No. 894,734. PATENTED JULY 28, 1908.

P. HAAS.

WATER CLOSET.

APPLICATION FILED JULY 8, 1907.

4 SHEETS—SHEET 1.

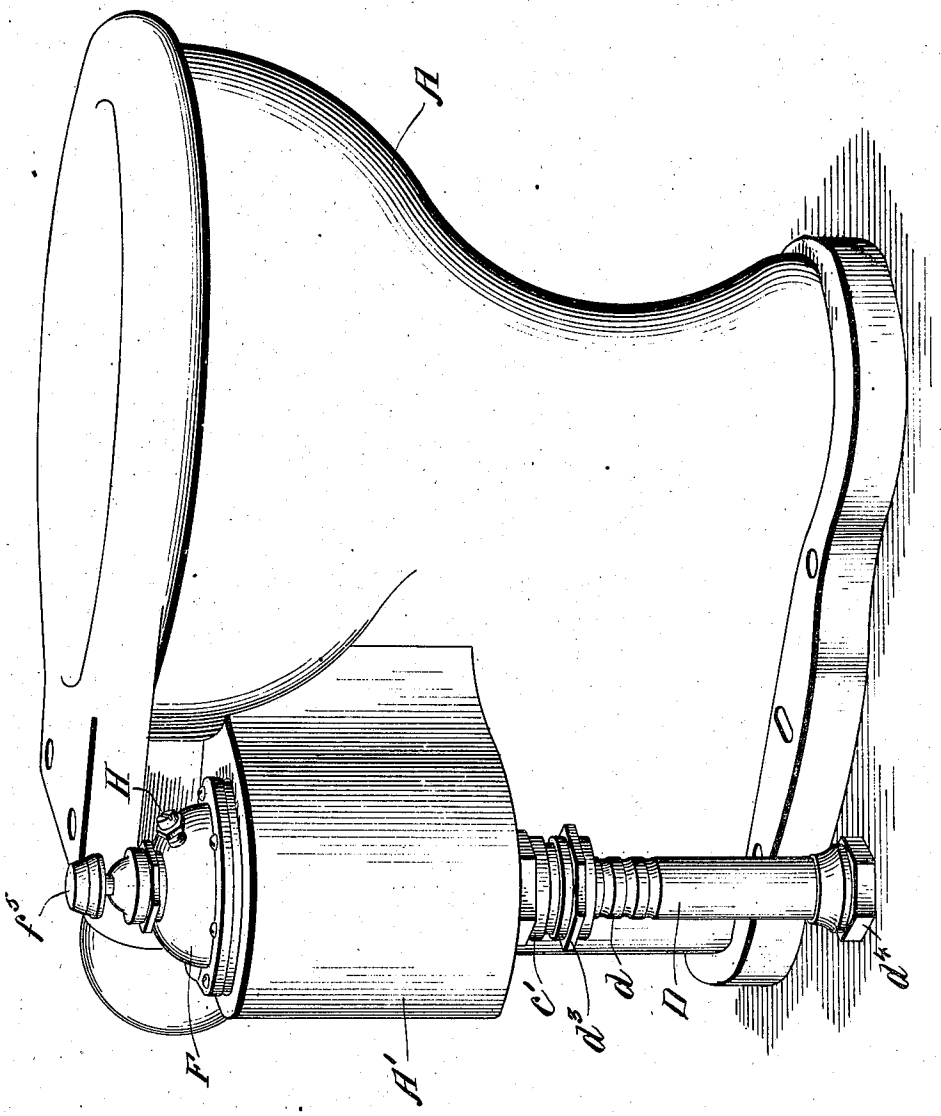


Fig. 1.

WITNESSES:

H. F. Hoyle.

J. K. Moore

INVENTOR

Philip Haas

BY

Whittemore Wood & Co

Attorneys

No. 894,734. PATENTED JULY 28, 1908.

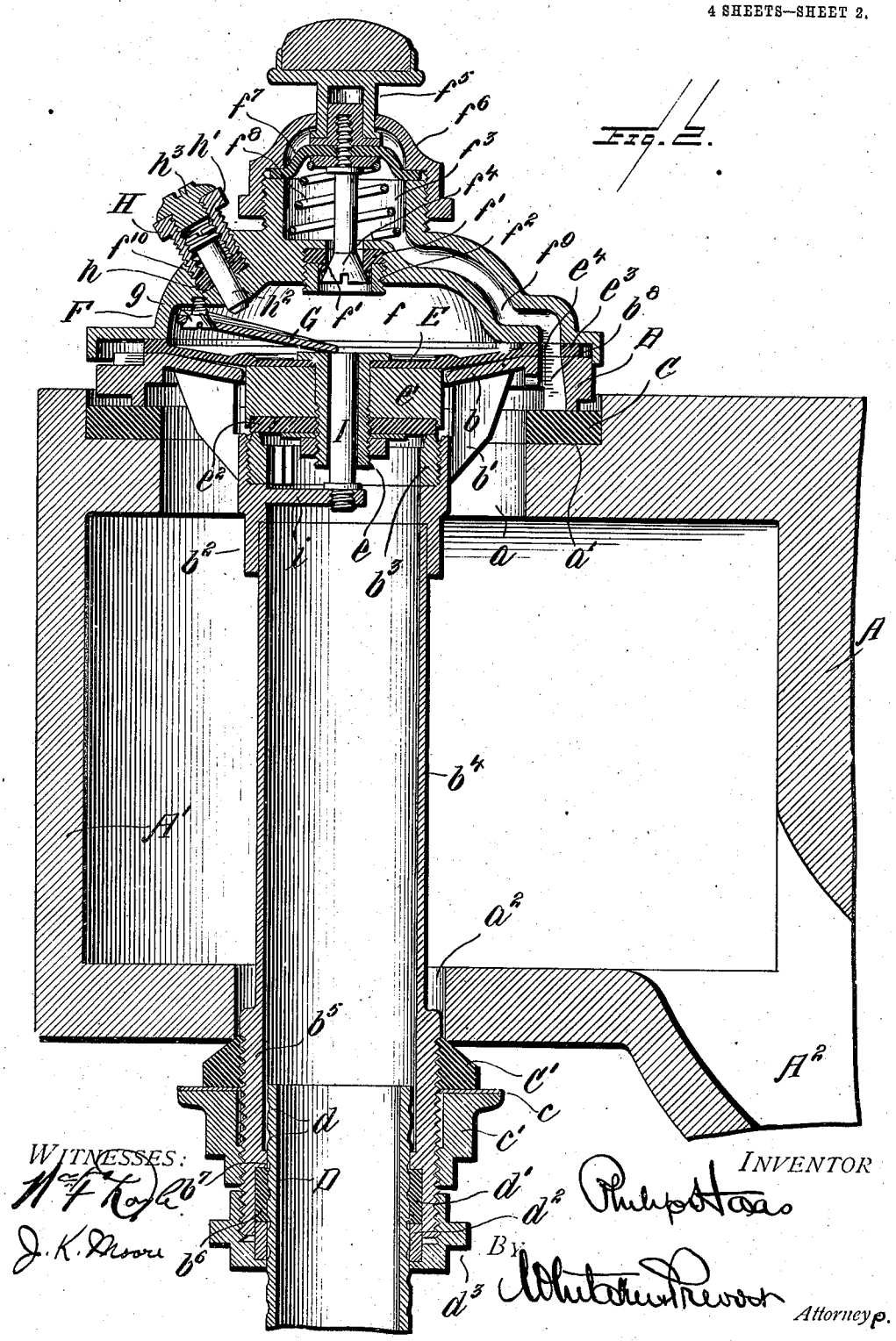
P. HAAS.

WATER CLOSET.

APPLICATION FILED JULY 8, 1907.

4 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

J. K. Moore

INVENTOR

Philip Haas

By

Attorney.

No. 894,734. PATENTED JULY 28, 1908.

P. HAAS.

WATER CLOSET.

APPLICATION FILED JULY 8, 1907.

4 SHEETS—SHEET 3.

Fig. 4.

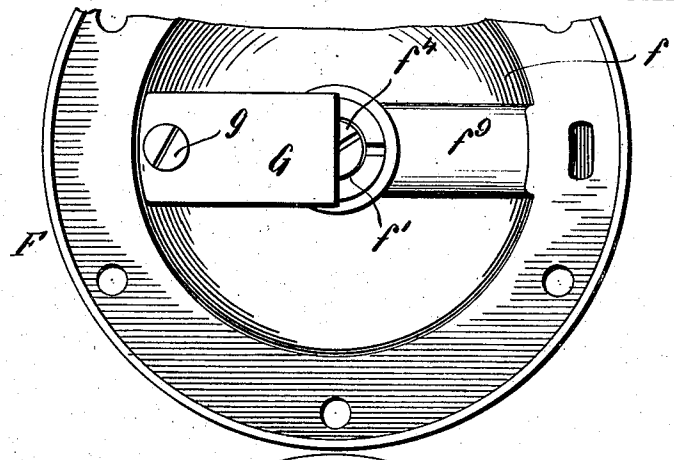


Fig. 2.

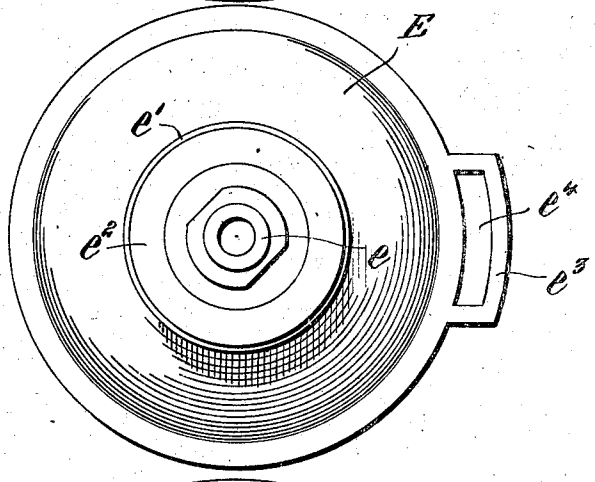
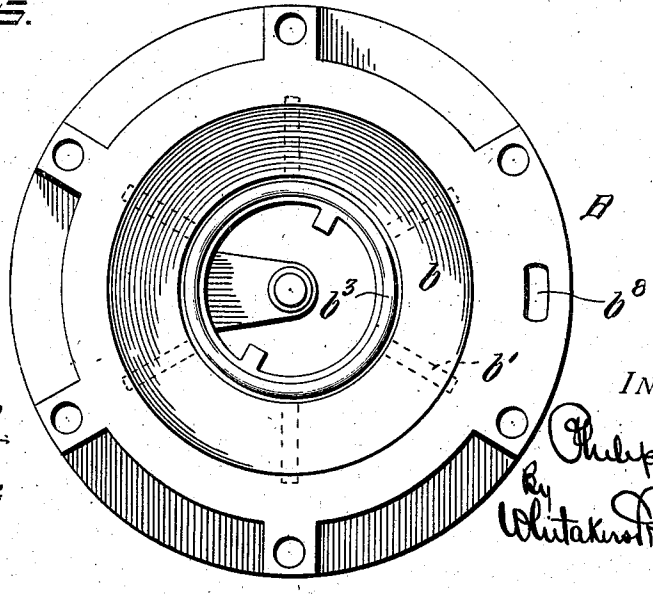


Fig. 5.



WITNESSES:

W. F. Dyke

J. K. Moore

INVENTOR

Philip Haas

By Whittaker Prevost

Attorneys

No. 894,734. PATENTED JULY 28, 1908.

P. HAAS.

WATER CLOSET.

APPLICATION FILED JULY 8, 1907.

4 SHEETS—SHEET 4.

Fig. 6.

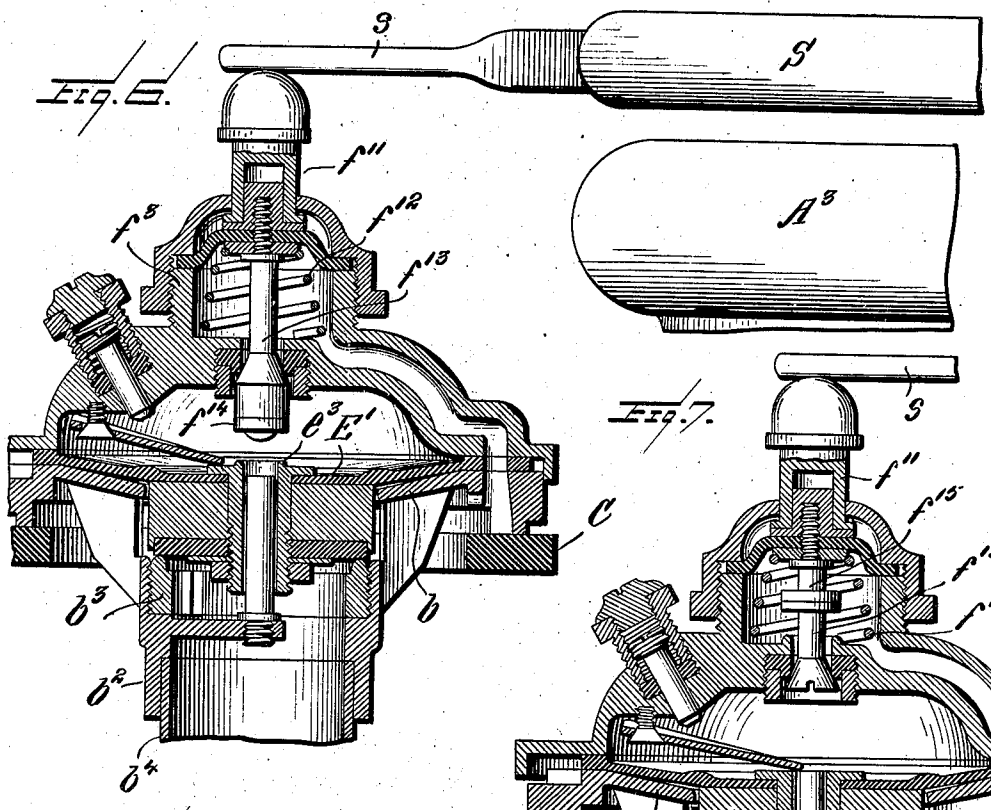
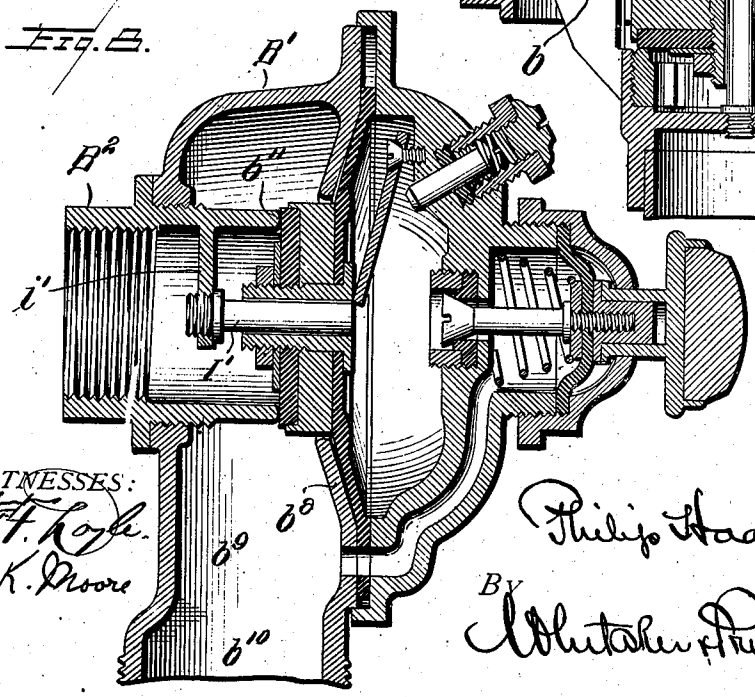


Fig. 7.

Fig. 8.



WITNESSES:

H. F. Hoge.

J. K. Moore.

INVENTOR

Philip Haas

BY

Whittaker & Wright

Attorneys

UNITED STATES PATENT OFFICE.

PHILIP HAAS, OF DAYTON, OHIO.

WATER-CLOSET.

No. 894,734. Specification of Letters Patent. Patented July 28, 1908.

Application filed July 8, 1907. Serial No. 382,760.

To all whom it may concern:

Be it known that I, PHILIP HAAS, citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Water-Closets; 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.

My invention consists in the novel features hereinafter described reference being had to the accompanying drawings which illustrate one form in which I have contemplated embodying my invention and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a perspective view of a closet bowl and flush valve therefor having my invention embodied therein. Fig. 2 is a vertical sectional view of the flush valve, and adjacent parts of the bowl. Fig. 3 is a bottom plan view of the upper part of the casing of the flush valve. Fig. 4 is a bottom plan view of the diaphragm valve, detached. Fig. 5 is a top plan view of the lower part of the valve mechanism with the diaphragm removed. Fig. 6 is a vertical sectional view of the valve mechanism, showing a slight modification of the invention. Fig. 7 is a similar view showing another slight modification of the invention. Fig. 8 is a vertical sectional view of a valve mechanism similar to that shown in Figs. 1 to 5 inclusive, constructed entirely separate from the closet bowl.

Referring to the form of the invention shown in Figs. 1 to 5 inclusive, A represents the closet bowl of porcelain or earthenware, and of any desired internal construction. The bowl A is provided preferably at one side with a hollow boss A′ formed integrally therewith provided with horizontal top and bottom faces and communicating with the water passage or passages of the bowl in any desired or usual manner. The boss A′ is provided with a large circular aperture a in its upper face, and an annular recess a' surrounding the said aperture, and the bottom face of said boss is provided with a smaller aperture a^2. The recess a' is occupied by a rubber packing ring C upon which rests a circular metal body forming part of a valve casing and which for convenience, I term the main body B. This main body B is provided with an inwardly extending, downwardly inclined annular web b forming a central aperture, and below said web are radial webs b' connecting the annular web b with a tubular portion b^2 forming a water inlet passage. The tubular part b^2 is provided on its upper face with a detachable annular valve seat b^3 which is preferably externally screw threaded and screws into a threaded recess in said tubular portion. The tubular portion b^2 is extended, either integrally or by means of a tube b^4, secured thereto, through the lower aperture a^2, of the boss A′, passing loosely therethrough and being provided at its lower end with an exterior threaded portion b^5, and the interior of said extension, at its lower end is provided with a packing recess b^6 and an inwardly projecting annular shoulder or stop b^7 above the same. The aperture formed between the valve seat b^3 and the web b forms a discharge passage, permitting when the main valve is open, the flow of water from the inlet pipe therethrough, into the interior of the boss, and thence to the bowl, as will be readily understood.

C′ represents a packing ring or gasket, preferably of rubber, surrounding the lower end of the extension b^4 and having an exterior conical face engaging the aperture a^2 in the boss A′. c is a metal washer below said ring C′, and c' is a nut screwed on the threaded portion of the extension and clamping the boss A′ between it and the main body B, of the valve mechanism, thus compressing the packing rings C and C′, and making a water tight joint between the valve mechanism and the boss A′ as will be readily understood.

D is a telescoping water inlet pipe which extends up from the floor, and has a portion provided with a plurality of annular recesses d extending up into the lower end of the extension b^4 within the annular shoulder b^7. A packing ring or sleeve d' of rubber surrounds said recessed portion of the pipe D and lies in the packing recess b^6; a metal ring d^2 surrounds said pipe D and extends partly into said recess b^6, so as to engage the packing ring d' and a nut d^3 engages the threaded lower end of the extension b^4 and forces the ring d^2 up against the packing ring d' thus expanding it laterally into one or more of the annular grooves d, and making a tight joint, while allowing the

pipe D to be adjusted vertically in the extension b^4 of the water inlet passage, according to the distance from the floor, where connection is made between pipe D and the water supply pipe by means of a union d^4.

Upon the main body B is placed the main diaphragm valve E, which extends over the annular web b, and is provided with a central aperture in which is fitted a metal sleeve e having an annular flange at its upper end, and a threaded portion at its lower end.

e' represents a metal disk having a central aperture through which the sleeve e passes, and provided with an annular recess in its lower face which receives a washer e^2, of a size to engage the valve seat b^3, and the said washer and disk are rigidly secured to the diaphragm by a nut and washer engaging the threaded end of the sleeve e, the parts being so arranged that the valve seats itself on the seat b^3 before the lateral portions of the diaphragm engage the web b. The web b, however, serves to prevent the diaphragm from being subjected to strain and will reinforce said diaphragm when pressure is applied above the same, after the valve is seated.

F represents the upper portion or casing cap of the valve mechanism, which fits down upon the marginal portions of the diaphragm E and is secured to the main body B by screws around the edges of the parts, as shown in Fig. 1, so as to firmly hold the diaphragm in place. The said cap is provided interiorly with a back pressure chamber f, above the diaphragm and having a relief aperture therein provided with a valve seat f', held in place by a screw ring f^2 fitting a threaded recess in the upper part of the cap.

Above the relief aperture, the cap is provided with a recess f^3 the walls of which are exteriorly threaded.

f^4 represents the relief valve which engages the seat f' and has an upwardly extending stem, secured to a push button f^5 (ordinarily operated manually) which extends through an aperture in a cap f^6, said cap f^6 being screwed on the exteriorly threaded recessed portion of the casing cap. The cap f^6 also holds in place a flexible diaphragm f^7 through which the stem of the valve passes, to prevent leakage of water around the push button, and a spring f^8 normally holds the relief valve closed. The recess f^3 communicates with a by-pass f^9 which is in communication with an aperture b^8 in the main body B, and this establishes communication with the interior of the boss A' which forms the discharge chamber or passage of the valve mechanism. The diaphragm E is provided with an offset e^3, having an aperture e^4 therein which registers with the passages f^9 and b^6, when the parts are in position. I also provide means for adjustably limiting the opening movement of the main diaphragm valve, which is so constructed as to be capable of adjustment from the outside without interfering with the operation of the valve mechanism. This consists in the present instance of a movable plate or blade G, secured to the inside of the casing cap F, as by means of a screw g loosely passing through an aperture in one end of the plate or blade, the said plate or blade having its other end engaging or in position to engage the main valve, and preferably a portion of the sleeve.

The casing cap F is provided on the outside with an interiorly threaded recess f^{10}, having a central aperture in its bottom. In this recess is located a packing ring h which is held in place and compressed by an internally and externally threaded sleeve H.

h' represents an adjusting screw which engages the internal threads of the sleeve H, and has a stem h^2 passing through the packing ring or washer h to a point adjacent to the blade G. The sleeve H is also preferably provided at its outer end with a screw plug h^3 for closing the end of the sleeve, but this is not essential.

It will be seen that by removing the plug h^3, a screw driver may be inserted into the sleeve H, so as to engage the adjustable screw or stop h', and turn it in either direction so as to adjust the position at which the main valve will be arrested by the engagement of the blade G with said stop. The adjustable screw h' is so constructed that it may be screwed in far enough to engage the blade G and force it firmly into engagement with the main valve when the latter is in closed position so as to hold it in closed position when it may be desired. Thus in shipping the valve mechanism the screw h' may be screwed in tightly, so as to hold the main valve seated and prevent jarring of the parts, and when a closet is installed and for any reason it is desired to put it out of operation, the screw h' may be screwed in so as to hold the main valve firmly in its seat and prevent the operation of the apparatus.

I represents a controlling stem which passes through the central aperture in the sleeve e of the main valve with what is termed an easy fit, the annular space or vent passage surrounding said stem forming the only communication between the inlet passage, and the back pressure chamber. This stem is mounted independently of the valve, and in this instance is secured to a bracket i cast integrally with the part b^2 which forms the inlet passage.

When the apparatus hereinbefore described is in operative condition, the diaphragm valve will be held closed by the pressure of water in the back pressure chamber f. To cause a flush of the closet the operator presses on the push button f^5 to open the relief valve, and releases the push button. At the instant the relief valve is opened a cer-

tain amount of water escapes from the back pressure chamber f, through the by-pass f^9 into the discharge chamber in the boss A', thus permitting the diaphragm valve to open and the flush water then passes from the pipe D, extension b^4 and the water inlet passage b^2 over valve seat b^3 beneath the web b, and to the discharge chamber in the boss A', from which it passes through a suitable discharge passage indicated at A^2 to the bowl. While the flushing operation proceeds, a part of the incoming water will find its way through the restricted annular vent passage around the stem I to the back pressure chamber where its accumulation will act on the outer side of the diaphragm, to close the main valve upon its seat.

In Fig. 8 I have shown a slightly modified form of the valve mechanism hereinbefore described, constructed entirely independently of the closet bowl and adapted to be connected thereto by suitable pipe connections. As shown in this figure the main body, here lettered B', consists of a hollow casing, provided with an annular web b^8, and having within said body a discharge chamber b^9 communicating with a discharge passage b^{10}, which may be connected to the closet bowl in any desired way.

B^2 represents a tubular part forming the water inlet passage, which is screwed into a threaded aperture into the main body, and preferably is provided on its inner end with an integral valve seat b^{11}. In order to renew the valve seat in case of wear the tubular part B^2 may be removed and a new part inserted. The part B^2 is provided with threads for the attachment to a water supply pipe and it is also provided with an internal projection i' carrying the controlling stem I'. All the remaining parts of the valve mechanism are constructed identically as shown and described with reference to Figs. 1 to 5 inclusive, and need not be again described.

In Fig. 6 I have shown a slightly modified form of the valve mechanism, which I find it convenient to use in some instances and particularly, where it is desired to have the valve mechanism operated automatically by the closet seat. In this figure S represents the closet seat and A^3 represents the rim of the bowl, the seat S being provided with an arm s, or other suitable device, for engaging the push button, here designated f^{11}, of the valve mechanism, and depressing the same when the seat is occupied, said seat normally being held slightly above the bowl by the spring f^{12} of the push button, or other suitable spring. The relief valve f^{13} is provided with an extension projecting into the back pressure chamber to a point near the center of the main valve, here lettered E', and being provided on its lower end with a washer f^{14} constituting an auxiliary valve.

The upper end of the sleeve of the main valve is provided with a valve seat e^3 surrounding the central aperture in said sleeve, and co-acting with the auxiliary valve f^{14}. The other parts of the valve are constructed exactly as shown and described with reference to Figs. 1 to 5. In the operation of this form of the valve mechanism, the depression of the seat S, causes the simultaneous depression of the push button f^{11}, thereby opening the relief valve f^{13} and causing the auxiliary valve f^{14} to seat itself on the seat e^3, thus cutting off the communication between the inlet passage and the back pressure chamber. At the instant the relief valve is opened, however, water in the back pressure chamber will be discharged through the by-pass as previously described and allow the main valve to open to produce a flushing movement. When the seat S is released, it is raised by the spring f^{12}, or other spring, permitting the auxiliary valve f^{14} to open. The relief valve f^{13} being already open, a second flushing occurs in the same manner as before described. In this form of the valve it will, therefore, be seen that the bowl is flushed before and after the seat is depressed, but the flushing is prevented while the seat is depressed, as the auxiliary valve cuts off the communication between the inlet passage and back pressure chamber, and also presses the main valve down onto its seat and holds it there.

Fig. 7 illustrates another slight modification of my invention which operates substantially as described with reference to Fig. 6, the only difference being that the auxiliary valve, here lettered f^{15} is located on the stem of the relief valve, and engages a valve seat f^{16} on the opposite side of the relief aperture from the regular valve seat engaged by the valve f^{13}. Thus when the seat is depressed the arm s will depress the push button and relief valve, opening the relief valve and producing a flushing of the bowl, until the auxiliary valve f^{15} closes, when the back pressure water accumulating in the back pressure chamber, will cause the main valve to close. When the seat is permitted to rise, a second flushing will occur, the relief valve being open as soon as the auxiliary valve opens, and when the relief valve is closed by its spring the back pressure water will accumulate and close the main valve.

The forms of valve shown in Figs. 6 and 7 are particularly desirable for use in schools and certain other public buildings to insure a proper flushing of the closet.

What I claim and desire to secure by Letters Patent is:—

1. In a water closet, the combination with the bowl, provided with a lateral hollow boss forming a water discharge passage within the same, and having apertures in opposite faces, of a valve mechanism having its main body engaging the exterior of said boss

around one of said apertures and forming the closing means for said aperture, a tubular device extending through the opposite aperture of said boss, said tubular device being connected with said valve mechanism and forming the water inlet passage thereto, and clamping devices engaging said tubular device for securing the valve mechanism to the boss, substantially as described.

2. In a water closet, the combination with the bowl provided with an integral hollow boss forming a water discharge chamber within the same, and having apertures in its upper and lower faces, of a valve mechanism having its main body located outside of said boss, said main body engaging the aperture in the upper face of said boss and forming the closing means for said aperture, a tubular part extending through the lower aperture in the boss, said tubular part being connected to the valve mechanism and forming the water supply passage thereto, means for securing said tubular part to the boss and closing the aperture in the lower face of the same, said valve mechanism being provided above the boss engaging portion of its main body with a removable part giving access to the interior of the valve mechanism, substantially as described.

3. In a water closet, the combination with a closet bowl having a laterally projecting hollow boss, forming within the same a water discharge chamber, and having apertures in its upper and lower faces, of a valve mechanism located outside of the boss and having a main body supported upon the upper face of said boss, and provided with a packing ring surrounding the aperture in said upper face, said main body forming the closing means for said aperture a tubular part, connected with said main body, and having a discharge aperture at its upper end within the boss, provided with a valve seat, said tubular part extending through the aperture in the lower face of said boss, and forming a water inlet passage, a packing ring for engaging said aperture, a clamping ring on said tubular part, for engaging said packing ring, a main valve for engaging said valve seat, a casing cap detachably secured to said main body, and providing within it a back pressure chamber, a relief valve, a by-pass discharging water from the back pressure chamber to the interior of said boss, and means for permitting the flow of water from said inlet passage to the back pressure chamber, substantially as described.

4. In a water closet valve, the combination with the main body provided with a water inlet passage, a discharge passage, and a back pressure chamber, of a main valve interposed between said inlet and discharge passages, and the back pressure chamber, a vent for establishing communication between the inlet passage and the back pressure chamber, a relief valve for said back pressure chamber, a casing inclosing portions of said valve mechanism, an adjustable device extending through said casing, and operable from the exterior thereof, and a movable part within the valve casing for engaging said adjustable device, and having a part in the path of the main valve, substantially as described.

5. In a water closet valve, the combination with the main body provided with a water inlet passage, a discharge passage and a back pressure chamber, of a main valve interposed between said inlet and discharge passages, and the back pressure chamber, a vent for establishing communication between the inlet passage and the back pressure chamber, a relief valve for said back pressure chamber, a casing inclosing portions of said valve mechanism, an adjustable stop extending through said casing and operable from the exterior thereof, a movable plate within said casing and adapted to engage said stop, said plate being connected to the casing at one end, and having its other end in the path of the main valve, substantially as described.

6. In a water closet valve, the combination with the main body provided with a water inlet passage, a discharge passage, and a back pressure chamber, of a main valve interposed between said inlet and discharge passages, and the back pressure chamber, a vent for establishing communication between the inlet passage and the back pressure chamber, a relief valve for said back pressure chamber, a casing inclosing portions of said valve mechanism, and provided with a screw threaded recess, and an aperture in the bottom of said recess, a packing ring in said recess, an interiorly and exteriorly threaded sleeve in said recess engaging said packing ring, an adjusting screw engaging the interior of said sleeve, and having a stem extending through the packing ring into the interior of said casing for adjustably limiting the opening movement of the main valve, substantially as described.

7. In a water closet valve provided with a water inlet passage, a discharge passage and a back pressure chamber, of a main valve interposed between the inlet passage and the back pressure chamber, and provided with a vent passage therein communicating with the inlet passage and the back pressure chamber, a relief valve for said back pressure chamber, and an auxiliary valve operated by the said relief valve and adapted by contact with portions of the main valve surrounding the vent passage to close said passage and the main valve, substantially as described.

8. In a water closet valve provided with a water inlet passage, a discharge passage, and a back pressure chamber, of a main valve interposed between the inlet passage and the

back pressure chamber and provided with a vent passage communicating with the inlet passage and the back pressure chamber, a relief valve for said back pressure chamber having a portion for positively engaging the main valve, and an auxiliary valve operated by the relief valve for closing one of the apertures communicating with the back pressure chamber and for closing the main valve, substantially as described.

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

PHILIP HAAS.

Witnesses:
CHAS. TWOMBLY.
G. A. CRIM.