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T. J. DAVIS.
PROCESS OF SINTERING.
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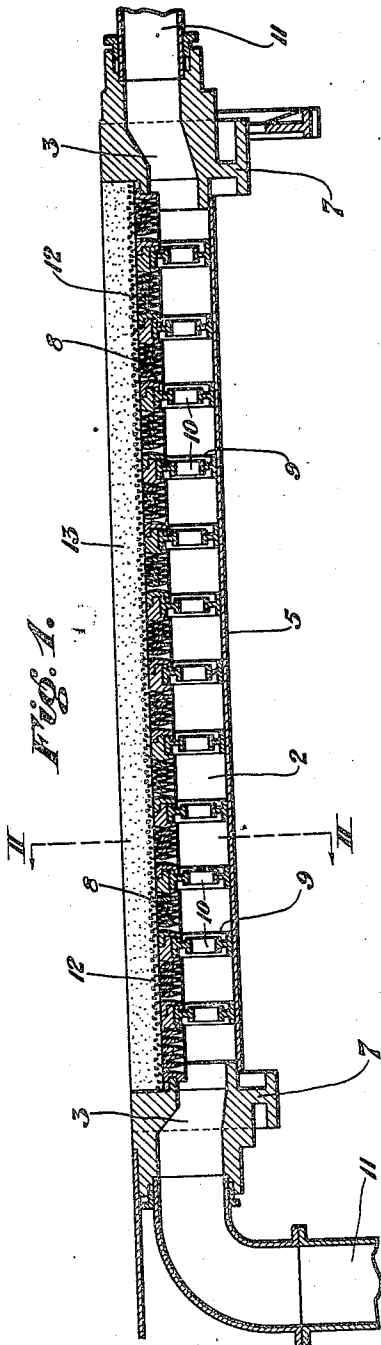


Fig. 1.

Witnesses:
Edwin Trumb.

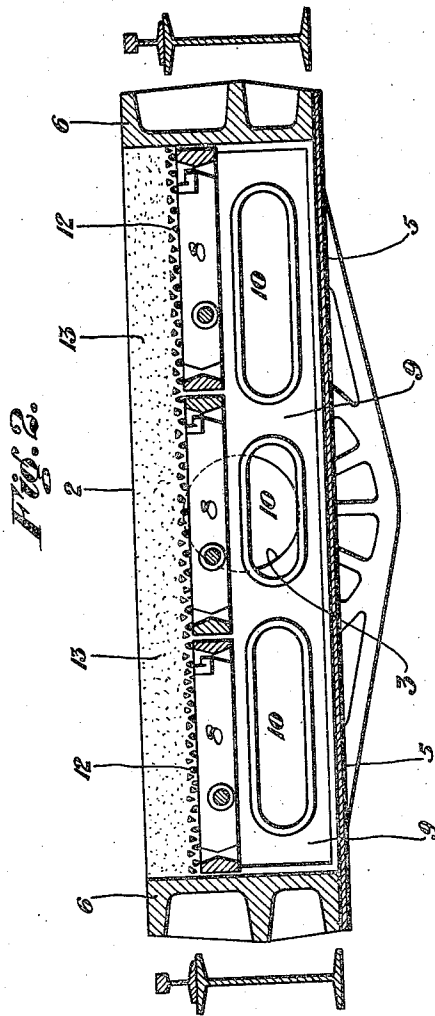


Fig. 2.

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UNITED STATES PATENT OFFICE.

THOMAS J. DAVIS, OF DUQUESNE, PENNSYLVANIA.

PROCESS OF SINTERING.

Application filed April 20, 1921. Serial No. 462,854.

To all whom it may concern:

Be it known that I, THOMAS J. DAVIS, a citizen of the United States, and resident of Duquesne, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Process of Sintering, of which the following is a specification.

This invention relates to sintering blast furnace flue dust, finely divided ores and similar combustible, metal bearing materials or metal bearing materials to which combustible material is added preparatory to sintering. While not necessarily limited to such apparatus my improved process is particularly adapted for use with sintering apparatus of the down-draft type and embodying a foraminous bottom, with means for passing a current of air, in quantities sufficient to support combustion and sinter the material, through a body of material located in the sintering pan.

Heretofore the foraminous bottom of the sintering apparatus has been covered with a relatively thin layer of refractory material, lumps of limestone usually being used. This layer of lumpy refractory material forms a porous hearth which directly supports the body of material to be sintered.

In the sintering operation the porous hearth of refractory material, or the major portion thereof, becomes an integral part of the mass of sinter, and is removed from the pan with the sintered mass. Not being metal, this refractory material is a diluent, which lowers the metallic content of the sinter and when limestone is employed, it slakes when the highly heated mass of sinter is quickly cooled by quenching with water, as is done with each successively formed quantity of sinter immediately after its removal from the sintering pans.

One object of my invention is to provide an improved process wherein a porous bed is provided to support the materials to be sintered without the use of refractory materials and whereby dilution of the sinter heretofore caused by the use of refractory material in forming the porous hearth is avoided and made unnecessary.

A further object is to provide a sintering process having a novel series of steps whereby the time consumed in sintering a given amount of material is materially shortened.

Referring now particularly to the drawings, forming part of this specification, Figure 1 is a sectional side elevation of a sinter-

ing pan adapted for use in carrying out my invention, and Figure 2 is a sectional end elevation on the line II—II of Figure 1.

In the accompanying drawings, the numeral 2 designates a sintering pan which is arranged to tilt or rock about a horizontal axis, opposite ends of this pan being provided with hollow trunnions 3, 3, by which the pan is rotatably mounted in suitable trunnion bearings.

The pan 2 has a bottom 5, sides 6, and integrally formed ends 7, the hollow trunnions 3, 3 opening into the pan through the end walls of the pan. At an intermediate point in the height of the side walls of the pan is a series of grate sections 8 having elongated apertures therein. The grate sections 8 are supported vertically by transverse girder supports 9 having apertures 10 in their web portion.

The outer ends of the hollow trunnions 3, 3, are connected to one end of suitable conduits 11, which are adapted to have their other end connected to an exhausting device (not shown) for creating a suction, thereby drawing the gaseous products of combustion through the grate sections 8, and along the pan beneath the grate.

A porous hearth 12 which is loosely positioned on the grate sections 8 is formed of a thin layer of coarse particles of previously sintered material. A mixture of flue dust or similar material and fine particles of previously sintered material is then placed in the sintering pan on top of the hearth 12 and leveled, forming a bed, 13, of material ready to be sintered.

It is the practice to separate the coarse and fine portions of the sinter by screening, the coarse portions being sent to the blast furnace or other place of utilization, and the fines being mixed with the finely divided flue dust or other material being used in the sintering operations.

In the operation of my improved process the screenings resulting from the first screening operation, just before described, are again screened to separate the coarser from the finer particles thereof. The coarser portions are then used in making the porous hearth 12, being spread over the foraminous grate 8. The finer particles are mixed with the flue dust or other material used in forming the bed 13. As the screenings or sinter will be coarser than the flue dust, a more porous body will be formed by the mixture,

thereby facilitating the passage of air or products of combustion through the bed of material being sintered.

5 The mixture of the fine particles of sintered material and flue dust or other material to be sintered is charged into the pan 2 and leveled off forming the bed 13 in the usual manner. The bed 13 is then ignited on its upper face and the exhaust blower is started so as to draw the air or products of combustion downwardly through the bed 13 into the space below the grate sections 8 and out through the conduits 10.

15 By the use of previously sintered material to form the porous hearth 12, a sinter is formed that will not disintegrate and one that contains no undesirable constituents for charging into the smelting furnace.

20 Also, by combining the fine particles of previously sintered material with the material to be sintered, the porosity of the bed 13 is increased, the passage of air or products of combustion therethrough is facilitated, and the time necessary to sinter a given quantity of material is materially lessened.

The advantages of my invention, as will be readily appreciated by those skilled in the art, arise from the use of a non-refractory material in forming the porous hearth and in utilizing the finely divided sinter to make the more finely divided flue dust less dense in preparing for the sintering operations.

35 I claim:—

1. The process of sintering flue dust and similar combustible material which includes first forming a porous hearth of coarse sintered material, then forming a bed of the materials to be sintered on said hearth, and finally igniting the so-formed bed.

40 2. The process of sintering flue dust and similar combustible materials which includes

forming a porous hearth of coarse sinter, mixing finely divided sinter with the materials to be sintered, forming a bed of the mixture upon said porous hearth, igniting one face of the so-formed bed and thereby sintering the mass. 45

3. The process of sintering flue dust and similar combustible materials which includes forming a porous hearth of comparatively coarse portions of previously formed sinter, mixing a quantity of finer portions of previously formed sinter with the flue dust, forming a bed of said mixture upon said porous hearth and then sintering the materials forming said bed. 55

4. The process of sintering flue dust and similar combustible materials which includes separating the fines from the coarser portions of previously made sinter, again separating said screened materials into its coarser and finer parts, forming a porous hearth on the perforated bottom of a sintering pan with the coarser grade of the screened screenings, mixing the finer grade of the screened screenings with the combustible materials to be sintered, forming a bed of the mixture upon said porous hearth, and then sintering the mass. 60 65 70

5. The process of sintering flue dust and similar combustible materials which includes screening sintered flue dust to separate the fines therefrom, re-screening the fines to separate the finer from the coarser portions thereof, forming a porous hearth of the coarser screened screenings, mixing the finer portions thereof with the materials to be sintered, and forming a bed of said mixture upon said porous hearth preparatory to sintering the mixture. 75 80

In testimony whereof, I have hereunto set my hand.

THOMAS J. DAVIS.