(No Model.) 3 Sheets—Sheet 1.

O. B. PECK.

CENTRIFUGAL ORE SEPARATOR.

No. 489,201. Patented Jan. 3, 1893.

Fig. 1.

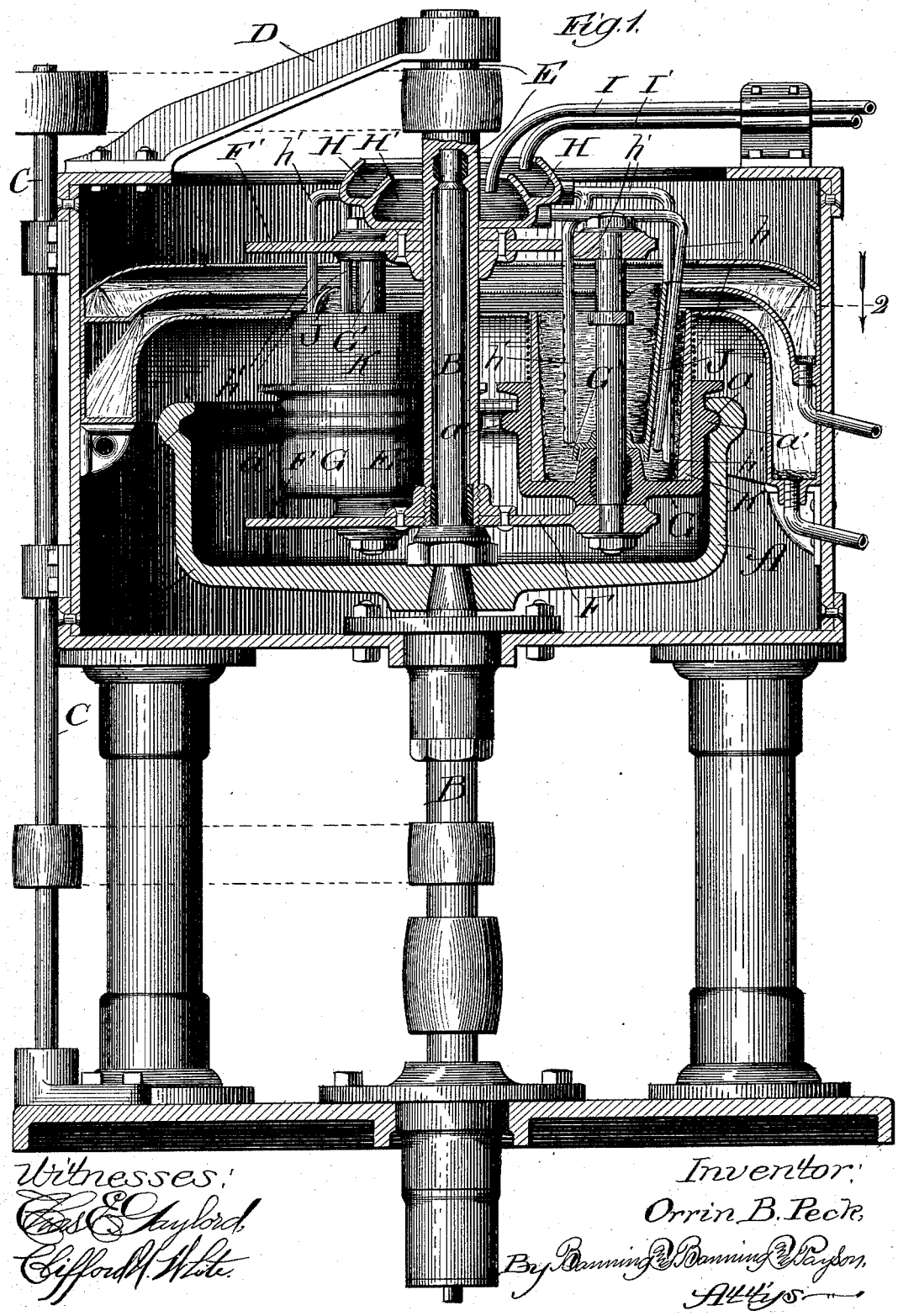

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Fig. 2.

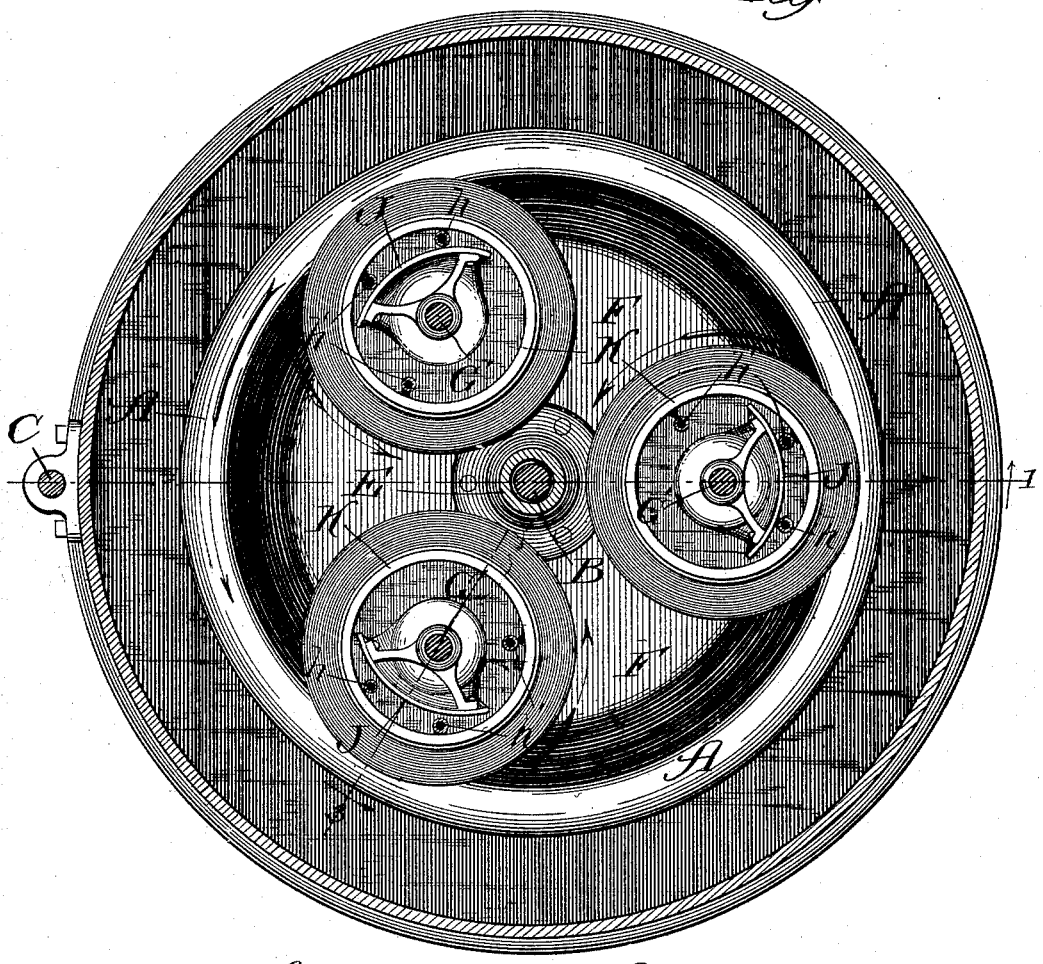
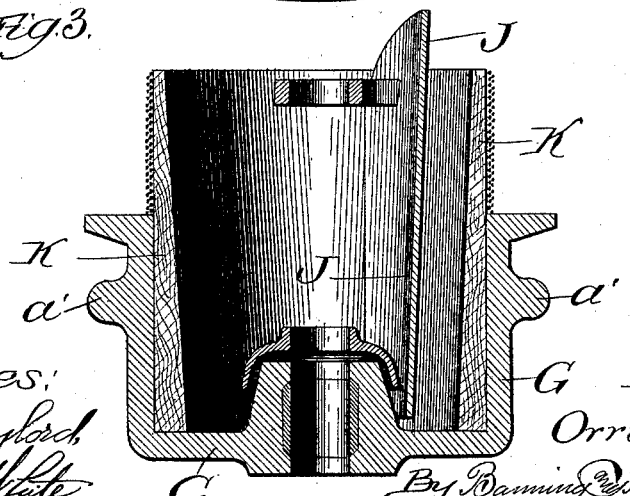


Fig. 3.



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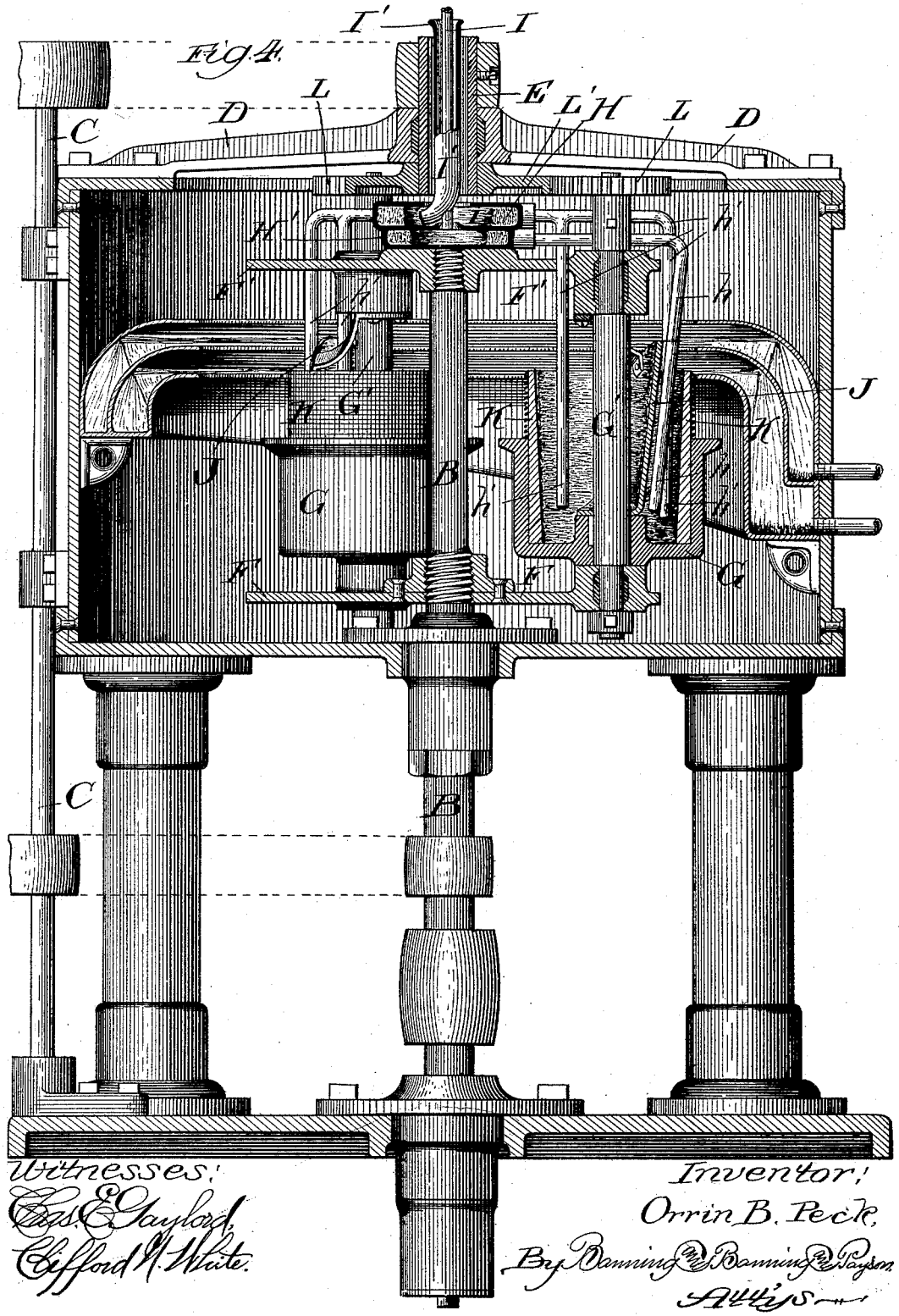

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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 489,201, dated January 3, 1893.

Application filed January 11, 1892. Serial No. 417,686. (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 represents a vertical section of my improved apparatus taken in line 1 of Fig. 2, looking in the direction of the arrow; Fig. 2 represents a plan view of a section taken in the line 2 of Fig. 1, looking in the direction of the arrow; Fig. 3 represents a vertical section of one of the separating vessels taken in line 3 of Fig. 2 looking in the direction of the arrow, and Fig. 4 represents a modified form of the apparatus.

In making my improved apparatus for the separation of 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. The shaft B is extended up through the rotatable vessel A, preferably to the top of the apparatus, as shown in the drawings. Arranged preferably 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 hollow shaft E, which is placed around the upper portion of the shaft B, extending down to a suitable step near the bottom of the revoluble vessel A. A belt connects a pulley on the top of the countershaft with a pulley near the top of the hollow sleeve E, so that as the countershaft is rotated it causes the hollow shaft to be also rotated. At the bottom of the hollow shaft is arranged a plate or disk F, and at a suitable position near the top of the apparatus is arranged another plate or disk F′. These plates are connected to the hollow shaft 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 F and F′. In the form of apparatus shown in the first two sheets of 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 tread or groove, so that there is frictional contact between them. The vessels G are carried around by the rotation of the hollow shaft, 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 hollow 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 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 hollow sleeve 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 and nearly vertical

troughs J, which preferably describe the arc of a circle, as shown particularly in Fig. 2. In the apparatus, as illustrated in the first two sheets of the drawings, these troughs are supported on the fixed shafts G′, so as not to rotate, while in Fig. 4 they are arranged in a fixed position by other means. 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 spray 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 around 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, and along 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. In Fig. 4 I have shown a modified form of the apparatus in which this has been done. In this modified apparatus the shafts G′ are made rotatable, and are provided with gear wheels L at their tops, meshing into a pinion L′, rotated on the sleeve E, and the treatment vessels are keyed or otherwise fastened to the shafts G′, so as to be rotated by them. In this arrangement the vessels are all carried around a common center, as in the apparatus illustrated in the first two sheets of the drawings, except that the plates or disks F, F′, on which they are mounted, are rotated by the shaft B, instead of by the hollow sleeve E, but the several treatment vessels are rotated separately by the rotation of the shafts G′.

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 rotatable around an axis external to itself, and at the same time around its own axis, means for introducing material and water into the treatment vessel and means for effecting such rotations, substantially as described.

2. In centrifugal ore separators, the combination of a treatment vessel 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 two or more treatment vessels rotatable around a common center, and each at the same time rotatable around its individual center, and means for rotating such vessels, substantially as described.

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