(No Model.) 2 Sheets—Sheet 1.

J. KELLY.

VALVE MECHANISM.

No. 522,324. Patented July 3, 1894.

Fig. 1.

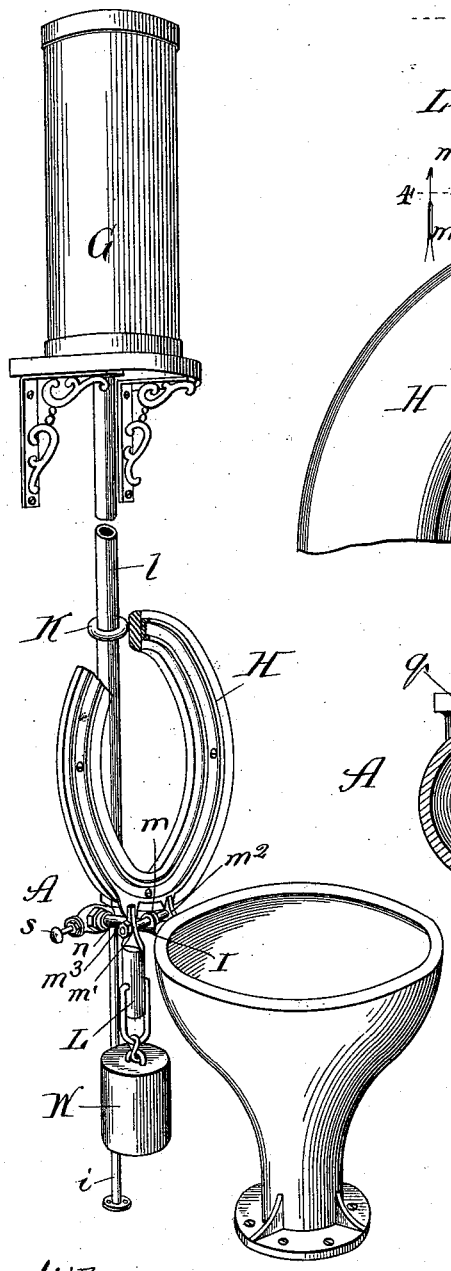


Fig. 2.

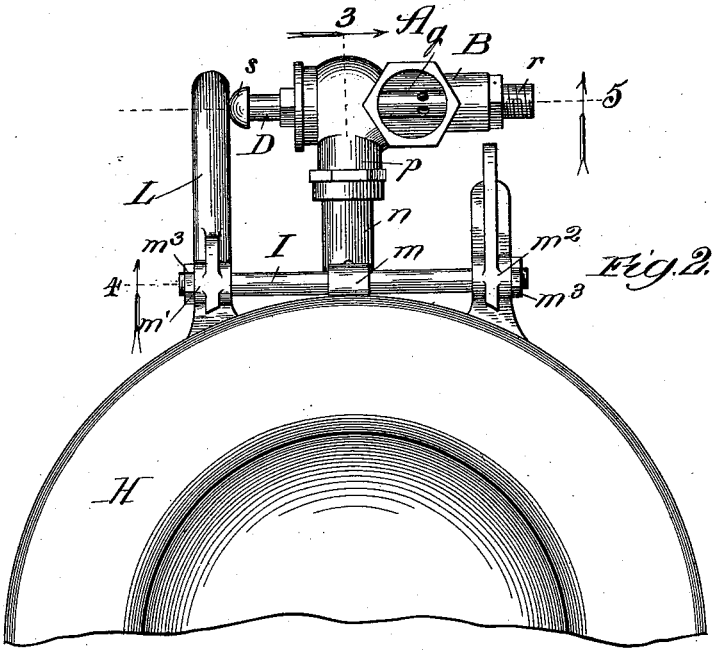
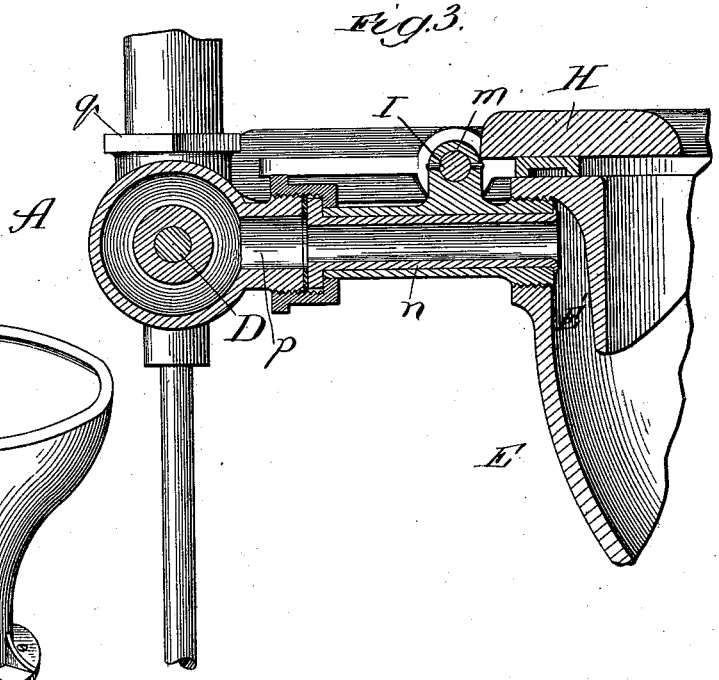


Fig. 3.



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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

J. KELLY.

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Fig. 4.

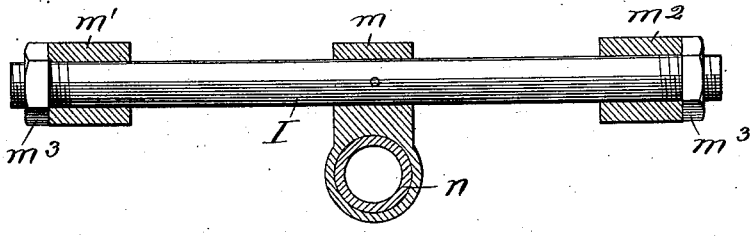


Fig. 5.

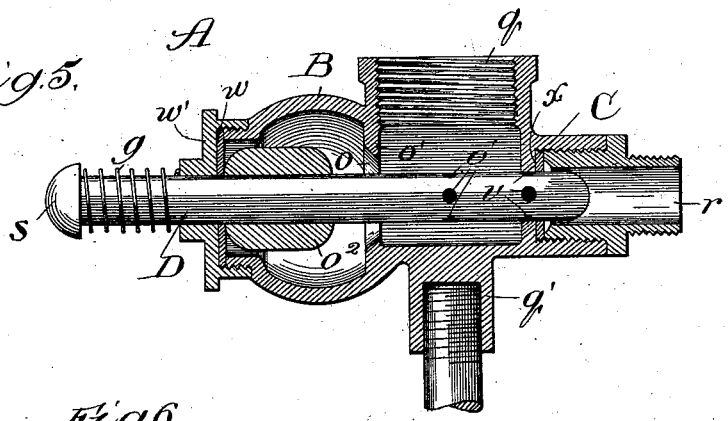


Fig. 6.

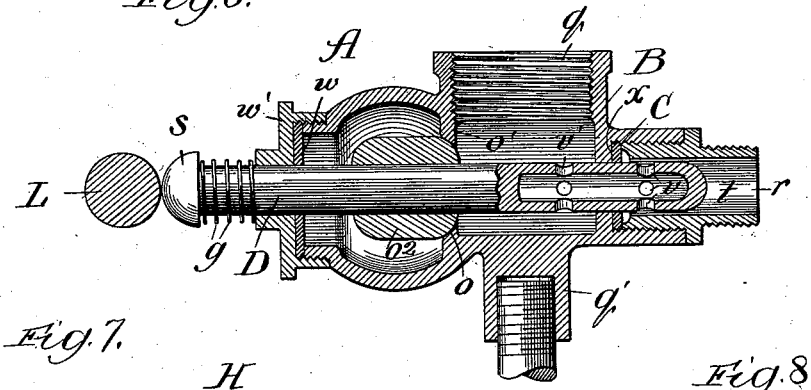


Fig. 7.

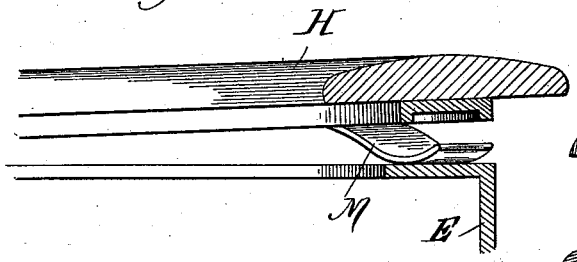
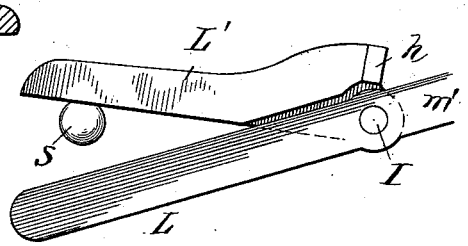


Fig. 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN KELLY, OF CHICAGO, ILLINOIS.

VALVE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 522,324, dated July 3, 1894.

Application filed December 23, 1893. Serial No. 494,510. (No model.)

To all whom it may concern:

Be it known that I, JOHN KELLY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Valve Mechanism, of which the following is a specification.

My invention relates to a valve-device for a water-closet, to be actuated by depressing a self-rising seat to open communication through the valve-shell of the supply-outlet leading to the overhead-tank with the inlet and thereby close to the supply-outlet the discharge or flush outlet to the bowl or hopper; and by the rise of the seat to close the inlet and open the discharge-outlet to the supply in the overhead-tank, whereby the contents of the latter may empty into and flush the hopper.

My improved valve-device has combined with it various features which tend to improve the mechanism in the matters of function and durability, and which are hereinafter more particularly described and claimed.

Referring to the accompanying drawings Figure 1 is a broken perspective view showing my improved valve-mechanism applied to a water-closet provided with an overhead flush-tank; Fig. 2, an enlarged plan view of the valve-mechanism as operatively combined with the bowl and seat, the latter being shown broken. Figs. 3, 4 and 5 are sections taken, respectively, at the lines 3, 4 and 5 on Fig. 2 and viewed in the directions indicated by arrows. Fig. 6 is a section like that presented in Fig. 5, but showing the valve-device in its position of opening communication between the inlet and tank-supply outlet in the shell, and closing the flush-discharge outlet; and Figs. 7 and 8 are broken views, the former in section and the latter in side elevation, showing modified details.

A is the valve-device comprising a shell B having at one end an inlet *r*, adapted to be coupled to a supply-pipe (not shown) of water under pressure, a supply-water outlet *q*, and a discharge-outlet *p*. Within the passage of the inlet *r*, and confined against an annular shoulder *x* therein, is an annular diaphragm C, (Figs. 5 and 6) of leather, rubber, or other suitable material. The part of the shell from which the discharge-outlet *p* leads should be enlarged, into approximately globular form as shown; and it is divided internally from the part from which the outlet *q* proceeds, by a partition *o'* containing an opening *o*, which should taper inwardly, as shown, and forms a valve-seat.

D is a reciprocating piston-valve, hollow, at least throughout a portion of its extent, as from its end *t* to the point *t'* (Fig. 6) and provided near the end *t* with one or more openings *v* and near the point *t'* with one or more openings *v'*.

A valve-head o^2, of rubber or other suitable material, is provided in the globular part of the shell on the piston, to reciprocate with it, and seats against the opening *o;* and at the adjacent end of the stem of the piston-valve it carries a rounded head *s*. For closing the end of the shell B through which the headed end of the piston-valve works, I provide an annular washer *w*, closely fitting about the stem, and secure it in place by a cap *w'* screwing externally upon the shell, as shown, and through which the headed end of the piston-valve protrudes. This means of closure affords a perfectly tight stuffing-box about the piston-valve, around which leakage is prevented by the washer, while leakage about the latter is prevented by the cap. From that part of the shell whence the outlet *q* proceeds, and opposite thereto, extends a nipple-socket *q'*.

The inlet *r* being connected with the supply of liquid under pressure, the outlet *q* with a storage-receptacle and the discharge-outlet *p* leading to any desired point or object, and with some means such as the lever, hereinafter described, bearing against the head *s* and normally holding the valve-head o^2 against its seat *o*, the openings *v* will protrude beyond the plane of the annular diaphragm C. Water, then, from the supply under pressure, by way of the inlet *r*, may enter the tubular piston-valve through the openings *v* and emerge therefrom through the openings *v'*, passing into the overhead receptacle referred to and filling it. On then withdrawing the means holding the head o^2 against its seat, the pressure against the head of the water in the receptacle forces it away from its seat, thereby opening communication between the supply-outlet *q* and discharge-outlet *p* and permit-

ting the contents of the overhead receptacle to discharge through the outlet p; while the consequent withdrawal of the end t of the reciprocating piston-valve into the shell, brings its openings v behind the annular diaphragm C, where they are not presented to the pressure-supply, which is thus cut off from the valve-device. On again forcing inward the piston-valve at its headed end, the valve-head o^2, is seated, to shut off communication between the supply-outlet q and discharge-outlet p, and protrude the openings v beyond the diaphragm C, when the filling of the receptacle again proceeds, in the manner described, to store the supply to be subsequently withdrawn through the discharge-outlet.

The described functions of my improved valve-device are peculiarly desirable in connection with a water-closet when applied thereto in a manner to be controlled by the raising and lowering of the hinged seat.

E is the bowl or hopper, into the flush-rim E′ of which, at the back, leads the flush-pipe n from the discharge-outlet p of the valve-shell B; and the pipe n has a hinge-bearing m for the seat, as hereinafter described.

From the supply-outlet q, in the upper side of the shell B leads the supply-pipe l to an overhead flush-tank G; the inlet r is coupled with the water-pressure supply-pipe (not shown), and a pipe or rod is screwed at one end into the nipple-socket q' and fastened at its opposite end to the floor, as indicated at i in Fig. 1, to afford a support for the valve-mechanism and tank.

H is the seat. It has projecting from its rear side the perforated bearings m' and m^2, at opposite sides and in alignment with the opening through the bearing m, to receive the ends of the hinge-rod I, which passes through the three bearings and is held in place by nuts m^3 screwed upon its ends. This manner of hinging the seat, namely on the pipe n, is much preferable to casting bearings for the hinge-connection of the seat with the bowl, on the body of the latter, since if one of the bearings, so cast, be broken, the entire bowl is irreparably damaged; whereas when the hinge-connection is provided, as according to my improvement, on the flush-pipe, it is not so likely to be broken, though in the event of its fracture, the pipe n may be readily removed and replaced by another at small expense.

The bearing m' is extended into an arm or lever L, which, in the rising and lowering movements of the seat, swings through the plane of the head s on the adjacent end of the piston-valve D and thus abuts against it when the seat is down, being below the head when the seat is raised, to which position it tends by the proper provision, to that end, of a spring or a weight W, the latter being shown in Fig. 1 as loosely hung on the lever L.

To prevent marring of the seat in striking, when raised, against the pipe l, I provide on the latter a tight-fitting ring K of soft material, preferably rubber, affording a cushion which may be adjusted, by slipping, to any desired height on the pipe, (at which it stays by reason of its tight fit,) according to the point at which the seat strikes the pipe.

The weight W maintains the seat in the raised position illustrated in Fig. 1 and tends to raise it to that position when lowered. When the seat is lowered, the lever L is raised to bear against the head s of the valve-piston D in its path, and thereby forces the valve-piston inward. This forces the valve-head o^2 against its seat, closing the discharge-outlet p to the supply-outlet q and protruding the openings v in the valve-piston beyond the diaphragm C, whereby the supply of water at the inlet r may pass through the valve-piston, and thence by way of the supply-outlet q and fill-pipe l into the tank. As the seat rises, on being freed, the lever L is withdrawn from the path of the reciprocating valve-piston, which is thereupon forced outward by the water-pressure against the valve-head, and thus withdraws the openings v behind the diaphragm C, to shut off the supply of water, and opens communication between the openings q and p, through which the contents of the tank discharge and flush the bowl E.

Any wear on the valve-head o^2, tending to prevent close seating thereof may be readily taken up by loosening the nut m^3 at one end of the hinge-rod I and tightening that at the opposite end to increase, according to the amount of wear, the extent of inward-stroke of the valve-piston by the lever L.

It is not necessary that the seat H shall be automatically raised to the extent represented in Fig. 1, for its function of withdrawing the lever L from bearing against the valve-piston may be accomplished by a comparatively slight rise of the seat, as indicated in Fig. 7. Then, however, instead of a weight W as the automatic raising means, I prefer to provide a spring-medium for the purpose. This is illustrated in the last-named figure of the drawings as a leaf-spring M fastened to the under side of the seat, near the front, to bear against the upper edge of the bowl. When the extent of automatic rise of the seat is thus comparatively slight, means should be provided, whereby in completely raising it for any purpose, the valve-piston shall be forced inward to cause filling of the tank, and permit, on lowering the seat to its then normal position, flushing of the bowl. I provide such means in the form of a supplemental lever L′ (Fig. 8) loosely supported on the hinge-rod I to extend over and coincident with the lever L and normally into inoperative contact with the head s of the piston-valve, whereby the seat, in its rise, will strike a lug h on the rear end of the supplemental lever and depress it toward its operating end, thereby causing it to bear against and force inward the valve-piston. On then lowering the seat, the lever L, by abutting against the under side of the le-

ver L′, will remove the latter from operation against the head *s* and permit the pressure from the tank to force out the piston-valve and permit the flushing.

If the pressure be insufficient to operate the piston-valve, a spring *g* may be used.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a bowl E and an overhead flush-tank, a valve-device having a shell provided with an inlet containing an annular diaphragm, a supply-outlet leading to the tank, a discharge-outlet leading to the bowl, a valve-seat between the said supply and discharge outlets, a reciprocating piston-valve operating to close the inlet when forced, with relation to the diaphragm, inward and to open the inlet when forced, with relation to the diaphragm, in the opposite direction, and a valve-head on the piston-valve, seating inward against said seat, and a seat having a laterally adjustable hinge-connection with the flush-pipe leading from the valve-device to the bowl, and provided with an operating lever for the piston-valve, substantially as described.

2. In combination with a bowl E and an overhead flush-tank, a valve-device having a shell provided with an inlet containing an annular diaphragm, a supply-outlet leading to the tank, a discharge-outlet leading to the bowl, a valve-seat between the supply and discharge outlets, a reciprocating piston-valve operating to close the inlet when forced, with relation to the diaphragm, inward and to open the inlet when forced, with relation to the diaphragm, in the opposite direction, and a valve-head on the piston-valve, seating inward against said seat, and an automatically rising hinged seat for the bowl, carrying a lever L and a supplemental lever L′ to engage the piston-valve, substantially as and for the purpose set forth.

3. In combination with a bowl E and an overhead flush-tank, a valve-device A comprising a shell B provided with an inlet *r* containing an annular diaphragm C, a supply-outlet *q* leading to the tank, a discharge-outlet *p* leading to the bowl, a valve-seat *o* between said supply and discharge outlets, and a reciprocating hollow piston-valve D having a head *s* at one end and openings *v′* and *v* toward its opposite end, a stuffing-box for the piston-valve, comprising an annular washer *w* and a cap *w′*, and an automatically rising seat H hinged to the pipe-connection between the valve-device and bowl and carrying a lever L to engage the head on the piston-valve, substantially as and for the purpose set forth.

JOHN KELLY.

In presence of—
M. J. FROST,
W. N. WILLIAMS.