(No Model.) 2 Sheets—Sheet 1.

O. B. PECK.

MACHINERY FOR CENTRIFUGALLY TREATING PARTICLES OF METALLIC OR MINERAL BEARING SUBSTANCES OF DIFFERENT DEGREES OF SPECIFIC GRAVITY.

No. 444,615. Patented Jan. 13, 1891.

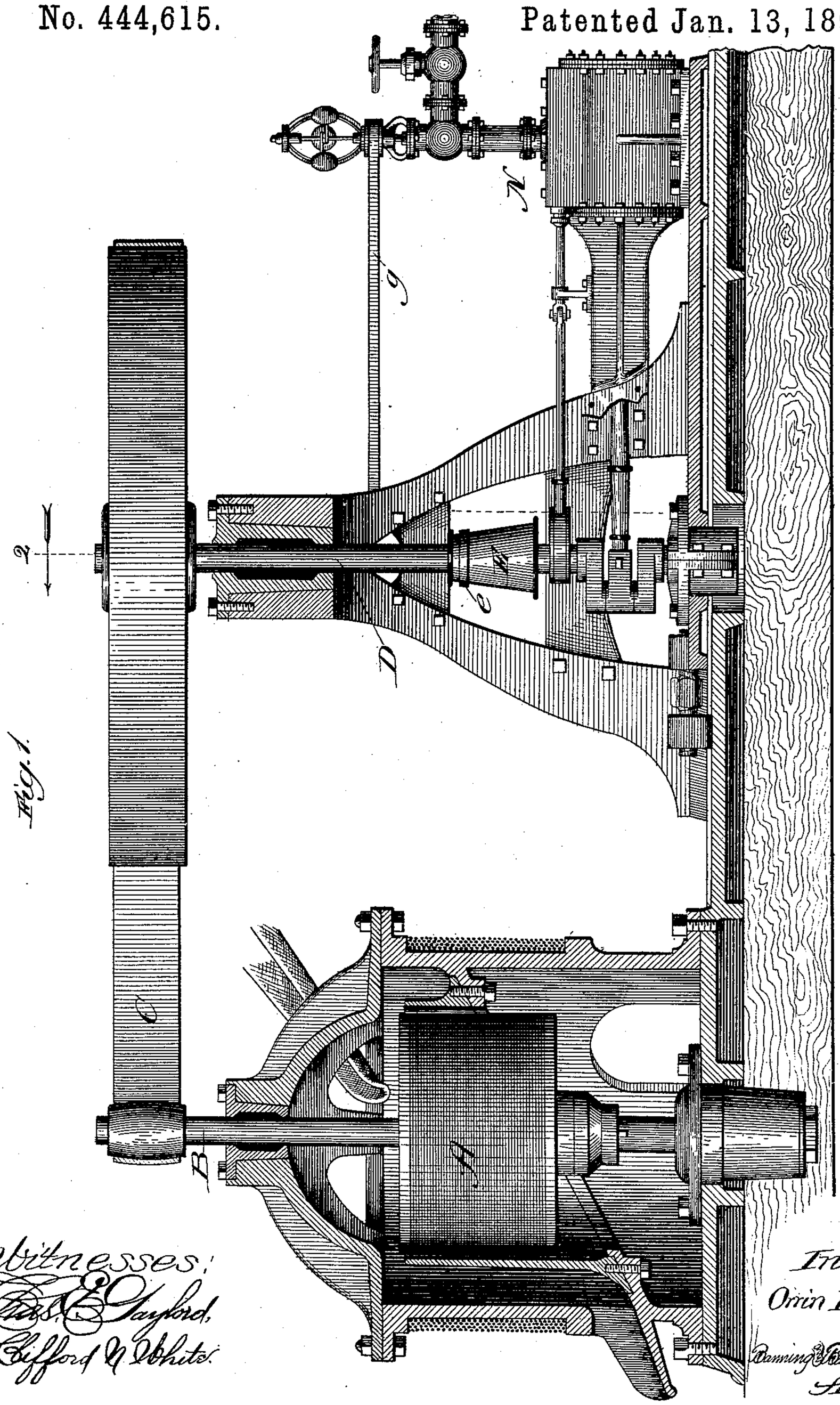

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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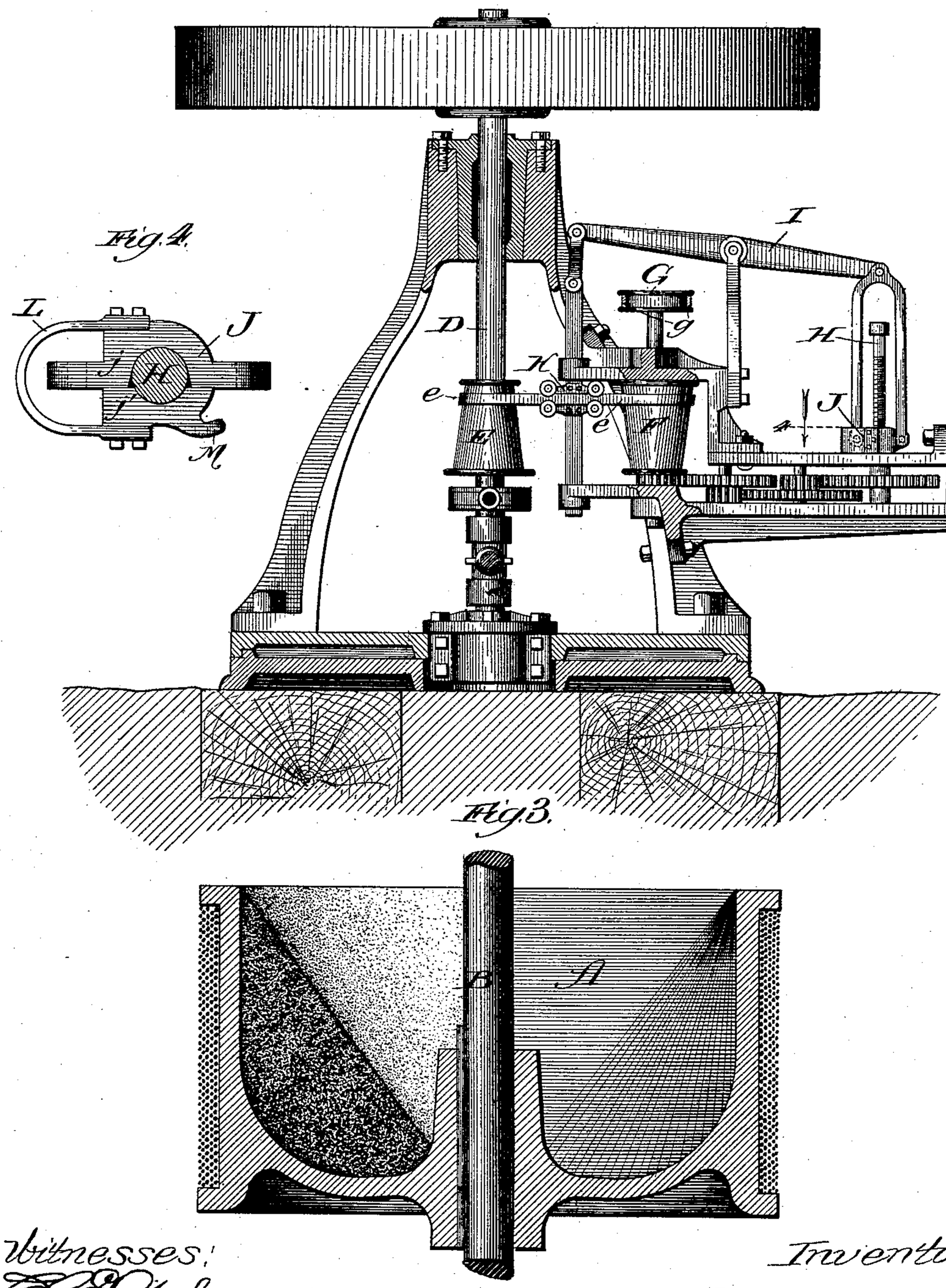
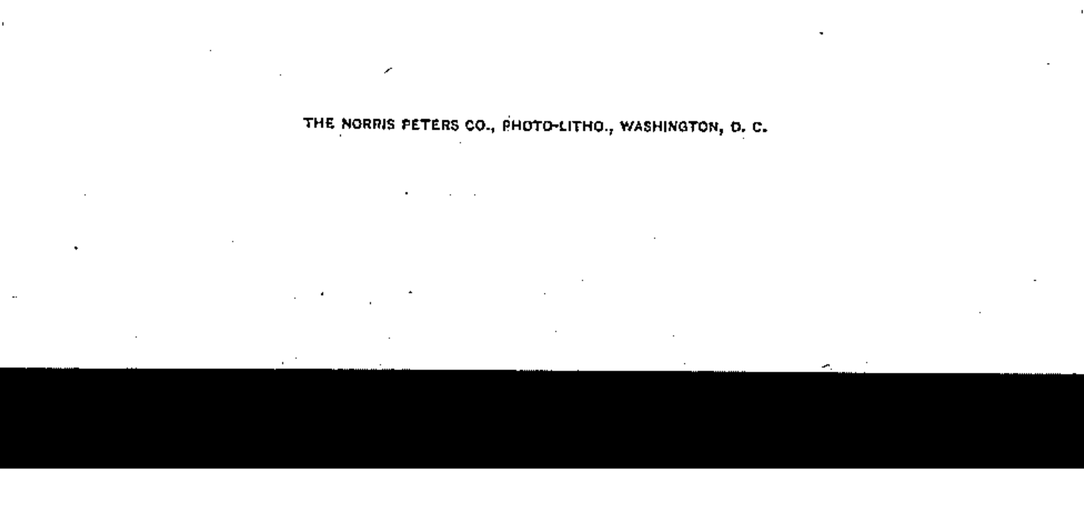


Fig. 4.

Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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

MACHINERY FOR CENTRIFUGALLY TREATING PARTICLES OF METALLIC OR MINERAL-BEARING SUBSTANCES OF DIFFERENT DEGREES OF SPECIFIC GRAVITY.

SPECIFICATION forming part of Letters Patent No. 444,615, dated January 13, 1891.

Application filed May 23, 1890. Serial No. 352,908. (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 Machinery for Centrifugally Treating Particles of Metallic or Mineral-Bearing Substances of Different Degrees of Specific Gravity, of which the following is a specification.

The object of my invention is to provide machinery in which the speed of the revoluble vessel receiving the particles of metallic or mineral-bearing substances of different degrees of specific gravity to be subjected to the action of centrifugal force may be gradually decreased from a high to a diminished rate of rotation from the commencement to the end of the operation; and my invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation, partly in section, of my improved machine. Fig. 2 is a vertical section taken in the line 2 of Fig. 1, looking in the direction of the arrow. Fig. 3 is a vertical section of the revolving vessel in which the matter is treated, and Fig. 4 is a detail of a nut hereinafter described.

In subjecting fine or powdery particles to the action of centrifugal force in a revoluble vessel I have found that the particles assume a position more nearly or more remotely approaching a vertical line against the sides of the vessel nearly in proportion to the amount of centrifugal force developed and speed at which the vessel in which they are treated is rotated.

In Fig. 3 of the drawings the lines diverging from the top to the bottom of the vessel will illustrate the position and quantity of material in the vessel at different rates of rotation. When the vessel is rotated at a very high speed, the particles introduced will be thrown to the sides and assume a nearly-vertical position, forming a nearly-vertical wall or thin layer, so that a comparatively small quantity will be retained in the vessel, and as new particles are introduced they will be forced against and up across the surface of this wall or layer and be discharged from the top of the vessel and lost. If, however, the speed of rotation of the revoluble vessel be great when the material begins to be introduced and gradually diminished throughout the operation, the heavier particles of the material will gradually lodge and accumulate on the surface of the wall or layer of material already accumulated and will be retained in the vessel while the lighter particles are passing or being forced across the surface of such already accumulated wall or layer to be discharged from the top of the vessel. In this way a gradually-accumulated mass of material is formed, inclining toward the top, as illustrated in one side of the vessel shown in Fig. 3. To secure this gradual and constant diminution of speed in the rotation of the receiving-vessel from the commencement to the end of the operation, I mount the vessel A on a revolving shaft B, adapted to support and rotate it. The shaft B is rotated by the belt C, driven by a pulley on the power-shaft D. This shaft is shown in the drawings as practically an extension of the crank-shaft of the engine, although it may be any shaft appropriately arranged to serve the purpose of transmitting the motive power. Mounted on this shaft I arrange a taper sheave or pulley E, and in proper location to it I arrange another taper pulley F on a shaft connected by a belt *g* on a pulley G with the governor of the engine. The two taper pulleys are connected together by belt *e* or by any other well-known and appropriate means. The shaft carrying the pulley F is provided with a pinion at one end connecting the trains of gear-wheels and the threaded screw H. A lever I is fulcrumed on any suitable support and provided at one end, through suitable link-connections, with a nut J, and at the other with a belt-guide K. This belt-guide suitably embraces the belt *e*, so as to move the same up or down as it is moved up or down by the action of the lever I. As the power of the engine N is applied and the revolving vessel A rotates, the pulley E on the shaft D is also rotated and drives the belt *e*, connecting it with the pulley F. This belt at the com-

mencement of the operation is intended to be arranged at the smallest end of the taper pulley E and at the largest end of the taper pulley F. As it rotates the pulley F, the train of gear-wheels is set in operation and the threaded rod H rotated. The gear-wheels are so arranged that this rod will be rotated very slowly. As it rotates it carries the nut J upward, lifting the end of the lever to which it is connected by links, and correspondingly depressing the other end of the lever with the belt-guide K. This of course carries the belt *e* down with it, so that it gradually passes from the larger to the smaller end of the taper pulley F. As it moves toward the smaller end of this pulley and toward the larger end of the pulley E, it is of course rotated at a higher rate of speed. This causes the belt *g*, connecting with the pulley of the governor, to travel more rapidly and to drive the governor at a greater speed. As its speed increases it gradually diminishes or stops the quantity of steam admitted to the cylinder, so that the speed of the engine, and consequently the speed of the receiving-vessel A, are gradually diminished, so that at the end of the operation, or during the time which it has taken for the belt *e* to travel from one end of the pulleys E and F to the other, which may occupy an hour in time, the receiving-vessel is rotating at a greatly-diminished rate of speed. In this way the heavier and more valuable particles of the material have been permitted to gradually accumulate in the vessel, as above described, instead of being thrown off and lost, as would be the case if the vessel were rotated at a uniform rate of speed. After the nut J has gradually passed from one end of the threaded rod H to the other it is of course desirable to return it to its initial point in preparation for another operation. This may be done while the vessel is being emptied, if desired, so that no loss of time need occur. To facilitate this return of the nut J to its original position, I make it in two parts *j* and *j'*. These parts are held together, preferably, by a U-spring L, which may be sprung apart a sufficient distance to support the two parts of the nut enough to disengage its screw-threads with the screw-threads of the rod H. This will enable it to slide down to its initial position, when the spring is allowed to bring the parts together again to once more engage the threads of the rod H.

To facilitate the opening of the parts from each other, I have provided the nut with an extension or handle M, which may be grasped to pull the pieces apart.

As I intend in this application to claim, broadly, a revoluble vessel adapted to be rotated at a gradually-decreasing rate of speed from a high to a diminished speed of rotation and means for accomplishing such diminishing speed of rotation, I wish to say that I do not intend to confine myself to the details of construction which I have shown and described.

What I regard as new, and desire to secure by Letters Patent, is--

1. In machinery for centrifugally treating and separating particles of metallic or mineral-bearing substances, the combination of a revoluble vessel, means for rotating such vessel, and means for gradually and automatically decreasing its speed of rotation from the commencement to the end of the operation, substantially as described.

2. In machinery for centrifugally treating and separating particles of metallic or mineral-bearing substances, the combination of a revoluble vessel, an engine generating and supplying power for the rotation of such vessel, means for transmitting and applying such power, and means for gradually and automatically decreasing the speed of the engine, and thereby the speed of rotation of the revoluble vessel, from the commencement to the end of the operation, substantially as described.

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Witnesses:
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