Nov. 16, 1926. 1,606,828

W. M. EARLY

FLUSHING VALVE

Filed April 2, 1923

Fig. 1.

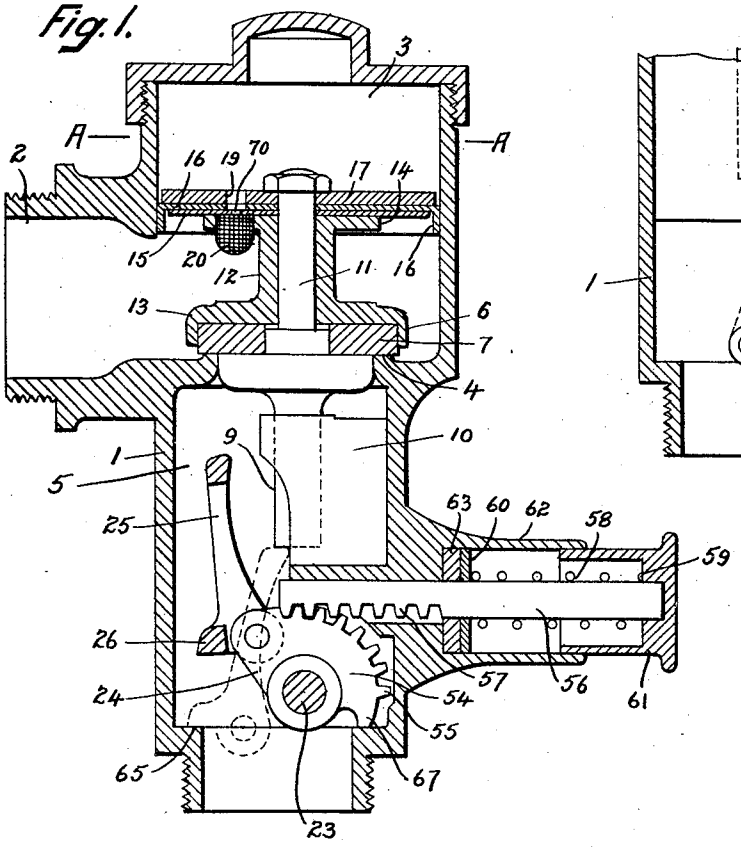
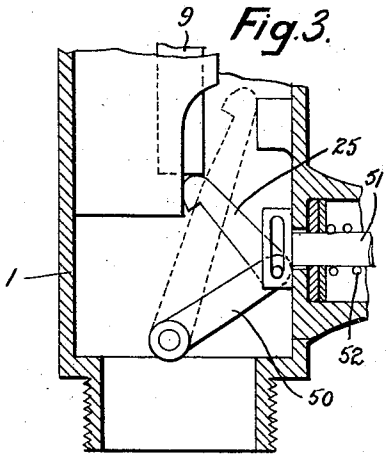


Fig. 3.



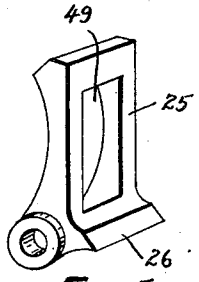


Fig. 5.

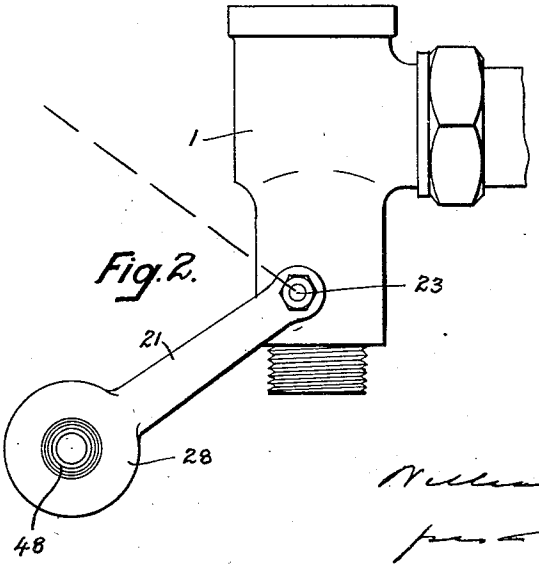


Fig. 2.

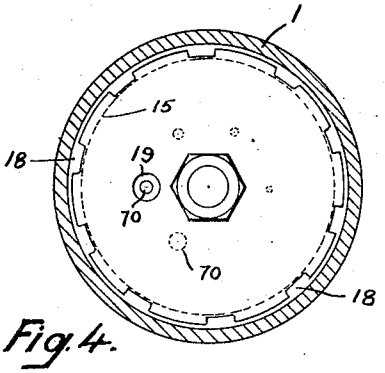


Fig. 4.

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UNITED STATES PATENT OFFICE.

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FLUSHING VALVE.

Application filed April 2, 1923. Serial No. 629,286.

This invention relates to water closet and the like flushing valves of the kind in which a valve normally closes the opening between the supply and the outlet chambers and in which such valve is opened by means upon the exterior of the casing.

The object of the present invention is to improve and simplify the construction of such devices.

According hereto a plunger is connected to the valve and fits loosely within the chamber above the valve and is so arranged that as the valve is raised from its seat and the plunger moved upwardly, the water in the space above the plunger will freely pass such plunger in order to enable it to be raised within the chamber. When the upward movement of the plunger ceases water will pass from the space below the plunger to the space above it through a by-pass preferably arranged in the plunger itself in order to permit the plunger and valve to move downwardly and the valve to close upon its seat after the required volume of water has flooded through the valve opening.

Means are provided whereby when the valve has been raised to the required height such means will become disengaged from the valve and permit the valve to close upon its seat independently of such valve raising means.

A preferred form of the invention will now be described with the aid of the accompanying drawings wherein:—

Figure 1 is a cross sectional elevation showing the valve closed upon its seat and the means for raising it,

Figure 2 is a side elevation of the closing device on a smaller scale than Figure 1 showing an alternative method of operating the valve,

Figure 3 is a sectional elevation of a further alternative method of operating the valve,

Figure 4 is a sectional plan on line A—A Figure 1 showing the valve plunger and the means for varying the speed of the valve, and

Figure 5 is a perspective detail view of the lever 25 of Figure 1.

Referring to the drawings the device consists of a casing 1 having an inlet chamber 2 which is attached to the source of supply, usually to a pipe leading to a reservoir. The upper part of the casing forms a cylindrical chamber 3 while a valve seating 4 is situated between the chamber 3 and the outlet chamber 5.

A valve 6 having a washer 7 of leather or other suitable material is normally seated upon the valve seating 4. The stem of the valve is preferably formed as illustrated, the tail portion sliding in a guide 10 cast integrally with the casing while the upper portion 11 of the stem receives a distance piece 12, the lower flange 13 of which forms a pocket for the washer 7. Upon the upper flange 14 of the distance piece 12 a circular plate 15 rests. A bucket leather 16 is securely held between the plate 15 and a plunger 17. The edge of the bucket leather 16 is flanged downwardly as shown, while the plate 17 fits loosely in the cylindrical chamber 3. The plate 17 and the leather 16 form a plunger which will permit water to pass between the periphery of the plunger and the walls of the cylindrical chamber 3 when the plunger is moved upwards, but the water below the plunger is prevented from passing to the space above the plunger by means of the bucket leather. If desired the plate 17 may be provided with notches 18 at intervals in its circumference in order to facilitate the passage of water as the plunger is moved upwards. A by-pass 19 is provided through the wall of the plunger to enable the water to pass into the space above it, and this opening may be regulated to the required area by means of the plate 15 which has a number of holes 70 of different diameters (see Figure 4) adapted to register with the by-pass 19 and thus its area may be varied by simply rotating the plate 15 so that an opening in the plate of the desired diameter will be opposite the by-pass 19. Each hole may have stamped or marked opposite to it a number designating the head in feet which will give a constant volume of flushing. Preferably the holes in the plates 15 are countersunk from both sides in order to produce a sharp edge and thereby to prevent deposits from blocking up the holes, or the thickness of the plate may be considerably less than the diameter of the smallest hole in order that the possibility of deposits forming thereon may be reduced to a minimum. The by-pass may also be protected from choking by a wire gauze strainer 20.

The valve is operated by means of a spindle 23 journalled in the casing. This spindle is provided with a crank 24, and to the

crank is pivoted a lever 25 which engages beneath the tail portion 9 of the valve stem, while a tail 26 on the lever engages against the shoulder 65 in order to bring the lever to the required position beneath the tail piece 9. The crank 24 to which the lever 25 is pivoted has a portion thereof formed into a quadrant 54 containing teeth 55. A rod 56 having teeth 57 gearing with the teeth 55 is guided in the casing. The lever 25 is formed with an opening 49, (as shown in Figure 5) in order that the rod 56 may pass through the lever. A coil spring 58 in compression between a shoulder 59 of the rod and a metal washer 60 retains the rod normally outwards. The shoulder 59 forms part of the recessed cap 61 telescoping within a socket 62 projecting from the casing. A leather washer 63 between the wall of the casing and the washer 60 prevents water passing into the chamber formed by the recess in the socket and in the cap.

The lever 25 is normally held in its raised position clear of the tail portion 9 and the inward movement of the rod rotates the quadrant 54 and lowers the lever to the position shown in dotted lines. As the lever moves downwards the tail 26 will strike the shoulder 65 and cause the upper end of the lever to fall into position beneath the tail portion 9. When the pressure upon the cap 61 is released the rod 56 will return under pressure of the spring 58 and rotate the quadrant 54, raise the lever 25, thereby opening the valve, the lever 25 sliding clear of the tail portion 9 by means of the curved face of the guide 10. A tail 67 upon the quadrant limits the outward movement of the rod.

In Figure 2 the lever 25 is retained in its raised position by means of a weight 28 upon the handle 21 which is attached to the spindle 23 and the handle is merely raised by the operator in order to permit the lever 25 to engage beneath the tail piece 9 and immediately the handle is released the weight 28 will fall and raise the lever 25 to open the valve. The weight may however, if desired, be arranged to simply return the lever 25 into its position beneath the tail piece, the valve being raised by the handle direct. The weight in Figure 2 has a lateral handle 48.

In Figure 3 another method of raising the valve is shown and consists of the lever 25 and a link 50 forming a toggle operated by a push rod 51 guided in the casing, such push button being under the tension of a spring 52 in a similar manner to that shown in Figure 1.

The plunger is permitted to move upwardly by reason of the fact that the water above the plunger can pass downwardly around the periphery of such plunger as above described and the valve being thereby raised the required flush is obtained. Immediately the lever 25 is tripped, water will pass through the by-pass 19, thus permitting the valve to close and when the valve again approaches its seat the pressure from the water supply will firmly seat it in position and shut off the flush.

I claim:

1. In a self-closing flushing device, valve operating means comprising a guide having a curved face, a valve stem moving in said guide and a lever engaging beneath the valve stem and riding against the curved face of the guide, said lever being disengaged from the valve stem as it rides past a given point of the curved face.

2. A flushing valve as claimed in claim 1 characterized by a crank upon a spindle operable by means exterior of the device, to which crank is pivoted the lever whose upper end is adapted to engage beneath the stem of the valve and having a tail piece which upon striking a stop within the valve casing will restore such lever again to a position beneath the valve stem.

3. A flushing valve device as claimed in claim 1 in which the lever is adapted to engage a stop as the lever moves downwardly whereby such lever is brought into position beneath the valve stem.

4. A valve device as claimed in claim 1 characterized by means for placing the lever into position for raising the valve and means for returning the operating means when released so as to raise the valve.

5. A valve device as claimed in claim 1 characterized by a crank to which the lever is pivoted, a toothed quadrant upon the crank, an actuating rod having teeth meshing with the teeth of the quadrant and a spring to return the rod to its normal position.

6. A valve device as claimed in claim 1 characterized by an actuating rod with teeth thereon and guided through the valve casing that engages a quadrant pivoted to the casing, which quadrant has pivoted thereon the valve raising lever, a spring normally retaining the lever in its raised position clear of the valve rod, all arranged whereby when the rod is operated the quadrant will rotate and lower the lever into engagement with the stem and when the rod is released the spring will return the rod and raise the lever in order to open the valve.

7. A flushing valve as claimed in claim 1 characterized by the valve being provided with a piston having a by-pass and a plate of which the thickness at the port where the opening is formed is less than the diameter of the opening, whereby the possibility of deposits forming thereon may be reduced to a minimum.

8. A flushing valve as claimed in claim 1 characterized by the valve being provided

with a piston having a by-pass and a plate of which the thickness at the port where the opening is formed is less than the diameter of the opening, whereby the possibility of deposits forming thereon may be reduced to a minimum and in which the plate contains a number of holes of different diameters that are adapted to register with the by-pass and piston.

9. A flushing valve as claimed in claim 1 characterized by the valve being provided with a piston having a by-pass and a plate of which the thickness at the port where the opening is formed is less than the diameter of the opening, whereby the possibility of deposits forming thereon may be reduced to a minimum, and a strainer around the by-pass.

In testimony whereof he has affixed his signature.

WILLIAM MAYNARD EARLY.