

No. 689,571.

Patented Dec. 24, 1901.

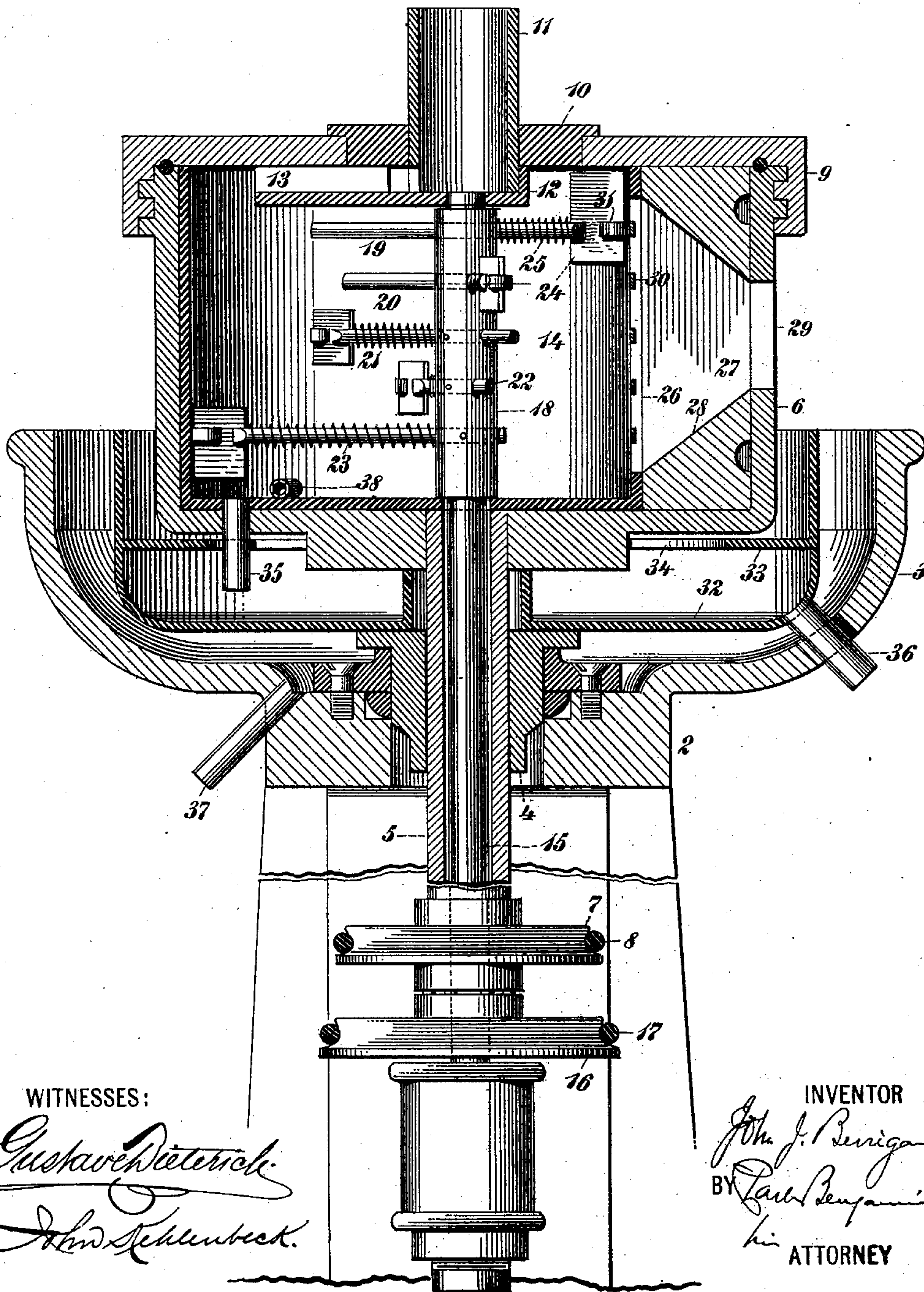
J. J. BERRIGAN.
CENTRIFUGAL MACHINE.

(Application filed July 2, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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Fig. 2.

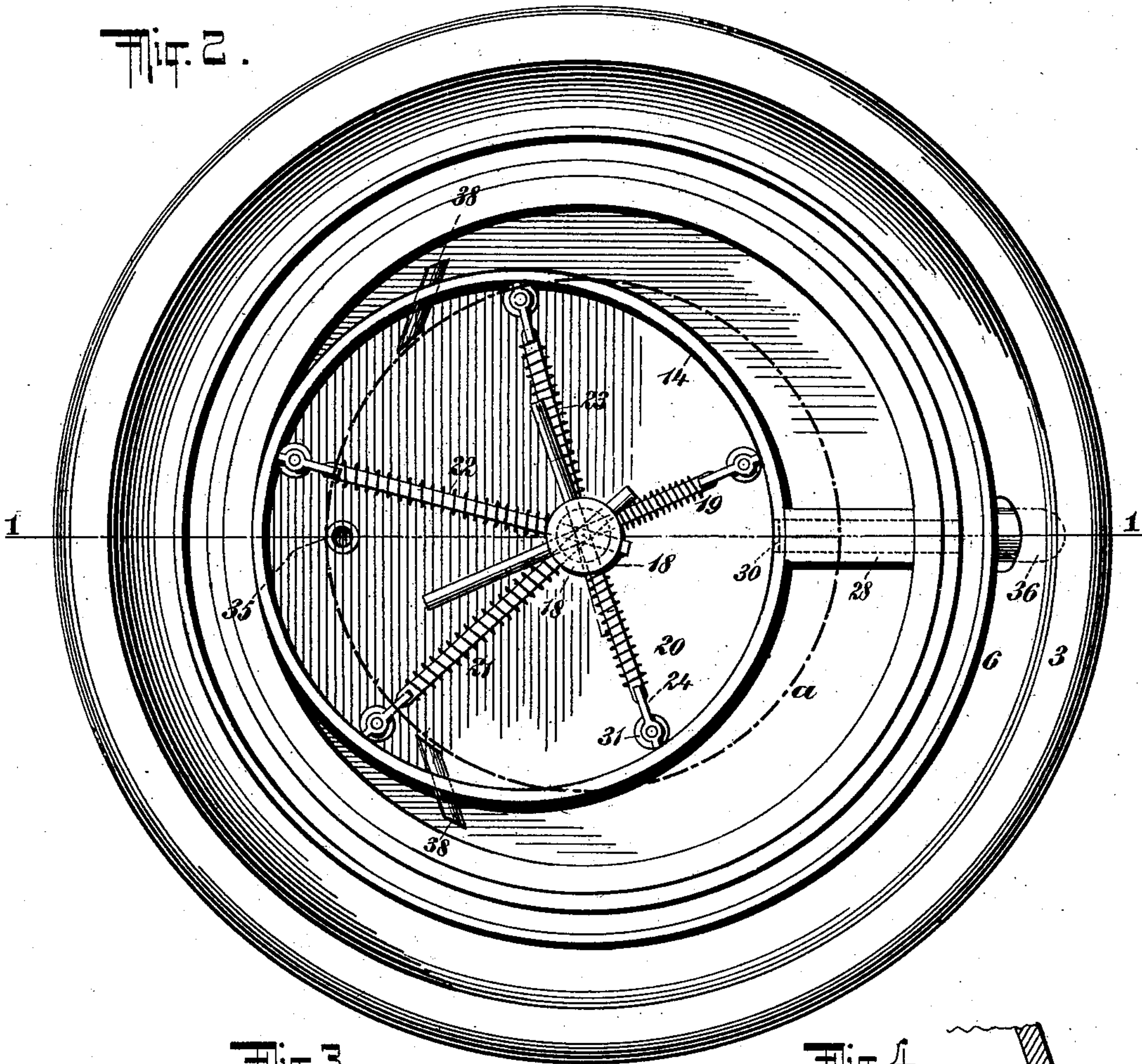
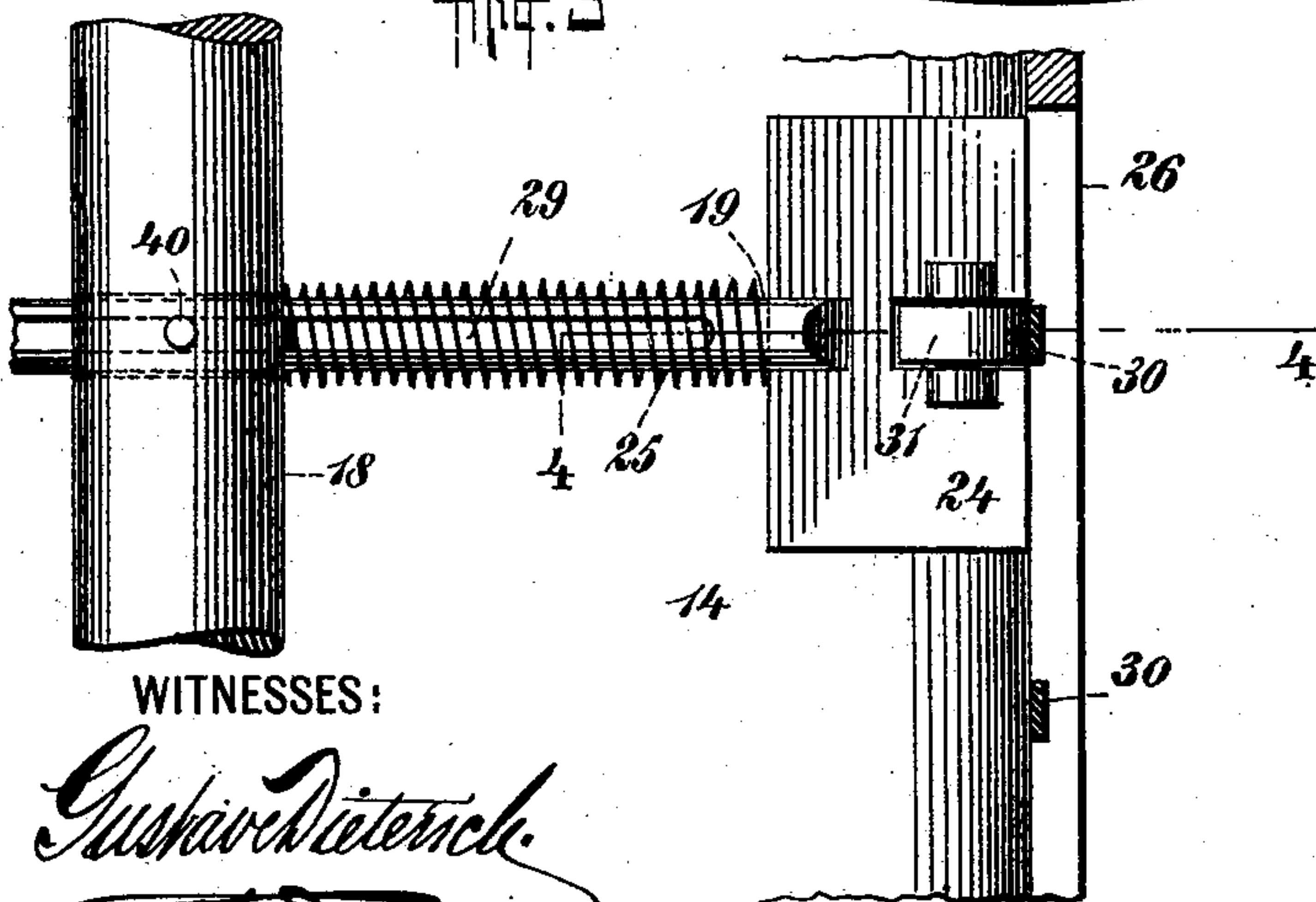


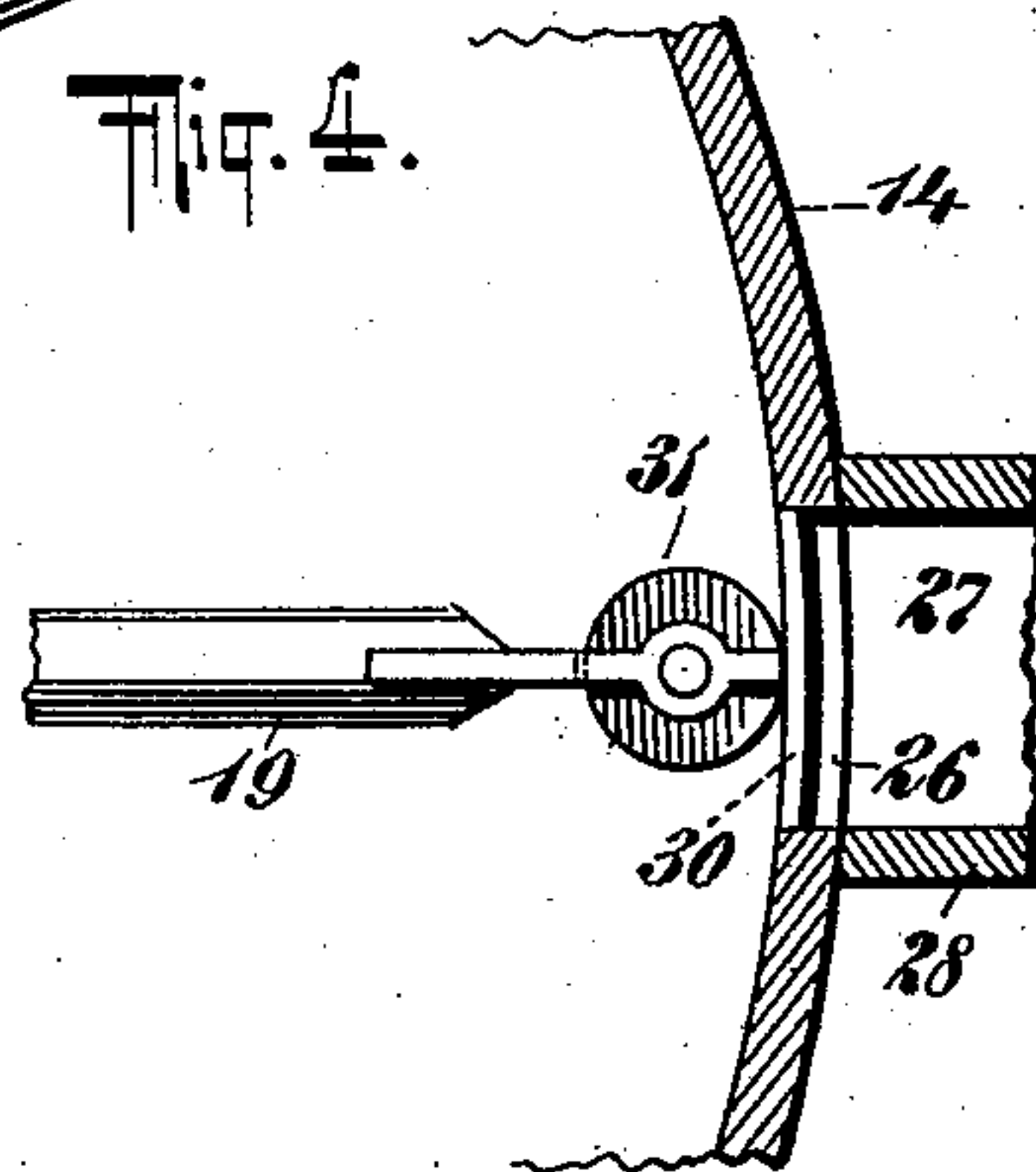
Fig. 3.



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Fig. 4.



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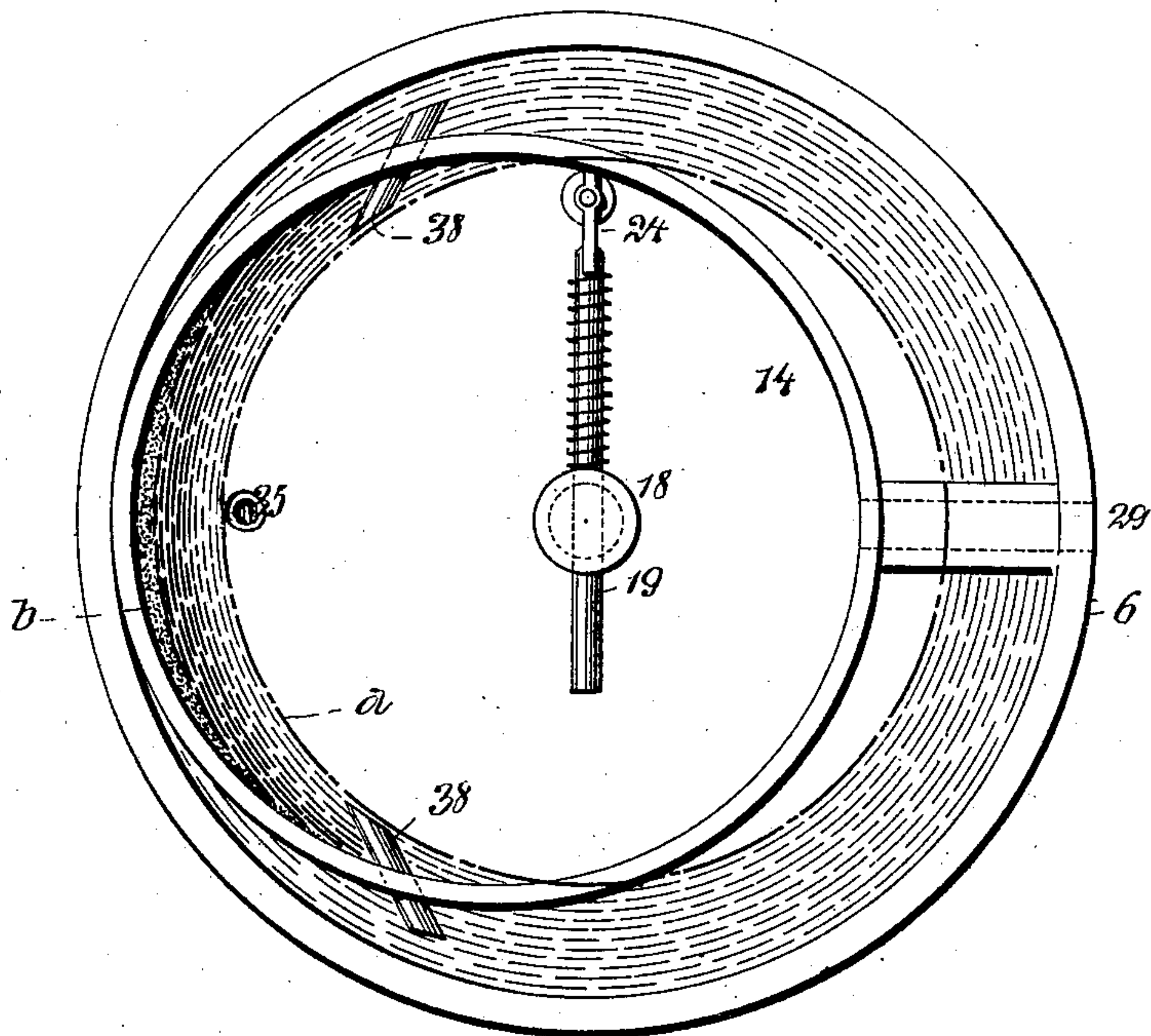
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3 Sheets—Sheet 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN JOSEPH BERRIGAN, OF EAST ORANGE, NEW JERSEY.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,571, dated December 24, 1901.

Application filed July 2, 1901. Serial No. 66,862. (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 that class of centrifugal machines in which solid and liquid constituents are separated and continuously ejected from the machine by the action of centrifugal force.

My invention consists in the construction of the machine, and more particularly in the means for preventing the openings leading from the receptacle from becoming clogged with solid material; also, in the scrapers and their associated parts, all as hereinafter pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section on the line 1 1 of Fig. 2 of a centrifugal machine embodying my invention. Fig. 2 is a plan view. Fig. 3 is a detail view of the scraper and a part of the receptacle. Fig. 4 is also a detail view in section on the line 4 4 of Fig. 3. Fig. 5 is a plan view illustrating the formation of the liquid ring.

Similar characters of reference indicate like parts.

2 is the standard, cast integrally with the upper portion of which is the cup 3. Passing through the gland 4 in the bottom of cup 3 is a hollow shaft 5, which carries the drum 6. The hollow shaft 5, and hence the drum 6, is rotated by means of the pulley 7, actuated by the belt, (shown at 8.) The drum 6 is provided with a flanged cover 9, engaging with a screw-thread at its upper portion. In the center of the cover is a flanged plug 10, through which passes the feed-inlet pipe 11 for the material to be treated. Said pipe delivers into the conduit 12, the end of which at 13 is opened. Within the drum 6 is a fixed cylindrical receptacle 14, disposed eccentrically to said drum. Within the hollow shaft 5 is a solid shaft 15, which is rotated by means of the belt-pulley 16 on pulley 17. The upper portion of shaft 15 within the receptacle 14 may be enlarged, as shown at 18, and at its upper extremity is journaled in the lower wall of conduit 12, as shown. Passing through a transverse opening in the

part 18 of the shaft are rods 19, 20, 21, 22, and 23. These rods pass loosely through the openings in the enlarged portion of the shaft and are arranged at different angles to one another. Each rod, as 19, carries at its end a scraper-blade 24. Between the scraper-blade and the shaft 18 in each case is interposed a spiral spring 25. Inasmuch as the rod 19 is free to move in the shaft 18 the effect of the spiral spring 25 is to throw the scraper-blade outward, so that its outer edge bears against the inner periphery of the receptacle 18. The scraper-blades on the other rods are similar to the scraper-blade 24, and they are so disposed as to act upon different portions of the inner periphery of the receptacle, so that all portions of said receptacle will be scraped by said blades as they are carried around by the revolution of the shaft 15.

In the wall of receptacle 14 is an outlet 26, which communicates with an outwardly-tapering conduit 27 made in the plate 28, which opening 27 communicates with the opening 29 in the drum. In the opening 26 are ribs 30, disposed in the same plane as the respective scraper-carrying rods 19 20, &c. In the end of each scraper-blade and in a suitable recess is pivoted a roller 31, adapted to bear on its associate rib 30.

Within the cup 3 is a pan 32, having a horizontal partition 33 with an annular opening 34, into which opening extends the escape-pipe 35, communicating with the interior of receptacle 14. From the pan 32 and extending through the cup 3 is another escape-pipe 36. 37 is a drain-pipe for the cup 3.

The operation of the machine as a whole is as follows: Combined solid and liquid to be separated are fed into the feed-inlet pipe 11, shafts 15 and 5 meanwhile being in rotation. By the action of centrifugal force said materials are ejected from conduit 12 and thrown against the most eccentric portion of the inner periphery of the receptacle. A part of the liquid constituent then escapes through the short pipes 38 in the lower portion of the wall of receptacle 14, and said liquid then forms a ring around a portion of the interior of the drum 6 and a portion of the interior of the receptacle 14, as indicated in dotted lines at *a* in Fig. 2. This ring remains practically permanent so long as the machine is in oper-

ation, the surplus liquid escaping from the receptacle through the pipe 35 and so into the pan 32, and finally out of the machine at the pipe 36. The solid constituent then deposited upon the inner wall of receptacle 14 is constantly removed therefrom by the action of the scraping-blades 31 and is carried around the interior of receptacle 14 until it is brought to the outlet-pipe 26, through which it escapes, passing through the conduit 27, and finally is thrown out of the machine by the action of centrifugal force at the opening 29 in the drum 6.

Special attention is now called to two features—namely, the arrangement of the short pipes 38, whereby liquid communication is established between the receptacle 14 and the drum 6, and also that of the scrapers 31 and associated parts.

Regarding the pipes 38, I have found that when communication is made between receptacle and drum by simple apertures in the wall of the receptacle said apertures are liable to become clogged with the solid constituent deposited, which is drawn or conveyed over them by the scrapers. I therefore employ the pipes 38, which pass through the lower portion of the receptacle-wall, as shown in Fig. 1, and lie below the lowest scraper. Each pipe extends inwardly for a distance, reaching nearly to the inner limit of the liquid ring *a*, Fig. 2; but in that ring the solid and denser material is all thrown centrifugally outward, so that the solid portions lie against the inner surface of the receptacle-wall, as shown at *b*, Fig. 5. Hence this solid constituent cannot move centripetally or back, so as to escape from the pipes 38; but, on the contrary, inasmuch as said pipes extend into the clear water near the inner circumference of the ring only clear water will flow through the said pipes and into the outer drum. Therefore all danger of the openings between receptacle and drum becoming clogged with solid material is by this means effectively prevented.

Referring now to the scrapers, by reason of the construction herein shown I am enabled to apply them to the shaft 18, disposed eccentrically in the receptacle 14 instead of, as heretofore, in a separate shaft disposed concentrically in said receptacle and geared to the shaft 15.

It will be evident that by making the scraper-arms freely movable longitudinally in the portion 18 of the shaft within the receptacle and by providing the springs 25 said rods will always adjust themselves in point of length to the eccentricity of the receptacle-wall, while the effect of the spring will always be to force them outward and in contact with said wall.

The object of the rollers 31, pivoted in the scraper-blades, is to prevent any possible jamming of the edges of the blades against the receptacle-wall by reason of an overaccumulation of solid material or otherwise. The

circumference of the roller 31 projects very slightly beyond the outer edge of the scraper-blade, and therefore the roller takes the thrust of the arm and freely turning relieves any undue friction.

The object of the ribs 30 in the opening 26 is of course to form a bearing-surface for the rollers and to prevent the scraping-blades being thrust through the opening by the expansion of the spring when said opening is reached.

In order to guide the rods 19, &c., more effectively, I form in each one of them a slot 39, Fig. 3, through which passes a pin 40 in the shaft 18.

I claim—

1. In a centrifugal machine, a receptacle for combined constituents to be separated, a support therefor rotary on an axis eccentrically placed within the perimeter of said receptacle, a rotary shaft within said receptacle coincident with said axis, and means carried by said shaft for conveying the solid constituent deposited centrifugally on a portion of the interior of said receptacle from its place of deposit to another portion of said interior.

2. In a centrifugal machine, a receptacle for combined constituents to be separated, a support therefor rotary on an axis eccentrically placed within the perimeter of said receptacle, a rotary shaft within said receptacle coincident with said axis, and means carried by said shaft for conveying the solid constituent deposited centrifugally on a portion of the interior of said receptacle from its place of deposit to an escape-opening in the wall of said receptacle.

3. In a centrifugal machine, a receptacle for combined constituents to be separated, a support therefor rotary on an axis eccentrically placed within the perimeter of said receptacle, a rotary shaft within said receptacle coincident with said axis, a scraper carried by said shaft and bearing against the inner periphery of said receptacle, and means for automatically varying the distance of said scraper radially from said shaft.

4. In a centrifugal machine, a receptacle for combined constituents to be separated, a support therefor rotary on an axis eccentrically placed within the perimeter of said receptacle, a rotary shaft within said receptacle coincident with said axis, an arm passing loosely through a transverse opening in said shaft, a scraper on the end of said arm and a spring interposed between said scraper and said arm and operating to hold said scraper in close proximity to the inner periphery of said receptacle.

5. In a centrifugal machine, a receptacle for combined constituents to be separated, a support therefor rotary on an axis eccentrically placed within the perimeter of said receptacle, a rotary shaft within said receptacle coincident with said axis, an arm passing loosely through a transverse opening in said

shaft, a scraper on the end of said arm, a spring interposed between said scraper and said arm and operating to hold the outer edge of said scraper in close proximity to the inner periphery of said receptacle, and a roller pivoted at said outer edge of said scraper.

6. In a centrifugal machine, a cylindrical receptacle for combined constituents to be separated having an outlet-opening in its wall provided with transverse ribs, a support for said receptacle rotary on an axis eccentrically placed within the perimeter of said receptacle, a rotary shaft within said receptacle coincident with said axis, an arm passing loosely through a transverse opening in said shaft, a scraper on the end of said arm, a roller pivoted at the bearing edge of said scraper, a spring interposed between said scraper and said arm and operating to hold said roller against one of said ribs.

7. The combination in a centrifugal machine having a receptacle for the combined constituents to be separated and a support therefor rotary on an axis eccentrically placed within the perimeter of said receptacle, of a rotary shaft 18 within said receptacle coincident with said axis, an arm 19 passing loosely through a transverse opening in said shaft and having a longitudinal slot 39, pin 40 passing through said shaft and slot in said arm, a scraper 24 carried by said arm, and a spiral spring 25 interposed between said scraper and said shaft.

8. In a centrifugal machine, a receptacle for the combined constituents to be separated, constructed to rotate on an axis eccentrically

placed within the perimeter of said receptacle, and a tubular conduit in the wall of said receptacle and extending into the interior thereof.

9. In a centrifugal machine, a drum rotary on a vertical axis, a receptacle for combined solid and liquid constituents to be separated eccentrically disposed therein, and a tubular conduit in the wall of said receptacle and extending into said receptacle.

10. In a centrifugal machine, a drum rotary on a vertical axis, a receptacle for combined solid and liquid constituents to be separated eccentrically disposed therein, and a tubular escape-conduit in the wall of said receptacle and extending into said drum and said receptacle.

11. In a centrifugal machine, a drum rotary on a vertical axis, a receptacle for the combined solid and liquid constituents to be separated eccentrically disposed therein, and tubular conduits 38 disposed in the wall of said receptacle and extending into the interior thereof.

12. In a centrifugal machine, a drum, rotary on a vertical axis and having a liquid-escape opening 35, a receptacle 14 for combined solid and liquid constituents to be separated eccentrically disposed therein and tubular conduits 38 disposed in the wall of said receptacle and extending into the interior thereof.

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