DUAL FLUSH TOILET MECHANISM

Inventors: Edward T. Hawley, Keyport, NJ (US); Philip J. Blyskal, Princeton, NJ (US)

Publication Classification

International Classification (IPC)
- Int. Cl. E03D L/4 (2006.01)

U.S. Classification
- 4/325

ABSTRACT

A dual flush toilet system includes a mechanism (22) that permits the flush handles (82,84) to be placed at any location on the toilet tank (12) and even on the top (14) of the toilet bowl if desired. The dual flush valve itself preferably comprises a prior art mechanism (20) attached to a pair of exterior handles (82,84) by means of a cable and wire system (60,64). Rotation of an outer handle (82) causes the main float (42) to rise under the influence of first wire (60) thereby causing a small, or low, volume flush to occur. Pushing down on both handles (82,84) simultaneously causes a float lock (34) to rise which in turn allows a lower float (52) to lift and engage the bottom rim (150) of the float mechanism (20) thereby holding the mechanism (20) up longer and causing the entire contents of the toilet to flush thereby creating a larger volume flush. A certain predetermined amount of play in the two wires (82,84) permits the float connector (32) and float lock (34) to be pulled upwards, but does not prevent them from moving downwardly when the spring action (110,112) of the handles (82,84) returns the handles (82,84) to the horizontal position. According to an alternative embodiment (180) of the invention, spring loaded push buttons (182,184) can be mounted on the lid (14) in place of the handles (82,84).
DUAL FLUSH TOILET MECHANISM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority of provisional U.S. application Ser. No. 60/736,937 filed on Nov. 15, 2005 and entitled “Dual Flush Toilet Mechanism” by Edward T. Hawley and Philip J. Blyskal, the entire contents and substance of which are hereby incorporated in total by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention
[0003] The invention comprises a dual flush toilet mechanism including a pair of flush handles or flush buttons that can be located virtually anywhere on the toilet tank or on the top thereof.
[0004] 2. Brief Description of the Related Art
[0005] Dual flush toilets are known especially in environments where water is precious as in the Middle East. Perhaps the best known European dual flush mechanism is manufactured by Plasston Maagig Michael Industries, Ltd., of Menasche, Israel. That particular mechanism has been retrofitted into American toilets by a variety of different mechanisms some of which are described in the patent literature. Note, for example, U.S. Pat. No. 6,898,808 which describes a typical adaptation using rigid levers. Other water closet devices that employ Plasston-type dual flush mechanisms are described in U.S. Pat. Nos. 5,711,039; 5,806,108; 5,396,665 and 4,305,163.
[0006] There are also a variety of toilets that use cables or chains to release the flush mechanism. See, for example, U.S. Pat. No. 6,920,649 which discloses a dual volume flushing system that incorporates a sheathed operating cable which, in turn, is activated by buttons.
[0007] Another system using loose cables is described in U.S. Pat. No. 5,042,096.
[0008] U.S. Pat. No. 6,848,469 describes another dual flush toilet having volumes set by an adjustable cable.
[0009] U.S. Pat. No. 3,903,550 describes a dual flushing tank for a water closet which employs a cable from either side of the tank and mounted handles which operate a bypass valve in the trap.
[0010] U.S. Pat. No. 3,877,082 is of interest in that it describes a dual flushing tank for a water closet which relies, in part, upon a pullable cable and the action between one of the two actuating handles on the tank and a water bypass valve. Both drainage valves are operated by linkages.
[0011] U.S. Pat. No. 3,906,533 describes a flush toilet, with a variable volume flush, and employs a finger grip element to actuate it mounted on the flush actuating handle assembly.
[0012] U.S. Pat. No. 6,966,533 describes another cable operated flush valve but not of the dual flush variety.
[0013] U.S. Pat. No. 4,700,413 describes a dual volume toilet wherein a flexible cable, extending to the exterior of the tank, can be operated to change the volume of the flush.
[0015] German Patent 199 40039 describes a dual flush toilet in one embodiment which employs two flexible links between the push button actuator and separate handle valve structures.

SUMMARY OF THE INVENTION

[0016] European Patent EP 997585 is of interest in that it describes a flexible operating member which extends from a push button to a pivoting lever.
[0017] Other devices of possible relevance, but probably lesser importance, are described in the following patents: U.S. Design pat. No. 252,584; U.S. Pat. Nos. 3,894,299; 3,903,551; 3,906,554; 4,128,906; 4,141,092; 4,171,547; 4,406,024; 4,433,445; 4,624,018; 4,750,220; 4,864,665; 5,400,445; 5,491,848; 5,500,961; 5,543,368; 5,680,059; 6,510,553.
[0018] While dual flush mechanisms, such as the Plasston dual flush valve, and the use of cables are known, to a limited degree, in the water closet art, nevertheless there appears to be a clear need for a dependable, economical and universal device which permits a toilet to be converted to a dual flush system regardless of the location of the flush handles. It was in the context of the foregoing prior art challenges that the present invention arose.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] In the dual flush mode, both handles are depressed. A tab on the inner handle engages a notch on the outer handle so that depressing the inner handle simultaneously pushes down on both handles and lifts both cable wires. The first, or low volume flush cable, wire operates in the manner previously described. The second wire is connected to a float lock which is pulled upward by the inner or second handle thereby releasing a lower float which is submerged in the water in the tank. Because the water float is submerged it rotates upward thereby placing the distal end, or foot of it, underneath the lower lip of the float mechanism. As the water continues to recede, this holds the float mechanism up a lot longer until such time as the water falls substantially below the level of the lower float. At that point the lower float, because it is no longer buoyant, returns to its original position thereby releasing the lower portion of the float valve and causing the seal on the float to mate with the seal near the drain pipe thereby stopping all outward flow. The water than fills up the tank again and the toilet is ready for use in either mode. A pair of springs on the wires forces the handles to return to their normal horizontal position.

[0021] The invention may be more fully understood by reference to the following drawings.

[0022] FIG. 1 is a partial cross-sectional view of a conventional, prior art dual flush toilet.
FIG. 2 is a partial cross-sectional view of the preferred embodiment of the invention showing the manner in which the flush handles may be moved to the left hand side of the toilet tank.

FIG. 3A is a cross-sectional view of the preferred embodiment of the invention immediately prior to flushing.

FIG. 3B is a cross-sectional, detailed view of the invention wherein the outer, lower volume, flush handle has been depressed and the invention allows a small or low volume of water to escape into the toilet bowl.

FIG. 3C is a cross-sectional, detailed view of the preferred embodiment of the invention in a later part of the low volume flush cycle after the handle has returned to its normal horizontal position and the upper float seal is about to contact the lower seal.

FIG. 4A is a cross-sectional, detailed view of the preferred embodiment of the invention at the initiation of the high volume cycle.

FIG. 4B is a cross-sectional, detailed view of the preferred embodiment of the invention in the next phase of the dual flush cycle in which the handles have returned to their normal horizontal positions and the main float valve is held open longer by the upward rotation of the lower float.

FIG. 4C is a cross-sectional, detailed view of the high volume flush mode shown in FIGS. 4A and 4B after the water in the tank has been almost entirely drained during the course of the high volume cycle.

FIG. 4D is a cross-sectional, detailed view of the dual flush mechanism at the end of the high volume flush cycle, wherein the toilet tank begins to refill and the mechanism is resetting itself for the next flush.

FIG. 5 is an exploded view of the dual handle flush mechanism.

FIG. 6 illustrates the manner in which the twin flushing handles connect to the wire operating mechanism through the wall of a standard toilet tank.

FIG. 7 illustrates the preferred embodiment of the invention in the form of a kit which can be purchased to modify a conventional, prior art toilet such as shown in FIG. 1.

FIG. 8 illustrates an alternative embodiment of the invention in which the dual flush mechanism is operated by a pair of buttons located in the top lid of the toilet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

During the course of this description like numbers will be used to identify like elements according to the different figures that illustrate the invention.

A typical prior art, dual flush toilet 10 is illustrated in FIG. 1. Such toilet devices typically include a standard ceramic tank 12, a ceramic lid 14 and a support base 16. A pair of dual flush handles 18 is shown located on the right hand side of the toilet tank 12, as is common in Europe. Handles 18 are attached to a lever lifting mechanisms on the inside of tank 12 in order to actuate dual flush mechanism 20. The dual flush mechanism 20 is preferable a Plasson type, manufactured by Plasson Maagen Michael Industries, Ltd., Menashe, Israel. Plasson type dual flush mechanisms 20 are common in Europe and in Israel and other locations where water is scarce. The problem is that they are hard to adapt to American style toilets where the handle might be on the left hand side, or perhaps even on the side, of the tank 12 and in some cases on the top 14 of the toilet 10. Accordingly, a mechanism is needed that will permit Plasson type dual flush mechanisms 20 to be adapted to American type toilets. Such a mechanism has to be robust, economical and reliable.

The preferred embodiment of the present invention 22 is illustrated in FIG. 2. As shown in FIG. 2, the dual flush handle assembly 22 is located on the left hand side of the front of the toilet tank 12, but, alternatively, could be located on either the left or right side of the toilet tank 12 or, even on the top 14. The invention 22 is such that it permits the dual flush handle mechanism to be placed almost anywhere on the toilet tank 12 using conventional fittings. Dual flush handle assembly 24 is connected by first cable 26 to flush valve connector 32 in order to actuate a low volume flush. Conversely, a second cable 28, also connected to the dual handle assembly 24 is connected to float lock 34 which causes the invention 22 to operate in its high volume, full flush mode. The wires 60 and 64, shown in FIG. 3A, pass through cables 26 and 28 respectively and are received by cable tower 30. A prior art Plasson-type dual flush mechanism 20 is shown in its normal position. Prior art dual flush mechanism 20 includes a vertical tube section 36 having an overflow opening 38 at the top thereof. A vertical row of teeth 40 is located on one side of vertical tube 36. A main float 42 is attached to vertical tube 36. Attached to main float 42 is a float adjustment lever 44 that selectively engages with one of the teeth 40 on the vertical tube 36. The purpose of adjusting the location of the main float 42 on the vertical tube 36 is to be able to control the amount of water 50 flushed from the tank 12 in the low volume flush mode. A seal 46 is located at the bottom of the tank 12 and surrounds a discharge pipe 48. When the toilet is shut off, traveling stopper seal 54, carried by vertical tube 36, mates with lower seal 46 to prevent the outflow of water 50. Also shown in FIG. 2 is the lower float 52 which comes into play during the large volume or full flush mode of the apparatus.

Further details of the mechanism 22 are illustrated in FIGS. 5-7.

FIG. 5 is an exploded view of the handle mechanism and its associated parts. The dual flush handle assembly 24 comprises an outer lever 82 and an inner lever 84. Outer lever 82 controls the single, low flush mode of the toilet whereas depressing inner lever 84 simultaneously depresses outer lever 82 and produces a full flush of the toilet. Outer lever 82 includes a notch 86 which engages with tab 88 on inner lever 84 so that depressing inner lever 84 simultaneously depresses outer lever 82. Outer lever 82 also includes a stem 90 and a key way 102 that passes through apertures 122, 124, 98, and 118 and is received in aperture 120 of lever cam 100. Similarly, inner lever 84 includes a stem 92 having a flat portion 104 which passes through aperture 124 and aperture 98 and engages with aperture 118 of lever cam 106. A conventional, through the wall fitting 94 permits the actuating shaft mechanism 90, 92 to pass through the tank wall 12 via aperture 124. A housing 96 having aperture 98 is located on the inside of the tank 12 and receives stems 90 and 92 from flush handles 82 and 84 respectively. A housing end plate 100, including an aperture 126, seals the components inside of housing 96 as seen, for example, in FIG. 6. Single flush wire 60 includes an anchor 116 that is received in a notch 130 in lever cam 108. Similarly, full flush wire 64 includes an anchor 114 which is received in a notch 128 in lever cam 106. A return spring 110 is attached at one end to housing 96 and the other end to lever cam 106 so as to return handle 84 to a normally horizontal position. Similarly, return spring 112 is also connected inside
housing 96 and to lever cam 108 to return handle 82 to a normally horizontal position after flushing.

FIG. 6 essentially illustrates the parts shown in the exploded view of FIG. 5 except as assembled and in position to pass through aperture 124 of the tank wall connector 94.

FIG. 7 illustrates the elements of the invention that might be sold as a conversion kit. The conversion kit may, or may not, be sold with a conventional Plsson-like dual flush mechanism 20 depending upon whether or not the customer already has such a mechanism. As shown in FIG. 7, a flush valve connector 32 includes a hole 68 which connects it to a pin 166, visible in FIG. 3A, so that it can be attached to the dual flush mechanism 20. A hole 74, substantially larger than wire 60, permits the wire 60 to pass through aperture 74 loosely and easily. Similarly, float lock 34 includes an upper aperture 80 having a diameter significantly larger than wire 64 so that it can loosely move up and down through aperture 80. Cable tower 30 includes an upper projecting tube 70 having an aperture 72 therein which permits wire 60 to pass there through and through aperture 74 of the flush valve connector 32. As shown in FIG. 3A, wire 60 includes a hooked crimp 62 so that it stays engaged in aperture 74 of the flush valve connector 32. Similarly, cable tower 30 also includes a second, lower upward projecting tube 76 having a passageway 78 there through significantly larger than wire 64. Wire 64 passes through passageway 78 and through passageway 80 in the float lock 34 and stays in position there because of crimp 66, also shown in FIG. 3A, at the end of wire 64.

FIGS. 3A-3C illustrate in progressive fashion the manner in which the mechanism 22 produces a small, or low volume, single flush.

FIG. 3A illustrates the invention 22 prior to initiation of a single, low volume flush. In this mode both handles 82, 84 of handle assembly 24 are in the normal horizontal position held there by springs 110 and 112. Upper seal stopper 54 is in contact with lower seal 46 so that water 50 cannot pass through the drain pipe 48. Lower float 52 is held downward by float lock 34 which prevents lower float 52 from rotating upwardly.

FIG. 3B illustrates the initiation of the single, low volume flush cycle. In this mode the outer handle 82 has been rotated downwardly as shown in the direction of arrow 170. This causes cam 108 to rotate and draw wire 60 upwardly. When this happens the crimp 62 engages the top of the flush valve connector 32 drawing it and the Plsson unit 20 in an upward direction as shown by arrows 132. This breaks the seal between the upper and lower seals 54 and 46 causing water 50 to discharge in the direction of arrow 134. The vertical tube 36 rides on an inner guide stem 56 having a passageway 58 there through. Once the seal between elements 46 and 54 is broken, the main float 42 moves upwardly towards the surface of water 50. The amount of the flush in the low flush mode is in part determined by the position of the adjustment device 44 with respect to teeth 40. During the phase of the cycle shown in FIG. 3B, the lower float 52 is held in position by the float lock mechanism 34.

FIG. 3C shows the invention 22 towards the end of the low, or small, flush cycle as the float mechanism 42 travels downward in the direction of arrow 136 so that upper seal 54 eventually mates with, and seals with, lower seal 46 thereby stopping the flow of water 50 out of drain 48. The float 42 can travel downwardly even though the handle 80 has returned upwardly to the horizontal position in the direction of arrow 140 because there is enough slack 138 in wire 60 so that the mechanism can float up and down. The float 42 ceases moving downward once the flush connector 32 contacts the crimp 62 in wire 60 and the two seals 46 and 54 mate. Once that happens the mechanism 10 returns to the preflush mode as illustrated in FIG. 3A.

FIGS. 4A-4D illustrate the manner in which the invention 22 is used in the dual, or high volume, flush mode.

In FIG. 4A the large volume flush cycle is shown at its initiation. Handle assembly 24 is pushed down in the direction of the arrow 142. Pushing down on inner handle 84 also pushes down on outer handle 82 because tab 88 engages the notch 86 in outer handle 82. Consequently both inner wires 60 and 54 are pulled upwardly at the same time. The wire 60 attached to the outer handle 82 pulls up on the flush valve connector 32 letting water 50 drain from the tank 12 in the direction of arrow 134. This action is similar to that described with regard to the single flush mode illustrated in FIGS. 3A-3C. At the same time as flush valve connector 32 is lifted up, the float lock 34 is also lifted up in the direction of arrow 144. Normally, when the float lock 34 is in the down position, it prevents lower float 52 from rotating about pivot pin 148. However, when the float lock 34 is moved upwardly under the influence of wire 64 and inner handle 84, it permits the lower float 52 to rotate and move upwardly in the direction of arrow 146 as it pivots around pivot pin 148. This in turn causes the foot 148 of the lower float 52 to move in position underneath the lower lip 150 of the dual flush mechanism 20 and its associated main float 42.

As the water 50 continues to recede in the direction of arrow 156 as shown in FIG. 4B, the inner and outer handles 84 and 82 of the handle assembly 24 return to the horizontal position under the influence of return springs 110 and 112. Continued dropping of the water level 50 in the direction of arrow 156 causes the bottom edge or lip 150 of the vertical tube 36 of the dual flush mechanism 20 to come to rest on the foot 148 of the lower float 52, effectively locking it in that position as long as water 50 substantially covers the lower float 52. The movement of lower float 52 effectively holds the upper seal 54 away from the lower seal 46 longer so that more water 50 escapes in the direction of arrow 134, thereby causing a substantially larger volume flush of the toilet bowl 12 than occurs during the single flush mode illustrated in FIGS. 3A-3C.

FIG. 4C illustrates the invention 22 towards the very end of the large volume flush mode. As the water 50 continues to empty in the direction of arrow 158, the tank 12 becomes almost totally evacuated. At the same time the water level 50 drops below the lower float 52 making the lower float 52 less buoyant. As the water 50 continues to further recede the weight of the lower float 52, which is now not held up by water 50, drops in the direction of arrow 160. This in turn causes the foot 148 of the lower float 52 to rotate away from the lower rim 150 of the vertical tube 36. During the course of discharge, the float lock 34 drops down in the direction of arrow 162 to lock the lower float 52 in its lowest, pre-discharge position. Since vertical tube 36 is no longer supported by the foot 148, it tends to further drop in the direction of arrow 158 causing the upper seal 54 to move into contact with the lower seal 46 thereby shutting off the downward flow of water 50 in the direction of arrow 134. At this point the water 50 in the tank is over 90-95% discharged and the tank 12 is in condition to start filling up again. An important feature of the invention is that wires 60 and 64 are loosely received in
apertures 74 and 80 of the float connector 32 and the float lock 34 respectively as seen in detail in FIG. 7. This causes a portion 138 of wire 60 to drop below the aperture 74 as seen in FIG. 4C. Similarly a portion 154 of wire 64 drops below aperture 80 of the float lock 34. Accordingly, wires 60 and 64 can only pull up on the float connector 32 and the float lock 34 but cannot hold them down. This permits the mechanism to reset itself. If, on the other hand, wires 60 and 64 were rigidly connected to float connector 32 and float lock 34, then the mechanism could not reset itself.

FIG. 4D illustrates the last phase of the large volume flush mode in which the upper seal 54 has come into sealing contact with lower seal 46 thereby preventing any more water 50 from escaping through the drain pipe 48. Water 50 continues to rise in the direction of arrow 164 until it reaches its pre-flush condition as illustrated in FIGS. 2 and 3A.

FIG. 8 illustrates an alternative embodiment 180 of the invention in which push buttons 182 and 184 mounted on the toilet lid 14 replace handles 82 and 84 which are normally mounted on the sides of the tank 12. While the two button alternative embodiment 180 is preferably mounted on lid 14, it could just as easily be mounted anywhere convenient on the side or front or even back of tank 12, if desired. Accordingly, the flush handles 82, 84 or buttons 182, 184 or similar actuating devices can be mounted just about anywhere on the toilet tank 12 or lid 14 depending on the needs of the user.

The preferred embodiment of the invention 22 has a number of advantages over the prior art. First, the invention 22 can be sold as a universal kit similar to that shown in FIG. 7, which would allow an individual to put the dual flush mechanism handle assembly 20 almost anywhere on the side of the tank 12 or on the top 14. If the dual flush handle assembly 20 is placed on the top 14, it is possible to replace the handles 82 and 84 with a pair of spring-loaded push buttons 182 and 184 as is done with many European toilets. Second, the system is fairly elegant in its operation and the parts can be manufactured from appropriate plastic materials relatively inexpensively. This is especially important in third world countries where water conservation is absolutely critical. Third, the system is very reliable in that it depends upon an existing prior art dual flush mechanism 20 but constructed in such a way that almost 100% reliability is ensured.

While the invention has been described with reference to the preferred embodiment thereof, it will be appreciated by those of ordinary skill in the art that modifications may be made to the parts and method that comprised the invention without departing from the spirit and scope of the invention as a whole.

1-17. (canceled)

18. A dual flush toilet apparatus, including a hole in the wall or top of a toilet tank, for use with a dual flush valve assembly comprising a vertical tube having a first float and a second float attached thereto, said apparatus comprising:
   a. a first handle means mountable through said hole;
   b. a second handle means also mountable through said hole, adjacent to said first handle means, and wherein said first and second handle means have a common axis of rotation when mounted through said hole;
   c. a first flexible, inelastic connecting means for connecting said first handle means to said dual flush valve assembly;
   d. a second flexible, inelastic connecting means for connecting said second handle means to a means to release said second float,
   e. a bracket mountable inside said tank through which said first and second flexible, inelastic connecting means both pass and which serves to guide said first and second flexible, inelastic connecting means;
   f. a connector means attachable at one end to said dual flush valve assembly and having a hole therein through which said first flexible, inelastic connecting means loosely passes so that said first flexible, inelastic connecting means can drop below said hole; and,
   g. a float lock means for selectively releasing said float and having a hole therein through which said second flexible, inelastic connecting means can drop below said hole in said float lock means, wherein actuation of said first handle means causes a low volume flush and actuation of both handles causes a high volume flush and further wherein said handle means can be mounted at more than one location on said toilet tank or top.

19. The apparatus of claim 18 wherein said first and second flexible, inelastic connecting means comprise a first and second wire respectively.

20. The apparatus of claim 19 wherein when said first handle means is actuated said first wire pulls up on said connector means and produces a low volume flush of said toilet and further wherein when said first handle means is released said connector means slides along said first wire.

21. The apparatus of claim 20 wherein when said second handle means is actuated said second wire pulls up on said float lock means releasing said second float so that it can hold up said dual flush valve assembly to produce a high volume flush and further wherein when said second handle means is released said float lock means slides along said second wire.

22. The apparatus of claim 21 further comprising:
   i. a return spring attached to said first handle means for returning said first handle means to its pre-flush condition.

23. The apparatus of claim 22 further comprising:
   i. a return spring attached to said second handle means for returning said second handle means to its pre-flush condition.

24. The apparatus of claim 23 wherein said second handle means includes a tab means for engaging said first handle means so that actuating said second handle means also causes said first handle means to be actuated.

25. A dual flush toilet apparatus including a hole in the tank or top of a toilet tank, for use with a dual flush valve assembly comprising a vertical tube having a first float and a second float attached thereto, said apparatus comprising:
   a. a first actuator means mountable through said hole;
   b. a second actuator means also mountable through said hole adjacent to said first actuator means;
   c. a first flexible, inelastic connecting means for connecting said first actuator means to said dual flush valve assembly;
   d. a second flexible, inelastic connecting means for connecting said second actuator means to a means to release said second float;
   e. a bracket mountable inside said tank through which said first and second flexible, inelastic connecting means both pass and which serves to guide said first and second flexible, inelastic connecting means; and,
   f. a connector means attachable at one end to said dual flush valve assembly and having a hole therein through which
said first flexible, inelastic connecting means loosely passes so that said first flexible, inelastic connecting means can drop below said hole; and,
g. a float lock means for selectively releasing said float and having a hole therein through which said second flexible, inelastic connecting means can loosely pass so that said second flexible, inelastic connecting means can drop below said hole in said float lock means,
wherein actuation of said first actuator means causes a low volume flush and actuation of both actuator means causes a high volume flush and further wherein said actuator means can be mounted at more than one location on said toilet tank or top.

26. The apparatus of claim 25 wherein said actuator means comprise push type actuators.

27. The apparatus of claim 26 wherein said actuator means comprise buttons mounted on said top of said toilet.

28. The apparatus of claim 26 wherein said actuator means comprise a first and second actuator means mounted on the side of said toilet.

29. The apparatus of claim 25 wherein said first and second flexible, inelastic connecting means comprise a first and second wire respectively.

30. The apparatus of claim 29 wherein when said first actuator means is actuated said first wire pulls up on said connector means and produces a low volume flush of said toilet and further wherein when said first actuator means is released said connector means slides along said first wire.

31. The apparatus of claim 30 wherein when said second actuator means is actuated said second wire pulls up on said float lock means releasing said second float so that it can hold up said dual flush valve assembly to produce a high volume flush and further wherein when said second actuator means is released said float lock means slides along said second wire.

32. The apparatus of claim 31 further comprising:
h. a first return spring attached to said first actuator means for returning said first actuator means to its pre-flush condition.

33. The apparatus of claim 32 further comprising:
i. a second return spring attached to said second actuator means for returning said second actuator means to its pre-flush condition.

34. The apparatus of claim 33 wherein said second actuator means includes a tab means for engaging said first actuator means so that actuating said second actuator means also causes said first actuator means to be actuated.

* * * * *