

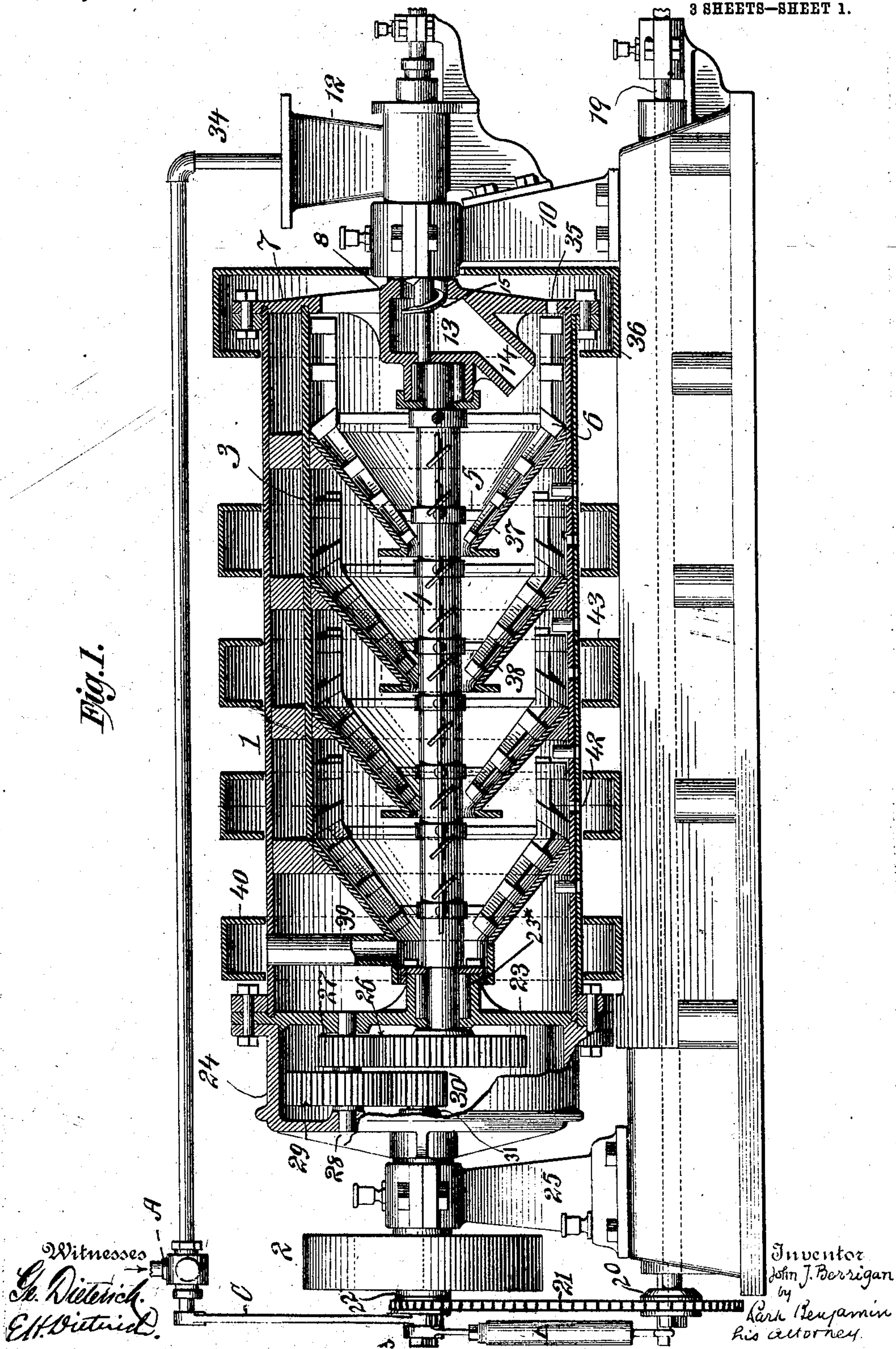
J. J. BERRIGAN.
 FEED GOVERNOR FOR CENTRIFUGAL SEPARATORS.
 APPLICATION FILED OCT. 6, 1905.

924,308.

Patented June 8, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

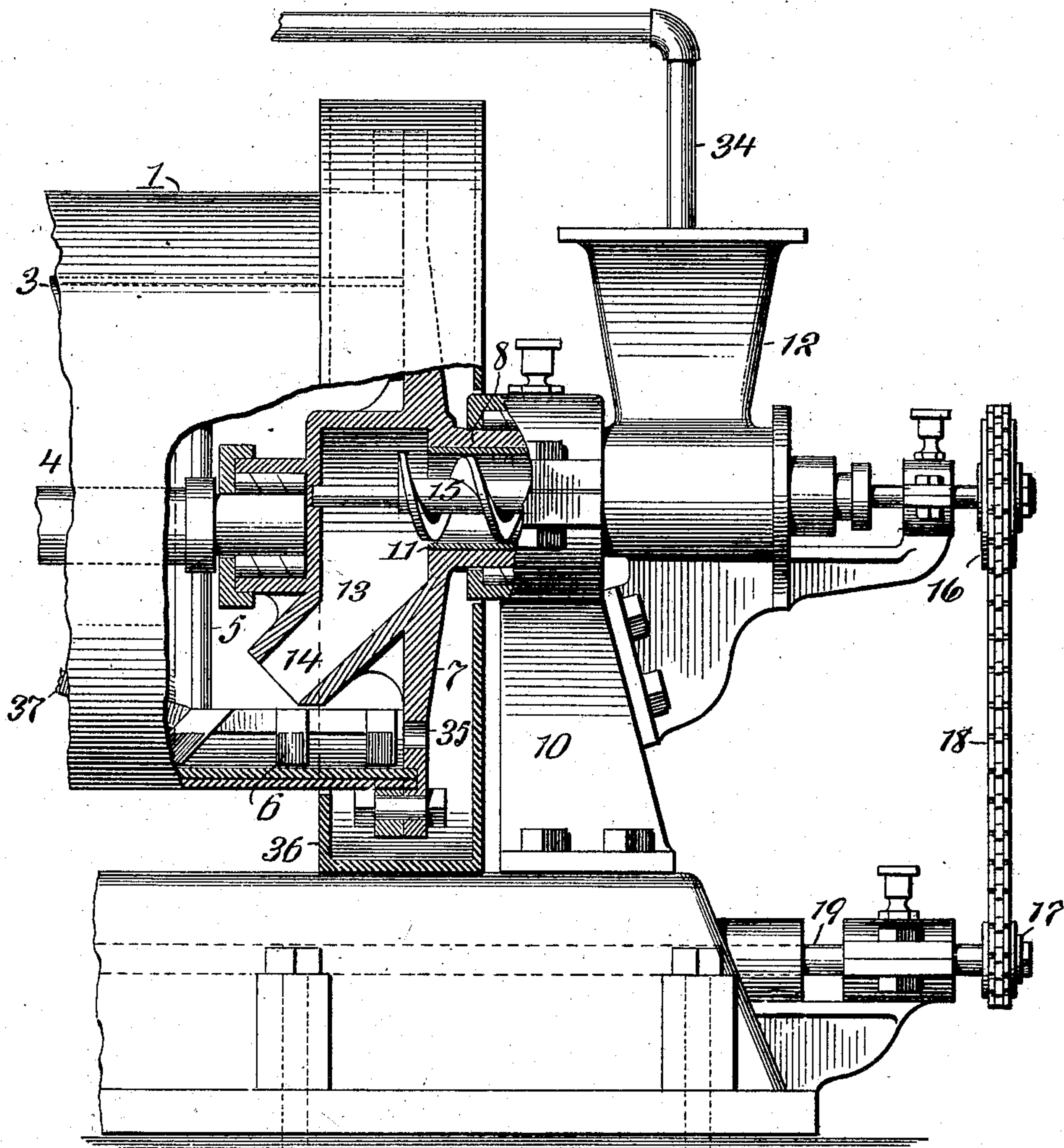


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Fig. 2.



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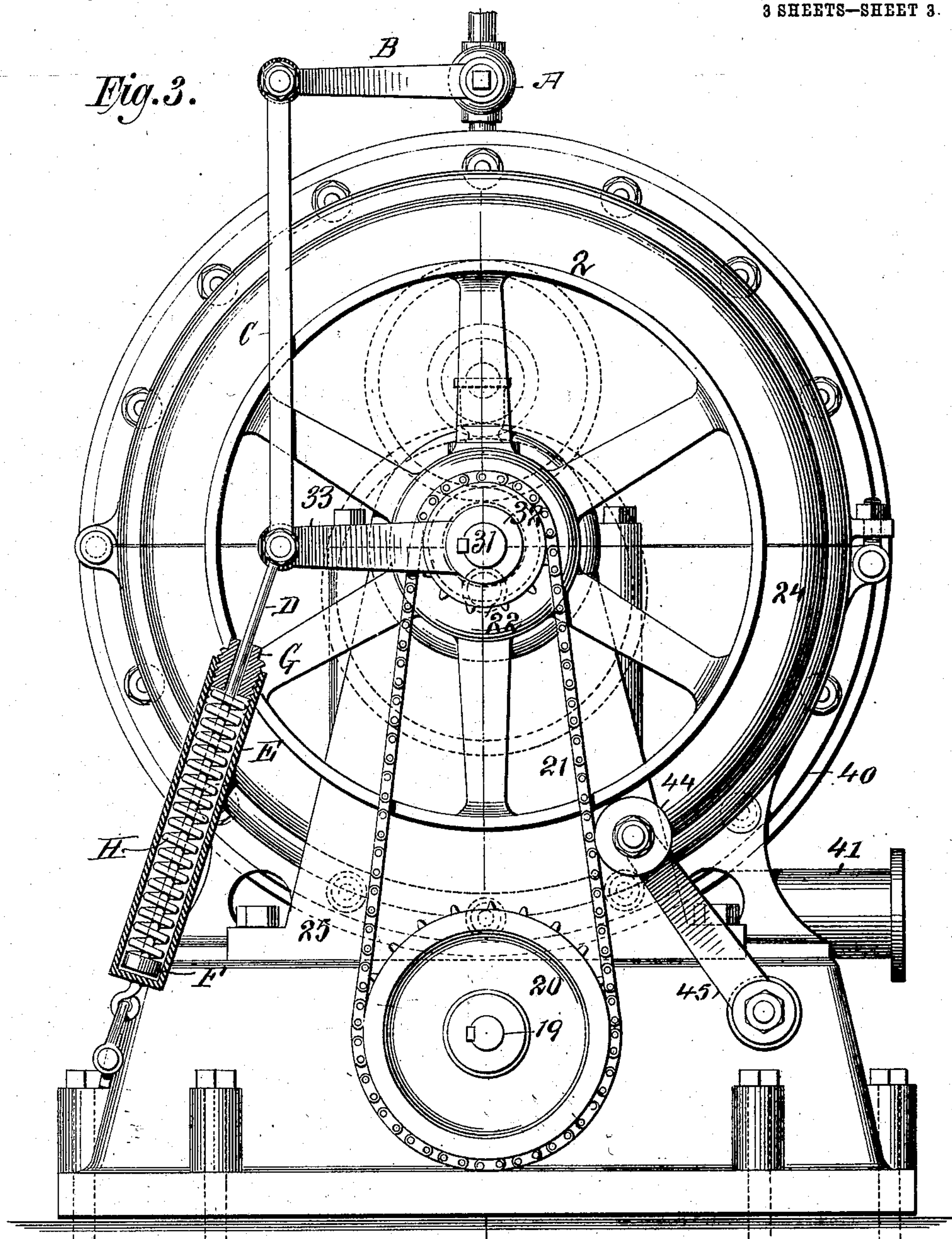
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UNITED STATES PATENT OFFICE.

JOHN J. BERRIGAN, OF ORANGE, NEW JERSEY.

FEED-GOVERNOR FOR CENTRIFUGAL SEPARATORS.

No. 924,308.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed October 6, 1905. Serial No. 281,593.

To all whom it may concern:

Be it known that I, JOHN J. BERRIGAN, a citizen of the United States, of Orange, Essex county, New Jersey, have invented a new and useful Improvement in Feed-Governors for Centrifugal Separators, of which the following is a specification.

This invention relates to a feed governor for centrifugal separators of solids and liquids.

The invention consists in the combination with a rotary centrifugal separator of mechanism for regulating the supply of feed thereto, and means for controlling said regulating mechanism by the load within said separator; also in the various combinations set forth in the claims.

In the accompanying drawings—Figure 1 is a longitudinal section of a centrifugal separator for separating solids and liquids, showing my feed governor in place. Fig. 2 is an end elevation and partial section, showing more particularly the means for driving the spiral feed conveyer. Fig. 3 is an end elevation of the separator showing the governor spring and case in longitudinal section.

Similar numbers and letters of reference indicate like parts.

The specific form of centrifugal separator herein illustrated is fully described and claimed in U. S. Letters Patent #827,903; granted to me August 7, 1906.

I will first describe the separator in its essential parts, and then point out the construction of my improved feed governor applied thereto.

The cylinder 1 is rotated on its horizontal axis by a belt not shown, which passes over driving pulley 2; within said cylinder is an eccentrically placed cylindrical separating vessel 3 having a central rotary shaft 4 carrying arms 5 which support scrapers 6 inclined propeller fashion. The cylinder head 7 has a hollow trunnion 8 received in a bearing in standard 10. The feed tube 11 passing through said trunnion communicates at one end with the feed hopper 12, and at the other end with a delivery chamber 13, having an inclined spout 14.

In the feed tube is a screw conveyer 15, on the shaft of which is a pulley 16, Fig. 2, which receives motion from pulley 17 through chain belt 18. Pulley 17 is fast on a shaft 19 which is journaled in the bed plate of the machine, which shaft at its other end carries pulley 20, which through chain belt 21 re-

ceives motion from pulley 22, on the shaft of driving pulley 2. Secured by bolts upon the head 23 is a cylindrical casing 24, on which is one of the cylinder trunnions, received and rotating in a bearing in standard 25.

The central shaft 4 within the separating vessel 3 is journaled in a roller bearing 23* contained in a sleeve formed on the one side of the head 23 and within the casing 24 and in a similar bearing provided at the end of the casing of delivery chamber 13. Said shaft carries a gear 26 which engages with a pinion 27 fast on a shaft 28, journaled at its ends in cylinder head 23 and casing 24. Shaft 28 also carries the gear 29 which engages with pinion 30 on the end of a shaft 31, which passes through the cylinder trunnion, which is hollow, and also through the hollow supporting shaft of driving pulley 2. On shaft 31 is keyed the collar 32, which carries the lever 33, through which lever the feed valve A is controlled in the manner herein-after to be described.

The operation of the separator is as follows: The combined solid and liquid materials to be separated enter the hopper 12 from the delivery pipe 34 and are carried by the screw conveyer 15 to the spout 14, whence they are delivered into the separating vessel 3. By reason of the rotation, the said combined materials are thrown outwardly by centrifugal force against the inner periphery of the wall of vessel 3. As soon as the liquid forming a ring around said wall reaches the opening 35 in cylinder head 7, it escapes into a fixed annular chamber 36 and thence from any suitable delivery spout.

The solid material is removed from the wall of the vessel by means of the scrapers 6, and through the inclination of said scrapers is carried into the cone 37 and escapes at the apex thereof. The solid material then passes into a second cone 38, and in like manner into a third and fourth cone, and finally escapes by the pipe 39 into the fixed annular chamber 40, and so to the delivery pipe 41, Fig. 3.

Whatever liquid does not escape through the opening 35 and hence may remain in the material, drains back down the incline of the first cone 37, so that after the solid material gets to the second cone 38 and to the subsequent cones, it contains very little moisture; whatever moisture there is, however, escapes through the openings 42 which extend through the walls of separating vessel 3 and

cylinder 1, which are in contact. Said liquid then accumulates in annular chambers 43, and is drawn off from them in any suitable manner.

5 The rotation of the scrapers 6 by means of the shaft 4 is effected in the following manner: The shaft 31 which carries pinion 30 and passes through the hollow hub of driving pulley 2 is held substantially stationary by
10 the governor spring in the manner shortly to be described. By reason of the rotation of cylinder 1, the gear 29 travels around the fixed pinion 30 and hence is rotated, and as a consequence the pinion 27 on the shaft of
15 said gear is also rotated, and said pinion in turn rotates the gear 26 and consequently the shaft 4.

The object and purpose of the feed governor which I am now about to describe is to
20 regulate the incoming flow of feed into pipe 34 and to do this automatically, in accordance with the load in the separating vessel. To this end there is provided in said feed pipe 34 a valve A, which is operated by the lever
25 B, connected by the link C to the lever 33, which is fast on the shaft 31 of pulley 22. Also pivoted to the end of lever 33 is a rod D, which enters the cylindrical casing E, and is provided at its lower end with a head F.
30 Between the head F and the screw plug G, which enters the end of the casing E is interposed a helical spring H. The casing E at its lower closed end is secured to the bed of the machine.

35 If, for any reason, an amount of feed, per given time, greater than that for which the governor is set, enters the machine, then the function of the governor is to shut off automatically the entrance of further feed and in
40 that way to keep the feed supply uniform. This it does in the following way: It will be obvious, that if an overplus of material enters the separating vessel 3 the scrapers 6 will at once encounter a greater resistance and
45 hence will be retarded in their motion. The effect of this retardation of the scrapers operating through the train of gears 26 to 30 is partly to rotate the shaft 31 of pulley 30, and hence to move the lever 33, from its horizontal position. The amount of overload
50 which shall result in this tilting of the lever is regulated by the tension of the helical spring H, and obviously the greater the overload the greater will be the angle over which
55 the lever 33 is tilted.

As already stated, the lever 33 is connected by the link C and the arm B of valve A—hence the tilting of said lever against the action of the spring H tends more or less
60 close said valve, and therefore, more or less

to cut off the feed supply through the pipe 34 and the hopper 12. It will thus be seen that the action of the governor is entirely automatic after it has been once adjusted to some normal overload, and that it will need no
65 further adjustment, so long as the same kind of materials are used in the machine. The idle pulley 44 is carried on the arm 45 pivoted on the bed of the machine and rests against the belt 21 by gravity, thus serving
70 to keep said belt tight.

I claim:

1. The combination in a centrifugal separator for solids and liquids, of a separating
75 vessel, rotary scrapers therein and means, controlled by the resistance offered to the movement of said scrapers by the material in said vessel, for regulating the supply of feed to said vessel.

2. The combination in a centrifugal separator for solids and liquids of a separating
80 vessel, rotary scrapers therein, a feed conduit, a valve in said conduit and mechanism controlled by the resistance offered to the movement of said scrapers by the material in
85 said vessel, for operating said valve.

3. The combination in a centrifugal separator for solids and liquids of a rotary separating vessel, a central shaft therein,
90 scrapers on said shaft, means for rotating said shaft at a speed different from the speed of rotation of said vessel, a feed conduit, a valve in said conduit and mechanism controlled by said shaft for operating said valve.

4. The combination with a centrifugal separator for solids and liquids having an internal rotary shaft and scrapers thereon, of an external shaft, a fixed bearing therefor, a spring connected to said external shaft and
100 opposing the rotation thereof in one direction, a feed conduit, a valve in said conduit controlled by said shaft and intermediate gearing between said shafts.

5. The combination with a centrifugal separator for solids and liquids having an internal rotary shaft and scrapers thereon of an external shaft, a fixed bearing therefor, a lever on said shaft, a spring connected to one end of said lever and to a fixed abutment, a feed conduit, a valve on said conduit controlled by said lever and intermediate gearing between said shafts.
110

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

JOHN J. BERRIGAN.

Witnesses:

WM. H. SIEGMAN,
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