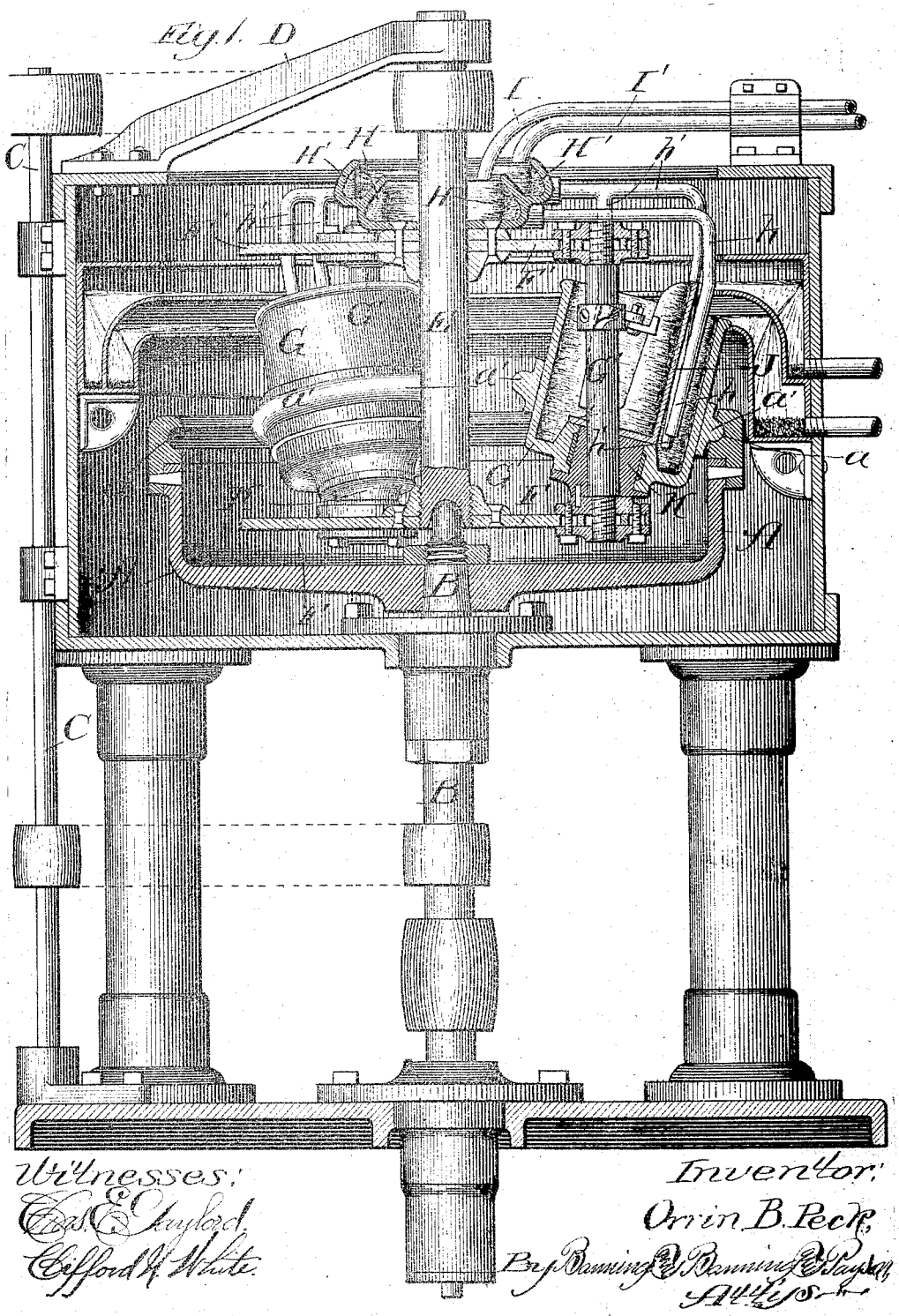
(No Model.) 2 Sheets—Sheet 1.

O. B. PECK.

CENTRIFUGAL ORE SEPARATOR.

No. 489,202. Patented Jan. 3, 1893.



(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

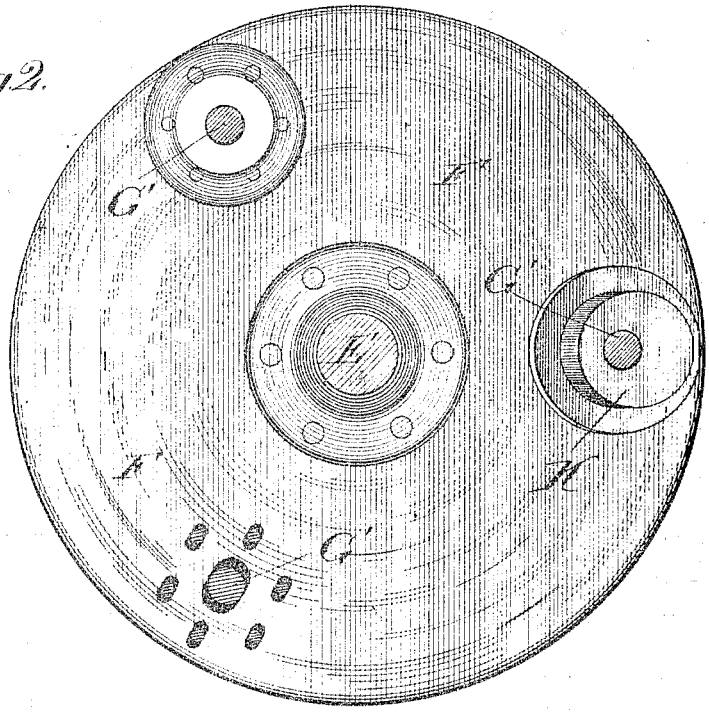


Fig. 4.

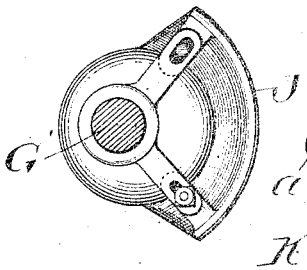
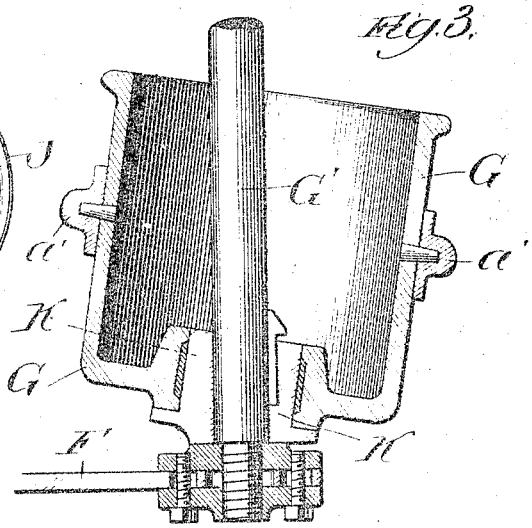


Fig. 3.



Witnesses:
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Clifford H. Waite.

Inventor:
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By Banning & Banning & Dayson,
Attys.

UNITED STATES PATENT OFFICE.

ORRIN B. PECK, OF CHICAGO, ILLINOIS, ASSIGNOR TO MELINDA PECK, OF SAME PLACE.

CENTRIFUGAL ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 489,202, dated January 3, 1893.

Application filed January 11, 1892. Serial No. 417,687. (No model.)

To all whom it may concern:

Be it known that I, ORRIN B. PECK, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Centrifugal Ore-Separators, of which the following is a specification.

In the drawings Figure 1 is a vertical section of my improved apparatus; Fig. 2 is a plan view of the lower disk herein described, and lettered F; Fig. 3 is a vertical section of one of the treatment vessels, and Fig. 4 is a plan view of the upper portion of a trough to be hereinafter described and lettered J.

In making my improved apparatus for separating powdered or finely divided particles containing mineral bearing substances of different degrees of specific gravity, I preferably make a revoluble vessel A, mounted upon and rotated by a revoluble shaft B, which may be supported in position in any suitable manner, and rotated by any suitable motive power. Arranged at one side of the apparatus, in convenient position, and supported in suitable bearings, is a countershaft C, carrying a pulley, so that it may be rotated by a belt running on a pulley on the shaft B. A bracket D extends from a suitable support, preferably the top of the curbing of the apparatus, to a central position over the apparatus, to furnish a bearing for the upper end of a shaft E, which is preferably seated on the upper end of the shaft B. A belt connects a pulley on the top of the countershaft with a pulley near the top of the shaft E, so that as the countershaft is rotated it causes the shaft to be also rotated. At the bottom of the shaft is arranged a plate or disk F, and at a suitable position near the top of the apparatus is arranged another disk or plate F′. These plates are connected to the shaft E in any suitable manner, so that they may be rotated with such shaft. Arranged between the two plates F and F′ are preferably three treatment vessels G, arranged around shafts G′, supported at the top and bottom in the plates or disks F and F′. In the form of apparatus shown in the drawings, these shafts are fixed and stationary, and the treatment vessels G are arranged to be rotated around them. Near the top of the rotatable vessel A is a groove or tread *a*, and in proper position around the outer edges of the treatment vessels G, is a tire or flange *a′*. This tire or flange fits into the thread or groove, so that there is frictional contact between them. The vessels G are carried around by the rotation of the shaft E, which rotates the plates or disks by which the treatment vessels are supported. As they are thus carried around, the frictional contact between the flanges or tires *a′* and the groove or tread *a* causes the treatment vessels to each rotate on its own axis. When, however, the rotatable vessel A, carried on the shaft B, is rotated at the same speed as the shaft E, the treatment vessels being carried around at the same speed as the rotatable vessel A, would have no independent rotation on their several axes, but would simply be carried around a common center in a circle, as it were. By regulating the rotation of the shaft E, which carries the treatment vessels around, therefore, such vessels may be either rotated on their respective axes or simply carried around, as may be preferred, and when they are rotating, the speed of their individual rotation may be regulated or modified, irrespective of the speed of rotation of the vessel A. The treatment vessels, therefore, have a capacity for compound rotation, all around the common axis B, and each around its own axis G′, as may be desired in operation. Each treatment vessel thus rotates around its own axis and around an axis external to it. Arranged near the top of the shaft E is what may be termed a receiving bowl, divided into compartments H and H′, which is rotated with the shaft. A pipe I delivers the material to be treated into the compartment H′, and a pipe I′ delivers water into the compartment H. In the treatment vessels are arranged fixed nearly vertical troughs J, which preferably describe the arc of a circle, as shown particularly in Fig. 4. In the apparatus as illustrated in the drawings, these troughs are supported on the fixed shafts G′, so as not to rotate, though they may be held in a fixed position by other means, if preferred. They are preferably located near the outer sides of the treatment vessels, measuring from the common center B. A pipe *h* leads from the compartment H′ of the receiving bowl to each of the treatment vessels, to

deliver the material to be treated behind or outside of the troughs J, while spraying pipes h' lead from the compartment H′ of the receiving bowl to each of the treatment vessels, to introduce the desired supply of water. As the material is introduced into the treatment vessels, it is carried by the action of centrifugal force against their sides farthest from the common center of rotation, and as the vessels are carried around the lighter particles and the water are driven out by the action of centrifugal force above the tops of the vessels into a curbing or other suitable receptacle, whence they may be carried off. The heavier particles adhering to the sides of the treatment vessels are carried by their individual rotations around toward the common center of rotation, whence they are thrown or driven from the inner sides of the vessels by the action of centrifugal force produced by the common rotation, into the troughs J, and up and over their tops into a suitable curbing or receptacle, to be carried off to the desired place of deposit.

It is obvious that the rotatable vessel A may be dispensed with, and other means adopted for the individual rotation of the treatment vessels. It is equally obvious that the portion of the rotatable vessel A which contains the groove or tread, may be made in a separate piece and alone rotated, so as to impart rotation to the treatment vessels. One reason I prefer to use the rotatable vessel A, and particularly that portion of it which contains the groove or tread, is that it assists in maintaining the treatment vessels in their proper relative positions, and I therefore prefer to use the arrangement shown in the drawings. I have shown the treatment vessels arranged at an incline outward from the vertical. This brings the sides of the vessels farthest from the common center of rotation at an inclination outward from the vertical, so as to facilitate the discharge of the material being treated. By changing the angle of the hole through the bushing K, or substituting another bushing in its place, in which the shafts G′ are arranged, and which afford the bearing between the treatment vessels and such shafts, the inclination of the treatment vessels from the vertical may be increased or diminished, as circumstances may require. I also provide for varying or adjusting the distance of the treatment vessels from the common center to increase or diminish the friction between the rim or tire a' and the groove or tread a, or to compensate for adjustments in the inclination of the treatment vessels. I effect this by making the holes in the plates F and F′, by which the shafts G′ are connected to such plates, somewhat slotted or elongated, so that the shafts may be moved out or in with the treatment vessels, as may be found necessary from time to time, or as consequent upon a change of position in the treatment vessels. In like manner I provide for adjusting the positions of the troughs J, to correspond to changes in position of the treatment vessels, by connecting them at their upper portions to the shafts G′ by adjustable bracket or strap connections.

What I regard as new in this application and desire to secure by Letters Patent, is:—

1. In centrifugal ore separators, the combination of a treatment vessel arranged at an inclination outward from the vertical, rotatable around an axis external to itself and at the same time around its own axis, and means for effecting such rotations, substantially as described.

2. In centrifugal ore separators, the combination of a treatment vessel arranged at an inclination outward from the vertical, rotatable around an axis external to itself and at the same time around its own axis, a stationary trough arranged in such vessel toward its side farthest from the external axis of rotation, and means for rotating such vessel on its own axis and at the same time around the external axis, substantially as described.

3. In centrifugal ore separators, the combination of a treatment vessel arranged at an inclination outward from the vertical, rotatable around an axis external to itself, to and from which it is adjustable, and at the same time rotatable around its own axis, and means for effecting such adjustments and rotations, substantially as described.

ORRIN B. PECK.

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