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(57) A sterilizing water dispensing apparatus (100), and a bidet and toilet seat having the same are disclosed. The sterilizing water dispensing apparatus (100) includes: an inlet to which sterilizing water is introduced; a cylindrical vortex production chamber that generates a vortex in the sterilizing water introduced through the inlet; and a dispensing hole disposed at the center of the bottom of the vortex production chamber and dispensing the vortex-produced sterilizing water in the vortex production chamber to an inner wall of the toilet. Because sterilizing water is dispensed in the form of fine particles with a relatively large surface area, the sterilizing water is brought into contact with a larger area of an inner wall of a toilet, so a sterilizing effect can be enhanced with a small quantity of sterilizing water.

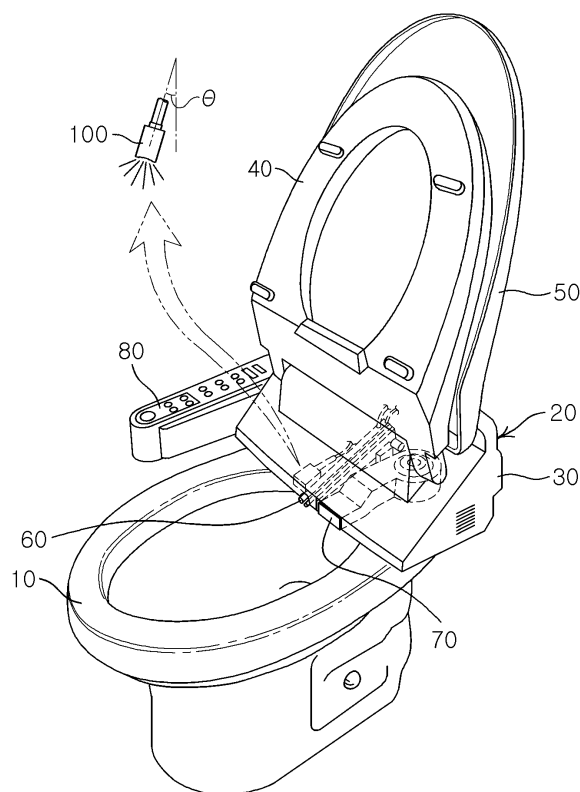


FIG. 1

Description**CROSS-REFERENCE TO RELATED APPLICATIONS**

5 [0001] This application claims the priorities of Korean Patent Applications Nos. 10-2009-0027612 and 10-2009-0083472 filed on March 31, 2009 and September 4, 2009 respectively, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION**Field of the Invention**

10 [0002] The present invention relates to a sterilizing water dispensing apparatus, and a bidet and toilet seat having the same.

Description of the Related Art

15 [0003] A toilet (i.e., a toilet bowl, a chamber pot, etc.) is equipment allowing a user to be seated to have a bowel movement, and recently, a bidet-equipped toilet has been widely used for a sanitary purpose. A bidet is a device for dispensing water to cleanse the private parts of the user after the user relieves himself, having the advantage of keeping the private parts of the user clean through washing without the use of paper.

20 [0004] Commonly, a water tank, a bidet, and a control panel are mounted on the toilet. Upon completion of a bowel movement, when the user presses a lever, water within the toilet is flushed out, along with feces, and the toilet is refilled with water from that contained within the water tank. In addition, when the user operates the bidet by manipulating the control panel, a nozzle installed within a main body of the bidet apparatus moves to a front side of the main body of the bidet apparatus to dispense cleansing water to the private parts of the user.

25 [0005] With the toilet operating in this manner, if the feces within the toilet are not entirely flushed out, the feces may be fixedly attached to an inner wall of the toilet. In addition, because water is always present within the toilet, various microorganisms may inhabit it and multiply, which is undesirable in terms of sanitation. Thus, the user must periodically wash the toilet by applying a sterilization solution or cleaning solution to the interior of the toilet.

SUMMARY OF THE INVENTION

30 [0006] An aspect of the present invention provides a sterilizing water dispensing apparatus capable of sterilizing the entire inner wall of a toilet with a small quantity of sterilizing water, and a bidet and a toilet seat having the same.

35 [0007] According to an aspect of the present invention, there is provided a sterilizing water dispensing apparatus including: an inlet through which sterilizing water is introduced; a cylindrical vortex production chamber that produces a vortex in the sterilizing water introduced through the inlet; and a dispensing hole disposed at the center of the bottom of the vortex production chamber and dispensing the vortex-produced sterilizing water of the vortex production chamber to an inner wall of the toilet.

40 [0008] The sterilizing water in the vortex production chamber may be sprayed in the form of fine particles through the dispensing hole.

45 [0009] The vortex production chamber may include a guide groove extending from a side wall to the interior, and in this case, the guide groove extends toward a position deviating from the center of the vortex production chamber, whereby sterilizing water can be introduced to the interior of the vortex production chamber along the guide groove, producing a vortex rotating about the center of the vortex production chamber.

[0010] The guide groove may be formed such that its width narrows toward the interior from the side wall.

[0011] A plurality of guide grooves may be formed to be symmetrical about the center of the vortex production chamber.

[0012] Sterilizing water may be dispensed through the dispensing hole at a dispensing angle of 100 degrees or greater.

50 [0013] The vortex production chamber may have a height (A) ranging from 0.1 mm to 0.3mm.

[0014] The dispensing hole may have a length (B) ranging from 0.1 mm to 0.3 mm.

[0015] The dispensing hole may have a diameter (C) ranging from 0.1 mm to 1.5 mm.

[0016] The guide groove may have a width (D) ranging from 0.1 mm to 0.7 mm.

[0017] The dispensing hole may be smaller than the inlet.

55 [0018] The pressure of sterilizing water within the vortex production chamber may range 1.2 kg/cm² to 5 kg/cm².

[0019] According to another aspect of the present invention, there is provided a bidet including the sterilizing water dispensing apparatus and a sterilizing water generating apparatus that supplies sterilizing water to the sterilizing water dispensing apparatus.

[0020] The sterilizing water generating apparatus may generate sterilizing water by an electrode method.

[0021] The bidet may further include: a nozzle assembly that dispenses water to the private parts of the user; and a nozzle tip cleaning part that cleans a nozzle tip of the nozzle assembly, wherein the sterilizing water generating apparatus is connected to the sterilizing water dispensing apparatus and the nozzle tip cleaning part, and sterilizing water generated by the sterilizing water generating apparatus is supplied to the sterilizing water dispensing apparatus or to the nozzle tip cleaning part.

[0022] The sterilizing water dispensing apparatus may be connected to a pump, and sterilizing water may be supplied by the pump.

[0023] The pump may include an electric motor, a decelerating gear part connected with the electric motor and having a plurality of gears to decelerate a rotational speed, a plurality of link members having one side coupled with the decelerating gear part and making a joint movement, and a pumping unit connected with another side of the link members and reciprocally moving according to the joint movement of the link member, wherein the pumping unit may supply sterilizing water of the sterilizing water generating apparatus to the sterilizing water dispensing apparatus while making a reciprocal movement.

[0024] A dispensing hole of the sterilizing water dispensing apparatus may be installed to be sloped from a directly downward side to a front side.

[0025] According to another aspect of the present invention, there is provided a toilet seat including: the sterilizing water dispensing apparatus, and the sterilizing water generating apparatus that supplies sterilizing water to the sterilizing water dispensing apparatus.

[0026] The sterilizing water generating apparatus may generate sterilizing water by a solution method.

[0027] The sterilizing water dispensing apparatus may be installed at a rear side of the toilet seat, and a dispensing hole may be installed to be sloped from a directly downward side to a front side.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The above and other aspects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0029] FIG. 1 is a perspective view of a toilet including a sterilizing water dispensing apparatus according to an exemplary embodiment of the present invention;

[0030] FIG. 2 is an exploded perspective view of the sterilizing water dispensing apparatus according to an exemplary embodiment of the present invention;

[0031] FIGs. 3a and 3b are side sectional views of the sterilizing water dispensing apparatus according to an exemplary embodiment of the present invention;

[0032] FIG. 4 is a bottom view of a body part of the sterilizing water dispensing apparatus according to an exemplary embodiment of the present invention;

[0033] FIG. 5 illustrates the configuration of a water supply system of the sterilizing water dispensing apparatus according to an exemplary embodiment of the present invention;

[0034] FIG. 6 illustrates a different type of pump according to an exemplary embodiment of the present invention; and

[0035] FIG. 7 illustrates dispensing of sterilizing water to an inner wall of a toilet by the sterilizing water dispensing apparatus according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0036] Exemplary embodiments of the present invention will now be described in detail with reference to the accompanying drawings. The invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. In the drawings, the shapes and dimensions may be exaggerated for clarity, and the same reference numerals will be used throughout to designate the same or like components.

[0037] FIG. 1 is a perspective view of a toilet 10 including a sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention.

[0038] With reference to FIG. 1, a bidet 20 is installed at an upper portion of the toilet 10. The bidet 20 includes a main body 30 of the bidet apparatus, and a toilet seat 40 and a toilet cover 50 are hinge-coupled to the main body 30 of the bidet apparatus such that they are rotatable. The toilet seat 40 has an annular shape to allow a user to be seated to have a bowel movement, and a heater may be disposed within the toilet seat 40 to heat the toilet seat 40 to have a temperature comfortable for a user. The toilet cover 50 is formed to have a shape corresponding to the toilet seat 40 in order to close the exposed portion of the annular toilet seat 40 when the toilet 10 is not in use.

[0039] A nozzle assembly 60 and a drying apparatus 70 are installed at an inner side of the main body 30 of the bidet

apparatus. The nozzle assembly 60 includes an anus cleaning nozzle and a for-women bidet nozzle. The cleaning nozzle and the bidet nozzle are installed to be movable in a forward direction from the main body 30 of the bidet apparatus. A nozzle tip having a discharge hole is mounted at a front end portion of each of the cleaning nozzle and the bidet nozzle to dispense flushing water.

[0040] The drying apparatus 70 includes a blow fan, a blow duct, and a heating unit, and discharges heated air in a forward direction from the main body 30 of the bidet apparatus.

[0041] A control panel 80 is installed at one side of the main body 30 of the bidet apparatus, so the user can control the operation of the bidet 20 by using the control panel 80. Namely, after having a bowel movement, the user may press a cleaning button or a bidet button. The cleaning nozzle or the bidet nozzle then moves forward to dispense water to the private parts of the user, and after cleaning, the user may press a drying button to dispense heated air to remove moisture from the private parts of the user.

[0042] The sterilizing water dispensing apparatus 100 is installed at a front portion of the main body 30 of the bidet apparatus. The sterilizing water dispensing apparatus 100 receives sterilizing water from a sterilizing water generating apparatus, and dispenses the sterilizing water to an inner wall of the toilet 10 to sterilize the inner wall of the toilet 10. The sterilizing water dispensing apparatus 100 is preferably mounted at the main body 30 of the bidet apparatus such that a dispensing hole is sloped from a direct downward direction toward a front side of the toilet 10. By making the dispensing hole positioned at a rear side of the toilet 10 point towards the front side, sterilizing water can be dispensed evenly on the entire inner wall of the toilet 10. In this respect, in consideration of the general size of the toilet 10 and mounting position of the sterilizing water dispensing apparatus 100, the dispensing hole is preferably installed to be sloped at more than 20 degrees in a forward direction. Alternatively, the sterilizing water dispensing apparatus 100 may be installed to be movable in a forward direction from the main body 30 of the bidet apparatus like the bidet nozzle, and in this case, the dispensing hole may not need to be installed to be sloped toward the front side. Meanwhile, the sterilizing water dispensing apparatus 100 may execute a dispensing operation by means of the control panel 80. Namely, a toilet sterilization button may be provided to the control panel 80, so that when the user presses the toilet sterilization button, the sterilizing water dispensing apparatus 100 can dispense sterilizing water.

[0043] FIG. 2 is an exploded perspective view of the sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention, FIGs. 3a and 3b are side sectional views of the sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention, and FIG. 4 is a bottom view of a body part of the sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention.

[0044] With reference to FIGs. 2 to 4, the sterilizing water dispensing apparatus 100 includes a body part 120 and a nozzle part 140.

[0045] The body part 120 includes a hollow part 121 through which sterilizing water can flow, an inlet 122 formed at an upper end thereof, and an outlet 123 formed at a lower portion thereof. Sterilizing water which has introduced through the inlet 122 formed at the upper end of the body part 120 flows along the hollow part 121 and then is discharged through the outlet 123.

[0046] The hollow part 121 extends in a lengthwise direction from the upper portion of the body part 120 to the lower portion of the body part 120, and the outlet 123 extends in a radial direction from the lower portion of the body part 120 so as to be fluid-connected with the hollow part 121. Accordingly, the sterilizing water flows from the upper portion to the lower portion of the hollow part 121 and then is discharged in the radial direction. A plurality of outlets 123 may be formed along the lower circumference of the body part 120, and in the present exemplary embodiment illustrated in the drawings, two outlets 123 are disposed in a facing manner.

[0047] A protruding part 124 is formed at a lower side of the outlet 123, namely, at the lowermost portion of the body part 120. The protruding part 124 has a diameter larger than the part the outlet 123 is formed on. The protruding part 124 in a cylindrical shape has a recessed bottom surface to form a vortex production chamber 130 together with the nozzle part 140. A guide groove 125 is formed at a side wall of the protruding part 124 to allow sterilizing water which has been discharged through the outlet 123 to be introduced therein. The guide groove 125, starting from the side wall of the protruding part 124, extends to the interior of the protruding part 124, and is formed to point toward a position deviating from the center of the protruding part 124. This configuration aims to providing a rotational force to the sterilizing water introduced along the guide groove 125 to thus produce a vortex. The guide groove 125 is formed such that its width narrows toward the interior from the side wall. Accordingly, the sterilizing water introduced into the vortex production chamber 130 along the guide groove 125 can flow at a high pressure and at high speed to produce a strong vortex. A plurality of guide grooves 125 may be formed, and in the present exemplary embodiment illustrated in the drawings, two guide grooves 125 are formed in a facing manner.

[0048] A bracket 126 is installed on the body part 120 and coupled to a front portion of the main body 30 of the bidet apparatus with a screw or the like.

[0049] The nozzle part 140, having a cylindrical shape, is a member coupled to the lower portion of the body part 120. A dispensing hole 141 is formed at the center of the bottom of the nozzle part 140. An inner side of the bottom of the

nozzle part 140 forms the vortex production chamber 130 together with the recessed portion of the protruding part 124. An outer portion of the bottom of the nozzle part 140 may be formed to be tapered such that the thickness increases as it goes away from the dispensing hole 141. The reason for forming the tapered outer portion of bottom of the nozzle part 140 is due to the fact that the length (B) of the dispensing hole 141 needs to be short in order to increase a dispensing angle for dispensing sterilizing water (to be described) and, in this case, if the thickness of the entire bottom of the nozzle part 140 is as small as to be equal to the length (B) of the dispensing hole 141, the rigidity of the bottom of the nozzle part 140 weakens, so the length (B) of the dispensing hole 141 remains short while the thickness of the outer portion of the bottom of the nozzle part 140 increases toward the outer side.

[0050] The operation method of the sterilizing water dispensing apparatus 100 configured thusly will now be described.

[0051] Sterilizing water introduced through the inlet 122 at the upper end of the body part 120 passes along the hollow part 121 and is then discharged in the radial direction of the body part 120 through the outlet 123 provided at the lower portion of the body part 120. The sterilizing water which has been discharged through the outlet 123 is introduced into the vortex production chamber 130 along the guide grooves 125 of the protruding part 124 formed at the lowermost portion of the body part 120. The guide groove 125 is formed to extend in a direction other than towards the center of the vortex production chamber 130 from the side wall of the vortex production chamber 130, so the sterilizing water introduced along the guide groove 125 forms a rotating vortex centered on the center of the vortex production chamber 130. In particular, because the width of the guide groove 125 is reduced toward the inner side, the sterilizing water flowing along the guide grooves 125 can flow at a high pressure and at a high speed to form a strong vortex. In addition, because the plurality of guide grooves 125 are disposed to face each other, vortices are produced from two places, complementing each other. The sterilizing water with the vortices produced in the vortex production chamber 130 is externally discharged through the dispensing hole 141 disposed at the center of the bottom of the nozzle part 140. At this time, the externally discharged sterilizing water, namely, the vortex-formed sterilizing water, passes through the dispensing hole 141 at a high pressure, to become fine particles being sprayed to the outer side.

[0052] In this manner, when the sterilizing water is sprayed in the form of fine particles with a large surface area, the sterilizing water can be brought into contact with a larger area of the inner wall of the toilet, having the advantage of enhancing the sterilizing effect even with the small quantity of sterilizing water.

[0053] Meanwhile, in order to spray the sterilizing water to the entire surface of the inner wall of the toilet 10 by using the single sterilizing water dispensing apparatus 100, it is required to properly set a dispensing angle and a dispensing speed of the sterilizing water dispensed from the dispensing hole 141. Namely, as the dispensing angle widens and the dispensing speed becomes high, sterilizing water can be dispensed widely, and if the dispensing angle is small, the dispensing range is reduced to perform partial dispensing, while if the dispensing speed is low, the dispensed sterilizing water could not extend for a desirable distance (i.e., it could not reach sufficiently far).

[0054] Thus, the dispensing angle and dispensing speed of sterilizing water needs to be increased so that the sterilizing water can be dispensed to the entire surface of the inner wall of the toilet 10, for which the sterilizing water dispensing apparatus 100 must be thus optimally designed. The inventors of the present invention found through an experimentation that the height (A) of the vortex production chamber 130, the length (B) of the dispensing hole 141, the diameter (C) of the dispensing hole 141, and the width (D) of the guide groove 125 are parameters affecting the dispensing angle and the dispensing speed.

[0055] In order to discover the influence of these parameters on the dispensing angle and the dispensing speed, the inventors conducted CFD (Computational Fluid Dynamics) research with respect to diverse parameter values, the results of which are as follows.

[0056]

Table

Case	A (mm)	B (mm)	C (mm)	D (mm)	Dispensing angle (degree)	Dispensing speed (m/s)
1	0.2	0.2	1	0.5	140	5.562
2	0.2	0.2	1.2	0.5	120	5.128
3	0.3	0.2	1	0.5	100	4.483
4	0.3	0.6	1	0.5	90	4.163
5	0.2	0.6	1.2	0.5	70	3.213
6	0.2	0.6	1	0.5	-	2.110

[0057] With reference to the above table, the first case shows the largest dispensing angle and the highest dispensing speed. In the second case, when the diameter (C) of the dispensing hole 141 was increased, the dispensing angle was reduced and the dispensing speed was lowered. In the third case, when the height (A) of the vortex production chamber 130 was increased, the dispensing angle was reduced and the dispensing speed was lowered. In the fourth to sixth cases, when the length (B) of the dispensing hole 141 was increased, the dispensing angle was further reduced and the dispensing speed was further lowered. Consequently, it should be noted that as the parameters A, B, and C are reduced, the dispensing angle and the dispensing speed are increased, establishing inverse proportional relationships.

[0058] Based on the results that the dispensing angle and the dispensing speed are inverse-proportional to the parameter values, in order to determine the upper limits of the parameters with which the dispensing angle and the dispensing speed can be larger than a certain value (e.g., the dispensing angle of at least 100 degrees), the inventor of the present invention conducted actual experimentation, the results of which are shown in the table below:

[0059]

Table

	A (mm)	B (mm)	C (mm)	D (mm)	Dispensing angle	Dispensing range
1	0.1	0.1	1	0.5	140 degrees or greater	99% or greater
2	0.2	0.2	1	0.5	100 degrees or greater	90% or greater
3	0.3	0.2	1	0.5	100 degrees or greater	90% or greater
4	0.5	0.2	1	0.5	20 degrees or smaller	Smaller than 10%
5	0.5	0.1	1.2	0.5	20 degrees or smaller	Smaller than 10%
6	0.2	0.3	1	0.5	100 degrees or greater	90% or greater
7	0.2	0.5	1	0.5	20 degrees of smaller	Smaller than 10%
8	0.2	1	1	0.5	Abnormal water stream	Smaller than 10%
9	0.5	1	1	0.5	Abnormal water stream	Smaller than 10%
10	0.2	1	1.2	0.5	Abnormal water stream	Smaller than 10%
11	0.5	1	1.2	0.5	20 degrees or smaller	Smaller than 10%
12	0.2	0.2	1.2	0.5	100 degrees or greater	90% or greater
13	0.2	0.2	1.5	0.5	100 degrees or greater	90% or greater
14	0.2	0.2	1.7	0.5	20 degrees or smaller	Smaller than 10%
15	0.2	0.2	1	0.7	100 degrees or greater	90% or greater
16	0.2	0.2	1	1	20 degrees or smaller	0%
17	0.2	0.2	1.2	1	20 degrees or smaller	Smaller than 10%
18	0.5	0.2	1	1	20 degrees or smaller	0%
19	0.5	0.1	1.2	1	20 degrees or smaller	Smaller than 10%
20	0.2	1	1.2	1	20 degrees or smaller	Smaller than 10%

[0060] With reference to the second to fourth cases in the above table, it is noted that, when B, C, and D are the same, the dispensing angle is 100 degrees or greater and the dispensing range is 90% or greater of the inner wall of the toilet, until when A is 0.3 mm or smaller, while if A is 0.5 mm, the dispensing angle is 20 degrees or lower and the dispensing range is smaller than 10%. Thus, in order to make the dispensing angle 100 degrees or greater and the dispensing range 90% or greater, A must be 0.3 mm or smaller.

[0061] With reference to the second, sixth to eighth cases in the above table, it is noted that, when A, C, and D are the same, the dispensing angle is 100 degrees or greater and the dispensing range is 90% or greater of the inner wall of the toilet until when B is 0.3 mm or smaller, while if B is 0.5 mm or greater, the dispensing angle is 20 degrees or lower and the dispensing range is smaller than 10%. Thus, in order to make the dispensing angle 100 degrees or greater and the dispensing range 90% or greater, B must be 0.3 mm or smaller.

[0062] With reference to the second and 12th to 14th cases in the above table, it is noted that, when A, B, and D are the same, the dispensing angle is 100 degrees or greater and the dispensing range is 90% or greater of the inner wall

of the toilet until when C is 1.5 mm or smaller, while if C is 1.7 mm, the dispensing angle is 20 degrees or lower and the dispensing range is smaller than 10%. Thus, in order to make the dispensing angle 100 degrees or greater and the dispensing range 90% or greater, C must be 1.5 mm or smaller.

[0063] With reference to the second, 15th and 16th cases in the above Table, it is noted that, when A, B, and C are the same, the dispensing angle is 100 degrees or greater and the dispensing range is 90% or greater of the inner wall of the toilet until when D is 0.7 mm or smaller, while if D is 1 mm, the dispensing angle is 20 degrees or lower and the dispensing range is smaller than 10%. Thus, in order to make the dispensing angle 100 degrees or greater and the dispensing range 90% or greater, D must be 0.7 mm or smaller.

[0064] With reference to the first case in the above table, it is noted that, when the parameters of A, B, C, and D are in the smallest range, the dispensing angle is 140 degrees or greater and the dispensing range is 99% of the inner wall of the toilet. However, in the fifth, ninth to 11th, and 17th to 20th cases, in which at least one of the parameters of A, B, C, and D exceeds the range, the dispensing angle is 20 degrees or smaller and the dispensing range is smaller than 10% of the inner wall of the toilet. For reference, the denotation of an abnormal water stream refers to a case that water is twisted to be dispensed, having a very small dispensing range.

[0065] When the above results are put together, in order to obtain the dispensing angle of 100 degrees or greater and the dispensing range of 90% or greater, the height (A) of the vortex production chamber 130 must be 0.3 mm or smaller, the length (B) of the dispensing hole 141 must be 0.3 mm or smaller, the diameter (C) of the dispensing hole 141 must be 1.5 mm or smaller, and the width (D) of the guide groove 125 must be 0.7 mm or smaller.

[0066] Meanwhile, the dispensing angle can be increased by reducing the parameters, but in consideration of molding limitations and costs, the fabrication of a dispensing hole with the parameters A, B, C, and D of 0.1 mm or smaller is not easy, and if realized, there is not a great deal of difference in its effects.

[0067] In addition, the above experimental results can be obtained when the pressure of sterilizing water within the vortex production chamber 130 is 1.2 kg/cm² or greater. That is, such large dispensing angle and dispensing range as in the experimental results cannot be obtained at a lower pressure. In order to maintain the pressure of the sterilizing water within the vortex production chamber 130 at a certain level or greater, preferably, the size of the dispensing hole 141 is designed to be smaller than the inlet 122. In this case, however, sterilizing water having an excessively high pressure would lead to damage to the components, so the pressure of the sterilizing water preferably does not exceed 5 kg/cm².

[0068] FIG. 5 illustrates the configuration of a water supply system of the sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention.

[0069] With reference to FIG. 5, the water supply system is configured to distribute source water to each element through a flow path control apparatus 300. The source water may be supplied by a water pipe or a water supply tank 400.

[0070] When the user executes cleaning or the bidet function, the source water is supplied to the cleaning nozzle 62 or the bidet nozzle 64, and flush water is dispensed through the nozzle.

[0071] When the user executes a nozzle tip cleaning function, the source water is supplied to the sterilizing water generating apparatus 200, in which the source water becomes sterilizing water. The sterilizing water is supplied to a nozzle tip cleaning part 66. The sterilizing water of the nozzle tip cleaning part 66 is applied to the nozzle tip, and the nozzle tip is sterilized.

[0072] When the user executes a toilet cleaning function, the source water is supplied to the sterilizing water generating apparatus 200, in which the source water becomes sterilizing water. When a desired quantity of sterilized water is generated with the lapse of a certain period of time, a pump 240 connected with the sterilizing water generating apparatus 200 operates to allow the sterilizing water to be introduced into the sterilizing water dispensing apparatus 100. The sterilizing water introduced into the sterilizing water dispensing apparatus 100 is dispensed to the inner wall of the toilet 10, sterilizing the toilet 10. The process of dispensing the sterilizing water in the spray form by the sterilizing water dispensing apparatus 100 is as described above.

[0073] When the nozzle tip is to be cleaned, a small quantity of sterilizing water is simply allowed to flow to the nozzle tip under the pressure of the source water without using a pump, but when the toilet is to be sterilized, the sterilizing water must be sprayed across the entire inner wall of the toilet, so a pump is driven to spray the sterilizing water. In this case, however, as stated above, the sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention sprays the sterilizing water in the form of fine particles, only a small quantity of sterilizing water (e.g., about 50 ml of sterilizing water) is required to sterilize the entire inner wall of the toilet. Thus, the use of a low capacity pump is sufficient and, for example, a low-noise high-lift diaphragm type pump may be employed.

[0074] FIG. 6 illustrates a different type of pump 240 according to an exemplary embodiment of the present invention. With reference to FIG. 6, the pump 240 includes a deceleration gear part 242 coupled to an electric motor 241 and having a plurality of gears to decelerate a rotational speed of the electric motor 241, and a plurality of link members 243 having one side coupled to the deceleration gear part 242 and make a joint movement. The pump 240 further includes a pumping unit 244 provided at the other side of the link member 243 and making a reciprocal movement according to the joint movement of the link member 243. The pumping unit 244 instantly pumps sterilizing water from the sterilizing

water generating apparatus 200 while making the reciprocal movement, and supplies it to the sterilizing water dispensing apparatus 100. In this manner, when the sterilizing water is supplied by instantly applying pressure to the sterilizing water dispensing apparatus 100, the sterilizing water which has passed through the sterilizing water dispensing apparatus 100 can be sprayed as particles in a fine size through the dispensing hole 141.

[0075] The sterilizing water generating apparatus 200 may use an electrode-type module that generates a sterilization material (mixed oxide: MO) from water itself by using an electric force and a ruthenium oxide catalyst electrode. The generation of sterilizing water according to the electrode method is a known art, so a detailed description thereof will be omitted.

[0076] A reactive material adding unit 220 may be connected to an inflow side of the sterilizing water generating apparatus 200. The reactive material adding unit 220 may add a reactive material to water introduced into the sterilizing water generating apparatus 200 to increase the amount of a sterilizing material generated in the sterilizing water generating apparatus 200. Solid NaCl may be used as the reactive material.

[0077] The reactive material is accommodated within the reactive material adding unit 220, mixed with water introduced to the interior of the reactive material adding unit 220, and then introduced to the sterilizing water generating apparatus 200. The sterilizing water generating apparatus 200 applies electricity to the NaCl-mixed water to generate HOCl⁻ or OCl⁻ ions, a sterilizing material. Besides NaCl, chlorine-based material, silver oxide, iodine-based material, and the like, may be introduced into the sterilizing water generating apparatus 200.

[0078] FIG. 7 illustrates the dispensing of sterilizing water to the inner wall of the toilet by the sterilizing water dispensing apparatus 100 according to an exemplary embodiment of the present invention. As shown in FIG. 7, the sterilizing water dispensing apparatus 100 attached to the front portion of the main body 30 of the bidet apparatus sprays sterilizing water at a wide dispensing angle to apply the sterilizing water to the entire surface of the inner wall of the toilet 10.

[0079] Meanwhile, in the exemplary embodiment as described above, the sterilizing water dispensing apparatus 100 and the sterilizing water generating apparatus 200 are installed at the bidet 20, but without being limited thereto, they may be installed at the toilet seat 40 and used. That is, the sterilizing water dispensing apparatus 100 and the sterilizing water generating apparatus 200 may be installed at a rear portion of the toilet seat 40, and likewise as in the case where they are installed at the bidet 20, preferably, the dispensing hole 141 is installed to be sloped forwardly at 20 degrees or greater from the direct downward direction. In addition, because electricity is not generally supplied to toilet seat 40, the sterilizing water generating apparatus 200 that generates sterilizing water according to a solution method.

[0080] A product manufactured by combining the sterilizing water dispensing apparatus to a toilet seat can be advantageously used for those users who want a toilet sterilization function although they do not use a bidet.

[0081] As set forth above, according to exemplary embodiments of the invention, because sterilizing water is dispensed in the form of fine particles with a relatively large surface area, the sterilizing water is brought into contact with a larger area of an inner wall of a toilet, so a sterilizing effect can be enhanced with a small quantity of sterilizing water.

[0082] In addition, because sterilizing water can be dispensed to the entire surface of the inner wall of the toilet with a single sterilizing water dispensing apparatus by increasing a dispensing angle and dispensing speed of sterilizing water, the configuration can be simple and the cost can be reduced.

[0083] While the present invention has been shown and described in connection with the exemplary embodiments, it will be apparent to those skilled in the art that modifications and variations can be made without departing from the spirit and scope of the invention as defined by the appended claims.

Claims

1. A sterilizing water dispensing apparatus comprising:

an inlet through which sterilizing water is introduced;
a cylindrical vortex production chamber that produces a vortex in the sterilizing water introduced through the inlet; and
a dispensing hole disposed at the center of the bottom of the vortex production chamber and dispensing the vortex-produced sterilizing water of the vortex production chamber to an inner wall of the toilet.

2. The apparatus of claim 1, wherein the sterilizing water in the vortex production chamber is sprayed in the form of fine particles through the dispensing hole.

3. The apparatus of claim 1, wherein the vortex production chamber comprises a guide groove extending from a side wall to the interior, the guide groove extending toward a position deviating from the center of the vortex production chamber, whereby sterilizing water is introduced to the interior of the vortex production chamber along the guide groove, producing a vortex rotating about the center of the vortex production chamber.

4. The apparatus of claim 3, wherein the guide groove is formed such that its width narrows toward the interior from the side wall.
- 5 5. The apparatus of claim 3, wherein a plurality of guide grooves are formed to be symmetrical about the center of the vortex production chamber.
6. The apparatus of claim 1, wherein sterilizing water is dispensed through the dispensing hole at a dispensing angle of 100 degrees or greater.
- 10 7. The apparatus of claim 1, wherein the vortex production chamber has a height ranging from 0.1 mm to 0.3mm.
8. The apparatus of claim 1, wherein the dispensing hole has a length ranging from 0.1 mm to 0.3 mm.
9. The apparatus of claim 1, wherein the dispensing hole has a diameter ranging from 0.1 mm to 1.5 mm.
- 15 10. The apparatus of claim 3, wherein the guide groove has a width ranging from 0.1 mm to 0.7 mm.
11. The apparatus of claim 1, wherein the dispensing hole is smaller than the inlet.
- 20 12. The apparatus of claim 11, wherein the pressure of sterilizing water within the vortex production chamber ranges 1.2 kg/cm² to 5 kg/cm².
13. A bidet comprising:
25 the sterilizing water dispensing apparatus described in claim 1; and
a sterilizing water generating apparatus that supplies sterilizing water to the sterilizing water dispensing apparatus.
- 30 14. The bidet of claim 13, wherein the sterilizing water generating apparatus generates sterilizing water by an electrode method.
15. The bidet of claim 13, further comprising:
35 a nozzle assembly that dispenses water to the private parts of the user; and
a nozzle tip cleaning part that cleans a nozzle tip of the nozzle assembly,
wherein the sterilizing water generating apparatus is connected to the sterilizing water dispensing apparatus and the nozzle tip cleaning part, and sterilizing water generated by the sterilizing water generating apparatus is supplied to the sterilizing water dispensing apparatus or to the nozzle tip cleaning part.
- 40 16. The bidet of claim 15, wherein the sterilizing water dispensing apparatus is connected to a pump, and sterilizing water is supplied by the pump.
17. The bidet of claim 16, wherein the pump comprises:
45 an electric motor;
a decelerating gear part connected with the electric motor and having a plurality of gears to decelerate a rotational speed;
a plurality of link members having one side coupled with the decelerating gear part and making a joint movement; and
50 a pumping unit connected with another side of the link members and reciprocally moving according to the joint movement of the link member,
wherein the pumping unit supplies sterilizing water of the sterilizing water generating apparatus to the sterilizing water dispensing apparatus while making a reciprocal movement.
- 55 18. The bidet of claim 13, wherein a dispensing hole of the sterilizing water dispensing apparatus is installed to be sloped from a directly downward side to a front side.
19. A toilet seat comprising:

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the sterilizing water dispensing apparatus described in claim 1; and
the sterilizing water generating apparatus that supplies sterilizing water to the sterilizing water dispensing apparatus.

5 **20.** The toilet seat of claim 19, wherein the sterilizing water generating apparatus generates sterilizing water by a solution method.

10 **21.** The toilet seat of claim 19, wherein the sterilizing water dispensing apparatus is installed at a rear side of the toilet seat, and a dispensing hole is installed to be sloped from a directly downward side to a front side.

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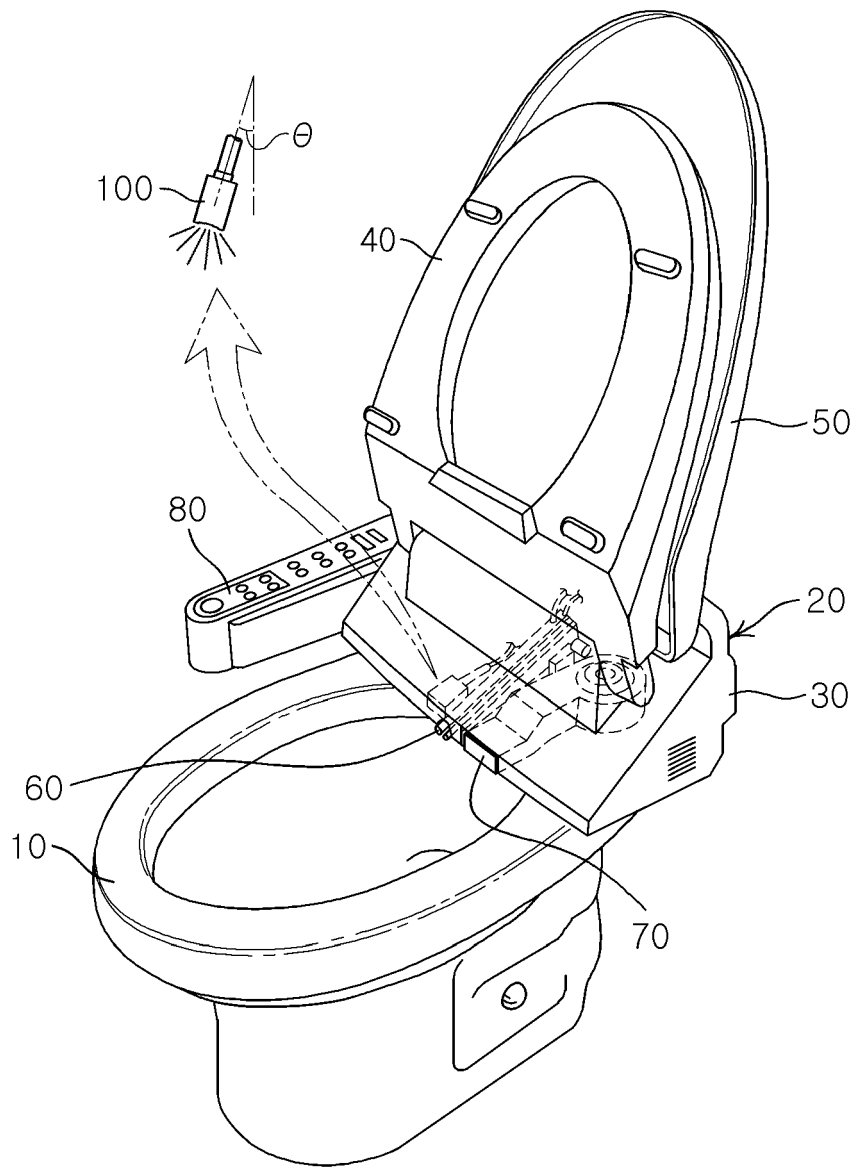


FIG. 1

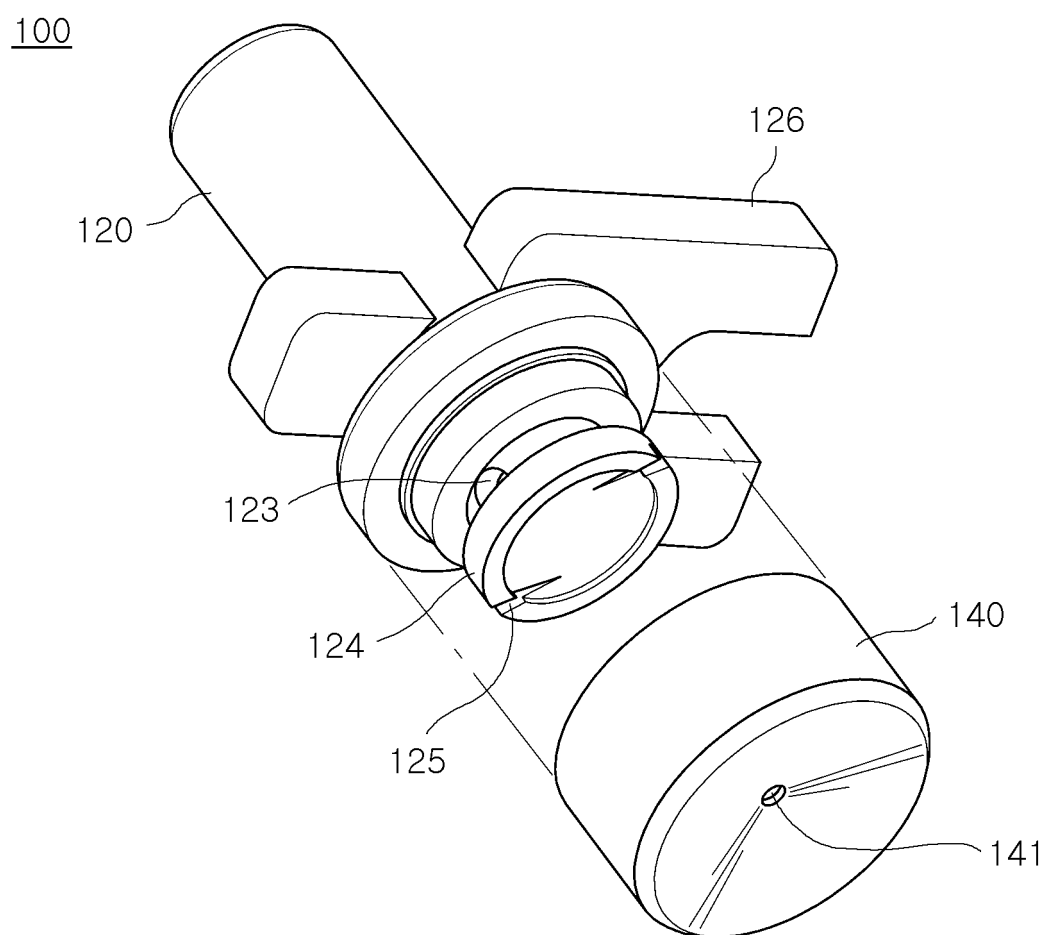


FIG. 2

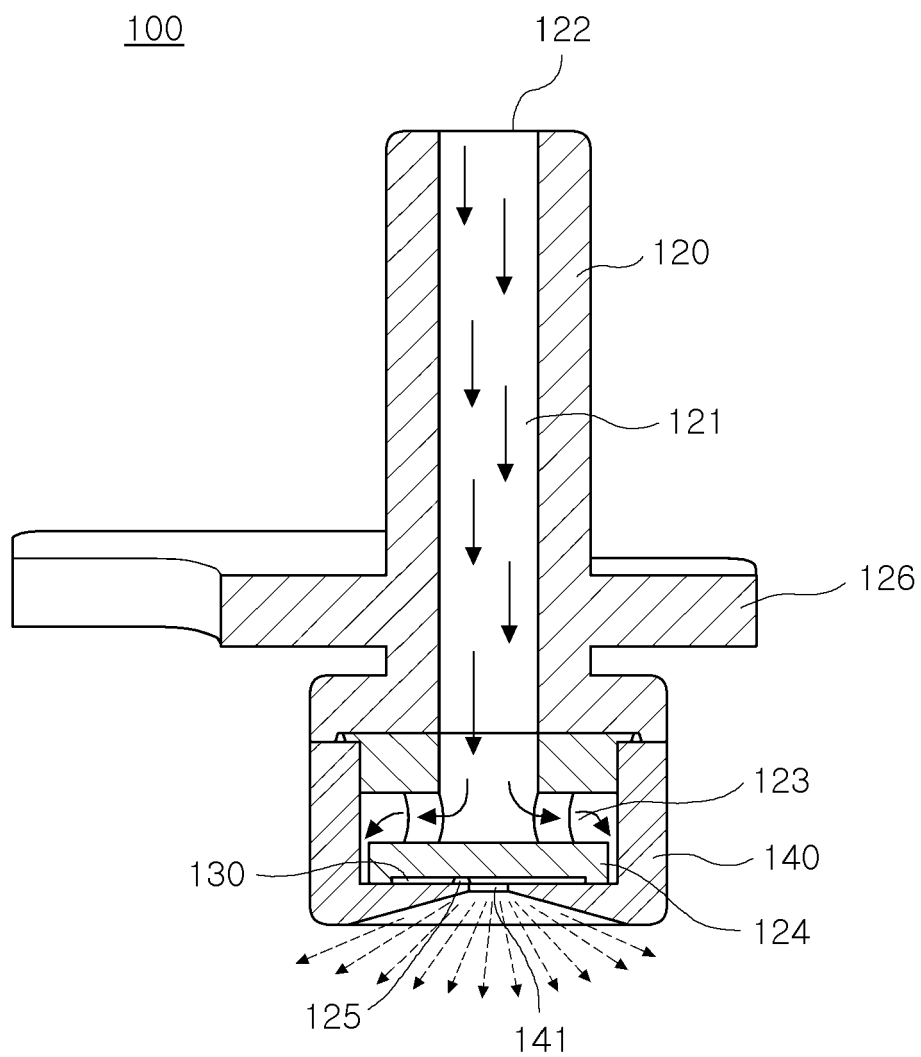


FIG. 3a

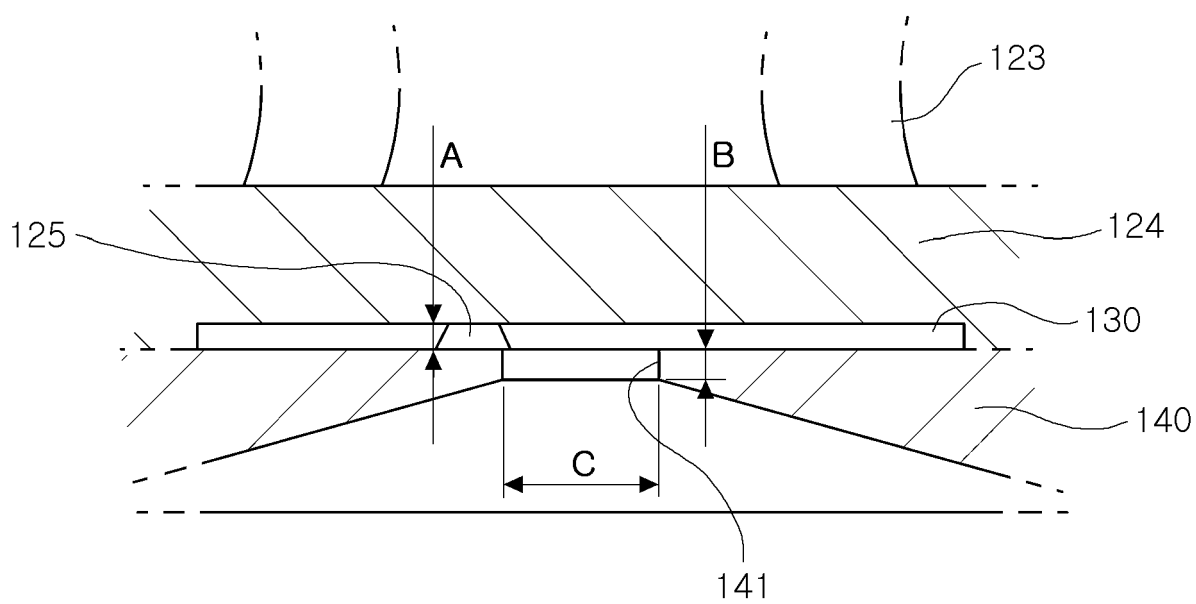


FIG. 3b

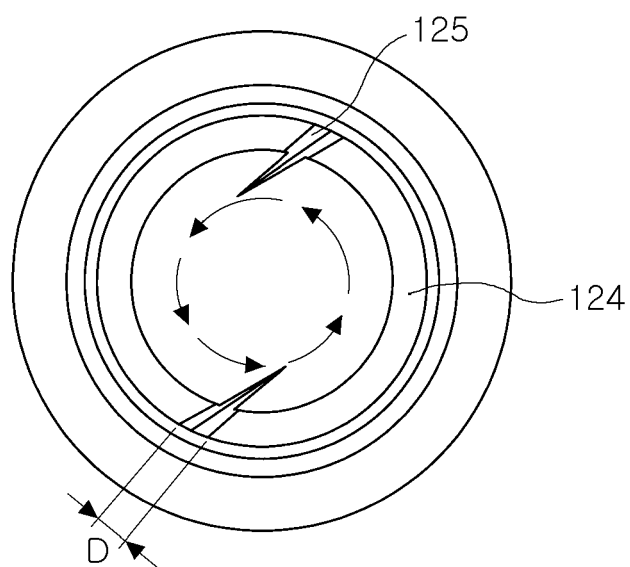


FIG. 4

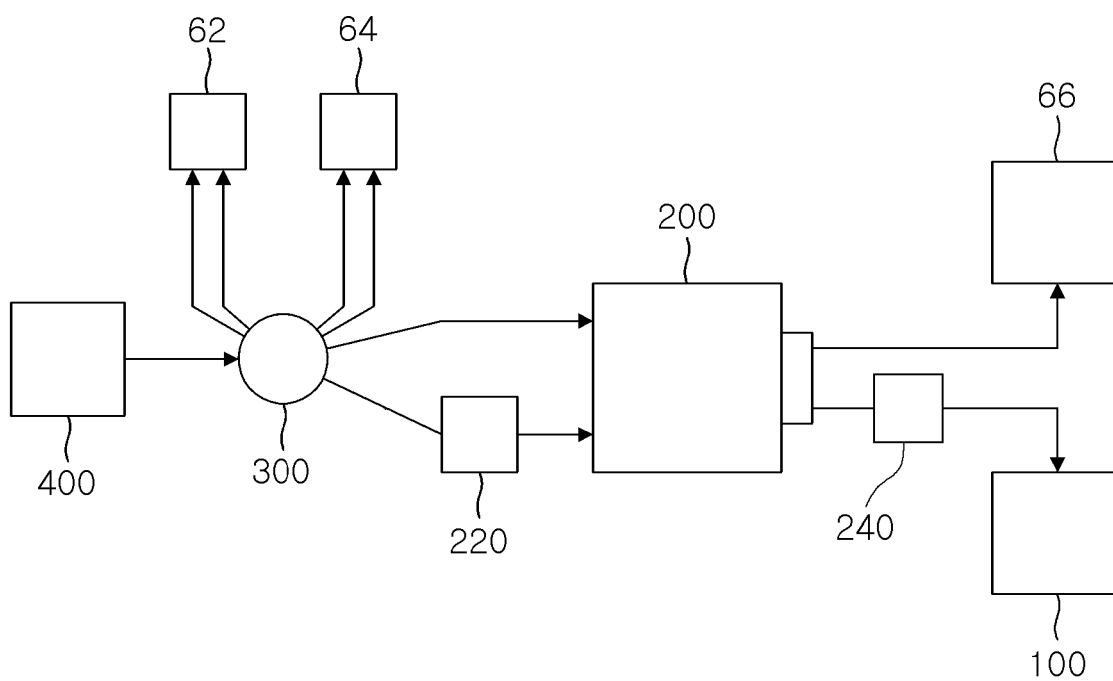


FIG. 5

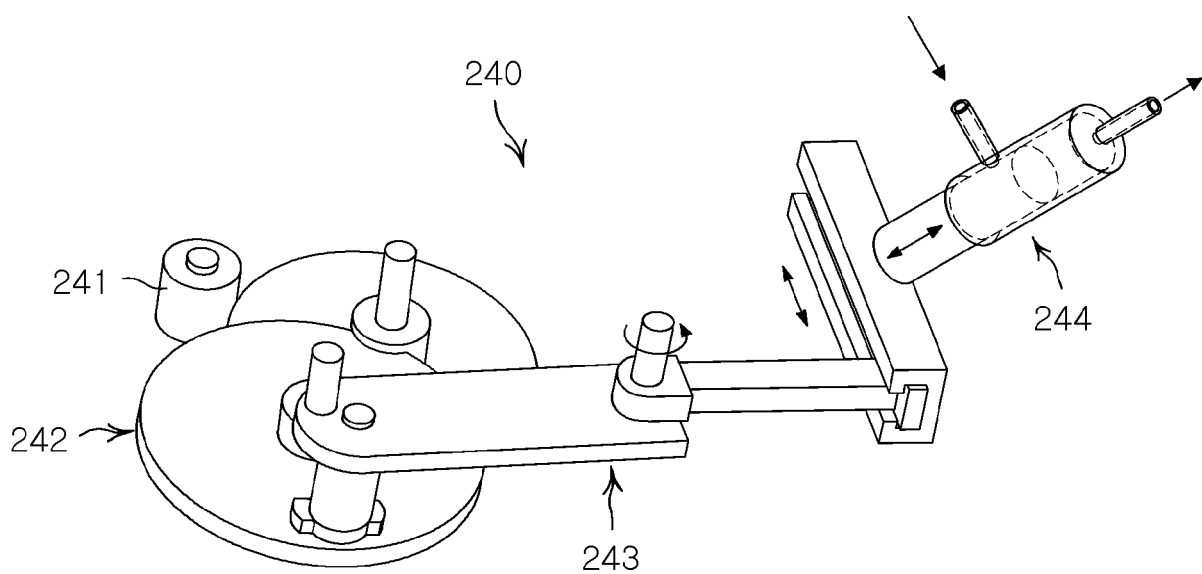


FIG. 6

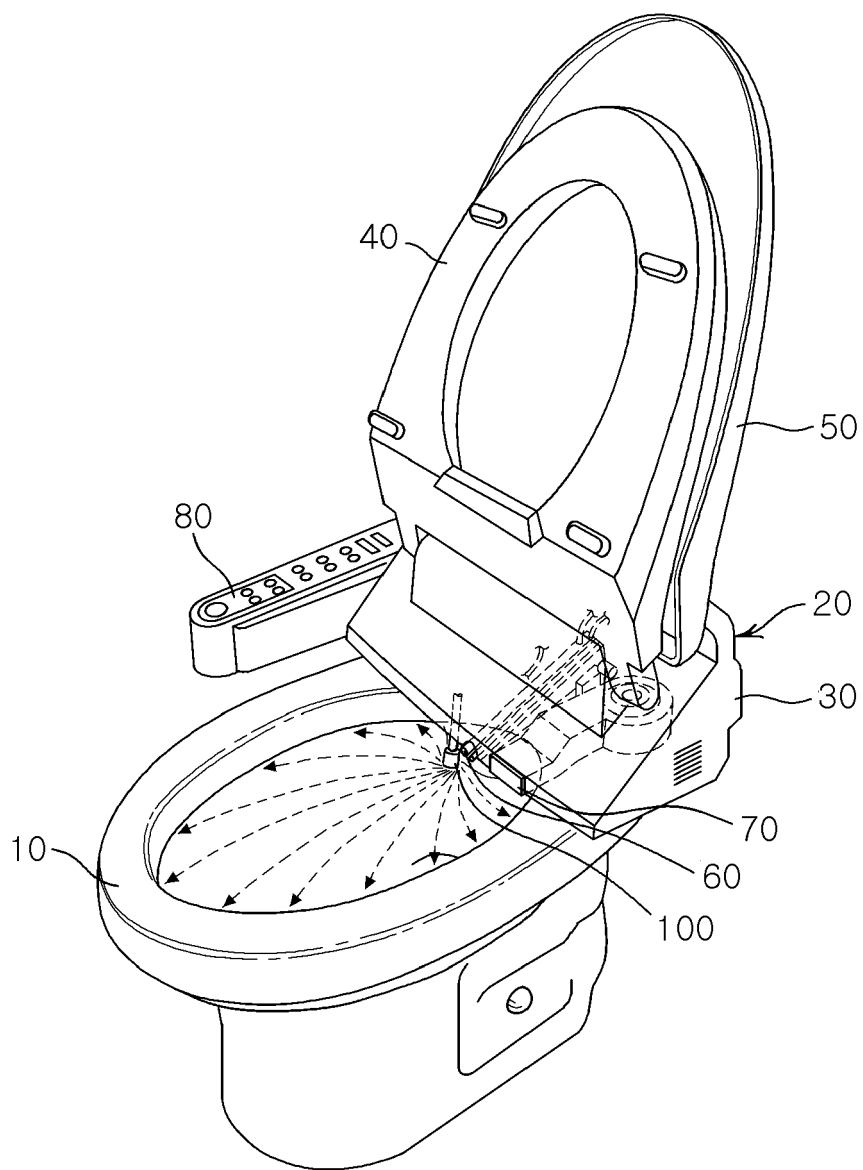


FIG. 7



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Application Number
EP 09 17 1575

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Place of search Munich		Date of completion of the search 30 June 2010	Examiner Geisenhofer, Michael
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