T. F. PAYNE.

FLUSHING VALVE.

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1,117,237.

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Fig. 2.

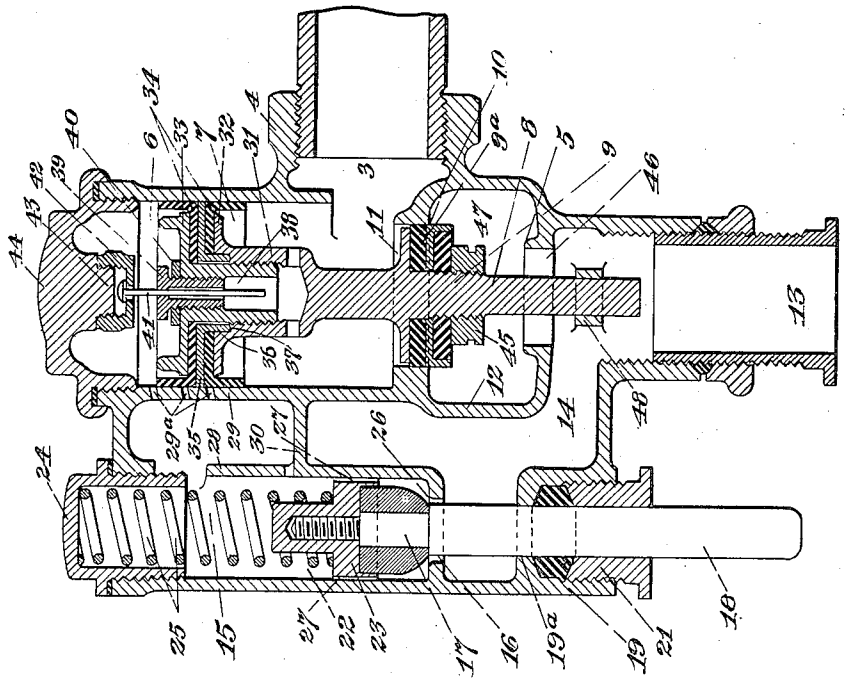
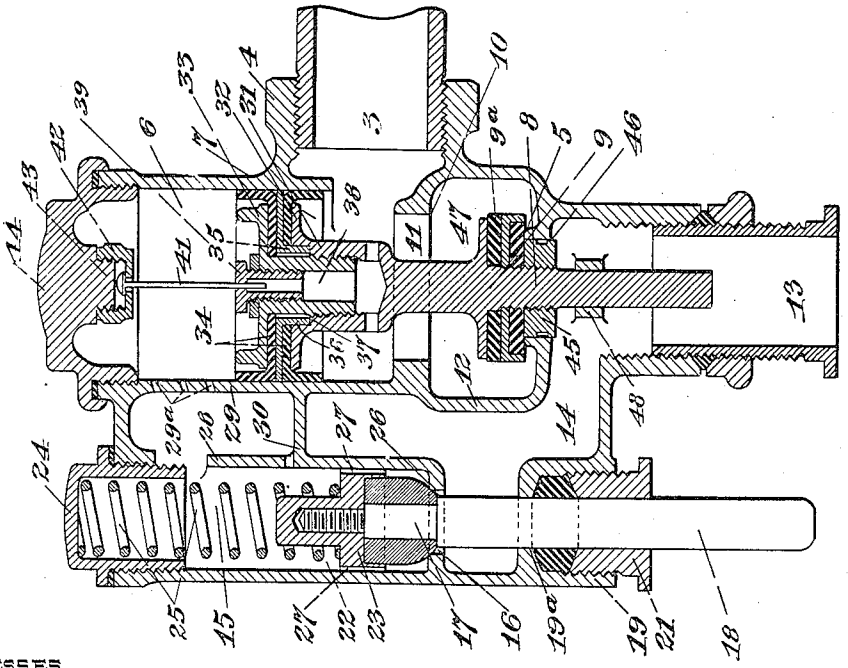


Fig. 1.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## FLUSHING-VALVE.

1,117,237. Specification of Letters Patent. Patented Nov. 17, 1914.

Application filed February 27, 1912. Serial No. 680,350.

*To all whom it may concern:*

Be it known that I, THOMAS F. PAYNE, a citizen of the United States of America, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Flushing-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to devices or valves for flushing closet-bowls and other sanitary apparatus.

In the flushing of closet-bowls it is desirable that an abundant supply of flushing water be discharged into the bowl in such manner as to overcome a too abrupt and noisy or unduly audible delivery and resultant splashing of the water. It is also desirable that the flow of water be such as to provide proper sanitation by carrying away all the waste paper deposited in the bowl, and to devise a valve by means of which the water may be so delivered is the primary object of my invention.

By my invention I am enabled to provide a simple, durable and inexpensive construction whereby there is afforded a valve that is capable of causing a sustained, uninterrupted flow of an abundant supply of flushing water without such impetus of delivery as occasions splattering and splashing within the bowl.

My invention also provides a valve in which the mechanism may be operatively manipulated by the depression and elevation of the closet seat. As such a valve, its object is to provide apparatus which may be easily manipulated without jarring and injurious ramming of the valve mechanism and whereby the valve may be returned without liability of canting or sticking, and a valve which enables easy and proper flushing of the bowl when used as a urinal.

A further object of my invention is the provision of a valve which affords a preliminary flow of water for an effectual preparatory wetting of the walls of the bowl, insuring cleanliness.

Another object of my invention is to provide a valve whereby there is obtained a period of inactivity or non-flow of flushing water so as to effect proper carrying away of all waste-paper deposited in the bowl, with resultant cleanliness and sanitation.

I aim to provide other improved details of valve construction as will be hereinafter more fully described.

I will now describe my invention so that others skilled in the art to which it appertains, may understand and construct the same and, while reference is made to the accompanying drawings in connection with this description, it is to be understood that I do not desire to limit myself to the embodiments of my invention illustrated in the drawings, it being premised that the invention is susceptible of embodiment in various forms of flushing valves.

Figure 1 is a vertical sectional view of a flushing valve of the seat-operating type embodying my invention, showing it in the closed or normal position it occupies when the seat is inclined or elevated; and Fig. 2 is a similar view showing the valve mechanism placed in position by depression of the closet-seat preparatory to flushing the bowl.

The numeral 2 indicates the source of supply of flushing water, connected to the inlet 3 leading into the casing 4 at a point above the valve seat 5 from which upwardly extends the vertical cylindrical chamber 6. Mounted in this chamber, for reciprocal operation, is the piston 7 carrying the depending stem portion 8. Attached to the stem portion is the valve 9 provided with a suitable double packing so as to afford not only a valve-like seal on the seat 5 when the valve is lowered, as shown in Fig. 1, but also the closing of the passage-way 11 by engagement of the upper packing disk $9^a$ with the cylindrical wall or seat 10 thereof when the valve is elevated, as shown in Fig. 2. The seat 5 is carried by the wall 12 below which, and leading into the outlet chamber 13, is a passage-way 14 which in turn communicates with the chamber 15 through the medium of the port 16 when the valve 17 is raised therefrom to open position on upward pressing by depressing the closet-seat; this valve 17 having the stem 18 which depends from the extension 19 of the casing 4, into operative engagement with the pivoted tripping lever 20 carried by the closet-seat. The stem 18 is centered by its bearing engagement with the wall $19^a$ of the casing, which is countersunk to accommodate the formation of a stuffing or packing chamber 21 for the prevention of leakage between the stem and casing.

Formed to snugly but freely fit the bar-

rel-like portion 22 of the chamber 15 the head 23 of the valve 17 constitutes a further guide for perfect centering of the valve and stem 18, and interposed between this head 23 and the screw-cap piece 24 at the upper end of the barrel 22 is the coil spring 25 normally pressing the valve 17 upon the seat 26 of the port 16. The cap 24 is removably screw-threaded into the top of the chamber to permit of access to and application and removal of the coil spring and valve 17, and it will be seen that this screw-cap is deeply chambered or the screw-threads are carried by a long barrel so that in the application of the coil spring great initial compression of the spring is unnecessary. Recesses or openings 27 in the side of the head 23 permit of the passage of water from the chamber 15 to the chamber or passage 14 when the valve 17 is unseated. Between the wall 28 of the barrel 22 and the wall 29 of the chamber 6 is the bridge piece 30 separating the chamber 14 from the chamber 15. The wall 29 of the main chamber 6 is provided with the several spaced perforations $29^a$ so as to effect communication of the chamber 15 with the chamber 6. These openings $29^a$ are closed by the operative rising of the piston in the chamber 6, so as to imprison the water and cushion the upward stroke of said piston as will be hereinafter described.

The stem 8 of the main valve 9 is provided with a threaded sleeve or hub-like portion 31 terminating in the disk 32 which coöperates with the disk-flange 33 to clamp in position the cup leathers 34 disposed symmetrically on opposite sides of the central disk 35 thereby forming the piston 7, the disk flange 33 being carried by an exteriorly threaded stem screwed into the threaded sleeve 31. It will be noted that the central disk 35 carries the depending flange or hub 36 which fits snugly in an annular recess or bore 37 of the stem 8 so as to insure proper centering of the valve. A central bore 38 is formed in the stem and communicates with the inlet 3 at a point below the piston 7 and opens into the chamber 6, above the piston, through a minute passage-way formed in the screw 39 threaded into bore 38. A lock nut 40 is provided for the screw 39. The passage-way of the screw receives the wiper-rod or pin 41 depending from the screw cap 42 threaded on the lug 43 of the cover piece 44 of the casing of the valve. The wiper rod is free to laterally shift so as to adjust itself to any irregularities of movement of the piston, and its office is to keep the minute passage-way in the screw free from clogging deposits.

The valve 9 has the reduced head like portion 45 which fits the opening 46 when the valve is in closed position on its seat. As the valve is caused to return to its seat, as hereinafter described, the head 45 serves to choke the water in its passage from the inlet through the opening 46 to the outlet and partially retard the closing action of the valve. The chamber 47 above the opening 46 insures a perfectly uniform and evenly distributed passage of water from the inlet to the outlet, the said chamber being of a diameter preferably slightly larger than the openings 11 and 46. Below the chamber 47, the lower end of the stem 8 is centrally positioned by means of the bearing or cross piece 48.

Upon pressure being applied to the closet seat 49, the stem 18 will be thereby thrust upwardly as shown in Fig. 3. Assuming that water has entered the chamber 6 and 15 and exerts its force upon the upper side of the piston 7 so as to close the opening 46 between the inlet 3 and the outlet 13, the upward thrust of the stem 18 and unseating of the valve 17 will relieve the pressure upon the top of piston 7 so that the pressure of the water from the inlet side of the piston will cause the said piston to travel upwardly, the water escaping through the port 16 and passage-way 14 to the outlet 13. As the valve 9 rises by reason of the travel of the piston, from the seat 5 to the opening 11 water from the inlet flows past the valve to the outlet. This short flow of water serves to give the wall of the closet bowl a preparatory sanitary wetting. When the valve reaches its upward limit of travel the opening 11 will be closed, terminating the flow from the inlet to the outlet. But upon removal of pressure from the seat and resultant return of the valve stem 18 to normal position and seating of the valve 17, the water from the inlet will pass through the central bore in the piston into the chamber 6 above the piston and into the second chamber 15 when, upon the filling of those chambers it will exert its pressure upon the upper side of the piston and cause the stem 8 to travel gradually downwardly, bringing the valve 9 from the opening 11 to its seat 5. During such travel the flushing water passes from the inlet 3 through the opening 11 into the chamber 47 and thence to the outlet 13 and closet bowl 50.

With the chamber 15 communicating with the chamber 6, the capacity for reception of water to exert closing pressure on the piston, is increased without unduly enlarging the size of the valve casing. These points of communication at $29^a$ are so arranged that when the piston 7 passes upwardly it traverses these openings and, while in its elevated position, leaves uncovered preferably one of the openings, thereby affording a restricted passage-way for the water in its flow from the chamber 6 to the chamber 15 with resultant slowness of filling. Such ar-

rangement of a plurality of chambers operates to provide a period of inactivity between the release of pressure on the closet seat and the commencement of flushing, so that there is insured an effectual carrying away of all waste paper deposited in the bowl. This feature of my invention will be found highly advantageous. The interval of non-flushing provides for delay in depositing the paper, without the necessity of tripping the valve for second flushing of the bowl to bring about cleanliness and proper sanitation.

Another feature arising from the particular disposition of the openings $29^a$ is that the full upward stroke of the piston 7 is cushioned against pounding impact with the top of the casing, the water, by reason of the cut off of the openings by the travel of the piston, being so imprisoned above the piston as to form a cushion. Such imprisoning of the water also causes it to back pass or surge backwardly through the minute passage-way in the piston, thereby assisting the wiper rod in keeping this orifice from clogging.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a flushing valve, a casing having inlet and outlet ports, a main chamber, an auxiliary chamber having a discharge port, and a plurality of openings formed in a wall of the casing and constituting passage-ways between the chambers, means for progressively controlling the several passage-ways in the flow of water from the main chamber to the auxiliary chamber and means for controlling the auxiliary discharge port with respect to the outlet port.

2. In a flushing valve, a casing having an inlet and outlet ports, a main chamber, an auxiliary chamber having a discharge port and a plurality of openings formed in a wall of the casing and constituting passage ways between the chambers, a valve for controlling the flow of water from the inlet to the outlet, a piston operatively connected to the valves and adapted to successively traverse the passage-ways connecting the chambers, and means for controlling the auxiliary discharge port with respect to the outlet.

3. In a flushing valve, a casing having inlet and outlet ports, a main chamber, an auxiliary chamber having a discharge port, and a plurality of openings formed in a wall of the casing and constituting passage-ways between the chambers and spaced from one another in horizontal planes, a valve for controlling the flow of water from the inlet to the outlet, a piston operatively connected to said valve and adapted to reciprocate in one of the chambers and to successively cover and uncover the plurality of passage-ways connecting the chambers, in its reciprocal action, and means for controlling the auxiliary discharge port with respect to the outlet port.

4. In a flushing valve, a casing having inlet and outlet ports, a main chamber, an auxiliary chamber having a discharge port, and a plurality of openings formed in a wall of the casing and constituting passage-ways between the chambers and spaced from one another, a valve for controlling the flow of water from the inlet to the outlet, a piston for controlling the valve and adapted to reciprocate in the main chamber and in its reciprocal action to successively cover and uncover the plurality of passage-ways connecting the chambers, and means for controlling the auxiliary discharge port with respect to the outlet port.

5. In a flushing valve, a chambered casing having an inlet and an outlet and a port disposed between said inlet and outlet, a valve controlling said port, a piston controlling the valve, a restricted passage-way in the piston, leading from the inlet to the chamber above the piston, and a wiper rod depending loosely from the casing to thereby permit lateral shifting of said rod and disposed to lie within the passage-way.

In testimony whereof, I have hereunto set my hand.

THOMAS F. PAYNE.

Witnesses:
M. A. BARTH,
M. A. FULLER.