June 5, 1934. D. E. WEST ET AL 1,961,469

FLUSH VALVE

Filed Nov. 30, 1932

Fig. 1.

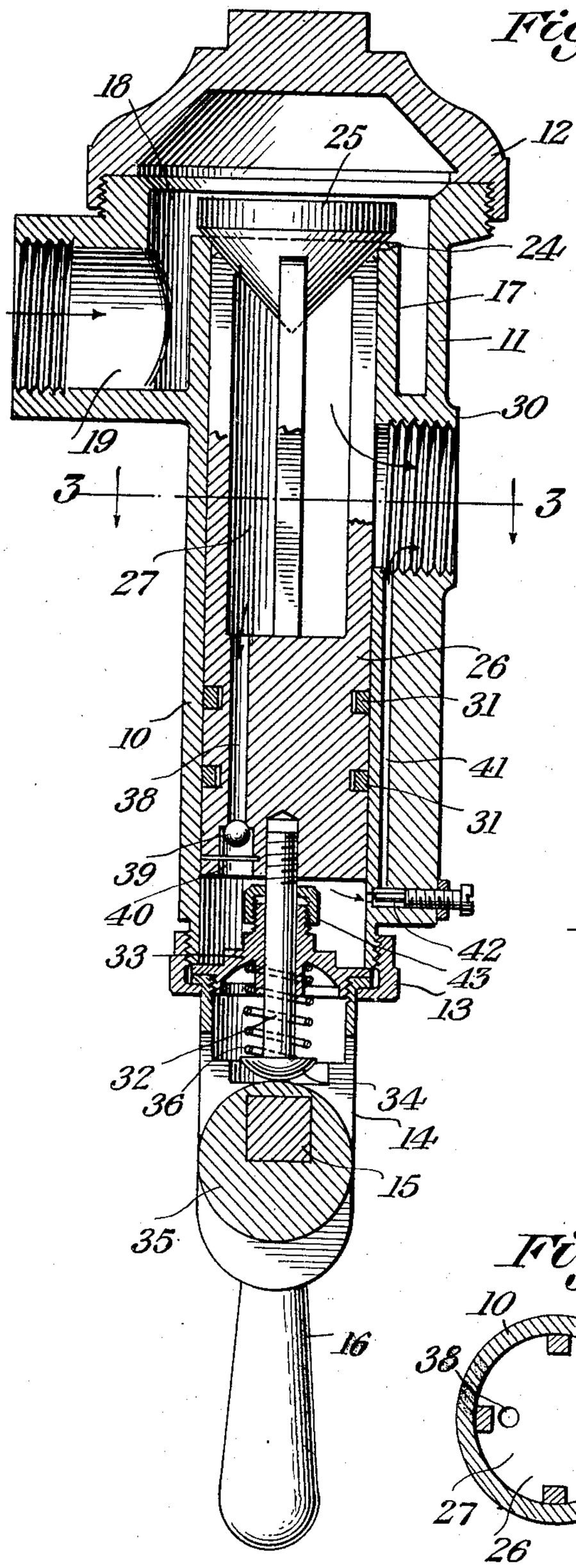


Fig. 4.

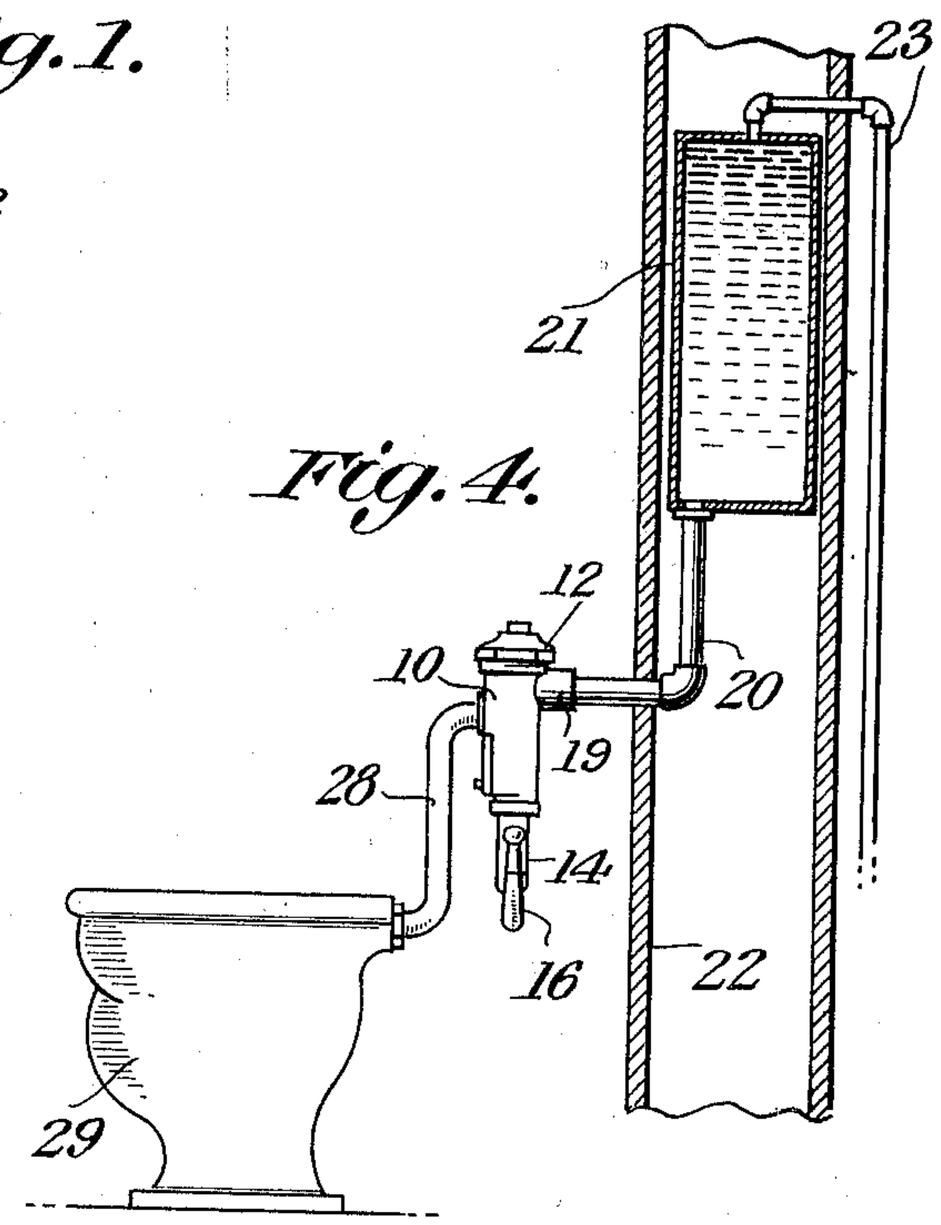


Fig. 2.

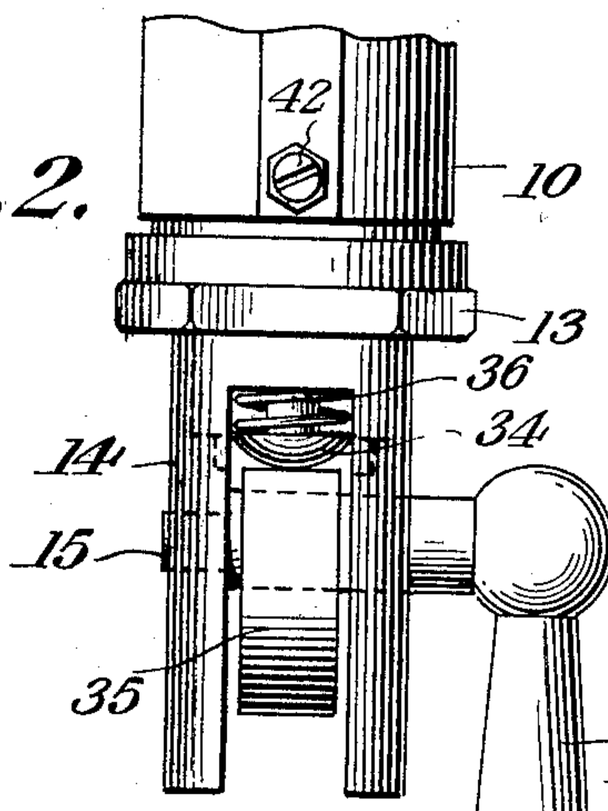
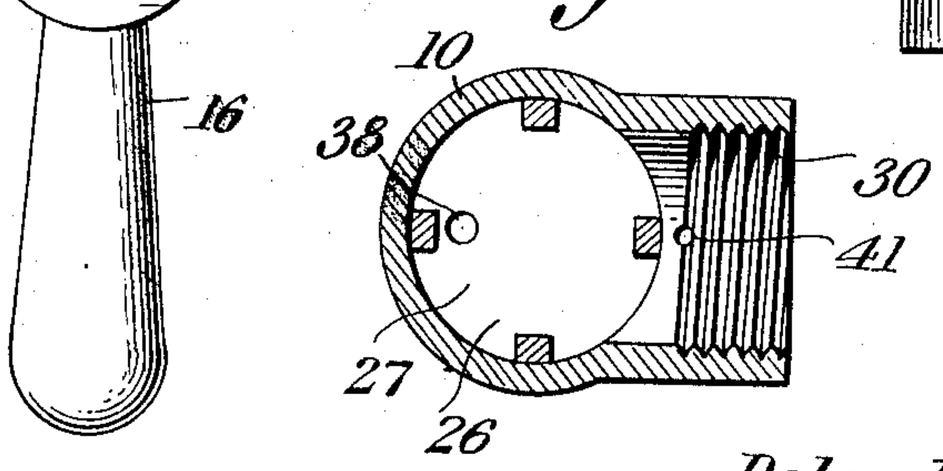


Fig. 3.



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FLUSH VALVE

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3 Claims. (Cl. 137—93)

The invention relates to a valve and more especially to flush valves for flushing toilets or other similar uses.

The primary object of the invention is the provision of a valve of this character wherein the same controls the amount of flow therethrough by means of a by-pass and needle valve control, the valve in its entirety being of novel construction.

A further object of the invention is the provision of a valve of this character, wherein the construction thereof assures it being strictly noiseless in operation and such valve is susceptible of quick action for flushing purposes.

A still further object of the invention is the provision of a valve of this character, the same being commonly known as slow closing valves, which are quickly opened by or as the result of a manual operation and which automatically close upon release of the manually moved part, the closing movement of the valve being obstructed and retarded by a confined body of water whose escape through a small orifice or by-pass regulates and controls such closing movement, the valve being such that it will operate on a half-inch water line in association with the closed tank which is confined within the wall of an edifice and furnishes a sufficient volume of water to flush the toilet and is not governed by the pressure of water as it will work equally well with high or low pressures.

A still further object of the invention is the provision of a valve of this character which is extremely simple in construction, thoroughly reliable and efficient in its purpose, possessing but few parts, strong, durable, and inexpensive to manufacture and install.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described in detail, illustrated in the accompanying drawing, which discloses the preferred embodiment of the invention, and pointed out in the claims hereunto appended.

In the accompanying drawing:

Figure 1 is a vertical sectional view through the valve constructed in accordance with the invention.

Figure 2 is a fragmentary elevation of the valve.

Figure 3 is a sectional view on the line 3—3 of Figure 1 looking in the direction of the arrows.

Figure 4 is a fragmentary vertical sectional view through the wall of an edifice showing the water tank, the toilet bowl and the valve in association in accordance with the invention.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing in detail, the valve structure comprises a cylindrical shell or casing 10 having an enlarged upper portion 11 carrying a removable cap 12, while the lower portion is fitted with a detachable collar 13, the same securing in place a bifurcated bearing 14. This bearing has journaled therein the stud spindle 15 of an actuating lever 16 of the hand operated type.

Formed interiorly of the shell or casing 10 at the larger upper end 11 thereof is a partition 17 which rises within a chamber 18 within said end 11 and above the water inlet nipple 19 integrally formed with the shell or casing. The inlet nipple 19 through pipe 20 communicates with a water tank 21. This tank 21 is preferably built within the wall 22 of an edifice and communicative therewith is a water feed pipe 23 of the water system of such edifice.

The partition 17, which is of tubiform, has at its upper free end a valve seat 24 for accommodating an inverted substantially conical-shaped valve head 25, the same being formed with a piston 26 snugly fitted for sliding movement in the shell or casing 10. The piston is provided with elongated openings 27 so that when the valve head 25 is lifted from its seat 24 water from the nipple 19 will flow through the openings 27 to the delivery pipe 28 opening into the toilet bowl 29, the pipe 28 being threaded in the nipple portion 30 formed in the shell or casing 10 as will be clearly apparent. When the valve head 25 is engaged with the seat 24 the water supply from the inlet nipples 19 to the pipe 28 is completely shut off. The piston 26 has fitted therewith the packing rings 31, these playing against the inner wall of the shell or casing 10 for a fluid-tight relationship therebetween. Removably secured to the piston 26 is a plunger 32 slidably mounted in a guide 33 fitted fluid-tight to the shell or casing 10 by the collar 13. The plunger 32 at its outer end has a rounded head 34 which contacts with a cam 35 rigidly carried by the axle 15, the plunger 32 being urged in the direction of the cam 35 by a coiled tensioning spring 36 seated against the guide 33 and the head 34 respectively. Thus it will be seen that when the lever 16 is turned the plunger 32, under the action of the cam 35, will be lifted, moving the piston 26 upwardly in the shell or casing 10 and

unseating the valve head 25 from the seat 24, whereupon, flow of water from the nipple 19 will pass through the openings 27 to the pipe 28 for the flushing of the bowl 29 as will be obvious.

The piston 26 has a passage 38 which forms a lead from the upper portion of the shell or casing 10 to the lower portion thereof so that water may pass from the inlet nipple 19 into the lower portion of the shell or casing 10 beneath the piston 26 to float the same for maintaining the valve head 25 disengaged from its seat 24 for a determined period of time in a manner presently described.

The passage 38 is controlled by a non-return check valve 39 held within a caged recess 40 provided in the piston 26. Thus it will be seen that water may flow from the upper part of the shell or casing 10 through the passage 38 to the lower part of said shell or casing but will be prevented from return flow to the upper part of said shell or casing by the valve 39 functioning as a check valve.

Provided in the shell or casing 10 is a by-pass 41 which opens into the nipple 30 and into the lower portion of the shell or casing 10 below the position of normalcy of the piston 26 and at this point there is provided a needle valve 42 operable from without the shell or casing 10 so as to regulate the passage of water through the by-pass 41, the valve 42 being manually set for the control of the flow through the by-pass as will be apparent. In this fashion the flushing of the bowl 29 is timed, as the valve head 25 cannot become seated against the seat 24 until the water beneath the piston 26 has escaped through the by-pass 41 into the nipple 30, thence through pipe 38 into the bowl. The plunger 32 operates through a packing gland 43 which is of conventional form.

From the foregoing it is thought that the construction and manner of operation of the valve will be clearly understood and therefore a more extended explanation has been omitted.

What is claimed is:

1. A valve of the kind described comprising a cylindrical shell forming a piston cylinder, a piston slidably fitted within said cylinder and having water flow openings at its upper end, an enlarged upper end formed on the shell, a water inlet nipple opening into said enlarged end, a water delivery nipple formed with the shell below the enlarged end, a vertical partition in the enlarged end and rising above the inlet nipple, a valve head on the piston and normally seated upon the partition to shut off water flow from the inlet to the outlet nipple, said piston having a passage establishing communication above and below the piston in said shell, a check valve located in said passage, said shell having a by-pass from below the piston to the outlet nipple, a manually set valve for the by-pass, and manually operable means for lifting the valve head from the partition.

2. A valve of the kind described comprising a cylindrical shell forming a piston cylinder, a piston slidably fitted within said cylinder and having water flow openings at its upper end, an enlarged upper end formed on the shell, a water inlet nipple opening into said enlarged end, a water delivery nipple formed with the shell below the enlarged end, a vertical partition in the enlarged end and rising above the inlet nipple, a valve head on the piston and normally seated upon the partition to shut off water flow from the inlet to the outlet nipple, said piston having a passage establishing communication above and below the piston in said shell, a check valve located in said passage, said shell having a by-pass from below the piston to the outlet nipple, a manually set valve for the by-pass, and manually operable means for lifting the valve head from the partition, the piston below the valve head being hollow for a distance with the water flow openings coextensive therewith.

3. A valve of the kind described comprising a cylindrical shell forming a piston cylinder, a piston slidably fitted within said cylinder and having water flow openings at its upper end, an enlarged upper end formed on the shell, a water inlet nipple opening into said enlarged end, a water delivery nipple formed with the shell below the enlarged end, a vertical partition in the enlarged end and rising above the inlet nipple, a valve head on the piston and normally seated upon the partition to shut off water flow from the inlet to the outlet nipple, said piston having a passage establishing communication above and below the piston in said shell, a check valve located in said passage, said shell having a by-pass from below the piston to the outlet nipple, a manually set valve for the by-pass, a bearing at the lower end of the shell, a collar fixing the bearing to the lower end of the shell, a plunger guide detachably fitted with the bearing, a plunger fixed in the piston and working in said guide, and a manually operable cam journaled in said bearing and active upon the plunger.

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