H. C. HOLTHOFF.

FEED AND DISCHARGE END LINER FOR TUBE MILLS.

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1,018,320. Patented Feb. 20, 1912.

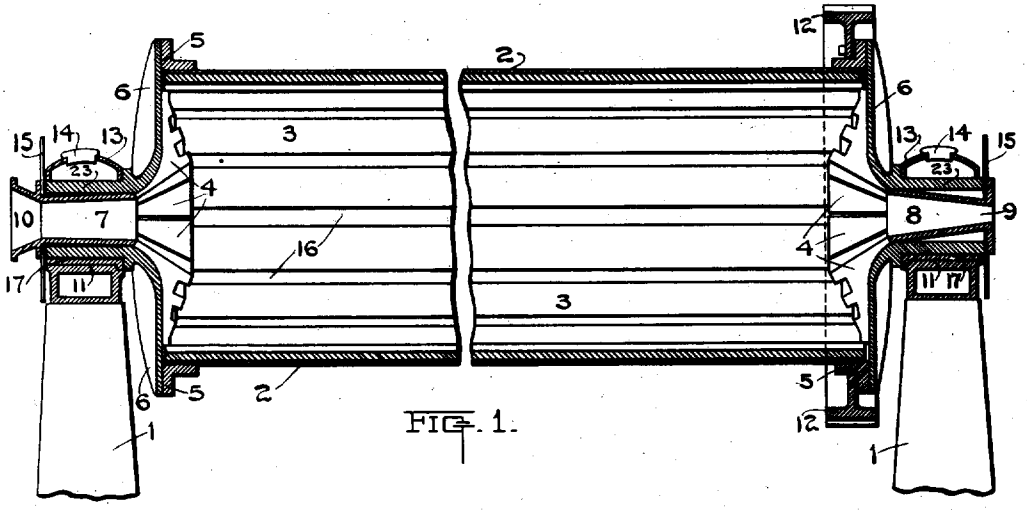

FIG. 1.

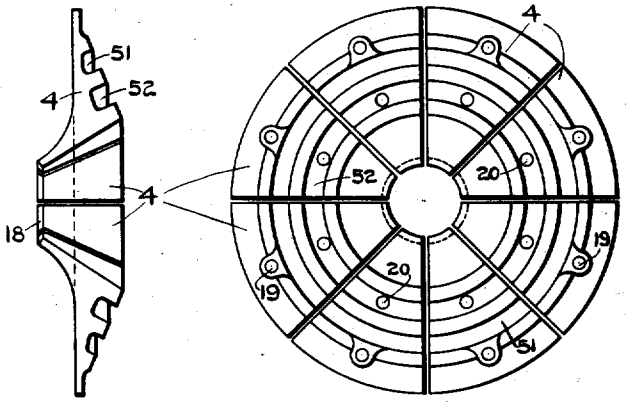

FIG. 2.

FIG. 3.

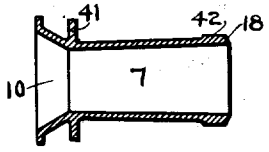

FIG. 4.

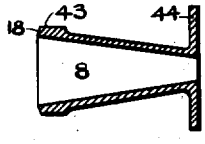

FIG. 5.

WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY C. HOLTHOFF, OF MEXICO, MEXICO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW JERSEY.

FEED AND DISCHARGE END-LINER FOR TUBE-MILLS.

1,018,320. Specification of Letters Patent. Patented Feb. 20, 1912.

Application filed January 27, 1909. Serial No. 474,357.

To all whom it may concern:

Be it known that I, HENRY C. HOLTHOFF, residing at Mexico, in the State of Mexico, Mexico, have invented a certain new and useful Improvement in Feed and Discharge End-Liners for Tube-Mills, of which the following is a specification.

This invention relates to improvements in the construction of end liners for tube mills.

The object of the invention is to produce end liners for tube mills which will tend to keep the material being ground within the interior of the mill, as well as to form a lining which will be similar to that of the remainder of the mill.

A clear conception of the invention can be obtained by referring to the accompanying drawings in which like reference characters designate the same parts in different views.

Figure 1 is a fragmental central vertical section of a tube mill. Fig. 2 is an enlarged end view of half of an end liner. Fig. 3 is an enlarged plan view of an end liner. Fig. 4 is an enlarged central vertical section of the discharge trunnion liner. Fig. 5 is an enlarged central vertical section of the feed trunnion liner.

The casing 2 of the tube mill shown in Fig. 1 is protected by the liners 3 provided with the grooves 16. The ends of the casing 2 are closed by the heads 6 which are connected to the casing 2 by means of the angle rings 5. These angle rings 5 are bolted to both the casing 2 and the heads 6. The supporting bearings or trunnions 23 for the mill are formed directly on the heads 6 and rest in the shells 17. These shells 17 are supported by the bearing frames 11 which are in turn supported by the foundation piers 1. The caps 13, having the covers 14, serve to keep the mill in place. The gear 12 is fastened to the angle ring 5 in any suitable manner, the gear 12 being concentric with the casing 2 and the bearings or trunnions 23. The heads 6 are lined by end liners 4, see Figs. 1, 2 and 3, these end liners 4 being segments of a circular lining and having the circular grooves 51, 52. These segmental end liners 4 are attached to the heads 6 by means of bolts which pass through the bolt holes 19, 20. The segmental end liners 4 are thickened to allow grooving and are thicker at their central portions than they are near the outer edges because wear is greater at the throat of the mill. The backs of the end liners 4 are flat to conform with the surfaces of the heads 6, thus causing the freely exposed surfaces to slope toward the center due to the thickening at the center. The feed trunnion is lined by a feed trunnion liner 8, see Figs. 1 and 5, which is conical in shape and is supported in the trunnion 23 by the flange 44 which fits up against the plate 15 and the surfaces 43, 18, which fit against the interior of the trunnion 23 and the backs of the end liners 4. The discharge trunnion liner 7, see Figs. 1 and 4, is slightly conical in shape for the greater portion of its length and has an abrupt conical section 10 near its end. The discharge trunnion liner 7 is supported in the trunnion 23 by the flange 41 which fits up against the plate 15 and the surfaces 42, 18, which fit against the interior of the trunnion 23 and the backs of the end liners 4.

In operating the device the material to be gound is fed into the feed trunnion liner 8 through the opening 9. The mill is then revolved, the power being applied to the gear 12, and the material is ground due to the rubbing of the particles against one another and the grinding balls or other material added to the charge. As more material is fed in, the ground material is forced toward the discharge trunnion 7 from which it is discharged.

During the process of grinding, the larger particles of material being ground and the balls or other material introduced to aid the grinding are prevented from discharging by the end liners 4 due to their surfaces which slope toward the interior of the mill, which surfaces have a tendency to throw the particles inward, the grooves 16, 51, 52 become packed with grinding material or balls and form obstructing surfaces against which the moving charge strikes.

It should be understood that it is not desired to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent,—

1. As an article of manufacture, an end liner section formed flat on one side adapted to coact against the head of a tube mill,

said liner section having an outer edge adapted to lie adjacent the periphery of said tube mill and having a freely shedding opposite side at an angle to said flat side and approaching said flat side at the outer edge of said liner section.

2. In a tube mill, an end liner having a convexly formed freely shedding surface above the mill axis extending from the most remote point of the end of the mill and lying entirely within the grinding chamber.

3. In a tube mill, an end liner composed of sections the sections being circularly grooved and having a sloping inwardly freely shedding surface above the mill axis extending from remote points of the end of the mill.

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

HENRY C. HOLTHOFF.

Witnesses:
H. C. CASE,
G. F. DE WEIN.