

F. MANUEL & K. M. REEVES.
ORE CONCENTRATOR.

Patented May 19, 1891

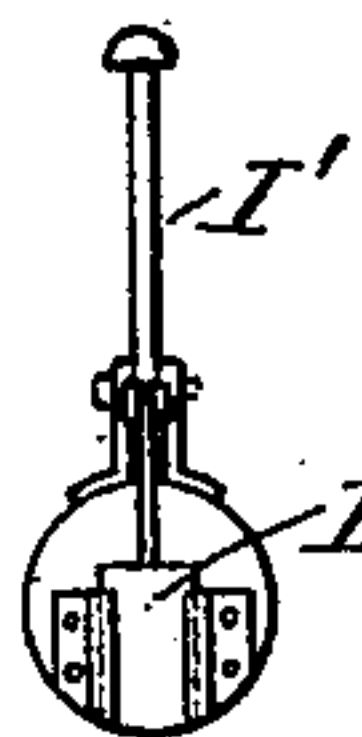


Fig. 2.

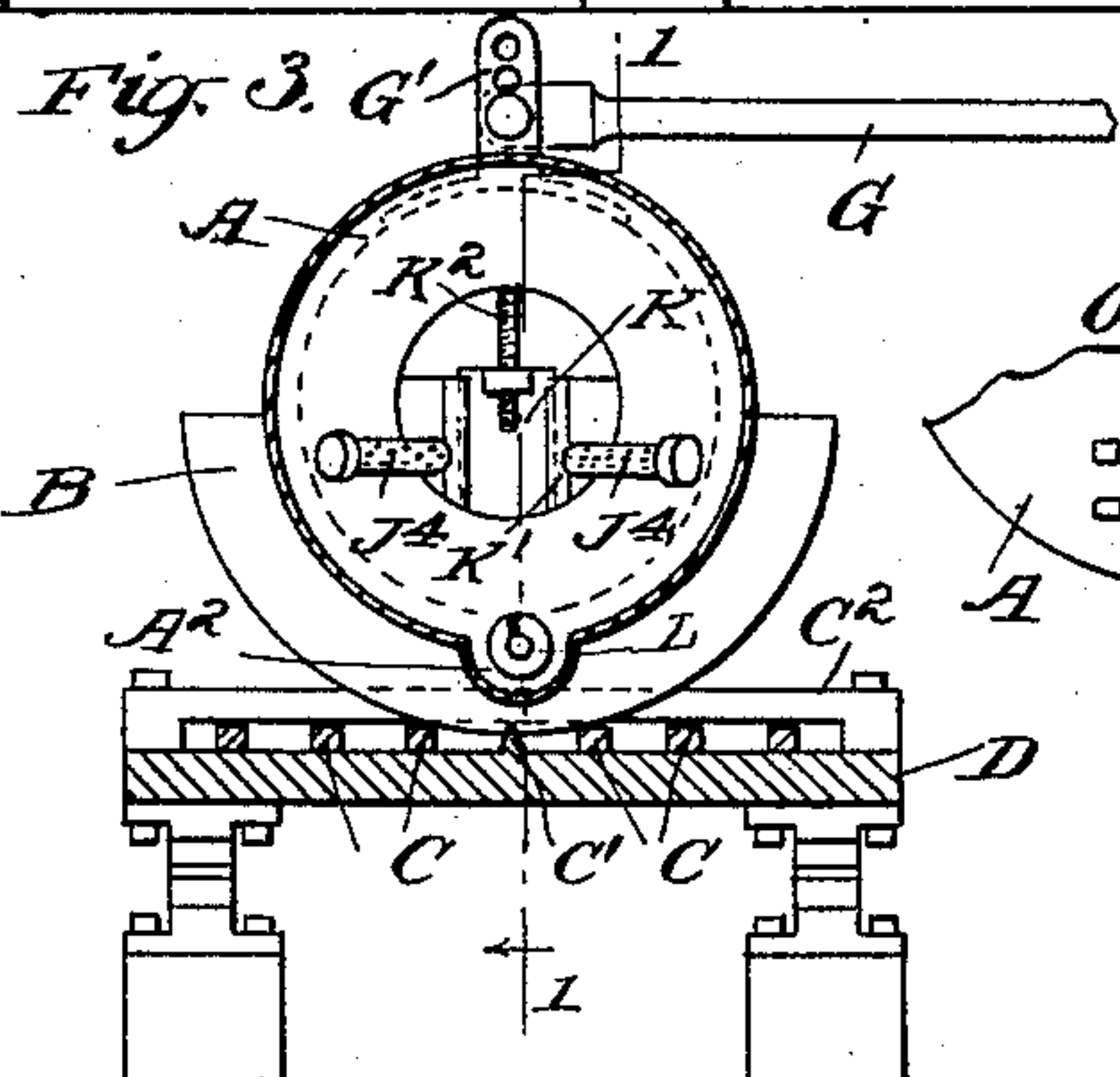


Fig. 8.

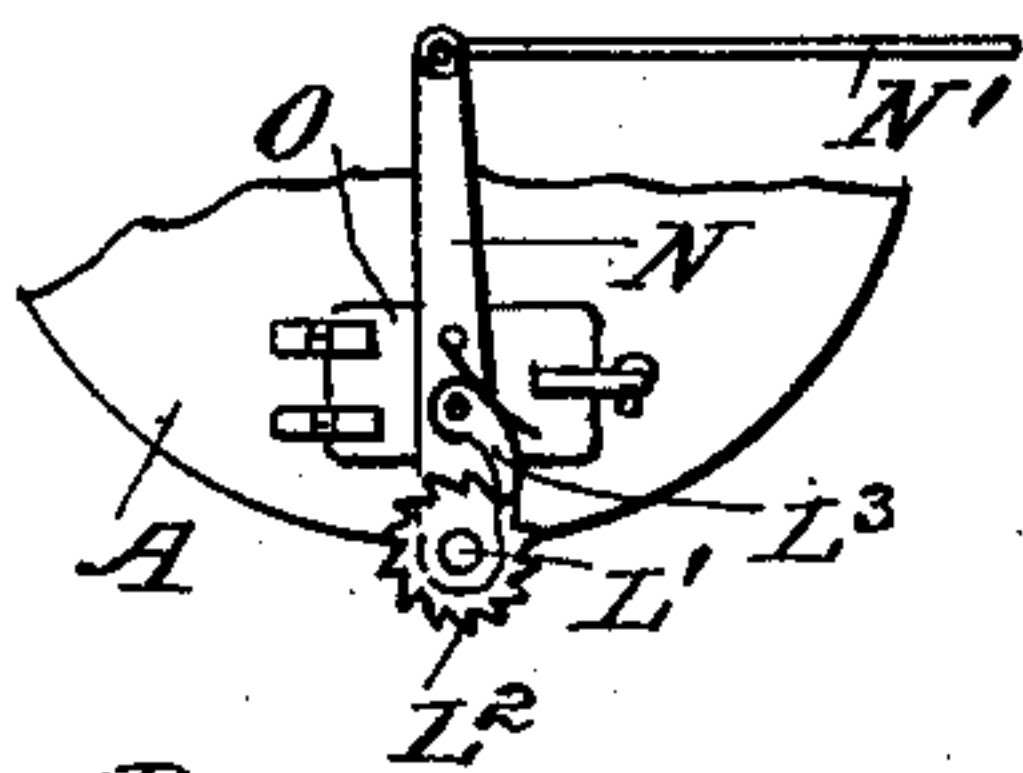


Fig. 4.

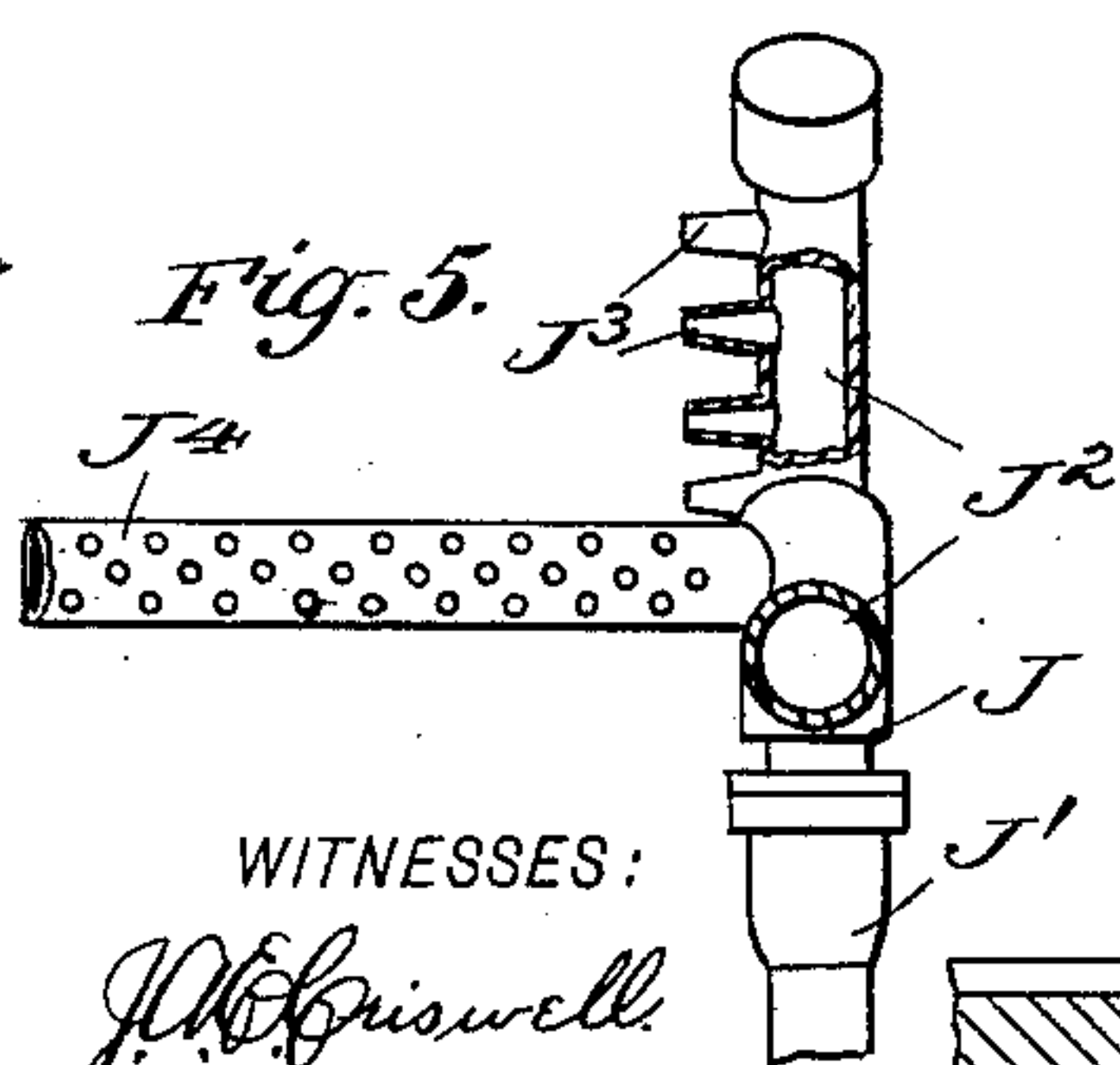
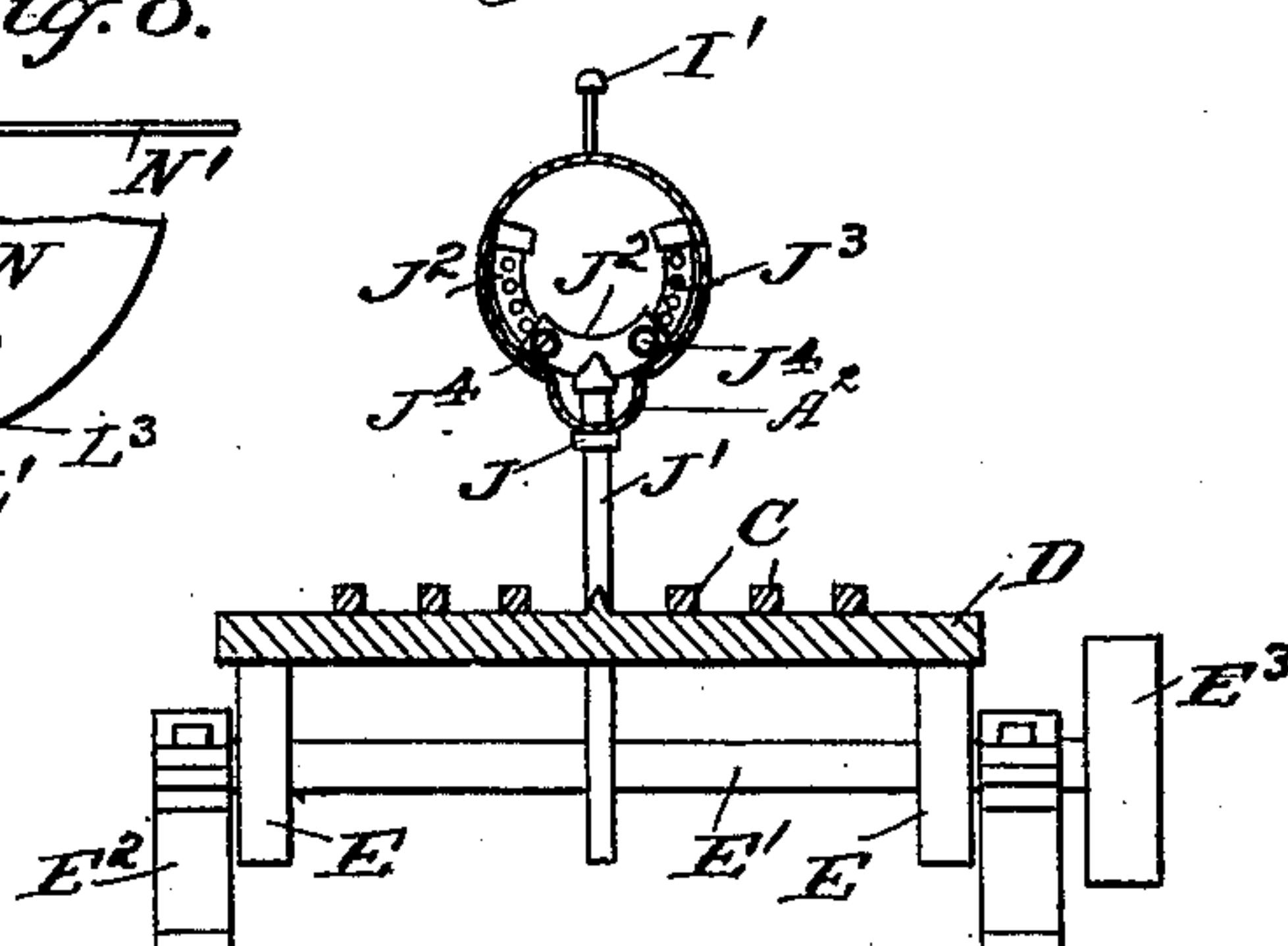


Fig. 6.

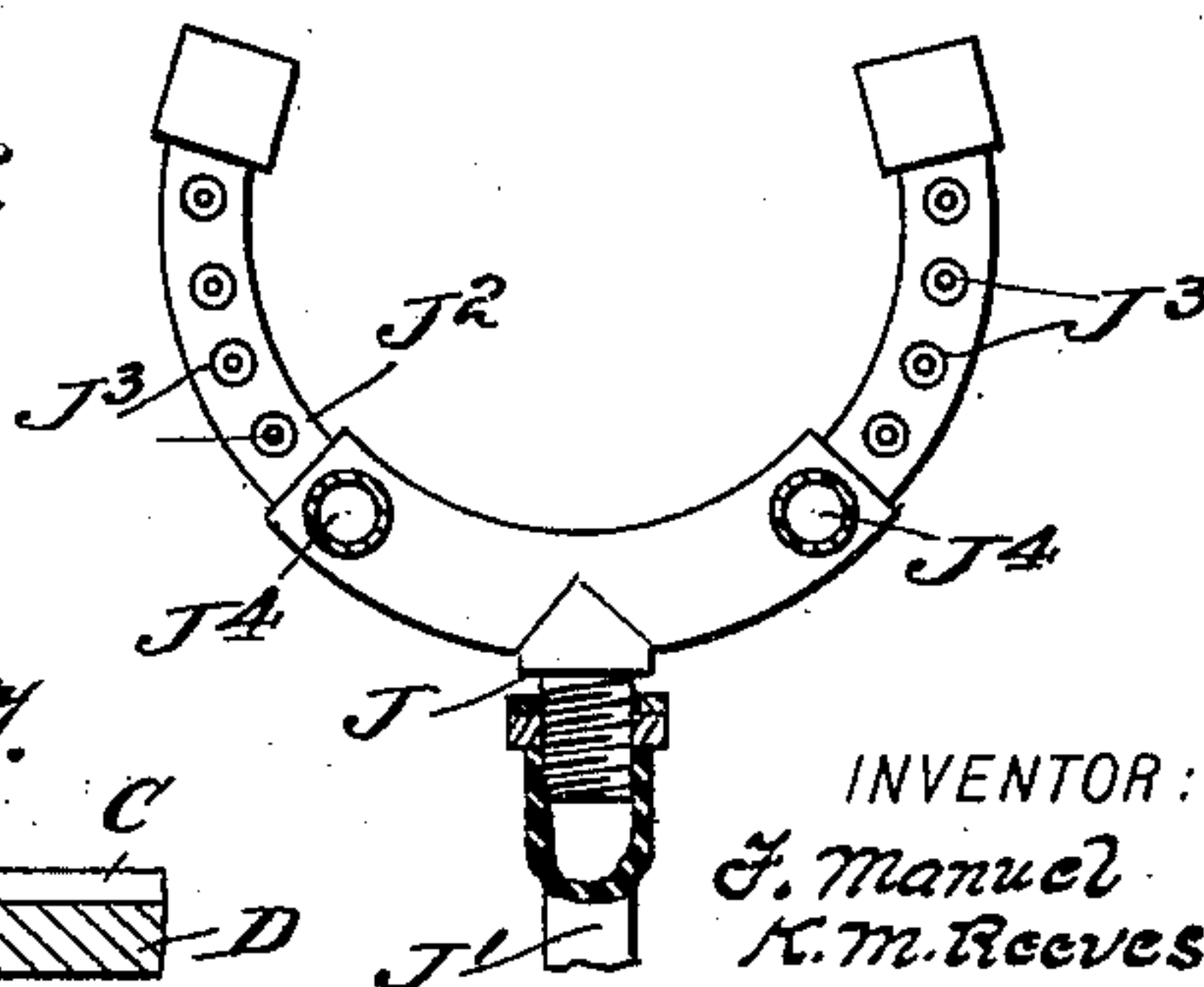


Fig. 7.

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UNITED STATES PATENT OFFICE.

FRED MANUEL AND KENNETH M. REEVES, OF HELENA, MONTANA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 452,676, dated May 19, 1891.

Application filed January 28, 1891. Serial No. 379,416. (No model.)

To all whom it may concern:

Be it known that we, FRED MANUEL and KENNETH M. REEVES, of Helena, in the county of Lewis and Clarke and State of Montana, have invented a new and Improved Ore-Concentrator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved ore-concentrator which is simple and durable in construction, very effective in operation, and readily separates the concentrates from the tailings.

The invention consists of a conical cylinder mounted to rock and provided at its closed large end with an inlet, the small end being open and forming an outlet.

The invention also consists in certain parts and details and combinations of the same, as will be described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement on the line 1 1 of Fig. 3. Fig. 2 is an end elevation of the small end of the cylinder. Fig. 3 is a transverse section of the improvement on the line 3 of Fig. 1. Fig. 4 is a similar view of the same on the line 4 of Fig. 1. Fig. 5 is an enlarged side elevation, with parts in section, of the water-feed pipe. Fig. 6 is an end elevation of the same with parts broken out. Fig. 7 is a sectional side elevation of a device for raising or lowering the table supporting the cylinder; and Fig. 8 is an end elevation of the large end of the cylinder, illustrating the mechanism for operating the conveyor.

The improved ore-concentrator is provided with a cylinder A, made in the shape of a truncated cone and having its large end closed and its small end open, so as to form a discharge for the tailings and water. The cylinder A is secured to semicircular rockers B, mounted to rock on a series of longitudinally-extending strips C, secured on the top of a table D, pivoted at one end at or near the large end of the cylinder A, and adapted to be raised and lowered at the small end, so as to regulate the level of the pulp in the cylinder A. The rockers B are each pro-

vided in the middle at their under side with a notch adapted to be engaged by a V-shaped longitudinally-extending strip C', being one of the strips C previously mentioned. This V-shaped strip and a notch serve to return the cylinder A to the proper place after imparting a rocking motion to the right and left to the cylinder. In order to prevent longitudinal displacement of the cylinder and its rockers, transverse guiding-strips C² are fastened to the top of the strips C on the table D on each side of each rocker, as is plainly shown in Figs. 1 and 3.

In order to swing the table D up and down, the said table is provided near the large end of the cylinder A with transversely-extending strips D', fulcrumed on correspondingly-recessed supports D², erected on the floor on which the machine stands. The other end of the table D is adapted to be raised or lowered by means of eccentrics E, secured on a transversely-extending shaft E', mounted to turn in suitable bearings E², erected on the floor. The shaft E' is provided on one end with a belt-wheel E³ or other means for turning the said shaft E' to swing the eccentrics or cam-wheels E up or down to raise or lower this end of the table, the latter swinging on the transverse strips D' as a fulcrum.

Instead of the eccentrics E, jack-screws F may be employed, screwing vertically in suitable nuts F', held on posts or supports F², erected on the floor. (See Fig. 7.) The cylinder A is provided on its top with brackets C', pivotally connected with a pitman G, connected with suitable machinery for imparting a transverse rolling motion to the said cylinder, so as to rock the same on its rockers B on the longitudinally-extending strips C. By thus causing the rockers B to pass from one strip to another a sudden jerk is given to the rocker, and consequently to the cylinder A, so as to agitate more readily the pulp within the cylinder A. The latter is provided on top near its closed end with an inlet A', connected by a flexible tube H with the feed-hopper H', through which the pulp is introduced. The flexible tube H follows the motion of the cylinder A, so that a continuous feeding from the hopper H' is insured.

The small end of the cylinder A is adapted to be opened or closed more or less by a gate

I, hung on a lever I', under the control of the operator. Near the discharge end of the cylinder A, and within the latter, is arranged a feed-pipe J, extending through the bottom of the cylinder A, to connect with the flexible pipe J', leading to a suitable source of water-supply to charge the water-feed pipe J. The latter is provided with a segmental pipe J², (see Figs. 5 and 6,) extending on both sides of the pipe J and provided with discharge-nozzles J³, through which the water supplied by the pipe J can pass in small jets to the interior of the cylinder A, so as to agitate the pulp therewith. From the segmental pipes J² also extend toward the large end of the cylinder A perforated pipes J⁴, serving a similar purpose to the nozzles J³, and thus the water passing through the said perforated pipes J⁴ agitates the pulp. Next to the feed-water pipe J, and toward the large end of the cylinder A, is arranged a gate K, mounted to slide vertically in suitable guideways K', arranged within the cylinder A and secured to the walls thereof. The gate K is adapted to be raised or lowered by means of a screw-rod K², extending through the top of the cylinder A and provided at the outer end with a hand-wheel K³ under the control of the operator.

In the bottom of the cylinder A is formed a pocket A², in which is arranged a transversely-extending conveyer-screw L, secured on a shaft L', mounted to turn in suitable bearings, of which one is on the inside of the cylinder A, as is plainly shown in Fig. 1, and the other is in the closed end of the said cylinder. The shaft L' extends to the outside and is provided on this outer end with a ratchet-wheel L², engaged by a spring-pressed pawl L³, fulcrumed on a lever N, loosely journaled on the shaft L'. The lever N is connected with a rod N', connected with suitable machinery for imparting a forward and backward swinging motion to the said lever to rotate the conveyer-screw at intervals, so that the concentrates settling in the bottom of the cylinder A are fed toward the large end of the said cylinder, where they are discharged through a suitable opening provided near the large end and in the bottom of the conveyer-pocket. The large end of the cylinder is provided with a door O, as shown in Fig. 8, through which door the cylinder can be entered.

The operation is as follows: When the pitman G is set in motion, a rocking motion is given to the cylinder A, as previously described, and the pulp introduced from the hopper H' through the flexible tube H is thus constantly agitated by the rocking motion of the cylinder, so that the heavy precious metals readily settle to the bottom, while the tailings and water flow toward the small end of the cylinder to be discharged through the gate I, which is open sufficiently for this purpose. In order to increase the agitation of the pulp, water is injected into the pulp through the nozzles J³ and perforated pipes

J⁴, as previously described. At suitable intervals the shaft E' is rotated so as to raise and lower the table D to agitate the pulp longitudinally within the cylinder A. The rotary motion of the conveyer-screw L continues to move the concentrates to the larger end of the cylinder A, from which they are discharged through a suitable opening provided in the bottom of the conveyer-pocket at the large end of the cylinder. The screw-gate K serves the especial purpose of retaining all of the ore which carries mineral of value, but is so finely pulverized that it forms a scum which floats off on top of the water, the gate being screwed down until the lower edge is constantly under water in the cylinder.

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

1. In an ore-concentrator, an imperforate truncated conical cylinder mounted to rock axially and provided with a closed large end and an open small end for discharging the tailings, substantially as shown and described.

2. In an ore-concentrator, an axially-rocking imperforate truncated conical cylinder arranged longitudinally and provided at its closed large end with a pulp-inlet, the small end of the said cylinder being open to form a tailings-discharge, substantially as shown and described.

3. In an ore-concentrator, the combination, with a table provided with longitudinal strips, of semicircular rockers mounted to rock transversely on the said strips, and a cylinder secured on the said rockers for containing the pulp, substantially as shown and described.

4. In an ore-concentrator, the combination, with a table provided with longitudinal strips, of semicircular rockers mounted to rock transversely on the said strips, a cylinder secured on the said rockers for containing the pulp, and means, substantially as described, for vertically adjusting the tailings end of the said table, as set forth.

5. In an ore-concentrator, the combination, with a conical cylinder arranged longitudinally, of rockers carrying the said cylinder and adapted to rock transversely, a pulp-inlet arranged on the large end of the said conical cylinder, and an adjustable gate held on the small open end of the said cylinder, substantially as shown and described.

6. In an ore-concentrator, the combination, with a conical cylinder arranged longitudinally, of rockers carrying the said cylinder and adapted to rock transversely, a pulp-inlet arranged on the large end of the said conical cylinder, an adjustable gate held on the small open end of the said cylinder, and a water-feed pipe arranged within the said cylinder and provided with discharge-nozzles, substantially as shown and described.

7. In an ore-concentrator, the combination, with a conical cylinder arranged longitudinally, of rockers carrying the said cylinder and adapted to rock transversely, a pulp-in-

let arranged on the large end of the said conical cylinder, an adjustable gate held on the small open end of the said cylinder, a water-feed pipe arranged within the said cylinder and provided with discharge-nozzles, and perforated pipes extending longitudinally within the said cylinder and leading from the said feed-water pipe, substantially as shown and described.

10 8. In an ore-concentrator, the combination, with a conical cylinder mounted to rock and having a closed large end and an open small end, of a gate arranged within the said cylinder between its ends, the said gate being
15 fitted to slide vertically, substantially as shown and described.

9. In an ore-concentrator, the combination, with a conical cylinder mounted to rock and having a closed large end and an open small
20 end, of a gate arranged within the said cylinder between its ends, the said gate being fitted to slide vertically, and a screw extend-

ing down into the cylinder and engaging the gate to raise and lower it, as set forth.

10. In an ore-concentrator, the combination, 25 with a conical cylinder arranged longitudinally and mounted to rock transversely, of a conveyer-screw extending longitudinally in the bottom of the said cylinder, substantially as shown and described. 30

11. In an ore-concentrator, the combination, with a conical cylinder arranged longitudinally and mounted to rock transversely, of a conveyer-screw extending longitudinally in the bottom of the said cylinder near the large
35 end of the said cylinder, and means, substantially as described, for imparting an intermittent rotary motion to the said conveyer-screw, as set forth.

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