A Button Assembly for Controlling Flushing Volume

Field of Invention

[0001] The present invention relates to a button assembly for controlling flush volume of a water closet. The button assembly may be used in a single or dual flush valve system.

Background

[0002] The following discussion of the background is intended to facilitate an understanding of the present disclosure only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or is part of the common general knowledge of the person skilled in the art in any jurisdiction as of the priority date of the invention.

[0003] Conventional water closets with flush valves and button assemblies that are concealed in a wall are usually found in hotels, offices, hospitals, shopping malls, commercial buildings, etc. A flush button is usually mounted onto the wall and actuated by a user to trigger a flush of the water closet or urinal.

[0004] Water is a scarce resource. Many countries have embarked on water conservation programs to educate people to conserve the use of water and to minimize wastage. In Singapore, for example, the Public Utilities Board (Pub) has made it compulsory for products to meet the Water Efficiency Labelling Scheme (WELS) requirements.

[0005] Efforts have been made to reduce water wastage for flushing systems having flush valves concealed in the wall. FIGs. 1A and 1B illustrate a known flush valve system 10. When the manual button 16 is pressed by a user, the lever 19 is actuated by the button 16. This results in a release of water pressure which then causes piston 17 to be raised from its initial “closed” position, in which no water is passed through the flush valve, to an “open” position. In the “open” position, water from inlet 11 flows through the flush valve and out of the outlet 18 to the water closet (as indicated by the

arrow in FIG. 1B). After a fixed period, the piston 17 returns to the “closed” position, thereby completing a flushing cycle. One known way to adjust and control the discharge volume of water flowing through the flush valve is by turning the stop cork 12 of the inlet 11. However, there are limitations in doing so since it would be difficult for a person to reach the stop cork 12 from the access panel in the wall. Moreover, if the stop cork 12 were to be adjusted, this would result in a weaker water pressure.

[0006] Another known way is to adjust the top screw 14 to control the height of the piston gap to control the volume of water flow to the outlet 18. However, due to the position and location of the top screw, it would be difficult to carry out any adjustment and special tools may be needed to access the top screw 14. Further, it is not possible to obtain a precise volume of water flow by adjustment of the top screw 14.

[0007] There is therefore a need for a system to alleviate one or more of the abovementioned problems.

Summary of Invention

[0008] The disclosure was conceptualized to provide an adjustable button assembly that may be installed with flushing systems that are concealed in walls. The button assembly may be configured to adjust and control water to be discharged in the flushing system. The button assembly may include a knob that is rotatable about its longitudinal axis and operable to raise or lower a vertical height of a plunger rod, such that the volume of water flow may be easily controlled and adjusted as necessary. Such a button assembly in the flushing system is more cost effective and readily accessible by a person through an access panel on the wall. With the knob, the desired amount of water volume can be set precisely according to a user’s requirements and aids in compensating for any manufacturing assembly error which may affect water flushing volume tolerance. Since the control of the water volume is carried out by simply rotating a knob (which is carried out by hand), no complicated tools are required.

[0009] In an aspect of the invention, there is provided a button assembly for a flushing system. The button assembly comprises a flush valve having a piston and a first lever

extending from the piston. The button assembly has a knob which is rotatable about a longitudinal axis of the knob. The button assembly has a first plunger rod configured to bear against the lever and is operatively connected to the knob. The plunger rod is configured to move in a linear direction towards or away from the piston when the knob is rotated about its longitudinal axis. The knob is configured to slidably engage and push the lever when a force is applied to the knob in a direction towards the lever.

[0010] In some embodiments, the button assembly further comprises an eccentric wheel mechanism attached to the knob and the lever and configured to enable the linear motion of the lever as the knob is rotated.

[0011] In some embodiments, the eccentric wheel mechanism comprises a cam.

[0012] In some embodiments, the flush valve has a second lever extending from the piston and positioned adjacent to the first lever, and the knob comprises a dual button configuration having a first button and a second button.

[0013] In some embodiments, the first button is operatively connected to the first plunger rod and the second button is operatively connected to a second plunger rod.

[0014] In some embodiments, the first and second plunger rods are being configured to move in a linear direction towards or away from the piston when the knob is rotated about its longitudinal axis.

[0015] In some embodiments, the first button is configured to trigger the piston to open for a first predetermined period and the second button is configured to trigger the piston to open for a second predetermined period, the second predetermined period being longer than the first predetermined period.

[0016] In some embodiments, the button assembly further comprises a locking mechanism disposed between the knob and the flush valve, the locking mechanism configured to retain the plunger rod at its determined position after the knob has rotated.

[0017] In some embodiments, the act of rotating the knob in a first direction to raise a height of the plunger rod in a direction towards the piston causes a greater volume of water to be discharged.

[0018] In some embodiments, the act of rotating the knob in a second direction, opposite of the first direction to lower a height of the plunger rod in a direction away from the piston causes a lower volume of water to be discharged.

[0019] In some embodiments, the first and second plunger rods each has a substantially flat end to engage the levers of the flush valve.

[0020] In some embodiments, the flush valve has a plurality of pins spaced apart from one another and the eccentric wheel mechanism has a plurality of corresponding holes adapted to receive the plurality of pins.

[0021] In some embodiments, the eccentric wheel mechanism has one or more guiding pins extending towards the flush valve.

[0022] In some embodiments, the knob is detachable from the eccentric mechanism.

[0023] In some embodiments, the knob is provided with markings to indicate the direction of rotation in order to reduce or increase the flow volume.

[0024] According to another aspect of the invention, there is provided a flushing system comprising the button assembly as described above.

[0025] In some embodiments, the button assembly and the flush valve are mounted and concealed within a wall.

[0026] Other aspects and features of the present invention will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

Brief Description of the Drawings

[0027] The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

[0028] FIGs 1A and 1B are various views of a flushing system of the prior art, in which FIG. 1A is a front side view and FIG. 1B is a partially cut-off view of FIG. 1A;

[0029] FIG. 2 is a perspective view of the button assembly in accordance with an embodiment of the invention which may be installed on a flushing system;

[0030] FIGs 3A to 3C are various views of the button assembly interacting with the flush valve, in which FIG. 3A is a cut-off side view of the button assembly, FIG. 3B is a side view illustrating the position of the plunger rod at a greater vertical height, and FIG. 3C is a side view illustrating the position of the plunger rod at a lower vertical height;

[0031] FIG. 4A is a front perspective view of the button assembly in accordance with an embodiment;

[0032] FIG. 4B is a rear perspective view of the button assembly of FIG. 4A;

[0033] FIG. 4C is front perspective view of the flush valve, without the button assmeblt installed;

[0034] FIG.5A is a front perspective view of the button assembly in accordance with another embodiment of the invention;

[0035] FIG. 5B is a front perspective view of the button assembly of FIG. 5A installed on a flushing system;

[0036] FIG. 6A and 6B are various views of the button assembly of FIG. 5A interacting with the flush valve, in which FIG. 6A is a side view of the button assembly, illustrating the position of the plungers rod at a greater vertical height, and FIG. 6B is a side view illustrating the position of the plunger rods at a lower vertical height; and

[0037] FIGs 7A, 7B, 7C and 7D are various views of the button assembly interacting with the flush valve.

Description of Embodiments

[0038] In order to illustrate the technical solution(s) to the embodiments of the present disclosure, embodiments of the present disclosure are described with reference to the drawings. It is appreciable that the drawings referred to are some examples or embodiments of the present disclosure. A person having ordinary skill in the art, without further creative efforts, may apply the present disclosure to other scenarios according to these drawings. For example, although the disclosure relates to a button assembly for a flushing system, a person having ordinary skill in the art would be able to apply the present disclosure to other sanitary systems which require controlled fluid volume flow.

[0039] In various embodiments of the invention, there is disclosed a button assembly for a flushing system. The button assembly comprises a flush valve having a piston and a first lever extending from the piston. The button assembly has a knob which is rotatable about a longitudinal axis of the knob. The button assembly has a first plunger rod configured to bear against the lever and is operatively connected to the knob. The plunger rod is configured to move in a linear direction towards or away from the piston when the knob is rotated about its longitudinal axis. The knob is configured to slidably engage and push the lever when a force is applied to the knob in a direction towards the lever. It will be appreciated that the manual button or knob may be rotated to control and obtain a precise volume of water flow for the flushing system. A simpler and more precise system to control the volume of water to be discharged during flushing may therefore be provided. The ease of installation, accessibility of the knob (which may be located directly behind the access panel, and simplicity of knob adjustment which negates the need for complicated tools, brings about great advantages that previously could not be achieved.

[0040] FIG. 2 is a perspective view of the button assembly in accordance with an embodiment of the invention which may be installed on a flushing system. The button

assembly 20 comprises a knob 22 and may be installed on a flushing valve 30. The knob 22 may be rotatable about its longitudinal axis to adjust the volume flow of water to be discharged in the flushing system. This will be explained later. The knob 22 may also be pushed by a user to activate the flush. Alternatively, the knob 22 may be concealed by an access panel mounted on a wall (not shown). A separate button on the access panel may then be connected to the knob such that when a user presses the button on the access panel, the knob in turn is pushed to actuate a lever of the flush valve which then activates the flushing.

[0041] FIG. 3A is a cut-off side view of the button assembly 20. The knob 22 is rotatable in either direction about its longitudinal axis X. The knob 22 is preferably of a round shape profile and may have a plurality of ridges located circumferentially around the knob to allow the fingers of a user to obtain a better grip when turning the knob. The knob 22 may be slidably mounted to an eccentric wheel mechanism 40 (shown in FIG. 4A). A plunger rod 24 extends from the eccentric wheel mechanism 40 in a direction away from the knob 22. The plunger rod 24 bears against a lever 32 of the flush valve 30. The flush valve 30 may have a piston 34 which lies on an edge of a housing of the flush valve 30 and remains in a default closed position. In this closed position, water is not allowed to flow through the flush valve to an outlet leading to the urinals or water closets.

[0042] The button assembly 20 has a plurality of guiding pins 44 extending from the eccentric mechanism towards the flush valve 30. The guiding pins 44 facilitates the button assembly 20 to slidably engage corresponding holes on the flush valve 30. Referring to FIG. 4A, the knob 22 has a plurality of sliding pins 28 spaced apart from one another. Preferably, two sliding pins are provided. The sliding pins 28 are configured to be slidably received in the corresponding guide rails 29. The eccentric wheel mechanism 40 has a generally cylindrical shape and has a pair of elbows 46 located along the circumference of the eccentric wheel mechanism 40. The elbows 46 are spaced apart on either side of the eccentric wheel mechanism 40. Each elbow 46 has a through hole 42 and is configured to receive a corresponding pin 36 (see FIG. 4C) mounted on the flush valve. This ensures that the eccentric wheel mechanism 40 does not rotate when the knob 22 rotates. In other words, when the knob 22 is rotated

by a user, only knob 22, sliding pin 28 and guide rail 29 are rotated about the longitudinal axis X. The eccentric wheel mechanism 40 remains stationary.

[0043] Returning to FIG. 3A, the plunger rod 24 of the button assembly 20 is configured to move linearly in a Z-direction, away from and towards the piston 34, when the knob 22 is rotated in a clockwise or anti-clockwise direction. This is made possible by the eccentric mechanism which converts rotational movement of the knob into a linear movement in the plunger rod 24. While an eccentric wheel mechanism is disclosed herein, the disclosure is not limited to eccentric wheel mechanisms. Any mechanism that is suitable for converting rotary motion in the knob to vertical linear motion may be employed. For example, a cam, a slider-crank mechanism, rack and pinion gears, screw-and-nut systems, etc may be used, so long as it does not interfere in the dual functionality of the knob, which may be rotated (along its longitudinal axis) and pressed (in a linear direction towards the lever).

[0044] FIG 3B is a side view illustrating the position of the plunger rod at a greater vertical height Z. When a user wishes to increase the discharge water volume flow, the user may turn the knob 22 in a first direction (e.g. clockwise direction). The rotary movement of the knob 22 is converted by the eccentric wheel mechanism 40 into linear motion at the plunger rod 24. In this illustration, the clockwise movement of the knob 22 causes the plunger rod 24 to be raised in a Z-direction linear motion towards the piston 34 to a Z_1 height and as shown in FIG. 3B. The Z height reference may be taken from the base end of the lever 32.

[0045] The plunger rod 24 is now at a greater Z height then initially. When the user pushes the knob 22 in a direction towards the flush valve 30, the plunger rod 24 pushes the lever 32 at the Z_1 height. Since the Z height is now at a higher point from the base of the lever 32, the same amount of linear motion from the knob 22 will cause the lever 32 to be displaced by a greater angle, with respect of a longitudinal axis X of the flush valve 30. Due to the increase in pressure differential, this allows the piston 34 to be raised to a higher position (i.e. larger gap) and thus allowing a greater volume of water flow to be discharged.

[0046] If a user wishes to decrease the discharge water volume flow, the user may turn the knob 22 in a second direction (e.g. anti-clockwise direction). The rotary movement of the knob 22 is converted by the eccentric wheel mechanism 40 into linear motion at the plunger rod 24. In this illustration, the anti-clockwise movement of the knob 22 causes the plunger rod 24 to be lowered in a Z-direction linear motion away from the piston 34 to a Z_2 height and as shown in FIG. 3C. Comparing FIGs 3B and 3C, Z_1 is greater than Z_2.

[0047] The plunger rod 24 is now at a lower Z height then initially. When the user pushes the knob 22 in a direction towards the flush valve 30, the plunger rod 24 pushes the lever 32 at the Z_2 height. Since the Z height is now at a lower point from the base of the lever 32, the same amount of linear motion from the knob 22 will cause the lever 32 to be displaced by a smaller angle, with respect of the longitudinal axis X of the flush valve 30. This allows the piston 34 to be raised to a lower position (i.e. smaller gap) and thus allowing a lower volume of water flow to be discharged.

[0048] The rotary motion of the knob is limited by the elbows 46. Once the knob is rotated beyond a certain degree, the guide rails 29 of the button assembly 20 will come into contact with the elbows 46 of the eccentric wheel mechanism, thus preventing further rotary motion.

[0049] Advantageously, a tip of the plunger rod that is in contact with the lever 24, has a generally flat profile. Current plunger rods rely on a generally circular shaped tip. Such plunger rods work based on point and line contact. During assembly and operations, the lever of the flush valve may deviate from its intended vertical position. This results in huge errors when triggering the lever with the circular plunger rods. With the generally flat tip profile of the plunger rod of an embodiment of the present invention, such errors are reduced since the flat tip plunger rod works based on line and surface contact. With a greater surface area of contact on the lever, any deviation in position of the lever of the flush valve would not result in many errors.

[0050] The button assembly 20 may comprise a locking mechanism 26. The locking mechanism 26 may surround the knob 22 and the eccentric wheel mechanism 40. The inner walls of the locking mechanism may be provided with threads that may be

screwed onto corresponding threads on the flush valve 30. The locking mechanism 26 enables the knob 22 to be held in its intended position after a rotary motion. This ensures that the plunger rod 24 is held in its intended Z height position, so that required flush discharge volume may be maintained consistently at each flush cycle. The knob 22 may be provided with markings to indicate the direction of rotation in order to reduce or increase the flow volume.

[0051] FIG.5A is a front perspective view of the button assembly in accordance with another embodiment of the invention. In this embodiment, the flush valve has a piston and two levers extending away from the piston (not shown). The button assembly 50 has a dual button configuration with a first button 53 and a second button 54. The button assembly 50 may be attached to the eccentric wheel mechanism 40 in a similar manner as the embodiment with a single flush and will not be repeated for brevity. In addition, the eccentric wheel mechanism 40 comprises a pair of plunger rods 58, 59 arranged adjacent to one another (as shown in FIG. 6A). The first button 53 is operatively connected to the first plunger rod 58 and the second button is operatively connected to the second plunger rod 59.

[0052] The first button 53 may be configured to cause the first plunger rod 58 to actuate a first lever to trigger the piston of the flush valve to open for a first predetermined period. The second button 54 may be configured to cause the second plunger rod 59 to actuate the second lever to trigger the piston of the flush valve to open for a second predetermined period. The second predetermined period may be a longer period than the first predetermined period. In actual use, the first button 53 may be used to actuate a reduced flush while the second button 54 may be used to actuate a full flush, depending on the button that a user presses. The first button may preferably be provided with markings to indicate a reduced flush and the second button may preferably be provided with markings to indicate a full flush. While the embodiment describes a first button which may trigger the piston to open for a first determined period and a second button which may trigger the piston to open for a second predetermined period longer than the first predetermined period, a skilled person will understand that the first and second buttons may be interchangeably used, for example, the second button may be arranged for a reduced flush, while the first button may be arranged for a full flush.

[0053] The button assembly may comprise a knob 52 that is rotatable about its longitudinal axis Y. The plunger rods 58, 59 of the button assembly 50 are configured to move linearly in a Z-direction, away from and towards the piston, when the knob 52 is rotated in a clockwise or anti-clockwise direction. This is made possible by the eccentric mechanism which converts rotational movement of the knob 52 into a linear movement in the plunger rods 58, 59. While an eccentric wheel mechanism is disclosed herein, the disclosure is not limited to eccentric wheel mechanisms. Any mechanism that is suitable for converting rotary motion in the knob to vertical linear motion may be employed. For example, a cam, a slider-crank mechanism, rack and pinion gears, screw-and-nut systems, etc may be used.

[0054] FIG 6A is a cutoff side view illustrating the position of the plunger rods 58, 59 at a greater vertical height Z. When a user wishes to increase the discharge water volume flow, the user may turn the knob 52 in a first direction (e.g. clockwise direction). The rotary movement of the knob 52 is converted by the eccentric wheel mechanism 40 into linear motion at the plunger rods 58, 59. In this illustration, the clockwise movement of the knob 52 causes the plunger rods 58,59 to be raised in a Z-direction linear motion towards the piston to a Z_3 height and as shown in FIG. 6A. The Z height reference may be taken from the base end of the respective levers.

[0055] The plunger rods 58, 59 are now at a greater Z height then initially. When the user pushes the first button 53 or the second button 54 (depending on whether a reduced or full flush is required), in a direction towards the flush valve, the plunger rods 58, 59 (depending on whether the first button 53 or second button 54 is pushed) pushes the corresponding lever at the Z_3 height. Since the Z height is now at a higher point from the base of the levers, the same amount of linear motion from the first or second buttons 53, 54 will cause the corresponding levers to be displaced by a greater angle, with respect of a longitudinal axis X of the flush valve. Due to the increase in pressure differential, this allows the piston to be raised to a higher position (i.e. larger gap) and thus allowing a greater volume of water flow to be discharged.

[0056] If a user wishes to decrease the discharge water volume flow, the user may turn the knob 52 in a second direction (e.g. anti-clockwise direction). The rotary

movement of the knob 52 is converted by the eccentric wheel mechanism 40 into linear motion at the plunger rods 58, 59. In this illustration, the anti-clockwise movement of the knob 52 causes the plunger rods 58, 59 to be lowered in a Z-direction linear motion away from the piston to a Z_4 height and as shown in FIG. 6B. Comparing FIGs 6A and 6B, Z_3 is greater than Z_4.

[0057] The plunger rods 58, 59 are now at a lower Z height then initially. When the user pushes the first button 53 or the second button 54 (depending on whether a reduced or full flush is required), in a direction towards the flush valve, the plunger rods 58, 59 (depending on whether the first button 53 or second button 54 is pushed) pushes the corresponding lever at the Z_4 height. Since the Z height is now at a lower point from the base of the corresponding levers, the same amount of linear motion from the first and second buttons 53, 54 will cause the corresponding levers to be displaced by a smaller angle, with respect of the longitudinal axis X of the flush valve. This allows the piston to be raised to a lower position (i.e. smaller gap) and thus allowing a lower volume of water flow to be discharged.

[0058] The rotary motion of the knob 52 is limited by the elbows 46. Once the knob 52 is rotated beyond a certain degree, the guide rails of the button assembly 50 (not shown but similar to FIG. 4A) will come into contact with the elbows 46 of the eccentric wheel mechanism, thus preventing further rotary motion.

[0059] Advantageously, each tip of the plunger rods 58, 59 that is in contact with the corresponding levers, has a generally flat profile. Current plunger rods rely on a generally circular shaped tip. Such plunger rods work based on point and line contact. During assembly and operations, the lever of the flush valve may deviate from its intended vertical position. This results in huge errors when triggering the lever with the circular plunger rods. With the generally flat tip profile of the plunger rod of an embodiment of the present invention, such errors are reduced since the flat tip plunger rod works based on line and surface contact. With a greater surface area of contact on the lever, any deviation in position of the lever of the flush valve would not result in many errors.

[0060] The button assembly 50 may comprise a locking mechanism 56. The locking mechanism 56 may surround the knob 52 and the eccentric wheel mechanism 40. The inner walls of the locking mechanism 56 may be provided with threads that may be screwed onto corresponding threads on the flush valve. The locking mechanism 56 enables the knob 52 to be held in its intended position after a rotary motion. This ensures that the plunger rods 58, 59 are held in their intended Z height positions, so that required flush discharge volume may be maintained consistently at each flush cycle. FIG. 5B illustrates the button assembly 50 mounted to the flush valve in a dual flush button configuration.

[0061] The flushing process of various embodiments of the invention will now be described, with reference to FIGs 7A, 7B, 7C and 7D. As shown in FIG. 7A, at an initial and default closed position, the piston 34 lies on an edge of the housing of the flush valve, such that there is no gap. In the closed position, water from the inlet is unable to flow through the flush valve in the absence of any gap. When a user presses the knob 22, the plunger rod 24 bears against the lever 32 and pushes the lever 32. This creates an increase in pressure differential which causes the piston 34 to rise to the determined level in a floating or open position. The lever 32 rises and rests on top of the plunger rod 24. A gap now exists and water from the water inlet is able to flow through the gaps of the flush valve 30, as shown in FIG. 7B.

[0062] After the flushing is completed and the piston 34 returns to the closed position and thus the gap is removed. Water from the water inlet is now unable to flow through the flush valve 30. At this point, the lever 32 is still in a retracted position and sits atop the plunger rod 24. The knob 22 is then released and the lever 32 is reset to its initial default position.

[0063] With the aforementioned disclosure, it will be apparent that the present invention provides a simple adjustable button assembly that can be easily manufactured and installed with a flush valve. The present invention allows a user to simply control and adjust the required water volume discharge by simply rotating the button or knob. With such a mechanical design, production and maintenance is relatively easy and the water volume can be controlled mechanically by hand. Moreover, the adjustable button assembly is situated at the front of the setup and

directly accessible through the access panel on a wall. The adjustable button assembly can also be readily used in a single or dual flush configuration. It would also be apparent to a person skilled in the art that the present disclosure may be applied to sanitary systems which require controlled fluid volume flow.

[0064] It will be apparent to those skilled in the art that various modifications, variations, substitutions, and equivalents exist for features of the system which do not materially depart from the scope of the invention.

[0065] It should be further appreciated by the person skilled in the art that variations and combinations of features described above, not being alternatives or substitutes, may be combined to form yet further embodiments falling within the intended scope of the invention.

Claims

1. A button assembly for a flushing system, comprising:

a flush valve having a piston and a first lever extending from the piston;

a knob rotatable about a longitudinal axis of the knob; and

a first plunger rod configured to bear against the lever and is operatively connected to the knob, the plunger rod being configured to move in a linear direction towards or away from the piston when the knob is rotated about its longitudinal axis, wherein the knob is configured to slidably engage and push the lever when a force is applied to the knob in a direction towards the lever.

2. The button assembly of claim 1, further comprising an eccentric wheel mechanism attached to the knob and the lever and configured to enable the linear motion of the lever as the knob is rotated.

3. The button assembly of claim 2, wherein the eccentric wheel mechanism comprises a cam.

4. The button assembly of any of the preceding claims, wherein the flush valve has a second lever extending from the piston and positioned adjacent to the first lever, and wherein the knob comprises a dual button configuration having a first button and a second button.

5. The button assembly of claim 4, wherein the first button is operatively connected to the first plunger rod and the second button is operatively connected to a second plunger rod.

6. The button assembly of claim 5, wherein the first and second plunger rods are being configured to move in a linear direction towards or away from the piston when the knob is rotated about its longitudinal axis.

7. The button assembly of claim 6, wherein the first button is configured to trigger the piston to open for a first predetermined period and the second button is configured to trigger the piston to open for a second predetermined period, and wherein the second predetermined period is longer than the first predetermined period.

8. The button assembly of any of the preceding claims, further comprising a locking mechanism disposed between the knob and the flush valve, the locking mechanism configured to retain the plunger rod at its determined position after the knob has rotated.

9. The button assembly of any of the preceding claims, wherein rotating the knob in a first direction to raise a height of the plunger rod in a direction towards the piston causes a greater volume of water to be discharged.

10. The button assembly of claim 9, wherein rotating the knob in a second direction, opposite of the first direction to lower a height of the plunger rod in a direction away from the piston causes a lower volume of water to be discharged.

11. The button assembly of any of the preceding claims, wherein the first and second plunger rods each has a substantially flat end to engage the levers of the flush valve.

12. The button assembly of any of claims 2 to 11, wherein the flush valve has a plurality of pins spaced apart from one another and the eccentric wheel mechanism has a plurality of corresponding holes adapted to receive the plurality of pins.

13. The button assembly of claim 12, wherein the eccentric wheel mechanism has one or more guiding pins extending towards the flush valve.

14. The button assembly of any of claims 2 to 13, wherein the knob is detachable from the eccentric mechanism.

15. The button assembly of any of the preceding claims, wherein the knob is provided with markings to indicate the direction of rotation in order to reduce or increase the flow volume.

16. A flushing system comprising the button assembly of any of the preceding claims.

17. The flushing system of claim 16, wherein the button assembly and the flush valve are mounted and concealed within a wall.