No. 727,540. PATENTED MAY 5, 1903.

W. HARVEY.

ROASTING OR DRYING APPARATUS.

APPLICATION FILED AUG. 10, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

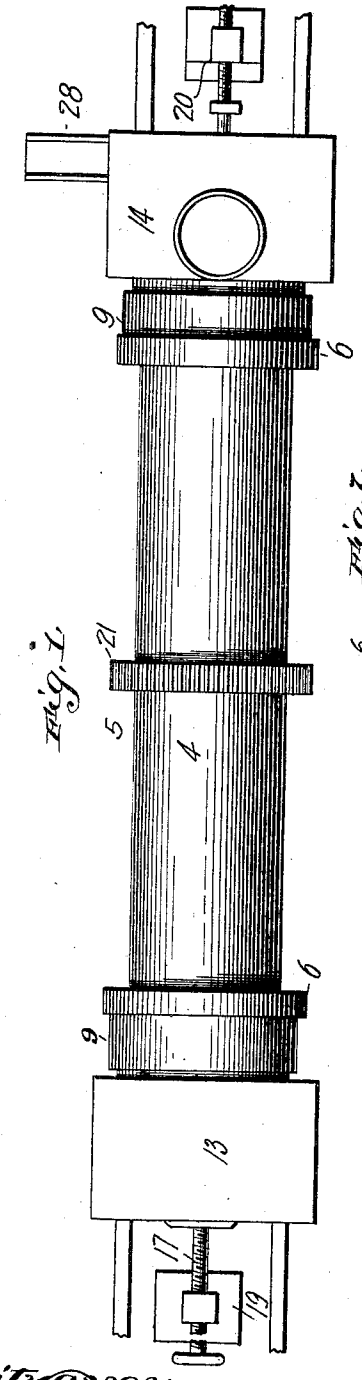


Fig. 1.

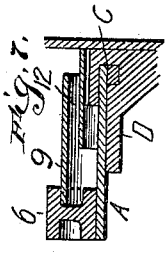


Fig. 3.

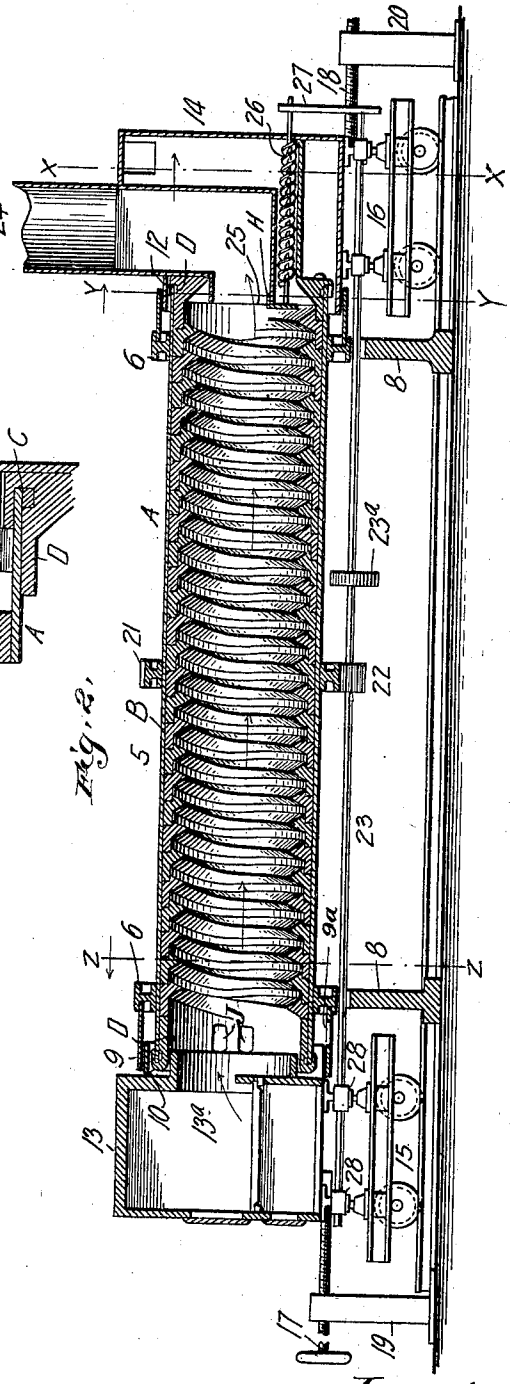


Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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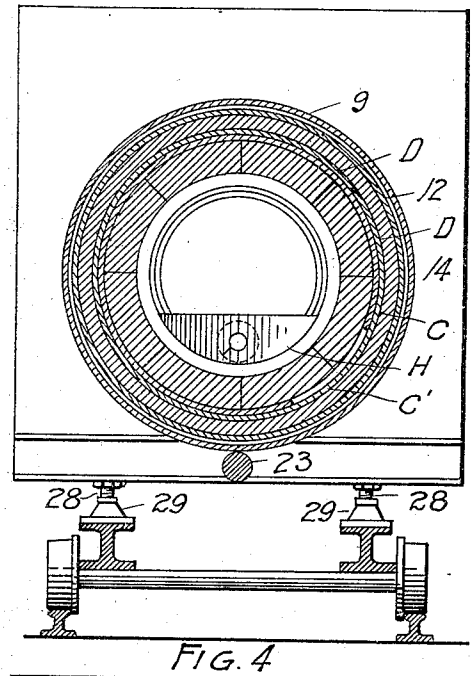


FIG. 4

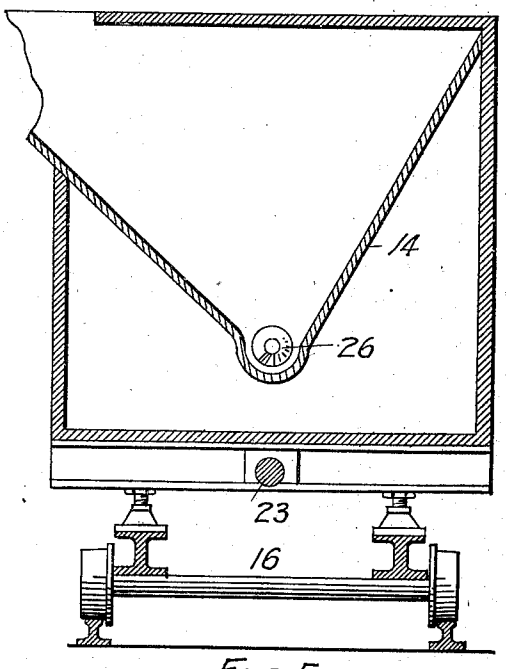


FIG. 5

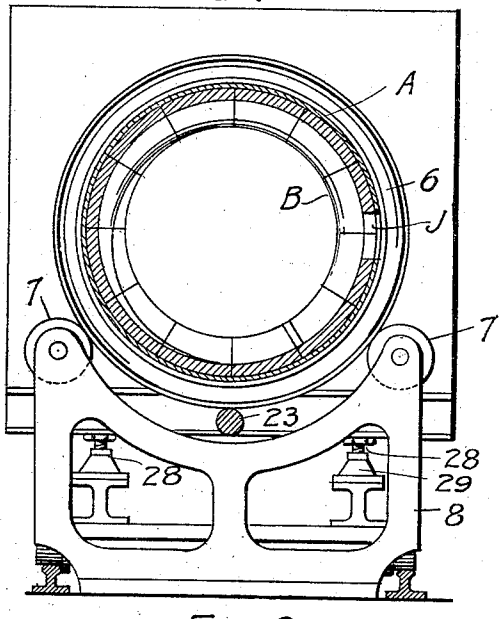


FIG. 3

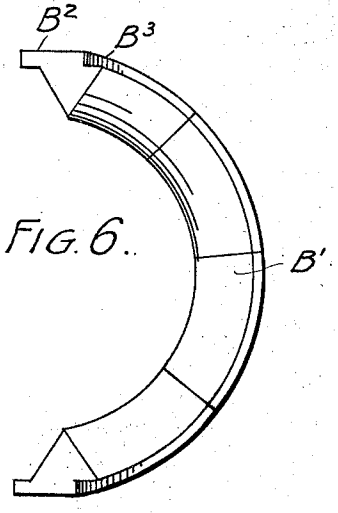


FIG. 6.

WITNESSES:

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No. 727,540. Patented May 5, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM HARVEY, OF DENVER, COLORADO.

ROASTING OR DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 727,540, dated May 5, 1903.

Application filed August 10, 1901. Serial No. 71,651. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HARVEY, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Roasting or Drying Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in an apparatus for roasting or drying ore and other substances, my object being to provide an apparatus which shall be simple in construction, economical in cost, reliable, durable, and efficient in use; and to these ends the invention consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan view of my improved apparatus. Fig. 2 is a vertical longitudinal section taken through the same. Figs. 3, 4, and 5 are cross-sections taken on the lines $z\,z$, $y\,y$, and $x\,x$, respectively, viewed in the direction of the arrows. Fig. 6 is a fragmentary perspective view illustrating the screw-thread of my improved conveyer. Fig. 7 is a fragmentary section shown on a larger scale.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate a cylindrical conveyer open at both ends and composed of an inner conveying-thread B, formed of bricks or sections composed of some suitable material, as fire-clay, capable of resisting a high degree of heat. The screw-thread is best illustrated in Fig. 6 and is composed of sections B′, the body portion of each being triangular in cross-section and provided with a flange B^2, adapted to overlap the adjacent section and engage a groove B^3, whereby the convolutions of the thread are interlocked. The shell A is provided with an interior ring C at each extremity. These rings engage bands D, formed of the same material as and located at the extremities of the screw-thread B, whereby the thread-sections are locked in place against endwise movement. The bands D are composed of sections of such length as to pass through openings C′, formed in the rings C, (see Fig. 4,) the sections being grooved to receive the rings, upon which they are moved around as soon as the grooves in the sections are brought into line with the rings until the complete band is formed, the sections being locked in place by the ring. The bands D are arranged to protect the extremities of the metal shell A from the heat. The shell A is surrounded near its extremities by two tracks 6, which engage wheels 7, mounted on suitable supports S. To these tracks are attached metal bands 9, which surround the extremities of the shell exteriorly, leaving sufficient space between the bands and the shell to receive annular flanges 10 and 12, formed on the fire-box 13 and the hopper 14, respectively, located at the opposite ends of the conveyer. The fire-box and feed-hopper are respectively mounted on trucks 15 and 16, which are connected with screws 17 and 18, engaging threaded openings formed in stationary parts 19 and 20, whereby the turning of the screws moves the trucks and their load back and forth at will. When it is desired to gain access to the interior of the conveyer, it is only necessary to move one of these instrumentalities far enough from the extremity of the conveyer to allow a man to enter the conveyer. This will be necessary in case repairs are needed. The conveyer 5 may be rotated in any suitable manner. As shown in the drawings, the shell is surrounded by a gear 21, which meshes with a pinion 22, mounted on a shaft 23.

The necessary fire for use in the treatment of ore or other material in my improved apparatus may be supplied from the fire-box or furnace 13, which communicates by way of an opening 13^a with the threaded interior of the conveyer. The heat passes through the conveyer in the direction indicated by the arrows in Fig. 2, and the products of combustion escape by way of a stack 24, with which the conveyer communicates by way of an opening 25. The heat may also be applied in any other suitable manner. Surrounding the base

of the stack and extending below the bottom thereof is the hopper or receptacle 14, into which the ore or other material is discharged preparatory to treatment. The feed-screw 26, located beneath the stack, conducts the ore or other material to the conveyer, whose rotation carries it in the direction of the fire-box by virtue of the screw-thread, which may be made of any desired pitch, according to the speed of travel desired. The feed-screw is protected from the heat of the cylinder by an arm H, composed of fire-clay or other suitable material adapted to resist a high degree of heat. The discharge extremity of the conveyer is provided with suitable openings J, through which the material passes after treatment. The adjacent band 9 is also provided with an opening 9^a, formed in its lowest part, through which there is a discharge every time the conveyer makes a revolution.

The feed-screw 26 is operated from the shaft 23 by means of a belt 27. The fire-box and the feed-hopper are vertically adjustable on their respective trucks by means of jack-screws 28 engaging threaded sockets 29, mounted on the truck-frames. The object of this adjustment is to bring the said instrumentalities in proper position with reference to the adjacent extremities of the roasting-cylinder.

Having thus described my invention, what I claim is—

1. In a roasting or drying apparatus, the combination of a hollow revoluble cylinder provided with an interior conveying-thread composed of distinct coöperating sections of material adapted to resist the action of the heat.

2. The combination of a hollow, revoluble, open-ended screw conveyer, a band surrounding each end of the conveyer, a movable furnace located at one end of the conveyer and provided with an annular flange, a movable feed-hopper located at the opposite end of the conveyer and provided with an annular flange, the flanges of the hopper and furnace being arranged to coöperate with the bands of the conveyer, substantially as described.

3. The combination of a hollow cylindrical, open-ended, interiorly-threaded, revoluble screw conveyer composed of an outer shell of metal and a sectional lining forming a conveying-thread, a band surrounding each end of the conveyer, leaving an annular space between itself and the outer shell of the conveyer, a movable heating apparatus located at one end of the conveyer, and a movable feeding apparatus located at the opposite end of the conveyer, and annular flanges attached to the heating and feeding apparatus, the said flanges being arranged to coöperate with the bands of the conveyer, substantially as described.

4. The combination of a hollow, cylindrical, open-ended, interiorly-threaded, revoluble screw conveyer composed of an outer shell of some suitable material, and a sectional lining forming a conveying-thread, a band surrounding each end of the conveyer, a furnace mounted on trucks at one end of the cylinder, and a combined feed-hopper and stack located at the opposite end of the cylinder, the furnace and hopper each having annular flanges arranged to enter the annular space between the conveyer-band and the walls of the conveyer, substantially as described.

5. The combination of an open-ended, revoluble screw conveyer provided with a band at each extremity, a furnace mounted on a truck at one end of the conveyer, a combined feed-hopper and stack mounted on a truck at the opposite end of the conveyer, the furnace and the feed-hopper being each provided with an annular flange arranged to coöperate with the bands of the conveyer, and screws for moving the trucks back and forth at the ends of the conveyer.

6. The combination of an open-ended, revoluble screw conveyer, provided with a band at each extremity, an annular space being left between each band and the outer wall of the conveyer, a furnace mounted on a truck at one end of the conveyer, a combined feed-hopper and stack mounted on a truck at the opposite end of the conveyer, the furnace and feed-hopper being provided with annular flanges arranged to enter the space between the bands of the conveyer and the outer wall of the latter, and screws for adjusting the furnace and hopper vertically on the trucks with reference to the ends of the conveyer.

7. In a roasting or drying apparatus, the combination of a hollow, revoluble cylinder provided with an interior continuous conveying-thread composed of a series of coöperating fire-clay sections, and a source of heat communicating with the interior of the cylinder whose extremities are open to receive and discharge the ore.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HARVEY.

Witnesses:
DENA NELSON,
A. J. O'BRIEN.