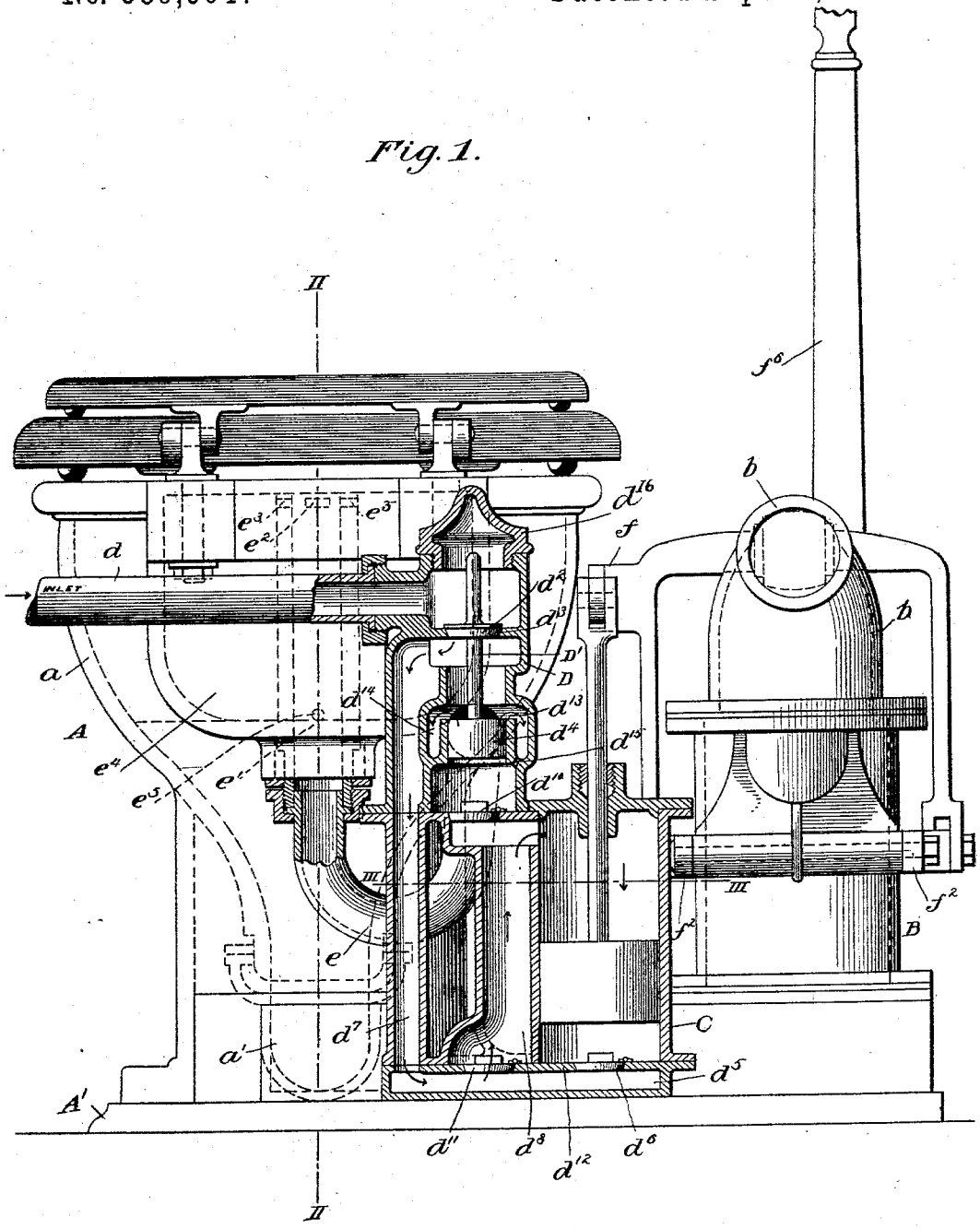
(No Model.) 3 Sheets—Sheet 1.

G. B. HOWELL.

PUMP WATER CLOSET.

No. 589,601. Patented Sept. 7, 1897.

Fig. 1.



Witnesses:
Edw. A. Duvall Jr.
Charles E. Riordan

Inventor.
George B. Howell
By Julian C. Dowell
His Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

G. B. HOWELL.

PUMP WATER CLOSET.

No. 589,601. Patented Sept. 7, 1897.

Fig. 2.

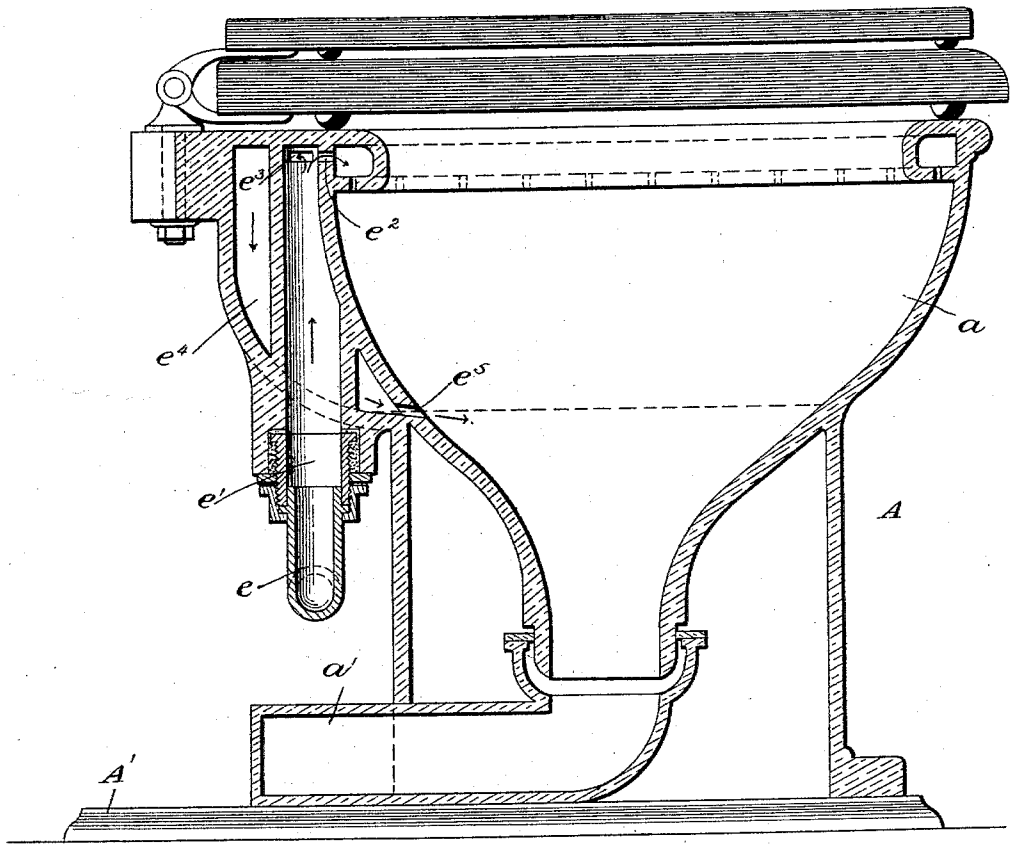
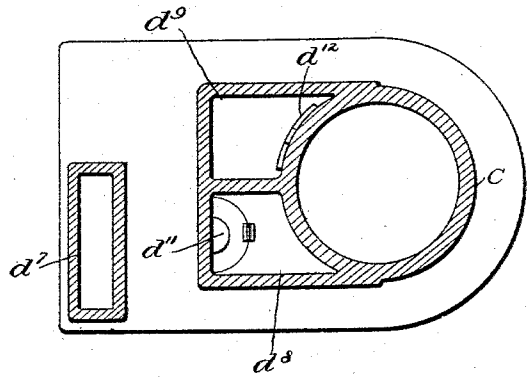


Fig. 3.



Witnesses.
Edw. O. Duvall Jr.
Charles E. Riordan

Inventor.
George B. Howell
By Julian C. Howell
His Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

G. B. HOWELL.

PUMP WATER CLOSET.

No. 589,601. Patented Sept. 7, 1897.

Fig. 4.

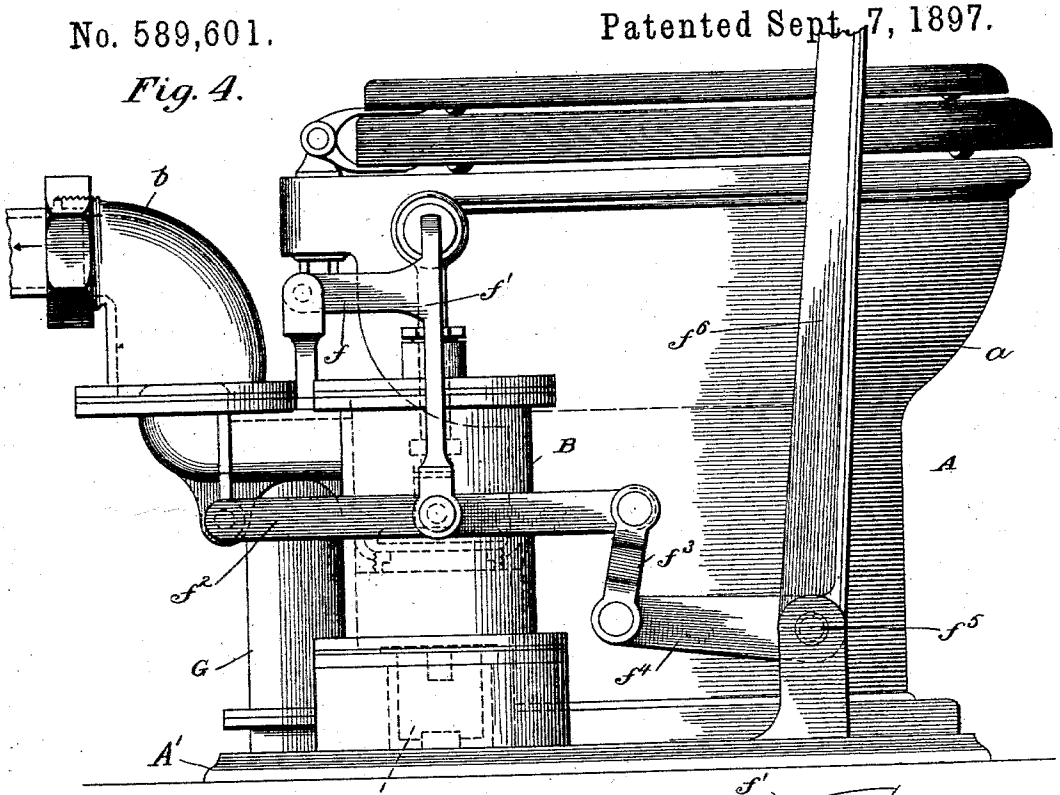
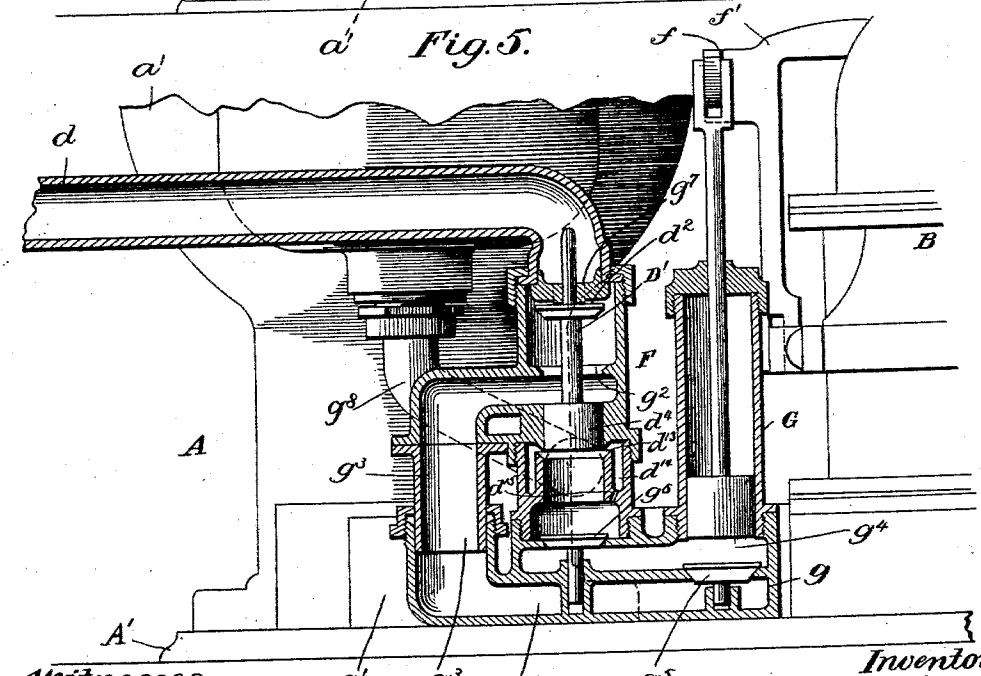


Fig. 5.



Witnesses.
Edw. O. Dundas Jr.
Charles E. Riordan

Inventor.
George B. Howell
By Julian C. Howell
His Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE B. HOWELL, OF PHILADELPHIA, PENNSYLVANIA.

PUMP WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 589,601, dated September 7, 1897.

Application filed April 21, 1897. Serial No. 633,078. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. HOWELL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pump Water-Closets; and I do hereby 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.

This invention relates to water-closets, but more particularly to pump water-closets for marine purposes.

When the water-closets on vessels are located below or slightly above the water-line, it is necessary to provide a pump into which the contents of the bowl are first drawn and then forced overboard, a small water-pump being operated to supply clean water to the bowl during the discharging process. After the pumping has ceased it becomes necessary to fill the bowl with clean water, and for this purpose it has been the practice, as far as I am aware, to provide a separate valve, which is either operated by a hand-pull or by means of a foot-treadle, both of which are decidedly objectionable, for the reason that very often (owing to the more or less complicated construction of marine closets generally) they are left in a foul condition or without the necessary water remaining in the bowl, owing to the fact that the user either does not know how or does not care to take the necessary trouble to operate the necessary parts to place the closet in the proper condition. Another objection to closets so supplied with water is that the refill is obtained by operating the valve until the proper amount of water is supplied to the bowl. This cannot be properly ascertained while sitting upon the seat, as there is no means of measuring the quantity of water entering the bowl except by the eye, and should it be attempted to do this without watching the progress of refilling there is great danger of an overflow or an insufficient quantity of water being supplied to the bowl by reason of the valve not being operated for the proper length of time.

The primary object of my invention is to overcome these and other objectionable features by providing means, operated from a single source, for effecting the proper discharge of the contents of the bowl, injecting clean water into the bowl while the discharge or soil pump is in operation, and finally supplying a measured quantity of water to the bowl to be retained therein until the contents of the bowl are again discharged.

Other objects are to provide simple and efficient means for governing the supply of water to the bowl, so as to preclude all possibility of an overflow, and to provide a simple and efficient device which may be employed in connection with various forms of closets and pumps.

The invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims at the end of the description.

In the drawings, wherein similar letters of reference denote similar parts, Figure 1 is a rear view, partly in section and partly in elevation, of an apparatus embodying my invention. Fig. 2 is a vertical sectional view through the closet, taken on the line II II of Fig. 1. Fig. 3 is a detail sectional plan view through the water-pump and waterways, taken on the line III III of Fig. 1. Fig. 4 is a side view of another form of apparatus embodying my invention; and Fig. 5 is a fragmentary rear view, partly in section and partly in elevation, of the form of apparatus shown in Fig. 4.

In said drawings, A may designate a closet of the pedestal type having the bowl *a* thereof provided with the usual seat and cover and supported upon a suitable base-plate A'. The lower portion of the closet-bowl is open and suitably connected to a soil-pipe *a'*, which latter may be angular in form and connected to the lower portion of a discharge or soil pump B. This pump, as well as the closet, may be of any desired form and may have a vertically-reciprocating piston or plunger, (shown in dotted lines in Fig. 4,) so that when the piston is operated the contents of the bowl will be drawn therein and forced through the discharge soil-pipe *b* overboard clear of the sides of the vessel, suitable valves (shown in dotted lines) being provided in the lower por-

tion of the pump-cylinder, the piston, and the discharge soil-pipe, respectively, to secure proper action of the pump.

For the purpose of supplying clean water to the closet-bowl and for automatically controlling such supply I may provide a water-pump C and a casing or cylinder D, containing an automatic valve D'. This cylinder and the pump may be variously arranged with respect to each other, and in Fig. 1 said cylinder is located above and to one side of the pump. A pipe d leads overboard or to some other source of water-supply and is connected to the inlet of the casing or cylinder D above the valve D', said valve preferably comprising a rod, a disk or other valve d^2, arranged upon said rod and adapted to shut off the flow of water through the inlet-pipe d when resting upon the seat d^3, and a piston d^4, adapted to move vertically in said cylinder.

The pump may be supported upon a hollow base d^5 and may communicate therewith through an aperture or opening arranged below the lower open end of the pump, a clack or other valve d^6 being provided to prevent the water entering the pump through said opening from being forced back into the base. This base may be connected to the cylinder D by a waterway or pipe, as at d^7, which latter extends from said cylinder below the seat d^3 and may have a portion thereof formed integrally with the pump and the other portion formed integrally with the cylinder, or said pipe may be formed in one piece or separately from the pump and said cylinder.

At d^8 and d^9, Figs. 1 and 3, are pipes or waterways, which may be formed integrally with and extend substantially parallel to said pump. One of said pipes or waterways, as d^8, communicates with the base d^5 at one end and at the other end communicates with the upper end of the pump and with the lower end of the cylinder D, while the pipe or waterway d^9 has its lower end communicating with the lower end of the pump and its upper end with the lower end of said cylinder. The upper ends of the pipes or waterways d^8 and d^9, where they communicate with the cylinder D, are each controlled by suitable clack or other valves d^{10}, arranged directly over said pipes, (one only of said valves being shown,) and pipe d^8, where it communuicates with the base d^5, is controlled by a suitable valve d^{11}, while the lower end of the pipe or waterway d^9, where it enters the pump, is also provided with a suitable valve, as at d^{12}, said waterways or pipes being of any suitable construction and arranged in any preferred manner.

The portion of the cylinder D in which the piston of the valve D' is adapted to slide may be located somewhat above the valves d^{10} and may be divided into two sections by an annular or other opening d^{13}, which serves to connect the lower section with a chamber d^{14}. This chamber may be annular and arranged around said lower section and may have one or more preferably small apertures d^{15}, connecting said chamber with the space above the valves d^{10} and below the lower section, so that after the piston-valve D' is raised by the water forced into the cylinder D by the pump C the water above said valves d^{10} will resist the backward or downward movement of said piston-valve and will gradually pass into the annular chamber d^{14} through said aperture or apertures d^{15} until the disk or valve d^2 reaches its seat d^3. The upward movement of the valve D' may be limited in various ways or, as shown, by the rod thereof striking the cap d^{16}, arranged on the cylinder D, and instead of depending upon the weight of the valve and pressure of the water on its upper surface for its downward movement a suitable spring or other means may be employed to assist its return. A pipe e has one end thereof opening into the chamber d^{14} and its other end suitably connected to a pipe or waterway e', which latter may form a part of the bowl and lead to or near the top thereof.

The pipe or waterway e' may have one or more lateral apertures e^2 leading to an apertured rim or other flushing device of the bowl and one or more apertures e^3 leading to a refill-chamber e^4, the latter being provided with one or more apertures e^5, preferably located at or near the water-line of the bowl, so as to gradually supply the proper amount of water to the bowl after the discharging process. By this means when the pump C is operated so as to force water into the cylinder D the valve D' will be lifted and automatically suspended, so as to prevent shutting off the water while the pump is in action, by reason of the pressure and retarding action of the water under the piston of said valve, thus permitting the proper quantity of water to be constantly supplied to the bowl; but as soon as the pump ceases to operate the valve will gradually automatically lower and shut off the water from the inlet-pipe, so as to prevent an overflow.

In order to simultaneously operate the discharge-pump B and the water-pump C, I may connect the upper end of the piston-rod of the pump C to an arm f, (Figs. 1 and 4,) extending outwardly from a suitable yoke, which latter may have pendent arms extending on opposite sides of the pump-cylinder and connected to levers f^2, intermediate their ends. These levers may have one of their ends pivoted to a bracket pendent from the discharge soil-pipe b or other portion of the pump and their outer ends connected by links f^3 to crank-arms f^4, said crank-arms being arranged on a suitable shaft f^5, supported in brackets or standards extending upwardly from the base-plate A'. An operating-lever f^6 is secured to the rocking shaft f^5, so that as said lever is moved back and forth the levers f^2 will be rocked on their pivots and a vertical reciprocating motion imparted to the yoke f' and the plungers of both of the pumps. Though the

means shown for operating the pistons of the pumps is very effective, it is obvious that other means may be employed when desired.

The operation of the invention will be readily understood from the foregoing description when taken in connection with the accompanying drawings.

Assuming that there is sufficient water in the waterways, the base d^5, and the water-pump from a previous operation and the plungers of the discharge and said water-pump are actuated by the mechanism heretofore described, it will be seen that as the plunger in the water-pump is forced downward, for instance, water previously in said pump will be forced past the valve d^{12} into the waterway d^9 and then past the valve d^{10}, controlling its upper end, and into the cylinder D. The pressure of the water against the piston d^4 of the valve D' will raise the disk d^2 off its seat and force the piston into the upper section of the portion of the cylinder in which said piston slides, so as to permit the water to pass through the annular opening d^{13} into the chamber d^{14}. From here the water enters the pipe e and then passes up the waterway e' through the lateral openings into the flushing-rim and the refill-chamber e^4 of the closet-bowl. During the downstroke of the plunger in the water-pump water will flow or be drawn past the disk or other valve d^2 into the base d^5 and then past the valve d^{11} up the waterway d^8 and into the upper end of the pump, as indicated by the arrows. The return or upstroke will open the valve d^6, drawing water into the pump-cylinder, and will close valve d^{11}, forcing the water above the piston in said pump past the valve d^{10} into the cylinder D, again raising the piston-valve D', if it has lowered, and is then forced into the chamber d^{14}, and from there into pipe e in a similar manner to the previous stroke of the pump-plunger. The water below the piston d^4 of the valve D' will gradually pass through the aperature d^{15}, so as to permit the valve d^2 to gradually automatically rest upon the seat d^3, thus shutting off the supply of water from the inlet-pipe to prevent an overflow and at the same time preventing the shutting off of the water while the pump is in operation. As the discharge-pump B is connected so as to operate with the water-pump C the contents of the bowl will be drawn therein and forced through the soil or discharge pipe b overboard free of the vessel simultaneously with the forcing of clean water into the bowl by the water-pump. After the pumps cease to be operated the water in the refill-chamber will flow through the aperture or apertures e^5 in the bowl, thus supplying a measured quantity of water to be left standing in said bowl.

I thus provide a simple and efficient marine or pump water-closet by which the bowl may be simultaneously discharged and clean water forced therein during the discharging process and a proper quantity of clean water supplied to the bowl to be left standing therein after the discharge.

In Figs. 4 and 5 I have shown a device embodying my invention in which the water-pump is single-acting instead of double-acting, as in Fig. 1. In this case the discharge-pump and the means for simultaneously operating the water and the discharge pumps are the same as in the form already described. The cylinder F, though slightly different in construction, and the piston-valve and the action of said valve are substantially the same as the cylinder D and the piston-valve D', and will therefore not be referred to in detail. The pump G and the cylinder F may have open screw-threaded lower ends adapted to fit into screw-threaded apertures or recesses in the base g, so as to be rigidly held thereon. This base has a lower waterway g' communicating with the cylinder F below the valve-seat g^2 therein by a waterway or pipe g^3, and has a waterway g^4 arranged above the waterway g^3 and beneath the pump G, an opening controlled by a suitable valve g^5 being provided, so as to form a communication between the lower waterway and said pump. The upper surface of the base may have an opening controlled by a suitable valve g^6, so as to form a communication between the cylinder F below the piston-valve D' and the waterway g^4. The valve D', instead of being guided simply by the piston d^4 thereof, may have its rod passed through a boss of a spider or yoke, as at g^7, arranged at the upper portion of the cylinder F or secured, as shown, to the lower end of the inlet-pipe d.

The operation is substantially the same as that of Fig. 1, except that the pump forces water into the cylinder F and the bowl during the downstroke only, by which movement the valve g^5 is closed, the valve g^6 opened, and the piston-valve D' lifted, as shown. The water then passes into the annular chamber d^{14} and into the pipe g^8, which connects said chamber to the bowl in the manner heretofore explained. During the upstroke of the piston the valve g^6 is closed and water enters the waterway g^3 and is drawn past the valve g^5 into the pump to be forced into the cylinder F during the downstroke, the resistance of the water below the piston-valve D' preventing said valve from shutting off the water during the upstroke of the pump-plunger.

It is obvious that various changes may be made in the construction and arrangement of the parts, that other means may be provided for permitting the gradual return of the automatic valve or arranging a valve so as to act automatically, that more than one valve may be employed, and that some of the parts may be dispensed with or others substituted therefor without departing from the spirit of my invention.

Having thus fully described by invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a pump water-closet, the combination with a bowl provided with a refill-chamber communicating therewith and with means

adapted to permit water to enter to flush the bowl, of a discharge-pump for the bowl, a second or water pump and connections therewith for supplying clean water to the refill-chamber and to the bowl for flushing purposes, means for simultaneously operating both pumps, together with an automatically-actuated valve controlling the supply of water to said second pump and normally suspended in an open position to permit water to be supplied to the bowl and the refill-chamber while the pumps are in operation, and which automatically shuts off the supply of water when the pumps are at rest, whereby, by a single operation, the proper quantity of clean water may be supplied to the bowl during and after the discharging process, and the water automatically shut off to prevent an overflow, substantially as described.

2. In a water-closet, the combination with a pump, of an automatically-actuated valve controlling the water-supply thereto and normally suspended in an open position by said pump while in operation, and which automatically shuts off the supply of water when the pump is at rest, substantially as described.

3. In a water-closet, the combination with a bowl, of a discharge-pump therefor, a second or water pump and means connecting said pump to the bowl for supplying clean water thereto, means for simultaneously operating both pumps, together with an automatically-actuated valve controlling the supply of water to said second pump and normally suspended in an open position while said latter pump is in operation to permit clean water to be supplied to the bowl and which automatically shuts off the supply of water when the pumps are at rest, substantially as described.

4. In a pump water-closet, the combination with a bowl; of a pump, a discharge conduit or waterway leading from the pump, to the bowl, a valve controlling the inlet to the pump, and means for operating said valve located in the discharge-conduit and operated by the flow of liquid therethrough, substantially as described.

5. In a pump water-closet, the combination with a bowl; of a pump, a discharge-conduit leading from the pump to the bowl, a supply-passage in communication with the pump, a valve located in said passage and means for operating said valve located in the discharge-conduit from the pump and operated by the pressure of fluid in said conduit, substantially as described.

6. In a pump water-closet the combination with a bowl; of a pump, a discharge conduit or waterway leading from the pump to the bowl, a supply-passage leading to the pump, and a valve located in said supply-passage adapted to be opened by the passage of fluid from the pump to the bowl to permit the fluid to pass from the supply-passage to the pump, substantially as described.

7. In a pump water-closet, the combination of a bowl, a water-pump, a cylinder provided with an inlet for the water, a pipe connecting the cylinder with the bowl, connections between the pump and said cylinder, together with an automatic valve controlling the water-supply and normally suspended in an open position while said pump is in operation and which automatically shuts off the supply of water when the pump is at rest, substantially as described.

8. In a pump water-closet, the combination with a bowl, of a double-acting water-pump and a discharge-pump therefor, and mechanism for simultaneously operating said pumps, a cylinder communicating with the water-pump and the closet-bowl, and provided with an inlet connected to a suitable source of water-supply, together with a valve controlling the water-supply inlet and automatically actuated and suspended while the pumps are in operation and which automatically shuts off the supply of water when the pumps are at rest, substantially as described.

9. In a pump water-closet, the combination with a bowl, of a water-pump, a cylinder provided with an inlet connected to the source of water-supply, means connecting the cylinder with the bowl and with the pump, a piston-valve controlling the water-supply and automatically actuated in one direction by said pump, and means arranged in said cylinder for retarding and permitting the gradual return of the piston-valve to its seat, substantially as described.

10. In a pump water-closet, the combination with a bowl, of a water-pump, a cylinder interposed between the pump and the bowl and provided with an inlet connected to the source of water-supply, a valve actuated in one direction by the water-pump and comprising a rod, a piston at or near one end of said rod, and a disk or other valve arranged on the rod and adapted to control the water-supply inlet, said cylinder having the lower portion thereof in which the piston of the valve works provided with an annular chamber which communicates at or near its upper end with the interior of said cylinder, and with an aperture connecting the lower portion of said chamber with the interior of the cylinder below the piston of the valve when in its lowest position to permit said valve to gradually lower to its seat, and means connecting said chamber of the cylinder with the bowl, substantially as described.

11. In a pump water-closet, the combination with a bowl, of a double-acting water-pump, a cylinder interposed between the pump and the bowl and provided with an inlet connected to a source of water-supply, waterways provided with suitable valves connecting the inlet of the cylinder with both ends of the pump, said cylinder being provided with an outlet connected with the bowl for supplying water thereto, waterways provided with suitable valves connecting both ends of the pump with

the outlet in the cylinder, together with a valve having a portion thereof interposed between the pump and the outlet in the cylinder so as to be automatically raised by said pump and which is normally suspended while the pump is in operation, said valve being adapted to control the supply of water to the pump and to the bowl, substantially as described.

12. In a pump water-closet, the combination with a bowl, of a water-pump, a cylinder interposed between the pump and the bowl and provided with an inlet connected to a source of water-supply and an outlet connected to the bowl, waterways provided with suitable valves connecting the inlet of the cylinder with the pump and said pump with the outlet in the cylinder, a piston-valve having the piston thereof interposed between the pump and the outlet in said cylinder so as to be automatically raised above the outlet by said pump and means for normally suspending said valve while the pump is in operation and to permit the valve to automatically gradually lower to shut off the water-supply when the pump is at rest, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEO. B. HOWELL.

Witnesses:

THOMAS KEOGH,

W. G. JOHNSON.