

G. R. THURBER.
ORE MILL.
APPLICATION FILED SEPT. 7, 1910.

1,059,089.

Patented Apr. 15, 1913.

2 SHEETS-SHEET 1.

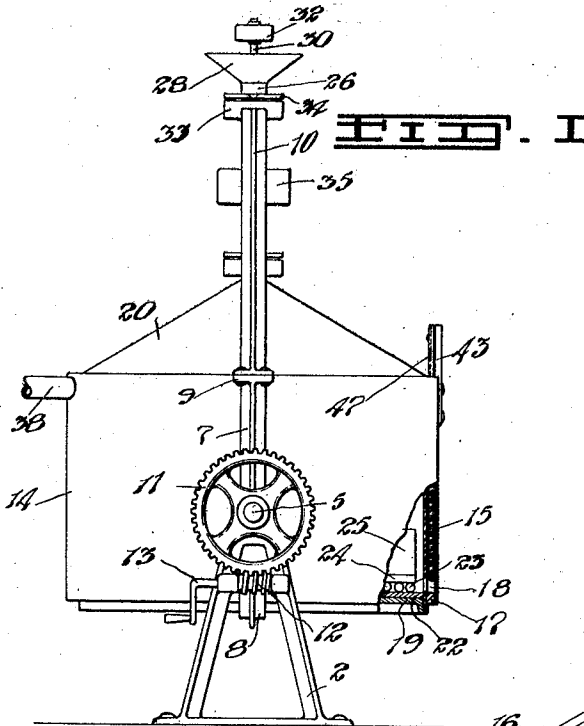
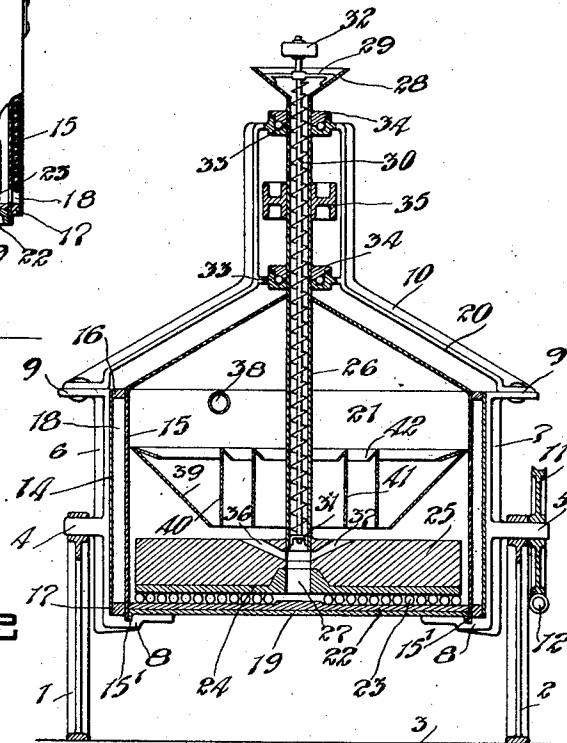


FIG. 1



WITNESSES
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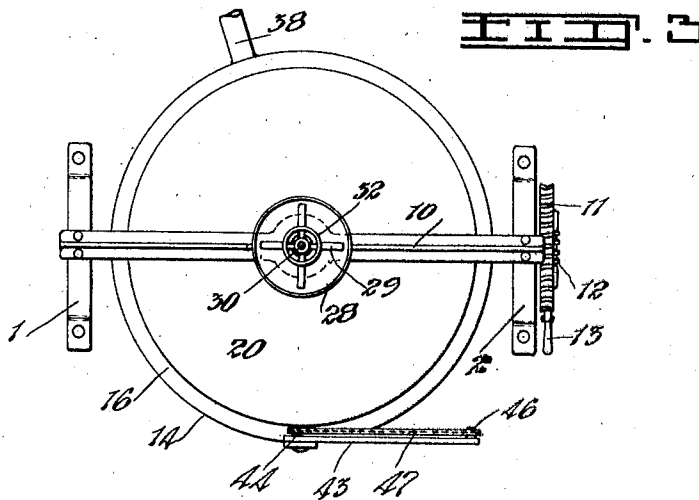
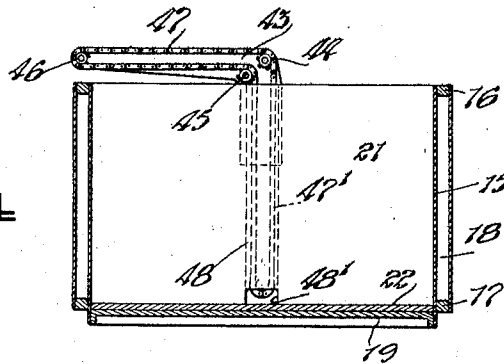


FIG. 4



WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE R. THURBER, OF KENORA, ONTARIO, CANADA.

ORE-MILL.

1,059,089.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed September 7, 1910. Serial No. 580,924.

To all whom it may concern:

Be it known that I, GEORGE ROBERT THURBER, of the town at Kenora, in the Province of Ontario, Canada, have invented certain
5 new and useful Improvements in Ore-Mills, of which the following is the specification.

My invention relates to ore mills and the object of the invention is to provide an ore mill for ore which is simple in construction, efficient in operation, and is easily attended.
10

It consists essentially in the arrangement and combination of parts hereinafter more fully described and later pointed out in the
15 appended claims.

Figure 1 is a side elevation of the ore mill, a portion thereof being broken away to expose interior construction. Fig. 2 is a vertical sectional view through the ore
20 mill, the parts being shown in side elevation, the section passing centrally through the supporting standards. Fig. 3 is a plan view of the same. Fig. 4 is a vertical sectional view through the central receptacle
25 and jacket showing the endless chain in side elevation.

In the drawings like characters of reference indicate corresponding parts in each figure.

30 1 and 2 represent the supporting standards which are securely bolted to any suitable base piece 3 and have bearings formed in their upper ends, which bearings receive stub axles 4 and 5 extending from the receptacle supporting members 6 and 7. These
35 members have their lower ends turned inwardly at 8 and their upper ends flared outwardly at 9, the upper ends carrying a bracket 10 which supports and centers the feed tube as later explained.
40

11 is a worm gear fixed on the outer end of the stub shaft 5 which protrudes beyond the standard 2.

45 12 is a worm engaging with the worm wheel and carried by the standard 2. The worm is provided with a suitable crank 13 whereby it can be turned to tilt the receptacle.

50 14 is an outer cylindrical casing having an open top and bottom, which casing is secured to the members 6 and 7 and rests on the inwardly turned ends 8 thereof.

15 is an inner cylindrical shell within the casing and having its lower end resting
55 within grooves 15' formed within the ends 8 of the members 6 and 7. Upper and lower

annular rings 16 and 17 pass between the casing and the shell and are secured to the same and form with them a steam jacket at 18 to which steam is supplied through the
60 ordinary inlet and outlet pipes (not shown).

19 is a circular bottom secured to the ends 8 of the supporting members 6 and 7 and having its outer edge flared downwardly into the grooves 15'.
65

20 is a conically-shaped cover carried by the shell, the cover, shell and bottom forming what I term the receptacle 21.

22 is a circular steel facing plate on the bottom 19 and forming a run-way for the balls 23. A second circular steel facing
70 plate 24 rests on the balls and is secured to a circular metallic iron member 25. It is to be noted that the plate 22 has the central portion thereof slightly thicker than the outer part to prevent the balls from crowding to the center. The balls and plates 22 and 24 form what is commonly
75 called a ball bearing for the member 25 and the parts carried thereby.
80

26 is a feed tube passing centrally down through the receptacle and having its lower end firmly secured to the member 25 where it is continuous with an opening or duct 27 passing through the iron member and the
85 plate 24. The upper end of the feed tube is flared outwardly into a hopper 28, which hopper carries a spider 29 carrying a bearing which receives the upper end of the worm feed screw 30, which feed screw has
90 its lower end centered in a bracket 31 secured to the tube 26. A pulley 32 is fastened to the upper end of the worm screw.

The bracket 10 is supplied with stationary cup bearings 33 which carry balls on which
95 rest second bearings 34 secured to the tube.

35 is a pulley secured to the tube 26 by which the same is rotated.

Ducts 36 and 37 are formed in the iron member 25 and lead from the upper face
100 thereof to the duct or opening 27.

A tube 38 passes from the interior of the receptacle to the outside of the ore mill, and is located toward the upper end of the receptacle.
105

Within the receptacle I have located a conical-shaped downwardly converging plate 39 which appears directly above the member 25 and has its upper edge secured to the shell. The upper edge of the plate
110 39 is turned downwardly for a purpose later explained. 40 and 41 are further plates

arranged concentric to the tube 26 and spaced apart to allow the passage of material between them. These plates have their upper edges turned downwardly at 42 for a purpose shortly apparent.

43 is an angular bar firmly secured to the casing and provided with three chain wheels, 44, 45 and 46, which carry an endless chain 47 having a portion 47' thereof entering a rectangular tube 48 which passes downwardly between the casing and the shell and opens at 48' to the interior of the receptacle. The chain is magnetized so as to draw metallic particles to it.

When the ore mill is used as an amalgamator mercury is placed in the bottom of the receptacle and the ore is fed through the tube by the feed screw which is turned by any suitable means such as a belt operating on the pulley 32. This amalgamator is particularly adapted for extracting gold from ore, the gold in the ore amalgamating with the mercury placed in the bottom of the receptacle. It is to be understood that the tube and parts secured thereto, including the member 25 and the plate 24 are rotated in the same direction as the feed screw, but faster by a belt attached to the pulley 35. The ore passed through the feed tube amalgamates with the mercury and passes up the sides of the receptacle at the edge of the iron member 25 where it comes in contact with a downwardly converging plate 39. The heavier material (tailings) is forced backwardly down through the ducts 36 and 37 to the duct 27 where it is again subjected to the action of the balls rolling in the mercury. The lighter material passes upwardly between the plates 39, 40 and 41 and floats in the chemicals placed in the receptacle for treating the ore, which chemicals are not herein described. The flanges 42 of the plates prevent any of the heavier material which clings to the plates from passing upwardly and deflect it downwardly to the ducts 36 and 37 where it is again passed to the duct 27 to be again amalgamated with the mercury. The light material which floats is drained off through the tube or pipe 38. The ore is treated continuously in this manner as long as the machine is operated.

What I claim as my invention is:

1. In a device of the class described the combination with a suitably mounted closed receptacle having an outlet opening therein toward the top a permanent lower and rotatably mounted upper facing plate located within the casing, balls interposed between the facing plates, means for rotating the upper plate and means for feeding material between the plates, of a plurality of concentrically arranged permanent plates carried by the receptacle and located above the upper facing plate, said concentric plates, having their upper edges inclined downwardly, as and for the purpose specified.

2. In a device of the class described the combination with a suitably mounted closed receptacle having an outlet opening therein toward the top, a permanent lower and rotatably mounted inner facing plate located within the casing balls interposed between the facing plates, means for rotating the upper plate and means for feeding material between the plates, of a conical shaped downwardly directed plate secured to the sides of the receptacle and located above the upper facing plate, said converging plate having the upper edge thereof turned downwardly and inwardly and a plurality of concentrically arranged plates contained within the conical shaped plate and having their upper edges turned downwardly and inwardly, as and for the purpose specified.

3. The combination with a receptacle having a closed top and bottom, a facing plate fixed on the bottom, a plurality of balls resting on the face of the plate, an opposing facing plate carried by the balls and provided with a centrally disposed duct, a feed tube communicating with the duct and means for rotating the top facing plate, of a member secured to the top facing plate and provided with a central opening communicating with the feed tube and the duct afore-said and having ducts therein leading from the upper face of the member to the central opening, as and for the purpose specified.

Signed at Kenora, in the Province of Ontario, this 15th day of July, 1910.

GEORGE R. THURBER.

In the presence of—

J. F. MACGILLIVRAY,

J. H. CHALLONER.