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(71) Applicant: Yiyuan (Shanghai) Environmental
Group Co., Ltd.
Shanghai 200000 (CN)
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(72) Inventor: CHEN, Chunhong
Shanghai 200000 (CN)
- (74) Representative: Gulde & Partner
Patent- und Rechtsanwaltskanzlei mbB
Wallstraße 58/59
10179 Berlin (DE)

(54)

WATER-SAVING TOILET BOWL

(57) A water-saving toilet bowl, comprising a seat (1), and a water tank (2) disposed on the seat (1); the seat (1) is provided with a water flushing cavity (11) thereon; the water flushing cavity (11) is connected to the water tank (2); the water tank (2) is provided with a flusher (21) thereon; the drain pipe (111) of the water flushing cavity (11) is connected to a sewer pipe (31) via a water-saving device; the water-saving device comprises a tank body, a hose (4), and a valve assembly controlling the closure and opening of the hose (4); the valve assembly comprises a rotation piece (51), a rotation shaft (52), and a first pressing piece (53); the hose (4) is disposed slanting downward in the tank body; one end of the hose (4) is connected to the drain pipe (111), and the other end is connected to the sewer pipe (31); the rotation shaft (52) is disposed on the tank body; the rotation piece (51) is rotatably disposed on the rotation shaft (52); the first pressing piece (53) is disposed at the front end of the rotation piece (51); when the rotation piece (51) rotates, the first pressing piece (53) presses the hose (4) to achieve the closure and opening of the hose (4); the slanting straight hose (4) is employed for discharging sewage, so that the sewage discharge of the toilet bowl is not required to travel upward, and the sewage can be easily discharged with only a small amount of water under the effect of gravity.

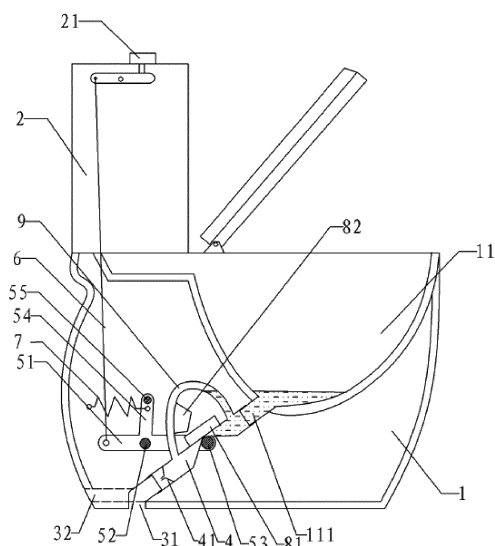


FIG. 1

Description

Technical Field

[0001] The present invention relates to the field of bathroom accessories, specifically to a water closet, in particular to a water-saving water closet.

Description of the Related Art

[0002] Currently, water closets are known as the "measuring scales of sanitary level". The invention of water closets by the English was a huge contribution to human society. Water closets have changed people's habits in washrooms. The neater, cleaner, and more convenient urination and/or defecation mode greatly improved people's living quality. The underground water supply and discharge pipes cover the entire city, so more and more people use the convenience of water closets.

[0003] In order to fulfill the aim of preventing the terrible smell in the sewage pipe from spreading into the room through the water closets and the aim of storing a proper amount of water, the sewage pipes of the existing water closets are designed into the complicated shape of bending upward first and then downward. To flush the sewage into the sewage pipe after using the water closet, a lot of water is needed to flush the water closet. To flush the sewage out, the sewage must be about 50mm higher than the bottom of the water closet; otherwise, the sewage will be retained in the water closet. This is why the traditional water closets consume a lot of water.

Contents of The Present Invention

[0004] The technical problem mainly solved in the present invention is to provide a water-saving water closet which is structured simply, rationally designed, and improves the use ratio of water sources.

[0005] To solve the above technical problem, the present invention provides a water-saving water closet, comprising a water closet body and a water tank disposed on the water closet body; the water closet body being provided with a flushing water chamber; the water chamber is connected with the water tank; the water tank is provided with a switch; a flushing chamber drain pipe is connected with an outside sewage pipe through a water-saving device; the water-saving device comprises a case, a hose, and a valve component which controls the closing and opening of the hose; and the valve component is linked with the switch.

[0006] The valve component comprises a rotor, a rotating shaft, and a first pressing member. The hose is disposed in the case in an inclined way, and one end of the hose is connected with the drain pipe while the other end is connected with the outside sewage pipe. The rotating shaft is disposed on the case. The rotor is rotationally disposed on the rotating shaft. The first pressing member is disposed at the front end of the rotor. The first

pressing member presses the hose to implement the closing and opening of the hose when the rotor rotates.

[0007] In order to improve the safety of the water-closing water closet, the water-saving device also comprises a siphon, and the siphon is disposed on the hose in a reverse "U" shape.

[0008] The present invention has the improvement that, the rotor extends to form a rotating end; the top of the rotating end is provided with a second pressing member; and the second pressing member presses the siphon to implement the closing and opening of the siphon when the rotor rotates.

[0009] In order to fix the hose with the drain pipe and the sewage pipe, the present invention has the improvement that, the two ends of the hose are provided with fixing slots which extend in the circumference; the water-saving device is also provided with a ring hoop; and the ring hoop is disposed in the fixing slots to fix the hose on the drain pipe and the sewage pipe.

[0010] The present invention has the improvement that, the rear end of the rotor is connected with a drive rope which pulls the rotor to rotate, and the drive rope is linked with the switch.

[0011] The present invention has the improvement that, the water-saving device is also provided with a reset spring; one end of the reset spring is connected with the rear end of the rotor, and the other end is fixed on the case.

[0012] The present invention has the improvement that, the case is also provided with a first fixing block and a second fixing block; the first fixing block is disposed on the other side of the hose relative to the first pressing member, and the second fixing block is disposed on the other side of the siphon relative to the second pressing member.

[0013] The present invention has the improvement that one end of the hose close to the sewage pipe is provided with a valve which allows fluid to flow in one direction.

[0014] The present invention has the beneficial effects that, the novel water closet design employs the inclined straight hose for sewage discharge such that the sewage discharge of this water closet is downward; by the effect of gravity, the sewage can be discharged with little water; the water closet is simply structured, convenient to use, high in safety, and has a huge market prospect.

Brief Description of Several Views of the Attached Drawings

[0015]

Figure 1 is a state diagram of the water-saving water closet of the present invention in the normal unused state.

Figure 2 is a state diagram of the water-saving water closet of the present invention in the sewage discharging state.

Description of numbers: 1-water closet body; 11-flushing water chamber; 111-drain pipe; 2-water tank; 21-switch; 31-lower sewage pipe; 32-rear sewage pipe; 4-hose; 41-valve; 51-rotor; 52-rotating shaft; 53-first pressing member; 54-rotating end; 55-second pressing member; 6-drive rope; 7-reset spring; 81-first fixing block; 82-second fixing block; 9-siphon.

Detailed Description of The Present Invention

[0016] The technical content, structural features, objectives, and effects of the present invention are described in detail with reference to the embodiments and attached drawings.

[0017] See figure 1. The present invention provides a water-saving water closet, comprising a water closet body 1 and a water tank 2 disposed on water closet body 1. The water closet body 1 is provided with a flushing water chamber 11. The flushing water chamber 11 is connected with water tank 2. Water tank 2 is provided with a switch 21. A flushing water valve is disposed between the water tank 2 and the flushing water chamber 11. The switch 21 controls the opening and closing of the flushing water valve to realize flushing of the water closet.

[0018] The drain pipe 111 of the flushing water chamber 11 is connected with an outside sewage pipe through a water-saving device. The water-saving device comprises a case, a hose 4, and a valve component which controls the closing and opening of hose 4.

[0019] The valve component comprises a rotor 51, a rotating shaft 52, and a first pressing member 53. Hose 4 is disposed in the case in an inclined way; one end of hose 4 is connected with the drain pipe 111, while the other end is connected with the outside sewage pipe. The rotating shaft 52 is disposed on the case. The rotor 51 is rotationally disposed on the rotating shaft 52. The first pressing member 53 is disposed at the front end of the rotor 51. The first pressing member 53 presses hose 4 to implement closing and opening of hose 4 when the rotor 51 rotates.

[0020] Hose 4 is disposed in an inclined way and is connected with the drain pipe 111 and the outside sewage pipe. When sewage in the flushing water chamber 11 is flushed away, the sewage and the water are directly discharged into the outside sewage pipe through the inclined hose 4. Different from the traditional water closet, the drainage is downward instead of upward, and the sewage can be easily flushed away using little water.

[0021] Wherein, the outside sewage pipe can be disposed in many ways. In one embodiment of the present invention, the outside sewage pipe is a lower sewage pipe 31 or a rear sewage pipe 32. The specific type of the sewage pipe is disposed upon the specific installation position of the water closet.

[0022] Specifically, hose 4 is not limited in material by the present invention, and preferably, is a silicone hose. Of course, the present invention does not limit the specific material of hose 4.

[0023] Wherein, this application provides preferable embodiments for the installation and fixation of hose 4. The end of hose 4 is connected and fixed with drain pipe 111 and the outside sewage pipe is fixed by a ring hoop. Specifically, the two ends of hose 4 are respectively provided with fixing slots that extend in the circumference; the water-saving device is also provided with a ring hoop; and the ring hoop is disposed in the fixing slots to fix hose 4 on drain pipe 111 and the sewage pipe. The fixing slots further limit the axial movement of the ring hoop. The fixation is firm; the dismantling is convenient; and the use is simple.

[0024] The water closet body 1 is provided with a case inside, or the water closet body 1 itself is the case. The case conducts the function of fixing rotating shaft 52. Rotor 51 is rotationally disposed on rotating shaft 52. In this embodiment, rotor 51 is composed of rotating plates which are disposed parallel to each other; the middle parts of the rotating plates have rotating holes through which rotating shaft 52 penetrates through. In this embodiment, the first pressing member 53 is a pressing rod; the two ends of the pressing rods are respectively connected with the two rotating plates; and hose 4 extends through the space between the pressing rod and the rotating shaft 52. When the rotator 51 rotates towards hose 4 along the pressing rod 4, the pressing rod presses hose 4 to reduce the cross section of hose 4 and continuously rotates to close hose 4 and in such circumstances, the rotator 51 rotates in the reverse direction to open hose 4. The rotor 51 is shaped like a rocker on the rotating shaft 52, alternatively controlling the opening and closing of hose 4.

[0025] The rotor 51 in the rocker mode in one embodiment is specially as follows: the rotor 51 is connected with a drive rope 6 which pulls the rotor 51 to rotate; and the drive rope 6 is linked with a switch 21. In the normally unused situation, hose 4 is closed, and in such circumstances, the first pressing member 53 presses hose 4. After use of the water closet, press the flushing switch 21 on the water tank 2, then the drive rope 6 drives the rotor 51 to rotate, the flushing water valve opens, the water tank 2 flushes the flushing water chamber 11, and then hose 4 opens to drain the sewage.

[0026] The rotor 51 in the rocker mode in another embodiment is as follows: the drive rope 6 is connected to the rear end of the rotor 51; the water-saving device is also provided with a reset spring 7; one end of the reset spring 7 is connected to the rear end of the rotor 51, while the other end is fixed on the case.

[0027] When the water closet is not used, the first pressing member 53 closes hose 4 and the spring is at the normal position. When the water closet is flushed in use, press the switch 21 for flushing while the drive rope 6 pulls the rotor 51 to rotate to open the hose 4 so as to drain the sewage. When the water closet is not used, the force acting on the drive rope 6 disappears, and the rotor 51 resets to the original position by the effect of the reset spring 7.

[0028] The outer side of the water tank 2 can be provided with a housing through which the drive rope 6 can penetrate, ensuring that the entire water closet has a beautiful appearance.

[0029] Furthermore, to valid the situation that hose 4 is entire bent and fails to close when pressed by the first pressing member 53, in this embodiment, the case is provided with a first fixing block 81. The first fixing block 81 is disposed on the other side of hose 4 relative to the first pressing member 53 and pressed against hose 4. When the first pressing member 53 presses hose 4, the movement of hose 4 is limited by the effect of support of the first fixing block 81, thus realizing the closing and opening of hose 4.

[0030] When the water closet is not used, hose 4 is closed, which means that water is not discharged into the sewage pipe. If the water closet leaks water, water will flow into the flushing water chamber 11 without stop and finally overflow out of the water closet. To avoid such situation, in this embodiment, the water-saving device also comprises a siphon 9. The siphon 9 is disposed on hose 4 in a reverse "U" shape. The peak of the reverse "U"-shaped siphon 9 disposed is lower than the water closet body 1 but higher than the water level in the flushing water chamber 11. The siphon 9 may have a smaller inner diameter;

[0031] The siphon has two functions. One is to generate an absorption force which generates siphonage through the siphon to continuously bring away water (or air) in the water closet when the sewage hose is sealed and the sewage in the lower sewage pipe is pulled downward continuously, thus ensuring smooth sewage discharge.

[0032] The other is to prevent water leakage. In the case that hose 4 is closed, when the water closet leaks water and the water level is higher than the peak of siphon 9, water flows out from siphon 9 by the effect of the pressure difference. Meanwhile, some sensors can be installed to prompt the users.

[0033] Moreover, siphon 9 is closed when hose 4 is used, avoiding the situation that the sewage is shunted by siphon 9, causes smaller flushing force of hose 4 and results in water waste. Meanwhile, the sewage is also prevented from being clamped in siphon 9 to cause failure of anti-leakage. Therefore, in this embodiment, the rotor 51 also extends to form a rotating end 54. The top of rotating end 54 is provided with a second pressing member 55. The second pressing member 55 presses siphon 9 to implement closing and opening of siphon 9 when rotor 51 rotates. In such circumstances, the connecting plates are trifurcate plates, and the principle is similar to that of the first pressing member 53 and therefore is not repeatedly described. It should be noted that hose 4 and siphon 9 are alternatively to be opened and closed, which means that when hose 4 is open, siphon 9 is closed, while when hose 4 is closed, siphon 9 is open. Therefore, when the first pressing member 53 is reset and hose 4 is pressed by the effect of reset spring 7, the second

pressing member 55 turns to the direction away from siphon hose 4.

[0034] In this embodiment, the case is provided with a second fixing block 82. The second fixing block 82 is disposed on the other side of siphon 9 relative to the second pressing member 55. In another embodiment, the first fixing block 81 and the second fixing block 82 are a whole body.

[0035] In this embodiment, one end of hose 4 close to the sewage pipe is provided with a valve 41 which allows the fluid to flow in one direction. Valve 41 functions as a one-way valve. When discharged, the water flushes open the opening in the middle part of valve 41. When the water closet is not used, the opening is closed to prevent the terrible smell in the sewage pipe from flowing back into the room.

[0036] The above mentioned description is only the exemplary embodiment of the present invention, which cannot limit the present invention. Within the spirit and principle of the present invention, any modification of the equivalent structure, or direct or indirect application in other related technical fields all shall be included in the protection scope of the present invention.

Claims

1. A water-saving water closet, comprising a water closet body and a water tank disposed on the water close body, said water closet body being provided with a flushing water chamber, said water chamber being connected with the water tank, the water tank being provided with a switch, **characterized in that**, a drain pipe of said flushing chamber is connected with an outside sewage pipe through a water-saving device; said water-saving device comprises a case, a hose, and a valve component which controls the closing and opening of the hose; and said valve component is linked with the switch; said hose is disposed in said case in an inclined way, one end of said hose is connected with the drain pipe while the other end is connected with the outside sewage pipe; said valve component comprises a rotor, a rotating member, and a first pressing member; said rotating shaft is disposed on the case; the rotor is rotationally disposed on the rotating shaft; said first pressing member is disposed at the front end of the rotating member; said first pressing member presses the hose to implement closing and opening of the hose when the rotor rotates.
2. The water-saving water closet according to claim 1, **characterized in that**, said water-saving device also comprises a siphon, and the siphon is disposed on the hose in a reverse "U" shape.
3. The water-saving water closet according to claim 2, **characterized in that**, said rotor also extends to

form a rotor end; the top of the rotor end is provided with a second pressing member; the second pressing member presses the siphon to implement closing and opening of the siphon when the rotor rotates.

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4. The water-saving water closet according to claim 1, **characterized in that**, the two ends of said hose are respectively provided with a fixing slot that extends in the circumference; said water-saving device is also provided with a ring hoop; the ring hoop is disposed in the fixing slot; and the hose is disposed on the drain pipe and the sewage pipe. 10
5. The water-saving water closet according to any one of claims 1-4, **characterized in that**, the rear end of said rotor is connected with a drive rope which pulls the rotor to rotate, and the drive rope is linked with the switch. 15
6. The water-saving closet according to claim 5, **characterized in that**, said water-saving device is also provided with a reset spring; one end of said reset spring is connected with the rear end of said rotor, and the other end is fixed at said case. 20
7. The water-saving closet according to claim 1, **characterized in that**, said case is also provided with a first fixing block and a second fixing block; said first fixing block is disposed on the other side of the hose relative to the first pressing member, and the second fixing block is disposed on the other side of the siphon relative to the second pressing member. 25 30
8. The water-saving closet according to claim 1, **characterized in that** one end of said hose close to the sewage pipe is provided with a valve which allows fluid to flow toward one direction. 35

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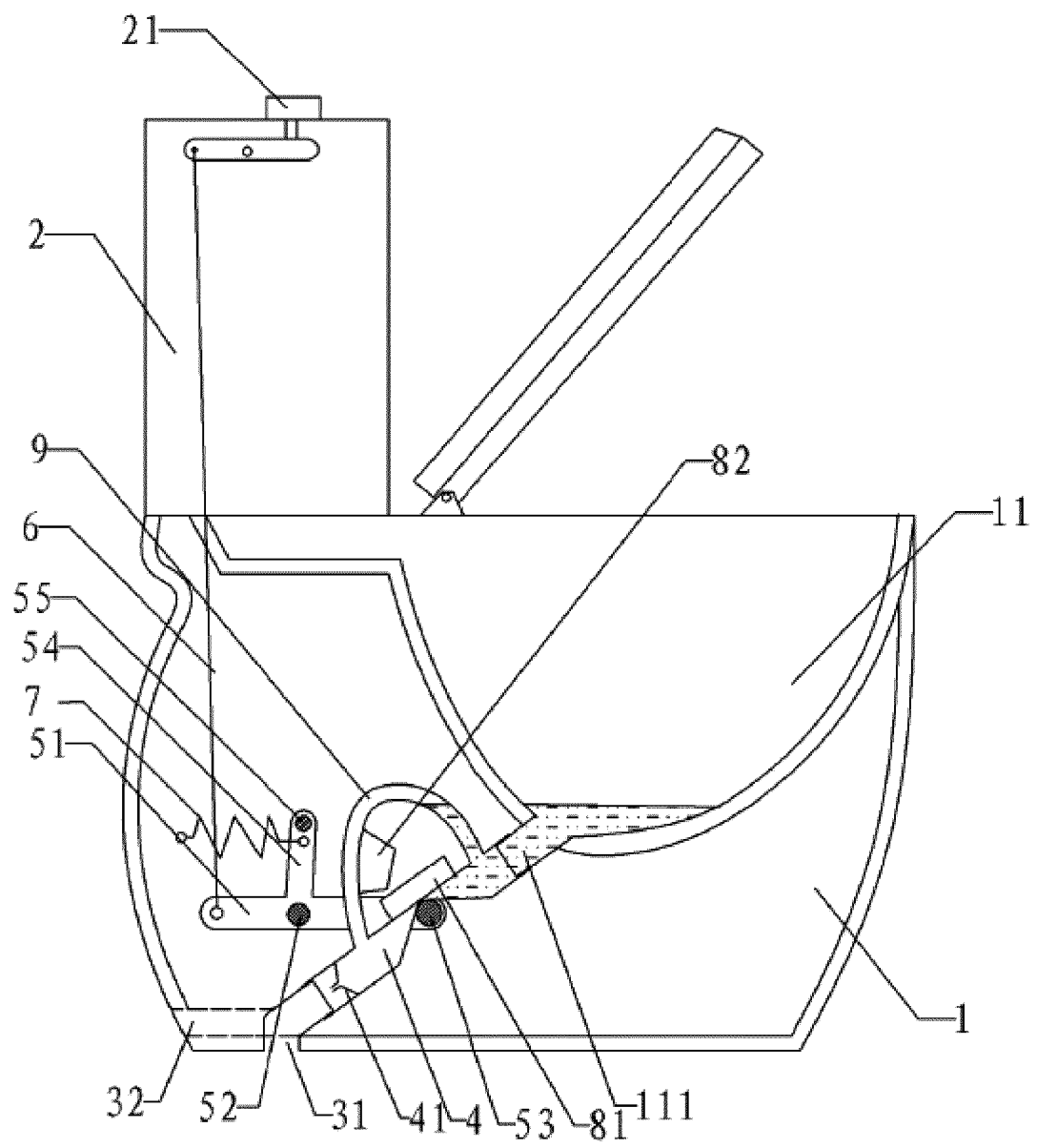


FIG. 1

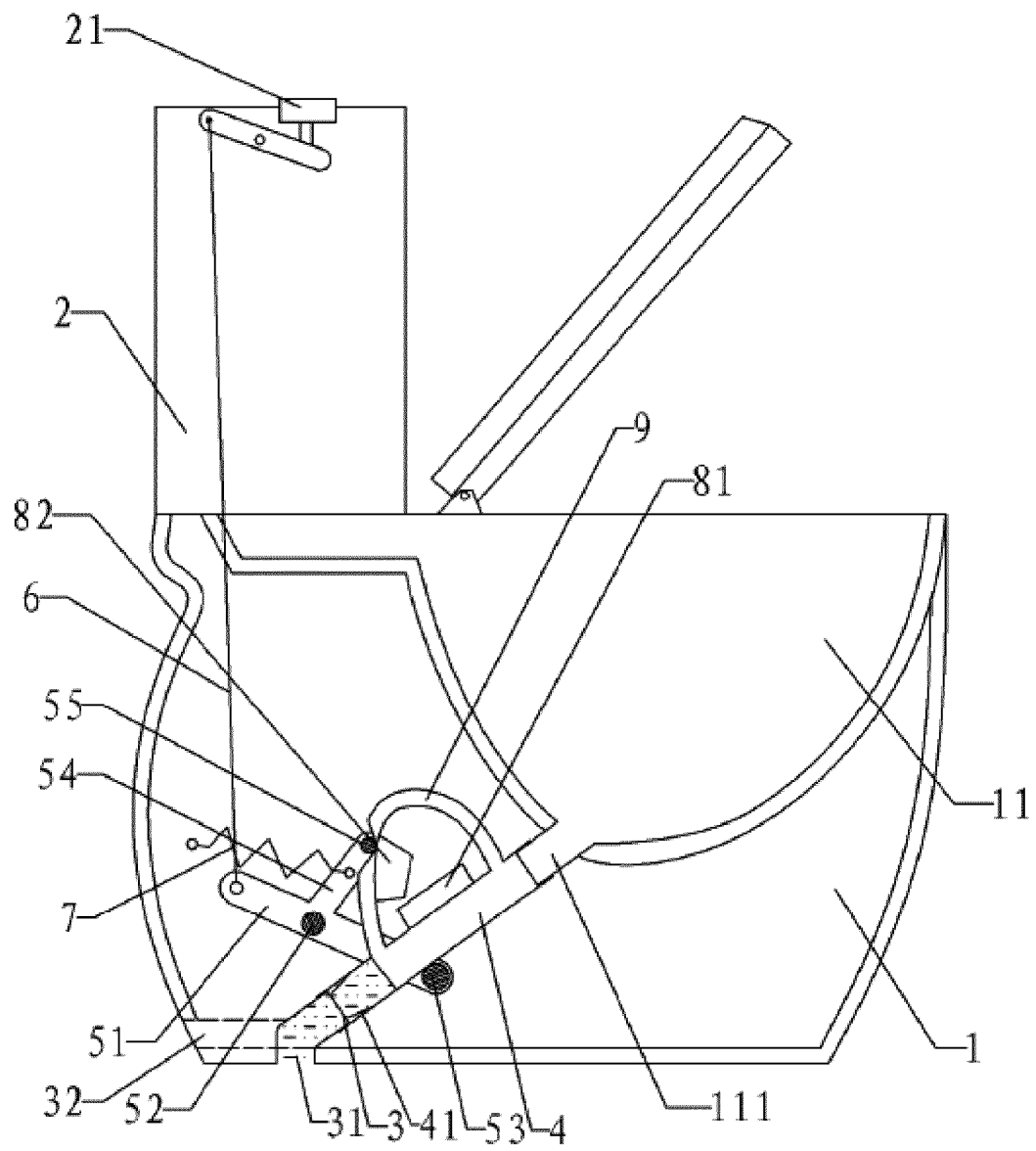


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/078199

A. CLASSIFICATION OF SUBJECT MATTER

See the extra sheet
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)

IPC: E03D

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

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

EPODOC, WPI, CNKI, CNPAT: toilet w bowl, pipe? or tube? or duct? or hose?, axis or axes, shaft, shafts, water w tank?, drain, drainage

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 2491512 Y (LU, Taibai et al.) 15 May 2002 (15.05.2002) description, page 1, count backward line 5 to page 2, line 4 and figure 1	1-8
A	CN 2851382 Y (LI, Ning) 27 December 2006 (27.12.2006) the whole document	1-8
A	CN 2491509 Y (CAO, Jiahong) 15 May 2002 (15.05.2002) the whole document	1-8
A	JP 2009074364 A (MATSUSHITA DENKI SANGYO KK) 09 April 2009 (09.04.2009) the whole document	1-8
A	JP 4285227 A (MATSUSHITA ELECTRIC WORKS LTD) 09 October 1992 (09.10.1992) the whole document	1-8

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
17 January 2013 (17.01.2013)

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Name and mailing address of the ISA
State Intellectual Property Office of the P. R. China
No. 6, Xitucheng Road, Jimenqiao
Haidian District, Beijing 100088, China
Facsimile No. (86-10) 62019451

Authorized officer
HAN, Bingbing
Telephone No. (86-10) 62085356

INTERNATIONAL SEARCH REPORT
Information on patent family members

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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 2491512 Y	15.05.2002	None	
CN 2851382 Y	27.12.2006	None	
CN 2491509 Y	15.05.2002	None	
JP 2009074364 A	09.04.2009	JP 4927107 B2	09.05.2012
JP 4285227 A	09.10.1992	JP 2642791 B2	20.08.1997

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/078199

A. CLASSIFICATION OF SUBJECT MATTER

E03D 11/10 (2006.01) i

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