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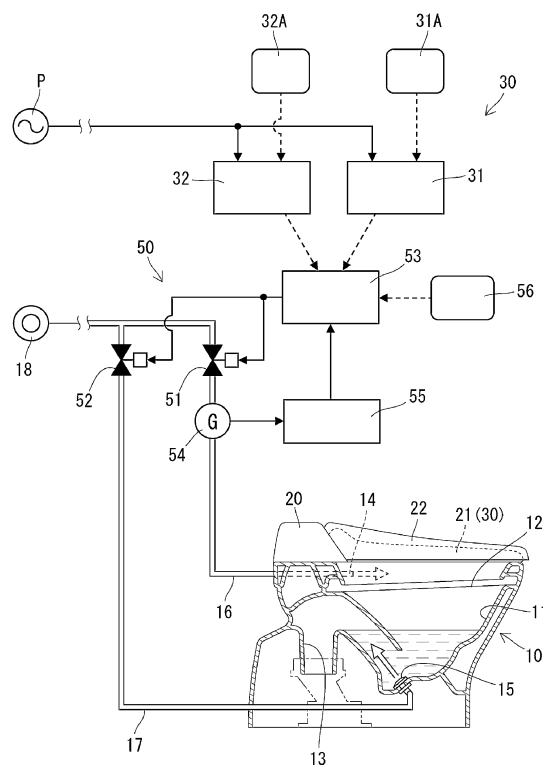
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LARGE FLUSH TOILET

(57) A flush toilet bowl capable of satisfactorily cleaning a toilet during a power failure is provided. The flush toilet bowl includes: a toilet bowl main body (10) that includes a bowl (11); a toilet bowl device (30) that is attached to the toilet bowl main body (10) including a human body detection sensor (32A), a local cleaning device (31), a heated toilet seat (21), or the like and is driven using a commercial power source (P) as a power source; and a toilet bowl cleaning device (50) that is driven using a battery (55) as a power source and supplies cleaning water to the bowl (11).

FIG. 1



## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to a flush toilet bowl.

### BACKGROUND ART

**[0002]** Patent Document 1 discloses a conventional flush toilet bowl. The flush toilet bowl is provided with a toilet bowl cleaning device that includes: a cleaning tank which stores cleaning water; and a pressure pump which supplies the cleaning water stored in the cleaning tank to a toilet bowl main body. In the toilet bowl cleaning device, when a power failure occurs during operation of the pressure pump, according to the rotation by an inertial force in the rotating portion thereof, the cleaning water having a volume of water required for performing water sealing in a water sealing portion of the toilet bowl main body can be supplied to the toilet bowl main body.

**[0003]** Accordingly, in the flush toilet bowl, even when the power failure occurs while performing toilet cleaning, the water sealing in the water sealing portion of the bowl can be achieved. Therefore, in the flush toilet bowl, it is possible to prevent offensive odor from reversely flowing from the downstream side of the water sealing portion to the bowl side.

### PRIOR ART DOCUMENTS

### PATENT DOCUMENT

**[0004]** [Patent Document 1] Japanese Unexamined Patent Application, First Publication No. 2008-174944

### SUMMARY OF INVENTION

### PROBLEMS TO BE SOLVED BY THE INVENTION

**[0005]** However, in the flush toilet bowl of Patent Document 1, since the toilet bowl cleaning device for supplying the cleaning water to the toilet bowl main body to perform water sealing of the water sealing portion is provided, when the power failure occurs while performing the toilet cleaning, general toilet cleaning cannot be performed during a power failure.

**[0006]** The present invention is made in consideration of the above-described problem in the related art, and an object thereof is to provide a flush toilet bowl capable of satisfactorily performing toilet cleaning during a power failure.

### MEANS FOR SOLVING THE PROBLEMS

**[0007]** A flush toilet bowl of the present invention includes: a toilet bowl main body that includes a bowl; a toilet bowl device that is attached to the toilet bowl main

body including a human body detection sensor, a local cleaning device, a heated toilet seat, or the like and is driven using a commercial power source as a power source; and a toilet bowl cleaning device that is driven using a battery as a power source and supplies cleaning water to the bowl.

**[0008]** In the flush toilet bowl, even during a power failure, since the toilet bowl cleaning device can be driven using the battery as the power source, the cleaning water can be supplied to the bowl of the toilet bowl main body. Moreover, since the toilet bowl device uses the commercial power source as the power source and is separated from the battery which is the power source of the toilet bowl cleaning device, the battery is not used except for driving the toilet bowl cleaning device. Accordingly, consumption of electricity of the battery decreases, and even during the power failure, the toilet bowl cleaning device can be repeatedly driven.

**[0009]** Therefore, in the flush toilet bowl of the present invention, the toilet cleaning can be satisfactorily performed during the power failure.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### **[0010]**

FIG. 1 is a conceptual diagram of a flush toilet bowl of Example 1.

FIG. 2 is a conceptual diagram of a flush toilet bowl of Example 2.

### EMBODIMENTS FOR CARRYING OUT THE INVENTION

**[0011]** Preferred embodiments of the present invention will be described.

**[0012]** The battery is a secondary battery, and a generator that charges the battery may be provided. In this case, since the battery is charged by the generator, a need for battery replacement can be almost eliminated. Moreover, if the generator generates electricity using a water flow of cleaning water which is supplied to a bowl by driving a toilet bowl cleaning device, the battery can be automatically charged when the cleaning water is supplied to the bowl.

**[0013]** A charging circuit that is capable of charging the battery from the commercial power source may be provided. In this case, it is possible to prevent a charge amount of the battery from being excessively decreased. Accordingly, since the toilet bowl cleaning device can be reliably driven by the battery as the power source, toilet cleaning can always be performed satisfactorily.

**[0014]** The charging circuit can charge the battery during a set period of time. In this case, if the battery can be charged during a period of time before a period of time having a high use frequency of a flush toilet bowl, after that, even when the toilet bowl cleaning device is repeatedly driven, a deficiency in the charge amount of the bat-

tery does not easily occur. In addition, if the battery is charged during a period of nighttime, the battery can be charged at a lower electricity rate.

**[0015]** A charging switch that turns on and turns off the charging of the battery by the charging circuit, may be provided. In this case, the battery can be charged as desired.

**[0016]** Next, Examples 1 and 2 in which the flush toilet bowl of the present invention is embodied will be described with reference to the drawings.

#### <Example 1>

**[0017]** As shown in FIG. 1, a flush toilet bowl of Example 1 includes a toilet bowl main body 10 having a bowl 11, a toilet bowl device 30 that is attached to the toilet bowl main body 10, and a toilet bowl cleaning device 50 that supplies cleaning water to the bowl 11.

**[0018]** The bowl 11 includes a rim water channel 12 which is formed on an upper circumferential edge thereof and through which the cleaning water flows. The toilet bowl main body 10 includes a toilet drainage channel 13 which communicates with the downstream side of the bowl 11. The toilet bowl main body 10 includes a rim nozzle 14 which discharges the cleaning water along the rim water channel 12, and a jet nozzle 15 which is provided on the lower end of the bowl 11 and discharges the cleaning water toward the toilet drainage channel 13. A rim water supply channel 16 is connected to the upstream side of the rim nozzle 14, and a jet water supply channel 17 is connected to the upstream side of the jet nozzle 15. The upstream end of the rim water supply channel 16 and the upstream end of the jet water supply channel 17 are joined to each other, and communicate with a water supply source 18 having a water supply pressure.

**[0019]** The flush toilet bowl includes: a toilet seat box 20 which is mounted on a rear upper surface of the toilet bowl main body 10; and a heated toilet seat 21 and a seat cover 22 which are rotatably supported by a front surface of the toilet seat box 20. In the heated toilet seat 21, a flat heater is attached on the inner side of the seat surface thereof. The flat heater generates heat using a commercial power source P as the power source. Accordingly, the heated toilet seat 21 can warm the seat surface.

**[0020]** In addition, the flush toilet bowl includes a local cleaning device 31 and the toilet bowl cleaning device 50 which are built in the toilet seat box 20. The local cleaning device 31 includes a remote controller 31A having an operation button. If the operation button of the remote controller 31A is operated, operation signals are sent to the local cleaning device 31 from the remote controller 31A. The local cleaning device 31 uses the commercial power source P as the power source, and is driven according to the operation signals sent from the remote controller 31A.

**[0021]** The toilet bowl cleaning device 50 includes: a

rim open-close valve 51 provided in the rim water supply channel 16; a jet open-close valve 52 provided in the jet water supply channel 17; and a controller 53 that sends the open-close signals to the rim open-close valve 51 and the jet open-close valve 52. Moreover, the toilet bowl cleaning device 50 includes: a generator 54 that is provided in the rim water supply channel 16 and generates electricity by a water flow in the rim water supply channel 16; and a lithium ion secondary battery 55 that accumulates the electricity generated by the generator 54. The toilet bowl cleaning device 50 drives the controller 53, the rim open-close valve 51, and the jet open-close valve 52 using the electricity accumulated in the lithium ion secondary battery 55. In addition, the toilet bowl cleaning device 50 includes an operation button 56 that performs toilet cleaning.

**[0022]** In the toilet bowl cleaning device 50, if the operation button 56 is operated, the controller 53 sends open-close signals to the rim open-close valve 51 and the jet open-close valve 52 according to a predetermined cleaning pattern, and the toilet cleaning is performed. As an example of the cleaning pattern, first, after rim cleaning discharging the cleaning water from the rim nozzle 14 is performed, jet cleaning discharging the cleaning water from the jet nozzle 15 is performed, and thereafter, the rim cleaning discharging the cleaning water from the rim nozzle 14 is performed. That is, in the toilet cleaning, a surface of the bowl 11 is cleaned by the initial rim cleaning and a level of the cleaning water in the bowl 11 increases, and thereafter, a siphon effect is generated in the toilet drainage channel 13 by the jet cleaning, waste or the like in the bowl 11 is discharged, and water sealing in the bowl 11 is formed by the later rim cleaning.

**[0023]** The flush toilet bowl includes an automatic cleaning device 32 that carries out the toilet cleaning in the toilet bowl cleaning device 50. The automatic cleaning device 32 uses the commercial power source P as the power source. The automatic cleaning device 32 includes a human body detection sensor 32A that detects a user who approaches the toilet bowl main body 10. After the user uses the flush toilet bowl, if the human body detection sensor 32A detects that the user is separated from the toilet bowl main body 10, the automatic cleaning device 32 sends the toilet cleaning signals to the controller 53 of the toilet bowl cleaning device 50 to perform toilet cleaning. The controller 53 of the toilet bowl cleaning device 50 receiving the toilet cleaning signals sends open-close signals to the rim open-close valve 51 and the jet open-close valve 52 according to a predetermined cleaning pattern, and performs the toilet cleaning.

**[0024]** Moreover, the remote controller 31A of the local cleaning device 31 includes a toilet cleaning button. If the toilet cleaning button is pressed, the toilet cleaning signals are sent to the controller 53 of the toilet bowl cleaning device 50 via the local cleaning device 31. Also in this case, the controller 53 of the toilet bowl cleaning device 50 receiving the toilet cleaning signals sends open-close signals to the rim open-close valve 51 and

the jet open-close valve 52 according to a predetermined cleaning pattern, and performs the toilet cleaning.

**[0025]** In the flush toilet bowl, the heated toilet seat 21, the local cleaning device 31, and the automatic cleaning device 32 correspond to the toilet bowl device 30.

**[0026]** In the flush toilet bowl including the above-described configuration, when a power failure does not occur, the toilet cleaning can be performed by operating the automatic cleaning device 32 or the toilet cleaning button provided on the remote controller 31A of the local cleaning device 31. On the other hand, during the power failure, the toilet cleaning can be performed by operating the operation button 56 of the toilet bowl cleaning device 50. At this time, the controller 53, the rim open-close valve 51, and the jet open-close valve 52 which are included in the toilet bowl cleaning device 50 are driven using electricity accumulated in the lithium ion secondary battery 55. Since the lithium ion secondary battery 55 is separated from the heated toilet seat 21, the local cleaning device 31, and the automatic cleaning device 32 which are included in the toilet bowl device 30, the lithium ion secondary battery 55 is not used except for driving of the toilet bowl cleaning device 50. Accordingly, consumption of electricity of the lithium ion secondary battery 55 decreases, and the toilet bowl cleaning device 50 can be repeatedly driven even during a power failure.

**[0027]** Therefore, the flush toilet bowl of Example 1 can satisfactorily perform toilet cleaning during a power failure.

**[0028]** In addition, the lithium ion secondary battery 55 is provided in the rim water supply channel 16, and can be charged by the generator 54 which generates electricity by the water flow in the rim water supply channel 16. Therefore, the lithium ion secondary battery 55 can be automatically charged when the toilet cleaning is performed. Moreover, the need for battery replacement almost does not occur.

#### <Example 2>

**[0029]** As shown in FIG. 2, a difference between flush toilet bowls of Examples 1 and 2 is that, in the flush toilet bowl of Example 2, a charging circuit 33 capable of charging the lithium ion secondary battery 55 from the commercial power source P is provided. The same reference numerals are assigned to the same configurations as in Example 1, and the detailed descriptions are omitted here.

**[0030]** In the flush toilet bowl, charging circuits 33 capable of charging the lithium ion secondary battery 55 are provided in the local cleaning device 31 and the automatic cleaning device 32, respectively. The charging circuits 33 are set to charge the lithium ion secondary battery 55 during the nighttime, for example, from 3 a.m. to 5 a.m.

**[0031]** Accordingly, since the lithium ion secondary battery 55 can be fully charged before a period of time in the morning having a high use frequency of the flush

toilet bowl, even when the toilet bowl cleaning device 50 is repeatedly driven after that, a deficiency in a charge amount of the lithium ion secondary battery 55 does not easily occur. In this way, since it is possible to prevent the charge amount of the lithium ion secondary battery 55 from being excessively decreased, the toilet bowl cleaning device 50 can be reliably driven, and the toilet cleaning can always be performed satisfactorily. In addition, since the charging is performed during a period of nighttime, the lithium ion secondary battery 55 can be charged at a lower electricity rate.

**[0032]** The remote controller 31A of the local cleaning device 31 includes a charging switch which turns on and turns off the charging of the lithium ion second battery 55 by the charging circuit 33. By turning on the charging switch, the charging circuit 33 of the local cleaning device 31 can charge the lithium ion secondary battery 55. In this way, in the flush toilet bowl, the lithium ion secondary battery 55 can be charged as desired.

**[0033]** In the flush toilet bowl including the above-described configuration, when a power failure does not occur, the toilet cleaning can be performed by operating the automatic cleaning device 32 or the toilet cleaning button provided on the remote controller 31A of the local cleaning device 31. On the other hand, during the power failure, the toilet cleaning can be performed by operating the operation button 56 of the toilet bowl cleaning device 50. At this time, the controller 53, the rim open-close valve 51, and the jet open-close valve 52 which are included in the toilet bowl cleaning device 50 are driven using electricity accumulated in the lithium ion secondary battery 55. Since the lithium ion secondary battery 55 is separated from the heated toilet seat 21, the local cleaning device 31, and the automatic cleaning device 32 which are included in the toilet bowl device 30, the lithium ion secondary battery 55 is not used except for driving of the toilet bowl cleaning device 50. Accordingly, consumption of electricity of the lithium ion secondary battery 55 decreases, and the toilet bowl cleaning device 50 can be repeatedly driven even during a power failure.

**[0034]** Therefore, the flush toilet bowl of Example 2 can satisfactorily perform toilet cleaning during a power failure.

**[0035]** The present invention is not limited to the examples which are described according to the descriptions and the drawings, and for example, the following examples are also included in the technical scope of the present invention.

(1) In Examples 1 and 2, the lithium ion secondary battery is used as the power source of the toilet bowl cleaning device. However, other secondary batteries or capacitors of a large capacity may be used as the power source of the toilet bowl cleaning device.

(2) In Examples 1 and 2, the lithium ion secondary battery is used as the power source of the toilet bowl cleaning device. However, a primary battery may be used as the power source of the toilet bowl cleaning

device. In this case, the generator charging the battery is not required.

(3) In Examples 1 and 2, the generator is provided in the rim water supply channel. However, the generator may be provided in the jet water supply channel. In this case, the generator may be provided in each of the rim water supply channel and the jet water supply channel, and may be provided only in the jet water supply channel.

(4) In Examples 1 and 2, the generator generating electricity using the water flow in the rim water supply channel is provided. However, the generator generating electricity using other means may be provided.

(5) In Examples 1 and 2, the toilet bowl device includes the heated toilet seat, the local cleaning device, and the automatic cleaning device. However, it is sufficient that the toilet bowl device includes at least one of these. Moreover, toilet bowl devices equivalent to these may be provided.

(6) In Example 2, the lithium ion secondary battery is charged during a period of nighttime. However, the lithium ion secondary battery may be charged during other periods of time.

(7) In Example 2, the local cleaning device and the automatic cleaning device each include a charging circuit; however, the charging circuit may be provided in only one thereof.

(8) In Example 2, the charging switch is provided in the remote controller of the local cleaning device. However, the charging switch may not be provided.

a battery as a power source and supplies cleaning water to the bowl.

2. The flush toilet bowl according to claim 1, wherein the battery is a secondary battery, and a generator that charges the battery is provided.

3. The flush toilet bowl according to claim 2, further comprising:

a charging circuit that is capable of charging the battery from the commercial power source.

4. The flush toilet bowl according to claim 3, wherein the charging circuit charges the battery during a set period of time.

5. The flush toilet bowl according to claim 3, further comprising:

a charging switch that turns on and turns off charging of the battery by the charging circuit.

#### Reference Signs List

#### [0036]

10: toilet bowl main body  
11: bowl  
30: toilet bowl device (21: heated toilet seat, 31: local cleaning device, and 32A: human body detection sensor)  
33: charging circuit  
50: toilet bowl cleaning device  
54: generator  
55: lithium ion secondary battery (battery)  
P: commercial power source

#### Claims

1. A flush toilet bowl comprising:

a toilet bowl main body that includes a bowl;  
a toilet bowl device that is attached to the toilet bowl main body including a human body detection sensor, a local cleaning device, a heated toilet seat, or the like and is driven using a commercial power source as a power source; and  
a toilet bowl cleaning device that is driven using

FIG. 1

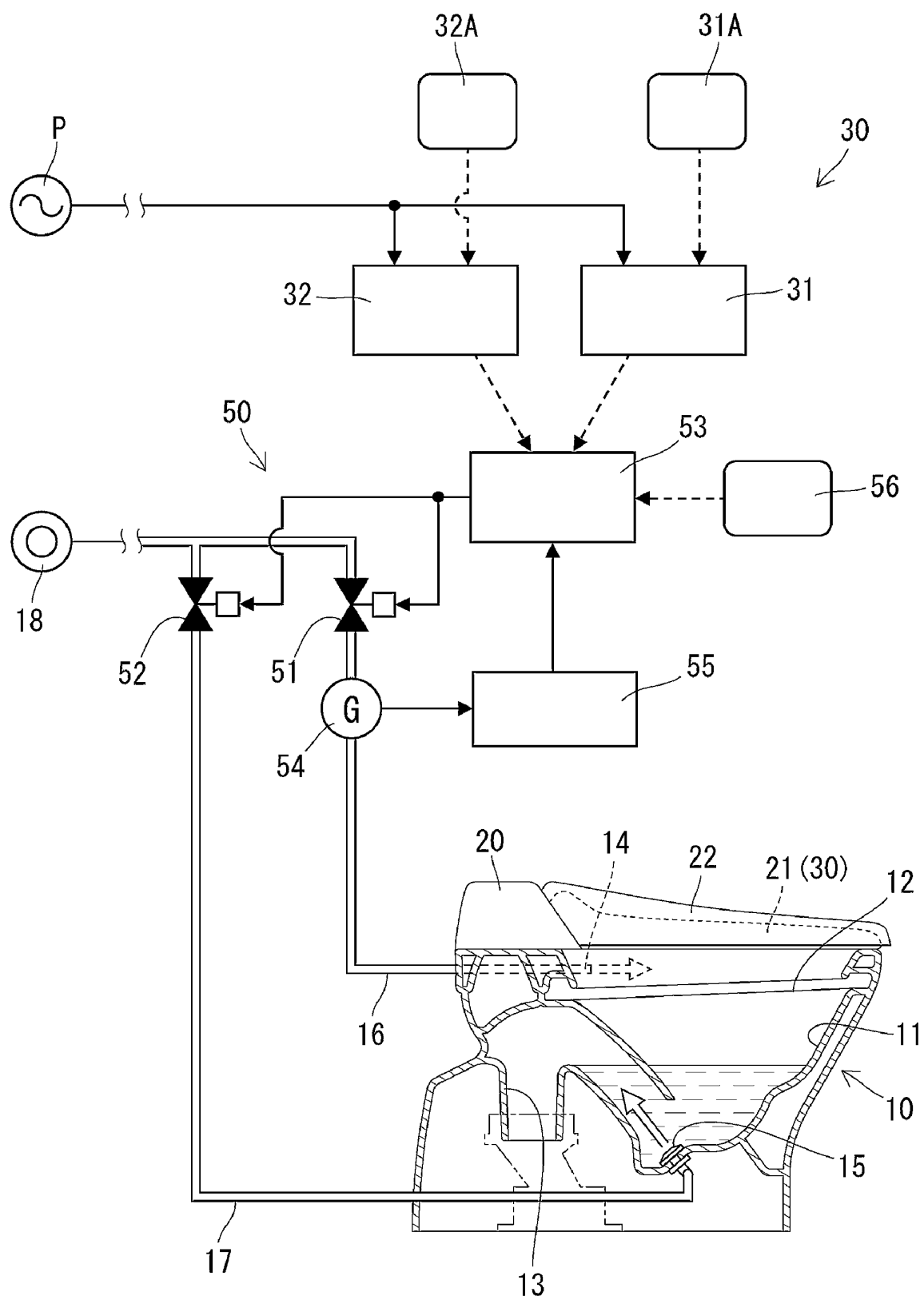
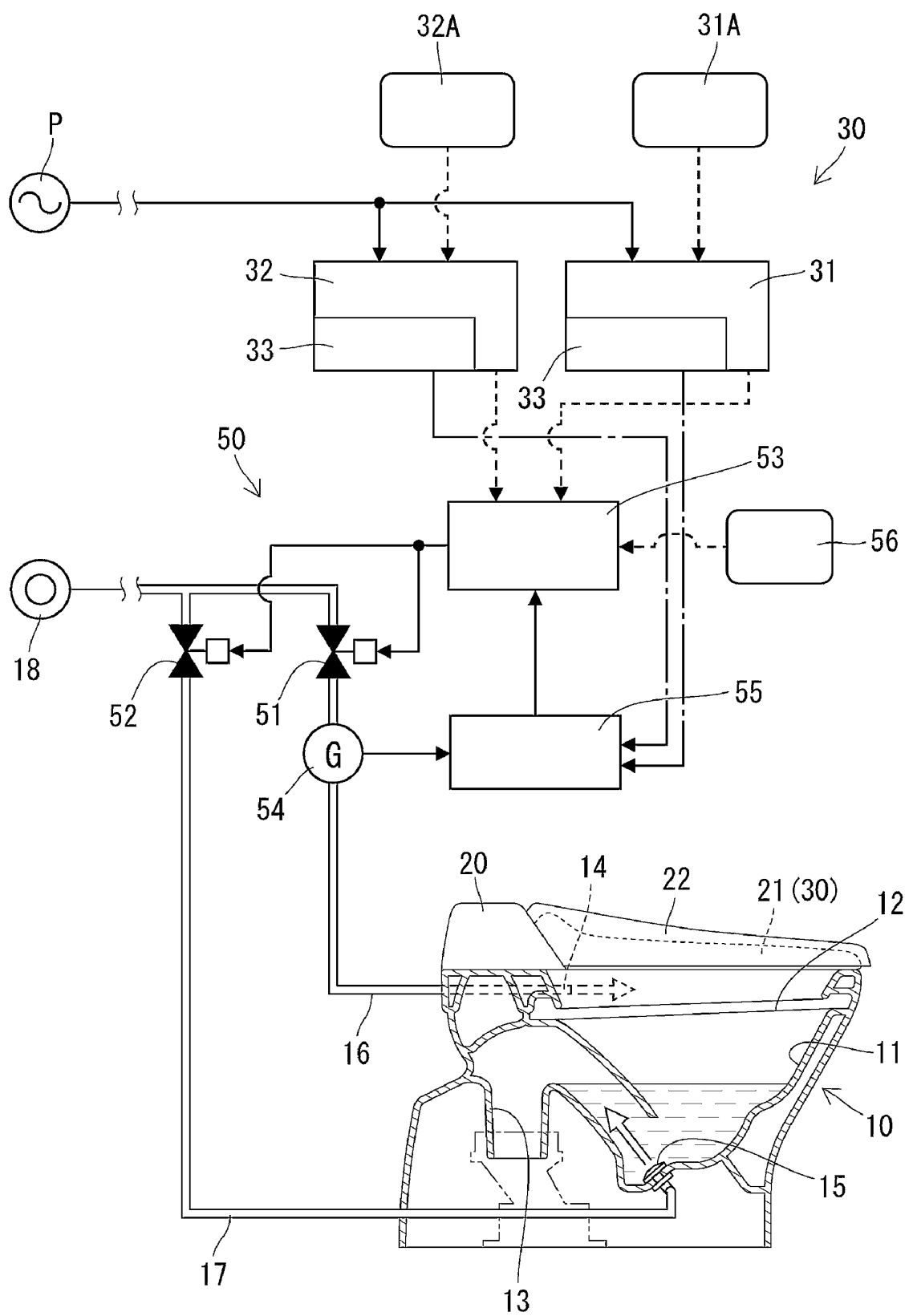


FIG. 2



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/076193

## A. CLASSIFICATION OF SUBJECT MATTER

E03D11/02 (2006.01) i, E03D5/10 (2006.01) i

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

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E03D11/02, E03D5/10

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2012
Kokai Jitsuyo Shinan Koho	1971-2012	Toroku Jitsuyo Shinan Koho	1994-2012

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 2010-242428 A (Inax Corp.), 28 October 2010 (28.10.2010), paragraphs [0037] to [0066]; fig. 2, 3 (Family: none)	1-5
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 65795/1990 (Laid-open No. 26285/1992) (Tokai Rika Co., Ltd.), 02 March 1992 (02.03.1992), page 3, line 16 to page 7, line 8; fig. 1 (Family: none)	1-3, 5

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

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"&amp;" document member of the same patent family

Date of the actual completion of the international search  
06 December, 2012 (06.12.12)Date of mailing of the international search report  
18 December, 2012 (18.12.12)Name and mailing address of the ISA/  
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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/076193

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 11-293740 A (Toto Ltd.), 26 October 1999 (26.10.1999), paragraphs [0047] to [0050] (Family: none)	4
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 134010/1989 (Laid-open No. 74151/1991) (Inax Corp.), 25 July 1991 (25.07.1991), fig. 1 & US 5079495 A                      & EP 0433631 A1 & DE 69000906 T                      & ES 2040020 T & KR 20-1994-0006229 Y	1-5

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 2008174944 A [0004]