D. W. McNEIL.

FLUSHING VALVE.

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912,599. Patented Feb. 16, 1909.

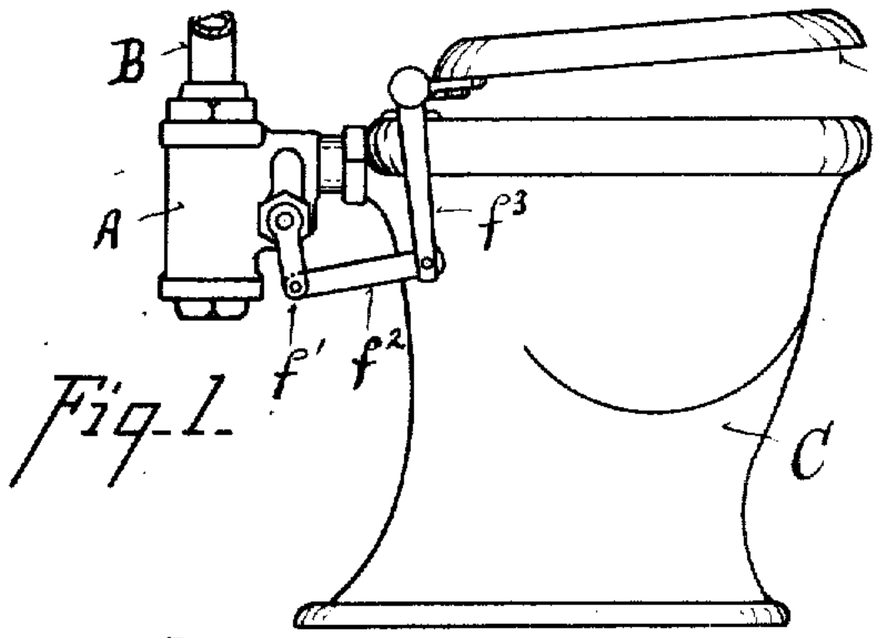

Fig. 1.

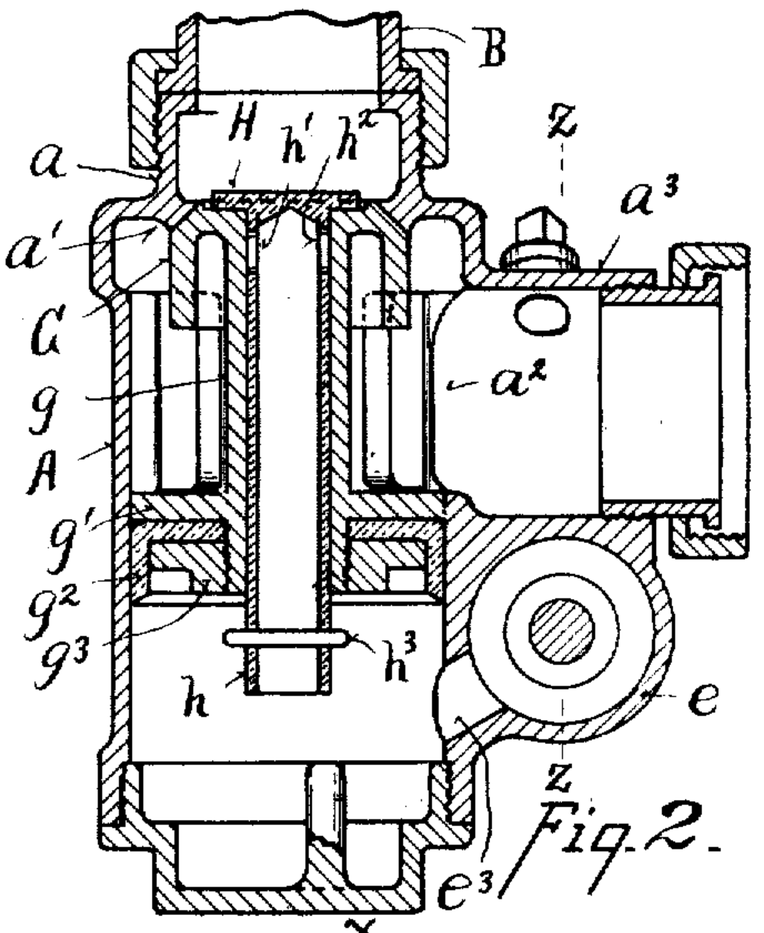

Fig. 2.

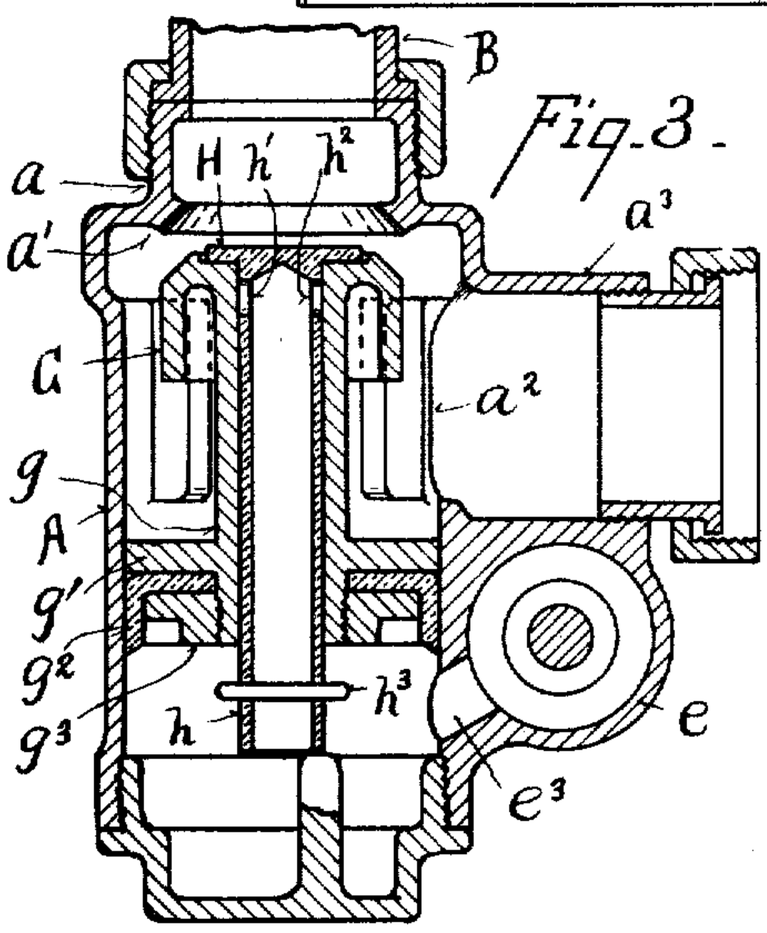

Fig. 3.

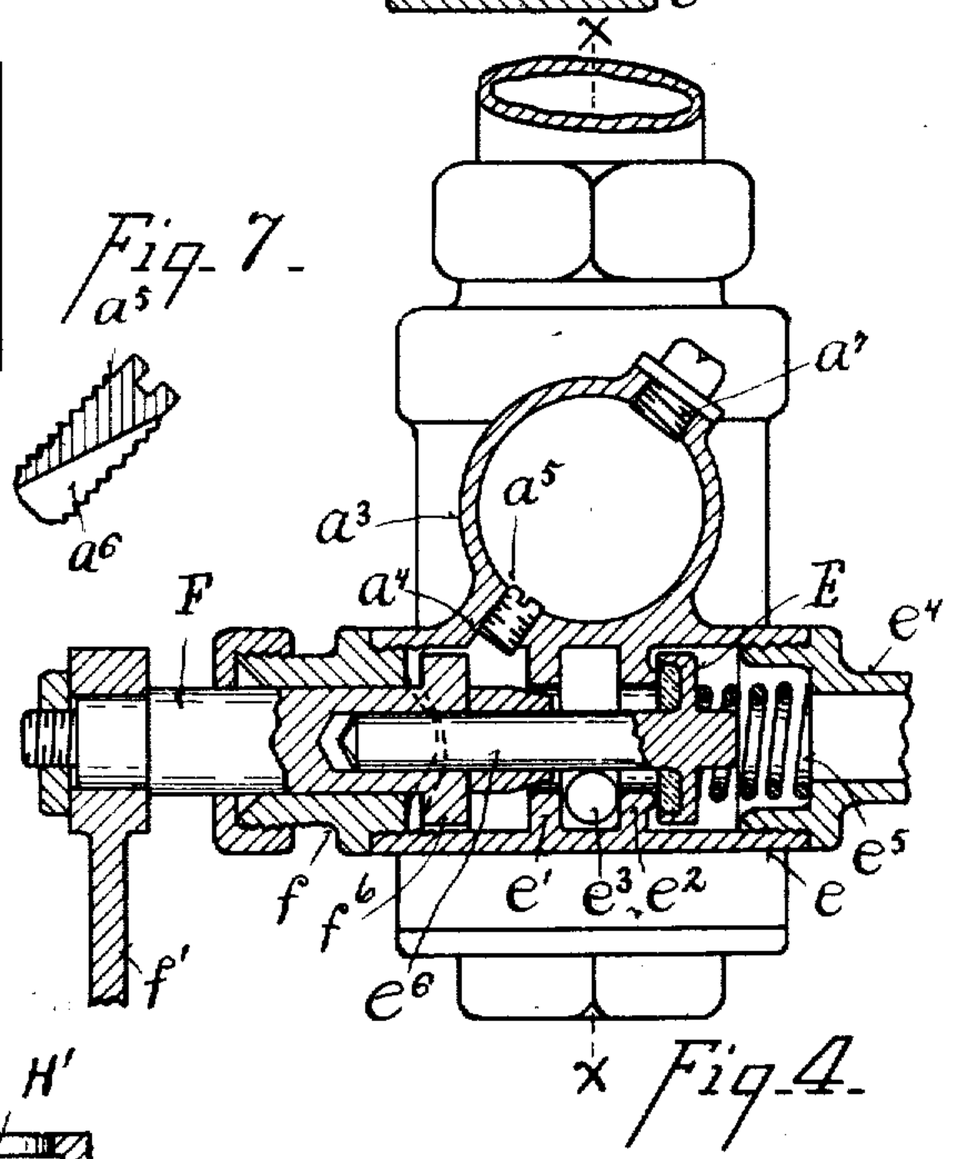

Fig. 4.

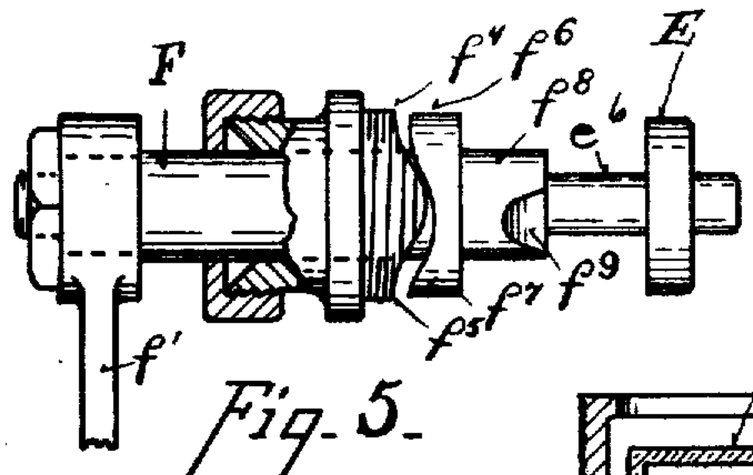

Fig. 5.

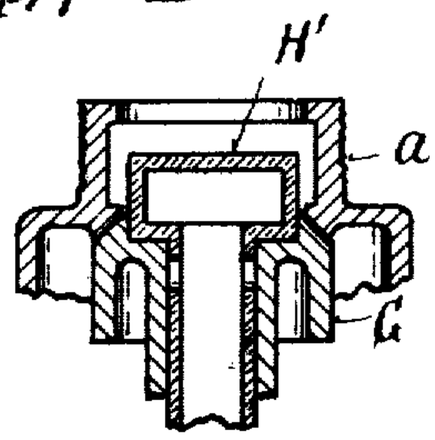

Fig. 6.

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

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FLUSHING-VALVE.

No. 912,599. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed December 9, 1907. Serial No. 405,745.

To all whom it may concern:

Be it known that I, DANIEL W. McNEIL, a citizen of the United States of America, and resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Flushing-Valves, of which the following is a specification.

My invention relates to that kind of flushing valve which is provided with a lever the moving of which admits water from the mains to a closed tank so that the water flowing into said tank compresses the air therein, the water continuing to flow into the tank until the pressure therein is equal to the pressure in the mains and in which the flushing is done by the water from the tank, thus fed, when the pressure upon the lever is released.

The object of my invention is to provide a valve of this character which has as few parts as practicable, so that it may be made at less cost and in a more compact form and is less liable to get out of order than those heretofore used, and which is provided with a ready means for regulating the rate of discharge of the flushing water. This object is attained by the means described in the specification and illustrated in the accompanying drawings, in which,

Figure 1 is a side elevation of a closet bowl, provided with a flushing valve embodying my invention, the tank being omitted. Fig. 2 is a central sectional view of the valve taken upon line x—x of Fig. 4, showing the valve in the position it occupies after the water in the tank has reached the pressure of that in the mains. Fig. 3 is a view similar to Fig. 2 but showing the position to which the valve is carried by the water in the flushing operation. Fig. 4 is a view taken upon line z—z of Fig. 2. Fig. 5 is a detail view of the rotatory push rod to which the lever is connected, and the valve for controlling water from the mains. Fig. 6 is a sectional detail view of a modified form of the main valve. Fig. 7 is a similar view of the regulating screw.

The valve housing consists of a cylindrical shell, A, having near its top an exteriorly screw-threaded annular extension, a, which is coupled by a nut to a pipe, B, which leads to the water tank—not shown. Below the valve seat, a', the housing has a port, a^2, surrounded by a lateral annular extension, a^3, which joins the discharge spout into the bowl, C, which is of ordinary construction. Upon the side of the cylindrical housing, A, is formed a smaller horizontal cylindrical housing, e, for the valves which control the entrance of the water from the mains into the housing, A. Housing, e, has upon its interior two central annular flanges, e', e^2, between which is a port, e^3, which leads into the lower chamber of housing, A. One end of the housing, e, is connected by a pipe, e^4, to the mains. The entrance of water from the pipe, e^4, to the port, e^3, is controlled by a valve, E, which is normally held to its seat, e^2, by a coiled spring, e^5. Within the end of the housing, e, opposite to the pipe, e^4, is a bonnet, f, within which is seated the push-rod, F, upon whose end is secured a lever, f', which is connected by arms, f^2, f^3, to the seat, c, whose forward end is held normally raised from the bowl by means of a spring, not shown. The inner end of the push rod has a recess into which the valve stem, e^6, of the valve, E, projects, so that an inward movement of the rod, F, will raise the valve, E, from its seat. The means whereby a rotation of the rod, F, will cause it to move inward, is as follows: Bonnet, f, has beveled notches, f^4, f^5, upon its inner end, and rod, f, has beveled lugs, f^6, f^7, which project into the notches, f^4, f^5, so that a rotation of the rod, F, will cause the lugs, f^6, f^7, to ride inward upon bevels, f^4, f^5 and carry the rod inward and push the valve, E, off its seat. Rod, F, has an enlarged portion, f^8, which in the forward position of the rod projects into the perforation in the flange, e', and closes the same, but which has its end, f^9, tapered so that when the rod is in its normal position there is a water passage between the end, f^9, and the flange, e'. Therefore when pressure is brought upon the lever, f', the rod, F, is pushed inward carrying the valve, E, off its seat, e^2, and carrying the portion, f^8, within the flange, e', so that water from the mains will then pass through the pipe, e^4, and port, e^3, into the bottom of the housing, A, and that when the pressure upon the lever, f', is released, the rod, F, will be retracted, the valve, E, be carried to its seat by the spring, e^5, and communication established between the lower chamber of the housing and the outlet, a^3, through the port, e^3, the perforation within the flange, e', and the port, a^4, which connects the interior of housing, e, with the discharge port, a^3, as

shown in Fig. 4. The size of the opening, a^4, is regulated by means of a split screw, a^5, the screw having a diagonal slit, a^6, in it, as shown in Fig. 7, by which the rate of flow through the port may be regulated.

Against the valve seat, a', the main valve, G, is seated. Valve, G, has a hollow valve-stem, g, formed integral with which is a piston, g', against which a cup leather, g^2, is held by means of a nut, g^3. Within the valve stem, g, is a secondary hollow valve-stem, h, which carries at its upper end a valve, H, beneath which the valve stem, h, has perforations, h', h^2. The movement of the valve-stem, h, within the valve-stem, g, is limited by means of a transverse pin, h^3.

The operation is as follows: When water enters the valve housing; A, through the port, e^3, the pressure under the cup leather, g^2, raises the valve, G, to its seat, a', and raises the valve, H, from its seat until the pin, h^3, contacts the lower end of the valve-stem, g, so that the perforations, h', h^2, stand above the stem, g, and water from the mains then passes into the pipe, B to the tank until the pressure therein has reached that of the pressure in the mains. The valve, H, will then by its own weight fall to its seat, thus cutting off communication between the tank, B, and the lower chamber within the housing, A, below the cup leather, g^2. When the pressure upon the lever, f', is released by the raising of the seat, c, the valve, E, resumes its seat against the flange, e^2 and the portion, f^8, is withdrawn from the perforation within the flange, e' and the water below the cup leather, g^2, flows out through the perforation, e^3, and the port, a^4, and the split nut, a^5, into the discharge outlet, a^3, the pressure below the cup leather, g^2, thus being relieved, the pressure in the tank will carry the valve, G, and the valve, H, downward, opening communication between pipe, B, and the discharge outlet, a^3, into the bowl. The rate at which the valve, G, will move away from its valve seat, a', will be in direct proportion to the rate at which the discharge from below the cup leather, g^2, takes place, which, as aforedescribed, depends upon the position of the split screw, a^5, in the port, a^4. The size of the opening between the valve, G, and its seat, a', is thus smallest when the pressure in the pipe, B, from the tank is greatest and as the pressure in the pipe, B, from the tank becomes less, the distance of the valve, G, from its seat, a', becomes greater, and thus the rate of the discharge of the flushing water is made uniform, or as nearly so as it may be desired to have it. To enable a person to regulate the position of the screw, a^5, the annular extension, a^3, is provided with an opening and a screw, a^7, in alinement with the screw, a^5, as shown in Fig. 4.

In the modification shown in Fig. 6, the valve, H′, which corresponds to valve, H, shown in Fig. 2, is made to project up into the annular extension, a, in order to retard the initial discharge of the water.

What I claim is:

1. A flush valve having a housing with an inlet and a discharge opening, a pipe connecting the housing with a closed tank in combination with a valve seat in the housing between the pipe and the discharge opening, a main valve to contact the valve seat, a valve stem projecting from the main valve into the housing, a piston upon the valve stem and contacting the housing between the inlet opening and the discharge opening, the main valve having an opening through it connecting the inlet opening and the pipe leading to the tank, a secondary valve seated within the opening in the main valve and adapted to be opened by the water from the mains to admit water to the tank, and closing the opening automatically when the pressure in the tank becomes equal to that in the mains and a valve at the inlet opening for controlling the flow of water from the mains.

2. In a flush valve having a valve housing with an inlet and a discharge opening, a pipe connecting the housing with a closed tank, in combination with a valve seat in the housing between the pipe and the discharge opening, a main valve to contact the valve seat, the main valve having a channel extending through it and its valve stem for connecting the inlet and the pipe leading to the tank, a piston upon the valve stem and contacting the housing between the inlet opening and the discharge opening, a secondary valve contacting the end of the main valve to close its opening and having a tubular stem extending into the main valve stem and having discharge openings adjacent the secondary valve for admitting water to the pipe and a valve in the inlet opening for controlling the flow of water from the mains.

3. A flush valve having a housing with an inlet and discharge opening, a pipe connecting the housing with a closed tank in combination with a valve seat in the housing between the pipe and discharge opening, a main valve to contact the valve seat, a valve stem projecting from the main valve into the housing, a piston upon the valve stem and contacting the housing between the inlet opening and the discharge opening, the housing having a channel connecting the inlet opening and the discharge opening, the main valve having an opening through it connecting the inlet opening and the pipe leading to the tank, a secondary valve seated within the opening in the main valve and adapted to be opened by the water from the mains to admit water to the tank, a third valve and a means whereby the moving of the third valve in one direction puts the inlet opening into communication with the mains and closes

the channel between the inlet opening and the discharge and the moving of the third valve in the other direction closes the communication between the inlet opening and the mains and opens the channel between the inlet opening and the discharge.

4. A flush valve having an inlet opening at one end, an opening at the opposite end to be connected to a closed tank, and a discharge between the inlet opening and the tank opening, a valve seat between the tank opening and the discharge opening, a main valve seated against the valve seat and having a piston to contact the housing between the discharge opening and the inlet opening, the main valve having a channel through it, a secondary valve within the channel to be opened by a pressure from the mains, a water-way connecting the chamber between the piston and the inlet with the discharge opening, a means for regulating the size of the water-way, a third valve, a means whereby the movement of the third valve in one direction puts said chamber into communication with the mains and cuts off its communication with the discharge, and the movement of the third valve in the opposite direction closes the communication of said chamber with the mains and opens its communication with the discharge.

5. A flushing valve to be interposed between the mains and a closed tank and having a main valve with a channel therethrough and a secondary valve seated within the channel in the main valve and adapted to be raised by the water from the mains and to resume its seat when the pressure in the tank equals that in the mains.

6. A vertical valve housing, a valve therein having two disks which when the valve is seated divide the housing into three chambers, the upper one communicating with a closed tank, the central one with a bowl, and the lower one receiving water from the mains, and when the valve is lowered puts the upper chamber into communication with the bowl, a channel through the valve putting the upper and lower chambers into communication, a secondary valve in the channel in the main valve to be opened by pressure from the mains, means of communication between the lower chamber and the bowl, and a third valve for regulating communication between the lower chamber and the mains and regulating the communication between the lower chamber and the bowl.

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Witnesses:
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