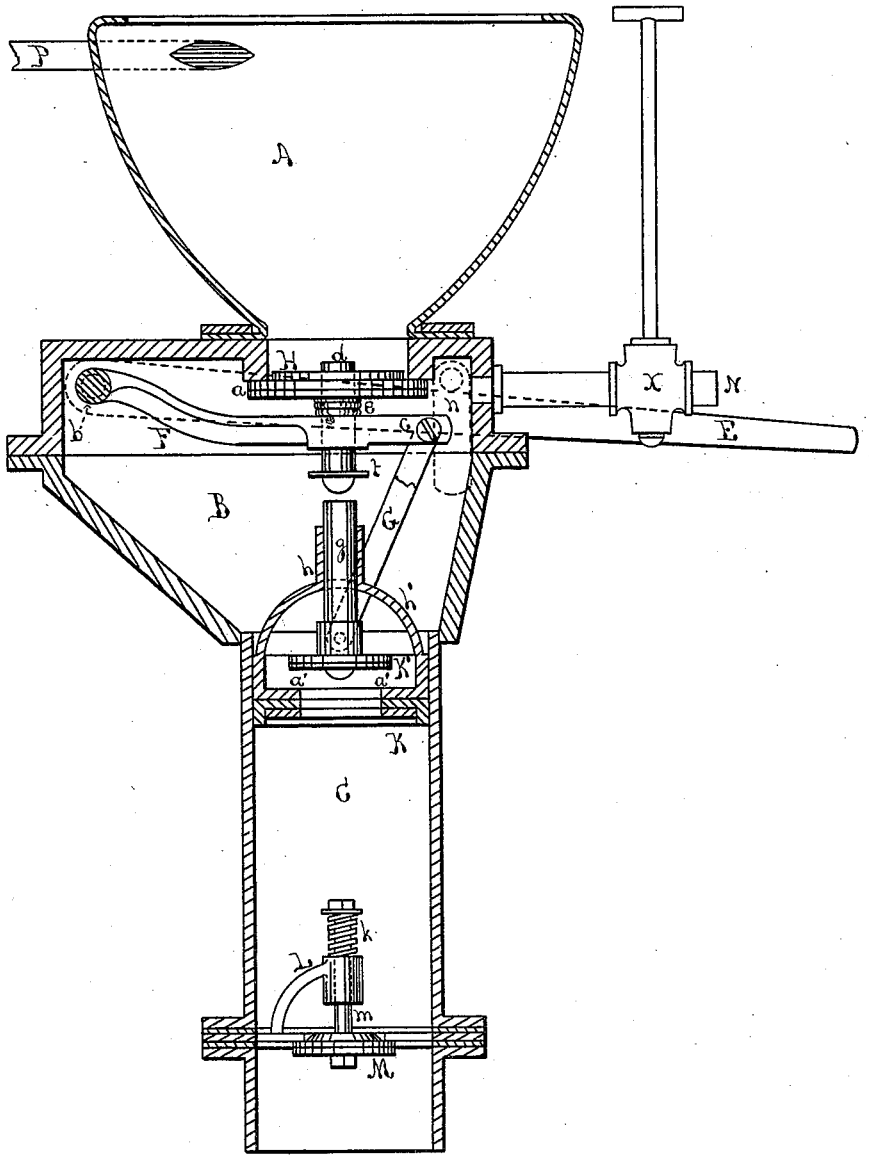
D. H. RICE & C. H. SARGENT.

WATER-CLOSETS FOR VESSELS.

No. 181,984. Patented Sept. 5, 1876.



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UNITED STATES PATENT OFFICE.

DAVID HALL RICE, OF LOWELL, AND CHARLES H. SARGENT, OF NEWBURYPORT, MASSACHUSETTS.

IMPROVEMENT IN WATER-CLOSETS FOR VESSELS.

Specification forming part of Letters Patent No. **181,984**, dated September 5, 1876; application filed May 22, 1876.

To all whom it may concern:

Be it known that we, DAVID HALL RICE, of Lowell, in the county of Middlesex and State of Massachusetts, and CHARLES H. SARGENT, of Newburyport, in the county of Essex and said State, have invented a new and Improved Water-Closet for Vessels, of which the following is a specification:

Our invention relates to the construction of water-closets for vessels, in which, on account of their size or construction, it is necessary or convenient to have the closet with its outlet-pipe substantially below the surface of the water. In order that the closet may be placed below the surface of the water, it is necessary to have such an arrangement of valves as will readily allow the substance to be forced out of the closet, and at the same time prevent any water from rushing up through, except at the will of the user, to cleanse the closet, and even when the closet is partly above the water during the rolling and pitching of the vessel in a storm, to render the closet available, when it is impossible and unsafe to use the ordinary closet, on account of the rush of water in the pipes. Our invention is intended to overcome these difficulties and provide a positive-acting and safe closet.

Figure 1 is a vertical section of our improved closet.

A is the bowl, which is screwed down upon the top of the box B. In the box B is the valve H, which fits water-tight upon the valve-seat *a*, and closes the passage from the bowl to the box. This valve is operated by the arm F, which is attached to the shaft *b*, one end of which passes through the box B; and to this projecting end is attached the lever E. This lever E is held up at the highest point of its stroke by the spring-latch *n*, which, when latched upon the lever, serves to bring the pressure of the spring *e* upon the valve H constantly, and keeps the valve closed water-tight. Instead of the spring *e*, the arm F or lever E may be made sufficiently elastic to keep the valve H closed tight. In order to make the hole for the shaft *b* in the box B water-tight, we place a common stuffing-box around the shaft where it passes through the box. The valve H is attached to the valve-stem *d*, which works freely through an opening in the arm F. Around the valve-stem *d*, and between the valve and arm, is a coil-spring, *e*, the operation of which will be described hereafter. K is a plunger, capable of vertical motion, having a cup-shaped packing, and fitting, substantially, water-tight into the pipe C, directly below the bowl. This plunger has a valve, K′, closing upon the valve-seat *a*′, and opening upward, while the valve-stem *g* works freely in the socket *h*, attached to the plunger. To this valve-stem we pivot one end of the link G, while the other end is pivoted to the arm F, the valve K′ thus having a direct positive motion. The link G is bifurcated at the lower end, one part of which is attached to the valve K′ on each side, and the two parts swing freely each side of the yoke *h*′, and are united to the opposite sides of the valve-stem *g* by the pivot passing through it. At the lower end of the pipe C is a valve, M, opening downward, and having a valve-stem, *m*, which slides freely through the socket L. Around this valve-stem is a coil-spring, *k*, which presses from the top of the socket L against a shoulder on the valve-stem, thus operating to keep the valve closed, except when the pressure on the valve from above is sufficient to force it open. This valve is opened by the action of the plunger K, the latter compressing the water in the pipe C against it when forced downward upon the top of the valve M, and forcing it through the latter.

The length of the pipe C is such that the plunger will strike against the valve-stem at the bottom of its stroke, and the valve-stem *g* may be prolonged downward as far as may be necessary to insure its striking the valve-stem *m*, which is believed to be new with us; or the valve-stem *m* may be so placed as to be entirely below the stroke of the plunger K and stem *g*.

A tank may be placed above the closet, and water admitted through the pipe P, if desired. As this closet is below the surface of the water, either wholly or so as to bring the water-line some inches above the bottom of the bowl, a pipe, N, is carried through the side of the vessel, below the water-line, to admit the wa-

ter from the outside into the box B, and, as desired, through the valve H, into the bowl, to thoroughly cleanse the latter.

The drawing represents the different parts in the position when ready for use.

The lever E is pressed down, carrying the arm F and link G with it. When the arm F begins its downward movement, the spring *e* on the valve-stem *d* presses from the arm against the valve H, and keeps it closed till the arm strikes the shoulder *f*, and at the same time the movement of the link G closes the valve K′. By this action of the spring *e* and movement of the link G, the valve H is not opened till the valve K′ is closed, and as soon as the valve H is opened the plunger K begins its downward stroke. The plunger, being forced down, presses on the water in the pipe C, and overcoming the pressure of the sea-water outside, and the tension of the spring *k*, forces it out, through the valve M, through the lower end of the pipe C, which passes through the side of the vessel into the sea. The valve X in the pipe N has been left open sufficiently for fresh water to rush into the box B, and help cleanse the latter, and prepare its contents to better pass the valves. On raising the lever E and plunger K, the valve M closes, and the vacuum below the plunger causes the contents of the box B and bowl A to pass downward, and be forced out of the side as the movement of the lever E is continued.

The pipe N is allowed to supply clean water to the closet until it is thoroughly cleansed, and until the bowl A is filled to the depth of about two or three inches, when the lever E is latched up by the latch *n*, the valve X is closed, and the closet left ready for use.

After the closet is used, the valve X should always be opened before the lever E is operated, as the jet of pure water from the pipe N prevents clogging of the valves, and insures the perfect cleansing of the closet.

Although we have spoken of a water-tank connected to the pipe P, it is not necessary, as the pipe N will be found always sufficient to keep the closet clean, and free from disagreeable odors. The amount of space thus saved by dispensing with a water-tank in the vessel for the closet, as well as the small space required for the latter, renders the use of this closet possible in places where others cannot be used.

The arrangement of the vertical pipe C below the bowl A insures the compact structure of the closet, and, in connection with the valve M, this vertical pipe causes this valve to pump out the closet entirely dry by the pitch of the vessel when in a sea, and keep it so, no matter how far below the water-line the top of the bowl A may be, until the valve X is opened, as described.

It should be understood that the pipe C discharges through the side of the vessel as nearly directly downward and outward as possible.

By the peculiar construction of the valve H, and its connection with the arm F by its stem *d* and the spring *e*, the valve H closes before the plunger K has completed its upward stroke, and thus assists to force the contents of the box B through the plunger-valve K′.

When the vessel is at sea, the valve X may be left open, if desired, and the pitch of the vessel will then cause a constant current of clean water to flow inward through the pipe N, and outward through the valve M and pipe C, the valve H meanwhile being closed water-tight.

A constant use of this closet upon a yacht of seven and three-fourths tons burthen has demonstrated that it operates as above described for some time, and established its durability and utility in that class of vessels.

What we claim as new and of our invention is—

1. The valve H, combined with the arm F by the stem *d* and spring *e*, substantially as described.

2. The combination of the lever E, latch *n*, arm F, and valve H, substantially as described.

3. The combination of the arm F and plunger K, provided with the valve K′, substantially as described.

4. The combination, with the plunger K, of the valve K′, operated positively by the link G, which drives the plunger, substantially as described.

5. The combination of the valve H, made to close before the upward stroke of the plunger is completed, with the latter, substantially as described.

6. The combination of the bowl A, the plunger K, provided with the valve K′, and the valve M, substantially as described.

7. The combination, with the closet discharge-pipe C, discharging directly from the pan outboard below the water-line, of the clean-water pipe N, carried inboard below the water-line, and emptying into the pipe C, between the pan and its discharge end, substantially as described.

8. In combination with the bowl A and discharge-pipe C, the enlarged connecting box or reservoir B, substantially as described.

9. The combination, with the discharge-pipe C, leading outboard below the water-line, of the valve M, opening downward and outward in such position that the rise and pitch of the vessel will operate it automatically, substantially as described.

10. The combination of the valve H, plunger K, and valve M, substantially as described.

11. The combination of the valve H and valve M with the clean-water pipe N, discharging into the conduit between said valves, substantially as described.

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