(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 269 885 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
17.01.2018 Bulletin 2018/03

(21) Application number: **16761096.3**

(22) Date of filing: **08.03.2016**

(51) Int Cl.:
E03D 9/08 *(2006.01)*

(86) International application number:
PCT/CN2016/075833

(87) International publication number:
WO 2016/141869 (15.09.2016 Gazette 2016/37)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **09.03.2015 CN 201510101871**

(71) Applicant: **Xiamen Axent Corporation Limited**
Xiamen, Fujian 361022 (CN)

(72) Inventors:
- **LUO, Jingquan**
  Fujian 361022 (CN)
- **FANG, Yimin**
  Fujian 361022 (CN)
- **HU, Jianru**
  Fujian 361022 (CN)
- **CHEN, Zhiliang**
  Fujian 361022 (CN)

(74) Representative: **Feltrinelli, Secondo Andrea et al**
APTA S.r.l.
Patent Department
Via Ca' di Cozzi, 41
37124 Verona (IT)

(54) NEW-TYPE CLEANING DEVICE AND CLEANING METHOD THEREOF

(57) A cleaning device of a human body local flushing device and a cleaning method thereof. The cleaning device comprises a partition switch (111) with a water flow partition function, a transfer device with at least one water inlet and a water outlet, a flushing assembly (3) for upwards ejecting flushing water to flush a local part of a human body, an inner flow path (2) at an upstream of the flushing assembly (3), an operating device adopting a corresponding element as an action response object, a water pump (4) for repeatedly pumping liquid and with the action controlled by the operating device, and a movable cleaning assembly (5) arranged outside the flushing assembly (3). The water outlet of the flushing assembly (3) is immersed in the cleaning liquid of the cleaning assembly (5) during a partial process of cleaning the inner flow path (2).

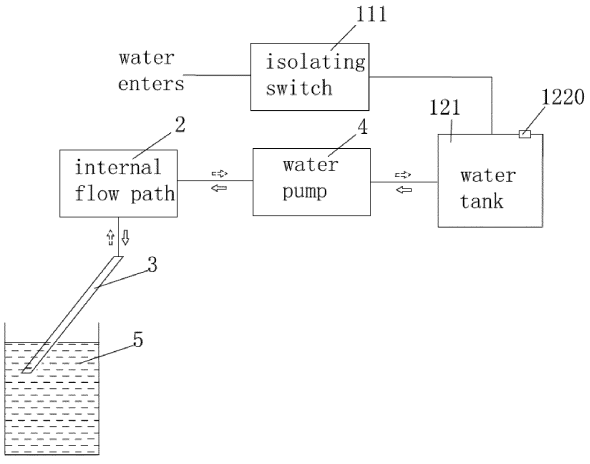

Figure 1

EP 3 269 885 A1

Description

FIELD

[0001] The present application relates to a new-type cleaning device and a cleaning method thereof for a human body part washing device, such as a toilet having a human body part washing function or other devices having the human body part washing function, and particularly relates to a new-type cleaning device and a cleaning method thereof for a human body part washing device, such as a toilet having a heating function or other devices.

BACKGROUND

[0002] In a human body part washing device such as a human body part washing toilet or other devices having the human body part washing function, the internal flow path for wash water and an outer surface of a washing assembly are prone to generating fouling or bacterium after a long time use.

[0003] In order to solve the above problem, a device with a sterilization function such as a sterilization lamp, a high-temperature fog sterilization component or a high-temperature water sterilization component is arranged at a water outlet of the washing assembly in the conventional technology, so as to sterilize a surface of the water outlet of the washing assembly. This type of sterilization device sterilizes only the outer surface of the washing assembly, and cannot go deep into the internal flow path for the wash water.

Technical Problem

[0004] In order to sterilize the internal flow path, a sterilization component or a descaling component is provided in the above device in the conventional technologies, and a control process for sterilization and descaling is also provided. When the sterilization or descaling is started, these components start to operate and release sterilization or descaling liquid into the internal flow path to sterilize or descale the internal flow path. Such sterilization or descaling method has the following problems. Since the sterilization or descaling component needs to be arranged in the internal flow path and cannot be removed from the human body part washing device, and the sterilization or descaling liquid from the sterilization or descaling component cannot circulate in the internal flow path and thus cannot be used efficiently.

Technical solution

[0005] The object of the present application is to provide a new-type cleaning device and a cleaning method thereof, for a human body part washing device such as a toilet or other device having a human body part washing function. The new-type cleaning device has a simple structure, operates easily, and can clean circularly and thoroughly.

[0006] The present application includes the following solutions. A new-type cleaning device includes: an isolating switch having a water flow isolating function, an intermediate device having at least one water inlet and at least one water outlet, a washing assembly configured to eject wash water upwards to wash a part of a human body, an internal flow path arranged at a water flow upstream position of the washing assembly, an operation device taking an element as an action response object, a water pump configured to reciprocatingly pump liquid and operate under control of the operation device, and a cleaning assembly which is movable and arranged outside the washing assembly, where a water outlet of the washing assembly is immersed in cleaning liquid in the cleaning assembly in a part of a process of cleaning the internal flow path.

[0007] Preferably, the intermediate device may be a water tank, an air hole is arranged on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank, the water pump is connected in series to the internal flow path, and is arranged at a water flow downstream position of the water tank and a water flow upstream position of the washing assembly. During the cleaning, the water pump operates reciprocatingly to enable the cleaning liquid to reciprocatingly flow in the cleaning assembly, the washing assembly, the internal flow path, the water pump and the water tank, thereby implementing internal cleaning.

[0008] Preferably, the new-type cleaning device may further include a switching device arranged at a water flow upstream position of the washing assembly to switch between a human body washing mode and a flow path cleaning mode.

[0009] In a case that the water pump is connected in series to the internal flow path, the above intermediate device may be a water tank. An air hole is arranged on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank. The water tank is arranged at a water flow upstream position of the water pump. The switching device has at least two water outlets. In this case, one of water outlets of the switching device is in water-communication with the water tank.

[0010] Preferably, the water pump may also be connected in parallel with the internal flow path.

[0011] In a case that the water pump is connected in parallel with the internal flow path, the intermediate device may be a three-way pipe having one water inlet and two water outlets, the three-way pipe is arranged at a water flow downstream position of the isolating switch, an end of the water pump is connected to one of the water outlets of the three-way pipe, and the other end of the water pump is connected to the switching device.

[0012] In a case that the water pump is connected in parallel with the internal flow path, the cleaning device may further include a water tank, an air hole is arranged

on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank, the water tank is connected in series to the water pump, the intermediate device is a three-way pipe having one water inlet and two water outlets, the three-way pipe is arranged at a water flow downstream position of the isolating switch, an end of the water pump which is not connected to the water tank is connected to one of the water outlets of the three-way pipe, and an end of the water tank which is not connected to the water pump is connected to the switching device.

[0013] An internal channel may include a water storage channel such as the inner flow path.

[0014] In a case that the water pump is connected in parallel with the internal flow path, the intermediate device is a water tank, an air hole is arranged on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank, the water tank is arranged at a water flow upstream position of the water pump, an end of the water pump is connected to the water tank and the other end of the water pump is connected to the switching device.

[0015] A cleaning method applied in the above new-type cleaning device includes the following steps 1 and 2.

[0016] In step 1, an control device is driven to rotate a water pump to discharge most of water in an internal flow path via a water outlet of a washing assembly.

[0017] In step 2, the water outlet of the washing assembly is immersed in cleaning liquid in the cleaning assembly, and the control device is driven by means of a cleaning button of the operation device to rotate the water pump, to allow the cleaning liquid in the cleaning assembly to flow circularly in a loop comprising the water pump and the internal flow path.

[0018] In step 1, the washing assembly may be in a retracted state during discharging of the most of water in the internal flow path.

[0019] In step 2, the cleaning liquid may be switched between different internal flow paths by a switching device.

[0020] After the internal flow path is cleaned using the cleaning liquid for a preset period of time in step 2, the water pump may allow most of the cleaning liquid to be discharged from the internal flow path, and water may be allowed to enter to discharge residual cleaning liquid in the internal flow path.

Advantageous Effect

[0021]

1. The cleaning assembly is arranged outside the washing assembly, therefore cleaning liquid with various cleaning functions may be prepared in the cleaning container according to particular cleaning requirements, which is easy to operate.

2. The cleaning liquid in the cleaning assembly is prepared according to requirements, and the cleaning liquid is circulated in the internal flow path and is switched between internal flow paths according to preset requirements. In this case, the cleaning is thorough and a cleaning effect of the device is improved.

3. It is unnecessary to arrange the cleaning assembly inside the part washing device, and the cleaning liquid is added via the water outlet of the washing assembly without occupying an inner space of the localized washing device.

4. A small amount of cleaning liquid is circulated or reciprocatingly flows in the internal flow path. Thus, the cleaning liquid is utilized effectively.

5. The cleaning liquid is prepared according to requirements. Different types of cleaning liquid for sterilization or descaling may be prepared according to requirements for cleaning the internal flow path as well as providing multiple cleaning modes such as sterilization and descaling. The device for washing can operate in the multiple cleaning modes such as sterilization and descaling by additionally providing only hardware such as a water pump in the device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022]

Figure 1 is a schematic diagram showing a connection structure according to a first embodiment;

Figure 2 is a schematic diagram showing a connection structure and a flow direction in a cleaning method A according to a second embodiment;

Figure 3 is a schematic diagram showing a connection structure and a flow direction in a cleaning method B according to the second embodiment;

Figure 4 is a schematic diagram showing a connection structure according to a third embodiment;

Figure 5 is a schematic diagram showing a connection structure and a flow direction in a cleaning method A according to an fourth embodiment;

Figure 6 is a schematic diagram showing a connection structure and a flow direction in a cleaning method B according to the fourth embodiment;

Figure 7 is a schematic diagram showing a connection structure and a flow direction in a cleaning method A according to an fifth embodiment; and

Figure 8 is a schematic diagram showing a connection structure and a flow direction in a cleaning method B according to the fifth embodiment.

DETAILED DESCRIPTION OF EMBODIMENTS

[0023] A new-type cleaning device for cleaning an internal flow path of a human body part washing device such as a toilet or other device having a human body part washing function includes: an isolating switch 111 having a water flow isolating function, a washing assembly 3 configured to eject wash water upwards to wash a human body part, an internal flow path 2 arranged at a water flow upstream position of the washing assembly, an operation device taking an element as an action response object, a water pump 4 configured to reciprocatingly pump liquid and operate under control of the operation device, and a cleaning assembly 5 which is movable and arranged outside the washing assembly. A water outlet of the washing assembly 3 is immersed in cleaning liquid of the cleaning assembly 5 in a part of the process of cleaning the internal flow path.

[0024] The internal flow path 2 is an internal pipeline arranged between the washing assembly 3 and the isolating switch 111 and used for the wash water flowing through. Generally, a heater is arranged in the internal flow path 2 to heat the wash water ejected to the human body by the washing assembly to an appropriate temperature, such that the wash water is comfortable. In addition, other assemblies are arranged in the internal flow path 2 to meet other requirements of the part washing device.

[0025] The cleaning device may further include a switching device 6 arranged at a water flow upstream position of the washing assembly 3 to enable the cleaning device to switch between a human body washing mode and a flow path cleaning mode.

[0026] The cleaning assembly 5 may include a cleaning container, cleaning liquid and a placement rack, which are arranged outside the above human body part washing device. The cleaning liquid may be sterilizing liquid, bactericidal liquid, descaling liquid or the like prepared according to the cleaning requirement. The placement rack may be a human hand or may be a holder which is relatively fixed on the human body part washing device, has a support function and allows the water outlet of the washing assembly to be immersed and extended to the bottom of the container. In the case that placement rack is the holder, the holder is preferably a removable holder with two sides rested on the human body part washing device and a middle portion provided with a groove for placing the cleaning container.

[0027] The above washing assembly 3 includes a spray rod and a spray head. Preferably, the spray rod is an automatically retractable rod, and the water outlet of the washing assembly is disposed on the spray head.

[0028] The spray head of the above washing assembly 3 may include one water outlet, or two or more water outlets for different washing modes such as water outlets for buttock washing, women washing, self-cleaning and the like.

[0029] The above internal flow path 2 may include an internal flow path of water passing components such as the heater and the interior of pipelines connected between the water passing components. Or, the internal flow path 2 may be an internal flow path in the human body part washing device which is prone to fouling and through which the wash water for the human body part flows.

First embodiment

[0030] As shown in Figure 1, in the embodiment, an intermediate device is a water tank 121. An air hole 1210 is arranged on the top of the water tank 121. Outside air enters the water tank via the air hole 1210 in the case that a negative pressure occurs in the water tank 121. The water pump 4 is connected in series in the internal flow path 2 and is located at water flow downstream position of the water tank 121 and water flow upstream position of the washing assembly 3. During a cleaning process, the water pump 4 moves reciprocatingly to enable the cleaning liquid to circulate inside the cleaning assembly, the washing assembly, the internal flow path, the water pump, the water tank and the like to achieve internal cleaning.

[0031] The washing assembly 3 may include one or more water outlets. In the case of more than one water outlet, after one water outlet is cleaned, the cleaning liquid is switched by the switching device to another uncleaned water outlet. In this embodiment, the water pump 4 is a two-way water pump which operates under control of the operation device.

[0032] In this embodiment, the water pump 4, the cleaning assembly 5, the washing assembly 3, the internal flow path 2, the water tank 121 and the like form a water flow loop in which water can flow reciprocatingly.

[0033] An internal channel includes the internal flow path, the water tank 121 and other water storage channels.

[0034] When the internal flow path is cleaned, the internal flow path of the above human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0035] In step 1, the operation device is driven to rotate the water pump forwards, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3.

[0036] In step 2, the water outlet of the washing assembly 3 is immersed in the cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button thereof to rotate the water pump reversely. In this case, the cleaning liquid is taken into the water tank 121 via the washing assembly 3 and the internal flow path 2. After an appropriate amount of cleaning liquid is taken in, the water pump 4 rotates for-

wards to allow the cleaning liquid to flow from the water tank 121 to the internal flow path 2 and then flow outwards via the washing assembly 3.

[0037] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow reciprocatingly in the above water flow loop.

[0038] In step 4, the water pump rotates forwards to allow the cleaning liquid to flow out of the internal flow path after the reciprocating flow in step 3 is completed.

[0039] In step 5, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0040] In the steps of the above cleaning method according to this embodiment, when step 1 is performed, the spray rod of the washing assembly 3 is in an unextended state, to prevent the water in the internal flow path from splashing on the human body during discharging.

[0041] In the case that the washing assembly 3 includes more than one water outlet, after reciprocating cleaning of a first water outlet in steps 2 to 3 is completed, the cleaning liquid is switched to an Nth water outlet by the switching device, and the reciprocating flow of the cleaning liquid in the internal flow path in steps 2 to 3 is repeated. If one of the water outlets of the washing assembly 3 cannot be immersed in the cleaning liquid in the cleaning container, the water outlet which cannot be immersed in the cleaning liquid is cleaned by the cleaning liquid taken into the internal flow path via one of the water outlets which can be immersed in the cleaning liquid, and then the cleaning liquid is discharged via the water outlet which cannot be immersed in the cleaning liquid.

Second embodiment

[0042] As shown in Figures 2 and 3, in this embodiment, the water pump is connected in series in the internal flow path. The above intermediate device may be a water tank 122. An air hole 1220 is arranged on the top of the water tank 122. Outside air enters the water tank via the air hole 1220 in the case that a negative pressure occurs in the water tank 122. The water tank 122 is arranged at a water flow upstream position of the water pump 4. The switching device 6 has at least two outlets. In this case, one of the outlets of the switching device and the water tank 122 are connected to allow water to circulate.

[0043] The washing assembly 3 may include one or more water outlets. In the case of more than one water outlet, after one water outlet is cleaned, the cleaning liquid is switched by the switching device 6 to another uncleaned water outlet.

[0044] One end of the water pump 4 is connected to the water tank 122, and the other end of the water pump 4 is connected to the internal flow path 2 at water flow upstream position of the switching device 6. During the human body washing process of the localized washing device, the outlet of the switching device 6 leading to the water tank 122 is in a closed state.

[0045] The water pump 4 is a two-way water pump which operates under control of the operation device.

[0046] An internal channel includes water storage channels such as the inner flow path 2 and the water tank 122.

[0047] In this embodiment, as shown in Figure 2, the water tank 122, the water pump 4, and the washing assembly 3 form a circulation loop in which water can flow circularly. When the internal flow path in the circulation loop is cleaned, the internal flow path of the above human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0048] In step 1, the operation device is driven to rotate the water pump forwards, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water tank 122 is in the closed state.

[0049] In step 2, the water outlet of the washing assembly 3 is immersed in the cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device while the outlet of the switching device 6 leading to the water tank 2 is maintained in the closed state. In this case, the water pump starts to rotate reversely, such that the cleaning liquid is into the water tank 122 via the washing assembly 3 and the internal flow path 2. After an appropriate amount of cleaning liquid is taken in, the outlet of the switching device 6 leading to the water tank 122 is in an opened state, and the water pump 4 rotates forwards to allow the cleaning liquid to flow from the water tank 122 to the internal flow path 2 and then flow back to the water tank 122 via the switching device 6.

[0050] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow circularly in the above water flow loop.

[0051] In step 4, the water pump rotates forwards to allow the cleaning liquid to flow out of the internal flow path after the circulation flow in step 3 is completed.

[0052] In step 5, the isolating switch is turned on to allow the outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0053] In this embodiment, as shown in Figure 3, another circulation loop may be formed. In this case, the washing assembly 3 includes at least two water outlets. During the cleaning process of the internal flow path, the switching device 6 makes one of the water outlets of the washing assembly to be in communication with the internal flow path 2. Meanwhile, another water outlet of the washing assembly is in communication with the water tank 122. The water tank 122, the water pump 4, the internal flow path 2, two water outlets of the washing assembly 3 and the cleaning assembly 5 form a circulation loop in which water can flow circularly. When the internal flow path of the circulation loop is cleaned, the internal flow path of the human body part washing device is cleaned according to a cleaning method including the

following steps 1-5.

[0054] In step 1, the operation device is driven to rotate the water pump to forwards, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water tank 122 is in a closed state.

[0055] In step 2, the water outlet of the washing assembly 3 is immersed in the cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device. In this case, the water pump starts to rotate reversely, such that the cleaning liquid is taken into the water tank 122 via the washing assembly 3, the internal flow path 2 and the water pump 4, and then flows to the washing assembly 3 via a flow path from the switching device 6 to the water tank 122 and flows back to the cleaning assembly.

[0056] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow circularly in the above water flow loop.

[0057] In step 4, after the circulation flow in step 3 is completed, the water pump rotates forwards to allow the cleaning liquid to flow out of the internal flow path. At this time, the outlet of the switching device 6 leading to the water tank 122 is in the closed state.

[0058] In step 5, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0059] In the steps of the above two cleaning methods, when step 1 is performed, the spray rod of the washing assembly 3 is in an unextended state, to prevent water in the internal flow path from splashing on the human body during discharging.

[0060] In the case that the washing assembly 3 includes more than one water outlet, after reciprocating cleaning of a first water outlet in steps 2 to 3 is completed, the cleaning liquid is switched to an Nth water outlet by the switching device, and the circulation of the cleaning liquid in the internal flow path in steps 2 to 3 is repeated. If one of the water outlets of the washing assembly 3 cannot be immersed in the cleaning liquid in the cleaning container, the water outlet which cannot be immersed in the cleaning liquid is cleaned by the cleaning liquid taken into the internal flow path via one of the water outlets which can be immersed in the cleaning liquid, and then the cleaning liquid is discharged via the water outlet which cannot be immersed in the cleaning liquid.

Third embodiment

[0061] As shown in Figure 4, the water pump 4 is connected in parallel with the internal flow path 2. In this embodiment, the intermediate device is a three-way pipe 133 having one water inlet and two water outlets. The isolating switch 113 is arranged at water flow upstream position of the three-way pipe 133. One end of the water pump 4 is connected to one of the water outlets of the three-way pipe 133, and the other end of the water pump 4 is connected to the switching device 6. The water pump is a one-way water pump which operates under control of the operation device.

[0062] The internal channel includes water storage channels such as the internal flow path.

[0063] In the embodiment, the washing assembly 3 includes two or more water outlets, in which a first water outlet is used for taking in the cleaning liquid, and an Nth water outlet is used for returning the taken-in cleaning liquid which has been used for cleaning one time back to the cleaning container. During the cleaning process of the internal flow path, the switching device 6 allows one of the water outlets of the washing assembly to keep in communication with the internal flow path 2 while allowing another water outlet of the washing assembly to keep in communication with the water tank 122. In this case, the three-way pipe 133, the water pump 4, the internal flow path 2, two outlets of the washing assembly 3, and the cleaning assembly 5 form a circulation loop in which water can flow circularly. When the internal flow path of the circulation loop is cleaned, the internal flow path of the above human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0064] In step 1, the operation device is driven to rotate the water pump reversely, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water pump 6 is in a closed state.

[0065] In step 2, the water outlet of the washing assembly 3 is immersed in cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device. In this case, the water pump starts to rotate reversely, such that the cleaning liquid is taken into the three-way pipe 133 via the first outlet of the washing assembly 3 and the internal flow path 2. Then the cleaning liquid flows from the water pump 4 to the switching device 6, then to the Nth water outlet of the washing assembly 3, and flows back to the cleaning container. At this time, the outlet of the switching device 6 leading to the water pump 4 is also in communication with the Nth water outlet of the washing assembly 3.

[0066] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow circularly in the above circulation loop.

[0067] In step 4, after the circulation flow in step 3 is completed, the water pump rotates forwards to allow the cleaning liquid to flow out of the internal flow path. At this time, the outlet of the switching device 6 leading to the water pump 4 is in the closed state.

[0068] In step 6, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0069] In the steps of the above two cleaning methods, when step 1 is performed, the spray rod of the washing assembly 3 is in an unextended state, to prevent water

in the internal flow path from splashing on the human body during the discharging.

[0070] In the case that the washing assembly 3 includes multiple water outlets, after reciprocating cleaning of a first water outlet in steps 2 to 3 is completed, the cleaning liquid is switched to an Nth water outlet by the switching device, and the circulation of the cleaning liquid in the internal flow path in steps 2 to 3 is repeated. If one of the water outlets of the washing assembly 3 cannot be immersed in the cleaning liquid in the cleaning container, the water outlet which cannot be immersed in the cleaning liquid is cleaned by the cleaning liquid taken into the internal flow path via one of the water outlets which can be immersed in the cleaning liquid, and then the cleaning liquid is discharged via the water outlet which cannot be immersed in the cleaning liquid.

Fourth embodiment

[0071] As shown in Figures 5 and 6, in the case that the water pump 4 and internal flow path 2 are connected in parallel, the cleaning device further includes a water tank 1240. An air hole is arranged on the top of the water tank 1240. Air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank. The water tank 1240 is connected in series to the water pump 4, and the intermediate device is a three-way pipe 134 having one water inlet and two water outlets. The three-way pipe 134 is arranged at water flow downstream position of the isolating switch. An end of the water pump 4 which is not connected to the water tank 1240 is connected to one of the water outlets of the three-way pipe 134, and an end of the water tank 1240 which is not connected to the water pump 4 is connected to the switching device 6. The water pump 4 is a two-way water pump which operates under control of the operation device.

[0072] The internal channel includes water storage channels such as the internal flow path 2 and the water tank 1240.

[0073] In the embodiment, as shown in Figure 5, the three-way pipe 134, the internal flow path 2, the switching device 6, the water tank 124, the water pump 4, and the washing assembly 3 form a circulation loop in which water can flow circularly. In the case of cleaning the internal flow path of the circulation loop, the internal flow path of the above human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0074] In step 1, the operation device is driven to rotate the water pump reversely, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water tank 124 is in a closed state.

[0075] In step 2, the water outlet of the washing assembly 3 is immersed in cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device while the outlet of the switching device 6 leading to the water tank 124 is maintained in the closed state. In this case, the water pump starts to rotate reversely, such that the cleaning liquid is taken into the water tank 124 via the washing assembly 3, the internal flow path 2, the three-way pipe 134 and water pump 6. After an appropriate amount of the cleaning liquid is taken in, the outlet of the switching device 6 leading to the water tank 124 is in an opened state while the outlet of the switching device 6 leading to the washing assembly 3 is in the closed state. The water pump 4 rotates forwards, such that the cleaning liquid flows from the water tank 124 to the switching device 6, the internal flow path 2, the three-way pipe 134 and the water pump 4, and then flows back to the water tank 124.

[0076] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container to flow circularly in the above circulation loop.

[0077] In step 4, after the circulation flow in step 3 is completed, the water pump rotates forwards to make the cleaning liquid flow out of the internal flow path.

[0078] In step 5, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0079] In the embodiment, as shown in Figure 6, another circulation loop may be formed. In this case, the washing assembly 3 includes at least two water outlets. During the cleaning process of the internal flow path, the switching device 6 allows one of the water outlets of the washing assembly to keep in communication with the internal flow path 2 while allowing the other water outlet of the washing assembly to keep in communication with the water tank 124. The water tank 124, the water pump 4, the three-way pipe 134, the internal flow path 2, two water outlets of the washing assembly 3, and the cleaning assembly 5 form a circulation loop in which water can flow circularly. When the internal flow path of the circulation loop is cleaned, the internal flow path of the human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0080] In step 1, the operation device is driven to rotate the water pump reversely, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water tank 124 is in a closed state.

[0081] In step 2, the water outlet of the washing assembly 3 is immersed in the cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device. In this case, the water pump starts to rotate reversely, such that the cleaning liquid is taken into the water tank 124 via the washing assembly 3, the internal flow path 2, the three-way pipe 134 and the water pump 4. Then the cleaning liquid flows to the washing assembly 3 via a flow path from the switching device 6 to the water tank 124 and flows back to the cleaning container of the cleaning assembly 5.

[0082] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow circularly in the above circulation loop.

[0083] In step 4, after the circulation flow in step 3 is completed, the water pump rotates forwards to allow the cleaning liquid to flow out of the internal flow path. At this time, the outlet of the switching device 6 leading to the water tank 124 is in the closed state.

[0084] In step 5, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0085] In the steps of the above two cleaning methods, when step 1 is performed, the spray rod of the washing assembly 3 is in an unextended state, to prevent the water in the internal flow path from splashing on the human body during discharging.

[0086] In the case that the washing assembly 3 includes multiple water outlets, after a reciprocating cleaning for the first water outlet in steps 2 to 3 is completed, the cleaning liquid is switched to an Nth water outlet by the switching device, and the circulation of the cleaning liquid in the internal flow path in steps 2 to 3 is repeated. If one of the water outlets of the washing assembly 3 cannot be immersed in the cleaning liquid in the cleaning container, the water outlet which cannot be immersed in the cleaning liquid is cleaned by the cleaning liquid taken into the internal flow path via one of the water outlets which can be immersed in the cleaning liquid, and then the cleaning liquid is discharged via the water outlet which cannot be immersed in the cleaning liquid.

Fifth embodiment

[0087] As shown in Figures 7 and 8, the water pump 4 is connected in parallel with the internal flow path 2, and the intermediate device is a water tank 125. An air hole is arranged on the top of the water tank 125. Air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank. The water tank is arranged at a water flow upstream position of the water pump. One end of the water pump 4 is connected to the water tank, and the other end of the water pump 4 is connected to the switching device 6. The water pump 4 is a two-way water pump which operates under control of the operation device.

[0088] The washing assembly 3 includes two or more water outlets, in which a first water outlet is used for taking in the cleaning liquid, and an Nth water outlet is used for returning the taken-in cleaning liquid which has been used for cleaning once back to the cleaning container.

[0089] The internal channel includes water storage channels such as the internal flow path and the water tank 125.

[0090] In the embodiment, as shown in Figure 7, the water tank 125, the internal flow path 2, the switching device 6, the water pump 4, and the washing assembly 3 form a circulation loop in which water can flow circularly. When the internal flow path in the circulation loop is cleaned, the internal flow path of the above human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0091] In step 1, the operation device is driven to rotate the water pump forwards, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water pump 4 is in an opened state.

[0092] In step 2, the water outlet of the washing assembly 3 is immersed in cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device. In this case, the water pump starts to rotate reversely, such that the cleaning liquid is taken into the water tank 125 via the switching device 6 and water pump 4. After an appropriate amount of the cleaning liquid is taken in, the outlet of the switching device 6 leading to the water tank 126 is in an opened state while the outlet of the switching device 6 leading to the washing assembly 3 is in the closed state, and the water pump 4 rotates forwards, such that the cleaning liquid flows from the water tank 125 to the water pump 4, the switching device 6 and the internal flow path 2, and then flows back to the water tank 124.

[0093] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow circularly in the above circulation loop.

[0094] In step 4, after the circulation flow in step 3 is completed, the water pump rotates forwards to make the cleaning liquid flow out of the internal flow path.

[0095] In step 5, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0096] In the embodiment, as shown in Figure 8, another circulation loop may be formed. In this case, during the cleaning process of the internal flow path, the switching device 6 allows one of the water outlets of the washing assembly to keep in communication with the internal flow path 2 while allowing another water outlet of the washing assembly to keep in communication with the water pump 4. The water pump 4, the water tank 125, the internal flow path 2, the switching device 6, two water outlets of the washing assembly 3, and the cleaning assembly 5 form a circulation loop in which water can flow circularly. When the internal flow path of the circulation loop is cleaned, the internal flow path of the human body part washing device is cleaned according to a cleaning method including the following steps 1-5.

[0097] In step 1, the operation device is driven to rotate the water pump forwards, to discharge most of water in the internal flow path via the water outlet of the washing assembly 3. At this time, the outlet of the switching device 6 leading to the water pump 4 is in a closed state.

[0098] In step 2, the water outlet of the washing assembly 3 is immersed in the cleaning liquid in the cleaning container, and then the operation device is driven by means of a cleaning button of the operation device. In

this case, the water pump starts to rotate reversely, such that the cleaning liquid is taken in and is allowed to flow through a first water outlet of the washing assembly 3, the water pump 4, the water tank 125, the internal flow path 2, the switching device 6, an Nth water outlet of the washing assembly 3 and then flow back to the cleaning container of the cleaning assembly 5.

[0099] In step 3, step 2 is repeated for a preset number of times or for a preset period of time, to make the cleaning liquid in the cleaning container flow circularly in the above circulation loop.

[0100] In step 4, after the circulation flow in step 3 is completed, the water pump rotates forwards to make the cleaning liquid flow out of the internal flow path. At this time, the outlet of the switching device 6 leading to the water tank 125 is in the closed state.

[0101] In step 5, the isolating switch is turned on to allow outside water to enter, to discharge the residual cleaning liquid in the internal flow path.

[0102] In the above steps of the cleaning method according to this embodiment, when step 1 is performed, the spray rod of the washing assembly is in an unextended state, to prevent the water in the internal flow path from splashing on the human body during discharging.

[0103] In the case that the washing assembly for the human body part washing device includes multiple water outlets, after a cleaning cycle for the first water outlet in step 2 is completed, the cleaning liquid is switched to the Nth water outlet by the switching device, and the circulation of the cleaning liquid in the internal flow path in step 2 is repeated. If one of the water outlets of the washing assembly cannot be immersed in the cleaning liquid in the cleaning container, the water outlet which cannot be immersed in the cleaning liquid is cleaned by the cleaning liquid taken into the internal flow path via one of the water outlets which can be immersed in the cleaning liquid, and then the taken-in cleaning liquid is discharged via the water outlet which cannot be immersed in the cleaning liquid.

[0104] The above embodiments are only for describing the present application, and are not intended to limit the present application. Changes and variations made to the above embodiments according to the technical substances of the present application all fall within the scope defined by the claims.

Industrial Applicability

[0105] In the present application, the cleaning assembly is arranged outside the washing assembly. Therefore, cleaning liquid with corresponding cleaning functions can be prepared in the cleaning container according to particular cleaning requirements, which is easy to operate.

Claims

1. A new-type cleaning device, comprising:

an isolating switch having a water flow isolating function;

an intermediate device having at least one water inlet and at least one water outlet;

a washing assembly configured to eject wash water upwards to wash a part of a human body;

an internal flow path arranged at a water flow upstream position of the washing assembly;

an operation device taking an element as an action response object;

a water pump configured to reciprocatingly pump liquid and operate under control of the operation device; and

a cleaning assembly which is movable and arranged outside the washing assembly; wherein a water outlet of the washing assembly is immersed in cleaning liquid in the cleaning assembly in the process of cleaning the internal flow path.

2. The new-type cleaning device according to claim 1, further comprising a switching device arranged at a water flow upstream position of the washing assembly and configured to switch between a human body washing mode and a flow path cleaning mode.

3. The new-type cleaning device according to claim 2, wherein the water pump is connected in series in the internal flow path, and is arranged at a water flow downstream position of the intermediate device and a water flow upstream position of the washing assembly.

4. The new-type cleaning device according to claim 3, wherein the intermediate device is a water tank, an air hole is arranged on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank, and the water tank is arranged at a water flow upstream position of the water pump.

5. The new-type cleaning device according to claim 4, wherein one of the water outlets of the switching device and the water tank are connected to allow water to circulate.

6. The new-type cleaning device according to claim 2, wherein the water pump is connected in parallel with the internal flow path.

7. The new-type cleaning device according to claim 6, wherein the intermediate device is a three-way pipe having at least one water inlet and at least two water outlets, the three-way pipe is arranged at a water flow downstream position of the isolating switch, one end of the water pump is connected to one of the water outlets of the three-way pipe, and the other end of the water pump is connected to the switching

device.

8. The new-type cleaning device according to claim 6, further comprising a water tank, an air hole is arranged on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank, the water tank is connected in series to the water pump, the intermediate device is a three-way pipe having one water inlet and two water outlets, the three-way pipe is arranged at a water flow downstream position of the isolating switch, an end of the water pump which is not connected to the water tank is connected to one of the water outlets of the three-way pipe, and an end of the water tank which is not connected to the water pump is connected to the switching device.

9. The new-type cleaning device according to claim 6, wherein the intermediate device is a water tank, an air hole is arranged on the top of the water tank, air outside the water tank enters the water tank via the air hole in the case that a negative pressure occurs in the water tank, the water tank is arranged at a water flow upstream position of the water pump, an end of the water pump is connected to the water tank and the other end of the water pump is connected to the switching device.

10. A cleaning method of a new-type cleaning device, comprising:

step 1, driving an operation device to rotate a water pump, to discharge most of water in an internal flow path via a water outlet of a washing assembly; and
step 2, immersing the water outlet of the washing assembly in a cleaning liquid in the cleaning assembly, and driving the operation device by means of a cleaning button of the operation device to rotate the water pump, to allow the cleaning liquid in the cleaning assembly to flow circularly in a loop comprising the water pump and the internal flow path.

11. The cleaning method according to claim 10, wherein, in step 1, the washing assembly is in an unextended state during discharging of the most of water in the internal flow path.

12. The cleaning method according claim 10, wherein, in step 2, the cleaning liquid is switched between different internal flow paths by a switching device.

13. The cleaning method according to claim 12, wherein after the loop is cleaned using the cleaning liquid for a preset period of time in step 2, the water pump allows most of the cleaning liquid to be discharged from the internal flow path, and an isolating switch is turned on to allow water to enter to discharge residual cleaning liquid in the internal flow path.

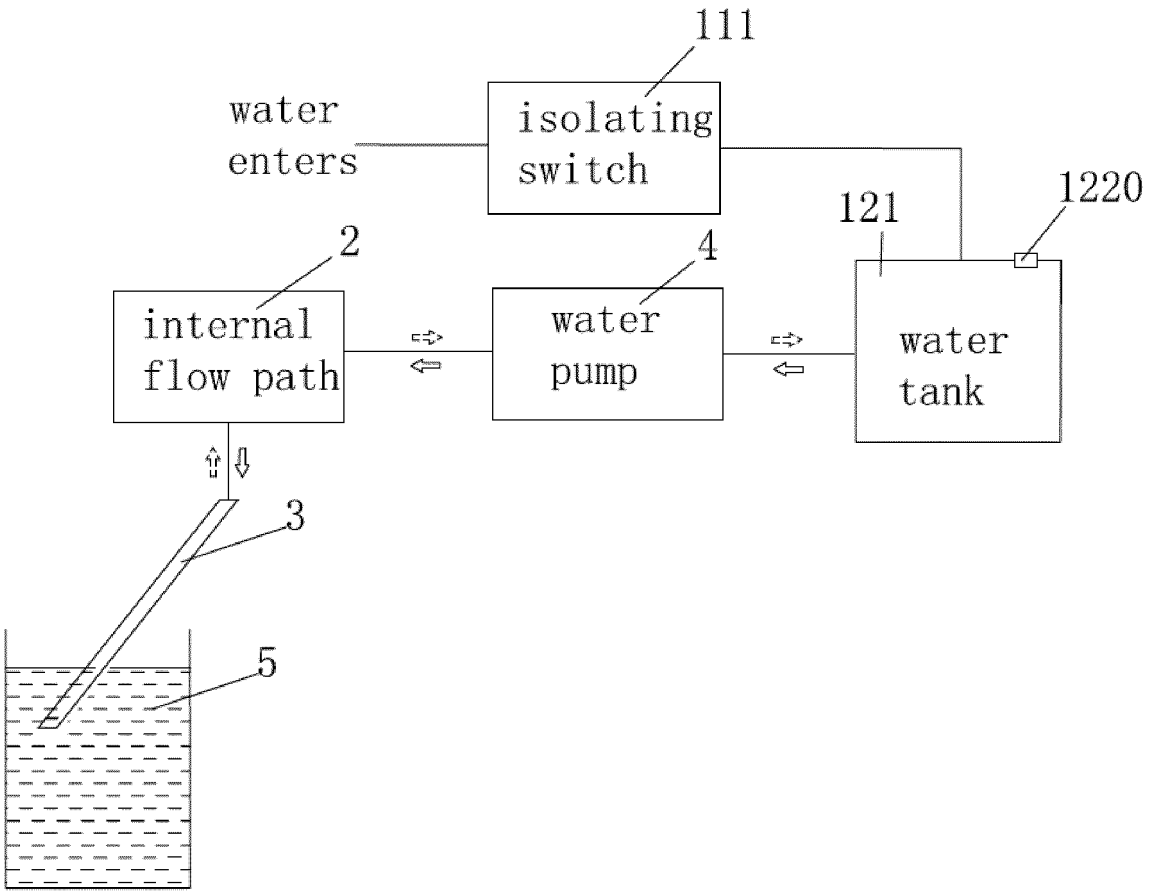
111
water
enters
isolating
switch
1220
121
2
4
internal
flow path
water
pump
water
tank
3
5

Figure 1

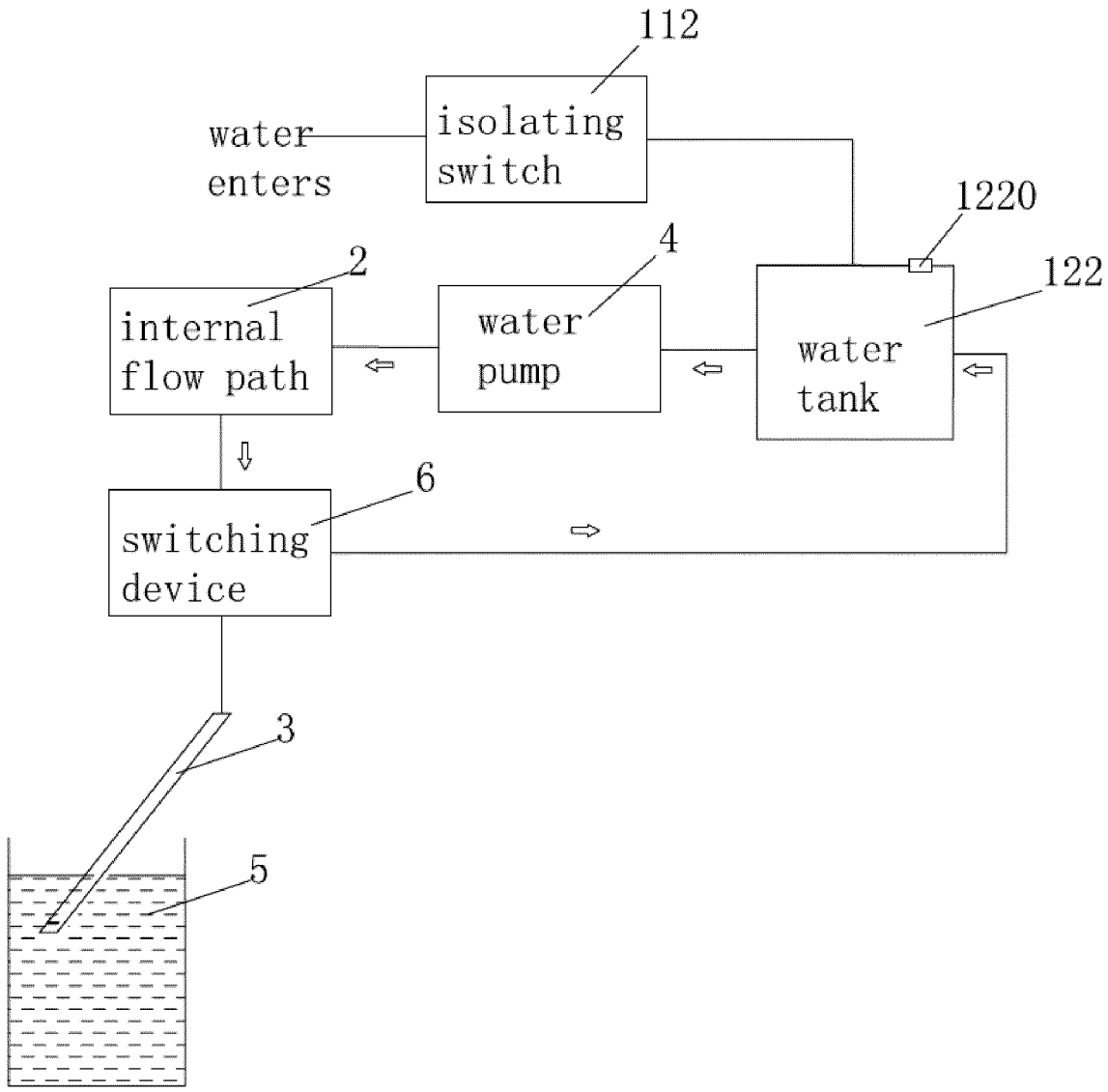
112
water enters
isolating switch
1220
122
2
4
internal flow path
water pump
water tank
6
switching device
3
5

Figure 2

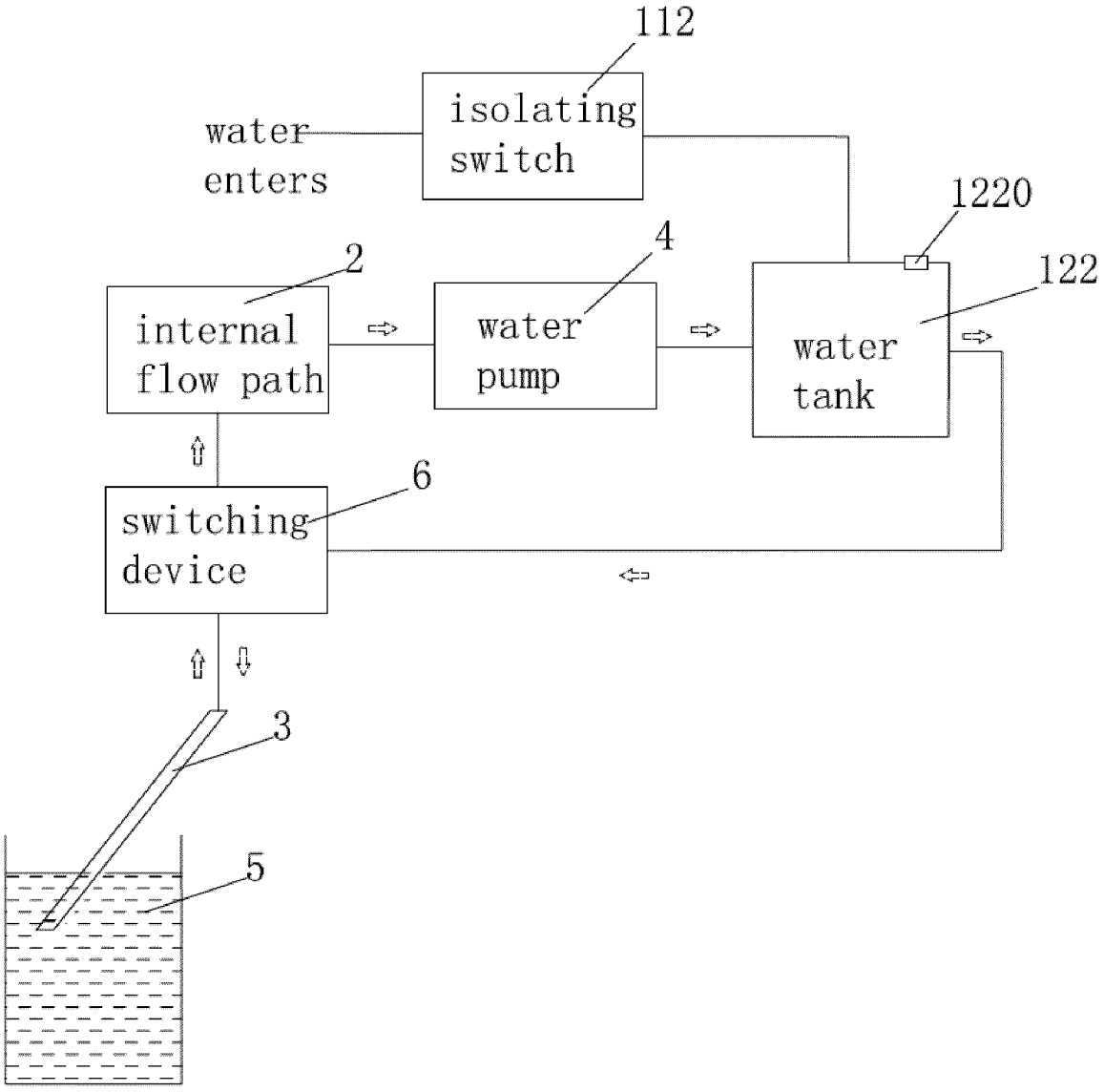
112
isolating switch
water enters
1220
4
2
122
internal flow path
water pump
water tank
6
switching device
3
5

Figure 3

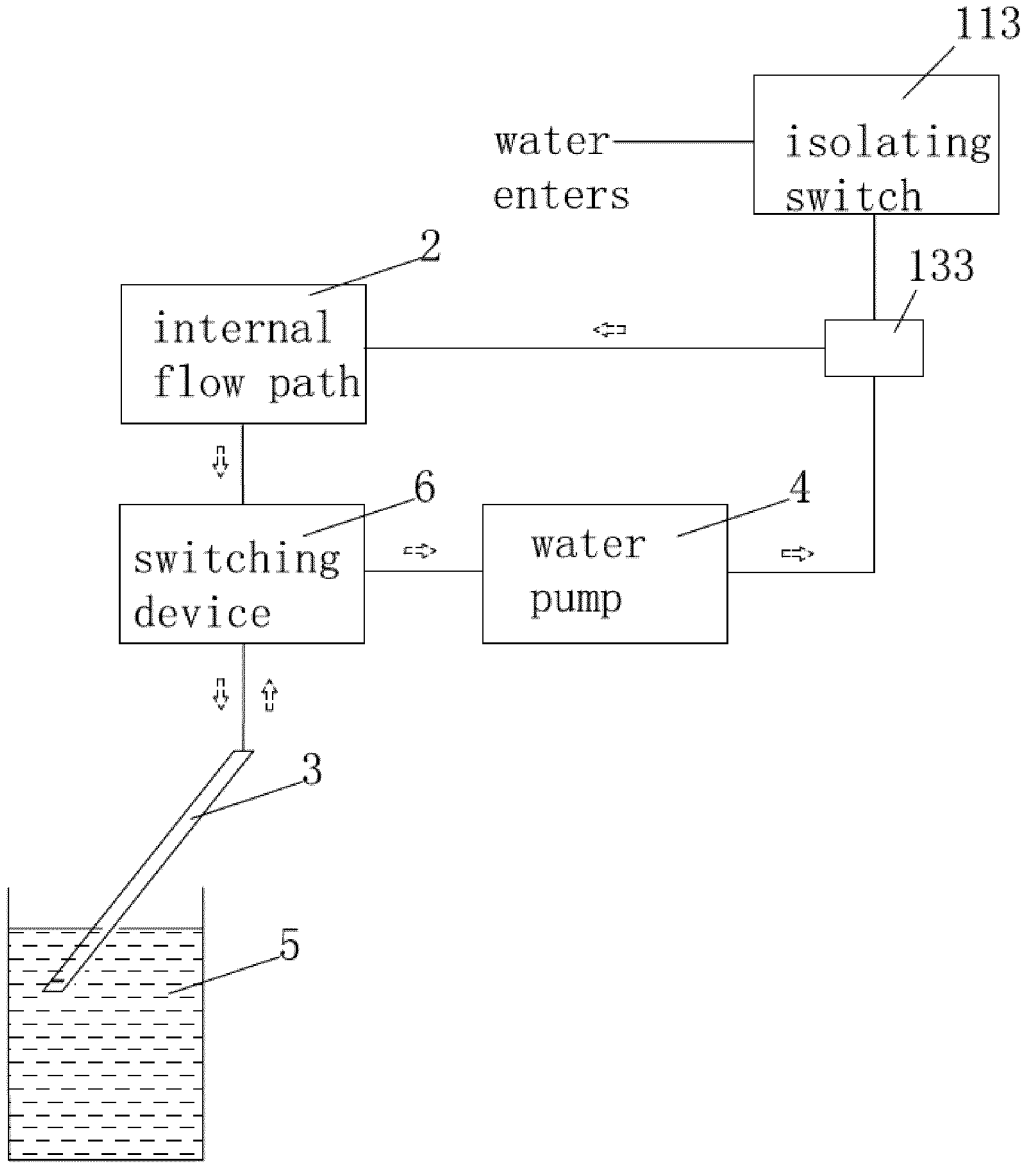
113
water
enters
isolating
switch
2
133
internal
flow path
6
4
switching
device
water
pump
3
5

Figure 4

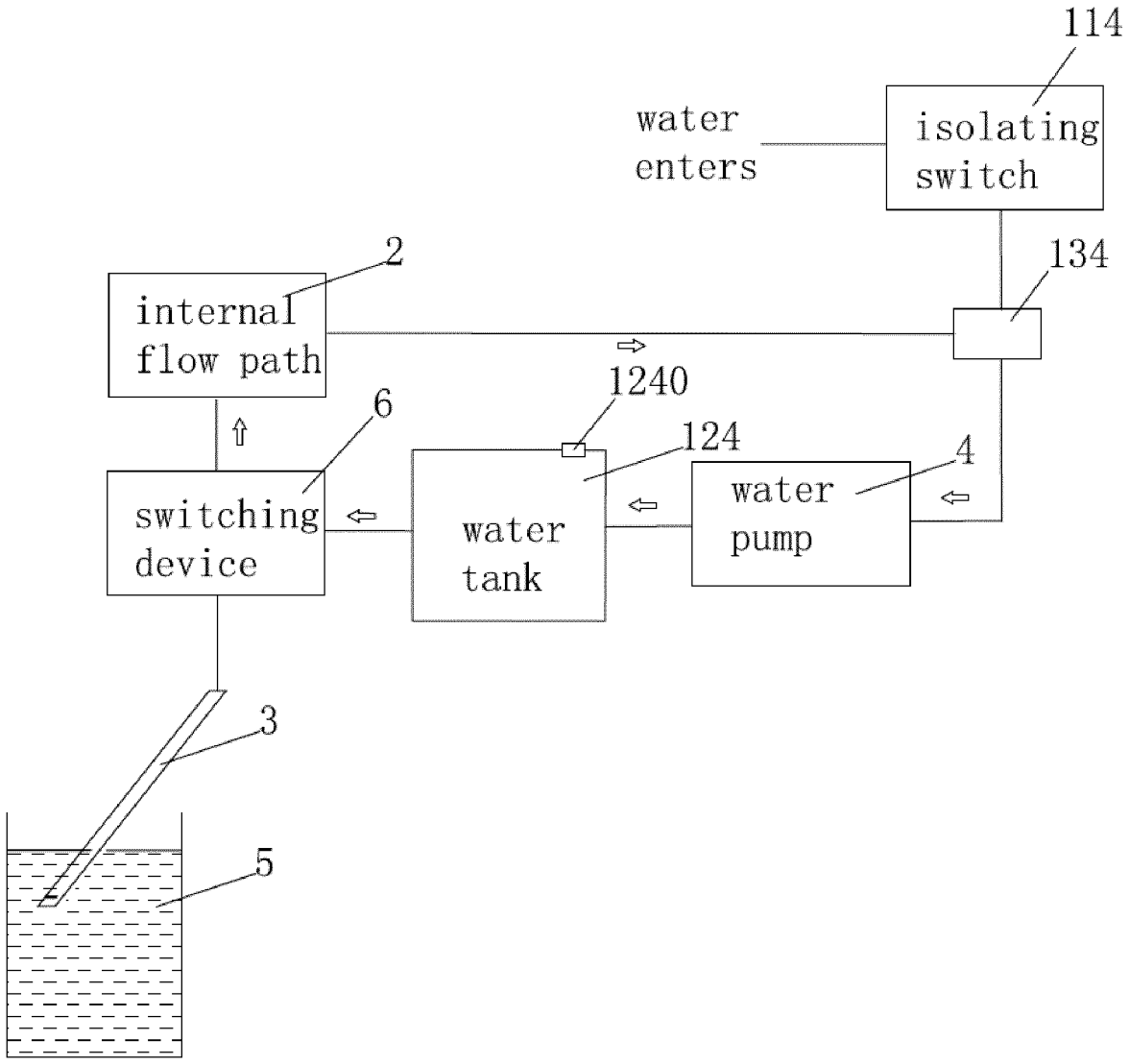
114
water
enters
isolating
switch
2
134
internal
flow path
1240
6
124
4
switching
device
water
tank
water
pump
3
5

Figure 5

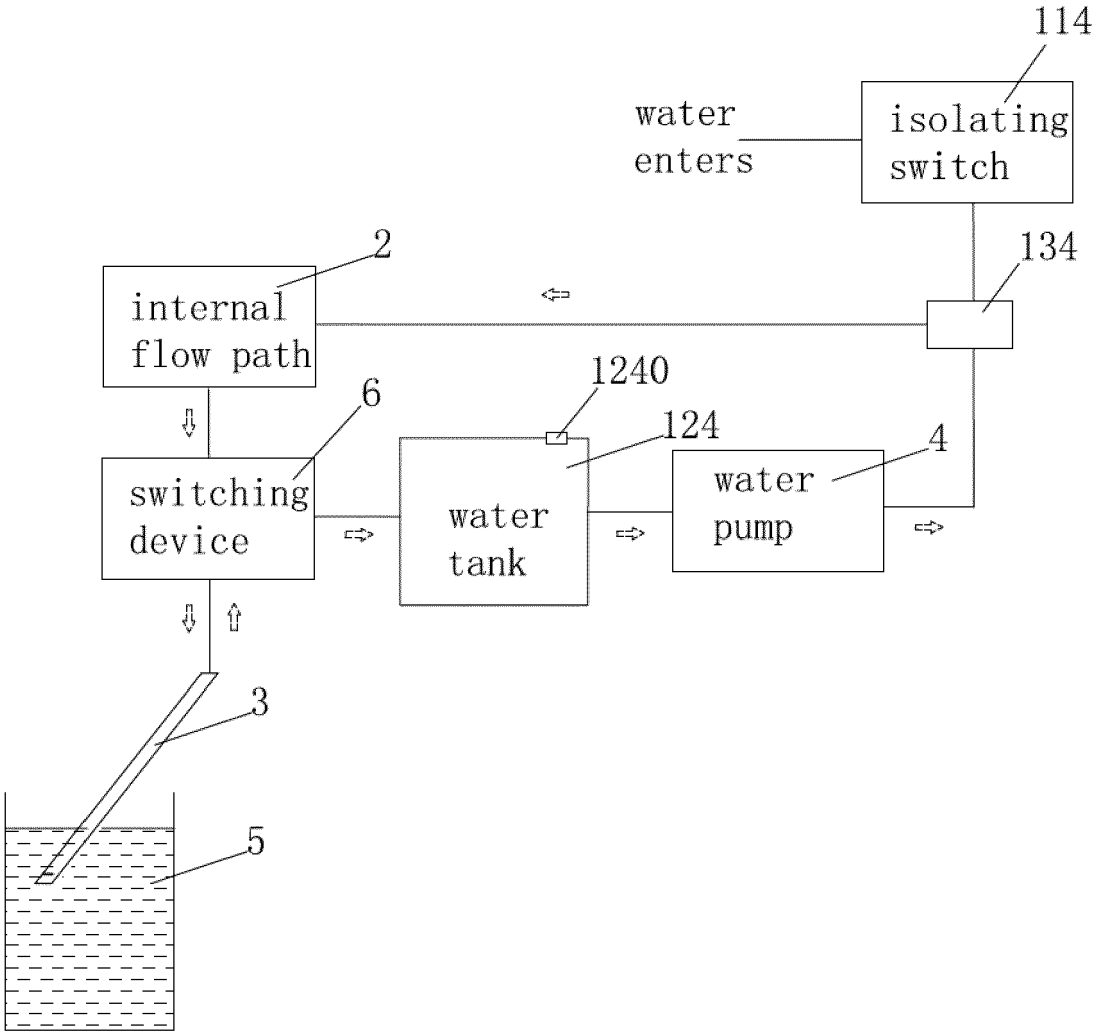
114
water enters
isolating switch
2
internal flow path
134
1240
6
124
4
switching device
water tank
water pump
3
5

Figure 6

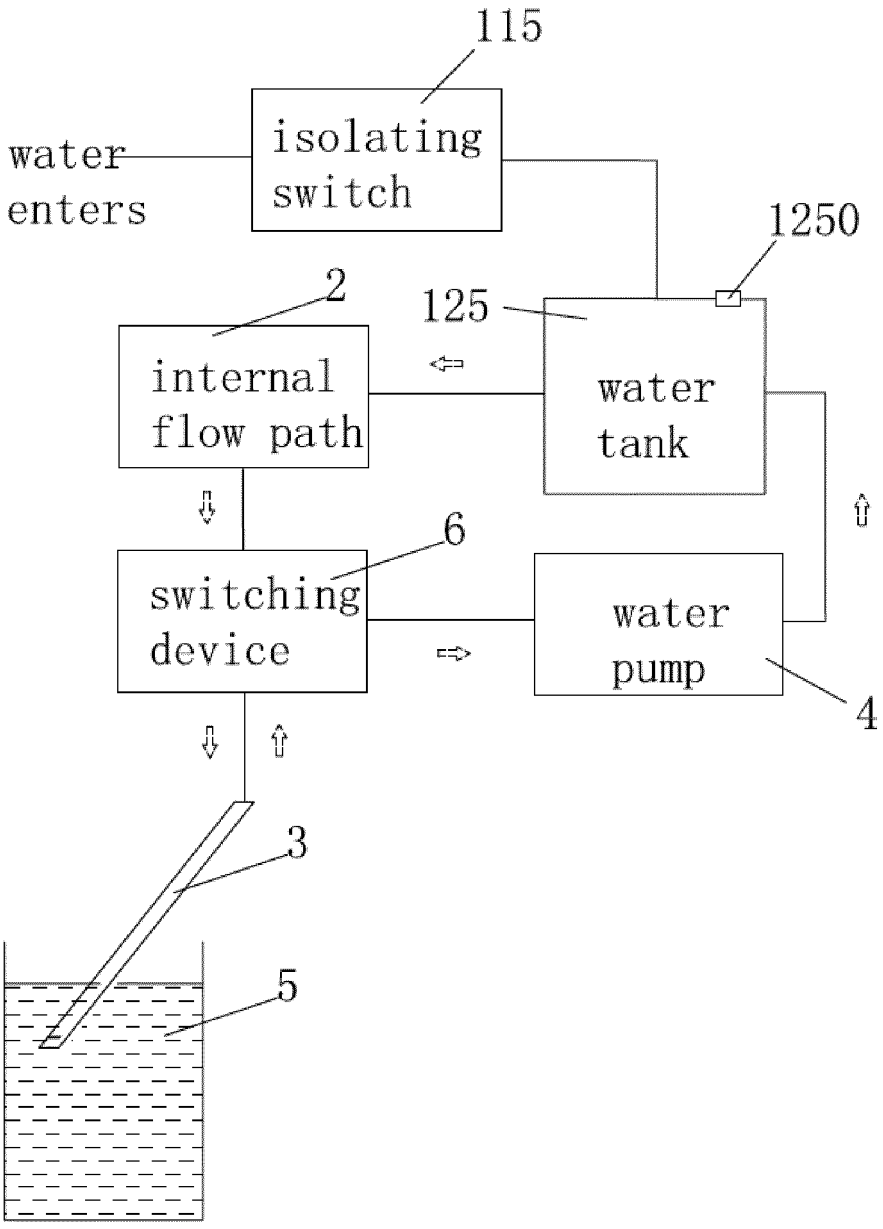
115
water enters
isolating switch
1250
2
125
internal flow path
water tank
6
switching device
water pump
4
3
5

Figure 7

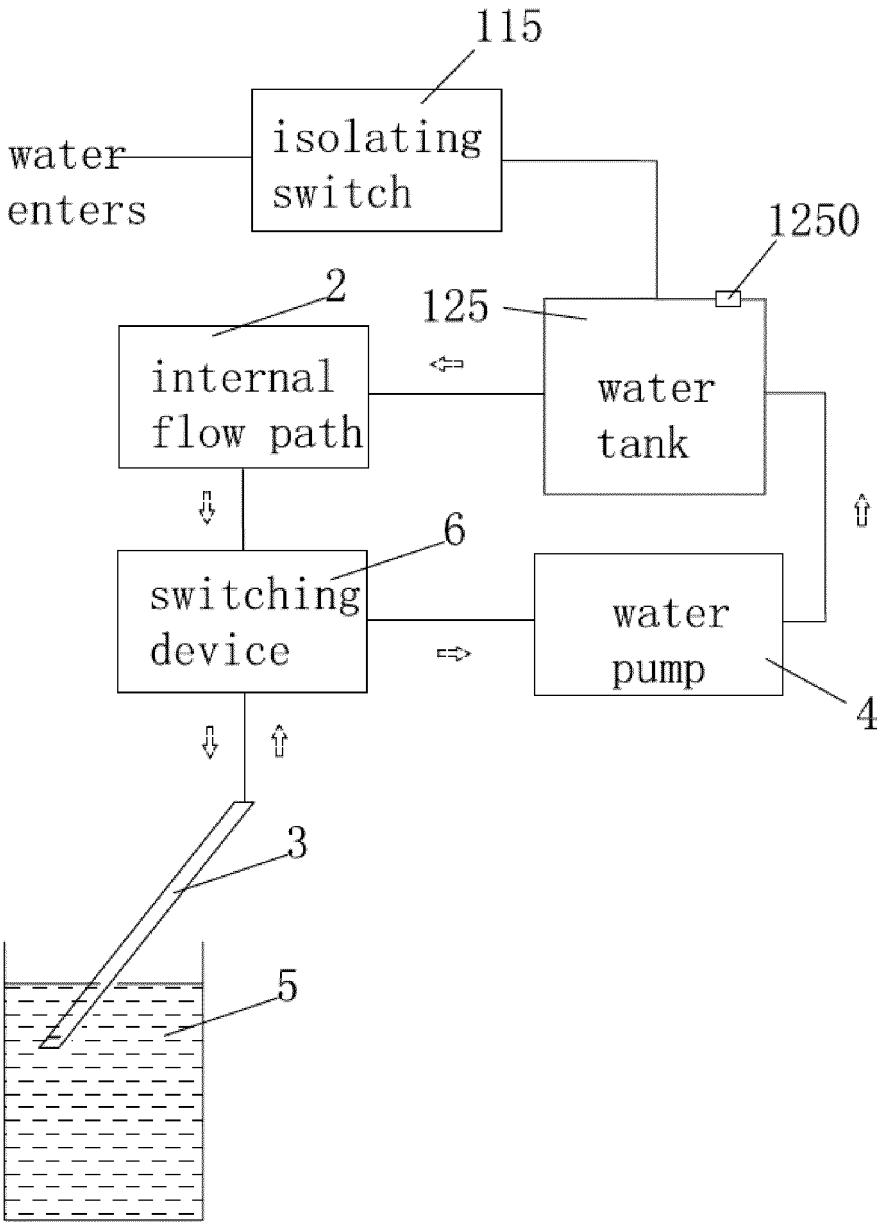
115
water enters
isolating switch
1250
2
125
internal flow path
water tank
6
switching device
water pump
4
3
5

Figure 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/075833

A. CLASSIFICATION OF SUBJECT MATTER

E03D 9/08 (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)

E03D 9

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)

CNKI; CPRSABS; CNABS; VEN: spray tube, toilet bowl, sanitary device, toilet seat, bidet, Lavatory, nozzle, shower, mouth, eject, spout, pipe, hose, conduit, wash, spray, flush, clean

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 104775490 A (AXENT TECHNOLOGY (XIAMEN) CO., LTD.), 15 July 2015 (15.07.2015), claims 1-13	1-13
X	CN 103025972 A (TOTO LTD.), 03 April 2013 (03.04.2013) description, particular embodiments, and figure 2 and 3, see paragraphs [0061] and [0071]	10-13
A	CN 103025972 A (TOTO LTD.), 03 April 2013 (03.04.2013), the whole document	1-9
A	CN 202595867 U (HEFEI ROYALSTAR KOWOO ELECTRONIC APPLIANCE CO. LTD.), 12 December 2012 (12.12.2012), the whole document	1-13
A	WO 2013147408 A1 (COWAY CO., LTD.), 03 October 2013 (03.10.2013), the whole document	1-13
A	JP 04222729 A (TOTO LTD. et al.), 12 August 1992 (12.08.1992), the whole document	1-13

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

* Special categories of cited documents:

"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

"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)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 May 2016 (25.05.2016)	**08 June 2016 (08.06.2016)**
Name and mailing address of the ISA/CN: 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**

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/075833

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 104775490 A	15 July 2015	None	
CN 103025972 A	03 April 2013	JP 5093762 B2	12 December 2012
		CN 103025972 B	03 December 2014
		US 8856979 B2	14 October 2014
		US 2013185861 A1	25 July 2013
		JP 2012047030 A	08 March 2012
		KR 101439192 B1	12 September 2014
		TW I473927 B	21 February 2015
		TW 201207201 A	16 February 2012
		WO 2012014947 A1	02 February 2012
		KR 20130032367 A	01 April 2013
		EP 2599926 A1	05 June 2013
CN 202595867 U	12 December 2012	None	
WO 2013147408 A1	03 October 2013	KR 20130109918 A	08 October 2013
		CN 104271850 A	07 January 2015
		US 2015101113 A1	16 April 2015
JP 04222729 A	12 August 1992	JP 2878460 B2	05 April 1999

Form PCT/ISA/210 (patent family annex) (July 2009)