No. 654,161. Patented July 24, 1900.

J. KIRBY, JR.

WATER CLOSET.

(Application filed Sept. 23, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

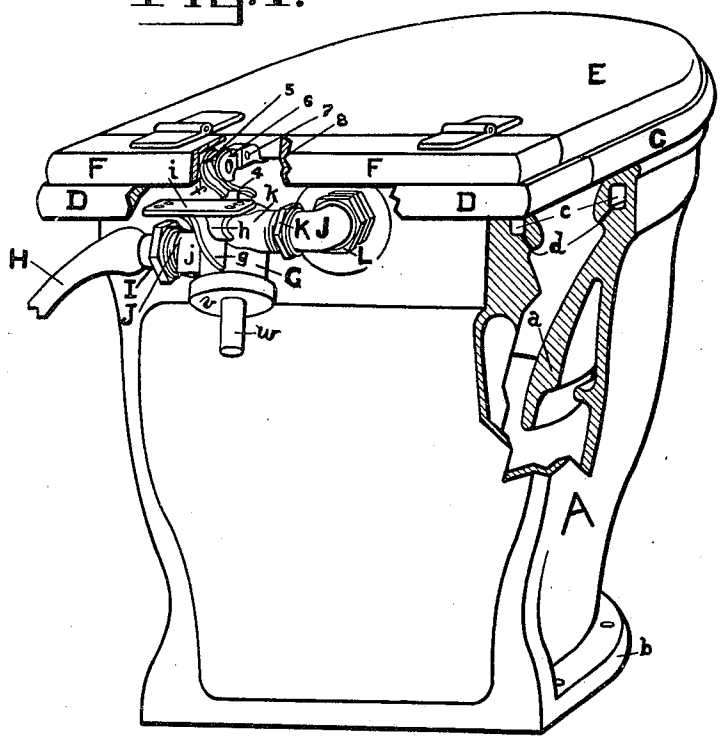
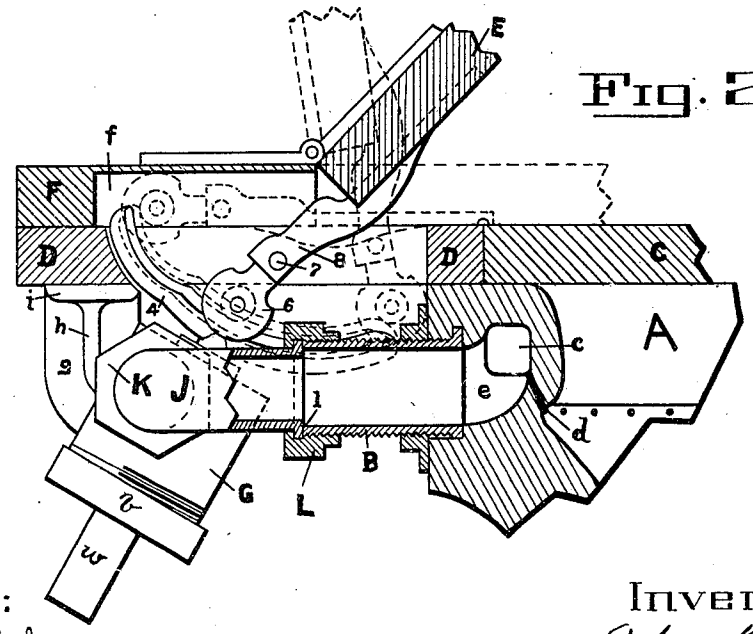


Fig. 2.



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Fig. 3.

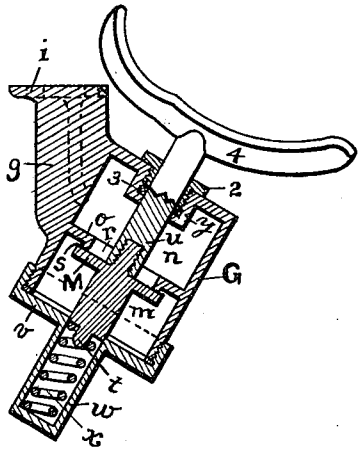


Fig. 4.

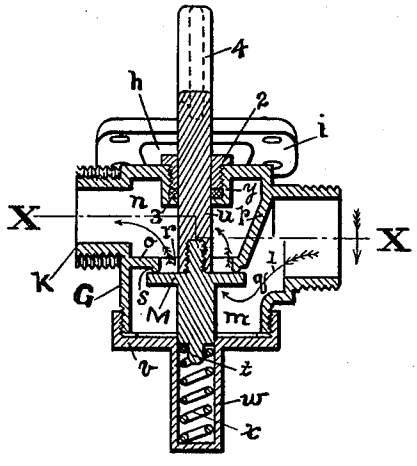


Fig. 6.

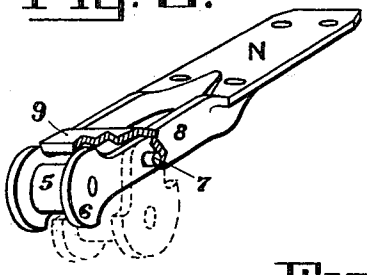


Fig. 5.

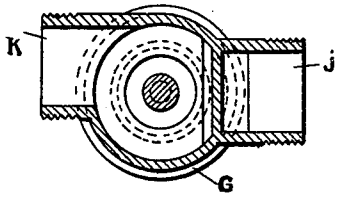


Fig. 8.

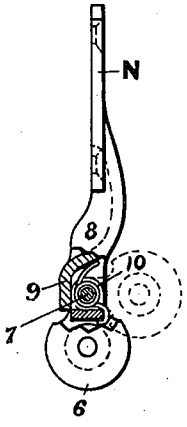
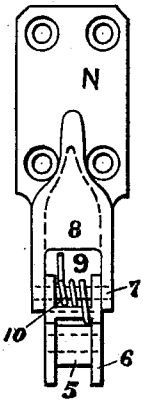


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN KIRBY, JR., OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON MANUFACTURING COMPANY, OF SAME PLACE.

WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 654,161, dated July 24, 1900.

Application filed September 23, 1899. Serial No. 731,410. (No model.)

To all whom it may concern:

Be it known that I, JOHN KIRBY, Jr., a 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 that the following is a clear, full, and exact description of the invention.

My invention relates to valves for water-closets and mechanism for operating the same.

The object of the invention is to provide a simple, inexpensive, and efficient spring-retracting valve and mechanism attached to the seat or lid of the closet for operating the same, whereby water communication with the closet will be established by movement of the seat or lid thereof; and it consists in certain novel features of construction and arrangement of parts, as hereinafter fully described, pointed out in the claims at the end of this specification, and shown in the accompanying drawings, which form a part hereof, and in which—

Figure 1 is a rear perspective view of the closet, a portion of the hopper being broken away to show the bowl; Fig. 2, a side view of the valve and its opening mechanism, showing a portion of the hopper in section through the flushing-inlet and coupling, also showing in cross-section through the center line of the valve the supports at the rear of the hopper and portions of the seat and lid hinged to the same, the seat being shown by solid lines in a semi-elevated position during its upward movement and the valve-stem depressed, and by dotted lines in raised and lowered positions with the valve-stem released; Fig. 3, a vertical sectional view through the center of the valve and its supporting-bracket, the upper part of the valve-stem and its curved cross-arm being shown in full; Fig. 4, a vertical sectional view through the center of the valve and connecting-necks looking toward the rear, the upper part of the valve-stem and its curved cross-arm being shown in full; Fig 5, a section through line X X of Fig. 4 looking down; Fig. 6, a perspective view of the valve-operating arm detached from the lid; Fig. 7, a plan view of the same, and Fig. 8 a side view thereof with the forward side of the arm broken away.

Similar letters and numerals of reference indicate corresponding parts throughout all the figures.

My invention is especially applicable to water-closets designed more particularly for use in railway-cars and other places where the supply of water for flushing the closet is carried in tanks, thereby necessitating economy in the use thereof; but it is not limited to any particular source of water-supply, and it is equally applicable to closets provided with dumping service-pans—such, for example, as is shown and described in United States Letters Patent No. 596,070—such closets being usually provided with a seat mounted above the hopper and a lid mounted above the seat. I have shown and will describe herein my invention applied to such construction.

In the accompanying drawings, A represents the hopper, provided with the usual inner bowl *a* and a flange *b*, by which flange the hopper may be secured to the floor. A flushing-chamber *c* extend arounds the hopper and is provided with a series of perforations *d*, through which water passes from the chamber to the interior of the hopper and flushes the same. Communicating with this chamber there is a water-inlet *e*, having one end of a screw-threaded hollow sleeve B secured therein and by means of which the valve is connected with the hopper in the usual manner. Above the hopper and resting on its top there is a seat C, hinged to a supporting-shelf D, which is cut away to accommodate the operating mechanism, as shown. Above the seat there is a lid E, hinged to a supporting-shelf F, located immediately over the shelf D and recessed, as shown at *f*, to receive the operating mechanism. It is evident, however, that by using suitably-constructed hinges the lid may be hinged to the shelf D, in which case the shelf F may be dispensed with; also, that D and F may be formed of a single piece, if desired, although I prefer the construction shown, and in which construction it will be observed that the operating mechanism and valve are

obscured from view. The supports D and F may be secured to the hopper by brackets (not shown) or otherwise, or they may be secured to a wall or partition or other part of the car or other structure in which the closet is located. G is the valve-casing, open at its lower end and having a bracket *g* and strengthening-ribs *h* and which is also provided with a plate *i*, by which the casing is secured to the under side of the shelf D. The valve-casing is also provided with hollow connecting-necks *j* and *k*, neck *j* being coupled to a supply-pipe H, leading from a suitable source of water-supply and coupled to the valve by a union-coupling I in the usual manner. The neck *k* of the valve-casing and the neck B are connected by means of an elbow J, (preferably rubber,) having a flange *l* at each end, as shown at one end in Fig. 2, and coupling-nuts K and L.

As the means for connecting the valve with the water-supply and hopper form no part of my invention, I will not further describe the same.

As shown in Figs. 3 and 4, the interior of the valve-casing is divided into two compartments consisting of an inlet-chamber *m* and an outlet-chamber *n*, the separation being formed by a transverse partition *o* and an inclined partition *p*, whereby passage-way *q* is formed and through which water from the supply-pipe H can enter the chamber *m*, as indicated by the arrow 1. The partition *o* is provided with an opening *r* and an annular downwardly-projecting flange *s*, forming a seat for a valve M, having downwardly and upwardly projecting stems *t* and *u*, joined together, as shown, for convenience in manufacturing. The lower end of the valve-casing is closed by a cap *v*, having a downwardly-projecting bored shank *w*, closed at the bottom and containing a spiral spring *x*, one end of which rests on the bottom of said shank and the other end having a bearing against the lower end of the valve-stem *t*, which is movable in the bore of said shank and is guided thereby. In the top of the valve-casing there is formed a downwardly-projecting interior screw-threaded neck *y*, through the bottom of which the upper stem *u* of the valve passes, and an interiorly-screw-threaded packing-nut 2 surrounds the said stem *u* and engages the thread of the neck *y*, thus forming a stuffing-box which contains suitable packing 3 to prevent leakage.

At the top end of the valve-stem *u* there is a curved arm 4, arranged to be acted upon by a friction-roller 5, journaled in a swinging frame 6, mounted on a pin 7 in a bifurcated or double operating-arm 8, which extends from a plate N, and which plate is secured to the under side of the lid E. At the outer end of this operating-arm and extending across the same there is a bridge 9, which serves to strengthen the arm and also forms a stop to limit the upward movement of the frame 6, and against which stop the said frame is held by a spring 10, coiled around the pin 7 and having one of its ends passing through said pin and the other of its ends bearing against the under side of bridge 9, as more clearly shown in Fig. 7, the spring being so coiled and arranged as that its tendency to unwind itself will raise the frame 6 to the positions shown in Figs. 1, 6, 7, and 8. The outer ends of the bifurcated or double arm 8 are enlarged to extend beyond the roller 5, and when the parts are assembled, as shown in Fig. 1, these enlarged portions extend down over the sides of the curved arm 4 of the valve-stem *u* and retain the latter in proper relation with the roller 5 while it travels backward and forward over the said curved arms. (See Fig. 2.)

The operation of the above-described mechanism is as follows: When the lid E is down, as shown in Fig. 1, the roller 5 is at rest and the valve is closed and so held by the spring *x*, and as the lid is raised the roller will travel over the curved arm, the curvature of which is such as to cause the roller to depress the valve-stems and open the valve, which allows water to enter the chamber *n*, as indicated by the arrows 2 in Fig. 4, and flow through the inlet *e* into the flushing-chamber *c* and thence through the perforations *d* into and over the inner surface of the bowl *a* of the hopper A, thereby flushing the closet. The radius in which the roller 5 travels is governed by the pintles of the hinges by which the lid is hinged to the shelf F, and the valve mechanism is so arranged that when the lid begins to swing upward the downward movement of the operating-arm 8 will cause the roller 5 to act upon the curved arm 4, thereby depressing the valve-stems and opening the valve, as hereinbefore recited, and this operation will continue until the lid reaches a position which frees the curved arm from the roller, as shown by dotted lines in Fig. 2, when the pressure of the spring *x* will close the valve and shut off the water from the closet. Then as the lid is closed the frame 6 being free to swing on the pin 7 in an opposite direction and against the pressure of the spring 10, (the latter being of less resistance than the spring *x*,) the valve will be held closed during the downward movement of the lid and until the latter is raised again, when the roller 5 will be in position to reëngage the curved arm 4 and open the valve upon the next raising of the lid.

It is obvious that by locating the stop or bridge 9 on the under side of the operating-arm 8 and reversing the spring 10 the valve will open on the downward movement of the lid instead of its upward movement, as above described; also, that by dispensing with the frame 6 and mounting the roller 5 directly in the operating-arm, lengthened accordingly, the valve may be arranged to open on both the upward and downward movements of the

lid, and that with slight mechanical changes the valve-operating arm may be applied to the seat and the lid dispensed with.

Various other modifications in structural details may be made without departing from the spirit of my invention. Therefore I do not limit my invention to the exact construction shown and described.

I claim—

1. In a water-closet, the combination of a hopper and a seat or lid hinged above it to a suitable support, a spring-retracted valve located below said support and having a projecting stem, an arm or head at the outer end of said stem, a horizontally-disposed arm secured to the under side of said seat or lid and projecting rearwardly therefrom, and a device movably connected to said arm and adapted to operatively engage said arm or head and open said valve when said seat or lid is moved in one direction and to move out of operative engagement with said arm or head when said seat or lid is moved in an opposite direction, substantially as set forth.

2. In a water-closet, the combination of a hopper and a seat or lid hinged above it to a suitable support, a spring-retracted valve secured to said support on the under side thereof and having a projecting stem, an arm or head at the outer end of said stem, a horizontally-disposed arm secured to the under side of said seat or lid and projecting rearwardly therefrom, and a device movably connected to said arm and adapted to operatively engage said arm or head and open said valve when said seat or lid is moved in one direction and to move out of operative engagement with said arm or head when said seat or lid is moved in an opposite direction, substantially as set forth.

3. In a water-closet, the combination of a hopper and a seat or lid hinged above it to a suitable support, a valve-casing carried by said support and having a valve-seat therein, a spring-retracted valve adapted to close against said valve-seat and having a stem projecting through said casing, a cross-arm at the outer end of said stem, a horizontally-disposed arm rigidly secured to the under side of said seat or lid and extending rearwardly therefrom, and a device movably connected to said arm and adapted to traverse said cross-arm and to coact therewith to open said valve by movement of said seat or lid in one direction and to move out of operative engagement therewith when said seat or lid is moved in an opposite direction, substantially as set forth.

4. In a water-closet, the combination of a hopper and a seat or lid hinged above it to a suitable support, a valve-casing secured to the under side of said support and having inlet and outlet chambers and connections, a valve-seat arranged within said casing, a spring-retracted valve adapted to close against said seat and having a stem projecting through said casing, a cross-arm attached to said stem at the outer end thereof, a horizontally-disposed arm attached to said seat or lid and extending rearwardly therefrom, and a device movably connected to said arm and adapted to operatively engage said cross-arm and thereby open said valve by movement of said seat or lid in one direction and to move out of engagement therewith when the same is moved in an opposite direction, substantially as set forth.

5. In a water-closet, the combination of a hopper and a seat or lid hinged above it to a suitable support, and a valve-casing located below said support and having a bracket by which it is secured thereto, means whereby the said casing is connected to the hopper, a spring-retracted valve arranged within said casing, a horizontally-disposed arm secured to said seat or lid and extending rearwardly therefrom, and a device movably connected to said arm and adapted to operatively engage with and open said valve by movement of said seat or lid in one direction and to move out of operative engagement therewith when the same is moved in an opposite direction, substantially as set forth.

In testimony whereof I hereunto subscribe my name this 21st day of September, 1899.

JOHN KIRBY, JR.

Witnesses:
N. EMMONS, Jr.,
H. S. MILLER.