DUAL FLUSH TOILET VALVE SYSTEM

Inventors: Lisbeth Pedersen Sylvestre, Nibe (DK); Nils Uwe Karstensen, Snedsted (DK)

Correspondence Address:
Arent Fox LLP
555 West Fifth Street, 48th Floor
Los Angeles, CA 90013 (US)

Assignees: Lisbeth Pedersen Sylvestre, Nibe (DK); Nils Uwe Karstensen, Snedsted (DK)

Appl. No.: 12/541,156
Filed: Aug. 13, 2009

Publication Classification

Int. Cl. E03D 1/35 (2006.01)

U.S. Cl. 4/395

ABSTRACT

A flush regulator for a toilet tank for regulating the outflow therefrom through an outlet, said regulator including a valve without buoyancy, said valve adapted to close said outlet, a connector connected at one end to said valve and a body of buoyancy at another end of said connector above said valve, said valve adapted to close said outlet when the water level in said tank reaches the upper edge of said body of buoyancy and said buoyancy and valve fall to close said outlet wherein said toilet tank includes an overflow pipe wherein said body of buoyancy is connected to the overflow pipe by a plurality of attachment points and wherein the height of the body of buoyancy is varied by attaching the body of buoyancy using one of the plurality of attachment points so as to adjust the height of the body of buoyancy relative to said valve.
DUAL FLUSH TOILET VALVE SYSTEM

BACKGROUND

[0001] 1. Field
[0002] The following description relates generally to water saving devices for cisterns, and particularly relates to a regulator for a toilet tank for regulating the outflow of liquid through an outlet.
[0003] 2. Background
[0004] Many existing toilet tanks and flush systems presently existing in North America have been designed and installed many years ago when the supply of fresh water was not much of a concern as it is in the present day. Generally speaking, the supply of fresh water and its purification is a concern in today's society, especially related to the volume of water being flushed. This concern is acute for organizations such as hotels, government bodies and other large organizations having many toilets used by many people. Such organizations are concerned with the volume of water being used for environmental reasons as well as the cost of its use.
[0005] There have been a variety of systems and mechanisms been designed to address this issue. One current approach to a water saving device for a flush tank includes a floating body, a guide track on which the floating body is slideably mounted by a bracket, and a clip mounted to the guide track for snap fit around the stand pipe of the flush tank. The guide track is positioned so that the body is substantially directly above a flush valve of the flush tank, so that upon flushing the body will contact and forcibly close the flush valve to save water. However, it is difficult to adjust the setting for different volume of waters desired.

[0006] In another example, a dual mode flush valve assembly is selectively operable in a full or partial flush mode for use with a toilet flush tank assembly including a flush valve actuator movably between a first and second position interconnected to a buoyant valve movably between an open and closed position, the dual mode flush valve assembly including a flush valve actuator assembly movably between an upper buoyant position, an intermediate full flush position and a lower partial flush position in combination with a flush valve control assembly movably between a first and second position disposed to selectively engage the flush valve actuator assembly. In the first position, the flush valve actuator assembly is in the upper buoyant position and the buoyant flush valve is in the closed position. When the flush actuator is moved from the first to second position for less than a predetermined period of time, moving the buoyant flush valve to the open position, the flush valve actuator assembly moves downward to the intermediate full flush position to engage the flush valve control assembly in the first position whereby the flush valve actuator assembly is held in spaced relation relative to the buoyant flush valve to provide the full flush mode. When the flush actuator is moved from the second to first second position for more than the predetermined period of time, moving the buoyant flush valve to the open position and the flush valve actuator assembly to the second position, the flush valve actuator assembly moves downward to the lower partial flush position to engage the flush valve moving the buoyant flush valve to the closed position so as to provide a partial flush.

[0007] The current devices and methods present relatively complicated structures.

[0008] Consequently, it would be desirable to address one or more of the deficiencies described above.

SUMMARY

[0009] The following presents a simplified summary of one or more aspects in order to provide a basic understanding of such aspects. This summary is not an extensive overview of all contemplated aspects, and is intended to neither identify key or critical elements of all aspects nor delineate the scope of any or all aspects. Its sole purpose is to present some concepts of one or more aspects in a simplified form as a prelude to the more detailed description that is presented later.

[0010] According to various aspects, the subject invention relates to systems and/or methods that provide a flush valve with dual flushing volumes that are easily operable.

[0011] In one aspect, a flush regulator for a toilet tank for regulating the outflow therefrom through an outlet is disclosed, the regulator including a valve without buoyancy, the valve adapted to close the outlet, a connector connected at one end to the valve and a body of buoyancy at another end of the connector above the valve, the valve adapted to close the outlet when the water level in the tank reaches the upper edge of the body of buoyancy and the buoyancy and valve fall to close the outlet wherein the toilet tank includes an overflow pipe wherein the body of buoyancy is connected to the overflow pipe by a plurality of attachment points and wherein the height of the body of buoyancy is varied by attaching the body of buoyancy using one of the plurality of attachment points so as to adjust the height of the body of buoyancy relative to the valve.

[0012] In another aspect, a flush regulator is disclosed in a toilet tank for regulating the outflow therefrom through an outlet, the regulator including a valve without buoyancy, the valve adapted to close the outlet, a connector connected at one end to the valve and a body of buoyancy attached above the valve, the valve adapted to close the outlet when the water level in the tank reaches the upper edge of the body of buoyancy and the buoyancy and valve fall to close the outlet; wherein the valve and the body of buoyancy is guided by a guide.

[0013] In yet another aspect, a regulator for a toilet tank for regulating the outflow of liquid through an outlet includes: (a) a valve for opening and closing the outlet; (b) means for locating the valve relative the outlet; (c) moveable buoyancy means disposed for slideable displacement relative the locating means for moving the valve from a closed position to an open position to permit the liquid through the outlet; (d) wherein the locating means is stationary relative the outlet and the buoyancy means slides relative the locating means when the valve is open for outflow of the liquid through the outlet; and (e) wherein the buoyancy means comprises: (i) a member to slideably embrace the locating means; (ii) a buoyancy member selectively moveable relative to the slideable member to adjust the level of flush of the liquid; and (f) wherein the locating means comprises: (i) a generally cylindrical body having a hole therethrough; (ii) a retaining member having a bore therethrough for frictionally receiving and retaining the cylindrical body.

[0014] To the accomplishment of the foregoing and related ends, the one or more aspects comprise the features hereinafter fully described and particularly pointed out in the claims. The following description and the annexed drawings set forth in detail certain illustrative aspects of the one or more aspects. These aspects are indicative, however, of but a few of
the various ways in which the principles of various aspects may be employed and the described aspects are intended to
include all such aspects and their equivalents.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] These and other sample aspects of the invention will be
described in the detailed description that follow, and in the
accompanying drawings, wherein:

[0016] FIG. 1 is a partial view of a dual-flush valve config-
ured in accordance with one aspect of the current disclosure;

[0017] FIG. 2 is a cut-away diagram of the dual-flush valve
of FIG. 1 installed in a toilet in accordance with one aspect of
the current disclosure;

[0018] FIG. 3 is a perspective view of the dual-flush valve
of FIG. 1; and

[0019] FIG. 4 is a diagram of an alternate version of the
dual-flush valve of FIG. 1.

[0020] In accordance with common practice, some of the
drawings may be simplified for clarity. Thus, the drawings
can not depict all of the components of a given apparatus
(e.g., device) or method. Finally, like reference numerals may
be used to denote like features throughout the specification
and figures.

DETAILED DESCRIPTION

[0021] Various aspects of the invention are described more
fully hereinafter with reference to the accompanying draw-
ings. This invention may, however, be embodied in many
different forms and should not be construed as limited to any
specific structure or function presented throughout this dis-
closure. Rather, these aspects are provided so that this disclo-
sure will be thorough and complete, and will fully convey the
scope of the invention to those skilled in the art. Based on the
teachings herein one skilled in the art should appreciate that
that the scope of the invention is intended to cover any aspect
of the invention disclosed herein, whether implemented inde-
dependently of or combined with any other aspect of the inven-
tion. For example, an apparatus may be implemented or a
method may be practiced using any number of the aspects set
forth herein. In addition, the scope of the invention is intended
to cover such an apparatus or method which is practiced using
other structure, functionality, or structure and functionality in
addition to or other than the various aspects of the invention
set forth herein. It should be understood that any aspect of the
invention disclosed herein may be embodied by one or more
elements of a claim.

[0022] In one aspect of the disclosure, a water saving device
in toilets is provided that replaces single flush valves in sys-
tems using flapper-type toilet flushing valves. The water sav-
ing device includes a dual flush valve that allows two volumes
of flushes: a first volume of flush when a flush handle is
pressed and released; and a second, larger volume of flush
when the flush handle is pressed and held. The water quantity
of the first volume of flush is adjustable while installing the
dual flush valve. After adjustment the small flush will flush
out constantly with the same water quantity as adjusted.

[0023] FIG. 1 illustrates a dual flush system 100 that
includes a valve shaft 101, which is illustrated in FIG. 2 as
installed in a toilet 200. FIG. 3 illustrates a perspective view
of the dual-flush system 100. Referring back to FIG. 1, an air
chamber 109 is attached to the valve shaft 101, with a rope
111 actuating the dual flush system 100 through a rope attach-
ment handle 132. When pulling the rope 111, which may be
implemented with a chain or water resistant material,
upwards with a handle 202, a valve 107 will open and start the
flushing procedure.

[0024] The air chamber 109 holds the valve 107 in the open
position by its buoyancy until the water level has reached it.
When the handle 202 is released, the valve 107 will close by
its lost of buoyancy. Adjustment of this level is achieved by
turning the air chamber 109 to disengage two brackets on air
chamber 109 (not shown) from a plurality of notches 101b,
moving air chamber 109 up or down on the various levels,
defined by the plurality of notches 101b as seen in FIG. 3.
turning air chamber 109 back until the two brackets attach to
another notch in the plurality of notches 101b of the valve
shaft 101.

[0025] In one aspect of the disclosure, the air chamber 109
is clamped upon the valve shaft 101. Adjustment of the water
quantity of a flush is achieved by moving the location of the
air chamber 109 up to provide more flush volume, or down for
less flush volume. The position of the air chamber 109 is hand
adjustable. The valve shaft 101 also provides an overflow
feature wherein an opening at the top of the valve shaft 101
allows water to flow into it. This double function, overflow
feature at the center of the valve shaft 101 is another important
feature of the dual flush system 100.

[0026] The valve shaft 101 is guided by a guide rod 102,
which is cross-shaped in one aspect of the disclosure, on a
center line of the valve shaft 101. The guide rod 102 allows
the valve shaft 101 to provide its overflow feature. In other
aspects of the disclosure, another shape may be used as long
as the cross-section of the cross-shaped rod 102 and the valve
shaft 101 includes space for water to flow through. The
upwards movement of the valve shaft 101 is limited by a
blocking ring 110. Incorporated into the blocking ring 110 is
an angle pipe 122. To refill the bowl, an S-shaped water trap
is used after flushing while refilling the toilet water tank. In
one aspect as disclosed herein, the angle pipe 122 of the
blocking ring 110 is to be connected with the refilling valve by
a rubber hose (not shown) to a water supply.

[0027] In one aspect of the disclosure, the guide rod 102 is
attached to a bottom piece 103 to attach to a bottom portion
104 of the valve shaft 101. The bottom portion 104 is installed
on a bottom of a water tank 106 using a rubber gasket 108 and
a nut 105. The dual flush system 100 is tightened against the
water tank 106 by the rubber gasket 108. The valve 107 is
implemented by a tapered rubber gasket 127 assembled to the
valve shaft 101 by a sliced ring 148.

[0028] In an aspect of the disclosure, it is possible to adjust
the height of the valve shaft 101 by shortening it. To do this the
valve shaft may be cut at any of the locations at the top of the
valve shaft 101, as indicated by the plurality of notches 101a.
Thus, in accordance, the position of the blocking ring 110
may have to be adjusted to follow the valve shaft 101 down-
wards.

[0029] FIG. 4 illustrates an alternate embodiment of the
dual-flush system 100, where a pull knob 451 is used to
actuate a pulling rod assembly 411. The elements of FIG. 4
that are not set forth separately and described differently
perform the same functions as identified in FIG. 1, with the
reference numbers of the items in FIG. 4 being paired to the
reference numbers of the items in FIG. 1 (e.g., the air chamber
409 of FIG. 4 performs the same functions as the air chamber
109 of FIG. 1).

[0030] In this disclosed aspect, a knob 451 actuates the dual
flush system 100 through a control rod 111 attached to a ro
attachment portion 132. The knob 451 is threaded through a water tank lid 406a and a top bow portion 450 using a tube 421. The top bow portion 450 is attached to a bottom bow portion 452 through a bow attachment 454. The bottom bow portion 452 is attached to a water tank 406b.

[0031] The previous description is provided to enable any person skilled in the art to fully understand the full scope of the disclosure. Modifications to the various configurations disclosed herein will be readily apparent to those skilled in the art. Thus, the claims are not intended to be limited to the various aspects of the invention described herein, but is to be accorded the full scope consistent with the language of claims, wherein reference to an element in the singular is not intended to mean “one and only one” unless specifically so stated, but rather “one or more.” Unless specifically stated otherwise, the term “some” refers to one or more. All structural and functional equivalents to the elements of the various aspects described throughout this disclosure that are known or later come to be known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the claims. Moreover, nothing disclosed herein is intended to be dedicated to the public regardless of whether such disclosure is explicitly recited in the claims. No claim element is to be construed under the provisions of 35 U.S.C. §112, sixth paragraph, unless the element is expressly recited using the phrase “means for” or, in the case of a method claim, the element is recited using the phrase “step for.”

What is claimed is:

1. A flush regulator for a toilet tank for regulating the outflow therefrom through an outlet, said regulator including a valve without buoyancy, said valve adapted to close said outlet, a connector connected at one end to said valve and a body of buoyancy at another end of said connector above said valve, said valve adapted to close said outlet when the water level in said tank reaches the upper edge of said body of buoyancy and said buoyancy and valve fail to close said outlet wherein said toilet tank includes an overflow pipe wherein said body of buoyancy is connected to the overflow pipe by a plurality of attachment points and wherein the height of the body of buoyancy is varied by attaching the body of buoyancy using one of the plurality of attachment points so as to adjust the height of the body of buoyancy relative to said valve.

2. The flush regulator as claimed in claim 1 wherein said body of buoyancy is installed on said connecting rod by a notched assembly between said body of buoyancy and said overflow pipe.

3. The flush regulator as claimed in claim 1 wherein said body of buoyancy is installed on said overflow pipe by a screw thread between said body of buoyancy and said overflow pipe.

4. The flush regulator as claimed in claim 1 wherein said body of buoyancy is fractionally clamped upon an intermediate socket to install the body of buoyancy at different levels.

5. A flush regulator for use in a toilet tank for regulating the outflow therefrom through an outlet, said regulator including a valve without buoyancy, said valve adapted to close said outlet, a connector connected at one end to said valve and a body of buoyancy attached above said valve, said valve adapted to close said outlet when the water level in said tank reaches the upper edge of said body of buoyancy and said buoyancy and valve fail to close said outlet; wherein said valve and said body of buoyancy is guided by a guide.

6. The flush regulator as claimed in claim 5 wherein said toilet tank includes an overflow pipe to which said body of buoyancy and wherein a location on which said overflow pipe said body of buoyancy is connected is varied by turning said body of buoyancy to engage a plurality of attachment points so as to adjust a distance between said body of buoyancy relative said slide valve.

7. The flush regulator as claimed in claim 5 wherein said guide is clamped into a clip connecting said guide with a water inlet hose, said clip provided with an elastic area so that said guide is held fast at all installed radial positions during further operation of said flush regulator.

8. The regulator for a toilet tank for regulating the outflow of liquid through an outlet comprising: (a) a valve for opening and closing said outlet; (b) means for locating said valve relative said outlet; (c) moveable buoyancy means disposed for slideable displacement relative said locating means for moving said valve from a closed position to an open position to permit said liquid through said outlet; (d) wherein said locating means is stationary relative said outlet and said buoyancy means slides relative said locating means when said valve is open for outflow of said liquid through said outlet; and (e) wherein said buoyancy means comprises: (i) a member to slideably embrace said locating means; (ii) a buoyancy member selectively moveable relative said slideable member to adjust the level of flush of said liquid; and (f) wherein said locating means comprises: (i) a generally cylindrical body having a hole therethrough; (ii) a retaining member having a bore therethrough for fractionally receiving and retaining said cylindrical body.

9. The regulator as claimed in claim 8 wherein retaining member comprises fastening means for fastening said retaining member to said overflow pipe.

10. The regulator as claimed in claim 9 wherein said hole in said generally cylindrical body is eccentrically disposed.

11. The regulator as claimed in claim 10 wherein said cylindrical body is fractionally rotate within said bore of said retaining member for adjusting the distance between the centre line of said hole and rod to the centre line of said overflow pipe so as to position said valve over said outlet.

12. The regulator as claimed in claim 11 wherein said cylindrical body includes a cylindrical extension having a diameter smaller than said cylindrical body.

13. The regulator as claimed in claim 12 wherein said hole through said cylindrical body extends through said extension.

14. The regulator as claimed in claim 13 wherein said rod is disposed for slideable movement through said hole and said rod is connected to said valve and said slideable member.

15. The regulator as claimed in claim 14 wherein said rod is fastened to said valve by a ball and socket joint.

16. The regulator as claimed in claim 15 which is adapted to be retrofitted to any existing toilet and wherein the level of flush is adjusted by moving said buoyancy member relative said slideable member.

* * * * *