

No. 735,813.

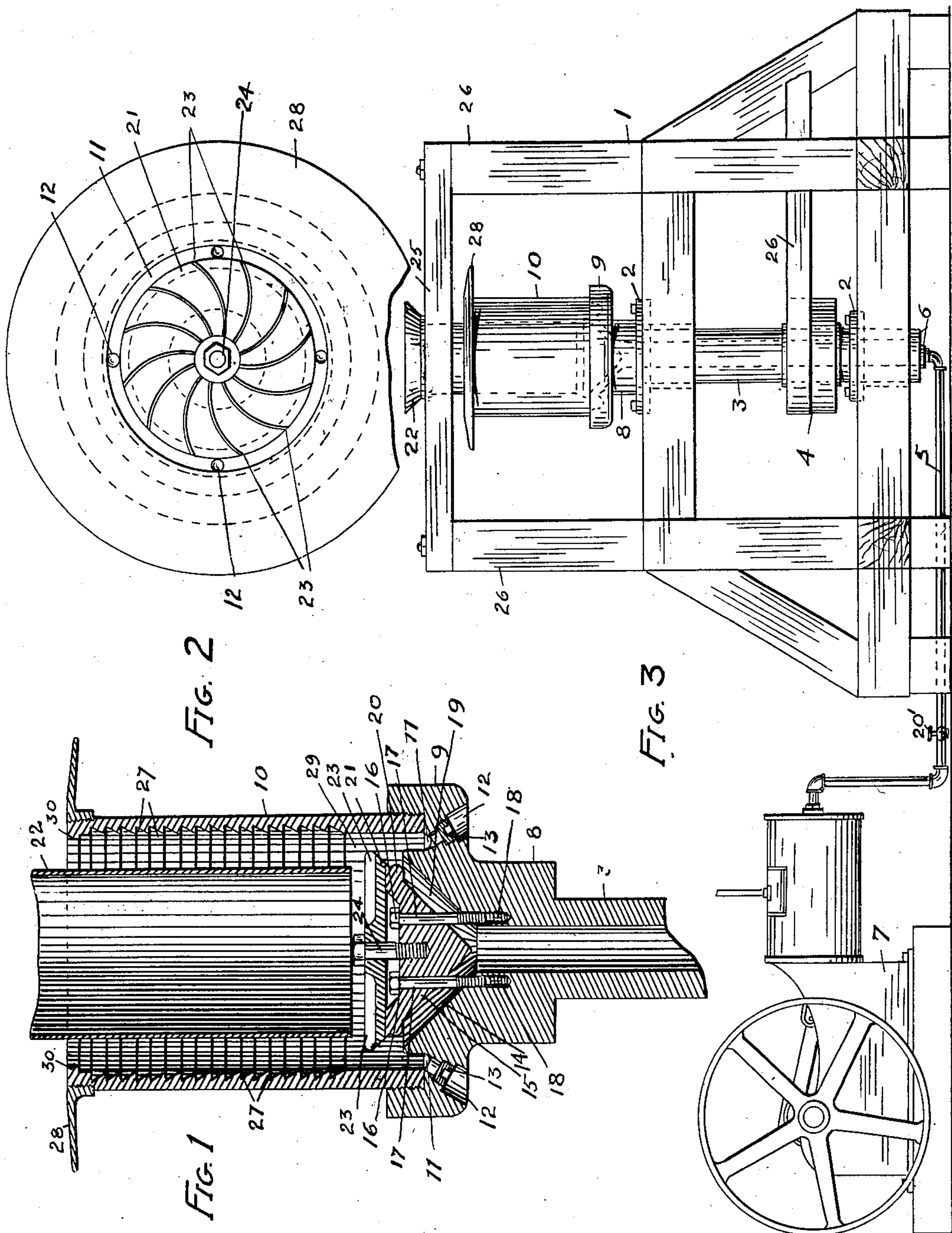
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ORE SEPARATOR.

APPLICATION FILED MAY 5, 1902.

NO MODEL.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 735,813, dated August 11, 1903.

Application filed May 5, 1902. Serial No. 105,968. (No model.)

To all whom it may concern:

Be it known that we, OSCAR F. PIRA and CARL F. SALOMONSON, citizens of the United States, and residents of Oakland, county of Alameda, State of California, have invented certain new and useful Improvements in Ore-Separators; and we do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to an apparatus more especially designed for the dry separation of gold and heavy valuable particles from the base or worthless material with which it is mixed or associated, thus producing a machine of great value in connection with the working of the material in portions of the country having a scarcity of water, although the machine is equally as well adapted for the working of pulp or wet material.

To comprehend the invention, reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a vertical sectional view of the apparatus arranged for dry working. Fig. 2 is a top plan view of the machine with the central feed-tube removed, and Fig. 3 is a view in elevation of the separator.

In the drawings the numeral 1 is used to indicate any suitable form of an exterior fixed frame provided with bearings 2. Within these bearings works the hollow shaft 3, upon which, between the bearings 2, is secured a pulley-wheel 4. Suitable connection 5 is made between running-joint 6 of the hollow shaft 3, which is closed at its lower end, and an air-compressor 7, located at any convenient place beyond the frame 1.

The upper end of the hollow shaft 3 terminates in an enlarged circular head 8, provided with an upwardly-extending internally-screw-threaded circular flange 9. To this flange is secured the vertically-disposed open cylinder 10, the lower end portion of which is externally screw-threaded, so as to permit of the cylinder being screwed to the circular flange 9. This manner of uniting the parts constitutes a convenient and simple means of forming connection, although any other desired manner of locking the cylinder to the enlarged head may be utilized.

Within the enlarged head 8 is formed a cir-

cular collecting-trough 11, which is provided with a series of outlets 12. These outlets are closed by means of the removable plugs 13.

Through the inner face of the enlarged head 8 is formed a centrally-inclined opening, which communicates with the interior of the hollow shaft 3. Within the inclined opening is fitted the inverted cone 15, which is vertically adjustable by means of the adjusting-bolts 16. These bolts work through openings 17 in the cone and within the screw-threaded sockets 18 in the inclined wall 14 of the enlarged head 8. The inverted cone 15 forms an inclined outlet 19 for the hollow shaft 3, whereby the air forced therethrough is deflected toward the side wall of the vertically-disposed cylinder 10. By means of the adjusting-bolts 16 the cone may be raised or lowered, so as to increase or decrease the area of the passage-way or outlet 19.

Near the base of the inverted cone 15 is formed a circular rib 20, which rib when the cone is forced downward its full distance bears upon the inclined wall 14 and closes the outlet or passage-way 19 against the escape of air. Such closing of the passage-way 19 is desirable when treating pulp or wet material in order to provide against the water used flowing into the hollow shaft 3. It is only during the treatment of such class of material that the inverted cone is adjusted to entirely close the passage-way or cut off communication with the interior of the hollow shaft.

It will be understood that the supply of air from the compressor to the hollow shaft 3 is controlled by a valve 20', introduced into connection 5, leading from the compressor to the running-joint 6. Of course any other suitable form of cut-off may be employed.

The base 21 of the inverted cone 15 in the present case constitutes a distributor for the material delivered thereto from the fixed feed pipe or tube 22. This table or distributor 21 is provided with a series of preferably-curved ribs 23, which separate and guide the material fed thereon toward the outer edge thereof. The table or distributor is attached to the inverted cone by means of the bolt 24, passing centrally therethrough.

The feed pipe or tube, open at each end, is

centrally arranged within the vertical cylinder 10, it being held in place by means of the brackets 25, projecting inwardly from the supports 26, extending upwardly from the fixed frame 1.

Rotary motion is imparted to the shaft 3, which carries the cylinder 10 and distributor or table 21, by means of a drive-belt 26, working over pulley-wheel 4. The drive-belt is driven from any suitable machinery. (Not shown.) However, we do not confine ourselves to the use of a drive-belt for imparting rotation to the parts, as any well-known means may be employed for the purpose which will enable the cylinder 10 to be driven at a high rate of speed.

On the inner face of the cylinder 10 a series of riffles 27 are formed, which riffles catch the heavier particles separated from the material and prevent same being carried beyond the upper edge of the cylinder. The base or worthless material carried beyond the upper edge of the cylinder falls onto the circular discharge-apron 28, attached to the outer face thereof, from which it is discharged.

In the work of separating the valuable particles from its associated material rotation or rotary motion is first imparted to the cylinder 10 and the distributing-table 21 through the medium of the drive mechanism. Crushed or pulverized ore is then fed into the stationary feed pipe or tube 22, which delivers the material onto table or distributor 21. The material thus fed onto the table is gradually guided toward its outer edge by the curved ribs 23, from whence it is thrown by centrifugal force against the inner wall of the rotating cylinder 10 and is carried upward by centrifugal force toward the upper edge of the cylinder. During this upward travel of the material the heavier or valuable particles will adhere to the inner wall of the cylinder, being caught and retained within the riffles 27. The lighter or worthless particles will be carried beyond the cylinder and finally settle onto the discharge-apron 28. Where the material is being worked in a dry condition, air under pressure is admitted from the compressor into the hollow shaft 3, from whence it escapes into the cylinder 10 through controlled passage-way or outlet 19. The air thus admitted creates a suction which acts to force the material delivered from the distributor or table 21 toward the upper edge of the cylinder and to carry the lighter or worthless separated material therefrom. Upon the machine being brought to a state of rest the valuable material caught by the riffled surface of the cylinder is released and falls into the circular trough 11, being withdrawn therefrom by opening the outlets 12.

By the centrifugal action of the machine the material fed onto the rotating table is thoroughly separated and the valuable particles eliminated therefrom and collected during the upward travel of the material within

the annular passage-way 29, formed by the inner wall of the cylinder and outer wall of the feed tube or pipe.

If desired, the cylinder 10 at or near its upper edge may be provided with an inwardly-extending flange 30, which flange may act in conjunction with the riffles to retain any of the valuable particles which may escape the riffles. In case the riffles should be dispensed with such flange will serve to prevent the escape of such of the valuable particles as fail to cling to the wall of the cylinder during the operation of the machine.

Having thus described our invention, what we claim as new, and desire to protect by Letters Patent, is—

1. In an ore-separator, the combination with a rotatable cylinder, of a centrally-arranged distributing-table, a series of riffles arranged on the inner face of the rotatable cylinder, means for imparting rotary motion to the cylinder and the distributing-table, an air-supply conduit discharging into the cylinder, means for bodily adjusting the distributing-table whereby said table constitutes a valve for the air-supply conduit, and a feed tube or pipe arranged within the cylinder and through which the material to be treated is delivered onto the revolving distributing-table.

2. In an ore-separator, the combination with a cylinder, of a distributing-table, means whereby the table and cylinder may be rotated, means for delivering material onto the distributing-table, an air-supply conduit discharging into the cylinder, and means for bodily adjusting the distributing-table whereby said table constitutes a valve for the air-supply conduit; substantially as described.

3. In an ore-separator, the combination with a rotatable cylinder, of a distributing-table arranged therein, of means for imparting rotation to the cylinder and distributing-table, a fixed feed tube or pipe located within the rotatable cylinder and through which material to be treated is delivered onto the rotatable distributing-table, means whereby air under pressure is delivered to the rotatable cylinder below the line of discharge for the distributing-table, and means for deflecting the air toward the inner surface of the wall of the cylinder.

4. In an ore-separator, the combination with a rotatable cylinder, of a series of riffles on the inner face thereof, a revolving head to which the cylinder is secured, a collecting-trough in said head to receive the valuable particles separated from its associated material, controlled outlets for said trough, a distributing-table secured to the rotatable head, devices for imparting vertical adjustment to said table, an air passage-way directed toward the inner face of the wall of the cylinder between the table and head, a feed pipe or tube through which material to be treated is delivered onto the distributing-table, mech-

anism for imparting rotation to the head, cylinder and distributing-table, and means for delivering air under pressure to the cylinder through the air passage-way existing between the head and distributing-table.

5 5. In an ore-separator, the combination with a fixed support, of a hollow shaft working through bearing thereof, a head attached to said shaft, an inclined opening formed
10 through the head and communicating with the interior of the shaft, an inverted cone fitted within the opening of the heads, means whereby the cone is adjustably attached to the head, a distributing-table carried by the
15 inverted cone, a vertically-disposed cylinder secured to the head, means on the inner face of the cylinder for preventing the escape of the valuable particles of the separated material, a fixed feed-tube through which material
20 to be treated is delivered onto the distributing-table, mechanism for imparting rotation to the cylinder and distributing-table, and means whereby air under pressure is admitted into the cylinder through the shaft and
25 head below the line of discharge for the distributing-table.

6. In an ore-separator, the combination with a cylinder, of a distributor in the lower

end thereof, means for feeding the material to said cylinder, a rotating hollow head located directly beneath and carrying the cylinder, said head having a flaring discharge end, an inverted cone supported above the discharge end of the head, and means for adjusting said cone bodily in a vertical direction to regulate the size of the opening leading from the head; substantially as described.

7. In an ore-separator, the combination with a cylinder, of a distributor in the lower end thereof, means for feeding the material to said cylinder, a rotating hollow head located directly beneath and carrying the cylinder, an inverted cone supported above the discharge end of the head, and means for adjusting the said cone bodily in a vertical direction to regulate the size of the opening leading from the head, substantially as described.

In witness whereof we have hereunto set our hands.

OSCAR F. PIRA.
CARL F. SALOMONSON.

Witnesses:

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D. B. RICHARDS.