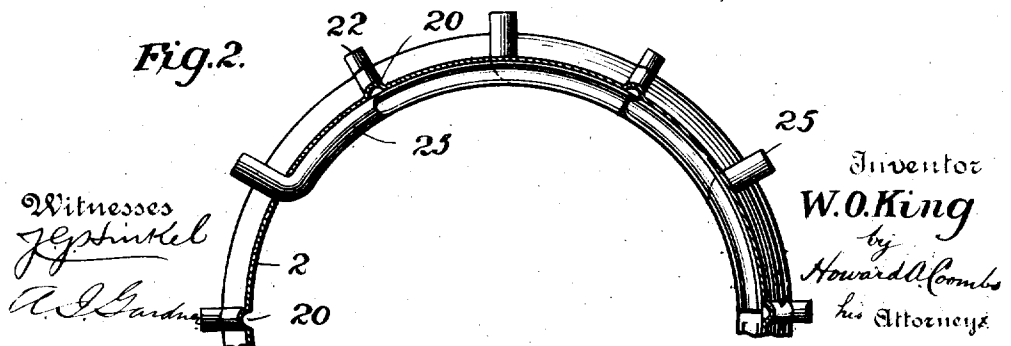
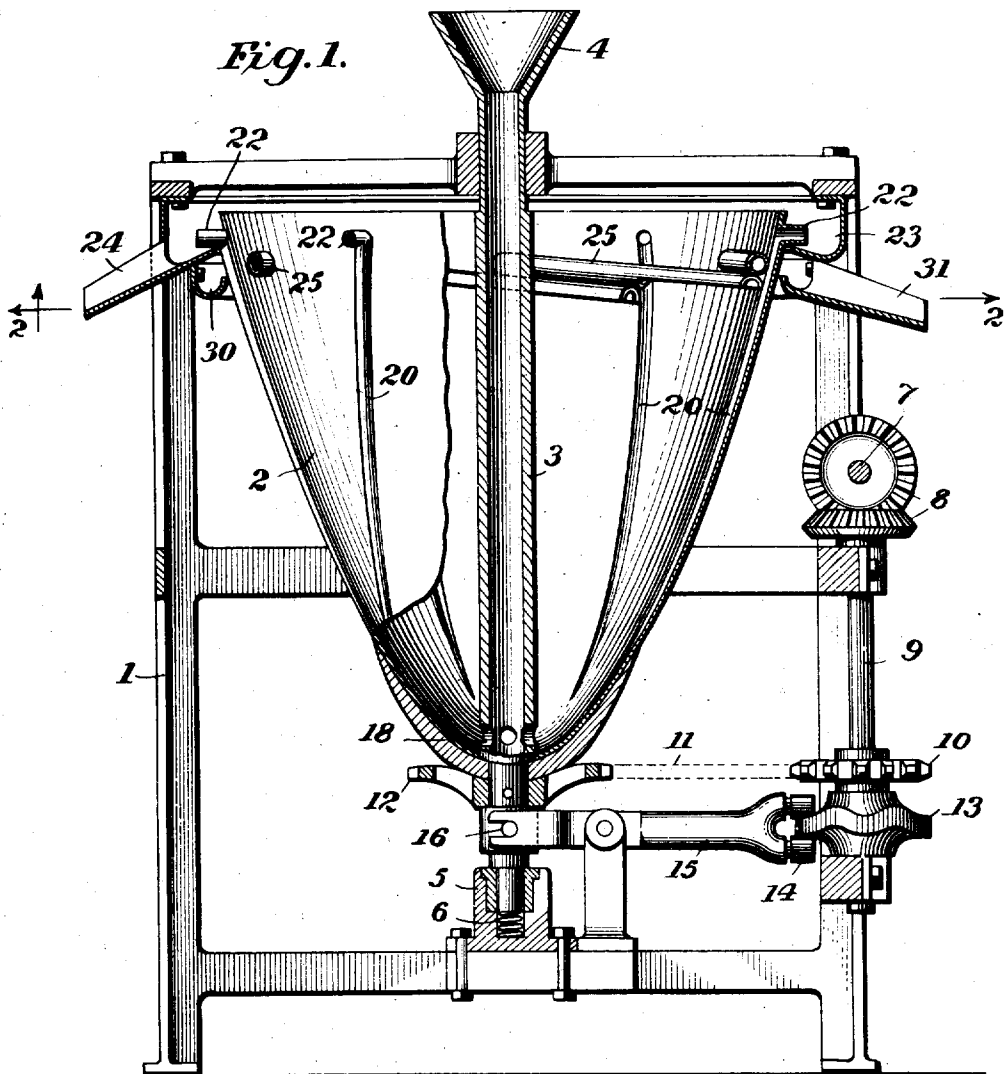


W. O. KING.
ORE CONCENTRATOR.
APPLICATION FILED MAR. 7, 1910.

974,075.

Patented Oct. 25, 1910.



UNITED STATES PATENT OFFICE.

WILLIAM O. KING, OF MOUNTAIN HOME, IDAHO.

ORE-CONCENTRATOR.

974,075.

Specification of Letters Patent.

Patented Oct. 25, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM O. KING, a citizen of the United States, residing at Mountain Home, in the county of Elmore and State of Idaho, have invented new and useful Improvements in Ore-Concentrators, of which the following is a specification.

My invention relates to centrifugal ore concentrators, by means of which the heavier and more valuable portions are separated from the lighter and less valuable portions of ore-bearing sands, crushed quartz, or the like.

More particularly stated, my invention resides in certain improvements which I have made in the construction of the bowl, whereby the separation of the heavier concentrates from the lighter tailings and refuse is rendered more complete and efficient than has heretofore been possible with existing machines, as far as I am aware, especially the concentration of certain ore-bearing sands, such as are found for example, in the Snake River.

I will now describe the improvements which I have made to the construction of the bowl in detail, reference being made to the accompanying drawing, in which,

Figure 1 is a sectional side elevation of my improved concentrator, and Fig. 2 is a half-plan sectional view of the bowl taken on the line 2—2 of Fig. 1, looking upward.

1 represents the frame of the concentrator, on which the bowl 2 and its actuating mechanism are supported. The bowl 2 is secured to and carried by a hollow shaft 3, the top of which may be funnel-shaped, as shown at 4, and the lower end of which is journaled in a step-bearing 5, in which it rests on a spring 6. The shaft 3 and bowl 2 are rotated from a driving shaft 7, connected by bevel gears 8 with a vertical shaft 9, on which is carried a sprocket-wheel 10, driving, by means of the chain 11, the sprocket-wheel 12, secured to the shaft 3. On the shaft 9 is also mounted a double face-cam 13, with the opposite faces of which contact rollers 14 carried by the forked end of a lever 15, pivoted on the frame and engaging with its slotted other end pins 16, secured to the shaft 3. Thus the bowl is not only rotated from the driving shaft 7 but is also vertically reciprocated, as is common in machines of this class. The bowl itself is parabolic in section, and the ores to be concentrated or the sands to be separated are

fed with water into the bowl through the hollow shaft 3, which is provided with lateral openings 18, communicating with the bowl near the bottom thereof.

The wall of the bowl is provided with a series of substantially vertical grooves 20, starting near the bottom of the bowl and increasing in depth toward the top, where they communicate with discharge openings 21 provided with short spouts 22. These grooves are not absolutely straight in the vertical direction but are curved slightly in the opposite direction to that in which the bowl is rotated, being equally spaced from each other, and in the example shown, being six in number. The purpose of these grooves is to lead the concentrates upwardly to said discharge openings. The concentrates being the heaviest part of the material being treated will naturally be thrown against the sides of the bowl and, by reason of its speed of rotation and agitation, will be forced upward along said grooves and through the discharge pipes 22, from which they fall into an annular trough 23, from which a spout 24 leads at some convenient point. The tailings or lighter portions of the material will also be forced upwardly by the centrifugal action and for their reception I have provided substantially horizontal means located intermediate of said grooves at a short distance below the tops thereof, said means consisting of a series of tubes 25, equal in number to the said grooves and having their lower halves cut away in that portion of them lying between one groove and the next, while for the remaining length of said tubes, which amounts to one-half the distance between two adjacent grooves, the tubes are left full, and said full or uncut-away parts of the tubes communicate with discharge openings 26, in the wall of the bowl, the plane of said openings being below that of the discharge openings 21 of the grooves 20, and each discharge opening 26, being located half-way between each pair of adjacent grooves 20. These tubes are arranged, as stated, substantially horizontally but are slightly inclined upwardly toward their discharge ends and overlap each other as shown in the drawing. The cut away portions of the tubes form barriers or stops for the lighter material between the grooves 20 and owing to their slight upward inclination conduct said material into the uncut-

away portions of the tubes and thence to the discharge openings 26, from which the tailings or refuse material is collected in an annular trough 30, from which a spout 31 leads off at some convenient point.

The operation of my improved concentrator will be readily understood from the above description. It will be seen that it provides for a continuous separation of ore-bearing sands or the like, the concentrates being continuously delivered from the bowl and collected at one point, while the tailings or refuse are delivered and collected at another.

Having thus described my invention what I claim is—

1. In an ore concentrator of the type described, a separating bowl parabolic in section and provided near its top with discharge openings for the concentrates and means to conduct the same thereto, and also provided with discharge openings for the tailings, located in a plane below that of the discharge openings for the concentrates, and independent transverse obstructing means located between each pair of discharge openings for the concentrates to conduct the tailings to their discharge openings.

2. In an ore concentrator of the type described, a separating bowl in the wall of which are provided a series of equidistant substantially vertical grooves, increasing in depth from near the bottom of the bowl to near its top and communicating there with discharge openings, and an equal number of substantially horizontal tubes, located near the top of the bowl below the level of said discharge openings, each tube extending throughout substantially one-and-one-half times the space between adjacent grooves and the lower half of each tube being cut away in that portion of it which extends from one groove to the next, the other ends of said tubes communicating with discharge

openings located midway between but slightly below the discharge openings of said grooves.

3. In an ore concentrator of the type described the combination of a hollow vertical shaft, a parabolic bowl secured thereto, said shaft having openings in its wall communicating with said bowl near its bottom, and means to rotate and reciprocate said shaft, said bowl having a series of substantially vertical grooves communicating with discharge openings for the concentrates near the top of the bowl, and with substantially horizontal means located between each pair of said grooves near the top thereof to arrest and catch the tailings, substantially horizontal tubes communicating with said means and with a second series of discharge openings located intermediate of said first mentioned openings, and stationary means surrounding said bowl to receive the concentrates and tailings respectively.

4. In an ore concentrator of the type described, a centrifugal bowl, the wall of which is provided internally with a series of equidistant longitudinal grooves communicating near their tops with discharge openings in said wall, an equal number of independent transverse obstructing means located between said grooves near their tops, an equal number of independent tubes communicating with said obstructing means and with another series of discharge openings intermediate of said first mentioned openings, and means to rotate and reciprocate said bowl.

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

WILLIAM O. KING.

Witnesses:

THOMAS TRASHEN,
ROY A. GEROLAMY.