(No Model.)

C. E. SEYMOUR.

ORE CONCENTRATOR.

No. 436,808. Patented Sept. 23, 1890.

Fig. 1.

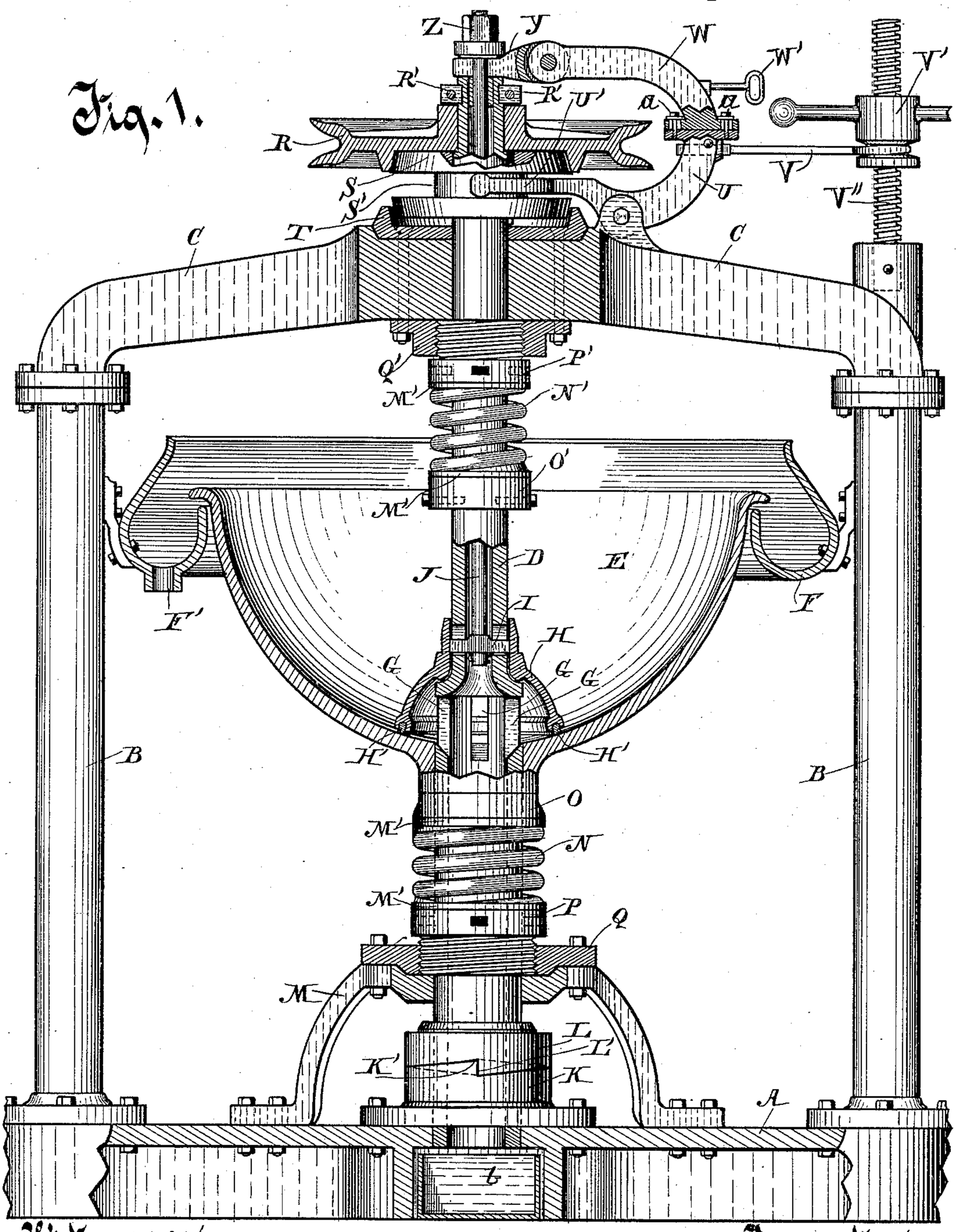
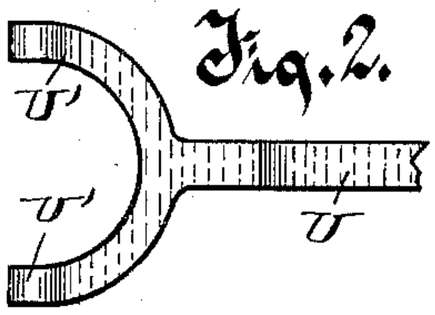


Fig. 2.



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ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 436,808, dated September 23, 1890.

Application filed June 16, 1890. Serial No. 355,596. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SEYMOUR, of Hurley, in the county of Ashland and State of Wisconsin, have invented new and useful Improvements in Ore-Concentrators, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in an ore-concentrator having a concave bowl fixed upright on a centrally-piercing shaft, which concentrator is adapted for separating ore from lighter intermingled material by the use of water through the action of centrifugal force and gravitation, the improvements being such as make the mechanism more efficient and useful both as to convenience and ease of manipulation, as well as for capability for work and results to be obtained.

In the drawings, Figure 1 is an elevation of my complete device, parts being broken away and shown in section for convenience of illustration and to show interior construction. Fig. 2 is a detail.

The frame on which other parts of the mechanism are supported consists of the base-piece A, the posts B B, and the cross-beam C. A central vertical shaft D is journaled in the base A and in the beam C. A concave bowl E is pierced centrally by the shaft D and is fixed upright and water-tight to the shaft. This bowl is intended to receive a supply of pulverized ore and intermingled earth and foreign material conveniently through a chute or pipe leading into the bowl and having its discharging end near the bottom of the bowl, and also a supply of water, which may be delivered thereto in a constant stream through a pipe or otherwise. An annular trough F, supported on the frame, encircles the bowl near its upper edge and is adapted to receive the overflow therefrom, which is discharged from the trough through the aperture F′. The hollow shaft D is provided with apertures G G, located just above the bottom of the bowl on the inside, through which apertures the contents of the bowl may be discharged through the shaft downwardly. A cup-shaped valve H is fitted water-tight, but movably, about the shaft D within the bowl, the lower edge of the valve being provided with a rubber packing H′, which normally bears water-tight against the inner surface of the bowl. The inner upper end of the valve H is provided with a bolt or cross-bar I, which passes through vertical slots therefor in the shaft which connects the valve to the vertically-movable stem J, by which the valve may be opened or closed, as hereinafter described.

A sleeve-block K about the shaft near its lower end is secured permanently to the base A and is provided with a diametrical cam K′, and a collar L, fixed to the shaft just above and bearing against the block K, has a cam L′, complementing the cam K′, whereby as the shaft is rotated it is given a reciprocal vertical movement, the shaft being supported vertically by the bearing of the collar L on the block K. A bridge M, affixed to the base A, receives the shaft D therethrough and serves as an additional journal-bearing therefor.

Two springs N N′, coiled about the shaft, are adapted to control to a limited extent the vertical movement of the shaft. The spring N is interposed between a collar O, fixed on the shaft, and a sleeve-nut P, turning by screw-thread into a plate Q, fixed to the bridge M. The spring N′ is interposed between a collar O′, fixed on the shaft, and a sleeve-nut P′, turning by screw-thread into a plate Q′, rigid to the cross-beam C. Washers M′ M′ are preferably interposed between the springs N and N′ and the collars O and O′ and sleeve-nuts P and P′. The shaft passes movably through the sleeve-nuts P and P′ and the washers M′ M′.

A driving-pulley R is loose on the shaft D, being held in place by a collar R′, secured removably to the shaft above it, the pulley resting on a shoulder of the shaft below it. A friction-wheel S, feathered on the shaft, is adapted when moved up against the pulley to engage it and communicate the motion of the pulley to the shaft, and when lowered away from the pulley is adapted to engage a bearing T, fixed on the beam C, and stop the rotation of the shaft. A tilting lever U, pivoted medially on the beam C, has a bifurcate inner arm, the two parts U′ U′ of which ride in a groove S′ in the friction-wheel S, the lever being adapted by its tilting movement to raise and lower the friction-wheel S. The outer arm of the lever U

is provided with an elastic rod V, which at its outer end rides in a groove in a nut V′, traveling by screw-thread on a standard V″, fixed in a post B. By the raising and lowering of the nut V′ the lever U is tilted, the spring of the rod V being only sufficient to permit of such slight oscillation of the arm U as is required by the vertical reciprocal movement of the shaft D on the cam K′, while the friction-wheel S remains in constant contact with the pulley R and the valve H remains closed. An extension W of the lever U is secured movably and adjustably horizontally on the end of the lever by means of bolts *a a* passing through slots therefor in the part W and turning into the lever U. A bifurcate wedge Y is hinged to the other extremity of the part W, the bifurcate parts of the wedge passing on the two sides of the stem J and bearing on their under surface against the top of the shaft D and above against the nut Z on the stem J. The wedge Y is intended to be forced under the nut Z, and thereby to raise the stem J and the thereto-affixed valve H, so as to permit the concentrates or contents of the bowl E to escape into the hollow shaft D through the apertures G G. When the part W is secured rigidly to the lever U, the wedge Y will be forced under the nut Z by the raising of the nut V′ at the same time that the friction-wheel S is carried down by the tilting of the lever U away from the pulley R and against the plate T, so that as the shaft is disengaged from the driving-pulley R its motion will be stopped by the contact of the friction-wheel S with the fixed plate T, and at the same time the valve H will be raised, so as to permit the escape of the contents of the bowl through the shaft D. When the part W is made movable on the lever U, by loosening the bolts *a a* the wedge Y may be forced under the nut Z and withdrawn therefrom by reciprocating the part W by means of the handle W′, affixed thereto, without tilting the lever U.

A pan *b* is inserted in the base A in a chamber therefor beneath the shaft D to catch the contents of the bowl as they are discharged thereform. The shaft D is shown in the drawings as of larger size below the valve H than above that point, the larger size being desirable for a sufficient passage for the contents of the bowl therethrough, though a shaft of uniform size throughout its length might be used if more desirable otherwise.

It will be understood that when a supply of pulverized ore and refuse is placed in the bowl E and the bowl is partly filled with water, that thereupon, by the rapid rotation of the shaft, the water with the lighter and earthy parts of the contents of the bowl will by centrifugal force be thrown out of the bowl over its edge into the trough F and discharged therefrom through the aperture F′, and that when the foreign matter has been thus sufficiently separated from the ore the bowl may be stopped and the washed ore be discharged therefrom downwardly through the shaft D by the raising of the nut V′, which promptly disconnects the bowl from the driving-pulley and at the same time opens the valve H, permitting the ore to escape into the pan *b*, as hereinbefore stated.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an ore-concentrator, the combination, with an ore-receiving bowl fixed upright on a centrally-piercing hollow revolving shaft provided with ports within the bowl near its bottom, of a vertically-moving cup-valve arranged to fit water-tight about the shaft on the inner surface of the bowl and to close the ports in the shaft, which valve is provided with a stem for lifting it and thereby opening the ports, substantially as described.

2. In an ore-concentrator, the combination, with an ore-receiving bowl fixed on a centrally-piercing hollow shaft provided with ports within and near the bottom of the bowl, of a cup-valve arranged to fit water-tight on the inner surface of the bowl, a stem movable vertically within the hollow shaft connected to the cup-valve, and a wedge arranged to be forced between a bearing on the stem of the valve and the end of the shaft, whereby the valve is opened, substantially as described.

3. In an ore-concentrator, the combination, with an ore-receiving bowl fixed upright on a hollow vertical revolving shaft, having ports within the bowl, of a valve about the shaft arranged to close the ports therein, which valve is provided with a stem located and arranged to move vertically in the shaft, a tilting lever pivoted on the frame, and a wedge hinged to one arm of the lever and arranged to be thrust by the tilting of the lever between a bearing on the valve-stem and a relatively fixed part of the machine, substantially as described.

4. In an ore-concentrator, the combination, with a vertical shaft carrying an ore-bowl fixed upright thereon, of a driving-pulley loose on the shaft, and a friction-wheel feathered on the shaft and arranged to be thrown into engagement with the pulley and in engagement with a fixed bearing on the frame by means of a tilting lever, substantially as described.

5. In an ore-concentrator, a vertical shaft carrying an ore-receiving bowl fixed thereon and provided with a driving-pulley revolubly loose on the shaft, in combination with a friction-wheel feathered on the shaft and arranged to be thrown into engagement with the pulley and out of engagement with the pulley and into engagement with a bearing fixed on the frame, a tilting lever pivoted on the frame, one arm of which rides in a groove therefor in the friction-wheel and is adapted to shift it on the shaft, the other arm of which lever is provided with a limitedly-elastic rod, the outer end of which rides in a groove in a nut turning by a screw-thread on a fixed

standard, whereby the lever is tilted, substantially as described.

6. In an ore-concentrator having a revolving shaft and a shifting friction-wheel thereon, the combination, with a tilting lever pivoted on the frame and arranged to shift the friction-wheel by means of an adjustable nut with which it has mechanical connection, of a part W, supported movably thereon, and a wedge Y, hinged to the part W and arranged to be inserted removably between a bearing on a valve-stem of the concentrator and the end of the shaft, substantially as described.

7. In an ore-concentrator, the combination, with a hollow vertical revolving shaft carrying an upright bowl fixed thereon, the shaft being provided with ports within the bowl, and a valve about the shaft arranged to close the ports therein, which valve is provided with a stem movable vertically within the shaft, of a friction-wheel feathered on the shaft and arranged to be thrown into and out of engagement with a driving-pulley revolubly loose on the shaft, a tilting lever pivoted on the frame, one arm of which rides in a groove therefor in the friction-wheel, and a wedge on the other arm of the tilting lever arranged to be thrown between a bearing on the valve-stem and the end of the shaft, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. SEYMOUR.

Witnesses:

HENRY D. RYAN,

D. H. PIERCE.