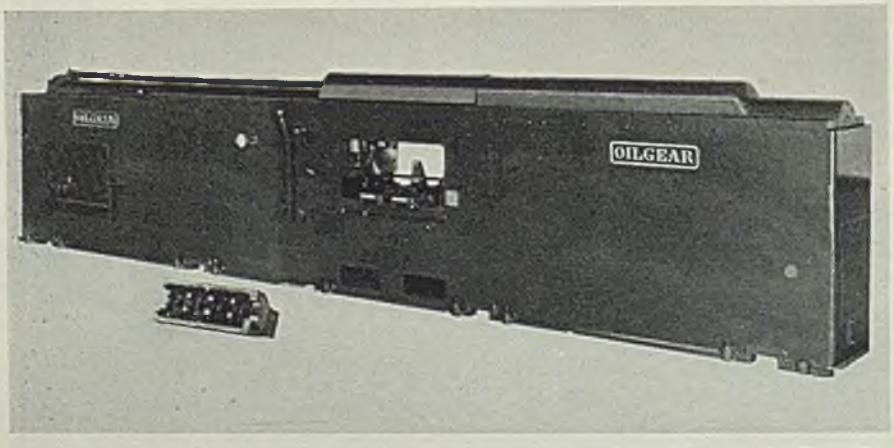
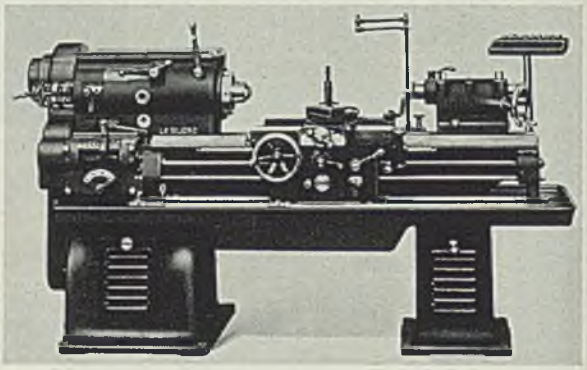
Yoke Operated Collapsible Tap—

Landis Machine Co., Waynesboro, Pa., announces a yoke operated collapsible tap for use on automatic screw machines. The tap is fitted with two flanges, against which a suitable forked type yoke attached to the machine operates for expanding and collapsing the chasers. The chasers are collapsed by having a yoke contact the flange near the front or chaser end of the tap upon the completion of the desired thread length. The chasers are reset to tapping position by having the second yoke contact the flange near the shank upon the return travel of the machine spindle. The detachable head feature used on previous Landis taps, whereby several sizes of heads may be attached to the same body, is used with this tap. The new product can be furnished in all sizes ranging from 1⅜ inches to 12 inches. It can be used either as a stationary or rotary tap.

Collapsible tap developed by Landis for use in automatic screw machines



Oilgear horizontal broach for finish broaching 8-cylinder motor blocks at a rate of 60 per hour



Le Blond heavy-duty tool room lathe which features roller bearing supported spindle and wide range of feed and thread speeds

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Toolroom Lathe—

R. K. Le Blond Machine Tool Co., Cincinnati, announces a new toolroom lathe. Headstock construction is rugged with the spindle supported at intervals by three antifriction bearings. Spindle rolls in preloaded roller bearings at front and center supports, with a roller bearing at the end to allow the spindle to float and to compensate for slight variations in the spindle due to temperature changes. All gears are hardened chrome nickel steel with teeth accurately cut and ground. Gears slide on splined shafts and the final drive is through a wide helical face gear. In addition to the gear train for twelve speed changes, the compounding of the feed and the reverse to the feed rod is built in the headstock. Extra deep well braced bed with compensating front way construction is provided, giving greater bearing surface than the inverted V-type. Both feed and thread are built with 56 changes, the feed ranging from 0.0013 to 0.166-inch and the thread from 1½ to 184 threads per inch.

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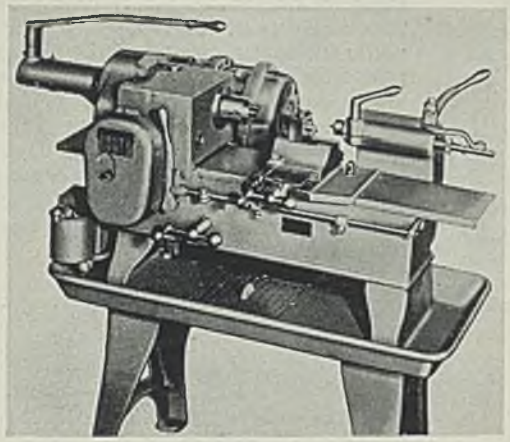
Manufacturing Lathe—

Porter-Cable Machine Co., Syracuse, N. Y., has perfected a new high speed headstock for its 9-inch manufacturing lathe to equip the lathe for rapid turning, facing and boring of small precision parts such as pulleys, valves, pistons, commutators and the like. To make possible this high speed and still hold to close limits, the spindle is mounted on preloaded ball bearings provided



Porter-Cable 9-inch manufacturing lathe which is equipped with a new high speed headstock

with force feed lubrication. Multiple V-belts drive the spindle unit direct from the motor which is mounted on an adjustable bracket at the rear. To prevent vibration, the motor is mounted on vulcanized rubber insulation. Feeds from 0.0005 to 0.010 may be obtained by means of pick-off gears. The spindle is of hollow construction, allowing for the use of air cylinders or mechanically operated chuck closers. Constant feed ratio per revolution of spindle is assured by driving the feed pick-off gears by V-belt from the spindle. The lathe is especially suitable for second operation work with tungsten carbide, stellite or diamond tools.

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Degreaser—

Detroit Rex Products Co., 13005 Hillview avenue, Detroit, has recently designed and built an automatic conveyorized vapor type degreaser for the cleaning of heavy gage metal parts. The machine is equipped with a two strand, cross rod type conveyor with a variable speed drive. Suspended from the conveyor on 30-inch centers are 17 special fixtures to handle the work baskets. Roller gravity conveyors at each end of the machine provide automatic loading and unloading. Electric immersion heaters and thermostatically controlled magnetic relay and line switch are used. The machine illustrated has a rated capacity of 6000 pounds of parts per hour at a conveyor speed of 1 foot per minute. Parts are received on the rolled conveyors loaded in grill type metal baskets having perforated plate separators. In the machine the baskets are subject to vapor cleaning in pure solvent vapor. Cycle of operations requires about 4½ minutes, and work is removed from the machine free of oil and dry.

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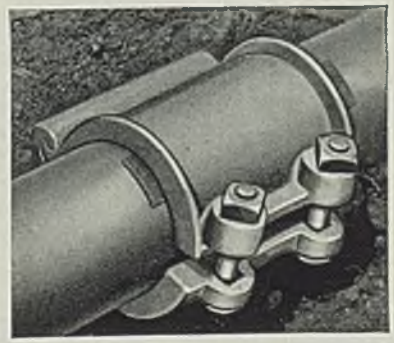
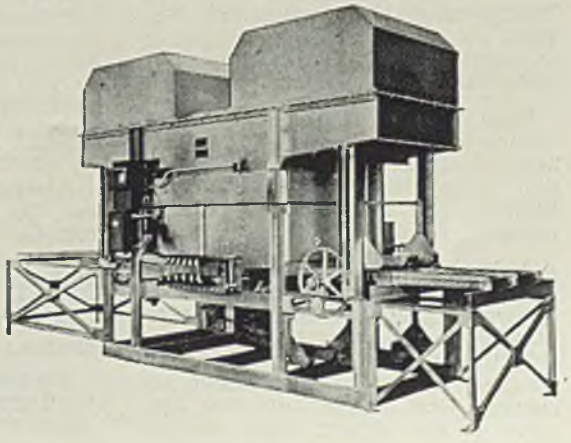
Pipe Clamp—

M. B. Skinner Co., South Bend, Ind., announces a redesigned pipe clamp for permanent stoppage of leaks in pipes of all sizes and pressures. Intended for use on all types of carriers, these clamps may be installed while the pipe is in service, except on certain high pressure applications. Clamps are tested under a pressure of 3000 pounds at the factory. Of malleable iron construction, the devices are hinged on one side for ease of installation. Two cadmium plated steel bolts hold the clamp in position. Products are enameled and supplied with a rubber gasket, in sizes ranging from ½ to 12 inches.



Skinner pipe clamp for positive stoppage of leaks in all types and sizes of pipe



Detroit Rex degreaser for cleaning heavy gage metal parts at a rate of 6000 pounds per hour

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Pneumatic Drill—

Ingersoll-Rand Co., 11 Broadway, New York, announces a new pneumatic drill known as the JA-30 Jackhamer. Intended for light work in maintenance, demolition and similar work, the new tool is of lightweight construction. Part of the weight saved is due to a new principle of rotation and a new valve. Weight of the unit is 30 pounds, and it is 19½ inches in length. For taking down roof, cutting hitch holes, blockholing, demolishing concrete, drilling shallow holes for foundation bolts, ladders, railing standards and the like, use of the lighter weight new tool results in a saving of time and men, according to company claims.

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Fuel Meter—

S. F. Bowser & Co., Fort Wayne, Ind., announces a new device called a Mir-o-meter which measures, indicates and records the amount of oil or tar which is delivered into the furnace. Fuel is pumped into the registering meter where it causes a displacement rotor to revolve. The extended end of the shaft to which this rotor is attached is direct connected to the tachometer generator, which generates the low voltage electrical force which actuates the indicator dial, showing the rate at which the fuel is being fed into the furnace. If desired, a recorder may be inserted into the system. To insure accuracy, the generator is balanced at the factory with the particular meter with which it is to be used. By use of this system, a close check may be kept on fuel consumption and burner efficiency.

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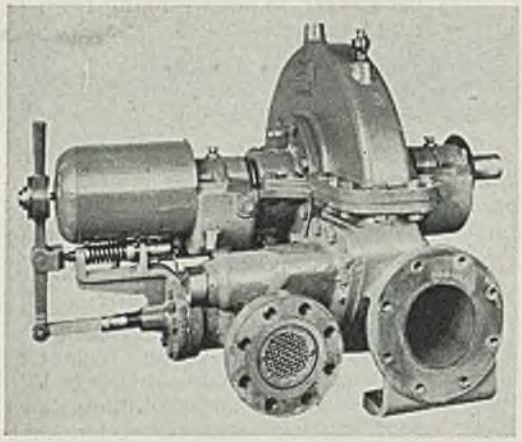
Steam Turbines—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces



Type C steam turbine for mechanical drives in industrial plants, developed by Westinghouse

a new line of type C turbines for driving general purpose machinery in industrial plants and auxiliary equipment in generating plants. Turbines are of the impulse type having one pressure and two velocity stages. They are built in capacities ranging from 5 to 500 horsepower at turbine speeds from 1000 to 5000 revolutions per minute. Suitable for use with steam pressures up to 650 pounds gage and for total temperatures up to 750 degrees Fahr., they may be operated either condensing or noncondensing with rotation in either direction. These turbines are particularly adapted to driving pumps, forced and induced draft fans, compressors, Jordans, pulp beaters, pulverizers, lineshafts and similar apparatus either direct connected or through belt drive.

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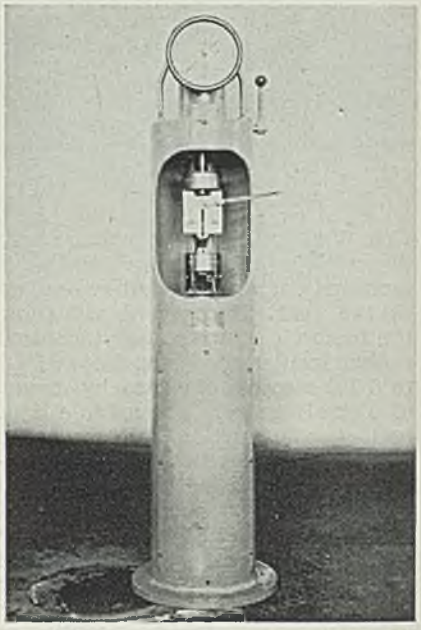
Spotweld Tester—

Baldwin-Southwark Corp., Philadelphia, has recently built a new device for testing the strength of spot welds. This new 10,000-pound hydraulic testing machine is supplied with a round base for rolling from place to place and a hook for moving by crane. An 8-inch precision dial indicates the load. The cylinder is located at the top of the machine and has a 4½-inch diameter ram with a 2-inch stroke. Fluid under pressure is pumped by a gear pump in the base direct connected to a ¼-horsepower motor. Specially designed file-face grips are used. The upper grip is of the open face type, while the lower grip is of the closed type with wide angle entrance. Grips will accommodate offsets in welded specimens from the smallest gage to ¼-inch without the use of backing plates or liners. All working parts of the machine are easily accessible by removing the front cover plate.



Portable hydraulic spot weld testing machine developed by Baldwin-Southwark Corp.

RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland.

Anti-Vibration Products — Korfund Co. Inc., Long Island City, N. Y. Booklet, volume 5, No. 1, devoted to the study of soundproofing and isolation of machine vibrations.

Jackhamer — Ingersoll-Rand Co., Phillipsburg, N. J. Booklet No. 2266, on a new jackhamer giving increased drilling from present compressor equipment.

High Speed and Oven Furnaces —American Gas Furnace Co., Elizabeth, N. J. Bulletin No. C-25C, on the company's high speed furnace; Bulletin No. B-25C, on oven furnaces.

Ball Bearing Design—Fafnir Bearing Co., New Britain, Conn. Folder No. 260, announcing the new MM9500 series, manufactured specifically to meet requirements of machine tool spindles of great accuracy. One of the improved features is the lighter cross section than the standard SAE 200 series, having smaller outside diameters for the same bore dimensions.

Pipe Threading Machines—Landis Machine Co., Waynesboro, Pa. Operator's instruction book covering Landis pipe threading and cutting machines and stationary die heads; gives data on care and operation of machines, and information regarding grinding and setting of chasers for use in these die heads and machines.

Aircraft Finishing—Berry Brothers, Co., Detroit. Folder on specifications for aircraft finishing. Some of the points covered are: Colors and color mixing, finishing methods for various surfaces, metal finishes and United States air corps specifications.

Centrifugal Pumps — Worthington Pump & Machinery Corp., Harrison, N. J. Folder No. W-318-R5A, illustrating type UB, two-stage volute centrifugal pumps. Bulletin No. W-621-B1A, describing type AN, single direct-acting air-cooled air compressors.

Monoveyors — Mechanical Handling Systems Inc., Detroit. Bulletin No. M-2, 94 pages and cover, including complete information on MHS monorail conveyors, with illustrations of the manufacturer's own plant as well as installations; engineering data cover trolleys, trolley wheels, parts, as well as drives, roller turns and other items.

Resistance Welding—Electric Controller & Mfg. Co., Cleveland. Booklet on the theory and application of resistance welding; contains information in regard to proper welding procedure, and correction of faults encountered when using this method of fabrication; single copies will be free of charge, but in quantity 10 cents each.

Activity of Steelworks Recedes from Peak

Rate Down 2 Points To 73, But Decline Appears Temporary

MARKET IN TABLOID

DEMAND . . . . . *Slightly easier.*

PRICES . . . . *Scrap weaker at Pittsburgh.*

PRODUCTION . . . . *Seven districts show decline.*

SHIPMENTS . . . . *Sheet mills still under pressure.*

STEELWORKS activity has receded slightly from its high peak of late September and early October, the national rate last week showing a decline of 2 points to 73 per cent.

Operations in the Pittsburgh district were down 7 points to 70 per cent; Chicago 1½ to 74½; Youngstown 1 to 77; Wheeling 3 to 92; eastern Pennsylvania ½ to 48; Birmingham 2½ to 61½ and New England ½ to 75. The other districts were unchanged. At Chicago and Youngstown the declines were because of the need for repairing furnaces. Last year in the same week the national rate was 52½ per cent of capacity.

Further slight moderation is possible in the next few weeks, but from then on until the end of the year activity is expected to be strong. Shipping releases are being awaited by the mills for a great amount of material, particularly from automobile manufacturers. It is estimated that enough steel was placed on mill books to make 1,000,000 cars in the fourth quarter, but the great bulk of this has not yet been released. One of the largest manufacturers, for instance, appears unlikely to increase assemblies until early next month. However, when the releases gain momentum sheet mills will be assured of near-capacity schedules.

Assemblies Show Gain of 11,545

AUTOMOBILE production last week showed a gain of 11,545 units to 59,740. Although in the same week last year 62,015 cars were assembled, total output this month probably will be close to that of October, 1935.

Pressure for deliveries is still strong in sheets and strip, but is considerably easier in such lines as shapes, plates and reinforcing steel, where backlogs have been declining slowly.

Bar sales are somewhat lighter, but backlogs of four to six weeks are still commonly reported by producers, and automotive releases are improving.

Wire producers are reported to be asking jobbers to whom they ship merchant products to sign written agreements that all the material they specify will be resold to dealers. Tin plate operations are still around 95 per cent of capacity.

With production of tillage tools increasing and the spring outlook favorable, farm implement manufacturers expect that their winter operations will be heavier than they were one year ago. Tractor output is steady.

Inquiries for 25 locomotives last week raised the number on the pending list to 140. Denver & Rio Grande Western is in the market for 15 and Western Pacific is likely to buy ten. A large amount of new business is under consideration for carbuilders.

Several fairly large rail inquiries are imminent, and the Pennsylvania is reported to have placed a substantial tonnage. Prices of standard steel rails have been extended to Nov. 30, applying on deliveries until March 31, 1937.

Shape Awards Increase

EIGHT awards ranging between 1000 and 2500 tons resulted in a gain of 9945 tons in shape contracts, putting the week's total at 20,380 tons. Awards for reinforcing steel declined about 700 tons to 2336. Plate contracts included 1800 tons for 12 barges for the American Barge Lines. In order to comply with the ship subsidy law, new bids must be taken for the United States liner which will require 15,000 tons of hull steel.

The pending list for shapes includes 5000 tons of sheet steel piling for the Navy at New York, and 3800 tons for the westerly approach of the Triboro bridge.

Pig iron orders have been heavy and October shipments will show a gain over September. Beehive coke producers are anticipating a continuance of their high rate of activity.

Weakness in scrap prices in the Pittsburgh district, where No. 1 material fell off 50 cents a ton, the first decline there in four months, has forced STEEL'S scrap composite down 21 cents to $16.33. The iron and steel index is at $34.62, down 2 cents from the last week's revised $34.64, and the composite of finished material is unchanged at $53.90.

COMPOSITE MARKET AVERAGES

	Oct. 24	Oct. 17	Oct. 10	One Month Ago Sept., 1936	Three Months Ago July, 1936	One Year Ago Oct., 1935	Five Years Ago Oct., 1931
Iron and Steel	$34.62	$34.64	$34.60	$34.15	$33.49	$32.84	$30.30
Finished Steel	53.90	53.90	53.90	53.10	53.40	53.70	48.22
Steelworks Scrap..	16.33	16.54	16.54	16.18	12.89	12.72	8.50

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

A COMPARISON OF PRICES

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

	Oct. 24, 1936	Sept. 1936	July 1936	Oct. 1935
Finished Material				
Steel bars, Pittsburgh	2.05c	1.95c	1.95c	1.85c
Steel bars, Chicago	2.10	2.00	2.00	1.90
Steel bars, Philadelphia	2.36	2.26	2.26	2.16
Iron bars, Terre Haute, Ind.	1.95	1.85	1.85	1.75
Shapes, Pittsburgh	1.90	1.90	1.90	1.80
Shapes, Philadelphia	2.11½	2.11½	2.11½	2.01½
Shapes, Chicago	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Philadelphia	2.09	2.09	2.09	1.99
Tank plates, Chicago	1.95	1.95	1.95	1.85
Sheets, No. 10, hot rolled, Pitts.	1.95	1.95	1.95	1.85
Sheets, No. 24, hot ann., Pitts.	2.60	2.50	2.50	2.40
Sheets, No. 24, galv., Pitts.	3.20	3.20	3.20	3.10
Sheets, No. 10, hot rolled, Gary	2.05	2.05	2.05	1.95
Sheets, No. 24, hot anneal., Gary	2.70	2.60	2.60	2.50
Sheets, No. 24, galvan., Gary	3.30	3.30	3.30	3.20
Plain wire, Pittsburgh	2.50	2.40	2.40	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.05	1.95	2.10	2.40
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$32.00	30.00	30.00	28.00
Sheet bars, open-hearth, Pitts.	32.00	30.00	30.00	28.00
Billets, open-hearth, Pittsburgh	32.00	30.00	30.00	27.00
Wire rods, No. 5 to ⅜-inch, Pitts.	40.00	38.00	38.00	38.00

	Oct. 24, 1936	Sept. 1936	July 1936	Oct. 1935
Pig Iron				
Bessemer, del. Pittsburgh	$20.8132	20.8132	20.8132	19.81
Basic, Valley	19.00	19.00	19.00	18.00
Basic, eastern del. East. Pa.	20.8132	20.8132	20.8132	19.81
No. 2 fdy., del. Pittsburgh	20.3132	20.3132	20.3132	19.31
No. 2 fry., Chicago	19.50	19.50	19.50	18.75
Southern No. 2, Birmingham	15.50	15.50	15.50	14.50
Southern No. 2, del. Cincinnati	19.44	19.44	20.2007	19.38
No. 1 2X eastern, del. Phila.	21.6882	21.6882	21.6882	20.68
Malleable, Valley	19.50	19.50	19.50	18.50
Malleable, Chicago	19.50	19.50	19.50	18.75
Lake Sup., charcoal, del. Chicago	25.7528	25.2528	25.2528	24.90
Ferromanganese, del. Pitts.	80.13	80.13	80.13	90.13
Gray forge, del. Pittsburgh	19.6741	19.6741	19.6741	18.67
Scrap				
Heavy melting steel, Pittsburgh	$17.75	17.75	14.15	13.65
Heavy melt. steel, No. 2, east. Pa.	14.25	14.00	11.50	11.00
Heavy melting steel, Chicago	16.25	16.15	13.25	12.50
Rail for rolling, Chicago	17.25	16.75	14.00	14.00
Railroad steel specialties, Chicago	17.75	17.65	14.75	13.50
Coke				
Connellsville, furnace, ovens	$4.00	3.90	3.45	3.55
Connellsville, foundry, ovens	4.25	4.25	4.25	4.35
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.95c
Gary	2.05c
Chicago, delivered	2.08c
Detroit, del.	2.15c
New York, del.	2.30c
Philadelphia, del.	2.26c
Birmingham	2.10c
St. Louis, del.	2.28c
Pacific ports, f.o.b. cars, dock	2.50c

Hot Rolled Annealed No. 24

Pittsburgh	2.60c
Gary	2.70c
Chicago, delivered	2.73c
Detroit, delivered	2.80c
New York, del.	2.95c
Philadelphia, del.	2.91c
Birmingham	2.75c
St. Louis, del.	2.935c
Pacific ports, f.o.b. cars, dock	3.25c

Galvanized No. 24

Pittsburgh	3.20c
Gary	3.30c
Chicago, delivered	3.33c
Philadelphia, del.	3.51c
New York, del.	3.55c
Birmingham	3.35c
St. Louis, del.	3.53½c
Pacific ports, f.o.b. cars, dock	3.80c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.60c
Gary	2.70c
Detroit, delivered	2.80c
Philadelphia, del.	2.91c
New York, del.	2.95c
Pacific ports, f.o.b. cars, dock	3.20c

Cold Rolled No. 20

Pittsburgh	3.05c
Gary	3.15c
Detroit, delivered	3.25c
Philadelphia, del.	3.36c
New York, del.	3.40c

Enameling Sheets

Pittsburgh, No. 10	2.45c
Pittsburgh, No. 20	3.05c
Gary, No. 10	2.55c
Gary, No. 20	3.15c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.50c
Do., Gary	3.60c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plate

Pittsburgh	1.90c
New York, del.	2.19c
Philadelphia, del.	2.09c
Boston, delivered	2.32c
Buffalo, delivered	2.15c
Chicago or Gary	1.95c
Cleveland, del.	2.09½c
Birmingham	2.05c
Coatesville, base	2.00c
Sparrows Pt., base	2.00c
Pacific ports, f.o.b. cars, dock	2.45c
St. Louis, delivered	2.18c

Structural Shapes

Pittsburgh	1.90c
Philadelphia, del.	2.11½c
New York, del.	2.16¼c
Boston, delivered	2.30½c
Bethlehem	2.00c
Chicago	1.95c
Cleveland, del.	2.10c
Buffalo	2.00c
Gulf Ports	2.30c
Birmingham	2.05c
Pacific ports, f.o.b. cars, dock	2.45c

Bars

Soft Steel
(Base, 3 to 25 tons)

Pittsburgh	2.05c
Chicago or Gary	2.10c
Duluth	2.20c
Birmingham	2.20c
Cleveland	2.10c
Buffalo	2.15c
Detroit, delivered	2.20c
Pacific ports, f.o.b. cars, dock	2.60c
Philadelphia, del.	2.36c
Boston, delivered	2.47c
New York, del.	2.40c
Pitts., forg. qual.	2.40c

Rail Steel
To Manufacturing Trade

Pittsburgh	1.90c
Chicago or Gary	1.95c
Moline, Ill.	1.95c
Cleveland	1.95c
Buffalo	2.00c

Iron

Terre Haute, Ind...	1.95c
Chicago	2.00c
Philadelphia	2.26c
Pittsburgh, refined.	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young..	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. car docks	2.45c
Philadelphia, del. ..	2.26c-2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young. ..	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails.....	$2.05
Cement coated nails.....	$2.05
Galv. nails, 15 gage and finer	$3.05
do. finer than 15 ga....	$4.55

(Per pound)

Polished staples	2.75c
Galv. fence staples	3.00c
Barbed wire, galv.	2.55c
Annealed fence wire.....	2.80c
Galv. fence wire	3.15c
Woven wire fencing (base column, c. l.)...	$60.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.50c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.05c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.35c
20,000 to 59,999 lbs.	2.30c
60,000 to 99,999 lbs.	2.25c
100,000 to 299,999 lbs....	2.22½c
300,000 lbs. and over...	2.20c

Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 15c; eastern Michigan, up 20c.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.55c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni.....	1.05
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon Van.	0.95
9200 spring flats	base
9200 spring rounds, squares	0.25

Piling

Pittsburgh	2.25c
Chicago, Buffalo	2.35c

Strip and Hoops

(Base, hot rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in. Pittsburgh	1.95c
Chicago or Gary	2.05c
Birmingham base	2.10c
Detroit, del.	2.15c
Philadelphia, del.	2.26c
New York, del....	2.30c
Cooperage hoop, Pittsburgh	2.05c
Chicago	2.15c
Cold strip, 0.25 carbon and under, Pitts., Cleveland.	2.60c
Detroit, del.	2.81c
Worcester, Mass..	2.80c

Carbon	Cleve-Pitts.	Worces-ter, Mass.
0.26—0.50...	2.60c	2.80c
0.51—0.75...	3.70c	3.90c
0.76—1.00...	5.45c	5.65c
Over 1.00...	7.50c	7.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20—100 lbs. ..	25.50-28.00
Light rails, billet qual. Pitts., Chi..	$35.00
Do., reroll. qual..	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel..	2.10c
Spikes, R. R. base.	2.75c
Track bolts, base..	3.75c
Tie plates, base....	2.00c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller....70-10 off	
Do. larger .....70-5 off	
Tire bolts .....50 off	

Plow Bolts

All sizes .....70-5 off	

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts .....65 off	
Elevator bolts .....65 off	

Nuts

S. A. E. semifinished hex.: ½ to 1-inch ....60-20-15 off	
Do., ½ to 1-inch..60-20-15 off	
Do., over 1-inch..60-20-15 off	

Hexagon Cap Screws

Milled .....80-10-10 off	
Upset, 1-in., smaller ....60 off	

Square Head Set Screws

Upset, 1-in., smaller.....75 off	
Headless set screws ....75 off	

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	3.05c
Struc., c. l., Chicago	3.15c
⅞-in. and smaller, Pitts., Chi., Cleve.	..70-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	$6.00 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.90
Do. less carloads, 5 kegs or more, no discount on size extras...	$3.20
Do. under 5 kegs; no disc. on size extras...	$3.35

Pipe and Tubing

Base $200 net ton, except on less boiler tubes under 2 inches and cold drawn seamless.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛ and ¼	60	44½
⅜	64½	55
½	67½	59
¾	69½	61½
1—3		

Iron

⅛	31½	15
¼	36½	20½
⅜—1 ¼	39½	25½
2	41½	26

Lap Weld

Steel

2	62	53½
2½—3	65	56½
3½—6	67	58½
7 and 8	66	56½
9 and 10	65½	56

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

⅛, butt weld	56
¼ and ⅜, butt weld....	59
½, butt weld	63½
¾, butt weld	66½
1 to 3, butt weld	68½
2, lap weld	61
2½ to 3, lap weld.....	64
3½ to 6, lap weld.....	66
7 and 8, lap weld.....	65

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 pts. under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices being on lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs...	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham.	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago.	47.40-48.40
6-in. & over, east. fdy.	43.00
Do. 4-in.	46.00

Class A pipe $3 over Class B Stnd. fittgs., Birm. base. $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo & Young.	$32.00
Philadelphia	37.67
Duluth	34.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff....	39.00
Forging, Duluth ...	41.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	32.00

Slabs

Pitts., Chi., Cleve., Young.	32.00

Wire Rods

Pitts., Cleve., No. 5 to ⅜2-inch incl....	40.00
Do., over ⅜2 to ⅞4-inch incl.	42.00

Chicago up $1; Worcester up $2

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point..	1.80c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur...	$3.75- 4.00
Connellsville, fdry.	4.25- 4.50
Connel. prem. fdry.	5.50
New River fdry. ..	6.00
Wise county fdry..	4.45- 5.00
Wise county fur...	4.00- 4.50

By-Product Foundry

Newark, N. J., del..	10.20-10.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
*New England, del..	12.00
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
*Cleveland, del. ...	10.30
*Buffalo, del.	10.50
*Detroit, del.	10.50
Philadel, del.	9.88

Coke By-Products

Spot gal. Producers' Plants

Pure and 90% benzol..	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford,

Phenol (200 lb. drums).	15.50c
Do. (450 lbs.).....	14.50c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	7.25c
Per 100 lbs. Atlantic seaboard	
Sulphate of ammonia	$1.275

†Western prices, ½-cent up.

Pig Iron

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

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$20.50	$21.00	$20.00	$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass	20.50	21.00	20.00	21.50
Hamilton, O.	19.50	19.50	19.00	....
Jackson, O.	20.25	20.25	19.75	....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	....	17.00	....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	....	20.00	....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	....	19.96	....
Boston from Birmingham	20.62	....	20.50	....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	....	....
Brooklyn, N. Y., from Bmghm.	22.55	....	....	....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	†19.72	....	19.60	....
Cincinnati from Hamilton, O.	19.82	20.58	20.08	....
Cincinnati from Birmingham	19.44	....	18.44	....
Cleveland from Birmingham	19.62	....	19.12	....
Indianapolis from Hamilton, O.	21.17	21.77	21.27	....
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.27	21.07
Muskegon, Mich., from Chicago, Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	....	....	....
Newark, N. J., from Bethlehem	21.99	22.49	....	....
Philadelphia from Birmingham	20.93	....	20.81	....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25
St. Louis, northern	20.00	20.00	19.50	....

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis from Birmingham	†19.68	....	19.50	....
St. Paul from Duluth	21.94	21.94	....	22.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00, Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
Valley furnace	19.00	Lake Superior fur.	$22.50
Pitts. dist. fur.	19.00	Do., del. Chicago	25.75
		Lylees, Tenn.	22.50

Silvery†

Jackson county, O., base; 6-6.50 per cent $22.75; 6.51-7—$23.25; 7-7.50—$23.75; 7.51-8—$24.25; 8-8.50—$24.75; 8.51-9—$25.25; 9-9.50—$25.75; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

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

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

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

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo., Ky.	$45.00
Alabama, Georgia	$38.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Georgia, Alabama	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	48.00

Ladle Brick (Dry Press)

Pa., O., W. Va., Mo.	$24.00
Do., wire cut	22.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead - burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chem. bonded chrome	45.00
Magnesite brick	65.00
Chem. bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$22.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$18.00
Do., for barge	$19.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Baltimore, base	75.00
Do., del. Pittsburgh	80.13
Spiegeleisen, 19-20% dom. Palmerston, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight allowed, c. l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	85.00
2% carbon, 90.00; 1%,	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.30-1.40
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Oct. 17	9.75	9.87½	9.40	44.40	43.90	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 19	9.75	9.87½	9.40	45.10	44.50	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 20	9.75	9.87½	9.40	44.55	44.00	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 21	9.75	9.87½	9.40	44.05	43.50	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 22	9.75	9.87½	9.40	43.87½	43.35	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 23	9.75	9.87½	9.40	44.20	43.60	4.60	4.45	4.85	*19.00	12.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.75c Conn. copper

Sheets	
Yellow brass (high)	15.62½
Copper, hot rolled	17.50
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	17.87½
Seamless copper	18.00
Rods	
High yellow brass	13.62½
Copper, hot rolled	14.25
Anodes	
Copper, untrimmed	15.00
Wire	
Yellow brass (high)	15.87½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	6.00- 6.25
Cleveland	6.75- 7.00
Chicago	6.25- 6.50
St. Louis	6.00- 6.50
Heavy Copper and Wire	
New York, No. 1	7.87½-8.00
Chicago, No. 1	7.75- 8.00
Cleveland, No. 1	7.50- 8.00
St. Louis, No. 1	7.50- 7.75
Composition Brass Borings	
New York	5.87½- 6.00
Light Copper	
New York	6.37½-6.62½
Chicago	6.25- 6.50
Cleveland	6.00- 6.25
St. Louis	6.00- 6.50
Light Brass	
*Chicago	3.62½-3.87½
Cleveland	3.50- 3.75
St. Louis	3.50- 4.00
Lead	
New York	3.75- 4.00
Cleveland	3.50- 3.75
Chicago	3.62½-3.87½
St. Louis	3.25- 3.75
Zinc	
New York	2.37½-2.62½
St. Louis	2.25- 2.75
Cleveland	2.25- 2.50
Aluminum	
*Borings, Cleveland	9.00- 9.50
Mixed, cast, Cleve.	13.00-13.25
Mixed, cast, St. L.	13.00-13.50
Clips, soft, Cleve.	14.50-15.00
SECONDARY METALS	
Brass ingot, 85-5-5-5	9.75
Stand. No. 12 alum.	16.75-17.25

Iron and Steel Scrap Prices

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

HEAVY MELTING STEEL

Birmingham†	11.00-13.00
Bos. d'ck, No. 1 exp.	†12.00
N. Eng. del. No. 1..	12.75
Buffalo, No. 1	16.00-16.50
Buffalo, No. 2	14.50-15.00
Chicago, No. 1	16.00-16.50
Cleveland, No. 1	15.50-16.00
Cleveland, No. 2	15.00-15.50
Detroit, No. 1	14.00-14.50
Eastern Pa., No. 1..	15.50-16.00
Eastern Pa., No. 2..	14.00-14.50
Federal, Ill.	12.75-13.25
Granite City, R. R.	14.25-14.75
Granite City, No. 2.	12.75-13.25
New York, No. 1....	†11.75-12.25
N. Y. d'ck, No. 1, exp.	†12.00-12.25
Pitts., No. 1 (R. R.).	18.00-18.50
Pitts., No. 1 (dlr.)..	17.50-18.00
Pittsburgh, No. 2...	15.50-16.00
St. Louis, R. R....	14.25-14.75
St. Louis, No. 2....	14.50-15.00
Toronto, dlrs. No. 1	10.50-11.00
Toronto, No. 2	9.50-10.00
Valleys, No. 1	16.75-17.25

COMPRESSED SHEETS

Buffalo, dealers	14.50-15.00
Chicago, factory	15.00-15.50
Chicago, dealer	14.00-14.50
Cleveland	15.00-15.50
Detroit	14.50-15.00
E. Pa., new mat....	15.00-15.50
E. Pa., old mat.	12.50-13.00
Pittsburgh	17.50-18.00
St. Louis	10.50-11.00
Valleys	16.50-16.75

BUNDLED SHEETS

Buffalo	12.00-12.50
Cincinnati, del.	9.50-10.00
Cleveland	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	8.75- 9.25
Toronto, dealers	4.50

SHEET CLIPPINGS, LOOSE

Chicago	10.00-10.50
Cincinnati	8.50- 9.00
Detroit	11.00-11.50
St. Louis	8.00- 8.50

STEEL RAILS, SHORT

Birmingham	14.00-16.00
Buffalo	17.50-18.00
Chicago (3 ft.)	17.25-17.75
Chicago (2 ft.)	18.50-19.00
Cincinnati, del.	16.50-17.00
Detroit	16.50-17.00
Pitts., open-hearth, 3 ft. and less	19.50-20.00
St. Louis, 2 ft. & less	16.00-16.50

STEEL RAILS, SCRAP

Boston district	†11.00-11.25
Buffalo	16.00-16.50
Chicago	16.00-16.50
Pittsburgh	18.00-18.50
St. Louis	15.00-15.50
Toronto, dealers	8.50

STOVE PLATE

Birmingham	8.00- 9.00
Boston, district	†7.00- 7.25
Buffalo	11.00-11.50
Chicago	9.00- 9.50
Cincinnati, dealers.	9.50-10.00
Detroit, net	9.00- 9.50
Eastern Pa.	12.50-12.75
New York, fdry.	†10.00
St. Louis	8.50- 9.00
Toronto, dealers, net	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	17.00-17.50
Chicago, springs	18.25-18.75
Eastern Pa.	19.00-19.50
Pittsburgh	20.50-21.00
St. Louis	15.50-16.00

ANGLE BARS—STEEL

Chicago	18.00-18.50
St. Louis	15.50-16.00
Buffalo	14.50-15.00

RAILROAD SPECIALTIES

Chicago	18.00-18.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	17.75-18.25
Cleveland, billet, bloom crops	19.00-19.50
Eastern Pa., crops..	18.50-19.00
Pittsburgh, billet, bloom crops	20.50-21.00
Pittsburgh, sheet bar crops	19.50-20.00

FROGS, SWITCHES

Chicago	16.00-16.50
St. Louis, cut	15.00-15.50

SHOVELING STEEL

Chicago	16.00-16.50
Federal, Ill.	13.00-13.50
Granite City, Ill.	12.75-13.25
Toronto, dealers	6.50

RAILROAD WROUGHT

Birmingham	8.00- 9.00
Boston, district	†8.00- 8.25
Buffalo, No. 1	14.50-15.00
Buffalo, No. 2	16.00-16.50
Chicago, No. 1, net.	14.00-14.50
Chicago, No. 2	16.00-16.50
Cincinnati, No. 2...	14.00-14.50
Eastern Pa.	16.00
St. Louis, No. 1....	13.00-13.50
St. Louis, No. 2....	14.50-15.00
Toronto, No. 1 dlr..	7.00

SPECIFICATION PIPE

Eastern Pa.	14.00-14.50
New York	†10.00-10.50

BUSHELING

Buffalo, No. 1	14.50-15.00
Chicago, No. 1	14.75-15.25
Cincin., No. 1, deal..	11.00-11.50
Cincinnati, No. 2...	6.50- 7.00
Cleveland, No. 2...	10.50-11.00
Detroit, No. 1, new.	13.50-14.00
Valleys, new, No. 1.	16.50-16.75
Toronto, dealers...	6.00

MACHINE TURNINGS

Birmingham	6.00- 6.50
Buffalo	9.00- 9.50
Chicago	8.50- 9.00
Cincinnati, dealers.	7.50- 8.00
Cleveland	10.00-10.50
Detroit	9.00- 9.50
Eastern Pa.	10.50
New York	†6.00- 6.50
Pittsburgh	12.00-12.50
St. Louis	6.00- 6.50
Toronto, dealers	4.00- 4.50
Valleys	10.75-11.25

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†5.25- 5.50
Buffalo	9.75-10.25
Cincinnati, dealers.	6.50- 7.00
Cleveland	10.50-11.00
Detroit	9.50-10.00
Eastern Pa.	9.00
New York	†4.75- 5.00
Pittsburgh	11.50-12.00
Toronto, dealers	4.00

CAST IRON BORINGS

Birmingham	6.00- 6.50
Boston dist. chem..	†6.25- 6.75
Boston dist. for mills	†6.00- 6.25
Buffalo	9.75-10.25
Chicago, dealers	9.25- 9.75
Cincinnati, dealers.	6.50- 7.00
Cleveland	10.50-11.00
Detroit	9.50-10.00
E. Pa., chemical....	10.00-13.00
New York	†6.00- 6.50
St. Louis	7.00- 7.50
Toronto, dealers	4.50- 5.00

PIPE AND FLUES

Cincinnati, dealers.	9.00- 9.50
Chicago, net	8.00- 8.50

RAILROAD GRATE BARS

Buffalo	11.00-11.50
Chicago, net	10.00-10.50
Cincinnati	9.00- 9.50
Eastern Pa.	12.50
New York	†8.00- 8.50
St. Louis	10.50-11.00

FORGE FLASHINGS

Boston district	†9.75-10.00
Buffalo	14.50-15.00
Cleveland	14.50-15.00
Detroit	12.50-13.00
Pittsburgh	15.50-16.00

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	18.00-18.50
Eastern Pa.	14.00-14.50

ARCH BARS, TRANSOMS

St. Louis	16.50-17.00

AXLE TURNINGS

Boston district	†7.25- 7.50
Buffalo	12.50-13.00
Chicago, elec. fur..	16.00-16.50
Eastern Pa.	13.00-14.00
St. Louis	10.50-11.00
Toronto	4.50

STEEL CAR AXLES

Birmingham	14.50-16.00
Boston district	†14.50-15.00
Buffalo	17.00-17.50
Chicago, net	18.00-18.50
Eastern Pa.	21.50
St. Louis	16.50-17.00
Toronto	8.50

SHAFTING

Boston district	†15.50-15.75
Eastern Pa.	21.00-21.50
New York	†16.50-17.00
St. Louis	15.00-15.50

CAR WHEELS

Birmingham	14.00-15.50
Boston dist. iron...	†11.00-11.50
Buffalo, iron	15.50-16.00
Buffalo, steel	17.50-18.00
Chicago, iron	16.50-17.00
Chicago, rolled steel	18.00-18.50
Cincinnati, iron	13.00-13.50
Eastern Pa., iron..	17.00
Eastern Pa., steel..	19.00-19.50
Pittsburgh, iron	18.00-18.50
Pittsburgh, steel	20.50-21.00
St. Louis, iron	14.00-14.50
St. Louis, steel	16.00-16.50
Toronto, net	8.50

NO. 1 CAST SCRAP

Birmingham	11.50-12.50
Bos. dis. No. 1 mch.	†10.75-11.00
N. Eng., del. No. 2.	†9.00- 9.25
N. Eng., del. textile	12.00-12.50
Buffalo, cupola	14.00-14.50
Buffalo, mach.	15.00-15.50
Chicago, agri. net..	12.00-12.50
Chicago, auto	12.50-13.00
Chicago, mach. net	14.00-14.50
Chicago, railr'd net	13.00-13.50
Cinci., mach. cup...	13.50-14.00
Cleveland, mach...	16.25-16.75
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard.	14.00-14.50
Pittsburgh, cupola.	17.00-17.50
San Francisco, del..	13.50-14.00
Seattle	10.00-11.00
St. Louis, No. 1....	12.50-13.00
St. L. No. 1, mach.	13.00-13.50
Toronto, No. 1, mach., net	9.50-10.00

HEAVY CAST

Boston dist. break.	10.25
New England del...	11.00-11.50
Buffalo, break	13.00-13.50
Cleveland, break.	13.00-13.50
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break.	11.50-12.00
Detroit, auto net..	13.50-14.00
Eastern Pa.	15.50
New York breakable	†11.25-11.75
Pittsburgh	15.00-15.50

MALLEABLE

Birmingham, R. R...	13.50-14.00
New England, del..	†16.25-17.50
Buffalo	17.00-17.50
Chicago, R. R.	18.00-18.50
Cinci., agri. del....	14.00-14.50
Cleveland, rail	17.50-18.00
Detroit, auto, net..	14.50-15.00
Eastern Pa., R. R...	17.50
Pittsburgh, rail	17.50-18.00
St. Louis, R. R.	15.50-16.00
Toronto, net	7.00

RAILS FOR ROLLING

5 feet and over

Birmingham	14.00-15.00
Birmingham	†11.00-11.50
Buffalo	16.50-17.00
Chicago	17.00-17.50
Eastern Pa.	16.00
New York	†12.00-12.50
St. Louis	16.00-16.50

LOCOMOTIVE TIRES

Chicago (cut)	17.50-18.00
St. Louis, No. 1	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	17.50-18.00
Chicago	18.50-19.00
Eastern Pa.	18.00-18.50
Pittsburgh (heavy)	19.50-20.00
Pittsburgh (light)	18.50-19.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.50- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	11.00
No. Afr. low phos.	11.00
Swedish basic, 65%	9.50
Swedish low phos..	10.50
Spanish No. Africa basic, 50 to 60%.	nom.
Tungsten, spot sh. ton unit, duty pd.	$15.85-16.00
N. F., fdy., 55%....	7.00
Chrome ore, 48% gross ton, c.l.f....	19.50-19.75

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%....	27.00
So. African, 50-52%....	27.00
Indian, 50-52%	26.00

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.10c
Chattanooga	3.56c
Chicago (j)	3.20c
Cincinnati	3.42c
Cleveland	3.10c
Detroit	3.29c
Houston	3.10c
Los Angeles	3.60c
Milwaukee	3.31c-3.46c
New Orleans	3.55c
New York‡ (d)	3.51c
Pitts. (h)	3.15c-3.30c
Philadelphia*	3.25c
Portland	3.70c
San Francisco	3.25c
Seattle	3.90c
St. Louis	3.45c
St. Paul	3.45c-3.60c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.56c
Baltimore*	3.10c
Cincinnati	3.42c
New York‡ (d)	3.15c
Philadelphia*	3.25c
St. Louis	3.45c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.56c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Angl., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.35c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.10c
Boston††	3.29c
Buffalo	3.35c
Chattanooga	3.66c
Chicago	3.30c
Cincinnati	3.52c
Cleveland	3.41c
Detroit	3.52c
Houston	3.10c
Los Angeles	3.60c
Milwaukee	3.41c
New Orleans	3.65c
New York‡ (d)	3.47c
Philadelphia*	3.10c
Pittsburgh (h)	3.25c
Portland (l)	3.70c
San Francisco	3.25c
Seattle (l)	3.75c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.60c

PLATES

Baltimore*	3.10c
Boston††	3.31c
Buffalo	3.47c
Chattanooga	3.66c
Chicago	3.30c
Cincinnati	3.52c
Cleveland, ¼-in. and over	3.41c
Detroit	3.52c
Detroit, 3/16-in.	3.85c
Houston	3.10c
Los Angeles	3.60c
Milwaukee	3.41c
New Orleans	3.65c
New York‡ (d)	3.50c
Philadelphia*	3.10c
Phila. floor	4.95c
Pittsburgh (h)	3.25c
Portland	3.70c
San Francisco	3.25c
Seattle	3.75c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.60c

NO. 10 BLUE

Baltimore*	3.10c
Boston (g)	3.40c
Buffalo	3.72c
Chattanooga	3.46c
Chicago	3.15c
Cincinnati	3.32c
Cleveland	3.21c
Det. 8-10 ga.	3.24c
Houston	3.45c
Los Angeles	3.70c
Milwaukee	3.26c
New Orleans	3.65c
New York‡ (d)	3.41c
Portland	3.85c
Philadelphia*	3.20c
Pittsburgh (h)	3.05c
San Francisco	3.60c
Seattle	3.85c
St. Louis	3.40c
St. Paul	3.40c
Tulsa	3.80c

NO. 24 BLACK

Baltimore *†	3.90c
Boston (g)	4.05c
Buffalo	3.35c
Chattanooga*	3.51c
Chicago	3.55c-4.55c
Cincinnati	3.97c
Cleveland	4.01c
Detroit	4.14c
Los Angeles	4.35c
Milwaukee	4.16c
New Orleans	4.50c
New York‡ (d)	4.10c
Phila.*†	3.85c
Pitts.** (h)	3.65c-4.95c
Portland	4.30c
Seattle	4.60c
San Francisco	4.20c
St. Louis	3.30c
St. Paul	4.10c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	3.90c
Buffalo	4.10c
Boston (g)	4.00c
Chattanooga*	3.96c
Chicago (h)	4.15c-5.15c
Cincinnati	4.82c
Cleveland	4.61c
Detroit	4.82c
Houston	4.50c
Los Angeles	4.40c
Milwaukee	4.76c
New Orleans	4.95c
New York‡ (d)	4.50c
Philadelphia*†	4.50c
Pitts.** (h)	4.30c-5.55c
Portland	4.60c
San Francisco	5.00c
Seattle	5.10c
St. Louis	4.90c
St. Paul	4.60c
Tulsa	5.20c

BANDS

Baltimore*	3.30c
Boston††	3.40c
Buffalo	3.52c
Chattanooga	3.71c
Chicago	3.40c
Cincinnati	3.57c
Cleveland	3.46c
Detroit, 3/16-in. and lighter	3.49c
Houston	3.35c
Los Angeles	4.20c
Milwaukee	3.51c
New Orleans	4.05c
New York‡ (d)	3.66c
Philadelphia*	3.30c
Pittsburgh (h)	3.30c
Portland	4.35c
San Francisco	4.20c
Seattle	4.35c
St. Louis	3.65c
St. Paul	3.65c
Tulsa	3.55c

HOOPS

Baltimore	2.30c
Boston††	4.40c
Buffalo	3.52c
Chicago	3.40c
Cincinnati	3.57c
Det., No. 14 and lighter	3.49c
Los Angeles	5.95c
Milwaukee	3.51c
New York‡ (d)	3.66c
Philadelphia*	3.55c
Pittsburgh (h)	3.80c
Portland	5.70c
San Francisco	6.25c
Seattle	5.70c
St. Louis	3.65c
St. Paul	3.65c

COLD FIN. STEEL

Baltimore (c)	3.98c
Boston*	4.15c
Buffalo (h)	3.70c
Chattanooga*	4.38c
Chicago (h)	3.75c
Cincinnati	3.97c
Cleveland (h)	3.75c
Detroit	3.84c
Los Ang. (f) (d)	5.85c
Milwaukee	3.86c
New Orleans	4.55c
New York‡ (d)	3.96c
Philadelphia*	4.01c
Pittsburgh	3.60c
Portland (f) (d)	6.30c
San Fran. (f) (d)	5.95c
Seattle (f) (d)	6.25c
St. Louis	4.00c
St. Paul	4.27c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.00c
Detroit	3.18c
New York‡ (d)	3.36c
St. Louis	3.41c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High Speed	59½c
High carbon, high chrome	39c
Oil hardening	23c
Special tool	21c
Extra tool	17¾c
Regular tool	14½c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	65
Cleveland	70
Detroit	70
Milwaukee	70
Pittsburgh	65-5

(a) Under 100 lbs., 60 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (l) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 3.35c.

Prices on heavier lines are subject to new quantity differentials: 399 lbs. and less, up 50 cts.; 400 to 3999 lbs., base; 4000 to 7999 lbs., 15 cts., under; 8000 to 14,999 lbs., 25 cts. under; 15,000 to 39,999 lbs., 35 cts. under; 40,000 lbs. and over, 50 cts. under; (except Boston).

‡Domestic steel; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 22

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.31 3 2 6*	$14.23	1 15 0
Basic bessemer	15.31 3 2 6*	11.79	1 9 0
Hematite, Phos. .03-.05	18.38 3 15 0	.....	.....
SEMIFINISHED STEEL			
Billets	$28.79 5 17 6	$19.10	2 7 0
Wire rods, No. 5 gage	43.86 8 19 0	36.61	4 10 0
FINISHED STEEL			
Standard rails	$40.43 8 5 0	$44.74	5 10 0
Merchant bars	1.86c 8 10 0	1.20c	3 5 0
Structural shapes	1.81c 8 5 0	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.89c 8 12 6	1.57c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.24c 10 5 0	2.30c	6 5 0††
Sheets, gal., 24 gage, corr.	2.73c 12 10 0	2.67c	7 5 0
Bands and strips	2.03c 9 5 0	1.48c	4 0 0
Plain wire, base	2.14c 9 15 0	1.94c	5 5 0
Galvanized wire, base	2.52c 11 10 0	2.15c	5 17 6
Wire nails, base	2.63c 12 0 0	1.75c	4 15 0
Tin plate, box 108 lbs.	$ 4.59 0 18 9	.....	.....

British ferromanganese $75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$18.38	3 15 0(a)	$13.54	290	$15.46	460	$25.31	63
Basic bessemer pig iron	18.38	3 15 0(a)	8.87	190	13.31	395	27.93 (b)	69.50
Furnace coke	5.27	1 1 6	4.86	104	4.60	137	7.63	19
Billets	30.01	6 2 6	21.34	457	19.49	580	38.77	96.50
Standard rails								
Merchant bars	1.81c	8 5 0	1.41c	671	1.73c	1,150	2.38c	132
Structural shapes	2.04c	9 7 0	1.32c	630	1.05c	700	1.98c	110
Plates, †¼-in. or 5 mm.	2.05c	9 7 6	1.30c	620	1.05c	700	1.93c	107
Sheets, black	2.12c	9 13 9	1.66c	790	1.28c	850	2.29c	127
Sheets, galv., corr., 24 ga.	2.63c	12 0 0§	1.79c	850‡	1.39c	925‡	2.59c	144‡
or 0.5 mm.	3.07c	14 0 0	2.84c	1,350	2.25c	1,500	6.66c	370
Plain wire	2.19c	10 0 0	2.31c	1,100	1.88c	1,250	3.11c	173
Bands and strips	2.21c	10 2 0	1.54c	735	1.28c	850	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price, British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 67.00 per cent over paper sterling.

Bars

Bar Prices, Page 84

Pittsburgh—Backlogs of four to six weeks in merchant steel bars are still commonly reported by producers. In fact, negotiating for delivery has taken a foremost place in the minds of most bar users. Releases against business placed late in September and early in October have kept to their recent high level. The market on alloy quality bars at 2.55c, f.o.b. Pittsburgh, and other basing points, remains firm and is subject to considerable test.

Cleveland—New bar tonnage is being booked at a less active rate than three or four weeks ago, however, this was expected in view of the rather heavy speculative buying movement during the latter part of September. Prices are steady.

Chicago—Steel bar sales are lighter, but automotive releases are improving gradually and farm implement manufacturers also are taking larger lots. Tractor production is steady and output of tillage tools is expanding. The decline in sales to a certain extent is a reflection of forward buying during September, though new business still is up to the average for the year to date. Heavy shipments still are going to cold bar finishers and forgers, this situation being influenced by expanding automotive activity. The market is steady on new business.

New York—While commercial bar buying is slack, the trade is surprised at the volume still coming out in view of heavy buying in September before the price advance.

Philadelphia—While new orders are less numerous, specifications for commercial bars are coming out freely against contracts, reflecting heavy consumption.

Plates

Plate Prices, Page 84

Pittsburgh—An order requiring about 1800 tons of plates was placed last week by the American Barge Lines with Dravo Contracting Co., Neville Island, Pittsburgh, involving the construction of twelve 175-foot standard coal barges. Part of the contract stipulated that immediate delivery be made on four, which is being filled out of Dravo's stock of finished barges.

Cleveland—Recent business has declined slightly in aggregate tonnage, tank and boiler jobs being more notably absent. Three or four weeks delivery considered good in many cases. Plates for five locomotives to be built by Lima Locomotive Works, Lima, O., for Boston & Maine railroad, have not yet been awarded. Prices remain firm.

Chicago—Plates are less active as a result of declining activity in fabricated structural steel. Steady demand still is appearing from railroad shops which are speeding repair work. Mills look to freight car buying to provide renewed support to plate demand. Backlogs of car builders are declining but a large amount of new business is under consideration. The decrease in new business lately is permitting mills to improve deliveries.

New York—Plate demand is sluggish but the outlook is promising in view of impending railroad equipment buying. A setback is noted, however, with respect to the United States liner requiring 15,000 tons of hull steel. New bids must be taken to comply with the ship subsidy law, according to a decision by the recently appointed maritime commission. Negotiations affected by the ruling date back to March, 1935.

Philadelphia—Plates are moving slightly better, although business is far from brisk. Active work includes a government mine planter requiring 500 tons of hull steel, on which Pusey & Jones, Wilmington, Del., are low and one or two tug boats for the Chesapeake & Ohio, each requiring 200 tons of hull steel, on which bids were opened Oct. 20. Other projects active are one to three car floats for the Pennsylvania railroad, on which bids were opened Oct. 20. Each will take 600 tons of steel.

Contracts Placed

1800 tons, 12 standard coal barges, for American Barge Lines, to Dravo Contracting Co., Neville Island, Pittsburgh.

690 tons, dredge pontoons and pipe, Vicksburg, Miss., to St. Louis Shipbuilding & Steel Co., St. Louis, and Treadwell Construction Co., Midland, Pa.

305 tons, 48-inch pipe, River Rouge, Mich., to Biggs Boiler Works Co., Akron, O.

200 tons, 36-inch welded steel pipe, treasury department, San Francisco for delivery at Oakland, Calif., to Steel Tank & Pipe Co., Berkeley, Calif.

185 tons, 10 tanks, West Port Arthur, Tex., to Chicago Bridge & Iron Works, Chicago.

100 tons, 256 half-inch plates for 12 marine boilers for three Ohio river steamers of Carnegie-Illinois Steel Corp., to Titusville Iron Works, Titusville, Pa.; plates rolled by Carnegie-Illinois Steel Corp., Pittsburgh.

Unstated tonnage, 400,000-gallon elevated water tank, Beaver Dam, Wis., to Pittsburgh-Des Moines Steel Co., Chicago.

Contracts Pending

4500 tons, Salem, Oreg., water system; James Crick, Spokane, Wash., low for all steel.

300 tons, stand pipe, Hickman Field, T. H.; bids Nov. 12.

Unstated tonnage, 250,000-gallon elevated water tank, Clintonville, Wis.; bids closed Oct. 19.

Unstated, 10 and 12-inch water mains, for St. Maries, Ida.; bids Oct. 30.

Sheets

Sheet Prices, Page 84

Pittsburgh — Sheet orders last week improved slightly but shipments on business placed earlier have not materially reduced backlogs. This is in spite of the fact that sheet shipments from this district are the highest since June, 1934. So much automotive tonnage already on books awaits to be released that sheet mills are virtually certain of excellent operation in fourth quarter. Refrigerator manufacturers now working on new models are also sizable specifiers.

Cleveland—Demand for sheets continues active, but not at the rate reported during the latter part of September. Automotive requirements have been restricted somewhat, because of delay by larger producers in getting into full swing. Household equipment manufacturers are buying heavily. Mills are operating at close to capacity with but slight improvement noted in deliveries.

Chicago—Releases from the automotive industry still are small and deliveries to several of the leading builders are in smaller volume than had been anticipated. Sheet mills have heavy orders, however, and are assured of near capacity schedules for the balance of the quarter. New buying is in fair volume and mills have been unable to effect any marked improvement on deliveries. Prices on new business are steady.

NEW YORK — Mill representatives here are virtually out of the market for sheet seconds. This is attributed in part to too heavy demand in recent weeks because of extended deliveries on primes and to efforts of mills in reclaiming all seconds possible in meeting specifications for primes. While tapering somewhat, sheet demand is still strong from a diversity of sources. Buying for fuel oil tanks is bringing notable tonnage, attributed to replacements due to better financial position of buyers.

Cincinnati — Backlogs of sheet mills are gradually being augmented by the brisk demand, which continues to exceed production. Some buyers are entering the market for needs to the end of the quarter, to assure delivery. Automotive specifications are expanding. Rolling schedules continue at capacity.

Philadelphia—Sheet specifications are well sustained although orders

are less numerous, due to heavy buying at the end of third quarter. Volume of specifications may be influenced shortly by earlier inventory to comply more easily with new regulations. Under these rules it is understood reports will be accepted on inventories as of Dec. 1.

St. Louis—While some tapering in demand for sheets from the building industry is noted, other users are still specifying on a large scale, and October volume bids fair to exceed that of September, which brought the peak of the year.

Birmingham, Ala.—Sheet mills continue active and shipments equal production. New business is being received almost daily and steady production assured through remainder of year.

Pipe

Pipe Prices, Page 85

Pittsburgh—Specifications cover standard lap weld pipe and oil country goods were outstandingly better last week, with the result that the market showed aggregates of several thousand tons daily, almost 100 per cent small lots, being placed with producers. The recently-noted 30,300-ton 10-inch seamless line pipe order placed by Gulf Oil Corp. is specified for immediate shipment, and last week pipe mills here which are supplying the order showed an advance in operating rates to about 60-65 per cent.

Cleveland—General requirements for steel pipe have shown improvement. Jobbers report stocks turning over at an increased rate. Cast pipe continues dull.

Chicago—Most orders for cast pipe call for small lots, but the total is fairly heavy, and October shipments are expected to compare favorably with preceding months. Purchases for WPA projects are numerous and additional business is in prospect from this source.

New York — With small orders making up the bulk of present business, increased activity was noted last week in the cast pipe market. Considerable business is being booked from WPA financed projects. Additional tonnages are being bought by the Westchester sanitary sewer commission.

PWA has approved funds to Esopus, N. Y., for purchase of 42,000 lineal feet of 6, 8 and 10-inch cast pipe, and also to Olean, N. Y., for 9800 feet of 16-inch cast pipe.

Seattle—Few cast pipe specifications are out and unimportant tonnages are involved. Demand for wrapped steel pipe is more active. Washington state purchasing agent will open bids at Olympia, Oct. 30, for King county district No. 49 involving an elevated steel water tower and tank and 107,360 feet of wrapped sheet, steel pipe, valves, etc. Eagle Point, Oreg., will open bids Nov. 4 for 4100 feet of galvanized pipe, 13,500 feet of 4 and 6-inch wrapped steel pipe.

Cast Pipe Placed

400 tons, water supply for South Bend, Ind., to United States Pipe & Foundry Co., Burlington, N. J.

383 tons, 6 and 8-inch, Walnut Creek, Calif., to American Cast Iron Pipe Co., Birmingham, Ala., and Pacific States Cast Iron Pipe Co., Provo, Utah.

100 tons, 4 and 6-inch, treasury department, San Bernardino, Calif., to unnamed interest.

Cast Pipe Pending

150 tons, 16-inch Rockaway beach boulevard, Queens, N. Y., for treasury department, procurement division, New York.

150 tons, sewage treatment plants at South river and Sayreville, N. J., through respective municipalities on WPA funds.

129 tons, 8 to 12-inch, Jackson, Calif.; bids opened.

Unstated tonnage, 500 feet of 12-inch, 110 feet of 10-inch, at Hasting for Westchester county sanitary sewer commission; bids Oct. 23.

Transportation

Track Material Prices, Page 85

With the price of standard steel rails extended a month, to Nov. 30, and with deliveries extended to March 31, 1937, a good volume of rail buying is expected to be closed in the next 30 days. The Pennsylvania is reported to have placed a substantial tonnage and other eastern roads, including the New York Central, are expected to inquire soon. The New York Central recently released a small tonnage against an old contract.

This road has postponed opening of bids on 50 locomotives until Oct. 26. Locomotive inquiry has brought at least 141 units before builders, in addition to those for which contracts have been made. This is an unusual number and shows confidence in future traffic requirements. In addition to those announced in the past few weeks by various roads, the Western Pacific and Denver & Rio Grande are in the market for a total of 25.

Columbia Steel Co., San Francisco, subsidiary of the United States Steel Corp., has transferred an order for 29,123 tons of steel rails for the Southern Pacific, to the Tennessee Coal, Iron & Railroad Co., Birmingham Ala., for rolling.

Nashville, Chattanooga & St. Louis directors have authorized expenditure of $123,337 for air conditioning all coaches on its lines. Its sleepers will be air conditioned by the Pullman-Standard Car Mfg. Co., Chicago.

An eastern anthracite road opened bids Oct. 23 on repairs to 1000 coal cars. St. Louis & Southwestern has awarded underframes for 50 flat cars to American Car & Foundry Co., New York.

Car Orders Placed

Cincinnati, New Orleans & Texas Pacific, subsidiary of Southern Railway System, 10 air dump cars, to Pressed Steel Car Co., Pittsburgh.

Locomotives Placed

Universal Atlas Cement Co., one 600-horsepower diesel locomotive to American Locomotive Co., New York.

Car Orders Pending

Chicago, Rock Island & Pacific, 350 automobile cars.

Louisville & Arkansas, 80 hopper cars.

Navy, two 70-ton flat cars; bids asked.

Seaboard Air Line, six trailer passenger cars; bids asked.

Western Pacific, 100 ballast and 50 flat cars, all 50 tons capacity; bids asked.

Locomotives Pending

Denver & Rio Grande Western, ten freight and five passenger locomotives

Western Pacific, ten freight locomotives.

Rail Orders Pending

Kansas City Southern, 6000 tons.

Buses Booked

A. C. F. Motors Co., New York: Thirteen 35-passenger and three 41-passenger, for Eastern Massachusetts Street Railway Co., Boston; six 35-passenger, for Worcester Street Railway Co., Worcester, Mass.; four 28-passenger, for Texas Bus Line Inc., Houston, Tex.; four 30-passenger, for Houston Electric Co., Houston, Tex.; four 35-passenger, for Springfield Street Railway Co., Springfield, Mass.; two 36-passenger, for Florida Motor Lines Inc., Jacksonville, Fla.

Twin Coach Co., Kent, O.: Thirty 40-passenger, for Milwaukee Electric Railway & Light Co., Milwaukee; seven 31-passenger, for Connecticut Co., New Haven, Conn.

Strip

Strip Prices, Page 85

Pittsburgh—The delivery situation on cold-rolled strip and stainless strip is still more acute than earlier in October. Several mills in this district have had virtually all of their cold rolling equipment in operation. Hot-rolled strip steel also shows delivery arrearages, with which most buyers are concerned rather than price.

Cleveland—Shipments during October are expected to exceed September and no letup is anticipated because of the increased demand

expected from auto partsmakers over the remainder of the quarter. Demand for narrow widths predominates among the hot-rolled material, while the reverse is true for cold-rolled. Backlogs continue well extended.

Chicago—While new strip business is lighter, mills are making fairly heavy shipments against contracts and consumption is well maintained in most directions. Improvement in automotive releases still is small and below expectations. This is caused by delays in the start of production of new models, a situation which is expected to be corrected by early November. The market is steady on new orders.

New York—Heavy buying is noted in narrow cold-rolled strip with some eastern producers booked so solidly they are being forced to turn down attractive tonnage. Automotive accessory and hardware manufacturers are pressing for deliveries particularly hard.

Wire

Wire Prices, Page 85

Pittsburgh—Moderately good test of $2.05 per keg, f.o.b. Pittsburgh or Cleveland, on standard wire nails has been developing and mills are endeavoring to complete shipments against $1.90 business, in effect openly until late September. In addition, in order to classify their jobbers, mills are asking jobbers to whom they ship merchant wire products to sign written agreements that all of the material they specify will be resold to dealers. Bolt and nut manufacturers, automobile spring makers and a number of wire specialty manufacturers are actively providing specifications for plain manufacturing wire, which is quoted at 2.50c, 6-9 gage base, f.o.b. Pittsburgh or Cleveland.

Cleveland—Producers report some improvement in deliveries on most grades of wire products. Gradual increase in activity among automotive builders has stimulated demand from partsmakers here. Requirements for plain and galvanized wire from agricultural sources continues strong. Most consumers continue to purchase for immediate needs only.

Chicago—Steel wire shipments are steady, but new business is less active. Sales are retarded to a certain extent by forward coverage in September, but with consumption well sustained, this lag is believed to be only temporary. Automotive needs are increasing gradually, with further gains seen for coming weeks.

New York—Buying of manufac-

turers' wire is brisk, with deliveries well extended. The situation on nails and merchant wire is featured by reports that producers may in the future confine sales to jobbers only.

Cold Finished

Cold Finished Prices, Page 85

Pittsburgh—Heavy backlogs with which producers entered October are still large, in spite of near-capacity operations in cold-finishing bar departments. Most of this business was entered for shipment at mills' convenience, which will carry present high rate of activity well into November. Although jobbers' stocks of cold-finished bars appear to be adequate for the time being, they also were heavy buyers in late September at the lower price.

A heavy steel guard extending from stem to stern replaces the usual wooden guard fitted around the hull on the tug boat CAROLYN launched recently in Wilmington, Del. This steel guard is known as the "war-nose" tight bumper.

Shapes

Structural Shape Prices, Page 84

New York—Inquiries are slow and lettings comparatively light. Harris Structural Steel Co., New York, booked 1000 tons for an apartment at 5 Riverside drive, the first large apartment to be built in New York for several years. So far bids have not been asked on any of the proposed 30 school buildings for the city. Triboro authority is preparing plans for an elevated highway on Exterior street, leading to the Triboro bridge, which will call for 3800 tons. Flintkote Co., Rutherford, N. J., plans to spend $750,000 for an asbestos plant and additional manufacturing facilities for automotive products at its plant in Rutherford.

Pittsburgh—Two large local structural contracts were placed last week, 2500 tons for Wheeling Steel Corp.'s new tin mill going to Bethlehem and 1550 tons for the Jerome street viaduct, McKeesport, Pa., to Fort Pitt Bridge Works. Inquiries are out on 967 tons in four Pennsylvania state bridges for Oct. 30. The largest in the latter group was a 1220-ton viaduct at Wilkes Barre, Pa., on which Dick-Smith Engineering Corp., Hazelton, Pa., is low.

Cleveland—One leading fabricator here states that of the jobs which it submitted bids over the last 60 days, private work constituted the greatest tonnage. Some fabricators have discontinued bidding on small jobs, except where deliveries can be made out of stock. Mansfield Asphalt Paving Co., Mansfield, O., was low bidder on the Bucyrus, O., state grade crossing elimination, involving 520 tons.

Chicago—Awards of fabricated shapes are light and new business in plain material also is receding from its active mid-summer rate. Inquiries are slightly more numerous, but small tonnages are involved in most projects. Public work is represented among the larger inquiries, with state bridges predominating. Mills are improving deliv-

Shape Awards Compared

	Tons
Week ended Oct. 23	20,380
Week ended Oct. 16	10,435
Week ended Oct. 9	20,455
This week, 1935	10,721
Weekly average, 1935	17,081
Weekly average, 1936	22,133
Weekly average, September	19,999
Total to date, 1935	706,146
Total to date, 1936	951,714

eries of plain shapes as a consequence of lighter demand.

Philadelphia—Demand is fair with two industrial plant additions at Lancaster, Pa., requiring 1050 tons. Four state bridge projects up for bids Oct. 30 will require approximately 1000 tons. Pending projects include 800 tons for a plant addition to the Armstrong Cork Co., Lancaster, Pa., bids opened Oct. 22. Prices are steady.

St. Louis—Further inroads have been made in backlogs of fabricators, and operations at the seven principal plants have receded to 50 per cent compared with 75 per cent a few weeks back. Purchasing of shapes by fabricators has also fallen off. A projected addition to the local Swift Packing Co. plant will require 1000 tons of shapes.

Birmingham, Ala. — Fabricating shops are active and backlogs have been holding up well. Ingalls Iron Works Co. has been awarded 900 tons for the new Kress store building. Several other substantial contracts have been placed.

San Francisco—Demand has fallen off materially during the past few weeks and awards totaled only 971 tons, bringing the aggregate for the year to 143,172 tons, compared with 97,976 tons for the same period last year. Bids have just been opened on approximately 10,000 tons for the Federal building, Los Angeles, and on 1500 tons for a crossing at Denver. Pending business does not exceed 18,000 tons.

Seattle—New projects involving sizable tonnages have developed, although the week's awards were not important. Bids will be opened Nov. 5 for a 96-foot steel girder span at Eugene, Oreg. Montana will receive tenders Oct. 29 for a five-span, 294-foot steel and concrete bridge in Roosevelt county, a 104-foot pony truss and a 175-foot deck girder bridge in Lincoln county. Fabricating plants generally are busy.

Shape Contracts Placed

2500 tons, various extensions to tin mill, Yorkville, O., for Wheeling Steel Corp., to Bethlehem Steel Co., Bethlehem, Pa.

2000 tons, sheet piling for new piers, Hamilton, Ont., to Algoma Steel Co., Sault Ste. Marie, Mich.

1900 tons, plant for Linde Air Products Co., Tonawanda, N. Y., to American Bridge Co., Pittsburgh.

1560 tons, armory for 104th engineers, Teaneck, N. J., to Oltmer Iron Works, Jersey City, N. J.

1550 tons, Jerome street bridge, McKeesport, Pa., for Allegheny county authority, to Fort Pitt Bridge Works, Pittsburgh.

1500 tons, steel sheet piling, for United States Navy department, Sewall's Point, Va., to Jones & Laughlin Steel Corp., Pittsburgh.

1400 tons, Belleville turnpike, Kearny, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, apartment, 5 Riverside drive, for Orphington Estates Inc., New York, to Harris Structural Steel Co., New York.

575 tons, crossing, Fayetteville, N. C., to Bethlehem Steel Co., Bethlehem, Pa.; 150 tons piling still pending.

560 tons, bridge, St. Louis, to Mississippi Valley Structural Steel Co., St. Louis.

500 tons, Dryden Rubber Co., Chicago, to Sprague Iron Works, Chicago.

450 tons, high school building, East Chicago, Ind., to United Boiler & Heating Co., Hammond, Ind.

440 tons, extensions to Pittsburgh Steel Co. mill buildings, Monessen, Pa., and Allenport, Pa., to Fort Pitt Bridge Works, Pittsburgh.

380 tons, bridge No. 1012, Crescent, Iowa, for Chicago & North Western railroad, to American Bridge Co., Pittsburgh.

355 tons, bridge WPMS 550-A, Washington county, Oklahoma, to Capital Iron Works Co., Topeka, Kans.

330 tons, section 3321 SF, Cicero, Cook county, Ill., to American Bridge Co., Pittsburgh.

320 tons, state bridge over N. Y. C. tracks, on route 20, Geneva, O., to Fort Pitt Bridge Works, Pittsburgh.

320 tons, office building, Payne Shoemaker Co., Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

310 tons, state highway underpass beneath Louisville & Nashville tracks, Brownsville, Tenn., to Nashville Bridge Co., Nashville, Tenn.

300 tons, refinery building, Spencer, Kellogg Co., Long Beach, Calif., to Min-

neapolis-Moline Power Implement Co., Minneapolis.

275 tons, railroad bridge, Kalamazoo, Mich., to American Bridge Co., Pittsburgh.

270 tons, Francis Assisi school, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

225 tons, warehouse building, Harvey, La., to Ingalls Iron Works Co., Birmingham, Ala.

175 tons, armory, Camden, N. J., to Oltmer Iron Works, Jersey City, N. J.

160 tons, gymnasium, Elkins Park, Pa., to Fort Pitt Bridge Works, Pittsburgh.

160 tons, high school gymnasium, Philadelphia, to Fort Pitt Bridge Works, Pittsburgh.

140 tons, Bell Telephone building, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, naval station storehouse, Lakehurst, N. J., to Belmont Iron Works, Eddystone, Pa.

120 tons, section 64-SF, St. Clair county, Illinois, to Stupp Bros. Bridge & Iron Co., St. Louis.

110 tons, factory building, Lindsay Wire Weaving Co., Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

105 tons, garage for Laub Baking Co., Cleveland, to Ingalls Iron Works Co., Birmingham, Ala.

105 tons, New York state highway bridge ER RC 3824, Tioga county, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, two buildings, Lorain, O., for American Stove Co., St. Louis, to Kilroy Structural Steel Co., Cleveland.

Shape Contracts Pending

5000 tons, steel sheet piling, two bulkheads for navy department, New York.

3800 tons, westerly approach, Triboro bridge, Queens, N. Y.

2650 tons, Columbia avenue viaduct superstructure, Cincinnati; bids in but awards deferred probably two weeks.

1220 tons, steel viaduct, Wilkes Barre, Pa.; Dick-Smith Engineering Corp., Hazleton, Pa., low on Oct. 16 state letting at $285,870.

900 tons, bridge, Boscobel, Wis.; Midland Structural Steel Co., Cicero, Ill., low bidder.

884 tons, state bridges, Texas.

800 tons, building for Armstrong Cork Co., Lancaster, Pa.

715 tons, bridge, Chesterfield, N. H.; O. W. Miller, Springfield, Mass., low.

700 tons, parcel post building, Houston, Tex.

530 tons, Mary Louise academy, Jamaica, N. Y.; bids in.

510 tons, shop building for Tube Reducing Corp., Newark, N. J.

500 tons, bridge, Cedar City, Utah.

500 tons, hospital building, Dixon, Ill.

500 tons, bridge, West Lebanon, N. H.; Simson Bros. Corp., Boston, low.

500 tons, bridge, Warner-Sutton, N. H.; Arborio Road Co., Hartford, Conn., low.

500 tons, Parkside housing project H-1205. Detroit, for United States government.

448 tons, through truss bridge, Center-Clearfield counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 30. Included, 52 tons of plain bars. Original bids of Oct. 9 rejected.

400 tons, Brainard aviation field building, for United States Treasury department, Hartford, Conn.

360 tons, state bridge WPGM-X1, Dearborn, Mich.

300 tons, hangar, Hartford, Conn., Treasury department, New Haven, Conn.; Lehigh Structural Steel Co., Allentown, Pa., low.

293 tons, bridge, Durham-Lisbon, Me.; American Bridge Co., Pittsburgh, low.

278 tons, two-span through truss bridge, Blair county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 30. Included, 38 tons of plain steel bars.

250 tons, addition, Hamilton Watch Co., Lancaster, Pa.; bids opened Oct. 21.

250 tons, additions to buildings Nos. 2 and 17, for W. K. Kellogg Co., Battle Creek, Mich.

151 tons, pony truss bridge, Bedford county, Pennsylvania; Mattro & Camponeschi, Pittsburgh, low on Oct. 16 state letting at $45,242. Included, 26 tons of plain steel bars.

147 tons, bridge, Lake Creek, Lincoln county, Mont.; bids Oct. 29.

138 tons, pony truss bridge, Luzerne county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 30. Included, 26 tons of plain steel bars.

135 tons, bridge, Calisteo, N. Mex.

123 tons, plate girder bridge, Elk county, Pennsylvania; C. L. Johnson & Son, Mansfield, Pa., low on Oct. 16 state letting at $64,108. Included, 34 tons of plain steel bars.

116 tons, Poplar river bridge, Roosevelt county, Montana; bids Oct. 29.

110 tons, (plain structural steel) I-beam bridge, Center - Clearfield counties, Pennsylvania; J. L. Wilson, State Col-

lege, Pa., low on Oct. 16 state letting at $29,460.

105 tons, consisting of 93 tons of fabricated structural steel and 12 tons of plain steel bars, pony truss bridge, Huntingdon county, Pennsylvania; Pittsburgh-Des Moines Steel Co., Pittsburgh, low on Oct. 16 state letting at $21,491.

100 tons, 1-story building, Greenpoint Savings bank; bids Nov. 5. A. L. Muller, architect.

Unstated tonnage, coal-handling docks on the Ohio river, Catlettsburg, Ky., for United Collieries Inc., Catlettsburg; bids being taken.

Unstated tonnage, substructure, piers and foundation, Easton, Pa.-Phillipsburg, N. J., toll bridge; John F. Casey Co., Pittsburgh, low on Oct. 15 bids to Delaware river joint toll bridge commission.

Unstated tonnage, double-leaf bascule bridge, Oshkosh, Wis.; plans approved by War department.

Unstated tonnage, state girder span, Eugene, Oreg.; bids Nov. 5.

Unstated tonnage, 20 sets service and emergency gates for Coulee dam; bids to reclamation bureau, Denver, Nov. 2.

Unstated tonnage, three state bridges in Roosevelt and Lincoln counties, Montana; bids at Helena, Mont., Oct. 29.

Reinforcing

Reinforcing Bar Prices, Page 85

Cleveland—Demand for reinforcing steel continues strong from miscellaneous consumers, but there are few individual jobs over 75 tons. Mills are running close to capacity. Miscellaneous orders, while not large, aggregate considerable tonnage. Paterson-Leitch Co., Cleveland, was awarded 200 tons for sewage disposal contract No. 91, this city. No price weakness has been noticed.

Chicago—No slackening has appeared in shipments. October deliveries are expected to equal those of previous months. New business is slightly less active than 60 days ago, but a relatively large tonnage is pending. Private construction generally is limited to small individual lots. While prices are reported somewhat stronger, irregularities still prevail.

New York—While prices here are stiffening, those in New Jersey continue to be shaded, in some instances as much as $12. However, the shading is reported only on smaller tonnages. Inquiries on larger tonnages are few although the total tonnage on smaller jobs is holding up comparatively well.

San Francisco—The market continues active, 3725 tons being placed, bringing the aggregate for the year to 207,753 tons as compared with 193,110 tons for the corresponding period in 1935. Bids have just been opened on 6000 tons for the federal building, Los Angeles, and on 500 tons for a crossing at Denver. Projects pending now call for more than 12,000 tons.

Seattle—Local mills are working on sizable backlogs although no important new specifications have been issued. Reclamation bureau Oct. 30 will open tenders for the Fresno dam, Montana, calling for 865 tons. For a grade crossing, bids at Denver Oct. 20, 500 tons are involved.

Concrete Awards Compared

	Tons
Week ended Oct. 23	2,336
Week ended Oct. 16	3,002
Week ended Oct. 9	6,722
This week, 1935	6,924
Weekly average, 1935	6,862
Weekly average, 1936	6,515
Weekly average, September	6,987
Total to date, 1935	298,846
Total to date, 1936	280,162

Reinforcing Steel Awards

475 tons, Verdugo road high school, Los Angeles, to Blue Diamond Corp., Los Angeles.

250 tons, building, American Manganese

Steel Co., Chicago Heights, Ill., to Concrete Engineering Co., Chicago.
200 tons, sewage disposal contract No. 91, to Paterson-Leitch Co., Cleveland.
200 tons, factory addition, Studebaker Motors Corp., Los Angeles, to unnamed interest.
187 tons, trash racks, specification 836-D, Imperial dam, California, to unnamed interest.
183 tons, bureau of reclamation, invitation A-42,097-A, Potholes, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.
180 tons, bridge at Carlile, Crook county, Wyoming, to unnamed interest.
157 tons, bureau of reclamation, invitation A-42,091-A, Potholes, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.
104 tons, highway work in Moffatt, Gunnison and Garfield counties, Colorado, to unnamed interest.
100 tons, gymnasium, King junior high school, Los Angeles, to Consolidated Steel Corp., Los Angeles.
100 tons, alterations, Lockwood street school, Los Angeles, to Concrete Engineering Co., Los Angeles.
100 tons, printing plant, North Vermont street, Los Angeles, to unnamed interest.
100 tons, Washington state highway work, to Northwest Steel Products Co., Seattle.
Unstated tonnage, state viaduct, Lane county, Oregon, to unnamed interest; Parker-Schram Co., Portland, Oreg., general contractor.
Unstated tonnage, Milwaukee avenue viaduct, Portland, Oreg., to unnamed interest; Hoffman Construction Co., Portland, general contractor.

Reinforcing Steel Pending

630 tons, dam 14, Le Claire, Iowa; bids to United States engineers, Rock Island, Ill., Nov. 5.
400 tons, Langston housing development, Washington; Coath & Goss Inc., Chicago, low.
350 tons, road work, Indiana.
334 tons, concrete and steel viaduct, Wilkes Barre, Pa.; Dick-Smith Engineering Corp., Hazleton, Pa., low on Oct. 16 state letting.
300 tons, office building, 210 Sansome street, San Francisco; general contract to Cahill Bros., San Francisco.
250 tons, fermenting tanks at Anheuser-Bush brewery, St. Louis; Bosari Tank Corp., New York, general contractor.
250 tons, section 11, route 101 Sixth avenue subway; bids Oct. 30.
195 tons, Treasury department, schedule 16,853, Los Angeles; bids opened.
180 tons, paving work, Cumberland-Perry counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 30.
140 tons, substructure, Easton, Pa., toll bridge; John F. Casey, Pittsburgh, low on general contract.
125 tons, hospital addition, Santa Monica, Calif.; bids being taken.
100 tons, high school, Covina, Calif.; bids opened.
100 tons, highway work, Torrance county, New Mexico; bids opened.
100 tons, crossing, Mountain Home county, Idaho; bids opened.
Unstated tonnage, bridge, Brown creek, Middle road, Sayville, Long Island, N. Y.
Unstated tonnage, westerly approach, Triboro bridge, Cypruss avenue to Exterior street, New York; plans out soon.

Pig Iron

Pig Iron Prices, Page 86

Pittsburgh—Certain recent proposals by some pig iron producers to advance prices were met recently by opposing policy on the part of other furnace interests, with the result that no market increase is being taken at this time. Pig iron orders have been so plentiful that in many cases both merchant and non-merchant producers have been forced to declare themselves out of the market except in caring for regularly supplied accounts. Struthers Iron & Steel Co. blast furnace at Struthers, O., resumed blast Oct. 19.

Cleveland — More activity is apparent in the market for basic iron. From nearby districts come reports of two large sales, one for 30,000 tons, and the other for 25,000 tons. In this district so far this month shipments are ahead of September, which in turn topped August. Some producers expect this quarter to exceed any previous one this year. Furnace stocks have been reduced considerably within the last month, and yet most consumers insist on placing orders at the last minute, expecting delivery almost over night. Some foundries who underestimated needs earlier this quarter are now asking additional tonnage. It is reported the expected price advance will not take place before the first of the year.

Chicago—October pig iron shipments will be 10 to 15 per cent heav-

ier than in September. The gain in deliveries reflects the increasing proportion of pig iron to scrap as well as a slight increase in foundry schedules. New business still is being received and in some cases, consumers are covering part of next quarter's requirements. Possibility of higher prices as well as anticipation of delays in obtaining delivery during coming months are factors responsible for the interest being shown in forward coverage. Prices are steady.

New York—Pig iron buying is restricted principally to small orders, but specifications against old contracts are holding up well.

Buffalo—Production of pig iron is practically at the capacity of usable stacks, and increasing piles of ore on local docks indicate steady schedules throughout the winter. Consumers are taking steady shipments and in most instances will clean up fourth quarter contracts well in advance of the end of the quarter.

Philadelphia—Pig iron specifications are being sustained, and while there is uncertainty as to early action, advances next quarter appear all but definitely assured.

Cincinnati—Pig iron requirements for the entire quarter are fairly well covered. Neither possibility of a car shortage nor pre-election influences has affected the steady movement of iron, moderately heavier because of the demand for automobile parts. Stocks of both producers and consumers are light.

St. Louis—While orders for pig iron have tapered, there is small doubt that October will be the best month so far this year. Melters are well covered for the balance of 1936, although additional scattered lots are being ordered. Further expansion in the melt is noted, as implement and tractor interests are swinging into full fall production and other specialty makers have increased schedules. Activity at stove foundries is at the highest rate recorded in many years.

Birmingham, Ala.—Demand for pig iron is steady, with spot orders still the rule. The base price remains firm at $15.50 for No. 2 foundry.

Toronto, Ont.—Pig iron business continues to appear in good volume, with sales holding better than 1000 tons per week. Daily melt also is improving, with operations now between 55 and 60 per cent. No additional contracts have been placed for future delivery but some large melters are taking supplies for several weeks ahead. Prices are firm.

Geo. P. Reintjes Co., Kansas City, Mo., developer and builder of furnaces, has appointed the Moorlane Co., Tulsa, Okla., as its sales representative.

Scrap

Scrap Prices, Page 87

Pittsburgh—Aggregate purchases of 9000 to 10,000 tons of No. 1 heavy melting steel by a downriver independent at an average of $17.75 last week lent confirmation of a weaker market. In consequence, the quotable range was off 50 cents a ton to $17.50 to $18 on No. 1 steel, marking the first price weakness in Pittsburg melting steel since June. In that interval the market had advanced from $13.25 to $18.50. Apparently well satisfied with supplies for the time being, a number of mills here have embargoes. Sympathetic with the lower range on No. 1 steel have been reductions in machine shop turnings, hydraulic compressed, No. 2 steel and flashings, though low phos specialties hold firmly at around $21 to $21.50.

Pittsburgh & Susquehanna railroad, in receivership since April 22, 1931, will ask bids shortly to scrap its entire line, consisting of 22.02

miles of track in Clearfield county, Pennsylvania. Last week the interstate commerce commission granted the receiver permission to abandon the entire line, due to poor business. Presumably, the road's three locomotives and nine miscellaneous cars will also be placed on the market.

Chicago—Scrap continues strong. The market here has not yet reflected the easier situation which has appeared at Pittsburgh. Scrap is coming out in no more than sufficient quantity to fill outstanding orders, and the flow from some districts has been diverted to mills in adjoining territories. The trade anticipates little new buying by local mills this month, but shipments against contracts continue heavy. Heavy melting steel nominally continues $16 to $16.50, with dealers able to pick up little tonnage at $16.25.

Boston—Eight classifications of scrap were marked down last week from 25 to 50 cents a ton as a reflection of lowered demand. Scrap rails were reduced 50 cents to $11.00 to $11.25; mixed shafting to $15.50 to $15.75; and machine shop turnings to $5.75 to $6.00 range. A reduction of 25 cents has been made and the spread taken out of the three grades of cast for domestic consumption.

Cleveland—Shipments of iron and steel scrap are engrossing attention of the trade. The generally prevailing lull in buying is welcomed, permitting dealers to catch up on shipments. They avoid booking business at today's prices. Considerable difficulty is found in obtaining supplies even at today's prices.

New York—With demand for immediate delivery dropping off considerably, scrap in hands of dealers is plentiful, and prices are weaker but unchanged. Although present buying prices are considered weak brokers have not officially indicated whether prices will be reduced. Italy continues to make inquiries.

Philadelphia—Scrap prices are holding at the current level, with little trading in steelmaking grades. Some trade leaders see weakness but it is not pronounced.

Buffalo—Scrap dealers are anxious to build up inventories before water shipments cease. In this effort they are now offering prices close to the best bids of consumers for the same material. No. 1 heavy melting steel readily commands $16.50 or slightly more, delivered at nearby works. Short steel rails, extremely scarce, are bringing close to $19.

Detroit—Both No. 1 and No. 2 heavy melting steel, forge flashings and No. 1 busheling, lost 50 cents a ton last week due to heavier production in this district, plus the fact that local consumers are showing no interest. One exception to the market's weaker tone is in blast furnace scrap where prices are firm.

Cincinnati—The iron and steel scrap market is quieter. However, dealers are trying to obtain stocks, either for application to contracts or in anticipation of a more active market. Shipping restrictions in nearby districts are not duplicated here, and have had only a sentimental effect. A tightening in offerings is acting counter to any trend toward weakness.

St. Louis—There is an active demand for iron and steel scrap and while prices are unchanged, the market is decidedly firm. Approximately 8000 to 10,000 tons have been bought the past week or ten days, principally steel grades.

Birmingham, Ala. — Available stock is not extensive, the larger producers not offering their product locally with better prices obtaining elsewhere. Scrap prices in Birmingham district are holding the high level that was reached a few weeks ago and some tonnage is moving.

Seattle—Inquiry from Oriental sources indicates renewed interest

although buyers still hesitate to pay the higher prices due to a firm market on this side and increased ocean freights. Dealers are selling steadily to local mills and foundries. Domestic prices firm at $10 while $10.50 is the going quotation on good material for export.

Toronto, Ont.—No special features have appeared in the iron and steel scrap markets. Sales continue at a good level with principal demand for steel grades. Regular shipments of heavy melting steel are being made to the Hamilton mills, and there is better call for steel scrap from other consumers. Machinery cast and dealers' cast have a steady call and there is a fair market for stove plate.

Warehouse

Warehouse Prices, Page 88

New York—Sales of warehouse products last week recovered somewhat from the recession noted during a previous week, bringing sales back to the September level. Sales of sheets are stronger, and smaller sales of cold-rolled strip is attributed to the covering of the larger buyers when mill prices were increased for the fourth quarter.

Cleveland—So far this month miscellaneous requirements for warehouse products has held at the steady level reported during September. While stocks are a little below normal, they are considerably better than those of most consumers. Prices continue to be firmly quoted at the advanced figures.

Chicago—Despite the adverse influence of higher prices this month, sales are about equal to those of September. October appears likely to be one of the three best months of the year from the standpoint of number of orders.

Philadelphia—Warehouse business this month will exceed September, according to present indications. Prices are steady.

Cincinnati—The active demand for warehouse offerings, especially in sheets and bars, continues. Building materials, however, have turned dull. Prices are firm.

St. Louis—Warehouse business continues at a brisk rate and October promises to be the best month for the year to date. Railroad buying shows steady expansion. Requirements are well diversified. Current movement of construction items is well in excess of that of the same period during the past several years, and extended mill deliveries continue to boost jobbing on sheets and other flat rolled material.

Seattle—Business continues in good volume. Sheets are in fair demand but medium gage plates for tanks and boilers and repair jobs show a large increase. The new price list is being generally maintained.

Semifinished

Semifinished Prices, Page 85

A growing trend in the semifinished market that has caused considerable concern to nonintegrated steel companies has been the tendency of mills who were formerly sellers of semifinished to withdraw from the market. In many cases this has been caused by sharp increase over the past few months in internal demands for semifinished among integrated mills and the condition promises to become more noticeable when finishing mill capacity under construction is completed. Some smaller mills have had trouble getting semifinished shipments which they desire and in one case in the Pittsburgh district a nonintegrated sheet mill is laying plans to build three 60-ton open hearths. Present prices name $32,

f.o.b. Pittsburgh, for rerolling billets, sheet bars and slabs, $40 and $42 for wire rods and $37 for forging quality billets.

Pittsburgh—Tin plate specifications continue to show many carrying rush shipping directions although this type of business, usually associated with the season's end, is involving more tonnage than usual. The result has been that tin mill operations are still strongly supported at around 95 per cent of capacity, considering all producers. An announcement on the 1937 price of tin plate is still awaited, the price meanwhile unchanged at $5.25 per base box.

Iron Ore

Iron Ore Prices, Page 87

Cleveland—According to a recent report compiled by the M. A. Hanna Co., Cleveland, 16 more boats were engaged in the ore trade Oct. 15 than on the same day in September.

The number of American lake ore carriers in commission Oct. 15 was 278, compared with 262 Sept. 15 and 186 Oct. 15, 1935. Seventeen fleets are now operating 100 per cent. The total number of American lake ore carriers is 309, making 89.97 per cent of the fleet active. Not since these statistics were compiled, beginning in 1931, have so many freighters been in commission.

The number of such carriers engaged in the ore trade is 273, compared with 247 in the preceding month and with 155 a year ago.

The steamer NEPTUNE of the Interlake Steamship Co., Cleveland, has been sold to W. E. Richey, Chicago, president of the Lake Ports Shipping Co., who has leased the boat to the Central States Transit Co., Buffalo. The boat has been idle for several years.

Receipts of iron ore at lower lake ports this season to Oct. 1, shipments to interior furnaces, and dock balances follow:

Port	Receipts Season	Shipments Season	Dock bal. Oct. 1, '36
Buffalo ..	2,388,781	4,762	1,800
Erie	1,269,875	1,274,054	57,441
Conneaut .	4,862,551	4,904,265	1,561,537
Ashtabula	3,272,740	3,228,736	1,721,846
Fairport ..	704,653	703,017	387,085
Cleveland	6,709,334	5,568,504	354,034
Lorain ...	1,968,179	981,320	28,088
Huron ..	599,689	642,899	292,089
Toledo ...	1,134,096	641,206	18,267
Total ..	22,909,898	17,948,763	4,422,187

Receipts at other than Lake Erie ports for September and the current season to Oct. 1 follow:

Port	Receipts in Sept.	Season to Oct. 1
Detroit	164,461	1,100,311
Indiana Harbor	320,490	1,620,730
Gary	546,943	2,486,074
So. Chi. (loc. furs.) .	758,437	3,749,724
Sault Ste. Marie, Ont.	44,659	117,021
Hamilton, Ont.	68,800	331,400
Total	1,903,790	9,405,260
Year ago	1,348,841	6,125,119

Stocks of iron ore at Lower Lake ports and furnaces Oct. 1 were approximately 1,500,000 tons less than on the comparable date last year, according to Lake Superior Iron Ore association.

The association's report follows:

	Tons
Consumed in August.....	3,968,845
Consumed in September.....	4,026,690
Increase in September	57,845
Consumed in September, 1935.	2,654,278
On hand at furnaces, Oct. 1..	27,555,476
On Lake Erie docks, Oct. 1....	4,422,187
Total on hand at furnaces and Lake Erie docks, Oct. 1....	31,977,663
Reserves, total, Oct. 1, 1935..	33,468,851

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 85

Bolt, nut and rivet demand is steady and October specifications are expected to equal or better those of September. A steady call is appearing from railroad shops, some

Behind the Scenes with STEEL

Metal Men Migrate

EIGHTEENTH annual National Metal congress and exposition is now history, and whatever we might say about it here would be a trifle anticlimactic; furthermore there are some 11 pages in this issue devoted to reports of technical sessions, slants on the show and other doings, and far be it from us to encroach on the sacred privileges of editors.

Exhibitors were wreathed in smiles as they packed up their wares Saturday morning to be shipped back to the home office. Crowds were large all week; sales on the floor were numerous; interest was high on the part of everyone, and representatives were worn to a frazzle trying to answer questions of visitors.

Because of its location smack in front of the only entrance to the show, STEEL'S exhibit was not missed by anyone. In case you were not there, we reproduce a picture of the display below. The photo was taken one morning before the show opened, so our representatives were still at home in bed. This department may be seen, however, just to the left of the water cooler, explaining the binomial theorem to a group of scarletina players from Peoria, Ill.

We went out on a little party one night with the robot from the USSteel booth. Found him to be a real nice fellow, not at all dizzy from his many trips around a circle of illustrated panels in the display. Said he was going to vote for Lemke.

* * *

Steel on the Boards

BOTH the cinemah and legitmut theatuh have turned to the steel industry for local color in two recent dramatic efforts, neither of which we have seen—which should qualify us as a critic. The picture —"The Magnificent Brute" — puts Victor McLaglen in the role of an open-hearth melter who wears no shirt and can recognize the pouring of a high-carbon heat some ten blocks away.

The drayma is a Norman Bel Geddes opus termed "Iron Men" and concerns itself with the carryings-on of a gang of structural steel workers. Mr. Geddes' settings are most realistic, we are told, and before your very eyes a derrick hoists skyscraper beams into place. Chief role in this saga of saloons and structurals is one William Haade of Local 40, International Association of Bridge, Structural and Ornamental Iron Workers.

* * *

Tops

HEADLINE of the week: "A Simple Thing for Old Cassius"—Standard Oil of Indiana in the Oct. 12 issue. Could they be referring to old Cassius Catchcan by any chance?

—SHRDLU

of which have increased operations during the past several weeks. Tractor production is holding its own, and farm implement manufacturers are increasing output of tillage tools. Specifications from jobbers generally are steady.

Steel in Europe

Foreign Steel Prices, Page 88

London—(*By Cable*)—Pig iron supplies in Great Britain are growing tighter and exports of foundry iron have been stopped, while those of hematite are strictly limited. Although steel output is the highest on record domestic supplies are insufficient to meet requirements and are being supplemented by increased Continental imports, the quota having been enlarged again.

The Continent reports export trade fairly strong, especially in bars, plates and sheets. The Far East and South America are active markets but American trade has been cut into by the recent freight increase.

Metallurgical Coke

Coke Prices, Page 85

Struthers Iron & Steel Co., Struthers, O., which blew in its merchant furnace Oct. 19, has commenced the receipt of beehive coke shipments from the Connellsville field. Wieman & Ward Co., Pittsburgh, sold the Struthers Iron & Steel Co. its requirements of about 15,000 tons of coke monthly. Heavy shipments to six other blast furnaces constitute the largest outlet for a greatly expanded beehive coke market in the Western Pennsylvania area. Inasmuch as the by-product oven output is all taken up and an active domestic season is immediately at hand, beehive coke producers are strongly confident that resumption in their business is not to be short lived. Going prices being recognized on beehive coke name standard furnace at $3.75 to $4 a ton, common foundry at $4.25 to $4.50, and premium foundry at $5.50, all f.o.b. Connellsville, Pa., ovens. By-product coke shipments continue at a high rate and in some districts are increasing as larger foundry melt demands heavier tonnage and domestic heating needs appear.

Import Cuban Chrome Ore

Fifteen hundred tons of chrome ore from Cuba arrived at Philadelphia in the week ended Oct. 17. Other arrivals included 150 tons of ferromanganese from Poland and 50 tons from the Netherlands; 152 tons of shapes from Belgium and 22 tons of steel tubes and seven tons of steel bars from Sweden.

Nonferrous Metals

Nonferrous Metal Prices, Page 86

New York—Copper sales increased steadily during the early part of last week accompanied by a stronger price tone but all consumers were satisfied at 9.75c, Connecticut. Additional strength in the undertone of lead and zinc markets also developed while tin was generally weak.

Copper—Sales volume reached its peak last week on Wednesday when 11,525 tons were done with the total for October through Thursday amounting to 49,985 tons. Export copper advanced to 10.15c to 10.20c, c.i.f., but a reaction is expected as the market is believed supported by speculative interests hedging against the franc. Steady prices are expected here unless consumers

begin to rush the market for metal.

Lead—Buying was well sustained with the tone of the market continuing firm to strong. St. Joseph Lead Co. continued to ask 4.70c, New York, and 4.50c, East St. Louis, while American Smelting & Refining Co. and other leading sellers asked 4.45c and 4.60c in the respective markets. The statistical position improved with a cut of over 17,000 tons in refined stocks reported for September.

Zinc—Demand increased and sentiment was buoyant on the price recoveries in London and good domestic shipment rates. Talk of a possible price rise here has been resumed. Prime western held last week at 4.85c, East St. Louis.

Tin—No real progress has been made in restriction negotiations with Siam. This development weakened the market here and Straits spot closed lower at 44.20c. Consumers continued to buy only occasional lots.

Steel Roads May Merge

Union Railroad Co., subsidiary of United States Steel Corp. in the Pittsburgh district, has scheduled a stockholders' meeting Oct. 27 in its plan to merge the Monongahela Southern Railroad Co. and the St. Clair Terminal Railroad Co., both leased lines, with the Union Railroad Co.

Metals Safety Leaders Named

ACTIVITIES of the metals division of the National Safety council, which recently held its twenty-fifth congress in Atlantic City, will be directed for the coming year by C. M. Allen, American Rolling Mill Co., Middletown, O., who was elected general chairman of the metals section executive committee.

R. A. Chaffin, Continental Steel Corp., Kokomo, Ind., was elected vice chairman and M. E. Trammell, Gulf States Steel Co., Alabama City, Ala., will serve as secretary and news letter editor.

A. V. Rohweder, superintendent of safety and welfare, Duluth, Missabe & Northern railway, Duluth, was elected vice president for industrial safety of the national council.

Committee chairmen for the metals section for 1936-37 include: Contests, Robert L. Schmitt, Louisville Car Wheel & Railway Supply Co., Louisville, Ky.; Engineering, R. H. Ferguson, Republic Steel Corp., Cleveland; Foundry, Irvin A. Brinkman, Mackintosh-Hemphill Co., Pittsburgh; Health, Dr. R. C. Engle, Republic Steel Corp., Cleveland; Membership, H. J. Griffith, Jones & Laughlin Steel Corp., Pittsburgh; Posters, H. H. Henry, Otis Steel Co., Cleveland; Program, C. W. Hanko, Pittsburgh Steel Co.. Monessen, Pa.; Publicity, C. E. Ralston, Pittsburgh Plate Glass Co., Pittsburgh; Railway Car Builders, P. J. Brand, Pullman Standard Car Mfg. Corp., Chicago; Slides and Safety Kinks, J. A. Oartel, Carnegie-Illinois Steel Corp., Pittsburgh; Statistics, W. T. Filmer, Youngstown Sheet & Tube Co., Youngstown, O.

Executive Committee Large

Members at large of the metals section executive committee include: F. C. Bennett, Buckeye Steel Castings Co., Columbus, O.; R. A. Beyer, Central Tube Co., Ambridge, Pa.; C. A. Bianchi, H. H. Robertson Co., Ambridge; E. F. Blank, Jones & Laughlin Steel Corp., Pittsburgh; J. A. Coltrin, National Radiator Corp., Johnstown, Pa.; C. S. Craigmile, Belden Mfg. Co., Chicago; H. M. Croghan, Inland Steel Co., East Chicago, Ind.; J. E. Culliney, Bethlehem Steel Co., Bethlehem, Pa.; H. W. Darr, Bethlehem Steel Co., Johnstown, Pa.; M. W. Dundore, Beloit Iron Works, Beloit, Wis.; B. T. Dye, Republic Steel Corp., Warren, O.; John P. Eib, Carnegie-Illinois Steel Corp., Joliet, Ill.; E. A. Ellis, Wheeling Steel Corp., Wheeling, W. Va.; J. P. Gatherum, Great Lakes Steel Corp., Ecorse, Mich.; A. C. Gibson, Spang, Chalfant Co. Inc., Pittsburgh; O. F. Harvey, American Car & Foundry Co., New York; S. E. Hawkes, MacWhyte Co., Kenosha, Wis.; H. G. Hensel, Youngstown Sheet & Tube Co., Chicago; W. A. Jarvis, Chase Companies Inc., Waterbury, Conn.; F. A. Lauerman, Republic Steel Corp., Chicago; T. H. McKenney (retired), Carnegie-Illinois Steel Corp., Chicago; D. V. Medalie, Interlake Iron Corp., Chicago; John O'Rourk, Bethlehem Steel Co., Sparrows Point, Md.; C. S. Phillips, Revere Copper & Brass Inc., Rome, N. Y.; Frank Rowe, Wheeling Steel Corp., Portsmouth, O.; A. C. Schultz, Bucyrus-Erie Co., So. Milwaukee, Wis.; H. J. Spoerer, Youngstown Sheet & Tube Co., East Chicago, Ind.; J. H. Stafford, Mississippi Valley Structural Steel Co., Decatur, Ill.; E. J. Sterner, Bethlehem Steel Co., Bethlehem, Pa.; J. A. Voss, Republic Steel Corp., Cleveland.

Dr. C. H. Watson, New York, med-

ical director of the American Telephone & Telegraph Co., was re-elected president of the national council.

Equipment

Pittsburgh—William M. Bailey Co. here has received an order from Carnegie-Illinois Steel Corp. for open-joint checkers for two 24 x 104-foot hot blast stoves at the Carrie furnaces, Rankin, Pa. A similar order has been received for a 21 x 116-foot stove at Ohio works, Youngstown, of the Carnegie-Illinois. Jones & Laughlin Steel Corp. has broken ground on the miniature steel plant, South Side, Pittsburgh, which is designed to correlate the work of the research and development engineers with manufacturing operations. The complete complement of equipment at the model plant has not been decided upon, but doubtless it will include at least one small open hearth and a cupola.

Chicago—Steadiness in demand for various small tools testifies to sustained activity in important branches of the metalworking industry. The summer letdown in sales of such items was small and since has recovered that loss. Machine tool buying is holding at a generally satisfactory level despite the lack of large individual inquiries. Most requests for bids cover no more than a few tools, and, in contrast to conditions a few years ago, are closed on promptly. One exception is railroad inquiry which, to a certain extent, is for the purpose of preparing 1937 budgets. Plant expansion in various industries is the most active in several years as reflected in the increasing number of small orders here for steel building materials. Much of this work involves the purchase of miscellaneous equipment.

New York—Downward trend in sales of machine tools during the past three months is apparent to only a slight extent in this area. Demand is diversified, with orders for single tools predominating. Deliveries can be had on some types of machines by the first of January, although the bulk of current orders cannot be filled in less than four or five months. General Motors Corp. is said to have a new equipment buying program outlined, and it is expected orders will be placed shortly.

Seattle—Summer demand has tapered off but business continues in heavy volume considering the season. Municipal requirements for electrical equipment, power and pumping plants are heavy while dealers report steady sales of road machinery, logging and sawmill equipment.

Construction and Enterprise

Ohio

BEREA, O.—City is having a survey made of light and water plants by W. C. Kammerer & Associates, 710 Smythe building, Cleveland. The survey will recommend improvements and new equipment necessary.

BROOKVILLE, O. — City will vote on $32,000 bond issue for construction of sanitary sewer system and disposal plant on Nov. 3.

CLEVELAND—City is taking bids for construction of extensions to incinerator works, including installation of sludge tank and filters. Bids are due noon, Oct. 29. City engineer is Robert Hoffman, 518 City Hall.

CLEVELAND — Nu-Enamel Corp., manufacturer of paints and varnishes, has acquired the Chi-Namel Paint & Varnish Co. plant at 8709 Kinsman road S. E., and will establish national headquarters here Nov. 1.

CLEVELAND — Sedlacek Mfg. Co., West Forty-seventh street and Storer

avenue S. W., manufacturer of machine parts, plans to buy former No. 1 body plant of American Coach & Body Co., at 3909 Clark avenue, to expand operations.

GEORGETOWN, O. — City will vote Nov. 3 on $30,000 bond issue for sewage disposal plant.

MT. VICTORY, O.—Village rejected bids received Oct. 17 for water treatment equipment. Taking new bids due noon, Nov. 5. Carl Simon, Van Wert, O., is consulting engineer.

NELSONVILLE, O. — City is taking combined bids, due Nov. 9, for construction of additions to light and waterworks systems. Cost of project is $80,000. (Noted Oct. 19).

RIO GRANDE, O.—Village to construct water works and sewage system at a cost of $40,000. Plans are completed and await WPA approval. Burgess & Niple, 568 East Broad, Columbus, O., are engineers.

SANDUSKY, O.—Apex Electrical Mfg. Co., 1100 East Fifty-second street, Cleveland, maker of electric cleaners and washing machines, has acquired an 18-acre factory site in Sandusky and plans expansion of stamping and enameling operations here.

TOLEDO, O. — Toledo Tallow Works, 4110 Lagrange street, will repair the $50,000 damage done to its plant by fire.

Connecticut

HARTFORD, CONN. — Connecticut Light & Power Co. plans to spend $200,000 rebuilding the emergency power plant at Scotland Dam which was damaged last spring by the floods. (Noted Aug. 10).

TERRYVILLE, CONN. — Chapman Machine Co., manufacturer of screw machine products and parts, has plans for a one-story plant addition.

Massachusetts

BOSTON — Boston Automatic Fire Alarm Co. is building a six-story plant at a cost of over $130,000, including equipment.

GARDNER, MASS. — Florence Stove Co., maker of oil stoves and range burners, has acquired additional manufacturing space at Athol, Mass.

GARDNER, MASS. — Heywood Wakefield Co., manufacturer of furniture, plans construction of a new power plant at a cost of $30,000.

New York

FALCONER, N. Y.—Excel Metal Cabinet Co. suffered a loss of $125,000 by fire Oct. 14.

NEW YORK — Commissioner of purchase, Russell Forbes, city of New York, Municipal building, Manhattan, will accept bids until Oct. 28 for furnishing and delivering Timken roller bearings and parts for various government departments.

New Jersey

NEWARK, N. J.—Welded Steel Corp. has been incorporated here. Edward R. McGlynn is agent.

Pennsylvania

BEAVER FALLS, PA.—City plans construction of addition to sewage disposal plant.

FAYETTE CITY, PA.—S. M. Speers, Belle Vernon, Pa., will build a belt conveyor tipple and loading dock on the right bank of the Monongahela river here.

HARRISBURG, PA. — Rural electrification administration, Washington, D. C., has approved $210,000 loan for 213-mile transmission line project in Bradford county, Pa.

LANCASTER, PA.—Armstrong Cork Co. plans a two-story addition to its present one-story plant. Henry Boettcher is architect.

LANCASTER, PA. — Hamilton Watch Co. is planning construction of a four-story brick building. Prack & Prack, Martin building, North Side, Pittsburgh, is architect.

NEW KENSINGTON, PA.—City will construct garbage disposal plant (incinerator) including buildings, furnace and other equipment. L. C. Heinle is city clerk. R. M. Douglass, 912 Columbia Bank building, Pittsburgh, is engineer.

PITTSBURGH—Foundation Co., Pittsburgh, will build an ice-breaker and a row of fender piles in the Ohio river at Neville Island, Pittsburgh.

PITTSBURGH—Hubbard & Co., Sixty-third and Butler streets, Pittsburgh, maker of heavy hardware and tools, will build a new galvanizing department to replace present shop, install crane runways, remodel forge shop. Rust Engineering Co. is general contractor.

Illinois

CHICAGO — Marshall Field & Co. will spend between $1,500,000 and $2,000,000 to replace 40 elevators in its loop store.

CHICAGO — Safway Steel Scaffolds Co., 1055 West Monroe street has been incorporated by A. D. Cameron, E. G. Jewell, and Harold W. Lorenz.

CHICAGO—Motive Equipment Manufacturers Inc., 2240 Ogden avenue, has been incorporated by Irving Harris, N. B. Sanow and C. T. Shanner to deal in automobile, airplane and electrical parts.

EAST MOLINE, ILL.—John Deere & Co., manufacturer of agricultural machinery, has awarded contracts for three new plant buildings to cost $150,000.

Michigan

ELSIE, MICH.—Village will take bids until Nov. 2 on construction of waterworks system, including erection of elevated steel tank and tower.

FLINT, MICH. — Burton township trustees are having plans prepared for $100,000 waterworks system, including storage tank, distribution system, diesel pump equipment, etc. Ora Gould, Flint, is consulting engineer.

GLADSTONE, MICH.—City will vote at fall election on municipal light and power plant to cost $100,000. Shoecraft, Drury & McNamee, Ann Arbor, Mich., are engineers.

Indiana

EVANSVILLE, IND. — Bids on construction of PWA project, Lincoln Gardens low-rent housing, have been rejected by administrator Harold L. Ickes. Specifications will be revised and bids re-advertised soon.

GARY, IND. — Standard Steel Spring Co., Coraopolis, Pa., has purchased the Gary Structural Steel Co. plant here and states that the Gary division will be enlarged.

GARY, IND.—National Steel Corp., Grant building, Pittsburgh, plans construction of a $7,000,000 tin plate finishing mill on its acreage adjoining Burns Ditch in northwest Porter county, Indiana, in the near future.

Alabama

BIRMINGHAM, ALA. — Tennessee Coal, Iron & Railroad Co., subsidiary of United States Steel Corp. will immediately begin a $29,000,000 expansion program. A large tin plate mill, two con-

tinuous cold-rolling mills, a continuous wide-strip mill, a new blooming mill, and two new batteries of coke ovens are reported among the improvements. J. L. Perry is president of the subsidiary company. (Noted Sept. 14).

CARBON HILL, ALA.—City application for WPA allotment to construct sanitary sewers has been approved.

CORDOVA, ALA. — City has loan of $35,000 for construction of sewerage system. Sam Bolling is mayor.

FAIRFIELD, ALA. — Tennessee Coal, Iron and Railroad Co., subsidiary of United States Steel Corp., has let contract for construction of 146 coke ovens, to cost $2,000,000, to Koppers Co., Pittsburgh.

PHENIX CITY, ALA.—City application for WPA funds of $8766 for water works extension has been approved.

Maryland

BALTIMORE—Baltimore Metal Products Corp. has been incorporated by Leo Fesenmeier and George T. Ness Jr., Munsey building, Baltimore.

BALTIMORE—Auto Cruiser Co. of America Inc., has been formed here by Ralph M. Crouse, 13 East Lee street, and Elwood S. Quamgesser.

BALTIMORE—Fallsway Spring Works, manufacturer of automobile springs, has leased one-story building at Fallsway and Centre streets here. Construction permit is applied for.

LUTHERVILLE, MD.—LaMotte Chemical Products Co., Frank LaMotte, acquired ten-acre factory site southeast side of York road.

District of Columbia

WASHINGTON — G. W. Forsebrg, Eighth and Water S. W., has permit for two-story addition to plant at 825 Water street to cost $25,000. Fred Drew Co. Inc., 2539 Pennsylvania avenue N. W., is builder; P. Remsen, 126 Chestnut avenue, Takomo Park, Md., is engineer.

WASHINGTON—Washington Suburban Sanitary Commission, Tower building, Fourteenth and K streets N. W., will receive bids Oct. 30 for erection of welded steel standpipe, 45 feet in diameter and 90 feet high. Specifications are on file with the chief engineer of the district at Hyattsville, Md.

WASHINGTON—Navy department, bureau of supplies and accounts, will take bids until Oct. 27 on one light duty motor driven engine lathe, schedule 9088, for delivery Norfolk, Va. The bureau will take bids until Oct. 30 for one motor driven woodworking machine, schedule 9110, for delivery Charleston, S. C.; until Nov. 3 for one motor driven handsaw, schedule 9101, for delivery Hingham, Mass., and two metal-cutting, motor driven band saws, schedule 9081, for delivery Mare Island, Calif., and until Nov. 6 for one motor driven, straight bevel gear generating machine, schedule 9109, for delivery also at Mare Island, Calif.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids until Nov. 3 on miscellaneous motor driven, horizontal, boring, drilling and milling machines, schedule 9100, for delivery Washington; miscellaneous electric arc welding sets, schedule 9112, for delivery various east coast points; four motor-driven, high-speed precision shapers, schedule 9114, for delivery Washington; one heavy duty, motor driven, ball bearing, tilting arbor saw, schedule 9115, for delivery Hingham, Mass.; one motor-driven, universal, milling machine, schedule 9121, and one motor-driven, heavy duty, radial drill, schedule 9124, both for delivery Washington.

Florida

DELAND, FLA.—City votes Nov. 17 on $398,000 electric light plant bond issue.

PENSACOLA, FLA. — City will receive bids Nov. 2 for material and equipment used in construction of sewage disposal plant. George J. Roark is city manager; Wiedeman & Singleton, Candler building, Atlanta, Ga., are engineers.

VALPARAISO, FLA.—City will vote Oct. 26 on $10,000 bonds for constructing artesian water works, install additional hydrants and mains.

Georgia

ATLANTA, GA.—City has let contract for its Utoy Creek disposal plant to Hardaway Contracting Co., Columbus, Ga., at $70,200. J. B. McCray Corp., Atlanta, is engineer. (Noted Sept. 28.)

MONTICELLO, GA.—City plans to install chlorinator and pump equipment in water works. Henry H. Jordan, Healey building, Atlanta, is architect.

Kentucky

CARLISLE, KY.—City authorized bond issue of $15,000 for waterworks improvements. John T. Gillig, Walton building, Lexington, Ky., is engineer.

HENDERSON, KY. — City has selected Westcott & Thornton, Owensboro, Ky., as engineers for its water and gas project. (Noted Sept. 28).

MAYSVILLE, KY. — Kentucky Power & Light Co., Louisville, Ky., will install a 2500-kilowatt turbo-generator at its plant here. Cost is estimated at $100,000.

Louisiana

ALEXANDRIA, LA.—City comission council will receive bids Nov. 4 for improvement of municipal power plant, including replacement of steam turbine, condensate pumps, and other equipment. P. J. Couvillon is secretary of the commission.

MOORINGSPORT, LA. — Town will install $35,000 waterworks. W. M. Eastham is clerk in charge; Huey & Cage, Monroe, La., are engineers.

PLAQUEMINE, LA. — Town receives bids Nov. 10 for sewage equipment. L. J. Voorhies is consulting engineer.

Mississippi

OXFORD, MISS.—City receives bids Nov. 3 for purchase, lease, or rent of 750-horsepower, stationary diesel-generator unit; alternate bids for diesel stationary engine of 600 horsepower.

SUMMIT, MISS.—Summit Textile Co. will begin work soon on its boiler plant, dyeing department, heating and sprinkler plant installation.

WOODVILLE, MISS.—Town receives bids Nov. 3 for turbine water pump.

North Carolina

GREENVILLE, N. C. — Blount Fer-

(*Please turn to Page* 107)

(*Continued from Page* 105)
tilizer Co. will rebuild on larger scale plant and office recently burned.

KINGS MOUNTAIN, N. C.—City plans to extend its water and sewer system with the aid of PWA allotment of $43,363. W. K. Dickson, 119 Circle avenue, Charlotte, N. C., is engineer.

South Carolina

HONEA PATH, S. C.—City plans to construct sewage disposal plant. J. E. Sirrine, Greenville, S. C., is engineer.

West Virginia

BECKLEY, W. VA. — Harry E. Moran plans to construct a coal tipple on property he has recently acquired here.

Missouri

BOONVILLE, MO.—City, will receive bids about Nov. 15 for construction of $75,000 waterworks system, including filtration and softening tanks, electric pump, etc. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., are engineers.

KANSAS CITY, MO.—De Tray Bros., Independence, Mo., have acquired a three-story building at 11606 Van Horn road for an expansion of their metal plating shop.

NORTH KANSAS CITY, MO.—Clay county suburban water association, A. E. Keeney, secretary, National Bank of North Kansas City, plans to spend $410,000 for new system of waterworks including 38 miles of main pipe lines, fireproof pump station building, two booster electric and gasoline pumps, and 75,000 and 150,000-gallon water storage tanks and towers. No definite date set for opening bids. Henrici-Lowry Engineering Co., 503 Huntzinger building, Kansas City, Mo., is engineer.

ST. LOUIS — Ladue-Deer Creek sanitary sewer district, Walter R. Mayne, acting president, votes Nov. 24 on $240,000 for constructing sanitary trunk line sewers. Estimated total cost of project, $435,000. W. W. Horner, 722 Chestnut street, St. Louis, is engineer.

Oklahoma

OKLAHOMA CITY, OKLA.—City has PWA allotment of $76,746 for waterworks improvements. T. G. Banks, city engineer, will probably receive bids within the next 30 days.

Texas

BELLEAIRE, TEX.—City has voted $60,000 bonds for water works.

CORPUS CHRISTI, TEX. — Hanlon-Buchanan Inc., Tulsa, refiners, plan construction of a $100,000 gasoline plant here.

CRYSTAL CITY, TEX. — City plans $10,000 waterworks improvement, and has applied for PWA funds. C. C. Williams is city manager.

TAYLOR, TEX.—Central Texas Power Co. has been incorporated by Victor Nelson and J. A. Sefcik.

Wisconsin

FORT ATKINSON, WIS. — City will vote Nov. 3 on purchase of electric distribution system from Wisconsin Power & Light Co., Madison, Wis., and construction of generating station. A. J. Koenig is city manager.

KENOSHA, WIS. — Specialty Brass Co., maker of dairy equipment, has purchased plant of Winther Motor Truck Co. on Lake Shore road, and will expand its capacity at an estimated cost of $100,000. Charles W. Anderson is president.

LA CROSSE, WIS. — Trane Co., La Crosse, manufacturer of heating equipment and supplies, will begin work soon on a one-story addition, 175 x 200 feet, at its No. 2 plant at Sixteenth and Bennett streets.

MADISON, WIS. — Madison Brass Works, 214 Waubesa street, will build a foundry addition, 30 x 70 feet.

NEENAH, WIS. — Neenah Foundry Co., Winneconne avenue, has let contract to Flour Construction Co., Oshkosh, Wis., for plant extension, 60 x 80 feet. E. J. Aylward is president.

OSHKOSH, WIS. — Wisconsin Axle Co., maker of bus and truck axles, and subsidiary of Timken-Detroit Axle Co., has leased 5000 square feet at Waukegan, Ill., to supplement its main plant here.

STEVENS POINT, WIS. — Portage county board of supervisors plans erection of highway department building costing $40,000 as WPA project. Equipment will include 5-ton crane with 40-foot span and 80-foot run. Hougen & Henderson, Wisconsin Rapids, Wis., are architects.

Minnesota

AITKIN, MINN.—Village plans purchase of diesel electric unit for municipal power plant at a cost of $10,000. H. C. Beecher is village clerk.

ANOKA, MINN.—City plans construction of municipal power plant and installation of diesel engine equipment. Burlingame & Hitchcock, Sexton building, Minneapolis, are engineers.

JORDAN, MINN.—Minnesota Utilities Co. has started construction of addition to power plant and will install a 400-KVA steam turbine. Cost estimated at $100,000.

ST. PAUL—Northern Cooperage Co., Concord and East Page streets, has awarded contracts for construction of dry kiln.

ST. PAUL—Vulcan Mfg. Co., South Wabasha and Channel streets, has been organized to manufacture hydraulic jacks. R. E. Lange is president.

ST. PAUL—Seeger Refrigerator Co., manufacturer of refrigerator cabinets, has awarded contract to Geo. J. Grant Construction Co., St. Paul, for erection of one-story warehouse and plant addition, 155 x 380 feet, including installation of sprinkler and conveyor systems, at a cost of $100,000.

North Dakota

BEULAH, N. DAK.—North Dakota Power and Light Co. has started construction of addition to power plant and will install new boiler.

BISMARCK, N. DAK.—North Dakota state highway department plans construction of three-story testing laboratory, 50 x 79 feet, and installation of machinery and equipment for testing materials for highway construction. W. F. Kurke, Fargo, N. Dak., is architect.

Iowa

DENISON, IOWA — South Crawford rural electric cooperative has $127,500 grant from REA for construction of 123 miles of rural transmission lines in Carroll, Crawford, and Shelby counties.

DES MOINES, IOWA—Des Moines Railway Co. will take bids Nov. 2 for installation of additional equipment in its power plant including boiler, stoker, turbine generator, draft fans, feed pumps, etc. Federal Engineering Co., Central Office building, Davenport, Iowa, is engineer.

FORT DODGE, IOWA—National Gypsum Co., Buffalo, plans expansion of its mill in southeast Fort Dodge, and erection of insulation board plant.

HARLAN, IOWA — Shelby county rural electric cooperative has REA loan of $267,500 for construction of 250 miles of rural transmission lines in Shelby.

(*Please turn to Page* 109)

(*Concluded from Page* 107)

and parts of Harrison, Cass, and Pottawattamie counties.

KELLOGG, IOWA — Midwest Metal Stamping Co. is constructing three additions to its plant at a cost of about $15,000.

LOGAN, IOWA — Harrison county rural electric cooperative, has REA grant of $200,000 for construction of 200 miles of rural transmission lines in Harrison and Monoma counties.

SPENCER, IOWA—City plans construction of addition to municipal power plant and installation of 1500 or 2000-KW turbine unit. Young & Stanley, Muscatine, Iowa, are engineers.

STATE CENTER, IOWA—City plans purchase of diesel engine as addition to power plant. H. M. Meads is city clerk.

Nebraska

ADAMS, NEBR. — City has WPA allotment of $13,091 for construction of proposed sewage disposal plant to cost $31,750. H. A. Davis, Crete, Nebr., is consulting engineer.

FALLS CITY, NEBR. — City has PWA allotment for construction of proposed waterworks improvements to cost about $47,200. City's share of the cost will be decided by election Nov. 3. Scott & Scott, Banker's Life building, Lincoln, are consulting engineers.

FARWELL, NEBR. — City voted Oct. 9 in favor of bond issue of $9,400 for construction of waterworks system, to be financed in part by federal aid. Approximate cost will be $17,000. Hinningham Engineering Co., Union State Bank building, Omaha, is consulting engineer.

LINCOLN, NEBR. — City plans to enlarge and modernize sewage disposal plant, at a cost of about $102,000. D. L. Erickson is city engineer; Theodore H. Berg is clerk.

LINCOLN, NEBR. — Nebraska state board of control, Walter Hager, chairman, A. C. Tilley, state engineer, has approved plans for construction of a heating plant at Kearney boys' industrial school, to cost $40,000; a heating plant at Milford women's industrial school, to cost $30,000; a sewage disposal plant at Norfolk state hospital, to cost $50,000; a sewage disposal system, to cost $25,000, and a laundry and industrial building, to cost $10,000, at York women's reformatory; a heating plant at Genoa girls' industrial school, to cost $30,000; and a heating plant at Kearney tubercular hospital, to cost $40,000.

Montana

GREAT FALLS, MONT. — Great Falls Paper Co. has opened bids for construction of $125,000 plant to replace structure destroyed by fire.

TWIN BRIDGES, MONT.—State plans construction of building to house manual training, machine shop and other departments at state orphans' home here. George H. Davey is superintendent of the orphans' home.

Idaho

COTTONWOOD, IDAHO — Cottonwood Elevator Co. suffered $40,000 loss when flour mill, grain elevator, and warehouse were destroyed by fire.

Pacific Coast

ELMHURST, CALIF.—Standard Trailer Co. is building a $45,000 plant here for the manufacture of auto trailers.

LOS ANGELES—Menasco Mfg. Co., 6714 McKinley avenue, maker of aircraft engines, plans to issue 70,000 shares of stock, the proceeds to purchase new machinery and equipment.

LOS ANGELES — Columbia Broadcasting System, Donald W. Thornburgh, vice-president, announces plans for $1,000,000 plant to be erected at Sunset boulevard and El Centro avenue.

LOS ANGELES — Pacific Coast Envelope Co., division of United States Envelope Co., Springfield, Mass., has acquired a site for a manufacturing plant. George R. Davis, 4221 East Sixtieth street, is manager.

LOS ANGELES — Gripper & Hagland Lumber Co. Inc. plans to spend $40,000 for wharf and other improvements at site of former Hammond Lumber Co. on Terminal Island.

LOS ANGELES — California Electric Steel Mills Inc. will start work on an electric steel rolling mill to cost $200,000. A. C. Denman, 834 South Lucerne boulevard, is manager.

OAKLAND, CALIF. — Chevrolet Motor Co., Detroit, has acquired the old Durant factory building here and will equip it as an automobile and truck factory.

TORRANCE, CALIF.—City has completed estimates on cost of inland industrial harbor project which reach the figure of $4,000,000. This estimate covers construction of a channel eight feet deep and 150 feet wide extending from Torrance to the main basin of Wilmington Harbor. Figures prepared by City Engineer Leonard and City Attorney Rippy.

WOODLAND, CALIF.—Spreckels Sugar Co., 2 Pine street, San Francisco, has awarded to Dinwiddie Construction Co., Los Angeles, contract for its $2,000,000 building project at Woodland.

ONTARIO, OREG. — Stoner Meat Co., Arthur Stoner, president, announces plans for new plant to replace one destroyed by fire recently.

PORTLAND, OREG. — State regents will receive bids Oct. 31 for proposed power plant at state university, Eugene. Oreg., including 556-horsepower boiler and equipment. Plans are by F. W. Horstkotte.

SPOKANE — Washington Water Power Co. is surveying between Tekoa and Garfield for 18 miles of projected 110,000-volt power lines.

THE DALLES, OREG. — Port of The Dalles is having plans drawn for proposed dock and bulk grain handling facilities. Charles Hageman is engineer.

SEATTLE — General Petroleum Co. is installing small storage tanks and making other improvements at local terminal, 1710 Sixteenth avenue S. W.

SEATTLE — Ropes Inc. has been organized by T. B. Morrison and associates to deal in marine supplies and logging machinery.

SEATTLE — City plans extension of power lines at a cost of $1,115,000 as part of proposed outlay of $8,500,000 for construction of Ruby dam project. Project includes 100 miles of transmission lines and substation improvements.

SEATTLE — Chelan Copper Co. has filed application with federal power commission to install power plant on Railroad creek, Chelan county. Hearing is set for Nov. 1. Installation would include dam, 3000-horsepower powerhouse, pipe line to powerhouse and 11 miles of transmission lines.

Canada

TORONTO, ONT.—Noranda Mines Ltd., James Y. Murdock president, plans to spend $5,000,000 on a power development program including construction of a 30,000-horsepower plant on the Ottawa river about 75 miles from the mines.

Alaska

SEWARD, ALASKA — City has received one bid on proposed municipal hydro-electric plant from R. J. Sommers, Juneau. His figure of $278,000 exceeded estimates and tender has been forwarded to PWA, Washington, D. C. Hubbell & Waller, Seattle, are engineers.

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Metallurgical Engineer, steel mill trained; five years broad personal experience sales and service engineering steel and allied products; eight years aggressive managing technical sales and service and directing introduction, marketing, advertising, laboratory and practical research of chrome nickel alloys and heavy chemicals to steel mills, foundries, and the implement, bolt and nut, fabricated steel, rod and wire, drop forging, automobile and allied products, and general steel consuming industries. Address Box 474, STEEL, Penton Bldg., Cleveland.

ALLOY STEEL SALESMAN TWENTY years sales experience in Western New York and Pennsylvania. Possess comprehensive knowledge of alloy and tool steels including non-corrosive and heat resisting types. Address Box 471, STEEL, Penton Bldg., Cleveland.

MANUFACTURERS REPRESENTATIVE selling steel bars and small shapes desires a line of sheets and plates or allied lines for Louisville, Ky., and Southern Indiana. Well established and a real producer. Address Box 473, STEEL, Penton Bldg., Cleveland.

MANUFACTURERS AGENCY

Representing prominent steel plate mill in excellent position to take on additional steel or allied line on strictly commission basis to cover Western New York and Northwestern Pennsylvania. Offices Buffalo, Syracuse, six salesmen. Address Box 435, STEEL, Penton Bldg., Cleveland.

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Help Wanted

WANTED
COLD DRAWN STEEL SALESMAN

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SUPERINTENDENT

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NEW RAILS—5000 tons—All Sections—All Sizes.
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NORTH WALES MACHINE CO. INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys. Semi-steel. Superior quality machine and hand molded, sand blast and tumbled.

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STANDARD STAMPING CO., INC., Charlotte, Mich. Rolled bushings, Spring Clips and other light stampings. Submit blue prints or samples.

ADVERTISING INDEX

Where-to-Buy Products index carried in first issue of month.

✦ ✦ ADVERTISING INDEX ✦ ✦

Where-to-Buy Products index carried in first issue of month.

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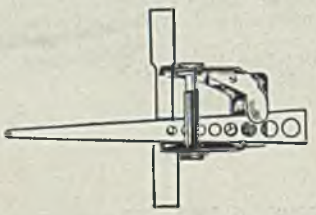

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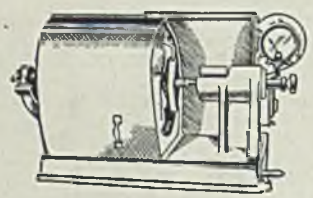

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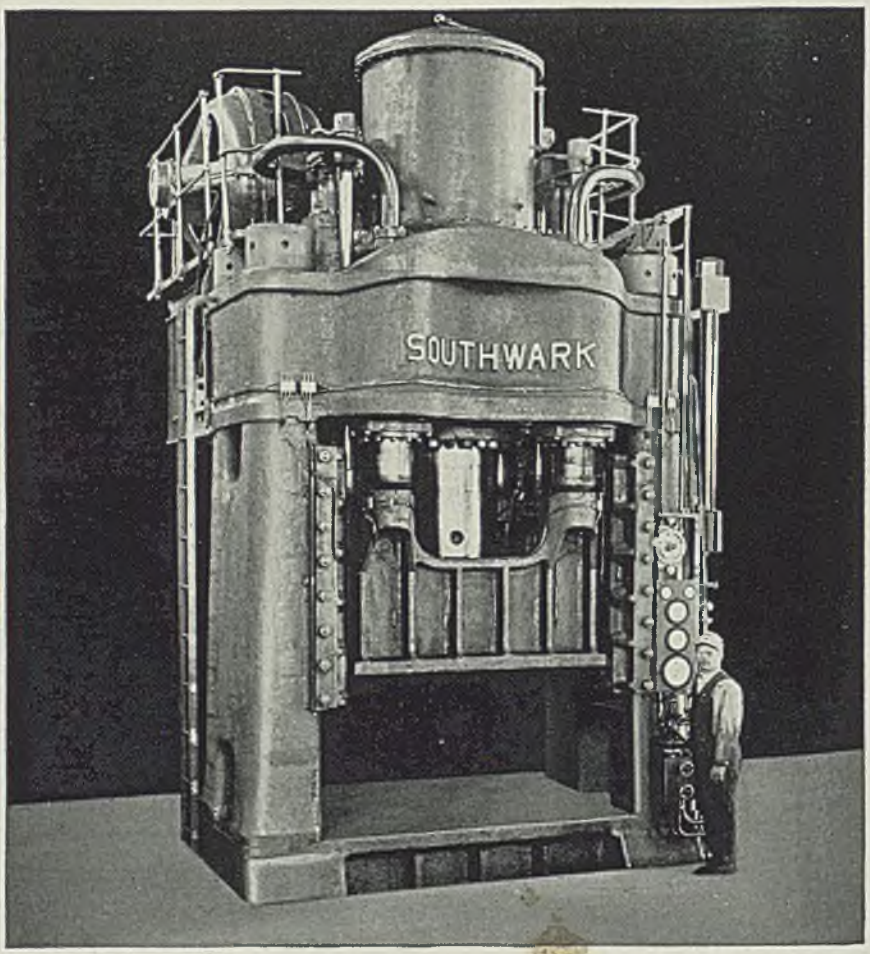

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