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(54) **System and method of controlling a flush toilet**

System und Verfahren zum Steuern einer Spültoilette

Système et procédé de commande d'une toilette à chasse d'eau

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Description**FIELD OF THE INVENTION**

[0001] The present invention relates to a flush toilet, and more particularly to a system and a method of controlling the flush toilet.

BACKGROUND OF THE INVENTION

[0002] As shown in FIG. 1, a conventional flush toilet contains a water tank (not shown) and a toilet body 10; the toilet body 10 includes a bowl 11, an inlet portion 12, a support portion 13, and a sewage draining conduit 14. The support portion 13 is integrally connected with a front side and a bottom end of the bowl 11. The bowl 11 includes a first flushing conduit 111 arranged on a peripheral side of a top end thereof and communicates with the inlet portion 12, the first flushing conduit 111 has a plurality of spouts 112 for flowing water from the water tank toward the bowl 11 via the inlet portion 12 and the first flushing conduit 111, such that the peripheral ring 113 or a seat ring of the toilet body 10 is flushed by the water. The bowl 11 also includes a flushing conduit 114 formed on a side wall thereof and a nozzle 115 defined on a distal end thereof so that the water from the water tank flows toward the sewage draining conduit 14 through the inlet portion 12 and the flushing conduit 114. The sewage draining conduit 14 is in communication with the bowl 11 so that the water flushes dirt out of the sewage draining conduit 14 through the plurality of spouts 112 and the nozzle 115.

[0003] The conventional flush toilet matches with a control device or a valve to control water flow. Furthermore, a regulator valve or a depressurizing valve cooperates with the flush toilet to maintain a water pressure stably, for example, a conventional flow stabilizer for reducing the water pressure automatically is disclosed in CN Publication No. 102678994A.

[0004] However, the regulator valve, the depressurizing valve, and the flow stabilizer can only stabilize the water pressure within a certain range, but they cannot keep a fixed water flow at a low water pressure or a high water pressure. For instance, when the conventional flow stabilizer is actually tested at the low water pressure or the high pressure, the water flow is decreased 20%.

[0005] Another system for controlling a flush toilet is shown for example in US 5 204 999-A.

[0006] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

[0007] One aspect of the present invention is to provide a system and a method of controlling a flush toilet which supply water stably to drain dirt and filth strongly.

[0008] To obtain the above, a system of controlling a flush toilet, which toilet includes a first flushing channel

and a second flushing channel, and the system contains:

a depressurizing valve including an inlet, a first outlet, and a second outlet; the inlet being in use in connection with an inlet pipe fitting;
a first water-supply pipe fitting employed to supply water from the first outlet of the depressurizing valve toward the first flushing channel of the flush toilet;
a second water-supply pipe fitting applied to supply the water from the second outlet of the depressurizing valve toward the second flushing channel of the flush toilet;
a first solenoid valve controlled to start and stop the first water-supply pipe fitting;
a second solenoid valve controlled to start and stop the second water-supply pipe fitting;
a water pressure sensor used to sense a water pressure in the depressurizing valve and to transmit a pressure signal;
a control unit served to receive a flushing signal started by a user and the pressure signal from the water pressure sensor, such that after receiving the flushing signal, a starting and closing sequence and starting times of the first solenoid valve and the second solenoid valve are controlled based on the pressure signal.

[0009] Preferably, the control unit determines a first start time, a second start time and a third start time according to the pressure signal received from the water pressure sensor and starts the first solenoid valve for T1 seconds and then closes the first solenoid valve, and the control unit starts the second solenoid valve for T2 seconds and then closes the second solenoid valve; the first solenoid valve is started by the control unit for seconds and then is closed, wherein first start time, the second start time, and the third start time of the first solenoid valve and the second solenoid valve are not overlapped.

[0010] In addition, a method of controlling a flush toilet comprising steps of:

- a. receiving a flushing signal started by a user by ways of a control unit;
- b. determining a first start time, a second start time, and a third start time by using the control unit based on a water pressure in a depressurizing valve;
- c. starting a first solenoid valve so that a peripheral ring on a flush toilet is flushed by a water for T1 seconds, and then closing the first solenoid valve after the peripheral ring is flushed;
- d. starting a second solenoid valve so that a sewage draining conduit is flushed for T2 seconds by the water and then closing the second solenoid valve after the sewage draining conduit is flushed;
- e. starting the first solenoid valve again so that the peripheral ring on the flush toilet is flushed by the water for T3 seconds and then the first solenoid valve is closed after the peripheral ring is flushed;

f. flashing the steps a, b, c, d and e.

[0011] The water pressure in the depressurizing valve is sensed by a water pressure sensor.

[0012] The first solenoid valve may be mounted at a predetermined position of a first water-supply pipe fitting which connects with the depressurizing valve, and the first solenoid valve may be coupled with a first flushing channel of the flush toilet.

[0013] The second solenoid valve may be fixed at a predetermined position of a second water-supply pipe fitting which joins with the depressurizing valve, and the second solenoid valve may be in connection with a second flushing channel of the flush toilet.

[0014] It is to be noted that the starting times of the first solenoid valve and the second solenoid valve are not overlapped, so the first start time, the second start time, and the third start time are independent, such that a part of the water is supplied to flush the peripheral ring of the first flushing channel or the nozzle in the same time. Accordingly, the water is entirely flushed toward a single flushing conduit, such as the first flushing channel or the second flushing conduit, thus draining the dirt and the filth strongly.

[0015] Preferably, the first start time, the second start time, and the third start time are determined based on the water pressure in the depressurizing valve sensed by the water pressure sensor, and the pressure signal is calculated and determined by the control unit, such that when the water pressure is low, the starting times of the first solenoid valve and the second solenoid valve are prolonged. In contrast, when the water pressure is high, the starting times of the first solenoid valve and the second solenoid valve are shorten. Therefore, as flushing the water toward the peripheral ring of the first flushing channel or the sewage draining conduit, the water is supplied stably even through the water supply is at a low pressure or a high pressure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 is a cross sectional view of a conventional flush toilet.

FIG. 2 is a cross sectional view showing a flush toilet suitable to be used in combination with the present invention.

FIG. 3 is a schematic diagram of the system of controlling the flush toilet according to the preferred embodiment of the present invention, wherein a solid line shows a water supply arrangement, and a dotted line shows an electric circuit and a signal arrangement.

FIG. 4 is a perspective view showing the system of controlling the flush toilet being applied in the flush toilet according to the preferred embodiment of the present invention, wherein the system contains a de-

pressurizing valve, a water pressure sensor, a first solenoid valve, a second solenoid valve, and a control unit.

FIG. 5 is a block flow chart of a method of controlling a flush toilet according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] With reference to FIGS. 2-3, a system of controlling a flush toilet 20 according to a preferred embodiment of the present invention, the flush toilet 20 includes a first flushing channel 21 and a second flushing channel 22, and the system of controlling the flush toilet 20 comprises a depressurizing valve 31, a first water-supply pipe fitting 32, a second water-supply pipe fitting 33, a first solenoid valve 34, a second solenoid valve 35, a water pressure sensor 36, and a control unit 37.

[0018] As shown in FIG. 4, the depressurizing valve 31 includes an inlet 311, a first outlet 312, and a second outlet 313. The inlet 311 is in connection with an inlet pipe fitting 314. The inlet pipe fitting 314 is coupled with a water supply 40.

[0019] The first water-supply pipe fitting 32 is employed to supply water from the first outlet 312 of the depressurizing valve 31 toward the first flushing channel 21 of the flush toilet 20. The first flushing channel 21 communicates with a plurality of spouts 211 to flush the water toward a peripheral ring 23 on the flush toilet 20.

[0020] The second water-supply pipe fitting 33 is applied to supply the water from the second outlet 313 of the depressurizing valve 31 toward the second flushing channel 22 of the flush toilet 20. The second flushing channel 22 is joined with a nozzle 221 to flush the water toward a sewage draining conduit 24.

[0021] The first solenoid valve 34 is controlled to start and stop the first water-supply pipe fitting 32. In this embodiment, the first solenoid valve 34 is mounted in the first outlet 312 of the depressurizing valve 31. But the first solenoid valve 34 can be also mounted at any position of the first water-supply pipe fitting 32.

[0022] The second solenoid valve 35 is controlled to start and stop the second water-supply pipe fitting 33. In this embodiment, the second solenoid valve 35 is fixed in the second outlet 313 of the depressurizing valve 31. But the second solenoid valve 35 can be also fixed at any position of the second water-supply pipe fitting 33.

[0023] The water pressure sensor 36 is used to sense a water pressure in the depressurizing valve 31 and to transmit a pressure signal P.

[0024] The control unit 37 is served to receive a flushing signal W started by a user and the pressure signal P from the water pressure sensor 36, such that after receiving the flushing signal W, a starting and closing sequence and starting times of the first solenoid valve 34 and the second solenoid valve 35 are controlled based on the pressure signal P.

[0025] The flushing signal W is produced after the user starts a mechanical operation, such as touching a switch (such as a handle or a button). In addition, the flushing signal W is produced after a untouch operation, for instance, after the user triggers a sensing device, such as an infrared sensing device.

[0026] The control unit 37 is any one of a CPU (Central Processing Unit), a MPU (Micro Processing Unit), and a MCU (Micro Control Unit). A DC power supply, such as a battery 38, supplies power to the control unit 37.

[0027] The water pressure sensor 36 is a mechanical sensor or an electronic sensor.

[0028] The control unit 37 determines a first start time T1, a second start time T2, and a third start time T3 according to the pressure signal P received from the water pressure sensor 36 and starts the first solenoid valve 34 for T1 seconds and then closes the first solenoid valve 34, thereafter the control unit 37 starts the second solenoid valve 35 for T2 seconds and then closes the second solenoid valve 35. Finally, the first solenoid valve 34 is started by the control unit 37 for T3 seconds and then is closed.

[0029] Referring further to FIG. 4, to simplify structure and installation, the depressurizing valve 31, the water pressure sensor 36, the first solenoid valve 34, the second solenoid valve 35, and the control unit 37 are installed in a controlling box 37.

[0030] The method of controlling the flush toilet 20 according to the preferred embodiment of the present invention comprises steps of:

- a. receiving the flushing signal W started by the user by ways of the control unit 37;
- b. determining the first start time T1, the second start time T2, and the third start time T3 by using the control unit 37 based on the water pressure in the depressurizing valve 31;
- c. starting the first solenoid valve 34 so that the peripheral ring 23 on the flush toilet 20 is flushed by the water for T1 seconds, and then closing the first solenoid valve 34 after the peripheral ring 23 is flushed;
- d. starting the second solenoid valve 35 so that the sewage draining conduit 24 is flushed by the water for T2 seconds and then closing the second solenoid valve 35 after the sewage draining conduit 24 is flushed;
- e. starting the first solenoid valve 34 again so that the peripheral ring 23 on the flush toilet 20 is flushed by the water for T3 seconds and then the first solenoid valve 34 is closed after the peripheral ring 23 is flushed;
- f. flashing the steps a, b, c, d and e.

[0031] The flushing signal W is produced after the user starts the mechanical operation, such as touching the switch (such as the handle or the button). In addition, the flushing signal W is produced after the untouch operation,

for instance, after the user triggers the sensing device, such as an infrared sensing device.

[0032] The water pressure in the depressurizing valve 31 is sensed by the water pressure sensor 36.

[0033] The first solenoid valve 34 is mounted at a predetermined position of the first water-supply pipe fitting 32 which connects with the depressurizing valve 31, and the first solenoid valve 34 is coupled with the first flushing channel 21 of the flush toilet 20. The second solenoid valve 35 is fixed at a predetermined position of the second water-supply pipe fitting 33 which joins with the depressurizing valve 31, and the second solenoid valve 35 is in connection with the second flushing channel 22 of the flush toilet 20.

[0034] Thereby, the system and the method of controlling the flush toilet of the present invention automatically control the starting and closing sequence and the starting times of the first solenoid valve 34 and the second solenoid valve 35 by means of the control unit 37, wherein the starting and closing sequence of the first solenoid valve 34 and the second solenoid valve 35 is to start and then to close the first solenoid valve 34, to start and then to close the second solenoid valve 35, and to start and then to close the first solenoid valve 34 again. For example, the first solenoid valve 34 is started and then is closed so that dirt on the peripheral ring 23 is flushed toward a water seal, and the second solenoid valve 35 is started and then is closed so that the dirt and filth on the water seal is flushed toward the sewage draining conduit 24, thereafter the first solenoid valve 34 is started again to supply the water toward the water seal.

[0035] It is to be noted that the starting times of the first solenoid valve 34 and the second solenoid valve 35 are not overlapped, so the first start time T1, the second start time T2, and the third start time T3 are independent, such that a part of the water is supplied to flush the peripheral ring 23 of the first flushing channel 21 or the nozzle 211 in the same time. Accordingly, the water is entirely flushed toward a single flushing conduit, such as the first flushing channel 21 or the second flushing conduit 22, thus draining the dirt and the filth strongly.

[0036] Preferably, the first start time T1, the second start time T2, and the third start time T3 are determined based on the water pressure in the depressurizing valve 31 sensed by the water pressure sensor 36, and the pressure signal P is calculated and determined by the control unit 37, such that when the water pressure is low, the starting times of the first solenoid valve 34 and the second solenoid valve 35 are prolonged. In contrast, when the water pressure is high, the starting times of the first solenoid valve 34 and the second solenoid valve 35 are shorten. Therefore, as flushing the water toward the peripheral ring 23 of the first flushing channel 21 or the sewage draining conduit 24, the water is supplied stably even through the water supply 40 is at a low pressure or a high pressure.

[0037] While the preferred embodiments of the invention have been set forth for the purpose of disclosure,

modifications of the disclosed embodiments of the invention as well as other embodiments thereof may occur to those skilled in the art. The scope of the claims should not be limited by the preferred embodiments set forth in the examples, but should be given the broadest interpretation consistent with the description as a whole.

Claims

1. A system of controlling a flush toilet (20), which toilet includes a first flushing channel (21) and a second flushing channel (22), the system comprising:
 - a depressurizing valve (31) including an inlet (311), a first outlet (312), and a second outlet (313); the inlet (311) being in use in connection with an inlet pipe fitting (314);
 - a first water-supply pipe fitting (32) employed to supply water from the first outlet (312) of the depressurizing valve (31) toward the first flushing channel (21) of the flush toilet (20);
 - a second water-supply pipe fitting (33) applied to supply the water from the second outlet (313) of the depressurizing valve (31) toward the second flushing channel (22) of the flush toilet (20);
 - a first solenoid valve (34) controlled to start and stop the flushing of the first water-supply pipe fitting (32);
 - a second solenoid valve (35) controlled to start and stop the flushing of the second water-supply pipe fitting (33);
 - a water pressure sensor (36) used to sense a water pressure in the depressurizing valve (31) and to transmit a pressure signal (P);
 - a control unit (37) served to receive a flushing signal (W) started by a user and the pressure signal (P) from the water pressure sensor (36), such that after receiving the flushing signal (W), a starting and closing sequence and starting times of the first solenoid valve (34) and the second solenoid valve (35) are controlled based on the pressure signal (P).
2. The system of controlling the flush toilet (20) as claimed in claim 1, **characterized in that** the control unit (37) receives the flushing signal (W) produced after the user starts a mechanical operation.
3. The system of controlling the flush toilet (20) as claimed in claim 2, **characterized in that** the flushing signal (W) is produced after the user touches a switch.
4. The system of controlling the flush toilet (20) as claimed in claim 1, **characterized in that** the control unit (37) receives the flushing signal (W) produced after a untouch operation.
5. The system of controlling the flush toilet (20) as claimed in claim 4, **characterized in that** the flushing signal (W) is produced after the user triggers a sensing device.
6. The system of controlling the flush toilet (20) as claimed in claim 1, **characterized in that** the control unit (37) is any one of a CPU (Central Processing Unit), a MPU (Micro Processing Unit), and a MCU (Micro Control Unit).
7. The system of controlling the flush toilet (20) as claimed in claim 1, **characterized in that** the water pressure sensor (36) is a mechanical sensor or an electronic sensor.
8. The system of controlling the flush toilet (20) as claimed in claim 1, **characterized in that** the control unit (37) determines a first start time (T1), a second start time (T2) and a third start time (T3) according to the pressure signal (P) received from the water pressure sensor (36) and starts the first solenoid valve (34) for T1 seconds and then closes the first solenoid valve (34), and the control unit (37) starts the second solenoid valve (35) for T2 seconds and then closes the second solenoid valve (35); the first solenoid valve (34) is started by the control unit (37) for T3 seconds and then is closed, wherein first start time (T1), the second start time (T2), and the third start time (T3) of the first solenoid valve (34) and the second solenoid valve (35) are not overlapped.
9. The system of controlling the flush toilet (20) as claimed in claim 1 further comprising a DC power supply supplying power to the control unit (37).
10. A method of controlling a flush toilet (20) comprising steps of:
 - a. receiving a flushing signal (W) started by a user by ways of a control unit (37);
 - b. determining a first start time (T1), a second start time (T2), and a third start time (T3) by using the control unit (37) based on a water pressure in a depressurizing valve (31);
 - c. starting a first solenoid valve (34) so that a peripheral ring (23) on a flush toilet (20) is flushed by a water for T1 seconds, and then closing the first solenoid valve (34) after the peripheral ring (23) is flushed;
 - d. starting a second solenoid valve (35) so that a sewage draining conduit (24) is flushed by the water for T2 seconds and then closing the second solenoid valve (35) after the sewage draining conduit (24) is flushed;
 - e. starting the first solenoid valve (34) again so that the peripheral ring (23) on the flush toilet (20) is flushed by the water for T3 seconds and

then the first solenoid valve (34) is closed after the peripheral ring (23) is flushed;
f. flashing the steps a, b, c, d and e.

11. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** the flushing signal (W) is produced after the user starts a mechanical operation. 5
12. The method of controlling the flush toilet (20) as claimed in claim 11, **characterized in that** the flushing signal (W) is produced after the user touches a switch. 10
13. The method of controlling a flush toilet (20) as claimed in claim 10, **characterized in that** the flushing signal (W) is produced after a untouch operation. 15
14. The method of controlling the flush toilet (20) as claimed in claim 13, **characterized in that** the flushing signal (W) is produced after the user triggers a sensing device. 20
15. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** the control unit (37) is any one of a CPU (Central Processing Unit), a MPU (Micro Processing Unit), and a MCU (Micro Control Unit). 25
16. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** the water pressure in the depressurizing valve (31) is sensed by a water pressure sensor (36). 30
17. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** the water pressure sensor (36) is a mechanical sensor or an electronic sensor. 35
18. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** the first solenoid valve (34) is mounted at a predetermined position of a first water-supply pipe fitting (32) which connects with the depressurizing valve (31), and the first solenoid valve (34) is coupled with a first flushing channel (21) of the flush toilet (20). 40
19. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** the second solenoid valve (35) is fixed at a predetermined position of a second water-supply pipe fitting (33) which joins with the depressurizing valve (31), and the second solenoid valve (35) is in connection with a second flushing channel (22) of the flush toilet (20). 45
20. The method of controlling the flush toilet (20) as claimed in claim 10, **characterized in that** a DC power supply supplies power to the control unit (37). 50

Patentansprüche

1. System zum Steuern einer Spültoilette (20), die einen ersten Spülkanal (21) und einen zweiten Spülkanal (22) umfasst, wobei das System folgendes umfasst:

 ein Dekompressionsventil (31) mit einem Einlass (311), einem ersten Auslass (312) und einem zweiten Auslass (313); wobei der Einlass (311) in Verbindung mit einer Einlassrohrverschraubung (314) verwendet wird;
 eine erste Wasserzufuhr-Rohrverschraubung (32), um Wasser von dem ersten Auslass (312) des Dekompressionsventils (31) hin zu dem ersten Spülkanal (21) der Spültoilette (20) zu liefern;
 eine zweite Wasserzufuhr-Rohrverschraubung (33), um das Wasser von dem zweiten Auslass (313) des Dekompressionsventils (31) hin zu dem zweiten Spülkanal (22) der Spültoilette (20) zu liefern;
 ein erstes Magnetventil (34), das gesteuert wird, um die Spülung der ersten Wasserzufuhr-Rohrverschraubung (32) zu starten und zu stoppen;
 ein zweites Magnetventil (35), das gesteuert wird, um die Spülung der zweiten Wasserzufuhr-Rohrverschraubung (33) zu starten und zu stoppen;
 einen Wasserdrucksensor (36), um einen Wasserdruck in dem Dekompressionsventil (31) wahrzunehmen und ein Drucksignal (P) zu übertragen;
 eine Steuereinheit (37), um ein Spülsignal (W), das von einem Benutzer gestartet wurde, und das Drucksignal (P) von dem Wasserdrucksensor (36) zu empfangen, so dass nach Empfang des Spülsignals (W) eine Start- und Schließsequenz und Startzeiten des ersten Magnetventils (34) und des zweiten Magnetventils (35) auf der Grundlage des Drucksignals (P) kontrolliert werden.
2. System zum Steuern der Spültoilette (20) nach Anspruch 1, **gekennzeichnet dadurch, dass** die Steuereinheit (37) das Spülsignal (W) empfängt, das entsteht, wenn der Benutzer eine mechanische Operation startet.
3. System zum Steuern der Spültoilette (20) nach Anspruch 2, **gekennzeichnet dadurch, dass** das Spülsignal (W) erzeugt wird, wenn der Benutzer einen Schalter berührt.
4. System zum Steuern der Spültoilette (20) nach Anspruch 1, **gekennzeichnet dadurch, dass** die Steuereinheit (37) das Spülsignal (W) empfängt, das nach einer berührungslosen Operation erzeugt wurde.

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5. System zum Steuern der Spültoilette (20) nach Anspruch 4, **gekennzeichnet dadurch, dass** das Spülsignal (W) erzeugt wird, nachdem der Benutzer eine Sensoreinheit ausgelöst hat. 5
6. System zum Steuern der Spültoilette (20) nach Anspruch 1, **gekennzeichnet dadurch, dass** die Steuereinheit (37) eine beliebige der folgenden ist: eine CPU (zentrale Verarbeitungseinheit), eine MPU (Mikro-Verarbeitungseinheit) oder eine MCU (Mikrosteuerung). 10
7. System zum Steuern der Spültoilette (20) nach Anspruch 1, **gekennzeichnet dadurch, dass** der Wasserdrucksensor (36) ein mechanischer Sensor oder ein elektronischer Sensor ist. 15
8. System zum Steuern der Spültoilette (20) nach Anspruch 1, **gekennzeichnet dadurch, dass** die Steuereinheit (37) eine erste Startzeit (T1), eine zweite Startzeit (T2) und eine dritte Startzeit (T3) festlegt, je nach dem vom Wasserdrucksensor (36) empfangenen Drucksignal (P), und das erste Magnetventil (34) für T1 Sekunden startet und dann das erste Magnetventil (34) schließt, und die Steuereinheit (37) startet das zweite Magnetventil (35) für T2 Sekunden und schließt dann das zweite Magnetventil (35); das erste Magnetventil (34) wird durch die Steuereinheit (37) für T3 Sekunden gestartet und dann geschlossen, wobei die erste Startzeit (T1), die zweite Startzeit (T2) und die dritte Startzeit (T3) des ersten Magnetventils (34) und des zweiten Magnetventils (35) sich nicht überlappen. 20
9. System zum Steuern der Spültoilette (20) nach Anspruch 1, des weiteren umfassend eine Gleichstromversorgung, die Energie an die Steuereinheit (37) liefert. 25
10. Verfahren zum Steuern einer Spültoilette (20) mit folgenden Phasen: 30
 - a. Empfang eines Spülsignals (W), das von einem Benutzer über eine Steuereinheit (37) gestartet wurde; 35
 - b. Bestimmung einer ersten Startzeit (T1), einer zweiten Startzeit (T2) und einer dritten Startzeit (T3) unter Verwendung der Steuereinheit (37) je nach dem Wasserdruck in einem Dekompressionsventil (31); 40
 - c. Start eines ersten Magnetventils (34), so dass ein Randring (23) auf einer Spültoilette (20) von Wasser T1 Sekunden lang gespült wird, und dann Schließen des ersten Magnetventils (34), nachdem der Randring (23) gespült wurde; 45
 - d. Start eines zweiten Magnetventils (35), so 50

dass eine Abwasserablassleitung (24) durch das Wasser T2 Sekunden lang gespült wird, und dann Schließen des zweiten Magnetventils (35), nachdem die Abwasserablassleitung (24) gespült wurde;

e. erneuter Start des ersten Magnetventils (34), so dass der Randring (23) auf der Spültoilette (20) durch das Wasser T3 Sekunden lang gespült wird, und dann wird das erste Magnetventil (34) geschlossen, nachdem der Randring (23) gespült wurde;

f. Wiederholen der Phasen a, b, c, d und e.

11. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** das Spülsignal (W) erzeugt wird, nachdem der Benutzer eine mechanische Operation gestartet hat. 15
12. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 11, **gekennzeichnet dadurch, dass** das Spülsignal (W) erzeugt wird, nachdem der Benutzer einen Schalter berührt hat. 20
13. Verfahren zum Steuern einer Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** das Spülsignal (W) nach einer berührungslosen Operation erzeugt wird. 25
14. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 13, **gekennzeichnet dadurch, dass** das Spülsignal (W) erzeugt wird nachdem der Benutzer eine Sensoreinheit ausgelöst hat. 30
15. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** die Steuereinheit (37) eine der folgenden ist: eine CPU (zentrale Verarbeitungseinheit), eine MPU (Mikro-Verarbeitungseinheit) oder eine MCU (Mikrosteuerung). 35
16. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** der Wasserdruck in dem Dekompressionsventil (31) von einem Wasserdrucksensor (36) erfasst wird. 40
17. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** der Wasserdrucksensor (36) ein mechanischer Sensor oder ein elektronischer Sensor ist. 45
18. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** das erste Magnetventil (34) in einer vorherbestimmten Position einer ersten Wasserzufuhr-Rohrverschraubung (32) montiert wird, die es mit dem Dekompressionsventil (31) verbindet, und das erste Magnetventil (34) mit einem ersten Spülkanal (21) der Spültoilette (20) gekoppelt ist. 50

19. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** das zweite Magnetventil (35) in einer vorherbestimmten Position einer zweiten Wasserzufuhr-Rohrverschraubung (33) befestigt ist, die es mit dem Dekompressionsventil (31) verbindet, und das zweite Magnetventil (35) in Verbindung mit einem zweiten Spülkanal (22) der Spültoilette (20) steht.
20. Verfahren zum Steuern der Spültoilette (20) nach Anspruch 10, **gekennzeichnet dadurch, dass** eine Gleichstromversorgung Energie an die Steuereinheit (37) liefert.

Revendications

1. Système de commande de toilettes à chasse d'eau (20), lesquelles toilettes comprennent un premier canal de rinçage (21) et un second canal de rinçage (22), le système comprenant :

une vanne de mise hors pression (31) comprenant une entrée (311), une première sortie (312) et une seconde sortie (313) ; l'entrée (311) étant, en utilisation, en liaison avec un raccord de tuyauterie d'entrée (314) ;

un premier raccord de tuyauterie de distribution d'eau (32) utilisé pour distribuer de l'eau de la première sortie (312) de la vanne de mise hors pression (31) vers le premier canal de rinçage (21) des toilettes à chasse d'eau (20) ;

un second raccord de tuyauterie de distribution d'eau (33) appliqué pour distribuer l'eau de la seconde sortie (313) de la vanne de mise hors pression (31) vers le second canal de rinçage (22) des toilettes à chasse d'eau (20) ;

une première électrovanne (34) commandée pour démarrer et arrêter le rinçage du premier raccord de tuyauterie de distribution d'eau (32) ; une seconde électrovanne (35) commandée pour démarrer et arrêter le rinçage du second raccord de tuyauterie de distribution d'eau (33) ; un capteur de pression d'eau (36) utilisé pour détecter une pression d'eau dans la vanne de mise hors pression (31) et émettre un signal de pression (P) ;

une unité de commande (37) servant à recevoir un signal de rinçage (W) démarré par un utilisateur et le signal de pression (P) provenant du capteur de pression d'eau (36), de telle sorte qu'après réception du signal de rinçage (W), une séquence de démarrage et de fermeture et des temps de démarrage de la première électrovanne (34) et de la seconde électrovanne (35) sont commandés sur la base du signal de pression (P).

2. Système de commande de toilettes à chasse d'eau (20) selon la revendication 1, **caractérisé par le fait que** l'unité de commande (37) reçoit le signal de rinçage (W) produit après que l'utilisateur a démarré une opération mécanique.

3. Système de commande de toilettes à chasse d'eau (20) selon la revendication 2, **caractérisé par le fait que** le signal de rinçage (W) est produit après que l'utilisateur a touché un commutateur.

4. Système de commande de toilettes à chasse d'eau (20) selon la revendication 1, **caractérisé par le fait que** l'unité de commande (37) reçoit le signal de rinçage (W) produit après une opération sans contact.

5. Système de commande de toilettes à chasse d'eau (20) selon la revendication 4, **caractérisé par le fait que** le signal de rinçage (W) est produit après que l'utilisateur a déclenché un dispositif de détection.

6. Système de commande de toilettes à chasse d'eau (20) selon la revendication 1, **caractérisé par le fait que** l'unité de commande (37) est l'un quelconque parmi une CPU (Unité Centrale de Traitement), un MPU (Microprocesseur) et un MCU (Microcontrôleur).

7. Système de commande de toilettes à chasse d'eau (20) selon la revendication 1, **caractérisé par le fait que** le capteur de pression d'eau (36) est un capteur mécanique ou un capteur électronique.

8. Système de commande de toilettes à chasse d'eau (20) selon la revendication 1, **caractérisé par le fait que** l'unité de commande (37) détermine un premier temps de démarrage (T1), un deuxième temps de démarrage (T2) et un troisième temps de démarrage (T3) selon le signal de pression (P) reçu en provenance du capteur de pression d'eau (36) et démarre la première électrovanne (34) pendant T1 secondes puis ferme la première électrovanne (34), et l'unité de commande (37) démarre la seconde électrovanne (35) pendant T2 secondes puis ferme la seconde électrovanne (35) ; la première électrovanne (34) est démarrée par l'unité de commande (37) pendant T3 secondes puis est fermée, le premier temps de démarrage (T1), le deuxième temps de démarrage (T2) et le troisième temps de démarrage (T3) de la première électrovanne (34) et de la seconde électrovanne (35) ne se chevauchant pas.

9. Système de commande de toilettes à chasse d'eau (20) selon la revendication 1, comprenant en outre une alimentation en courant continu fournissant de la puissance à l'unité de commande (37).

10. Procédé de commande de toilettes à chasse d'eau

- (20) comprenant les étapes consistant à :
- a. recevoir un signal de rinçage (W) démarré par un utilisateur au moyen d'une unité de commande (37) ;
 - b. déterminer un premier temps de démarrage (T1), un deuxième temps de démarrage (T2) et un troisième temps de démarrage (T3) en utilisant l'unité de commande (37) sur la base d'une pression d'eau dans une vanne de mise hors pression (31) ;
 - c. démarrer une première électrovanne (34) de telle sorte qu'une bague périphérique (23) sur des toilettes à chasse d'eau (20) est rincée par l'eau pendant T1 secondes, puis fermer la première électrovanne (34) après que la bague périphérique (23) est rincée ;
 - d. démarrer une seconde électrovanne (35) de telle sorte qu'un conduit de drainage d'eaux usées (24) est rincé par l'eau pendant T2 secondes, puis fermer la seconde électrovanne (35) après que le conduit de drainage d'eaux usées (24) est rincé ;
 - e. démarrer la première électrovanne (34) à nouveau de telle sorte que la bague périphérique (23) sur les toilettes à chasse d'eau (20) est rincée par l'eau pendant T3 secondes, puis la première électrovanne (34) est fermée après que la bague périphérique (23) est rincée ;
 - f. lancer les étapes a, b, c, d et e.
11. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** le signal de rinçage (W) est produit après que l'utilisateur a démarré une opération mécanique.
12. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 11, **caractérisé par le fait que** le signal de rinçage (W) est produit après que l'utilisateur a touché un commutateur.
13. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** le signal de rinçage (W) est produit après une opération sans contact.
14. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 13, **caractérisé par le fait que** le signal de rinçage (W) est produit après que l'utilisateur a déclenché un dispositif de détection.
15. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** l'unité de commande (37) est l'un quelconque parmi une CPU (Unité Centrale de Traitement), un MPU (Microprocesseur) et un MCU (Microcontrôleur).
16. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** la pression d'eau dans la vanne de mise hors pression (31) est détectée par un capteur de pression d'eau (36).
17. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** le capteur de pression d'eau (36) est un capteur mécanique ou un capteur électronique.
18. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** la première électrovanne (34) est montée à une position prédéterminée d'un premier raccord de tuyauterie de distribution d'eau (32) qui est relié à la vanne de mise hors pression (31), et la première électrovanne (34) est couplée à un premier canal de rinçage (21) des toilettes à chasse d'eau (20).
19. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait que** la seconde électrovanne (35) est fixée à une position prédéterminée d'un second raccord de tuyauterie de distribution d'eau (33) qui est relié à la vanne de mise hors pression (31), et la seconde électrovanne (35) est en liaison avec un second canal de rinçage (22) des toilettes à chasse d'eau (20).
20. Procédé de commande de toilettes à chasse d'eau (20) selon la revendication 10, **caractérisé par le fait qu'une** alimentation en courant continu fournit de la puissance à l'unité de commande (37).

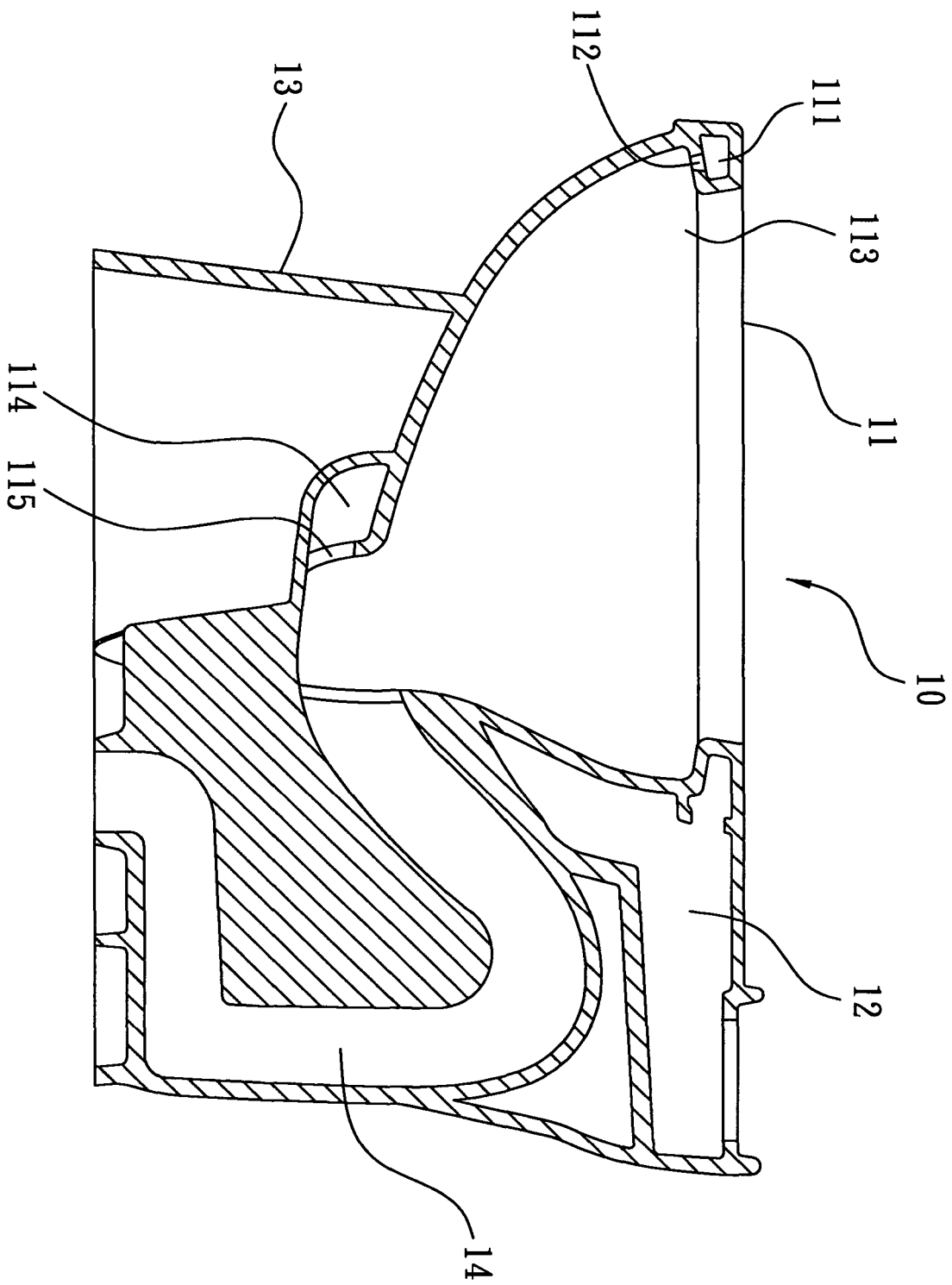


FIG. 1

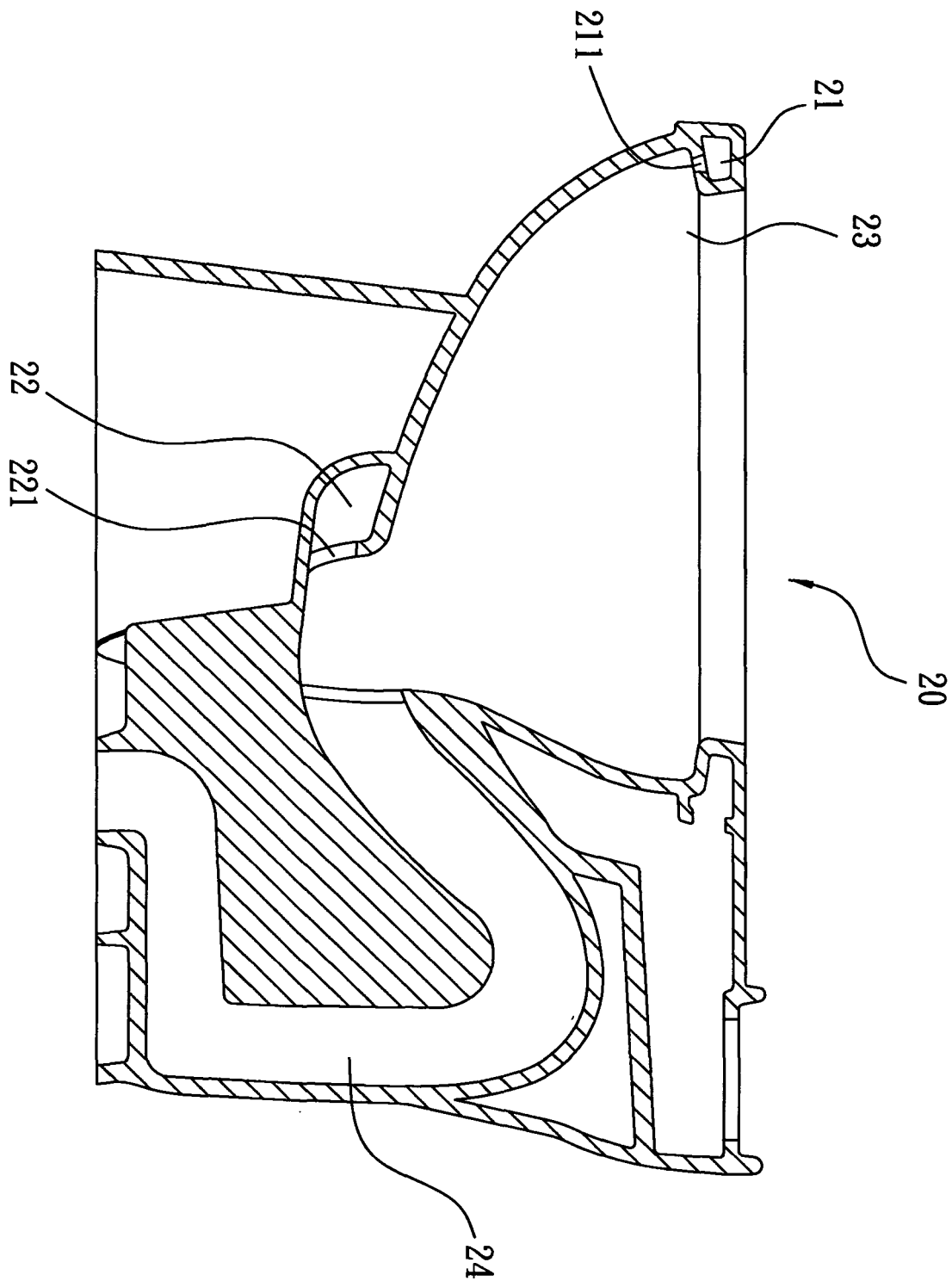


FIG. 2

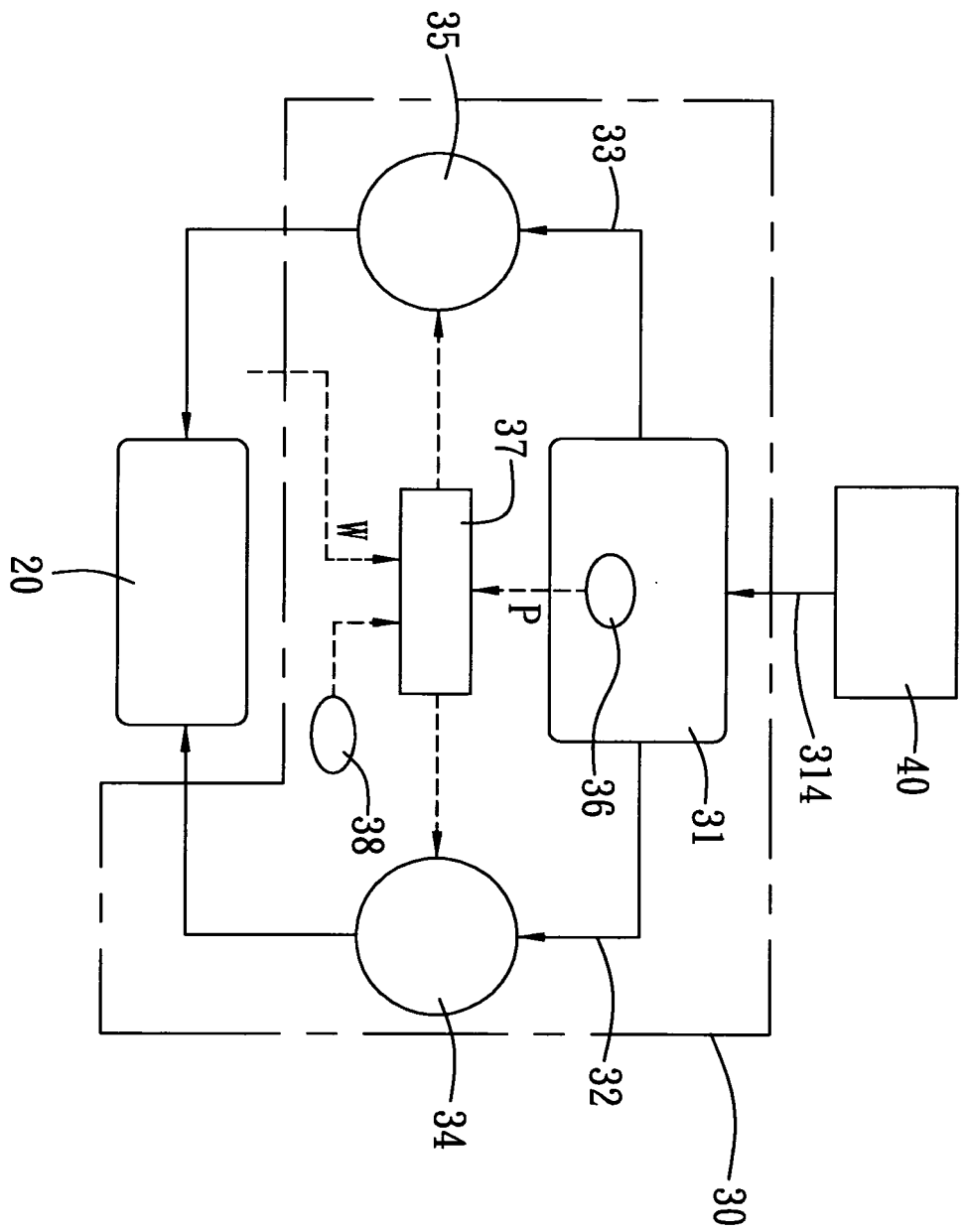


FIG. 3

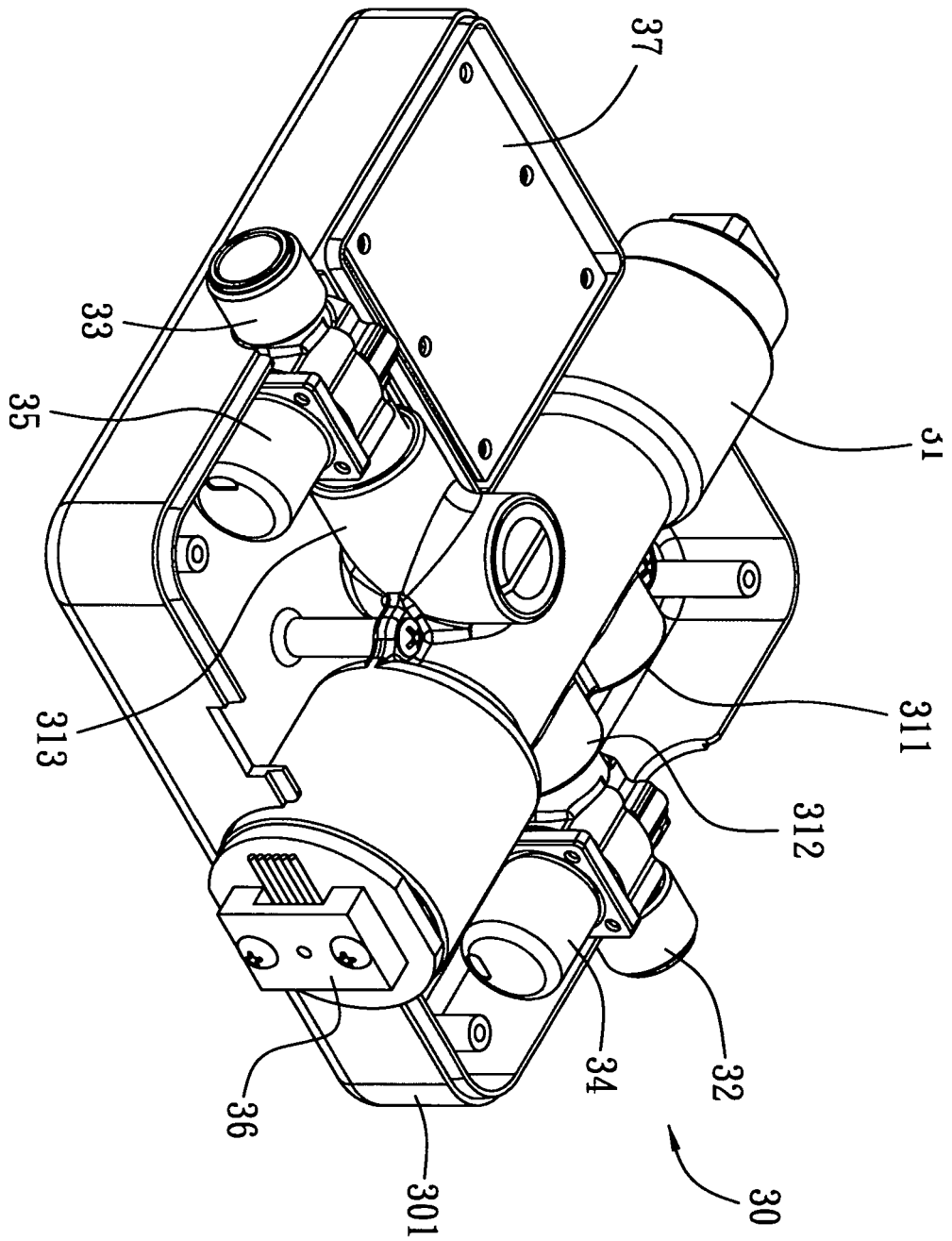


FIG. 4

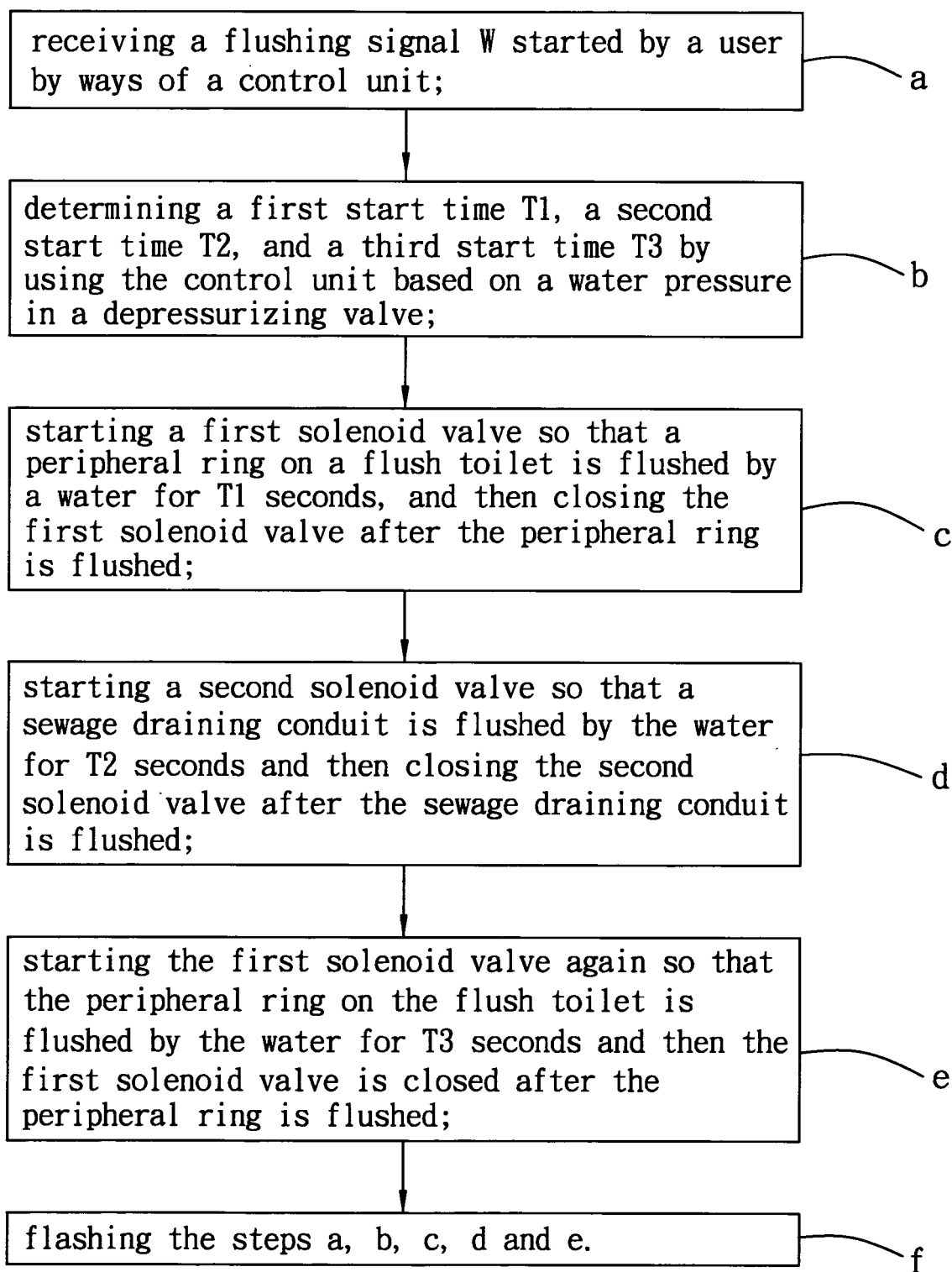


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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