A. H. COPLAN AND A. BAILLOT.

PLATE FOR GRINDING MILLS.

APPLICATION FILED JULY 11, 1919. RENEWED OCT. 13, 1920.

1,360,725.

Patented Nov. 30, 1920.

3 SHEETS—SHEET 1.

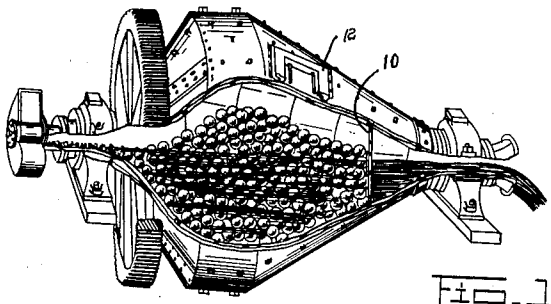


Fig. 1.

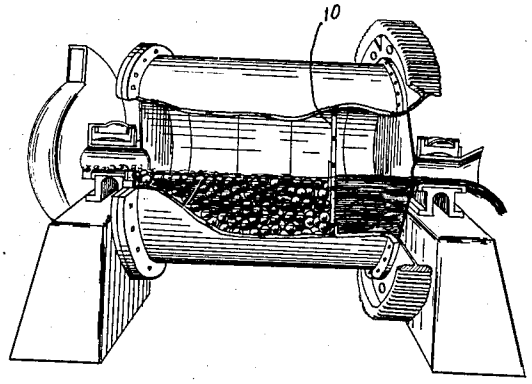


Fig. 2.

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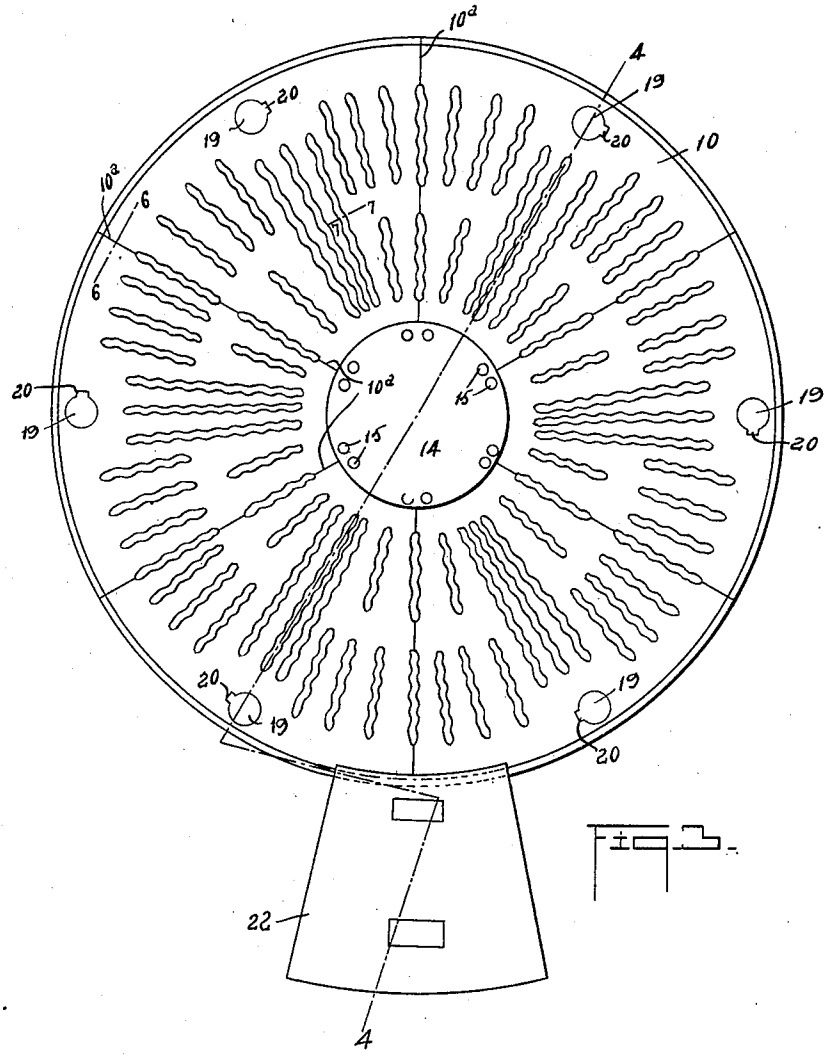


Fig. 3.

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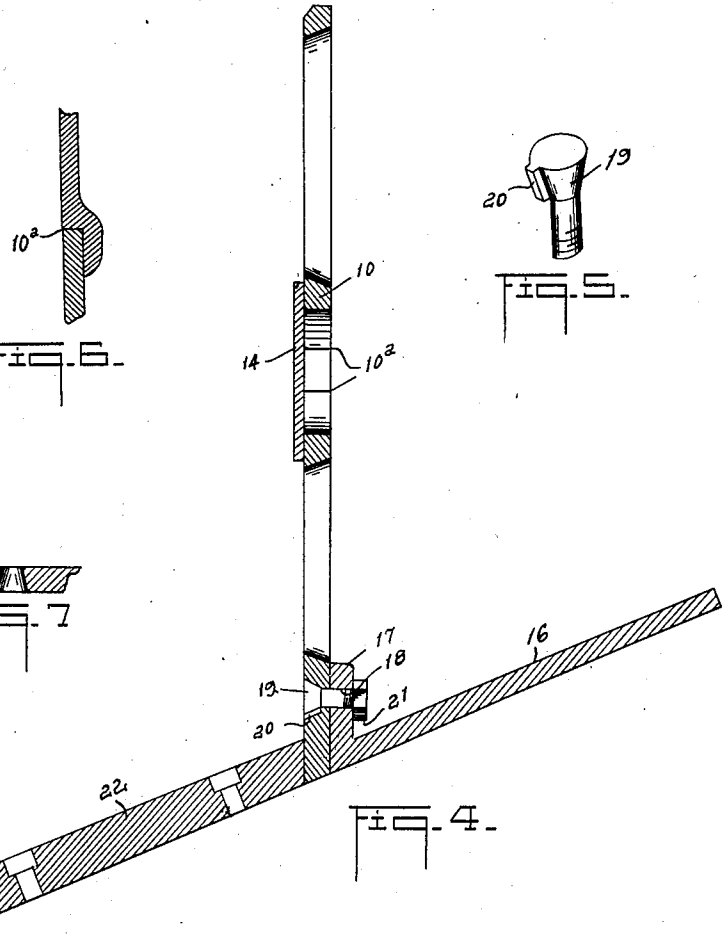


Fig. 4.

Fig. 6.

Fig. 5.

Fig. 7.

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UNITED STATES PATENT OFFICE.

ARCHIBALD H. COPLAN AND ALPHONSE BAILLOT, OF HULL, QUEBEC, CANADA.

PLATE FOR GRINDING-MILLS.

1,360,725. Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed July 11, 1919, Serial No. 310,061. Renewed October 13, 1920. Serial No. 416,780.

To all whom it may concern:

Be it known that we, ARCHIBALD H. COPLAN, gentleman, and ALPHONSE BAILLOT, plant superintendent, citizens of Canada, residing at Hull, in the county of Wright and Province of Quebec, Canada, have invented certain new and useful Improvements in Plates for Grinding-Mills, of which the following is a specification.

This invention relates to improvements in grinding mills of either the cylindrical or conical shape by an improved diaphragm or plate.

It has been found in operation that in the ball and pebble types of grinding mills that certain of the outflow is bound to work out of the outlet pipe and also from time to time some of the balls or pebbles flow out, which might cause considerable damage when passing through a further process of treating the ore or other industrial products.

To overcome this feature, we provide a plate having radial slots cut therethrough, the walls of such slots being parallel and corrugated.

A further object is to provide a plate having suitable slots therein which will not clog, and to this end we provide slots having outwardly tapered sides in the direction of the flow of the ore.

A further object is to provide a plate which can be divided into sections and inserted through the manhole of the mill.

A further object is to provide a specific locking means for the plate against one of the series of lining plates and having the next series of lining plates abutting it on its outer circumference.

With these and other objects in view, the invention consists in the construction, combination and arrangement of parts as will be hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claim hereunto appended.

Figure 1 is a perspective view of conical shaped mill, part of the side being removed to show position of our invention therein,

Fig. 2 is a perspective view of a cylindrical mill, part being broken away to show our plate therein,

Fig. 3 is an enlarged front view of our invention.

Fig. 4 is a sectional view on the line 4—4 of Fig. 3,

Fig. 5 is an enlarged plan view of one of the retaining bolts,

Fig. 6 is a sectional view on the line 6—6 of Fig. 3, and

Fig. 7 is a sectional view on the line 7—7 of Fig. 3.

Referring to the drawings like numerals designate like parts in the various drawings.

Referring more particularly to Figs. 1 and 2 which show two designs of mills in which ore or other industrial products are ground by the use of balls or pebbles, we provide a plate 10 which is removably held between the lining plates nearest the discharge end.

Referring more particularly to the other drawings which show the construction in more details, the plate 10 is divided into any desired number of sections as at 10^a. It is made in these sections so that it can be put through the manhole 12 in the body part of the mill and put into the proper position therein. 14 is a central plate to which the inner ends of all the sections are engaged by the counter-sunk bolts 15.

In placing this plate 10 into position, the lining plates 16 are first put into their proper position, which lining plates are provided with inwardly extending lugs 17 in which we provide an orifice 18. 19 is a bolt having a tapered head and a key 20 formed on one side. The sections of the plate 10 are each provided with an opening to receive the bolt 19 and the key 20. By having the key 20, bolts 19 will not be allowed to turn and as they are counter-sunk there will be little or no wear on the head ends of these bolts. The bolt after passing through the plate will extend through the orifice 18 and its extended end will have a nut 21 screw-threaded thereon so as to hold the plate 10 firmly against the lining plates 16. After all the plates have been bolted securely to the different lugs 17 and to the central plate 14, the next row of lining plates 22 are placed in position as shown in Fig. 4. The general practice is to have the lining plates 16 and 22 abut each other at right angles to the sides of the plates. It will be noticed in Fig. 4 that part of the corner of the lining plates 22 is cut off so as to get a tight connection between the plate 10 and the lining plates 16 and 22.

In previous plates of this nature, straight slots have been cut so as to radiate from the center, but this has been found unsatisfactory, as a long piece of shale ore coming edgewise against the slot will be allowed to

pass through, while with corrugated walls as shown in our invention, such shale strips would not be permitted to pass through the slots.

It will be further noted that certain of the slots are only part of the length of other of the slots. This feature will be found of considerable advantage as it strengthens the plate and gives a variation to the reception of the ore through the plate.

The slots as well as having corrugated sides are tapered outwardly from the side through which the ore flows. This feature has been found to be of considerable advantage as the material when ground sufficiently small to pass through the opening on the inner side of the plate will not bind with the sides of the slot owing to their tapered formation, and thus will relieve considerable amount of expense in having to remove material which has become clogged in the slots. It will be noted from reference to Figs. 4 and 7 that both the ends and the sides of the slots are tapered.

The sections of the plate 10 overlap each other as shown in Fig. 6, the overlapping portion being on the side nearest the discharge. It will be noted that the inner face of the plate is entirely free of any obstruction which might cause wear to such parts or cause the ore to be picked up or to cause wear to the balls or pebbles.

From the foregoing it is thought that the construction of our invention will be clearly understood, and therefore a more extended explanation has been omitted.

What we claim as new, is,—

A ball mill having a tapering shell, a sectional screen plate therein and fastening means for securing in place the outer end of said plate, consisting of sectional linings for said shell on opposite sides of said plate, the lining sections on one side of said plate having flanges inclined to the main portions thereof and having securing means clamping them to said plate, and the lining sections on the opposite side of the plate having beveled ends abutting against said plate.

In testimony whereof we affix our signatures in the presence of two witnesses.

ARCHIBALD H. COPLAN.
ALPHONSE BAILLOT.

Witnesses:
M. McMillan,
D. Roy Kennedy.