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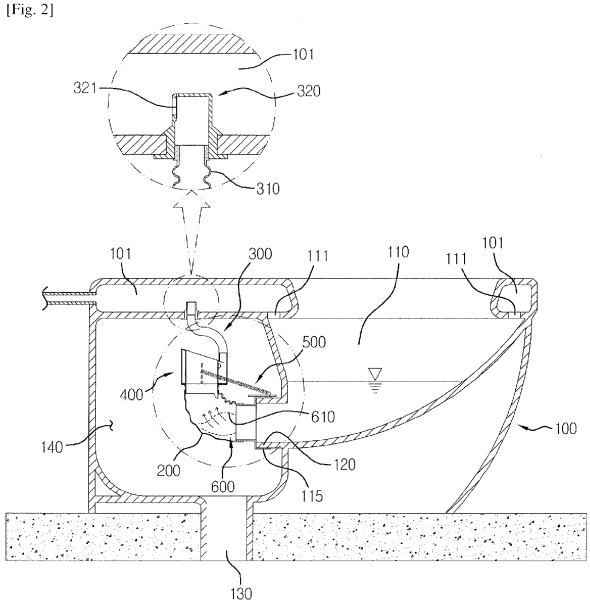
(54) SEWAGE DISCHARGE DEVICE OF VARIABLE WATER-SAVING TOILET

(57) The present invention relates to a sewage discharge device of a variable water-saving toilet, the device discharging sewage in a bowl to the outside by the load of an auxiliary tank, when a part of tap water branches off from a tap water inflow path such that the tap water stored in the auxiliary tank provided around the outer periphery of a sewage discharge pipe of the toilet reaches a predetermined amount or more.

[Fig. 2]



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a sewage discharge device for a variable type water-saving flush toilet, and more particularly, to a sewage discharge device for a variable type water-saving flush toilet in which a part of flushing water flowing through a flushing water inflow passage is branched so that when flushing water stored in an auxiliary tank disposed at the outer circumference of a sewage discharge tube of the flush toilet reaches a preset amount, sewage contained in a bowl is discharged to the outside by the auxiliary tank's own weight.

2. Description of Related Art

[0002] In general, a flush toilet employs the principle of a siphon in which a certain amount water is contained in a toilet bowl to smoothly remove foul odor or excretions rising from a waste outlet port and cleanly wash the inside of the bowl.

[0003] This siphon principle refers to a principle in which when a water level in an inverted U-shaped tube forms an equilibrium state with that in the toilet bowl, water is in a stagnant state whereas when the water level in the toilet bowl rises suddenly, water contained in the bowl is discharged to the outside due to a difference in the pressure between the toilet bowl and the siphon tube in a relatively low pressure state while being accompanied by an increase in pressure inside the toilet bowl.

[0004] As shown in FIG. 1, a typical flush toilet includes a bowl 2 configured to contain a predetermined amount of water, and a waste wash water tank 1 disposed at a higher position than that of the bowl 2 and configured to store a predetermined amount of waste wash water, the waste wash water tank being connected to the bowl 2 through a water supply passage 2a closed by a packing valve 5, so that the packing valve 5 operated in cooperation with a flush lever installed at the waste wash water tank 1 opens a water feed port 10 by the manipulation of the flush lever 3 to allow water stored in the waste wash water tank 1 to be rapidly supplied to the bowl 2 through the water supply passage 2a. Thus, waste including feces and urine precipitated in the bowl is discharged to the outside through a water drainage passage 2b via a drain trap 2c by the siphon effect in which water to be drained along the water drainage passage 2b of the bowl is created by a hydraulic pressure generated in the bowl 2 with increased water level in the bowl 2.

[0005] However, such a conventional flush toilet as described above entails a problem in that a water level higher than a height of the drain trap 2c should be maintained to prevent backflow of foul toilet odor in the bowl, and an amount of water capable of overcoming a hydraulic pressure at the height of the drain trap 2c should be used during flushing of the toilet, leading to an increase in the amount of water consumed.

[0006] Furthermore, since the existing flush toilet should conform to a regulation prescribing that the diameter of a sewage discharge tube shall be set to be more than 45 mm, i.e., generally about 45-55 mm, which was determined according to KS standards to smoothly discharge sewage from the bowl, a so called siphon phenomenon is caused to occur in order to wash sewage inside the bowl by a suction force. For the purpose of causing the siphon phenomenon, it is required that water of more than 60 ml should be supplied to the inside of the bowl at least at one time. To this end, in the case of the conventional flush toilet, a water tank is installed and a certain amount of water is stored therein at normal times, and then water is supplied to the inside of the bowl through the water supply passage fluidically communicating with the water tank and the bowl by the opening of an opening/closing stopper attached to an aperture of a water discharge tube having a diameter of about 65 mm or less, which was installed at the inside of the water tank so that the siphon phenomenon occurs to perform the washing operation.

[0007] Therefore, the conventional flush toilet also entails a problem in that although flushing water is supplied to the inside of the bowl from a water pipe having an aperture of about 15 mm, the diameter of the sewage discharge tube of the bowl is typically not more than 45-55 mm, and thus the siphon phenomenon cannot occur and the flushing water is discharged to the outside through the sewage discharge tube as it is, which makes it impossible to wash sewage contained in the bowl.

[0008] For this reason, since a male urinal is directly connected to a water pipe in use, automatic washing has been generalized by a sensor or the like. However, a toilet stool cannot wash sewage by its direct connection to the water pipe for the above reason, and thus an automatic toilet stool could not be commercialized.

[0009] Further, the existing flush toilet (partially, a flush value type toilet product with a water feed tube having an aperture of 1 inch is excluded) should necessarily have a water tank function to enable washing of the bowl. For this reason, there is also a spatial restriction because the size of the flush toilet cannot be reduced due to a design limitation and the water tank. In addition, a water tank and a toilet stand are integrally manufactured of earthenware into a so-called "one-piece type flush toilet), a defective rate increases and thus a production yield decreases, resulting in a rise of the cost of earthenware products.

[0010] Moreover, there may be the case where even though water leakage occurs due to a defect of a water feed and discharge tube installed at the inside of the water tank, it is difficult for a user to easily detect the water leakage and thus the user cannot recognize the water leakage until he or she checks a bill for the water supply and drainage service. In addition, since a so-called flash toilet used in a common restroom or a public place such

as an office building or the like does not include a water tank, it should be additionally equipped with a water tube having a diameter of 25 mm (1 inch) separately from a general water pipe having a diameter of 15 mm so that it can be directly connected to the water pipe to supply a large amount of water at one time in use. To this end, vast installation cost is additionally required, and a so-called "water hammer" phenomenon during the operation of the flush lever is accompanied by a serious noise, which makes it impossible to use the flash toilet in a general home environment.

[0011] Further, Korean Patent No. 10-1131810 discloses a water-saving flush toilet having a variable double straight tube, in which the variable double straight tube is configured to be operated in an existing water flow path and a bowl rim manner. When a water level inside a bowl during the supply of flushing water from a tap, the variable double straight tube is downwardly moved so that sewage can be discharged, but a hydraulic pressure of the flushing water drops drastically in a water supply passage fluidically communicating with a water tank and the bowl and a water supply passage formed in the bowl rim, which ultimately makes it impossible to use the flushing water from a tap, and thus there is caused a problem associated with the washing of sewage contained in the bowl. In addition, it is difficult to control the delay of the sewage discharge time when the variable double straight tube is downwardly moved during the discharge of sewage, occasionally resulting in backflow of some sewage.

[0012] Moreover, Korean Patent No. 10-1131810 also discloses that flushing water should be supplied to the bowl until the variable double straight tube is downwardly moved to discharge sewage, and the supplied flushing water is immediately mixed with sewage contained in the bowl and thus is also changed into sewage. Resultantly, waste wash water is squandered, leading to a half-reduction in the water-saving effect.

[0013] Furthermore, Korean Patent No. 10-1131810 also discloses that the variable double straight tube uses water stored in an auxiliary tank disposed on the outer circumference of a sewage discharge tube as a part of sewage to be discharged, and thus the variable double straight tube is clogged by sewage introduced into the auxiliary tank after a lapse of a predetermined period of time, which causes an erroneous operation of the sewage discharge tube, leading to deterioration of durability of the sewage discharge tube.

SUMMARY OF THE INVENTION

[0014] Accordingly, the present invention has been made to solve the aforementioned problems occurring in the prior art, and it is an object of the present invention to provide a sewage discharge device for a variable type water-saving flush toilet in which a part of flushing water flowing through a flushing water inflow passage is branched and a sewage discharge unit connected to an outlet port of a bowl by a bellows tube is elastically moved downwardly by the branched flushing water's own weight so that the sewage can be sequentially discharged, and the sewage discharge unit can elastically return to its original position after completion of the discharge of the sewage contained in the bowl.

[0015] Another object of the present invention is to provide a sewage discharge device for a variable type water-saving flush toilet, which can discharge sanitary sewage contained in a bowl of the flush toilet using flushing water directly supplied from a water pipeline even without a water tank.

[0016] Still another object of the present invention is to provide a sewage discharge device for a variable type water-saving flush toilet, in which a sewage discharge unit can be stably operated if flushing water supplied from a water pipeline is more than a certain pressure despite a change in the pressure of water so that since the sewage discharge device is hardly influenced by the pressure of water supplied, a washing performance can be maintained stably.

[0017] Yet another object of the present invention is to provide a sewage discharge device for a variable type water-saving flush toilet, in which flushing water supplied from a water pipeline can be used so that the sewage discharge device can contribute to diversification of a toilet bowl design, reductions in the production cost and installation space, and generalization of the use of an automatic flush toilet employing a sensor by eliminating the necessity of a water tank necessary for an existing flush toilet.

[0018] To achieve the above objects, according to a preferred embodiment of the present invention, there is provided a sewage discharge device for a variable type water-saving flush toilet, including: a toilet body 100 installed on a floor or a wall, the toilet body 110 including a flushing water inlet port 111 formed therein so as to allow for inflow of flushing water flowing through a flushing water inflow passage 101 into which the flushing water is introduced from the outside, a bowl 110 opened at a top thereof and configured to store a certain amount of sewage therein, a connection tube 120 configured to discharge sewage from the bowl 110, and a cover part 140 configured to cover a rear portion of the bowl 110 and to allow sewage discharged through the connection tube 120 to be induced to a bottom tube 130; a corrugated tube 200 connected to the connection tube 120, the corrugated tube 200 being configured to form a flow path of sewage drained from the bowl 110 and being capable of bent in one direction; a flushing water branching unit 300 fluidically connected with the flushing water inflow passage 101 and configured to allow a part of the flushing water flowing through the flushing water inflow passage 101 to be branched when the flushing water is introduced into the bowl 110; a sewage discharge tube 400 comprising: a main discharge tube 410 connected to the corrugated tube 200 and configured to discharge sewage to the outside; and an auxiliary tank 420 disposed on an outer circumferential surface of the main discharge tube

410 and configured to store therein flushing water branched from the flushing water branching unit 300 and supplied thereto, the auxiliary tank having an auxiliary discharge hole 422 formed thereon to allow flushing water stored in a lower portion thereof to be drained, wherein when the flushing water branched from the flushing water branching unit 300 reaches a preset amount, the auxiliary tank 420 is downwardly moved by its own weight so that sewage is discharged to the outside through the main discharge tube 410, and the time during which sewage is discharged to the outside through the main discharge tube 410 is delayed in proportion to a discharge speed at which the flushing water supplied to the auxiliary tank 420 is drained through the auxiliary drain hole 422; and an elastic unit 500 configured to elastically interconnect the connection tube 120 and the sewage discharge tube 400, and to allow the sewage discharge tube 400 to be oriented in an upright state by an elastic force of the elastic unit upon the interruption of the supply of flushing water.

[0019] In addition, in the sewage discharge device for a variable type water-saving flush toilet of the present invention, the elastic unit may include: a first hanging member mounted on a connection tube interconnecting the connection tube and the corrugated tube so as to be protruded to both sides, the first hanging member having a pair of first hanging holes formed at each of both end portions thereof; a pair of second hanging members mounted on both sides of the sewage discharge tube, each of the second hanging members having a pair of second hanging holes formed thereon so as to be spaced apart from each other; and a pair of elastic members each connected at one end thereof to any one of the pair of second hanging holes of each of the pair of second hanging members and connected at the other end thereof to each of the pair of first hanging holes of each of both end portions of the first hanging member.

[0020] In addition, the sewage discharge device for a variable type water-saving flush toilet of the present invention, may further include an odor prevention unit 600 disposed inside the corrugated tube 200 or the sewage discharge tube 400, the odor prevention unit being opened when the sewage flows through the corrugated tube 200 or the sewage discharge tube 400 and closed when the sewage does not flow therethrough.

[0021] Further, in the sewage discharge device for a variable type water-saving flush toilet of the present invention, the flushing water branching unit 300 may include: a branching corrugated tube 310 coupled at an upper end thereof to the flushing water inflow passage 101 and connected at a lower end thereof to the auxiliary tank 420; and a branched water inlet part 320 connected to the upper end of the branching corrugated tube 310 and disposed at the inside of the flushing water inflow passage 101.

[0022] In addition, in the sewage discharge device for a variable type water-saving flush toilet of the present invention, the flushing water branching unit 300 may further include an odor prevention valve 321 disposed at an entrance portion of the branched water inlet part 320, and configured to be opened by a hydraulic pressure when flushing water is supplied to the flushing water inflow passage 101 and closed by the odor prevention valve's own weight when the supply of the flushing water is interrupted so that foul toilet odor is prevented from flowing into the flushing water inflow passage 101.

[0023] In addition, in the sewage discharge device for a variable type water-saving flush toilet of the present invention, the odor prevention unit 600 may include an odor prevention member 610 that is disposed at the inside of the sewage discharge tube 400, is formed in a hollow shape, and is made of vinyl or thin rubber having flexibility, wherein one end of the odor prevention member 610 is fixed to one end of an inner circumference of the sewage discharge tube 400, and wherein the other end of the odor prevention member 610 is disposed to form a free end along the other end of the inner circumference of the sewage discharge tube 400, whereby when sewage contained in the bowl 110 flows into the corrugated tube 200 through connection tube 120, it is introduced into a hollow space of the odor prevention member 610 to open the odor prevention member 610, and whereby when the discharge of the sewage from the sewage discharge tube 400 is completed, the outward shape of the other end of the odor prevention member 610 disposed to form the free end is changed to be closely abutted against the sewage discharge tube 400.

EFFECTS OF THE INVENTION

[0024] As described above, the present invention has an advantageous effect in that the auxiliary tank is disposed on the outer circumference of the sewage discharge tube to supply a part of flushing water flowing through the flushing water inflow passage to the auxiliary tank through an auxiliary corrugated tube so that sewage can be rapidly discharged to the outside by rotating the sewage discharge tube by the auxiliary tank's own weight.

[0025] Further, according to the present invention, when flushing water is not supplied, the sewage discharge tube is not displaced so that although a large amount of sewage is supplied temporarily, the amount of water contained in the bowl can be stably maintained without affecting the sewage discharge tube, thereby maximally preventing adhesion of sewage onto the inside of the bowl or foul odor.

[0026] In addition, the present invention has an effect in that when the amount of the flushing water supplied to the auxiliary tank is more than a preset level, the operation of the sewage discharge tube can be performed stably, thereby maximally preventing a deterioration in the washing performance according to a change in the pressure of water supplied.

[0027] Moreover, according to the present invention, a part of flushing water flowing through the flushing water

inflow passage is supplied to the auxiliary tank via the flushing water branching unit to allow the age discharge tube to be downwardly operated elastically so that sewage contained in the bowl can be discharged to the outside before flushing water is supplied to the bowl, thereby maximizing the water saving effect.

[0028] Besides, according to the present invention, since it is possible to control the effect of extending the sewage discharge time depending on the weight of the auxiliary tank by the elastic force of the sewage discharge tube rotated downwardly upon the discharge of sewage, backflow of the sewage or the remaining water can be suppressed, thereby ensuring a perfect washing performance.

[0029] In addition, the present invention has an effect in that some flushing water is supplied to the auxiliary tank so that an erroneous operation of the sewage discharge tube that may occur during the use of the sewage can be prevented.

[0030] In addition, the present invention has an effect in that a hollowed odor prevention member made of vinyl or thin rubber is disposed inside the sewage discharge tube, thereby minimizing backflow of foul toilet odor to the bowl of the toilet body after the discharge of sewage.

[0031] Further, the present invention has an effect in that it can be applied to a flush toilet employing a water tank such as an existing flush toilet, as well as sewage contained in the bowl of the flush toilet can be discharged to the outside by using flushing water supplied from the water pipeline even without any water tank, thereby achieving generalization of the automatic flush toilet.

[0032] Furthermore, the present invention has an effect in that it can implement diversification of the design of the flush toilet and reduce the production cost of the flush toilet through a decrease of defective rate in the production process by eliminating the necessity of a water tank.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic cross-sectional view illustrating a configuration of a conventional flush toilet according to the prior art;

FIGS. 2 and 3 are schematic cross-sectional views illustrating a state in which sanitary sewage is not discharged in a sewage discharge device for a variable type water-saving flush toilet according to the present invention;

FIGS. 4 and 5 are schematic cross-sectional views illustrating a state in which sanitary sewage is discharged in a sewage discharge device for a variable type water-saving flush toilet according to the present invention; and

FIGS. 6 and 7 are exploded perspective views illustrating a state in which a sewage discharge tube and an elastic unit are connected to each other in a sewage discharge device for a variable type water-saving flush toilet according to the present invention.

Explanation on Symbols

[0034]

100: toilet body
200: corrugated tube
300: flushing water branching unit
310: branching corrugated tube
320: branched water inlet part
321: odor prevention valve
400: sewage discharge tube
410: main discharge tube
420: auxiliary tank
500: elastic unit
600: odor prevention unit

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0035] Hereinafter the configuration of a sewage discharge device for a variable type water-saving flush toilet according to the present invention will be described in detail with reference to the accompanying drawings.

[0036] FIGS. 2 and 3 are schematic cross-sectional views illustrating a state in which sanitary sewage is not discharged in a sewage discharge device for a variable type water-saving flush toilet according to the present invention, FIGS. 4 and 5 are schematic cross-sectional views illustrating a state in which sanitary sewage is discharged in a sewage discharge device for a variable type water-saving flush toilet according to the present invention, and FIGS. 6 and 7 are exploded perspective views illustrating a state in which a sewage discharge tube and an elastic unit are connected to each other in a sewage discharge device for a variable type water-saving flush toilet according to the present invention.

[0037] Referring to FIGS. 2 and 4, a tankless water-saving flush toilet of the present invention roughly includes a toilet body 100, a corrugated tube 200, a flushing water branching unit 300, a sewage discharge tube 400, and an elastic unit 500.

[0038] The configuration of each of the elements will be described hereinafter,

Toilet body 100

[0039] The toilet body 100 according to the present invention is installed on a floor or a wall of a toilet, a restroom, a bathroom or the like.

[0040] The toilet body 100 includes a flushing water inlet port 111 formed therein so as to allow for inflow of

flushing water flowing through a flushing water inflow passage 101 into which the flushing water is introduced from the outside, a bowl 110 opened at a top thereof and configured to store a given amount of sewage therein. The flushing water is supplied to the bowl 110 through the flushing water inlet port 111 to wash the inside of the bowl 110. When a valve is opened through a flushing water valve (not shown), flushing water is introduced into the flushing water inflow passage 101 and is involved in washing the bowl 110.

[0041] In addition, the toilet body 100 includes a connection tube 120 configured to discharge sewage from the bowl 110.

[0042] Further, the toilet body 100 includes a cover part 140 that is configured to cover a rear portion of the bowl 110 and allows sewage discharged through the connection tube 120 to be induced to a bottom tube 130.

Corrugated tube 200

[0043] The corrugated tube 200 according to the present invention is connected to the connection tube 120. That is, one end of the corrugated tube 200 is connected to a distal end of the connection tube 120.

[0044] The one end of the corrugated tube 200 may be fittingly fixed to the connection tube 120, and may be connected to the connection tube 120 in a screw fastening manner.

[0045] The corrugated tube 200 serves to form a flow path of sewage drained from the bowl 110, and is a flexible tube that can be bent in one direction by an external force.

Flushing water branching unit 300

[0046] The flushing water branching unit 300 according to the present invention is fluidically connected with the flushing water inflow passage 101 and serves to allow a part of the flushing water flowing through the flushing water inflow passage 101 to be branched when the flushing water is introduced into the bowl 110. When the flushing water is supplied to the bowl 110 to wash the bowl 110, some flushing water branched from the flushing water branching unit 300 from the flushing water inflow passage 101 is introduced into and stored in an auxiliary tank 420 of the sewage discharge tube 400 which will be described later so that the sewage discharge tube 400 is rotated by the auxiliary tank's own weight, which is involved in discharging sewage.

[0047] The flushing water branching unit 300 includes a branching corrugated tube 310 and a branched water inlet part 320.

[0048] The branching corrugated tube 310 is coupled at an upper end thereof to the flushing water inflow passage 101 and is connected at a lower end thereof to the auxiliary tank 420.

[0049] The branched water inlet part 320 is connected to the upper end of the branching corrugated tube 310 and is disposed at the inside of the flushing water inflow passage 101 so that it serves to allow for introduction of some branched flushing water. The introduced branched water flows into and is stored in the auxiliary tank 420 of the sewage discharge tube 400 which will be described later through the branching corrugated tube 310.

[0050] In an embodiment of the present invention, the use of flushing water directly supplied from a water pipeline can drain sanitary sewage contained in a bowl 110 of the flush toilet even without a water tank.

[0051] Moreover, preferably, the flushing water branching unit 300 further includes an odor prevention valve 321 disposed at an entrance portion of the branched water inlet part 320, and configured to be opened by a hydraulic pressure when flushing water is supplied to the flushing water inflow passage 101 and closed by the odor prevention valve's own weight when the supply of the flushing water is interrupted so that foul toilet odor is prevented from flowing into the flushing water inflow passage 101.

[0052] When provided, the odor prevention valve 321 is closed by its own weight upon the interruption of the supply of the flushing water so that foul toilet odor can be prevented from flowing into the bowl 110 and then the interior of a toilet room through the flushing water inflow passage 101.

[0053] FIG. 5 is a cross-sectional view illustrating the operation of a sewage discharge tube according to the present invention.

Sewage discharge tube 400

[0054] Referring to FIGS. 2 and 5, the sewage discharge tube 400 according to the present invention is connected to the corrugated tube 200. When flushing water introduced through the flushing water branching unit 300 is stored in the auxiliary tank 420, a load is applied to the sewage discharge tube 400 to downwardly move the sewage discharge tube 400 to discharge sanitary sewage contained in the bowl to the outside.

[0055] The sewage discharge tube 400 includes a cylindrical main discharge tube 410 connected to one end of the corrugated tube 200 and an auxiliary tank 420 disposed on an outer circumferential surface of the main discharge tube 410 to circumferentially surround the main discharge tube 410.

[0056] The main discharge tube 410 is connected to the corrugated tube 200 and servers to discharge sewage to the outside.

[0057] The auxiliary tank 420 is disposed on an outer circumferential surface of the main discharge tube 410 and is configured to store therein flushing water branched from the flushing water branching unit 300 and supplied thereto. The auxiliary tank 420 has an auxiliary drain hole 422 formed thereon to allow flushing water stored in a lower portion thereof to be discharged. The auxiliary tank 420 serves to rotate the sewage discharge tube 400 by its own weight of the flushing water branched from the

flushing water branching unit 300 and stored therein upon the supply of the flushing water to the bowl 110 to wash the bowl 110 so that sewage contained in the bowl 110 can be discharged to the outside through the main discharge tube 410 connected to the corrugated tube 200. At this time, when the flushing water branched from the flushing water branching unit 300 reaches a preset amount, the auxiliary tank 420 is downwardly moved by its own weight so that sewage is discharged to the outside through the main discharge tube 410, and the time during which sewage is discharged to the outside through the main discharge tube 410 is delayed in proportion to a discharge speed at which the flushing water supplied to the auxiliary tank 420 is drained through the auxiliary drain hole 422.

[0058] Herein, the auxiliary tank 420 includes a connection part 421 disposed at an upper portion thereof so as to be connected to the branching corrugated tube 310, and an auxiliary drain hole 422 formed on the outer circumference of a lower portion thereof so as to allow flushing water stored in the auxiliary tank to be drained therethrough.

[0059] By virtue of the configuration as described above, when sewage is not discharged, the sewage discharge tube 400 is maintained at an upright state. In other words, when flushing water does not flow into the flushing water branching unit 300, the sewage discharge tube 400 is not rotated, so that the bowl 110 can maintain a stable amount of water stored therein, and thus suppress adhesion of waste including feces and urine to the inner wall of the bowl 110 and generation of foul odor.

[0060] Subsequently, when a user manipulates a flushing water valve, a lever, or the like to supply flushing water to the flushing water inflow passage 101 after responding to the call of nature, a part of flushing water flowing through the flushing water inflow passage 101 is branched from the flushing water branching unit 300 and stored in the auxiliary tank 420 of the sewage discharge tube 400.

[0061] When the flushing water branched from the flushing water branching unit 300 reaches a preset amount at a state shown in FIGS. 2 and 3, the sewage discharge tube 400 is rotated downwardly by the auxiliary tank's own weight as shown in FIGS. 4 and 5. The state in which the sewage discharge tube 400 has been rotated is a state in which the main discharge tube 410 is oriented horizontally to enable to discharge sewage from the bowl 110.

[0062] The flushing water stored in the auxiliary tank 420 of the sewage discharge tube 400 is a power source of downwardly moving the main discharge tube 410 due to the weight of the flushing water, and plays an important role of delaying the sewage discharge time.

[0063] As such, when the sewage discharge tube 400 is rotated downwardly, sewage contained in the bowl 110 is discharged to the outside through the main discharge tube 410 of the sewage discharge tube 400 via the corrugated tube 200. At this time, the branched flushing water stored in the auxiliary tank 420 is slowly downwardly drained to the outside through the auxiliary drain hole 422.

[0064] In addition, while flushing water is introduced into the bowl 110 through the flushing water inlet port 111 via the flushing water inflow passage 101, it washes the inner wall of the bowl 110 and sewage removed from the bowl 110 is also discharged to the outside through the main discharge tube 410 of the sewage discharge tube 400 via the corrugated tube 200.

[0065] The introduction of the flushing water into the bowl 110 through the flushing water inlet port 111df via the flushing water inflow passage 101 occurs slightly later than the branching of the flushing water from the flushing water branching unit 300. Thus, the introduction of the flushing water into the bowl 110 occurs slightly slower than or nearly simultaneously with the rotation of the sewage discharge tube 400 to discharge sewage. As such, when flushing water is supplied to the bowl 110 slightly slower than or nearly simultaneously with a sewage discharge time point through the sewage discharge tube 400, the flushing water supplied to the bowl 110 can wash the inside of the bowl 110 without being mixed with sewage contained in the bowl 110, and thus it can be involved in only washing the bowl 110. As such, the flushing water supplied to the bowl 110 is involved in only washing the bowl 110, so that it can be prevented from being mixed with the sewage contained in the bowl 110 and rising in the bowl 110, and thus the bowl 110 can be maintained in a clean state and a water-saving effect can be exhibited.

[0066] When the flushing water branched from the flushing water branching unit 300 and stored in the auxiliary tank 420 is drained in a certain amount through the auxiliary drain hole 422, the sewage discharge tube 400 returns to its original position by an elastic force of the elastic unit 500 as shown in FIGS. 2 and 3. The sewage discharge tube 400 is maintained in a rotated state until the flushing water is completely drained to the outside from the auxiliary tank 420 of the sewage discharge tube 400 through the auxiliary drain hole 422, and thus the discharge time of sewage discharged to the outside through the main discharge tube 410 of the sewage discharge tube 400 can be delayed. As such, the discharge time of sewage discharged to the outside through the main discharge tube 410 is delayed so that sewage contained in the bowl 110 can be discharged completely without any residues of the sewage, resulting in an increase in the washing efficiency.

[0067] The adjustment of the discharge time of sewage discharged through the main discharge tube 410 of the sewage discharge tube 400 is associated with an increase or decrease in the drainage speed of flushing water drained through the auxiliary drain hole 422. Ultimately, the discharge time of sewage depends on the size of the auxiliary drain hole 422.

[0068] The discharge time of sewage discharged through the main discharge tube 410 may be controlled

by variably adjusting the area of the auxiliary drain hole 422 formed at a rear end of the auxiliary tank 420.

[0069] As shown in FIGS. 2 and 3, when the sewage discharge tube 400 returns to its original position, washed water contained in the bowl 110 is prevented from being discharged to the outside. In this case, the time point when the sewage discharge tube 400 returns to its original position is an end time point of the supply of flushing water to the flushing water inflow passage 101. At the end time point of the supply of flushing water to the flushing water inflow passage 101, the flushing water is supplied to only the bowl 110 so that it is half filled in the bowl 110.

[0070] FIGS. 6 and 7 are exploded perspective views illustrating a state in which a sewage discharge tube and an elastic unit are connected to each other in a sewage discharge device for a variable type water-saving flush toilet according to the present invention.

Elastic unit 500

[0071] Referring to FIGS. 6 and 7, the elastic unit 500 according to the present invention serves to elastically interconnect the connection tube 120 and the sewage discharge tube 400, and allows the sewage discharge tube 400 to be oriented in an upright state by an elastic force of the elastic unit upon the interruption of the supply of flushing water.

[0072] Its own weight of the flushing water supplied to and stored in the auxiliary tank 420 is preferably set to be larger than the elastic force of the elastic unit 500 so that the sewage discharge tube 400 is rotated by the its own weight of the flushing water stored in the auxiliary tank 420.

[0073] The elastic unit 500 includes: a first hanging member 510 mounted on a connection tube 115 interconnecting the connection tube 120 and the corrugated tube 200 so as to be protruded to both sides, the first hanging member having a pair of first hanging holes 511 formed at each of both end portions thereof; a pair of second hanging members 520 mounted on both sides of the sewage discharge tube 400, each of the second hanging members 520 having a pair of second hanging holes 521 formed thereon so as to be spaced apart from each other; and a pair of elastic members 530 each connected at one end thereof to any one of the pair of second hanging holes 521 of each of the pair of second hanging members 520 and connected at the other end thereof to each of the pair of first hanging holes 511 of each of both end portions of the first hanging member 510.

[0074] Herein, the first hanging holes 511 of the first hanging member 510 are formed in plural numbers at both ends of the first hanging member 510 so as to be spaced apart from each other.

[0075] The purpose of providing the first hanging hole 511 and the second hanging hole 521 in plural numbers is to adjust a tensile force of the elastic member.

[0076] Each of the pair of second hanging members 520 is formed in a flat plate shape, and extends radially outwardly from both opposite sides of the outer circumferential surface of the main discharge tube 410.

[0077] The connection tube 115 interconnecting the connection tube 120 and the corrugated tube 200 preferably includes a first connection part 115a connected to the connection tube 120 and a second connection part 115b connected to the corrugated tube 200 so that the first connection part 115a and the second connection part 115b are coupled to each other.

Odor prevention unit 600

[0078] Referring to FIGS. 2 to 5, the odor prevention unit 600 is disposed inside the corrugated tube 200 or the sewage discharge tube 400, and is opened when the sewage flows through the corrugated tube 200 or the sewage discharge tube 400 and closed when the sewage does not flow therethrough.

[0079] The odor prevention unit 600 includes an odor prevention member 610 that is disposed at the inside of the sewage discharge tube 400, is formed in a hollow shape, and is made of vinyl or thin rubber having flexibility.

[0080] Preferably, the odor prevention unit 600 has a hollow shape and is formed of vinyl or rubber having flexibility.

[0081] Herein, one end of the odor prevention member 610 is fixed to one end of an inner circumference of the sewage discharge tube 400. A process of fixing the odor prevention member 610 may be performed by using an adhesive.

[0082] The other end of the odor prevention member 610 is disposed to form a free end along the other end of the inner circumference of the sewage discharge tube 400. In other words, the other end of the odor prevention member 610 is not fixed at the inside of the sewage discharge tube 400.

[0083] Accordingly, when sewage contained in the bowl 110 flows into the corrugated tube 200 through connection tube 120, it can be introduced into a hollow space of the odor prevention member 610 to open the odor prevention member 610.

[0084] **In** this case, a circumference of the odor prevention member 610 is larger than the outer circumference of the sewage discharge tube 400 so that the odor prevention member 610 can be closely abutted against the outer circumference of the sewage discharge tube 400.

[0085] **In** addition, when the discharge of the sewage from the sewage discharge tube 400 is completed, the outward shape of the other end of the odor prevention member 610 disposed to form the free end is changed to be closely abutted against the sewage discharge tube 400.

[0086] **In** other words, after the discharge of the sewage contained in the bowl 110 has been completed, the other end of the odor prevention member 610 is closed

by being closely abutted against the sewage discharge tube 400

[0087] Accordingly, the other end of the odor prevention member 610 is maintained in a relatively closed state, and thus it is possible to minimally reduce foul odor generated from a side from which sewage is discharged.

[0088] While the sewage discharge device for a variable type water-saving flush toilet according to the present invention have been described and illustrated in connection with specific exemplary embodiments with reference to the accompanying drawings, it will be readily appreciated by those skilled in the art that it is merely illustrative of the preferred embodiments of the present invention and various modifications and changes can be made thereto within the spirit and scope of the present invention, set forth in the claims.

Claims

1. A sewage discharge device for a variable type water-saving flush toilet, comprising:

   a toilet body (100) installed on a floor or a wall, the toilet body (100) including a flushing water inlet port (111) formed therein so as to allow for inflow of flushing water flowing through a flushing water inflow passage (101) into which the flushing water is introduced from the outside, a bowl (110) opened at a top thereof and configured to store a certain amount of sewage therein, a connection tube (120) configured to discharge sewage from the bowl (110), and a cover part (140) configured to cover a rear portion of the bowl (110) and to allow sewage discharged through the connection tube (120) to be induced to a bottom tube (130);
   a corrugated tube (200) connected to the connection tube (120), the corrugated tube (200) being configured to form a flow path of sewage drained from the bowl (110) and being capable of bent in one direction;
   a flushing water branching unit (300) fluidically connected with the flushing water inflow passage (101) and configured to allow a part of the flushing water flowing through the flushing water inflow passage (101) to be branched when the flushing water is introduced into the bowl (110);
   a sewage discharge tube (400) comprising: a main discharge tube (410) connected to the corrugated tube (200) and configured to discharge sewage to the outside; and an auxiliary tank (420) disposed on an outer circumferential surface of the main discharge tube (410) and configured to store therein flushing water branched from the flushing water branching unit (300) and supplied thereto, the auxiliary tank having an auxiliary discharge hole (422) formed thereon to allow flushing water stored in a lower portion thereof to be drained,
   wherein when the flushing water branched from the flushing water branching unit (300) reaches a preset amount, the auxiliary tank (420) is downwardly moved by its own weight so that sewage is discharged to the outside through the main discharge tube (410), and the time during which sewage is discharged to the outside through the main discharge tube (410) is delayed in proportion to a discharge speed at which the flushing water supplied to the auxiliary tank (420) is drained through the auxiliary drain hole (422); and
   an elastic unit (500) configured to elastically interconnect the connection tube (120) and the sewage discharge tube (400), and to allow the sewage discharge tube (400) to be oriented in an upright state by an elastic force of the elastic unit upon the interruption of the supply of flushing water.

2. The sewage discharge device for a variable type water-saving flush toilet according to claim 1, wherein the elastic unit (500) comprises:

   a first hanging member (510) mounted on a connection tube (115) interconnecting the connection tube (120) and the corrugated tube (200) so as to be protruded to both sides, the first hanging member having a pair of first hanging holes (511) formed at each of both end portions thereof;
   a pair of second hanging members (520) mounted on both sides of the sewage discharge tube (400), each of the second hanging members (520) having a pair of second hanging holes (521) formed thereon so as to be spaced apart from each other; and
   a pair of elastic members (530) each connected at one end thereof to any one of the pair of second hanging holes (521) of each of the pair of second hanging members (520) and connected at the other end thereof to each of the pair of first hanging holes (511) of each of both end portions of the first hanging member (510).

3. The sewage discharge device for a variable type water-saving flush toilet according to claim 1, further comprising an odor prevention unit (600) disposed inside the corrugated tube (200) or the sewage discharge tube (400), the odor prevention unit being opened when the sewage flows through the corrugated tube (200) or the sewage discharge tube (400) and closed when the sewage does not flow therethrough.

4. The sewage discharge device for a variable type wa-

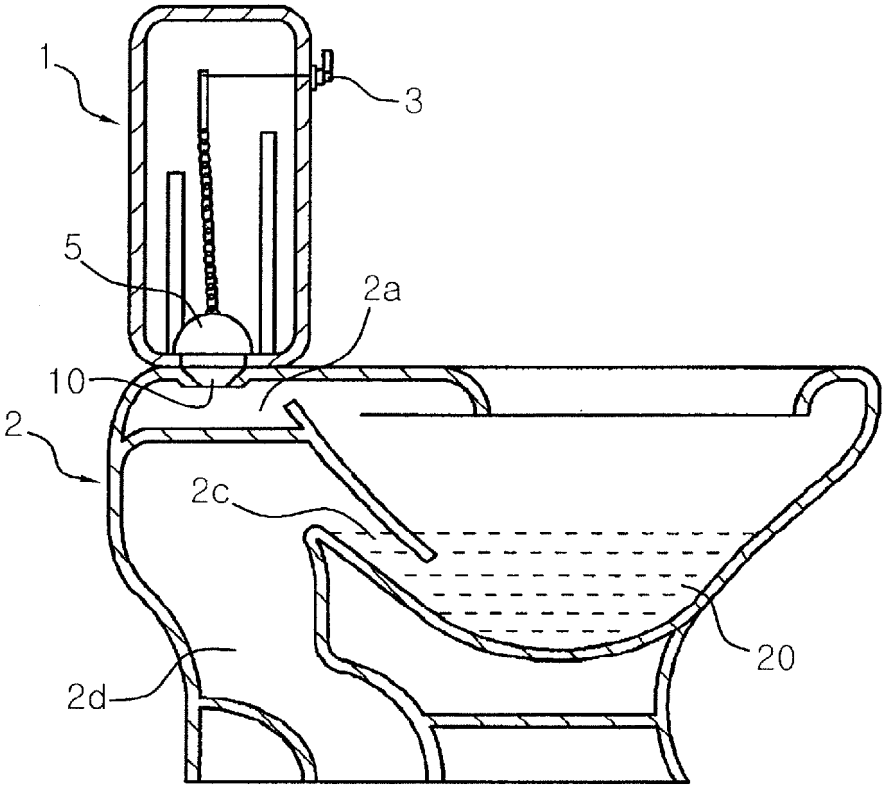
ter-saving flush toilet according to claim 1, wherein the flushing water branching unit (300) comprises:

a branching corrugated tube (310) coupled at an upper end thereof to the flushing water inflow passage (101) and connected at a lower end thereof to the auxiliary tank (420); and
a branched water inlet part (320) connected to the upper end of the branching corrugated tube (310) and disposed at the inside of the flushing water inflow passage (101).

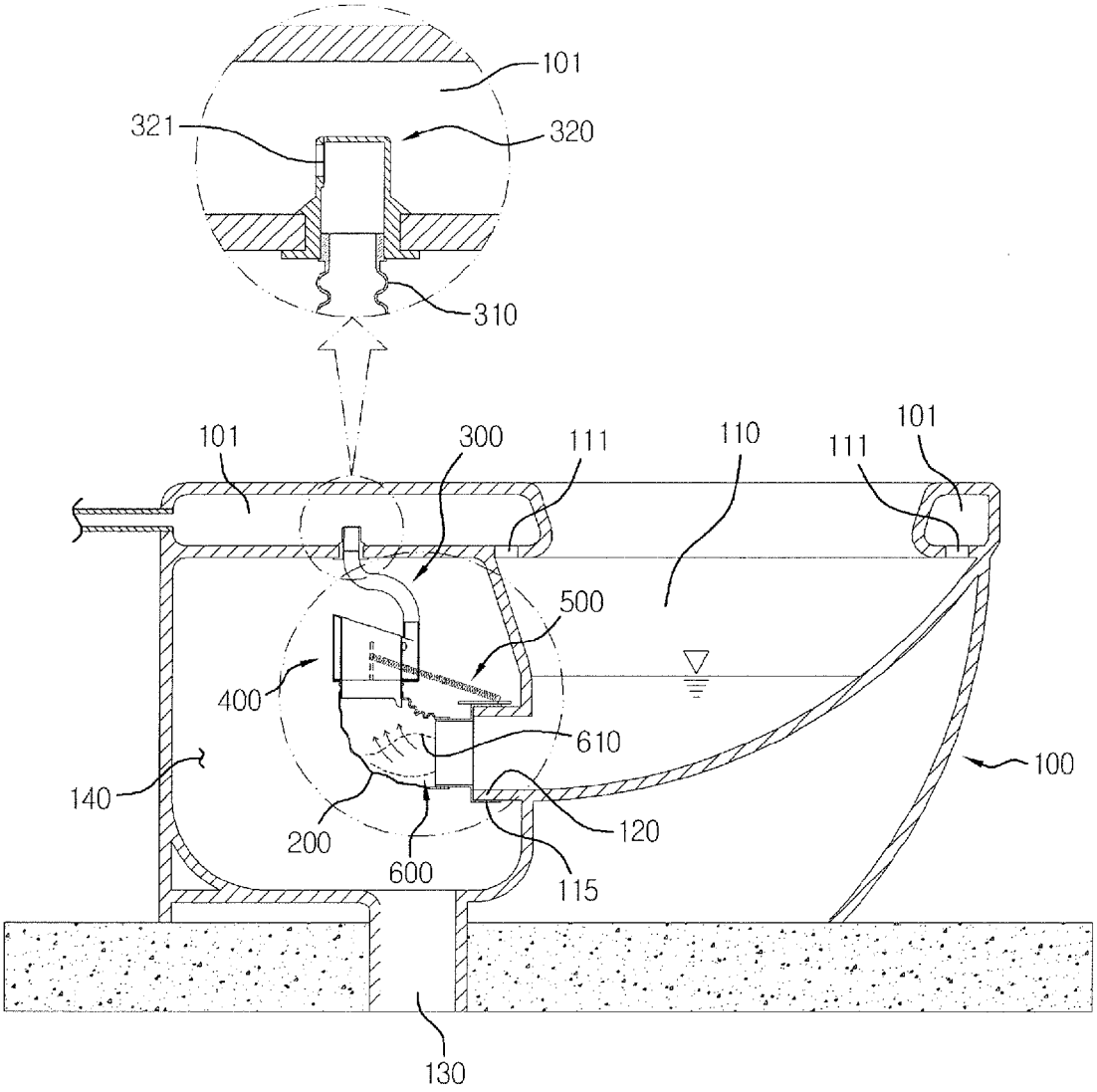
5. The sewage discharge device for a variable type water-saving flush toilet according to claim 1, wherein the flushing water branching unit (300) further comprises an odor prevention valve (321) disposed at an entrance portion of the branched water inlet part (320), and configured to be opened by a hydraulic pressure when flushing water is supplied to the flushing water inflow passage (101) and closed by the odor prevention valve's own weight when the supply of the flushing water is interrupted so that foul toilet odor is prevented from flowing into the flushing water inflow passage (101).

6. The sewage discharge device for a variable type water-saving flush toilet according to claim 3, wherein the odor prevention unit (600) comprises an odor prevention member (610) that is disposed at the inside of the sewage discharge tube (400), is formed in a hollow shape, and is made of vinyl or thin rubber having flexibility,
wherein one end of the odor prevention member (610) is fixed to one end of an inner circumference of the sewage discharge tube (400), and
wherein the other end of the odor prevention member (610) is disposed to form a free end along the other end of the inner circumference of the sewage discharge tube (400),
whereby when sewage contained in the bowl (110) flows into the corrugated tube (200) through connection tube (120), it is introduced into a hollow space of the odor prevention member (610) to open the odor prevention member (610), and
whereby when the discharge of the sewage from the sewage discharge tube (400) is completed, the outward shape of the other end of the odor prevention member (610) disposed to form the free end is changed to be closely abutted against the sewage discharge tube (400).

[Fig. 1]



[Fig. 2]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115
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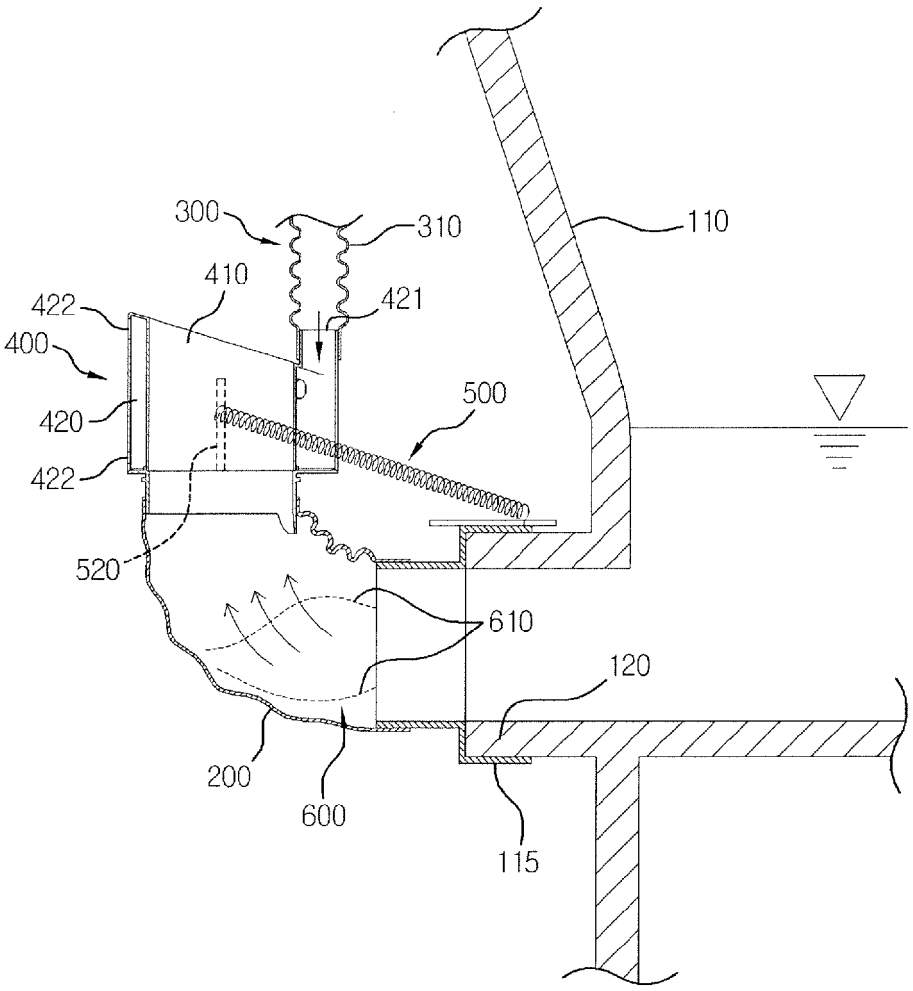
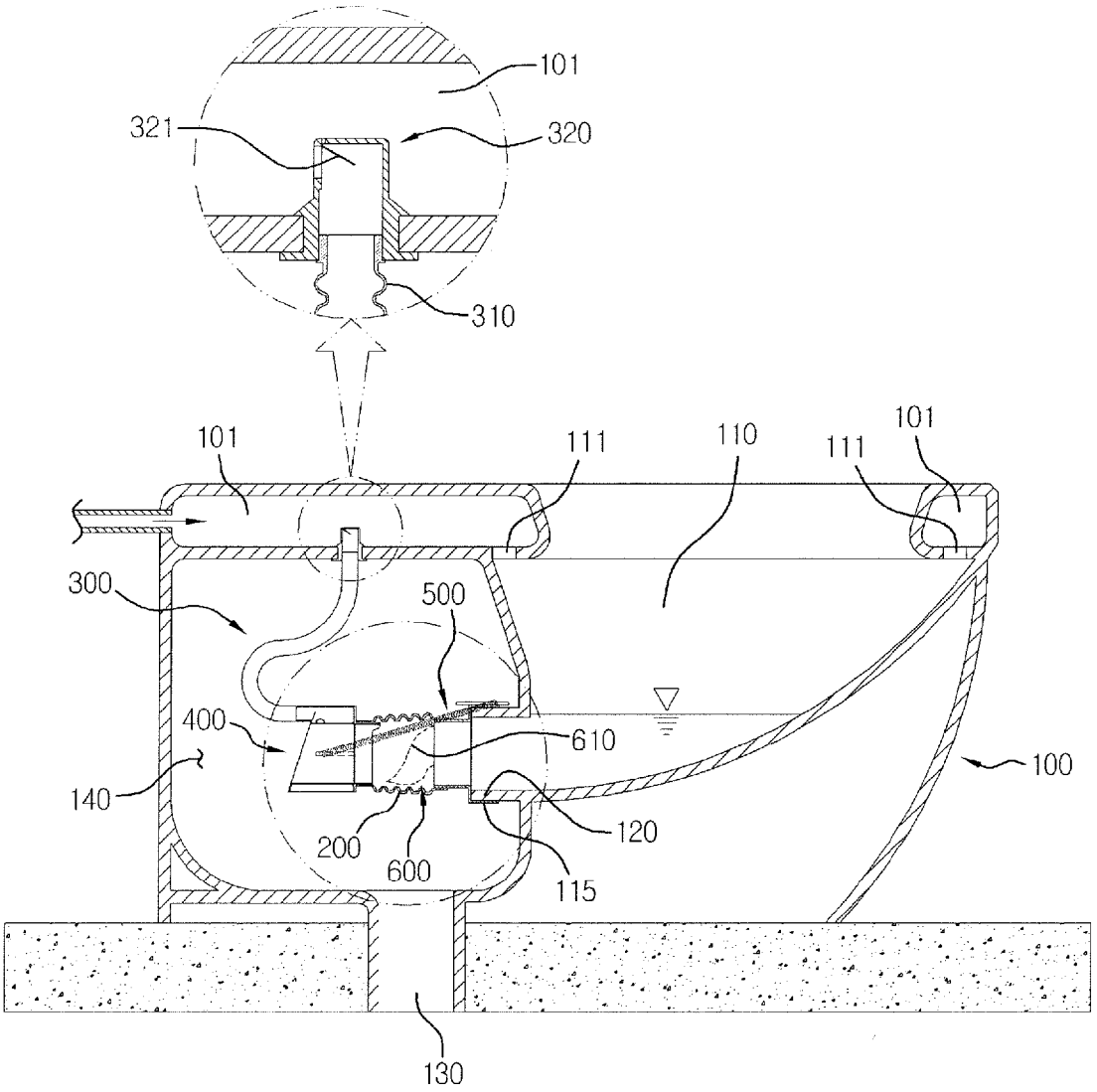
[Fig. 3]



[Fig. 4]


101
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320
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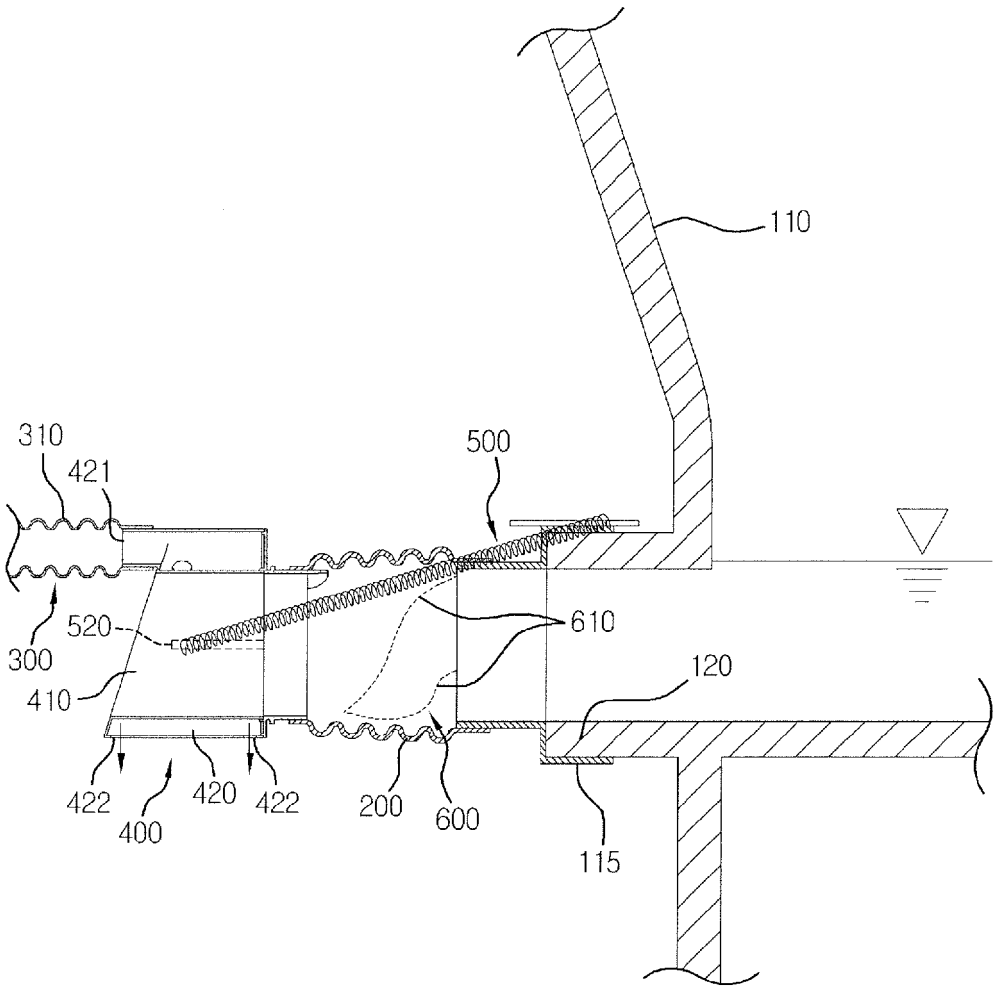
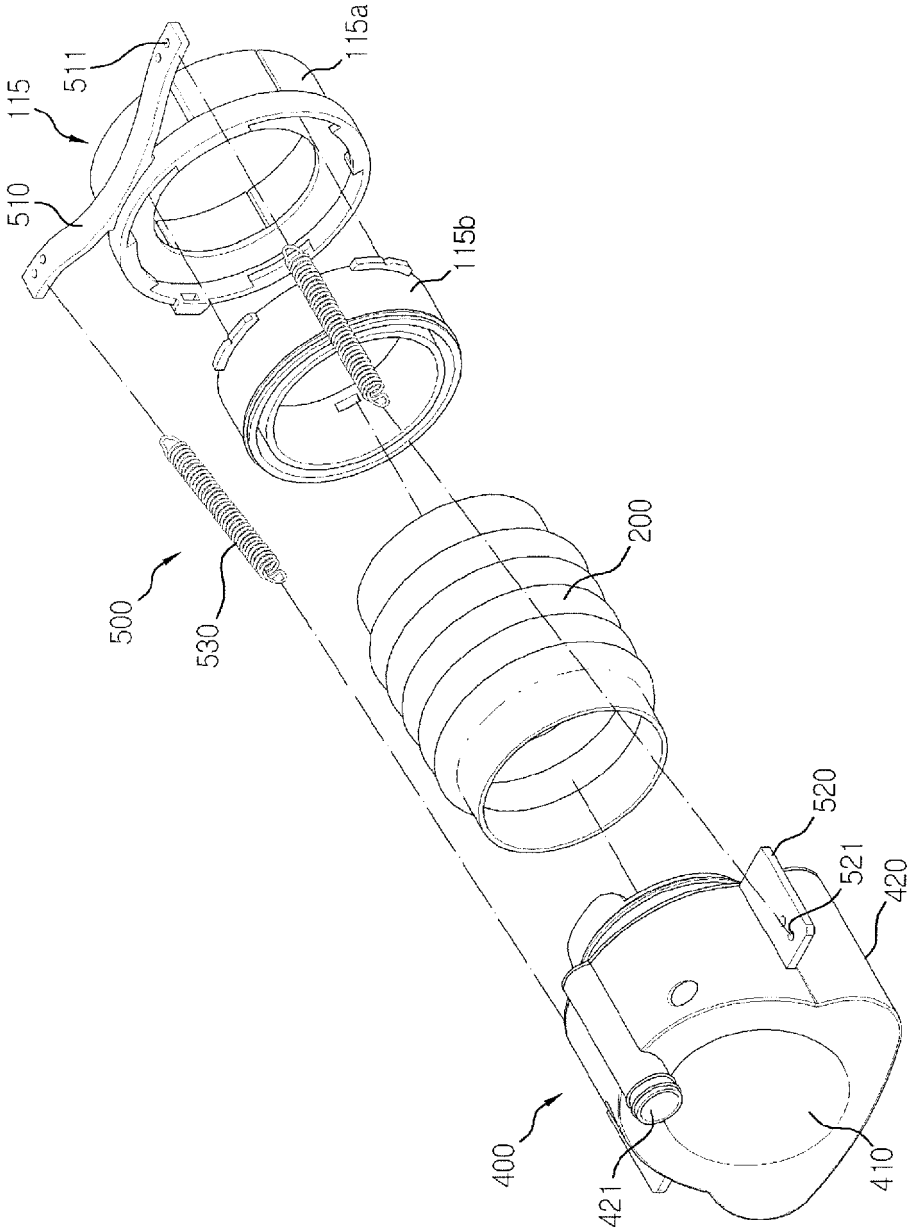
120
115
130

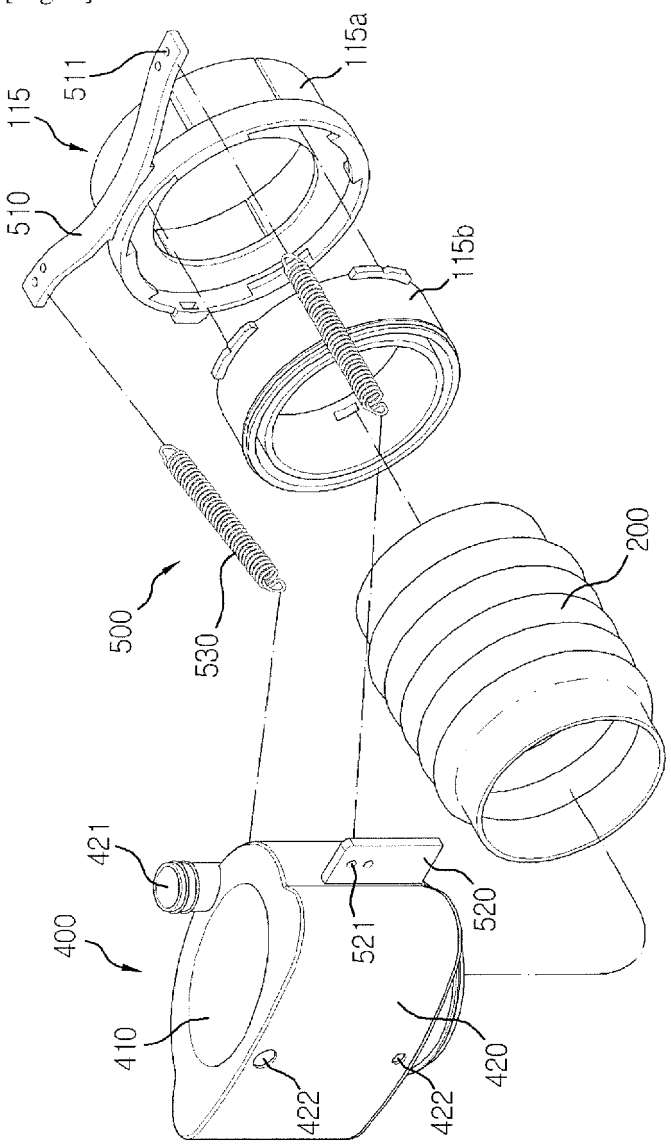
[Fig. 5]



[Fig. 6]



[Fig. 7]


115a
511
115
510
115b
200
500
530
421
520
521
400
410
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422
422

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2018/005085

A. CLASSIFICATION OF SUBJECT MATTER

E03D 11/18(2006.01)i, E03D 11/10(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E03D 11/18; E03D 5/02; E03D 5/00; E03D 11/02; E03D 5/012; E03D 3/00; E03D 11/00; E03D 11/13; E03D 11/16; E03D 11/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: wastewater, bowl, connection pipe, corrugated pipe, branching part, emission, elastic part, water-saving toilet bowl

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-1442624 B1 (YEOMYEONGTECHE CO., LTD.) 26 September 2014 See paragraphs [0001], [0014], [0043]-[0045], [0074]-[0076], [0082], and figures 2-4, 6.	1-6
A	KR 10-1638427 B1 (YEOMYEONGTECHE CO., LTD. et al.) 12 July 2016 See paragraphs [0056]-[0134]; and figures 5-11.	1-6
A	KR 10-1016248 B1 (INTERBAS CO., LTD.) 25 February 2011 See paragraphs [0043]-[0084]; and figures 5-12.	1-6
A	KR 20-2010-0006594 U (LEE, Jae Mo) 29 June 2010 See paragraphs [0008]-[0011]; and figures 1-5.	1-6
A	KR 10-0479678 B1 (WEN, Jong Chil) 31 March 2005 See paragraphs [0035]-[0053]; and figures 3-7.	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search	Date of mailing of the international search report
16 AUGUST 2018 (16.08.2018)	**16 AUGUST 2018 (16.08.2018)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex Daejeon Building 4, 189, Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2018/005085

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REFERENCES CITED IN THE DESCRIPTION

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- KR 101131810 **[0011] [0012] [0013]**