July 5, 1927. 1,635,010

E. B. ROSE

FLUSH VALVE

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Fig. 2.

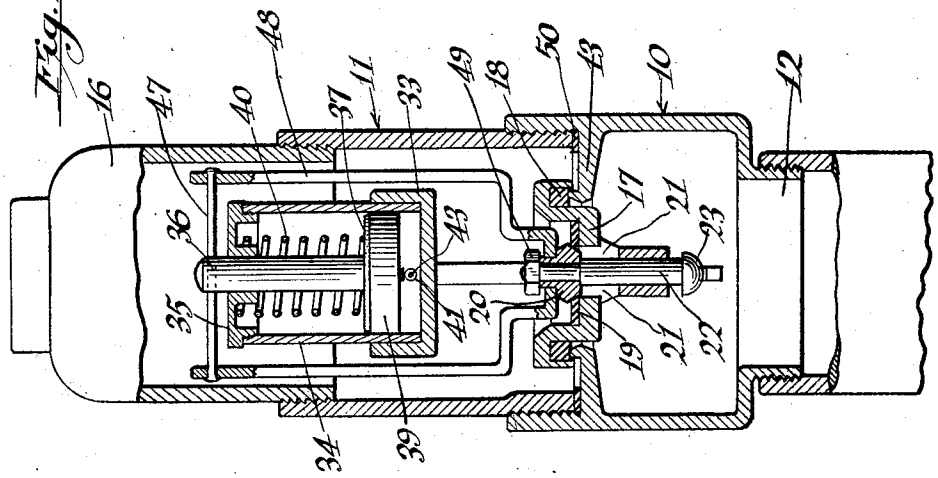
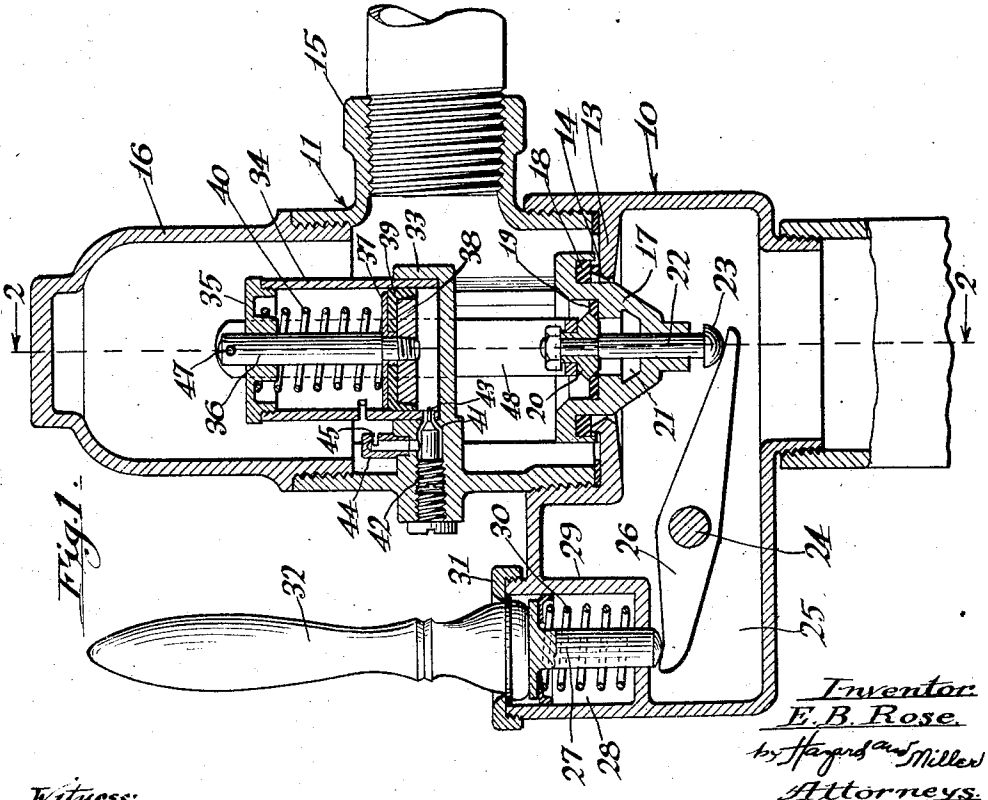



Fig. 1.




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Witness:

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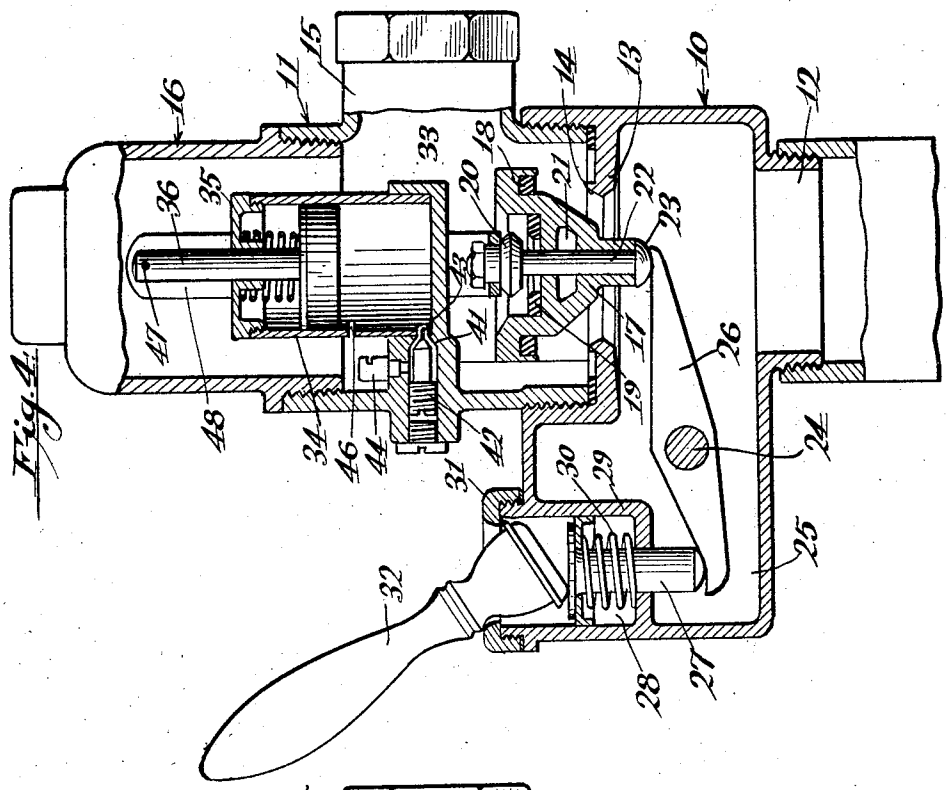


Fig. 4.

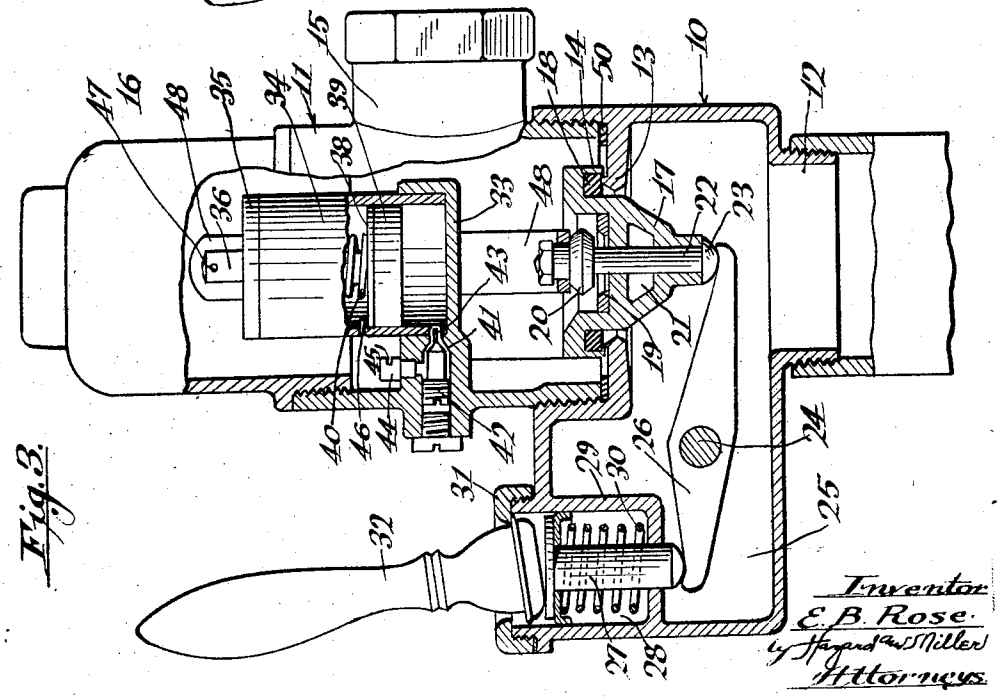


Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## FLUSH VALVE.

Application filed March 4, 1926. Serial No. 92,262.

This invention relates to improvements in flush valves.

An object of the invention is to provide an improved flush valve consisting essentially of a body in which is formed a valve seat, a closure for the valve seat and a dashpot for limiting the rate of closing movement of the closure upon the valve seat, these parts being so arranged in the body that the dash pot cannot have its operation hindered by dirt which may be in the fluid released by the flush valve.

Another object of the invention is to provide a flush valve having a body which is so constructed as to provide an air trap which will relieve any tendency of causing water hammer in the pipes leading to the flush valve.

A further object of the invention is to provide a flush valve of novel and simple construction and which has a novel and advantageous adjustment, enabling the valve to be mounted in various positions.

With the foregoing and other objects in view which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a vertical section through the improved flush valve showing the valve in closed position,

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1,

Fig. 3 is a view similar to Fig. 1, illustrating the valve as it starts to open, and

Fig. 4 is a view similar to Fig. 3 showing the valve in open position.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the improved flush valve consists of a body formed of a lower section 10 and an upper section 11. The lower section provides an outlet 12 and has an annular flange 13 formed upon its interior which provides a valve seat 14. On the upper section 11 there is formed a lateral inlet 15 and the upper end of the upper section 11 is closed by a hollow cap 16 threadedly mounted thereon. On the valve seat 14 there is adapted to seat an outer or major closure 17 carrying a packing ring 18 adapted to engage the seat and a packing ring 19 affording a valve seat for an inner or minor closure 20. The lower end of the major closure 17 has slots 21 formed in its opposite sides, enabling water to pass therethrough when the inner or minor closure is unseated. The inner or minor closure 20 is mounted on a stem 22 which is slidable in the outer or major closure 17. Its forward movement is limited by means of a head 23 formed on the stem and engageable upon the closure 17.

As a means for unseating the two closures, a spindle 24 extends transversely through the forward extension 25 provided upon the lower section 10 of the body. On this spindle there is pivotally mounted a lever 26 having one end engageable with the head 23. The other end of the lever 26 is engaged by the lower end of a plunger 27 reciprocable in a compartment 28 defined in the extension 25 by a partition 29. This plunger is urged into its uppermost position by means of a coil spring 30 compressed between the bottom of the partition 29 and the head on the plunger. On the top of the compartment 28 there is threaded a bonnet 31 which retains the lower end of a handle 32 within the compartment 28 against the head of the plunger 27. As shown in Figs. 3 and 4, by rocking this handle in any direction, it will force the plunger 27 downwardly, thus rocking the lever 26 and lifting the stem 22. During the first part of the upward movement of the stem, the inner or minor closure 20 is unseated, enabling some of the fluid to pass through the outer or major closure 17. During a continued upward movement the head 23 engages the closure 17 and lifts it from the seat 14, thus permitting a large quantity of water to pass from the inlet 15 through the outlet 14.

In the upper section 11 opposite the inlet 15 there is formed an open topped cup 33 and a cylindrical pipe section 34 is mounted in this cup and extends upwardly therefrom providing a cylinder for the dashpot. A top closure 35 is threaded into the top of the cylinder 34 and a plunger rod 36 slidably extends through the closure with a small amount of clearance. Adjacent the bottom of the plunger rod 36 there is formed a shoulder against which the plate 37 is positioned. A nut 38 is threaded onto the bottom of the plunger rod 36 and serves to compress a cup leather 39 between it and the plate 37. A coil spring 40 is disposed about the plunger rod 36 and is compressed be-

tween the top closure 35 and the plate 37, serving to urge the piston of the dashpot into its lowermost position.

At the forward side of the cup 33 there is formed an outlet 41 in which a needle valve 42 is threaded so as to be adjustable. This needle valve has rather a long stem 43 extending through the outlet 41 so as to project a short distance into the cylinder of the dashpot. The outlet communicates with the interior of a small cap 44 which has its top closed and its outlet 45 formed in its side. In the side of the cylinder 34 there is formed a small aperture 46 for a purpose hereinafter to be described.

The upper end of the piston rod 36 has a transversely extending pin 47 mounted thereon, which pin has its ends connected to the upwardly extending arms of a U-shaped yoke 48. The lower end of the yoke has an aperture in it to receive the upper end of the stem 22 and is held thereon by means of a nut 49, which provides a swivelled connection between the yoke 48 and the stem 22. It will be noted that the upper section 11 of the body is adapted to be screwed down into the lower section 10 against the flange 13 and shims 50 are positioned between the lower end of the upper section and the flange for a purpose hereinafter to be more fully set forth.

The operation of the improved valve is as follows: On lifting the two closures 17 and 20 by means of the pin 22, the yoke 48 is caused to lift the piston rod 36, and thus cause the fluid, which enters the cylinder of the dashpot between the piston rod 36 and the closure 35, to slip past the cup leather 39 so as to be disposed upon the under side of the piston of the dashpot. On releasing the handle 32 the spring 30 returns it to its normal position, and the spring 40 tends to force the piston of the dashpot downwardly, causing the closures 17 and 20 to again seat. Because of the fact that the fluid is entrapped upon the lower side of the piston, it must pass out through the outlet 41 around the needle valve 42, escaping through the cap 44 and the lateral outlet 45. As the needle 43 extends into the dashpot cylinder some distance, it will prevent any sediment or other solid matter from blocking the outlet 41. Furthermore, as the top of the cap 44 is closed, any sediment which might be in the water will not settle through the cap and thus clog the outlet 41 about the needle valve. It will also be understood that the arrangement of the dashpot above the inlet 15 is such that any solid material in the liquid will tend to settle in the lower portion of the valve and not in the dashpot so as to hinder the operation of the dashpot.

The purpose of the apertures 46 is to form an outlet for air which may be entrapped in the dashpot when the valve is initially installed, which air might influence the correct operation of the flush valve.

It will be noted that the hollow cap 16 encloses the upper end of the dashpot and this cap will normally form an air trap above the dashpot, the level of the liquid in the body being a short distance above the dashpot. Such being the case, the air entrapped within the cap 16 forms a cushion of a compressible fluid which will relieve any tendency of water hammer within the pipes leading to the inlet 15. The purpose of having the body formed of upper and lower sections with shims 50 between the lower end of the upper section 11 and the flange 13 is to provide an adjustment. In the drawings the inlet 15 is illustrated as being directly in back of the handle 32. However, by increasing the number of shims 50 or decreasing them, as the case may be, the upper section can be tightened upon the lower section, and the inlet 15 can be caused to extend either toward the left or toward the right of the handle 32, or at any other angle, enabling the flush valve to be installed in buildings where the plumbing has already been installed, or, in other words, enabling the flush valve to accommodate itself to the plumbing and not causing the plumbing to be so designed as to accommodate the valve.

From the above described construction it will be readily understood that a novel and improved flush valve has been designed which is quite advantageous and which is very efficient in operation.

It will be understood that various changes in the detail of construction may be made without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A flush valve comprising a body formed of upper and lower sections, the lower section having an outlet and a valve seat therein, a closure adapted to seat thereon, means for unseating the closure associated with the lower section, the upper section having a lateral inlet and being adjustable upon the lower section, whereby the position of the inlet with respect to said means may be varied, and a dashpot mounted in the upper section, the piston of which is connected by means of a swiveled connection to the valve closure so as to be operable thereby.

2. A flush valve comprising a body formed of upper and lower sections, the lower section having an outlet therefrom, an internal flange in the lower section providing a valve seat, a closure adapted to seat thereon, means for unseating the closure associated with the lower section, the upper section having a lateral inlet, shims resting on said flange, the upper section being provided with a threaded portion adapted to be received in

the lower section and bear against said shims whereby the position of the inlet with respect to said means may be varied, and a hollow cap mounted on top of the upper section, providing an air trap as and for the purpose specified.

3. A flush valve comprising a body formed of upper and lower sections, the lower section having an outlet and a valve seat therein, a closure adapted to seat thereon, means for unseating the closure associated with the lower section, the upper section having a lateral inlet, shims between said upper section and said lower section whereby the position of the inlet with respect to said means may be varied, and a dash-pot mounted in the upper section, the piston of which is connected by means of a swivel connection to the valve closure so as to be operable thereby.

4. A flush valve comprising a body formed of upper and lower sections, the lower section having an outlet and an internal flange providing a valve seat therein, a closure adapted to seat thereon, means for unseating the closure associated with the lower section, the upper section having a lateral inlet, shims resting on said flange, the upper section having a threaded portion adapted to be received by the lower portion, the end of which is adapted to bear on said shims, whereby the position of the inlet with respect to said means may be varied, and a dash-pot mounted in the upper section, the piston of which is connected by means of a swivel connection to the valve closure so as to be operable thereby.

In testimony whereof I have signed my name to this specification.

ELIAS B. ROSE.