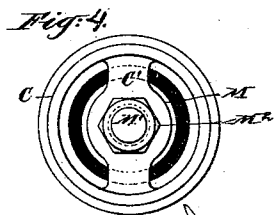
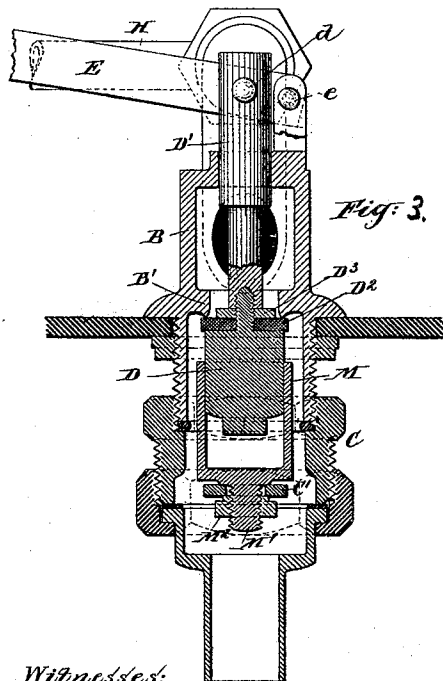
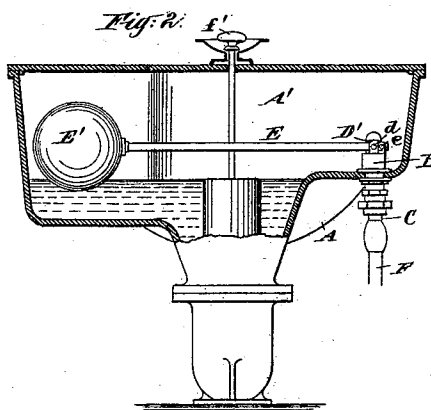
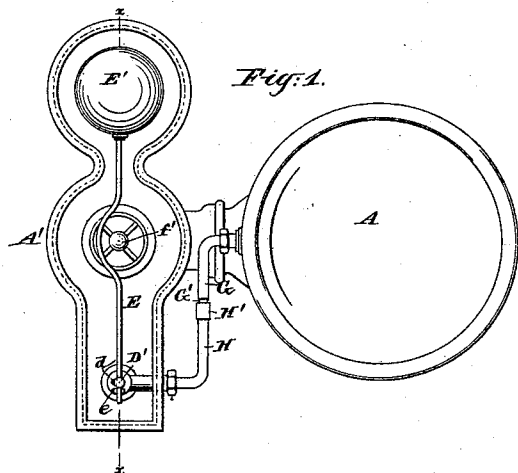


(No Model.)

J. HANKENHOF.
VALVE FOR WATER CLOSETS.

No. 478,963.

Patented July 12, 1892.



Witnesses:

Charles R. Searle,
M. F. Boyle

Inventor:

Jules Hankenhof
by his attorney
Thomas Spess Stetson

UNITED STATES PATENT OFFICE.

JULIES HANKENHOF, OF NEW YORK, N. Y., ASSIGNOR TO FRANK COOK, OF
SAME PLACE.

VALVE FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 478,963, dated July 12, 1892.

Application filed May 11, 1891. Serial No. 392,276. (No model.)

To all whom it may concern:

Be it known that I, JULIES HANKENHOF, a citizen of the United States, residing in the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Water-Closets, of which the following is a specification.

The improvement relates to the provisions for supplying water from a main or other source furnishing water through a suitable pipe at moderate pressure. There may be the ordinary tank in the upper portion of the closet, performing its usual function, being filled at leisure through a small pipe and delivering in more liberal quantities for the brief periods required.

I will describe the invention as applied to the form of water-closet set forth in the patent to me dated August 19, 1890, No. 434,778. As in the said former patent, the pressure of the water urges the valve to its seat. Instead of a thin disk of metal, I increase the thickness and make the valve what may be called a "smoothly-finished cylinder," extending downward, and inclose this loosely in a hollow cylindrical case. This case is closed at the bottom, and as the valve opens and closes the water flows in and out through the very contracted annular space between the valve and this case. This insures that the closing movement shall be slow. The case is held strongly against movement upward or downward, but allowed to move laterally to a small extent in all directions. This compensates for imperfections in the workmanship and for the slight circular motion due to the operating-lever and allows the valve to find its seat fairly under all conditions. I connect the operating-lever to the stem of the valve by a pivot-pin. All the parts can be readily disconnected when required.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a general plan view. Fig. 2 is a vertical section on the line *xx* in Fig. 1. The remaining figures are on a larger scale. Fig. 3 is a vertical section of a portion. Fig. 4 is a plan view of a portion seen from below.

Similar letters of reference indicate corre-

sponding parts in all the figures where they appear.

A is the bowl, and A' the connected side chamber.

B is the valve-casing, and B' the horizontal partial partition forming the seat for the valve.

C is an extension-piece engaging tightly by screw-threads and a packing-ring, as shown, with the lower end of the casing B and having a cross-bar C'. This extension is connected by a coupling to a supply-pipe F, which may be of lead and may supply water from an elevated reservoir at a constant pressure.

D is the valve, and D' a stem extending upward and outward through a tolerably-close-fitting aperture in the top of the casing B. Its upper end is connected by a pivot *d* to a lever E, having a fulcrum at *e* and operated by a float E'. When the operator opens the ordinary discharge-valve (not shown) by lifting on the knob *f'*, the water is rapidly discharged and the gravity of the now-unsupported float E' depresses the lever E and opens the valve. The water flows through the pipe G H and is distributed into the bowl. When it accumulates again in the closet sufficiently to lift the float E', it acts through the lever E and pivot *d* and stem D' to raise the valve again into contact with its seat B' and the induction of the water is stopped. The body of the valve D is extended downward in the form of a smoothly-finished cylinder. (See Fig. 4.) This is loosely inclosed in a hollow cylindrical casing M, the screw-threaded stem M' of which is inserted loosely in the cross-bar C'. A nut M², which may in practice be a nut and jam-nut, is set on the stem M', connecting it strongly with the cross-bar C' to resist motion upward, but allowing it liberty to move a little laterally in all directions. The joint between the exterior of the cylindric portion of the valve D and the interior of the inclosing case M is sufficiently easy to allow the water to flow in and out slowly. The arrangement insures that the valve shall open and close slowly. The rate of opening is not so important; but the slow closing is of advantage in causing the water to rise sufficiently to allow the valve to press fairly and tightly against its seat. The body

D of the valve is formed separate from the stem D' and connected by a screw-threaded extension on the one part tapped into the other. A soft face D² is held in place on the valve by embracing it between the body D and a washer D³, as indicated in Fig. 4. This construction and the fact that the extension-piece C, carrying the loosely-connected case M, is readily attached to the part B and detached at will makes it easy to assemble the parts and to disconnect them, as required.

There have been previous water-closets in which a connected piston or a part of the valve itself, adapted to serve pistonwise, was matched into a loosely-inclosed cylinder, with the effect to retard the closing of the valve, such as shown in Fig. 5 of the British Patent No. 417, of 1875; but my construction serves differently in combination with the automatic operation of the valve by the float producing an effect not found in such previous constructions. My combination opens the valve automatically, but tardily, and allows the water to be entirely emptied from the bowl A and chamber A' and the discharge-valve to be tightly closed again before the water is much admitted, which greatly economizes the water. My construction also retards the closing and insures that the water flows into the bowl until it rises sufficiently high to press upward with a gentle but effective force on the float to hold the valve tightly pressed to its seat. The effect is superior to anything

before known to me for this purpose either among automatic actions or those operated at will.

The location of the casing M, in which the lower portion D of the valve is loosely fitted, insures not only that the slow induction of the water into the chamber between the valve and the bottom of the casing M as the valve closes shall retard the closing, but also that the valve shall be shielded from the force of the current of water, and thus protected from any tendency to close too soon.

I claim as my invention—

1. In a water-closet, the combination, with a valve having its body B extended in the direction from which the water is received, of a casing M and a loose connection of the latter to the fixed portions of the mechanism, adapted to allow slight lateral movement of the casing, as herein specified.

2. In a water-closet, the extension C, cross-bar C', and loosely but strongly connected casing M, in combination with the valve-casing B, valve D, lever E, and operating-float E', adapted to be readily applied together and separated, as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

JULIES HANKENHOF.

Witnesses:

RAE HARRISON,
M. F. BOYLE.