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(72) Inventors:
• **LIN, Fengde**
Xiamen, Fujian 361028 (CN)
• **LIN, Xiaolong**
Xiamen, Fujian 361028 (CN)
• **ZHANG, Kaixing**
Xiamen, Fujian 361028 (CN)
• **CHEN, Donghai**
Xiamen, Fujian 361028 (CN)

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(74) Representative: **Verscht, Thomas Kurt Albert**
Josephsburgstrasse 88 A
81673 München (DE)

(71) Applicant: **Xiamen Solex High-Tech Industries
Co., Ltd.**
Xiamen, Fujian 361028 (CN)

(54) **WATER OUTLET DEVICE, OVERHEAD SHOWER HEAD, DRIVING DEVICE AND WATER PATH SWITCHING METHOD**

(57) The present disclosure discloses a water outlet device, an overhead shower head, a driving device and a water path switching method. The water outlet device comprises a water path switching mechanism, a water distribution mechanism and two mechanisms; the water distribution mechanism is operatively connected to the water path switching mechanism, the water distribution mechanism is driven to act by an action of the water path switching mechanism; both of the first mechanism and the second mechanism are configured to drive the water path switching mechanism to act; when the water outlet device is turned off and a duration exceeds t , the first mechanism first drives the water path switching mechanism to act, and the second mechanism then drives the water path switching mechanism to act; and when the water outlet device is turned off and the duration does not exceed t , only the first mechanism drives the water path switching mechanism to act. The advantages of the present disclosure are as follows: the water path switching mechanism can be driven according to whether the duration exceeds t to control the water distribution mechanism, thus providing convenience for users.

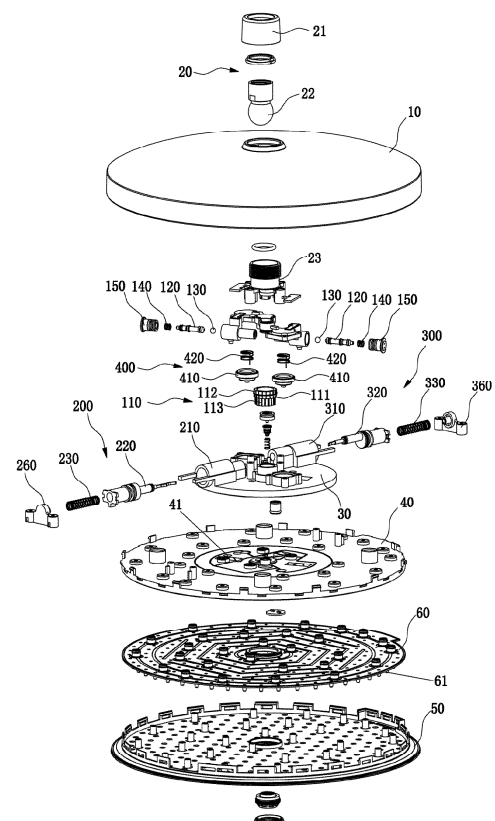


FIG. 1

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Description

RELATED APPLICATIONS

[0001] This application claims priority to Chinese patent application number 202510352116.X, filed on March 24, 2025 and Chinese patent application number 202511815084.9, filed on December 4, 2025. Chinese patent application number 202510352116.X and Chinese patent application number 202511815084.9 are incorporated herein by reference.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates to the technical field of bathroom devices, and in particular relates to a water outlet device, an overhead shower head, a driving device and a water path switching method.

BACKGROUND OF THE DISCLOSURE

[0003] An overhead shower head is a water spray nozzle installed on a top, a design of the overhead shower head is mainly to enrich shower experience by providing large-area water coverage, allowing users to feel a rain-like effect during showers.

[0004] Existing shower heads can switch water outlet effects through a main process as follows: automatically switching water paths for the different water outlet effects at a moment of quickly turning off and on water. However, after the overhead shower head is turned off for a period of time, it will automatically reset to a water path of an initial water outlet effect and cannot maintain a water outlet effect prior to closing the water, which causes inconvenience for users in a usage scenario in which the users intermittently use the same water outlet effect for a relatively long time.

[0005] Therefore, there is an urgent need for a water outlet device, an overhead shower head, and a water path switching method to solve the aforementioned problems.

BRIEF SUMMARY OF THE DISCLOSURE

[0006] According to one aspect of the present disclosure, the objective is to address the deficiencies in the background.

[0007] The present disclosure provides a first technical solution to achieve the objective: a water outlet device, it comprises:

A water path switching mechanism;
A water distribution mechanism operatively connected to the water path switching mechanism, the water distribution mechanism is driven to act by an action of the water path switching mechanism;
A first mechanism and a second mechanism, both of the first mechanism and the second mechanism are

configured to drive the water path switching mechanism to act;

When the water outlet device is turned off and a duration exceeds t , the first mechanism first drives the water path switching mechanism to act in a first direction, and the second mechanism then drives the water path switching mechanism to act in a second direction, with the first direction being opposite to the second direction;

When the water outlet device is turned off and the duration does not exceed t , only the first mechanism drives the water path switching mechanism to act in the first direction.

[0008] Preferably, when water is turned off and the duration exceeds t , the first mechanism and the second mechanism sequentially drive the water path switching mechanism to bring the water distribution mechanism into a state prior to closing water;

When the water is turned off and the duration does not exceed t , only the first mechanism drives the water path switching mechanism to drive the water distribution mechanism to switch water outlet effects.

[0009] Preferably, the water path switching mechanism is rotatably disposed, and both the first mechanism and the second mechanism are configured to push the water path switching mechanism to rotate with opposite rotation directions.

[0010] Preferably, the first mechanism disengages from the water path switching mechanism after pushing the water path switching mechanism to rotate.

[0011] Preferably, the first mechanism comprises a slidable first shaft, the first shaft comprises a second protrusion, and a first guide post is fixedly additionally configured, a movement process of the first shaft is as follows: the first shaft first acts on the water path switching mechanism to push the water path switching mechanism to rotate, and the second protrusion is then pushed by the first guide post to move the first shaft away from the water path switching mechanism.

[0012] Preferably, the first shaft further comprises a first protrusion, and another first guide post is fixedly additionally configured, the movement process of the first shaft is as follows: the first protrusion first acts on another first guide post to enable the first shaft to push the water path switching mechanism to rotate, and the second protrusion is then pushed by the first guide post.

[0013] Preferably, the water path switching mechanism comprises a ratchet wheel, the ratchet wheel comprises annular ratchet teeth, and both the first mechanism and the second mechanism are configured to abut against the annular ratchet teeth to push the water path switching mechanism to rotate.

[0014] Preferably, the annular ratchet teeth are divided into first annular ratchet teeth and second annular ratchet teeth with opposite tooth directions, and the first mechanism and the second mechanism are configured to respectively abut against the first annular ratchet teeth and

the second annular ratchet teeth and push the water path switching mechanism to rotate in opposite directions.

[0015] Preferably, the annular ratchet teeth are divided into first annular ratchet teeth and second annular ratchet teeth with the same tooth direction, and the first mechanism and the second mechanism are configured to respectively abut against the first annular ratchet teeth and the second annular ratchet teeth and push the water path switching mechanism to rotate in the same direction.

[0016] Preferably, the first annular ratchet teeth are disposed in an annular array, the second annular ratchet teeth are disposed in an annular array, and the first annular ratchet teeth and the second annular ratchet teeth are equal in number.

[0017] Preferably, the first mechanism comprises a first control chamber, a first shaft slidably received in the first control chamber and a first elastic element, when water enters, a hydraulic force acting on the first shaft via the water in the first control chamber is greater than an elastic force of the first elastic element, and a force difference drives the first shaft away from the water path switching mechanism, when the water is turned off, the first control chamber drains, and the first elastic element drives the first shaft to reset, driving the water path switching mechanism to act via the reset of the first shaft; The second mechanism comprises a second control chamber, a second shaft slidably received in the second control chamber and a second elastic element, when the water enters, a hydraulic force acting on the second shaft via the water in the second control chamber is greater than an elastic force of the second elastic element, and a force difference drives the second shaft away from the water path switching mechanism, when the water is turned off, the second control chamber drains, and the second elastic element drives the second shaft to reset, driving the water path switching mechanism to act via the reset of the second shaft.

[0018] Preferably, a drainage speed of the first control chamber is greater than a drainage speed of the second control chamber after the water is turned off.

[0019] Preferably, the first control chamber is in communication with a first drain valve, and the first control chamber drains through the first drain valve; the second control chamber is in communication with a second drain valve, and the second control chamber drains through the second drain valve; and a drainage speed of the first drain valve is greater than a drainage speed of the second drain valve.

[0020] Preferably, it comprises a plurality of water outlets, the water path switching mechanism is rotatably disposed, and the water distribution mechanism is driven to act by a rotation of the water path switching mechanism to open at least a selected one of the water outlets.

[0021] Preferably, it comprises a switching space and one or more water distribution spaces, a water path between the switching space and the one or more water distribution spaces is not in communication, the water path switching mechanism is disposed in the switching

space, and the water distribution mechanism is disposed in the one or more water distribution spaces.

[0022] Preferably, it comprises a plurality of chamber bodies, a number of the one or more water distribution spaces is multiple, the water distribution mechanism comprises a plurality of third shafts, the plurality of third shafts are respectively disposed in multiple of the one or more water distribution spaces and are in one-to-one correspondence with the plurality of chamber bodies, the rotation of the water path switching mechanism is configured to drive the third shafts to act so as to open corresponding ones of the water outlets of the chamber bodies.

[0023] Preferably, the water distribution mechanism comprises a plurality of pilot valves, a pilot valve is configured with a slidable third shaft and a primary flow channel, on and off of the primary flow channel is controlled by on and off of the pilot valve, the on and off of the pilot valve is controlled by sliding of the third shaft, and the rotation of the water path switching mechanism drives at least one of the third shafts to slide.

[0024] Preferably, the pilot valve comprises a pilot valve body and a pressure relief channel, and the pilot valve body moves between a conducting position and a blocking position to control the on and off of the pilot valve; a space inside the pilot valve and on the pilot valve body forms a chamber body, and the pilot valve body comprises a clearance; and the pressure relief channel is connected to the chamber body, and the third shaft controls on and off of the pressure relief channel, when the pressure relief channel is opened and the chamber body is relieved of pressure, the pilot valve body is driven to move to the conducting position, and when the pressure relief channel is closed and the water from the water inlet mechanism enters the chamber body through the clearance, the pilot valve body is driven to move to the blocking position.

[0025] Preferably, the water distribution mechanism comprises one or more water distribution valve assemblies, a water distribution valve assembly comprises a slidable third shaft, the rotation of the water path switching mechanism drives the third shaft to slide, and the water distribution valve assembly is controlled by sliding of the third shaft.

[0026] Preferably, a number of the one or more water distribution valve assemblies is multiple, each of the one or more water distribution valve assemblies comprises a water outlet, the rotation of the water path switching mechanism drives at least a selected one of the third shafts to slide to open the water outlet corresponding to a selected one of the one or more water distribution valve assemblies.

[0027] Preferably, the one or more water distribution valve assemblies comprises at least two water outlets, and water discharge from the at least two water outlets is switched by sliding of the third shaft.

[0028] Preferably, the water path switching mechanism comprises a plurality of control notches along a

circumferential direction, and the rotation of the water path switching mechanism controls the third shaft to slide by the plurality of control notches.

[0029] Preferably, the water distribution valve assembly further comprises a movable ball and a third elastic element, the movable ball is disposed between one end of the third shaft and the water path switching mechanism, and the third elastic element abuts against the other end of the third shaft, when the water path switching mechanism rotates until any one of the control notches is aligned with the movable ball, the movable ball moves into the one of the control notches under an action of the third elastic element, and the third shaft slides to open a corresponding water outlet.

[0030] The present disclosure provides a second technical solution to achieve the objective: a water outlet device, it comprises:

A water path switching mechanism;

A water distribution mechanism operatively connected to the water path switching mechanism, the water distribution mechanism comprises a plurality of pilot valves, and the water distribution mechanism is driven to act by an action of the water path switching mechanism to control on and off of at least one of the pilot valves;

[0031] A first mechanism, on which an elastic element is disposed, the first mechanism is configured to drive the water path switching mechanism to act, when the water outlet device is turned on, the elastic element stores energy under an action of hydraulic pressure, when water is turned off, the elastic element releases the energy to drive the water path switching mechanism to act.

[0032] Preferably, a pilot valve is configured with a slidable third shaft and a primary flow channel, on and off of the primary flow channel is controlled by on and off of the pilot valve, the on and off of the pilot valve is controlled by sliding of the third shaft, and the third shaft is operatively connected to the water path switching mechanism; and when the water outlet device is turned off, the first mechanism drives the water path switching mechanism to act, and the water path switching mechanism drives at least one of the third shafts to slide via transmission.

[0033] The present disclosure provides a third technical solution to achieve the objective: an overhead shower head, it comprises a shower shell, a face cover and the water outlet device, the water outlet device further comprises a water inlet mechanism and a water distribution body, the shower shell and the face cover enclose an installation space, the water distribution body comprises a plurality of water outlet chambers corresponding to a plurality of water outlet effects, the water inlet mechanism is disposed at a top of the shower shell to enable water to enter the installation space, and the water outlet device is disposed in the installation space and is configured to discharge the water from any one of the water outlet

chambers.

[0034] The present disclosure provides a fourth technical solution to achieve the objective: a driving device, it comprises:

A water inlet mechanism;

A movable mechanism movably disposed;

A first mechanism and a second mechanism, both of the first mechanism and the second mechanism are configured to drive the movable mechanism to act; both the first mechanism and the second mechanism are configured to be in communication with the water inlet mechanism, when the water inlet mechanism is turned off and a duration exceeds t , the first mechanism first drives the movable mechanism to act in a first direction, and the second mechanism then drives the movable mechanism to act in a second direction; and when water is turned off and the duration does not exceed t , only the first mechanism drives the movable mechanism to act in the first direction.

[0035] Preferably, the movable mechanism is rotatably disposed to form a rotating mechanism, and both the first mechanism and the second mechanism are configured to drive the rotating mechanism to rotate.

[0036] Preferably, the first mechanism disengages from the rotating mechanism after pushing the rotating mechanism to rotate.

[0037] Preferably, the rotating mechanism comprises a ratchet wheel, the ratchet wheel comprises annular ratchet teeth, and the first mechanism and the second mechanism are configured to abut against the annular ratchet teeth to push the rotating mechanism to rotate.

[0038] Preferably, the first mechanism comprises a first control chamber, a first shaft slidably received in the first control chamber and a first elastic element, when water enters, a hydraulic force acting on the first shaft via the water in the first control chamber is greater than an elastic force of the first elastic element, and a force difference drives the first shaft away from the rotating mechanism, when the water is turned off, the first control chamber drains, and the first elastic element drives the first shaft to reset, driving the rotating mechanism to act via the reset of the first shaft;

The second mechanism comprises a second control chamber, a second shaft slidably received in the second control chamber and a second elastic element, when the water enters, a hydraulic force acting on the second shaft via the water in the second control chamber is greater than an elastic force of the second elastic element, and a force difference drives the second shaft away from the rotating mechanism, when the water is turned off, the second control chamber drains, the second elastic element drives the second shaft to reset, driving the rotating mechanism to act via the reset of the second shaft, and a drainage speed of the first control chamber is greater than a drainage speed of the second control chamber

after the water is turned off.

[0039] Preferably, it further comprises a slidable third shaft, the rotating mechanism comprises a plurality of control notches along a circumferential direction, and a rotation of the rotating mechanism controls the third shaft to slide via the plurality of control notches.

[0040] Preferably, the third shaft is configured with a movable ball and a third elastic element, the movable ball is disposed between one end of the third shaft and the rotating mechanism, the third elastic element is disposed at the other end of the third shaft, and when the rotating mechanism rotates until any one of the control notches is aligned with the movable ball, the movable ball moves into the one of the control notches and the third shaft slides under an action of the third elastic element.

[0041] The present disclosure provides a fifth technical solution to achieve the objective: a water path switching method for the water outlet device, it comprises:

Step 1. water flows into the water outlet device;

Step 2. the first mechanism and the second mechanism are away from the water path switching mechanism, the water outlet device discharges water in one state, and discharging the water in the one state is defined as a first water outlet state;

Step 3. the water outlet device is turned off, and selections are respectively made according to whether a duration of water shut-off exceeds t :

[0042] If exceeding t , the first mechanism first drives the water path switching mechanism to act in a first direction and drives the water distribution mechanism to act to switch to a second water outlet state, and the second mechanism then drives the water path switching mechanism to act in a second direction and drives the water distribution mechanism to act to return to the first water outlet state;

If not exceeding t , only the first mechanism drives the water path switching mechanism to act in the first direction and drives the water distribution mechanism to act to switch to the second water outlet state.

[0043] The technical solutions have the following advantages: the water outlet device comprises the water path switching mechanism, the water distribution mechanism, the first mechanism and the second mechanism. The water path switching mechanism can act to drive the water distribution mechanism to act, thereby switching the water outlet effects. When the water is turned off and the duration of water shut-off exceeds t , the first mechanism first drives the water path switching mechanism to act in the first direction, and the second mechanism then drives the water path switching mechanism to act in the second direction; when the duration does not exceed t , only the first mechanism drives the water path switching mechanism to act; therefore, the water path switching mechanism can be driven according to whether the duration exceeds t to control the water distribution mechanism, thus providing convenience for users.

[0044] The first mechanism and the second mechanism can respectively drive the water path switching mechanism to perform opposite actions, when the duration of water shut-off exceeds t , the first mechanism and the second mechanism sequentially drive the water path switching mechanism to maintain the water path switching mechanism and the water distribution mechanism in the state prior to closing the water; and when the duration of water shut-off does not exceed t , only the first mechanism drives the water path switching mechanism to act to drive the water distribution mechanism to switch the water outlet effects. That is, the water outlet device can achieve cyclic switching of water outlet effects when the overhead shower head is continuously turned off and on quickly (the duration of water shut-off does not exceed t), maintain a water outlet effect prior to closing the water when it is turned on again after being turned off for a long time (the duration of water shut-off exceeds t), and this provides convenience for the users who intermittently use the same water outlet effect for a relatively long time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045]

FIG. 1 is an exploded view of an overhead shower head of an embodiment of the present disclosure;

FIG. 2 is a schematic diagram (from a bottom view angle) of a part of a water outlet device and a water distribution body of the embodiment of the present disclosure;

FIG. 3 is a schematic diagram (from a top view angle) of the part of the water outlet device and the water distribution body of the embodiment of the present disclosure;

FIG. 4 is a partially enlarged view of a structure marked J in FIG. 3;

FIG. 5 is a bottom view of the overhead shower head of the embodiment of the present disclosure;

FIG. 6 is a cross-sectional view along an A-A direction in FIG. 5;

FIG. 7 is a partially enlarged view of a structure marked E in FIG. 6;

FIG. 8 is a cross-sectional view along a B-B direction in FIG. 5;

FIG. 9 is a partially enlarged view of a structure marked F in FIG. 8;

FIG. 10 is a cross-sectional view along a C-C direction in FIG. 5;

FIG. 11 is a partially enlarged view of a structure marked G in FIG. 10;

FIG. 12 is a cross-sectional view along a D-D direction in FIG. 5;

FIG. 13 is a partially enlarged view of a structure marked H in FIG. 12;

FIG. 14 is a partially enlarged view of a structure marked I in FIG. 12;

FIG. 15 is a schematic diagram of a water path switching mechanism of Embodiment 1 of the present disclosure;

FIG. 16 is a first cross-sectional view of a part of an overhead shower head of Embodiment 2 of the present disclosure; and

FIG. 17 is a second cross-sectional view of the part of the overhead shower head of Embodiment 2 of the present disclosure.

[0046] In the drawings: chamber body 1; pressure relief channel 11; water outlet 12; shower shell 10; water outlet chamber 13; water flow channel 14; water inlet mechanism 20; water inlet nut 21; water inlet ball head 22; water inlet seat 23; water distribution body 30; installation groove 31; water distribution seat 40; face cover 50; and water outlet face cover 60;

Water path switching mechanism 110; first annular ratchet teeth 111; second annular ratchet teeth 112; control notch 113; third shaft 120; movable ball 130; function valve shaft elastic element 140; function valve body 150; and sealing ring member 160; First mechanism 200; first valve body 210; first control chamber 211; first sealing ring 212; first shaft 220; first protrusion 221; second protrusion 222; first elastic element 230; first drain valve 240; drainage channel 241; first guide post 250; and first spring seat 260; Second mechanism 300; second valve body 310; second control chamber 311; second sealing ring 312; second shaft 320; second elastic element 330; second drain valve 340; drainage gap 341; second guide post 350; and second spring seat 360; and Pilot valve 400; pilot valve body 410; annular clearance 411; on-off elastic element 420; and clearing rod 421.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0047] The technical solutions of the present disclosure will be further described below in combination with the accompanying drawings and specific embodiments.

[0048] To further clarify the objectives, the technical

solutions, and the advantages of the embodiments of the present disclosure, the technical solutions in the embodiments of the present disclosure will be clearly and completely described below in combination with the accompanying drawings in the embodiments of the present disclosure, and it is obvious that the described embodiments are only some embodiments rather than all embodiments of the present disclosure. The elements of the embodiments of the present disclosure described and illustrated in the accompanying drawings herein can be generally arranged and designed in various different configurations.

[0049] Therefore, the following detailed description of the embodiments of the present disclosure provided in accordance with the accompanying drawings is not intended to limit the claimed scope of the present disclosure but merely illustrates selected embodiments of the present disclosure. All other embodiments shall fall within the protection scope of the present disclosure provided that they are obtained by those of ordinary skill in the art without creative efforts based on the embodiments of the present disclosure.

[0050] It should be noted that: similar reference numerals and characters in the accompanying drawings described below denote similar items, so an item need not to be further defined and explained in subsequent accompanying drawings once it is defined in one accompanying drawing.

[0051] In the description of the present disclosure, it should be noted that the terms of "upper", "lower", "left", "right", "vertical", "horizontal", "inner", "outer", etc., indicate orientations or positional relationships based on the orientations or positional relationships shown in the accompanying drawings or the orientations or positional relationships where the product of the present disclosure is commonly placed during use, and are only for the convenience of describing the present disclosure and simplifying the description, rather than indicating or implying that the device or element as referred to should have a specified orientation, be constructed and operated in the specified orientation, and thus should not be construed as limiting the present disclosure. In addition, the terms of "first", "second", "third", etc., are only used for distinguishing descriptions and should not be construed as indicating or implying relative importance. In the description of the present disclosure, unless otherwise specified, "plurality" means two or more.

[0052] In the description of the present disclosure, it should be further noted that unless otherwise clearly specified and limited, the terms of "disposed", "connected", and "fixed" should be construed broadly, for example, it can be a fixed connection, a detachable connection, or an integral connection; a mechanical connection or an electrical connection. For those of ordinary skill in the art, the specific meanings of the terms in the present disclosure can be construed according to specific circumstances.

[0053] In the present disclosure, unless otherwise

clearly specified and limited, a first feature being "on" or "under" a second feature can include the first and second features being in direct contact, or can include the first and second features being not in direct contact but being in contact through another feature therebetween. Moreover, the first feature being "above", "on an upper side" and "over" the second feature includes the first feature being directly above and obliquely above the second feature, or simply means that the first feature is horizontally higher than the second feature. The first feature being "below", "on a lower side" and "beneath" the second feature includes the first feature being directly below and obliquely below the second feature, or simply means that the first feature is horizontally lower than the second feature.

[0054] The term "and/or" in this embodiment is only an associative relationship describing associated objects, indicating that there may be three relationships, for example, A and/or B may indicate: merely A exists, both A and B exist, and merely B exists. In addition, the character "/" in the present disclosure generally indicates that the foregoing and subsequent associated objects are in a relationship of "or".

[0055] The embodiments of the present disclosure will be described below in detail, examples of the embodiments are illustrated in the accompanying drawings, wherein identical or similar reference numerals represent identical or similar elements or elements having identical or similar functions throughout. The embodiments described below with reference to the accompanying drawing are exemplary, only for illustrating the present disclosure, and should not be construed as limiting the present disclosure.

Embodiment 1

[0056] Referring to FIG. 1, this embodiment provides a water outlet device and an overhead shower head. The overhead shower head comprises the water outlet device of this embodiment.

[0057] The overhead shower head comprises a shower shell 10, the water outlet device and a face cover 50. The water outlet device comprises a water inlet mechanism 20, a water distribution body 30, a water distribution seat 40 and a water outlet face cover 60, the shower shell 10 and the face cover 50 enclose an installation space, and the water distribution body 30 and the water distribution seat 40 are accommodated in the installation space. The water distribution body 30 comprises a plurality of water outlet chamber bodies 13 corresponding to a plurality of water outlet effects, and the water inlet mechanism 20 is disposed on a top of the shower shell 10 to connect to a water source. The water distribution seat 40 is disposed below the water distribution body 30 and comprises a plurality of water outlet holes 41 for discharging water. The water outlet face cover 60 is disposed on a lower side of the water distribution seat 40 away from the water distribution body 30

and comprises a plurality of water outlet nozzles for discharging the water, and a number of the water outlet nozzles 61 is greater than a number of the water outlet holes on the water distribution seat 40.

[0058] The water inlet mechanism 20 comprises a water inlet nut 21, a water inlet ball head 22 and a water inlet seat 23. The water inlet seat 23 is disposed on the top of the shower shell 10, the water inlet nut 21 is screwed to the water inlet seat 23, the water inlet ball head 22 is disposed in the water inlet nut 21 and the water inlet seat 23, the water inlet nut 21 and the water inlet seat 23 are configured to compress the water inlet ball head 22, and the water inlet ball head 22 is configured to be threadedly connected to a water inlet pipe (not shown in the drawings). The water inlet ball head 22 is movably embedded in a top of the water inlet seat 23, which is convenient for adjusting a relative angle between the shower shell 10 and the water inlet ball head 22, that is, adjusting a water outlet angle of the overhead shower head.

[0059] Referring to FIGS. 2-5, 10 and 11, the water outlet device forms a plurality of chamber bodies 1 corresponding to the plurality of water outlet effects, each of the chamber bodies 1 correspondingly has a water outlet 12, and the water outlet 12 is in communication with a water outlet chamber 13. The water outlet device of this embodiment comprises a water path switching mechanism 110, a water distribution mechanism, a first mechanism 200 and a second mechanism 300. In this embodiment, the water path switching mechanism 110 is rotatably disposed, and the water path switching mechanism 110 comprises a ratchet wheel, which can act to drive the water distribution mechanism to act to optionally open at least one of the water outlets of corresponding one or more of the chamber bodies 1.

[0060] The water outlet device comprises a switching space and a water distribution space. A water path between the switching space and the water distribution space is not in communication, the water path switching mechanism 110 is disposed in the switching space, and the water distribution mechanism is disposed in the water distribution space.

[0061] The first mechanism 200 and the second mechanism 300 are configured to respectively drive the water path switching mechanism 110 to perform opposite actions. When the water outlet device in a state of water turn-on is turned off and not turned on again or turned on again after a period of time, that is, when the water is turned off and a duration of water shut-off exceeds a predetermined time t , the first mechanism 200 and the second mechanism 300 sequentially drive the water path switching mechanism 110 to maintain the water path switching mechanism 110 and the water distribution mechanism in a state prior to closing the water, specifically, the first mechanism 200 first drives the water path switching mechanism 110 to act to switch the water distribution mechanism to switch a water outlet state, and the second mechanism 300 then drives the water path switching

mechanism 110 to act to drive the water distribution mechanism to reset and then switch back to an original water outlet state (the state prior to closing the water). t can be 5 seconds, 10 seconds or other times, which can be designed according to market demands. When the water outlet device in the state of water turn-on is turned off and then turned on quickly, that is, when the water is turned off and the duration does not exceed the predetermined time t, only the first mechanism 200 drives the water path switching mechanism 110 to act to drive the water distribution mechanism to switch the water outlet effects. In this embodiment, the first mechanism 200 is an instantaneous switching mechanism, and the second mechanism 300 is a delayed switching mechanism. The water discharge for the chamber body 1 can be controlled by at least a selected one of the first mechanism 200 and the second mechanism 300 to achieve different ones of the water outlet effects through the action of the aforementioned water distribution mechanism. Through the first mechanism 200, cyclic switching of the water outlet effects can be achieved when the water outlet device is continuously turned off and on quickly (the duration does not exceed t); and through a cooperation of the second mechanism 300 and the first mechanism 200, a water outlet effect prior to closing the water can be maintained when the water outlet device is turned off for a long time (the duration exceeds t) and turned on again, this provides convenience for users in a usage scenario in which the users intermittently use the same water outlet effect for a relatively long time. When the water enters the water outlet device, the second mechanism 300 and the first mechanism 200 are away from the water path switching mechanism 110, and the water path switching mechanism 110 does not move; and when the water outlet device is turned off, "the first mechanism 200 and the second mechanism 300" sequentially approach the water path switching mechanism 110, or only "the first mechanism 200" approaches the water path switching mechanism 110 to drive the water path switching mechanism 110 to rotate.

[0062] Referring to FIGS. 12-14, the water distribution mechanism comprises a plurality of water distribution valve assemblies. A water distribution valve assembly comprises a third shaft 120, the third shaft 120 corresponds to the chamber body 1, and a rotation of the water path switching mechanism 110 can drive at least a selected one of the third shafts to act to open the water outlet of the corresponding one or more of the chamber bodies 1; and in this embodiment, the third shaft 120 is a function valve shaft.

[0063] In this embodiment, the water distribution valve assembly is disposed on the water distribution body 30, and it further comprises a function valve body 150 and a sealing ring member 160. The water distribution body 30 comprises an installation groove 31, as shown in FIG. 3, the water distribution valve assembly is disposed in the installation groove 31, and the third shaft 120 coaxially and movably penetrates through the function valve body

150, as shown in FIGS. 12-14. The sealing ring member 160 is disposed around the third shaft 120, when the third shaft 120 moves away from the water path switching mechanism 110 along an axial direction of the function valve body 150, the sealing ring member 160 can abut against a side wall of the function valve body 150 to block a pressure relief channel 11, as shown in FIG. 13; when the third shaft 120 moves toward the water path switching mechanism 110 along the axial direction of the function valve body 150, the sealing ring member 160 can disengage from the side wall of the function valve body 150 to open the pressure relief channel 11, as shown in FIG. 14.

[0064] As shown in FIG. 3, the water distribution valve assembly further comprises a movable ball 130. The movable ball 130 is in one-to-one correspondence with the third shaft 120 and is disposed between one end of the third shaft 120 and the water path switching mechanism 110. A third elastic element 140 is disposed on the other end of the third shaft 120, and the third elastic element 140 is a function valve shaft elastic element. The water path switching mechanism 110 comprises a plurality of control notches 113 disposed in a circumferential array, and a convex tooth is disposed between every adjacent two of the control notches 113, when the movable ball corresponds to the convex tooth, the third elastic element 140 compresses to store energy, as shown in FIG. 15, when the water path switching mechanism 110 rotates from the convex tooth until any one of the control notches 113 is aligned with the movable ball 130, the movable ball 130 moves into the one of the control notches 113 under an action of the third elastic element 140, and the third shaft 120 moves toward the water path switching mechanism 110 to open a pressure relief channel 11 so as to open the water outlet 12 of the corresponding one or more of the chamber bodies 1, as shown in FIG. 14.

[0065] Referring to FIGS. 1, 10 and 11, the water distribution mechanism further comprises a plurality of pilot valves 400. The pilot valves 400 are in one-to-one correspondence with the chamber bodies 1, the chamber bodies 1 form pressure chambers of the pilot valves 400, the pilot valves 400 comprise pilot valve bodies 410, spaces above the pilot valve bodies 410 in the pilot valves 400 form the pressure chambers, on and off of the pilot valves are controlled by movements of the pilot valve bodies 410 between conducting positions and blocking positions, the pilot valve bodies 410 comprise clearances 411, when the water flows into the overhead shower head, the water from the water inlet mechanism 20 first enters a water inlet flow channel 201, and then enters corresponding one or more of the pressure chambers through the clearances 411 of the plurality of pilot valves 400 (e.g., enters the clearances 411 from annular chambers 401 of the water inlet flow channel 201), at this time, the pilot valve bodies 410 move downward to the blocking positions under hydraulic pressure in the pressure chambers (pressure in the pressure chambers is not relieved), thereby blocking the annular chambers 401 and water

outlets 12. A water inflow rate through a clearance 411 is less than a water outflow rate through the pressure relief channel 11, relative to water inflow and pressure relief, a pressure relief speed is greater than a water inflow speed, so a movement stroke of the third shaft 120 is shorter, thus shortening a switching stroke of the third shaft 120.

[0066] Referring to FIGS. 13 and 14, one end of the pressure relief channel 11 is in communication with a pressure chamber, and the third shaft 120 can control on and off of the pressure relief channel 11. The rotation of the water path switching mechanism 110 drives the third shaft 120 to act to control the on and off of the pressure relief channel 11, thereby controlling whether pressure in a pressure chamber of a pilot valve 400 is relieved, and further controlling on and off of the pilot valve 400, before pressure relief, a primary flow channel 403 of the pilot valve is closed under hydraulic pressure in the pressure chamber (specifically, such as the hydraulic pressure in the pressure chamber + an elastic force of an on-off elastic element 420 - hydraulic pressure in an annular chamber 401), at this time, the water outlet 12 corresponding to the pilot valve is not in communication with the water inlet mechanism 20 (the annular chamber 401 and the water outlet 12 are blocked), after the pressure in the pressure chamber is relieved (specifically, such as the hydraulic pressure in the annular chamber 401 - the elastic force of the on-off elastic element 420), the primary flow channel 403 of the pilot valve is opened, at this time, the water outlet 12 corresponding to the pilot valve is in communication with the water inlet mechanism 20 (such as the annular chamber 401 of the water inlet flow channel 201), the water in the primary flow channel 403 of the pilot valve and the pressure relief channel 11 converges downstream, such as converging in the water outlet chamber 13 downstream, and a water outlet effect corresponding to the water outlet chamber 13 is produced. The water path switching mechanism 110 controls the third shaft of at least a selected one of the water distribution valve assemblies to slide so as to open the pressure relief channel 11 of the pilot valve corresponding to the selected one of the water distribution valve assemblies, to relieve the pressure of the pressure chamber of the pilot valve corresponding to the selected one of the water distribution valve assemblies, to open the pilot valve corresponding to the selected one of the water distribution valve assemblies, to enable the water outlet of a selected one of the pilot valves to be in communication with the water inlet mechanism, to discharge the water from the water outlet chamber 13 of the selected one of the pilot valves, and to produce the water outlet effect corresponding to a selected one of the water outlet chamber 13. However, it is not limited thereto, the water path switching mechanism 110 can also drive a water distribution plate to rotate, and switching of water paths can be directly achieved through rotation of the water distribution plate (the water distribution plate comprises a water passage hole, the water distribution body com-

prises a plurality of water distribution holes, the water through hole is aligned with or staggered from a selected one of the water distribution holes, and the selected one of water distribution holes discharge water).

[0067] The pilot valve 400 further comprises the on-off elastic element 420, the on-off elastic element 420 and a pilot valve body 410 are coaxially disposed and abut against each other, and the on-off elastic element 420 is disposed on an upper side of the pilot valve body 410, that is, in the pressure chamber. When the water in the pressure chamber flows out through the corresponding pressure relief channel 11 for pressure relief, the on-off elastic element 420 is compressed under the hydraulic pressure, a hydraulic force in the annular chamber 401 is greater than the elastic force of the on-off elastic element 420, at this time, the pilot valve body 410 moves upward to a conducting position under the hydraulic pressure, and the water in the primary flow channel 403 of the pilot valve corresponding to the pressure chamber and the pressure relief channel 11 converges downstream for discharging the water.

[0068] The on-off elastic element 420 comprises a spiral section, and the spiral section is further connected to a clearing rod 421, the clearing rod 421 can extend into the clearance 411, when the pilot valve body 410 moves under hydraulic variations in the pressure chamber, the spiral section is configured to be compressed, the pilot valve body 410 is configured to slide, and the clearing rod 421 can slide in the annular clearance 411. With each compression and recovery process of the on-off elastic element 420, the clearing rod 421 removes scale, impurities or the like in the clearance 411, thus preventing the clearance 411 from being blocked. The pilot valve body 410 comprises, for example, a diaphragm 4001 and a valve seat 4002 configured to move up and down, the valve seat 4002 is assembled to a middle region of the diaphragm 4001, a periphery of the diaphragm 4001 is fixed, and the clearance 411 fixedly passes through the valve seat 4002 and the diaphragm 4001.

[0069] Referring to FIGS. 1, 3, 6 and 8, the first mechanism 200 and the second mechanism 300 can respectively push the water path switching mechanism 110 to rotate in different directions. After the overhead shower head in the state of water turn-on is turned off for the period of time (t), the first mechanism 200 and the second mechanism 300 sequentially push the water path switching mechanism 110 to rotate, so that the water path switching mechanism 110 maintains the state prior to closing the water. It should be noted that a first shaft 220 can disengage from the water path switching mechanism 110 after finishing driving the water path switching mechanism 110, such as separating from first annular ratchet teeth 111, so as to facilitate a subsequent driving of the water path switching mechanism 110 by a second shaft 320, and a clutch state is achieved through separation or not. When the overhead shower head in the state of water turn-on is turned off and then turned on quickly (less than t), the first mechanism 200 pushes the water path switch-

ing mechanism 110 to rotate to switch the water outlet effects.

[0070] The water path switching mechanism 110 comprises first annular ratchet teeth 111 and second annular ratchet teeth 112, as shown in FIG. 15. A tooth direction of the first annular ratchet teeth 111 is opposite to a tooth direction of the second annular ratchet teeth 112. The first mechanism 200 and the second mechanism 300 are disposed opposite to each other, the water path switching mechanism 110 is disposed between the first mechanism 200 and the second mechanism 300, for example, the first mechanism 200 and the second mechanism 300 are respectively disposed on both sides of the water path switching mechanism 110 (such as being respectively disposed on left and right sides) and on the same side of a rotation axis (such as both on a front side or both on a rear side). The first mechanism 200 can be engaged and abutted against the first annular ratchet teeth 111, and the second mechanism 300 can be engaged and abutted against the second annular ratchet teeth 112, so that the first mechanism 200 and the second mechanism 300 drive the water path switching mechanism 110 to rotate in opposite directions. In this embodiment, a number of the first annular ratchet teeth 111 is equal to that of the second annular ratchet teeth 112, so each time either the first mechanism 200 or the second mechanism 300 approaches (approaches in place) the water path switching mechanism 110, it can drive the water path switching mechanism 110 to rotate. However, other arrangements can also be adopted, such as the first mechanism and the second mechanism are both disposed on the same side of the water path switching mechanism 110 and respectively disposed on both sides of the rotation axis, and the directions in which the two drive the ratchet wheel to rotate are opposite.

[0071] The first mechanism 200 comprises a first valve body 210, the first shaft 220, a first elastic element 230 and a first spring seat 260. In this embodiment, the first valve body 210 is an instantaneous switching valve body, the first shaft 220 is an instantaneous switching shaft, and the first elastic element 230 is an instantaneous switching elastic element. A first control chamber 211 is formed inside the instantaneous switching valve body, the first control chamber 211 is in communication with the water inlet mechanism 20 of the overhead shower head, and the water from the water inlet mechanism 20 can enter the first control chamber 211 to increase a pressure of the first control chamber 211. The first spring seat 260 is fixedly disposed on the water distribution seat 40, and one end of the instantaneous switching elastic element abuts against the first spring seat 260. The instantaneous switching shaft penetrates through the first control chamber 211, one end extends toward the water path switching mechanism 110, the extension extends out of the first control chamber 211 and is not in contact with the water, the water path switching mechanism 110 is not in communication with the water inlet mechanism 20, that is, the instantaneous switching shaft does not extend into the

water inlet flow channel of the water inlet mechanism. The other end is disposed with the instantaneous switching elastic element, and one end of the instantaneous switching elastic element away from the water path switching mechanism 110 abuts against the first spring seat 260. In this specific embodiment, the instantaneous switching shaft is isolated from the water inlet flow channel 201. Referring to FIG. 6, after the water enters the water outlet device, the instantaneous switching shaft is subjected to an action resulting from a first area difference between a first sealing ring 212 between the instantaneous switching shaft and the instantaneous switching valve body and a sealing ring 213 disposed around the instantaneous switching shaft, when there is the water in the first control chamber 211, and the product of a pressure in the first control chamber 211 and the first area difference is greater than an elastic force of the instantaneous switching elastic element, that is, a hydraulic force acting on the first shaft 220 via the water is greater than the elastic force of the first elastic element 230 acting on the first shaft 220, and the force difference drives the instantaneous switching shaft to move away from the water path switching mechanism 110. It should be noted that when the instantaneous switching shaft moves away from the water path switching mechanism 110, the water from the water inlet mechanism 20 can enter corresponding pressure chambers through the clearances 411 of the plurality of pilot valves 400 respectively.

[0072] The second mechanism 300 comprises a second valve body 310, the second shaft 320, a second elastic element 330 and a second spring seat 360. In this embodiment, the second valve body 310 is a delayed switching valve body, the second shaft 320 is a delayed switching shaft, and the second elastic element 330 is a delayed switching elastic element. A second control chamber 311 is formed inside the delayed switching valve body, the second control chamber 311 is in communication with the water inlet mechanism 20 of the overhead shower head, and the water from the water inlet mechanism 20 can enter the second control chamber 311 to increase a pressure of the second control chamber 311. The water outlet device comprises a water-passing area and a non-water-passing area, the delayed switching shaft penetrates through the second control chamber 311, one end extends toward the water path switching mechanism 110, the extension extends out of the second control chamber 311 and is not in contact with the water, the water path switching mechanism 110 is not in communication with the water inlet mechanism 20, that is, the delayed switching shaft does not extend into the water inlet flow channel of the water inlet mechanism, the water inlet flow channel, the water distribution mechanism and the like are disposed in the water-passing area, and the water path switching mechanism 110 is disposed in the non-water-passing area. The water flowing from the water inlet flow channel directly reaches the water distribution mechanism without passing through the water

path switching mechanism 110, thus avoiding pressure division by the water path switching mechanism 110, in this way, the water flowing from the water inlet flow channel reaches the first control chamber 211 and the second control chamber 311 to generate hydraulic force on the first shaft 220 and the second shaft 320, and a starting hydraulic pressure is significantly smaller than that when the water path switching mechanism 110 is disposed in the water-passing area. The other end is disposed with the delayed switching elastic element, the second spring seat 360 is fixedly disposed on the water distribution seat 40, and one end of the delayed switching elastic element away from the water path switching mechanism 110 abuts against the second spring seat 360. In this specific embodiment, the delayed switching shaft is isolated from the water inlet flow channel 201. Referring to FIG. 6, after the water enters the water outlet device, the delayed switching shaft is subjected to an action resulting from a second area difference between a second sealing ring 312 between the delayed switching shaft and the delayed switching valve body and a sealing ring 313 disposed around the delayed switching shaft, when there is the water in the second control chamber 311, and the product of a pressure in the second control chamber 311 and the second area difference is greater than an elastic force of the delayed switching elastic element, that is, a hydraulic force acting on the second shaft 320 via the water is greater than the elastic force of the second elastic element 330 acting on the second shaft 320, the force difference drives the delayed switching shaft to move away from the water path switching mechanism 110.

[0073] Referring to FIGS. 3 and 4, the first mechanism 200 further comprises a plurality of first guide posts 250, such as two first guide posts 250. The plurality of first guide posts 250 are disposed at intervals, the first shaft 220 is disposed among the plurality of first guide posts 250, and the first guide posts 250 can provide guidance for a movement of the first shaft 220. Opposite sides of the first shaft 220 respectively comprise a first protrusion 221 and a second protrusion 222, the first protrusion 221 is at the front, the second protrusion 222 is at the rear, the first protrusion 221 corresponds to one of the first guide posts 250, and the second protrusion 222 corresponds to another of the first guide posts 250. After the water outlet device is turned off, a movement process of the first shaft 220 is as follows: first, the first protrusion 221 acts on a corresponding one of the first guide posts 250, so that a head of the first shaft 220 abuts against the first annular ratchet teeth 111 and drives the water path switching mechanism 110 to rotate by a preset angle; then, the second protrusion 222 acts on a corresponding one of the first guide posts 250 to push the first shaft 220 outward, so that the head of the first shaft 220 disengages from the first annular ratchet teeth 111, at this time, the second shaft 320 can act on the water path switching mechanism 110 subsequently. Similarly, the second mechanism 300 further includes a second guide post 350, and the second

guide post 350 can provide guidance for a movement of the second shaft 320. That is to say, the first guide posts 250 and the second guide post 350 can respectively ensure the stability and accuracy of the first shaft 220 and the second shaft 320 during operation.

[0074] Referring to FIGS. 2 and 6-9, the first control chamber 211 is in communication with a first drain valve 240, after the water is turned off, the first control chamber 211 drains at a very fast speed via the first drain valve 240, and the first shaft 220 approaches and pushes the water path switching mechanism 110 to rotate under the action of the first elastic element 230. The second control chamber 311 is in communication with a second drain valve 340, the second control chamber 311 drains at a relatively slow speed via the second drain valve 340, and the second shaft 320 can approach and push the water path switching mechanism 110 to rotate under an action of the second elastic element 330. A drainage speed of the first drain valve 240 is greater than a drainage speed of the second drain valve 340, the first drain valve 240 is an instantaneous drain valve, and the second drain valve 340 is a delayed drain valve.

[0075] As shown in FIG. 7, the delayed drain valve drains through a drainage gap 341, as shown in FIG. 9, the instantaneous drain valve drains through a drainage channel 241. A drainage area of the drainage channel 241 is significantly larger than a drainage area of the drainage gap 341, so a drainage speed of the drainage channel 241 is significantly greater than a drainage speed of the drainage gap 341. When the overhead shower head is turned on and then turned off, both the delayed switching shaft and the instantaneous switching shaft will approach the water path switching mechanism 110 to reset under the action of the elastic elements, and their reset speeds are respectively related to the drainage speeds of the delayed drain valve and the instantaneous drain valve. As a drainage speed of the delayed drain valve is significantly less than a drainage speed of the instantaneous drain valve, the instantaneous switching shaft can reset faster, that is to say, when the water is continuously turned off and on quickly (not exceeding t), the instantaneous drain valve drains, and the water path switching mechanism 110 can be continuously controlled by the instantaneous switching shaft to rotate, thereby continuously switching the water outlet effects, during this process, the delayed drain valve has not finished draining, and the delayed switching shaft has not reset or has not reset in place and does not act on the water path switching mechanism. When the overhead shower head in the state of water turn-on is turned off for a long time (exceeding t), the instantaneous drain valve drains, the water path switching mechanism 110 is driven by the instantaneous switching shaft to rotate clockwise by the preset angle to switch the water outlet effects, the delayed drain valve drains, the delayed switching shaft resets under the action of the delayed switching elastic element, when the water is drained, the delayed switching shaft resets in place, and the water path switching

mechanism 110 is driven by the delayed switching shaft to rotate counterclockwise by the same angle to switch back to the original water outlet effect, so that the water path switching mechanism 110 maintains a state prior to closing the water, that is, maintains the water outlet effect prior to closing the water.

[0076] As shown in FIG. 9, the first drain valve 240 is in communication with the first control chamber 211, cooperates with the drainage channel 241, and comprises a first movable valve 242 and a first elastic body 243 abutting against the first movable valve 242, after the water is turned on, the water pushes the first movable valve 242 open, a hydraulic force exerted on the first movable valve 242 is greater than an elastic force of the first elastic body 243, so that the first movable valve moves downward to seal the drainage channel 241, the water enters the first control chamber 211, when the water is turned off, the hydraulic force decreases or disappears, the elastic force of the first elastic body 243 drives the first movable valve 242 to move upward to open the drainage channel 241, and the first control chamber 211 drains quickly. If necessary, the second drain valve 340 can be configured to have the same structure as the first drain valve, the only difference is that a drainage area of the second drain valve is small and a drainage speed is slow, however, other structures are described below by way of examples.

[0077] In this embodiment, as shown in FIGS. 2-3, 6-10 and 13, the water outlet device comprises the water inlet flow channel 201, and the water inlet flow channel 201 comprises a water inlet path 2001, a communication chamber 2002, a first water passage port 2004, a water inlet chamber 2005, a second water passage port 2006 and a third water passage port 2007; one end of the water inlet path 2001 is in communication with the water inlet mechanism 20, the other end is a water inlet 2003 in communication with the communication chamber 2002, the first water passage port 2004 is in communication with the communication chamber 2002 and the first control chamber 211, the first control chamber 211 is in communication with the third water passage port 2007, the third water passage port 2007 is in communication with the water inlet chamber 2005, and the second water passage port 2006 is in communication with the communication chamber 2002 and the second control chamber 311. After water enters: the water can enter the first control chamber 211 through the water inlet mechanism 20 - the water inlet path 2001 - the communication chamber 2002 - the first water passage port 2004; the water can enter the water inlet chamber 2005 through the water inlet mechanism 20 - the water inlet path 2001 - the communication chamber 2002 - the first water passage port 2004 - the first control chamber 211 - the third water passage port 2007; the water can enter the second control chamber 311 through the water inlet mechanism 20 - the water inlet path 2001 - the communication chamber 2002 - the second water passage port 2006.

[0078] In this embodiment, the water inlet 2003 corre-

sponds to the drainage channel 241 up and down, the first movable valve 242 connects the water inlet 2003 and the drainage channel 241, after the water is turned on, the water can act on the first movable valve 242 to move downward to seal the drainage channel 241 when entering the communication chamber 2002 from the water inlet 2003, when the water is turned off, the first elastic body 243 resets to open the drainage channel 241 to drain the water in the first control chamber 211, drainage: the water in the first control chamber 211 is drained through the first control chamber 211 - the first water passage port 2004 - the communication chamber 2002 - the drainage channel 241.

[0079] As shown in FIGS. 6-8, the second water passage port 2006 is equipped with the second drain valve 340, and the second drain valve 340 comprises a one-way valve, the one-way valve further comprises the drainage gap 341, when water enters, the water from the communication chamber 2002 to the second water passage port 2006 drives the one-way valve to open, and after opening, the water from the communication chamber 2002 enters the second control chamber 311 through the second water passage port 2006 and the drainage gap 341; and after the water is turned off, the one-way valve resets to close the second water passage port 2006, and due to the drainage gap 341, the water in the second control chamber 311 is drained through the drainage gap 341, for example: the second control chamber 311 → the drainage gap 341 → the communication chamber 2002 → the drainage channel 241. The one-way valve comprises, for example, a second movable valve 342 and a second elastic body 343 abutting against the second movable valve 342, the aforementioned drainage gap 341 is disposed on the second movable valve 342, the second elastic body 343 comprises a spiral section and a straight section extending from a tail end of the spiral section in a direction parallel to an axis, the straight section is inserted into the drainage gap 341, which not only performs positioning and guiding functions to reduce a water passage area, but also removes scale.

[0080] As shown in FIG. 11, the pilot valve 400 comprises the water outlet 12 and the annular chamber 401, the annular chamber 401 surrounds the water outlet 12 and is blocked by a blocking ring 402, and the blocking ring 402 is, for example, formed on the water distribution body; when the pilot valve body 410 is sealingly covered on an end surface of the blocking ring 402 to block a communication between the annular chamber 401 and the water outlet 12, the pilot valve 400 is closed, and the primary flow channel 403 of the pilot valve body 410 is closed; when the pilot valve body 410 moves upward away from the end surface of the blocking ring 402, the annular chamber 401 is in communication with the water outlet 12, the pilot valve 400 is opened, and the primary flow channel 403 of the pilot valve body 410 is opened; the water inlet chamber 2005 is in communication with the annular chamber 401 of each of the pilot valves 400, and each of the water outlets 12 is respectively in com-

munication with each of the water outlet chambers 13, that is: the water inlet mechanism 20 → the water inlet path 2001 → the communication chamber 2002 → the first water passage port 2004 → the first control chamber 211 → the third water passage port 2007 → the water inlet chamber 2005 → the annular chamber 401 → the water outlet 12 → the water outlet chamber 13. As shown in FIGS. 13 and 14, one end of the pressure relief channel 11 is in communication with the chamber body 1, and the other end is in communication with the function valve body 150, the function valve body 150 further comprises a confluence channel in communication with the water outlet chamber 13, the on and off of the pressure relief channel 11 is controlled by sliding of the third shaft 120, that is, on and off of the pressure relief channel 11 and the confluence channel is controlled, for example, pressure relief is performed when opened, and the water is depressurized along the chamber body 1 → the pressure relief channel 11 → the function valve body 150 → the confluence channel → the water outlet chamber 13.

[0081] This embodiment provides a water path switching method, the water path switching method switches the water outlet effects based on the water outlet device of this embodiment. The water path switching method comprises:

Step 1: the overhead shower head is turned on, and the water flows into the water inlet mechanism 20;
 Step 2: the water enters the water outlet device, when the water flows into the first control chamber of the first mechanism 200 and the second control chamber of the second mechanism 300, the first shaft and the second shaft move away from the water path switching mechanism 110 under the action of the hydraulic pressure, at this time, one of the chamber bodies 1 of the water distribution mechanism discharges water to achieve one of the water outlet effects, the one of the water outlet effects is defined as a first water outlet effect (a first water outlet state);
 Step 3: the water outlet device in the state of water turn-on is turned off, and selections are respectively made according to whether a duration of water shut-off exceeds t:

[0082] If exceeding t, the first control chamber 211 and the second control chamber 311 drain through the first drain valve 240 and the second drain valve 340 respectively, first, the first control chamber 211 drains, the first shaft 220 of the first mechanism 200 slides toward the water path switching mechanism 110 under the action of the first elastic element 230, at approximately the time when water is completely drained, the water path switching mechanism 110 is driven to rotate forward (which can be clockwise or counterclockwise), the water distribution mechanism is driven to act to switch to a second water outlet state (close the pilot valve for the first water outlet state and open the pilot valve for the second water outlet state), the second control chamber 311 drains, the sec-

ond shaft 320 of the second mechanism 300 slides in a direction close to the water path switching mechanism 110 under the action of the second elastic element 330, at approximately the time when water is completely drained, the water path switching mechanism 110 is driven to rotate reversely, the water distribution mechanism is driven to act to return to the first water outlet state (close the pilot valve for the second water outlet state and open the pilot valve for the first water outlet state), and the step 1 is then executed; and as a time for the second control chamber 311 to finish draining is later than a time for the first control chamber 211 to finish draining, the first shaft 220 first drives the water path switching mechanism 110 to rotate forward, and the second shaft 320 then drives the water path switching mechanism 110 to rotate reversely;

[0083] If not exceeding t, the first control chamber 211 and the second control chamber 311 drain through the first drain valve 240 and the second drain valve 340 respectively, the first control chamber 211 drains, the first shaft 220 of the first mechanism 200 slides toward the water path switching mechanism 110 under the action of the first elastic element 230, the water path switching mechanism 110 is driven to rotate forward, the water distribution mechanism is driven to act to switch to the second water outlet effect (at this time, the water in the second control chamber 311 has not been completely drained, and the second shaft has not slid or has not slid to a position where the water path switching mechanism is driven to rotate reversely), and the step 1 is then executed.

[0084] When the water outlet device in the state of water turn-on is turned off, the instantaneous switching mechanism and the delayed switching mechanism sequentially drive the water path switching mechanism 110, thus enabling the water path switching mechanism 110 rotate by the same angle in two opposite directions sequentially to maintain the state prior to closing the water, so that the water outlet state prior to closing the water can be maintained when the water is turned on next time, providing convenience for users.

[0085] When the water outlet device in the state of water turn-on is turned off and then turned on quickly, the delayed switching mechanism is still in a separated state from the water path switching mechanism 110, thus being unable to control the water path switching mechanism 110, at this time, only the instantaneous switching mechanism drives the water path switching mechanism 110 to rotate by the preset angle, controlling one chamber to turn off water and another chamber to discharge water, so as to achieve switching of the water outlet effects.

[0086] This embodiment describes two of the water outlet effects by way of examples, but it is not limited thereto, and three or four of the water outlet effects are also applicable.

Embodiment 2

[0087] This embodiment provides the water outlet device, this embodiment differs from Embodiment 1 in that specific water distribution modes of the water distribution mechanism are different.

[0088] Referring to FIGS. 15-17, the water outlet device of this embodiment does not comprise the pressure chambers of Embodiment 1, the water distribution body comprises a water flow channel 14, and the water flow channel 14 is in communication with the water inlet mechanism 20. The water flow channel 14 is correspondingly in communication with the plurality of water outlets 12, and the plurality of water outlets 12 are in one-to-one correspondence with the plurality of water outlet chambers 13, different ones of the water outlet chambers 13 correspond to different ones of the water outlet effects, and the rotation of the water path switching mechanism 110 can drive the water distribution mechanism to act. In this embodiment, there are two of the water outlets 12 corresponding to the water flow channel 14, the two of the water outlets 12 are distributed at intervals in an axial direction of the third shaft 120, the two of the water outlets 12 are alternately opened through a movement of the water distribution mechanism along this straight line, thus achieving switching of the water outlet effects.

[0089] The water distribution mechanism comprises a water distribution valve assembly, a structure of the water distribution valve assembly can be the same as that in Embodiment 1, the third shaft 120 is disposed in the water distribution space, the rotation of the water path switching mechanism 110 can drive the third shaft 120 to perform linear movement along an axial direction thereof in the water flow channel 14, the water outlets 12 are alternately opened to achieve switching of the water outlet effects through a conversion of the third shaft between the two positions shown in FIGS. 15 and 16. This embodiment describes two of the water outlets by way of examples, but it is not limited thereto, the plurality of water outlets can be disposed at intervals along a sliding direction, and the water path switching mechanism 110 comprises corresponding multi-stage protrusions, outer diameters of the multi-stage protrusions are different, the third shaft is then controlled to be at different positions via the multi-stage protrusions, so that the water outlets at different positions discharge water to switch different effects.

Embodiment 3

[0090] This embodiment provides the water outlet device, this embodiment differs from Embodiment 1 in that: the water outlet device only comprises the first mechanism, the water distribution mechanism comprises the plurality of pilot valves, the pilot valve comprises the slidable third shaft and the primary flow channel 403, the on and off of the pilot valve controls on and off between the water inlet mechanism of the water outlet device and the primary flow channel 403, that is, controls

on and off between the annular chamber and the water outlet, the on and off of the pilot valve is controlled by sliding of the third shaft, the rotation of the water path switching mechanism drives at least a selected one of the third shafts to slide, a selected one of the pilot valves is opened, the primary flow channel of the selected one of the pilot valves is in communication with the water inlet mechanism, the primary flow channel of the selected one of the pilot valves discharges water, and the water outlet and the water outlet chamber of the selected one of the pilot valves discharge water. The ratchet wheel of the water path switching mechanism only comprises the first annular ratchet teeth, the first shaft of the first mechanism is engaged with the first annular ratchet teeth, and the third shaft is operatively connected to the water path switching mechanism. The structures and connections of the pilot valves, the first mechanism and the third shaft can refer to Embodiment 1.

Embodiment 4

[0091] This embodiment provides a driving device, this embodiment differs from Embodiment 1 in that: the water path switching mechanism is rotatably disposed to form a movable mechanism (i.e., a rotating mechanism) in this embodiment, and the driving device comprises the water inlet mechanism, the movable mechanism, the first mechanism and the second mechanism; the first mechanism and the second mechanism can respectively drive the movable mechanism to act; both the first mechanism and the second mechanism are configured to be in communication with the water inlet mechanism, when the water inlet mechanism is turned off and the duration exceeds t , the first mechanism first drives the movable mechanism to rotate forward, and the second mechanism then drives the movable mechanism to rotate reversely; and when the water inlet mechanism is turned off and the duration does not exceed t , only the first mechanism drives the movable mechanism to rotate forward. The rotation or the rotation followed by reset of the movable mechanism can be controlled through on and off of the water inlet mechanism and the off duration. The structures of the movable mechanism, the first mechanism and the second mechanism can refer to Embodiments 1 and 3.

[0092] If necessary, a slidable third shaft can be further included, the movable mechanism comprises a plurality of control notches along a circumferential direction, the rotation of the movable mechanism drive the third shaft to slide via the plurality of control notches, sliding of the third shaft can be controlled through the on and off of the water inlet mechanism and the off duration, and sliding control of the third shaft may refer to Embodiment 1.

[0093] The present invention may be summarized as follows: The present disclosure discloses a water outlet device, an overhead shower head, a driving device and a water path switching method. The water outlet device comprises a water path switching mechanism, a water

distribution mechanism and two mechanisms; the water distribution mechanism is operatively connected to the water path switching mechanism, the water distribution mechanism is driven to act by an action of the water path switching mechanism; both of the first mechanism and the second mechanism are configured to drive the water path switching mechanism to act; when the water outlet device is turned off and a duration exceeds t , the first mechanism first drives the water path switching mechanism to act, and the second mechanism then drives the water path switching mechanism to act; and when the water outlet device is turned off and the duration does not exceed t , only the first mechanism drives the water path switching mechanism to act. The advantages of the present disclosure are as follows: the water path switching mechanism can be driven according to whether the duration exceeds t to control the water distribution mechanism, thus providing convenience for users.

[0094] The present invention may also be summarized as follows:

1. A water outlet device, characterized in that, it comprises:

a water path switching mechanism (110);
 a water distribution mechanism operatively connected to the water path switching mechanism (110), the water distribution mechanism is driven to act by an action of the water path switching mechanism (110);
 a first mechanism (200) and a second mechanism (300), both of the first mechanism (200) and the second mechanism (300) are configured to drive the water path switching mechanism (110) to act;
 when the water outlet device is turned off and a duration exceeds t , the first mechanism (200) first drives the water path switching mechanism (110) to act in a first direction, and the second mechanism (300) then drives the water path switching mechanism (110) to act in a second direction, with the first direction being opposite to the second direction; and
 when the water outlet device is turned off and the duration does not exceed t , only the first mechanism (200) drives the water path switching mechanism (110) to act in the first direction.

2. The water outlet device according to item 1, characterized in that:

when water is turned off and the duration exceeds t , the first mechanism (200) and the second mechanism (300) sequentially drive the water path switching mechanism (110) to bring the water distribution mechanism into a state prior to closing water; and
 when the water is turned off and the duration

does not exceed t , only the first mechanism (200) drives the water path switching mechanism (110) to drive the water distribution mechanism to switch water outlet effects.

3. The water outlet device according to item 1 and/or 2, characterized in that: the water path switching mechanism (110) is rotatably disposed, and both the first mechanism (200) and the second mechanism (300) are configured to push the water path switching mechanism (110) to rotate with opposite rotation directions.

4. The water outlet device according to any one or more of items 1 to 3, characterized in that: the first mechanism (200) disengages from the water path switching mechanism (110) after pushing the water path switching mechanism (110) to rotate.

5. The water outlet device according to any one or more of items 1 to 4, characterized in that: the first mechanism (200) comprises a slidable first shaft (220), the first shaft (220) comprises a second protrusion (222), and a first guide post (250) is fixedly additionally configured, a movement process of the first shaft (220) is as follows: the first shaft (220) first acts on the water path switching mechanism (110) to push the water path switching mechanism (110) to rotate, and the second protrusion (222) is then pushed by the first guide post (250) to disengage the first shaft (220) from the water path switching mechanism (110).

6. The water outlet device according to item 5, characterized in that: the first shaft (220) further comprises a first protrusion (221), and another first guide post (250) is fixedly additionally configured, the movement process of the first shaft (220) is as follows: the first protrusion (221) first acts on another first guide post (250) to enable the first shaft (220) to push the water path switching mechanism (110) to rotate, and the second protrusion (222) is then pushed by the first guide post (250).

7. The water outlet device according to any one or more of items 1 to 6, characterized in that: the water path switching mechanism (110) comprises a ratchet wheel, the ratchet wheel comprises annular ratchet teeth, and both the first mechanism (200) and the second mechanism (300) are configured to abut against the annular ratchet teeth to push the water path switching mechanism (110) to rotate.

8. The water outlet device according to item 7, characterized in that: the annular ratchet teeth are divided into first annular ratchet teeth (111) and second annular ratchet teeth (112) with opposite tooth directions, and the first mechanism (200) and the second mechanism (300) are configured to respectively abut against the first annular ratchet teeth (111) and the second annular ratchet teeth (112) and push the water path switching mechanism (110) to rotate in opposite directions.

9. The water outlet device according to item 8, characterized in that: the first annular ratchet teeth (111) are disposed in an annular array, the second annular ratchet teeth (112) are disposed in an annular array, and the first annular ratchet teeth (111) and the second annular ratchet teeth (112) are equal in number.

10. The water outlet device according to any one or more of items 1 to 9, characterized in that:

the first mechanism (200) comprises a first control chamber (211), a first shaft (220) slidably received in the first control chamber (211) and a first elastic element (230), when water enters, a hydraulic force acting on the first shaft (220) via the water in the first control chamber (211) is greater than an elastic force of the first elastic element (230), and a force difference drives the first shaft (220) away from the water path switching mechanism (110), when the water is turned off, the first control chamber (211) drains, and the first elastic element (230) drives the first shaft (220) to reset, driving the water path switching mechanism (110) to act via the reset of the first shaft (220); and

the second mechanism (300) comprises a second control chamber (311), a second shaft (320) slidably received in the second control chamber (311) and a second elastic element (330), when the water enters, a hydraulic force acting on the second shaft (320) via the water in the second control chamber (311) is greater than an elastic force of the second elastic element (330), and a force difference drives the second shaft (320) away from the water path switching mechanism (110), when the water is turned off, the second control chamber (311) drains, and the second elastic element (330) drives the second shaft (320) to reset, driving the water path switching mechanism (110) to act via the reset of the second shaft (320).

11. The water outlet device according to item 10, characterized in that: a drainage speed of the first control chamber (211) is greater than a drainage speed of the second control chamber (311) after the water is turned off.

12. The water outlet device according to item 10 and/or 11, characterized in that: the first control chamber (211) is in communication with a first drain valve (240), and the first control chamber (211) drains through the first drain valve (240); the second control chamber (311) is in communication with a second drain valve (340), and the second control chamber (311) drains through the second drain valve (340); and a drainage speed of the first drain valve (240) is greater than a drainage speed of the second drain valve (340).

13. The water outlet device according to any one or more of items 1 to 12, characterized in that: it comprises a plurality of water outlets (12), the water path switching mechanism (110) is rotatably disposed, and the water distribution mechanism is driven to act by a rotation of the water path switching mechanism (110) to open at least a selected one of the water outlets (12).

14. The water outlet device according to any one or more of items 1 to 13, characterized in that: it comprises a switching space and one or more water distribution spaces, a water path between the switching space and the one or more water distribution spaces is not in communication, the water path switching mechanism (110) is disposed in the switching space, and the water distribution mechanism is disposed in the one or more water distribution spaces.

15. The water outlet device according to item 14, characterized in that: it comprises a plurality of chamber bodies (1), a number of the one or more water distribution spaces is multiple, the water distribution mechanism comprises a plurality of third shafts (120), the plurality of third shafts (120) are respectively disposed in multiple of the one or more water distribution spaces and are in one-to-one correspondence with the plurality of chamber bodies (1), the rotation of the water path switching mechanism (110) is configured to drive the third shafts (120) to act so as to open corresponding ones of the water outlets (12) of the chamber bodies (1).

16. The water outlet device according to any one or more of items 1 to 15, characterized in that: the water distribution mechanism comprises a plurality of pilot valves (400), a pilot valve (400) is configured with a slidable third shaft (120) and a primary flow channel (403), on and off of the primary flow channel (403) is controlled by on and off of the pilot valve (400), the on and off of the pilot valve (400) is controlled by sliding of the third shaft (120), and a rotation of the water path switching mechanism (110) drives at least one of the third shafts (120) to slide.

17. The water outlet device according to item 16, characterized in that: the pilot valve (400) comprises a pilot valve body (410) and a pressure relief channel (11), and the pilot valve body (410) moves between a conducting position and a blocking position to control the on and off of the pilot valve (400); a space inside the pilot valve (400) and on the pilot valve body (410) forms a chamber body (1), and the pilot valve body (410) comprises a clearance (411); and the pressure relief channel (11) is connected to the chamber body (1), and the third shaft (120) controls on and off of the pressure relief channel (11), when the pressure relief channel (11) is opened and the chamber body is relieved of pressure, the pilot valve body (410) is driven to move to the conducting position, and when the pressure relief channel (11) is closed and the

water from the water inlet mechanism (20) enters the chamber body (1) through the clearance (411), the pilot valve body (410) is driven to move to the blocking position.

18. The water outlet device according to any one or more of items 1 to 17, characterized in that: the water distribution mechanism comprises one or more water distribution valve assemblies, a water distribution valve assembly comprises a slidable third shaft (120), a rotation of the water path switching mechanism (110) drives the third shaft (120) to slide, and the water distribution valve assembly is controlled by sliding of the third shaft (120).

19. The water outlet device according to item 18, characterized in that: a number of the one or more water distribution valve assemblies is multiple, each of the one or more water distribution valve assemblies comprises a water outlet (12), the rotation of the water path switching mechanism (110) drives at least a selected one of the third shafts (120) to slide to open the water outlet (12) corresponding to a selected one of the one or more water distribution valve assemblies.

20. The water outlet device according to item 18 and/or 19, characterized in that: the one or more water distribution valve assemblies comprises at least two water outlets (12), and water discharge from the at least two water outlets (12) is switched by sliding of the third shaft (120).

21. The water outlet device according to any one or more of items 18 to 20, characterized in that: the water path switching mechanism (110) comprises a plurality of control notches (113) along a circumferential direction, and the rotation of the water path switching mechanism (110) controls the third shaft (120) to slide by the plurality of control notches (113).

22. The water outlet device according to item 21, characterized in that: the water distribution valve assembly further comprises a movable ball (130) and a third elastic element (140), the movable ball (130) is disposed between one end of the third shaft (120) and the water path switching mechanism (110), and the third elastic element (140) abuts against the other end of the third shaft (120), when the water path switching mechanism (110) rotates until any one of the control notches (113) is aligned with the movable ball (130), the movable ball (130) moves into the one of the control notches (113) under an action of the third elastic element (140), and the third shaft (120) slides to open a corresponding water outlet (12).

23. A water outlet device, characterized in that, it comprises:

a water path switching mechanism (110);
a water distribution mechanism operatively connected to the water path switching mechanism (110), the water distribution mechanism com-

prises a plurality of pilot valves (400), and the water distribution mechanism is driven to act by an action of the water path switching mechanism (110) to control on and off of at least one of the pilot valves (400); and

a first mechanism (200), on which an elastic element is disposed, the first mechanism (200) is configured to drive the water path switching mechanism (110) to act, when the water outlet device is turned on, the elastic element (230) stores energy under an action of hydraulic pressure, when water is turned off, the elastic element (230) releases the energy to drive the water path switching mechanism (110) to act.

24. The water outlet device according to item 23, characterized in that: the water distribution mechanism comprises a plurality of pilot valves (400), a pilot valve (400) is configured with a slidable third shaft (120) and a primary flow channel (403), on and off of the primary flow channel (403) is controlled by on and off of the pilot valve (400), the on and off of the pilot valve (400) is controlled by sliding of the third shaft (120), and the third shaft (120) is operatively connected to the water path switching mechanism (110); and when the water outlet device is turned off, the first mechanism (200) drives the water path switching mechanism (110) to act, and the water path switching mechanism (110) drives at least one of the third shafts (120) to slide via transmission.

25. An overhead shower head, characterized in that: it comprises a shower shell (10), a face cover (50) and the water outlet device according to any one or more of items 1 to 24, the water outlet device further comprises a water inlet mechanism (20) and a water distribution body (30), the shower shell (10) and the face cover (50) enclose an installation space, the water distribution body (30) comprises a plurality of water outlet chambers (13) corresponding to a plurality of water outlet effects, the water inlet mechanism (20) is disposed at a top of the shower shell (10) to enable water to enter the installation space, and the water outlet device is disposed in the installation space and is configured to discharge the water from any one of the water outlet chambers (13).

26. A driving device, characterized in that: it comprises:

a water inlet mechanism;
a movable mechanism movably disposed; and
a first mechanism and a second mechanism, both of the first mechanism and the second mechanism are configured to drive the movable mechanism to act; both the first mechanism and the second mechanism are configured to be in communication with the water inlet mechanism, when the water inlet mechanism is turned off and

a duration exceeds t , the first mechanism first drives the movable mechanism to act in a first direction, and the second mechanism then drives the movable mechanism to act in a second direction; and when water is turned off and the duration does not exceed t , only the first mechanism drives the movable mechanism to act in the first direction.

27. The driving device according to item 26, characterized in that: the movable mechanism is rotatably disposed to form a rotating mechanism, and both the first mechanism and the second mechanism are configured to drive the rotating mechanism to rotate.

28. The driving device according to item 27, characterized in that: the first mechanism disengages from the rotating mechanism after pushing the rotating mechanism to rotate.

29. The driving device according to item 27 and/or 28, characterized in that: the rotating mechanism comprises a ratchet wheel, the ratchet wheel comprises annular ratchet teeth, and the first mechanism and the second mechanism are configured to abut against the annular ratchet teeth to push the rotating mechanism to rotate.

30. The driving device according to any one or more of items 27 to 29, characterized in that:

the first mechanism comprises a first control chamber, a first shaft slidably received in the first control chamber and a first elastic element, when water enters, a hydraulic force acting on the first shaft via the water in the first control chamber is greater than an elastic force of the first elastic element, and a force difference drives the first shaft away from the rotating mechanism, when the water is turned off, the first control chamber drains, and the first elastic element drives the first shaft to reset, driving the rotating mechanism to act via the reset of the first shaft; and

the second mechanism comprises a second control chamber, a second shaft slidably received in the second control chamber and a second elastic element, when the water enters, a hydraulic force acting on the second shaft via the water in the second control chamber is greater than an elastic force of the second elastic element, and a force difference drives the second shaft away from the rotating mechanism, when the water is turned off, the second control chamber drains, the second elastic element drives the second shaft to reset, driving the rotating mechanism to act via the reset of the second shaft, and a drainage speed of the first control chamber is greater than a drainage speed of the second control chamber after the water is turned off.

31. The driving device according to any one or more of items 27 to 30, characterized in that: it further comprises a slidable third shaft, the rotating mechanism comprises a plurality of control notches along a circumferential direction, and a rotation of the rotating mechanism controls the third shaft to slide via the plurality of control notches.

32. The driving device according to item 31, characterized in that: the third shaft is configured with a movable ball and a third elastic element, the movable ball is disposed between one end of the third shaft and the rotating mechanism, the third elastic element is disposed at the other end of the third shaft, and when the rotating mechanism rotates until any one of the control notches is aligned with the movable ball, the third shaft is driven to slide and the movable ball moves into the one of the control notches under an action of the third elastic element.

33. A water path switching method for the water outlet device according to any one or more of items 1 to 24, characterized in that: it comprises:

step 1. water flows into the water outlet device; step 2. the first mechanism (200) and the second mechanism (300) are away from the water path switching mechanism (110), the water outlet device discharges water in one state, and discharging the water in the one state is defined as a first water outlet state; and

step 3. the water outlet device is turned off, and selections are respectively made according to whether a duration of water shut-off exceeds t :

if exceeding t , the first mechanism (200) first drives the water path switching mechanism (110) to act in a first direction and drives the water distribution mechanism to act to switch to a second water outlet state, and the second mechanism (300) then drives the water path switching mechanism (110) to act in a second direction and drives the water distribution mechanism to act to return to the first water outlet state; and if not exceeding t , only the first mechanism (200) drives the water path switching mechanism (110) to act in the first direction and drives the water distribution mechanism to act to switch to the second water outlet state.

[0095] It is obvious that the aforementioned embodiments of the present disclosure are merely examples used for clearly illustrating the present disclosure, rather than limiting the embodiments of the present disclosure. Various obvious modifications, rearrangements and substitutions made by those of skill in the art shall not depart from the protection scope of the present disclosure. It is unnecessary and impossible to exhaustively list all em-

bodiments herein. Any modifications, equivalent replacements, improvements and the like shall fall within the protection scope defined by the claims of the present disclosure provided that they are made within the spirit and principles of the present disclosure.

Claims

1. A water outlet device, **characterized in that**, it comprises:

a water path switching mechanism (110);
a water distribution mechanism operatively connected to the water path switching mechanism (110), the water distribution mechanism is driven to act by an action of the water path switching mechanism (110);

a first mechanism (200) and a second mechanism (300), both of the first mechanism (200) and the second mechanism (300) are configured to drive the water path switching mechanism (110) to act;

when the water outlet device is turned off and a duration exceeds t , the first mechanism (200) first drives the water path switching mechanism (110) to act in a first direction, and the second mechanism (300) then drives the water path switching mechanism (110) to act in a second direction, with the first direction being opposite to the second direction; and

when the water outlet device is turned off and the duration does not exceed t , only the first mechanism (200) drives the water path switching mechanism (110) to act in the first direction.

2. The water outlet device according to claim 1, **characterized in that**:

when water is turned off and the duration exceeds t , the first mechanism (200) and the second mechanism (300) sequentially drive the water path switching mechanism (110) to bring the water distribution mechanism into a state prior to closing water; and

when the water is turned off and the duration does not exceed t , only the first mechanism (200) drives the water path switching mechanism (110) to drive the water distribution mechanism to switch water outlet effects.

3. The water outlet device according to claim 1 and/or 2, **characterized in that**: the water path switching mechanism (110) is rotatably disposed, and both the first mechanism (200) and the second mechanism (300) are configured to push the water path switching mechanism (110) to rotate with opposite rotation directions.

4. The water outlet device according to any one or more of claims 1 to 3, **characterized in that**: the first mechanism (200) disengages from the water path switching mechanism (110) after pushing the water path switching mechanism (110) to rotate, wherein preferably: the first mechanism (200) comprises a slidable first shaft (220), the first shaft (220) comprises a second protrusion (222), and a first guide post (250) is fixedly additionally configured, a movement process of the first shaft (220) is as follows: the first shaft (220) first acts on the water path switching mechanism (110) to push the water path switching mechanism (110) to rotate, and the second protrusion (222) is then pushed by the first guide post (250) to disengage the first shaft (220) from the water path switching mechanism (110).

5. The water outlet device according to claim 4, **characterized in that**: the first shaft (220) further comprises a first protrusion (221), and another first guide post (250) is fixedly additionally configured, the movement process of the first shaft (220) is as follows: the first protrusion (221) first acts on another first guide post (250) to enable the first shaft (220) to push the water path switching mechanism (110) to rotate, and the second protrusion (222) is then pushed by the first guide post (250).

6. The water outlet device according to any one or more of claims 1 to 5, **characterized in that**: the water path switching mechanism (110) comprises a ratchet wheel, the ratchet wheel comprises annular ratchet teeth, and both the first mechanism (200) and the second mechanism (300) are configured to abut against the annular ratchet teeth to push the water path switching mechanism (110) to rotate.

7. The water outlet device according to claim 6, **characterized in that**: the annular ratchet teeth are divided into first annular ratchet teeth (111) and second annular ratchet teeth (112) with opposite tooth directions, and the first mechanism (200) and the second mechanism (300) are configured to respectively abut against the first annular ratchet teeth (111) and the second annular ratchet teeth (112) and push the water path switching mechanism (110) to rotate in opposite directions, wherein preferably: the first annular ratchet teeth (111) are disposed in an annular array, the second annular ratchet teeth (112) are disposed in an annular array, and the first annular ratchet teeth (111) and the second annular ratchet teeth (112) are equal in number.

8. The water outlet device according to any one or more of claims 1 to 7, **characterized in that**:

the first mechanism (200) comprises a first control chamber (211), a first shaft (220) slidably

received in the first control chamber (211) and a first elastic element (230), when water enters, a hydraulic force acting on the first shaft (220) via the water in the first control chamber (211) is greater than an elastic force of the first elastic element (230), and a force difference drives the first shaft (220) away from the water path switching mechanism (110), when the water is turned off, the first control chamber (211) drains, and the first elastic element (230) drives the first shaft (220) to reset, driving the water path switching mechanism (110) to act via the reset of the first shaft (220); and the second mechanism (300) comprises a second control chamber (311), a second shaft (320) slidably received in the second control chamber (311) and a second elastic element (330), when the water enters, a hydraulic force acting on the second shaft (320) via the water in the second control chamber (311) is greater than an elastic force of the second elastic element (330), and a force difference drives the second shaft (320) away from the water path switching mechanism (110), when the water is turned off, the second control chamber (311) drains, and the second elastic element (330) drives the second shaft (320) to reset, driving the water path switching mechanism (110) to act via the reset of the second shaft (320).

9. The water outlet device according to claim 8, **characterized in that:** a drainage speed of the first control chamber (211) is greater than a drainage speed of the second control chamber (311) after the water is turned off, wherein preferably: the first control chamber (211) is in communication with a first drain valve (240), and the first control chamber (211) drains through the first drain valve (240); the second control chamber (311) is in communication with a second drain valve (340), and the second control chamber (311) drains through the second drain valve (340); and a drainage speed of the first drain valve (240) is greater than a drainage speed of the second drain valve (340).
10. The water outlet device according to any one or more of claims 1 to 9, **characterized in that:** it comprises a plurality of water outlets (12), the water path switching mechanism (110) is rotatably disposed, and the water distribution mechanism is driven to act by a rotation of the water path switching mechanism (110) to open at least a selected one of the water outlets (12).
11. The water outlet device according to any one or more of claims 1 to 10, **characterized in that:** it comprises a switching space and one or more water distribution spaces, a water path between the switching space

and the one or more water distribution spaces is not in communication, the water path switching mechanism (110) is disposed in the switching space, and the water distribution mechanism is disposed in the one or more water distribution spaces, wherein preferably: it comprises a plurality of chamber bodies (1), a number of the one or more water distribution spaces is multiple, the water distribution mechanism comprises a plurality of third shafts (120), the plurality of third shafts (120) are respectively disposed in multiple of the one or more water distribution spaces and are in one-to-one correspondence with the plurality of chamber bodies (1), the rotation of the water path switching mechanism (110) is configured to drive the third shafts (120) to act so as to open corresponding ones of the water outlets (12) of the chamber bodies (1).

12. The water outlet device according to any one or more of claims 1 to 11, **characterized in that:** the water distribution mechanism comprises a plurality of pilot valves (400), a pilot valve (400) is configured with a slidable third shaft (120) and a primary flow channel (403), on and off of the primary flow channel (403) is controlled by on and off of the pilot valve (400), the on and off of the pilot valve (400) is controlled by sliding of the third shaft (120), and a rotation of the water path switching mechanism (110) drives at least one of the third shafts (120) to slide.
13. The water outlet device according to claim 12, **characterized in that:** the pilot valve (400) comprises a pilot valve body (410) and a pressure relief channel (11), and the pilot valve body (410) moves between a conducting position and a blocking position to control the on and off of the pilot valve (400); a space inside the pilot valve (400) and on the pilot valve body (410) forms a chamber body (1), and the pilot valve body (410) comprises a clearance (411); and the pressure relief channel (11) is connected to the chamber body (1), and the third shaft (120) controls on and off of the pressure relief channel (11), when the pressure relief channel (11) is opened and the chamber body is relieved of pressure, the pilot valve body (410) is driven to move to the conducting position, and when the pressure relief channel (11) is closed and the water from the water inlet mechanism (20) enters the chamber body (1) through the clearance (411), the pilot valve body (410) is driven to move to the blocking position.
14. The water outlet device according to any one or more of claims 1 to 13, **characterized in that:** the water distribution mechanism comprises one or more water distribution valve assemblies, a water distribution valve assembly comprises a slidable third shaft (120), a rotation of the water path switching mechanism (110) drives the third shaft (120) to slide, and the

water distribution valve assembly is controlled by sliding of the third shaft (120).

15. The water outlet device according to claim 14, **characterized in that:** a number of the one or more water distribution valve assemblies is multiple, each of the one or more water distribution valve assemblies comprises a water outlet (12), the rotation of the water path switching mechanism (110) drives at least a selected one of the third shafts (120) to slide to open the water outlet (12) corresponding to a selected one of the one or more water distribution valve assemblies, wherein preferably: the one or more water distribution valve assemblies comprises at least two water outlets (12), and water discharge from the at least two water outlets (12) is switched by sliding of the third shaft (120).

16. The water outlet device according to claim 14 and/or 15, **characterized in that:** the water path switching mechanism (110) comprises a plurality of control notches (113) along a circumferential direction, and the rotation of the water path switching mechanism (110) controls the third shaft (120) to slide by the plurality of control notches (113), wherein preferably: the water distribution valve assembly further comprises a movable ball (130) and a third elastic element (140), the movable ball (130) is disposed between one end of the third shaft (120) and the water path switching mechanism (110), and the third elastic element (140) abuts against the other end of the third shaft (120), when the water path switching mechanism (110) rotates until any one of the control notches (113) is aligned with the movable ball (130), the movable ball (130) moves into the one of the control notches (113) under an action of the third elastic element (140), and the third shaft (120) slides to open a corresponding water outlet (12).

17. A water outlet device, **characterized in that,** it comprises:

a water path switching mechanism (110);
a water distribution mechanism operatively connected to the water path switching mechanism (110), the water distribution mechanism comprises a plurality of pilot valves (400), and the water distribution mechanism is driven to act by an action of the water path switching mechanism (110) to control on and off of at least one of the pilot valves (400); and
a first mechanism (200), on which an elastic element is disposed, the first mechanism (200) is configured to drive the water path switching mechanism (110) to act, when the water outlet device is turned on, the elastic element (230) stores energy under an action of hydraulic pressure, when water is turned off,

the elastic element (230) releases the energy to drive the water path switching mechanism (110) to act.

18. The water outlet device according to claim 17, **characterized in that:** the water distribution mechanism comprises a plurality of pilot valves (400), a pilot valve (400) is configured with a slidable third shaft (120) and a primary flow channel (403), on and off of the primary flow channel (403) is controlled by on and off of the pilot valve (400), the on and off of the pilot valve (400) is controlled by sliding of the third shaft (120), and the third shaft (120) is operatively connected to the water path switching mechanism (110); and when the water outlet device is turned off, the first mechanism (200) drives the water path switching mechanism (110) to act, and the water path switching mechanism (110) drives at least one of the third shafts (120) to slide via transmission.

19. An overhead shower head, **characterized in that:** it comprises a shower shell (10), a face cover (50) and the water outlet device according to any one or more of claims 1 to 18, the water outlet device further comprises a water inlet mechanism (20) and a water distribution body (30), the shower shell (10) and the face cover (50) enclose an installation space, the water distribution body (30) comprises a plurality of water outlet chambers (13) corresponding to a plurality of water outlet effects, the water inlet mechanism (20) is disposed at a top of the shower shell (10) to enable water to enter the installation space, and the water outlet device is disposed in the installation space and is configured to discharge the water from any one of the water outlet chambers (13).

20. A driving device, **characterized in that:** it comprises:

a water inlet mechanism;
a movable mechanism movably disposed; and
a first mechanism and a second mechanism, both of the first mechanism and the second mechanism are configured to drive the movable mechanism to act; both the first mechanism and the second mechanism are configured to be in communication with the water inlet mechanism, when the water inlet mechanism is turned off and a duration exceeds t , the first mechanism first drives the movable mechanism to act in a first direction, and the second mechanism then drives the movable mechanism to act in a second direction; and when water is turned off and the duration does not exceed t , only the first mechanism drives the movable mechanism to act in the first direction.

21. The driving device according to claim 20, **character-**

ized in that: the movable mechanism is rotatably disposed to form a rotating mechanism, and both the first mechanism and the second mechanism are configured to drive the rotating mechanism to rotate.

22. The driving device according to claim 21, **characterized in that:** the first mechanism disengages from the rotating mechanism after pushing the rotating mechanism to rotate,

and/or wherein preferably: the rotating mechanism comprises a ratchet wheel, the ratchet wheel comprises annular ratchet teeth, and the first mechanism and the second mechanism are configured to abut against the annular ratchet teeth to push the rotating mechanism to rotate;
and/or wherein preferably:

the first mechanism comprises a first control chamber, a first shaft slidably received in the first control chamber and a first elastic element, when water enters, a hydraulic force acting on the first shaft via the water in the first control chamber is greater than an elastic force of the first elastic element, and a force difference drives the first shaft away from the rotating mechanism, when the water is turned off, the first control chamber drains, and the first elastic element drives the first shaft to reset, driving the rotating mechanism to act via the reset of the first shaft, and

the second mechanism comprises a second control chamber, a second shaft slidably received in the second control chamber and a second elastic element, when the water enters, a hydraulic force acting on the second shaft via the water in the second control chamber is greater than an elastic force of the second elastic element, and a force difference drives the second shaft away from the rotating mechanism, when the water is turned off, the second control chamber drains, the second elastic element drives the second shaft to reset, driving the rotating mechanism to act via the reset of the second shaft, and a drainage speed of the first control chamber is greater than a drainage speed of the second control chamber after the water is turned off;

and/or wherein preferably: it further comprises a slidable third shaft, the rotating mechanism comprises a plurality of control notches along a circumferential direction, and a rotation of the rotating mechanism controls the third shaft to slide via the plurality of control notches,

wherein preferably: the third shaft is configured with a movable ball and a third elastic element, the movable ball is disposed between one end of the third shaft and the rotating mechanism, the third elastic element is disposed at the other end of the third shaft, and when the rotating mechanism rotates until any one of the control notches is aligned with the movable ball, the third shaft is driven to slide and the movable ball moves into the one of the control notches under an action of the third elastic element.

23. A water path switching method for the water outlet device according to any one or more of claims 1 to 18, **characterized in that:** it comprises:

step 1. water flows into the water outlet device;
step 2. the first mechanism (200) and the second mechanism (300) are away from the water path switching mechanism (110), the water outlet device discharges water in one state, and discharging the water in the one state is defined as a first water outlet state; and
step 3. the water outlet device is turned off, and selections are respectively made according to whether a duration of water shut-off exceeds t:

if exceeding t, the first mechanism (200) first drives the water path switching mechanism (110) to act in a first direction and drives the water distribution mechanism to act to switch to a second water outlet state, and the second mechanism (300) then drives the water path switching mechanism (110) to act in a second direction and drives the water distribution mechanism to act to return to the first water outlet state; and
if not exceeding t, only the first mechanism (200) drives the water path switching mechanism (110) to act in the first direction and drives the water distribution mechanism to act to switch to the second water outlet state.

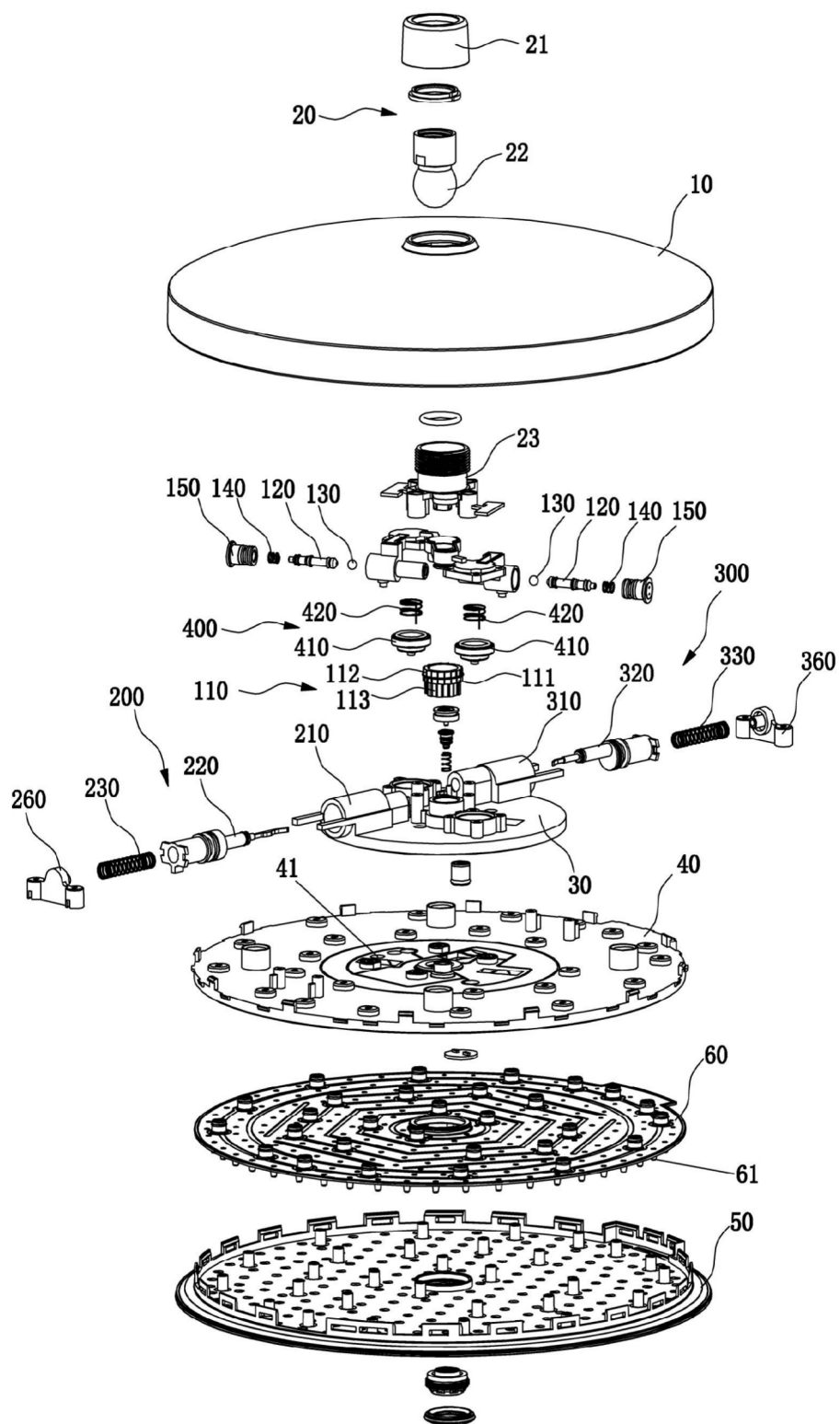


FIG. 1

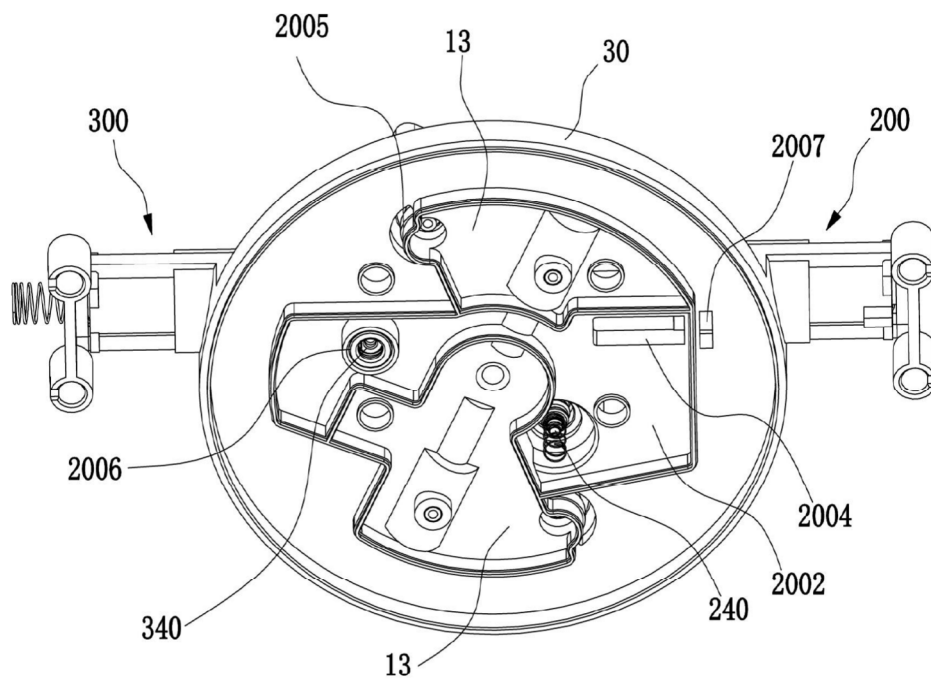


FIG. 2

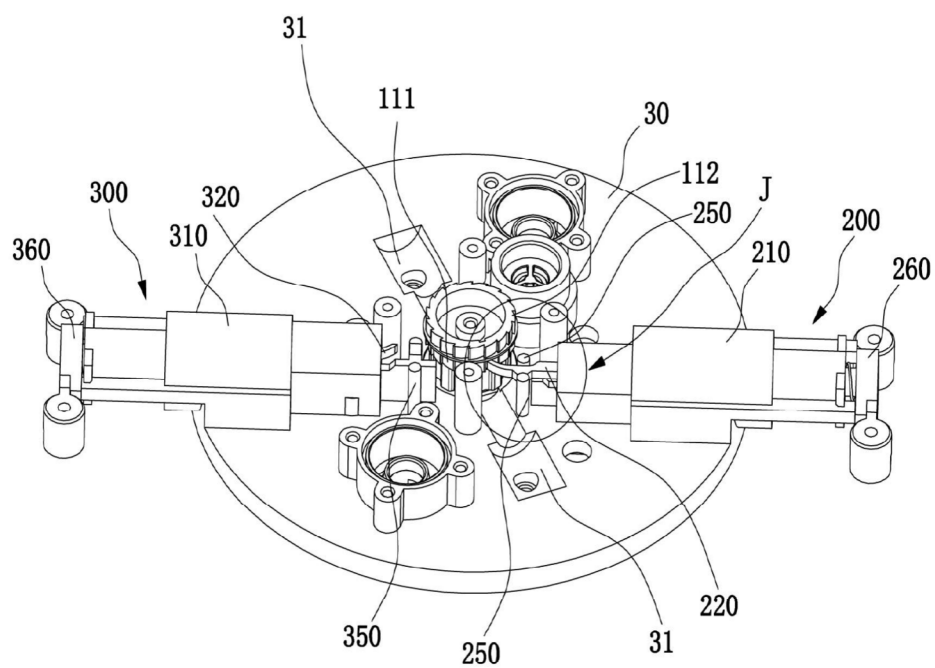


FIG. 3

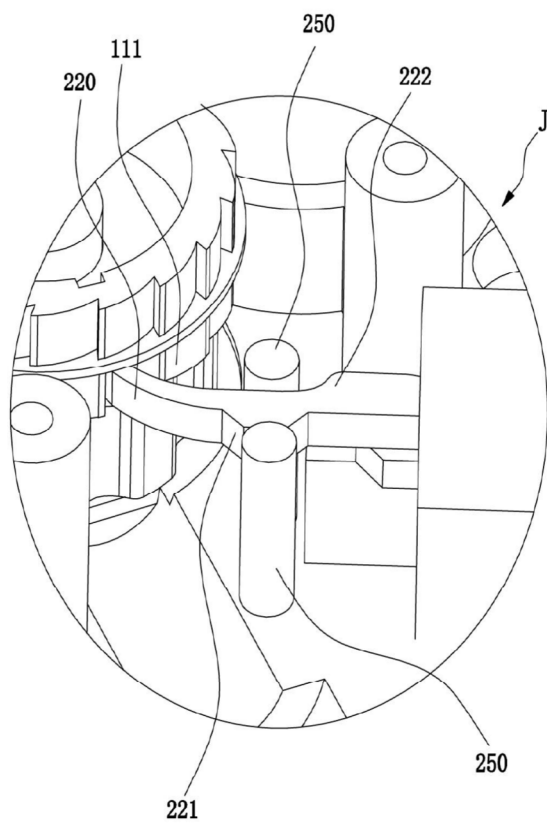


FIG. 4

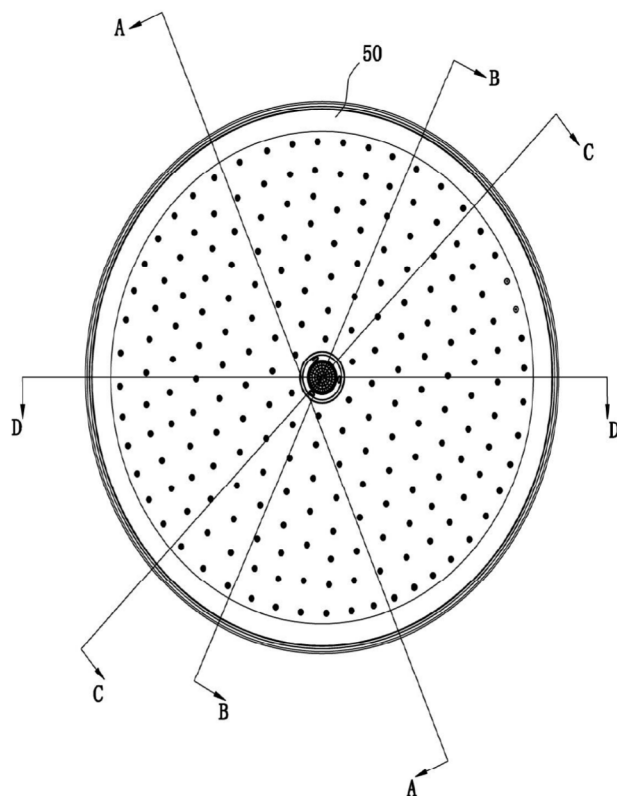


FIG. 5

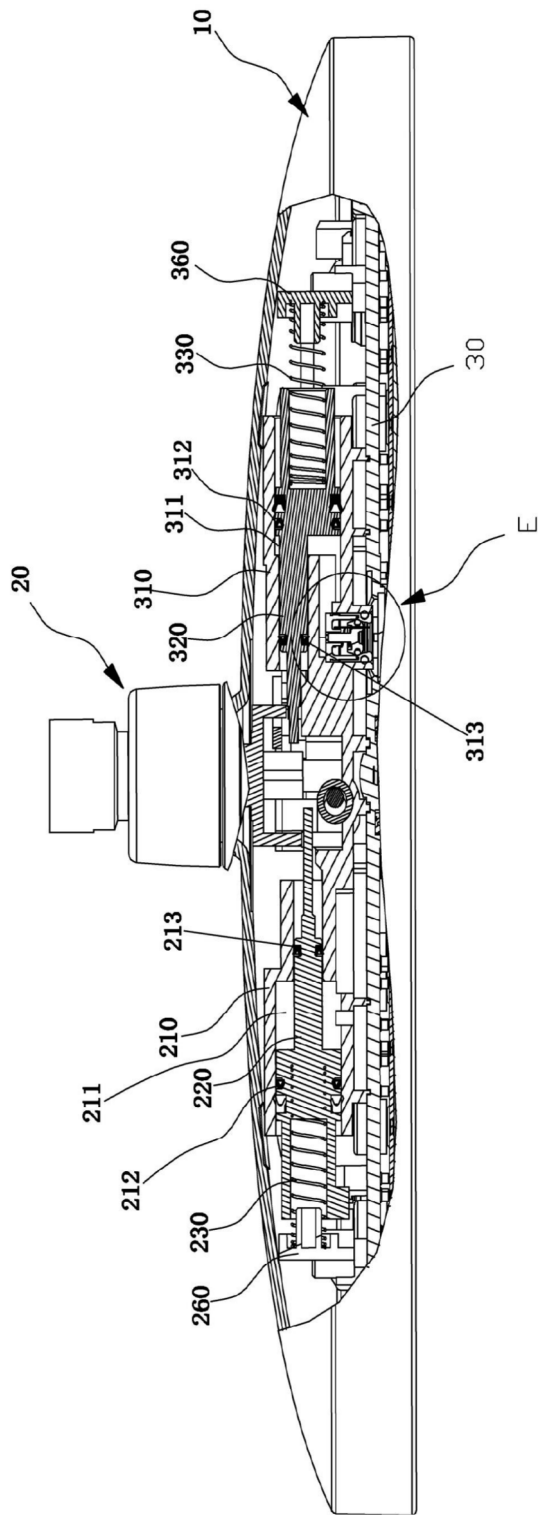


FIG. 6

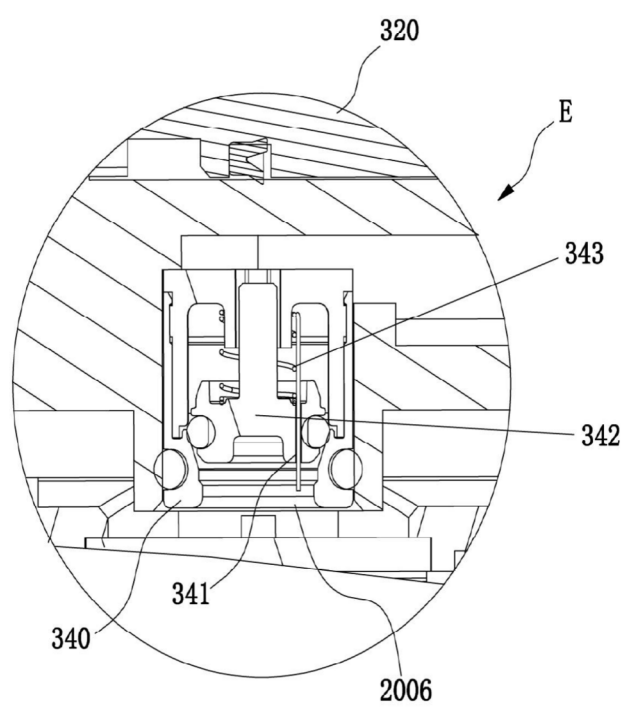


FIG. 7

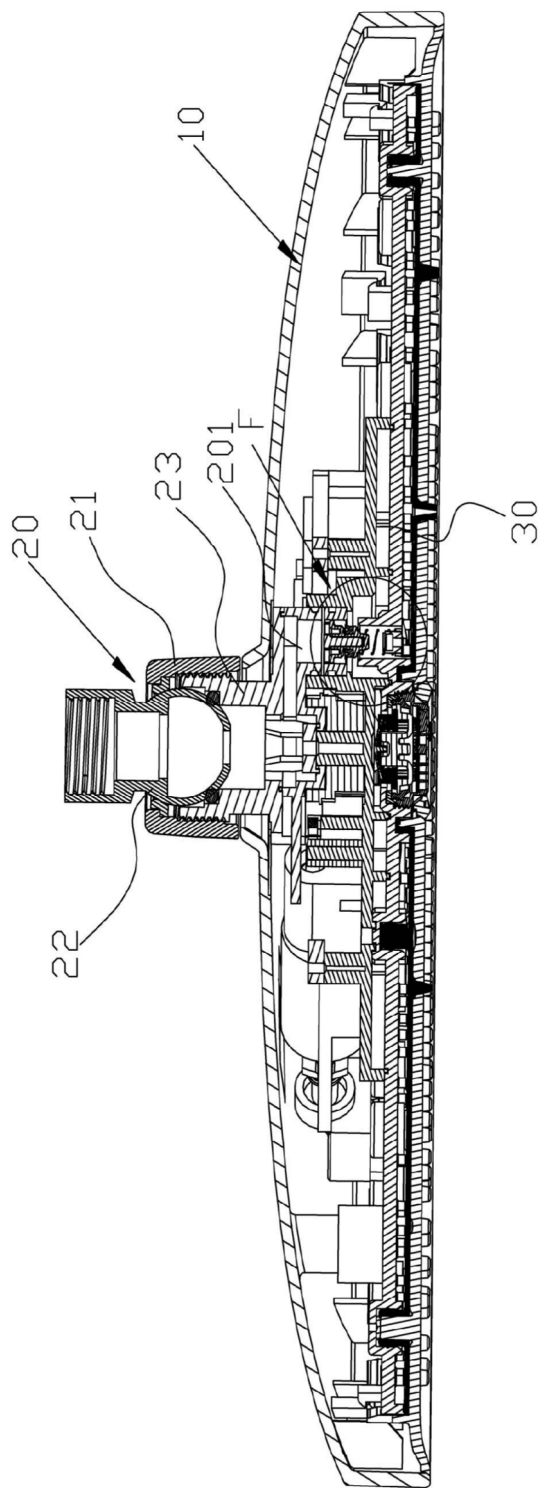


FIG. 8

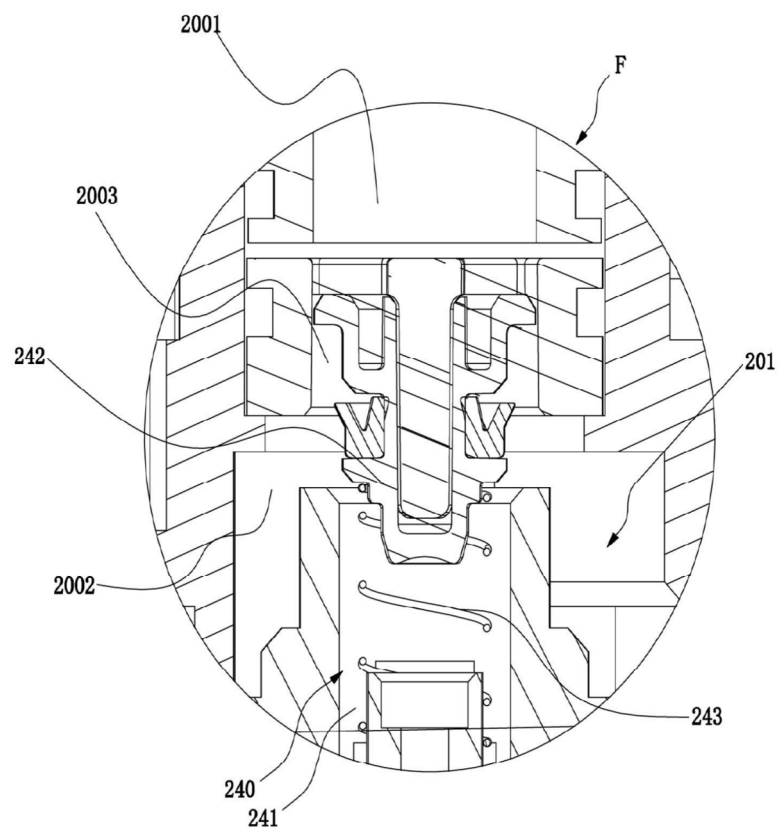


FIG. 9

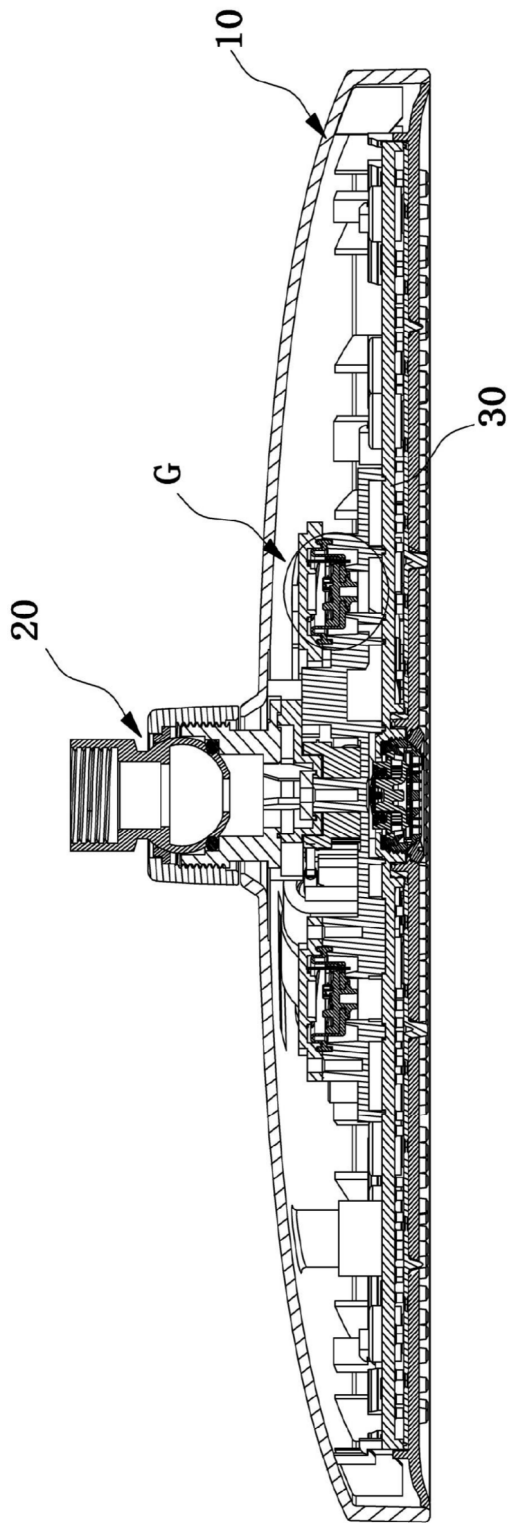


FIG. 10

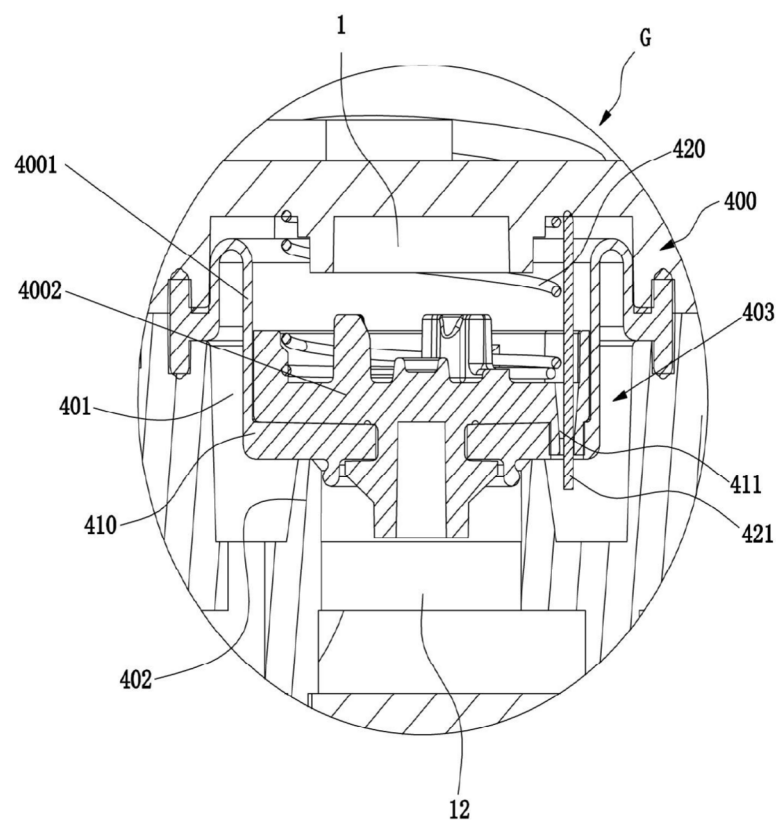


FIG. 11

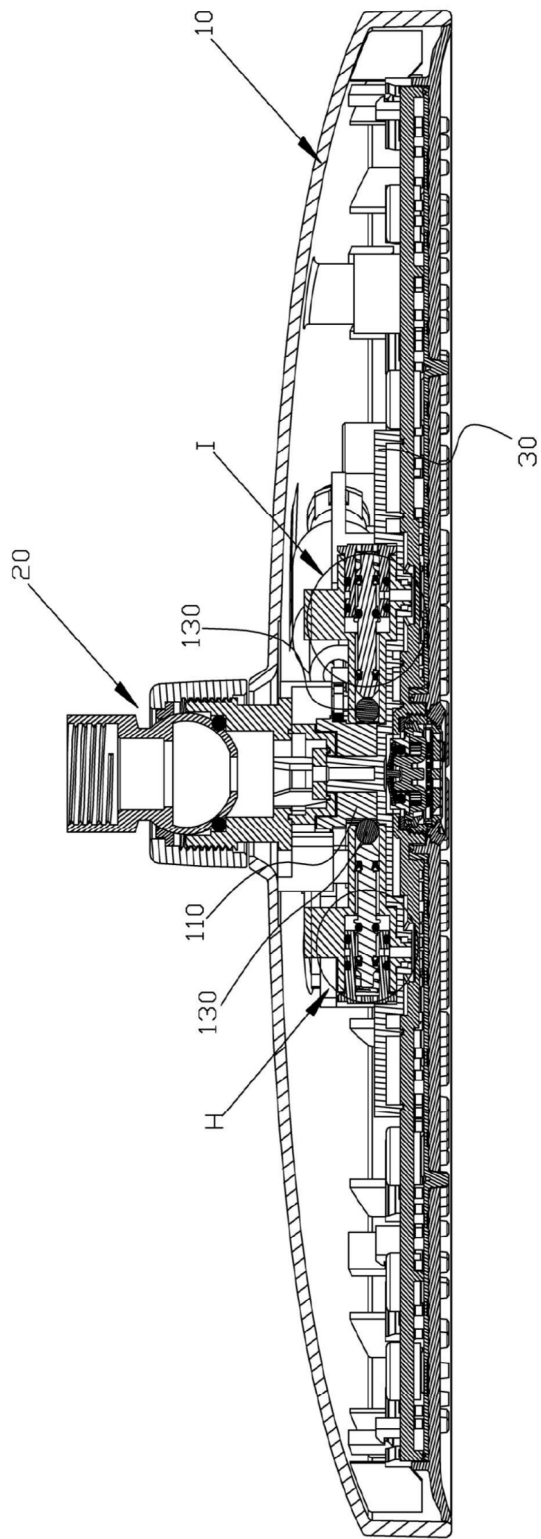


FIG. 12

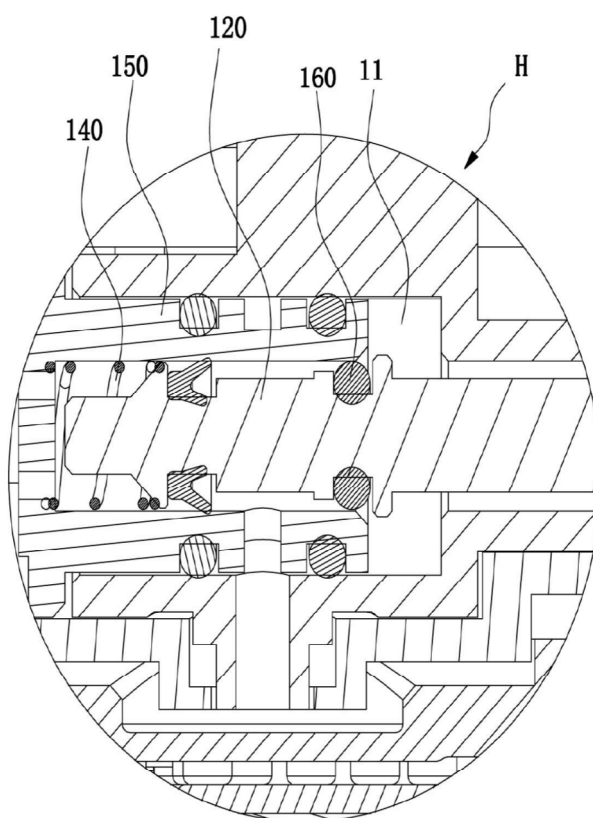


FIG. 13

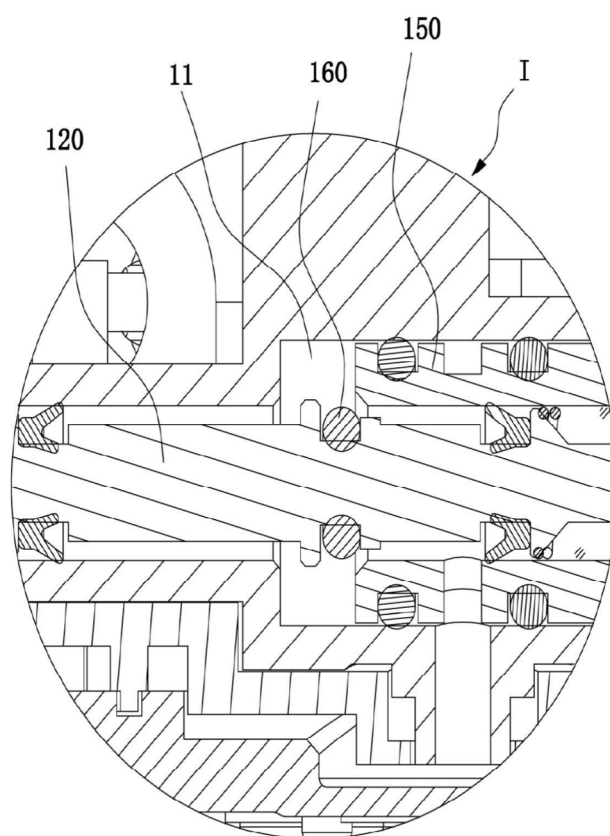


FIG. 14

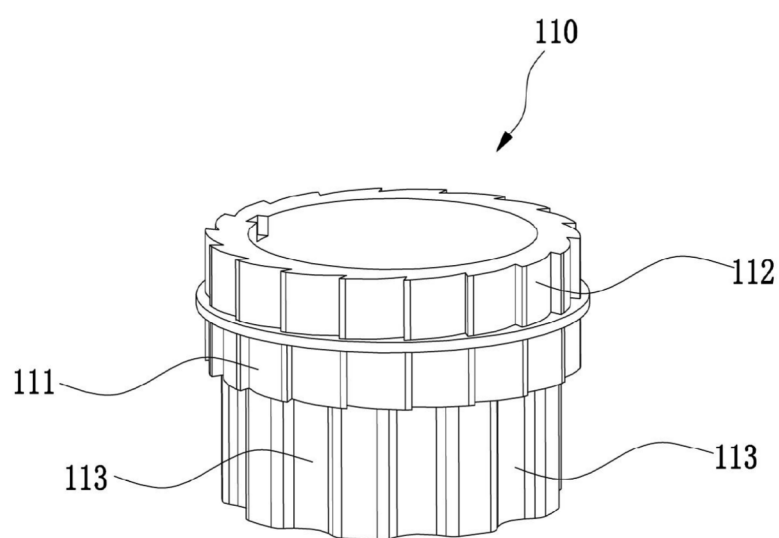


FIG. 15

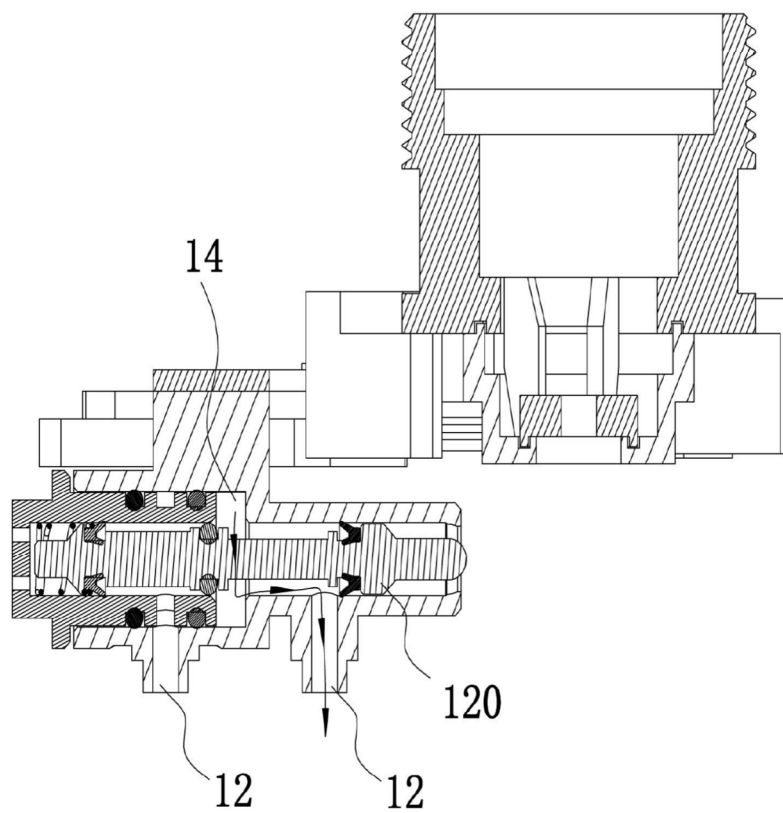


FIG. 16

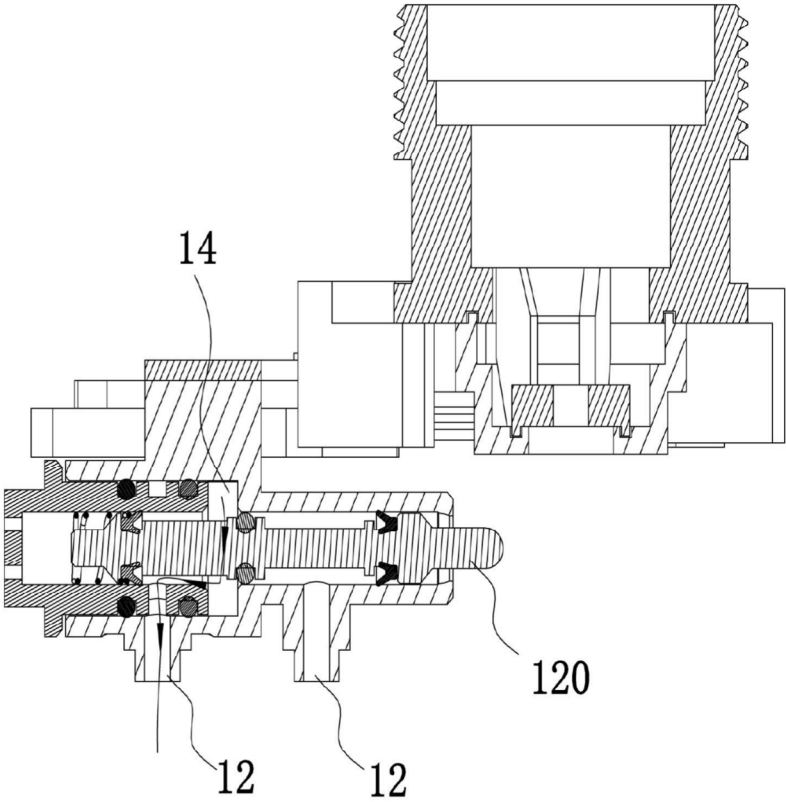


FIG. 17



EUROPEAN SEARCH REPORT

Application Number

EP 26 16 7359

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 115 591 687 A (XIAMEN JIKE SANITARY WARE CO LTD; HU SHOURONG) 13 January 2023 (2023-01-13) * the whole document *	1-4, 6-10, 19-22	INV. B05B1/16
X	US 2020/086333 A1 (MATSUI HIDEYUKI [JP] ET AL) 19 March 2020 (2020-03-19) * the whole document *	17	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B05B
Place of search		Date of completion of the search	Examiner
Munich		11 August 2026	Frego, Maria Chiara
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11-08-2026

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