

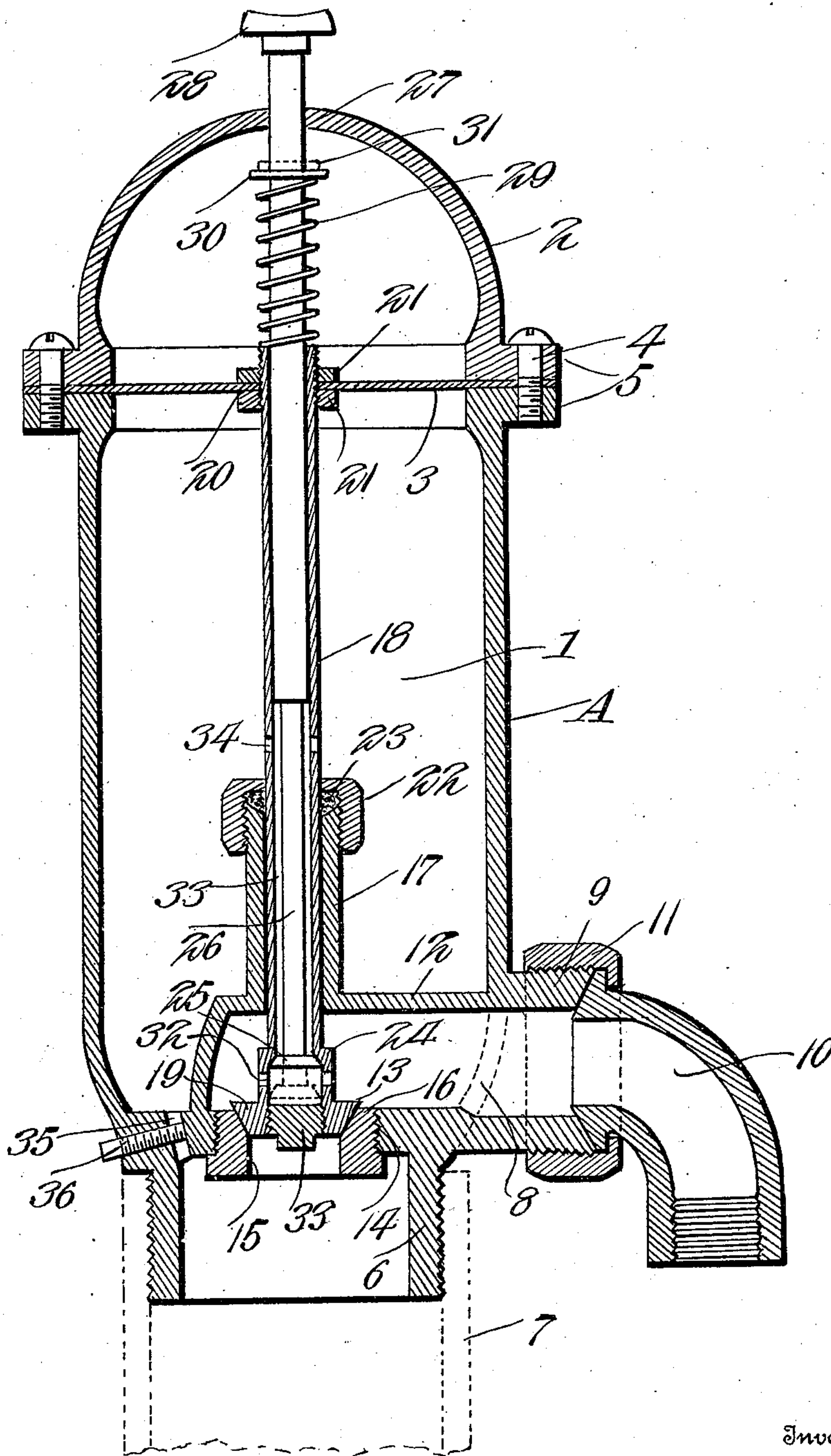
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FLUSH VALVE.

APPLICATION FILED OCT. 9, 1908.

933,855.

Patented Sept. 14, 1909.



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DWIGHT E. SELBY, OF BALLARD, WASHINGTON.

FLUSH-VALVE.

933,855.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed October 9, 1908. Serial No. 456,921.

To all whom it may concern:

Be it known that I, DWIGHT E. SELBY, a citizen of the United States, residing at Ballard, in the county of King and State of Washington, have invented new and useful Improvements in Flush-Valves, of which the following is a specification.

This invention relates to a closet flush valve of that type which is adapted to directly connect the flush pipe with the service main without the use of a storage tank.

The invention has for its objects to improve and simplify the construction and operation of flush valves of this character so as to be comparatively simple and inexpensive to manufacture, composed of few parts, reliable and efficient in use, and readily manipulated.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one embodiment of the invention, the figure is a central vertical section of the device.

Referring to the drawing, A designates a hollow cylindrical or other body which forms an expansion chamber 1 and on the top of the body is a dome-like cap 2 between which and the body is inserted a flexible diaphragm 3 that is held in place by fastenings 4 passing through peripheral flanges 5 on the cap of the body. The lower end of the body is formed into an externally-threaded collar 6 that is adapted to screw into the upper end of the flush pipe designated by 7. The body A is provided at its lower end with a side inlet port 8 at which is formed a hollow tubular extension or boss 9 for connection by a coupling 10 with the supply pipe, the coupling being secured by a clamping nut 11. Within the bottom of the casing is a partition 12 which separates the expansion chamber from the inlet chamber 13 that communicates with the service pipe. The bottom of the body A is provided with a threaded opening 14 in which is screwed a sleeve 15 formed with a conical valve seat

16 and through this sleeve the water is adapted to flow from the chamber 13 to the flush pipe when it is desired to flush the closet. Integrally formed on the partition 12 and rising therefrom in the center of the body A is a tubular guide 17 for the valve stem. Passing through the guide is a tubular valve stem 18 which carries at its lower end a valve 19 adapted to engage the seat 16 and this stem extends upwardly through the chamber 1 and through an opening 20 in the inlet diaphragm 3 and is secured to the latter by clamping nuts 21 screwed on the stem and bearing against opposite sides of the diaphragm. On the upper end of the tubular guide 17 is a gland nut 22 for pressing a packing ring 23 around the hollow stem 18 so as to prevent the leakage of water from the chamber 13 to the expansion chamber 1. Within the valve stem is a conical seat 24 which is engaged by a controlling valve 25 arranged within the hollow valve stem 18 and connected with the solid stem 26 that passes upwardly through and out of the stem 18 and through an opening 27 in the cap or dome 2, the upper end of the stem being provided with a removable push button 28. The valve 18 is held under the seat by a spring 29 arranged on the stem 26 at a point above the diaphragm with its lower end bearing on the upper extremity of the hollow stem 18 and its upper end bearing on a washer 30 removably held in place by a pin 31 extending through the valve stem 16, the spring serving to urge the valve stem 26 upwardly so as to hold the valve 26 against its seat 24. Just below the seat 24, the hollow valve stem 18 is enlarged into a chamber and the walls thereof are provided with ports 32 which communicate with the inlet chamber 8. The lower end of the hollow valve stem is closed by a plug 33 which forms a stop for limiting the opening movement of the valve 25, and this plug is inserted after the valve 25 and stem 26 are applied to the hollow valve stem 18. The lower part of the stem 26 is reduced in diameter to provide an annular space or passage 33 which is adapted to communicate with the inlet chamber 13 when the valve 25 is opened, and this passage 33 com-

municates by means of ports 34, with the expansion chamber 1. A by-pass 35 is provided between the expansion chamber and flush pipe through which the excess of water from the chamber 1 can drain out, the by-pass being controlled by a screw valve 36.

To operate the valve, the push button 27 is pressed downwardly to impart a longitudinal movement to the valve stem 26 against the tension of the spring 29 so as to open the valve 24, thereby allowing water under the city pressure to flow from the chamber 13 into the expansion chamber 1, through the ports 32, passage 33, and ports 34. As the volume of water in the chamber 1 increases, the full inlet pressure is exerted on the diaphragm 3 with the result that the latter is dished upwardly and the valve stem 18 carried therewith so as to open the valve 19 and allow water to flow directly into the pipe 7 for the flushing operation. After the pressure is removed from the push button 28, the valve 25 will close, thereby cutting off the supply of water to the chamber 1. The water gradually passes out from the chamber through the by-pass 35 so that the pressure on the diaphragm 3 is lessened and the valve 19 permitted to close under the action of the diaphragm 3.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention, what I claim is:—

1. A flush valve comprising a casing, a partition dividing the casing into inlet and expansion chambers, a supply pipe connected with the inlet chamber, an outlet through which the water passes from the inlet chamber, a valve controlling the outlet, a hollow stem passing through the expansion chamber, and a diaphragm rigidly connected with the valve stem and secured at the top of the chamber, ports in the valve stem communicating with the inlet chamber, a seat above the ports and arranged within the hollow valve stem, a valve adapted to engage the seat, a stem for the last-mentioned valve passing through the hollow valve stem and out of the top of the latter, a port in the hollow valve stem communicating with the expansion chamber, there being a passage

between the valve stems for permitting water to flow from the inlet chamber to the expansion chamber, a spring on the valve stem, and a spring acting on the valve stem for seating the valve.

2. A flush valve comprising a hollow body or casing, a cap covering the same, a diaphragm arranged between the cap and casing, a partition arranged in the bottom of the casing for providing a lower inlet chamber and an upper expansion chamber, the bottom of the inlet chamber being provided with a tapped opening, a tubular member threaded in the opening and provided with a valve seat, a tubular guide disposed above the valve seat and supported on the partition, a hollow valve stem extending through the guide and through the diaphragm, means for securing the valve stem to the diaphragm, a valve on the lower end of the stem arranged to engage the said seat, a packing on the guide engaging the valve stem, spaced ports in the valve stem for communicating respectively with the inlet and expansion chambers, an internal seat in the valve stem disposed between the ports, a controlling valve adapted to engage the last-mentioned seat, a stem for the controlling valve passing upwardly through the hollow valve stem and through the cap, means on the upper end of the controlling valve stem for actuating the same, a spring on the controlling valve stem and bearing against the upper end of the hollow valve stem to hold the valves closed, the controlling valve stem being reduced in diameter to provide a passage between the ports to permit water to pass from the inlet to the expansion chamber when the controlling valve is open, means for connecting the casing with a flush pipe, means for connecting the inlet chamber with a supply pipe, and a valve-controlled by-pass between the bottom of the expansion chamber and flush pipe.

3. A flush valve comprising a casing, means for connecting the bottom thereof with the flush pipe, a partition dividing the casing into a lower inlet and upper expansion chamber, a port between the inlet chamber and flush pipe, a tubular guide disposed vertically above the port, a tubular valve stem extending through the guide, a valve on the stem arranged to close the port, a cap for the top of the casing, a diaphragm disposed between the cap and casing, means for securing the valve stem to the diaphragm, a valve controlling communication between the two chambers through the valve stem, a stem secured to the last-mentioned valve and extending through the hollow valve stem and projecting out of the top of the latter, an actuator on the upper end of the last-mentioned valve stem, a helical compression

spring on the last-mentioned valve stem and
arranged with its lower end bearing on the
upper extremity of the tubular valve stem,
a by-pass in the lower part of the casing for
5 controlling the passage of water from the
expansion chamber to the flush pipe, and a
regulating valve controlling the by-pass.

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

DWIGHT E. SELBY.

Witnesses:

THOS. A. WAKEFIELD,
E. E. LIBBY.