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SINTERING OF ORE AND BLAST-FURNACE FLUE DUST; A BIBLIOGRAPHY

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Sintering of Ore and Blast-Furnace Flue Dust; a Bibliography

THIS bibliography includes only articles which deal with the sintering of ferrous materials, although a few general articles contain also material on non-ferrous ores. The patents included are those revealed by various indexes and abstract journals; no attempt has been made to cover this field thoroughly.

The list is confined to material available in the Carnegie Library of Pittsburgh and each item has been examined.

Books and Magazine Articles:

Agnew, C. E. Benefits from the use of high-iron concentrates in a blast furnace. 1938. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 131, p. 116-120.)

Discussion, p. 120-126.

The same, without discussion. 1938. (In Metals technology, v. 5, Technical publication no. 956.)

Shows how, through proper modifications in the sintering process, the Eastern magnetites can be reduced as easily as the Lake hematites.

American Ore Reclamation Company. Sintering and desulphurizing of iron ore materials. 24p. 1919. The Company, New York.

Baake, Reinhold. Die sinterung von minette-gichtstaub und -feinerz. 1931. (In Stahl und eisen, v. 51, p. 1277-1283.)

Gives general details of the Dwight-Lloyd process.

Backert, A. O. ed. The A B C of iron and steel. Ed. 5. 415p. 1925. Penton, Cleveland.

A few paragraphs on page 26 give a general discussion of the sintering process.

Barrett, Guy, and Rogerson, T. B. Notes on the present knowledge and practice in regard to the briquetting of iron ores. 1917. (In Journal of the Iron and Steel Institute, v. 96, p. 7-48.)

The section entitled "The Dwight Lloyd Process" (p. 28-42) is an excellent review of the literature to that time, and considers all the sintering processes then in use. Contains a good bibliography.

Baumgartner, Ernst. Die neue Greenawalt-sinteranlage in Kladno. 1931. (In Stahl und eisen, v. 51, p. 1017-1021.)

Details of plant with operating results and cost data. Contains photographs and diagrams.

Blau, Max. Erfahrungen mit dem Lurgi-sinterapparat. 1929. (In Stahl und eisen, v. 49, p. 388-392.)

Experiences in sintering a friable iron-manganese ore of high water content.

Brassert, H. A. Blast furnace practice in Germany. 1928. (In Blast furnace and steel plant, v. 16, p. 8-11.)

About a page is devoted to German sintering practice.

Central Furnace [Company] to sinter dust. 1926. (In Blast furnace and steel plant, v. 14, p. 196.)

Brief general description of the sintering process as it applies to an installation of the Central Furnace Company.

Clements, Fred. Blast furnace practice. 3v. 1929. Benn, London.

Volumes 1 and 3 contain some material on sintering.

Cordonnier, Robert. Agglomération des poussières de hauts fourneaux et traitement des minerais de fer

carbonatés par le procédé "Greenawalt." 1930. (In Revue de métallurgie, mémoires, v. 27, p. 467-478.)

Description and operation of plant, with photographs and diagrams.

Counselman, T. B. Beneficiating Minnesota iron ores. 1941. (In Mining and metallurgy, v. 22, p. 405-409, 412.)

Pays brief attention to sintering.

Cousin, A. Briquetting iron ores at the John Cockerill works. 1927. (In Iron & coal trades review, v. 114, p. 235.)

Description and diagram of a continuous tunnel furnace for the sintering of iron ore briquettes.

Dwight, Arthur S. The Dwight & Lloyd process of roasting and sintering. 1912. (In Original communications of the Eighth International Congress of Applied Chemistry, v. 3, p. 31-40.)

Economy in the production of sinter. 1917. (In Iron trade review, v. 61, p. 543-544.)

Considers dust-tight motor coverings, sprays in the wind boxes, and other devices.

Eilender, Walter, and Schwalble, Rolf. Einfluss von sinterzeit, -temperatur und pressdruck auf die festigkeitseigenschaften von sintereisen. 1939. (In Archiv für das eisenhüttenwesen, v. 13, p. 267-272.)

Contains diagrams and microphotographs.

Endell, K. Zur erforschung des sintervorganges. 1921. (In Metall und erz, v. 18, p. 169-177.)

Endell, Kurd. Ueber das sintern von eisenerzen. 1921. (In Mitteilungen aus dem Kaiser-Wilhelm-In-

stitut für Eisenforschung zu Düsseldorf, v. 3, no. 1, p. 37-43.)

Results of experiments made to determine optimum temperatures for the agglomeration of hematite, magnetite, and minette ores.

Enlarged sintering machine. 1918. (In Iron age, v. 101, p. 200-201.)

Describes a machine installed at New Castle, Pa. for the Carnegie Steel Company.

Estep, H. Cole. Rotary sintering kilns at Gary. 1915. (In Iron trade review, v. 56, p. 1020-1022.)

Contains photographs and a diagram.

Fans for ore sintering. 1924. (In Iron age, v. 114, p. 692.)

Discusses briefly the fan requirements of the stoker type sintering installations.

From a monograph by Arthur L. Greene, Buffalo Forge Co., Buffalo, N. Y.

Flaccus, L. C. Neueres über sintern von feinerz und eisenhaltigem gichtstaube. 1908. (In Stahl und eisen, v. 28, p. 993-994.)

Discussion and diagrams of the Scott sintering process.

Flue dust sintering plant at Gary. 1915. (In Iron age, v. 95, p. 1168-1170.)

Contains diagrams and photographs.

For increased sintering capacity. 1918. (In Iron trade review, v. 62, p. 221.)

Describes a machine installed at New Castle, Pa. for the Carnegie Steel Co.

Forsythe, Robert. The blast furnace and the manufacture of pig iron; an elementary treatise for the use of the metallurgical student and the furnaceman; re-

vised by Carl A. Meissner and J. A. Mohr. 371 p. 1922. U. P. C. Book Company, Inc., New York.

About 2½ pages devoted to sintering. Includes a diagram of a Dwight-Lloyd plant.

Fourment, Marcel. Grillage et agglomération des minerais au four à turbulence. 1935. (In Revue de métallurgie, mémoires, v. 32, p. 245-247.)

Brief description, with diagrams, of a Saint-Jacques furnace.

Fournier, M. Note sur l'agglomeration deş minerais fins aux mines de fer de Rouina. 1930. (In Revue de l'industrie minerale, no. 235, p. 435-438.)

Gayley, James. The sintering of fine iron-bearing materials. 1912. (In Transactions of the American Institute of Mining Engineers, v. 42, p. 180-190.)

Gives a list of the advantages of the Dwight-Lloyd process.

The same. 1911. (In Bulletin of the American Institute of Mining Engineers, no. 56, p. 631-641.)

The same, condensed. 1911. (In Engineering and mining journal, v. 92, p. 115-116.)

Title varies.

Gayley, James. The sintering of iron bearing materials. 1912. (In Iron age, v. 89, p. 73-76.)

General principles involved in, and a description of a Dwight-Lloyd plant.

Gerhardt, R. B. Methods of preparing Cuban brown iron ore for blast furnace use. 1912. (In Journal of the Engineers' Society of Pennsylvania, v. 4, p. 347-352.)

Discussion, by R. V. McKay. p. 353-354.

Contains a brief description of the Dwight-Lloyd and Greenawalt processes.

The same, without discussion, enlarged. 1913. (In Iron age, v. 52; p. 364-366.)

There is some additional material on nodulizing, furnace slags, and pig iron, with reference to the Cuban ore.

Gilles, Josef Wilhelm. Sintern von gichtstaub und feinerz im schachtofen. 1935. (In Stahl und eisen, v. 55, p. 1188-1190.)

Gives details of a shaft sintering furnace patented by A. Daub. Includes data from an experimental plant.

Gleason, A. J. Present tendencies in iron ore preparation. 1937. (In Mining congress journal, v. 23, no. 1, p. 60-63.)

Makes brief mention of use of sintering to remove water and improve smelting of the ore.

Grechni, Ya. Microscopic investigations of Krivoi Rog sinter. 1939. (In Metals and alloys, v. 10, no. 4, p. MA203.)

Asbtract of an article which appeared originally in 1938 in Teoriya i praktika metallurgii, no. 7-8, p. 23-31.

Greenawalt, John E. The sintering process and some recent developments. 1938. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 131, p. 44-65.)
Discussion, p. 65-73.

The same, without discussion. 1938. (In Metals technology, v. 5, Technical publication no. 963.)

Greenawalt, William E. The Greenawalt sintering process. 1921. (In Mining and scientific press, v. 122, p. 81-85.)

Contains diagrams.

Grethe, Kurt, and Stoecker, Julius. Die reduzierbarkeit von Dwight-Lloyd-sinter und deren anpassung

an den erzmöller. 1935. (In Stahl und eisen, v. 55, p. 641-647.)

Discussion, p. 647-648.

Guthmann, Kurt. Wärmetechnik und betriebswirtschaft hüttenmännischer aufbereitungsanlagen. I. Schacht- und drehrohröfen, sinteranlagen. 1939. (In Stahl und eisen, v. 59, p. 1125-1133.)

Discusses the heat balances and fuel consumption of some German sintering plants. Contains photographs and detail drawings.

Hansell, H. V. The agglomeration of fine iron ores. 1913. (In Transactions of the Canadian Mining Institute, v. 16, p. 295-309.)

Discusses the West, Huntington-Heberlein, Dwight-Lloyd, and Greenawalt processes.

Harding, P. O. A continuous ore sintering machine. 1916. (In Iron age, v. 98, p. 138-139.)

Designed to avoid burning and clogging of the grate.

Harlan, B. J. Recent trends in blast-furnace operation and design. 1934. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 113, p. 34-41.)

Contains a very brief paragraph on sintering.

Harrison, Perry G. The adaptation of the sintering process to soft iron ores, i.e., Evergreen Mining Company sintering experience. 1930. (In Proceedings of the Lake Superior Mining Institute, v. 28, p. 67-73.)

Contains a flow sheet.

Harrison, Perry G. Sinter-facts and fancies. 1939. (In Blast furnace and steel plant, v. 27, p. 372-374, 411, 492-493, 515-516, 604-605, 616.)

Concerned with some of the operating problems of sintering, the reducibility of various sinters, and the results of some plant experiments on sintering.

Harrison, Perry G. Sintering economics. 1932. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 100, p. 57-63.)

Discussion, p. 63.

A detailed analysis of the cost of sintering various iron ores in large-scale Dwight-Lloyd continuously operated sinter machines.

Harrison, Perry G. Sintering limonitic iron ores at Ironton, Minnesota. 1930. (In Transactions of the American Institute of Mining and Metallurgical Engineers, Iron and Steel Division, p. 346-355.)

Discussion, p. 355-357.

The same, condensed. 1930. (In Iron age, v. 125, p. 642-644.)

The same, without discussion. 1930. (In American Institute of Mining and Metallurgical Engineers, Technical publication no. 284.)

Contains a flow sheet.

Hasselbring, A. Beneficiated iron ores. 1925. (In Iron and steel of Canada, v. 8, p. 21-23.)

Gives typical analyses of Michipicoten and Mesabi ores before and after sintering.

The same. 1925. (In Canadian mining journal, v. 46, p. 68-70.)

Hassler, J. M. Offsetting increased labor cost in Southern blast-furnace operation. 1937. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 125, p. 47-69.)

Discussion, p. 69-72.

A section (p. 57-62) discusses the sintering of silicious Southern ores. Contains description and diagram of a plant.

Haven, Wm. A. Recent developments in American blast-furnace design and practice. 1933. (In Journal of the Iron and Steel Institute, v. 127, p. 51-80.)

Contains a section on sintering (p. 66-68).

Henry, P. E. Note sur la problème d'enrichissement du minerai de fer de Khénifra (Maroc francais). 1933. (In Annales des mines, ser. 13, v. 3, p. 67-111, 169-231, 277-306, 351-414.)

Chapters 9-10 (p. 367-412) include a discussion of the composition and nature of sinter, the mechanism of the agglomeration of iron ores, and the results of sintering tests made on Khénifra ore.

Hewitt, G. W. Future possibilities of Mesaba magnetite sinter. 1942. (In Blast furnace and steel plant, v. 30, p. 753-757, 768.)

Paper read at the spring meeting of the Eastern States Blast Furnace and Coke Oven Association, Pittsburgh, June 5.
Gives data showing economic advantages of using sinter.

Hubbell, A. H. Sintering Minnesota iron ore at the Evergreen plant. 1931. (In Engineering and mining journal, v. 132, p. 244-247.)

Contains a reproduction of the flow sheet given by P. G. Harrison in Transactions of the American Institute of Mining and Metallurgical Engineers, 1930, and lists a number of changes since instituted at the plant.

Hyde, R. W. Sintering. 1941. (In Engineering and mining journal, v. 142, no. 8, p. 123.)

Brief description of the uses of the Dwight-Lloyd sintering process.

Improved D. & L. sintering machine. 1918. (In Engineering and mining journal, v. 106, p. 713.)

Describes a machine installed at New Castle, Pa. for the Carnegie Steel Co.

Improvement in sintering blast furnace flue-dust. 1918. (In Metallurgical and chemical engineering, v. 18, p. 319.)

Describes a machine installed at New Castle, Pa. for the Carnegie Steel Co.

Johnson, J. E. The principles, operation and products of the blast furnace. 551p. 1918. McGraw, New York.

A few pages are devoted to sintering.

Joseph, T. L. Blast furnace and raw materials progress. 1939. (In Blast furnace and steel plant, v. 27, p. 175-179.)

About a page is devoted to a general description of the results of using sinters of varying silica content.

Joseph, T. L. Size preparation of iron ores. 1934. (In U. S. Mines Bureau, Report of investigations no. 3240, p. 3-12.)

Shows that physical properties are more important than chemical properties in determining rate of reduction of sinter. Indicates a method of determining the amount of iron silicate in sinter.

Joseph, T. L., and others. Composition and deoxidation of iron oxide sinters. 1933. (In Blast furnace and steel plant, v. 21, p. 147-150, 207-210, 260-263, 321-323, 336.)

The same, abstract. 1933. (In Iron & coal trades review, v. 127, p. 58.)

An investigation of the effect of physical properties, chemical composition and temperature conditions of sinter on the rate of its reduction.

Klärding, Josef. Ueber das einbinden von kalk beim sintern von eisenerz. 1939. (In Archiv für das eisenhüttenwesen, v. 12, p. 525-528.)

Results of experiments on sintering German Fortuna ore with quicklime, followed by reduction.

Klugh, B. G. Interesting sintering plant at Birdsboro, Pa. 1922. (In Blast furnace and steel plant, v. 10, p. 24-28.)

Contains photographs and diagrams.

Klugh, B. G. The microstructure of sintered iron-bearing materials. 1914. (In Transactions of the American Institute of Mining Engineers, v. 45, p. 330-345.)

The same. 1913. (In Bulletin of the American Institute of Mining Engineers, no. 77, p. 813-828.)

A description of the structural qualities illustrated in a series of 13 microphotographs.

Klugh, B. G. The sintering of fine iron-bearing materials by the Dwight & Lloyd process. 1913. (In Transactions of the American Institute of Mining Engineers, v. 43, p. 364-375.)

The same. 1912. (In Bulletin of the American Institute of Mining Engineers, no. 65, p. 507-518.)

Discussion, p. 518-526.

Klugh, B. G. Sintering processes for iron-bearing materials. 1913. (In Proceedings of the Engineers' Society of Western Pennsylvania, v. 29, p. 618-631.)

Discussion, p. 631-651.

The same, abstract. 1914. (In Metallurgical and chemical engineering, v. 12, p. 197.)

Traces the beginnings of the use of the sintering process, and gives some cost data. There is considerable attention to the respective merits of the continuous and intermittent processes.

Klugh, Bethune G. The mechanical development of sintering iron bearing materials. 1916. (In Year book

of the American Iron and Steel Institute, 1915, p. 468-483.)

Discussion, by Robert E. Brooke, p. 484-488.

Discussion, by Hermann A. Brassert, p. 489-492.

The same, abstract. 1915. (In Monthly bulletin of the American Iron and Steel Institute, v. 3, p. 273-275.)

The same, condensed. 1915. (In Iron age, v. 96, p. 1000-1005.)

The same, condensed. 1915. (In Iron trade review, v. 57, p. 835-838, 868c.)

Title varies. A detailed description with photographs and diagrams. Gives list of requirements for successful sintering.

Knox, John D. Furnacemen . . look to your sinter. 1943. (In Steel, v. 112, no. 1, p. 254-256, 258.)

Attempts to show the value of using sinter in blast-furnace burden.

Kreutzberg, E. C. Iron ore sintering spreads in East. 1926. (In Iron trade review, v. 78, p. 641-643.)

Discusses growth of use of the sintering process among Eastern ore producers.

Krom sintering system. 1921. (In Iron age, v. 108, p. 794.)

Contains a diagram.

The Krom sintering system. 1921. (In Mining and scientific press, v. 123, p. 524.)

Said to overcome the difficulty in sintering those substances which stick tenaciously to the sintering grate.

Laws, Eugene H. An improvement in sintering machines. 1914. (In Mining and engineering world, v. 41, p. 200-201.)

Describes an invention designed to improve the pallets of a Dwight-Lloyd machine. U. S. patent no. 1,097,592.

Lloyd, R. L. Sintering iron-bearing materials. 1922. (In Mining and metallurgy, v. 3, no. 190, p. 17-19.)

Discusses the beginning of the use of the sintering process, and gives tests of iron-bearing materials and of mixtures adaptable for sintering.

Lubricating device for sintering machines. 1928. (In Engineering and mining journal, v. 126, p. 578.)

Description and diagrams of a compressed-air device for lubricating the sliding surface of the pallet frame of a Dwight-Lloyd machine.

Luyken, Walter, and Kraeber, Ludwig. Untersuchungen über die saugzugsinterung von eisenerzen. 1931. (In Mitteilungen aus dem Kaiser-Wilhelm-Institut für Eisenforschung zu Düsseldorf, v. 13, p. 247-260.)

The same, condensed. 1932. (In Stahl und eisen, v. 52, p. 296.)

Results of an investigation to determine the influence of the operating conditions on the sintering process and on the properties of the sintered material. Contains microphotographs.

Luyken, Walter, and Kremer, Gottfried. Der einfluss des chemisch gebunden wassers auf den brennstoffverbrauch bei der sinterung von eisenerzen. 1938. (In Mitteilungen aus dem Kaiser-Wilhelm-Institut für Eisenforschung zu Düsseldorf, v. 20, p. 303-306.)

McClurkin, Robert. Sinter in blast-furnace burdens. 1932. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 100, p. 47-53.)

Discussion, p. 54-56.

The same, condensed. 1932. (In Blast furnace and steel plant, v. 20, p. 340-343.)

Gives the results of some trials of the use of sintered ore.

Mackenzie, G. C. Production of a sinter, low in phosphorus, from the iron ores of central Ontario.

1916. (In Transactions of the Canadian Mining Institute, v. 19, p. 148-150.)

Gives data from experiments conducted at the metallurgical laboratories of the Mines Branch of the Canadian Department of Mines.

Matschkowski, A. I., and Arbusow, W. A. Versuche zur doppelschichtigen zusammensinterung im Makejew-agglomerierwerk. 1938. (In Chemisches zentralblatt, v. 109, pt. 1, p. 3520.)

Abstract of an article which appeared originally in 1937, in Uralskaja metallurgija, no. 5, p. 3-8.

Mesabi sinter. 1921. (In Iron age, v. 107, p. 1309.)

Reproduces a flow sheet of the Mesabi Iron Co. as given in a pamphlet issued by Clement K. Quinn & Co. of Cleveland.

Modern sintering; some notable new plants. 1937. (In Chemistry and industry, v. 56, p. 739.)

A brief description of some British plants.

Morgan, M. F. Design and operation of a modern sintering plant. 1942. (In Iron and steel engineer, v. 19, no. 4, p. 103-105.)

Discussion, p. 105-113.

Morgan, M. F. Sintering plant improves blast furnace practice in South. 1937. (In Steel, v. 100, no. 6, p. 60-61.)

Gives a diagram and describes briefly the operation of a plant of the Republic Steel Corp. at Thomas, Alabama.

A new design of sintering machine. 1941. (In Blast furnace and steel plant, v. 29, p. 716-717, 725.)

Said to reduce installation, operating, and maintenance costs.

New Dwight and Lloyd sintering machine. 1918. (In Blast furnace and steel plant, v. 6, p. 77-78.)

Description of a plant installed at New Castle, Pa. for Carnegie Steel Co.

New English sintering plant. 1935. (In Blast furnace and steel plant, v. 23, p. 404-407.)

Diagrams and a rather full description of a plant of the United Steel Companies, Ltd., designed to sinter 800 tons of fines per day by the Greenawalt process.

New sintering plant at Gary. 1915. (In Engineering and mining journal, v. 100, p. 107.)

O'Connell, W H. Producing pig iron for the trade. 1942. (In Compressed air magazine, v. 47, p. 6815-6818.)

Gives a general description of the sintering operations at the Birdsboro plant of the E. & G. Brooke Co.

Ore-handling, crushing and sintering plant at the Staveley Coal & Iron Company's Devonshire works. 1936. (In Iron & coal trades review, v. 132, p. 350-357.)

Details of operation with diagrams and photographs.

Ore-sintering plant at Corby. 1936. (In Iron & coal trades review, v. 132, p. 402.)

Brief description.

Pallet-leveling device. 1930. (In Engineering and mining journal, v. 130, p. 514.)

Describes a device designed by L. W. Kirk.

Pallet roller oils sintering machine. 1928. (In Engineering and mining journal, v. 126, p. 789.)

A device for lubricating the pallet rollers of Dwight-Lloyd machines. Contains diagrams.

Paquet, Joseph. Neuere drehrohrofen-sinteranlagen. 1932. (In Stahl und eisen, v. 52, p. 218-220.)

The same, condensed translation. 1932. (In Iron & coal trades review, v. 124, p. 601.)

Description and diagrams.

Plock, Albert F. The reclamation of flue dust for furnace use. 1913. (In Iron trade review, v. 52, p. 1017-1018, 1063-1065.)

Discusses the Dwight-Lloyd, Greenawalt, and West sintering processes, and the cost of their respective operation.

Pulsifer, H. B. Laboratory sintering. 1913. (In Chemical engineer, v. 17, p. 167-169.)

Gives directions for small-scale sintering of iron ores and flue dust.

Ramsey, George D. Sintering adds greatly to efficiency of Ironton (Utah) plant, Columbia Steel Co. 1935. (In Mining and metallurgy, v. 16, p. 365-368.)

Paper presented before the Utah section American Institute of Mining and Metallurgical Engineers.

Describes operation of the plant.

A rapid reaction agglomerating furnace. 1938. (In Industrial chemist and chemical manufacturer, v. 14, p. 268-271.)

Description, with photographs and diagrams, of a Saint-Jacques plant.

Recent improvements in sintering equipment and practice. 1919. (In Engineering and mining journal, v. 107, p. 744-745.)

Contains diagrams.

Rostovtsev, S. Physico-chemical principles of sintering Krivoi Rog iron ores. 1939. (In Metals and alloys, v. 10, no. 2, p. MA82.)

Abstract of an article which appeared originally in 1938 in Teoriya i praktika metallurgii, no. 6, p. 3-9.

Sainderichin, Nicolas. L'agglomération des matières premières pour le lit de fusion des hauts-fourneaux. 1932. (In Chaleur & industrie, v. 13, p. 403-406.)

Describes the Follsain process, in which continuous sintering is carried out in a rotating tube furnace. Gives some operation data.

Saint-Jacques, Camille, and Poupet, Louis. Le grillage et l'agglomération des poussières et des minerais pulvérulents dans le four à turbulence système Saint-Jacques. 1935. (In Congrès International des Mines, de la Métallurgie et de la Géologie appliquée, 7th session, Section de métallurgie, v. 2, Mémoires individuels, p. 47-54.)

The same. 1935. (In Revue de métallurgie, mémoires, v. 32, p. 581-588.)

In this apparatus, the ore is introduced under pressure into the top of a refractory-lined cylindrical chamber.

The same, condensed translation. 1935. (In Iron & coal trades review, v. 131, p. 982-983.)

There is appended some descriptive material.

Schiefer, H. V. Modern sintering plant of the Cambria Steel Company. 1921. (In Blast furnace and steel plant, v. 9, p. 633-638.)

The same. 1921. (In Iron age, v. 108, p. 1141-1146.)

The same. 1921. (In Iron trade review, v. 69, p. 1139-1144.)

Description, photographs, and diagrams of a Dwight-Lloyd plant. Title varies.

Schiefer, H. V. Sintering flue dust at Mingo Junction. 1917. (In Iron age, v. 99, p. 1299-1304.)

Detailed description, photographs, and diagrams.

Schiefer, H. V. Sintering plant installed at Toledo. 1916. (In Iron trade review, v. 58, p. 1154-1161.)

Detailed description with photographs and diagrams.

Schönzeler, Mathias. Die sinterung und reduktion von Krivoi-Rog-erzen. 1936. (In Stahl und eisen, v. 56, p. 47-49.)

Schwartz, G. M. Iron-ore sinter. 1929. (In Transactions of the American Institute of Mining and Metallurgical Engineers, Iron and Steel Division, p. 39-66.)
Discussion, p. 66-67.

The same. 1929. (In American Institute of Mining and Metallurgical Engineers, Technical publication no. 227.)

The same, abstract. 1929. (In Mining and metallurgy, v. 10, p. 390-391.)

The same, condensed. 1930. (In Blast furnace and steel plant, v. 18, p. 462-467, 471.)

A study of the microstructure of polished specimens of several sinters.

Schwartz, G. M. Magnetite crystals in sinters; the sequence of crystallization. 1927. (In Engineering and mining journal, v. 124, p. 453-455.)

Concerned with microstructure of sinters.

The Scott method of sintering fine ores. 1908. (In Iron age, v. 81, p. 594-595.)

General description with diagrams.

Shallock, E. W. Sintering of iron ore. 1941. (In Iron and steel engineer, v. 18, no. 8, p. 59-62.)
Discussion, p. 62-63, 73.

Mainly devoted to the development of the use of the sintering process. Gives a classification of the types of ores for which sintering is desirable.

Shallock, E. W. Thirty years of iron sintering. 1940. (In Blast furnace and steel plant, v. 28, p. 71-75, 169-170.)

Gives procedure for reclamation of flue dust, and a classification of ores that may be sintered.

Shelton, S. M., and Lamb, F. D. Concentration of blast furnace flue dusts. 1942. (In Iron age, v. 149, no. 24, p. 54-59.)

Includes a table of data on effect of sintering an unroasted sample of ore, and the magnetic product obtained from a roasted sample.

Siegel, Heinz. Reduktionsversuche an minette-erzen und sintergut. 1931. (In Archiv für das eisenhüttenwesen, v. 4, p. 557-564.)

An investigation, on a laboratory scale, of the changes which ore and sinter undergo in their passage through a blast furnace.

Simons, W. E. The A. I. B. sinter plant at Messrs. Guest, Keen and Nettlefolds, Ltd., Cardiff works. 1929. (In Journal of the Iron and Steel Institute, v. 119, p. 89-102.)

Discussion and correspondence, p. 103-112.

The same, condensed. 1929. (In Engineer, v. 147, p. 508-509.)

The same, condensed. 1929. (In Engineering, v. 127, p. 560-562.)

The same, condensed. 1929. (In Iron trade review, v. 85, p. 392-394, 400.)

A detailed description with illustrations, diagrams, and tables of operating data. The plant is a modification of the Greenawalt method.

Sintering at a modern blast furnace plant. 1934. (In Chemical age, metallurgical section, December 1, p. 35.)

Consists only of pictures and their captions.

Sintering fine ores for blast furnaces. 1929. (In Iron & coal trades review, v. 119, p. 506-507.)

Brief description of Dwight-Lloyd circular and straight-line machines. Considers efficiency, suitable materials, and operating costs of the sintering process.

Sintering hæmatite ore; the plant at Millom. 1936. (In Iron & steel industry and British foundryman, v. 9, p. 140-142.)

Brief description with diagrams of the A. I. B. plant of the Millom & Askam Haematite Co., Ltd.

Sintering in rotary kilns. 1937. (In Steel, v. 101, December 20, p. 71-72, 74.)

A brief description of how the rotary kiln is adapted to the sintering process by special design and firing methods.

Sintering of iron ores. 1933. (In Metallurgia, v. 8, p. 104.)

Description of the installation at Corby.

The sintering of iron ores; a notable installation at Corby. 1934. (In Journal of the Society of Chemical Industry, v. 53, (Chemistry and industry, v. 12) p. 744-745.)

Description of a sintering machine.

Sintering ore and flue dust. 1916. (In Iron age, v. 97, p. 960.)

Abstracts of U. S. patents no. 1,166,903; 1,166,904; 1,158,982; and 1,166,927.

Sintering plant at Pottstown. 1914. (In Iron trade review, v. 55, p. 292-293, 302.)

A Dwight-Lloyd installation of the Eastern Steel Co.

Sintering plant at Staveley's Devonshire works. 1936. (In Metallurgia, v. 15, p. 54.)

Brief description with illustrations of a plant having a sintering area of 430 square feet, and rate of travel of the pallets from 20 to 54 inches per minute.

Sintering plant at the Ford works. 1933. (In Iron & coal trades review, v. 127, p. 279.)

General description of the plant.

Sintering plant at the Ford works. 1933. (In Iron & steel industry and British foundryman, v. 6, p. 411-412.)

General description of the plant.

Sintering plant of Millom & Askam Hematite Iron Company, Limited. 1936. (In Iron & coal trades review, v. 133, p. 788-789.)

Rather full description, with photographs.

Sintering practice at a modern steel works; details of the installation at Corby. 1936. (In Chemical age, metallurgical section, July 4, p. 4.)

Sinterung von eisenerz nach dem Follsain-verfahren. 1932. (In Stahl und eisen, v. 52, p. 345.)

Brief description of the Follsain process.

Slater, J. H. Use of sinter in blast-furnace burdens. 1940. (In Metals technology, v. 7, Technical publication no. 1263.)

The same. 1941. (In Transactions of the American Institute of Mining and Metallurgical Engineers, v. 145, p. 44-46.)

The same, abstract. 1940. (In Iron age, v. 145, May 2, p. 54.)

The same, condensed. 1941. (In Iron & coal trades review, v. 142, p. 170.)

Gives data from tests conducted by the author to show advantages of using sinter.

Smith, Robert Christie. Sintering: its nature and cause. 1923. (In Journal of the Chemical Society, v. 123, p. 2088-2094.)

The physical chemistry of sintering.

Stehli, H. J. Sintering to increase returns to ore shippers. 1923. (In Engineering and mining journal-press, v. 115, p. 1110-1114.)

Discusses the savings in shipping costs effected by sintering, with brief attention to ferrous ores.

Stoughton, Bradley. Metallurgy of iron and steel. 1912. (In Engineering and mining journal, v. 93, p. 50-52.)

Gives a very brief discussion of sintering and suggests its possible application to the fine Mesabi ores.

Sweetser, Ralph H. Blast furnace practice. 356p. 1938. McGraw, New York.

P. 57-62 describe the types of sintering plants in common use in American practice; p. 95-106 are mainly devoted to a discussion of the sintering process.

Thyrre, S. G. Modern practice in rotary kiln sintering. 1941. (In Blast furnace and steel plant, v. 29, p. 324-329, 355, 361.)

Paper presented at a meeting of the Eastern States Blast Furnace and Coke Oven Association.

The same, condensed. 1942. (In Rock products, v. 45, no. 8, p. 84, 86.)

Tornblad, J. Recent improvements in the Greenawalt sintering apparatus. 1932. (In Journal of the Iron and Steel Institute, v. 125, p. 75-84.)

Discussion, p. 85-92; v. 126, p. 421-422.

Author's reply, p. 92-102; v. 126, p. 422-424.

The same, condensed. 1932. (In Engineering, v. 133, p. 725-727.)

Disadvantages of early types of Greenawalt apparatus. Some cost data.

Tournier, E. J. Sinter for blast furnace burdens. 1927. (In Iron age, v. 119, p. 775-778, 1138-1141; v. 120, p. 72-74.)

Part 2 published under title "Charging and igniting ore for sinter"; part 3, under title "Sintering performance and costs." Considers only the Greenawalt process.

Tournier, Edward J. Gas for sintering iron ore. 1933. (In Gas age-record, v. 72, p. 621-622.)

Brief general description of the sintering process with a short discussion of the use of natural and manufactured gas as a fuel.

Tournier, Edward J. Improvements in ferrous sintering. 1928. (In Iron age, v. 121, p. 191-193, 243, 466-467, 510, 668-670.)

Part 2 published under title "Sintering a variety of materials"; part 3, under title "Making low-grade ores of use." Contains flow sheets.

Tournier, Edward J. Sintering conserves our iron ores. 1934. (In Compressed air magazine, v. 39, p. 4345-4347.)

Mostly concerned with a general description of the sintering process.

2400 tons of sinter per day. 1942. (In Iron age, v. 150, no. 27, p. 32-35.)

Description of the Campbell, Ohio, plant of the Youngstown Sheet & Tube Co.

Use of sinter to increase blast furnace output. 1942. (In Steel, v. 110, no. 19, p. 107-108.)

Gives data to show that the country's pig iron output would be more advantageously increased by building more sintering plants and using more sinter in blast furnace burdens, than by building more blast furnaces.

Vogel, Felix A. Sintering and briquetting of fluedust. 1913. (In Transactions of the American Institute of Mining Engineers, v. 43, p. 381-386.)
Discussion, p. 737-743.

Gives a brief description of several processes used in adapting flue dust for use in blast furnaces.

Wagner, A. Erzagglomerieranlage der Cockerillwerke in Seraing. 1926. (In Stahl und eisen, v. 46, p. 1563-1564.)

Wagner, A. Der gegenwärtige stand der verfahren zur stückigmachung von eisenerzen. 1927. (In Stahl und eisen, v. 47, p. 613-626, 659-662.)

Discusses growth and use of sintering process in various countries. Description and diagrams of some plants.

Wagner, Alfons. Die aufbereitung der rohstoffe bei den Röchlingschen Eisen- und Stahlwerken, A.-G., in Völklingen. 1931. (In Stahl und eisen, v. 51, p. 217-225.)

Deals with sintering of oölitic iron ore. Results obtained with Lurgi and Dwight-Lloyd plants.

Wallace, Robert. Coke-burning ignition stoves for sintering machines. 1926. (In Engineering and mining journal, v. 122, p. 412.)

Describes the operation of a stove at the Midvale plant of the United States Smelting, Refining & Mining Co.

Weiskopf, A. Anreichern, brikettieren und agglomerieren von eisenerzen und gichtstaub. 1913. (In Stahl und eisen, v. 33, p. 276-281, 319-327.)

Presented before the Hauptversammlung des Vereins deutscher Eisenhuettenleute, in December, 1912.
Describes some of the agglomerating processes.

Wendeborn, Helmut B. Über die physikalischen und thermischen grundlagen der sinterröstung. 1934. (In Metall und erz, v. 31, p. 1-7.)

Discussion, p. 7-8.

A discussion of the sintering process.

West, James G. The West process for sintering flue dust. 1912. (In Iron age, v. 90, p. 954-958.)

Discusses the chemical, physical, and magnetic properties of flue dust, the methods of treating flue dust for blast furnace use, the West process, and the chemical and physical properties of the sinter produced by it.

The West sintering process. 1912. (In Engineering and mining journal, v. 94, p. 459-460.)

Sinters fine materials as they fall through an opening in the roof of a reverberatory furnace to a movable hearth below.

Weyel, A. Die verwertung des feinspates. 1927. (In Stahl und eisen, v. 47, p. 25-26.)

Describes sintering of fines of Siegerland carbonate ores.

Whiting, J. T. Microscopic and petrographic studies of blast furnace materials. 1938. (In Year book of the American Iron and Steel Institute, 1938, p. 58-95.)

Discussion, by J. E. Lose, p. 95-96.

Part 1 (p. 58-75) is a rather full discussion of the author's attempts to reduce sucessfully hematite ores through the use of the proper sinter. Contains photomicrographs and charts.

Woodbridge, Dwight E. Reduced ore piles raise hopes. 1926. (In Iron age, v. 117, p. 130-133.)

About a page is used to discuss the then current growth in the use of sintering, and the effect on furnace output.

Youngstown Sheet and Tube [Company] now making sinter at Campbell works. 1943. (In Blast furnace and steel plant, v. 31, no. 1, p. 109-112, 118.)

Description of the plant.

United States Patents.

882,517. Process of treating ores. Arthur S. Dwight and Richard L. Lloyd. 1908.

Describes a sintering process.

882,518. Process of roasting and sintering ores. Arthur S. Dwight and Richard L. Lloyd. 1908.

916,395. Apparatus for desulfurizing and sintering ores. Arthur S. Dwight and Richard L. Lloyd. 1909.

Said to be adapted for iron and other ores, particularly when the ores bear sulfur.

916,397. Process of roasting and sintering ore. Arthur S. Dwight. 1909.

1,166,142. Calcining, desulfurizing, and agglomerating ores &c. Franz Meyer. 1915.

The same, abstract. 1916. (In Engineering and mining journal, v. 101, p. 526.)

The number is incorrectly reported in the abstract as 1,666,142.

1,166,903. Method of agglomerating ores. Philip O. Harding. 1916.

The same, abstract. 1916. (In Iron age, v. 97, p. 960.)

The same, abstract. 1916. (In Metallurgical and chemical engineering, v. 14, p. 396.)

1,166,904. Machine for agglomerating ores. Philip O. Harding. 1916.

The same, abstract. 1916. (In Iron age, v. 97, p. 960.)

The same, abstract. 1916. (In Metallurgical and chemical engineering, v. 14, p. 396.)

1,166,927. Process of recovering flue-dust. Samuel W Osgood. 1916.

The same, abstract. 1916. (In Iron age, v. 97, p. 960.)

The flue dust is made into pellets and then sintered.

1,197,199. Apparatus for roasting and sintering ores. James Gayley. 1916.

The same, abstract. 1917. (In Metallurgical and chemical engineering, v. 16, p. 228-229.)

1,205,944. Process for sintering fine ores, flue-dust, purple ore, and the like. Carl Giesecke. 1916.

The material to be sintered is mixed with slimes, agglomerated, and heated in a shaft furnace with finely divided fuel.

1,215,637. Apparatus for roasting and sintering ores. Arthur S. Dwight. 1917.

The same, abstract. 1917. (In Metallurgical and chemical engineering, v. 17, p. 139.)

1,221,962. Process for sintering fine oxid ore and metallurgical products. Heinrich Bittmann. 1917.

The same, abstract. 1917. (In Metallurgical and chemical engineering, v. 16, p. 706.)

In this process, there are alternate layers of carbon fuel and of the ore to be sintered.

1,222,893. Agglomeration of fine ores and flue-dust. Wilhelm Schumacher. 1917.

The same, abstract. 1917. (In Metallurgical and chemical engineering, v. 17, p. 139.)

The ore is molded into briquettes before sintering.

1,231,831. Process of treating materials. Frederick W. Yost. 1917.

The same, abstract. 1917. (In Metallurgical and chemical engineering, v. 17, p. 498.)

Essentially a sintering process.

1,245,183. Process of sintering. Arthur J. Boynton and Albert E. Sands. 1917.

The same, abstract. 1918. (In Metallurgical and chemical engineering, v. 18, p. 263.)

1,247,661. Method and apparatus for sintering ores. James Gayley. 1917.

The same, abstract. 1918. (In Metallurgical and chemical engineering, v. 18, p. 42.)

1,254,316. Process of treating ores. Arthur S. Dwight. 1918.

A sintering process.

1,442,023. Sintering apparatus. Louis C. Edgar. 1923.

A process for cleaning and cooling the exhaust gases.

1,444,955. Process of sintering. Thomas J. Davis. 1923.

A porous hearth of coarse sintered material is formed upon which a bed of material to be sintered is formed.

1,508,101. Method of sintering fine ores and the like. Anders Holmberg. 1924.

The pan is charged with layers of ore containing different percentage of fuel in such manner that the fuel gradually decreases from the top to the bottom. The charge is ignited at the upper surface.

1,528,322. Grate for sintering apparatus. Thomas J. Davis. 1925.

The grate has swinging grate bars adapted to dislodge any substance clogging the grate when the pan is tilted.

1,847,596. Art of sintering ore fines, flue dust, sulphide, or other concentrates. Thomas W. Cavers and George M. Lee. 1932.

Limestone is added to the ore and the mixture is heated to effect the combination of silica with magnesia or lime. The temperature is too low to cause any appreciable reaction between ferric oxide and silica.

1,965,320. Sintering method. Edward Shallock. 1934.

Particles of varying degrees of fineness are separated so that the coarsest grains are on the bottom, and the bed becomes progressively more fine-grained toward the top.

2,006,936. Method and means for producing fine sinter returns. Walter R. Zehner. 1935.

The surface of the bed is grooved, then ignited. The thin sections are then air-quenched until the thick sections have burned through.

2,095,567. Sintering. Frank R. McGee. 1937

Uses a circular grate.

2,191,911. Method of sintering. John E. Greenawalt. 1940.

Claims to use a smaller amount of fuel, and to effect sintering at a temperature too low to cause the formation of iron silicates.

2,244,372. Wind box for sintering machine. Ralph E. H. Pomeroy. 1941.

2,248,180. Method of reclaiming finely divided metallic particles. Wilson H. Moriarty. 1941.

Describes a method of sintering ores in which the fuel customarily used is replaced, in whole or in part, by either the metal of the ore, or one of the metals commonly alloyed with it.

2,254,323. Sintering machine. Edward W. Shallock. 1941.

A continuous machine.

2,273,821. Sintering machine. Charles E. Agnew. 1942.

British Patents.

156,183. Process of making agglomerates to be sintered in shaft furnace. Carl Giesecke. 1922.

A mixture of ore, fuel, and water is molded by an extrusion press prior to sintering.

399,382. A process for sintering fine ores or the like. Friedrich Krupp Grusonwerk Aktiengesellschaft. 1932.

A process in which combustion is effected by supply of air, and iron sponge is used as the fuel.

469,328. Improvements in and relating to the treatment of iron ores for subsequent reduction. Herman Alexander Brassert and H. A. Brassert & Co. 1937.

Claims in part to separate the sinter into two or more sizes, magnetically separating the fines, and to control the $CO:CO_2$ ratio so as to decrease the non-magnetic iron oxide.