

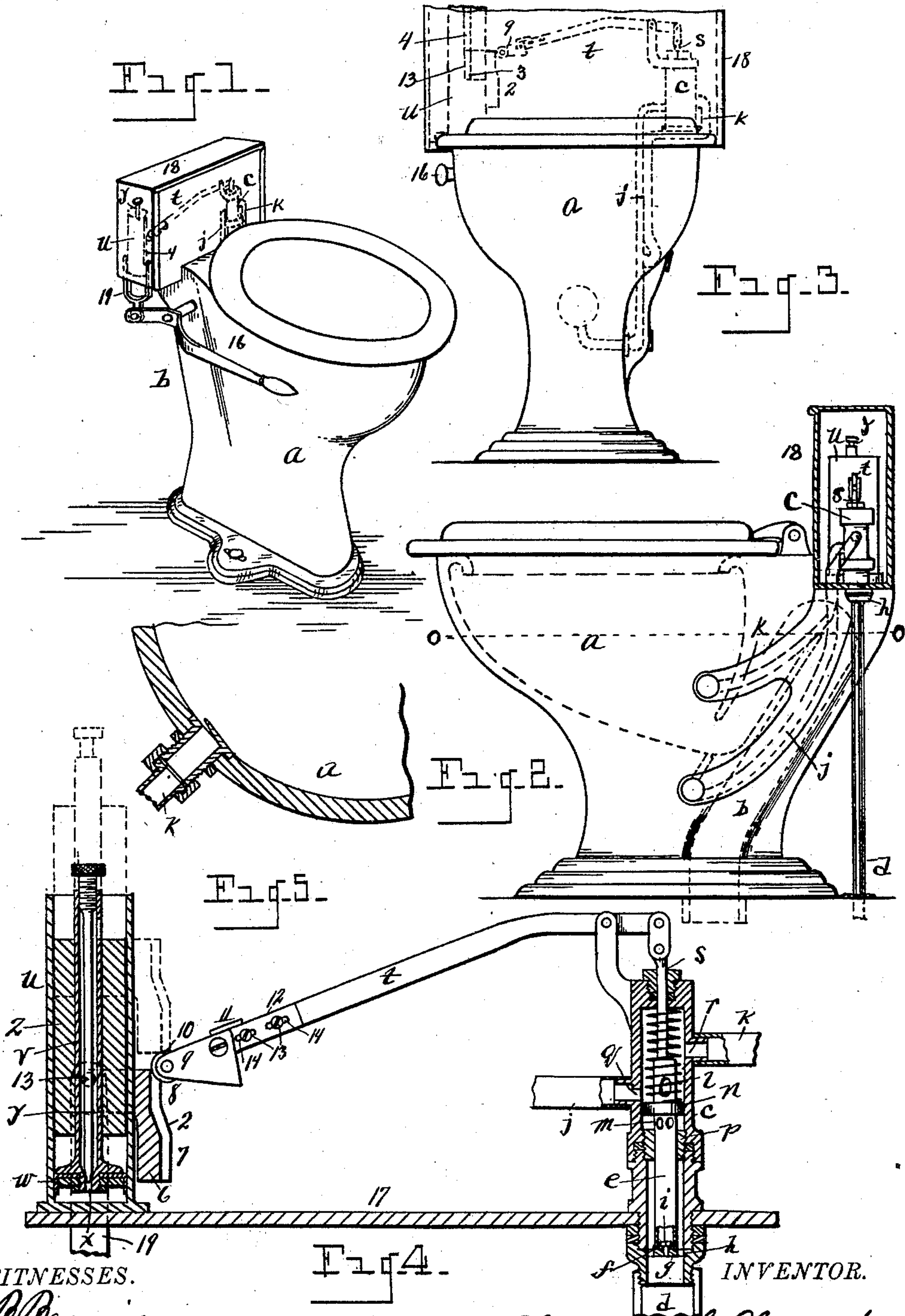
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Patented Apr. 2, 1901.

A. G. ALEXANDER.
WATER CLOSET VALVE.

(Application filed June 4, 1900.)

(No Model.)



WITNESSES.

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WATER-CLOSET VALVE.

SPECIFICATION forming part of Letters Patent No. 671,123, dated April 2, 1901.

Application filed June 4, 1900. Serial No. 18,973. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER G. ALEXANDER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Water-Closet Valves; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has reference to a water-closet valve and its connections; and it consists in the construction, combination, and arrangement of devices hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in perspective. Fig. 2 is a view in side elevation. Fig. 3 is a front elevation. Fig. 4 is a view in vertical section through the valve and the dash-pot. Fig. 5 is a detail view in horizontal section, showing the entrance of the flushing-pipe into the bowl.

My invention aims to provide a valve of this description to be worked by direct pressure, no tank being employed.

I carry out my invention as follows: A closet-bowl is indicated at *a*, provided with a trap *b*. The valve is provided with a case *c*, forming an interior chamber into which leads a water-supply pipe *d*. Within the case is a tubular valve *e*, seating at the base of the case upon a leather seat *f*, which is carried by a brass seat *g* in the base of the case, said seat *g* being held in place by a ring *h* in the casing, a screw *i* in the center of the brass seat *g* securing the leather seat *f* thereupon. A pipe *j* leads from the valve-casing into the heel of the trap, as shown, and an additional pipe *k* leads from the valve-case into the bowl at a point and in a manner suitable to cause a circular motion of the water in the bowl. As shown, the pipe *k* leads into the bowl below the water-line, the water-line being indicated by the dotted line *o o*, Fig. 2, as will be evident from the construction of the trap. This arrangement keeps a good body of water in circulation about the sides of the bowl, the water through the pipe *k* when the valve is unseated entering into the bowl below the water-

line with a body of water already in the bowl. The tubular valve is provided with upper and lower ports (indicated at *l* and *m*) and with a ring *n* between said ports. The case is provided with a packing-ring *p*, through which the tubular valve reciprocates. Said case is also formed with ports *q* and *r*, opening into the pipes *j* and *k*, respectively. Connected with the tubular valve is a valve-stem, (indicated at *s*.) When the valve is lifted off its seat, water is allowed to pass through the tube and out of the ports or openings *l* and *m* of the same above the packing-ring *p* and above and below the ring *n* on the valve. The ring *n* on the tubular valve is fitted loosely within the valve-case to allow the water-pressure to be equal on the sides of said ring, so as not to force said ring against the side of the valve-case or against the port in the valve-case governed thereby. This ring *n* is designed to partially close the port *q* in the valve-case when adjacent thereto, so as to stop siphonage in the base of the trap. For this purpose said ring need not be entirely water-tight, but only tight enough to sufficiently break the force of the water-pressure passing through the corresponding pipe into the base of the trap. It will be seen that the water-pressure is equalized above and below the ring *n* as well as upon the sides of said ring, while when said ring is adjacent to the port *q* it will sufficiently close said port, allowing a little water to pass thereabout, but not enough to throw the water out of the trap. When the valve is first opened, both ports *q* and *r* are full open to allow the discharge of the bowl and the scouring and ventilating of the same. As the valve partially closes the ring *n* partially cuts off the port *q*, supplying the jet at the heel of the trap, while the valve allows the supply of water at the side of the bowl to continue to fill the bowl until the valve is seated. The entrance of the pipe *k* into the bowl is arranged, as shown more particularly in Fig. 5, so as to throw the water adjacent to the inner surface of the bowl, so that the water will sweep in an eddy and conveying the water in the center of the bowl about the inner surface of the bowl, the eddy continuing so long as water is permitted to pass through the pipe *k*. When the water is closed off from the pipe *j* by the movement of the

ring upon the valve, the descent of the valve is so regulated as to still leave open the communication of the valve-case with the pipe *k*, so that water shall continue to flow through the pipe *k* into the bowl to fill it to required height.

To actuate the valve, I engage with the valve-stem a lever *t*, actuated in any suitable manner, as by a piston *v* in a dash-pot *u*, provided with a valve *w* at its lower end. The base of the dash-pot is provided with an air-outlet orifice *x*, controlled by a valve *y*, so as to allow more or less air to escape from the dash-pot under the valve to ease the descent of the piston in the valve as may be desired. The piston is weighted, as shown at *z*, sufficient to operate the same in the dash-pot. Connected with the piston is a reciprocatory slide 2, which may consist of an arc-shaped support, (indicated by the numeral 3,) guided in its reciprocation in the elongated recesses 4 in the dash-pot, the slide being also formed with an upright arm or shoulder 6, the face of which travels against the outer end of the lever *t*. The face of the shoulder 6 is preferably made straight for a desired distance at the lower end thereof, as indicated at 7, while the upper face is shown recessed, as indicated at 8; but said shoulder may be made in different shapes to secure the desired regulation of said lever. The outer end of the lever *t* is provided with a pivotally-supported arm 9, carrying a roller 10 at its outer extremity, the arm 9 being free to tilt upward at its rear end, the lever being provided with a stop 11 to limit the movement of the arm 9. The arm 9 is shown carried by a bracket 12, adjustably secured on the end of the lever, as by screws 13, passed through elongated recesses 14 in said bracket. This adjustment permits the taking up of any wear and the efficient working of the lever. It will be evident that as the slide descends its lower end contacting with the roller at the outer end of the lever *t* will depress the adjacent end of the lever, raising the tubular valve in the valve-case and holding said valve in a given raised position so long as the straight or plain surface of the block at the lower end thereof is in contact with said roller, both ports *q* and *r* being fully open. When the roller, however, rides into the recess of the block, as above described, the adjacent end of the lever will be permitted to rise a corresponding degree, thereby allowing the tubular valve in the case *c* to descend in a corresponding manner, thereby bringing the ring *n* of the valve into position to sufficiently close the passage of water through the port *q* into the pipe *j*, to the jet in the base of the trap, still, however, allowing the water to pass through the pipe *k* until the upper end of the slide rides out of contact with the adjacent end of the lever *t*, at which time the valve will seat to close off the passage of water into the valve-case. The slide, as above described, may be caused to descend more or less rap-

idly, as may be desired, by governing the amount of air allowed to escape from the dash-pot under the piston in the manner hereinbefore set forth. The plunger or piston is guided in its reciprocation in the dash-pot by means of arms 13, traveling in the elongated recesses. The plunger or piston in the dash-pot may be raised in any suitable manner, a hand pull or lever being indicated at 16 in the drawings for that purpose; but the piston may be raised by action of the seat or in any other desired manner. The port *q* in the valve-case is preferably made oblong. The valve-case and dash-pot may be located upon a common support 17. The valve and the dash-pot, with the connections above described, may be inclosed within a case 18. It will be seen that the water-supply pipe communicates at all times with the interior of the valve-case below the packing-ring through which the tubular valve reciprocates.

The satisfactory working of this water-closet depends on a continuous flow with a pressure of not less than fifteen pounds. The discharge of this closet being by force of pressure and not by siphonage, as in other makes, there is no shoe or heel in the left leg of the trap to clog up. The outlet may be carried straight to a soil-pipe either at the back or at the bottom of the closet, the water for flushing entering at the bottom of the bowl in a circular way, causing the water in the bowl to go around very quickly, causing a whirlpool thoroughly scouring the bowl and conveying the water in the center of the same and raising it up around the upper sides of the bowl, making it much easier for the jet at the base of the trap to throw the contents of the bowl over the trap.

By the regulation of the discharge of air from the dash-pot the valve can be kept open, so as to open communication with both of the pipes leading to the bowl, as long as may be desired, and the jet at the heel of the trap can be continued any desired length of time, causing a complete ventilation of bowl and room. The pipes leading from the valve to the bowl may form a part of the bowl or be made of metal tubing, as may be preferred.

It is not necessary that the water-valve be placed on the top of the closet, as shown; but it can be placed in any desirable position that the lever can be made to work it and may be used in the quick discharge and refilling of bowls for washbasins or urinals, getting the same results of scouring and ventilation as described in the working of a water-closet.

The lever or pull 16 may be connected with the plunger of the dash-pot in any suitable manner, as by a yoke 19. The pipes *j* and *k* may lead through suitable channels in the bowl, as indicated more particularly in Figs. 2 and 3, or otherwise, as may be desired.

What I claim as my invention is—

1. A valve mechanism embodying in combination a valve-case and provided with a valve-seat and outlet-ports one above the

other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports, a tubular valve seating at its lower end within said case to govern the communications of the outlet-pipes with said chamber, and means to actuate the valve, said valve constructed and arranged to cut off the communication of the upper of said outlet-pipes before cutting off the communication of the other outlet-pipe with the interior chamber of the valve-case.

2. A valve mechanism embodying in combination a valve-case and provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports, a tubular valve seating at its lower end within said case to govern the communications of the outlet-pipes with said chamber, and means to actuate the valve, said valve constructed and arranged to cut off the communication of one of said outlet-pipes before cutting off the communication of the other outlet-pipe with said chamber, and simultaneously cutting off communication of both the outlet-pipes with the valve-case when said valve is seated.

3. A valve mechanism embodying in combination a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe and two outlet-pipes communicating therewith the one above the other through said ports, a tubular valve seating upon said seat within said case to govern the communications of the outlet-pipes with the valve-case, and means to actuate the valve, said valve provided with upper and lower ports and with means to cut off the communication of one of the outlet-pipes with said chamber before cutting off communication of the other outlet-pipe with said chamber.

4. A valve mechanism embodying in combination a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports, a tubular valve seating within the case upon said seat to govern the communications of the outlet-pipes with said chamber, said valve constructed and arranged to cut off the communication of the outlet-pipes with said chamber, and means to govern the descent of the valve to its seat to hold the valve open after communication of one of the outlet-pipes with said case has been cut off.

5. The combination with a closet-bowl, of a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, two pipe connections communicating therewith through said ports and connecting the case with the bowl, a water-supply pipe communicating with said chamber, a tubular valve seating in said

case upon said seat and governing the communication of said pipe connections with said chamber the one above the other, and means to actuate said valve, said valve constructed and arranged to cut off the communication of one of said pipe connections with said chamber before cutting off communication of the other pipe connection with said chamber.

6. The combination with a closet-bowl of a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports and connecting the case with the bowl, a tubular valve to seat within the case upon said seat to govern the communications of the outlet-pipes with said chamber, a lever to actuate said valve, and means to actuate said lever, said valve constructed and arranged to cut off the communication of one of said pipe connections with said chamber before cutting off communication of the other pipe connection with said chamber.

7. A valve mechanism embodying in combination a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports, a tubular valve seating within the case upon said seat to govern the communications of the outlet-pipes with said chamber, a lever to actuate said valve, and a dash-pot provided with a piston to actuate said lever.

8. A valve mechanism embodying in combination a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports, a tubular valve seating within the case upon said seat to govern the communications of the outlet-pipes with said chamber, a lever to actuate said valve, a dash-pot provided with a piston to actuate said lever, said dash-pot provided with a reciprocatory device to contact with the adjacent end of the lever to operate the lever, said device recessed at the upper end of the outer face.

9. A valve mechanism embodying in combination a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber the one above the other through said ports, a tubular valve seating within the case upon said seat to govern the communications of said outlet-pipes with said chamber, a dash-pot provided with an interior piston to actuate said valve, and means to control the descent of said piston.

10. A valve mechanism embodying in combination a valve-case provided with a valve-seat and with outlet-ports one above the other and forming an interior chamber, a supply-pipe, two outlet-pipes communicating with

said chamber the one above the other through said ports, a tubular valve seating within the case upon said seat to govern the communications of the outlet-pipes with said chamber, a lever to actuate said valve, a dash-pot provided with an interior piston to actuate said lever, an outlet air-orifice in said piston, and a valve to control said orifice.

11. The combination with a bowl, of a valve-case, two pipe connections communicating with the bowl the one above the other and with the valve-case, a water-supply pipe communicating with the valve-case, a valve seating in said case to govern the communication of said connections with the valve-case, and means to actuate said valve, said valve constructed and arranged to open both of said pipe connections when lifted and upon the opposite movement of the valve to cut off the communication of one of said pipe connections with the valve-case before cutting off the communication of the other of said pipe connections with the case.

12. The combination with a closet-bowl, of a valve-case having a pipe connection into the trap of the bowl, and an additional pipe connecting the valve-case into the bowl below the water-line, a water-supply pipe communicating with said valve-case, a valve to control the communication of the pipe connections of the valve-case with the bowl, means to actuate said valve, said valve constructed and arranged to open both of said pipe connec-

tions when lifted and upon the opposite movement of the valve to cut off the communication of one of said pipe connections with the valve-case before cutting off the communication of the other of said pipe connections with the case.

13. A valve mechanism embodying in combination a valve-case forming an interior chamber, a supply-pipe, two outlet-pipes communicating with said chamber, a tubular valve provided with a ring thereupon, and with ports above and below said ring to control the communication of said outlet-pipes with said chamber.

14. A valve mechanism embodying in combination a valve-case forming an interior chamber provided with a packing-ring between the extremities of said chamber, a supply-pipe, two outlet-pipes communicating with said chamber, a tubular valve reciprocatory through said packing-ring and provided with a ring above the packing-ring, said valve also provided with ports above and below the ring thereupon to control the communication of said chamber with said outlet-pipes.

In testimony whereof I sign this specification in the presence of two witnesses.

ALEXANDER G. ALEXANDER.

Witnesses:

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M. HICKEY.