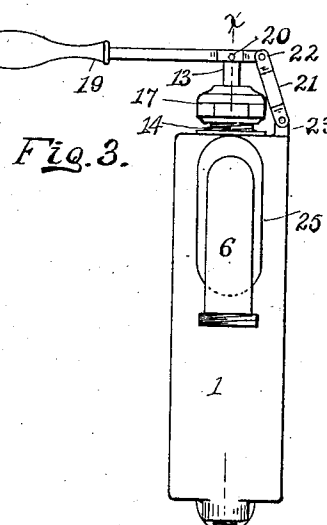
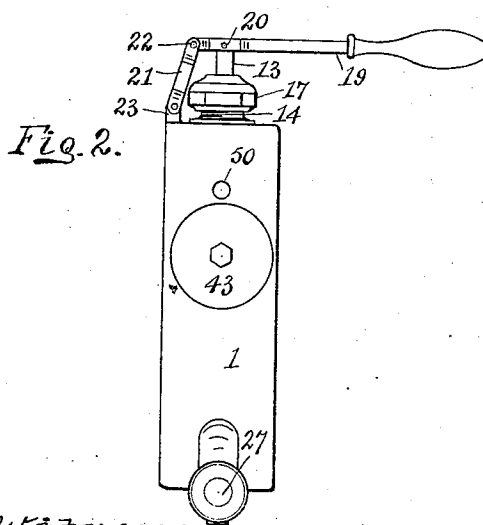
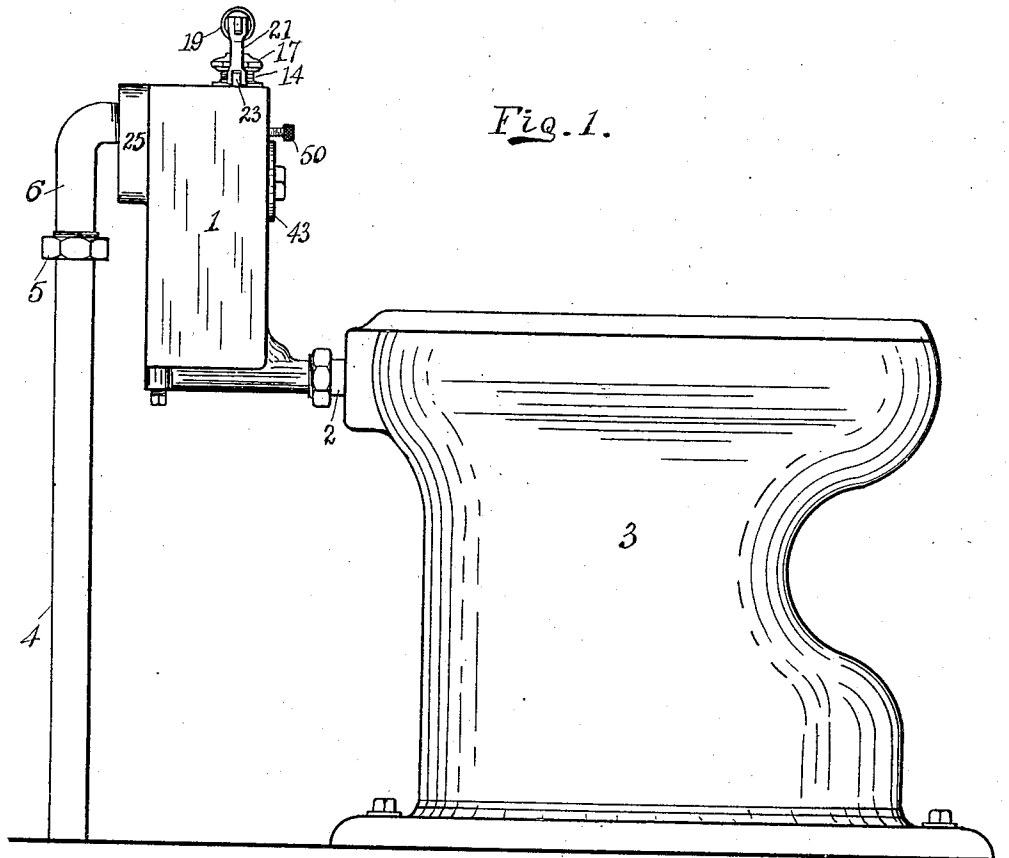


P. S. MILLICE.  
FLUSHING APPARATUS.  
APPLICATION FILED AUG. 3, 1906.

938,683.

Patented Nov. 2, 1909.  
2 SHEETS—SHEET 1.



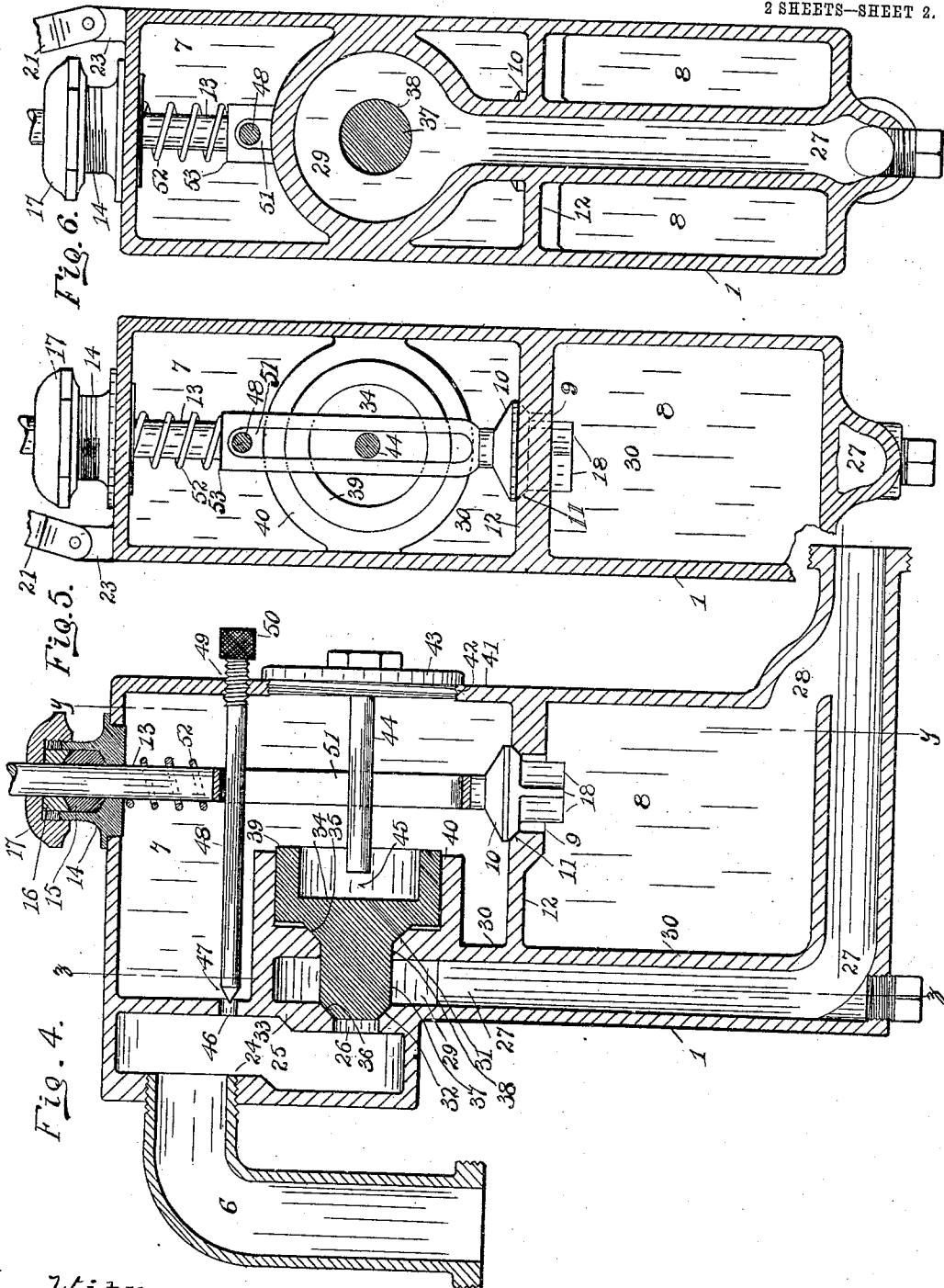
Witnesses:  
Theodore Gung-  
Gordelia O'Hearn

Inventor:  
Paul S. Millice,  
by A. H. Harkleb, his attorney

P. S. MILLICE.  
FLUSHING APPARATUS.  
APPLICATION FILED AUG. 3, 1906.

938,683.

Patented Nov. 2, 1909.  
2 SHEETS—SHEET 2.



Witnesses:  
Theodore Jung-  
Cordelia O. Hearn.

Inventor:  
Paul S. Millice  
by H. F. Halsleb,  
His Attorney.

# UNITED STATES PATENT OFFICE.

PAUL S. MILLICE, OF HAMILTON, OHIO.

## FLUSHING APPARATUS.

38,683.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed August 3, 1906. Serial No. 329,056.

*to all whom it may concern:*

Be it known that I, PAUL S. MILLICE, a citizen of the United States, residing at Hamilton, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Flushing Apparatus, of which the following is a specification.

My invention relates primarily to flushing apparatus for closets, and the invention will be readily understood from the following description and claims, and from the drawings, in which latter:

Figure 1 represents a side elevation of my improved device shown in connection with a bowl. Fig. 2 is a front elevation of my improved device. Fig. 3 is a rear elevation of the same. Fig. 4 is a central vertical section of the same on the line  $x-x$  of Fig. 3. Fig. 5 is a vertical cross-section of the same taken on a line corresponding to the line  $y-y$  of Fig. 4; and, Fig. 6 is a vertical cross-section of the same taken on a line corresponding to the line  $z-z$  of Fig. 4.

1 represents the casing which may have a suitable connection 2 with a bowl 3 or other container which it is desired to flush. The casing may be connected with any suitable water or fluid supply as through a pipe 4 and a union-coupling 5 connecting with a pipe 6 threaded into the casing.

The casing comprises a plurality of compartments, one of which is adapted to receive the water or other fluid, and in which the latter acts for automatically closing a supply valve. The other compartment serves as a relief compartment when the flushing is initiated. Thus 7 is a pressure compartment and 8 is a relief compartment, the latter being preferably located below the pressure compartment. There is a passage between the compartments arranged to be closed by a valve 10 adapted to seat on a valve-seat 11 shown as located on a shelf 12, the shelf forming the separating wall between the compartments. The opening of the valve 10 initiates the flushing. I have shown it manually operated, although it is obvious that automatic means may be provided for the purpose, as by suitable connection with the closet seat. The valve is shown as formed with a cone-seat. It has a stem 13 extending therefrom taking through a bushing 14 threaded to the casing, suitable packing 15 being in the bushing which is compressible by a gland 16 through bearing nut 17. This bushing is prefer-

ably larger than the valve-seat for ready admission of the valve and for permitting proper grinding of the valve-seat through the bushing opening. The valve preferably has wings 18 depending therefrom and guided by the walls of the passage 9. An operating lever 19 is pivoted to the valve-stem 13 at 20 and to a link 21 at 22, the link in turn being pivoted to a lug 23 on the casing.

The pipe 6 is threaded into an opening 24 communicating with a receiving chamber 25 having a discharge opening 26 to a discharge passage 27 which communicates with the connection 2, a sub-passage 28 being projected into the direction of the passage 27 and into the direction of the passage of water through the passage 27. Preferably at the opening 26 there is a chamber 29 in the passage 27. A wall 30 separates the passage 27 and the compartments 7 and 8. A valve-seat 31 is located in this wall, and a valve-seat 32 is located in the wall 33 between the chamber 25 and the chamber 29. A valve 34 has seating faces 35 36 adapted to seat against the valve-seats 31 32 respectively, forming a compound valve. The valve also has a stem 37 preferably having sliding fit in an opening 38 adjacent the valve-seat 31. The valve also has an annular flange 39 forming a hub having sliding fit in a bearing 40 shown as an annular wall projected from the wall 30. The seating-face 35 is shown larger than the seating face 34, the opening 26 being of substantially less diameter than the diameter of the inner end of the valve at the annular flange or hub 39. The outer wall 41 of the casing has an opening 42 into which a plug 43 is threaded, the plug having a stem 44 projecting inwardly toward the valve 34. This stem forms a limiting member for the unseating travel of the compound valve, the compound valve having a travel corresponding to the space 45 between it and the end of the stem. The opening 42 is preferably larger than the bearing-face for the compound valve and the valve-seats for permitting fitting of the latter.

An opening 46 connects the chamber 25 with the pressure compartment 7, forming a sub-passage into said compartment, and I prefer to provide a regulating valve for this opening. I have shown such regulating valve at 47 on a stem 48 threaded at 49 into the wall of the casing and having an adjust-

ing knob 50. The stem 13 is preferably provided with a slot 51 through which the stem of the regulating valve 47 and stem 44 may project. A spring 52 takes about the stem 13 and is seated between the shoulder 53 on the stem and the bushing 14. The opening 46 is substantially smaller than the opening 26, so as to receive substantially less fluid than the latter. The opening 46, it will be noted, is shown in the wall of the pressure-compartment 7, outside the longitudinal plane of the valve-seat 31, and forms a by-pass from the fluid passage to the pressure-compartment around said valve, for conducting the fluid from the front to the rear of the valve 34 without passing through said valve, thereby permitting said valve to be made solid, and forming a cheap construction.

In operation when the flushing operation is closed, the water from the head of pressure is checked by the valve 34 at the valve-seat 32 and by the valve 10, the pressure compartment being filled with water. When it is desired to flush, the valve 10 is unseated, which permits the water in the pressure compartment to pass into the relief compartment 8. As soon as pressure in the pressure compartment is relieved, the compound valve will be unseated by the pressure of the supply, the unseating being limited by the stem 44. This unseating of the valve 34 will permit the water to pass through the opening 26 and the passage 27 past the sub-passage into the bowl, thereby flushing the latter, the direction of the sub-passage 28 insuring that the flow of water under pressure through the passage 27 shall not prevent the passage of water through the sub-passage 28. The office of the relief compartment is to receive the water from the pressure compartment when the flushing is initiated and obviate the liability of the water which passes through the flushing passage, checking the flow from the pressure compartment. The valve 10 is then resealed. The water will pass through the passage 27 and will also pass through the opening 46 into the pressure compartment. The sub-passage into the pressure compartment however is comparatively slight in cross-section and may be regulated by the regulating valve 47, depending on the pressure of the head of water and the length of time it is desired to have the flushing continue. The greater the pressure and the greater the length of time of flushing, the smaller will the opening 46 be regulated. The water passing through the opening 46 into the pressure compartment will gradually refill that compartment, and the pressure exerted by the water passing through said opening will gradually reseat the valve 34, and the more nearly said valve is resealed the greater will be the pressure exerted in the pressure compartment through the opening 46. The differential pressure

exerted upon the valve 34 results from the greater superficial area of the inner end of said valve as compared with the superficial area of the opening 26, and the comparatively small area of the opening 46 compared to the area of the opening 26 and the area of the inner end of said valve, the relation of the areas of said parts causing increased pressure against the inner end of the valve 34 upon pressure being exerted in the pressure compartment. This pressure in the pressure compartment also causes the valve 10 to be firmly seated, as the pressure at the outer end of said valve, when said valve is seated and the apparatus closed, is substantially only atmospheric pressure. The bore of the feed-pipe is also greater than the opening 26 for causing a back-pressure which compels water to pass through the opening 46 at all times when said valve 34 is open.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. A flushing apparatus comprising a casing having a pressure-compartment, a discharge-passage and a receiving-chamber, the walls of said receiving-chamber being provided with an inlet-opening and with a discharge-opening to said discharge-passage, said discharge-opening being of less cross-section than said inlet-opening, in combination with a compound valve for the walls of said discharge-passage between said receiving-chamber and pressure-compartment and forming a valve for said discharge-opening, said compound valve having a backing-face of greater area in said pressure-compartment than the area of said discharge-opening, the wall of said receiving-chamber being further provided with a by-pass of smaller diameter than said discharge-opening, said by-pass being outside the longitudinal plane of the said valve for said discharge-opening for leading the fluid around said compound valve from in advance to the rear thereof, said by-pass being further disconnected from said discharge-opening so as to receive its fluid from a different part of said receiving-chamber than said discharge-opening, substantially as described.

2. A flushing apparatus comprising a casing having a pressure-compartment, a discharge-passage and a receiving-chamber, the walls of said receiving-chamber being provided with an inlet-opening and with a discharge-opening to said discharge-passage, said discharge-opening being of less cross-section than said inlet-opening, in combination with a compound valve for the walls of said discharge passage between said receiving-chamber and pressure-compartment and forming a valve for said discharge-opening, said compound valve having a backing-face of greater area in said pressure-compartment than the area of said discharge-opening, the

all of said receiving-chamber being further provided with a by-pass of smaller diameter than said discharge-opening, said by-pass being outside the longitudinal plane of the said valve for said discharge-opening for leading the fluid around said compound valve from in advance to the rear thereof, said by-pass being further disconnected from said discharge-opening so as to receive its fluid from a different part of said receiving-chamber than said discharge-opening, and a regulating valve for said by-pass, substantially as described.

3. A flushing apparatus comprising a casing having a pressure-compartment, a relief-compartment, a discharge-passage and a receiving-chamber, the walls of said receiving-chamber being provided with an inlet-opening and with a discharge-opening to said discharge-passage, said discharge-opening being of less cross-section than said inlet-opening, said pressure-compartment and relief-compartment having an opening therebetween, in combination with a compound valve for the walls of said discharge-passage between said receiving-chamber and pressure-compartment and forming a valve for said discharge-opening, said compound valve having a backing-face of greater area in said pressure-compartment than the area of said discharge-opening, the wall of said receiving-chamber being further provided with a by-pass of smaller diameter than said discharge-opening, said by-pass being outside the longitudinal plane of the said valve for said discharge-opening for leading the fluid around said compound valve from in advance to the rear thereof, said by-pass being further disconnected from said discharge-opening so as to receive its fluid from a different part of said receiving-chamber than said discharge-opening, and a valve between said pressure-compartment and relief-compartment, substantially as described.

4. In a flushing apparatus, the combination of a casing having a pressure-compartment, a relief compartment and a fluid passage, said relief compartment having a

sub-passage communicating with said fluid passage, a valve between said compartments, 50  
a compound valve, the walls of said fluid passage having openings and valve-seats for said compound valve, said compound valve having an inner hub, a bearing in said pressure compartment for said hub, said hub being of larger diameter than the initial opening in said fluid passage, said fluid passage having a sub-passage to said pressure compartment of smaller diameter than said last-named openings, forming a by-pass around 60  
said compound valve, a regulating valve for said last-named sub-passage, and a limiting member in said pressure compartment for said compound valve, substantially as described. 65

5. In a flushing apparatus, the combination of a casing having a pressure compartment, a relief compartment and a fluid passage, said relief compartment having a sub-passage communicating with said fluid passage, 70  
a valve between said compartments, a compound valve, the walls of said fluid passage having openings and valve-seats for said compound valve, said compound valve having an inner hub, a bearing in said pressure compartment for said hub, said hub being of larger diameter than the initial opening in said fluid passage, said fluid passage having a sub-passage to said pressure compartment of smaller diameter than said 80  
last-named openings, forming a by-pass around said compound valve, a regulating valve for said last-named sub-passage, and a limiting member in said pressure compartment for said compound valve, said first-named valve having a valve-stem provided with a slot for receiving said regulating valve and limiting member, substantially as described. 85

In testimony whereof, I have subscribed my name hereto in the presence of two subscribing witnesses. 90

PAUL S. MILLICE.

Witnesses:

THEODORE C. JUNG,  
A. F. HERBSLEB.