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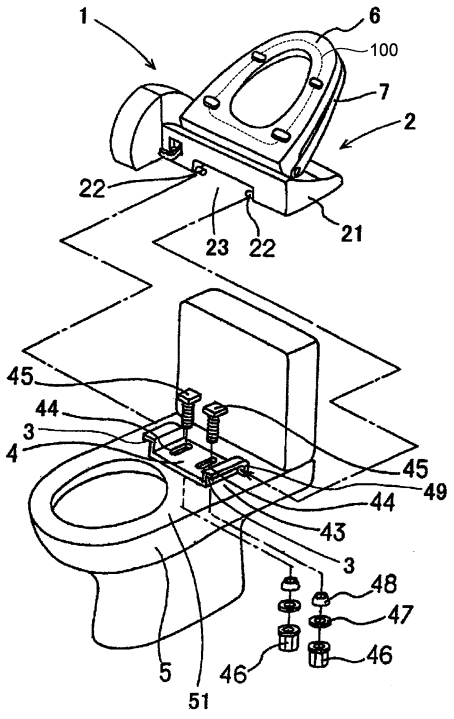
(54) Detachable toilet seat apparatus

(57) A toilet seat apparatus (1) includes a base portion (4, 40) adapted to be fixed on a toilet bowl (5), a main body portion (2, 20) detachably mounted on the base portion, a toilet seat (6) rotatably supported by the main body portion, a guide groove (43) formed at the base portion and extending in a backward and forward direction of the toilet bowl and having an opening portion (3) at a front side thereof, and a pin (22) provided at the main body portion, the pin being inserted into the guide groove for allowing the main body portion to slide relative to the base portion, rise from the base portion, and to detach from the base portion.

FIG. 1



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Description

FIELD OF THE INVENTION

[0001] This invention relates to a toilet seat apparatus, and more particularly to a toilet seat apparatus which is detachable from a toilet bowl.

BACKGROUND

[0002] Conventionally, a toilet seat apparatus practically used is provided with a washing mechanism for spouting warm water for washing, and a heating mechanism for heating a toilet seat. Such conventional toilet seat apparatus generally includes a base portion provided at a rear side of an upper surface of a toilet bowl, a main body portion supported by the base portion, a toilet seat for seating, and a toilet cover for opening and closing an upper surface of the toilet bowl. The toilet seat and the toilet cover are rotatably supported at the main body portion. The toilet seat apparatus further includes a washing nozzle, a warm water tank, a heater, and a keep-warm portion if need arises. Recently, a toilet seat apparatus with a movable main body portion has been introduced. The movable main body portion of this type is movable for making a space between a toilet bowl main body and the main body portion of the toilet seat apparatus so that the cleaning can be easily made. One of the known washing toilet seat apparatuses including a lifting mechanism is disclosed in JPH9-316976A. More particularly, the disclosed toilet seat apparatus includes the lifting mechanism for lifting the main body portion in an outside direction, a lateral direction, a rear direction, or an upper direction of the toilet bowl. By means of the lifting mechanism, the quite heavy main body portion can be moved without difficulty and yet in a safe manner.

[0003] With the configuration of the toilet seat apparatus disclosed in JPH9-316976A, the main body portion cannot be readily detached considering any possible falling of the main body portion and for improvement of safety. However, the main body portion may necessarily be detached for checking inside thereof or for draining water from the tank in order to prevent freeze in a condition where the toilet seat apparatus is not used for a long period of time. Under such circumstances, entire washing toilet seat is detached by loosening a fixing bolt and a nut, by which the base portion is fixed to the toilet bowl main body. Because detachment and reattachment of the main body portion may necessarily be performed within a limited space located below a lower tank at a rear side of the toilet bowl, the detachment and reattachment of the main body portion may occasionally be difficult and may require careful attention.

[0004] A need thus exists for a toilet seat apparatus, which can detach a movable main body portion together with a toilet seat and a toilet cover from a base portion without difficulty in a safe manner.

SUMMARY OF THE INVENTION

[0005] According to an aspect of the present invention, a toilet seat apparatus includes a base portion adapted to be fixed on a toilet bowl, a main body portion detachably mounted on the base portion, a toilet seat rotatably supported by the main body portion, a guide groove formed at the base portion and extending in a backward and forward direction of the toilet bowl and having an opening portion at a front side thereof, and a pin provided at the main body portion, the pin being inserted into the guide groove for allowing the main body portion to slide relative to the base portion, rise from the base portion, and to detach from the base portion.

[0006] According to an another aspect of the present invention, a method for assembling a toilet seat apparatus, the method includes the steps of arranging the main body portion at a front side of an upper surface of the toilet bowl, pushing the main body portion rearward of the base portion until the pin reaches the guide groove through an opening portion of the guide groove, pushing the main body portion rearward of the base portion so that the pin slides along the guide groove to finally reach a closing portion of the guide groove, and fixing the main body portion to the base portion.

[0007] With the configuration of the toilet seat apparatus according to the present invention, the main body portion can be detached from the base portion in a safe manner by means of a simple operation such as moving the main body portion in the backward and forward direction. Further, in a condition where the toilet seat apparatus is provided with opening and closing means, which allows and restricts attaching and detaching operations of the main body portion, and a biasing member, which maintains restriction of the attaching and detaching operations of the main body portion, the attaching and detaching operations of the main body portion can be performed in safe and reliable manner because the main body portion is not detached at the time of normal use and cleaning.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The foregoing and additional features and characteristics of the present invention will become more apparent from the following detailed description considered with reference to the accompanying drawings, wherein:

[0009] Fig. 1 is a perspective view of a washing toilet seat apparatus according to a first embodiment of the present invention with some parts being disassembled.

[0010] Fig. 2A is a view for explaining an operation of a main body portion of a toilet seat apparatus according to a second embodiment of the present invention in a condition where the main body portion is slid forward.

[0011] Fig. 2B is a view for explaining the operation of the main body portion of the toilet seat apparatus according to the second embodiment of the present invention in a condition where the main body portion is swung and

lifted.

[0012] Fig. 3A is a plane sectional view illustrating a base portion of a toilet seat apparatus according to a third embodiment of the present invention in a condition where an opening portion is closed.

[0013] Fig. 3B is a plane sectional view illustrating the base portion of the toilet seat apparatus according to the third embodiment of the present invention in a condition where the opening portion is opened.

DETAILED DESCRIPTION

[0014] Embodiments of the present invention will be explained hereinbelow with reference to the attached drawings. A first embodiment of the present invention is illustrated in Fig. 1. In practical use, separately illustrated members indicated by a dashed line in Fig. 1 are assembled. A washing toilet seat apparatus (i.e., a toilet seat apparatus) 1 according to the first embodiment of the invention includes a base portion 4, a main body portion 2, a toilet seat 6, and a toilet cover 7.

[0015] The base portion 4 is symmetrically formed from a substantially rectangular member and is provided with two elongated holes 44. The elongated holes 44 are penetrating through the base portion 4 at both sides of a center portion thereof. By means of the elongated holes 44, a mounting position of the base portion 4 can be adjusted in a backward and forward direction of a toilet bowl 5. The elongated holes 44 of the base portion 4 and mounting holes of the toilet bowl 5 are fastened by means of fixing members such as a fixing bolt 45, a nut 46, a washer 47, and a packing 48, and the base portion 4 is thereby fixed to a rear side of an upper surface 51 of the toilet bowl 5. Two guide grooves 43 are arranged at both sides of the base portion 4, respectively, in the backward and forward direction of the toilet bowl 5. Each guide groove 43 includes a substantially U-shaped cross section with an opening. A part of the base portion 4 forms a first side surface and a bottom surface of the substantially U-shaped cross section of the guide groove 43, and a part of the upper surface 51 of the toilet bowl 5 forms a second side surface of the substantially U-shaped cross section of the guide groove 43. The guide groove 43 includes a closing portion 49 at a rear side thereof and includes an opening portion 3 at a front side thereof. The opening portion 3 includes a cross section identical to that of the guide groove 43.

[0016] The main body portion 2 is mainly formed from a substantially box shaped casing 21. The casing 21 includes a washing mechanism 200 therein. The toilet seat 6 and the toilet cover 7 are rotatably supported at an upper surface of the casing 21. Further, the casing 21 is formed with a cutout portion 23 at a central lower portion. The cutout portion 23 includes a substantially rectangular cross section and is penetrating through the casing 21 in a backward and forward direction so that the casing 21 can pass through the base portion 4 when the casing 21 slides in the backward and forward direction of the toilet bowl 5. The cutout portion 23 is provided with a pair of pins 22 at inner side surfaces in a width direction thereof. The pins 22 protrude inwardly to face with each other. The pins 22 are insertable into an opening of the substantially U-shaped cross section of the guide groove 43 of the base portion 4. Further, each pin 22 includes a substantially elliptical cross section, a major axis of which is wider than a width of the guide groove 43.

[0017] With the configuration of the washing toilet seat apparatus 1 according to the first embodiment of the present invention, the main body portion 2 is attached to the base portion 4 in accordance with the following order. First, the main body portion 2 is arranged at a front side of the upper surface 51 of the toilet bowl 5 in such a manner that the cutout portion 23 is positioned in front of the base portion 4, and the pin 22 is positioned in front of the opening portion 3. Next, the main body portion 2 is pushed rearward of the base portion 4 until the pin 22 reaches the guide groove 43 through the opening portion 3. In a condition where the main body portion 2 is further pushed rearward, the pin 22 slides along the guide groove 43 to finally reach the closing portion 49. At this position, by fixing the main body portion 2 to the base portion 4 by means of an engaging mechanism (not shown), an attaching operation of the main body portion 2 is completed. During the attaching operation, the casing 21 and the toilet seat 6 are not necessarily be lifted or raised because they slide on the upper surface 51 of the toilet bowl 5.

[0018] The main body portion 2 is detached from the base portion 4 in reverse order. More particularly, at first, the engaging mechanism is removed for making the main body portion 2 movable. Next, the main body portion 2 is pulled forward so that the pin 22 slides along the guide groove 43 to reach the opening portion 3. In a condition where the main body portion 2 is further pulled forward, the pin 22 passes through the opening portion 3 and is pulled out. Thereby, the main body portion 2 is pulled out at a center of the front side of the upper surface 51 of the toilet bowl 5. Accordingly, the attaching and detaching operations of the main body portion 2 can be performed without difficulty. Further, the attaching and detaching operations of the main body portion 2 can be performed in a safe manner because the main body portion 2 is not necessarily be lifted or raised during the operation.

[0019] A second embodiment of the present invention will be explained hereinafter with reference to Figs. 2A-2B. The same structure as described in the aforementioned embodiment is not repeatedly explained. According to the second embodiment of the present invention, the pin 22 is provided at a rear end portion of the cutout portion 23. At the time of normal use, a main body portion 20 is fixed by means of the engaging mechanism at a rear side position indicated by a chain double-dashed line illustrated in Fig. 2A. At the time of cleaning, the engaging mechanism is removed, and then the main body portion 20 is pulled forward by sliding the pin 22 along the guide groove 43. On this occasion, the casing 21 and

the toilet seat 6 are not necessarily be lifted or raised because they slide on the upper surface 51 of the toilet bowl 5 during the aforementioned operation. Accordingly, a rear end portion of the upper surface 51 of the toilet bowl 5 is opened and can thereby be cleaned.

[0020] Further, as illustrated in Fig. 2B, the main body portion 20 is lifted or raised in such a manner that the main body portion 20 is swung rearward by making the pin 22 as a rotational axis. On this occasion, because the major axis of the substantially elliptical cross section of the pin 22 is wider than the width of the guide groove 43, the pin 22 occupies a full width of the guide groove 43 during swing and is thereby held in the guide groove 43. Accordingly, the main body portion 20 does not move even in a condition where it is released from a user's hand, and the main body portion 20 is thereby held at a lifted state. In a condition where the toilet seat 6 and the toilet cover 7 are further rotated from an upper side toward a rear side, a vicinity of a center portion and a front portion of the upper surface 51 of the toilet bowl 5 is opened and can thereby be cleaned.

[0021] According to the second embodiment of the present invention, because of a sliding operation of the main body portion 20, a swinging and lifting operation of the main body portion 20, and a rotating operation of the toilet seat 6 and the toile cover 7, whole surface of the upper surface 51 of the toilet bowl 5 is opened in order, and thus the toilet seat apparatus can be cleaned.

[0022] A third embodiment of the present invention will be explained hereinafter with reference to Figs. 3A-3B. The same structure as described in the aforementioned embodiments is not repeatedly explained. According to the third embodiment of the present invention, a base portion 40 includes opening and closing means 8. The opening and closing means 8 includes two movable plates 81, a spring member 9 serving as a biasing means, and a release member 85.

[0023] Each movable plate 81 is flexible and includes a first end portion 82, a middle portion 83 and a second end portion 84. Each first end portion 82 of the movable plates 81 moves into and out from the opening portion 3 in such manner to across the opening portion 3, each middle portion 83 of the movable plates 81 is curved, and the second end portions 84 of the movable plates 81 are approached mutually and are together supported in parallel by means of the spring member 9. A first end of the spring member 9 supports the second end portions 84 of the movable plates 81, and a second end of the spring member 9 is fixed to the base portion 40. The spring member 9 normally biases the two movable plates 81 so that each first end portion 82 protrudes to close the opening portion 3 as illustrated in Fig. 3A. The substantially column shaped release member 85 contacts with the spring member 9 at a first end and can be operated at a second end. In a condition where the second end of the release member 85 is pushed, as illustrated in Fig. 3B, the spring member 9 is compressed to pull back the movable plate 81, and then the first end portion 82 of the movable plate 81 is pulled back to open the opening portion 3.

[0024] According to the third embodiment of the present invention, by means of the opening and closing means 8 and the spring member 9, the opening portion 3 is closed except for a condition where the release member 85 is pushed. Accordingly, the attaching and detaching operations of the main body portion 2 can be restricted at the time of normal use and at the time of cleaning.

[0025] According to the embodiments of the present invention, the toilet seat 6 is a heated toilet seat, which is heated by means of a heater 100. However the present invention is not limited thereto. Alternatively, or in addition, the toilet seat may not be the heated toilet seat. Further, alternatively or in addition, the main body portion 2, 20 may not include the washing mechanism 200 therein. More particularly, the toilet seat apparatus may include a simple structure such that the toilet seat 6 is simply rotatably supported at the main body portion 2, 20. Even in such conditions, according to the present invention, cleaning of the upper surface 51 of the toilet bowl 5 can be performed without difficulty.

[0026] With the configuration of the toilet seat apparatus according to the embodiments of the present invention, the main body portion is movable for convenience in cleaning and can be detached if need arises. The toilet seat apparatus according to the present invention includes the base portion, the main body portion, the toilet seat, and the toilet cover. Alternatively, or in addition, the toilet seat apparatus may not include the toilet cover. The main body portion of the toilet seat apparatus is detachably supported by the base portion.

[0027] With the configuration of the toilet seat apparatus according to the embodiments of the present invention, the base portion is provided at the rear side of the upper surface of the toilet bowl for slidably and swingably supporting the main body portion. The base portion is fixed to the rear side of the upper surface of the toilet bowl by means of the fixing member such as the bolt, or the like. The base portion is formed with the guide groove arranged in the backward and forward direction of the toilet bowl for supporting the main body portion.

[0028] With the configuration of the toilet seat apparatus according to the embodiments of the present invention, two guide grooves are arranged at both sides of the base portion, respectively. However, the present invention is not limited thereto. Alternatively, or in addition, a single guide groove may be arranged at the upper surface of the base portion. Further, alternatively, or in addition, more than two guide grooves may be arranged at the base portion. The guide groove may include a generally rectangular cross section. Alternatively, or in addition, an interior of the guide groove may be configured to be wider than an inlet portion of the guide groove for preventing the main body portion from being detached from the base portion. Because a length of the guide groove in the backward and forward direction is mostly equivalent to a stroke of the main body portion slidable along the guide

groove, the present invention is applicable as long as the length of the guide groove is defined in view of convenience in cleaning. Further, the guide groove includes the opening portion at the front side thereof and the guide groove is thereby opened outward.

[0029] The main body portion may include the washing mechanism therein. Further, the toilet seat may be the heated toilet seat. With the configuration of the toilet seat apparatus according to the embodiments of the present invention, the main body portion, which is a major member of the toilet seat apparatus, rotatably supports the toilet seat and the toilet cover. The toilet seat apparatus may be provided with the washing mechanism such as a washing nozzle, a warm water tank, or the like. Further, the toilet seat may be the heated toilet seat, which includes the heater, a keep-warm portion, or the like. The main body portion includes the pin insertable into the guide groove of the base portion.

[0030] The present invention is applicable as long as the pin includes the substantially elliptical cross section, the major axis of which is wider than the width of the guide groove. However, the present invention is not limited thereto. Alternatively, or in addition, the pin may include the substantially elliptical cross section, which is smaller than the width of the guide groove. In both cases, the main body portion can be lifted or raised from the toilet bowl by swinging around the pin serving as a central axis. In a condition where the pin includes the substantially elliptical cross section, the pin is held in the guide groove during swing and the main body portion is thereby held at the lifted state even when the main body portion is released from the user's hand. Therefore, cleaning can be performed without difficulty. Alternatively, or in addition, the pin may be configured to slide along the guide groove but not to rotate therein. Further, the main body portion and the pin may be configured to be relatively rotatable. In this case, the main body portion is slidable relative to the base portion in the backward and forward direction by inserting the pin into the guide groove through the opening portion. Further, the main body portion can be lifted or raised by making the pin as the central axis at a given sliding position. Alternatively, or in addition, the pin may be provided at a bottom surface of the main body portion so that the pin may not disturb the user.

[0031] The toilet seat apparatus may include the opening and closing means for allowing and restricting the attaching and detaching operations of the main body portion relative to the base portion. More particularly, the toilet seat apparatus may include a means for allowing and restricting the attaching and detaching operations of the main body portion such as the opening and closing means for opening and closing the opening portion. The opening and closing means opens the opening portion only in a condition where the pin is inserted into or detached from the guide groove, and otherwise closes the opening portion. Accordingly, because the opening portion is closed in a condition where the toilet seat apparatus is used or cleaned, the main body portion can be held in a reliable manner. In a condition where the toilet seat apparatus includes plural opening portions, each opening portion may include the opening and closing means, which together perform the opening and closing operations. The opening and closing means can be realized, for example, by providing the movable plate at the base portion for closing the opening portion by sliding.

[0032] Further, the opening and closing means may include the biasing means for maintaining a restriction of the attaching and detaching operations of the main body portion. For example, the biasing means normally biases the movable plate so that the movable plate slides to close the opening portion. Further, the biasing means is released at the time of attaching or detaching operation of the main body portion. In a condition where the toilet seat apparatus includes plural opening and closing means, each opening and closing means may include the biasing means. The biasing means may include the spring member, or the like.

[0033] In order to prevent the main body portion from being moved during use, the present invention is provided with an engaging mechanism for fixing the main body portion to the base portion or the toilet bowl at a rear side of the sliding position.

[0034] According to the embodiments of the present invention, the toilet seat apparatus is assembled and operated in accordance with the following order. First, the base portion is fixed to the rear side of the upper surface of the toilet bowl by means of the fixing member. Next, the main body portion is arranged on the toilet bowl in such a manner that the pin is positioned in front of the opening portion located at a front side of the base portion. Then, the biasing means is released to open the opening portion, and the main body portion is pushed to move rearward. On this occasion, the pin is inserted into the guide groove through the opening portion, and the main body portion is thereby supported by the base portion. Then, the main body portion is further pushed rearward so that the pin slides along the guide groove to reach a rear side of the guide groove. On this occasion, the toilet seat apparatus becomes available by fixing the main body portion by means of the engaging mechanism.

[0035] At the time of cleaning, the upper surface of the toilet bowl can be opened in order by sliding the main body portion by removing the engaging mechanism, by lifting the main body portion by swinging it at the given sliding position, and by rotating the toilet seat and the toilet cover. Further, because the opening portion is closed by mean of the biasing means, the main body portion is not detached from the base portion at the time of cleaning.

[0036] According to the embodiments of the present invention, the main body portion of the toilet seat apparatus is detached from the base portion in accordance with the following order. First, the engaging mechanism is removed, and then the main body portion is pulled forward by sliding the pin along the guide groove. Next, the biasing means is released to open the opening portion,

and the main body portion is further pulled and detached from the base portion by pulling the pin out of the opening portion. Accordingly, the attaching and detaching operations of the main body portion can be performed in a safe manner without lifting or raising the main body portion during the operation in a condition where the base portion is fixed at the toilet bowl.

[0037] With the configuration of the toilet seat apparatus according to the embodiments of the present invention, the main body portion is provided with the pin for inserting into the guide groove provided at the base portion. Further, the pin is detachable from the opening portion. Therefore, the main body portion can be detached from the base portion in a safe manner by means of a simple operation such as moving the main body portion in the backward and forward direction. Further, in a condition where the toilet seat apparatus is provided with the opening and closing means, which allows and restricts the attaching and detaching operations of the main body portion, and the biasing member, which maintains the restriction of the attaching and detaching operations of the main body portion, the attaching and detaching operations of the main body portion can be performed in safe and reliable manner because the main body portion is not detached at the time of normal use and cleaning.

A toilet seat apparatus (1) includes a base portion (4, 40) adapted to be fixed on a toilet bowl (5), a main body portion (2, 20) detachably mounted on the base portion, a toilet seat (6) rotatably supported by the main body portion, a guide groove (43) formed at the base portion and extending in a backward and forward direction of the toilet bowl and having an opening portion (3) at a front side thereof, and a pin (22) provided at the main body portion, the pin being inserted into the guide groove for allowing the main body portion to slide relative to the base portion, rise from the base portion, and to detach from the base portion.

Claims

1. A toilet seat apparatus (1) comprising:

a base portion (4, 40) adapted to be fixed on a toilet bowl (5);
a main body portion (2, 20) detachably mounted on the base portion; and
a toilet seat (6) rotatably supported by the main body portion, **characterized in that** the toilet seat apparatus further comprises:

a guide groove (43) formed at the base portion and extending in a backward and forward direction of the toilet bowl and having an opening portion (3) at a front side thereof; and
a pin (22) provided at the main body portion the pin being inserted into the guide groove for allowing the main body portion to slide relative to the base portion, rise from the base portion, and to detach from the base portion.

2. The toilet seat apparatus according to claim 1, wherein the pin is inserted into the guide groove from the opening portion upon assembling the main body portion relative to the base portion.

3. The toilet seat apparatus according to claim 1, wherein the toilet seat apparatus further comprises opening and closing means (8) for allowing attaching and detaching operations of the main body portion relative to the base portion by opening the opening portion of the guide groove, and for restricting the attaching and detaching operations of the main body portion relative to the base portion by closing the opening portion of the guide groove.

4. The toilet seat apparatus according to claim 3, wherein the opening and closing means includes a movable plate (81) and a biasing means (9) for biasing the movable plate to close the opening portion of the guide groove for restricting the attaching and detaching operations of the main body portion.

5. The toilet seat apparatus according to claim 1, wherein the main body portion includes a washing mechanism (200) therein.

6. The toilet seat apparatus according to claim 1, wherein the toilet seat includes a heated toilet seat.

7. The toilet seat apparatus according to claim 1, wherein the pin includes a substantially elliptical cross section, a major axis of which is wider than a width of the guide groove.

8. The toilet seat apparatus according to claim 1, wherein the toilet seat apparatus further comprises a toilet cover (7) rotatably supported by the main body portion.

9. A method for assembling a toilet seat apparatus, the method comprising the steps of:

arranging a main body portion at a front side of an upper surface of a toilet bowl;
pushing the main body portion rearward of a base portion until a pin reaches a guide groove through an opening portion of the guide groove;
pushing the main body portion rearward of the base portion so that the pin slides along the guide groove to finally reach a closing portion of the guide groove; and
fixing the main body portion to the base portion.

10. The method for assembling the toilet seat apparatus according to claim 9, the method further comprises the steps of fixing the base portion to the toilet bowl and rotatably assembling the toilet seat to the main body portion before arranging the main body portion at the front side of the upper surface of the toilet bowl.

FIG. 1

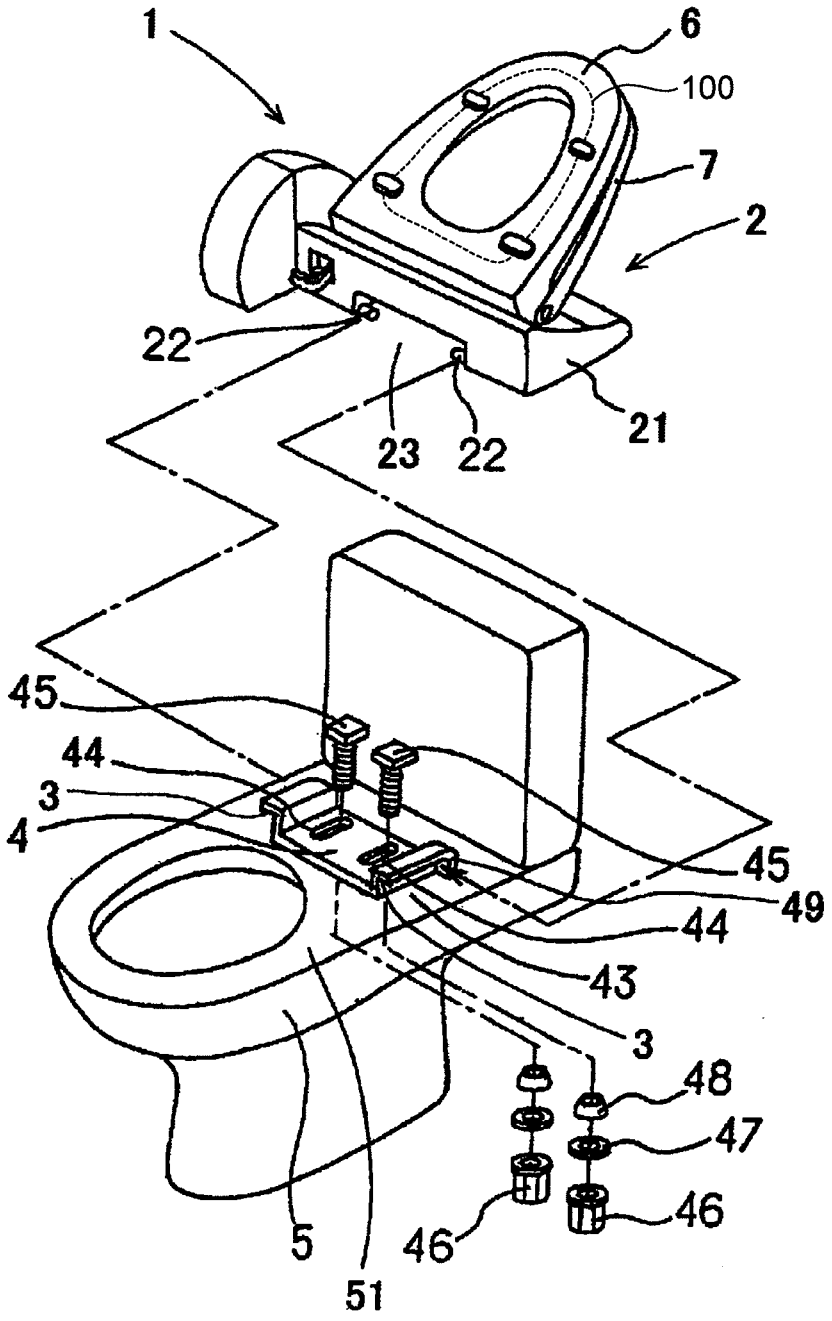

FIG. 2A

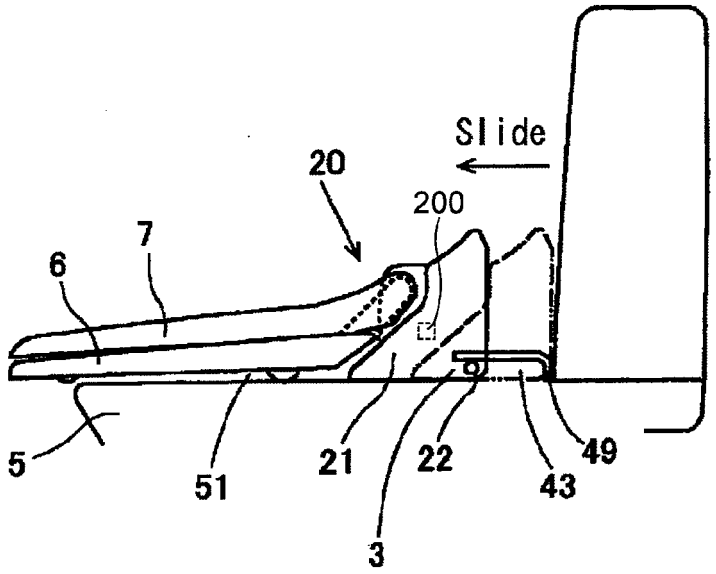
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FIG. 2B

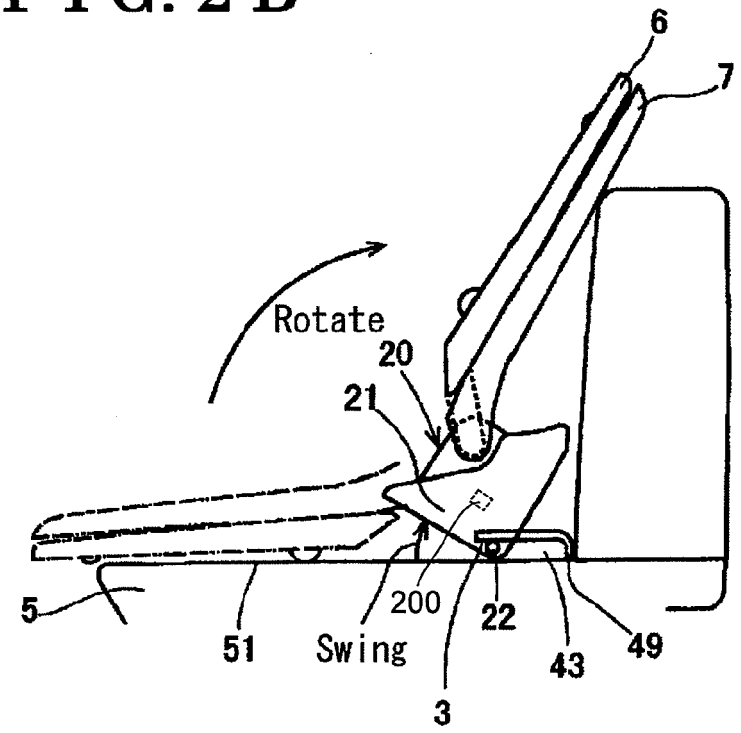
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FIG. 3A

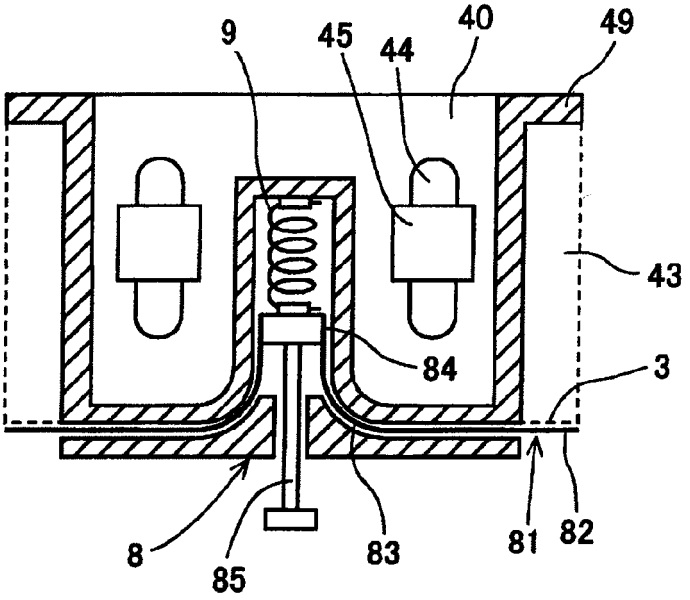
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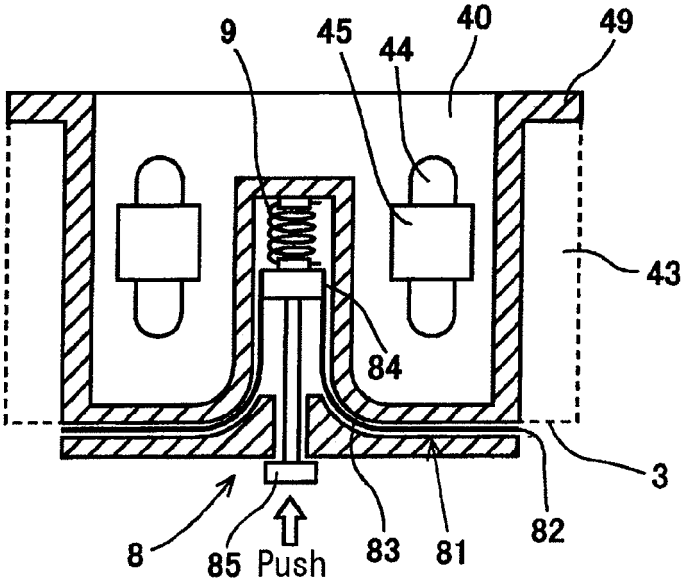
FIG. 3B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