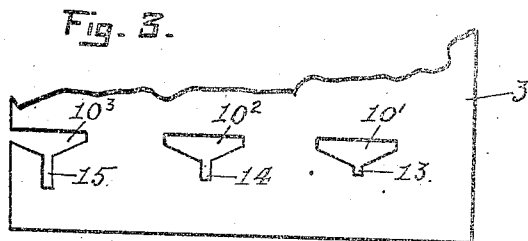
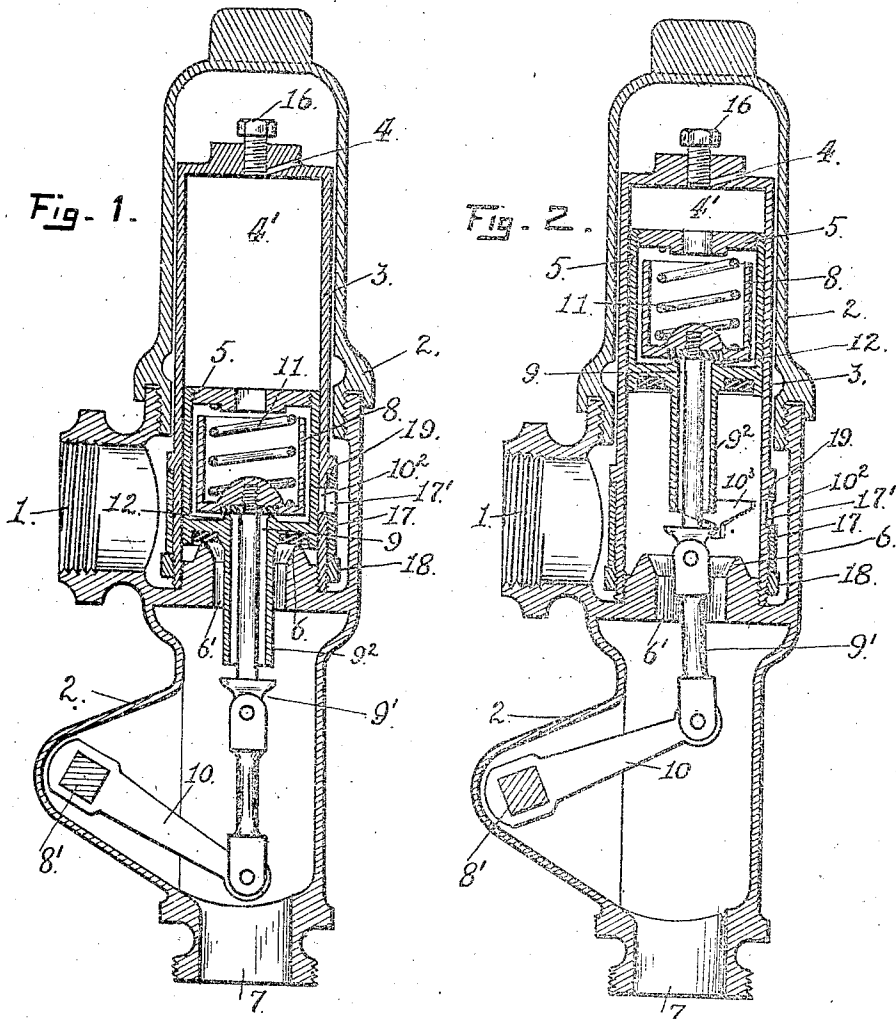


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VALVE MECHANISM FOR CLOSET BOWLS.
APPLICATION FILED APR. 15, 1907.

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Patented Dec. 29, 1908.



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VALVE MECHANISM FOR CLOSET-BOWLS.

No. 908,224.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed April 15, 1907. Serial No. 368,361.

To all whom it may concern:

Be it known that I, CHARLES M. ECKLAND, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Valve Mechanism for Closet-Bowls, of which the following is a specification.

The present invention relates to certain new and useful mechanism for actuating and controlling the movement of the valve for automatically governing the supply of water for the flushing of closet bowls; the object of the invention being to dispense with the overhead tank or the tank reservoir ordinarily employed for maintaining a body of water for flushing purposes, and to so arrange for the valve movement that while an ample quantity of water is supplied for the proper flushing of the closet bowl and partly refilling the same with an after-wash, the seating of the valve shall be such as to gradually cut-off the flow of water from the main supply and to finally seat itself to entirely close or cut-off the water supply entirely without noise or jar on the pipes, thus providing for an absolutely noiseless flushing of the closet bowl, and removing the objectionable feature of the flushing means at present employed in connection with the closet equipment or connections installed in hotels and houses generally.

To comprehend the invention reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a vertical sectional view taken through the piston-valve, said view illustrating the parts in position to entirely close the flow of water to the bowl of the closet; Fig. 2 is a similar view illustrating the piston-valve and its controlling valve in full upward position to open the outlet ports for the flow of water to the closet bowl; and Fig. 3 is a broken plan view of the blank from which is formed the inner cylinder for the outer casing, said view disclosing the inlet ports for the flow of water from the main supply to the outlet ports.

In the drawings the numeral 1 is used to designate the main supply for the water, and 2 an outer casing connected thereto. Within this said outer casing is fitted the cylinder 3, having in its top portion a water inlet 4, through which inlet water is admitted into the pressure chamber 4' of the said cylinder.

In the present case the outer cylinder is illustrated as sectional, the upper section being screwed onto the lower section, the purpose of so constructing the said outer casing being to enable the interior mechanism to be readily inserted within the casing, and to be quickly removed therefrom.

Within the pressure chamber 4' of the cylinder 3 is fitted the vertically movable piston-valve 5, said piston-valve resting in its closed position on the valve seat 6 to close the main outlet port 6' of the casing, which port communicates with the outlet 7 leading to the connection with the closet-bowl.

In the piston-valve 5 is located and works the valve 8, which valve controls the outlet leading from the said piston-valve 5. The valve 8 during its upward movement engages the under face of the ported piston-valve 5 and lifts the same from its seat 6, the said valve 8 being raised from its seat and forced upward within the piston-valve 5 by means of a handle. This handle is fitted within a socket in the shaft 8' working within the lower portion of the outer casing 2, and the same is connected to the valve stem 9' by means of the lever 10. The valve stem 9' works through the sleeve 9², downwardly projecting from the piston-valve 5. The valve 8, which has an upwardly opening cup shaped chamber at its upper end, is normally held to its seat 12 by means of a spring 11 supported in the cup-shaped chamber and having its upper end bearing against the top of the piston-valve 5.

In the lower portion of the cylinder 3 are provided the beveled or inclined inlet ports 10¹, 10², 10³, which are formed respectively with the downwardly extended slots 13, 14, 15, the slot 15 being prolonged slightly beyond the depth of the slot 14, which slot 14 in turn extends slightly below the depth of the slot 13. These slotted extensions of the said inlet ports are for the purpose of permitting an inflow of a small quantity of water to the closet-bowl after the ports 10¹, 10², and 10³ have been closed by the vertically movable piston-valve 5 during its downward movement, said inflow of water through the slotted extensions 13, 14, and 15 constituting an after-wash for the closet-bowl.

In the top of the stationary cylinder 3 is fitted an adjustable screw 16, which screw

controls the area of the port 4 in order to regulate the time of flush or movement of the piston-valve 5.

On the lower portion of the cylinder 3 is fitted a ring 17, having openings 17' therein which correspond with and register with the before mentioned inlet ports 10', 10², 10³ formed in the said cylinder. This ring is for the purpose of governing the area of the said inlet ports to regulate the amount or quantity of water admitted to the closet-bowl for the flushing thereof. Should it be desired to reduce the quantity of water to flow through the said ports during the movement of the piston-valve 5, the ring 17 is given a part turn so as to partly cover the inlet ports by reducing the opening thereof. When the ring 17 has been given the desired adjustment for the admission of the quantity of water during the flushing action of the valve mechanism, the same is locked in position by the tightening ring 18, which is threaded on the lower extremity of the cylinder 3 and, which when screwed up forces the upper edge of the regulating ring against the shoulder 19 of the cylinder 3 to secure the said ring 17 in its adjusted position.

The water enters the casing 2 through the main supply pipe or entrance for the water, passing between the inner wall of the said casing 2 and the outer wall of the cylinder 3 arranged within the upper portion or section of the outer casing, and flows into the pressure chamber 4' of the cylinder 3 to fill the same through the inlet 4, the pressure of the water thus admitted into the said pressure chamber 4' acting on the piston-valve 5 to hold the same down upon its seat 6 to close the main outlet port 6'. When the piston-valve stands in this position the flow of water to the closet-bowl is cut off, Fig. 1 of the drawings. As the handle is raised, it actuates the lever 10 and the valve stem 9' to lift the valve 8 from off its seat 12 so as to uncover the outlet port 9, causing the water to discharge from within the pressure chamber of the cylinder 3, and permitting the piston-valve 5, through the movement of the valve 8, to be carried to the top of the said pressure chamber 4' of the cylinder 3. This movement of the said piston-valve uncovers the outlet port 6', and gradually opens the main inlet ports 10', 10², 10³, the opening of which ports permits the water entering through the main supply 1 to flow directly into the lower portion of the pressure chamber 4' and to escape through the uncovered main outlet port into the outlet 7 leading through its connections to the closet-bowl for flushing purposes. The moment the handle is released, the pressure of the spring 11 acting on the valve 8, forces the said valve to its seat 12 to close the port 9 and prevent the escape of water from within the pressure chamber 4' of the cylinder 3,

permitting the water entering the said chamber through the inlet 4 to accumulate therein and the pressure thereof to act upon the piston-valve 5 to force the same downward to gradually close the ports 10', 10², 10³, and cut off the main flow of water to the closet-bowl. After the main flow of the water has been cut off, a small quantity of water will continue to flow through the slotted extensions 13, 14, 15 of the main inlet ports, which flow of water constitutes the after-wash for the part refilling of the closet-bowl. As the piston-valve 5 continues its downward movement after having closed the main inlet ports to cut off the main flow of water, the slotted extensions 13, 14, 15 are closed in succession, making a gradual and small final closing as the said piston-valve 5 is forced by the pressure of the water within the pressure chamber of the cylinder 3 onto its seat 6, to close the main outlet 6'. This gradual seating of the piston-valve 5 and cutting off of the flow of water to the closet-bowl, obviates all noise and jar on the pipes.

Having thus described the invention, what is claimed as new and desired to be protected by Letters Patent is—

1. The combination of an outer casing provided with a main inlet and a main outlet for the water, and a main valve seat, a cylinder within the casing provided with a series of inlet ports, a piston valve within the cylinder to control the inlet ports of the cylinder and having an auxiliary valve seat, a relief valve working within the piston valve to lift the piston valve from its seat, said relief valve having an upwardly opening cup shaped chamber at its upper end, means for actuating the relief valve to raise the piston valve from its seat and a controlled inlet communicating with the interior of the cylinder for admitting water therein to act against the piston valve.

2. The combination with an outer casing provided with a main water supply opening and a main outlet for the water entering therein, of a cylinder secured within the outer casing, a controlled inlet in said cylinder establishing communication with the pressure chamber thereof, of a series of valves working within said chamber, of a series of inlet ports in the lower portion of the cylinder, said ports being gradually opened and closed by the movement of the valves within the pressure chamber of the cylinder, of a series of successively prolonged slotted rectangular shaped extensions for the said inlet ports, of a regulating ring for controlling the area of the inlet ports, and of means for actuating the valves within the pressure chamber of the cylinder to open the inlet ports.

3. The combination with an outer casing provided with a main water supply inlet and

a main outlet for the water entering therein, of a cylinder located within the said casing, the interior of said cylinder forming a pressure chamber, of a series of inlet ports formed in the lower portion of the cylinder, of a series of successively prolonged slotted extensions, of the same width throughout, for the inlet ports, of a valve working within the pressure chamber of the cylinder for gradually opening and closing the inlet ports and successively opening and closing the slotted extensions of the said ports, and of means for raising the said valve within the pressure chamber to open the mentioned inlet ports.

4. The combination with an outer casing provided with a main supply inlet and a main outlet for the water, of a cylinder located within the casing, of a series of inlet ports in said casing, of gradually prolonged slotted extensions for the inlet ports, of a piston-valve within the cylinder for gradually opening and closing the inlet ports and the slotted extensions thereof, of a relief valve working within the piston-valve for lifting the said piston-valve from its seat, said relief valve having an upwardly opening cup-shaped chamber at its upper end, of a spring supported within the cup shaped chamber with its upper end bearing against the top of the piston valve, said spring acting to normally hold the relief valve to its seat, of means for actuating the relief valve to raise the piston-valve from its seat, of a controlled inlet communicating with the interior of the cylinder for admitting water therein to act against the piston-valve, and a ring on the cylinder for regulating the area of the inlet ports to control the flow of water there-through during the movement of the piston valve.

5. The combination of an outer casing provided with a main inlet and a main outlet for the water and a main valve seat, a cylinder within the casing provided with a series of inlet ports, a piston valve within the cylinder to control the inlet ports of the cylinder and having an auxiliary valve seat, a relief valve working within the piston valve to lift the piston valve from its seat, said relief valve having an upwardly opening cup shaped chamber at its upper end, a spring arranged within the cup shaped chamber to bear against the piston valve to normally hold the relief valve to its seat and a controlled inlet communicating with the interior of the cylinder for admitting water thereinto, against the piston valve.

6. The combination with an outer casing provided with a main inlet and a main outlet

for the water and a main valve seat, a cylinder within the casing provided with a series of inlet ports, a piston valve within the cylinder to control the inlet ports of the cylinder and having an auxiliary valve seat, a relief valve working within the piston valve to lift the piston valve from its seat, a spring to normally hold the relief valve to its seat, said spring being arranged to have its opposite ends engaged with the relief valve and piston valve respectively, means for actuating the relief valve to raise the piston valve from its seat and a controlled inlet communicating with the interior of the cylinder for admitting water therein to act against the piston valve.

7. The combination of an outer casing provided with a main inlet and a main outlet for the water and a main valve seat, a cylinder within the casing provided with a series of inlet ports, a piston valve within the cylinder to control said inlet ports and having an auxiliary valve seat, a relief valve working within the piston valve to lift the piston valve from its seat, a spring to normally hold the relief valve to its seat, said spring being interposed between and arranged to work against the relief valve and the piston valve, means for actuating the relief valve to raise the piston valve from its seat and a controlled inlet communicating with the interior of the cylinder for admitting water therein to act against the piston valve.

8. The combination of an outer casing provided with a main inlet and a main outlet for the water and a main valve seat, a cylinder within the casing provided with a series of inlet ports, a piston valve working within the cylinder to control the inlet ports of the cylinder and having an auxiliary valve seat, said piston valve being arranged to completely close said inlet ports of the cylinder when the piston valve rests upon its seat, a relief valve working within the piston valve to lift the piston valve from its seat, means for actuating the relief valve to raise the piston valve from its seat and a controlled inlet communicating with the interior of the cylinder for admitting water therein to act against the piston valve.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES M. ECKLAND.

Witnesses:

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W. H. RUSSELL.