2 Sheets—Sheet 1.

S. S. HELLYER.

Water Closet.

No. 234,570. **Patented Nov. 16, 1880.**

Fig. 1.

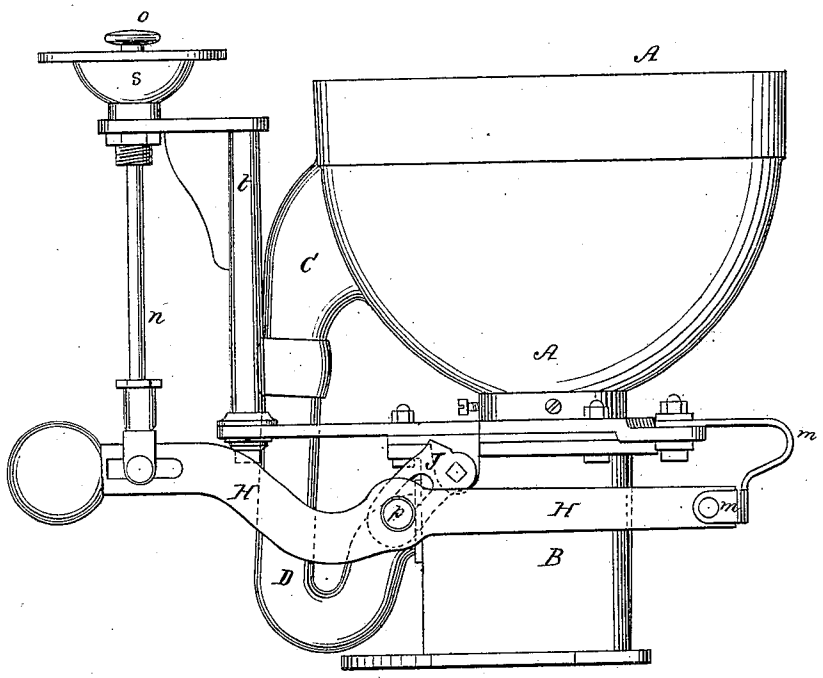


Fig. 4.

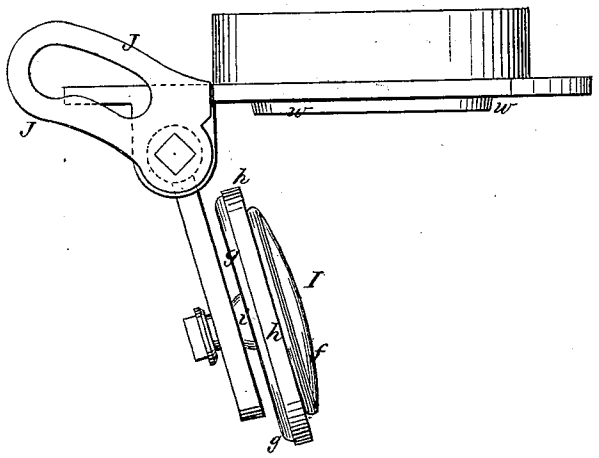
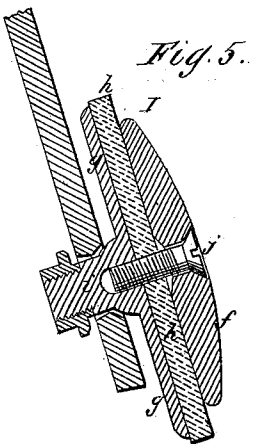


Fig. 5.



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2 Sheets—Sheet 2.

S. S. HELLYER.

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Fig. 2.

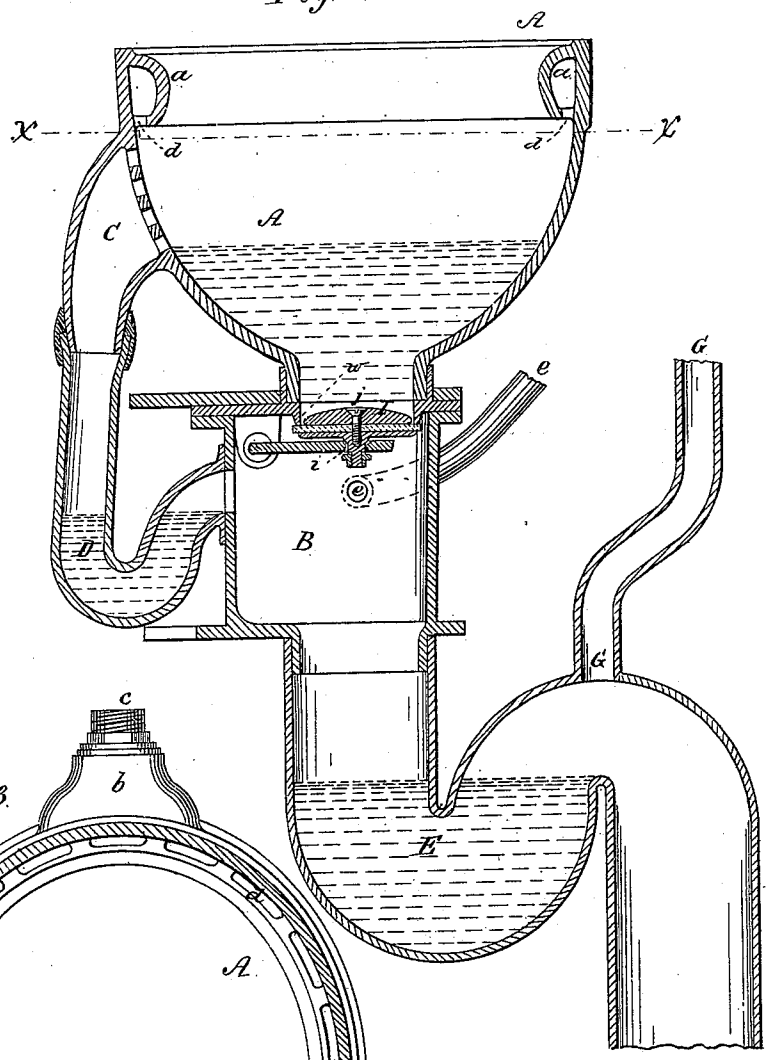
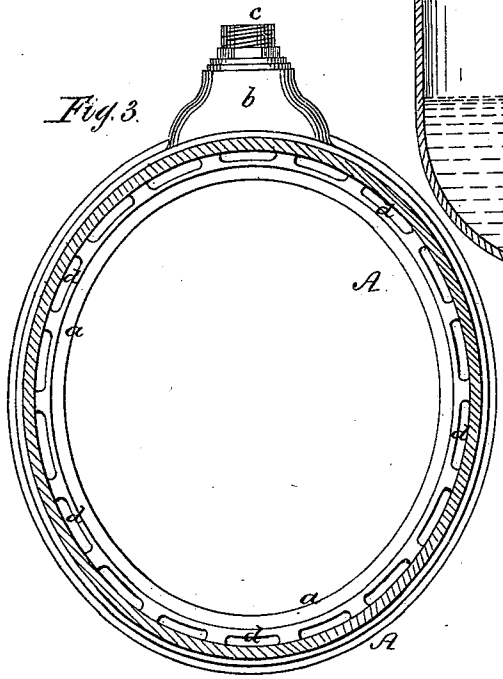


Fig. 3.



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UNITED STATES PATENT OFFICE.

SAMUEL S. HELLYER, OF LONDON, ENGLAND, ASSIGNOR TO HENRY C. MEYER & CO., OF NEW YORK, N. Y.

WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 234,570, dated November 16, 1880.

Application filed September 4, 1879.

To all whom it may concern:

Be it known that I, SAMUEL S. HELLYER, of London, of the county of Middlesex, England, have invented certain new and useful Improvements in Water-Closets; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention relates more particularly to that kind of water-closet apparatus in which the basin is provided with valve at its outlet or throat, so that when this valve is closed a given quantity of water is retained in the basin. In this kind of water-closets, as heretofore made, the detail construction has varied in the closets of different makers; but in all of them some one or more objections have existed in the practical use of the apparatus.

My invention has for its main objects to overcome, as far as practicable, all the objections had to this kind of closet, and to provide for use a water-closet combining to the greatest extent, so far as practical, a perfection of wash, cleanliness, and ventilation of the receiver and other parts, perfection of fit and durability in the valve devices, and less wear and tear on the working parts, together with general simplicity and economy of manufacture; and to this end and object, principally, my invention consists, first, in a novel construction and arrangement of the flushing-rim and apparatus of the basin; second, in a novel form and arrangement of valve, such that it will adjust itself to properly seal the outlet of the basin under all ordinary circumstances, and remain longer in a perfectly-operative condition; third, in a novel arrangement of the lever with a yielding fulcrum to relieve the valve, its seat, and other working parts from too sudden jar and strain when the lever falls, and thus make the apparatus more durable and less liable to derangement; fourth, in a novel construction of disk-valve and peculiar arrangement of the same with its seat, at the outlet of the hopper, such that there will be less liability for any collection and retention of particles of paper or other material upon the rubber bearing-surface of the valve, the presence of which particles might interfere with the perfect seating of the latter.

To enable those skilled in the art to make and use my invention, I will now proceed to more fully explain the construction and operation of a water-closet embracing the several features of said invention, referring by letters to the accompanying drawings, in which—

Figure 1 is a side view or elevation of a closet made according to my invention. Fig. 2 is a vertical central section of the same. Fig. 3 is a horizontal section at *x x*, Fig. 2, with the basin inverted to show the flushing apparatus. Fig. 4 is a detail side view of the valve and its seat removed and drawn on a larger scale, and Fig. 5 is a detail partial section of said valve, (on a still larger scale.)

In the several figures the same part will be found designated by the same letter of reference.

A is the basin, which is arranged immediately over, and the outlet of which is connected to, the receiver B, in about the usual manner. The interior of this receiver B is, by preference, enameled, and the upper edge of the basin A is formed with a hollow rim or "flushing-rim," as seen at *a*, which communicates, through the medium of a branch or nozzle, *b*, and pipe *c*, with the water-supply pipe. The under part of the flushing-rim *a* has numerous oblong apertures, *d*, (the form and arrangement of which are best seen at Fig. 3,) through which the water is discharged in convergent sheets onto the walls of the basin A, for the purpose of thoroughly washing it, both at the time of the discharge of the basin's contents and at the time of the "after-wash."

C is the overflow-nozzle of the basin, which, as shown, communicates with the trapped pipe D, which, in turn, communicates with the receiver B near its upper portion. (See Fig. 2.)

E is the main trap of the soil-pipe F, connected, as shown, (in the usual manner,) directly to the bottom of the receiver B, and provided, by preference, with a ventilating shaft or pipe, G, for carrying off any gases that may ascend within the soil-pipe.

e is a vent-pipe extending out of the receiver B, and designed, principally, to prevent the overflow and trap C D from getting air-

bound and inoperative, and, secondarily, to ventilate the receiver and carry off any odors or gases that might possibly arise therefrom when the valve of the basin is opened.

I is the outlet-valve of the basin, and is constructed, as shown, of a combined china disk, *f*, a metal disk, *g*, and a thick rubber disk, *h*, these parts being arranged concentrically in the manner shown, and being fastened together by a central stud, *i*, and screw *j*, and the whole so mounted that the valve is not only free to rotate about the center of the disks composing it, but also capable of a sort of rocking (or universal-joint) movement, so that in coming to its seat it can seat itself in different planes, and out of parallelism with the plane of the seat, as and for purposes to be presently explained.

The detail construction of the valve will be best understood by reference to Figs. 4 and 5 of the drawings, from which and the other figures it will be seen that while the rubber disk *h* is of a diameter considerably greater than that of the valve-seat, and that while the diameter of the metal disk *g* is nearly as great as that of said rubber disk, in order that the rubber disk may be properly held up against the valve-seat to insure a water-tight joint, the china disk *f* is made of such a diameter as to nearly or quite fill the internal circumference of the tubular valve-seat, the edges of said china disk being rounded (as seen in cross-section at Fig. 5) and its exposed face made quite convex, as illustrated. This peculiar structure of the several parts of the valve, and their relative arrangement together and with the seat of the valve, in the manner shown and described, are important, since thereby it follows that while a soft packing-surface is properly brought to bear against the annular metallic seat, practically all the rest of the uppermost part of the valve is composed of such material and is of such shape that in the use of the apparatus the water discharged at each dumping of the contents of the basin will wash off from the upper exposed surface of the valve all particles of matter or material that may have settled thereon, and there will be no liability of the clinging to any part of the valve of any particles of saturated paper, such as might operate to prevent a water-tight closing of the outlet of the basin.

The valve is vibrated on its hinge by means of a lever, H, which is pivoted at one end of a spring-fulcrum, *m*, and has connected to it near its other (weighted) end the usual rod, *n*, of the pull-up handle *o*, the said lever having a stud or wrist-pin, *p*, projecting from it, that engages with the slotted arm J of the valve's shaft, as clearly shown.

The motion of the lever and the arrangement of it and the arm J together are such that the throw of the latter will be such as to open the valve clear down (or into a nearly vertical plane) when the handle *o* is pulled up properly.

The spring *m* is secured at one end to the casting of the closet, as shown, and has the lever H pivoted to its other end, as seen best at Fig. 1. In this manner provision is made in the spring for a yielding of the fulcral point of the lever when it may be allowed to descend suddenly and the valve allowed to come to its seat with a slam, and from this capacity of the weighted lever thus to yield when it and the valve come to a stop the valve and its seat and the other parts are more or less relieved of the injurious wear and tear to which all the parts are subjected when the lever has an immovable fulcrum.

The pull-up rod is held laterally in place by the usual means at *s*, sustained by the standard *t*, in the ordinary manner, and the general operation of the closet, as to the discharge of the contents of the basin by the use of the pull-up handle, and the ingress of the water to refill it, are about the same as usual.

I have illustrated by broken lines in the drawings the water contained in the several receptacles up to the levels supposed to be maintained in the closet when the parts are in their normal positions; and from the drawings it will be seen that when the valve I is closed and the closet in a condition for use the basin A will contain water up to the level of the overflow-nozzle C, that the trap at D will be full of water up to the point where it communicates with the receiver B, and that the main trap E of the soil-pipe will contain water up to the level indicated, and that thus the soil-pipe will be sealed by its trap. Also, the outlet of the basin will have a water-seal in its trap D. Therefore the escape of any gases or odors upward into the basin A must be impossible.

When the closet is used the movement upward of the pull-up handle *o* effects the vibration of the lever H, and through it the opening of the valve I, and at the same time the letting on of the water, as usual, through the supply-pipe at *c*, and thence into the flushing-rim *a*. At the same time that the body of water contained in the basin, together with the excrement deposited therein, falls into the receiver B, a fresh supply of water rushes in from the flushing-rim at its apertures and assists the cleansing of the basin, and when the valve I is reclosed the water again fills in the basin A up to the level indicated at Fig. 2, and any excess of water, or any slop-water emptied into the basin A without opening the valve I, will overflow at C, and passing through the trap at D run into the receiver B, and from thence escape through trap at E into the descending soil-pipe; but as the receiver B is sealed above and below, respectively, by the valve I and water in basin A and the trap E, and as the communication between the overflow at C and the receiver B has also a water-seal at D, it follows that, without some provision for a free egress of air from the said receiver, the communication between it and the overflow might become practically useless or partially inop-

erative. To avoid this difficulty the vent-pipe *e* is provided, by means of which the air confined in B can freely escape said vent-pipe, at the same time performing the secondary (and usual) function of a ventilator of the receiver.

By reason of the oblong or slot-like shape of the flushing apparatus *d* of the rim *a*, made of the proper capacity, and their arrangement, as shown, I am enabled not only to concentrate the water toward the outlet, but also to eject sheets of water downward over the entire wall-surface of the basin, thus insuring a perfect washing of said walls.

As before stated, the valve I is not only free to turn on its central stud, but is free to rock more or less out of a horizontal plane.

The object and advantages of this mode of construction and principle of operation are these, viz: In the first place the frequent turning round of the valve I during use prevents the wearing away unevenly of the rubber packing at any one point where the packing may come against the valve-seat *w;* and in the next place, in the event of the collection of any particles of matter on either the valve-seat or the valve (where it comes against the seat) that would otherwise prevent the valve from seating so as to form a water-tight joint, this capacity of the valve to seat itself in various planes relative to the plane of the seat enables the valve and seat to come together and form a tight joint, notwithstanding the presence of slightly-obstructive matter at one or more points.

This peculiarity of operation and the results thereof are important, since, in an apparatus made as heretofore, the liability of an imperfection of the joint between the valve and its seat, under ordinary difficulties, has been very great; and the consequence of any such imperfection of the joint is a leakage out of the basin of the water-supply and the rendering of the basin unfit for use.

The endurance of the valve and its seat in my improved closet is also much greater than in other apparatuses, by reason of the strain and shock being, in a measure, taken up, as before explained, by the spring-fulcrum of the lever whenever the said lever is allowed to fall suddenly after the use of the closet and discharge of the contents of the basin.

Having now so fully explained the several features of my improved closet that any one skilled in the art can make and use the same, what I claim therein as new, and desire to secure by Letters Patent, is—

1. A basin having formed at its upper edge a flushing-rim, *a*, provided throughout its entire length with a series of long narrow slots or slit-like openings of equal length and breadth, and equidistant, and operating to discharge sheets of water from the upper edge of the basin over its walls and toward the outlet, as hereinbefore set forth.

2. In combination with the outlet of the basin and its valve-seat, a self-adjusting valve which is capable of rotation, and also of a change in its plane, for the purpose of adapting itself to any inequalities in seating, as and for the purpose set forth.

3. In combination with the lever H and its attachments, a yielding or springing fulcrum, substantially as and for the purposes described.

4. In combination with the valve-seat at the outlet of the basin, a disk-valve composed of an upper disk, *f*, of china or analogous material, a metallic or other lower packing-supporting disk, *g*, and an interposed rubber disk, *h*, the several parts being arranged to operate together in substantially the manner and for the purposes set forth.

Witness my hand and seal this 8th day of July, 1879.

SAMUEL STEVENS HELLYER. [L. S.]

In presence of—
C. R. FLOOD,
R. T. CHEESEWORTH.