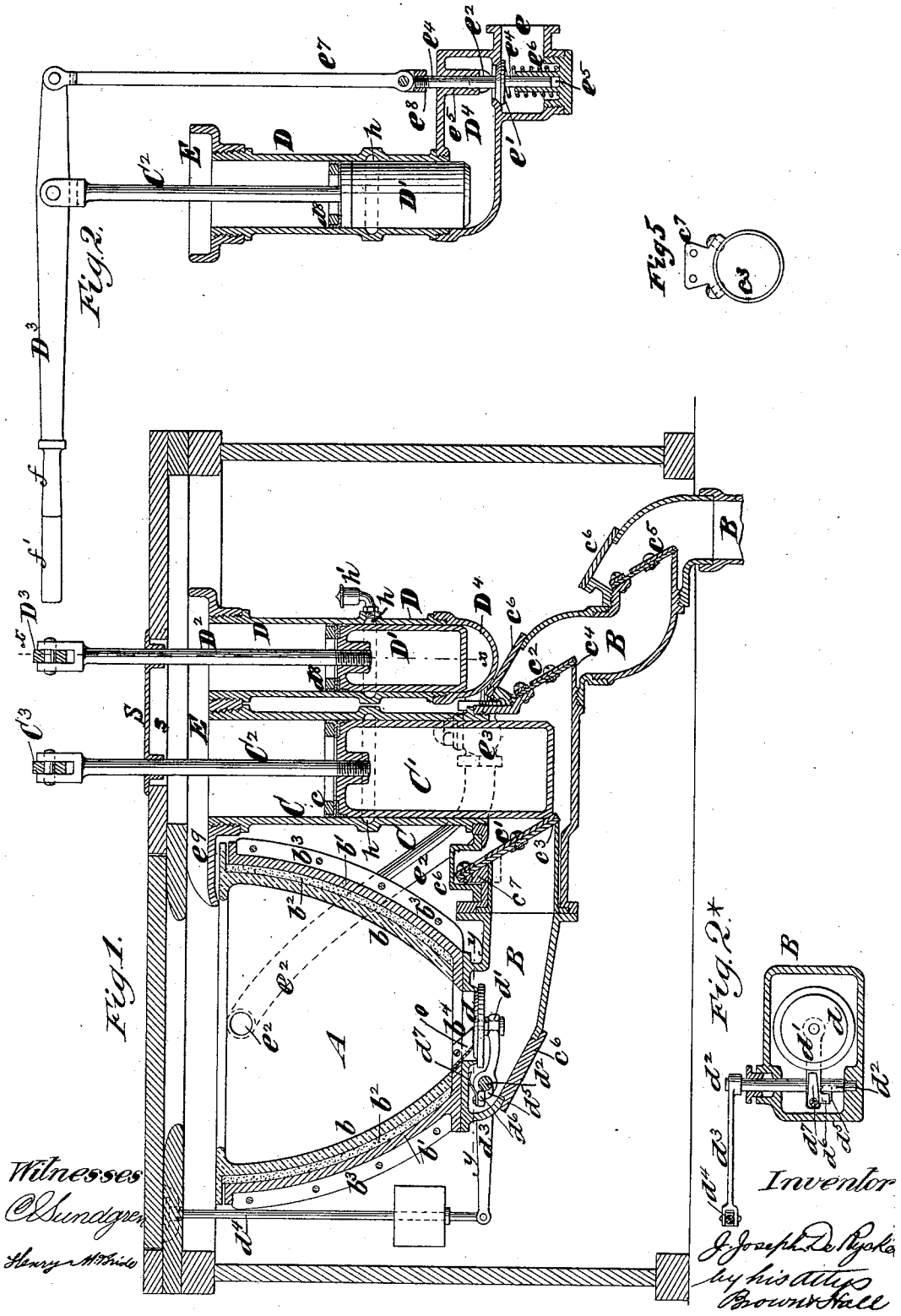
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WATER CLOSET FOR SHIPS, &c.

No. 368,329. Patented Aug. 16, 1887.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

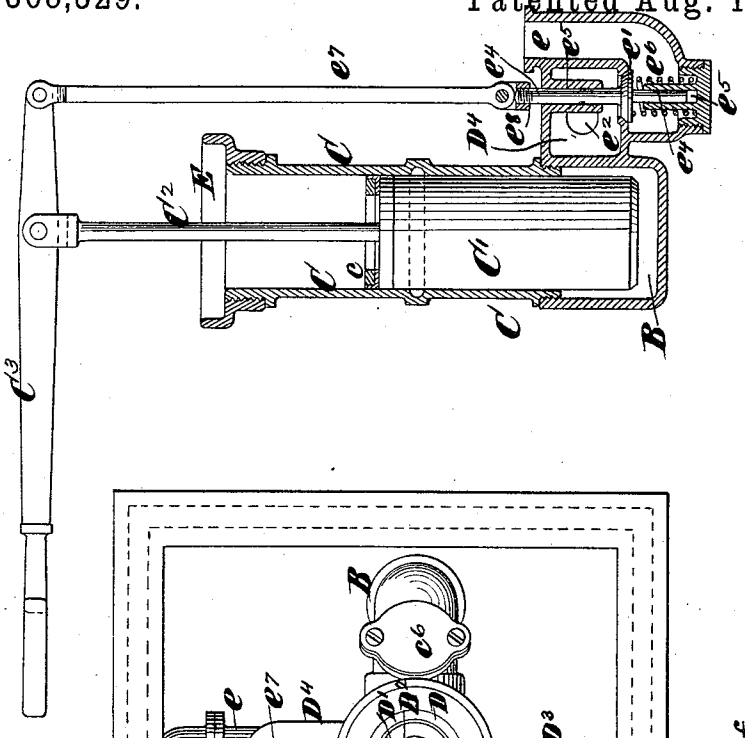
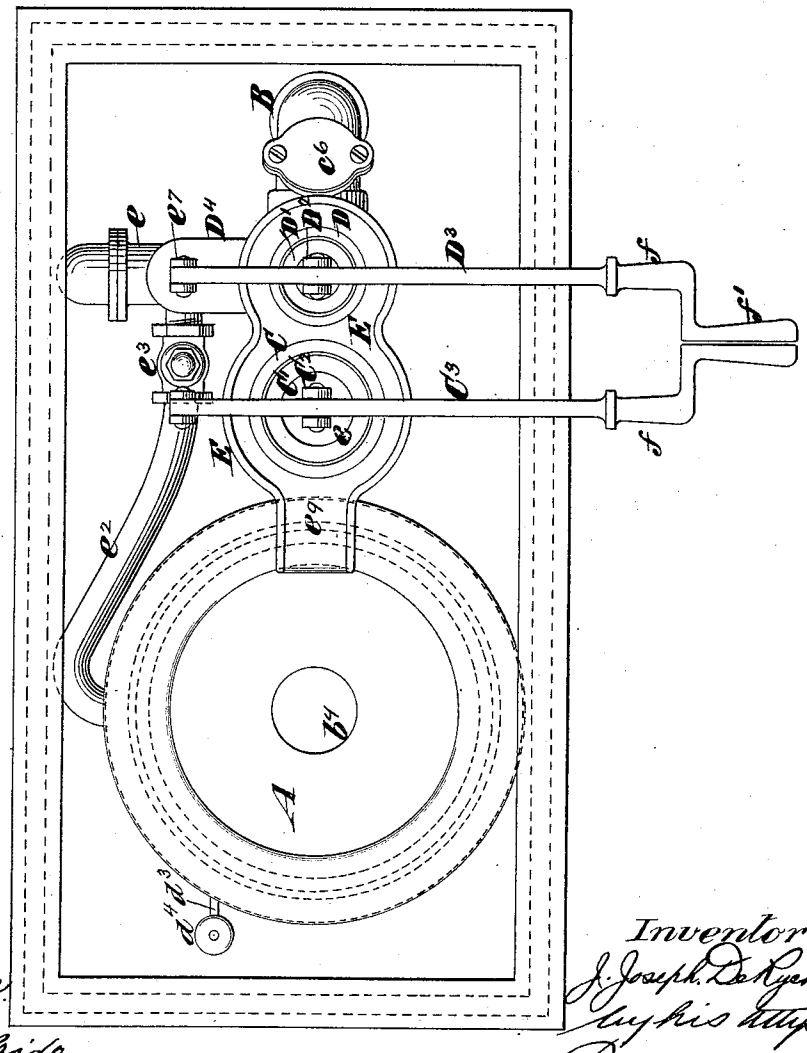


Fig. 3.



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UNITED STATES PATENT OFFICE.

J. JOSEPH DE RYCKE, OF NEW YORK, N. Y.

WATER-CLOSET FOR SHIPS, &c.

SPECIFICATION forming part of Letters Patent No. 368,329, dated August 16, 1887.

Application filed September 14, 1886. Serial No. 213,491. (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 for Ships and other Purposes, of which the following is a specification.

My invention more particularly relates to water-closets which are designed for use aboard yachts or other ships or vessels, and in which are employed, in connection with the closet-hopper, a soil-pump for withdrawing the contents of the hopper and discharging it positively overboard, and usually, also, a water-supply pump, whereby flushing or cleaning water may be supplied to the hopper.

The objects of my invention are to provide greater security against the closet being flooded by the inflow of sea-water when the closet is arranged below the level of water outside the vessel, and to dispense with the goose-neck or upwardly-bowed portion of the discharge pipe or passage from the soil-pump which is ordinarily provided for the purpose; also, to provide for the outlet from the hopper a valve which will readily be opened by the suction-stroke of the pump and is self-closing, and which may also be opened positively, when desired, by the person using the closet; also, to provide, in connection with the soil-pump and the water-supply pump, a system of operating levers or handles, whereby either or both pumps may be operated with one hand at the will of the person using the closet; also, to so combine the valve whereby the flow of clean water to the hopper is controlled with the pump and connections for operating it that said valve will be opened positively in the opposite direction to that in which water flows when the plunger of the pump is operated and will be held closed by the head of water when the closet is arranged below the level of water in which the vessel floats.

The invention consists in novel combinations of parts, which are hereinafter described, and pointed out in the claims, whereby the desired objects are attained.

In the accompanying drawings, Figure 1 is a vertical section of a ship's closet embodying my invention. Fig. 2 is a sectional elevation upon the plane indicated by the dotted line *x x*, Fig. 1. Fig. 2* is a horizontal section upon the plane indicated by the dotted line *y y*, Fig. 1. Fig. 3 is a plan of a closet, the seat or upper portion being removed. Fig. 4 is a vertical section of a soil-pump combined with a valve which controls the flow of water to the closet-hopper and which may be employed when the closet is to be arranged below the water-level and when a separate water-supply pump is therefore not needed, and Fig. 5 is a detail view hereinafter described.

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

A designates the closet-hopper, which may be of any suitable construction, but as here represented consists of a porcelain or other lining, *b*, an outer casing, *b'*, which may be made of metal, and a packing, b^2, of asphalt or other suitable dense substance or material, interposed between the lining and the outer casing and serving to completely fill the space between them to the exclusion of urine and other matter which might render the closet foul. In order to secure the complete filling of the space between the lining and outer casing with packing material, b^2, I make the outer casing, *b'*, in two or more sections, which may be united by flanged joints b^3, as shown in Fig. 1. A sufficient quantity of packing material, b^2, may then be applied outside the lining *b*, and the halves or sections of the outer casing, *b'*, may be drawn together over the lining and packing, thereby insuring a perfect filling of all space between the lining and the outer casing.

At the bottom of the hopper A is an outlet-throat, b^4, from which extends the discharge or delivery passage B. This passage may be of any suitable construction and may extend in any desired direction.

Communicating with the discharge-passage B is a soil-pump, which consists of a pump-barrel, C, having its lower end in open communication with the passage B, and a plunger or piston, C', working within the barrel C. The plunger C' may be provided with suitable packing, *c*, and may be operated by any suitable handle and connections—as, for example, by a plunger-rod, C^2, and a lever, C^3.

I employ in connection with the pump C C' a suction-valve, *c'*, and a main delivery-valve, c^2, which are of ordinary construction, such valves being hinged at their upper edges and

seating upon inclined seats c^3 c^4, which, as here represented, are so formed as to leave a clear space below the valve-seat, so that no paper or other material can lodge upon the seat and interfere with the proper operation of the valve. As here shown, the seat c^3 consists of a piece of tubing clamped in position between two sections of the discharge-passage B and having its end inclined. At the top of this seat-piece is a projection or saddle, c^7, as shown in Fig. 5, to which the valve c' is secured. In this way a sufficient length of hinge is obtained for the valve, and the devices which secure it in place are readily accessible when the bonnet or cover c^6, hereinafter described, is removed. It will be observed that the projection c^7 extends above the line of the top of the discharge-passage B, and that the bonnet or cap c^6 is recessed on its under side, so as to receive the said projection and the hinge of the valve. Hence, when the bonnet or cap is removed, the projection and hinge of the valve are exposed above the top of the passage B, and ready access may be had to them by a screw-driver or wrench for removing and replacing the valve. In addition to the suction and main delivery-valves c' c^2, I employ a supplemental delivery-valve, c^5, which is arranged outward beyond the delivery-valve proper, c^2, and which opens outward from the pump, and this valve affords greater security against the pump and closet-hopper being flooded by outside water when the closet is arranged below the level of water in which the vessel floats.

The suction-valve proper, c', is arranged, as shown, at some distance from the hopper-outlet b^4, and such outlet is controlled by a valve, d, carried by an arm, d', which is loosely fitted to a rock-shaft, d^2. The rock-shaft d^2 is provided with an arm or lever, d^3, with which is connected a pull rod or handle, d^4. Upon the rock-shaft d^2 is a toe or projection, d^5, and upon the valve-carrying arm d' is a corresponding toe or projection, d^6, which overlies or overhangs the toe or projection d^5, and through which the valve will be moved downward or opened by the upward pull upon the rod or handle d^4. A spring, d^7, applied to the valve-carrying arm d', may serve as a means of closing the valve automatically, and by such spring or other equivalent closing device the valve d will be normally held to its seat against the hopper-outlet b^4, but will be free to open by the suction-stroke of the plunger C'. When the suction-stroke of the plunger C' is performed, the suction upon the valve, or rather the atmospheric pressure upon its upper surface or face, will cause it to open, the arm d' turning freely on the shaft d^2, and the toe d^6 on the arm moving away from the toe d^5 on the shaft. As soon as the action of the pump ceases, the valve d will be automatically closed by the spring d^7, and whenever it be desired to open the valve by hand while using the closet an upward pull upon the rod d^4 and arm d^3 will cause the toe or projection d^5 of the shaft d^2 to act upon the toe or projection d^6 of the arm d', and will therefore open the valve. The several valves c', c^2, c^5, and d are accessible through hand-holes provided with suitable bonnets or covers, c^6, as best shown in Fig. 1.

In order to guide the contents of the hopper as they escape at the outlet b^4, and prevent paper or other refuse from lodging on the hinge side of the valve d and interfering with its proper closing, I may provide a flexible shield or guard, o, of india-rubber, leather, or other suitable material, which will overlap the valve d on the hinge side thereof.

D D' designate, respectively, the barrel and plunger of the water-supply pump. Beyond the main discharge or delivery valve c^2 the passage B has a descending portion leading to the supplemental delivery-valve c^5. Ordinarily, when the closet is located below the water-level within a ship, a goose-neck or upwardly-bowed portion of the delivery-passage or discharge-pipe is provided between the soil-pump and the end of the delivery or discharge pipe. This goose-neck extends upward above the level of water around the vessel, and therefore prevents the inflowing of water in quantity to flood the closet. By the employment of the supplemental delivery-valve c^5, I am enabled to safely dispense with such goose-neck or upwardly-bowed portion of the discharge passage or pipe. The plunger may be provided with suitable packing, d^8, and may be operated through a rod, D^2, and a lever or handle, D^3. The pump-barrel D communicates at the lower end with a water-chest, D^4, which receives its supply of water through a branch pipe or passage, e, under control of a suitable valve, e', as shown in Fig. 2, and from the water chest or chamber D^4 leads a pipe, e^2, whereby the clean water is delivered into the closet-hopper A. In the pipe e may be provided a check or delivery valve, e^3.

In order to prevent the closet from ever being flooded with water, even though it may be arranged below the water-level, I construct and arrange the valve e', so that it opens outward from the pump D D', and in a contrary direction to that in which a suction-valve usually opens. The outside head of water therefore acts to hold the valve e' always tightly closed upon its seat. The valve-stem e^4 is fitted to suitable guides, e^5, and to the valve is applied a spring, e^6, which also serves to close the valve. With the valve stem e^4 is connected a rod, e^7, supporting the fulcrum of the lever D^3. Consequently it will be seen that whenever the lever D^3 is raised to produce the upward stroke of the pump-plunger D', the valve e' will be opened before the pump-plunger is moved, inasmuch as said valve will offer less resistance to the movement of the lever D^3 than will the plunger. As soon, however, as the shoulder e^8 upon the valve-stem strikes the top of the water-chest D^4, as shown in Fig. 2, the valve e' can open no farther, and the lever D^3 is then supported

by the fixed fulcrum, and its upward movement will raise the plunger D'.

In cases where the closet is arranged below the level of water the water-pump D D' is not necessarily employed, and the inlet water-passage *e* and pipe e^2 may be connected with a water-chest, D^4, which is entirely independent of the soil-pump, as shown in Fig. 4, and in which is arranged a valve, *e'*, like that before described. The rod e^3, extending upward from the valve-stem e^4, will then support the fulcrum for the lever C^3 of the soil-pump, as shown in Fig. 4, and any movement of the lever C^3 in an upward direction will open the valve *e'* and admit water to the closet-hopper A.

It is desirable to provide means whereby both pumps or either of the pumps may be operated with one hand at the will of the person using the closet. As best shown in Fig. 3, the two levers C^3 D^3 have handles *f*, whereby they may be severally operated, and beyond the handles *f* they are offset inward toward each other and combine to form a single handle, *f'*, which may be grasped in one hand, and by it both levers may be operated for working both pumps. As best shown in Fig. 1, the plunger C' of the soil-pump will operate with a wedge-like action upon the suction-valve proper, *e'*, to hold it to its seat, as is shown and described in my United States Letters Patent No. 334,941, dated January 26, 1886.

A person using the closet may, if he so desire, leave the valve *d* in its closed position until through using, and then by grasping the handle *f'* he may operate both pumps, so as to withdraw all the contents of the closet-hopper and wash it out thoroughly, discharging all the water employed in washing. He may then operate the lever D^3 singly, in order to fill up the hopper A to the required height with clean water. If he so desire, the person using the hopper may, by the pull-rod d^4, open the valve *d* at any period during use, thus discharging the contents of the hopper into the discharge-passage B, and he may then by operating the lever D^3 singly introduce clean water into the hopper. Then, after he is through using, he may operate both pumps, as before described, to flush out the closet and may finally operate the water-supply pump to fill the hopper to the required height with clean water.

I have here shown both the pump-barrels C D connected with an overflow trough or basin, E, having a spout, e^9, whereby all overflow-water from the pumps will be delivered into the hopper A. In this example of my invention the pump-barrels C D are made separate from the overflow basin or trough E, and may be screwed or otherwise secured thereinto, thus providing for a simple and inexpensive construction of the parts, and enabling the pump-barrels to be made of brass or of drawn tubes, if so desired, without the necessity of making the overflow basin or trough E of the same metal.

In order to properly lubricate the pump-plungers, I may construct each of the barrels C D with an annular channel, *h*, in its inner surface, and this annular channel may be constantly supplied with oil or other lubricant from a self-feeder or oil-cup, *h'*, connected with the barrel, and as shown applied to the barrel D of the water-pump in Fig. 1.

The closet and pumps are inclosed by a casing, H, and in the top thereof is a large opening, *s*, receiving through it both pump-rods C^2 D^2. A guide-plate, S, is secured over the opening *s*, and in said plate the two rods are separately guided.

I am aware that a non-conducting covering of porous or fibrous material—such as hair, felt, &c.—has been held around a steam-pipe by an outer jacket of other material, divided longitudinally, and hence I do not include such a covering and jacket in my invention. In my closet-hopper the packing b^2 is of a dense material—such as asphalt—and by the casing *b'* such material is compacted around the lining *b*, so as to prevent the possibility of urine entering between the lining and casing. A non-conducting material and jacket such as is commonly applied to a steam-pipe would not in any degree serve the purpose of my invention if applied to the lining of a closet-hopper. It will be observed that the suction-valve *e'*, which controls the inflow of water to the water-supply pump and thence to the hopper, and which is loaded to hold it to its seat, and so combined with the pump-handle that it will be opened positively and held open during the whole time that the pump is making its suction-stroke, is very advantageous when the closet is below the outside level of water. Such a combination absolutely prevents the flooding of the closet by clean water. If the valve were so arranged as to open by its weight during the suction-stroke of the pump, the positive action of the parts so necessary to the desired result would not be secured. I am aware of no combination of a pump and a suction-valve loaded to close and hold it to its seat automatically, and a connection through which the pump-handle exerts the necessary force to open and hold open the valve during the suction-stroke, and which then permits the automatic and instant closing of the valve under the action of the spring or other device by which it is loaded.

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

1. The combination, with a closet-hopper and its discharge-passage, of a soil-pump the barrel of which communicates with said passage, pump suction and delivery valves in said passage, and an automatically-closing valve independent of the suction-valve proper, closing the hopper-outlet and arranged to be opened downwardly by the suction-stroke of the pump, substantially as herein described.

2. The combination, with a closet-hopper and a discharge-passage leading therefrom, of a soil-pump the barrel of which communicates with said passage, a suction-valve and a main delivery-valve in said passage, and a supple-

mental delivery-valve independent of and beyond the main valve, arranged in said passage and opening outward from the pump, whereby a goose-neck or upwardly-bowed portion of the discharge-passage to prevent the inflow of water is dispensed with, substantially as herein described.

3. The combination, with a closet-hopper and a soil-pump, of a discharge-passage leading from the hopper and provided with a suction-valve and a main delivery-valve, and having a descending portion beyond the main delivery-valve and a supplemental delivery-valve beyond the main delivery-valve and in the descending portion of the passage, whereby a goose-neck or upwardly-bowed portion of the discharge-passage to prevent the inflow of water is dispensed with, substantially as herein described.

4. The combination, with a closet-hopper and a discharge-passage leading therefrom, of a soil-pump having its barrel C in communication with said passage, the suction-valve c' and main delivery-valve c^2 in said passage, the automatically closing valve d, applied to the hopper-outlet and arranged to be opened downward by the suction-stroke of the pump, and the supplemental delivery-valve c^5 beyond the main delivery-valve c^2, and opening outward from the pump, substantially as herein described.

5. The combination, with a closet-hopper and its discharge-passage, of a soil-pump, an automatically-closing valve applied to the hopper-outlet, and a handle whereby the valve may be opened by hand, when desired, said valve being arranged to open independently of the handle, so that it will be left free to be opened by the suction-stroke of the pump, substantially as herein described.

6. The combination, with a closet-hopper and its discharge-passage and soil-pump, of the rock-shaft d^2, provided with a toe, d^5, a self-closing valve, d, and a carrying-arm, d', mounted loosely on the shaft and provided with a toe, d^6, overlapping the toe upon the shaft, and a handle whereby the rock-shaft may be turned to open the valve, substantially as herein described.

7. The combination, with a closet-hopper, of a soil-pump and a water-supply pump, and two levers connected with the plungers of the two pumps, each lever having a handle, whereby it may be operated independently of the other, and the two levers being provided with a third handle, whereby they may be operated in unison, substantially as herein described.

8. The combination, with a closet-hopper and a pump consisting of a barrel and a plunger, of a valve whereby the flow of water to the hopper is controlled, and which is loaded, so as to hold it positively to its seat and to cause it to close automatically, a handle for operating the pump-plunger, and a connection between the handle and valve, whereby the valve will be positively opened and held open during the time that the handle is operated to make the suction-stroke of the pump, substantially as herein described.

9. The combination, with a closet-hopper, of a soil-pump and a water-supply pump provided with handles for operating their plungers, a suction-valve arranged to open in the opposite direction to that in which water flows through it and loaded to hold it to its seat and to cause it to close automatically, a delivery-valve arranged to open in the same direction in which water flows through it, and a connection between the handle of the water-supply pump and the suction-valve of said pump, whereby said valve will be positively opened and held open during the time that the handle is operated to make the suction-stroke of the pump, substantially as herein described.

10. The combination, with a closet-hopper and a pump consisting of a barrel and a plunger, of a valve whereby the flow of water to the hopper is controlled, a lever for operating the pump-plunger, and a rod sustained by the valve and carrying the lever-fulcrum, whereby the valve will be positively opened by the operation of the lever, substantially as herein described.

11. The combination, with a closet-hopper having a downwardly-presented outlet, of a hinged valve closing said outlet and a flexible shield or guard secured to the hopper within the outlet and overlapping the valve upon the hinge side thereof, substantially as herein described.

12. The combination, with a closet-hopper and a discharge-passage leading therefrom, of a valve, c', in said passage and a tubular seat-piece having an inclined face on which the valve rests, an upward projection, c^7, which extends above the top of the passage and to which the valve is hinged at its upper edge, so that it may open outward and upward from its seat, and a bonnet or cap secured upon the discharge-passage over the valve and recessed on its under side to receive said upward projection, substantially as herein described.

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