No. 834,043. PATENTED OCT. 23, 1906.

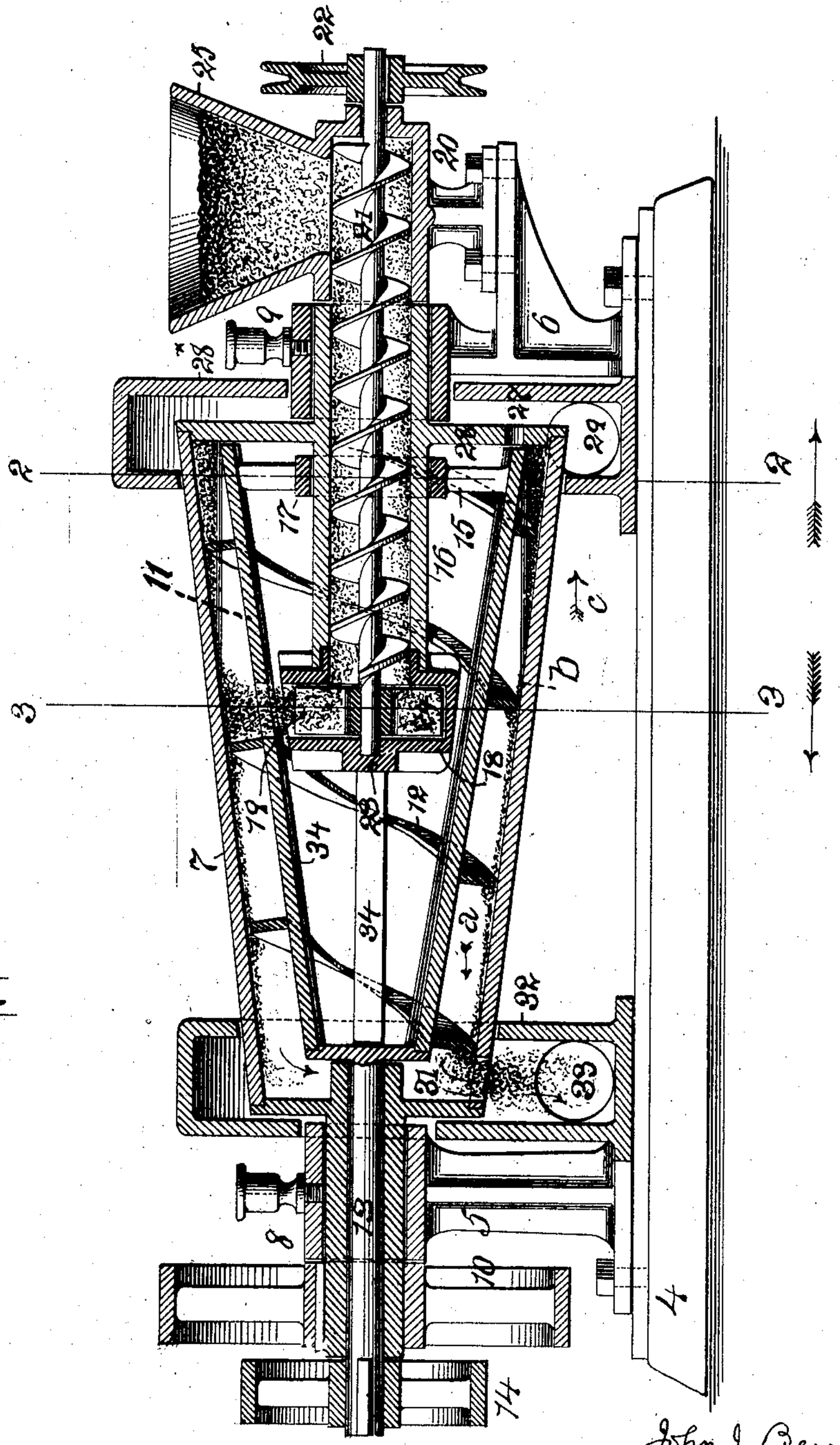
J. J. BERRIGAN.

CENTRIFUGAL SEPARATOR.

APPLICATION FILED MAR. 1, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 2.

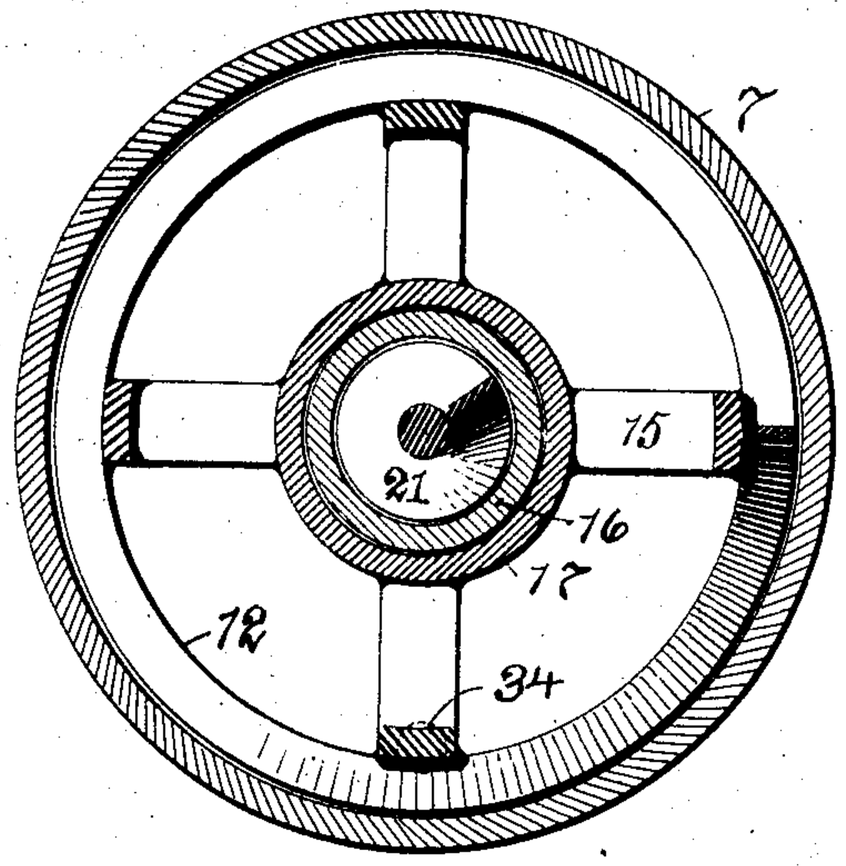
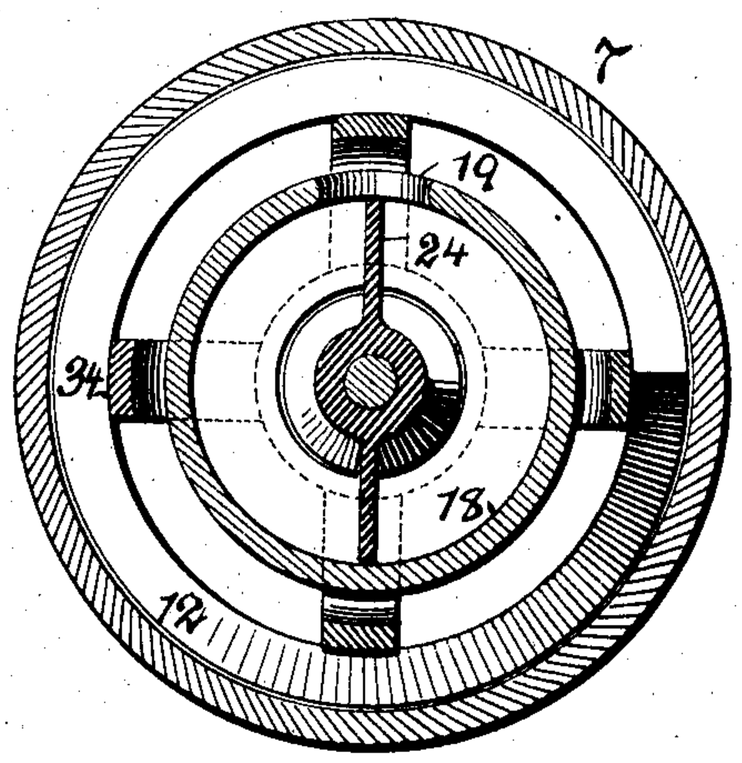


Fig. 3.



WITNESSES:

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CENTRIFUGAL SEPARATOR.

No. 834,043. Specification of Letters Patent. Patented Oct. 23, 1906.

Application filed March 1, 1904. Serial No. 196,056.

To all whom it may concern:

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

In another application for Letters Patent, Serial No. 193,147, filed by me February 11, 1904, I have fully described and broadly claimed a new machine for separating solids and liquids, wherein the liquid is drawn off by decantation from the inner surface of the deposit formed by centrifugal force on the circumferential wall of a rotary vessel, while the solids are conveyed from said deposit longitudinally of said vessel over a dry space therein and finally ejected at a distance from their place of entry.

My present invention consists in the construction of the centrifugal machine described, wherein the aforesaid principle is carried into effect, as more particularly hereinafter pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of the machine. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 is a cross-section on the line 3 3 of Fig. 1.

Similar numbers of reference indicate like parts.

4 is the bed of the machine, upon which are bolted two standards 5 and 6.

7 is a rotary conical separating vessel supported on trunnions 8 and 9, journaled, respectively, in standards 5 and 6. Trunnion 8 receives the driving-pulley 10, by which the vessel 7 is rotated on its longitudinal axis. Within the vessel 7 is a long conical cage 11, formed by the bars 34, which on its exterior carries the spiral conveyer-blade 12. Extending from the small end of cage 11 and passing through the hollow trunnion 8 and also through the hub of the driving-pulley 10 is a shaft 13, which carries a pulley 14, by means of which pulley the conveyer-cage 11 is rotated at a speed different from that at which the separating vessel 7 is rotated by means of the pulley 10. In the large end of cage 11 is disposed a supporting-spider 15. The hollow trunnion 9 is extended inwardly, as shown at 16, and passes through the central ring 17 of the spider 15. The inner end of the tubular extension 16 communicates with a box 18, which has a delivery-opening 19. Supported on standard 6 is a feed-chamber 20, open at one end to coincide with the opening in the hollow trunnion 9 and tubular extension 16. In said chamber, trunnion, and tubular extension is a spiral conveyer 21. One end of the shaft of said conveyer carries a driving-pulley 22. The other end is journaled at 23 in the box 18. Within the box 18 the conveyer-shaft carries radial arms 24. Communicating with the chamber 20 is a feed-hopper 25. The liquid-escape opening 27 is disposed in the large head 28 of the separating vessel. 28* is a stationary box receiving said large end and having a liquid-outlet at 29. At the small end of the rotary vessel is an escape-orifice 31 for solids, which delivers into an inclosing box 32, from which said solids pass by the opening 33.

The operation of the machine as a whole is as follows: The combined materials being placed in the hopper 25 are fed by the rotary conveyer 21 into the box 23 and thence by centrifugal force and the revolution of the arms 24 are ejected through the opening 19 and through an interval between the parts of one of the cage-bars 34, as shown in Fig. 1, and so into the separating vessel 7. By the action of centrifugal force said materials are caused to form a ring near the large end of said vessel. When said ring attains a certain depth measured radially from the axis of rotation of said vessel, the liquid which is on the inner periphery of said ring escapes through opening 27, and so into the box 28*, and finally out at 29. Meanwhile the conveyer-blades 12 move the solid in the direction of the arrows *a* to the small end of the vessel 7, and so to the outlet 31 and box 32, and finally escape-opening 33.

I desire to call special attention to the following points of construction: The longitudinal axis of the separating vessel is coincident with its axis of rotation and not eccentric thereto, as is specifically shown in the embodiment of my invention illustrated in my aforesaid pending application. The incoming feed instead of being delivered at some point near to the large end is delivered at a point a considerable distance therefrom. The object of this is to prevent the combined

materials flowing directly from inlet to the liquid-outlet 27. It will be noticed that in my present device the liquid-line extends longitudinally of the separating vessel to a point *b* and that the stream of incoming material to that vessel meets its inner periphery at a point between *b* and the small end of said vessel. The combined materials therein when acted on by centrifugal force to move to that portion of the vessel farthest radially distant from its axis of rotation are caused to travel in the direction of the arrow *c*, or, in other words, in a direction against that in which they are positively moved by the rotary conveyer 12. The consequence of this is that while the liquid with comparative freedom passes the conveyer the solids are constantly intercepted by it and moved toward the delivery end, so that the tendency of an overplus of solids to accumulate at the large end of the vessel is thus prevented and all danger of their being quickly washed into the liquid-outlet opening is avoided. Another point to be noted is that although the conveyer and the separating vessel are rotated at different speeds the tube 16 is fast within the vessel, and hence rotates at the same speed, so that the opening 19 does not change position circumferentially around the separating vessel, but always delivers material against the same part of the inner periphery thereof.

I claim—

1. In a machine for separating solids and liquids a rotary separating vessel having a liquid-outlet, means within said vessel for conveying the solid material in a direction longitudinally of said vessel from inlet to outlet, and means for feeding the materials to be separated into said vessel at a point distant from one end thereof.

2. In a machine for separating solids and liquids, a rotary separating vessel having a liquid-outlet between its circumferential wall and its axis of rotation, means for conveying solid material in a direction longitudinally of said vessel from inlet to outlet and means for feeding materials to be separated into said vessel at a point between said liquid-outlet and said solid-outlet.

3. In a machine for separating solids and liquids, a rotary separating vessel having outlet-openings respectively for the separated materials, an axially-disposed feed-tube having a lateral escape-opening entering said vessel and rotating therewith, and means for moving the deposited solid material in a direction longitudinally of said vessel to its escape-outlet.

4. In a machine for separating solids and liquids, a rotary separating vessel having outlet-openings respectively for the separated materials, an axially-disposed feed-tube having a lateral escape-opening entering said vessel and rotating therewith and a rotary spiral conveyer surrounding said tube and constructed to move the deposited solid material to its escape-outlet.

5. In a machine for separating solids and liquids a rotary separating vessel having a liquid-outlet between its circumferential wall and its axis of rotation, and an escape-outlet for solids, an axially-disposed feed-tube having a lateral escape-opening entering said vessel and rotating therewith, a spiral conveyer, a cage supporting said conveyer within said vessel and surrounding said tube and means for rotating said cage at a rate of speed different from that of said vessel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN JOSEPH BERRIGAN.

Witnesses:

WM. H. SIEGMAN,

I. A. VAN WART.