Nov. 29, 1932. G. F. WEATON ET AL 1,889,055

SINTERING OF METALLIFEROUS MATERIALS

Filed Feb. 25, 1932 2 Sheets-Sheet 1

Fig. 1.

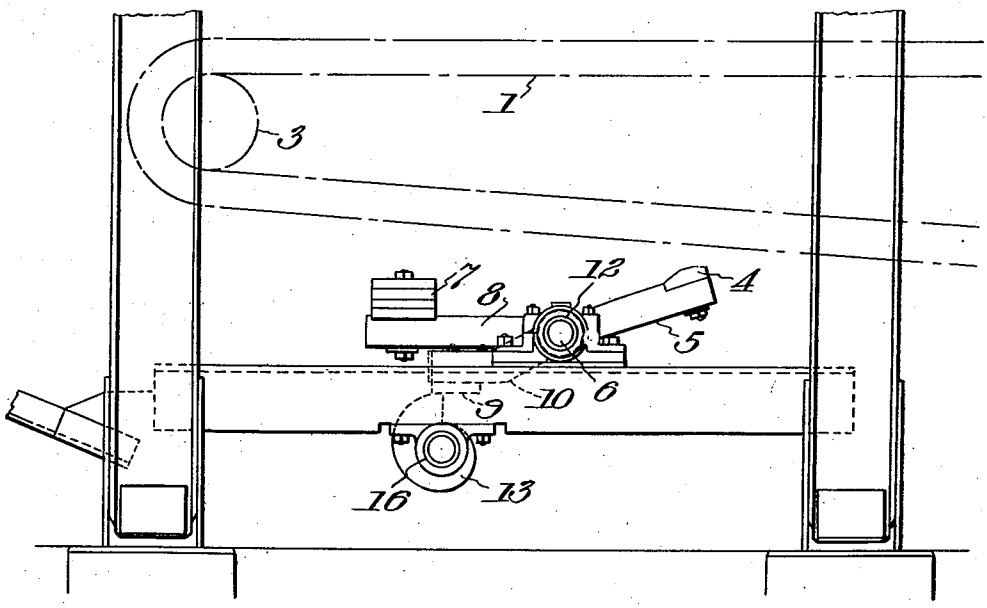
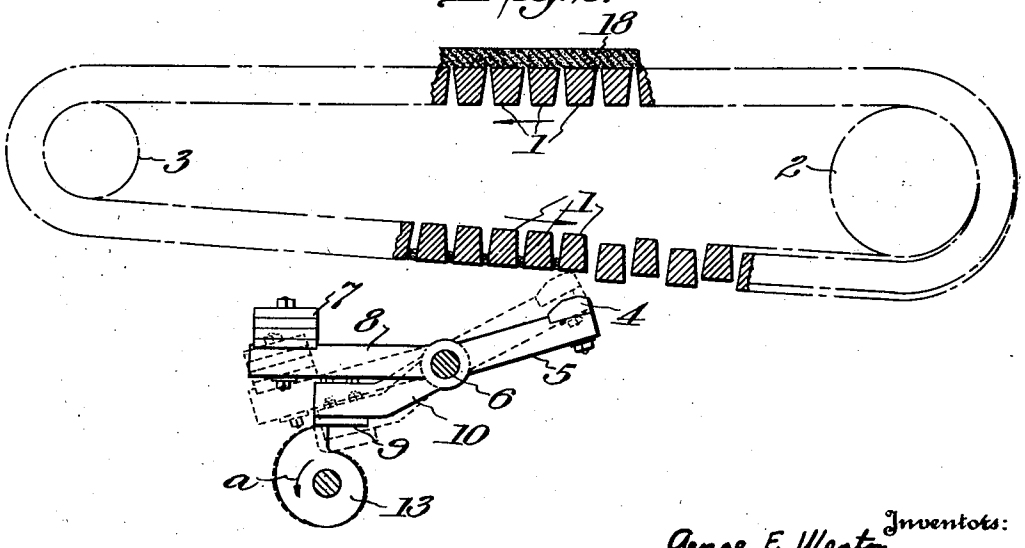


Fig. 2.



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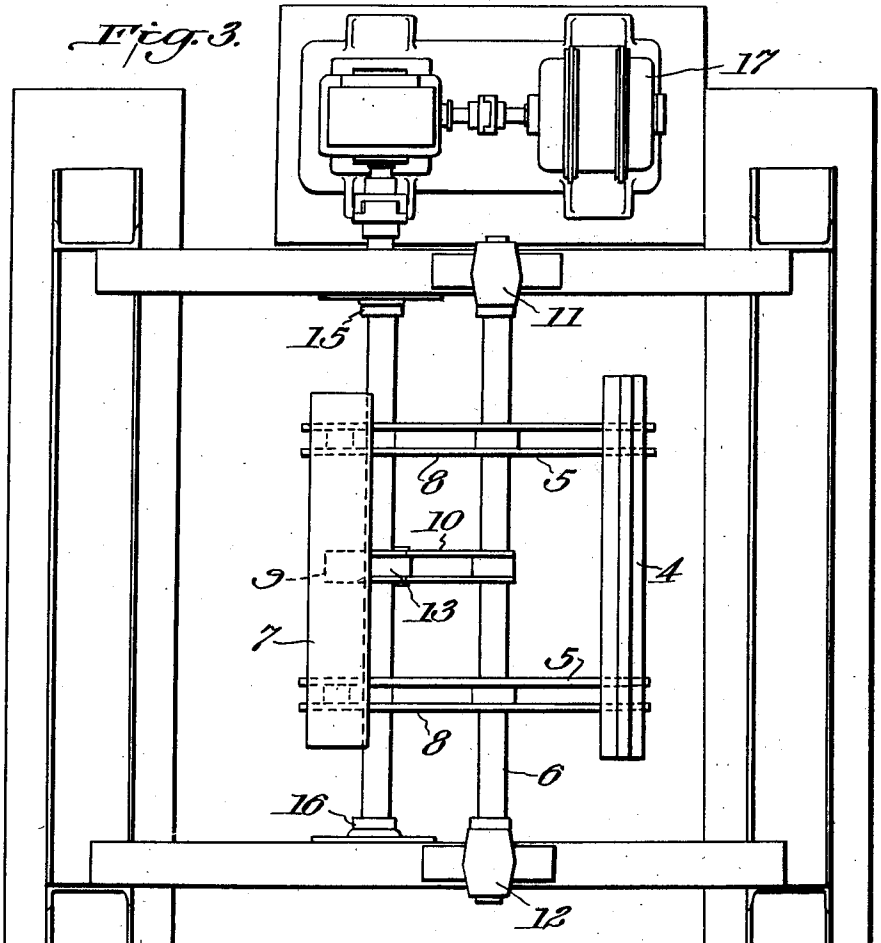
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Fig. 3.



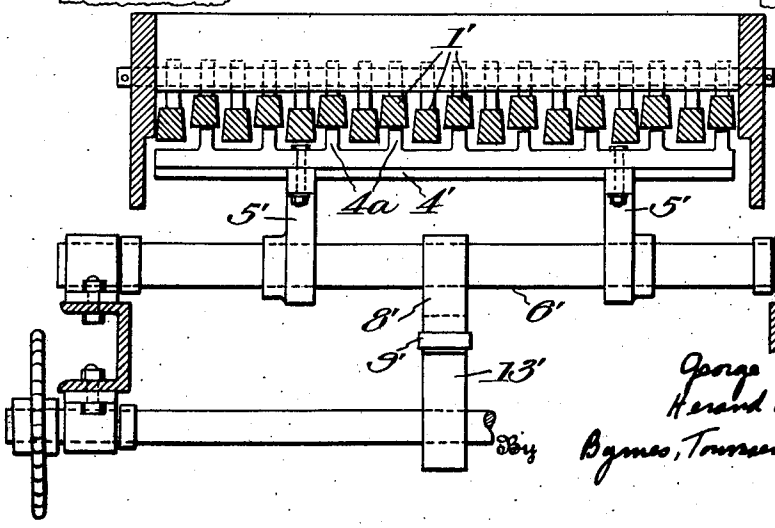


Fig. 4.

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UNITED STATES PATENT OFFICE

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SINTERING OF METALLIFEROUS MATERIALS

Application filed February 25, 1932. Serial No. 595,150.

The present invention is directed to a method and apparatus for removing accretions or deposits from the grate bars of sintering machines, particularly those of the traveling grate type such as the Dwight and Lloyd sintering machine.

One object of the invention is to provide a method and means whereby accretions or deposits may be substantially completely removed from the grate bars whereby obstruction of the draft and consequent irregular working of the sintering operation is avoided. Another object, particularly when zinc ores are to be sintered, is to remove such deposits as contain segregated contaminants and thereby to prevent them from re-entering the sintered product.

In brief the invention comprises a method and means whereby the grate bars, after the sintered product has been removed therefrom in the usual manner, are subjected to repeated blows whereby the adhering matter is dislodged.

The invention will be more particularly described by way of example with reference to the accompanying drawings wherein:

Fig. 1 is an elevation showing a grate bar jarring mechanism, constructed in accordance with the invention, in operative relation to the grate bars of a sintering machine of the usual type;

Fig. 2 is an elevation in partial section showing the principle of operation of the invention;

Fig. 3 is a plan view of the grate bar mechanism illustrated in Figs. 1 and 2; and

Fig. 4 is a view in partial section of a modified form of the invention.

In the drawings, 1 are grate bars, carried on a plurality of pallets (not shown) in the usual manner in an endless belt around rotatable wheels 2 and 3. The grate bars may be of any desired shape and are advantageously provided with small ribs to maintain a uniform spacing between the bars.

The grate bar cleaning mechanism comprises the following elements: a striking bar 4, substantially as long as the width of the grate bars and attached to one end of lever arms 5, the other ends of which are rigidly attached to a pivot shaft 6; a counterweight 7 attached to one end of lever arms 8, the other ends of which are likewise rigidly attached to said pivot shaft 6 and positioned oppositely to said striking bar 4; a cam button 9 rigidly fastened to one end of a lever arm 10, the other end of which is also rigidly fastened to pivot shaft 6 and positioned at a small angle downwardly from counterweight lever arms 8; bearings 11 and 12, carried on rigid framework of the sintering machine, in which the two ends of pivot shaft 6 are rotatably mounted; a cam 13, rigidly attached to a shaft 14, which is in turn rotatably mounted in bearings 15 and 16; and a motor 17, geared to one end of shaft 14.

In the operation of the sintering machine, a mixture of ore with sufficient sulfur for sinter fuel, or of ore and carbonaceous material is fed on top of the grates 1, forming a bed 18 of uniform thickness, and ignited by a flame. Suction is applied to the underside of the grates under the bed of material, causing a stream of air and flame to pass through the bed of material, thus partially fusing and sintering the ore. Volatile compounds are carried downward through the grates, a portion depositing in the lower part of the sintered mass, a portion depositing on the grates themselves, and a portion passing on with the gases.

When the pallets carrying the grates pass around the periphery of wheel 3 the fused and sintered ores on the grates are discharged by gravity and the grates travel from a position underside of wheel 3 to underside of sprocket wheel 2 in an inverted position. A portion of the partially fused volatilized material, however, is found attached to the surfaces of the grate bars and also lodged in the openings between the grate bars, causing the openings to be partially or wholly obstructed. Portions of these deposits subsequently break off as the grate bars discharge their sintered ore load by gravity and thus re-introduce into the sintered ore the segregated contaminants.

The operation of the cleaning mechanism is as follows:

The motor 17 rotates shaft 14 and cam 13

in the direction of arrow *a*. The curved surface of the cam lifts button 9 to its maximum height shown in solid lines, in which position counterweight 7 and striking bar 4 take the position also shown by full lines. The weights of the counterweight 7 and striking bar 4 are so proportioned as to make the turning moment of counterweight 7 about the axis of pivot shaft 6 much in excess of the turning moment of striking bar 4. When the cam rotates further and the cam point passes the edge of the cam button 9, the counterweight falls and causes the bar 4 to strike a blow against the under surface of the grate bars, at which time the striking bar 4, counterweight 7, and cam button 9 take the position shown in dotted lines. The surface of cam coming in contact with the cam button is so designed as to commence lifting the button shortly after the striking bar strikes the surface of the grates. The repeated intermittent blows of the striking bar 4 against the grate bars as the cam rotates, causes the partially fused and deposited contaminants attached to the surface of the grate bars to break into pieces and be detached from the grates and fall into a receiving hopper, not shown. Furthermore, the grate bars, which are usually held fast by the particles of contaminants lodged in the openings between grate bars, are jarred loose by the blows of the striking hammer, this relative movement between grate bars helping the material lodged in between grate bars to be crumbled and dislodged therefrom.

The effect of the removal of these deposits of contaminants from the grate is to improve the quality of the ultimate product and increase the capacity of the sintering machine due to the clearing of the air passages, which promotes the combustion necessary for the sintering of the mass and the recovery of the contaminating substances.

The modification shown in Fig. 4 is particularly adapted to effect the removal of accretions or deposits from grate bars of the type positioned parallel to the direction of travel of the pallets of the sintering machine. As shown, the mechanism is similar to the mechanism of Figs. 1 to 3, as is indicated by the corresponding primed reference numerals. In this embodiment of the invention, striking bar 4′ is provided with projections 4*a* adapted to strike alternate grate bars of the assembly when the grate bars are in their inverted position. This action effectively cleans the accretions and deposits from the grate bars.

It will thus be seen that the invention broadly comprises a method of cleaning the grate bars of sintering machines which consists in subjecting said grate bars to intermittent impacts; and a mechanism for effecting the cleaning of grate bars of sintering machines comprising striking means and means for causing said striking means to impinge against said grate bars.

This application is a continuation-in-part of our application Serial No. 539,912, filed May 25, 1931.

We claim:

1. Apparatus for cleaning the grate bars of sintering machines comprising a striking member, and means for causing said striking member periodically to impinge against said grate bars.

2. Apparatus for cleaning the grate bars of sintering machines comprising a striking member connected to a pivot member, and means for actuating said striking member on said pivot member so as periodically to impinge against said grate bars.

3. Apparatus for cleaning the grate bars of sintering machines comprising a striking member connected to a pivot member and positioned parallel and subjacent to the grate bars of the sintering machine, a rotatable cam member in operative relation to said striking member and positioned to cause said striking member to impinge against said grate bars upon rotation of said cam member, and means to effect the rotation of said cam member.

4. Apparatus for cleaning the grate bars of sintering machines having longitudinally positioned grate bars comprising a striking member adapted to engage alternate grate bars and means for causing said striking member periodically to impinge against said alternate grate bars.

5. Apparatus for cleaning the grate bars of sintering machines comprising a striking member connected to a pivot member, said striking member being positioned subjacent and at right angles to the grate bars of the sintering machine, a rotatable cam member in operative relation to said striking member and positioned to cause said striking member to impinge against said grate bars upon rotation of said cam member, and means for effecting the rotation of said cam member.

6. Apparatus for cleaning the grate bars of sintering machines comprising a striking member connected to a pivot member, said striking member being positioned subjacent and at right angles to the grate bars of the sintering machine and provided which projections adapted to engage alternate grate bars, a rotatable cam member in operative relation to said striking member and positioned to cause said striking member to impinge against said alternate grate bars upon rotation of said cam member, and means for effecting the rotation of said cam member.

In testimony whereof, we affix our signatures.

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