I. F. MONELL.

ORE CONCENTRATOR.

APPLICATION FILED OCT. 13, 1910.

997,843.

Patented July 11, 1911.

3 SHEETS—SHEET 1.

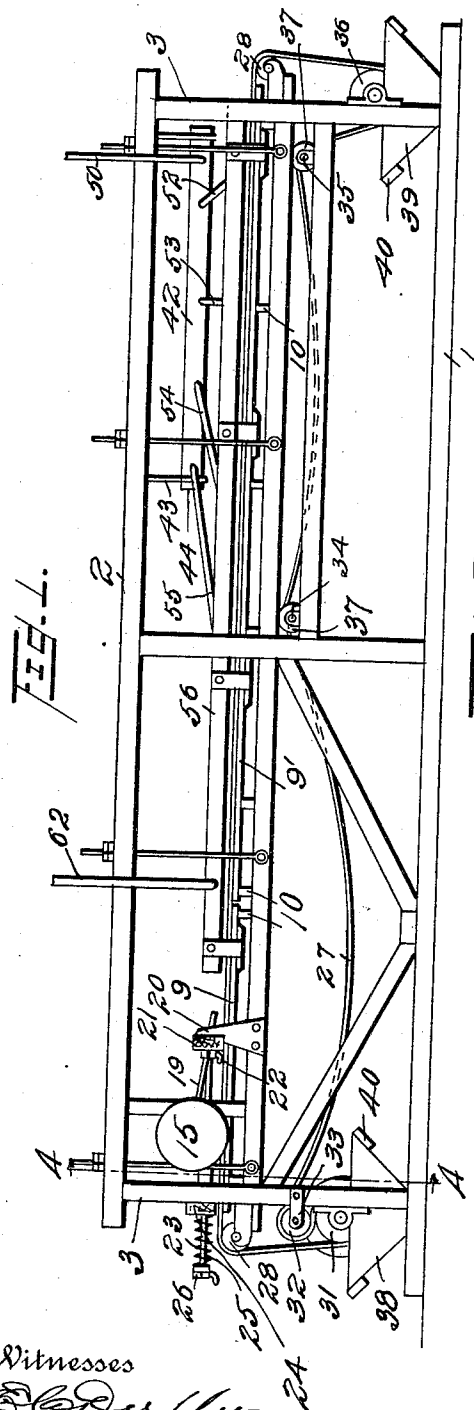

FIG. 1.

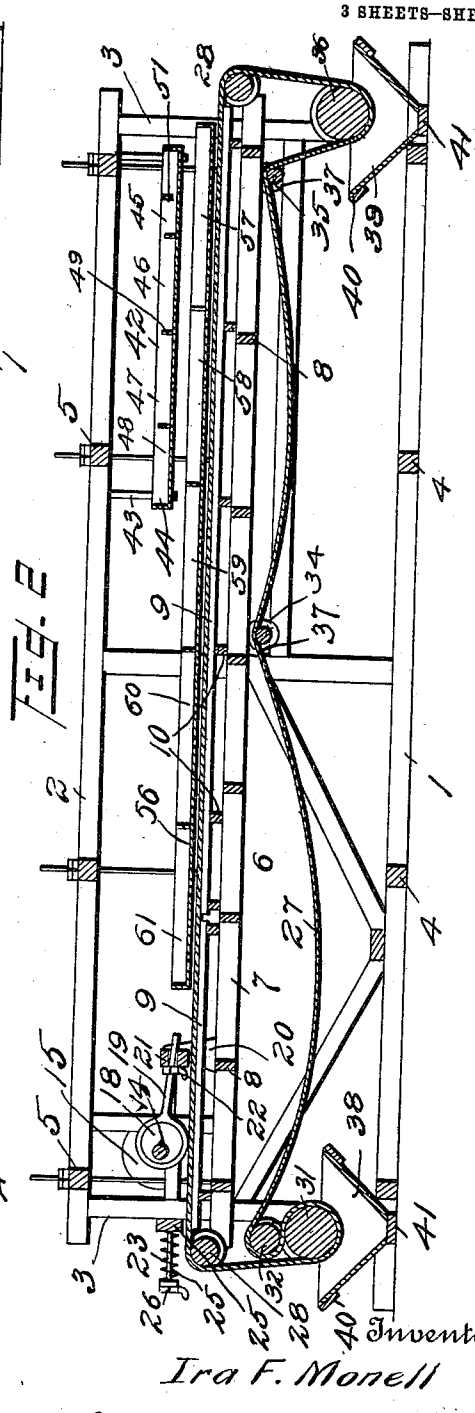

FIG. 2.

Witnesses

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3 SHEETS—SHEET 2.

FIG. 3.

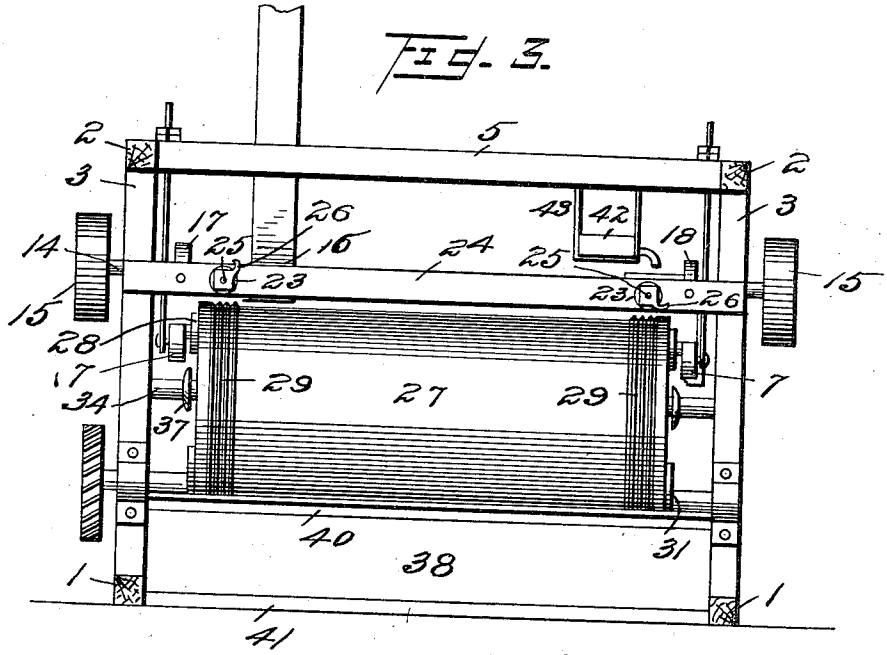
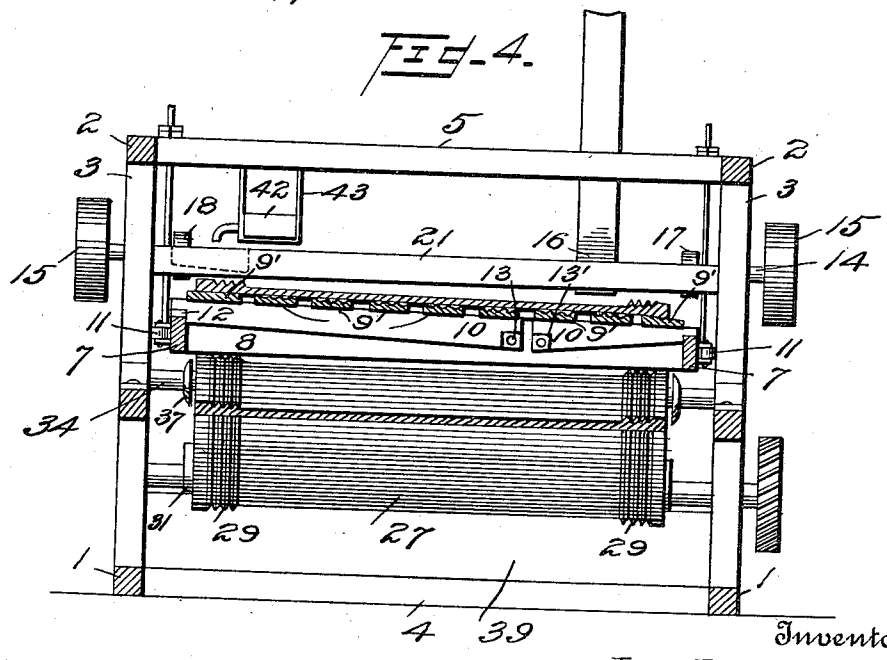


FIG. 4.



Witnesses

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3 SHEETS—SHEET 3.

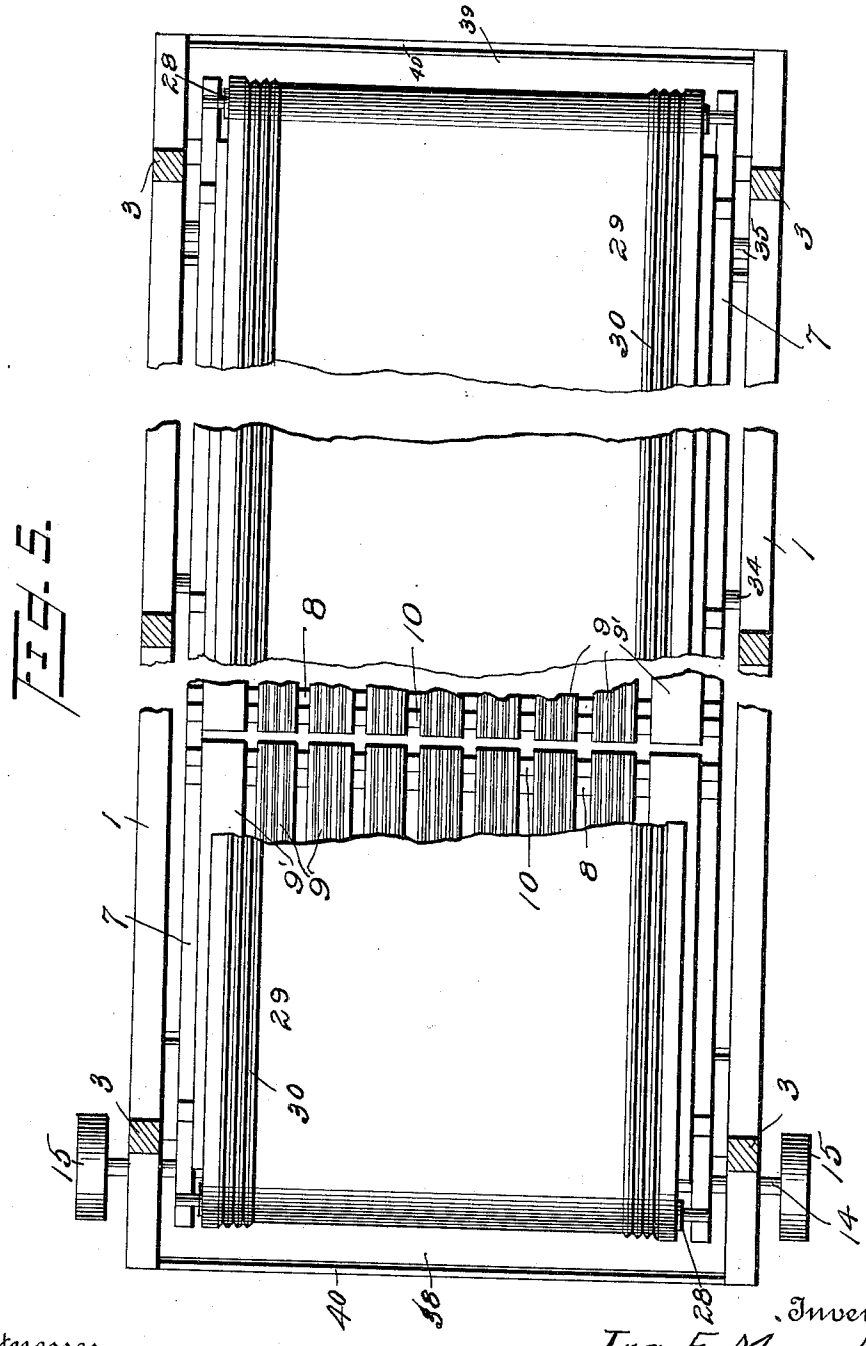

FIG. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

IRA F. MONELL, OF BOULDER, COLORADO.

ORE-CONCENTRATOR.

997,843. Specification of Letters Patent. Patented July 11, 1911.

Application filed October 13, 1910. Serial No. 586,934.

To all whom it may concern:

Be it known that I, IRA F. MONELL, a citizen of the United States, residing at Boulder, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Ore-Concentrators; 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.

This invention relates to improvements in ore concentrators and is designed especially as an improvement on the structure shown in Patent #972,017, granted to me on Oct. 4, 1910.

The principal object of the invention is to provide simple and efficient means for separating and saving the fine mineral which floats in the concentrating water and is ordinarily carried away and lost in the tailings.

Another object of the invention is to provide an improved concentrator of this character having means for reciprocating the swinging frame in a smooth even manner and avoiding the pounding of a loose eccentric.

Another object of the invention is to provide an improved belt and guide therefor.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:—Figure 1 represents a side elevation of an ore concentrator constructed in accordance with this invention; Fig. 2 is a longitudinal vertical section thereof; Fig. 3 is an end elevation thereof; Fig. 4 is a transverse vertical section taken on the line 4—4 of Fig. 1; and, Fig. 5 is a top plan view thereof with the parts broken out.

In the embodiment illustrated a supporting or main frame is shown comprising bottom sills 1, top sills 2, vertical supports 3 and cross bars 4 and 5 for the bottom and top sills.

Mounted within the supporting frame is the usual agitator frame 6 which is suitably mounted for vibratory movement in the main frame and comprises longitudinal or side pieces 7, cross strips 8 extending between the side pieces 7 and the flooring consisting of a longitudinal series of laterally spaced strips or boards 9, which are mounted upon hinged bars 10 and having their upper faces corrugated, as shown clearly in Figs. 2 and 3, over which the belt hereinafter described may be readily drawn. These corrugations also prevent the belt from adhering to the flooring when the machine has been out of use for a long time.

The side strips 9′ of the flooring are preferably plain and the strip at the lower end thereof is beveled as shown to permit the tailings to pass readily over the side thereof. The side bars or pieces 7 of the agitator frame are provided with laterally extending rollers 11 which bear against the side members of the main frame and serve as guides for the agitator frame and to prevent it from moving laterally. The hinged bars 10 on which the flooring is secured permit the adjustment of said flooring at a greater or less inclination to adjust the grade of the belt carried thereby and it is obvious that the long or feed side of the floor may have a much less inclination than the discharge or short side thereof. The front end of the supporting strips 10 may be held at different adjustments above the adjacent ends of the cross strips 8 by spacing blocks 12 and said supporting bars 10 are held in adjusted position by any suitable means preferably by means of bolts 13 and nuts 13′ respectively. A drive shaft 14 is mounted in the vertical supports 3 of the main frame and the opposite ends thereof which project beyond said supports are provided with balance wheels 15. A power pulley 16 is also mounted on said shaft 14 and may be connected with any suitable source of power for driving the shaft 14. The eccentrics 17 and 18 are also fixed to the shaft 14 preferably adjacent the inner faces of the supports or standards 3 and are connected to rods 19 which are engaged with a push beam 21 mounted on brackets, as 20, secured to opposite sides of the agitator frame preferably to the side members 7 thereof.

The beam 21 is preferably bolted to the brackets 20 and the rods 19 extend through said beam. (See Figs. 1 and 2). Tail nuts 22, are secured to the rods 19 and are de-

signed to adjust the tension of a coiled spring 23 mounted on the outer end of a rod, 25, to be described.

A beam 24 is secured to the uprights 3 at one end of the main frame and through which the rod 25 extends and is secured at its front end to the push beam 21. A tail nut 26 is secured to the outer end of the said rod 25 for adjusting the tension of said spring 23. The eccentrics 17 and 18 move the agitator frame in one direction and prevent any wabbling and the spring 23 returns it to initial position and also holds said frame firmly against the eccentrics and thereby prevents the eccentrics becoming loose and pounding.

A belt 27 is mounted longitudinally in the main frame and passes over rollers 28 at opposite ends of the oscillating frame. This belt is preferably constructed of alternate layers of rubber and canvas or any other suitable material and its upper face is provided near its opposite edges with a plurality of longitudinally extending ribs or corrugations, as 29, to provide strength to the edge of the belt and also to catch any mineral on the discharge side of the belt. This belt may be of any suitable length and of any desired size but is preferably fifty-nine feet long and five feet wide. As shown in Fig. 4, the outer edges of this belt are plain for about one-half inch and then three or more corrugations 30 are formed adjacent thereto, any desired number being used. The upper stretch of this belt passes over the flooring of the swinging or reciprocatory frame and the lower stretch thereof passes under and around a drive roller 31 suitably mounted at one end of the main frame beneath the agitator frame and then around a belt wrapping drum or roller 32 mounted in suitable brackets 33 which extend laterally from the uprights 3 of the main frame to support the roller 32 over the roller 31 a slight distance thereabove. The belt then passes over an idle roller 34 arranged intermediately of the ends of the main frame, then around a roller 35 mounted on the main frame at the opposite end of the machine and under a roller 36 arranged below the roller 28 at that end of the agitator frame, said roller 36 being mounted on the uprights 3 at the end of the main frame.

The roller 32 is designed to wrap the belt 27 closely around the greater portion of the roller 31 whereby the rotation of the latter will impart motion to the belt while the belt may be loosed and allowed to lag to conform to the shape of the floor over which it passes. This roller 31 may be rotated at any desired speed by worm and gear mechanism, (not shown,) for causing the belt to pass over the flooring of the agitator frame at the required speed.

The various rollers above described are each provided near opposite ends with annular flanges as 37, which form guides for the belt and hold it against lateral movement on said rollers, said belt being loose, easily tracks within said flanges.

Arranged below the rollers 31 and 36 at opposite ends of the frame are two mineral tanks 38 and 39 the heads of which are preferably constructed of wood and the sides and bottom of any suitable metal. The side edges of these tanks are preferably reinforced by wooden strips or bars, as 40, bolted or otherwise secured thereto and similar reinforcing strips 41 are secured to the bottoms thereof.

A primary pulp box 42 for sizing and distributing pulp to a second pulp or distributing box is arranged along the front side of the apparatus in a plane above the agitator frame and is preferably supported by means of rods 43 which are connected with the top bars 2 of the main frame. This box 42 is preferably divided into four compartments 45, 46, 47, and 48, and the partitions 49 which form these compartments terminate at their upper edges slightly below the edges of the box for a purpose to be described. A feed pipe 50 discharges into the compartment 45 being supplied with pulp from any suitable source and the pulp fed through said pipe passes under a depending baffle plate 51 arranged transversely of the compartment 45 and the heavier particles pass out through a pipe 52 which leads from said compartment 45 to a distributing pulp box 56 arranged therebelow. The pulp then flows over the partition 49 into the adjacent compartment 46 and the heavier particles remaining therein pass out through a pipe 53 in to a corresponding compartment arranged in the pulp distributer 56. The remaining pulp flows over the partition 49 into the compartment 47 and the remaining heavy particles therein pass out through a pipe 54 to the distributer 56 and the fine particles left in the pulp pass out through a pipe 55 to the distributing box 56. This distributing box 56 which extends substantially the full length of the agitator frame is provided with a perforated bottom and is divided into five compartments, 57, 58, 59, 60, and 61 and which receive the pulp as it is discharged from the pipes 52, 53, 54, and 55. The fifth compartment 61 at the end of the box being designed to receive fresh water supplied from a pipe 62 which dresses off the sand in the box 56.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the prin-

ciple or sacrificing any of the advantages of this invention as defined in the appended claims.

I claim as my invention:—

1. A belt for an ore concentrator having its edges thickened, said thickened edges being provided on their upper faces with longitudinally extending corrugations for catching the mineral on the discharge side thereof and for reinforcing the edges of the belt.

2. A belt for an ore concentrator having thickened portions adjacent its opposite edges, said portions being provided on their upper faces with longitudinally extending corrugations spaced from the edges of the belt.

3. In an ore concentrator, an agitator frame, concentrating means carried thereby, a primary sizing and distributing pulp box arranged longitudinally along the front or feed side of the apparatus in a plane above said agitator frame, said box having a plurality of longitudinally spaced partitions with their upper edges arranged in a plane slightly below the edges of the box, a pulp feed pipe discharging into the compartment at the outer end of said box, a depending baffle plate arranged in said compartment, a longer pulp distributing box extending substantially the full length of the agitator frame and having a perforated bottom, pipes connected at one end near the bottom of the respective compartments of said first-mentioned box and discharging into said last-mentioned box, and means for supplying water to the longer box.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

IRA F. MONELL.

Witnesses:
HOWARD WILLIAMS,
WILLIAM T. MCGINNIS.