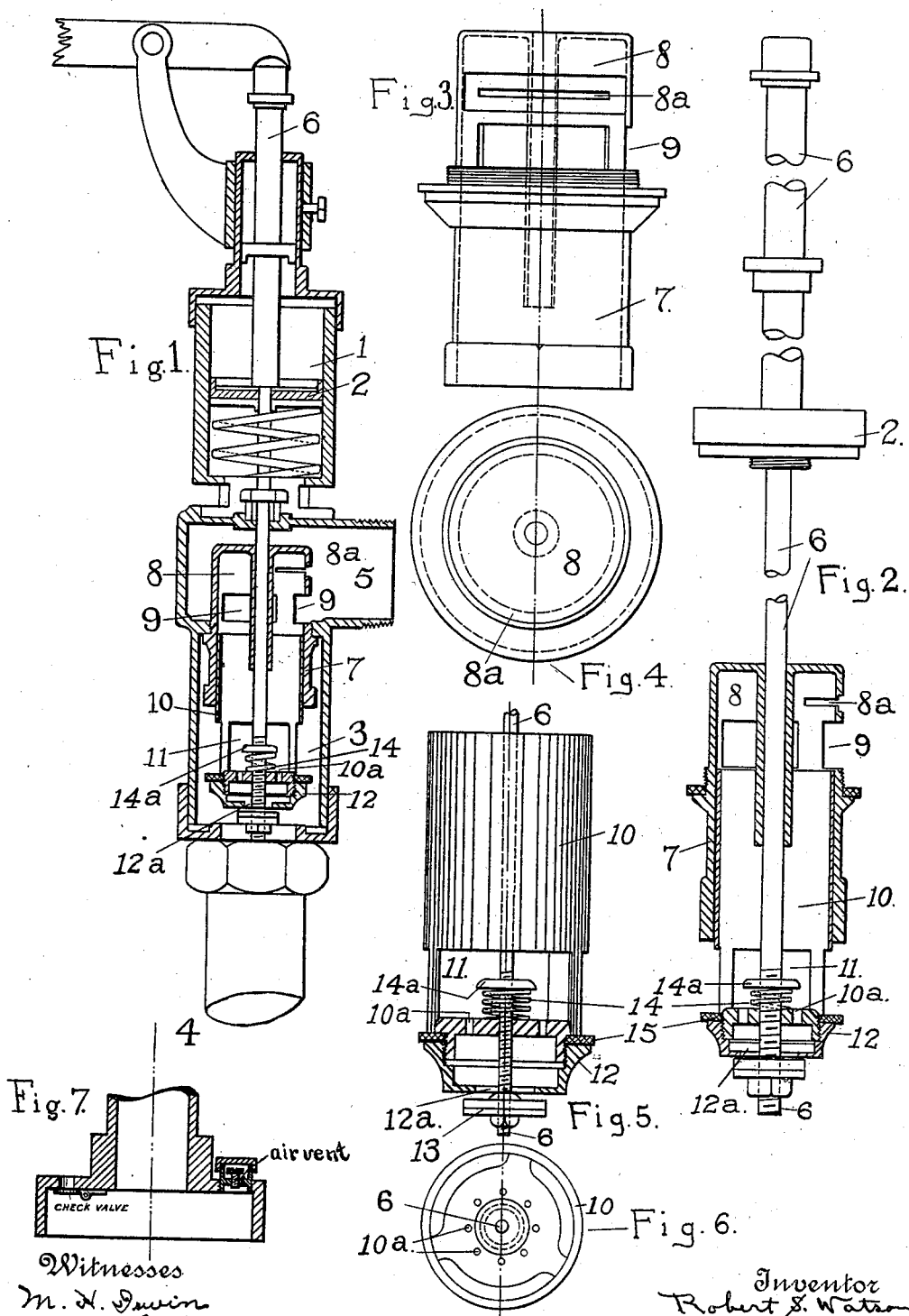


No. 649,089.

Patented May 8, 1900.

R. S. WATSON.
WATER CLOSET VALVE.
(Application filed Sept. 2, 1898.)

(No Model.)



Witnesses
M. H. Davis
David L. Farrow.

Inventor
Robert S. Watson
By his Attorney
Geo. B. Willcox

UNITED STATES PATENT OFFICE.

ROBERT S. WATSON, OF BAY CITY, MICHIGAN.

WATER-CLOSET VALVE.

SPECIFICATION forming part of Letters Patent No. 649,089, dated May 8, 1900.

Application filed September 2, 1898. Serial No. 690,093. (No model.)

To all whom it may concern:

Be it known that I, ROBERT S. WATSON, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Water-Closet Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to flushing-valves for water-closets, and more particularly to that class of water-closet valves adapted to be interposed directly between the water-main and the closet-bowl.

The general principle of operation of my present improved valve is as follows: An air-chamber located above the water-regulating valve contains a piston which is connected to the water-valve by a rod and is normally pressed to the top of the air-chamber by a spring. The air-chamber is open to the atmosphere at the bottom, and a check-valve (shown in Fig. 7) in the top of the air-chamber admits air above the piston, but prevents its egress. A small opening in the top of the air-chamber, the size of which can be easily regulated, permits air to escape slowly from above the piston. When the piston is depressed by pushing down the rod, the space above the piston is filled with air, which gradually discharges through the small opening as the piston is slowly pushed upward by the spring. Thus a slow closing of the water-regulating valve is effected.

This invention relates solely to certain improved details of construction and arrangement of the water-controlling mechanism whereby I am enabled to accomplish the objects of my invention, which are, first, to secure prompt and positive closure of the relief-valve upon removing pressure from the valve-stem; second, to cushion the main valve at the top of its travel and prevent noise when working under high pressure; third, to secure a positive but quiet flow of water into the bowl for a brief period after flushing. The various means by which I attain these objects are shown in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of the casing, showing the valve open. Fig. 2 is an

enlarged detail of the valve-stem with valves in place. Fig. 3 is a side view of the valve-chest and compression-chamber. Fig. 4 is a top view of the parts shown in Fig. 3. Fig. 5 is a side view, partly in section, of the main and relief valves. Fig. 6 is a top view of the same. Fig. 7 is an enlarged detail of the top of the air-chamber, showing the valves for admitting and discharging air.

Throughout the several views similar figures of reference designate similar parts.

1 is the air-chamber, in which operates the piston or plunger 2.

3 is a water-chamber having an inlet 4 and an outlet or discharge 5.

The valve mechanism forming the subject of my present invention is inclosed in the water-compartments and is operated conjointly with the air-piston by a central valve-rod 6.

7 is a cylindrical valve-chest secured by screw-threads or otherwise in the water-chamber 3, as shown in Fig. 1.

8 is a compression-chamber located above the valve-chest and preferably made in one piece with it, discharge openings or ports 9 being provided between the chest and chamber. The chamber is also provided with a small discharge-opening 8^a above the ports 9. A hollow cylindrical valve 10, attached to the valve-rod 6 and movable thereby longitudinally within the chest 7, opens or closes the ports 9. At the lower end of the valve 10 are water-inlets 11, also opened and closed by the movement of the valve in the chest 7. The bottom of valve 10 has water-inlets 10^a and a cap 12, the head of which is provided with a water-inlet 12^a and forms a seat for the relief-valve 13. A nut or washer 14^a is adjustably attached by screw-threads or otherwise to the valve-rod 6, and a spring 14, extending between the washer and the bottom of valve 10, closes the relief-valve when the pressure is removed from the valve-rod 6.

The proportions of the valve 10 and the valve-chest 7 are such that the water-inlets 11 are still partly open when the discharge-ports 9 are closed, and the inlets 11 close when the top of the valve passes and closes the small slit 8^a in the chamber 8.

The top rim of the cap 12 is provided with a ring of rubber or other suitable packing 15

to form a water-tight joint between the valve 10 and the bottom of the valve-chest 7 when the valve is closed.

The operation of the valve is as follows:

- 5 Depressing the rod 6 compresses the spring 14 and opens the relief-valve 13. Water under pressure of the main enters the valve 10 through the openings 12^a and 10^a, filling the valve and balancing the pressure on it. Fur-
- 10 ther depression of the rod 6 lowers the valve 10 within the chest 7, opening the inlet-ports 11 and discharge-ports 9, permitting the free passage of flushing-water therethrough. Upon releasing the pressure on the valve-rod the
- 15 spring 14 expands, closing the relief-valve. After flushing the escape of air from above the spring-pressed air-piston 2 slowly raises the valve-stem. The valve 10 rises, closing the discharge-ports 9, thus ending the flush.
- 20 Water entering the inlet 11, which is still partly open, fills the valve and compression chamber, augmenting the pressure therein and cushioning the valve. For a brief period after closing the ports 9, while the valve rises
- 25 in the chamber 8, a certain quantity of water is discharged through the orifice 8^a, refilling the closet-bowl. Further rise of the valve 10 closes the opening 8^a and the inlets 11.

- 30 By cushioning the top of the valve in chamber 8, as described, I avoid all pounding or jar noticeable in uncushioned valves when operating under high pressure.

- 35 Heretofore it has been my practice to allow the relief-valve 13 to remain open until the flush had ceased and the main valve closed, permitting the water-pressure to close the relief-valve. Under light pressures this arrangement was satisfactory; but when subjected to heavy pressure it closed too suddenly, causing a sharp noise. Therefore I
- 40 have applied the spring 14 to the valve-rod,

whereby the relief-valve is mechanically closed before the main valve 10 closes, thus avoiding all shocks, and this means or its equivalents for closing the relief-valve while the main valve is open forms an important feature of my invention. 45

What I claim is—

1. In combination with the casing of a flushing device, a water-valve comprising a hollow cylindrical valve-seat removably secured in the casing, said valve-seat being closed at one end to form a cushioning-chamber and having openings near its closed end for discharge of water; a hollow cylindrical valve longitudinally movable within said valve-seat, having water-inlets at its lower end and being open at its upper end; and an auxiliary valve attached to the lower end of the hollow cylindrical valve, substantially as described. 50 55 60

2. In a water-regulating device for pneumatically-controlled flushing-valves the removable cylindrical valve-seat having outlet-openings 9, and the compression-chamber 8 having openings 8^a therein; in combination with the hollow cylindrical valve 10 having inlet-openings 11; and an auxiliary valve carried by said valve 10, all arranged substantially as described and for the purposes set forth. 65 70

3. In a flushing device of the kind described a hollow cylindrical valve having lateral openings near its lower end, a perforated base, a cap for said base having a water-inlet, a valve to close said inlet, and means substantially as described for closing the valve. 75

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

ROBERT S. WATSON.

Witnesses:

RAY FRALICK,
J. W. McMATH.