J. GAYLEY.

APPARATUS FOR ROASTING AND SINTERING ORES.

APPLICATION FILED MAY 6, 1916.

1,197,199.

Patented Sept. 5, 1916.

2 SHEETS—SHEET 1.

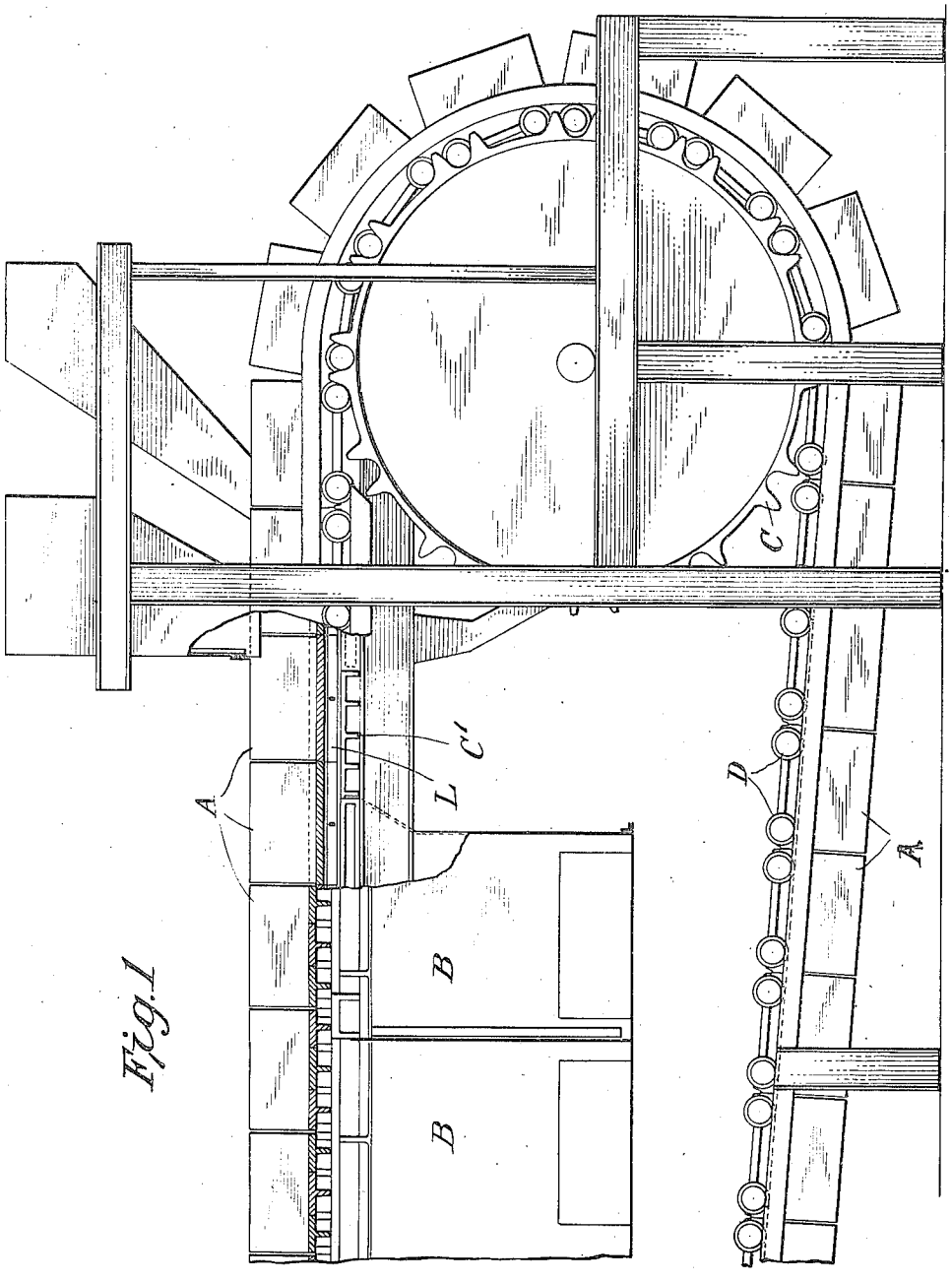


Fig. 1

James Gayley Inventor

by his Attorneys

Penn Raye, Coolpir & Hazzard

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Fig. 2

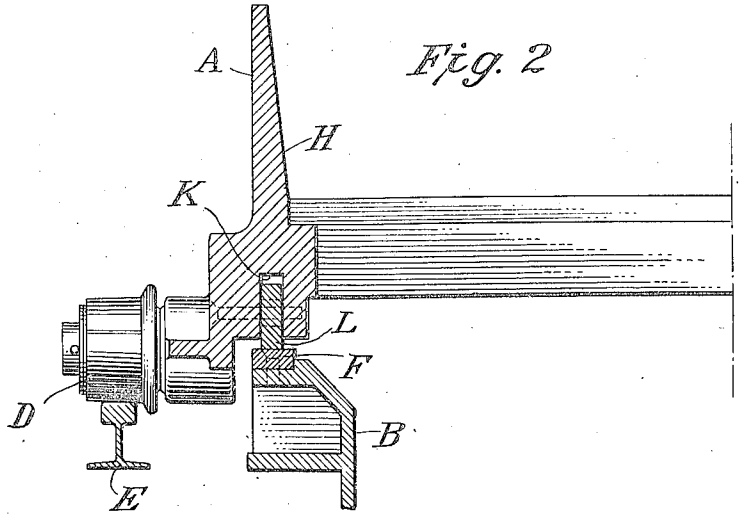
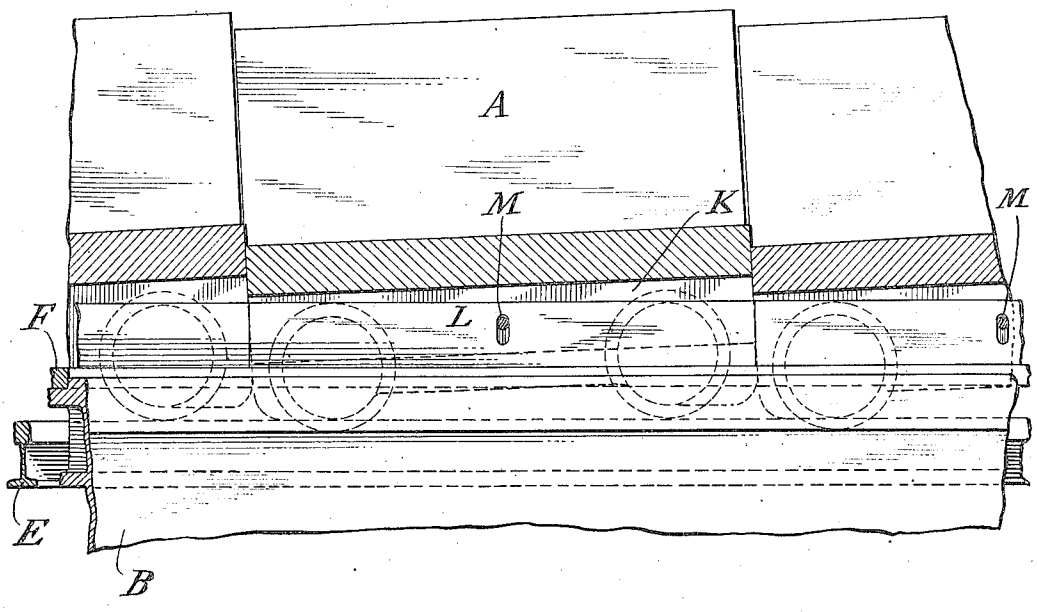


Fig. 3



James Gayley Inventor

By his Attorneys

Kerr, Page, Cooper & Hayward

UNITED STATES PATENT OFFICE.

JAMES GAYLEY, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN ORE RECLAMATION COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR ROASTING AND SINTERING ORES.

1,197,199. Specification of Letters Patent. Patented Sept. 5, 1916.

Application filed May 6, 1916. Serial No. 95,775.

To all whom it may concern:

Be it known that I, JAMES GAYLEY, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Apparatus for Roasting and Sintering Ores, of which the following is a full, clear, and exact description.

The invention which is set forth and claimed in this application for Letters Patent is an improvement in the construction of sintering machines, more particularly those of the Dwight and Lloyd type, in which continuous traveling grates made up of articulated elements or pallets are moved over a suction or wind box to produce through a body of ore contained in the pallets a down draft which roasts or sinters the ore after it has been ignited at the surface. One of the most important requirements in the operation of a continuous down draft sintering machine of this general character is the prevention of the access of air into the suction chamber which has not passed through the sintering charge of ore in the pallets, for the entrance of such air imposes upon the fans inducing the draft much useless work and retards the speed and efficiency of sintering. In recognition of this the designers of these machines have always provided for a sliding contact between the pallets and wearing bars along the top of the wind box, and this contact is provided for whether the entire weight of the loaded pallets be sustained by the wind box itself, or partly or mainly by the side track rails upon which the flanged wheels at the sides of the pallets may run. In actual practice it has been found that when the pallets are supported by the wind box, grooves are worn in each side of the bottom of the pallets where they make sliding contact with the wearing bars, and it has also been found difficult to confine the pallets laterally to a fixed path with the result that the inner faces of the flanged wheel hubs with which they are equipped wear to a considerable extent where they slide against the vertical surfaces of the wind box wearing bars. In an entirely new machine in which all of the articulating members of the sprocket wheel drive are correctly related to each other, the pallets are delivered by the sprocket wheels to the top of the wind box in substantially correct alinement, both vertically and horizontally, so that the train of pallets forms acceptably air-tight joints with the wearing bars. But, however, after use and consequent wear, it is found that the pallets are delivered by the sprocket wheels to the wind-box in greater or less misalinement to each other and to the wearing bars, which displacement may be either vertical or horizontal or both, with the result that openings or defective joints between the pallets and the wind box are formed through which air passes directly to the wind box which has not passed through the ore. Other and further objections to this plan of construction are due to the necessity for frequent repairs and renewals of worn parts and to the excessive power required to overcome the friction due to the full weight of the loaded pallets sliding over the top of the wind box. It has been proposed to reduce the number and character of these objections by supporting the pallets while passing over the wind box on track rails upon which run the flanged wheels mounted at the sides of the pallets and which heretofore have served only for carrying the pallets around the curved track at the discharge end of the machine and along the inclined return tracks under the wind box. In such cases, the upper supporting track rails are made vertically adjustable, so that the lower surface of the pallets may be maintained just close enough to the upper surfaces of the wind box wearing bars to form approximately air tight joints, but at the same time relieving the wind box of the weight of the pallets. This construction, while effective in a measure when all of the pallets as they come over the wind box occupy their normal relation to each other and to the top of the wind box or when any such misalinement of the pallets is in a horizontal direction only, do not correct the evils that result from undue wear of the sprockets and wheels and vertical misalinement of the pallets, for it matters not how frequently or carefully the track rails are adjusted the leakage due to the tilting or raising of individual pallets is not prevented, since such adjustment affects only the pallet train as a whole, and the joint is continuous over the suction chamber and is in a single continuous plane.

My invention involves the use in connection with the traveling pallets when supported by side track rails or other means so as not to rest upon the wearing bars of the wind box, of metal wind seals or curtains preferably attached to the pallets and contacting with and sliding on the wearing bars, and which are self adjusting to cover and close the space between the pallets and the wind box top whatever, in practice, the proportions of this may be. In other words and stated more specifically for the purpose of defining the nature and function of my improvement, I secure to the pallets along each side a plate, bar or curtain movable freely in a vertical direction with respect thereto and resting at their lower edges upon the wearing bars of the wind box. Preferably, these bars or curtains are contained in grooves in the bottom of the pallets and run over the face of the wearing bars, so that their sides being always in practical contact with the pallets they maintain between the latter and the wearing bars a substantially air tight joint regardless of the vertical position or displacement of any of the pallets with respect to the wearing bars. This improvement I have illustrated in the accompanying drawings in which, assuming the general character of the machine to be fully understood by all to whom this specification is addressed as it is illustrated in U. S. patent to Laws No. 1,097,592 of May 19th, 1914—

Figure 1 is a longitudinal section of a portion of the machine, showing my improvement in connection therewith. Fig. 2 is a vertical cross-section of the same, and Fig. 3 a sectional elevation showing the operation of my attachment in a special case.

In these machines a train of pallets A moves continuously over the top of a suction wind box B, being kept in motion by suitable sprocket devices. The sprockets lift the pallets from below onto the upper track and push the train of pallets the full length of the said track over the wind box to the discharge point at the other end of the machine. The pallets are fitted with flanged wheels D on either side, which permit the former to roll by gravity around a curved end track at the discharge end and along the length of an inclined track under the machine. These wheels also engage the teeth of the sprockets C and transmit to the train of pallets the power required to raise them onto the upper track rails E, extending alongside the wind box and to compel them with a continuous motion. The whole length of the wind box top is fitted at either side with a rectangular wearing bar F, and at each end it is filled with a dead plate C′ over which the whole width of the pallet slides to prevent leakage of air at those points. The wearing bars constitute the fixed member of the sliding joint which is maintained between the pallets and the wind box.

In the under surfaces of the sides H of the pallets are formed longitudinal recesses or grooves K onto which fit bars or plates or what, with reference to their intended function I have designated as curtains L. In their simplest embodiment these curtains consist of rectangular plates or bars of the same length as the pallet and fit into the recesses of the latter with only sufficient clearance to permit of free movement therein under the influence of their own weight. To prevent these curtains from endwise movement in the pallets, they are held by rods or pins M passing through vertically elongated slots therein.

By reference to Fig. 3, the operation and function of the wind seal bars or curtains will be understood. The pallets, impelled by the sprockets, may not be perfectly alined vertically, but may, for instance, be slightly tilted as shown. Under the conditions, which have been heretofore obtained, it is manifest that any such displacement would very seriously impair the integrity of the joint between the wind box and the tilted pallet, but when the latter are equipped with my proposed curtains, the latter under the influence of gravity drop to the face of the wearing bars and thus serve as seals which maintain the joint complete whatever, within possible limits, the inclination of the pallet may be. Under these circumstances, the adjustment of the track rails vertically even if provided for is a matter of slight moment, as the clearance between the lower edges of the pallets and the wearing strips of the wind box may be of very considerable extent.

I have not deemed it necessary herein to illustrate other than the most typical form of seal or curtain that may be made in accordance with my invention, but it is obvious that in construction and in details of operation it may be varied to an almost indefinite extent. The function of the new device, which I have introduced into these machines, being understood to be the closure of an impaired joint between the pallets and the wind box by some device of comparatively insignificant mass or weight compared with the pallets, and which is self adjustable to maintain such joint closed by gravity or by any similar force tending to move it when necessary, it will be seen at once that the specific construction of such device becomes a purely secondary consideration.

What I claim is:—

1. In a continuous sintering machine of the kind described, the combination with a wind box, a series of grate bearing pallets, and supports therefor which permit the pallets to be moved over the continuous top of

the wind box, of series of sectional seal bars or curtains intermediate to the pallets and wind box adapted by their adjustment to automatically close the joints between said pallets and the wind box and thus prevent impairment of the air-tight union between the two.

2. In a continuous sintering machine of the kind described, the combination with a wind box, grate bearing pallets and traveling supports therefor, which permit the pallets to be moved over the top of the wind box, of wind seal bars or curtains connected to the pallets and covering the joints between the same and the wind box and adapted for automatic adjustment to maintain such joints air tight.

3. In a continuous sintering machine of the kind described, the combination with a wind box, grate bearing pallets, movable over the top of the wind box, and wheels rolling on track bars for supporting the pallets, of wind seal bars or curtains connected to the pallets and movable freely in slots therein and adapted to seat air tight by their own weight upon the top edges of the wind box.

4. In a continuous sintering machine of the kind described, the combination with a wind box, grate bearing pallets and wheels adapted to travel on track rails for supporting the pallets, of rectangular wind seal bars or curtains movably supported in vertical grooves in the pallets and means for preventing the endwise movement thereof in the pallet grooves, while permitting them to rest upon the top of the wind box.

5. In a continuous sintering machine of the kind described, the combination with the wind box, grate bearing pallets, and flanged wheels adapted to travel on track rails for supporting and moving the same over the wind box, of self-adjusting wind seal bars or curtains carried by the pallets and adapted to always rest upon the sides of the wind box and maintain the joint or space between the pallets and the wind box closed air tight notwithstanding displacements of individual pallets.

6. In a continuous sintering machine of the kind described, the combination with the wind box, fitted along its upper edges with wearing bars, and a series of grate bearing pallets supported on side tracks and adapted to move over the top of the wind box, of self-adjusting wind seal bars or curtains carried by the pallets and contacting with the wearing bars, whereby the joint or space between the pallets and the wind box is sustantially closed air tight, whatever the elevation of the pallets above such wearing bars may be.

7. In a continuous sintering machine of the kind described, the combination with a train of grate bearing pallets, fitted with wheels adapted to roll on track rails for supporting the weight of the loaded pallets, and a wind box over which the pallets travel, provided with wearing bars forming the fixed members of sliding wind seal joints, of self-adjusting wind seal bars or curtains on the pallets adapted to form by their own weight continuous flexible air tight joints with the wearing bars of the wind box.

8. In a sintering machine of the kind described, the combination with a train of grate bearing pallets, a wind box over the top of which the pallets are adapted to be moved, and provided with fixed continuous wearing bars, track wheels fitted to sides of the pallets, track rails on each side of the wind box for supporting the weight of the loaded pallets, and sectional wind seal bars or curtains supported between the pallets and the wearing bars of the wind box and adapted by their automatic adjustment with respect to both, to preserve the joints between them air tight, without regard to the displacement with respect to the wearing bars of individual pallets.

9. In a sintering machine of the kind described, the combination with a train of grate bearing pallets, a wind box fitted with wearing bars over which the pallets travel, track wheels fitted to both sides of the pallets, fixed track bars on both sides of the wind box for said wheels and adapted to support the loaded pallets, rectangular wind seal bars or curtains vertically movable in grooves in the pallets and resting upon the wearing bars of the wind box to form continuous flexible air tight joints therewith.

In testimony whereof I hereunto affix my signature.

JAMES GAYLEY.