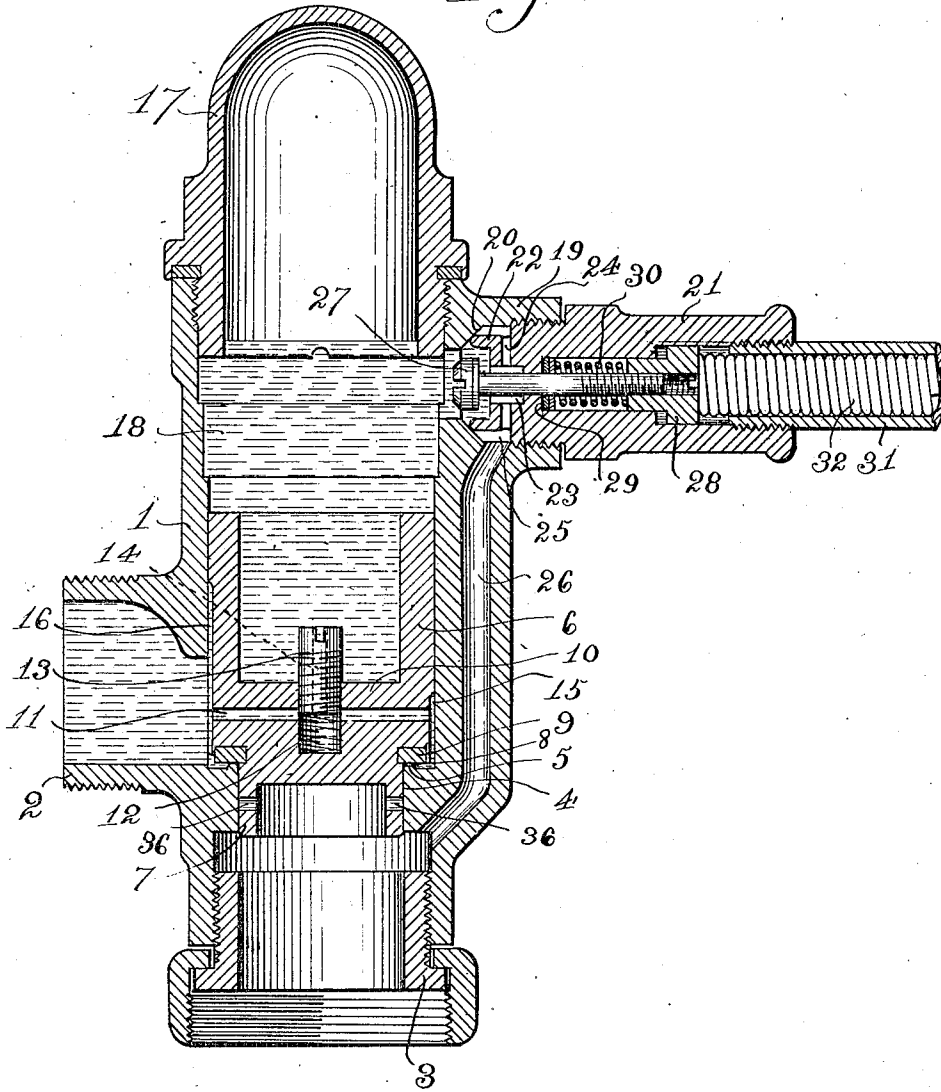


H. KUPSCH.
CLOSET FLUSH VALVE.

APPLICATION FILED MAY 11, 1903. RENEWED MAY 5, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



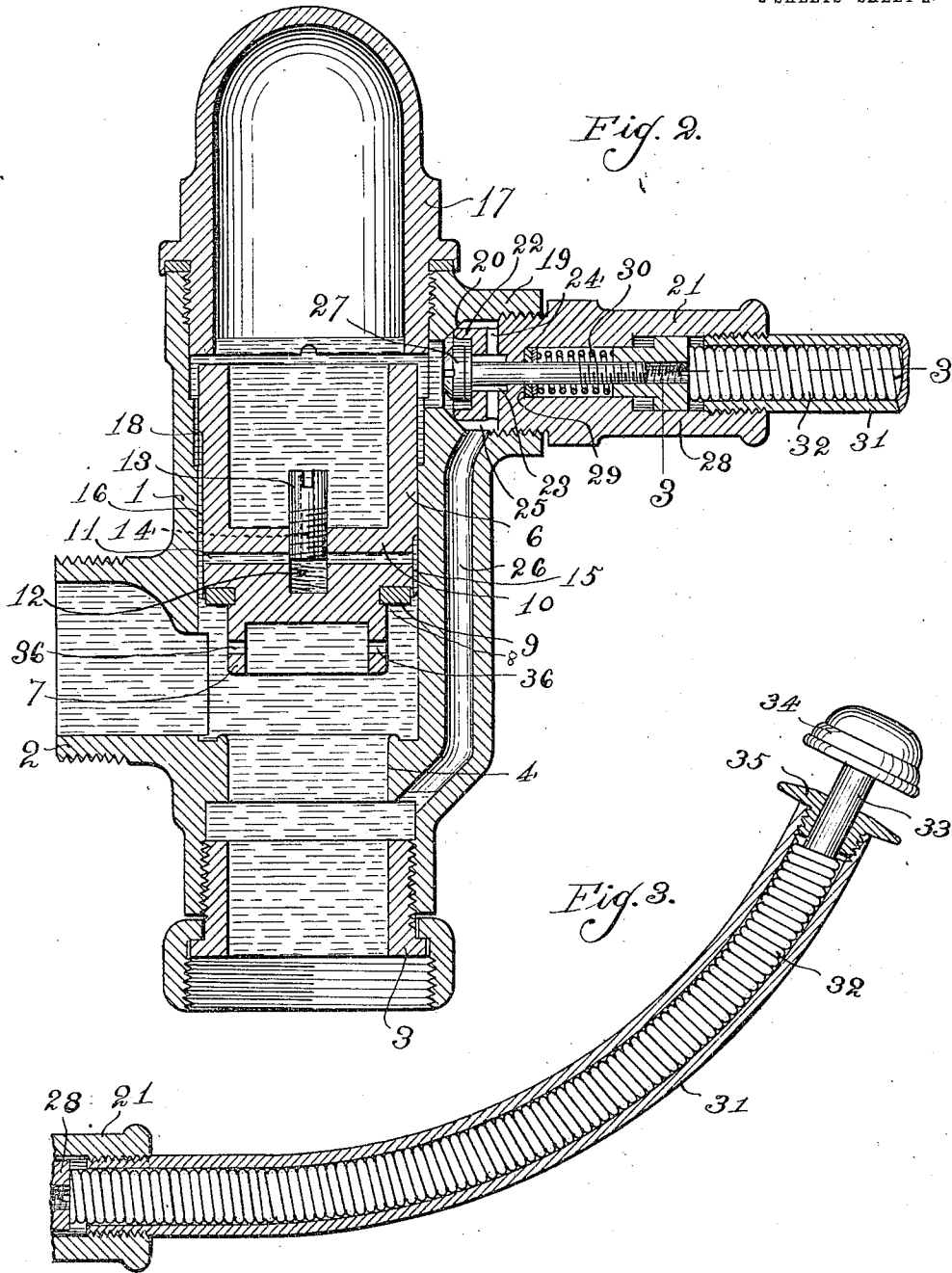
Witnesses:
C. F. Wilson
Wm B. Snowhook

Inventor:
Hermann Kupsch
By *Rudolph Am. Loeb*
Attorney.

H. KUPSCH.
CLOSET FLUSH VALVE.

APPLICATION FILED MAY 11, 1903. RENEWED MAY 5, 1906.

2 SHEETS—SHEET 2.



Witnesses:

C. F. Wilson
Wm B Snowhook

Inventor:

Hermann Kupsch
By *Rudolph Qu...*
Attorney.

UNITED STATES PATENT OFFICE.

HERMANN KUPSCH, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALTON F. JOHNSON, OF CHICAGO, ILLINOIS.

CLOSET FLUSH-VALVE.

No. 837,077.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed May 11, 1903. Renewed May 5, 1906. Serial No. 315,305.

To all whom it may concern:

Be it known that I, HERMANN KUPSCH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Closet Flush-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel construction in a closet flush-valve, the object being to provide a valve which connects directly with the water-service and will feed a measured quantity of water at each operation without the intermediacy of a tank; and it consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 is a central longitudinal section of a valve constructed in accordance with my invention. Fig. 2 is a similar section showing the operating parts in another position. Fig. 3 is a sectional view on the line 3 3 of Fig. 2, showing the tube and valve-actuating devices mounted therein to bring the latter to a convenient point to be operated.

My said device consists of a practically cylindrical casing 1, provided with an externally-threaded nipple 2, by means of which it is connected with the water-service pipe, and provided at its lower end with a union 3, by means of which it is connected with the closet-bowl or other device to be flushed or fed. Immediately below the water-inlet the said casing is internally annularly reduced, as at 4, said reduced portion being provided at its upper end with an upwardly-projecting annular shoulder 5, forming a valve-seat upon which the piston-valve 6 seats. The said valve 6 consists of a trunk-piston provided at its lower end with a reduced extension 7, snugly fitting within the reduced portion 4 of said casing, while above said extension 7 an annular shoulder 8 is formed, which receives a rubber or other flexible washer 9, which seats on said valve-seat 5. The said valve 6 is hollow at its ends and is provided between its ends with a partition-wall 10, having a diametrical passage 11 bored there-

through, which communicates with a central threaded recess 12 in the upper face of said partition-wall 10. Said recess 12 receives a screw 13, which acts as a valve to control said passage 11, and is provided with a central opening 14, through which communication is established between said passage 11 and the chamber above the said valve 6. At opposite ends of said passage 11 said valve 6 is provided with longitudinal grooves 15 and 16, said groove 15 being short and extending from the shoulder 8 to a point slightly above the mouth of the passage 11, while said groove 16 extends from said shoulder 8 to a point adjacent the upper end of said valve 6.

The said valve 6 fits snugly within said casing 1 above the water-inlet, and its upward movement is limited by the lower end of a cap 17, extending into said casing 1 at its upper end, said cap forming an air-chamber in the said upper end of said casing. Below the lower end of said cap 17 said casing is annularly enlarged, as at 18, so that said piston when at the upper limit of its movement extends into said enlarged portion 18 a sufficient distance to cause communication to be established between the water-inlet and said chamber 18 through the longitudinal groove 16. Communicating with said chamber 18 is a radial nipple 19, having an annular tapered shoulder 20 at its inner end, which forms a valve-seat. The said nipple is internally threaded at its outer end to receive a sleeve 21, which is provided at its inner end with an annularly-reduced portion 22, seating on said valve-seat 20. The said reduced portion 22 is provided with a central passage 23, which communicates, by means of radial passages 24, with the annular chamber 25 between said reduced portion 23 and the inner wall of the nipple 19, which in turn communicates with the interior of the casing 1 below the valve-seat 5 by means of the duct 26, formed in the wall of said casing. The said passage 24 is controlled by a valve 27, the stem of which passes into said sleeve 21 and carries an adjustable collar 28 at its rear end, between which and the inner end wall 29 of said sleeve a spiral spring 30 is interposed, which normally holds said valve 27 closed. The said cap 17 is hollow and forms an air-chamber above the chamber 18, which serves to

cushion the force of the water as the valve 6 shuts off the flow, thus absolutely preventing the pounding usually attendant upon shutting off the flow of water when the pressure is high. In the lower end of said cap are notches which permit the escape of water from the chamber 18 when the valve 6 is at the extreme upper limit of its movement.

As the said casing is generally so located relatively to the closet-seat as to be very inconvenient of access, I have found it advisable to provide means convenient to the person to operate the valve, and to this end I secure a curved tube 31 in the outer end of said sleeve 21, in which a closely-coiled spring 32 is mounted, which bears against the outer face of the collar 28 at one end and at its other end against the inner end of the shank 33 of a button 34, movable longitudinally in a cap 35 at the free end of said tube 31, said spring forming a flexible shaft by means of which pressure on said button 34 is communicated to the valve 27 to open the latter against the action of said spring 30.

The operation of my device is as follows: In the position shown in Fig. 1, in which the valve 6 is closed, the pressure in the chamber 18 is equal to the pressure in the service-pipe by reason of the fact that the said chamber 18 communicates with the service-pipe through the passages 11 and 14. The service-pressure acts upon the piston 6 at its lower end only upon the free portion of the shoulder 8, while it acts upon the entire cross-sectional area of said piston at its upper end, such differential areas obviously serving to hold said valve firmly on its seat. By opening the valve 27 the pressure on the upper end of the piston is immediately released, the water contained in the chamber 18 passing out through the passages 23, 24, 25, and 26, and such release of pressure causes the valve 6 to be raised to the upper limit of its movement, thereby causing the service-pipe to be directly connected with the closet-bowl. So long as the valve 27 remains open the valve 6 will remain at the upper limit of its movement; but as soon as said valve 27 is closed said valve 6 will begin its downward movement, partly by gravity and partly by the flow of water into the chamber 18 through the passage 11 and groove 16, the rapidity of its downward movement being determined by the rapidity with which the chamber 18 can be refilled with water.

It will be noted that when the valve 6 is at the upper limit of its movement, as shown in Fig. 2, the chamber 18 communicates with the service-pipe not only through the passages 11 and 14, but also through the groove 16. Hence until the upper end of said groove 16 passes below the shoulder at the lower end of chamber 18 the flow of water into the latter will be rapid and cause said valve 6 to

move rapidly downward. After said groove 16 has passed below said shoulder, however, the movement of the valve 6 will be very gradual, the rapidity of such movement being determined by the adjustment of the screw 13, which regulates the flow of water through the passage 11. When the lower end of the extension 7 of said valve 6 has passed the valve-seat 5, the flushing flow of water will cease. As such flow is very rapid, it frequently happens that the trap of the closet is siphoned out, and to avoid its remaining empty I provide perforations 36 in said extensions 7 through which a sufficient after-flow of water is assured to fill the trap and provide sufficient water in the closet-bowl to render same sanitary. After said perforations 36 have passed the valve-seat 5 the after-flow ceases and valve 6 becomes firmly seated by reason of the equalization of pressures in the service-pipe and chamber 18, which, by reason of the differential areas acted upon thereby, as before stated, causes the valve 6 to be securely held on its seat.

In Fig. 1 I have shown the valve 6 on its seat and the valve 27 open, which would cause the valve 6 to be instantaneously raised, while in Fig. 2 I have shown the valve 6 at the upper limit of its movement and the valve 27 closed.

My device is exceedingly simple and efficient and very easily operated.

I claim as my invention—

1. In a closet flush-valve, the combination with a trunk-piston valve in the body thereof, a valve-seat of smaller diameter than said valve, a guide-passage in which said valve moves, and a fluid-pressure chamber above said guide-passage of larger diameter than the latter, of a water-inlet above said valve-seat, a passage through said valve connecting said water-inlet with said fluid-pressure chamber, an auxiliary valve controlling the pressure in said fluid-pressure chamber, and an auxiliary passage in said valve terminating between the ends of the latter and controlled by the movements thereof, said auxiliary passage being adapted to establish secondary communication with said fluid-pressure chamber when said valve approaches the upper limit of its movement to accelerate the initial downward stroke of the latter, said auxiliary passage being closed before said valve reaches the lower limit of its movement to check the closing movement thereof.

2. In a closet flush-valve having a fluid-pressure-actuated piston-valve, and a cylindrical guide-chamber in which said valve is movable, a fluid-pressure chamber above said valve of larger diameter than the latter, an auxiliary valve controlling said chamber, said valve having passages connecting said fluid-pressure chamber with the water-inlet, one of said passages being in the body of said valve and the other thereof on its periphery,

said last-named passage extending from the lower end of said valve to a point midway between the ends thereof and being closed at its upper end by the wall of said guide-passage when said valve is at or near the lower limit of its movement, and adapted, when said valve is at the upper limit of its movement to increase the flow of water into said

fluid-pressure chamber to accelerate the initial closing movement of said valve. 10

In testimony whereof I affix my signature in presence of two witnesses.

HERMANN KUPSCH.

Witnesses:

RUDOLPH Wm. LOTZ,
E. F. WILSON.