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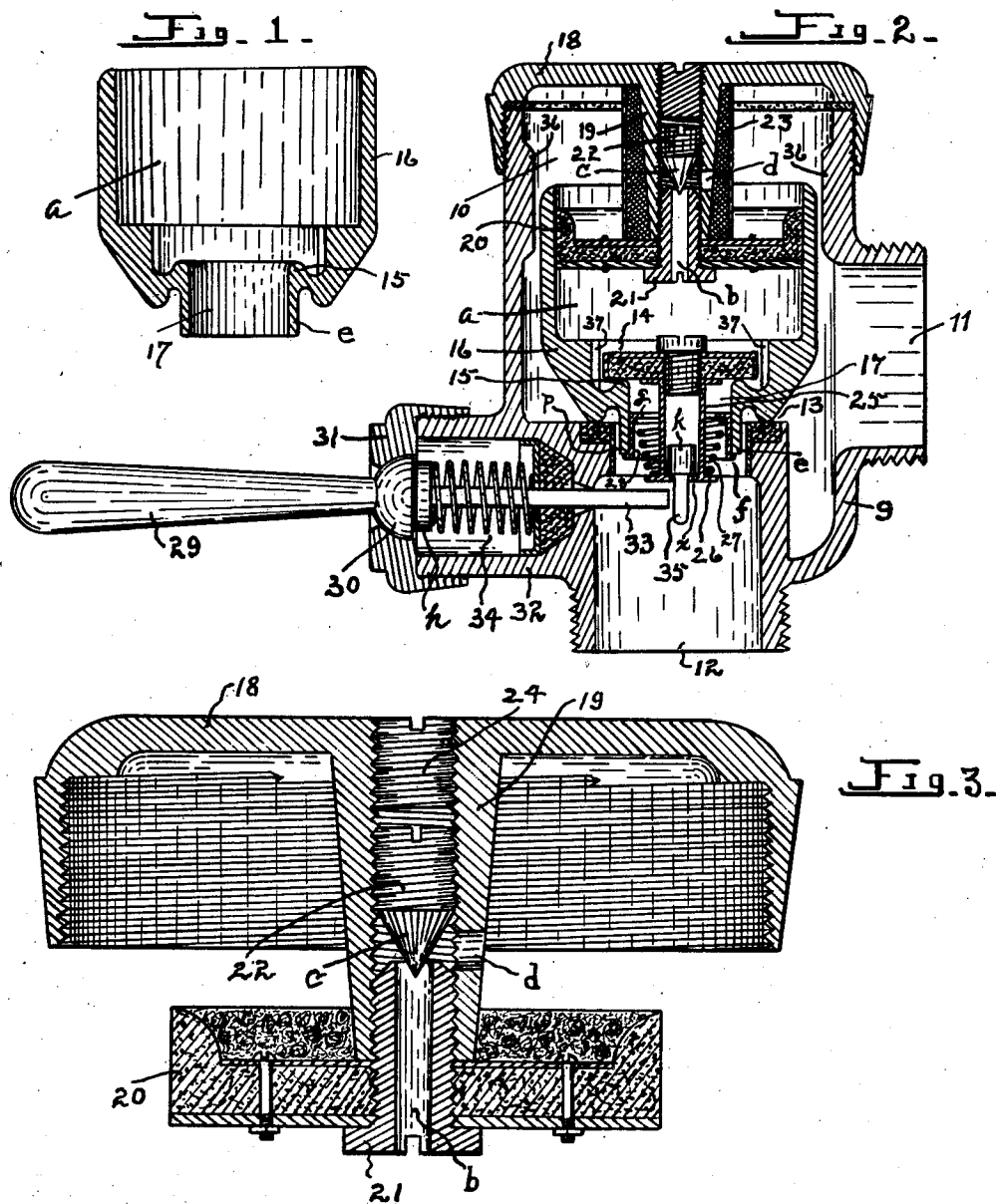
L. H. HOLCOMB ET AL

1,556,442

FLUSH VALVE

Filed May 10, 1922

2 Sheets-Sheet 1



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By

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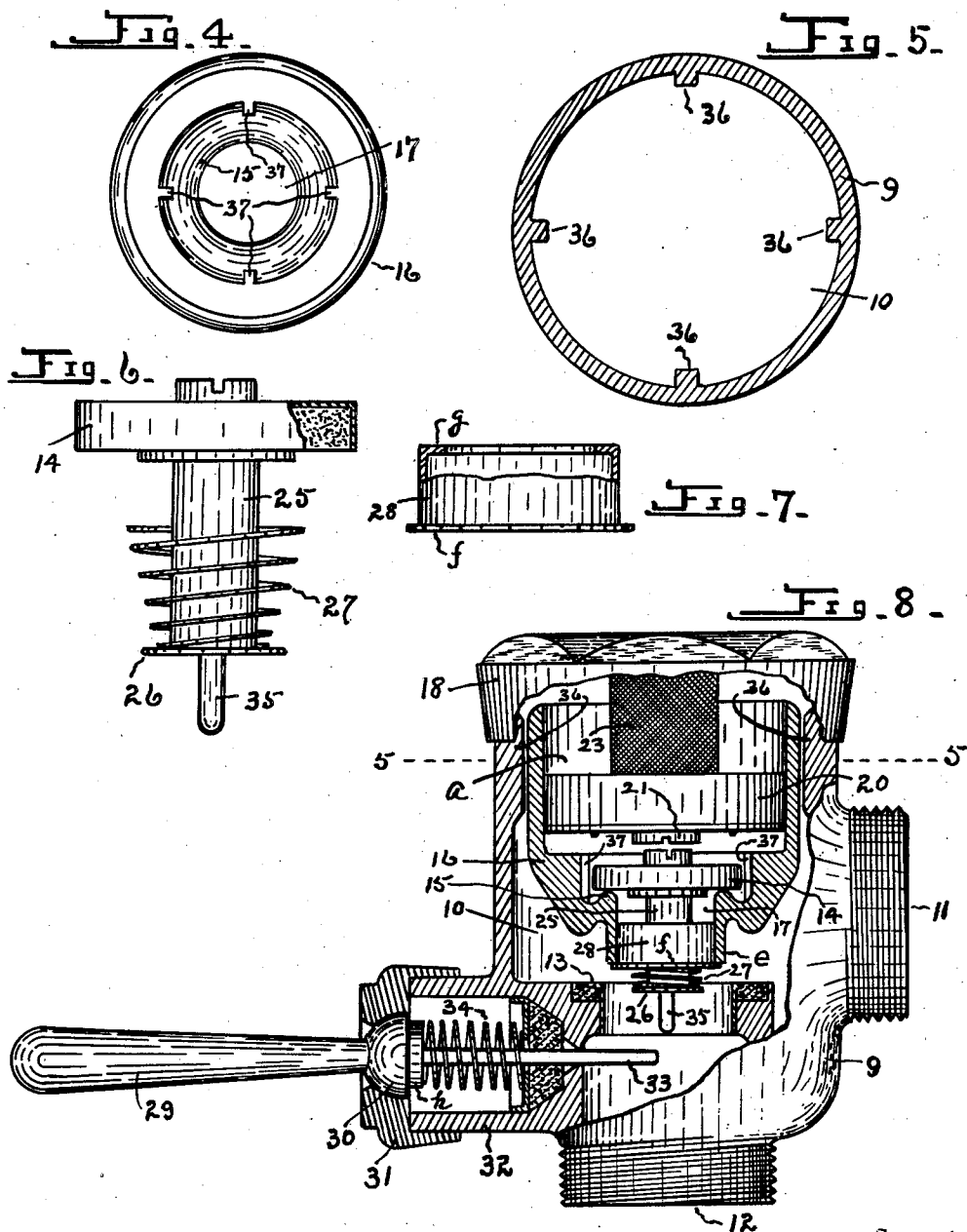
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UNITED STATES PATENT OFFICE.

LAMBERT H. HOLCOMB AND HENRY HAUBENS, OF OMAHA, NEBRASKA.

FLUSH VALVE.

Application filed May 10, 1922. Serial No. 559,831.

To all whom it may concern:

Be it known that we, LAMBERT H. HOLCOMB and HENRY HAUBENS, citizens of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Flush Valves, of which the following is a specification.

This invention has for its object, broadly, to provide a flush valve consisting of few and simple parts so that it may be manufactured economically, may be conveniently assembled and will be durable. One of the specific objects is to provide means which may be readily adjusted for controlling the sliding movement of the main valve to its seat and thereby regulate the flow of water used for flushing. Another object is to provide a noiseless feature for the movement of the main valve, this being the provision of a constricted passageway between the flange of said valve and its seat operating to modify or retard its speed and preventing vibration. Another specific object is to provide a release valve within the main valve having resilient means tending to maintain it on its seat regardless of the degree of pressure and also preventing any deposit of silt or other obstructions on its seat. The invention also includes the use of a screen, tending to prevent the entrance of sand, gravel or other obstructions within the chamber of the main valve.

The invention consists of the novel construction, combination and arrangement of parts as described herein and claimed, and as illustrated in the accompanying drawings, wherein,—

Fig. 1 is a sectional view of the main valve. Fig. 2 is a view of the device in longitudinal section. Fig. 3 shows a cap and parts mounted thereon, a cylindrical screen being omitted, the view of the cap being in longitudinal section and on an enlarged scale. Fig. 4 is a plan view of the main valve. Fig. 5 is a transverse section through the valve housing on line 5—5 of Fig. 8 to clearly show a plurality of lugs for guides. Fig. 6 is a partly broken, side view of the release valve showing certain operating parts mounted on its stem. Fig. 7 is a broken away, side view of a sleeve or spring-holder for the stem of the release valve. Fig. 8 is a sectional view showing position of parts when the main valve is removed from its seat.

Referring now to the drawing for a more particular description, numeral 9 indicates a valve housing having a compartment 10 through which water, under pressure, may pass from its intake port 11 to its discharge port 12 by passing the valve seat 13, subject to the control of a release valve 14 having a valve seat 15 in a hollow main valve 16, the latter having a cylindrical passageway 17 and adapted to be seated on the valve seat 13.

In order that the objects first mentioned may be attained, we provide certain features to be fully described. Numeral 18 indicates a cap for the valve housing, said cap being provided centrally with a tubular stem 19 which projects within the chamber *a* of the valve 16. At 20 is indicated a flexible disc or stationary piston which is disposed within and engages the wall of the chamber *a* and is secured to the stem 19 by means of a screw 21 having a passageway *b*. Numeral 22 indicates a screw operating as an adjusting, needle valve, since, by rotating it, its tapered end *c* may enter the passageway *b* a desired distance to control a flow of water to the chamber *a* from the compartment 10, the water passing through a port *d* of the stem 19, and tending, by water pressure to normally maintain the valves 14 and 16 on their respective seats. In order that foreign substances may not enter the chamber *a* and therefore will not lodge between the valve 14 and its seat 15, a screen 23 is provided and is disposed to circumscribe the stem 19, this being a desired feature in operation since, such lodgement would permit a constant waste of water.

Numeral 24 indicates a screw-plug which is mounted in the top of the cap to prevent rotation, accidental or otherwise, of the needle-valve 22.

In order that the release-valve 14 may be normally pressed upon its seat, this pressure being additional to the pressure of water, and that it may be released readily and effectively, it is provided with a hollow stem 25 adapted to be disposed centrally of the cylindrical flange *e* of the valve 16, said stem being provided with a horizontal flange 26 adapted to support the lower end of a spiral spring 27.

Numeral 28 indicates a sleeve adapted to be inserted within the cylindrical flange *e* through which water may pass to the discharge port 12 from the chamber *a*, after

passing the valve 14, said sleeve being provided with an outwardly projecting flange *f* for engaging the lower end of the flange *e*, and having an inwardly projecting flange *g* at its top for engaging the upper end of the spring 27.

It will be understood that when the valve 14 moves from its seat, water will move through the passageway 17 from the chamber *a*, the valve 16 thereupon moving upwardly from its seat 13, and resulting in the desired operation of flushing, the water continuing to flow freely from the intake port 11 to and through the discharge port 12, the degree of resistance of the spring 27 being such that it will not prevent operation.

The removal of the release valve from its seat is accomplished by use of a handle 29 having a boss 30 mounted to permit limited swinging movements in the cap 31 which is provided for the tubular projection 32 of the valve housing. Numeral 33 indicates a plunger bar mounted to permit longitudinal movements in the projection 32 and having a head *h* normally engaging the boss 30 of the handle by means of a spiral spring 34.

At 35 is indicated a stop-member having a head *k* slidably mounted in the hollow stem 25 of the valve 14, the head *k* being prevented from moving entirely out of the stem by means of the inwardly projecting flange *x* which is provided for the lower end of said stem, and in operation, a swinging movement of the handle 29, against the force of the spring 34, will cause the bar 33 to move inwardly of the valve housing 9, into engagement with the stop-member 35, whereby, member 35, together with the stem 25 and valve 14 will be moved, the latter being moved from its seat sufficiently to release the water, or a part thereof, from the chamber *a*, and to permit a free movement of water from the pressure side to the discharge port 12, by passing the valve seat 13.

It will be understood that the valve 16, by action of gravity, will move to its seat 13 as soon as the chamber *a* becomes filled with water. Since water moves in the direction of least resistance it will pass the valve seat 13 and the discharge port 12 from the intake 11, the valve 14, by action of the spring 27 remaining on its seat. As soon as that part of the chamber *a*, below the piston 20, becomes filled with water which passes through the port *d* and passageway *b*, the valve 16 will engage its seat 13, which terminates the operation of flushing.

When the valve 16 moves upwardly to its highest position, the stop-member 35 will be disposed in a plane somewhat above the plane of the plunger-bar 33. The head *k* of the stop-member is adapted to have a sliding movement within the hollow stem 25, the object in view for this construction being to cause operation of flushing to be

certain, since, in some instances, an operator, by use of the handle 29, may inadvertently maintain the plunger-bar in its innermost position. This however, will not prevent a downward movement of the valves and termination of the flow, since, on account of the construction, if the stop-member engages the upper side of the bar 33 while the valve 16 is moving to its seat, the head *k* may slide upwardly in the hollow stem 25 of the release valve.

By referring to Fig. 2 it will be seen that a passageway *p* is formed between the flange *e* of the valve 16 and the adjacent wall of the valve seat 13. The provision of the flange *e* is of advantage to prevent vibration which otherwise might result by the contact of this valve with its seat, and on account of the construction as described, the downward movement of the valve 16 will be retarded as soon as the flange *e* is disposed in close proximity to the valve-seat 13 since the water will flow through the constricted passageway *p* until the valve 16 is seated.

Numerals 36 indicate guides or ridges which are provided for the wall of the valve housing; they project inwardly of the compartment 10, and tend to maintain the valve 16 in a vertical position, and permit a movement of water to the port *d*.

Numerals 37 indicate guides of ridges which are provided for the hollow valve 16. They permit a limited rocking movement of the valve 14 when the latter is moved from its seat, but prevent excessive rocking movements of said valve, and permit a suitable flow of water from the chamber *a* of the valve 16 through the passageway 17 when the relief valve is moved from its seat by operation of the handle 29, plunger-bar 33 and stop-member 35.

While we have described construction in detail, certain details may be changed, and changes in form, size and proportions may be made, said changes being within the scope of the invention as claimed.

We claim as our invention,—

1. In a flush valve, the combination with an upright valve housing having a valve seat and provided with a cap having a tubular stem projecting toward the valve seat, said stem being provided with an intake port, a valve normally disposed on the valve seat, said valve having an annular chamber opening on its top and provided with a valve seat, a flexible disc in the chamber of the valve, a screw threaded in the stem of the cap in engagement with the disc and having a passageway communicating with said intake port, a needle valve in said tubular stem for controlling the passageway of the screw, a screen circumscribing said stem in engagement with said cap and said disc, and a release valve normally disposed on the valve seat of the first named valve and adapted

ed to be moved for causing a movement of the first named valve.

2. In a flush valve, the combination with a valve housing having a valve seat and a cap having a tubular stem provided with an intake port, a valve for said valve seat having an annular chamber opening on its top and having a valve seat, a disc in the chamber of the valve, a screw threaded in the stem of the cap in engagement with the disc and

having a passageway communicating with said intake port, a needle valve in the stem of said cap, and a release valve normally disposed on the valve seat of the first named valve and arranged to be moved for causing a movement of the first named valve. 15

In testimony whereof, we have affixed our signatures.

LAMBERT H. HOLCOMB.
HENRY HAUBENS.