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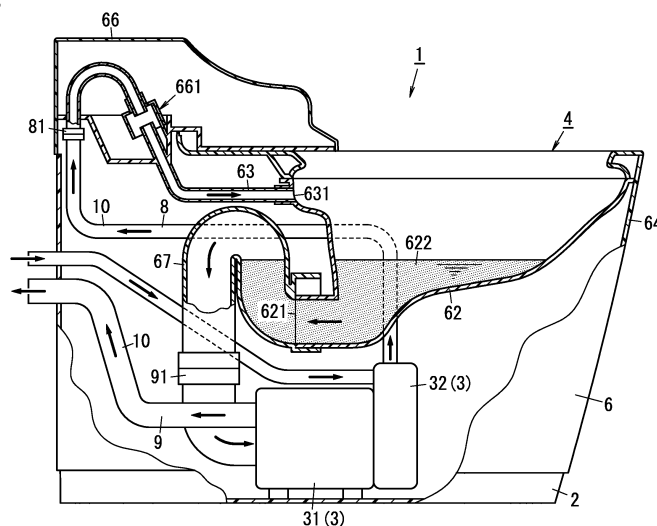
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(54) **TOILET DEVICE**

(57) The problem to be overcome by the present disclosure is to provide a toilet device that facilitates maintenance of its water supply unit and waste breaking unit. A toilet body (4) includes a bowl (62) and a water inlet (631) to supply water into the bowl (62). A water supply unit (32) is attached to a pedestal (2) and connected to the water inlet (631) to selectively provide or stop supply

of water. A waste breaking unit (31) is attached to the pedestal (2) and connected to the bowl (62) to break, into pieces, the wastes drained. An inlet line disconnector (81) disconnects the water supply unit (32) from the water inlet (631). An outlet line disconnector (91) disconnects the waste breaking unit (31) from the bowl (62).

FIG. 6



Description**Technical Field**

[0001] The present disclosure relates to a toilet device.

Background Art

[0002] Patent Literature 1 discloses a known pneumatic toilet device (hereinafter simply referred to as a "toilet device"). The toilet device of Patent Literature 1 includes a waste breaking pumping system and a fill valve. The waste breaking pumping system is connected to a waste outlet of a toilet bowl to receive the wastes drained from the toilet bowl. The waste breaking pumping system is designed to break, into pieces, the wastes that have flowed in and then drain the wastes to a drainage system.

[0003] The fill valve is provided for a water inlet line connected to a water supply system such as a city water. The fill valve may selectively provide or stop supply of water into the toilet bowl.

[0004] In the toilet device of Patent Literature 1, units such as the waste breaking pumping system and the fill valve are so heavyweight that it is difficult for a person in charge of maintenance of the toilet device to do the maintenance by moving the toilet device such as when the waste breaking pumping system is clogged up with some foreign matter.

Citation List**Patent Literature**

[0005] Patent Literature 1: JP 2017-14696 A

Summary of Invention

[0006] In view of the foregoing background, it is therefore an object of the present disclosure to provide a toilet device that facilitates maintenance of its water supply unit and waste breaking unit.

[0007] A toilet device according to the present disclosure includes: a pedestal to be mounted on an installation surface; and a toilet body to be set on the pedestal. The toilet body includes: a bowl to receive wastes and drain the wastes through a waste outlet; and a water inlet to supply water into the bowl. The toilet device further includes a water supply unit, a waste breaking unit, an inlet line disconnecter, and an outlet line disconnecter. The water supply unit is attached to the pedestal, is connected to the water inlet through a water inlet line, and selectively provides or stops supply of water to the water inlet. The waste breaking unit is attached to the pedestal, is connected to the waste outlet through a waste outlet line, and breaks, into pieces, the wastes drained through the waste outlet. The inlet line disconnecter disconnects the water supply unit from the water inlet. The outlet line disconnecter disconnects the waste breaking unit from the

waste outlet.

Brief Description of Drawings

[0008] FIG. 1 is a perspective view illustrating how a toilet device according to an exemplary embodiment of the present disclosure is installed on an installation surface;

FIG. 2 is an exploded perspective view of the toilet device;

FIG. 3A is a perspective view illustrating a pedestal and units of the toilet device;

FIG. 3B is a cross-sectional view of the pedestal and units of the toilet device as taken along a plane intersecting at right angles with a forward/backward direction;

FIG. 4 is a perspective view illustrating a frame of the toilet device;

FIG. 5A is a partially cutaway plan view illustrating how the frame and a skirt are assembled;

FIG. 5B is an enlarged view illustrating portion A shown in FIG. 5A;

FIG. 6 is a schematic representation illustrating a water inlet line and a waste outlet line of the toilet device; and

FIG. 7A is a perspective view illustrating a procedure in which the toilet body is removed from the pedestal in the toilet device;

FIG. 7B is a perspective view illustrating a procedure in which the toilet body is removed from the pedestal in the toilet device; and

FIG. 7C is a perspective view illustrating a procedure in which the toilet body is removed from the pedestal in the toilet device.

Description of Embodiments**(1) Embodiments****(1.1) Overview**

[0009] A toilet device 1 according to an exemplary embodiment is installed on an installation surface 100 as shown in FIG. 1. The toilet device 1 includes a pedestal 2 to be mounted on the installation surface 100, a toilet body 4, a water supply unit 32 (see FIG. 2), a waste breaking unit 31 (see FIG. 2), an inlet line disconnecter 81 (see FIG. 6), and an outlet line disconnecter 91 (see FIG. 6).

[0010] The toilet body 4 is set on the pedestal 2. The toilet body 4 includes a bowl 62 and a water inlet 631 for supplying water into the bowl 62 as shown in FIG. 6. The bowl 62 has a waste outlet 621, receives wastes discharged by the user, and drains the wastes through the waste outlet 621.

[0011] The water supply unit 32 selectively provides or stops supply of water to the water inlet 631. The water supply unit 32 is connected to the water inlet 631 through

a water inlet line 8. The water supply unit 32 is attached to the pedestal 2. The waste breaking unit 31 breaks, into pieces, wastes drained from the bowl 62. The waste breaking unit 31 is connected to the waste outlet 621 of the bowl 62 through a waste outlet line 9. The waste breaking unit 31 is attached to the pedestal 2.

[0012] The inlet line disconnecter 81 disconnects the water supply unit 32 from the water inlet 631. Meanwhile, the outlet line disconnecter 91 disconnects the waste breaking unit 31 from the waste outlet 621. This allows the toilet body 4 to be separated from the water supply unit 32 and the waste breaking unit 31, thus making the toilet body 4 removable with the water supply unit 32 and the waste breaking unit 31 left on the pedestal 2.

[0013] Thus, the toilet device 1 according to this embodiment facilitates the maintenance of the water supply unit 32 and the waste breaking unit 31.

(1.2) Details

[0014] Next, the toilet device 1 according to this embodiment will be described in further detail.

[0015] As shown in FIG. 1, the toilet device 1 according to this embodiment is installed on the installation surface 100. The toilet device 1 according to this embodiment is mounted on, and attached with a fixing member onto, the installation surface 100. In this embodiment, the installation surface 100 is a floor surface. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the installation surface 100 may also be the upper surface of a mat such as a waterproof mat, the upper surface of tiles, the upper surface of a floor tray in a bathroom, for example, or even the ground. The installation surface 100 may be provided either indoors or outdoors, whichever is appropriate. The installation surface 100 is a flat surface in this embodiment but may also be a surface with unevenness.

[0016] The toilet device 1 according to this embodiment is arranged inside a toilet room. The toilet room has at least one wall 101. In the following description, a direction pointing from the wall 101 toward the toilet device 1 and aligned with the installation surface 100 is defined herein as a "forward direction" and the opposite direction thereof is defined herein as a "backward direction" as shown in FIG. 1. Meanwhile, the "leftward direction" and "rightward direction" are defined herein for the user who is facing the toilet device 1 in the backward direction.

[0017] In this embodiment, the toilet room includes a water inlet member 102 and a waste outlet member 103. In this embodiment, the water inlet member 102 is fixed on the wall 101 of the toilet room. The water inlet member 102 is a member connected to a water supply source and designed to supply water to the toilet device 1. The water inlet member 102 is implemented as a shutoff valve in this embodiment but may also be a joint fixed on the wall 101. The water supply source is the source from which water is supplied and refers herein to plumbing branching from a water distributing pipe, which leads to a distribution

reservoir, toward respective dwelling houses. Therefore, according to this embodiment, the water supplied from the water inlet member 102 has water pressure. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the water supply source may also be plumbing leading to a reservoir tank.

[0018] In this embodiment, the waste outlet member 103 is fixed on the wall 101 of the toilet room. The waste outlet member 103 is a member connected to a sewer and designed to drain the wastes that have been broken into pieces by the toilet device 1. The waste outlet member 103 is implemented as a valve in this embodiment but may also be a joint fixed on the wall 101, for example.

[0019] The toilet device 1 further includes an inlet line connector 12 and an outlet line connector 11. The inlet line connector 12 is a member connected to the water inlet member 102 and receiving the water supplied from the water supply source. The inlet line connector 12 and the water inlet member 102 are connected together via an inlet line 104. The outlet line connector 11 is a member, which is connected to the waste outlet member 103 and through which the wastes are drained from the toilet device 1. The outlet line connector 11 and the waste outlet member 103 are connected together via an outlet line 105.

[0020] The toilet device 1 according to this embodiment includes the pedestal 2, a plurality of units 3, the toilet body 4, and a rear cover 7 as shown in FIG. 2.

(1.2.1) Pedestal

[0021] The pedestal 2 is a member to which the unit(s) 3 is/are attached and which is to be mounted on the installation surface 100. In this embodiment, the pedestal 2 is attached to the installation surface 100 with a fixing member. However, the pedestal 2 does not have to be fixed to the installation surface 100. In other words, as used herein, if some member is "mounted on the installation surface 100," then the member may or may not be fixed on the installation surface 100.

[0022] To the pedestal 2, attached is/are the unit(s) 3 to be described later as shown in FIG. 3A. The units 3 are fixed to the pedestal 2. The pedestal 2 includes a bottom plate 21 to which the unit(s) 3 is/are attached, an outer peripheral portion 22, and catching members 27. In this embodiment, the bottom plate 21, the outer peripheral portion 22, and the catching members 27 are integrated together. The bottom plate 21 and the outer peripheral portion 22 are made of a synthetic resin in this embodiment but may also be made of vulcanite, a metal, carbon, wood, or any other suitable material.

[0023] The lower surface of the bottom plate 21 faces the installation surface 100. The bottom plate 21 is interposed between the unit(s) 3 and the installation surface 100 and is able to receive, even when water leaks out of the units 3, the water. As shown in FIG. 3B, the bottom plate 21 has a plate shape and is parallel to the installation

surface 100 in this embodiment.

[0024] The outer peripheral portion 22 is a portion formed continuously with the outer periphery of the bottom plate 21. The outer peripheral portion 22 is formed integrally with the upper surface of the bottom plate 21. In this embodiment, the outer peripheral portion 22 includes a standup surface 221, a mounting surface 222, a plurality of through holes 223, and a plurality of attachment holes 224.

[0025] The standup surface 221 is a surface that stands up along the outer periphery of the bottom plate 21 when viewed from over the toilet device 1 (i.e., when viewed in plan). In this embodiment, the standup surface 221 is a plane parallel to a vertical plane. The standup surface 221 prevents the water received at the bottom plate 21 from overflowing into the installation surface 100. In this embodiment, the standup surface 221 is provided inside the outer peripheral edge of the bottom plate 21 such that the standup surface 221 is located at a predetermined distance from the outer peripheral edge of the bottom plate 21. The interval between respective facing portions of the standup surface 221 is determined to be at least long enough to house the unit(s) 3.

[0026] As used herein, the "vertical plane" refers to a plane that intersects at right angles with the installation surface 100. Also, as used herein, if something is "parallel to" another, then the angle formed between two lines on the same plane (or between two planes in the same space or between a line and a plane) may fall within the range from 0 degrees to 10 degrees.

[0027] Note that the standup surface 221 is supposed to be a plane parallel to a vertical plane in this embodiment. However, this is only an example of the present disclosure and should not be construed as limiting. Rather the standup surface 221 just needs to stand up with respect to the upper surface of the bottom plate 21 and may define a tilt angle with respect to the vertical plane or may have a curved or stepped shape when taken along the vertical plane.

[0028] The mounting surface 222 is a surface on which the toilet body 4 is mounted. The mounting surface 222 just needs to mount the toilet body 4 thereon and may have a plurality of openings as shown in FIG. 3A. In this embodiment, the mounting surface 222 is parallel to the installation surface 100 and perpendicular to the standup surface 221. The mounting surface 222 is located over the upper surface of the bottom plate 21.

[0029] The through holes 223 are holes to pass fixing members to mount the pedestal 2 onto the installation surface 100. A plurality of (e.g., two in this embodiment) through holes 223 are provided outside of the standup surface 221. The through holes 223 are provided behind the center of the pedestal 2 in the forward/backward direction and at right and left ends, respectively. As used herein, the "outside of the standup surface 221" refers to a region located, in a plan view of the pedestal 2, opposite from its center (of the plan view) with respect to the standup surface 221. In this embodiment, each of the

through holes 223 runs from the mounting surface 222 through the lower surface of the bottom plate 21. In other words, the through holes 223 run in the upward/downward direction.

[0030] In this embodiment, the through holes 223 are implemented as round holes. However, the through holes 223 do not have to be round holes but may also be oval holes, rectangular holes, or even keyholes, for example. Alternatively, the through holes 223 may even be cutouts which are open outward in a plan view.

[0031] The attachment holes 224 are holes to attach the toilet body 4 onto the mounting surface 222. A plurality of (e.g., two in this embodiment) attachment holes 224 are provided outside of the standup surface 221. The respective attachment holes 224 are provided forward of the through holes 223. In this embodiment, each of the attachment holes 224 runs from the mounting surface 222 through the lower surface of the bottom plate 21. However, this is only an example of the present disclosure and should not be construed as limiting. In this embodiment, the lower end of each of the attachment holes 224 is counterbored to house a nut 226 therein as shown in FIG. 3B. In this embodiment, a frame 5 of the toilet body 4 is attached to the pedestal 2 with bolts 225 and nuts 226. Alternatively, the inner peripheral surface of each of the attachment holes 224 may be threaded. The frame 5 is attached to the pedestal 2 with fixing members inserted into the attachment holes 224.

[0032] The lower end portion at the front end (hereinafter referred to as a "frontend portion") of the toilet body 4 is caught in the catching members 27. In this embodiment, the catching members 27 are implemented as a pair of hooks 270 that regulate the upward movement of the toilet body 4. The pair of hooks 270 are separated from each other in the rightward/leftward direction.

(1.2.2) Unit(s)

[0033] A plurality of (e.g., two in this embodiment) units 3 are attached to the pedestal 2. In this embodiment, these units 3 are machines to be driven when supplied with motive power. The motive power is supposed to be electric power in this embodiment but may also be air. The toilet device 1 according to this embodiment includes, as the plurality of units 3, the waste breaking unit 31 and the water supply unit 32.

[0034] The waste breaking unit 31 is attached to the bottom plate 21. In this embodiment, the waste breaking unit 31 breaks, into pieces, the wastes that have been drained from the bowl 62. As used herein, the "wastes" include not only excrements (including feces and urine) discharged by the user, for example, but also paper and other wastes as well. In this embodiment, the waste breaking unit 31 includes a waste breaking machine for breaking the wastes into pieces and a pneumatic pump for pumping out the wastes that have been broken into pieces. As will be described later in the "(1.2.5) Water inlet line and waste outlet line" section, the waste break-

ing unit 31 is provided on the waste outlet line 9 that connects the waste outlet 621 of the bowl 62 to the outlet line connector 11. As used herein, the "waste outlet line 9" refers to a passage through which the wastes drained from the bowl 62 passes. In other words, the waste breaking unit 31 is connected to the waste outlet 621 of the bowl 62 through the waste outlet line 9.

[0035] The water supply unit 32 selectively provides or stops supply of water to the water inlet 631 provided for the bowl 62. The water supply unit 32 is attached to the waste breaking unit 31 and is indirectly attached to the bottom plate 21. Therefore, as used herein, when some member (such as the unit 3 in this embodiment) is "attached to the bottom plate 21," the member is attached to the bottom plate 21 either directly or indirectly.

[0036] In this embodiment, the water supply unit 32 is implemented as a solenoid valve. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the water supply unit 32 may also be implemented as a motorized valve or a feed pump. Still alternatively, the water supply unit 32 may also be a combination of a feed pump and either a solenoid valve or a motorized valve. Particularly when the water pressure of the water supply source is insufficient, the water supply unit 32 suitably includes a feed pump.

[0037] As will be described later in the "(1.2.5) Water inlet line and waste outlet line" section, the water supply unit 32 is provided on the water inlet line 8 that connects the water inlet 631 to supply water into the bowl 62 to the inlet line connector 12. As used herein, the "water inlet line 8" refers to a passage through which the water supplied from the water supply source passes. In other words, the water supply unit 32 is connected to the water inlet 631 through the water inlet line 8.

(1.2.3) Toilet body

[0038] The toilet body 4 is set on the pedestal 2. In this embodiment, the toilet body 4 is attached removably to the pedestal 2. As shown in FIG. 2, the toilet body 4 includes a frame 5 and a resin molded member 6.

[0039] The frame 5 forms the framework of the toilet body 4. In this embodiment, the frame 5 is made of a metallic material, and more specifically, made of stainless steel. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the frame 5 may also be made of iron, titanium, steel, zinc, or copper, for example. Still alternatively, the frame 5 may also be made of a resin with high strength such as fiber-reinforced plastic. As shown in FIG. 4, the frame 5 includes a base 51, a standup portion 52, a pair of legs 53, and a pair of supporting portions 54.

[0040] The base 51 faces the upper surface of the pedestal 2. In this embodiment, the base 51 is attached removably to the mounting surface 222 of the pedestal 2. The base 51 is formed in a generally U-shape in a plan view and is open backward. The inner peripheral edge

of the base 51 forms an opening. In other words, the frame 5 has a lower opening plane 55 with an opening space that faces downward toward the upper surface of the pedestal 2. The lower opening plane 55 is a plane flush with the lower surface of the base 51.

[0041] The base 51 includes a plurality of coupling portions 511 on both ends in the rightward/leftward direction. In this embodiment, each of the plurality of coupling portions 511 is a hole. The base 51 and the pedestal 2 are coupled together via fixing members passed through the coupling portions 511 and the attachment holes 224. The coupling portions 511 are provided backward of the standup portion 52 of the base 51. Also, the lower end of a skirt 64 (to be described later) is attached to a portion, located forward of the standup portion 52, of the base 51.

[0042] The standup portion 52 is a portion that stands up from the upper surface of the base 51. As shown in FIG. 5B, an attachment piece 642, provided at the rear end of the skirt 64, is attached to the standup portion 52 with a fixing member 634. In this embodiment, the standup portion 52 is formed in a vertically inverted U-shape in a front view as shown in FIG. 4.

[0043] The pair of legs 53 are provided to stand up one to one from the rear ends of the base 51. The pair of legs 53 are spaced apart from each other in the rightward/leftward direction and the respective rear edges, facing each other, of the pair of legs 53 form an opening. In other words, the frame 5 has a rear opening plane 56 that faces backward and has an opening space. The rear opening plane 56 is flush with the rear surface of the legs 53 and is parallel to a vertical plane in this embodiment. In this embodiment, the base 51 is open backward and is provided neither a reinforcing member that bridges the respective rear ends of the base 51 nor a reinforcing member that bridges the respective lower ends of the pair of legs 53. This allows the respective opening spaces of the rear opening plane 56 and the lower opening plane 55 to communicate with each other.

[0044] The respective supporting portions 54 connect the standup portion 52 to the legs 53. The respective supporting portions 54 are formed in a generally crank shape in a plan view. In this embodiment, the pair of supporting portions 54 are linked together with a link member 57.

[0045] The resin molded member 6 is a member that forms the shell of the toilet body 4 and is supported by the frame 5. In this embodiment, the resin molded member 6 includes a rim 61, the bowl 62, a water inlet nozzle 63 (see FIG. 6), the skirt 64 that supports the bowl 62, a pair of side covers 65, a rear cover 66, and a waste trap 67 as shown in FIG. 2.

[0046] The rim 61 is attached to the upper end of the bowl 62. The rim 61 is formed in an annular shape in a plan view. The upper end face of the rim 61 is a flat surface, on which a toilet seat 13 is placed as shown in FIG. 1. The toilet seat 13 and a lid 14 are mounted to the rear cover 66 to be rotatable around a shaft that is parallel to the rightward/leftward direction.

[0047] The bowl 62 receives the wastes discharged by the user and drains the wastes through the waste outlet 621 (see FIG. 6). The bowl 62 has an opening plane on the upper surface thereof and is formed in a cup shape. A cylindrical portion that opens backward is provided at the lower end of the bowl 62. The rear end of the cylindrical portion is the waste outlet 621.

[0048] The water inlet nozzle 63 supplies water into the bowl 62. The water inlet nozzle 63 is connected to the water supply unit 32 through the water inlet line 8. The tip surface of the water inlet nozzle 63 defines the water inlet 631, through which water runs out. In other words, the water inlet 631 supplies water into the bowl 62.

[0049] The skirt 64 supports the bowl 62 thereon. As shown in FIG. 2, the skirt 64 is formed to have a generally U-horizontal cross section. On the inner peripheral surface of the skirt 64, provided are a plurality of longitudinal ribs 641. At a level somewhat lower than the upper end of the skirt 64, the bowl 62 is supported by the longitudinal ribs 641 such that the rim 61 is attached to the upper end of the skirt 64. The rim 61 and the skirt 64 are integrated together by welding.

[0050] When the user seats him- or herself on the toilet seat 13, load is applied downward via the rim 61. However, the load is received by the longitudinal ribs 641 of the skirt 64. The rear and lower ends of the skirt 64 are fixed to the frame 5, thus allowing the load from the rim 61 to be received effectively.

[0051] The pair of side covers 65 are attached removably to the frame 5. The side covers 65 cover the coupling portions 511. Thus, removing the side covers 65 from the frame 5 causes the coupling portions 511 to be exposed as shown in FIG. 7A. This allows the user or a maintenance person to remove the frame 5 from the pedestal 2 easily simply by removing the side covers 65 from the frame 5.

[0052] The rear cover 66 is attached to the supporting portions 54 of the frame 5. The rear cover 66 forms an upper part of the rear end portion of the toilet device 1. In this embodiment, the rear cover 66 houses a backflow check structure 661 as shown in FIG. 6. The backflow check structure 661 is provided halfway through the water inlet line 8.

[0053] The waste trap 67 forms water seal in the bowl 62. The water seal 622 is water that is stored in the bowl 62 to prevent unpleasant odor from flowing back from the drainpipe and also prevent sanitary insects from attempting to enter the bowl 62 in the toilet room. The waste trap 67 is attached to the waste outlet 621 of the bowl 62. In this embodiment, the waste trap 67 is a so-called "S-trap." The waste trap 67 is provided halfway through the waste outlet line 9. In other words, the waste trap 67 is connected to the waste breaking unit 31 through the waste outlet line 9.

(1.2.4) Rear cover

[0054] The rear cover 7 is attached to the rear end of

the pedestal 2. The rear cover 7 covers the rear opening plane 56 of the frame 5. The rear cover 7 is not fixed to the frame 5. Thus, even when the frame 5 is removed from the pedestal 2, the rear cover 7 is still attached to the pedestal 2. The rear cover 7 is located backward of the toilet body 4. As shown in FIG. 2, the rear cover 7 includes a holding portion 71 for holding at least a part of a pipe 10 that form the waste outlet line 9. Optionally, the holding portion 71 may hold at least a part of a tube 10 that forms the water inlet line 8. In other words, the rear cover 7 may hold either the waste outlet line 9 or the water inlet line 8, whichever is appropriate.

(1.2.5) Water inlet line and waste outlet line

[0055] The water inlet line 8 is a passage that connects the inlet line connector 12 to the water inlet 631 as shown in FIG. 6. The water inlet line 8 is provided with the water supply unit 32. On the water inlet line 8, an inlet line disconnecter 81 is provided between the water supply unit 32 and the water inlet 631 (more specifically, between the water supply unit 32 and the backflow check structure 661).

[0056] The inlet line disconnecter 81 is provided for the water inlet line 8 to disconnect the water supply unit 32 from the water inlet 631. In this embodiment, the inlet line disconnecter 81 is a joint fixed to the toilet body 4. The tube 10 connected between the joint and the water supply unit 32 is removable with respect to the joint.

[0057] In this embodiment, the inlet line disconnecter 81 is implemented as a joint. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the inlet line disconnecter 81 may also be implemented as a socket, a coupling joint, or a one-touch joint that allows the user to remove the tube 10 by single operation. In this embodiment, the inlet line disconnecter 81 is fixed to the toilet body 4. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the inlet line disconnecter 81 may also be configured such that the tube 10 is removable from the water supply unit 32 or that the tube 10 is separable halfway.

[0058] The tube 10 may be implemented as a tube with bendability, a hose with flexibility, vulcanite, or a flexible tube made of a metallic material, for example.

[0059] The waste outlet line 9 is a passage that connects the outlet line connector 11 to the waste outlet 621 as described above. The waste outlet line 9 is provided with the waste breaking unit 31. On the waste outlet line 9, an outlet line disconnecter 91 is provided between the waste breaking unit 31 and the waste outlet 621 (more specifically, between the waste breaking unit 31 and the waste trap 67).

[0060] The outlet line disconnecter 91 is provided for the waste outlet line 9 to disconnect the waste breaking unit 31 from the waste outlet 621. In this embodiment, the outlet line disconnecter 91 is implemented as a joint fixed to the waste breaking unit 31. The joint and the

waste trap 67 are attached to be removable from each other.

[0061] In this embodiment, the outlet line disconnecter 91 is implemented as a joint. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the outlet line disconnecter 91 may also be implemented as a socket, a coupling joint, or a one-touch joint that allows the user to remove the tube 10 by single operation. In this embodiment, the outlet line disconnecter 91 is fixed to the waste breaking unit 31. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the tube 10 may be provided between the waste breaking unit 31 and the waste trap 67 such that the outlet line disconnecter 91 is separable halfway on the tube 10.

(1.2.6) How to remove toilet body

[0062] When the toilet device 1 with the configuration described above is subjected to maintenance, for example, the toilet body 4 may be removed from the pedestal 2 in the following manner. First, as shown in FIG. 7A, the user or a maintenance person (hereinafter referred to as the "user" for convenience sake) removes the side covers 65 from the frame 5. Then, the coupling portions 511, the inlet line disconnecter 81, and the outlet line disconnecter 91 are exposed. The user removes the fixing members that connect the pedestal 2 to the coupling portions 511, i.e., the fixing members that couple the pedestal 2 to the base 51 of the frame 5. In addition, the user disconnects the water supply unit 32 and the waste breaking unit 31 from the toilet body 4 by operating the inlet line disconnecter 81 and the outlet line disconnecter 91. Note that in this state, the lower end portion at the front end of the toilet body 4 is still caught on the catching members 27 of the pedestal 2. In addition, in this state, the water supply unit 32 and the waste breaking unit 31 are located over the lower opening plane 55 and forward of the rear opening plane 56. As used herein, when the water supply unit 32 and the waste breaking unit 31 are located "over" the lower opening plane 55, the water supply unit 32 or the waste breaking unit 31 may overlap with the lower opening plane 55. Also, as used herein, when the water supply unit 32 and the waste breaking unit 31 are located "forward of the rear opening plane 56, the water supply unit 32 or the waste breaking unit 31 may overlap with the rear opening plane 56.

[0063] Next, the user moves the toilet body 4 forward with respect to the pedestal 2 as shown in FIG. 7B. This brings the lower end portion at the front end of the toilet body 4 out of engagement with the catching members 27, thus making the toilet body 4 movable upward. The frame 5 has the rear opening plane 56. Thus, even if the units 31 are kept attached to the pedestal 2, the toilet body 4 is still movable with respect to the pedestal 2.

[0064] In this state, the user moves the toilet body 4 upward. In the frame 5, the opening space of the rear

opening plane 56 communicates with the opening space of the lower opening plane 55. This allows the user to move the toilet body 4 forward and upward with respect to the pedestal 2.

[0065] Removing the toilet body 4 from over the pedestal 2 facilitates maintenance of the units 3. In addition, the pedestal 2 has the bottom plate 21, and therefore, is able to receive water leaking out from the inlet line disconnecter 81 or the outlet line disconnecter 91 as well as water leaking when the units 3 are subjected to maintenance upside down. Thus, the toilet device 1 according to this embodiment allows the user to do maintenance of the units 3 more easily.

(2) Variations

[0066] Note that the embodiment described above is only an exemplary one of various embodiments of the present disclosure and should not be construed as limiting. Rather, the exemplary embodiment may be readily modified in various manners depending on a design choice or any other factor without departing from the scope of the present disclosure. Next, variations of the exemplary embodiment will be enumerated one after another. Any of the variations to be described below may be adopted in combination as appropriate.

[0067] In the toilet device 1 according to the embodiment described above, the shutoff valve fixed to the wall 101 of the toilet room and serving as the water inlet member 102 and the inlet line connector 12 are connected together through the inlet line. However, this is only an example of the present disclosure and should not be construed as limiting. Alternatively, the plumbing extended from the water supply source may be directly connected to the inlet line connector 12 of the toilet device 1.

[0068] Also, in the embodiment described above, the toilet body 4 is attached removably to the mounting surface 222 of the pedestal 2. Alternatively, the toilet body 4 may be attached removably to a side surface of the pedestal 2. Still alternatively, the frame 5 of the toilet body 4 may be located outside of the pedestal 2 and may be attached removably to the installation surface 100. In other words, at least part of the toilet body 4 may be located over the pedestal 2.

[0069] Furthermore, in the embodiment described above, the water supply unit 32 and the waste breaking unit 31 are both attached to the bottom plate 21. Alternatively, one of the water supply unit 32 or the waste breaking unit 31 may be attached to the bottom plate 21 and the other may be attached to a crosspiece bridging the outer peripheral portion 22. Still alternatively, both the water supply unit 32 and the waste breaking unit 31 may be attached to a crosspiece bridging the outer peripheral portion 22. That is to say, the units 3 do not have to be attached to the bottom plate 21.

[0070] In the embodiment described above, the water supplied into the bowl 62 is tap water. However, this is only an example of the present disclosure and should

not be construed as limiting. Alternatively, the water supplied into the bowl 62 may also be water to which a detergent has been added halfway through the water inlet line 8.

(3) Aspects

[0071] As can be seen from the foregoing description of embodiments, a toilet device (1) according to a first aspect includes: a pedestal (2) to be mounted on an installation surface (100); and a toilet body (4) to be set on the pedestal (2). The toilet body (4) includes: a bowl (62) to receive wastes and drain the wastes through a waste outlet (621); and a water inlet (631) to supply water into the bowl (62). The toilet device (1) further includes a water supply unit (32), a waste breaking unit (31), an inlet line disconnecter (81), and an outlet line disconnecter (91). The water supply unit (32) is attached to the pedestal (2) and connected to the water inlet (631) through a water inlet line (8). The water supply unit (32) selectively provides or stops supply of water to the water inlet (631). The waste breaking unit (31) is attached to the pedestal (2) and connected to the waste outlet (621) through a waste outlet line (9). The waste breaking unit (31) breaks, into pieces, the wastes drained through the waste outlet (621). The inlet line disconnecter (81) disconnects the water supply unit (32) from the water inlet (631). The outlet line disconnecter (91) disconnects the waste breaking unit (31) from the waste outlet (621).

[0072] This aspect allows the toilet body (4) to be moved with respect to the pedestal (2) after the water supply unit (32) has been disconnected from the toilet body (4) by the inlet line disconnecter (81) and after the waste breaking unit (31) has been disconnected from the toilet body (4) by the outlet line disconnecter (91). At this time, the water supply unit (32) and the waste breaking unit (31) may be left attached to the pedestal (2), thus allowing a maintenance person to move the toilet body (4) easily. This facilitates the maintenance, for example, of the water supply unit (32) or the waste breaking unit (31).

[0073] In a toilet device (1) according to a second aspect, which may be implemented in conjunction with the first aspect, the toilet body (4) is attached removably to the pedestal (2).

[0074] This aspect eliminates the need to attach the toilet body (4) directly to the installation surface (100) when mounting the toilet device (1) onto the installation surface (100).

[0075] In a toilet device (1) according to a third aspect, which may be implemented in conjunction with the first or second aspect, the pedestal (2) includes a bottom plate (21) facing the installation surface (100).

[0076] This aspect allows, even when water flows out of at least one of the water supply unit (32) or the waste breaking unit (31) during the maintenance, for example, the water to be received at the bottom plate (21), thus reducing the overflow of the water on the installation sur-

face (100).

[0077] In a toilet device (1) according to a fourth aspect, which may be implemented in conjunction with the third aspect, at least one of the water supply unit (32) or the waste breaking unit (31) is attached to the bottom plate (21).

[0078] This aspect simplifies the attachment structure of at least one of the water supply unit (32) or the waste breaking unit (31).

[0079] In a toilet device (1) according to a fifth aspect, which may be implemented in conjunction with the third or fourth aspect, the pedestal (2) includes a standup surface (221) that stands up along an outer periphery of the bottom plate (21).

[0080] This aspect reduces, when water flowing out of at least one of the water supply unit (32) or the waste breaking unit (31) is received at the bottom plate (21), the chances of the received water flowing out of the bottom plate (21) toward the installation surface (100).

[0081] In a toilet device (1) according to a sixth aspect, which may be implemented in conjunction with the fifth aspect, the pedestal (2) has a through hole (223) provided outside of the standup surface (221), and the pedestal (2) is attached to the installation surface (100) via a fixing member that passes through the through hole (223).

[0082] This aspect prevents, when the pedestal (2) is mounted on the installation surface (100) with a fixing member, the water received at the bottom plate (21) from flowing outside of the standup surface (211), thus reducing the chances of the water running along the fixing member toward the installation surface (100).

[0083] In a toilet device (1) according to a seventh aspect, which may be implemented in conjunction with any one of the first to sixth aspects, the toilet body (4) includes a frame (5) and a side cover (65). The frame (5) includes a coupling portion (511) and is attached to the pedestal (2) to be removable at the coupling portion (511). The side cover (65) is removable from the frame (5) and covers the coupling portion (511).

[0084] This aspect facilitates the work to be done at the coupling portion (511) because the coupling portion (511) is exposed simply by removing the side cover (65), thus allowing the toilet body (4) to be removed easily from the pedestal (2).

[0085] In a toilet device (1) according to an eighth aspect, which may be implemented in conjunction with any one of the first to seventh aspects, the toilet body (4) includes a waste trap (67) connected to the waste outlet (621) and provided for the waste outlet line (9). The outlet line disconnecter (91) is provided between the waste trap (67) and the waste breaking unit (31).

[0086] This aspect allows the toilet body (4) to be moved with water seal kept formed by the waste trap (67).

[0087] Note that the constituent elements according to the second to eighth aspects are not essential constituent elements for the toilet device (1) but may be omitted as appropriate.

Reference Signs List**[0088]**

1	Toilet Device
2	Pedestal
21	Bottom Plate
221	Standup Surface
223	Through Hole
31	Waste Breaking Unit
32	Water Supply Unit
4	Toilet Body
5	Frame
511	Coupling Portion
62	Bowl
621	Waste Outlet
631	Water Inlet
65	Side Cover
67	Waste Trap
8	Water Inlet Line
81	Inlet Line Disconnecter
9	Waste Outlet Line
91	Outlet Line Disconnecter
100	Installation Surface

Claims**1.** A toilet device comprising:

a pedestal configured to be mounted on an installation surface; and
 a toilet body configured to be set on the pedestal, the toilet body including:

a bowl configured to receive wastes and drain the wastes through a waste outlet; and
 a water inlet configured to supply water into the bowl,
 the toilet device further comprising:

a water supply unit attached to the pedestal, connected to the water inlet through a water inlet line, and configured to selectively provide or stop supply of water to the water inlet;
 a waste breaking unit attached to the pedestal, connected to the waste outlet through a waste outlet line, and configured to break, into pieces, the wastes drained through the waste outlet;
 an inlet line disconnecter configured to disconnect the water supply unit from the water inlet; and
 an outlet line disconnecter configured to disconnect the waste breaking unit from the waste outlet.

2. The toilet device of claim 1, wherein the toilet body is attached removably to the pedestal.

3. The toilet device of claim 1 or 2, wherein the pedestal includes a bottom plate facing the installation surface.

4. The toilet device of claim 3, wherein at least one of the water supply unit or the waste breaking unit is attached to the bottom plate.

5. The toilet device of claim 3 or 4, wherein the pedestal includes a standup surface that stands up along an outer periphery of the bottom plate.

6. The toilet device of claim 5, wherein the pedestal has a through hole provided outside of the standup surface, and the pedestal is attached to the installation surface via a fixing member that passes through the through hole.

7. The toilet device of any one of claims 1 to 6, wherein the toilet body includes:

a frame including a coupling portion and attached to the pedestal to be removable at the coupling portion; and
 a side cover removable from the frame and configured to cover the coupling portion.

8. The toilet device of any one of claims 1 to 7, wherein the toilet body includes a waste trap connected to the waste outlet and provided for the waste outlet line, and
 the outlet line disconnecter is provided between the waste trap and the waste breaking unit.

FIG. 1

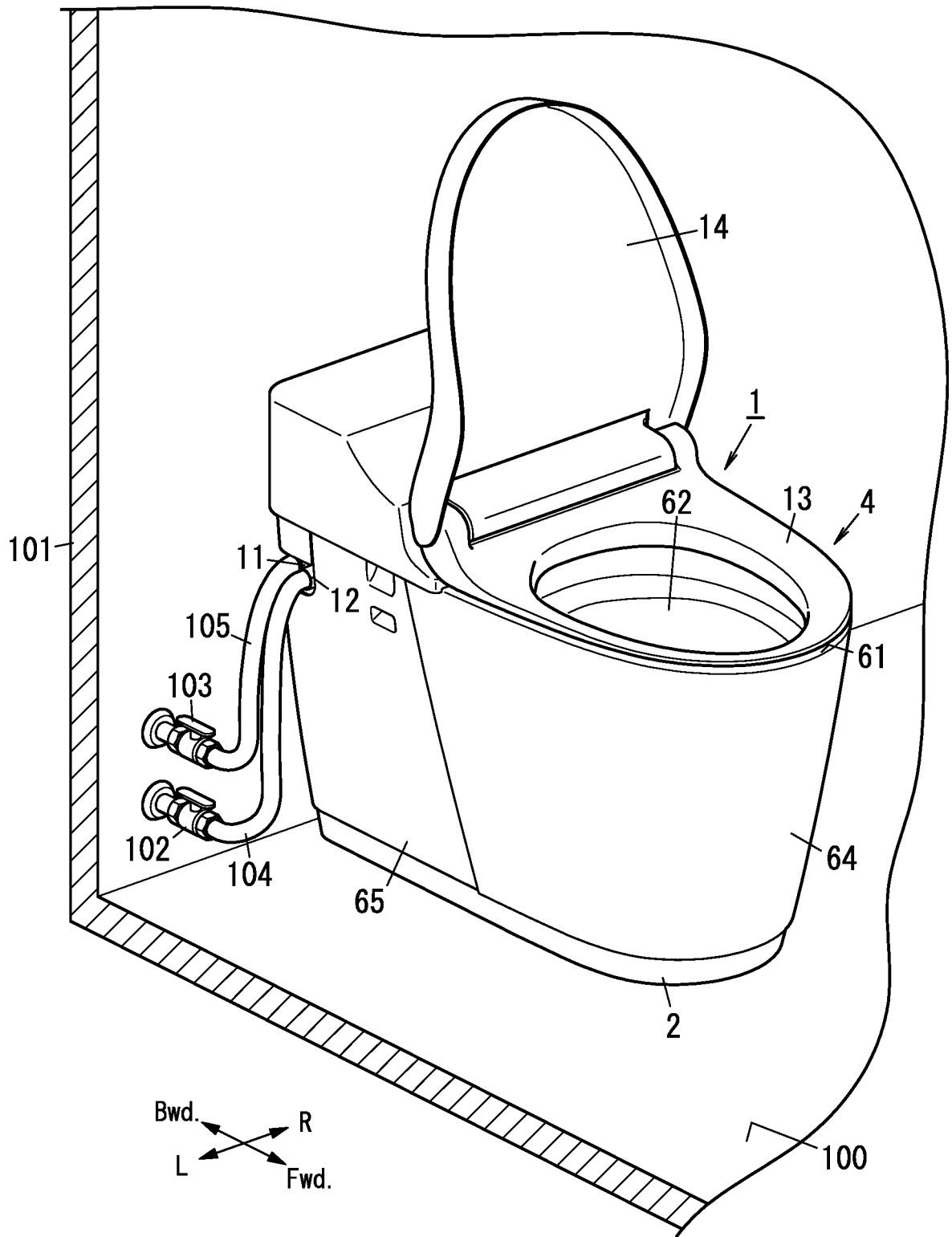


FIG. 2

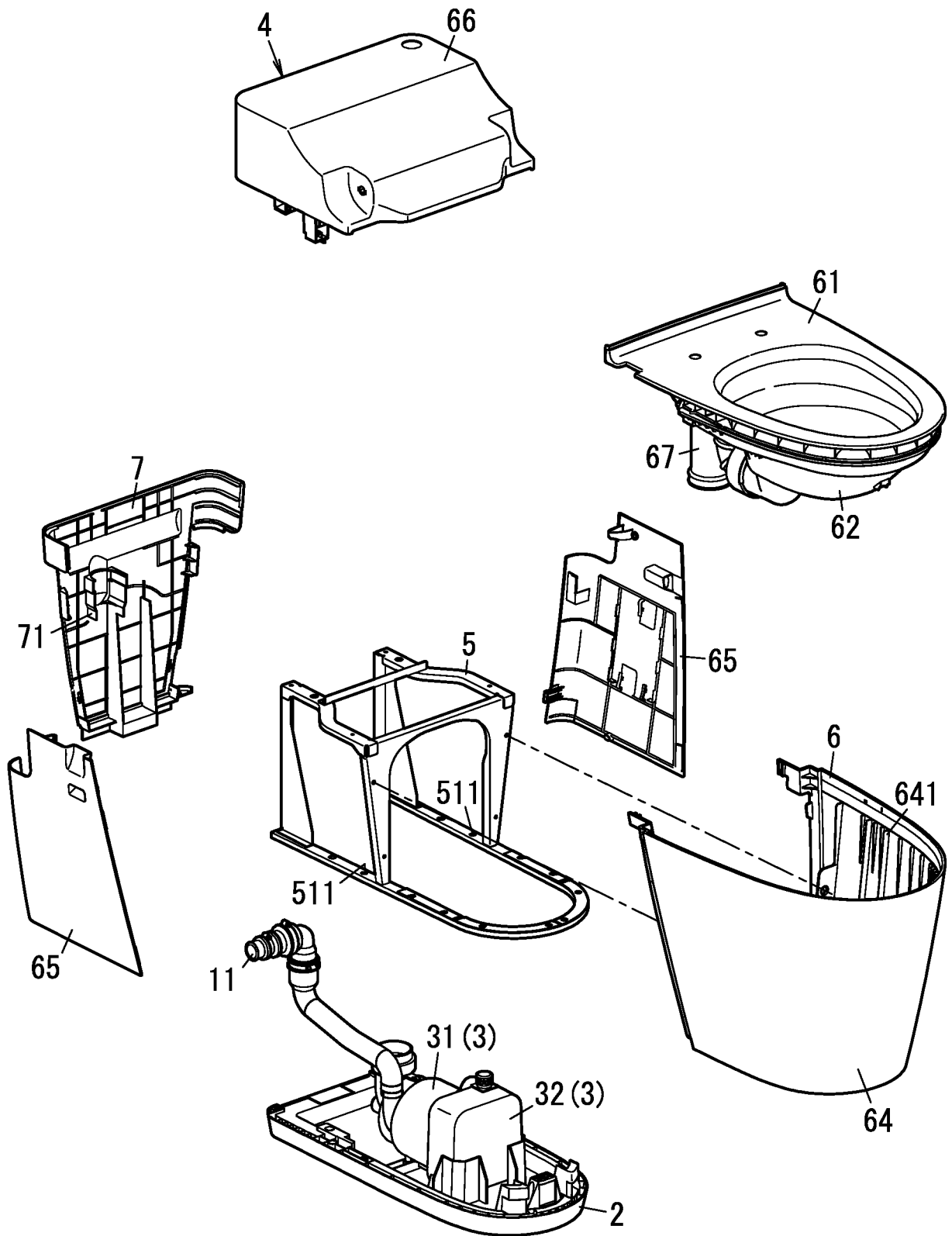


FIG. 3A

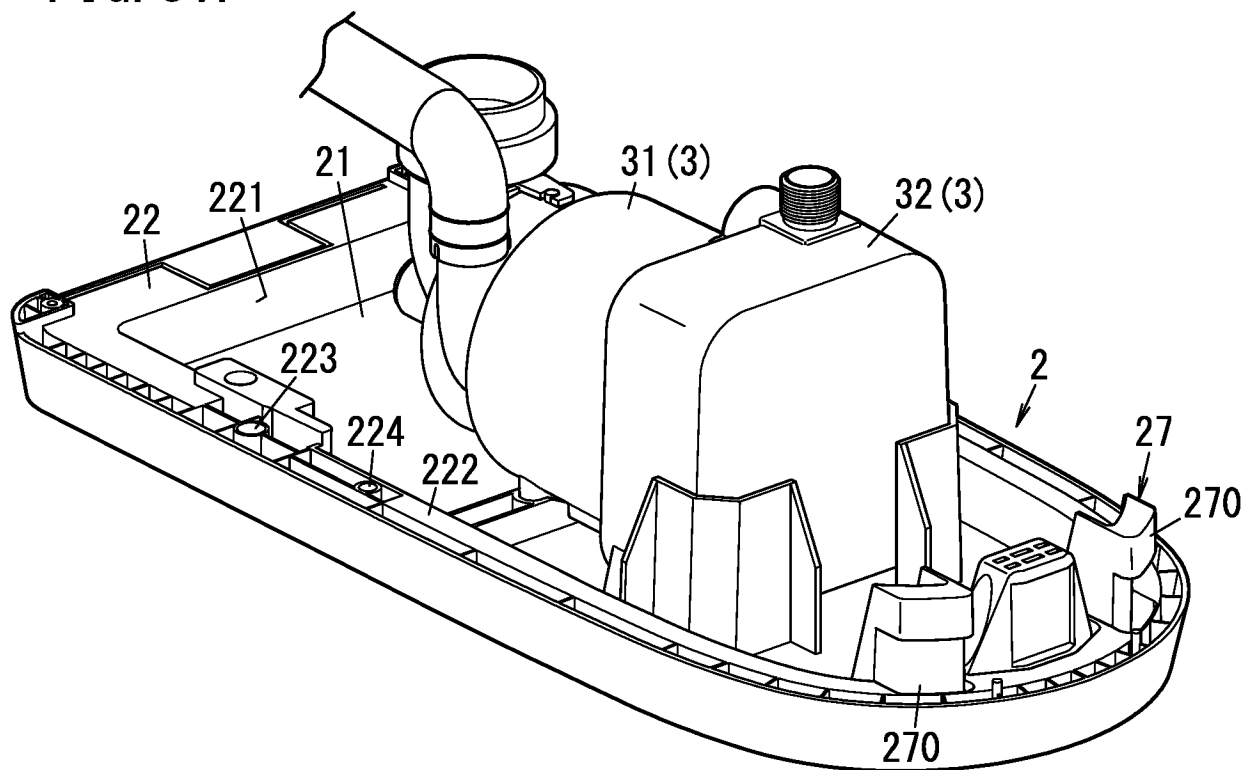


FIG. 3B

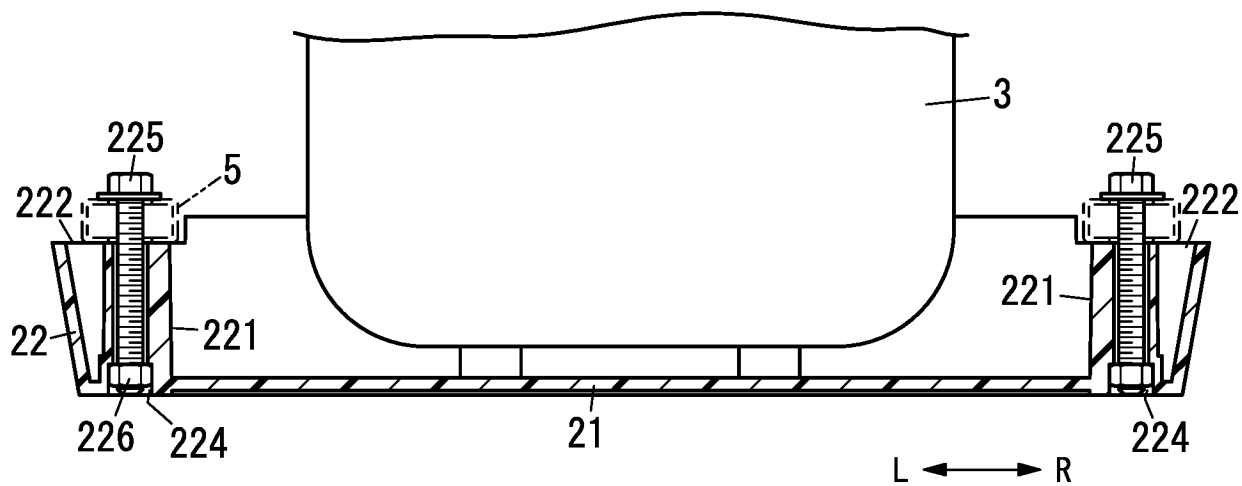
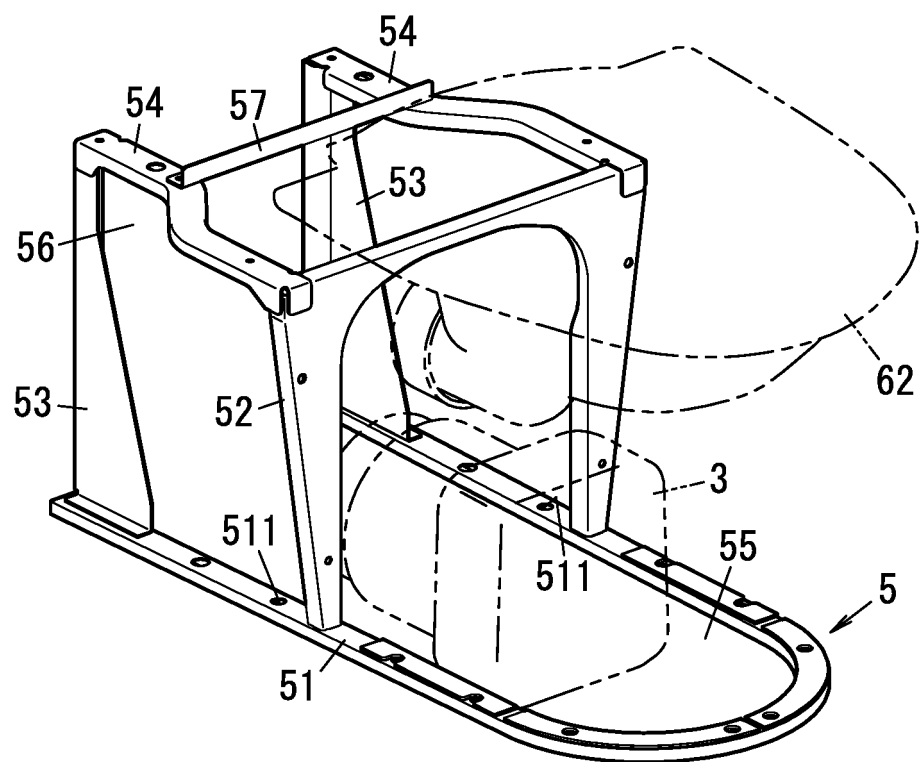
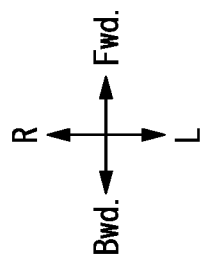
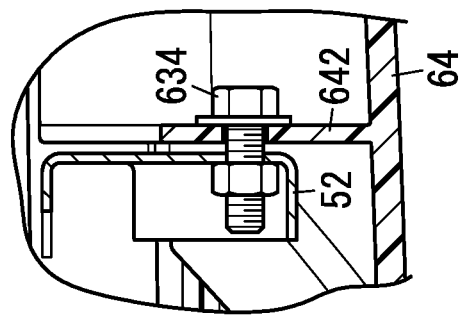
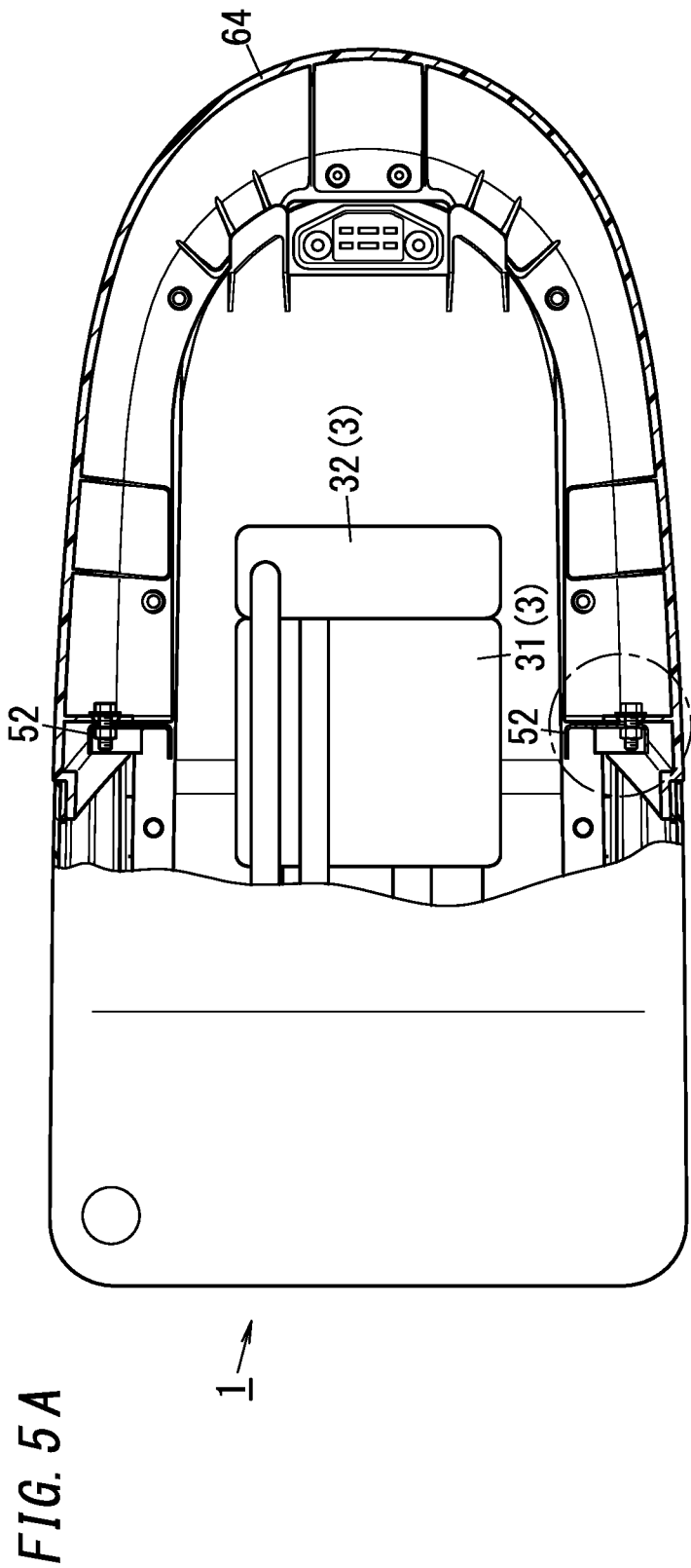


FIG. 4





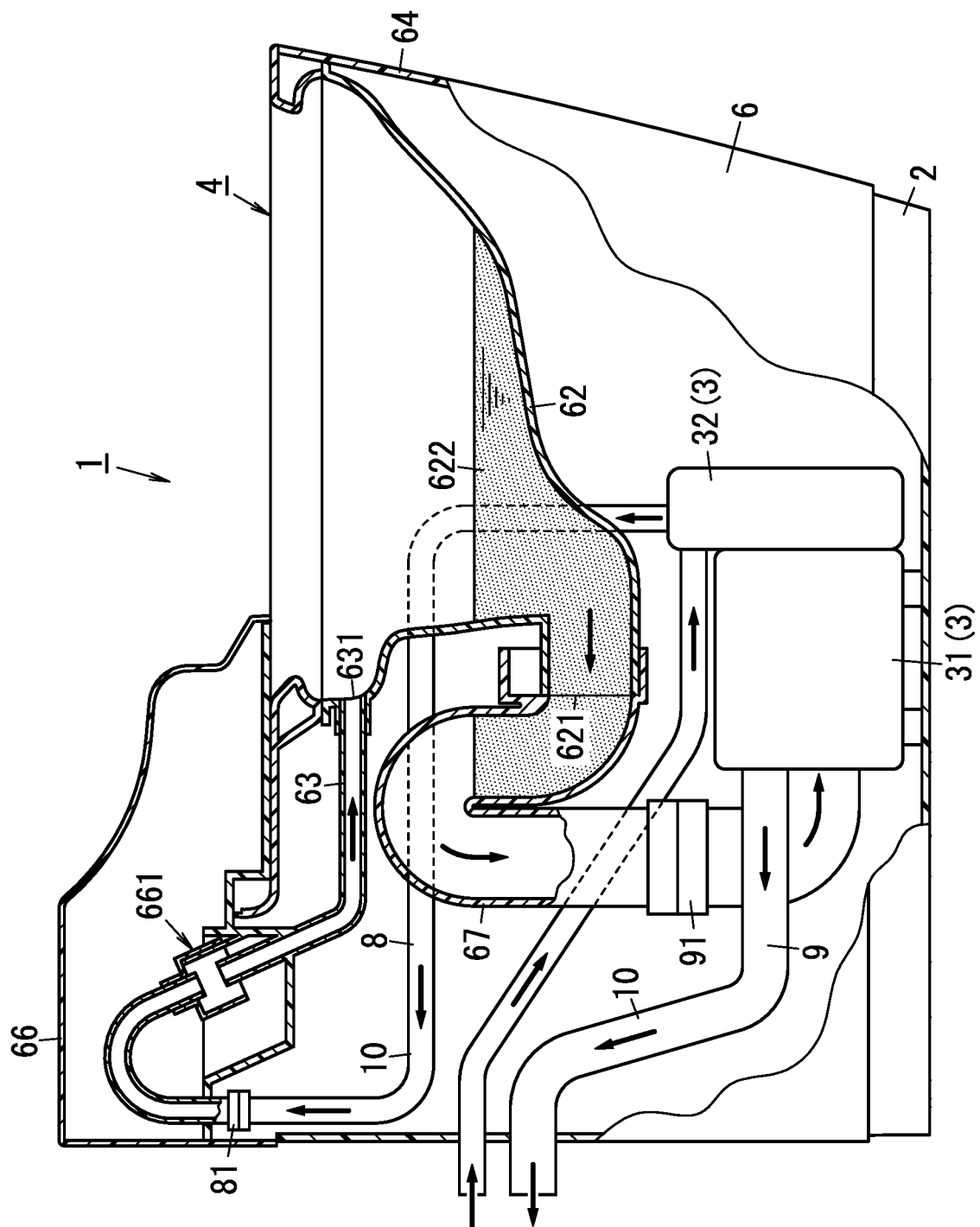


FIG. 6

FIG. 7A

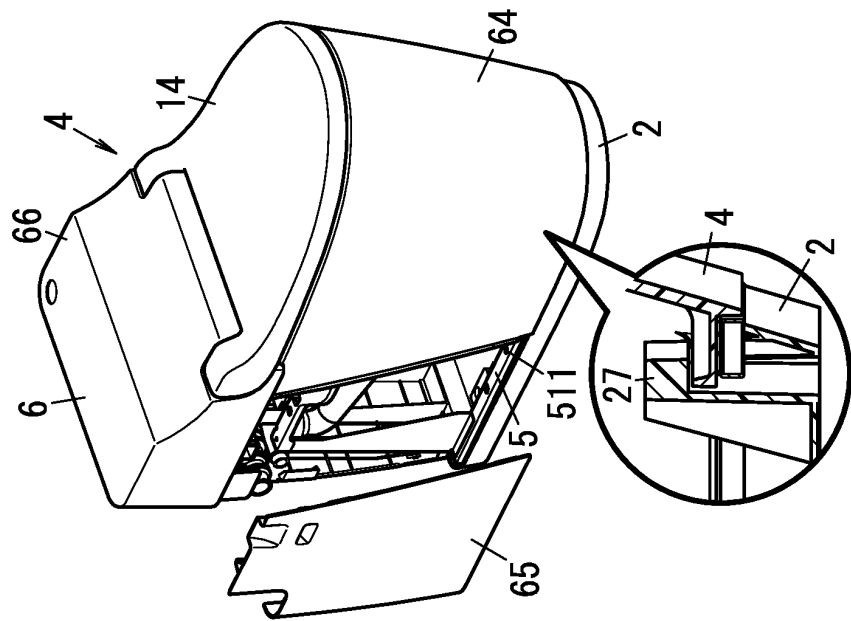


FIG. 7B

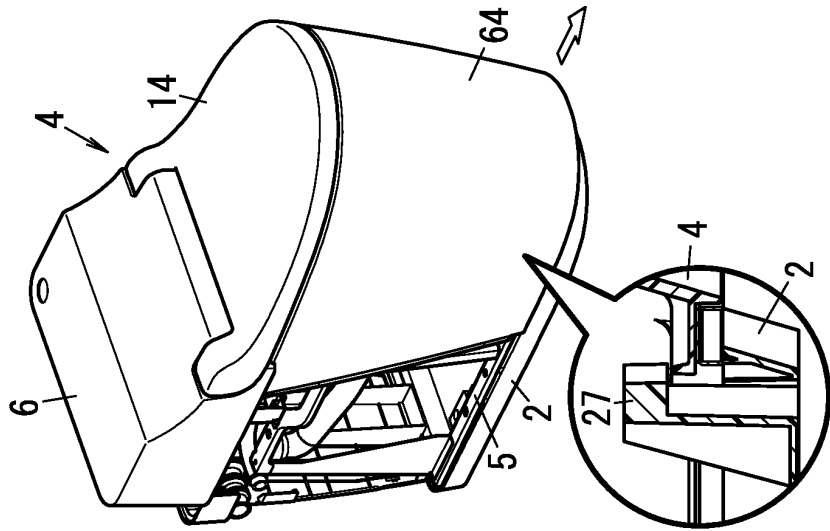
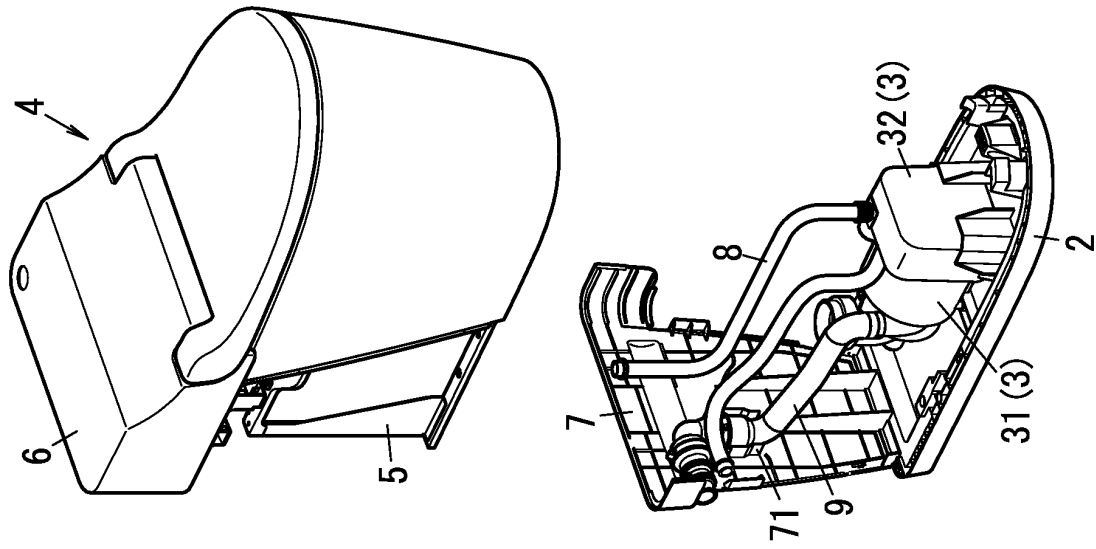


FIG. 7C



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/021996

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. E03D11/13(2006.01)i, B02C18/00(2006.01)i, E03D9/10(2006.01)i,
E03D11/11(2006.01)i, E03D11/17(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)

Int.Cl. E03D11/13, B02C18/00, E03D9/10, E03D11/11, E03D11/17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2019

Registered utility model specifications of Japan 1996-2019

Published registered utility model applications of Japan 1994-2019

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2015-21373 A (PANASONIC CORPORATION) 02 February 2015, paragraphs [0015]-[0036], fig. 1-3 (Family: none)	1-8
Y	JP 2008-82032 A (TOTO LTD.) 10 April 2008, paragraphs [0033], [0045]-[0047], fig. 1-13 (Family: none)	1-8



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search
24.07.2019

Date of mailing of the international search report
13.08.2019

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/021996

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2005-105581 A (TOTO LTD.) 21 April 2005, paragraphs [0018], [0019], fig. 1-3 (Family: none)	1-8
Y	JP 9-125507 A (INAX CORPORATION) 13 May 1997, paragraph [0016], fig. 1 (Family: none)	5-8
A	EP 2921719 A1 (VALSIR S.P.A.) 23 September 2015, entire text, all drawings & PL 2921719 T & AU 2015201394 A	1-8

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2017014696 A [0005]