(No Model.)

H. A. TOBEY.

WATER CLOSET VALVE.

No. 295,691. Patented Mar. 25, 1884.

Fig. 1

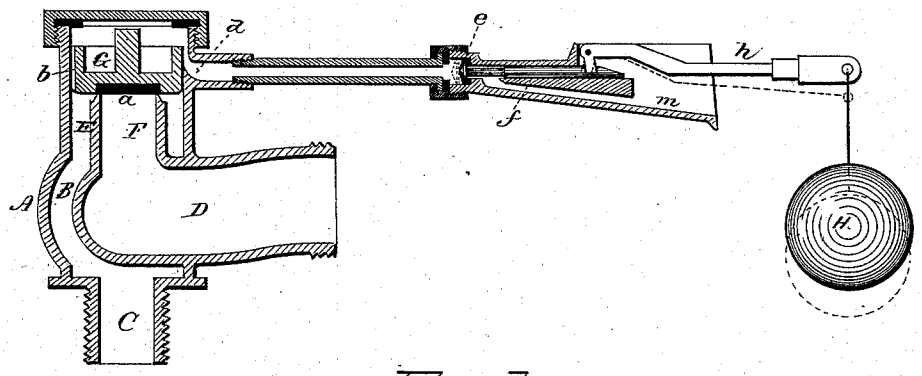


Fig. 2

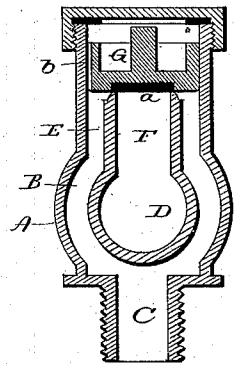
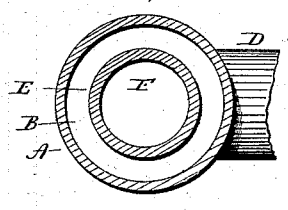


Fig. 3



Witnesses.
J. A. Shumway
J. L. Earle

Henry A. Tobey
Inventor
by Atty.
John L. Earle.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

HENRY A. TOBEY, OF DAYTON, OHIO, ASSIGNOR TO THE HARTFORD SANITARY PLUMBING COMPANY, OF HARTFORD, CONNECTICUT.

WATER-CLOSET VALVE.

SPECIFICATION forming part of Letters Patent No. 295,691, dated March 25, 1884.

Application filed July 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. TOBEY, of Dayton, in the county of Montgomery and State of Ohio, have invented a new Improvement in Water-Closet Valves; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a vertical central section cutting through the outlet-passage from the valve-chamber; Fig. 2, a vertical section cutting at right angles to the section of Fig. 1; Fig. 3, a transverse section below the valve and above the outlet.

This invention relates to an improvement in that class of valves employed for flushing water-closets, and in which a balance-valve is employed which will suddenly open the flow to the bowl and automatically slowly close.

Valves of this class have been made with a circular chamber, within which the valve is arranged, and into which chamber the water flows from the supply, with a concentric opening in the chamber, through which the water enters the passage to the bowl, the valve resting upon said concentric opening to close the passage, and with a small aperture through the valve from the water-chamber, so that the water from the supply will pass slowly from below the valve to its opposite side, and, there counterbalancing the pressure of the water, will force the valve to, and hold it upon its seat, to close the passage to the bowl and until the pressure is removed from the opposite side, when the inflow of water will raise the valve to permit that inflow to pass to the bowl; but in such valves the inlet-passage has been at one side of the chamber near the valve, so that the pressure or momentum of the water is interrupted by the bend in the column and prevents the direct and uniform action of the water upon the entire exposed under side of the valve. Being at one side of the chamber, the force is necessarily greater at the point of entry than it is at other points around the face of the valve, and, as the column bends, it strikes the face of the valve at different angles. This irregular pressure is increased by the side pressure or reaction produced upon the sides of the chamber and valve, and causes the valve to vibrate, producing a disagreeable noise and uneven delivery. Again, in such inflow—that is to say, at substantially right angles to the axis of the valve—the water in turning over into the concentric outlet flows irregularly into that passage. The break of the stream produced by the bend in the passage into the chamber is the cause of this deflection of the water, and such deflection causes an irregular action upon the valve, frequently deranging its operation, and requiring guides or other means than the valve itself to keep it in its proper relative position or to aid in its closing.

The object of my invention is to overcome these difficulties; and it consists in a valve-chamber having the inlet in axial line therewith, with an outlet above the inlet, and an extension from that outlet upward into and concentric with said valve-chamber, so as to make the opening to the outlet and the valve-seat thereon above the bend in the outlet-passage, and so as to form a clear concentric space in the valve-chamber below the valve-seat, combined with a free valve in the chamber above the outlet-opening, and of substantially the same area as the chamber, whereby that portion of the under surface of the valve over the space between the outlet-passage and the walls of the chamber is exposed to the vertical or direct axial action of the water in the valve-chamber, the construction of the valve and chamber being such as to permit a slight flow of water from that part of the chamber below the valve to that part of the chamber above, and an escape-passage from the chamber above the valve, and with a mechanism to open said passage above the valve, whereby the water above the valve which produces the counter-balance upon the valve will freely escape and permit the direct and axial action of the column of water below, as more fully hereinafter described.

A represents the case of the chamber B. This chamber has an inlet, C, at its lower end, and substantially concentric with the chamber. From the chamber a passage, D, leads to the bowl. This passage turns upward within the chamber, so as to form a concentric tube or extension within said chamber. The upper end of this tube is open. This tubular exten-

sion E should have considerable length above the passage D, so as to leave a concentric space between it and the wall of the chamber B, and this space of so much length and capacity as not to produce a break in the tubular column of water which surrounds the tubular extension or concentric passage F to the outlet-passage D. Above this tubular extension E is the valve G. This valve is best made of a diameter corresponding to the diameter of the chamber E, but so as to move up and down freely therein, and at its central portion is fitted with a flexible material, *a*, or otherwise, to rest upon the mouth of the concentric tubular extension E, and which forms the valve-seat, and so as to close the passage F when it sets thereon. That portion of the valve outside the concentric passage stands over the space between the said passage and the wall of the chamber B, and that portion of the valve is therefore exposed to the pressure in the chamber B. The small passage *b* leads from that part of the chamber B below the valve to the part of the chamber above. It may be a vertical groove in the periphery of the valve, or a vertical groove in the wall of the chamber; or the valve itself may be slightly less in diameter than the chamber, so as to permit the water to pass slowly through the space to that part of the chamber above the valve. The inflow of water to and pressure in the chamber is in the axial line of the chamber and valve, and because of the concentric tubular extension E that column stands and bears equally upon the valve at all points around the central passage. From that part of the chamber above the valve an opening or passage, *d*, is made for the escape of water; but the area of the passage *d* must be much greater than the passage which permits the water in the chamber B to pass from that part of the chamber B below the valve to that part of the chamber above. If this passage *d* be closed, then the equilibrium produced upon the valve will hold it in its closed position; but if this passage *d* be suddenly opened to permit the water above the valve to quickly escape, and thereby remove the pressure above the valve, the pressure below will instantly raise the valve, and the water will flow into the opening F and down through the tubular extension into the outlet D. Because of this tubular extension standing concentric with the column of water and leaving the water free and uninterrupted in its passage entirely around the chamber, the action upon the valve is equal at all points, and this, as it were, tubular column of water, rising, turns from all directions and with equal force and pressure over into the concentric passage F, and prevents any possible deflection of the valve or forming of vacuums in the chamber, which must be the case where irregular or interrupted breaks occur, and such as would occur were it not for the tubular concentric extension E.

The device here represented for opening the passage *d* for the escape of water from above the valve is that used in the Hartford Sanitary Plumbing Company's closet, and consists of a valve, *e*, on a spindle, *f*, in substantially axial line with the tube that leads from above the valve G, and closes from the direction of the flow of water, so that the pressure of water tends to close the valve; and in connection with this valve-spindle is a bell-crank lever, *h*, upon which a float, H, is hung, which stands in a water-passage in connection with the bowl, and so that when the water stands at the predetermined level in the bowl the float will raise the lever *h* and draw the valve *e* onto its seat, as shown; but when the water is permitted to escape from the bowl, then the float H falls, and by its weight forces the valve *e* from its seat, so as to open the passage of escape from above the valve G, as seen in broken lines, Fig. 1, and when so opened the water escapes from the chamber above the valve G through the waste-passage *m;* but while I prefer this mechanism for opening the passage above the valve G, other mechanism may be employed for this purpose. By this construction, which permits the formation of a tubular column of water within the valve-chamber below the valve, such perfect evenness of pressure upon the under side of the valve is attained, and such an equal escape from the chamber at all points into the outlet produced, that the valve requires no guide other than its own periphery upon the walls of the chamber.

I do not wish to be understood by the term "concentric" inlet to imply that the supply-pipe must lead directly into the chamber B in a concentric direction. It may lead at right angles into a chamber below, which chamber, being concentric with the chamber B above, forms the concentric inlet which I have herein described.

I claim—

The herein-described valve, consisting of the chamber B, having an inlet, C, concentric therewith and below the outlet-passage, the outlet-passage from one side of the chamber, with a tubular extension therefrom into said chamber and concentric therewith, and so as to form a concentric space between the walls of said chamber and said tubular extension, with the valve G arranged to seat upon the open end of said concentric extension, and of an area substantially equal to the internal area of the chamber, but so as to leave a slight passage from that part of the chamber below to the part of the chamber above the valve, and an opening from that part of the chamber above the valve, with mechanism, substantially such as described, to open said passage above the valve for the escape of water therefrom, substantially as described.

HENRY A. TOBEY.

Witnesses:
FRANK HUMPHREYS,
IRA B. HAMBLIN.