United States Patent [19]

Jones

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[54] **FRESH WATER FLUSH PORTABLE TOILET**

[76] Inventor: **Sterling B. Jones,** 858 Duff Ave., West Covina, Calif. 91790

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[52] **U.S. Cl.** **4/78,** 4/10, 4/90, 4/115, 4/124, 4/142

[51] **Int. Cl.** **E03d 11/10,** E03d 5/00

[58] **Field of Search** 4/10, 1, 8, 18, 26, 35, 4/39, 40, 76–78, 79–80, 89–90, 115–117, 120, 124, 135, 138, 141, 142

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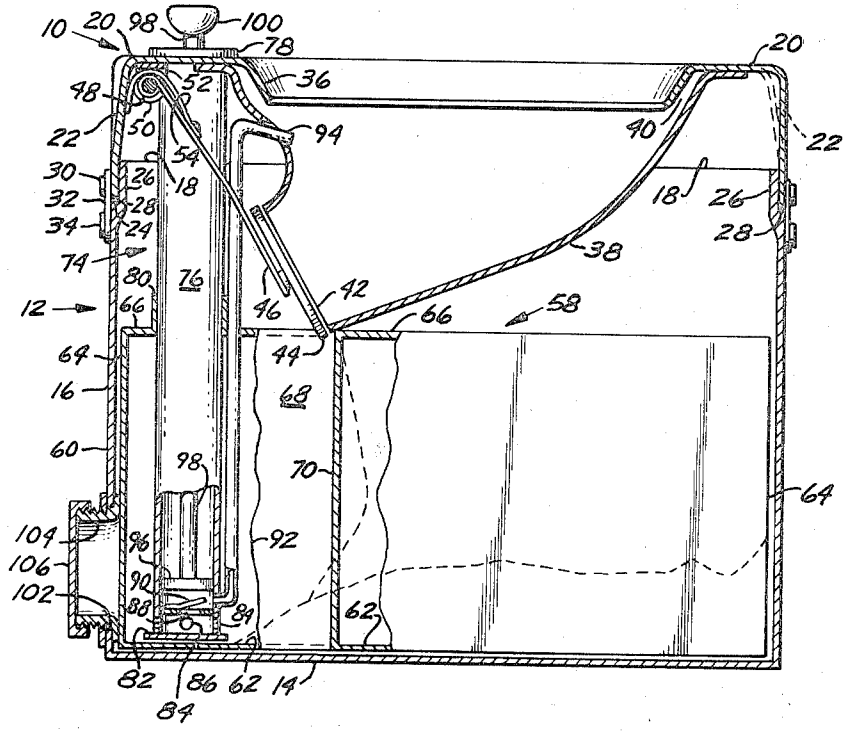
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Primary Examiner—Henry K. Artis

[57] **ABSTRACT**

The toilet of this invention comprises a rigid commode having a lower hollow portion and an upper portion which fits on and is removably secured thereto. The lower portion constitutes a holding tank for "dark water," or sewage. The upper portion is formed with a conventional toilet seat and is provided with a depending bowl having an outlet to discharge into the storage tank. A fresh water container formed of flexible plastic material is mounted in the holding tank and generally conforms to it in shape. A pump is provided to withdraw water from the container and discharge it into the bowl. As the water is withdrawn, the container collapses and provides displacement for the sewage. Thus, both the fresh water and the sewage occupy the same holding tank volume simultaneously without being intermingled.

8 Claims, 4 Drawing Figures



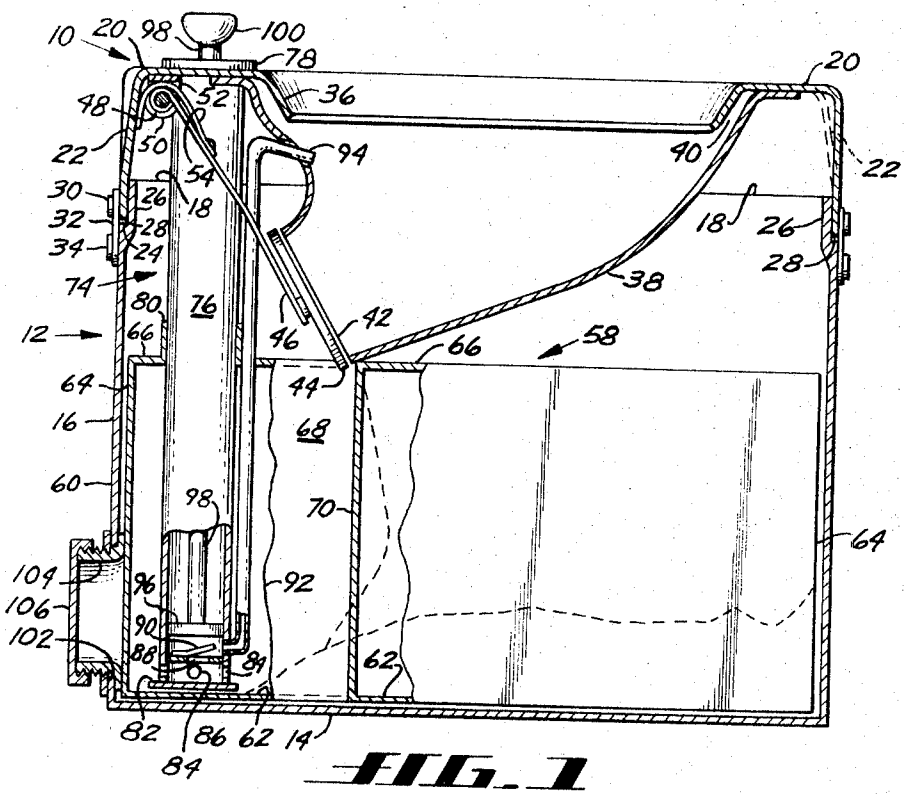

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FIG. 1

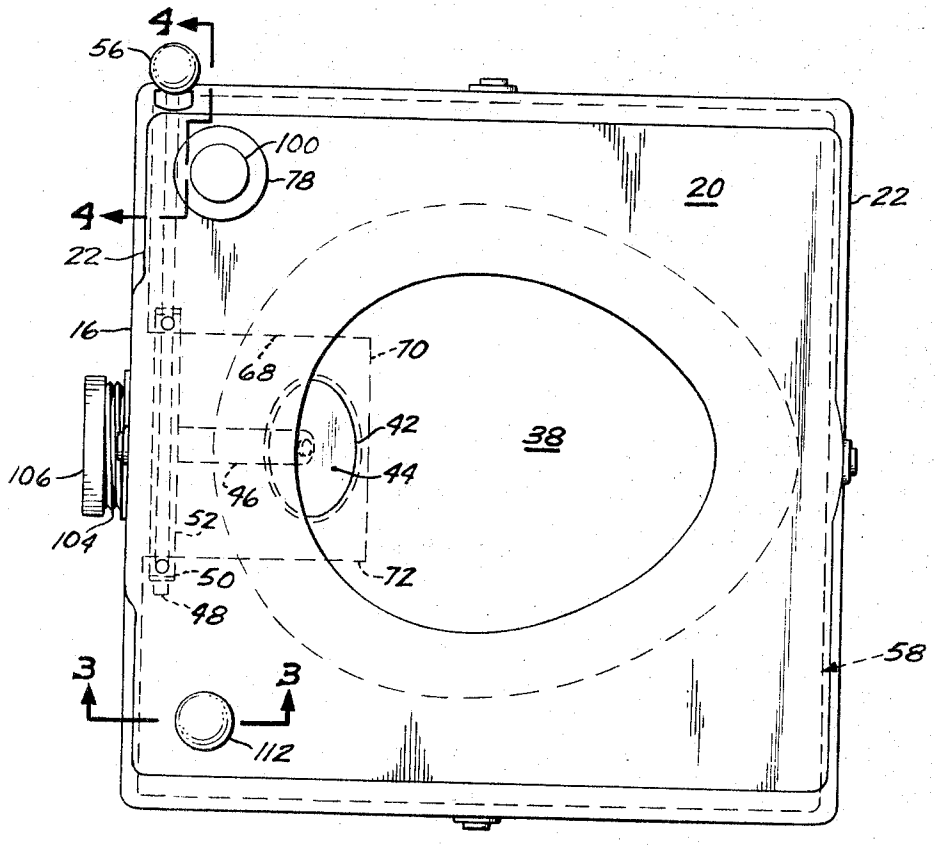

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FIG. 2

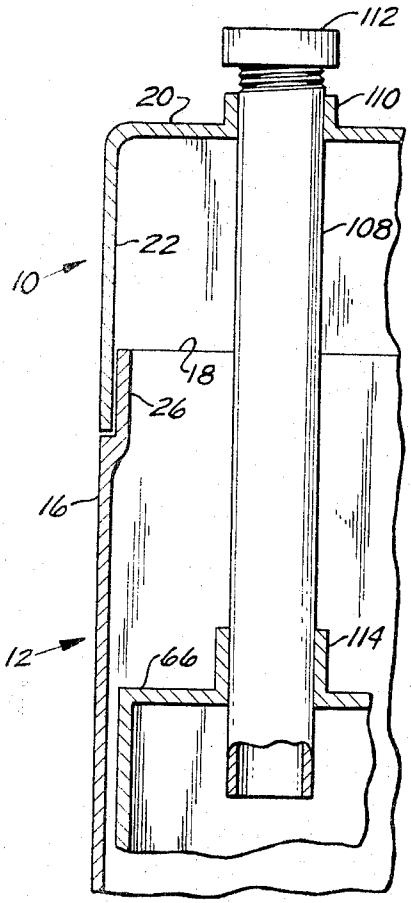


FIG. 3

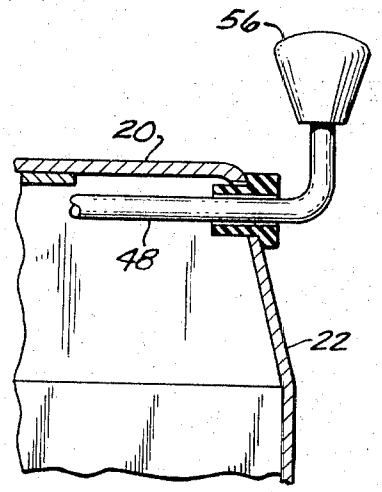


FIG. 4

FRESH WATER FLUSH PORTABLE TOILET

BACKGROUND OF THE INVENTION

This invention lies in the field of portable toilets such as used extensively by campers and travelers, and is directed to such toilets which have provision for fresh water flushing.

One of the simplest types of such toilets presently being used consists of a holder, such as a box, within which a bucket type container is mounted, and a minimal toilet seat mounted on the holder. It is necessary to provide a tight fitting lid for the container to prevent sloshing during travel and to prevent dissemination of odors. The lid must be removed and replaced for each use.

The most sophisticated type now available is a flushing, recirculating system which may be operated manually or electrically, and is similar to those used on modern day air-planes. It is very satisfactory but necessarily also very complicated, heavy, expensive, and relatively costly to maintain.

An intermediate type which has gained rather wide acceptance is the non-recirculating flushing toilet. In this variety, a two section commode is provided in which one section is a container for fresh water and the other is a holding tank for "dark water," or sewage. The two distinct compartments, which are of generally the same size, take up twice the space of the holding tank of the simple type, and require a great deal of material and manufacturing expense. In addition they are bulky and heavy, and thus difficult to handle when emptying and cleaning. An attempt to overcome this difficulty provides an upper section including the toilet seat and bowl and a built-in fresh water tank. A lower section is provided which includes a holding tank. When it is desired to empty and clean the holding tank, it may be disconnected from the upper section and handled separately. While this overcomes the handling difficulty, it actually increases the total bulk and weight and introduces even more manufacturing complexity so that the total cost is substantially increased.

SUMMARY OF THE INVENTION

The toilet of the present invention overcomes the disadvantages mentioned above and provides an easily portable apparatus which retains the desired flushing capability while reducing bulk and expense to a minimum.

Generally stated, and in its presently preferred form, the apparatus of the invention comprises a rigid commode made up of separable upper and lower components. The lower component is a hollow casing of any desired cross sectional shape, preferably square or rectangular, which serves as the holding tank. The upper component fits on the lower one and may be temporarily secured thereto by any suitable fasteners. The upper component includes a conventional toilet seat and is provided with a depending bowl having an outlet to discharge into the holding tank.

A collapsible container for fresh water, made of a suitable flexible plastic material, is mounted within the holding tank and has the same general lateral dimensions, while its upper wall extends approximately to the level of the lower margin of the bowl outlet. Thus it holds the maximum amount of fresh water for the size of the apparatus. A barrel type pump extends down through the upper component and into the container, with its lower end close to the bottom of the container, and the pump inlet is preferably located close to its lower end. A single stroke of the pump withdraws a predetermined quantity of water from the container and discharges it into the bowl for flushing.

The aft wall of the container is formed with a vertical recess in planform to provide a vertical flow path from the outlet to the bottom of the holding tank. As the fresh water is withdrawn and the sewage accumulates in the bottom of the holding tank, the container gradually collapses and provides displacement for the sewage, and the lower wall of the container is gradually raised by the sewage.

A cleanout aperture is formed at the bottom of the aft wall of the holding tank in general alignment with the bottom of the recess in the container to facilitate emptying and cleaning.

BRIEF DESCRIPTION OF THE DRAWINGS

Various other advantages and features of novelty will become apparent as the description proceeds in conjunction with the attached drawings, in which:

FIG. 1 is a schematic view of the total apparatus in side elevation, partly in section;

FIG. 2 is a schematic plan view of the apparatus of FIG. 1;

FIG. 3 is a sectional view taken on line 3—3 of FIG. 2; and

FIG. 4 is a schematic sectional view of a detail of the apparatus.

DESCRIPTION OF PREFERRED EMBODIMENT

A portable toilet incorporating the features of the invention is schematically illustrated in FIG. 1, in which a commode, preferably of rigid plastic material, comprises upper and lower major components 10 and 12. The lower component 12 is essentially an open-topped casing of any desired cross sectional shape, here shown as being substantially square, which serves as the holding tank for "dark water," or sewage. The bottom 14 and side walls 16 are preferably generally planar and the upper margin 18 lies in a horizontal plane.

The upper component 10 has an upper wall 20 and depending side walls 22 with a lower margin 24 lying in a horizontal plane, the marginal portions being substantially coplanar with walls 16. The latter are formed with an inset lip 26 to define an external shoulder 28. The marginal portions of walls 22 fit snugly over the lip and seat on shoulder 28. To prevent inadvertent separation of the components when the apparatus is moved about, latches of any suitable type are provided. As shown, such latches include a pivot pin 30, a swinging latch hook 32 mounted on the pivot pin, and a latch pin 34 to be engaged by the hook.

A conventional toilet seat 36 is formed in upper wall 20. A depending bowl 38 may be formed as a continuation of the seat but preferably is formed separately as shown and secured to the under side of wall 20 to provide an overlap recess 40 which tends to prevent sloshing if any water is present in the bowl while it is being transported. The bowl is directed downward and rearward and terminates in a discharge outlet 42 which opens down and aft.

A clapper valve 44 is provided to close the outlet between uses and may be provided with any type of suitable seal, not shown. The valve is attached to the end of arm 46 which in turn is secured to pivot shaft 48, the

shaft being rotatably mounted in ears 50 of bracket 52. A leaf spring 54 is secured to arm 46 and extends up over shaft 48 and down into engagement with wall 22 to yieldingly maintain valve 44 in closed position. As shown in FIG. 4, the end of shaft 48 is bent upward and provided with an operating knob 56.

A container 58 for fresh water is mounted in the lower portion 60 of component 12 which serves as the holding tank. The container is formed of any suitable heavy duty flexible plastic material so that it will collapse on occasion. It has generally the same lateral dimensions as the holding tank so that it generally occupies the same volume. The bottom wall 62 lies on the bottom 14 of the holding tank, side walls 64 contact side walls 16 of the holding tank, and the upper wall 66, which is preferably but not necessarily planar, lies at an elevation substantially even with the lower margin of outlet 42, as best seen in FIG. 1. The aft wall of the container is formed from top to bottom with a recess in planform, as best seen in FIG. 2. Thus there are actually three additional side walls 68, 70, and 72 to provide a vertical flow path for sewage discharged from outlet 42 to flow directly to the bottom of the holding tank.

The means for flushing the toilet comprises a pump 74 having a barrel 76 mounted at its upper end in a boss 78 on upper wall 20 and extending vertically down through the upper wall 66 of the container, which is formed with an annular flange 80 to grip the barrel and hold that portion of wall 66 in fixed position. The lower end of the barrel extends down to a point close to bottom wall 62 and is provided with a foot 82 to prevent the flexible wall from obstructing inlet openings 84. A diaphragm 86 is provided with an aperture 88 covered by a flapper valve 90. Conduit 92, connected to the barrel above the diaphragm, extends upward and forward, ending in a nozzle or spout 94 to discharge water into the bowl. The pump is provided with a plunger 96, a plunger rod 98, and an operating knob 100. When the plunger is raised, it draws water into the barrel through aperture 88 in a measured amount. When the plunger is then lowered, valve 90 closes and the water is delivered through conduit 92 and nozzle 94 into the bowl.

Each time the pump is operated, the volume of water in the container is reduced so that it gradually collapses and provides displacement for the sewage. As the latter accumulates in the bottom of the holding tank, it gradually pushes up the lower portion of the container as indicated by the broken lines of FIG. 1. Thus, the fresh water and the sewage occupy the volume of the holding tank simultaneously and yet there is no intermingling of the two fluids. This novel feature avoids the necessity for providing a separate rigid container for fresh water, eliminating the extra bulk and weight as well as the added complication and cost of manufacture. The recess formed by walls 68, 70, and 72 serves the further purpose of providing added displacement volume to handle the added volume of the sewage as compared to the original volume of the fresh water. As will be noted by reference to FIG. 1, the foot 82 of the pump holds down a corner of the container as the balance of it rises and therefore all of the fresh water will flow down to the pump inlets 84.

A cleanout aperture 102 is formed in the lower part of the aft wall of the holding tank and provided with a fitting 104 and a cap 106. Turning to FIG. 2, it will be seen that the aperture is in alignment with the recess in the container to provide ready access to the aperture for emptying and cleaning. To thoroughly flush out the holding tank, large quantities of fresh water may be poured into the bowl and thence through outlet 42, holding the valve 44 open. It will be noted further that the recess in the aft wall of the container provides clearance for the opening movement of valve 44 as it swings downward and rearward.

As seen in FIGS. 2 and 3, a filler tube 108 for fresh water extends down through upper wall 20 of the upper component and is gripped by flange 110 to secure it in substantially fixed position. A closure cap 112 is provided. The lower end of the filler tube extends down through flange 114 formed on the upper wall 66 of the container and is gripped by the flange to hold that portion of the container in relatively fixed position. The location of the pump barrel and the filler tube near opposite corners of the aft portion of the container, as shown in FIG. 2, insures that the recess will be maintained in alignment with the outlet 42.

I claim:

1. A fresh water flushing portable toilet, comprising:

a rigid commode having a hollow lower portion serving as a holding tank for sewage, and an upper portion formed with a toilet seat and provided with a depending bowl having an outlet to discharge into the holding tank;

a collapsible container for fresh water mounted within the holding tank;

and pump means to withdraw fresh water from the container and discharge it into the bowl to flush the latter;

the container being adapted to collapse as the fresh water is withdrawn to provide displacement volume for the sewage and permit both fresh water and sewage to occupy the holding tank simultaneously without being intermingled.

2. A toilet as claimed in claim 1; wherein

the container has substantially the same lateral dimensions as the holding tank, and its upper wall is at substantially the same elevation as the lower end of the bowl outlet to provide maximum fresh water storage.

3. A toilet as claimed in claim 2; wherein

one container wall is formed from top to bottom with a recess in horizontal planform in general alignment with the outlet to define a vertical flow path from the outlet to the bottom of the holding tank and to provide a total displacement for sewage which is greater than the total displacement of the container for fresh water.

4. A toilet as claimed in claim 3; wherein

a closure valve is provided to normally cover the outlet opening;

and the recess in the container wall is located to provide clearance for the opening movement of the valve.

5. A toilet as claimed in claim 3; wherein

a cleanout aperture is formed in the part of a wall of the holding tank which is in alignment with the lower end of the recess in the container to facilitate emptying and cleaning of the holding tank.

6. A toilet as claimed in claim 3; wherein

the pump means includes a pump barrel which extends vertically down from the upper wall of the

upper portion of the commode and is fixed thereto, and extends down through the upper wall of the container and is fixed thereto;

and a fresh water filler tube extends vertically down through the upper wall of the upper portion of the commode and is fixed thereto, and extends down through the upper wall of the container and is fixed thereto;

the connections of the barrel and tube to the container upper wall being adjacent to the container side wall which is formed with the recess, and spaced away from the recess in opposite directions to serve to retain the recess in proper alignment with the outlet of the bowl.

7. A toilet as claimed in claim 1; wherein

the pump means includes a vertical pump barrel having an inlet adjacent to its lower end;

the barrel extending into the container to a point adjacent its bottom wall to retain that portion of the wall in its lower position as the remainder of the container is displaced upward by sewage and thereby to insure that all of the fresh water will flow down to the pump inlet.

8. A toilet as claimed in claim 7; wherein

the pump barrel extends down through the upper wall of the upper portion of the commode and is fixed thereto;

and the barrel also extends down through the upper wall of the container and is fixed thereto to retain that portion of the wall in fixed position.

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