No. 696,130. Patented Mar. 25, 1902.

J. J. BERRIGAN.

CENTRIFUGAL MACHINE.

(Application filed July 2, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

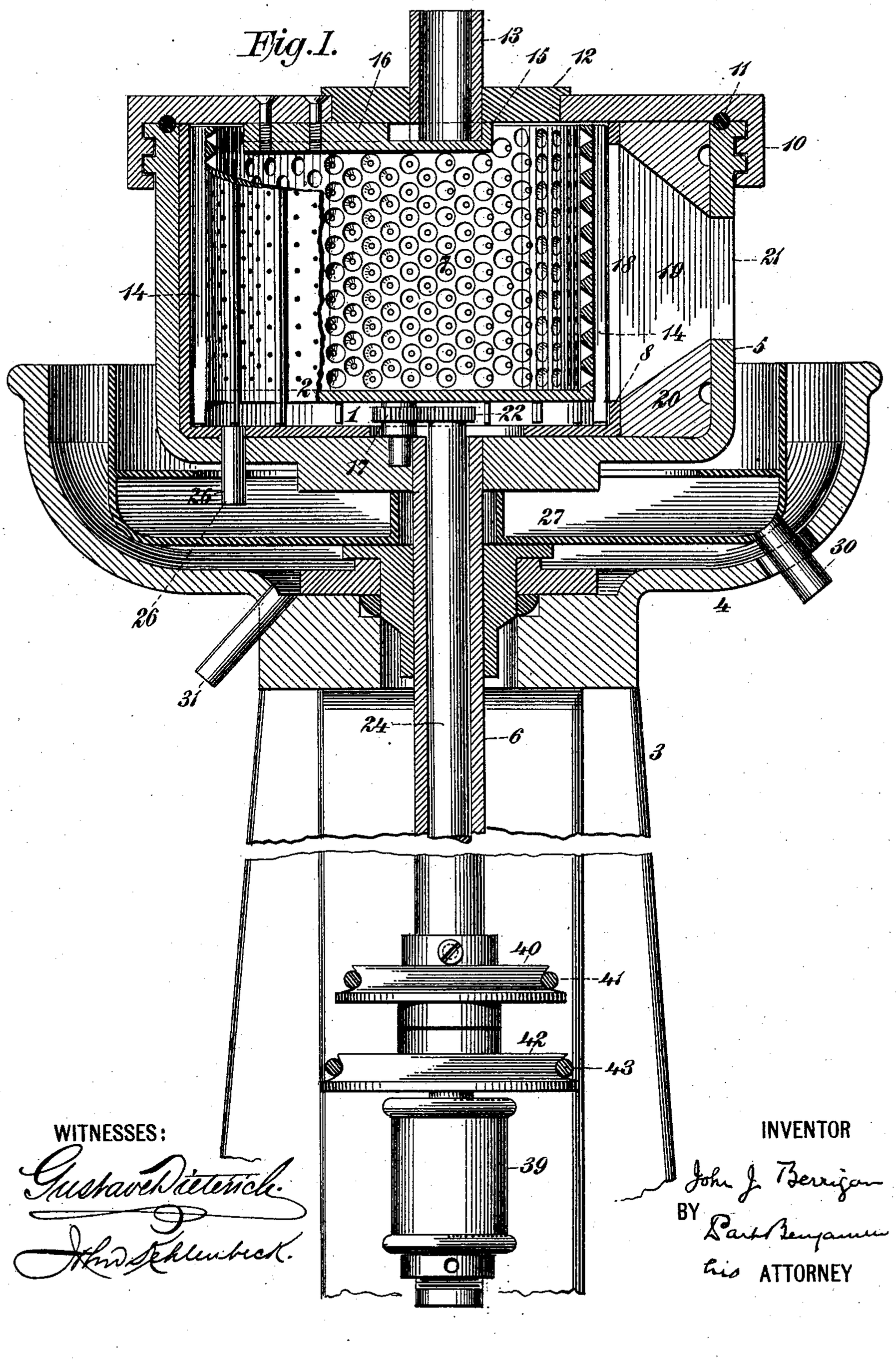

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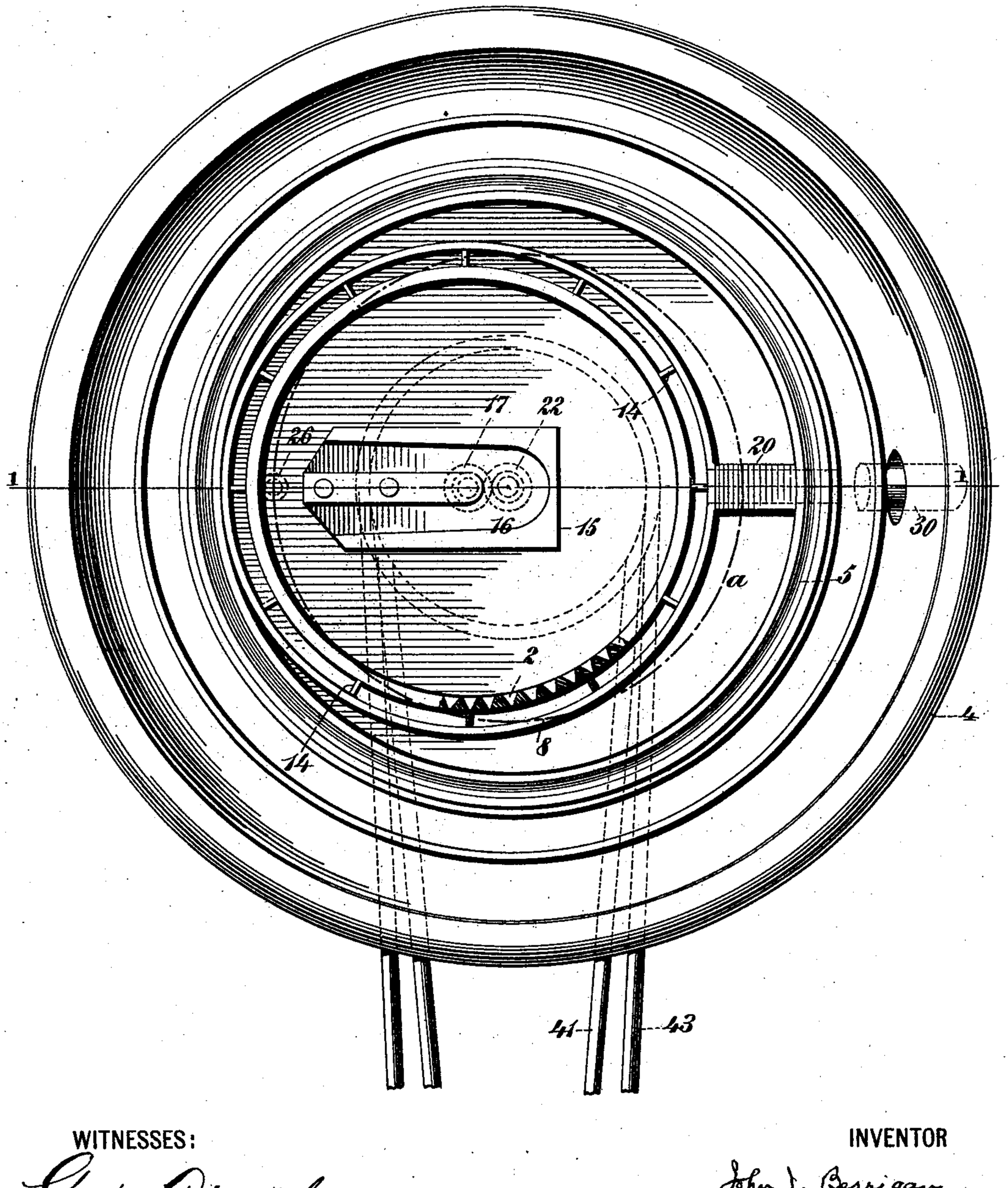
Fig. 2.



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CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 696,130, dated March 25, 1902.

Application filed July 2, 1901. Serial No. 66,861. (No model.)

To all whom it may concern:

Be it known that I, JOHN JOSEPH BERRIGAN, of East Orange, Essex county, New Jersey, have invented a new and useful Improvement in Centrifugal Machines, of which the following is a specification.

My invention relates to a centrifugal machine wherein solids and liquids are separated, the two constituents being continuously ejected while the apparatus is in operation.

My invention consists in a receptacle for the combined constituents to be separated rotary on an eccentric axis and provided with a perforated vessel to receive said constituents; also, in said receptacle having a rotary perforated vessel for the same purpose; also, in the combination of the cylindrical receptacle, the cylindrical rotary perforated vessel therein, and scrapers on the exterior of said vessel constructed to remove the solid constituent deposited on the interior of said receptacle and convey the same to an outlet-opening; also, in the various combinations more particularly set forth in the claims.

In the accompanying drawings, Figure 1 is a vertical section on the line *x x* of Fig. 2. Fig. 2 is a plan view.

Similar numbers of reference indicate like parts.

The supporting-standard 3 of the machine is preferably cast in one piece with the cup 4. Within the cup is the rotary drum 5, secured on the hollow shaft 6. In the drum 5 is the fixed cylindrical receptacle 8. Drum and receptacle are closed by a cover 9, having flange 10, threaded to engage with the drum periphery. A gasket 11 may be interposed between cover and drum. In cover 9 is a flanged plug 12, supporting the inlet-conduit 13. Secured on the under side of the cover is a plate 15, having channels 16. The material entering receptacle 8 by conduit 13 passes through the channels 16 and is ejected therefrom by centrifugal force. In the wall of receptacle 8 is an opening 18, which communicates through a conduit 19, formed in plate 20, with a smaller opening 21 in the wall of the drum. The openings 18 and 21 and conduit 19 together form a passage through which the solid constituent of the material under treatment is ejected from the machine by centrifugal force.

The liquid constituent flows from vessel 8 by pipe 26 into a stationary pan 27, whence it escapes from the machine by the outlet-pipe 30. Pipe 31 is a drain for the cup 4. The drum 5 is rotated by means of the grooved pulley 40 on the hollow shaft 6, to which motion is imparted by a belt 41 from any suitable motor.

The foregoing mechanism is fully shown and described in Letters Patent No. 677,926, granted to me July 9, 1901.

I will now set forth the especial features of improvement to which my present application relates. Pivoted, as shown at 1, within the receptacle 8 is a cylindrical vessel 2, the wall of which is perforated with numerous conical openings, as 7. The diameter of vessel 2 is somewhat less than that of receptacle 8, so that a narrow annular space is left between them. On the exterior of vessel 2 are vertical scrapers 14, the outer edges of which bear against the inner surface of the wall of receptacle 8. On the supporting-pivot 1 of vessel 2 is a gear 17, which engages with a gear 22, fast on the shaft 24, which is received within the hollow shaft 6. Shaft 24 is rotated by the grooved pulley 42, to which motion is imparted by the belt 43, and the lower end is received in a step (not shown) disposed within the fixed sleeve 39, which may be cast integrally with standard 3.

The operation of the machine is as follows: The drum 5 and vessel 2 being set in rotation, a sufficient quantity of liquid is poured in through conduit 13 to produce the liquid ring around the interior of drum 5, substantially as shown at *a*, Fig. 2. The combined constituents (solid and liquid) to be separated are then introduced through the conduit 13. As they descend into the channels 16 they are projected therefrom by centrifugal force against the inner surface of the rotating perforated vessel 2. Both constituents are then carried by the centrifugal force of rotation of drum 5 through the conical apertures in said vessel and against the inner wall of receptacle 8 at and near the place of greatest eccentricity with respect to the axis of rotation of drum 5. The liquid escapes through pipe 26 to pan 27, and, as already stated, out of the machine by pipe 30. The solid constituent as fast as deposited is removed by the

scrapers 14 and carried by them around the inner periphery of receptacle 8 until the outlet 18 is reached, when, as already explained, by the action of centrifugal force said constituent is ejected through said opening, conduit 19, and opening 21 out of the machine.

The special advantage of the arrangement above described is as follows: In the centrifugal machine described in my aforesaid patent I employ within the cylindrical receptacle a central rotary shaft provided with arms having scrapers at the ends of said arms, which scrapers traverse the inner periphery of the receptacle and convey the solid constituent from its place of deposit to the outlet-opening. I have found that when the solid to be separated from the liquid is light and fine in character the use of radial scraper-arms is a disadvantage, for the reason that they operate to agitate the fluid material within the receptacle, and thus prevent its ready deposit by the action of centrifugal force. It will be seen that in my present device I use no central shaft having radial arms to support scrapers and that the scrapers, as already explained, are disposed on the exterior of the rotating perforated vessel. As a consequence the liquid between the perforated vessel and the receptacle remains practically quiet, so that the fine solids are readily precipitated by the action of centrifugal force on the receptacle-wall. It will be noticed that the conical apertures in the perforated vessel 2 are larger at their inner ends and that there are very many of them, so that the combined materials readily pass through them to the annular space between the perforated vessel and receptacle.

I claim—

1. In a centrifugal machine in combination with a receptacle for the combined constituents to be separated rotary on an eccentric axis, a multiperforated vessel arranged to receive said constituents and disposed within said receptacle.

2. In a centrifugal machine, in combination with a receptacle for the combined solid and liquid constituents to be separated rotary on an eccentric axis and having an outlet-opening for said solid constituent a multiperforated vessel arranged to receive said constituents and disposed within said receptacle, and means between said vessel and receptacle for conveying the solid constituent deposited on the wall of said receptacle to said outlet-opening.

3. In a centrifugal machine, in combination with a receptacle for the combined constituents to be separated rotary on an eccentric axis, a rotary multiperforated vessel arranged to receive said constituents and disposed within said receptacle.

4. In a centrifugal machine, the combination of a receptacle for the combined solid and liquid constituents to be separated having an outlet-opening for said solid constituent and constructed to rotate on an eccentric axis, a rotary receiving multiperforated vessel for said constituents disposed within said receptacle, and means for conveying the solid constituent deposited on a portion of the inner surface of said receptacle to said outlet-opening.

5. In a centrifugal machine, the combination of a receptacle for the combined solid and liquid constituents to be separated having an outlet-opening for said solid constituent and constructed to rotate on an eccentric axis, a rotary receiving multiperforated vessel for said constituents, and means on the exterior of said vessel for conveying the solid constituent deposited on a portion of the inner surface of said receptacle to said outlet-opening.

6. In a centrifugal machine, the combination of a cylindrical receptacle for the combined constituents to be separated constructed to rotate on an eccentric axis, and a multiperforated vessel disposed within said receptacle and rotary on an axis concentric therewith.

7. In a centrifugal machine, the combination of a cylindrical receptacle for the combined constituents to be separated constructed to rotate on an eccentric axis, a rotary cylindrical multiperforated vessel within said receptacle and means for feeding said constituents into said vessel.

8. In a centrifugal machine, the combination of a cylindrical receptacle for the combined constituents to be separated constructed to rotate on an eccentric axis, a cylindrical vessel of less diameter within said vessel and having a multiplicity of conical perforations in its wall, means for rotating said vessel on its own central axis, and means for feeding said constituents into said perforated vessel.

9. In a centrifugal machine the combination of a cylindrical vessel for the combined constituents to be separated rotary on an eccentric axis and provided with an outlet-opening, a rotary cylindrical multiperforated vessel of less diameter than said cylindrical vessel and disposed within the same and a scraper on the exterior of said multiperforated vessel adapted to convey the material deposited on the inner surface of said cylindrical vessel to the said outlet-opening thereof.

10. In a centrifugal machine, the combination of a cylindrical vessel for the combined constituents to be separated rotary on an eccentric axis and provided with an outlet-opening, a rotary cylindrical multiperforated vessel of less diameter than said cylindrical vessel and concentrically disposed within the same, and a scraper on the exterior of said multiperforated vessel adapted to convey the material deposited on the inner surface of said vessel to the said outlet-opening thereof.

11. The combination of the rotary drum 5, receptacle 8 eccentrically fixed therein, rotary multiperforated vessel 2 concentrically

pivoted within said receptacle 8, and a plurality of scrapers 14 on the outer periphery of said perforated vessel.

12. The combination of the rotary drum 5, supporting hollow shaft 6, receptacle 8 eccentrically fixed in said drum, multiperforated vessel 2, pivot 1 supporting said perforated vessel concentrically within said receptacle, rotary shaft 24 within hollow shaft 6, and gears 17 and 22 between shaft 24 and pivot 1.

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