No. 659,813. Patented Oct. 16, 1900.

E. W. EATON.

ORE WASHER AND SEPARATOR.

(Application filed Jan. 31, 1900.)

(No Model.)

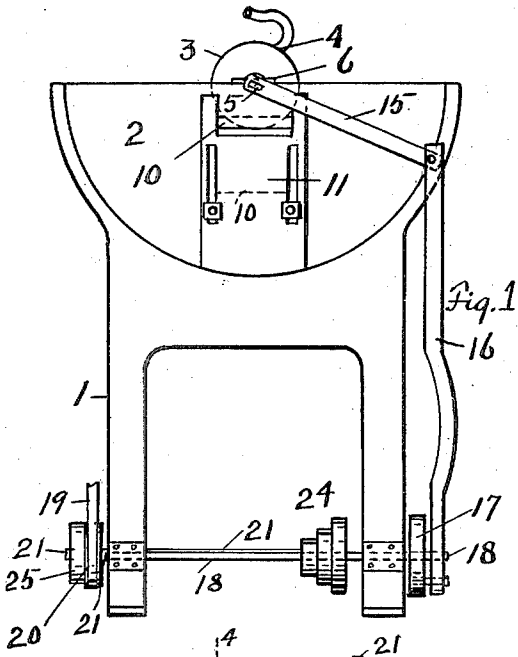


Fig. 1.

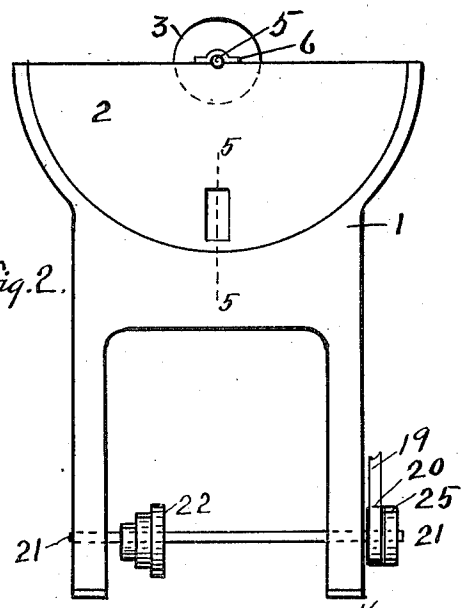


Fig. 2.

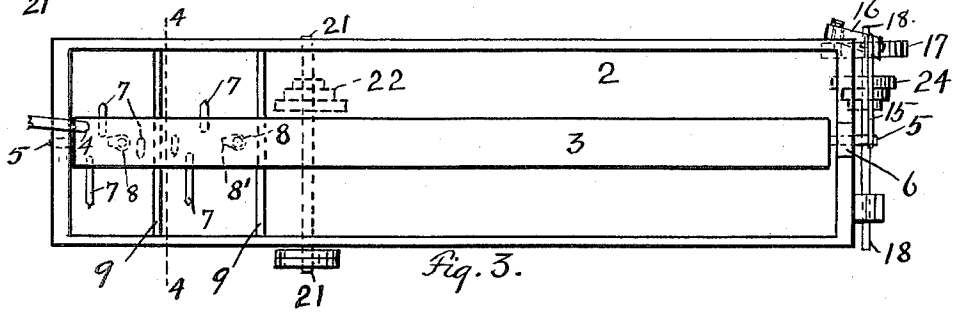


Fig. 3.

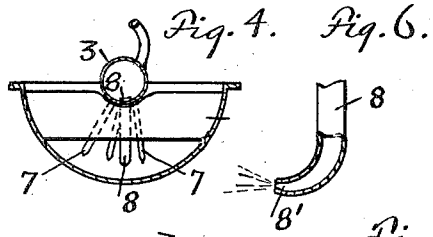


Fig. 4.

Fig. 6.

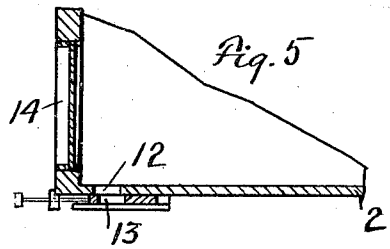


Fig. 5.

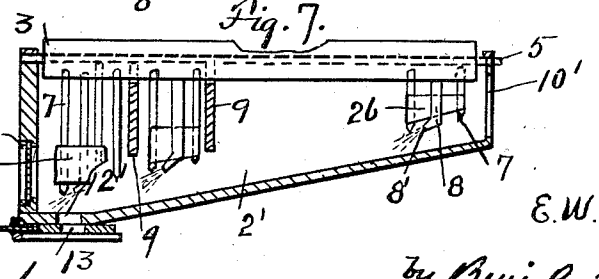


Fig. 7.

Witnesses
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UNITED STATES PATENT OFFICE.

ETHAN W. EATON, OF SOCORRO, TERRITORY OF NEW MEXICO.

ORE WASHER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 659,813, dated October 16, 1900.

Application filed January 31, 1900. Serial No. 3,510. (No model.)

To all whom it may concern:

Be it known that I, ETHAN W. EATON, a resident of Socorro, in the county of Socorro and Territory of New Mexico, have invented certain new and useful Improvements in Ore Washers and Separators; and I do hereby 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 pertains to make and use the same.

The invention relates to ore washers and concentrators, and has for its objects to simplify such apparatus, cheapen their construction, and increase their efficiency.

The invention consists in the construction hereinafter described and pointed out.

In the accompanying drawings, Figures 1 and 2 are rear and front end elevations of the apparatus. Fig. 3 is a reduced plan of the apparatus. Fig. 4 is a section on line 4 4 of Fig. 3. Fig. 5 is an enlarged section on line 5 5 of Fig. 2. Fig. 6 is a broken side view, partly in section, of one of the hollow stirrers. Fig. 7 is a longitudinal section of a modified tank.

Numeral 1 denotes a frame supporting a tank 2, preferably of the form illustrated.

3 denotes a hollow rocking vessel or cylinder, closed except at inlet 4, whereby it is adapted to be connected to a flexible, jointed, or other water-supply pipe. 5 denotes gudgeons fixed to the cylinder-heads, and 6 represents bearings for the same. To this rocking cylinder are secured numerous pulp-stirring arms 7, arranged substantially as shown.

8 denotes hollow arms whereby water delivered under pressure into cylinder 3 is discharged under the pulp to agitate the lower part of the contents of the tank. These hollow stirrers are preferably bent at their lower ends toward the front of the tank at 8′, as indicated in Figs. 6 and 7, their discharge ends being reduced in size to increase the effect of the water, whereby concentrates are forced toward discharge-opening 12.

9 denotes a series of partitions extending from near the top of the tank downwardly and below an overflow or outlet 10. By these partitions direct flow of pulp or water to said outlet is prevented, as everything must pass below them. The overflow-opening is regulable by means of a sliding gate 11, which can be adjusted to different levels, as different materials may require for the most successful separation of values from the gangue. Near the front of the tank is an opening 12, regulable by means of a gate 13 for the continuous or interval discharge of the heavy concentrates that gravitate to the bottom of the tank and toward said outlet.

14 denotes an opening closed with mica, glass, or other transparent material to permit inspection of the character and condition of the contents of the lower part of the tank.

Any convenient or preferred means for charging fine material to be washed and separated into the front end of the tank may be employed, and further description is unnecessary.

The cylinder 3 may be suitably rocked by any convenient means. As illustrated an arm 15, fixed to the cylinder, is connected by a rod 16 eccentrically to a wheel 17 on a shaft 18, driven by a belt 19, which drives pulley 20, shaft 21, and cone-pulleys 22 and 24. An idle or loose pulley is denoted by 25.

In Fig. 7 is shown a modified form of tank 2′, in which the waste-discharge end 10′ is entirely open and on a higher plane than the concentrate-discharge 12′, the bottom of the tank gradually sloping between these openings. It has also been found advisable in working certain ores to use scraper-plates 26, which may be secured temporarily or permanently to two or more of the pulp-stirring arms 7 and arranged longitudinally or diagonally of the tank.

The invention is not limited to particular dimensions, and these may be varied indefinitely; but a length of six feet and a horizontal diameter of two feet for the tank and a diameter of four or five inches for the rocking cylinder 3 are suitable.

In operation all the material charged is compelled to pass under the partitions and is thoroughly saturated and diluted with water. The water-charging pipes extending downward a suitable distance have each a fine delivery-passage, preferably turned toward the front or concentrate-discharge end of the tank. These pipes are carried back and forth transversely by the rocking cylinder. By this means, coöperating with the fingers 7, the sediment is agitated in manner

to facilitate separation by gravity or flotation of the heavier and valuable parts from the gangue or worthless and lighter parts of the pulp and the moving of heavier parts toward front or concentrate-discharge end. If any fine particles of the heavier and valuable substance or substances remain entangled with the lighter worthless portions and are thereby floated toward the outlet, they will be arrested by the partitions and time thereby given for more thorough separation.

During operation the waste-overflow and the concentrate-outlet may be constantly open or open at intervals, as may be required, and both are made regulable, as also is the speed of the stirring devices and the amount of water and ore supply. By these means the effect of current is reduced to a practical minimum, and abundant provision is made for thorough separation by gravity and flotation.

The apparatus is not only simple and economical in construction, but separates the valuable sediment very thoroughly and with rapidity and economy.

Obviously the machine is capable of use with quicksilver or other means of amalgamation, and all uses whatsoever which do not involve a departure from the substantial principles of construction are contemplated.

Having thus described my invention, what I claim is—

1. In an ore washer and separator, a tank having an overflow-opening and a lower discharge-opening, a water-supply vessel mounted on the tank and provided on its under side with pulp-stirring arms, and mechanism to rock the vessel and stir the pulp, part of said arms being hollow to convey water from the vessel to near the bottom of the tank and having their discharge ends bent to project at all times toward the concentrate-discharge end of the tank.

2. In an ore washer and separator, a tank having an overflow-opening and a lower discharge-opening, a water-supply vessel mounted on the tank and provided on its under side with pulp-stirring arms, and mechanism to rock the vessel and stir the pulp, part of said arms being hollow to convey water from the vessel to near the bottom of the tank, said arms having their discharge ends reduced in size and bent to project at all times toward the concentrate-discharge end of the tank.

3. In an ore washer and separator, a tank having an overflow-opening and a lower discharge-opening, a water-supply vessel mounted on the tank and provided on its under side with pulp-stirring arms, and mechanism to rock the vessel and stir the pulp, part of said arms being hollow to convey water from the vessel to near the bottom of the tank and having their dischage ends bent toward the concentrate-discharge end of the tank, and partitions extending from the top of the tank to a level below the overflow-opening.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ETHAN W. EATON.

Witnesses:
MICHAEL COONEY,
ESTEVAN BACA.