No. 750,698. PATENTED JAN. 26, 1904.

H. DE RAASLOFF.

CENTRIFUGAL MACHINE.

APPLICATION FILED MAR. 26, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 3.

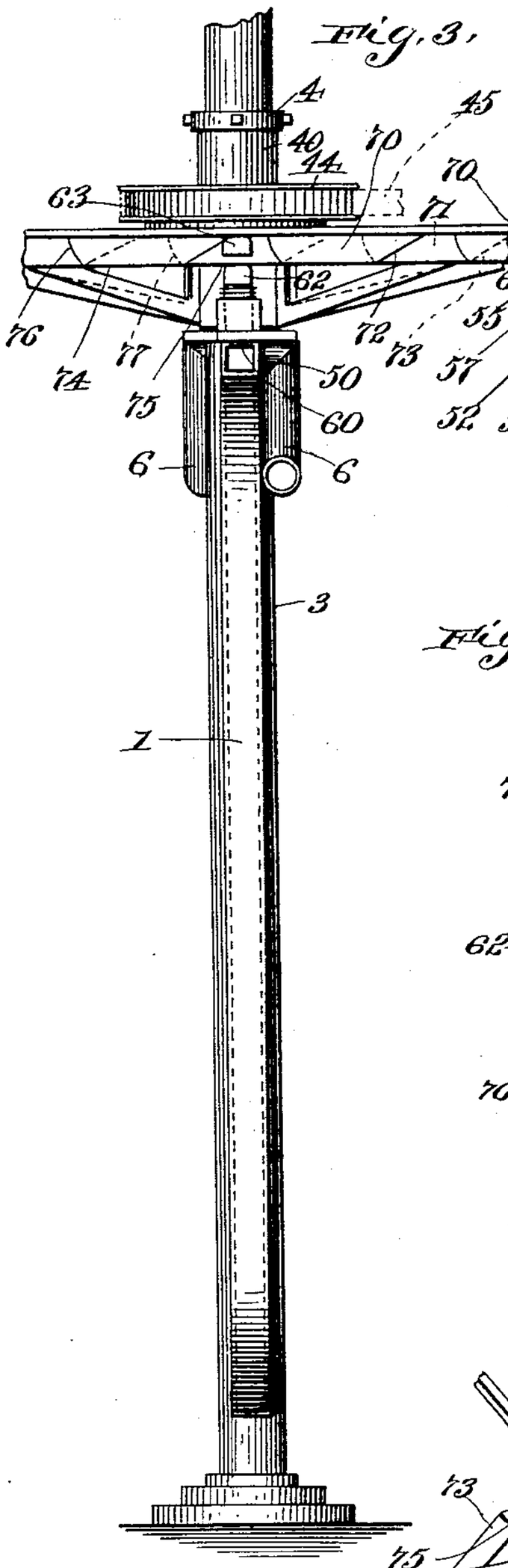



Fig. 1.

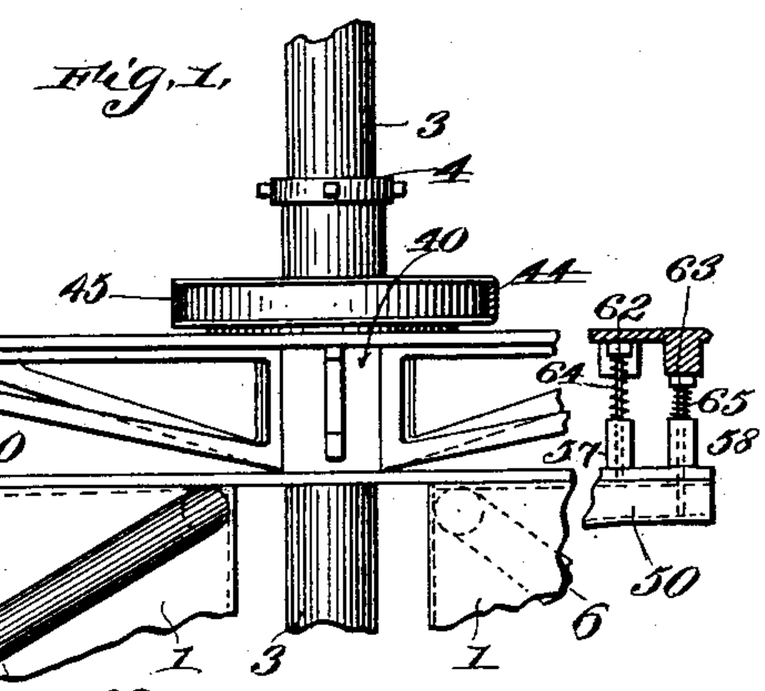



Fig. 2.

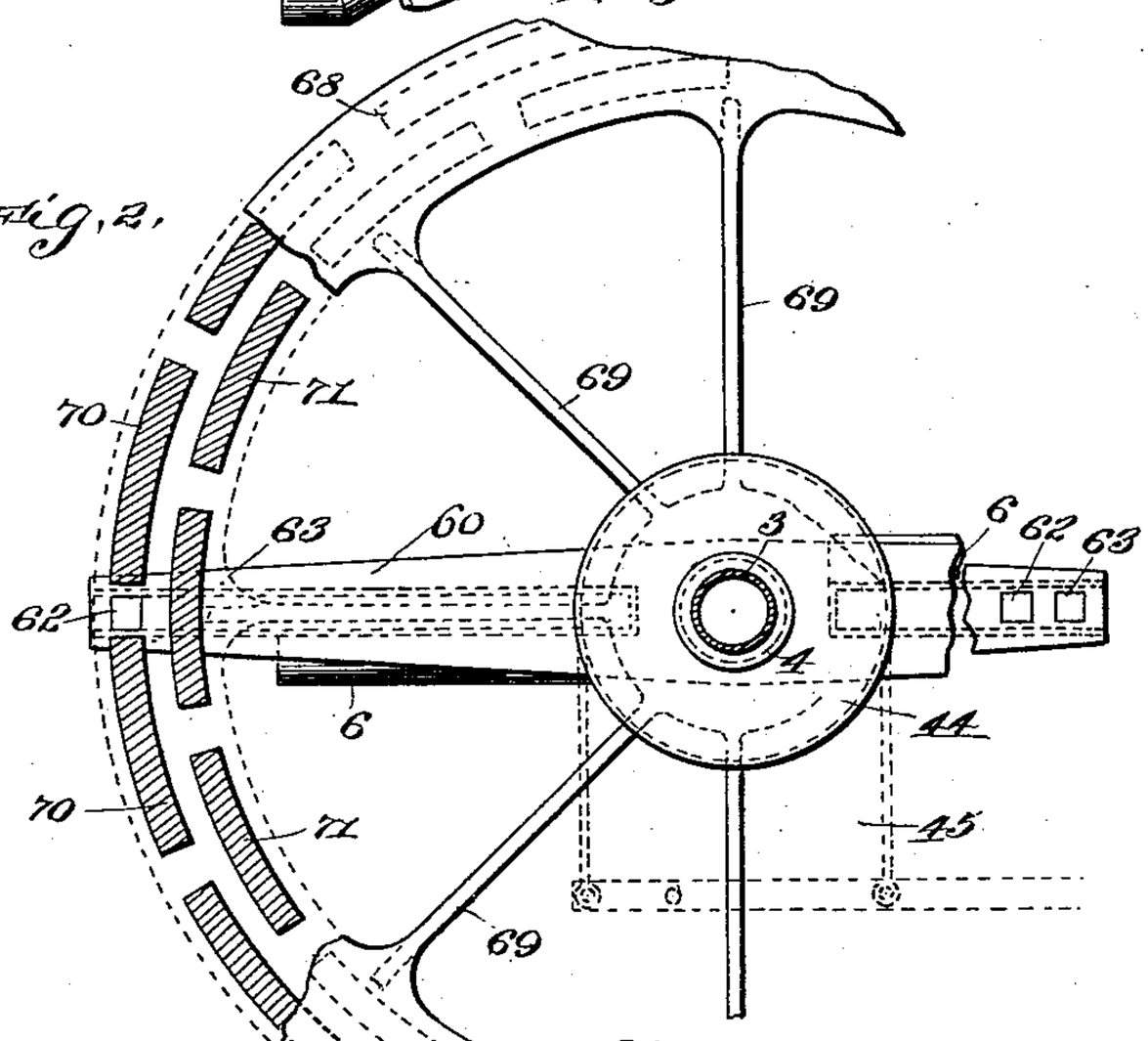
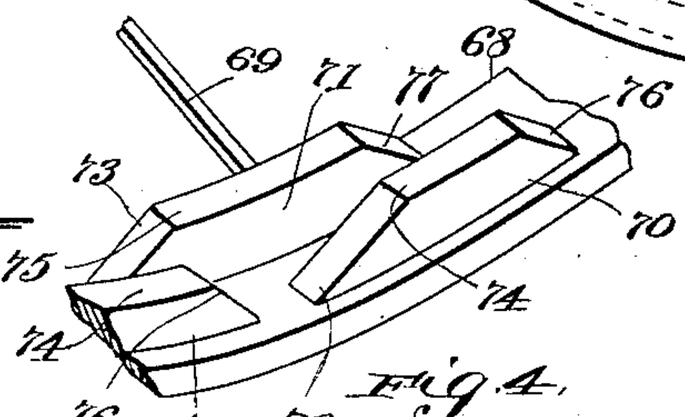



Fig. 4.




Witnesses:
Michael Conway
Henry V. Brown.

Inventor:
Harald de Raasloff,
by Dwalter Brown,
his attorney.

No. 750,698. PATENTED JAN. 26, 1904.

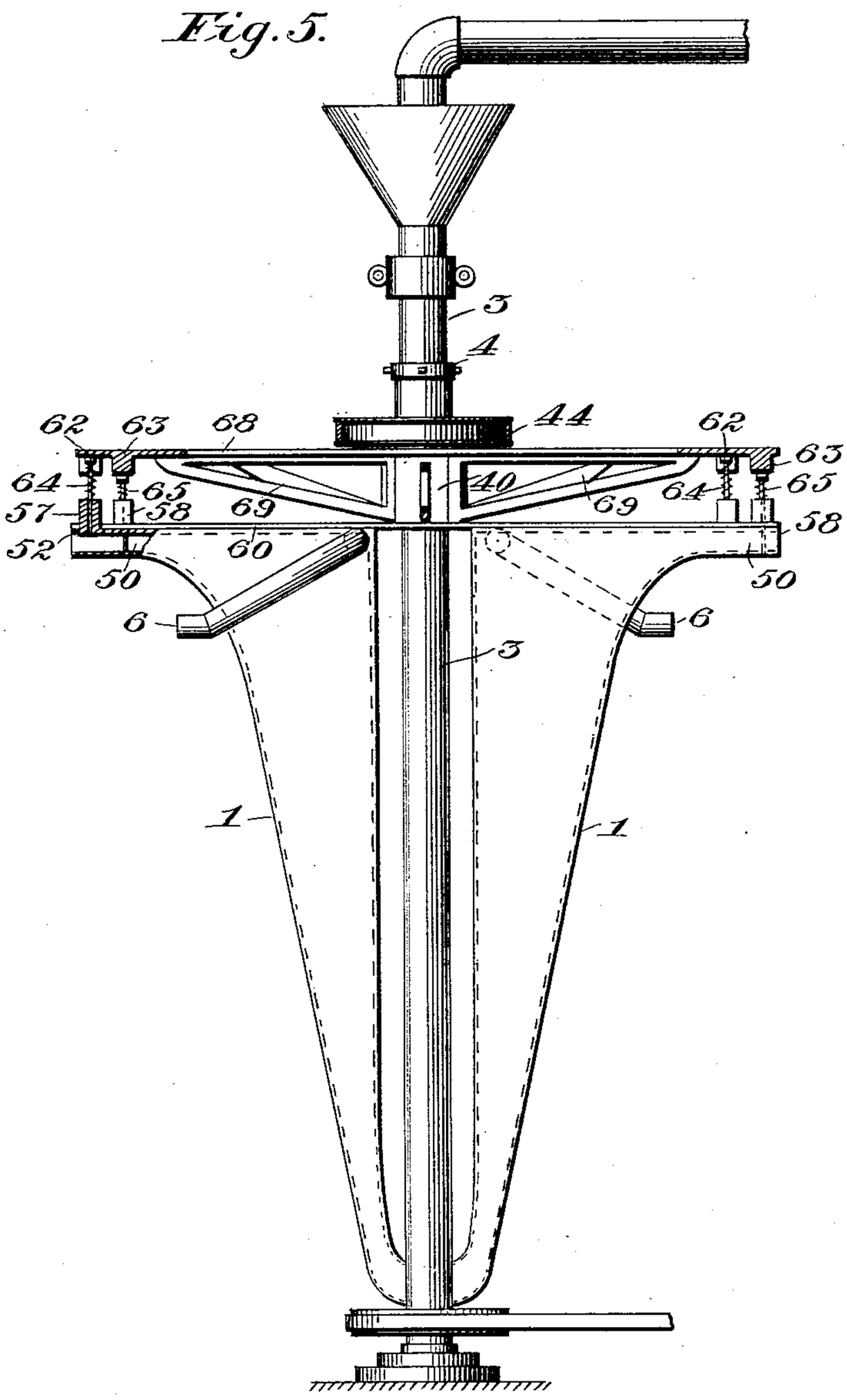
# H. DE RAASLOFF.

## CENTRIFUGAL MACHINE.

APPLICATION FILED MAR. 26, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

*Fig. 5.*




Witnesses:
Charles Klein
Irving H. Reed. Jr.

Inventor:
Harald de Raasloff
by D Walter Brown
his attorney

No. 750,698. Patented January 26, 1904.

# UNITED STATES PATENT OFFICE.

HARALD DE RAASLOFF, OF NEW YORK, N. Y.

## CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 750,698, dated January 26, 1904.

Original application filed November 1, 1901, Serial No. 80,769. Divided and this application filed March 26, 1902. Serial No. 100,032.

(No model.)

*To all whom it may concern:*

Be it known that I, HARALD DE RAASLOFF, a citizen of the United States of America, and a resident of the borough of Manhattan, in the city of New York and State of New York, have invented certain new and useful Improvements in Centrifugal Machines, of which the following is a specification.

This invention relates to improvements in centrifugal machines.

The present application is a division of my application filed in the United States Patent Office on November 1, 1901, Serial No. 80,769, upon which said application Letters Patent issued on the 19th day of August, 1902, numbered 707,521. My said application Serial No. 80,769 relates to centrifugal machines in which the outlets for the discharge of the separated material from the rotary separating-chamber are so controlled by valves that the separated material forms a mass, which I term a "plug," in or at the outlets, which plug is discharged from the separating-chamber at the same rate at which it is formed, the valves being so constructed and arranged that while they allow of the passage through the outlets of the separated material in regulated quantities they also at all times close the outlets against direct communication from the separating-chamber outwardly, whereby all spurting of the liquid or lighter material from the outlets from which the heavier materials are discharged can be prevented and the consistency or dryness of the heavier separated material controlled at the will of the operator. In the present application the valves which control the outlets are reciprocating gates, and there are preferably two gates in each outlet, which are so operated intermittently and successively as to cut off sections of the plug and allow the same to discharge, while closing the outlet behind the plug against the escape of the lighter material.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a broken elevation, partly sectioned, of the upper part of a centrifugal machine provided with reciprocating gates. Fig. 2 is a broken plan of the same. Fig. 3 is a broken front elevation of the machine as the same would appear when seen from the left of Fig. 1. Fig. 4 is a broken inverted perspective detail, on a large scale, of the cams which operate the gates. Fig. 5 is a side elevation, on a smaller scale, of the complete machine, showing the relative positions of the several parts.

As described in my said application Serial No. 80,769, the machine is provided with a number of boxes or chambers 1 1, which are symmetrically disposed around and fastened to a vertical hollow shaft 3, which is supported in suitable bearings and driven at suitable velocity by any motive power, as an electric motor or steam-engine. At their lower ends said chambers communicate with the interior of said shaft 3, which receives the material that is to be separated from suitable pipes or tanks (not shown) at the top and discharges the said material into said compartments near the bottom, the lower end of said shaft 3, which is stepped in a suitable bearing, being of course closed. At the top said chambers 1 1 are fastened to the plate 60, which is firmly secured to the said shaft 3. While the drawings show only two chambers 1 1, any number may be used, which should, however, be symmetrically disposed around shaft 3 in order to properly balance the machine and prevent excessive vibration at high rotary speeds. Said chambers 1 are preferably of the shape shown in the drawings and are each provided at their upper and outermost part with outlets 50 with parallel opposite vertical walls. Said outlets 50 are each controlled by gates, which are preferably two in number, as 52 and 53, respectively, said gates working in stuffing-boxes 57 58 and through suitable slots in the plate 60 and the top of the chambers 1 1. When said gates 52 or 53 are closed, they seal their respective outlets at one or more points, said gates being made water-tight by suitable packing, if necessary. The stems 55 56 of said gates 52 53 are made broad in a direction tangential to the rotation of the chambers 1 1 in order to resist bending strains, and said stems are respectively provided with shoes 62 63, which have beveled ends, as shown, and

are normally pressed upward by springs 64 65. Pipes 6 6 discharge the lighter material from said chambers. In order to properly control the discharge of separated material from said outlets 50, said gates should be so operated that the outlet is always closed by at least one gate, so that direct communication outwardly from chamber 1 is always prevented, and I show in the accompanying drawings a preferred construction for so operating said gates. A cam-plate 68 is connected by arms 69 with a long hub 40, which has a working fit on said shaft 3 and is provided with a brake-wheel 44, on which is a strap brake 45, which is operated in any well-known manner, 4 being a collar to prevent the jumping up of said hub 40. On the under side of said plate 68 and positioned to slide over said shoes 62 63 are two concentric cams (or rows of similar cams) 70 71, respectively. Said cams 70 71 are formed, respectively, with the flat surfaces 74 75, the more gradually inclined front ends 72 73, and the more sharply inclined rear ends 76 77, and said cams are so staggered as to cause both gates 52 53 to remain closed for a short time simultaneously, as hereinafter described.

Manifestly if the plate 68 and the chambers 1 1 rotate in the same direction and at the same speed the gates 52 53 will remain stationary in their outlets; but if there be relative differential motion between the said plate and chambers the cams 70 71 and springs 64 65 will open and close said gates with a rapidity depending on the different relative velocity of the said plate 68 and chambers 1, and therefore the opening and closing of the gates can be controlled at will by varying the tension of the strap 45 on the brake-wheel 44. Now if a mixture of lighter and heavier materials enters the chambers 1 1 from the shaft 3 the heavier material separates out and collects at the outlets 50, where, its free discharge from the chambers 1 1 being checked by the gates 52 or 53, it forms a mass, which I term the "plug." Now supposing that gate 53 is closed and gate 52 is open, as in Fig. 3, this plug will be momentarily prevented from discharging by gate 53; but soon the relative differential motion between the plate 68 and the chambers 1 1 will cause one of the cams, 70, to close gate 52 before gate 53 opens and will keep gate 52 closed a short time after gate 53 opens. When gate 53 does open, the plug will be pushed by centrifugal force outward against gate 52. Now gate 53 again closing cuts off a section of the plug, which fills the space or chamber in the outlet 50 between gates 52 and 53. Now presently gate 52 opens, gate 53 still remaining closed, and the section of plug thus cut off discharges from the outlet into any suitable receptacle. Gate 52 now closes again before gate 53 opens, and so on, at least one gate always closing the outlet 50. By varying the relative velocities of the plate 68 and the chambers 1 1 the gates can be operated at any desired rapidity, so as to permit of the discharge of the separated material at the same rate as it is separated and at any degree of consistency or dryness.

Now having described my improvements, I claim as my invention—

1. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of reciprocating gates in said outlet, and means adapted to reciprocate said gates successively in such manner that the outlet is always closed by at least one gate, substantially as described.

2. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of reciprocating gates in said outlet and means for intermittently opening and closing one gate while another gate is closed, whereby said outlet is always sealed, substantially as described.

3. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of independently-reciprocating gates in said outlet and differential-speed means for operating said gates independently and intermittently, substantially as described.

4. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of reciprocating gates in said outlet, and a differential-speed cam adapted to intermittently operate said gates, substantially as described.

5. In a centrifugal machine, the combination with a rotary separating-chamber provided with an outlet, of two reciprocating gates in said outlet, and a differential-speed rotor provided with two cams respectively adapted to intermittently operate one gate while the other gate is closed, substantially as described.

6. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of independently-reciprocating gates controlling said outlet, differential-speed means for independently and intermittently opening and closing said gates, and means for varying the speed of said first-named means, substantially as described.

7. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of reciprocating gates controlling the outlet, differential-speed cams for actuating said gates, and means for varying the speed of said cams, substantially as described.

8. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of reciprocating gates controlling said outlets, differential-speed rotary cams for intermittently operating said gates, and a friction-brake for varying the speed of said cams, substantially as described.

9. In a centrifugal machine, the combination with a plurality of rotary separating-chambers symmetrically disposed around the axis of rotation and each provided with an outlet and with an inlet, of a plurality of reciprocating gates controlling the outlet of each chamber, differential-speed rotary cams adapted to intermittently and successively operate said gates, and means for varying the speed of said cams, substantially as described.

10. In a centrifugal machine, the combination with a rotary separating-chamber provided with a discharge-outlet, of a plurality of reciprocating spring-opened gates controlling the outlet, and a plurality of differential-speed rotary cams adapted to intermittently and successively close said gates, substantially as described.

Signed at New York city this 25th day of March, 1902.

HARALD DE RAASLOFF.

Witnesses:

DAVID WALTER BROWN,

ABM. VAN SANTVOORD.