March 21, 1950 A. R. GROSS, JR 2,501,510

MARINE TOILET

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Fig. 1.

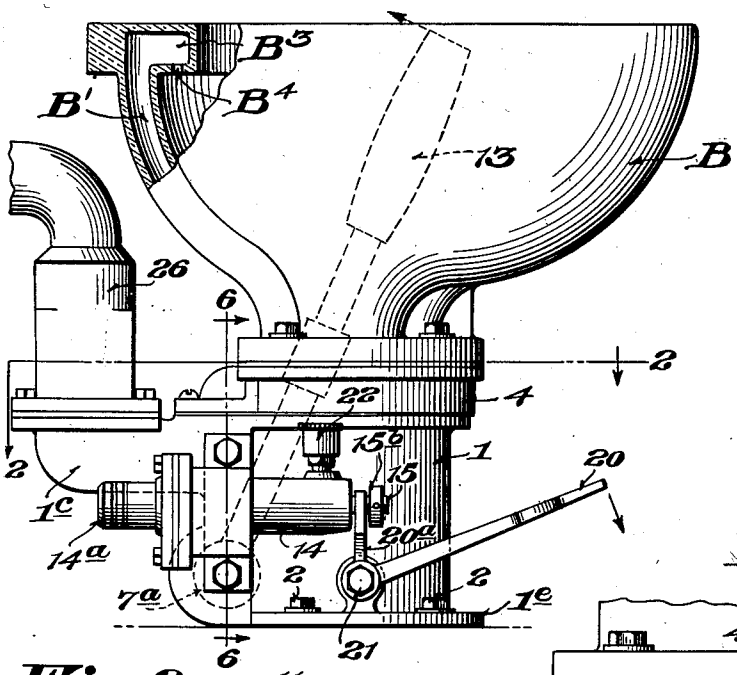


Fig. 2.

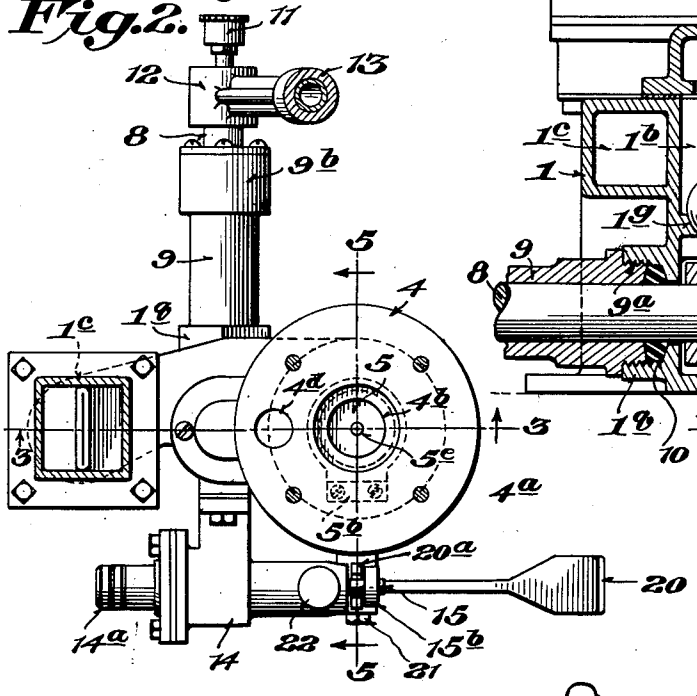
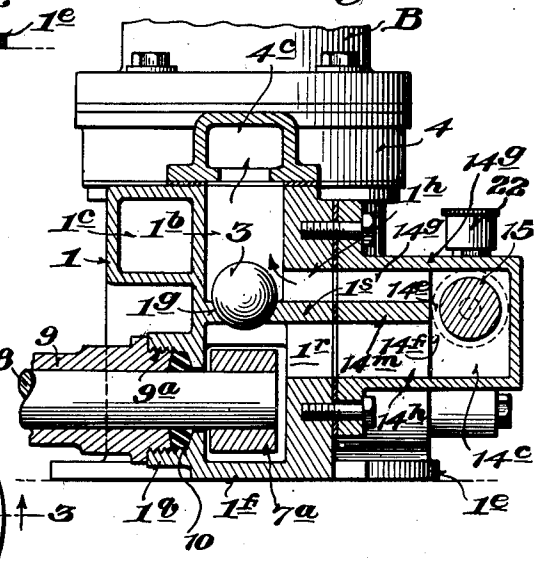


Fig. 6.



Inventor

Angus R. Gross, Jr.,

By Alexander Mitchell

Attorneys

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Fig. 3.

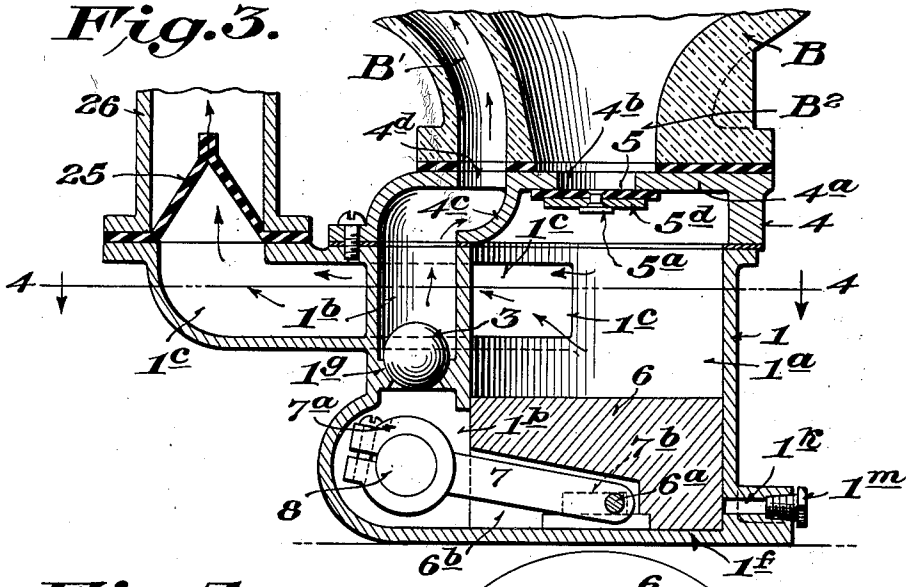


Fig. 4.

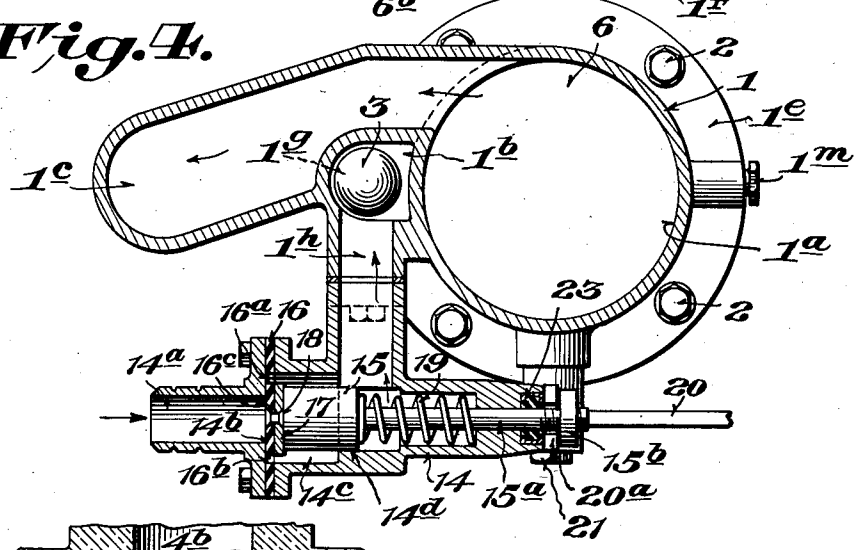
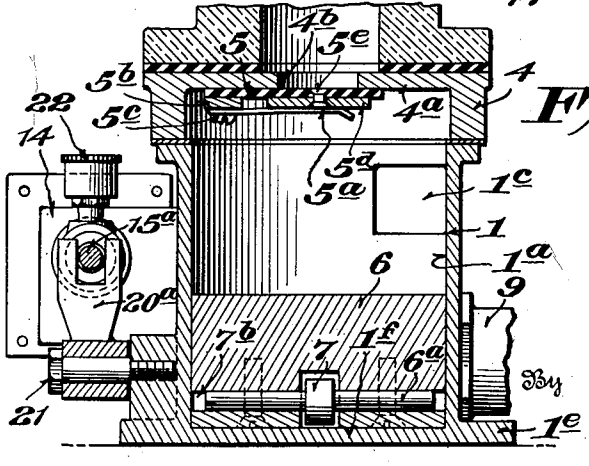


Fig. 5.



Inventor

Augus R. Gross, Jr.

By Alexander & Dowell

Attorneys

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UNITED STATES PATENT OFFICE

2,501,510

MARINE TOILET

Angus Roy Gross, Jr., Baltimore, Md.

Application March 27, 1946, Serial No. 657,521

6 Claims. (Cl. 4—77)

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This invention is a novel improvement in marine water closets and its principal object is to provide a water closet for use on boats and yachts and which will operate efficiently above and below the water line, and which can be installed cheaply and easily. The present invention is an improvement upon U. S. Letters Patent No. 2,047,866, issued July 14, 1936, to Angus R. Gross.

The principal object of my invention is to provide a toilet which will eliminate many pipe fittings and joints heretofore required in installing marine water closets, thereby lessening the cost and time required for installation, and also reducing maintenance charge, my invention comprising a lower pump section for an upper bowl section, the pump section supporting the bowl section which is directly mounted upon the pump section. When the pump section is secured in place and connected to the water supply and discharge pipes respectively, the mere fastening of the bowl upon the pump section completes the water supply and refuse disposal connections between the sections without requiring any placing or adjustments of pipe connections between the sections.

I will explain the invention with reference to the accompanying drawings, which illustrate one practical embodiment thereof, to enable others familiar with the art to adopt and use the same; and will summarize in the claims, the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings:

Figure 1 is a side elevation of my novel marine toilet, partly in section.

Fig. 2 is a horizontal section on the line 2—2, Fig. 1.

Fig. 3 is a vertical section on the line 3—3, Fig. 2.

Fig. 4 is a horizontal section on the line 4—4, Fig. 3.

Fig. 5 is a vertical section on the line 5—5, Fig. 2; and

Fig. 6 is a vertical section on the line 6—6, Fig. 1.

As shown, the lower or pump section consists of a casing 1, having a vertically disposed cylinder 1*a* therein, casing 1 being open at its upper end. Parallel with the cylinder 1 but to one side thereof is a water inlet duct 1*b* open at the top. Extending laterally from the upper end of the cylinder 1*a* beside the inlet duct 1*b* is a soil outlet duct 1*c*. The lower end of the casing 1 has a bolting flange 1*e* which is perforated to receive holding-down bolts 2 or the like whereby the base may be firmly secured to a support, the lower end of the casing 1 being closed by a bottom plate 1*f*. A drain 1*k* is provided in the lower end of the cylinder 1*a* normally closed by removable plug 1*m*.

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In the lower end of the water inlet 1*b* is a seat 1*g* for a lead-core ball valve 3, preferably of tread rubber, and extending laterally of the inlet 1*b* above the seat 1*g* is a duct 1*h* adapted to be connected with a water inlet valve casing hereinafter described.

Upon the upper end of the casing 1 is a head 4 in the form of an inverted cup, same having its upper end closed as at 4*a* to embrace the area of the cylinder 1*a* and the water inlet 1*b*, said head having a soil discharge opening 4*b* disposed substantially axially of the cylinder 1*a*. Head 4 has a substantially circular wall 4*c* closing the upper open end of the cylinder 1*a*. Disposed adjacent the periphery of the top 4*a* of head 4 is a water inlet opening 4*d* registering with the inlet 1*b* and forming a continuation thereof through the head 4, separated from the cylinder 1*a*.

On the under side of the top 4*a* of head 4 is a downwardly opening discharge valve for the soil from the bowl, the same being shown more particularly in Fig. 5 as comprising a strip 5 of rubber, normally disposed across the discharge opening 4*b*, the same being yieldably held against the opening by means of a spring 5*a* of resilient metal mounted on a block 5*b* at one side of the opening by means of a screw 5*c* or the like, the outer end of the spring 5*a* engaging a fibre or other disc 5*d* riveted as at 5*e* to the rubber sheet 5 concentrically of the opening 4*b*, the spring 5*a* normally yieldably maintaining the sheet 5 reinforced by disc 5*d* across the opening 4*b* to close same while permitting the valve to open downwardly by suction within the cylinder 1*a*.

Within the cylinder 1*a* is a piston 6, which is vertically reciprocally mounted therein by means of an arm 7 on a horizontal rocker shaft 8 journaled in the casing 1, as shown more particularly in Figs. 2, 3 and 6, said arm 7 extending through an opening 1*p* (Fig. 3) in casing 1 in the inner wall of the inlet below the valve seat 1*g*, and having a hub 7*a* which is adapted to be clamped around the inner end of the shaft 8, said arm 7 having its outer end carrying a pin 6*a* engaging a slotted bracket 7*b* through a slot 6*b*, bracket 7*b* being carried by the underside of the piston 6, whereby when the shaft 8 is rocked, the piston

6 will be freely raised and lowered without binding.

As shown more particularly in Figs. 2 and 6, shaft 8 is journaled in a sleeve 9 having its threaded end 9a secured in an internally threaded boss 1q of the casing 1 parallel with the bolting flange 1e, a suitable packing 10 (Fig. 6) being interposed between the sleeve and boss. The outer end of the shaft extends beyond the sleeve 9 and through packing (not shown) in an enlarged boss 9b of sleeve 9. Shaft 8 is provided with a bore, in the outer end of which is threaded a grease cup 11 to lubricate the shaft 8 within the sleeve 9.

On the shaft 8 beyond sleeve 9 is a lever 12 secured thereto in any desired manner, said lever 12 having a handle 13 extensibly mounted thereon and terminating adjacent the top of the toilet bowl, as shown in Figure 1. By the above construction, when the handle 13 is reciprocated, the piston 6 will be vertically reciprocated in the cylinder 1a.

In the casing 1 below the inlet port 1h (Fig. 6), is an inlet port 1r, communicating with the inlet 1p (Fig. 3), which opens into the lower end of the cylinder 1a, and also extending to the under side of the valve seat 1g.

The water is supplied to the water inlet 1b from a valve casing 14, shown more particularly in Figs. 2 and 4, the same having an inlet 14a adapted to be connected with the water supply, which may be a gravital supply, where the toilet is located below the water line, or a water pressure supply where the toilet is dispoed above the water line.

Within the inlet 14a is a valve seat 14b beyond which the water passage 14c is enlarged, and then further reduced as at 14d to fit a plunger 15, reciprocably mounted in the cylindrical portion 14d, as hereinafter explained. The chamber 14c communicates, as shown in Fig. 6, around the plunger 15 through ports 14e and 14f, the port 14e communicating through port 14g with the water inlet duct 1h of the casing 1, while the port 14f communicates through duct 14h with the duct 1r of the casing 1, the ducts 14g and 14h being separated by a wall 14m.

Between the valve seat 14b and the chamber 14c is a valve, preferably comprising a rubber sheet 16, forming not only the valve but a gasket between the sections of the valve casing, sheet 16 having parallel slits 16a and 16b at opposite sides of the valve seat 14b to form a loose flap 16c which is reinforced by a fibre or other strip 17 secured thereto by rivet 18, the fibre strip being directly engaged by the plunger 15 to close the valve 16c under normal conditions.

Plunger 15 has a stem 15a extending through the opposite end of the valve casing 14 from the inlet 14a, and a spring 19 within the casing 14 behind the plunger 15 normally yieldably urges the plunger 15 into contact with the valve 16c to close same against the valve seat 14b.

Rod 15a extends beyond the valve casing 14 and carries a head 15b threaded thereon for adjustment purposes. The head 15b is engaged by a yoke 20a of a bell crank foot pedal 20, mounted on a horizontal pivot 21 extending from the side of the casing 1.

In order to lubricate the rod 15a, a grease cup 22 or the like is preferably threaded into the valve casing 14 between the spring 19 and the adjacent end of the valve casing 14, a suitable packing 23 being provided in the valve casing 14 to prevent leakage of water along the plunger actuating rod 15a.

By the above construction, when the foot pedal 20 is depressed, the valve 16c—17 will be permitted to open, admitting water into the chamber 14c, from whence the water flows through the port 14e to the upper inlet port 1h and thence upwardly past the valve 3 to the port 4d in the head 4. At the same time water is permitted to pass through the port 4f to the lower inlet port 1r of the casing, from whence the water flows around the lever 7 through the port 1p and into the cylinder 1a below the lower end of plunger 6.

The toilet bowl B, shown in Figs. 1 and 3, is of standard make and is provided with a water inlet B' registering at its lower end, as shown in Fig. 3, with the water inlet port 4d; while the central outlet of the bowl registers with the outlet 4b of the head 4. The inlet port B' leads to an annular chamber B3 around the upper portion of the bowl, from whence the water is discharged through outlets B4, the water flowing down the inside of the bowl to the discharge portion B2 thereof in the usual manner, the particular form of bowl forming no part of my present invention and therefore needing no further particular description here.

In operation

When it is desired to flush the bowl, the operator will depress the treadle 20 with his foot, the extent of depression of the treadle governing the amount of water admitted past the valve 16c—17. Some of the water passing the valve 16c—17 will pass directly through the upper by-pass 1h above the ball valve 3 directly into the inlet duct 1b of the bowl. The remaining portion of the water will be directed through the lower port 14f and 1r to the cylinder 1a under the piston 6. As the plunger is reciprocated by the operator rocking the handle 13, the upstroke water will be drawn into the lower portion of the cylinder 1a below the plunger 6, while the contents of the cylinder 1a above the piston 6 will be compressed and forced laterally through the discharge port 1c of the cylinder past the check valve 25 and through the discharge pipe 26 in the usual manner, the check valve 25 preventing the soil from dropping down the pipe 26 back into the cylinder 1a. During the raising of the plunger 6 the valve 5 will be closed by pressure so that all the soil is forced through the outlet 1c.

When the plunger 6 descends, the valve 5 is open and the contents of the bowl are sucked down into the upper end of the cylinder 1a. At the same time the water below the cylinder is placed under compression and is forced upwardly through the passage 1r, raising the ball valve 3, and thus forced into the water inlet B' of the bowl B.

By varying the pressure on the treadle 20, the amount of water admitted into the bowl B can be nicely regulated. If the lever 13 is actuated without depressing the treadle 20, no water will be admitted to the bowl B but the contents of the bowl will be first drawn into the upper end of the cylinder 1a and then forcibly discharged. Thus, the supply of standing water in the central portion of the bowl B can be regulated as desired.

I do not limit my invention to the exact form shown in the drawing, for obviously changes may be made therein within the scope of the claims.

I claim:

1. In a marine water closet having a bowl section provided with a water inlet and with a soil outlet in its lower end; a pump section having a cylinder and having an offset water inlet duct; said section having a soil opening in its top com-

municating with one end of the cylinder, and having a lateral opening in its top communicating with the water inlet duct; an inwardly opening valve across the soil opening; a soil outlet duct extending from the valved end of the cylinder; said water inlet duct communicating through a port in the cylinder wall with the other end of the cylinder; a check valve in said water inlet duct; a plunger in the cylinder; means for reciprocating the plunger; means for admitting water into the water inlet duct above and below the check valve; and said soil opening in the pump section being adapted to register with the soil outlet of the bowl section, and said lateral opening of the pump section being adapted to register with the water inlet of the bowl section.

2. In a water closet as set forth in claim 1, said plunger operating means comprising a bearing sleeve extending laterally from said pump section; a rocker shaft journaled in the sleeve and entering the water inlet duct opposite the port; an arm on the rocker shaft slidably engaging the underside of the plunger, said arm extending through the said port; and a lever on the shaft beyond the sleeve extending upwardly beside the pump section.

3. In a water closet as set forth in claim 1, said plunger operating means comprising a bearing sleeve extending laterally from said pump section; a rocker shaft journaled in the sleeve and entering the water inlet duct opposite the port; an arm on the rocker shaft slidably engaging the underside of the plunger, said arm extending through the said port; means for preventing passage of water through said sleeve along said shaft; and a lever on the shaft beyond the sleeve extending upwardly beside the pump section.

4. In a water closet as set forth in claim 1, said plunger operating means comprising a bearing sleeve extending laterally from said pump section; a rocker shaft journaled in the sleeve and entering the water inlet duct opposite the port; an arm on the rocker shaft slidably engaging the underside of the plunger, said arm extending through the said port; means for preventing passage of water through said sleeve along said shaft; means for lubricating the shaft in said sleeve; and a lever on the shaft beyond the sleeve extending upwardly beside the pump section, whereby as the lever is actuated the movement of the plunger in one direction will suck the soil from the bowl outlet into the adjacent end of the cylinder and simultaneously force the water at the other end of the cylinder past the check valve and into the water inlet of the bowl, and

when the plunger is moving in the opposite direction the soil will be passed through the soil outlet duct, and simultaneously water from the admitting means will be drawn into the end of the cylinder.

5. In a water closet as set forth in claim 1, said water admitting means comprising a valve casing mounted on the pump section having a valve chamber communicating with the water inlet duct at opposite sides of the check valve; a second valve in said chamber; a treadle journaled on the pump section adjacent the valve casing, and a spring pressed follower in the valve chamber actuated by the treadle and normally closing the second valve, whereby the amount of water admitted to the valve chamber will be proportional to the amount of movement of the treadle.

6. In a marine water closet, a pump section, having a vertically disposed pumping cylinder and a vertically disposed offset water inlet duct, and having an open upper end; a head closing said upper end of the pump section, said head having a soil opening in its top communicating with the upper end of the cylinder and having a lateral opening in its top communicating with the water inlet duct; a downwardly opening valve across the soil opening of the head; a soil outlet duct extending from the upper end of the cylinder; said water inlet duct communicating through a port in the cylinder wall with the lower end of the cylinder; a downwardly seating ball valve in said water inlet duct; a plunger in the cylinder; means for reciprocating the plunger; and means for admitting water into the water inlet duct above and below the ball valve.

ANGUS ROY GROSS, JR.

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