

[54] SANITARY APPARATUS

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4/224

[51] Int. Cl.....E03d 9/02

[58] Field of Search.....4/109, 222, 223, 224, 225,
4/220, 227; 137/209; 239/41, 42

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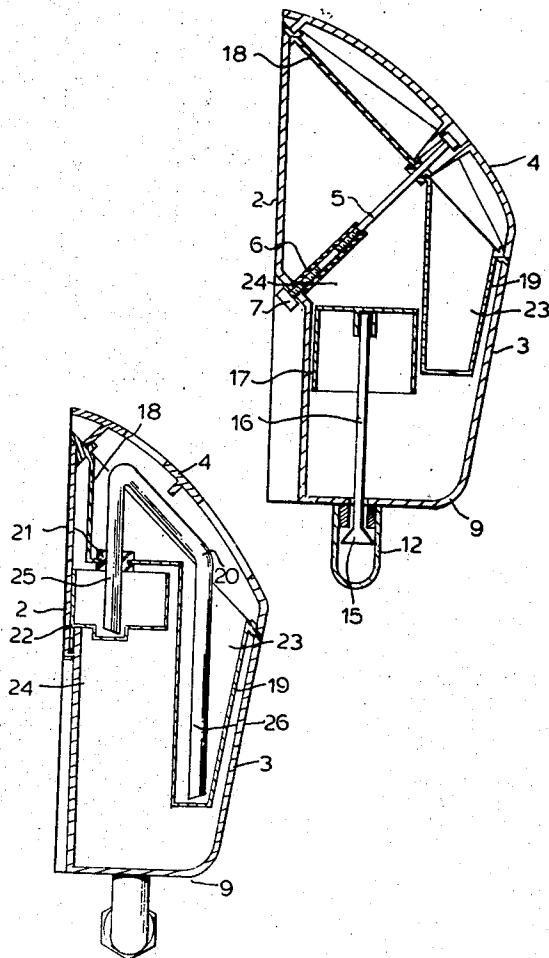
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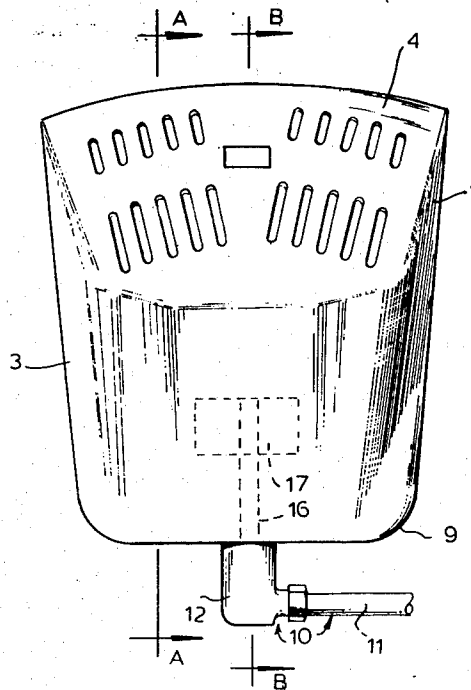
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ABSTRACT

The invention provides a deodorizing apparatus in which a flow of air generated by movement of water at some stage in a flushing cycle of a urinal, water-closet basin or the like convenience is directed into a vessel capable of receiving a liquid and thence passes upwardly through the shorter leg of a syphon tube and downwardly through the longer leg of the syphon tube to bubble from the longer leg of the syphon tube through a deodorant liquid contained in a second vessel from which it emerges to deodorize the surrounding atmosphere. The two vessels are disposed in respective chambers defined by a common container and isolated from one another by a partition through which the syphon tube passes. In one embodiment flushing water flows into the first chamber during a flush and drains therefrom at the end of a flush. In another embodiment an open-bottomed container adapted to be disposed in a flushing system is connected to the first chamber.

10 Claims, 5 Drawing Figures





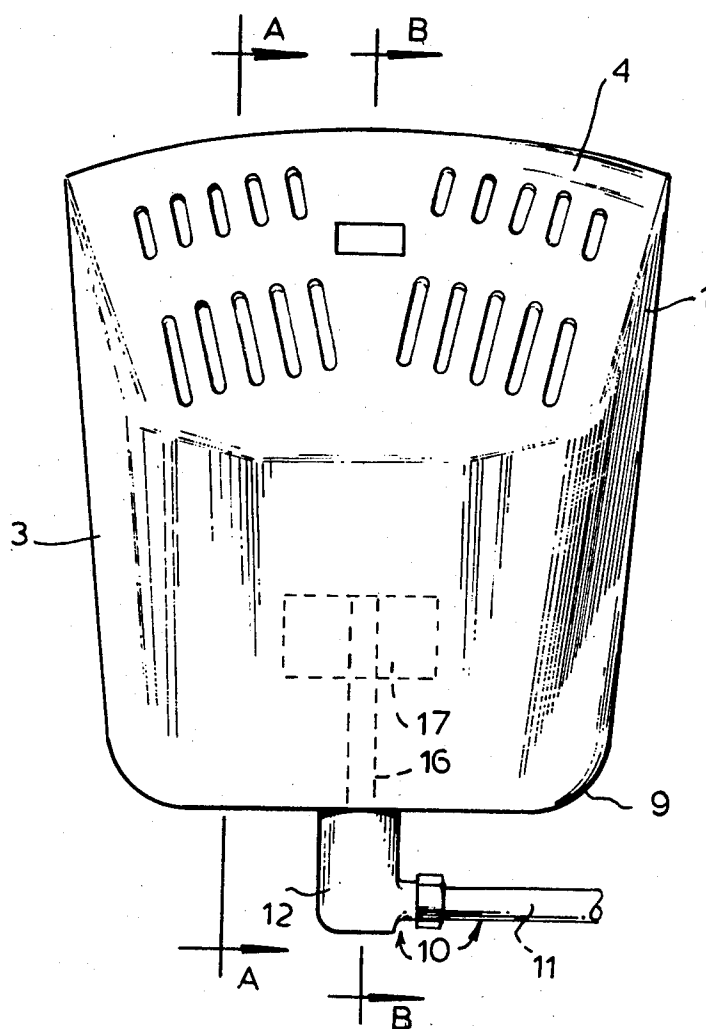


FIG. 1.

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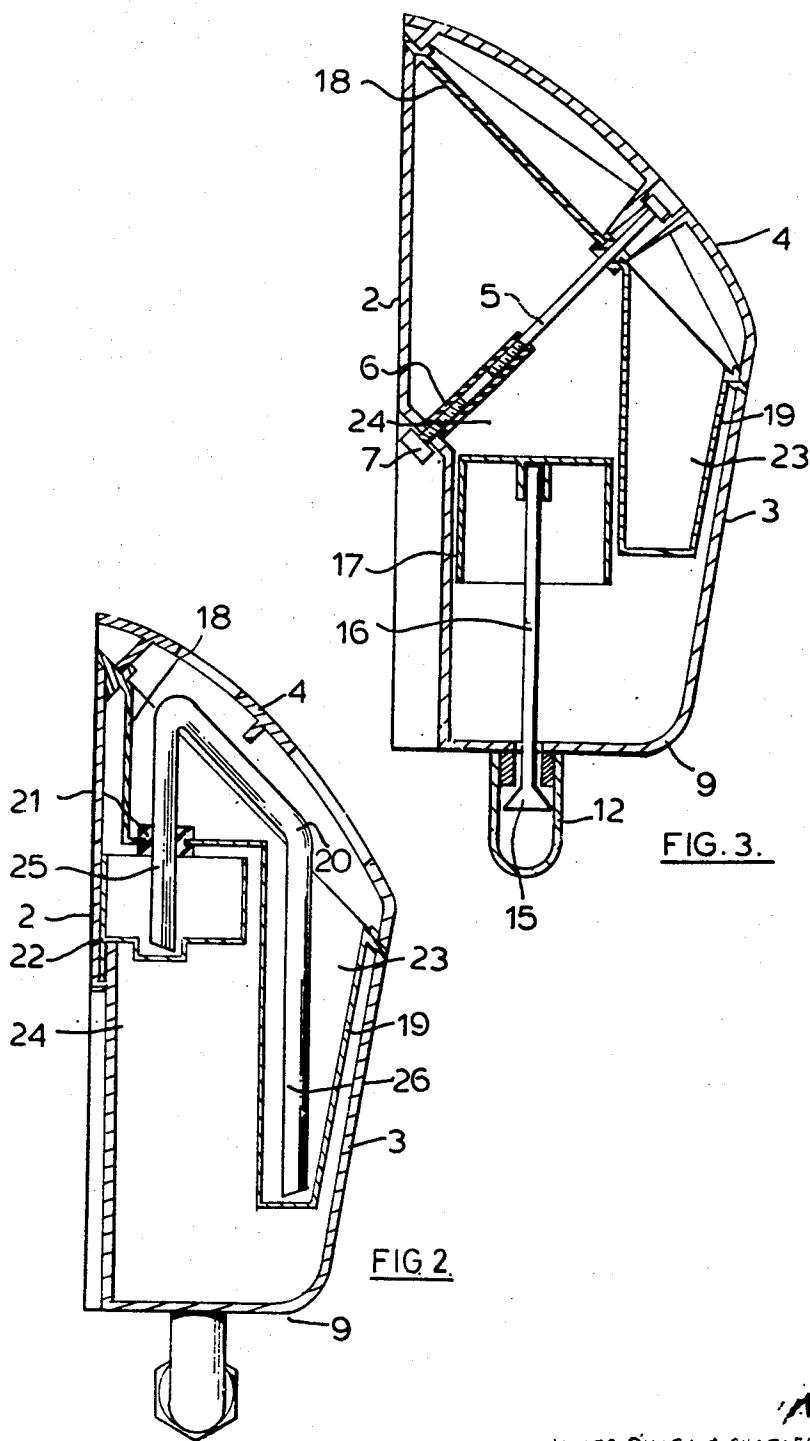


FIG. 3.

FIG. 2.

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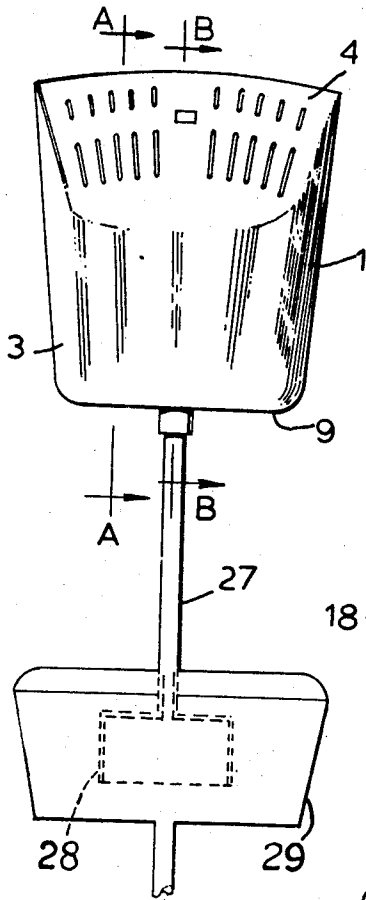


FIG. 4.

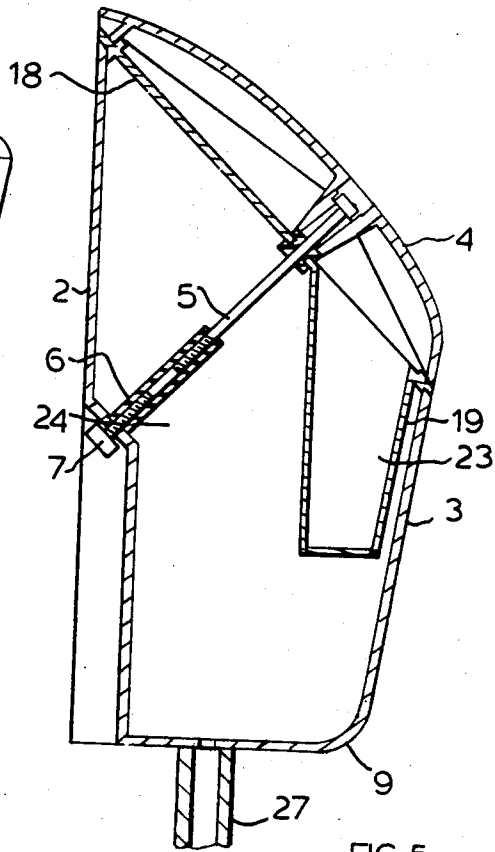


FIG. 5.

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SANITARY APPARATUS

The present invention relates to an apparatus for deodorizing the atmosphere and is primarily concerned with an apparatus whereby the air in a particular locality is automatically given a charge of a volatile deodorant or disinfectant from time to time, for example, as with each flushing operation of a water supply cistern.

A deodorizing apparatus in which air displaced by water from the flushing of a cistern is caused to pass through or by a pad soaked in deodorant liquid is known (see, for example, U.K. Pat. specification No. 1,069,213). In such an apparatus, the air displaced picks up deodorant vapor from the pad and then passes into the atmosphere. However, pads have some disadvantages in that they have to be changed periodically, they increase the initial cost of the apparatus, they can collect solid particles becoming contaminated and expensive deodorant liquid is wasted. It would, therefore, be advantageous to provide a deodorizing apparatus in which pads were not required. Some suggestions have been made for providing a deodorizing apparatus not requiring pads. Thus, in U.K. Pat. specification No. 782,872, it is stated that the air displaced may be caused to bubble through the deodorant liquid. However, a difficulty here is that there is often a suck-back effect at the end of the flush and deodorant liquid is sucked back along the air pipe and lost. This difficulty is overcome in U.K. Pat. specification No. 782,872 by providing a non-return valve. This, however, increases the cost and complexity of the apparatus and increases maintenance problems. Indeed, the invention of specification U.K. Pat. No. 782,872 has not been adopted commercially, as far as is known.

It is believed that a deodorizing apparatus in which air is bubbled directly into deodorant liquid provides a more uniform dispersion of deodorant than is obtained in a deodorizing apparatus incorporating a pad. Moreover, the former apparatus has a smaller surface area of deodorant liquid compared with the latter apparatus thus reducing losses by evaporation, and ensuring more effective use of deodorant liquid.

It has now been found, however, that a deodorizing apparatus can be provided which enables air displaced by water from a flushing cistern to be bubbled directly into deodorant liquid and at the same time overcomes the above-mentioned problem of suck-back in a manner which is automatically effective and is very simple, requiring no valves or complicated devices.

Thus, according to the present invention there is provided a deodorizing apparatus in which a flow of air generated by movement of water at some stage in a flushing cycle is directed into a vessel capable of receiving a liquid and from thence passes upwardly through the shorter leg of a syphon duct, then downwardly through the longer leg of the syphon duct and then passes from the longer leg of the syphon duct into a deodorant liquid contained in a second vessel from which it emerges to deodorize the surrounding atmosphere, the end of the shorter leg of the syphon duct being near to the base of said first mentioned vessel and being above the lower end of the longer leg.

A deodorizing apparatus of the present invention comprises a chamber into which flush water is allowed to rise to displace air therefrom either during the filling of a flushing cistern or during a flush therefrom, a first vessel capable of receiving a liquid, said vessel being in pneumatic communication with said chamber to receive air discharged therefrom, a second vessel for receiving a deodorant liquid, a syphon duct whose shorter leg extends upwardly from adjacent the base of said first vessel and whose longer leg extends downwardly towards the base of said second vessel, said vessels being pneumatically isolated from one another except for the connection afforded therebetween by said syphon tube.

The deodorizing apparatus of the present invention may be used in conjunction with both "high-flush" cisterns and "low-flush" cisterns. Thus, when used with a "high-flush" cistern, the chamber may be connected to the flush pipe of the cistern

so that water passing down the flush pipe enters the chamber to displace air therefrom. In a "low-flush" cistern, however, insufficient pressure is developed in the flush pipe during the flush. The chamber is therefore positioned in the cistern with an open end near the bottom of the cistern, the open end being above the minimum water level, so that when the cistern is being filled with water, air is displaced upwardly from the chamber. It will be observed, therefore, that when the deodorizing apparatus is used with a "high-flush" cistern, the deodorizing draught of air is produced during the actual flushing of the cistern, whereas when used with a "low-flush" cistern, the deodorizing draught is produced during the filling of the cistern.

After the air has ceased to pass through the syphon duct in the operation of the present invention, there is often a suck-back effect which sucks deodorant liquid into the syphon duct. The deodorant liquid would thus be wasted but for the provision of the first vessel, in which the sucked-back liquid is collected. When the suck-back ceases, the liquid in the first vessel flows back along the syphon tube, by syphon action, into the second vessel. Thus, loss of expensive deodorant liquid is simply and automatically minimized or avoided. Moreover, in some cases, the agitation caused by the movement of the liquid back into the first vessel causes further deodorant vapor to be released.

In a preferred form, the deodorizing apparatus of the present invention comprises two chambers each with a vessel therein for receiving liquid, one of which chambers has an air discharge opening and the other chamber is connectable to a flushing system so as to give rise in known manner to an increase or pressure in said chamber at some stage of a flushing cycle and to a subsequent return to normal pressure therein, and a syphon duct whose shorter leg extends upwardly from adjacent the base of the vessel of said other chamber and whose longer leg extends downwardly towards the base of the vessel of said one chamber so that the lower end of the longer leg lies below the lower end of the shorter leg, said chambers being pneumatically isolated except for the connection therebetween afforded by said syphon duct. Thus, as stated above, the displacement of air giving rise to an increase in pressure takes place during the flush when the deodorizing apparatus is used in conjunction with a "high-flush" cistern and whilst the cistern is filling when used in conjunction with a "low-flush" cistern.

In the operation of the preferred form of the deodorizing apparatus, when used in conjunction with a "high-flush" cistern, water rises in the said other chamber during a flush to drive air from the said other chamber through said syphon duct to adjacent the base of the vessel in said one chamber, through deodorant liquid in said vessel and thence through said air discharge opening into the atmosphere. Deodorant liquid, if sucked back through the syphon duct from the vessel in said one chamber to the vessel in said other chamber while the water drains from said other chamber, is subsequently syphoned back into the vessel in said one chamber.

Conveniently, the preferred form of the deodorizing apparatus, when used in conjunction with a "high-flush" cistern, is provided with a float in said other chamber, said float being connected to a valve, positioned to control the flow of water into said other chamber. Thus, when sufficient water has entered said other chamber, the float activates the valve so preventing further flow of water into said other chamber.

In the operation of the preferred form of the deodorizing apparatus, when used in conjunction with a "low-flush" cistern, air pressure rises in said other chamber at some stage of a flushing cycle and the air is driven from the said other chamber through said syphon duct to adjacent the base of the vessel in said one chamber, through deodorant liquid in said vessel and thence through said air discharge opening into the atmosphere. Deodorant liquid is syphoned back in the same way as in the apparatus used in conjunction with a "high-flush" cistern, in cases where the liquid is sucked-back. A convenient means for causing air pressure to rise in said other

chamber is provided by a further chamber having an open bottom, positioned in the cistern and connected by a conduit to said other chamber. Thus, when the cistern fills, air is displaced from the further chamber and thence into said other chamber.

In the preferred form of deodorizing apparatus according to the present invention said chambers can be incorporated in a single container with said air discharge opening in its upper part and with the syphon tube passing through a partition which seals one chamber from the other, passing below the vessel in said one chamber and above the vessel in said other chamber. Conveniently, said partition can comprise the vessel of said one chamber.

Examples of deodorant liquids which can be used in the apparatus of the present invention are:

1. a mixture of isoeugenol, eugenol, geraniol and aromatic chemicals;
2. a mixture of citrus oil, lemongrass oil and aromatic chemicals;
3. a mixture of essential oils of lavender and orange together with aromatic chemicals; and
4. a mixture of essential oils and their derivatives isolates containing 30 percent isopropyl alcohol.

It will, however, be readily appreciated that the liquids used in the apparatus of the present invention need not necessarily be restricted to deodorant liquids. Thus, any volatile liquid, the vapor of which it is desired to disperse into the air, could be used, for example, perfumes, insecticides, aromatics and the like.

The invention will now be further described by way of example with reference to the somewhat diagrammatic drawings which illustrate two forms of deodorizing apparatus according to the present invention and in which:

FIG. 1 is a front view of a high-flush arrangement;

FIG. 2 is a section on the line A—A of FIG. 1;

FIG. 3 is a section on the line B—B of FIG. 1;

FIG. 4 is a front view of a low-flush arrangement; and

FIG. 5 is a section on the line B—B of FIG. 4, a section on the line A—A of FIG. 4 being the same as FIG. 2.

Referring first of all to FIGS. 1, 2 and 3, the outer container 1 comprises a shell having a back-wall 2, a front-wall 3 and a base 9, and a grille 4 sealed to the back-wall 2 and front-wall 3. The grille 4 is secured in position by a screw 5 which engages in a threaded pillar 6 held by a second screw 7 to the inner face of the back-wall 2.

A pipe connection 10 is secured to the base 9 of the outer container 1. A pipe 11 of the pipe connection 10 leads to a flush pipe. The pipe connection 10 includes a valve housing 12. A valve 15 in the valve housing 12 has a valve stem 16 connected at its upper end to a float 17, comprising a sealed hollow container which may be of metal or plastics material. The outer container 1 has two chambers 23 and 24 which are separated by an internal diaphragm 18, which is held in position by the screw 5 and sealed by an epoxy resin gasket (not shown). The diaphragm 18 is conveniently constructed from an acetal copolymer such as "Kematal." Each chamber 23 and 24 is provided with a vessel 19 and 22 for receiving liquid. The second vessel 19 is actually part of the diaphragm 18 and the first vessel 22 is firmly affixed to the back-wall 2 of the outer container 1.

The other chamber 24 is connectable to a flushing system via the valve housing 12, the pipe connection 10 and the pipe 11. A syphon duct in the form of a copper U-tube 20 passes through the diaphragm 18 and is held in position by means of a neoprene grommet 21. The shorter leg 25 of the U-tube 20 extends upwardly from adjacent the base of the first vessel 22 of the chamber 24 and the longer leg 26 of the U-tube 20 extends downwardly towards the base of the second vessel 19 of the chamber 23. The lower end of the longer leg 26 lies below the lower end of the shorter leg 25. The chambers 23 and 24 are pneumatically isolated from one another except for the connection therebetween afforded by the U-tube 20.

In operation of the deodorizing apparatus depicted in FIGS. 1, 2 and 3, a flush of water passes down the flush pipe to which the pipe 11 is connected. Water enters the chamber 24 and rises therein. The float 17 and the valve 15 are arranged to restrict the rise of water in the chamber 24. The movement of water causes a flow of air to be generated. The air passes into the first vessel 22, upwardly through the shorter leg 25 of the U-tube 20, downwardly through the longer leg 26 of the U-tube 20 into deodorant liquid contained in the second vessel 19. The air thus picks up deodorant and passes through the grille 4 into the atmosphere.

At the end of the flush, water drains from the chamber 24 and a fresh supply of air is drawn in. There is often a suck-back at the end of the flush and deodorant liquid tends to be drawn from the vessel 19 along the U-tube 20 and into the vessel 22. When the suck-back ceases, the deodorant liquid which has been collected in the vessel 22 passes along the U-tube 20 and back into the vessel 19 by syphon action.

Referring now to FIGS. 4 and 5, certain parts are identical with those in FIGS. 1, 2 and 3 and these have been given the same reference numerals. Moreover the section according to FIG. 2 also applies to the embodiment of FIGS. 4 and 5.

The embodiment of FIGS. 4 and 5 differs from that of FIGS. 1 to 3 in that the valve 15 and the float 17 are omitted and in place of the pipe 11, a pipe 27 is secured to the base 9 of the outer container. This pipe 27 leads to a container 28 to which it is connected. The container 28 is open-bottomed and is positioned within a cistern 29.

In operation of the deodorizing apparatus depicted in FIGS. 4 and 5, water rises in the cistern 29 after a flush has occurred. The rising of the water level forces air from the container 28 and along the pipe 27. The air passes into the chamber 24 and thence into the first vessel 22, upwardly through the shorter leg 25 of the U-tube 20, downwardly through the longer leg 26 of the U-tube 20 into deodorant liquid contained in the second vessel 19. The air thus picks up deodorant and passes through the grille 4 into the atmosphere.

When the cistern 29 is flushed again, there is often a suck-back as water leaves the container 28. Deodorant liquid thus tends to be drawn from the vessel 19 along the U-tube and into the vessel 22. When the suck-back ceases, the deodorant liquid which has been collected in the vessel 22 passes along the U-tube 20 and back into the vessel 19 by syphon action.

In the embodiment of FIGS. 1, 2 and 3 a disinfecting device can be provided in the chamber 24. Such disinfecting device can comprise an inverted inner container within the chamber 24 with its lower end spaced above the base 9 and closed by a layer, wad or plug of reticulate or foraminous material as described more fully in the above-mentioned British Pat. specification No. 1,069,213. A viscous, slowly mobile disinfectant composition inside the inverted container rests on the upper face of the layer, wad or plug. The chamber 24 does not drain completely at the end of the flush and some disinfectant composition diffuses through the layer, wad or plug during the interval between flushes to form with the residual liquid retained in the bottom of the container 24 a concentrated disinfectant solution. This concentrated solution is diluted by flushing water fed through the pipe 11 during a flush and the diluted disinfectant solution discharges itself from the container 1 into the convenience at the end of a flush.

In the embodiment of FIGS. 4 and 5 a disinfecting device can be attached to the open-bottomed container 28 disposed in the cistern 29. In this case such disinfecting device can comprise an inverted inner container disposed within a separate outer container in its lower end closed by a layer, wad or plug as described more fully in British Pat. specification No. 1,070,188. As before, residual water in the outer container forms a concentrated disinfectant solution with disinfectant composition which diffuses out of the inverted inner container. When the cistern fills, water flows into the outer container to dilute the disinfectant solution. Towards the end of a flush the diluted solution flows into the cistern through an inverted U-tube under syphonic action.

We claim:

1. A deodorizing apparatus for a flushing system having an intermittent flow of flush water therein, comprising a chamber adapted to receive flush water during one stage of the flow of flush water whereby flush water can rise in said chamber to displace air therefrom; a first vessel capable of receiving a liquid, said first vessel being in pneumatic communication with said chamber to receive air displaced therefrom; a second vessel for receiving a deodorant liquid; and syphon duct means having a shorter leg which extends upwardly from adjacent the base of said first vessel and a longer leg which extends downwardly towards the base of said second vessel, and means pneumatically isolating said vessels from one another except for the connection afforded therebetween by said syphon duct means.

2. Apparatus according to claim 1 further comprising float valve means to limit the rise of water in said chamber.

3. Apparatus according to claim 1 including a container having an open bottom and adapted to be disposed inside a cistern of the flushing system, said chamber being defined in said open bottomed container.

4. A deodorizing apparatus comprising first and second chambers; first and second vessels for receiving liquid disposed respectively in said first and second chambers, means for connecting said first chamber to a flushing system so as to give rise to an increase of pressure in said one chamber at one stage of a flushing cycle and to a subsequent return to normal pressure therein, said second chamber having an air discharge opening; and syphon duct means having a shorter leg which extends upwardly from adjacent the base of said first vessel and a longer leg which extends downwardly towards the base of said second vessel so that the lower end of the longer leg lies below the lower end of the shorter leg, and means pneumatically isolating said chambers from one another except for the

connection therebetween afforded by said syphon duct means.

5. Apparatus according to claim 4 including a float valve at the lower end of said first chamber to limit the rise of flush water in said first chamber.

6. Apparatus according to claim 4 in which said first chamber comprises first and second portions and a pipe interconnecting said chamber portion, and in which the apparatus further comprises a single container defining said first chamber portion and said second chamber and having therein a partition separating said second chamber from said first chamber portion, and a container having an open bottom and adapted to be disposed inside a cistern of the flushing system, said second chamber portion being defined in said open-bottomed container, said syphon duct means comprising a syphon tube passing through said partition.

7. Apparatus according to claim 5 comprising a single container, said first and second chambers being defined in said single container with said air discharge opening in an upper part of said container, and a partition in said container sealing said first chamber from said second chamber, said syphon duct means comprising a syphon tube passing through said partition and passing below the second vessel in said second chamber and above the first vessel in said first chamber.

8. Apparatus according to claim 7 in which said partition comprises said second vessel.

9. Apparatus according to claim 4 comprising a disinfecting device in said first chamber and adapted to discharge a diluted disinfectant solution into the flushing system.

10. Apparatus according to claim 3 comprising a disinfecting device attached to said open-bottomed container and adapted to discharge a diluted disinfectant solution into the cistern.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,668,716 Dated June 13, 1972

Inventor(s) James O'Hara and Charles Lewis Gibbins

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the grant (only) insert the following:

We claim:

1. A deodorizing apparatus for a flushing system having an intermittent flow of flush water therein, comprising a chamber adapted to receive flush water during one stage of the flow of flush water whereby flush water can rise in said chamber to displace air therefrom; a first vessel capable of receiving a liquid, said first vessel being in pneumatic communication with said chamber to receive air displaced therefrom; a second vessel for receiving a deodorant liquid; and syphon duct means having a shorter leg which extends upwardly from adjacent the base of said first vessel and a longer leg which extends downwardly towards the base of said second vessel, and means pneumatically isolating said vessels from one another except for the connection afforded therebetween by said syphon duct means.
2. Apparatus according to claim 1 further comprising float valve means to limit the rise of water in said chamber.
3. Apparatus according to claim 1 including a container having an open bottom and adapted to be disposed inside a cistern of the flushing system, said chamber being defined in said open bottomed container.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PAGE - 2

Patent No. 3,668,716

Dated June 13, 1972

Inventor(s) James O'Hara and Charles Lewis Gibbins

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

4. A deodorizing apparatus comprising first and second chambers; first and second vessels for receiving liquid disposed respectively in said first and second chambers, means for connecting said first chamber to a flushing system so as to give rise to an increase of pressure in said one chamber at one stage of a flushing cycle and to a subsequent return to normal pressure therein, said second chamber having an air discharge opening; and syphon duct means having a shorter leg which extends upwardly from adjacent the base of said first vessel and a longer leg which extends downwardly towards the base of said second vessel so that the lower end of the longer leg lies below the lower end of the shorter leg, and means pneumatically isolating said chambers from one another except for the connection therebetween afforded by said syphon duct means.

5. Apparatus according to claim 4 including a float valve at the lower end of said first chamber to limit the rise of flush water in said first chamber.

6. Apparatus according to claim 4 in which said first chamber comprises first and second portions and a pipe interconnecting said chamber portion, and in which the apparatus further comprises a single container defining said first chamber portion and said second chamber and having therein a partition separating said second chamber from said first chamber portion, and a container having an open bottom and adapted to be disposed inside a cistern of the flushing system, said second chamber portion being defined in said open-bottomed container, said syphon duct means comprising a syphon tube passing through said partition.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PAGE - 3

Patent No. 3,668,716

Dated June 13, 1972

Inventor(s) James O'Hara and Charles Lewis Gibbins

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

7. Apparatus according to claim 5 comprising a single container, said first and second chambers being defined in said single container with said air discharge opening in an upper part of said container, and a partition in said container sealing said first chamber from said second chamber, said syphon duct means comprising a syphon tube passing through said partition and passing below the second vessel in said second chamber and above the first vessel in said first chamber.

8. Apparatus according to claim 7 in which said partition comprises said second vessel.

9. Apparatus according to claim 4 comprising a disinfecting device in said first chamber and adapted to discharge a diluted disinfectant solution into the flushing system.

10. Apparatus according to claim 3 comprising a disinfecting device attached to said open-bottomed container and adapted to discharge a diluted disinfectant solution into the cistern.

Signed and sealed this 9th day of July 1974.

(SEAL)

Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents