No. 745,696. PATENTED DEC. 1, 1903.

A. C. VAN KIRK.

CENTRIFUGAL SEPARATOR.

APPLICATION FILED JULY 28, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

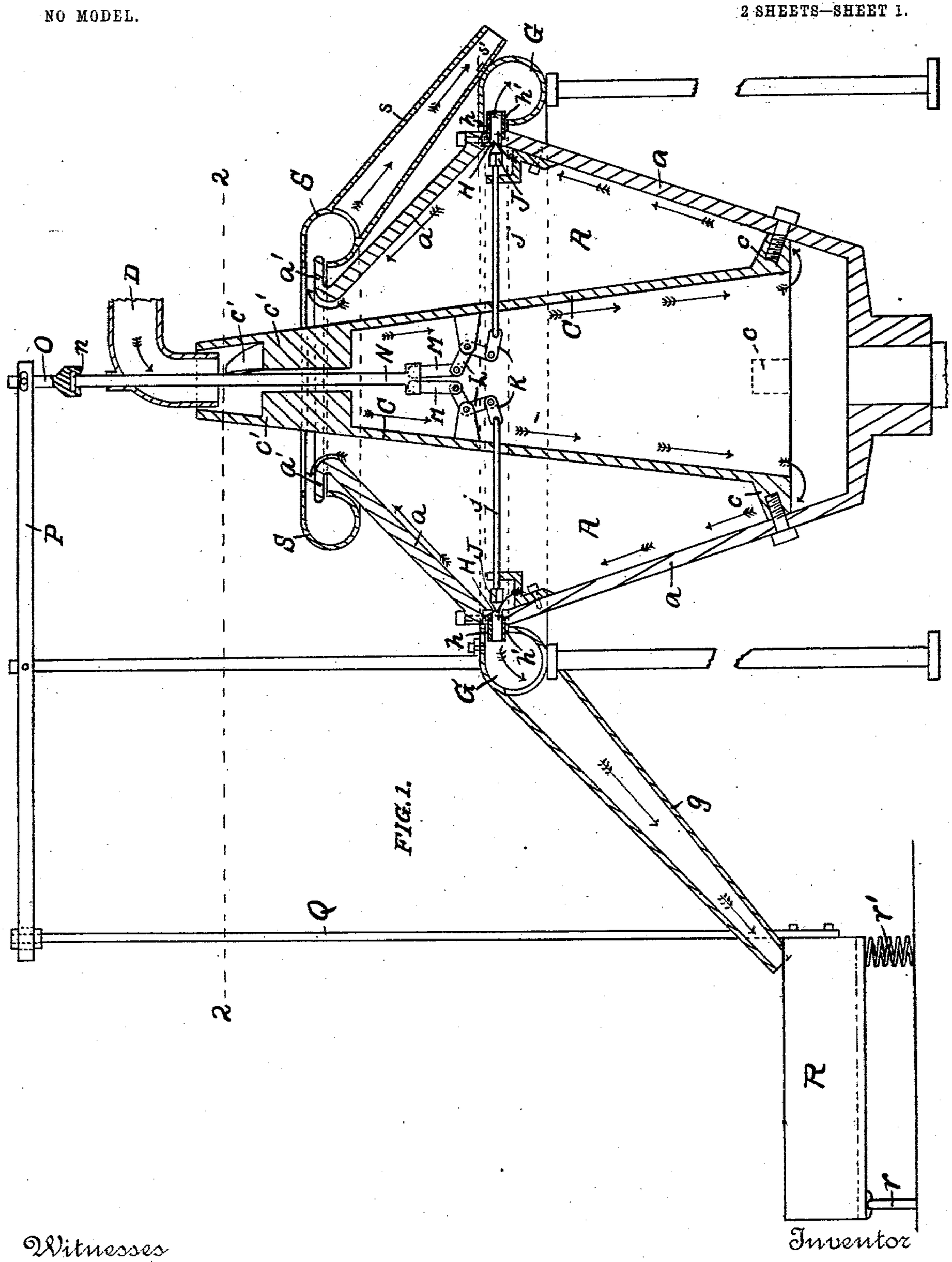

FIG. 1.

Witnesses
Clara Stannus
Agnes B. Grant.

Inventor
Arthur C. Van Kirk
By Attorneys
Parkinson & Richards

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NO MODEL. 2 SHEETS—SHEET 2.

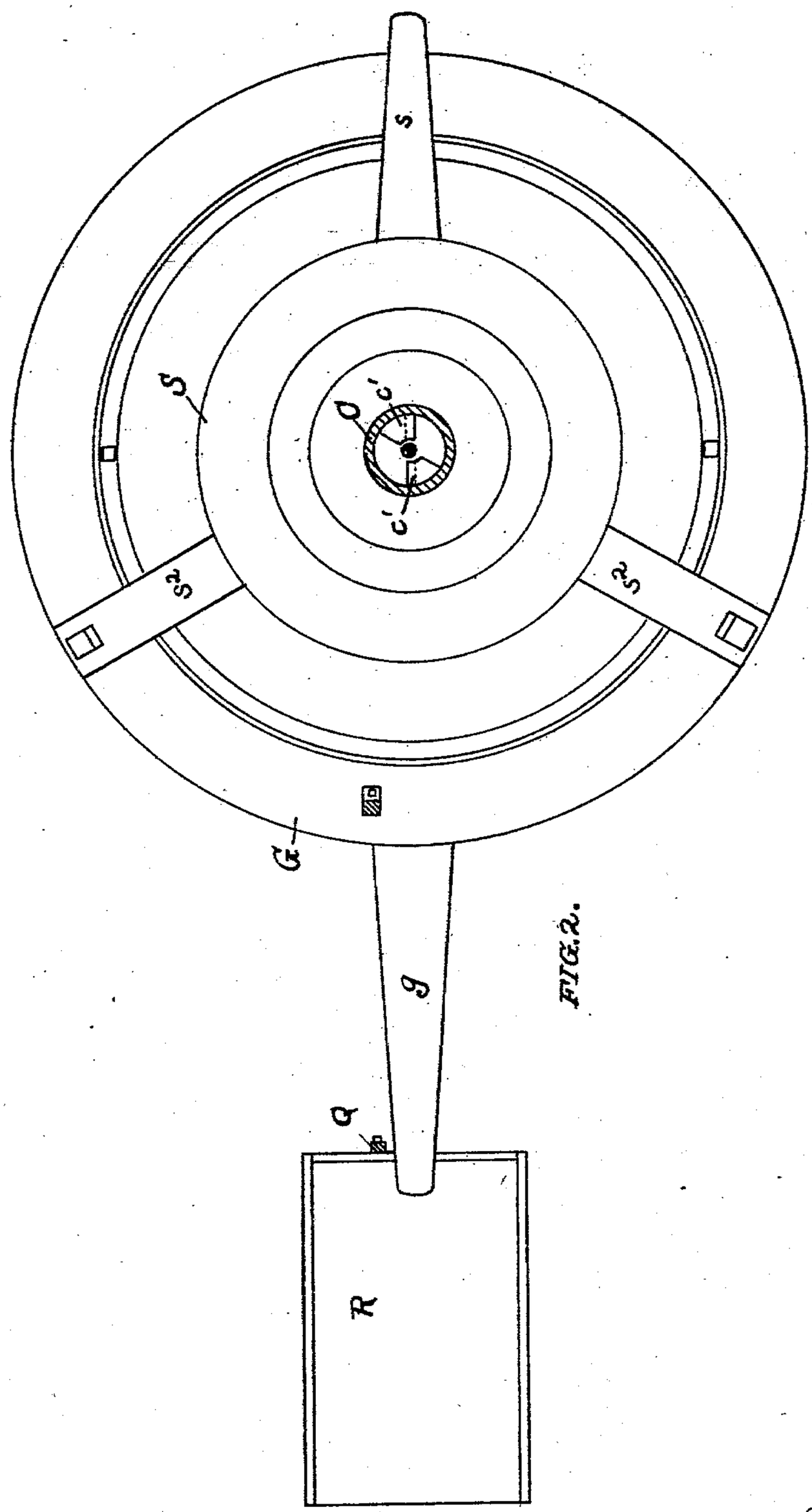

FIG. 2.

Witnesses:
Clara Stannus
Agnes B. Grant.

Inventor
Arthur C. Van Kirk
By Attorneys
Parkinson & Richards

No. 745,696. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

ARTHUR C. VAN KIRK, OF TIFFIN, OHIO.

CENTRIFUGAL SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 745,696, dated December 1, 1903.

Application filed July 28, 1903. Serial No. 167,309. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. VAN KIRK, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have invented certain new and useful Improvements in Centrifugal Separators, of which the following is a specification.

An object of my invention is to provide a centrifugal separator for removing solid matter from liquids, and more especially for removing the fiber and mushy substance from the waste water of paper-mills.

A further object of my invention is to provide a separator which will automatically regulate the quantity of liquid drawn off with the solid matter, so as to render the mixture of a proper consistency to be pumped or otherwise handled, as desired.

My invention consists in the combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of a separator embodying my invention, and Fig. 2 a section on line 2 2 of Fig. 1.

The separating-chamber A is carried by a vertical shaft B, which is rotatably mounted and driven at a high rate of speed. The sides *a* of chamber A are made slightly flaring from the bottom upwardly and at the top are inclined inwardly toward the center, as shown. A feed-cone C is mounted in chamber A on lugs *c*, with its open upper end extending above the open top of chamber A, where a feed-pipe D empties into it. In its upper end cone C is provided with two wings or flanges *c'*, which serve to impart a rotary motion to the material immediately upon entrance. At their upper ends the wings *c'* are made slightly spiral in shape, so as to assist the ready entry of fluid.

A trough G is mounted about chamber A and ports H provided in the walls of chamber A at the largest diameter with pipes *h*, projecting into trough H through an annular opening *h'*. The ports H are controlled by needle-point valves J, having valve-stems *j*. Valve-stems *j* are connected by means of links K to bell-crank levers L, which are connected by means of links M to rod N. Rod N has a swiveled connection *n* with head-piece O, which has a slot-pin connection with lever P. Lever P is connected by means of rod Q with a box or trough R, which is set to receive the discharge from trough G through spout *g*. At one end the trough R is pivoted on support *r* and at the other or receiving ends provided with a spring *r'*, tending to hold the trough in a substantially horizontal position.

The top of chamber A is provided with a flange *a'*, extending into a trough S, which is provided with discharge-spout *s*. The spout is preferably bolted to trough G by bolt *s'*, and with standards s^2, which are also bolted to trough G, serves to hold trough S in position.

In operation shaft A is rapidly rotated and the waste water from the paper-mill, containing fiber or mushy substance, is conducted to the separator through pipe D, whence it enters cone C, which is rapidly rotating with chamber A. The wings *c'* impart a rotary motion to the material, and the centrifugal force throws the heavier fiber and other solid substance outwardly against the flaring walls of cone C, which causes the fiber and water to travel down the walls and out of the bottom of the cone, as indicated by the arrows in Fig. 1. Here the fiber and water come under the influence of the flaring walls of chamber A and are caused to travel upwardly between lugs *c*, with the fiber forced to the outside and the water to the inside. The fiber passing up the walls of chamber C escapes through ports H into trough G, whence it passes through spout *g* to trough R. In case the mushy matter thus drawn off is too thick to run freely it piles up in the end of trough R over spring *r'* and depresses that end of the trough. This downward movement of trough R serves through lever P to operate rod N to cause bell-crank levers L to withdraw valves J from ports H to permit the escape of waste water from ports H. On the other hand, should the mushy substance become very thin it will run from trough R very quickly and permit spring *r'* to raise trough R to partially close ports H, and thus limit the quantity of water withdrawn. Owing to the fact that the discharge of the mushy material takes place at the largest diameter of chamber A and said material is freed from the influence of the rotation of chamber A at this point, the discharge is positive and under considerable force. The bulk of the wa-

ter admitted through feed-pipe D passes out the open tops of chamber A over flange *a'* into trough S, whence it is discharged through spout *s*.

While I have shown and described the preferred form of construction for carrying my invention into effect, this is capable of variation without departing from the spirit of the invention. I therefore do not wish to be confined to the exact construction shown; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a separator of a separating-chamber; a discharge-opening for the solid matter; means for regulating the discharge-opening; an accumulator adapted to receive the discharged matter and mounted to be moved by accumulation of the discharged matter therein; and connections between the accumulator and the means for regulating the discharge, whereby the discharge-opening is controlled by the accumulations of discharged matter, substantially as specified.

2. The combination in a separator of a separating-chamber; a discharge-opening for the solid matter; a valve controlling the discharge-opening; an accumulator adapted to receive the discharged matter and mounted to be moved by accumulation of the discharged matter therein; and connections between the accumulator and valve for controlling the latter, substantially as specified.

3. The combination in a separator of a rotatable chamber having walls flaring from one end outwardly for a portion of their length and inclined inwardly for another portion of their length; a discharge-opening for the solid matter at the largest periphery of the chamber; means for regulating the discharge-opening; an accumulator adapted to receive the discharged matter and mounted to be moved by accumulation of the discharged matter therein, and connections between the accumulator and the means for regulating the discharge, whereby the discharge-opening is controlled by the accumulation of discharged matter, substantially as specified.

4. The combination in a separator of a rotatable chamber having walls flaring upwardly and outwardly from the bottom and then inclined inwardly and upwardly toward the center of the chamber; a discharge-opening for the solid matter at the largest periphery of the chamber; a valve for controlling the discharge-opening; an accumulator adapted to receive the discharged matter and mounted to be moved by accumulation of discharged matter therein; connections between the accumulator and the valve for controlling the latter; and a discharge for fluid near the center of the chamber, substantially as specified.

5. The combination in a separator of a rotatable chamber having walls flaring upwardly and outwardly from the bottom and then inclined inwardly and upwardly toward the center of the chamber; a feed-cone mounted concentric with the chamber and flaring downwardly and outwardly; a discharge-opening for the solid matter at the largest periphery of the chamber; a valve for controlling the discharge-opening; an accumulator adapted to receive the discharged matter and mounted to be moved by accumulation of discharged matter therein; connections between the accumulator and the valve for controlling the latter; and a discharge for fluid near the center of the chamber, substantially as specified.

6. The combination in a separator of a separating-chamber; ports H in said chamber; valves J for controlling same ports; accumulator R for receiving the discharged solid matter; and rod Q, lever P, rod N, links M; bell-crank levers L and links R for operating valves J, substantially as specified.

7. The combination in a separator of a separating-chamber A; feed-cone C; ports H in chamber A; valves J for controlling said ports; troughs G and S; accumulator R for receiving the discharged solid matter; and rod Q, lever P, rod N, links M, bell-crank levers L and links R for operating valves J, substantially as specified.

ARTHUR C. VAN KIRK.

Witnesses:
GEORGE M. HOKE,
E. G. CRANN.