

No. 832,043.

PATENTED OCT. 2, 1906.

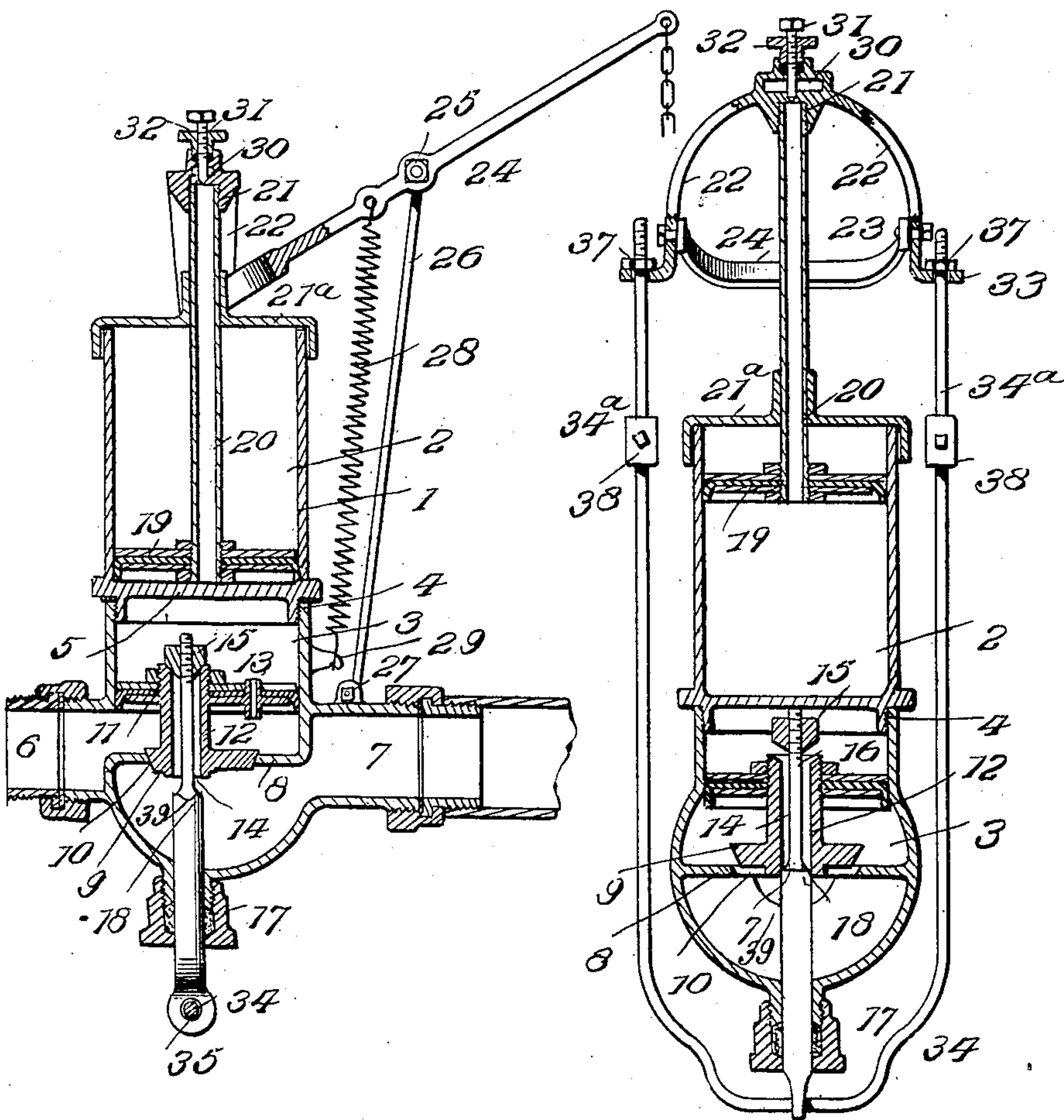
L. T. DERY.
FLUSH VALVE.

APPLICATION FILED APR. 14, 1905. RENEWED FEB. 20, 1906.

2 SHEETS—SHEET 1.

FIG. 1.

FIG. 2.



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Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

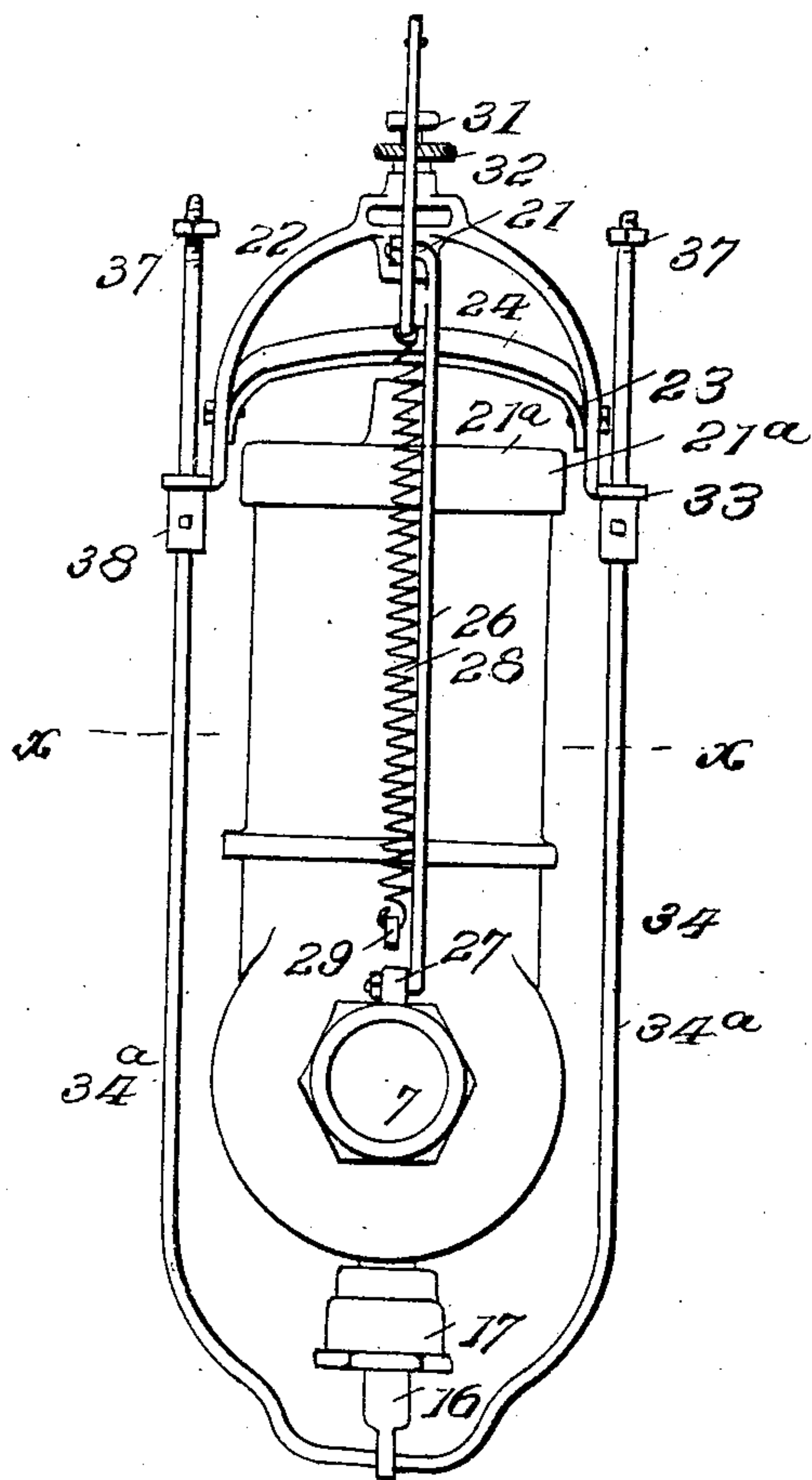
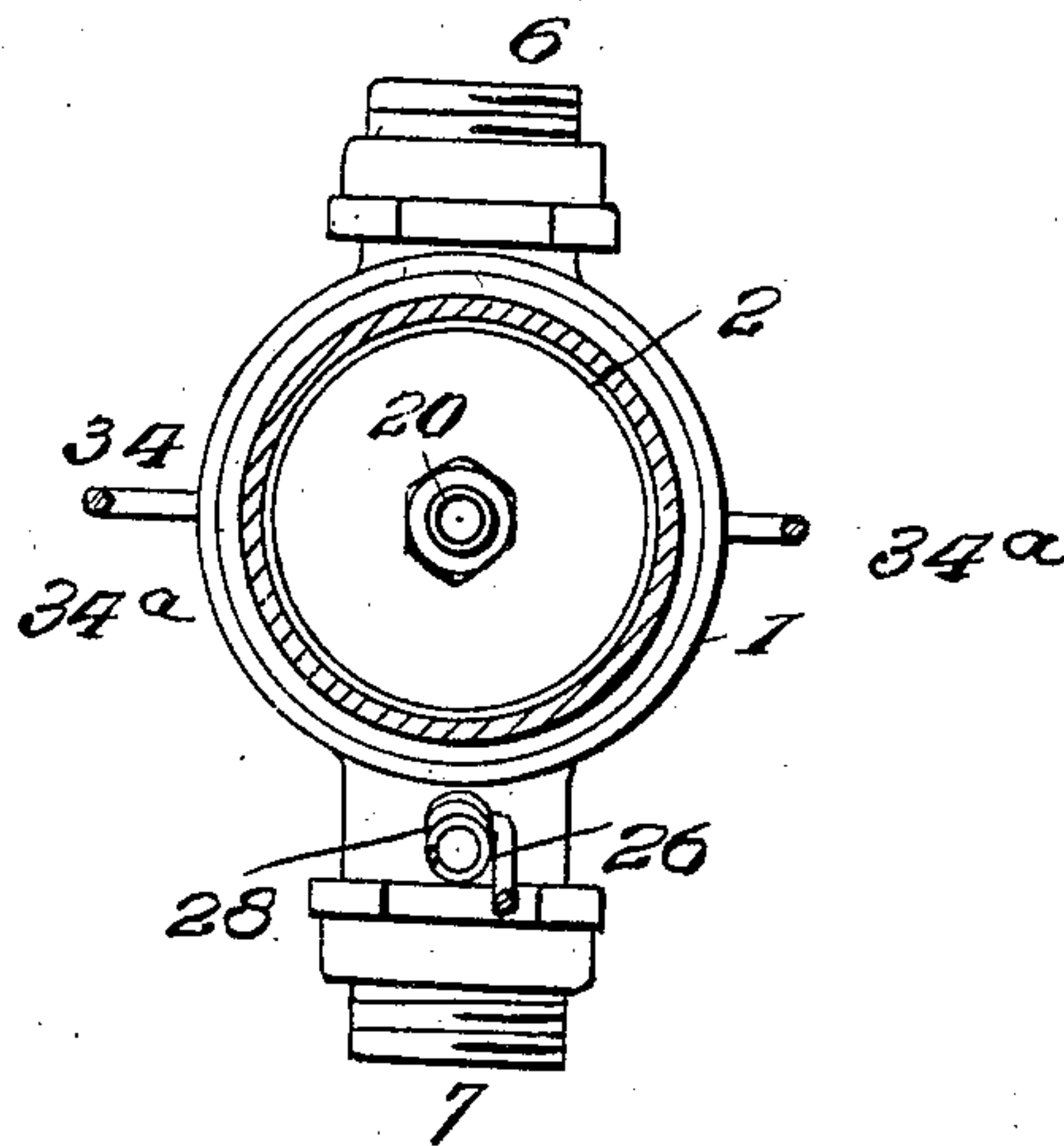


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

LOUIE T. DERY, OF MONTPELIER, NORTH DAKOTA.

FLUSH-VALVE.

No. 832,043.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed April 14, 1905. Renewed February 20, 1906. Serial No. 302,051.

To all whom it may concern:

Be it known that I, LOUIE T. DERY, a citizen of the United States, residing at Montpelier, in the county of Stutsman and State of North Dakota, have invented certain new and useful Improvements in Flush-Valves, of which the following is a specification.

This invention relates to improvements in water-closet flush-valves, and aims to provide a construction of valve means of this type of a simplified nature and embodying a combination of parts facilitating the ease of operation of the mechanism and the general serviceability thereof.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a vertical sectional view of a valve constructed in accordance with the invention. Fig. 2 is a vertical sectional view taken about at a right angle of Fig. 1. Fig. 3 is a rear elevation of the invention. Fig. 4 is a horizontal sectional view taken about on the line *xx* of Fig. 3.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Describing specifically the structure of the invention, the numeral 1 indicates the casing, which is divided into an upper air-chamber 2 and a lower water-chamber 3. The casing may be made in sections, the upper section having the chamber 2 and having screw connection, as shown at 4, with the lower section of the casing which embodies the water-chamber 3, the bottom 5 of the chamber 2 dividing said chamber from the chamber 3. The chamber 3 has an inlet 6 communicating therewith and an outlet 7 leading therefrom, an apertured partition 8 being interposed between the inlet 6 and the outlet 7. The main valve 9 is normally seated upon the partition 8, closing the aperture 10 therein, and said valve is connected with a piston 11, which operates in the chamber 3. A tubular extension 12 projects from the piston 11, and the valve 9 is formed integrally with this extension 12 in the preferred construction of the invention. A port 13 extends through the piston 11 and affords communication between the inlet 6 and portions of the chamber 3 upon opposite sides of the piston 11. The

tubular portion of the extension 12 (shown at 14) establishes communication between the portion of the chamber 3 above the piston 11 and the outlet 7, or, in other words, the portion 14 represents a passage which when open leads directly from the chamber 3 above the piston 11 to the outlet 7 in communication with the under side of the diaphragm or partition 8. The passage 14 is normally closed at the upper end or at the end adjacent the piston 11 by means of a relief-valve 15, said valve being connected with a stem 16, which passes through the passage 14 and out of the casing 1 through a stuffing-box 17 at the lower extremity thereof. The stem 16 is formed with a shoulder 18, which is adapted to abut with the valve 9 upon the under side of the latter, as will be described hereinafter. A piston 19 operates in the chamber or compartment 2 also, said piston having a tubular piston-rod 20, which passes loosely through a cap 21^a, tightly fitted to the upper extremity of the casing 1. The upper end of the piston-rod 20 is threaded into a head 21 exterior of the casing 1 above the latter, said head having outwardly and downwardly curved extensions 22, which are directly connected with the bifurcated end portions 23 of an operating-lever 24. The operating-lever 24 is pivoted at a point between its ends, as shown at 25, to the upper extremity of a bar 26, said bar 26 being pivoted at its lower end to the casing 1 at 27. A spring 28 is connected at one end with the lever 24, the opposite end of the spring being connected with a lug 29, projecting laterally from the casing 1, and this spring normally holds the lever 24 in such a position that the piston 19 actuated thereby is near the lower extremity of the compartment 2. The head 21 is formed with a vertical opening or air-passage 30, communicating with the tubular portion of the rod 20, and this passage 30 is partially closed by an adjustable pin 31, which latter is adapted to regulate or govern the amount of air which may pass through the passage 30 into the interior of the chamber 2 through the tubular portion of the rod 20. A jam-nut 32 may be utilized to position the pin 31 at a predetermined adjustment.

The lever 24 is not only operably connected with the rod 20 for actuating the piston 19, but said lever is also adapted to operate the valve 9. For this purpose projections 33 are extended laterally from the extremities of the members 22 of the head 21, said projec-

tions 33 having vertical apertures through which pass the sides 34^a of the actuating member 34, the latter being of U form, as shown most clearly in Fig. 3. The actuating member 34 consists, preferably, of a rod bent at a point between its ends and passing at the point of curvature through an opening 35 in the lower extremity of the valve-stem 16, the upper extremity of the side 34^a of the member 34 having stops 37 in the form of nuts attached thereto. Collars 38 are carried by the sides 34^a, between the upper and lower extremities thereof, and these collars also form stops adapted to be engaged by the projections 33. An inlet-port 39 is provided at the lower portion of the chamber 2. The pistons 11 and 19 are of course provided with suitable packing.

Under normal conditions the water passes into the casing 1 through the inlet 6, said water filling the chamber 3, as it may pass freely through the port 13 in the piston 11. The pressure upon the piston 11 is from opposite sides thereof, and the valve 15 is normally in a position closing the passage 14, establishing communication between the outlet 7 and the chamber 3. Upon actuation of the lever 24 by pulling the same downwardly the piston 11 is raised, and air is drawn into the compartment 2 through the space between the cap 21 and rod 20. As soon as the head 21 reaches a predetermined point in its upward movement the projections 33 will come into contact with the stops and raise the valve-stem 16 and the valve 15 carried thereby. The back or pressure upon the piston 11 is relieved as the water in the upper portion of the chamber 3 passes through the passage 14 out through the outlet 7. The back or pressure above the piston 11 being relieved, the pressure upon the under side thereof causes said piston to move upwardly, carrying the valve with it. Further, at a certain point in the upward movement of the stem 16 the shoulder 18 will come into contact with the valve 9 and positively open the valve and raise the piston 11 to the limit of their upward movement. The lever 24 being released, the spring 28 will pull the lever downwardly, the movement of the lever in this direction being retarded by the air acting upon the piston 19 in the chamber 2, such air gradually escaping from the chamber through the passage 30. Just before the piston 19 is at the limit of its lowering movement the projections 33 will strike the collar or stops 38 and cause the actuating member 34 to lower, forcing the valve 15 down upon its seat, closing the passage 14 and causing the main valve 9 also to seat itself without jar, since the piston 11 will gradually move as the water passes into the upper portion of the chamber 3 through the port 13.

The packing of the piston 19 is such that as said piston is raised air can be drawn into

the compartment 2 and through the space between the rod 20 and the cap 21^a, and this air passes by the piston to a point below the same. When the piston lowers, the pressure of the air expands the packing between the same and the casing 1, so that the air must be forced out of the casing through the hollow portion of the rod 20. The shoulder 18 of the valve-stem is recessed, as shown at 39, so as not to close the lower end of the passage 14.

Having thus described the invention, what is claimed as new is—

1. In a flush-valve, the combination of a retarding-piston, a chamber in which said retarding-piston operates, a fluid-chamber, a piston in said fluid-chamber, inlet and outlet means for the fluid-chamber, a main valve connected with the piston in said fluid-chamber, means establishing communication between the inlet and fluid chamber upon opposite sides of the piston therein, a relief-valve for relieving the piston in the fluid-chamber of back pressure, operating means connected with the retarding-piston, and actuating means connecting the operating means aforesaid with the relief-valve and permitting movement of the retarding-piston independently of the relief-valve.

2. In a flush-valve, the combination of a retarding-piston, a chamber in which said retarding-piston operates, a fluid-chamber, a piston in said fluid-chamber, inlet and outlet means for the fluid-chamber, a main valve connected with the piston in said fluid-chamber, means establishing communication between the inlet and the fluid chamber upon opposite sides of the piston therein, a relief-valve for relieving the piston in the fluid-chamber of back pressure, operating means connected with the retarding-piston, and actuating means connecting the operating means for the retarding-piston with the relief-valve and arranged to effect movement of the relief-valve to open and close the same as the retarding-piston approaches opposite limits of its movement.

3. In a flush-valve, the combination of a retarding-piston, a chamber in which said retarding-piston operates, a fluid-chamber, a piston in said fluid-chamber, inlet and outlet means for the fluid-chamber, a main valve connected with the piston in said fluid-chamber, means establishing communication between the inlet and the fluid chamber upon opposite sides of the piston therein, a relief-valve for relieving the piston in the fluid-chamber of back pressure, an operating-lever connected with the retarding-piston, a member connecting the operating-lever and the relief-valve, and means supported by the connecting member aforesaid for actuating the relief-valve when the retarding-piston approaches opposite limits of its movement.

4. In a flush-valve, the combination of a retarding-piston, a chamber in which said re-

tarding-piston operates, a fluid-chamber, a piston in said fluid-chamber, inlet and outlet means for the fluid-chamber, a main valve connected with the piston in said fluid-chamber, means establishing communication between the inlet and the fluid-chamber upon opposite sides of the piston therein, a relief-valve for relieving the piston in the fluid-chamber of back pressure, a tubular piston-rod for the retarding-piston and forming a passage for outlet of air from the chamber in which the retarding-piston operates, means for regulating or governing the amount of air passing through the passage formed by the piston-rod aforesaid, and operating means for actuating the retarding-piston and the relief-valve.

5. In a flush-valve, the combination of a casing subdivided into an upper air-chamber and a lower fluid-chamber, a retarding-piston operating in the air-chamber, inlet and outlet means communicating with the fluid-chamber, a main valve in the fluid-chamber, a piston operating in the fluid-chamber and connected with the main valve, means establishing communication between the inlet and the fluid chamber upon opposite sides of the piston therein, a relief-valve for relieving the piston in the fluid-chamber of back pressure, a relief-valve stem extending through the casing, an operating-lever, a spring connected with said lever, a piston-rod extending from the retarding-piston and connected at an end thereof with the operating-lever, an

actuating member of substantially U form having the sides thereof arranged upon opposite sides of the casing, said actuating member being connected at one end with the operating-lever and at the opposite end with the valve-stem, and means carried by the sides of the actuating member to be engaged when the retarding-piston approaches opposite limits of its movement and thereby effect opening and closing of the relief-valve.

6. In a flush-valve, the combination of an air-chamber, a piston operating therein, a fluid-chamber, a piston operating therein, a fluid inlet and outlet connected with the fluid-chamber, means establishing communication between the inlet and portions of the fluid-chamber upon opposite sides of the piston operating therein, a relief-valve for relieving the piston in the fluid-chamber of back pressure, a main valve connected with the piston in the fluid-chamber, a stem for said relief-valve, a lever directly connected with the piston in the air-chamber, and means operated by the lever at a predetermined point in the movement of the latter and initially actuating the stem of the relief-valve.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIE T. DERY. [L. s.]

Witnesses:

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HENRY J. DERY.