March 17, 1925. 1,530,380

U. G. LEE

MARINE WATER CLOSET

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Fig. 2.

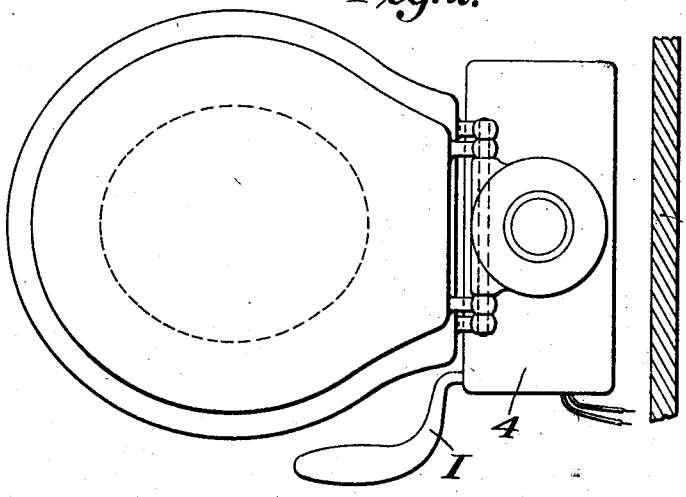
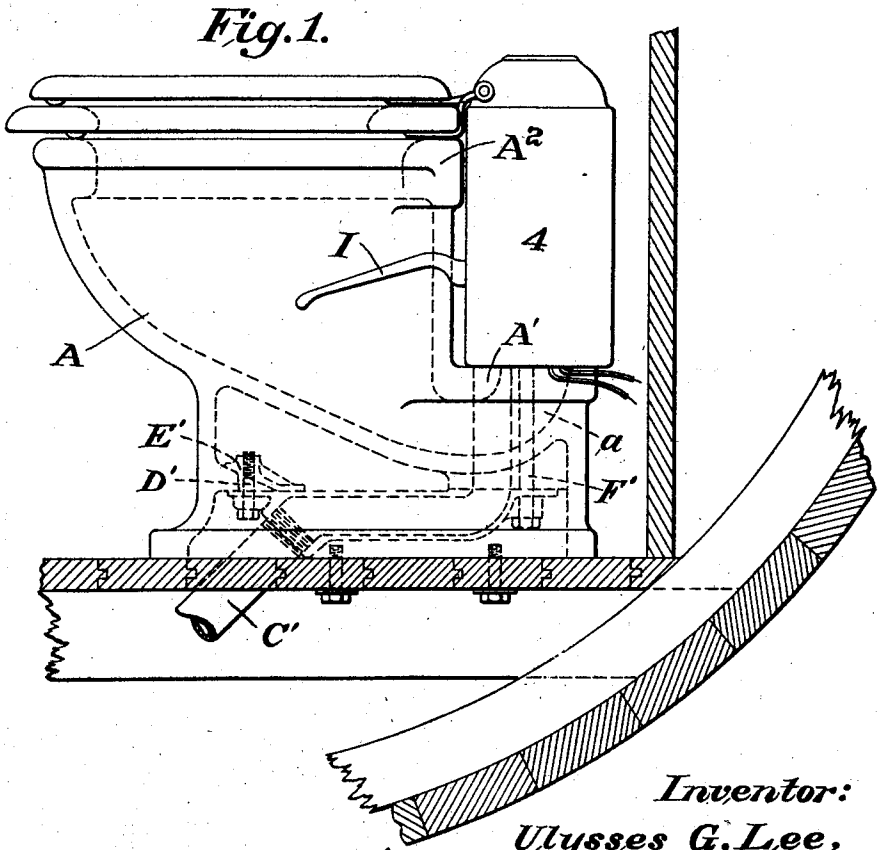


Fig. 1.



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Fig. 4.

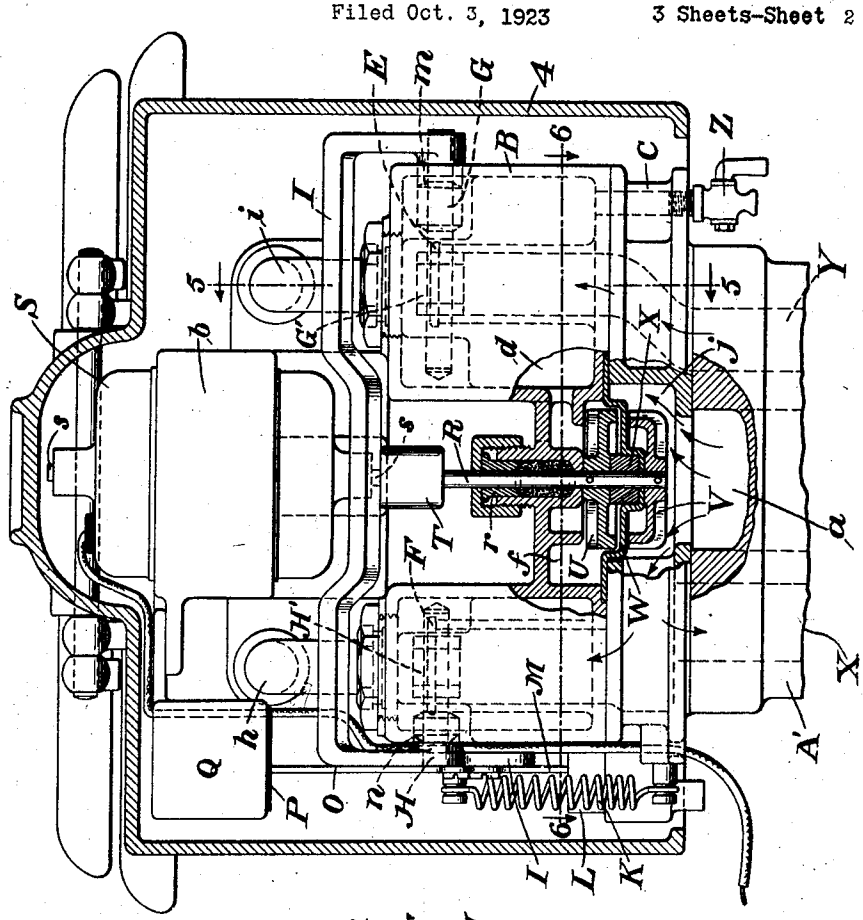
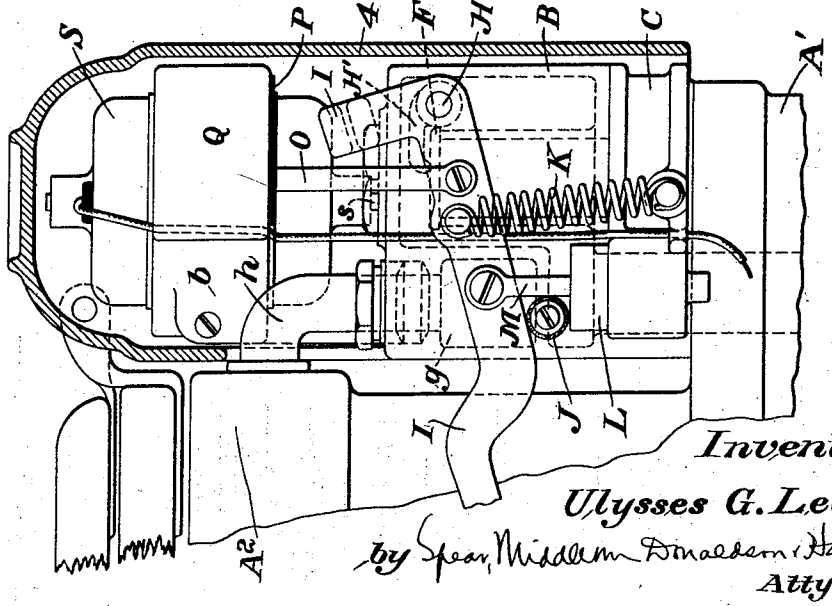


Fig. 3.



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Fig. 5.

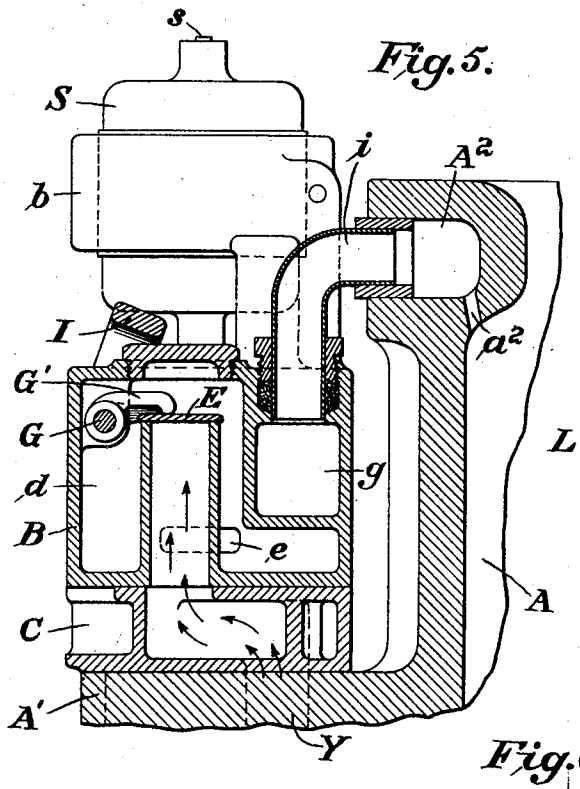


Fig. 7.

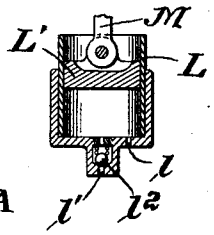
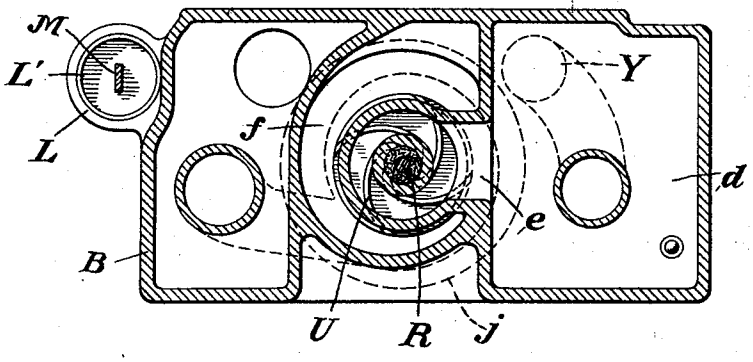


Fig. 6.



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Patented Mar. 17, 1925. 1,530,380

UNITED STATES PATENT OFFICE.

ULYSSES G. LEE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO OTTO C. SCHULZ, OF CHICAGO, ILLINOIS.

MARINE WATER-CLOSET.

Application filed October 3, 1923. Serial No. 666,402.

To all whom it may concern:

Be it known that I, ULYSSES G. LEE, a citizen of the United States, and resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Marine Water-Closets, of which the following is a specification.

My invention relates to improvements in water closets designed especially for marine use, where the closet has frequently to be located below the water line.

One object of the invention is to provide a water closet having pump mechanism located above the bottom of the bowl so as to trap or positively retain a certain amount of water in the bowl and avoid the necessity of using a valve or bowl closure for this purpose, as experience has shown that such valves, as shown for example in patent of Sell and Berger, No. 1,329,932, are not always effective, owing to the presence in the water of toilet water, etc., which many times prevents the valve from closing properly.

I have further aimed to locate the pump and controlling mechanism directly back of the bowl in such a manner as to occupy but little space and permit easy access in case repairs are needed, this being a very desirable feature, as such water closets are usually or frequently placed in very close quarters.

I have further aimed to provide a construction which will be free from external pipes or connections other than the electrical wires, and in which the flushing mechanism and all pipes and even holding-down bolts are beneath the floor, all of which contribute to the production of a sanitary installation.

With these and other objects in view, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described, the nature and scope of my invention being particularly ascertained and defined by the appended claims.

An embodiment of my invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a side view showing the general arrangement of water closet bowl and mechanism for flushing.

Fig. 2 is a plan view of same.

Fig. 3 is a side view with one side of the covering case removed to show the operating lever and mechanism.

Fig. 4 is a rear view with one side of covering case removed, so as to disclose the mechanism, and with parts broken away to show the pumps in section.

Fig. 5 is a section on line 5—5 of Fig. 4.

Fig. 6 is a section on line 6—6 of Fig. 4, and

Fig. 7 is a detail view.

The closet is composed of a porcelain bowl A with a platform extension A′ projecting rearwardly, which platform is for supporting the flushing mechanism. The outlet *a* for the bowl extends rearwardly and then up to the under side of the flushing mechanism to which it joins at about the center, a rubber packing being interposed to make a tight joint.

The flushing mechanism is composed of two superposed main castings or frames B and C and the whole mechanism is enclosed in a metal casing 4 to protect it from damage.

The main casting B carries the valve chambers for the inlet valve E and the outlet valve F, which valves are of the clapper type and are pivoted on the pivot pins G and H. These pins form pivots for the rocker handle I which is extended into position convenient to the operator. This handle extension rests on a soft bumper J when not in operation, and a heavy spring K holds the handle normally in a downward position.

When the handle is lifted by manuel power it is restored to inoperative position by the spring K. This return movement is retarded and slow in its action because of an air cylinder L, the piston L′ of which is connected by means of link M to the rocker handle, thus constituting a dash pot from which the air escapes through restricted port *l*, air being admitted on the up stroke of the piston through port *l′* controlled by ball valve *l²*. (See Fig. 7.)

Another link O connects the handle lever to a snap switch P of the push button type. This switch is enclosed in a metal box Q which is attached to the main frame extension. As the switch mechanism per se forms no part of the present invention and may be of any known approved type, illustration thereof is deemed unnecessary.

This switch snaps into the closed posi-

tion when the handle nears the upward limit of its stroke, and snaps into the open position as it nears the lower limit.

If the water closet is located on the boat at a point below the water line, then the external pressure of water outside of the boat tends to open the valve E while the valve F closes of its own weight or from the pressure of water.

In other words, the valve E opens inwardly while the valve F opens outwardly with reference to the water pressure outside the boat.

The main frame part or casting B has an upward extension *b* cast integral which is in the form of a split ring for clamping a motor S in alignment with the pump shaft R. This shaft is coupled to a shaft *s* of motor S by means of coupling T. The shaft passes through a stuffing box *r* and two bladed runners or impellers U and V mounted on the lower end of pump shaft. The upper runner or impeller U is separated from the lower impeller V by a thin plate W, which plate is preferably about $\frac{1}{16}''$ thick and is clamped between castings or frame parts B and C and recessed into the casting B. This stationary plate W is spun with a depression in the middle into which a self lubricating bearing X is forced. The upper pump supplies water from the outside of the vessel for flushing the toilet. This water enters through the duct Y in the porcelain and passes upwards through inlet valve E into the chamber *d* and from there into the pump through duct *e*. A spiral pump chamber *f* is cast in the underside of casting B, which spiral chamber has a discharge outlet into a rear chamber or passage *g* from which the water is forced into the bowl through two pipes *h* and *i*. The bowl has the usual hollow rim A^2 with small holes a^2 for distributing the water evenly around the bowl.

The lower pump is for pumping the water and sewage out of the bowl and is always primed and ready for action due to the fact that the outlet of this pump is higher than the pump impeller, the arrangement being such that water is trapped in the bowl and pump chamber with no chance for leakage. This water level being higher than the pump impeller, keeps it always submerged in water. The outlet for the lower pump chamber *j* is through the valve F and then downwardly through port *x*. A drain cock Z is provided for drawing out the water in the cold weather when water closet is liable to freeze.

It will be observed from Fig. 4 that the lower impeller is of substantially cup shape, with the blades extending across the bottom and hence facing the bowl discharge or outlet *a* when the latter communicates with the pump chamber, the axis of the pump being substantially in alignment with said bowl discharge. The blades are continued up around the sides of the impeller body and the pump chamber *j* is sufficiently large so that the blades are spaced therefrom to permit passage of sewage without obstruction.

The valves E and F are pivoted loosely on pins G and H. The pins G and H pass through stuffing boxes *m* and *n* and are fixed to rocker I so that they oscillate when rocker handle I is operated. Mounted on these pins and fastened thereto are arms G′ and H′ which press against valves E and F by the action of spring K when handle lever I is in the downward or inoperative position. The purpose of this is to insure the outlet valve closing and to force the inlet valve shut and hold it in that position against a pressure which varies with the height of the water outside the boat, and also the pressure due to waves.

The operation of the closet is as follows: The operator lifts the handle I until the switch snaps and closes the circuit starting the motor. The motor operates while the handle descends slowly, this slow action being due to air trapped in air cylinder or dash pot L. The lower pump pumps water out of the bowl and the upper pump pumps water in until the handle I descends to a point where the switch snaps into an open position. When the motor stops, part of the water runs back, and also the water in the rim of the bowl runs down, filling the bowl to a point where the water keeps the runner of the lower pump submerged.

The upper pump runner also runs in water trapped in the pump chamber between the inlet valve E and the outlet pipes and the discharge pipes *h* and *i* which are higher than the pump chamber.

Beneath the base of the porcelain bowl are extension pipes C′ which extend the suction and discharge forward to a point where connections are easily made through a convenient hatch. These pipes are cast together in one casting which is held in position with packing between it and the porcelain, with the through bolts that hold the flushing mechanism in place. The forward end of this casting is also fastened with a single bolt D′ and a clamp E′; holding down bolts F′ are also screwed into this casting.

It will also be observed that if any heavy article be dropped accidentally into the bowl it will not be drawn into the pump and cause damage to the same, but will sink by gravity to the lowest point in the bowl and remain there. This feature greatly reduces the possibility of breakage.

Having thus described my invention, what I claim is:

1. In a marine closet, a pump chamber

included in the outlet from said bowl, and a rotary bladed impeller located in said chamber and journaled to rotate about a vertical axis, said chamber having its outlet located at a higher level than the impeller.

2. In a marine closet, a pump chamber included in the outlet from said bowl, and a rotary pump located in said chamber, said chamber having its outlet located at a higher level than the impeller.

3. In a marine water closet, a closet bowl, an inlet pipe for supplying water up to the rim of the bowl and provided with an inwardly opening check valve, a centrifugal pump included in said inlet pipe at a level below the bowl rim and check valve for keeping the pump rotor continually submerged in the water thus trapped, and means for operating the rotor.

4. In a marine water closet, a bowl having an inlet and an outlet provided with water traps, centrifugal pumps included in said inlet and outlet and having rotors arranged to be constantly submerged in the water in said traps, a single shaft on which said rotors are mounted, and means for driving said shaft.

5. In a marine water closet, a bowl, a discharge pipe or passage connected therewith and having an outlet higher than the bottom of the bowl, said passage including a cylindrical pump chamber having an axial inlet and a peripheral discharge, and a bladed rotor rotatably mounted in said chamber with means for operating it.

6. In a marine water closet, a bowl having inlet and outlet passages, superposed rotary pump chambers included in said passages, a single rotary vertical shaft passing through both chambers, a bladed rotor carried by said shaft in each chamber, and means for rotating said shaft.

7. In a marine closet, a bowl having inlet and outlet passages, superposed rotary pump chambers included in said passages, a single rotary vertical shaft passing through both chambers, a bladed rotor carried by said shaft in each chamber, means for rotating said shaft, the outlet from the lower chamber being arranged at a higher level than the rotor therein.

8. In a marine water closet, a bowl, a frame member at the rear thereof above the bottom of the bowl and provided with inlet and outlet valve chambers having suitable check valves, a water supply pipe connected with the inlet valve chamber, a discharge pipe connected with the outlet valve chamber, a passage leading from said inlet valve chamber to the upper part of the bowl, a passage leading from the bottom of the bowl to the outlet valve chamber, said passages including centrifugal pump chambers, and centrifugal pumps in said chambers with means for operating them.

9. In a marine water closet, a bowl, a frame member at the rear thereof above the bottom of the bowl and provided with inlet and outlet valve chambers having suitable check valves, a water supply pipe connected with the inlet valve chamber, a discharge pipe connected with the outlet valve chamber, a passage leading from said inlet valve chamber to the upper part of the bowl, a passage leading from the bottom of the bowl to the outlet valve chamber, said passages including centrifugal pump chambers located one above the other with their axes in vertical alignment, rotors located in said pump chambers, a single shaft by which said rotors are carried, and means for operating said shaft.

10. In a marine water closet, a bowl having a shelf portion in rear thereof, a frame comprising superposed upper and lower castings or members having their opposed faces provided with pump chamber forming recesses, a partition member separating said recesses and clamped between said members, said upper member having inlet and outlet valve chambers disposed on opposite sides of said pump chambers, and having suitable check valves, said inlet valve chamber communicating with a source of supply and with one of the pump chambers, and said outlet valve chamber communicating with the other pump chamber and a discharge outlet, and said pump chambers being connected with the top and bottom of the bowl respectively, a shaft extending through said pump chambers, rotors carried by said shaft, and means for driving said shaft.

11. In a marine water closet, the combination with the bowl and pump mechanism for flushing the same, of an electric motor for driving the pump, a switch for controlling said motor, check valves in the inlet and outlet connections, a movable control member, connections by which the switch is closed when the control member is moved in one direction, and opened when it is moved in the other direction, and means interposed between said member and said valves whereby the valves are released by said first named movement and pressed against their seats by the second named movement.

12. In a marine water closet, a valve seat, a check valve cooperating therewith of the clapper type, a shaft to which said valve is pivotally connected, flushing mechanism, a lever fast on said shaft and arranged to operate said flushing mechanism, and a presser arm carried by said shaft and arranged to bear on the check valve.

13. In a marine water closet, the combination with the bowl and pump mechanism for flushing the same, of an electric motor for driving the pump, a switch for controlling

said motor, check valves in the inlet and outlet connections, a movable control member, connections by which the switch is closed when the control member is moved in one direction, and opened when it is moved in the other direction, and means interposed between said member and said valves whereby the valves are released by said first named movement and pressed against their seats by the second named movement, and a dash pot connected to said hand controlled member for retarding the return movement thereof.

14. In a marine water closet, the combination with the outlet therefrom of a centrifugal pump chamber having its intake communicating with said outlet and having a lateral discharge port in the periphery thereof, of a centrifugal bladed rotor having the blades in part facing the bowl discharge and in part opposed to and spaced from the wall of said pump chamber to permit passage of sewage without obstruction.

15. In combination, a closet bowl, flushing mechanism mounted at the rear of the bowl and connected therewith, said bowl having suitable inlet and discharge passages for the flushing water and sewage terminating at the bottom of the bowl adjacent its rear end, and an extension member bolted to the bottom of the bowl and having passages cooperating with the bowl passages, said extension member projecting into accessible position adjacent the front of the bowl.

16. In combination, a closet bowl having an integral platform at the rear, flushing mechanism on said platform, inlet and outlet passages connecting said flushing mechanism and bowl with water supply and sewage discharge pipes, an extension member beneath the bowl having passages included in said pipe connections, through bolts connecting both the extension member at the rear and said flushing mechanism to the bowl, and other bolts connecting said extension member and the bowl adjacent the front.

17. In a marine water closet, a bowl, a rotary suction pump for discharging the bowl, said bowl having a depression in the outlet thereof for retaining any heavy articles accidentally dropped therein.

18. In a marine water closet, a bowl, a discharge therefrom having a pump chamber, a rotary suction pump located in said pump chamber, said discharge having an outlet located at a higher elevation than said pump chamber, and having also a depression between the bowl and pump for retaining any solid articles accidentally dropped in the bowl.

19. In a marine water closet, the combination with the bowl and pump mechanism for flushing the same, of an electric motor for driving the pump, a switch for controlling said motor, check valves in the inlet and outlet connections, a movable control member, connections by which the switch is closed when the control member is moved in one direction, and opened when it is moved in the other direction, and a dash pot connected to said hand controlled member for retarding the return movement thereof.

In testimony whereof, I affix my signature.

ULYSSES G. LEE.