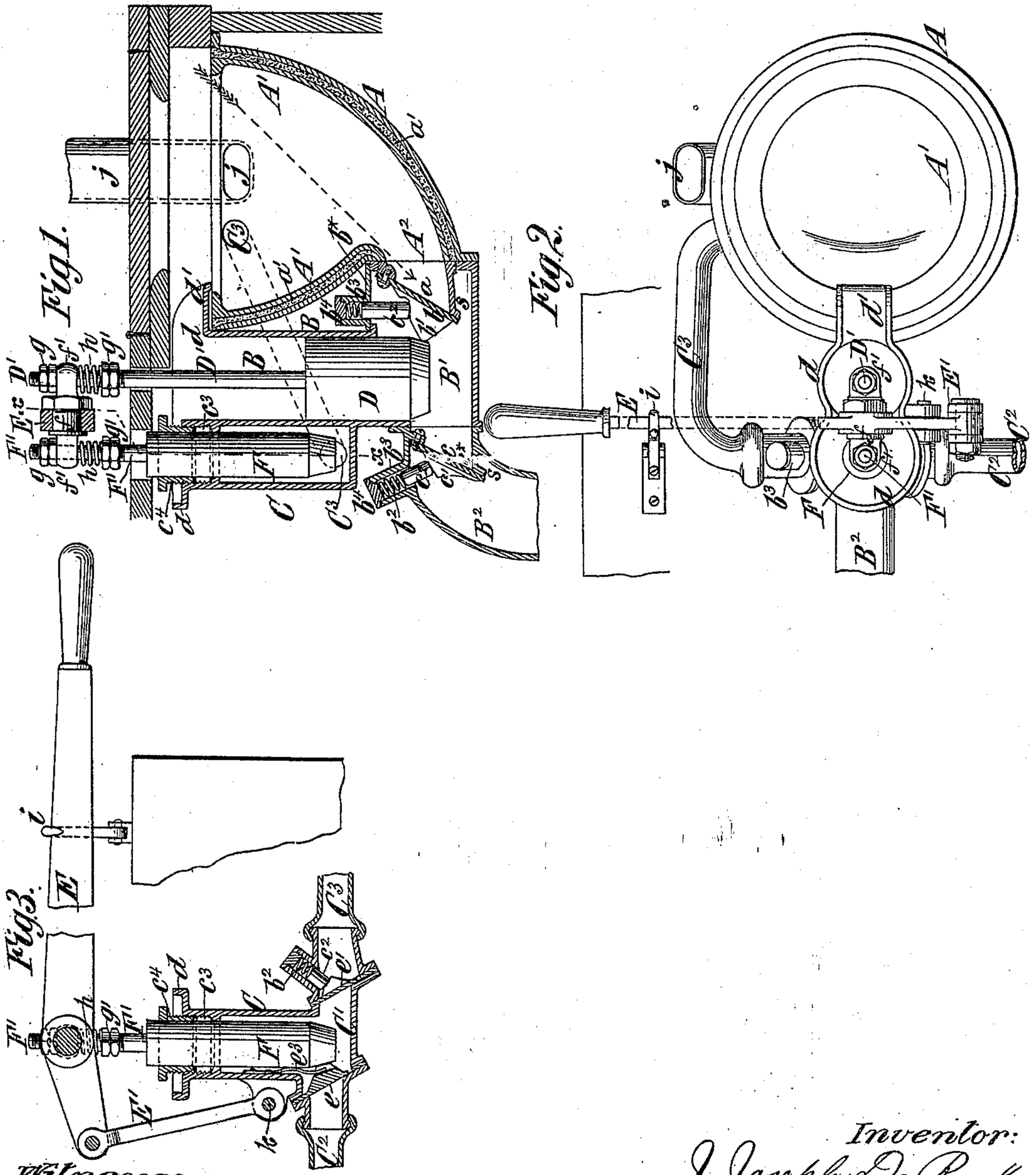
(No Model.)

# J. J. DE RYCKE.

## WATER CLOSET.

No. 334,941. Patented Jan. 26, 1886.

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## WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 334,941, dated January 26, 1886.

Application filed June 12, 1885. Serial No. 168,469. (No model.)

*To all whom it may concern:*

Be it known that I, J. JOSEPH DE RYCKE, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Water-Closets, of which the following is a specification.

My invention is applicable, more particularly, to water-closets for use in ships and other marine vessels; and it relates to the class of closet which has connected with the hopper a soil-pump by the operation of which the contents of the hopper will be positively withdrawn therefrom and positively discharged overboard, and also a water-supply pump by which clean water is taken from the sea or a suitable tank and discharged into the hopper. In closets of this class the two pumps have been arranged to be operated by a single lever, and I prefer to so operate the pumps, although they may be operated by separate levers or devices. It has also been proposed in closets of this class to have the plunger of the soil-pump, when in its lowest position, come to a stop upon the inlet-valve, which is between the hopper and the soil-pump, to lock the valve closed and prevent the flooding of the hopper by water entering from the sea through the soil-delivery pipe.

An important object of my invention is to so construct and combine the hopper, soil-pump, and the valve opening from the hopper into the soil-pump as to facilitate the free discharge of all solid matter and paper from the hopper, and so as to afford provision for readily reaching said valve through the hopper, in order to clear it, if it becomes clogged, without disconnecting any parts of the closet; also to combine the plungers of the soil-pump and water-supply pump, either or both, with the lever or devices for operating them, so that the plungers will, when down, always exert upon the inlet-valves of the two pumps a sufficient pressure to hold said valves tightly to their seats and prevent leakage, even after the parts become worn by use, or in case the parts are not accurately adjusted or connected; also to make the upper parts of the pump chambers or cylinders of simple construction, providing for the ready removal of the plungers in case it be desired for any purpose, and also providing for the free overflow into the hopper of any water due to leakage which may collect in the pump chambers or cylinders above the plungers. These and other advantages are attained by novel features of construction and combinations of parts, which are hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of a pump closet embodying my invention. Fig. 2 is a plan thereof; and Fig. 3 is a vertical section of the water-supply pump on the plane of the dotted line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A designates the hopper, which has a lining, A′, of porcelain or other analogous material, which may be readily kept clean.

B designates the barrel or cylinder of the soil-pumps, which communicates at the lower end with a valve-box or soil-chamber, B′, and C designates the barrel or cylinder of the water-supply pump.

As here represented, the barrels or cylinders B C and the valve-box or soil-chamber B′ are all formed in one integral casting; but they may be separately formed and bolted together.

The hopper A, which may be a metal casting, is gradually reduced in size toward the bottom, and there has a laterally-presented discharge throat or nozzle, $A^2$, which is flanged and has secured to it the flanged end of the chamber B′. A removable tubular valve-seat, *a*, is screwed into or otherwise secured in the box B′, and seating upon the outer end of the valve-seat, which is inclined downward and outward from the hopper, is a valve, *b*, which opens from the hopper into the chamber B′. This construction is desirable, because the hopper and the valve box or chamber B′ are brought very near together, and as the box or chamber B′ is slightly lower than the bottom of the hopper, all the contents of the hopper will pass freely and easily into the box or chamber B′, leaving the hopper clean. In case any paper remains in the outlet-nozzle $A^2$ or obstructs the valve, such obstruction can be reached through the hopper and readily cleared away, and the valve is visible through the hopper, as indicated by the dotted arrow in Fig. 1.

The lining A′ is held in place by asphalt or other cement, *a′*, introduced between its exterior and the hopper proper, A. This cement filling prevents cracking of the porcelain lining A′, and also prevents the infiltration of urine or other foul matter between the lining and hopper proper.

With the box or chamber B′ is connected the discharge or soil-delivery pipe $B^2$, and between the two is an outlet-valve, *c*, which opens outward from the box or chamber B′. It will be clearly seen from Fig. 1 that there is a constant descent from the hopper-outlet to the pipe $B^2$; and hence all solid matter and paper from the hopper will pass freely from the hopper and to the outlet or soil-delivery pipe $B^2$ without lodging and remaining in any part of the passage.

As shown in Fig. 1, the valve *c* closes upon an inclined seat, *c**, which projects beyond the box B′ and well into the soil-discharge pipe $B^2$, in a manner similar to the position of the valve-seat *a* in the box B′. Consequently below each valve-seat is a clear space, *s*, which greatly facilitates the clear passage through and beyond the valve of all paper and solid matter.

As represented in Fig. 1, the soil inlet and outlet pipes *b c* have projections *b′ c′* on their backs, and are pressed against their seats by springs. In this example of the invention spiral springs and plungers $b^2$ $c^2$ are arranged in sockets or slideways $b^3$, which are closed at their outer ends by screw-plugs $b^4$, and these spring-actuated plungers or plugs $c^2$ bear against the projections on the backs of the valves *b c*, and hold said valves forcibly to their seats, as well as oppose a yielding resistance to their opening. The socket $b^3$, which contains the spring and plunger $b^2$ $c^2$, for holding the valve *b* to its seat, is formed in a removable bonnet or hand-plate, *b**, which may be removed when access is desired to the valve *b*. As here shown, the plunger D of the soil-pump fits snugly in the chamber or barrel B, which is entirely open at the upper end, and is operated by a hand-lever, E, through a rod, D′.

The plunger F of the water-supply pump is connected by a rod, F′, with the same hand-lever, E, and works through a stuffing-box and gland, $c^3$ $c^4$, at the top of the barrel or cylinder C.

The cylinders or barrels B C have at their upper ends a basin or pan, *d*, which is or may be formed integral with them, and is provided with a spout, *d′*, extending over the hopper A, and serving to discharge thereinto all water leaking upward past the plungers D F of the two pumps. The upper end of the barrel B of the soil-pump opens directly into the overflow pan or basin *d*, and hence there is no necessity of the plunger D being an absolute fit in its barrel B, and I dispense with any packing and avoid the use in the soil-pump of any soft or absorbent material which might become foul.

The arrangement of the supply and discharge passages of the supply-pump C F is shown in Fig. 3. At the bottom of the barrel or cylinder C is a valve-box, C′, with one end of which is connected a water-supply pipe, $C^2$, leading from the outer side of the vessel or from a tank in the vessel, and with the other end of which is connected a water-discharge pipe, $C^3$, leading into the top of the hopper A, as shown in Fig. 1. In the box C′ are suction and discharge valves *e e′*, which are shown as having projections upon their backs. The suction-valve *e* is held to its seat by a spring, $e^3$, which is secured in the pump-chamber C, and is so formed that when the plunger F is pushed down it bears against and deflects the spring and causes it to exert an increased pressure on the valve *e*, and the plunger also acts with a wedge-like action on the back of the valve. The valve *e′* may be and is shown as pressed to its seat by a plunger and spring, $c^2$ $b^2$, like those applied to the valves of the soil-pump, and before described.

The plunger D of the soil-pump has its lower end tapered or made conical, and as it descends it strikes against and operates with a wedge-like action on the projection *b′* on the valve *b*, and holds the latter to its seal, thereby preventing the leakage of water backward through the pipe $B^2$ and the overflow of the hopper. Now, it will be obvious that the plunger D, if fixed to the hand-lever E, might, by reason of wear or imperfect connection or adjustment of the parts, fail to press the valve *b* to its seat. To obviate this difficulty, I interpose between the two plungers D F and their operating-lever E springs which exert a downward pressure on the plungers, but will yield and allow the lever E to be moved downward after the plunger D comes to a bearing on the valve *b*, thereby insuring the tight closing of the valve by the plunger.

I have here shown the lever E as having a transverse cross-head, *f*, secured to it by a nut and shoulder, and having in opposite ends eyes *f′*, through which the plunger-rods D′ F′ pass. These rods are fitted with pairs of nuts, *g g′*, and between the eyes *f′* and the lower nuts, *g′*, are spiral springs *h*, which press the plungers down to their lowermost position relatively to the lever E. In lieu of spiral springs, I may employ rubber blocks or springs of other construction to produce a like result, and the nuts *g g′* provide for readily adjusting the plungers relatively to the lever E.

The plungers may be filled in with lead to give them weight; but for greater security I prefer to arrange a catch or hook, *i*, which may be slipped over the lever, as shown in Fig. 3, for holding it down, with the plunger D bearing on the valve *b*. As here shown, the lever E is fulcrumed to a link, E′, the lower end of which is pivoted at *k*.

When the lever E is raised, the valve *b* opens and the contents of the hopper are drawn into the soil-pump, and clean water is drawn through the pipe $C^2$ into the supply-pump.

When the lever is pushed down, the valve *c* opens to allow the contents of the soil-pump to be discharged through the pipe $B^2$, and the water from the supply-pump is discharged through the pipe $C^3$ into the hopper.

A ventilating-pipe, *j*, leading upward from the hopper, may be connected with the smoke-stack from a boiler or stove, and the upward draft thus produced will remove all foul odors from the closet.

I do not claim, broadly, as of my invention the combination, with a closet-hopper and an outlet-valve at the bottom thereof, of a box or chamber into which the hopper delivers its contents, and which is provided with a discharge-valve whereby communication between such box or chamber and the discharge-pipe is controlled and a soil-pump connected with such box or chamber.

According to my invention the discharge-outlet from the aforesaid box or chamber into the discharge-pipe is at the extreme bottom of the box or chamber; and hence it will be seen that the discharge of water and solid matter from the hopper is greatly facilitated, because such water and solid matter do not have to ascend at any point after they leave the hopper and before they enter the discharge-pipe.

It is not new to attach a discharge-pipe to the bottom of the outlet-throat of the hopper; but in all marine closets of the class to which my invention relates such discharge-pipe extends upward after it leaves the hopper in the form of a trap or otherwise, and hence the water and solid matter discharged must at some point ascend in order to reach the discharge-pipe.

According to my invention the box or chamber B′ extends from the outlet throat or nozzle of the hopper, and the discharge-valve seat *c** extends from the extreme bottom of the box or chamber B′; hence it will be seen that my closet affords no opportunity for the retention and lodgment of paper and solid matter between the hopper-outlet and the discharge-pipe.

It is advantangeous to have the valve seats *a c** inclined downward and outward with valves which are hinged at the top, because then these valves will automatically close themselves and will still afford free exit to all water or solid matter from the hopper. Where horizontal valve-seats are employed with valves opening upward, they will automatically close themselves, but will not afford any provision for the free exit of water, paper, and other solid matter from the hopper to the discharge-pipe, and where valve-seats are inclined downward and inward from the hopper with valves hinged at or near their upper edges, such valves afford free exit to water and solid matter, but will not automatically close, and a weighted lever or other means must be employed for closing them.

It will be observed that the water-supply pump which I have here shown is of such construction that it discharges upon the downstroke, and hence the last operation of the pump, when the lever is forced down to hold the valves closed, will be to discharge its volume of water into the hopper. This water will of course be retained in the hopper until after the closet is used, and hence the facility with which the closet may be kept clean.

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

1. The combination, with a closet-hopper having at the bottom a laterally-presented outlet throat or nozzle and a valve thereto hinged at its upper edge, so as to open outward and upward, of a soil-pump having at the bottom a laterally-extending chamber or valve-box secured to the throat or nozzle of the hopper, and provided with a discharge outlet and valve leading from the extreme bottom of the chamber or box, and a discharge-pipe leading downward from the discharge-outlet of the chamber or box, substantially as herein described.

2. The combination, with a hopper having a laterally-presented throat or nozzle, a box or chamber, B′, connected with said outlet throat or nozzle, and a soil-discharge pipe, $B^2$, leading from the box or chamber B′, of a soil-pump connected with the box or chamber, the valve-seat *a*, extending from the outlet throat or nozzle and inclined downward and outward from the hopper, the inclined valve *b*, hinged at its upper edge and closing automatically on the seat *a*, the valve-seat *c**, leading from the extreme bottom of the box or chamber B′ into the discharge-pipe and inclined downward and outward from said box or chamber, and the valve *c*, hinged at the top to open outward and upward from the box or chamber, substantially as herein described.

3. The combination, with a closet-hopper having a laterally-presented outlet and a valve-seat, of a valve hinged at the upper edge to swing upward and outward in opening, and a soil-pump having a plunger, which, when forced down, operates with a wedge-like action upon the back of said valve, substantially as herein described.

4. The combination, with the hopper having a laterally-presented outlet-throat, $A^2$, and a valve-seat inclined downward and outward, and a valve hinged at the upper edge and closing on said seat, of the soil-pump having a plunger tapered at the lower end and operating with a wedge-like action on the back of the valve, substantially as herein described.

5. The combination, with the hopper A, having the laterally-presented outlet throat or nozzle, the soil-pump and its valves *b c*, having projections on their backs, of the plungers $c^2$ and their actuating-springs $b^2$, acting upon the backs of the valves to hold them closed, substantially as herein described.

6. The combination, with a closet-hopper

and a valve box or chamber communicating with the outlet throat or nozzle of the hopper, and having the soil-discharge pipe extending from it, of a soil-pump consisting of a barrel connected at its lower end with the box or chamber and open at the upper end, and having at the upper end a discharge into the hopper, and a plunger fitting said barrel, substantially as herein described.

7. The combination, with a closet-hopper, of a soil-pump and a water-supply pump consisting of barrels or cylinders provided with suitable valves and plungers fitted thereto, and a pan or basin with the bottom of which the upper ends of the barrels or cylinders communicate, and which has a spout or nozzle delivering into the hopper, substantially as herein described.

8. The combination, with a closet-hopper having a discharge throat or nozzle and an outlet-valve closing thereon, of a soil-pump consisting of a barrel and a plunger, which, when forced down, acts upon said valve to hold it to its seat, a lever for operating the plunger, and a spring which is compressed or put under tension by the downward movement of the lever, and which causes the plunger to act with an elastic pressure or force upon the valve, substantially as herein described.

9. The combination, with a closet-hopper and a soil-pump consisting of a barrel and a plunger and an outlet-valve from the hopper, which is pressed to its seat by the plunger, of a lever or handle for operating the plunger, and a spring interposed between the lever and plunger, for insuring the action of the plunger on the valve, substantially as herein described.

10. The combination, with the hopper A and a pump-barrel, C, and the valve *b* of the pump, of the pump-plunger D and rod D′, the lever E, receiving said rod through it, and the nuts *g g′* and spring *h* applied to said rod, substantially as herein described.

11. The combination, with a closet-hopper and soil and supply pumps connected therewith and consisting of barrels or cylinders and plungers fitted thereto, of valves which are held closed by the plungers when down, a lever or handle for operating the plungers, and springs interposed between the lever or handle and plungers, substantially as herein described.

12. The combination, with a closet-hopper, and a water-supply pump consisting of a barrel or cylinder provided with suitable valves and a plunger, which, when depressed, acts to hold the inlet-valve to its seat, of a lever or handle for operating the plunger, and a spring interposed between the lever or handle and the plunger, for insuring the action of the plunger on the valve, substantially as herein described.

13. The combination, with a closet-hopper and a valve opening outwardly therefrom, of a soil-pump consisting of a barrel and a plunger operating, when down, to hold the valve closed, a lever for operating the plunger, and a hook or catch for holding the lever and plunger in their lowermost position, substantially as herein described.

14. The combination, with a closet-hopper and a valve opening outward therefrom, of a soil-pump consisting of a barrel and a plunger operating, when down, to hold the valve closed, a lever for operating the plunger, and a spring interposed between the lever and plunger, and a hook or catch for holding the lever and plunger depressed, substantially as herein described.

15. The combination, with a closet-hopper and a valve opening outward therefrom, of the soil-pump, and a water-supply pump consisting of a barrel provided with suction and discharge valves, and a plunger whereby water will on the downward movement of the said plunger be discharged into the hopper, substantially as herein described.

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