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(54) **A backflow prevention system for a toilet flushing system**

(57) A non-gravity flushing system is provided, comprising a water inlet valve (108) for allowing pressurized supply water to enter said flushing system (100) being arranged in direct fluid communication with said water inlet valve (108), wherein said flushing system (100) is configured to discharge a flow of flushing water through an outlet port (302) into a water inlet of a WC bowl (10)

when a flush is initiated. The system is characterized by a first backflow prevention device (150) arranged downstream of the water inlet valve (108), and a second backflow prevention device (350) arranged downstream of said first backflow prevention device (150) and upstream of the water inlet of said WC bowl (10).

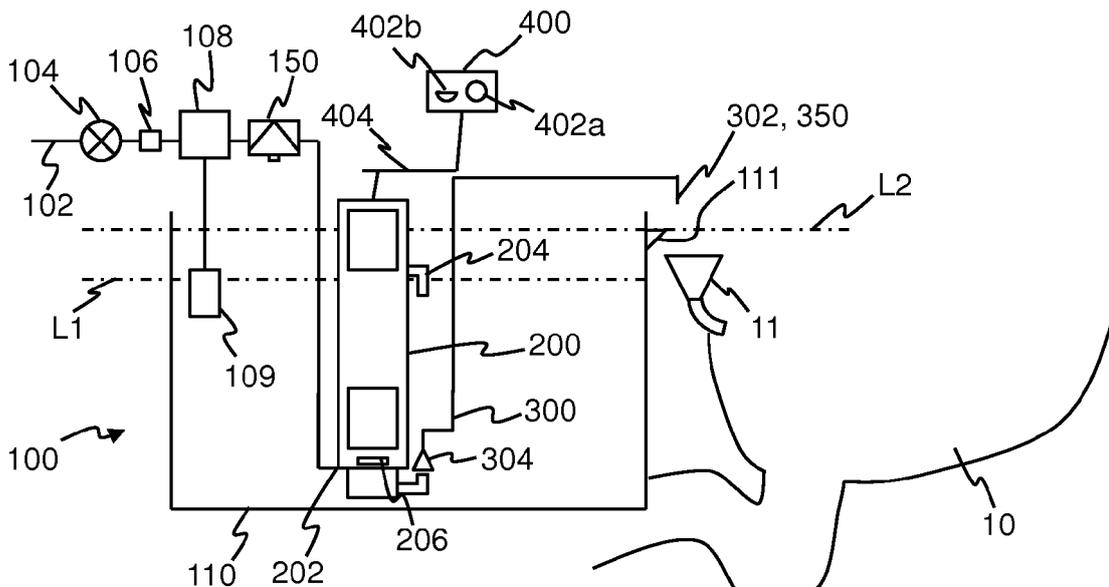


Fig. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a flushing system for a toilet. More particularly, the present invention relates to a non-gravity flushing system reducing the risk of contamination of the supply water.

BACKGROUND

[0002] Many different types of toilets are available on the market. The flushing system may e.g. be designed to allow flushing water to enter the bowl by gravity, which may be provided by arranging a flushing cistern at a level vertically above an inlet valve to the WC bowl, thus located below the level of the flushing cistern. The flushing cistern contains a certain volume of water used for flushing, whereby the flushing cistern is at least partly discharged upon flushing. For such toilets, the flushing cistern may be arranged inside a hollow body formed integrally with the WC bowl. However for wall mounted toilets, such flushing cistern may instead be provided inside the wall adjacent to the WC bowl.

[0003] Should the flushing cistern inside the wall be subject to a water leakage, severe damages may occur which may be difficult to detect in a short time. Therefore, it is often desirable to have the flushing cistern arranged such that water leakage may be easily detected visually.

[0004] Another drawback of toilets of which the flush system is operating on gravity is that they are bulky and occupies a significant amount of space. Reducing the size of the WC bowl will however also reduce the operating performance of the flush system, either by reducing the volume of flush water, the flushing flow, or both. Such proposed reduction is undesired also because of the requirements of the European standards due to the fact that a reduction of the size of the flush system operating on gravity will result in a performance well below the present European requirements, as well as normal consumer expectations.

[0005] For this purpose another type of flush systems has been developed, having a flushing cistern arranged at approximately the same level as the WC bowl. In order to discharge water from the cistern during a flush sequence, a pressurized system within the flushing cistern may be utilized. An electrical pump or compressor, or any other energy storing device, may thus provide pressurized water which may be discharged to the WC bowl without the need of gravitational force.

[0006] Although such flushing system makes it possible to provide a very compact toilet, a number of disadvantages will affect the overall quality negatively. One such disadvantage is the need for electricity, whereby additional installation costs and operational costs will reduce the total cost effectiveness of the toilet. Another, and more important, disadvantage is that contaminated water in the WC bowl may easily escape from the WC

bowl to the supply water via the flushing cistern. Attempts have been made trying to solve this issue by providing a backflow preventing valve before the inlet valve of the flushing cistern. However, such system is not fulfilling the demanding requirements and standards of the European authorities, why such pressurized systems are very rare in Europe. Therefore, it would be advantageous to provide a pressurized flushing system fulfilling all requirements on water safety issues.

SUMMARY

[0007] Accordingly, the present invention preferably seeks to mitigate or eliminate one or more of the above-identified deficiencies in the art and disadvantages singly or in any combination and solves at least the above mentioned problems by providing a flushing system with two individual backflow prevention devices.

[0008] An idea of the present invention is therefore to provide a backflow prevention arrangement for a flushing system in which at least a part of the water in the flushing cistern used for flushing is arranged below the vertical level of the inlet to the WC bowl.

[0009] A further idea of the present invention is to provide a backflow prevention arrangement for a flushing system, which backflow prevention arrangement ensures that water from the WC bowl may never escape to the main water supply.

[0010] According to a first aspect, a non-gravity flushing system is provided. The system comprises a water inlet valve for allowing pressurized supply water to enter said flushing system being arranged in direct fluid communication with said water inlet valve, wherein said flushing system is configured to discharge a flow of flushing water through an outlet port into a water inlet of a WC bowl when a flush is initiated. The system is characterized by a first backflow prevention device arranged downstream of the water inlet valve, and a second backflow prevention device arranged downstream of said first backflow prevention device and upstream of the water inlet of said WC bowl.

[0011] The flushing system may further comprise a flushing cistern for storing flushing water, wherein at least a part of the stored water can be arranged vertically below the water inlet to the WC bowl. Said flushing cistern may also comprise a tank for storing flushing water.

[0012] The tank may be capable of storing pressurized flushing water and to discharge said flushing water into the WC bowl.

[0013] The flushing system may be capable of discharging the flushing water stored in said flushing cistern by means of an ejector.

[0014] The ejector may receive a water flow for drawing the water from the flushing cistern, and the water flow may be provided by the tank or by the pressurized supply water.

[0015] The tank may be arranged inside said flushing cistern, and said flushing cistern may store non-pressu-

rized flushing water.

[0016] The first backflow prevention device may be a backflow prevention valve, and an inlet end of the backflow prevention valve may be directly connected to an outlet end of the water inlet valve. Further, the backflow prevention valve may be arranged at a predetermined distance above a maximum water level in the flushing cistern. The predetermined distance may preferably be at least 20 mm.

[0017] The first backflow prevention valve may comprise a first check valve, a second check valve, and an intermediate chamber connecting said first check valve to said second check valve, wherein said intermediate chamber comprises a drain outlet.

[0018] The second backflow prevention device may form an air gap between said outlet port and a water inlet of the WC bowl. The air gap may have a vertical extension of at least 20 mm.

[0019] According to a second aspect, a non-gravity toilet is provided, comprising a flushing system according to the first aspect.

[0020] A non-gravity toilet should in this context be interpreted to cover all toilets which do not require a gravity action on the flushing water in order to discharge it into the toilet bowl. Hence, a non-gravity toilet includes pressurized flushing systems of which at least some of the stored flushing water can be arranged at a vertical level below the inlet to the toilet bowl.

BRIEF DESCRIPTION OF DRAWINGS

[0021] These and other aspects, features and advantages of which the invention is capable of will be apparent and elucidated from the following description of embodiments of the present invention, reference being made to the accompanying drawings, in which

Fig. 1 is schematic view of a flushing system according to a first embodiment;

Fig. 2 is schematic view of a flushing system according to a second embodiment;

Fig. 3 is schematic view of a flushing system according to a third embodiment;

Fig. 4 is schematic view of a flushing system according to a fourth embodiment;

Fig. 5 is schematic view of a flushing system according to a fifth embodiment;

Fig. 6 is a cross-sectional view of a backflow prevention device for use with a flushing system;

Fig. 7a-c shows another example of a backflow prevention device for use with a flushing system.

DETAILED DESCRIPTION

[0022] Several embodiments of the present invention will be described in more detail below with reference to the accompanying drawings in order for those skilled in the art to be able to carry out the invention. The invention

may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. The embodiments do not limit the invention, but the invention is only limited by the appended claims. Furthermore, the terminology used in the detailed description of the particular embodiments illustrated in the accompanying drawings is not intended to be limiting of the invention.

[0023] The following description focuses on embodiments of the present invention applicable to a flushing system for a toilet.

[0024] In an embodiment according to Fig. 1, a toilet 10 is connected to a flushing system 100. The flushing system 100 is connected to a water supply conduit 102 for providing flushing water via a shut-off valve 104. Preferably, a filter 106 is provided downstream of the shut-off valve 104. An inlet valve 108 is arranged downstream of the filter 106 for controlling the amount of water entering the flushing system 100. Water flowing out from the inlet valve 108 will eventually enter a flushing cistern 110, which is capable of storing water between flushes.

[0025] Now returning to the inlet valve 108, a float 109 arranged inside the flushing cistern 110 provides a purely mechanical control of the operation of the inlet valve 108. That is, the inlet valve 108 is configured to open when the float 109 is in a downward position corresponding to a lower water level in the flushing cistern 110. Consequently, when the water level inside the flushing cistern 110 reaches a predetermined upper limit (as indicated by the dashed line L1), a mechanical link between the float 109 and the inlet valve 108 will cause the inlet valve 108 to close, thus preventing additional water to enter the flushing cistern 110.

[0026] However, the inlet valve 108 may in some embodiments be replaced by an electronic valve, having electronic sensors for controlling the open/close mechanism of the inlet valve. Other valves, either mechanical or electrical, utilizing various control systems for opening and closing of the valve, may also be provided.

[0027] A tank 200 is arranged inside the flushing cistern 110, and has an inlet port 202 directly connected to the water supply. The tank 200 may for some embodiments be a pressure tank such that it is capable of storing a specific volume of water at an increased pressure. Moreover, the tank may also be a part of a mechanical or electrical pump or compressor, or any other means suitable for providing a flow of flushing water. However, the tank 200 may also be a tank storing water at ambient pressure, whereby a spring loaded piston is capable of discharging water out from the tank upon flushing. Such tank is e.g. described in the co-pending application SE1250132-6 by the same applicant. For that specific tank, when the water level in the pressure tank 200 has reached an upper limit, excess water will escape through an outlet 204 whereby the flushing cistern 110 will be

subsequently filled with water. As the inlet valve 108 is controlled by means of the water level inside the flushing cistern 110, the pressure tank 200 will always be full with water before the inlet valve 108 closes.

[0028] When the tank 200 is opened in order to release the stored water, an outlet valve 206 opens whereby the stored water drains out from the tank 200. The drained water thus flows through a conduit 300 which ends at an outlet port 302. The outlet port 302 is arranged such that the water, exiting through the outlet port 302, is allowed to enter the WC bowl 10 for providing a flush.

[0029] In a preferred embodiment, as described in the co-pending application mentioned above, the conduit 300 comprises an ejector 304 arranged in close proximity to the outlet valve 206 of the tank 200. Hence, when the tank 200 discharges water out from the outlet valve 206, the water will enter the ejector 304. The ejector 304 will thus draw water from the flushing cistern 110 (thus acting as a slave tank) such that water from the tank 200 as well as from the flushing cistern 110 will flow through the conduit 300 and thus will enter the WC bowl 10. The ejector may however be omitted for flushing systems of which the tank is capable of providing enough water to perform a flush, e.g. by means of a pump, a large tank, etc.

[0030] A flushing mechanism 400 is further provided in order to activate a flushing sequence. The flushing mechanism 400 is preferably provided outside the flushing cistern 200 such that it is maneuverable by a user. Preferably, flush buttons 402 are provided for initiating the flush sequence, whereby a first flush button 402a may provide a large flush while a second flush button 402b may provide a small flush. A lever mechanism 404 is further provided for connecting the flushing mechanism 400 with the pressure tank 200. Hence, when the flushing mechanism 400 is activated by a user pressing any of the flush buttons 402a, 402b, the lever mechanism 404 will cause the tank 200 to open whereby flushing water is allowed to flow to the WC bowl 10. The mechanical flushing mechanism may in some embodiments be replaced by an electrical flushing mechanism, responsive to a user and electrically connected to a flush initiation device.

[0031] According to current standards, the described flushing system (including the toilet) may be divided into three different zones. In the first zone, i.e. the supply water conduit 102, the water quality is so called Category 1 water. This category may simply be described as high quality drinking water without any bacterial contamination being harmful for humans. In the second zone, i.e. the flushing cistern 110, the water is so called Category 3 water. This category may simply be described as high quality water, however not suitable for drinking, but without any harmful bacteria. In the third zone, i.e. the WC bowl 10, the water quality is so called Category 5 water. This category may simply be described as low quality water not suitable for drinking, and possibly containing harmful bacteria.

[0032] In order to prevent backflow of Category 5 water from the WC bowl 10 to the water supply conduit 102, two individual backflow prevention devices 150, 350 are provided. The first backflow prevention device 150 is preferably a device with different pressure zones and an intermediate zone, vented to the atmosphere. The upstream zone and the downstream zone, provided on each side of the intermediate zone, are forming different non-controllable pressure zones for the incoming water. Further, the first backflow prevention device 150 is directly connected to the inlet valve 108 such that the intrinsic pressure of the water supply is maintained within the backflow prevention device 150. The first backflow prevention device 150 is preferably arranged between the inlet valve 108 and the tank 200, and located at a predetermined distance vertically above the maximum water level, indicated by the dashed line L2, in the flushing cistern 110. More preferably, the vertical distance between the maximum water level L2 and a vent hole of the first backflow prevention device 150 is $\geq 20\text{mm}$. This is advantageous in that contaminated water in the flushing cistern 110 may never escape into the backflow prevention device 150. Further, it is preferred to maintain the intrinsic pressure of the water supply within the backflow prevention device 150 in order to use that pressure for loading the tank 200 with water.

[0033] Although the first backflow prevention device 150 prevents contaminated water to enter the water supply conduit 102, it has been proven that it is necessary to also provide means for preventing Category 5 water (i.e. water from the WC bowl 10) to enter the flushing cistern 110. For this purpose, a second backflow prevention device 350 is arranged at the outlet port 302 of the flushing system 100. The second backflow prevention device 350 is preferably an air gap formed by a vertical distance between the outlet port 302 and an inlet port 11 of the WC bowl 10. The vertical extension of the air gap is preferably $\geq 20\text{mm}$ in order to securely prevent bacteria and other contamination to spread into the conduit 300. The outlet port 302 may be inserted into an outer housing, which at its lower end is connected to the inlet port 11 of the WC bowl. The outer housing may preferably be in fluid connection with an overflow 111 of the flushing cistern 110, which overflow 111 has a purpose of draining excess water from the flushing cistern 110 into the WC bowl 10 in cases where the inlet valve 108 is not working properly. Preferably, the vertical distance between the overflow 111 and the inlet port 11 of the WC bowl is $\geq 20\text{mm}$.

[0034] Now turning to Fig. 2, another embodiment of a flushing system 100' is shown. This embodiment differs from the embodiment of Fig. 1 in that two individual tanks 200a, 200b are provided within the flushing cistern 110. Each tank 200a, 200b is directly connected to the water supply conduit 102 via a shut-off valve 104, a filter 106, an inlet valve 108 and a backflow prevention device 150. However, some of these components, except the backflow prevention device 150, may be omitted depending

on the particular application and installation requirements. Before supply water reaches the tanks 200a, 200b, the water conduit is divided such that each inlet port 202a, 202b receives water simultaneously. Further, each outlet valve 206a, 206b is allowing water to be drawn from the flushing cistern 110 during a flush. The conduits 300a, 300b guiding the flushing water to the WC bowl 10 are preferably joined at a common outlet port 302, however two outlet ports may also be provided. Alternatively, the two conduits 300a, 300b may be joined upstream of the outlet port 302.

[0035] Having two individual tanks is advantageous in many ways. For example, since the space inside the flushing cistern is extremely limited, it may be advantageous to arrange an increased number of tanks as each one of the tanks may be fitted in flushing cistern areas not otherwise being able to accommodate a single larger tank.

[0036] Further embodiments of the flushing system 100 are shown in Figs. 3-5. Starting with Fig. 3, a tank 200 forms the entire flushing cistern. Optionally, a further vessel may be provided to house the tank 200 for preventing leakage, however as the tank 200 is sealed tightly against the environment such additional vessel should not be necessary. The tank 200 is capable of storing water from the supply at an elevated pressure, such that the pressurized water may be discharged into the WC bowl. In a yet further embodiment, the tank 200 stores water at ambient pressure but includes a water pump for providing a flow. In Fig. 4 another flushing system 100 is shown. Here, the flushing cistern 110 stores water such that at least a part of the stored water is arranged vertically below the WC bowl inlet 11. In order to discharge the water of the flushing cistern 110 into the WC bowl, the flushing mechanism 400 is connected to a valve 220 arranged between the first backflow prevention device 150 and an ejector 304. When the valve 220 opens pressurized water from the main water supply 102 will flow into the ejector 304, thus drawing the water from the flushing cistern 110 into the WC bowl 10. For such operation, the inlet valve 108 must of course also open in order to allow water to flow into the ejector 304.

[0037] In Fig. 5 an additional embodiment of a flushing system 100 is shown. Here, there is no need at all for a flushing cistern or a tank. Instead, the flushing mechanism 400 is directly connected to the inlet valve 108, which provides a direct flow of water to enter the WC bowl when a flush is initiated. For this particular embodiment, utilizing a first backflow prevention device 150 and a second backflow prevention device 350 in a similar manner as to the embodiments described above, the conduit 103 guiding water from the first backflow prevention device 150 to the outlet port 302 may have a larger diameter, either constant or increasing over its length. Hence, an increased flow may be achieved for performing the flush. The inlet valve 108 may in this particular embodiment be a direct acting flushing valve, controlled by the flushing mechanism 400.

[0038] It should be realized that the flushing system 100 shown in Fig. 5 may be modified such that the first backflow prevention device 150 is omitted, whereby the direct acting flushing valve 108 provides a water flow in direct communication with the second backflow prevention device 350.

[0039] Now turning to Fig. 6, an embodiment of the second backflow prevention device 350 is shown. The flushing cistern 110 encloses the water conduit 300 which serves to supply flushing water from the cistern 110, as well as from the tank(s) (not shown) to the WC bowl. Due to the location of the flushing cistern 110, i.e. at a vertical level such that flushing water is at least partly arranged below the vertical level of the inlet port 11, the conduit 300 needs to extend vertically upwards. The conduit 300 ends at the outlet 302 which forms a part of the backflow prevention device 350 together with the inlet port 11 of the WC bowl. As can be seen in Figs. 1-5, there is an air gap between the outlet port 302 of the flushing system and the inlet port 11 of the WC bowl, which air gap ensures that no contaminated water in the WC bowl may flow in the wrong direction, i.e. to the flushing cistern 110.

[0040] Now turning to Fig. 7a-c, an embodiment of the first backflow prevention device 150 will be described. In this embodiment, the first backflow prevention device 150 is a backflow prevention valve being operated by the intrinsic pressure of the water supply. The minimum upstream pressure at which the valve will operate is preferably set to approximately 0,5 Bar for complying with current standards. However, the minimum upstream pressure at which the valve opens is preferably set according to the specific requirements of the particular installation site. Hence, the minimum upstream pressure at which the valve opens may be between 0,2 and 2 Bar, such as 0,5, 0,75, or 1 Bar.

[0041] Generally, the backflow prevention valve 150 comprises an inlet 152 forming a part of a first check valve 156, and an outlet 164 forming a part of a second check valve 166. The first check valve 156 and the second check valve 166 are connected by means of an intermediate chamber 176 having a drain outlet 178 for discharging leaking water into the flushing cistern 110. Hence, the backflow prevention valve is preferably arranged above the flushing cistern 110. More preferably, the backflow prevention valve 150 is arranged at a minimum distance of 20 mm above the maximum water level L2 of the flushing cistern 110, such that water from the flushing cistern 110 may never escape into the backflow prevention valve 150.

[0042] Starting with Fig. 7a, an exploded view is shown. An inlet body 152 is connected to the water supply conduit for receiving pressurized water. Inside the inlet body 152 a poppet 154 is inserted. The poppet 154 houses an insert, or check valve 156 which is further enclosed within a spring biased piston 158. The spring 160, acting on the piston 158, rests on a flat rubber sealing 162 arranged within an outlet body 164. Inside the outlet body 164, a second insert, or check valve 166 is provided.

The first check valve 156 is sealed against the interior surface of the piston 158 by means of an o-ring. Correspondingly, the second check valve 166 is sealed against the interior surface of the outlet body 164 by means of another o-ring. The outlet body 164 is further connected to a conduit serving to guide inlet water to the pressure tanks previously described. The inlet body 152 and the outlet body 164 may be connected to its corresponding conduit by means of threads, or by a snap lock connection for facilitating replacement of the valve 150.

[0043] Now turning to Fig. 7b, the backflow prevention valve 150 is shown in a closed position, i.e. when there is no water flowing towards the inlet body 152 (or water flowing at a pressure below the cracking pressure). In this case, the piston 158 will be forced towards the inlet body 152 by the spring 160 and a lip 168 of the first check valve 156 is pressed towards a socket 170.

[0044] When water is flowing into the valve 150 at a pressure above the cracking pressure, preferably between 0,5 and 10 Bar, the piston 158 will be sealed against the flat rubber sealing 162 and the check valve 156 will open, as is shown in Fig. 7c. This is accomplished since the force required to compress the spring 160 is lower than the force required to allow water to flow through a first check valve 156, Hence, water is allowed to flow through the check valve 156 into a closed conduit formed between the check valves 156, 166 by means of the position of the piston 158. The second check valve 166 is similar to the first check valve, whereby the water pressure will provide a small slit between a lip 172 and a socket 174 of the second check valve 166. Water is thus allowed to exit the backflow prevention valve 150.

[0045] Should a possibility for backflow occur, e.g. due to a decreased pressure in the water supply conduit, water is prevented to flow through the backflow prevention valve 150 in the opposite direction as the second check valve 166 will not allow water to pass. Even if damage should occur, e.g. by a leakage in the o-ring, the first check valve 156 will provide a similar backflow prevention functionality. Even if this also should malfunction, the spring 160 will open the intermediate chamber to the atmosphere and thus prevent any backflow to the water supply. Hence, when the backflow prevention valve 150 is closed, the position of the piston 158 will open the intermediate chamber 176 to the atmosphere. As soon as the inlet water applies a pressure on the first check valve 156, the piston 158 will move towards the second check valve 166 thus closing the intermediate chamber 176 such that a closed conduit is provided.

[0046] As described above, the backflow prevention valve 150 is preferably arranged above the flushing cistern, such that any leakage of the backflow prevention valve 150 will result in a water flow into the flushing cistern. This is advantageous in that no damage of surrounding equipment will occur.

[0047] Although the present invention has been described above with reference to specific embodiments, it is not intended to be limited to the specific form set forth

herein. Rather, the invention is limited only by the accompanying claims and, other embodiments than the specific above are equally possible within the scope of these appended claims.

5 **[0048]** In the claims, the term "comprises/comprising" does not exclude the presence of other elements or steps. Furthermore, although individually listed, a plurality of means, elements or method steps may be implemented by e.g. a single unit. Additionally, although individual features may be included in different claims, these may possibly advantageously be combined, and the inclusion in different claims does not imply that a combination of features is not feasible and/or advantageous. In addition, singular references do not exclude a plurality.

10 **[0049]** The terms "a", "an", "first", "second" etc do not preclude a plurality. Reference signs in the claims are provided merely as a clarifying example and shall not be construed as limiting the scope of the claims in any way. Further, any reference to a relative position such as upper, lower, above, below, etc should be interpreted as the position during use, i.e. when the flushing system is mounted and connected to an associated WC.

25 Claims

1. A non-gravity flushing system, comprising a water inlet valve (108) for allowing pressurized supply water to enter said flushing system (100) being arranged in direct fluid communication with said water inlet valve (108), wherein said flushing system (100) is configured to discharge a flow of flushing water through an outlet port (302) into a water inlet of a WC bowl (10) when a flush is initiated,
characterized by
a first backflow prevention device (150) arranged downstream of the water inlet valve (108), and
a second backflow prevention device (350) arranged downstream of said first backflow prevention device (150) and upstream of the water inlet of said WC bowl (10).
2. The flushing system according to claim 1, further comprising a flushing cistern (110) for storing flushing water, wherein at least a part of the stored water can be arranged vertically below the water inlet to the WC bowl (10).
3. The flushing system according to claim 2, wherein said flushing cistern (110) comprises a tank (200) for storing flushing water.
4. The flushing system according to claim 3, wherein said tank (200) is capable of storing pressurized flushing water and to discharge said flushing water into the WC bowl (10).

5. The flushing system according to claim 2 or 3, wherein said flushing system (100) is capable of discharging the flushing water stored in said flushing cistern (110) by means of an ejector (304). 5
6. The flushing system according to claim 5, wherein said ejector (304) receives a water flow for drawing the water from the flushing cistern (110), and wherein said water flow is provided by the tank (200) or by the pressurized supply water. 10
7. The flushing system according to claim 3 and 5, wherein said tank (200) is arranged inside said flushing cistern (110), and wherein said flushing cistern (110) stores non-pressurized flushing water. 15
8. The flushing system according to any one of the preceding claims, wherein said first backflow prevention device (150) is a backflow prevention valve. 20
9. The flushing system according to claim 8, wherein an inlet end (152) of the backflow prevention valve (150) is directly connected to an outlet end of the water inlet valve (108). 25
10. The flushing system according to claim 8 or 9, wherein said backflow prevention valve (150) is arranged at a predetermined distance above a maximum water level (L2) in the flushing cistern (110). 30
11. The flushing system according to claim 10, wherein said predetermined distance is at least 20 mm.
12. The flushing system according to any one of claims 8 to 11, wherein said first backflow prevention valve (150) comprises a first check valve (156), a second check valve (166), and an intermediate chamber (176) connecting said first check valve (156) to said second check valve (166), wherein said intermediate chamber (176) comprises a drain outlet (178). 35 40
13. The flushing system according to any one of the preceding claims, wherein said second backflow prevention device (350) forms an air gap between said outlet port (302) and a water inlet (11) of the WC bowl (10). 45
14. The flushing system according to claim 13, wherein said air gap has a vertical extension of at least 20 mm. 50
15. A non-gravity toilet, comprising a flushing system (100) according to any one of the preceding claims. 55

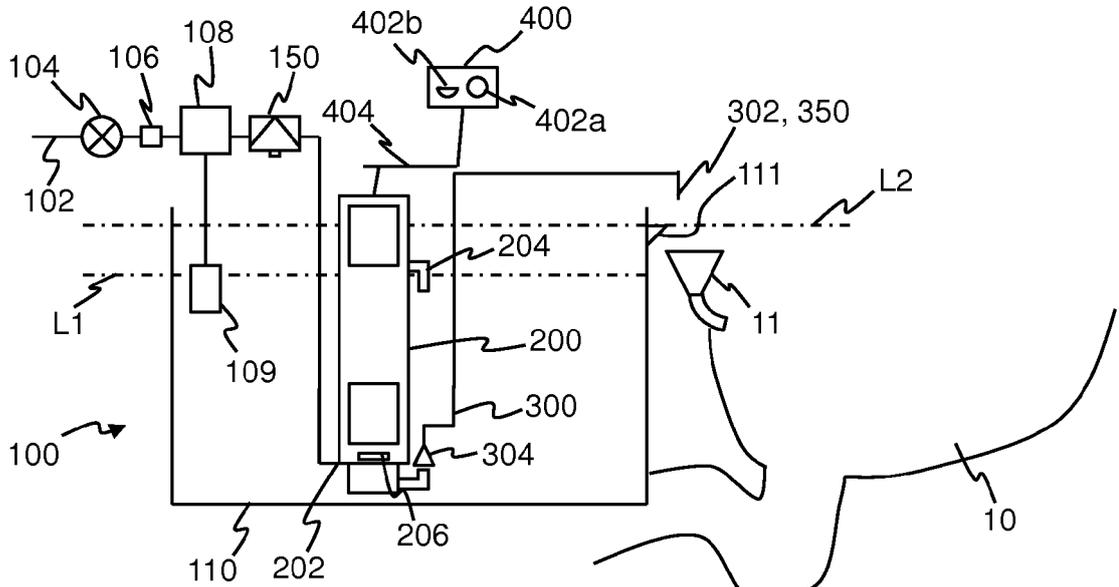


Fig. 1

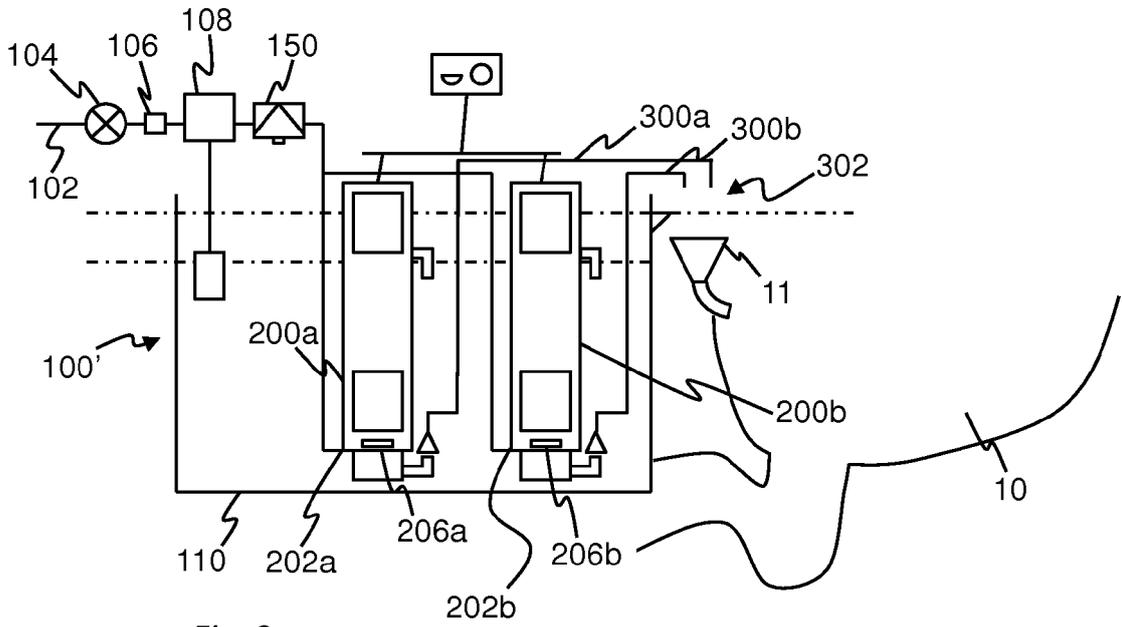
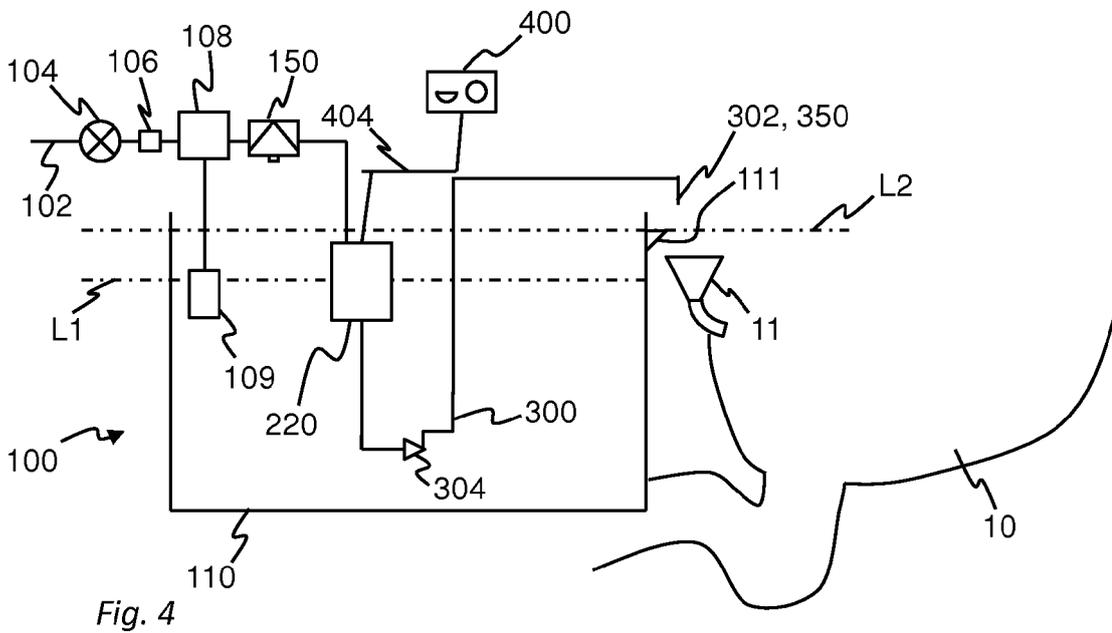
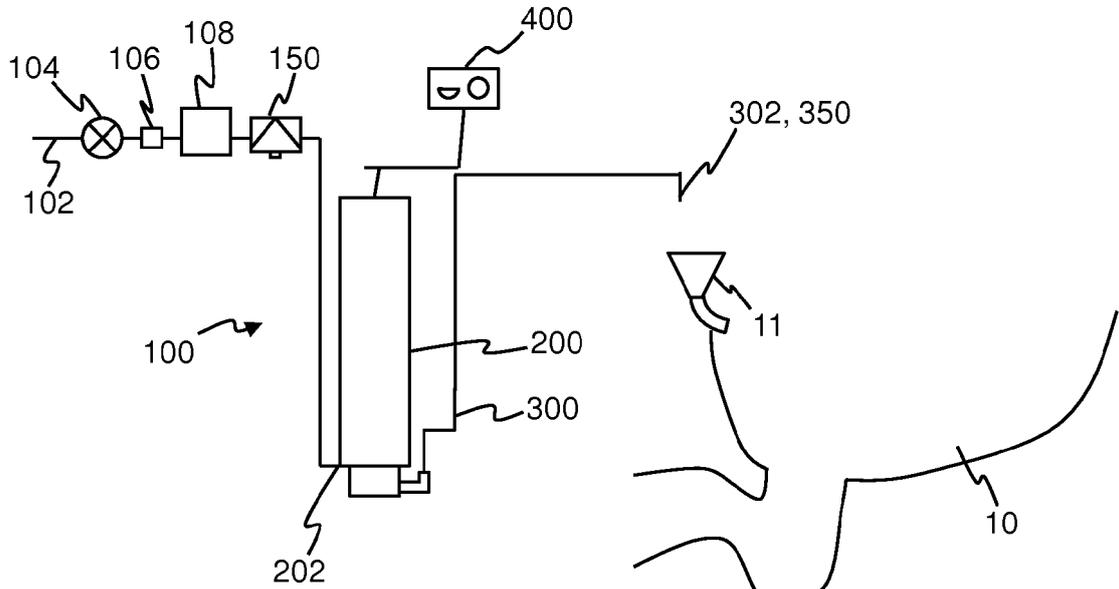


Fig. 2



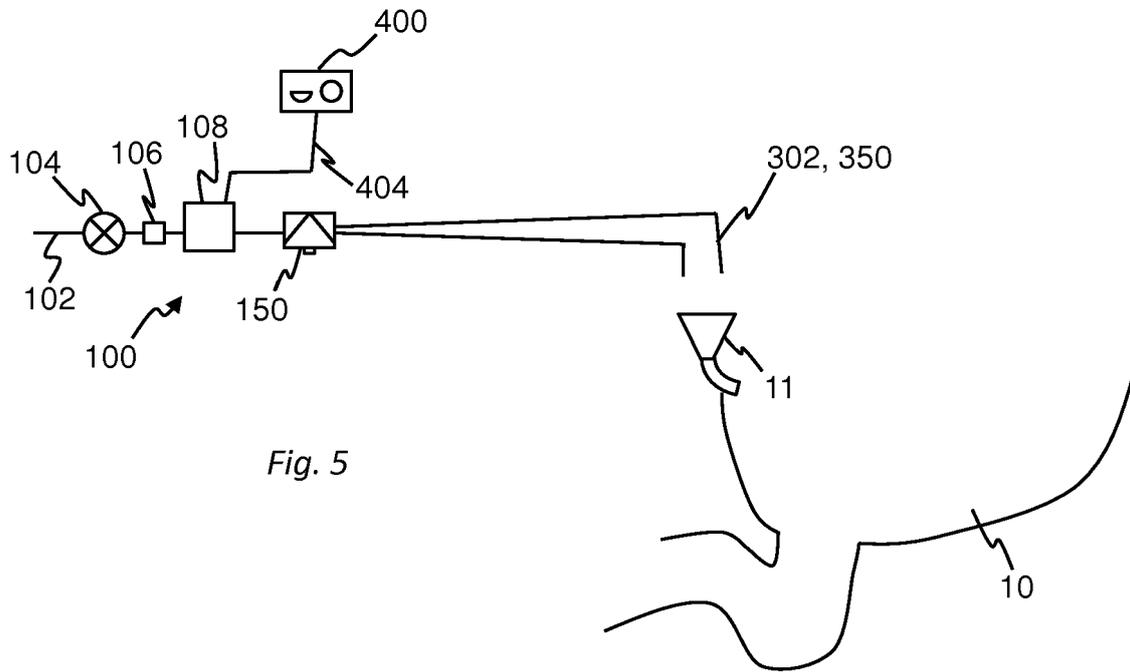


Fig. 5

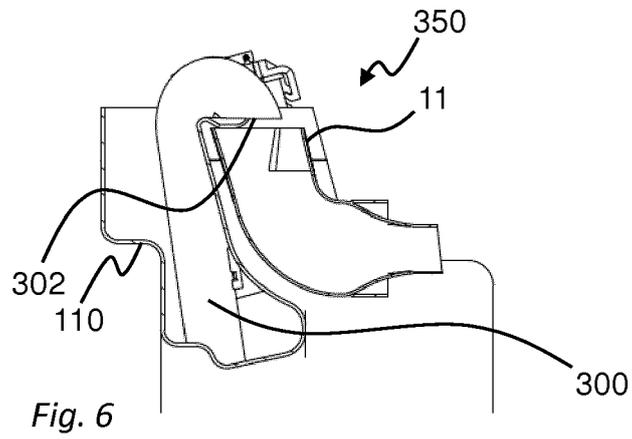
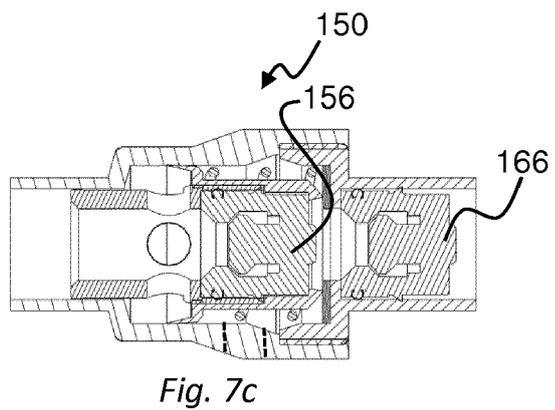
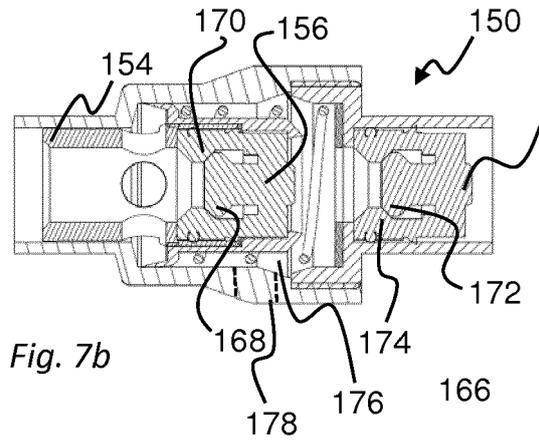
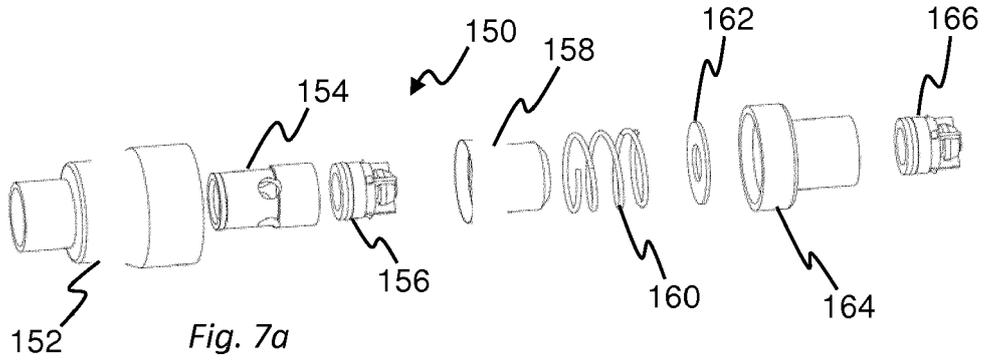


Fig. 6





EUROPEAN SEARCH REPORT

Application Number
EP 13 15 1854

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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