



(11)

EP 4 556 642 A1

(12)

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

(43) Date of publication:
21.05.2025 Bulletin 2025/21

(51) International Patent Classification (IPC):
E03C 1/08 (2006.01)

(21) Application number: **23842450.1**

(52) Cooperative Patent Classification (CPC):
E03C 1/08; E03C 1/084; E03C 1/086

(22) Date of filing: **24.07.2023**

(86) International application number:
PCT/CN2023/108871

(87) International publication number:
WO 2024/017388 (25.01.2024 Gazette 2024/04)

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

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

(30) Priority: **22.07.2022 CN 202221913174 U**

(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) **TELESCOPIC BUBBLER**

(57) Provided in the present invention is a telescopic bubbler, which comprises a bubbler body, a telescopic assembly and a mounting seat. When a tap is closed or is opened, the telescopic assembly drives the bubbler body to move in the axial direction of the mounting seat to a first position or a second position. When being located at the first position, the bubbler body is in limited fit with the mounting seat in the swing direction of a ball head, and when being located at the second position, the bubbler body is spaced apart from the mounting seat by a certain distance, so as to remove the limited fit between the bubbler body and the mounting seat in the swing direction of the ball head. The bubbler can be swung to regulate the outlet direction of water when a tap is opened. In addition, the continuity of the appearance of the bubbler is not damaged when the tap is closed.

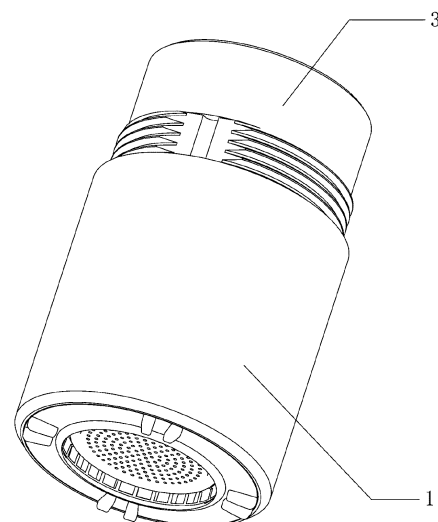


FIG. 1

Description

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to a water outlet device, and in particular relates to an aerator.

BACKGROUND OF THE DISCLOSURE

[0002] An aerator is a device that has a foaming effect and conserves water. The aerator allows water and air that flow through to be completely mixed, an introduction of air greatly improves flushing power of the water, water consumption is effectively reduced, and the water is conserved. The aerators in the existing techniques are generally fixedly installed at a water outlet of a faucet, if the faucet is fixed, the aerator is also fixed, and an angle of the water outlet cannot be adjusted. In order to adjust the angle of the water outlet, an aerator in the existing techniques is divided into a mounting seat and an aerator body, the mounting seat is fixedly connected to a water outlet of the faucet, and the aerator body is connected to the mounting seat by a ball head to achieve swinging, so that the aerator body can swing relative to the faucet to adjust the angle of the water outlet. However, a connecting rod of the ball head in this solution is exposed, which is unattractive, and a consistency in an appearance the faucet is destroyed.

BRIEF SUMMARY OF THE DISCLOSURE

[0003] The main technical problem to be resolved by the present disclosure is to provide an aerator, the aerator can swing to adjust a water outflow direction when water flows, and a consistency in an appearance of the aerator is also not damaged when the water stops.

[0004] In order to solve the aforementioned technical problem, the present disclosure provides a telescopic aerator, it comprises: an aerator body, a telescopic assembly and a mounting seat; the telescopic assembly is swingably connected to the aerator body through a ball head; and the telescopic assembly drives the aerator body to move to a first position or a second position along an axial direction of the mounting seat when water stops and the water flows;

[0005] When the aerator body is in the first position, the aerator body forms a positioning cooperation with the mounting seat along a swinging direction of the ball head; and when the aerator body is in the second position, the aerator body is separated from the mounting seat by a preset distance, so that the aerator body is released from the positioning cooperation with the mounting seat along the swinging direction of the ball head.

[0006] In a preferred embodiment, the aerator body is connected to the ball head through a fixed ring.

[0007] In a preferred embodiment, the fixed ring is exposed on a side of the aerator body facing the mounting seat.

[0008] In a preferred embodiment, the telescopic assembly comprises a sealing portion hermetically sealed to the mounting seat and a connecting portion connected to the ball head, a groove is disposed between the sealing portion and the connecting portion, and an opening of the groove faces downward.

[0009] In a preferred embodiment, the mounting seat comprises a through passage for the connecting portion to pass through, and when the aerator body is in the second position, a side wall of the through passage is inserted into the groove along the opening.

[0010] In a preferred embodiment, a guiding wall is disposed in the mounting seat, and the guiding wall guides the fixed ring during a movement of the aerator body from the second position to the first position.

[0011] In a preferred embodiment, the guiding wall surrounds to form a receiving chamber with an opening at two ends, and the receiving chamber comprises a structure with a diameter of the opening that gradually increases from one end away from the aerator body to the other end.

[0012] In a preferred embodiment, the telescopic assembly comprises a piston and a spring, and the piston is movably disposed in the mounting seat, one side of the piston along an axial direction of the mounting seat contacts the water flow, and the other side is connected to an inner wall of the mounting seat through the spring.

[0013] In a preferred embodiment, a side of the piston facing the ball head comprises a mounting hole configured for mounting the ball head; and the mounting hole and the ball head are fixed by a threaded connection.

[0014] The present disclosure further discloses a telescopic aerator, it comprises: an aerator body, a telescopic assembly and a mounting seat; the telescopic assembly is disposed in the aerator body and is swingably connected to the mounting seat through a ball head; and the telescopic assembly drives the aerator body to move to a first position or a second position along an axial direction of the mounting seat when water stops and the water flows; and

[0015] When the aerator body is in the second position, the aerator body is separated from the mounting seat by a preset distance.

[0016] In a preferred embodiment, the mounting seat is connected to the aerator body through a fixed ring.

[0017] In a preferred embodiment, the fixed ring is exposed on a side of the mounting seat facing the aerator body.

[0018] In a preferred embodiment, the telescopic assembly comprises a sealing portion hermetically sealed to the mounting seat and a connecting portion connected to the ball head, a groove is disposed between the sealing portion and the connecting portion, and an opening of the groove faces upward.

[0019] In a preferred embodiment, the aerator body comprises a guiding wall, and the guiding wall guides the fixed ring during a movement of the aerator body from the second position to the first position.

[0020] In a preferred embodiment, the telescopic assembly comprises a piston, a spring and a piston cylinder, the piston is movably disposed in the piston cylinder, one side of the piston along an axial direction of the aerator body contacts the water flow, and the other side is connected to an inner wall of the piston cylinder through the spring.

[0021] In a preferred embodiment, it further comprises a damping mechanism, which is used for the aerator to be hovered within a swinging range in a water flowing state.

[0022] In a preferred embodiment, the damping mechanism is disposed in the mounting seat and comprises a friction base, a friction cylinder pad and a second spring.

[0023] Compared with the existing techniques, the present disclosure has the following advantages:

The present disclosure provides the telescopic aerator, which allows a piston component to drive the aerator body to move between the first position and the second position through the water pressure changes when the water stops and the water flows, consequently, the aerator body is separated from the mounting seat by the preset distance when the water flows, so that the aerator body is released from a positioning cooperation with the mounting seat along a swinging direction of the ball head. In this way, the aerator body can have a function of adjusting the angle of the water outflow by swinging. When the water stops, the aerator body forms the positioning cooperation with the mounting seat along the swinging direction of the ball head, ensuring the consistency in the appearance of the aerator in the water stop state.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

FIG. 1 illustrates a perspective view of an aerator in preferred Embodiment 1 of the present disclosure;

FIG. 2 illustrates an exploded perspective view of the aerator in preferred Embodiment 1 of the present disclosure;

FIG. 3 illustrates a side view of the bubble in a water stop state in preferred Embodiment 1 of the present disclosure;

FIG. 4 illustrates a sectional view of the aerator in the water stop state in preferred Embodiment 1 of the present disclosure;

FIG. 5 illustrates a side view of the aerator in a water flowing state in preferred Embodiment 1 of the present disclosure;

FIG. 6 illustrates a sectional view of the aerator in the water flowing state in preferred Embodiment 1 of the present disclosure;

FIG. 7 illustrates a diagrammatic view of a water dividing body in preferred Embodiment 1 of the present disclosure;

FIG. 8 illustrates a top view of the water dividing body

in preferred Embodiment 1 of the present disclosure; FIG. 9 illustrates a diagrammatic view of a pressure cover in preferred Embodiment 1 of the present disclosure;

FIG. 10 illustrates a diagrammatic view of water outflow in preferred Embodiment 1 of the present disclosure with the water dividing body in a first position;

FIG. 11 illustrates a diagrammatic view of the water outflow in preferred Embodiment 1 with the water dividing body in a second position;

FIG. 12 illustrates a side view of an aerator in a water stop state in preferred Embodiment 2 of the present disclosure;

FIG. 13 illustrates a sectional view of the aerator in the water stop state in preferred Embodiment 2 of the present disclosure;

FIG. 14 illustrates a side view of the aerator in a water flowing state in preferred Embodiment 2 of the present disclosure;

FIG. 15 illustrates a sectional view of the aerator in the water flowing state in Embodiment 2 of the present disclosure;

FIG. 16 illustrates an exploded perspective view of an aerator in preferred Embodiment 3 of the present disclosure;

FIG. 17 illustrates a sectional view of the aerator in a water stop state in preferred Embodiment 3 of the present disclosure;

FIG. 18 illustrates a sectional view of the aerator in a water flowing state in preferred Embodiment 3 of the present disclosure; and

FIG. 19 illustrates a sectional view of a shower body in a hovering state after swinging to an arbitrary position in preferred Embodiment 3 of the present disclosure with the aerator in the water flowing state.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0025] The technical solutions in the embodiments of the present disclosure will be described clearly and completely in combination with the accompanying drawings in the embodiments of the present disclosure; and it is obvious that the described embodiments are merely some embodiments of the present disclosure rather than all embodiments, and all other embodiments fall within the protective scope of the present disclosure provided that they are obtained based on the embodiments of the present disclosure by a person of ordinary skill in the art without creative works.

[0026] In the description of the present disclosure, it should be noted that terms, such as "upper", "lower", "inner", "outer", "top/bottom", indicate orientations or positional relationships based on orientations or positional relationships shown in the accompanying drawings, are merely used to easily describe the present disclosure and simplify the description, rather than indicating or implying that a referenced device or element

should have a particular orientation or be constructed and operated with a particular orientation, and therefore should not to be understood as a limitation of the present disclosure. Furthermore, the terms "first" and "second" are merely used for descriptive purposes and should not be understood as indicating or implying relative importance.

[0027] In the description of the present disclosure, unless otherwise expressly specified and limited, it is noted that terms, such as "mounted", "disposed with", "socketed/sleeved", and "connected", should develop a broad understanding, for example, "connection" can be a wall-mountable connection, a detachable connection, an integrated connection, a mechanical connection, an electrical connection, a direct connection, an indirect connection via an intermediate medium, or a communication between inner portions of two elements, and the specific meaning of the terms in the present disclosure can be understood in specific conditions for those of ordinary skill in the art.

Embodiment 1

[0028] Referring to FIGS. 1-11, this embodiment provides a telescopic aerator, which comprises: an aerator body 1, a telescopic assembly 2 and a mounting seat 3; the telescopic assembly 2 is swingably connected to the aerator body 1 through a ball head 4; the telescopic assembly 2 drives the aerator body 1 to move to a first position or a second position along an axial direction of the mounting seat 3 under water pressure changes when the water stops and the water flows; when the aerator body 1 is in the first position, the aerator body 1 abuts the mounting seat 3, and in this embodiment, a fixed ring connected to the ball head 4 is accommodated in the mounting seat 3 synchronously; and when the aerator body 1 is in the second position, the aerator body 1 is separated from the mounting seat 3 by a preset distance, and the fixed ring 11 connected to the aerator body 1 and the ball head 4 is exposed outside of the mounting seat 3 synchronously. In this embodiment, the aerator body 1 is driven to move by the water pressure changes when the water stops and the water flows. As a simple alternative, an electrical signal can be generated by water flow changes when the water stops and the water flows, and a controller controls an electromagnetic unit or a mechanical unit to drive the aerator body 1 to move using electromagnetic force or mechanical force through the electrical signal.

[0029] The aforementioned aerator allows a piston component to drive the aerator body 1 to move between the first position and the second position through the water pressure changes when the water stops and the water flows, consequently, when the water flows, the aerator body 1 is separated from the mounting seat 3 by the preset distance, so that the aerator body 1 can swing to adjust an angle of water outflow; and when the water stops, the aerator body 1 abuts the mounting seat 3,

ensuring consistency in an appearance of the aerator in a water stop state.

[0030] In order to enable the aerator body 1 to be guided and restored to be centered when the water stops, the mounting seat 3 and the aerator body comprise a guiding wall 31 configured for a guiding cooperation with the fixed ring 11 within in the first position. Specifically, the guiding wall 31 surrounds to define a receiving chamber 32 with an opening at two ends, and the receiving chamber 32 has a structure with a diameter of the opening that gradually increases from one end away from the aerator body 1 to the other end. In this way, the aerator body 1 will accurately restored to the second position through a guiding effect of the guiding wall 31 during a movement.

[0031] In order to be achieve the guiding cooperation with the guiding wall 31, the fixed ring 11 has an inclined surface that fits the guiding wall 31.

[0032] In addition, in order to ensure normal water outflow function of the aerator, the telescopic assembly 2 and the ball head 4 comprise a water flow passage 5 for water passage. In this way, water can flow into the aerator body 1 from the water flow passage.

[0033] In order to enable the telescopic assembly 2 to move to different positions under different water pressures, the telescopic assembly 2 comprises a piston 21 and a spring 22, the piston 21 is movably disposed in the mounting seat 3, a side of the piston 21 along an axial direction of the mounting seat 3 contacts the water flow, and the other side is connected to an inner wall of the mounting seat 3 through the spring 22. In this way, when the telescopic assembly 2 drives an aerator assembly to the first position, the spring 22 is in a relatively loose state. When the telescopic assembly 2 drives the aerator body 1 to the second position, the spring 22 is in a compressed state. At this time, if a water flowing state is converted to the water stop state, the water pressure applied to the piston 21 becomes smaller, and the spring 22 releases an elastic restoring force to drive the aerator body 1 to be restored to the first position.

[0034] In this embodiment, the mounting seat 3 comprises a through passage for the piston 21 to pass through, the through passage comprises a side wall 35 extending upward along a direction of the water flow, and in this embodiment, the side wall 35 further comprises the guiding wall 31 disposed on a lower end of the side wall 35 and stretching outward along a radial direction; the mounting seat 3 further comprises an outer peripheral wall 32 configured for connecting to a water outlet device; and the outer peripheral wall 32 comprises a thread. The outer peripheral wall 32 is connected to a bottom of the guiding wall 31 through a bottom wall 34, so that a first groove 33 with an opening facing upward is formed between the outer peripheral wall 32 and the guiding wall 31, and the spring 22 abuts the bottom wall 34; and the piston 21 comprises a sealing portion 211 hermetically sealed to the mounting seat 3 and a connecting portion 212 connected to the ball head 4, and a second groove 213 with an opening facing downward is formed between

the sealing portion 211 and the connecting portion 212. Consequently, when the aerator body 1 is in the second position, the side wall 35 of the through passage is inserted into the second groove 213 through the opening. The sealing portion 211 comprises a groove disposed on an outer peripheral wall of the piston and a Y-shaped ring 23 installed in the groove. The connecting portion 212 comprises a thread connected to the ball head 4.

[0035] In this embodiment, in order to enable the ball head 4 to be mounted, a side of the piston 21 facing the ball head 4 comprises a mounting hole configured for mounting the ball head 4, and the mounting hole and the ball head 4 are fixed by a threaded connection.

[0036] In addition, in order to prevent water leakage caused by the water flow flowing out of a gap between the piston 21 and a side wall of the mounting seat 3, the Y-shaped ring 23 is disposed between the piston 21 and the side wall of the mounting seat 3.

[0037] In this embodiment, the aerator body 1 can be switched between two different water outflow sprays, and a switching process can be achieved by rotating the aerator body 1. Therefore, an inner side of the aerator body 1 further comprises a water inlet seat 12, a pressure cover 13, a sealing gasket 14 and a water dividing body 15, and the water inlet seat 12 is disposed between the ball head 4 and the water dividing body 15, so that the water flowing out of the water flow passage 5 can flow into the water dividing body 15 through the water inlet seat 12. The water dividing body 15 is fixedly connected to a shell 16 of the aerator body 1, an avoidance opening 131 is disposed on an axial center of the pressure cover 13 to enable a lower end of the water inlet seat 12 to pass through, and the lower end of the water inlet seat 12 passes through the avoidance opening 131 to be fixedly connected to the water dividing body 15 by a screw 121. Therefore, the shell 16 rotates to drive the water dividing body 15 and the water inlet seat 12 to rotate relative to the sealing gasket 14.

[0038] The sealing gasket 14 is disposed between the pressure cover 13 and the water dividing body 15, and a downward-pressing spring 17 is disposed on a side of the pressure cover 13 away from the sealing gasket 14, and one end of the spring away from the pressure cover 13 abuts the water inlet seat 12. The water inlet seat 12 squeezes the downward-pressing spring 17 during a movement from a first position to a second position, so that the downward-pressing spring 17 drives the pressure cover 13 to downwardly press down the sealing gasket 14.

[0039] The pressure cover 13 further comprises an annular water passage opening 132 on an outer side of the avoidance opening 131 along a radial direction. The water dividing body 15 comprises a first flow passage 151 and second flow passages 152, the second flow passages 152 are disposed at intervals along a circumferential direction, and the first flow passage 151 is disposed between two adjacent ones of the second flow passages 152. The first flow passage 151 and the second

flow passages 152 are separated by a baffle 153. The water passage opening 132 is in communication with the first flow passage 151 and the second flow passages 152 simultaneously.

[0040] When the water inlet seat 12 is in the first position, the downward-pressing spring 17 is in an extended state, a communication between the water passage opening 132 and the second flow passages 152 is opened using the sealing gasket 14, the water flow respectively flows out through the first flow passage 151 and the second flow passages 152 of the water dividing body 15, an outer annular water spray wraps an inner annular water spray to finally form a beam of the water flow at a water outlet nozzle of the aerator body 1, as inner and outer rings are filled with the water flow, external air cannot be inhaled into a cavity of the aerator body 1, water spray in a soft water state is formed.

[0041] When the shell 16 drives the water inlet seat 12 to rotate to the second position, the downward-pressing spring 17 is in a compressed state, and the sealing gasket 14 is squeezed by the pressure cover 13, thereby sealing the communication between the water passage opening 132 and the second flow passages 152. The second flow passages 152 of the water dividing body 15 are sealed, and the water flows out of the first flow passage 151. A steel sheet 154 is disposed on a water outlet of the first flow passage 151, and the water flows through fine holes on the steel sheet 154 to form multiple beams of delicate steel sheet water sprays.

Embodiment 2

[0042] Referring to FIGS. 12-15, this embodiment differs from Embodiment 1 in that: the fixed ring 11 in Embodiment 1 is exposed on the side of the aerator body 1 facing the mounting seat 3, while in this embodiment, the fixed ring 11 as a whole is accommodated in the aerator body 1; as the fixed ring 11 is accommodated in the aerator body 1, the guiding wall 31 used to guide the fixed ring 11 in Embodiment 1 can also be excluded. Therefore, the side wall 35 in this embodiment does not comprise the guiding wall 31. The remainder aligns with Embodiment 1 and will not be repeated herein.

Embodiment 3

[0043] Referring to FIGS. 16-19, this embodiment differs from Embodiment 1 in that: this embodiment comprises: an aerator body 10, a telescopic assembly 20 and a mounting seat 30; the telescopic assembly 20 is disposed in the aerator body 10 and is swingably connected to the mounting seat 30 through a ball head 40. That is: the ball head 40 is inverted, and the telescopic assembly 20 is disposed in the aerator body 10.

[0044] The telescopic assembly 20 drives the aerator body 10 to move to the first position or the second position along an axial direction of the mounting seat 30 under the water pressure changes when the water stops and the

water flows; when the aerator body 10 is in the first position, the aerator body 10 abuts the mounting seat 30; when the aerator body 10 is in the second position, the aerator body 10 is separated from the mounting seat 30 by the preset distance. In this embodiment, the aerator body 10 is driven to move by the water pressure changes when the water stops and the water flows.

[0045] The aforementioned aerator allows the telescopic assembly 20 to drive the aerator body 10 to move between the first position and the second position through the water pressure changes when the water stops and the water flows, consequently, the aerator body 10 is separated from the mounting seat 30 by the preset distance when the water flows, so that the aerator body 10 can swing to adjust the angle of the water outflow; and when the water stops, the aerator body 10 abuts the mounting seat 30, ensuring the consistency in the appearance of the aerator in the water stop state.

[0046] In order to enable the aerator body 10 to be guided and restored to be centralized when the water stops, in this embodiment, the mounting seat 30 is disposed with a fixed ring 301, and the aerator body 10 is correspondingly disposed with a guiding wall 101 configured for a guiding cooperation with the fixed ring 301. Specifically, the guiding wall 101 surrounds to define a receiving chamber 102 with an opening at two ends, and the receiving chamber 102 has a structure with a diameter of the opening that gradually increases from one end away from the mounting seat 30 to the other end. In this way, the aerator body 10 will be accurately restored to the second position through a guiding effect of the guiding wall 101 during the movement.

[0047] In addition, in order to ensure the normal water outflow function of the aerator, the telescopic assembly 20 and the ball head 40 are disposed with a water flow passage 50 configured for the water passage. In this way, the water can flow into the aerator body 10 from the water flow passage.

[0048] In order to enable the telescopic assembly 20 to move to different positions under different water pressures, the telescopic assembly 20 comprises a piston 201 and a spring 202, the piston 201 is movably disposed in the aerator body 10, one side of the piston 201 along an axial direction of the aerator body 10 contacts the water flow, in this embodiment, the telescopic assembly 20 further comprises a piston cylinder 203, the piston 201 is disposed in the piston cylinder 203, the piston cylinder 203 is assembled in the aerator body 10, and the other side of the piston 201 is connected to an inner wall of the aerator body 10 through the piston cylinder 203.

[0049] When the telescopic assembly 20 drives the aerator assembly to be in the first position, the spring 202 is in a relatively loose state. When the telescopic assembly 20 drives the aerator body 10 to be in the second position, the spring 202 is in a compressed state. At this time, if the water flowing state is converted to the water stop state, the water pressure applied to the piston 201 becomes smaller, and the spring 202 releases an

elastic restoring force to drive the aerator body 10 to be restored to the first position.

[0050] In this embodiment, the ball head 40 comprises a head 401 and a rod 402. The head 401 is disposed in the mounting seat 30 and is hermetically sealed to an inner wall of the mounting seat 30 through a second sealing ring 302.

[0051] The piston 201 comprises a sealing portion 2011 hermetically sealed to the piston cylinder 203 and a connecting portion 2012 connected to the rod 402 of the ball head, and a second groove 2013 with an opening facing upward is formed between the sealing portion 2011 and the connecting portion 2012. When the aerator body 10 is in the second position, a side wall 2031 of the piston cylinder 203 is inserted into the second groove 2013 through the opening. The sealing portion 2011 comprises a groove disposed on an outer peripheral wall of the piston and a Y-shaped ring 204 disposed in the groove. The connecting portion 2012 comprises a thread connected to the rod 402 of the ball head.

[0052] In order to enable the aerator to be hovered within a swinging range in the water flowing state, this embodiment further comprises a damping mechanism 60, the damping mechanism 60 comprises a friction base 601, a friction cylinder pad 602 and a second spring 603. The second spring 603 is disposed in the head 401 of the ball head, a lower end of the friction cylinder pad 602 is disposed in the head 401 and above the second spring 603, an upper end of the friction cylinder pad 602 is a spherical annular surface, the friction base 601 is disposed in the mounting seat 30, and a portion of an outer spherical surface of an upper portion of the head 401 can form a clearance cooperation or an abutting cooperation with an inner wall of the friction base 601.

[0053] Referring to FIGS. 18 and 19, when the aerator swings to a preset position, the upper spherical annular surface of the friction cylinder pad 602 abuts the inner wall of the friction base 601 under an action of the second spring 603, and the aerator forms a hovered state.

[0054] The preceding description is merely preferred specific embodiments of the present disclosure, and the design and the concept of the disclosure of is not limited thereto, it is intended that the protective scope of the present disclosure cover non-substantive modifications of the present disclosure provided they are made based on the concept within the technical scope disclosed in the present disclosure by any person familiar with skill in the technical art.

INDUSTRIAL APPLICABILITY

[0055] The present disclosure provides the telescopic aerator, the telescopic assembly drives the aerator body to move to a first position or a second position along an axial direction of the mounting seat when water stops and the water flows; when the aerator body is in the first position, the aerator body forms a positioning cooperation with the mounting seat along a swinging direction of

the ball head; and when the aerator body is in the second position, the aerator body is separated from the mounting seat by a preset distance, so that the aerator body is released from the positioning cooperation with the mounting seat along the swinging direction of the ball head. The aerator can swing to adjust the water outflow direction when the water flows, and the consistency in the appearance of the aerator is also not damaged when the water stops.

Claims

1. A telescopic aerator, **characterized in that**, it comprises: an aerator body, a telescopic assembly and a mounting seat; the telescopic assembly is swingably connected to the aerator body through a ball head; and the telescopic assembly drives the aerator body to move to a first position or a second position along an axial direction of the mounting seat when water stops and the water flows; and when the aerator body is in the second position, the aerator body is separated from the mounting seat by a preset distance.
2. The telescopic aerator according to claim 1, **characterized in that**: the aerator body is connected to the ball head through a fixed ring.
3. The telescopic aerator according to claim 2, **characterized in that**: the fixed ring is exposed on a side of the aerator body facing the mounting seat.
4. The telescopic aerator according to claim 1, **characterized in that**: the telescopic assembly comprises a sealing portion hermetically sealed to the mounting seat and a connecting portion connected to the ball head, a groove is disposed between the sealing portion and the connecting portion, and an opening of the groove faces downward.
5. The telescopic aerator according to claim 4, **characterized in that**: the mounting seat comprises a through passage for the connecting portion to pass through, and when the aerator body is in the second position, a side wall of the through passage is inserted into the groove along the opening.
6. The telescopic aerator according to claim 2, **characterized in that**: a guiding wall is disposed in the mounting seat, and the guiding wall guides the fixed ring during a movement of the aerator body from the second position to the first position.
7. The telescopic aerator according to claim 6, **characterized in that**: the guiding wall surrounds to form a receiving chamber with an opening at two ends, and the receiving chamber comprises a structure

with a diameter of the opening that gradually increases from one end away from the aerator body to the other end.

8. The telescopic aerator according to claim 1, **characterized in that**: the telescopic assembly and the ball head comprise a water flow passage for water passage.
9. The telescopic aerator according to any one of claims 1-8, **characterized in that**: the telescopic assembly comprises a piston and a spring, and the piston is movably disposed in the mounting seat, one side of the piston along an axial direction of the mounting seat contacts the water flow, and the other side is connected to an inner wall of the mounting seat through the spring.
10. The telescopic aerator according to claim 9, **characterized in that**: a side of the piston facing the ball head comprises a mounting hole configured for mounting the ball head; and the mounting hole and the ball head are fixed by a threaded connection.
11. A telescopic aerator, **characterized in that**, it comprises: an aerator body, a telescopic assembly and a mounting seat; the telescopic assembly is disposed in the aerator body and is swingably connected to the mounting seat through a ball head; and the telescopic assembly drives the aerator body to move to a first position or a second position along an axial direction of the mounting seat when water stops and the water flows; and when the aerator body is in the second position, the aerator body is separated from the mounting seat by a preset distance.
12. The telescopic aerator according to claim 11, **characterized in that**: the mounting seat is connected to the aerator body through a fixed ring.
13. The telescopic aerator according to claim 12, **characterized in that**: the fixed ring is exposed on a side of the mounting seat facing the aerator body.
14. The telescopic aerator according to claim 11, **characterized in that**: the telescopic assembly comprises a sealing portion hermetically sealed to the mounting seat and a connecting portion connected to the ball head, a groove is disposed between the sealing portion and the connecting portion, and an opening of the groove faces upward.
15. The telescopic aerator according to claim 12, **characterized in that**: the aerator body comprises a guiding wall, and the guiding wall guides the fixed ring during a movement of the aerator body from the second position to the first position.

16. The telescopic aerator according to any one of claims 11-15, **characterized in that:** the telescopic assembly comprises a piston, a spring and a piston cylinder, the piston is movably disposed in the piston cylinder, one side of the piston along an axial direction of the aerator body contacts the water flow, and the other side is connected to an inner wall of the piston cylinder through the spring. 5
17. The telescopic aerator according to claim 10, **characterized in that:** it further comprises a damping mechanism, which is disposed in the mounting seat and comprises a friction base, a friction cylinder pad and a second spring; it is used for the aerator to be hovered within a swinging range in a water flowing state. 10 15
18. The telescopic aerator according to claim 17, **characterized in that:** the second spring is disposed in the ball head, a lower end of the friction cylinder pad is disposed in a head and above the second spring, an upper end of the friction cylinder pad is a spherical annular surface, the friction base is disposed in the mounting seat, a portion of an outer spherical surface of an upper portion of the head forms a clearance cooperation or an abutting cooperation with an inner wall of the friction base; and 20 25
- when the aerator swing to a preset position, the upper spherical annular surface of the friction cylinder pad abuts the inner wall of the friction base under an action of the second spring, and the aerator forms a hovered state. 30

35

40

45

50

55

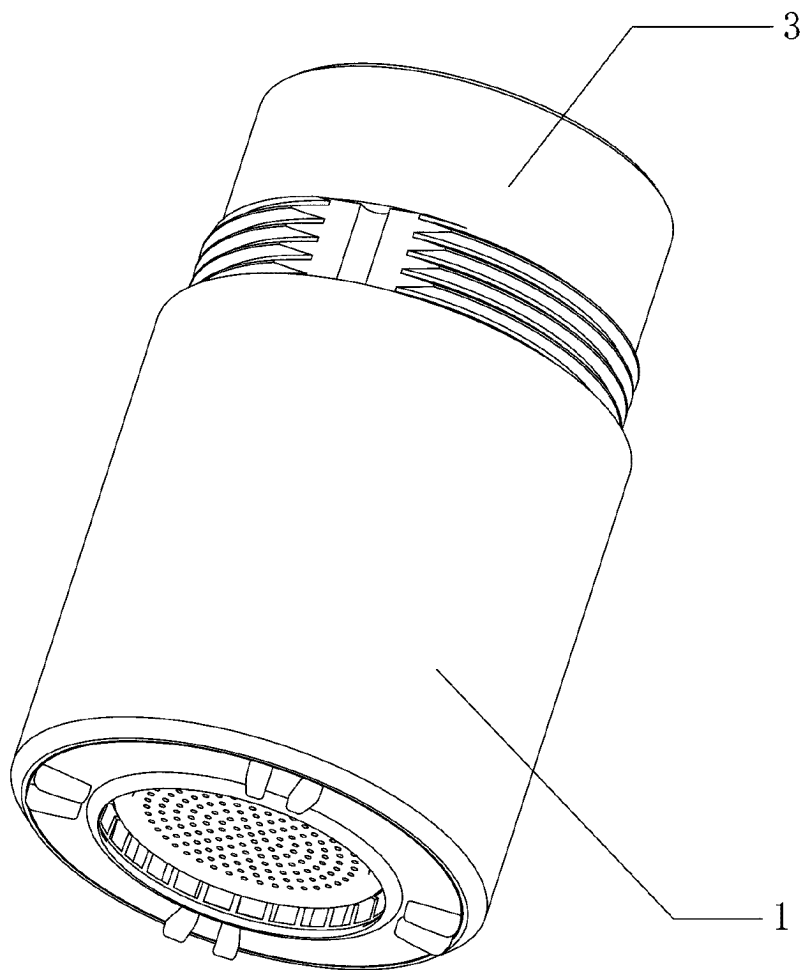


FIG. 1

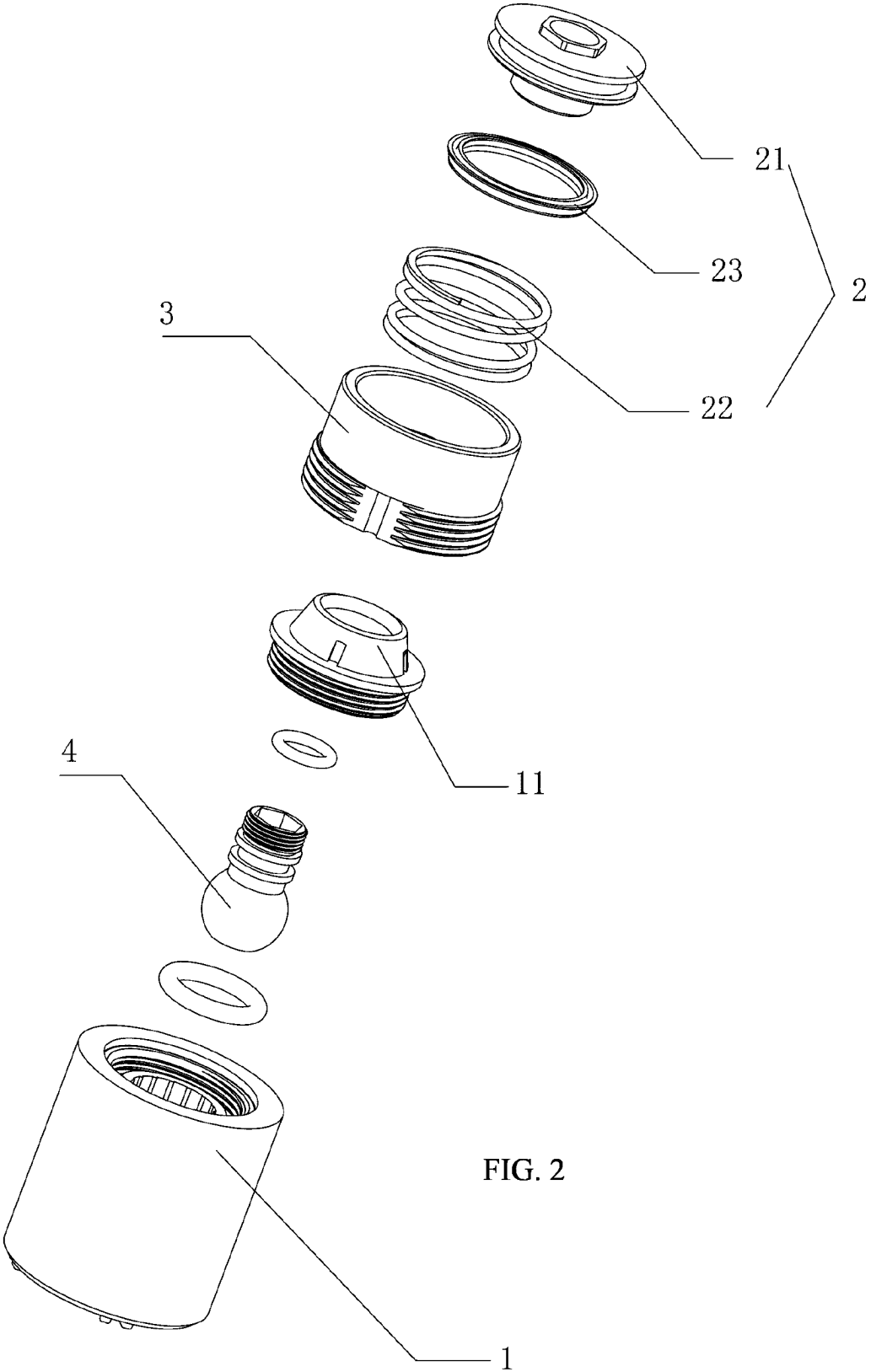


FIG. 2

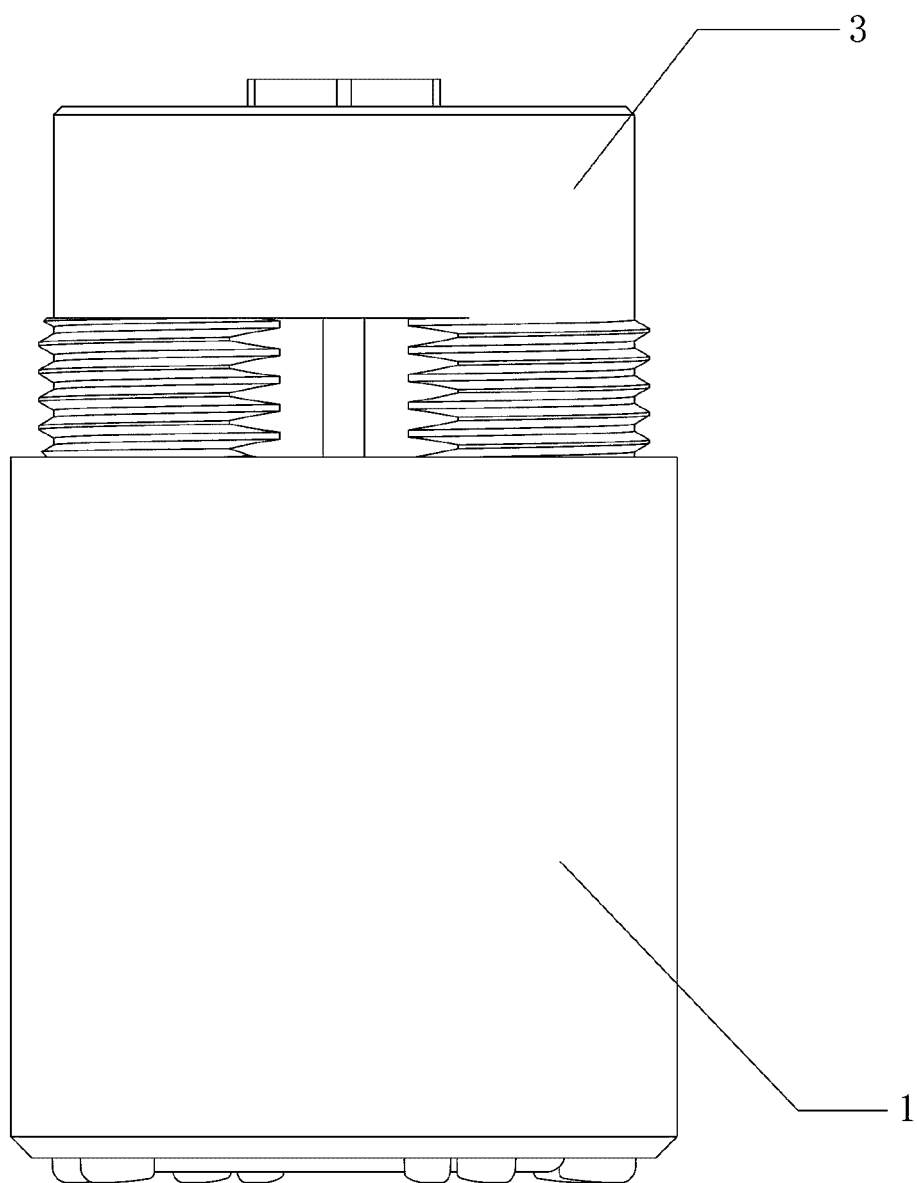


FIG. 3

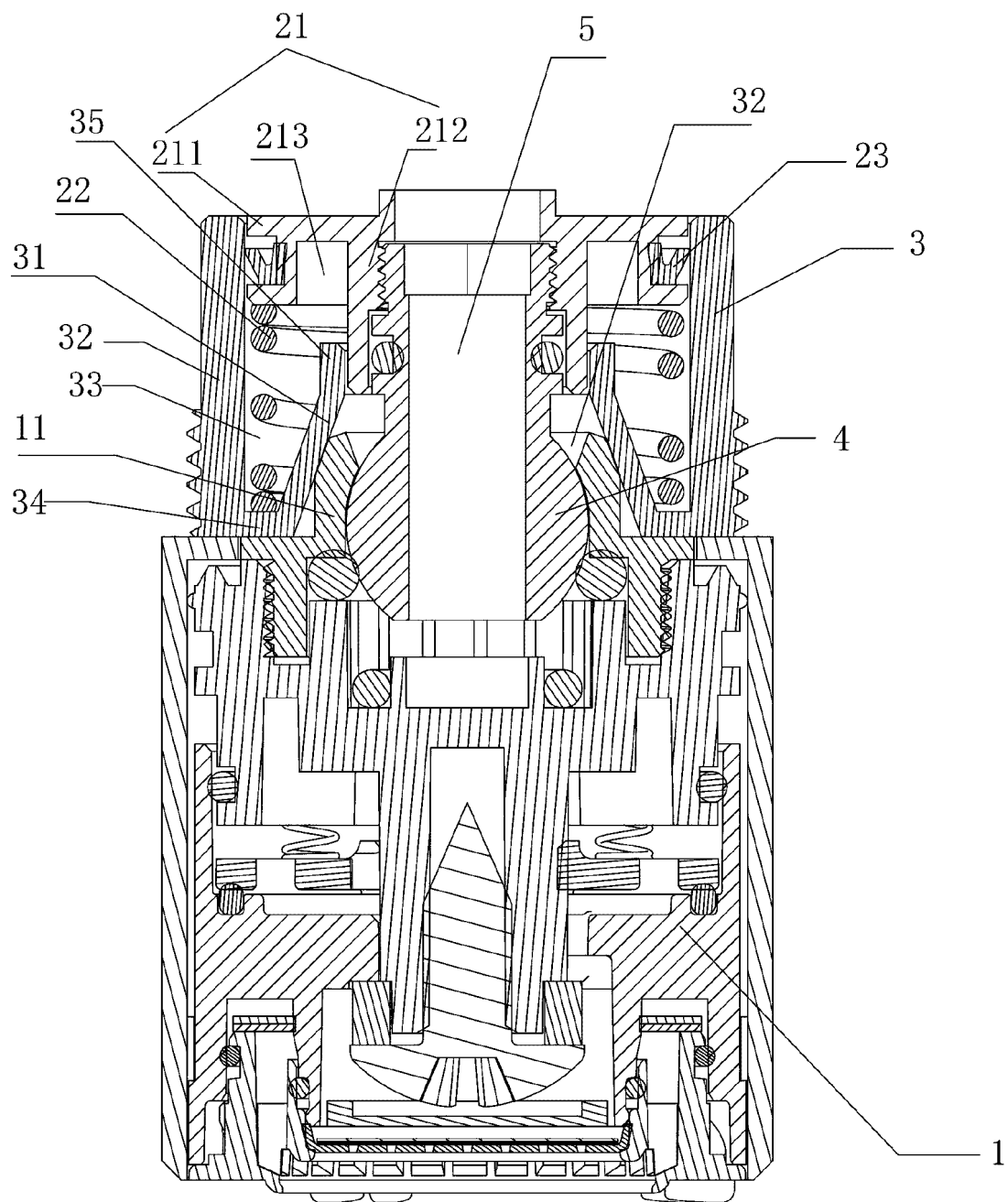


FIG. 4

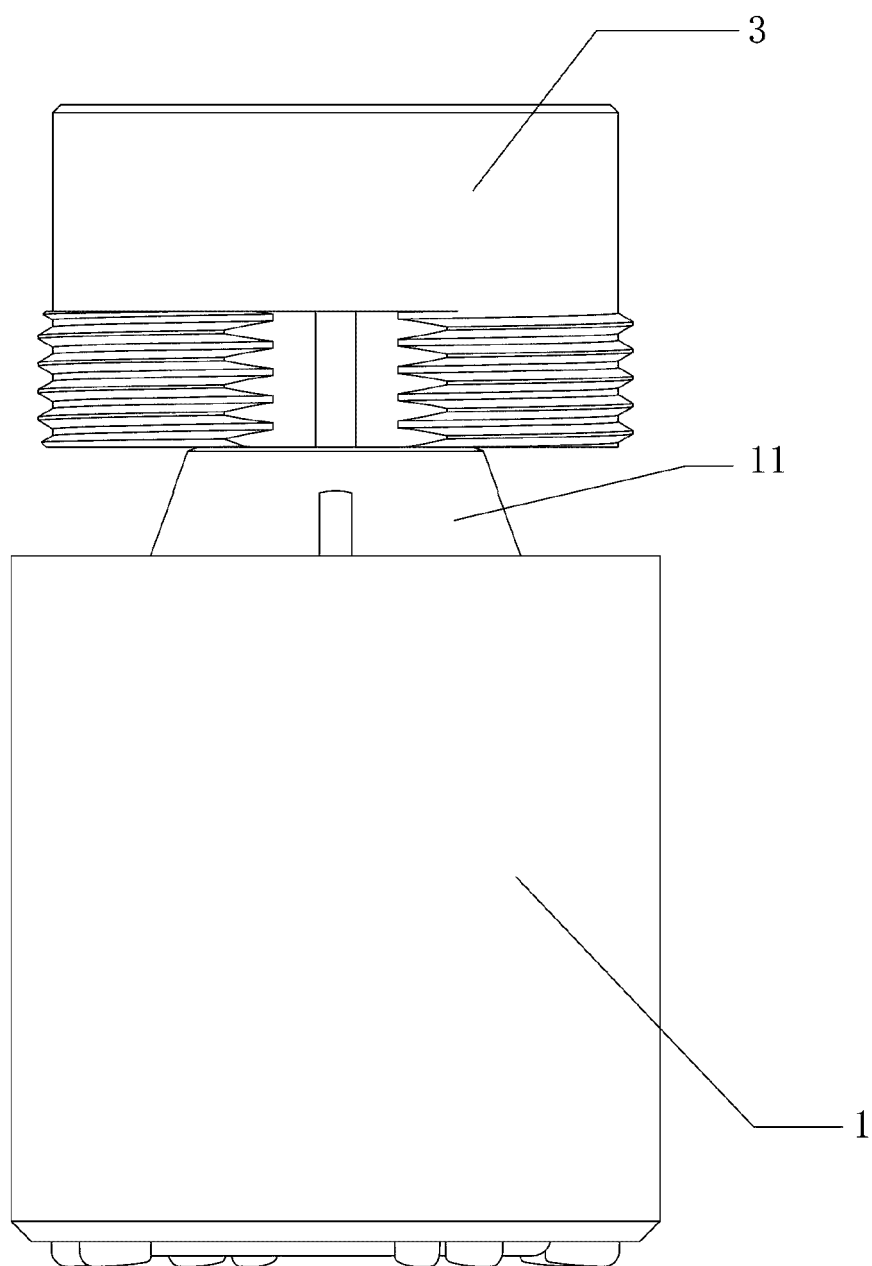


FIG. 5

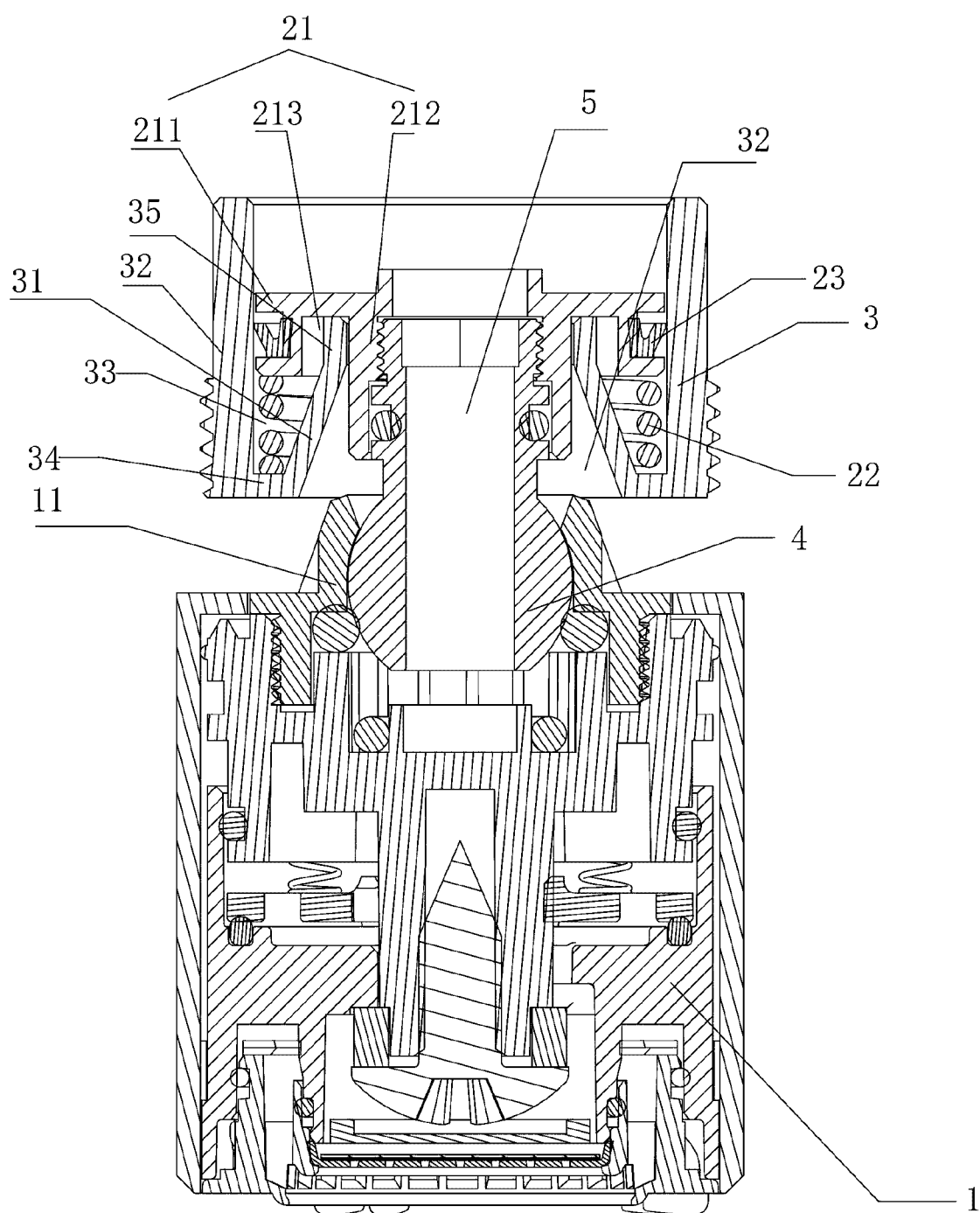


FIG. 6

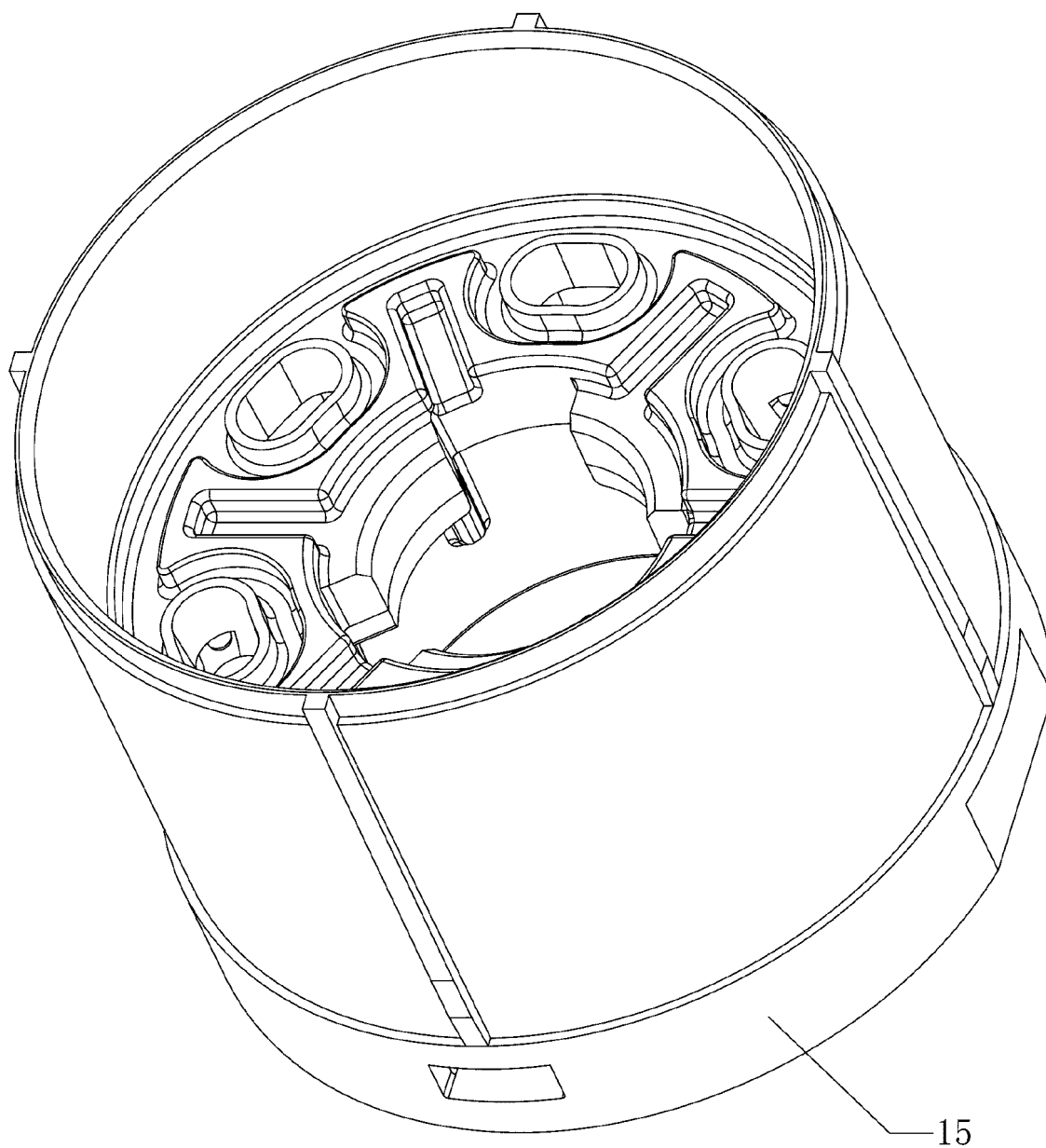


FIG. 7

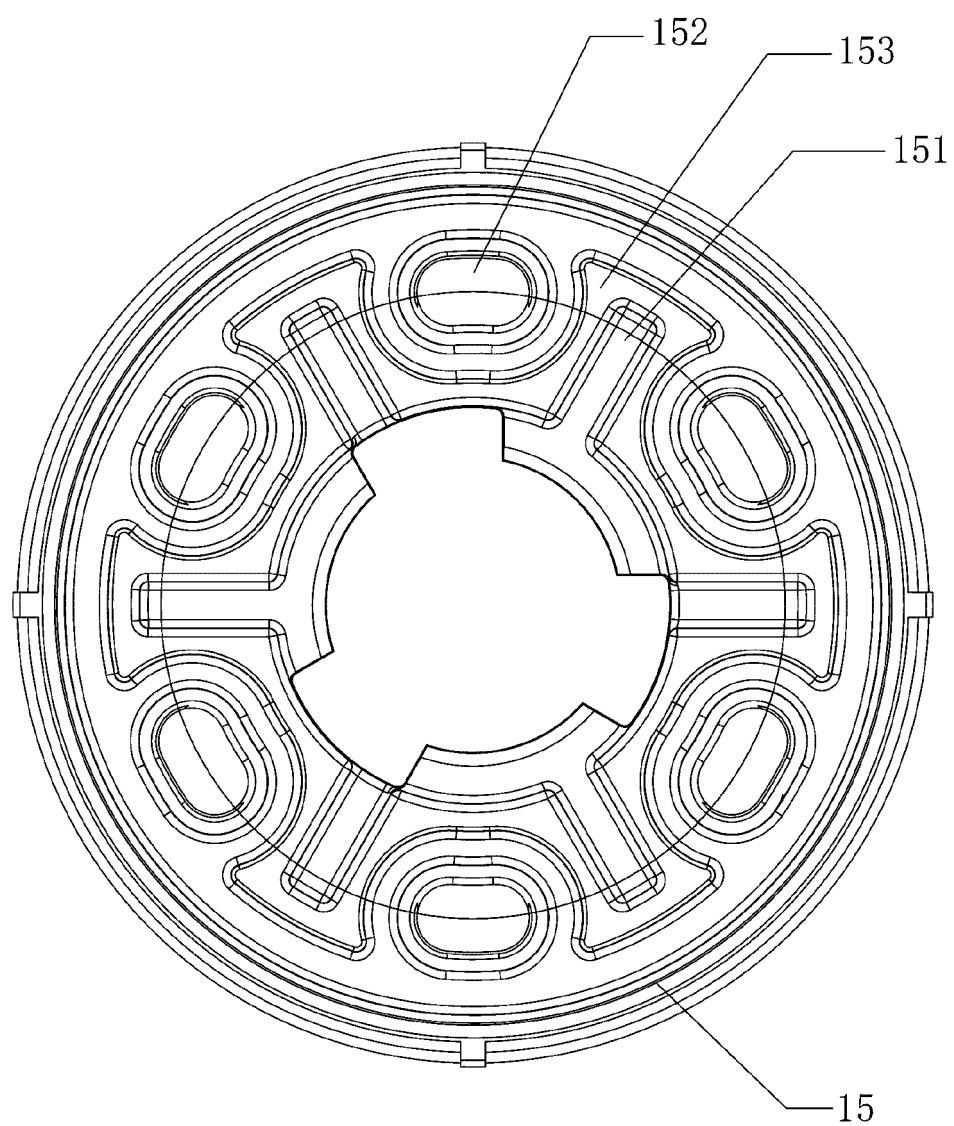


FIG. 8

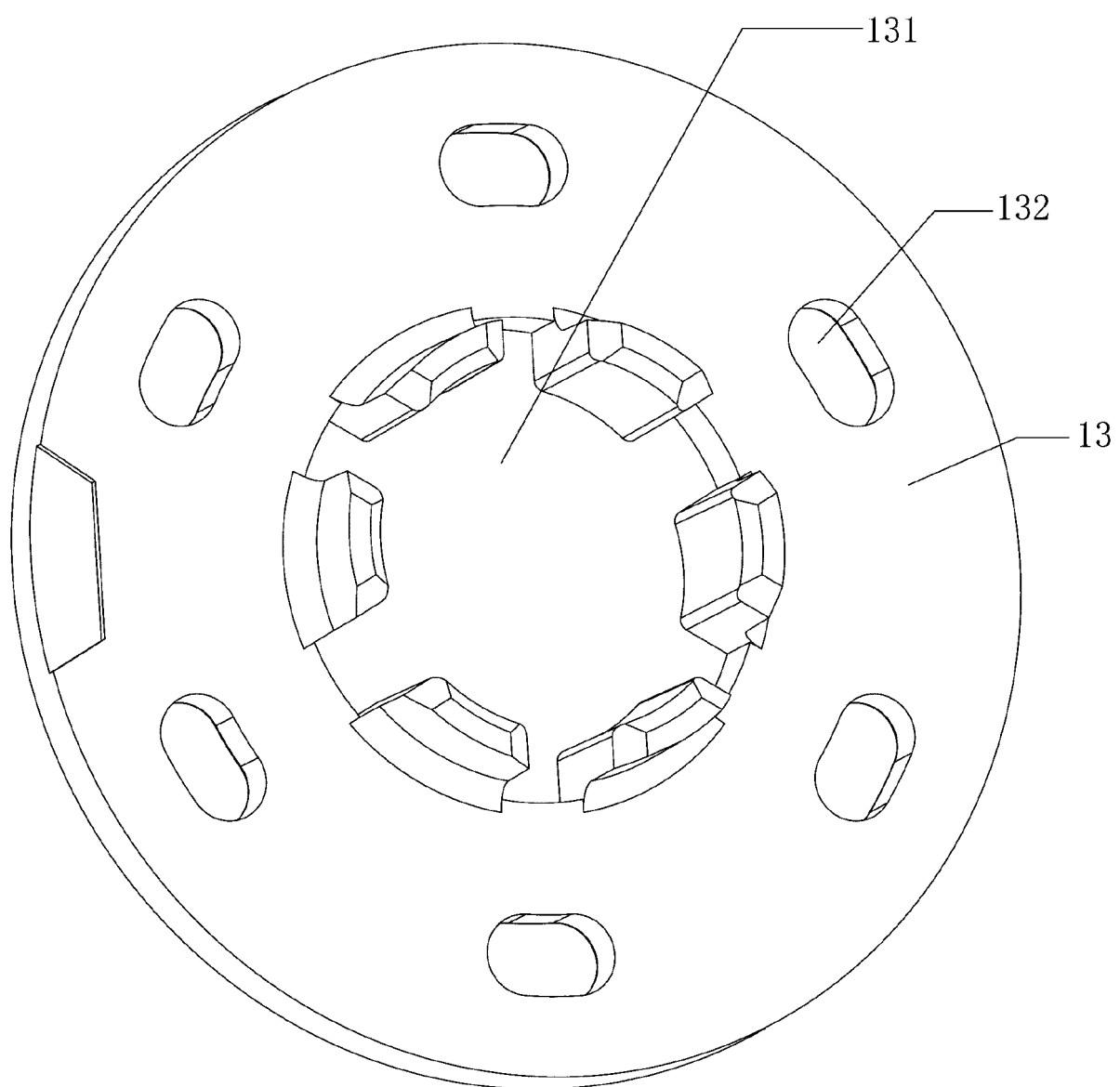


FIG. 9

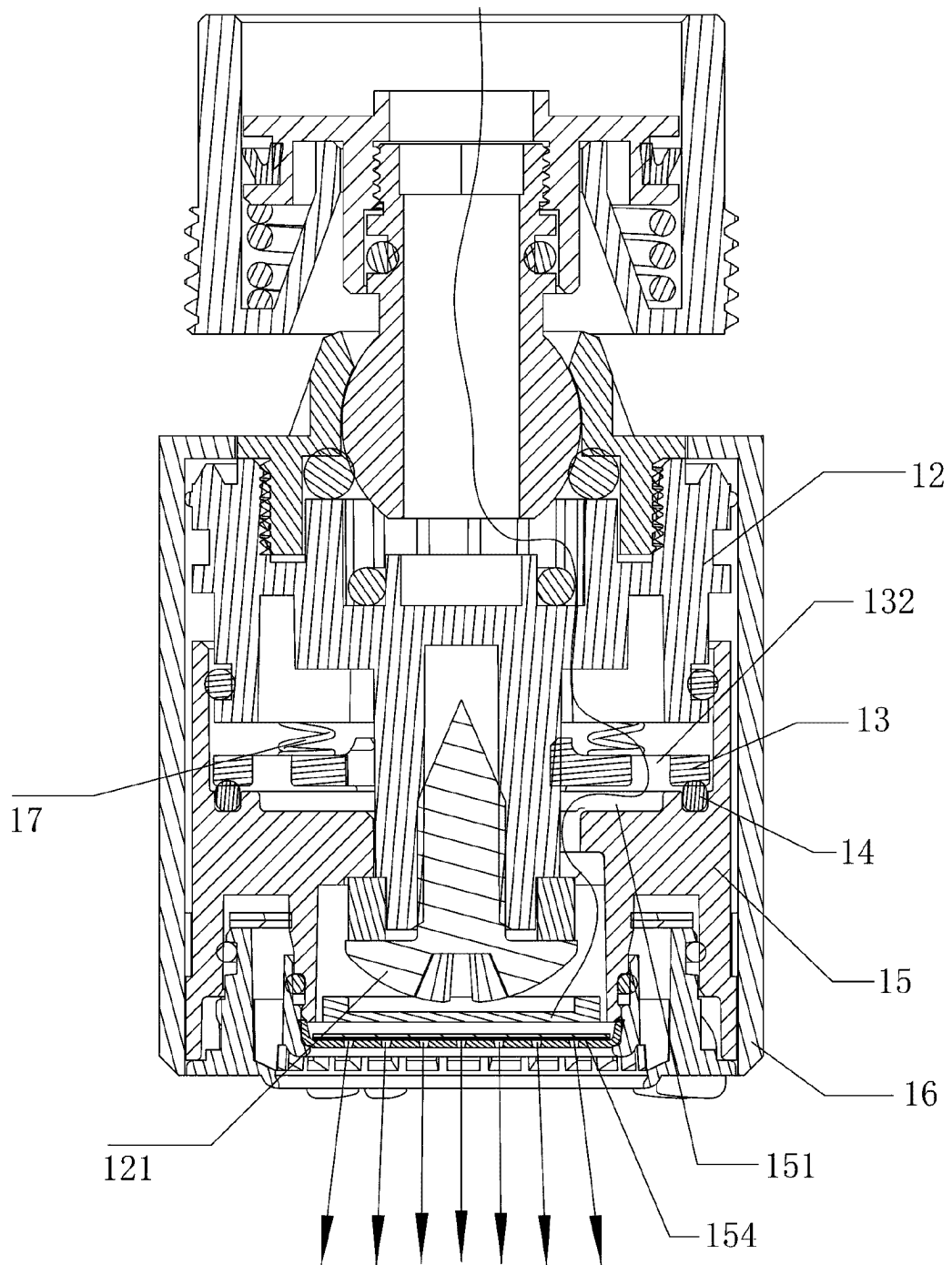
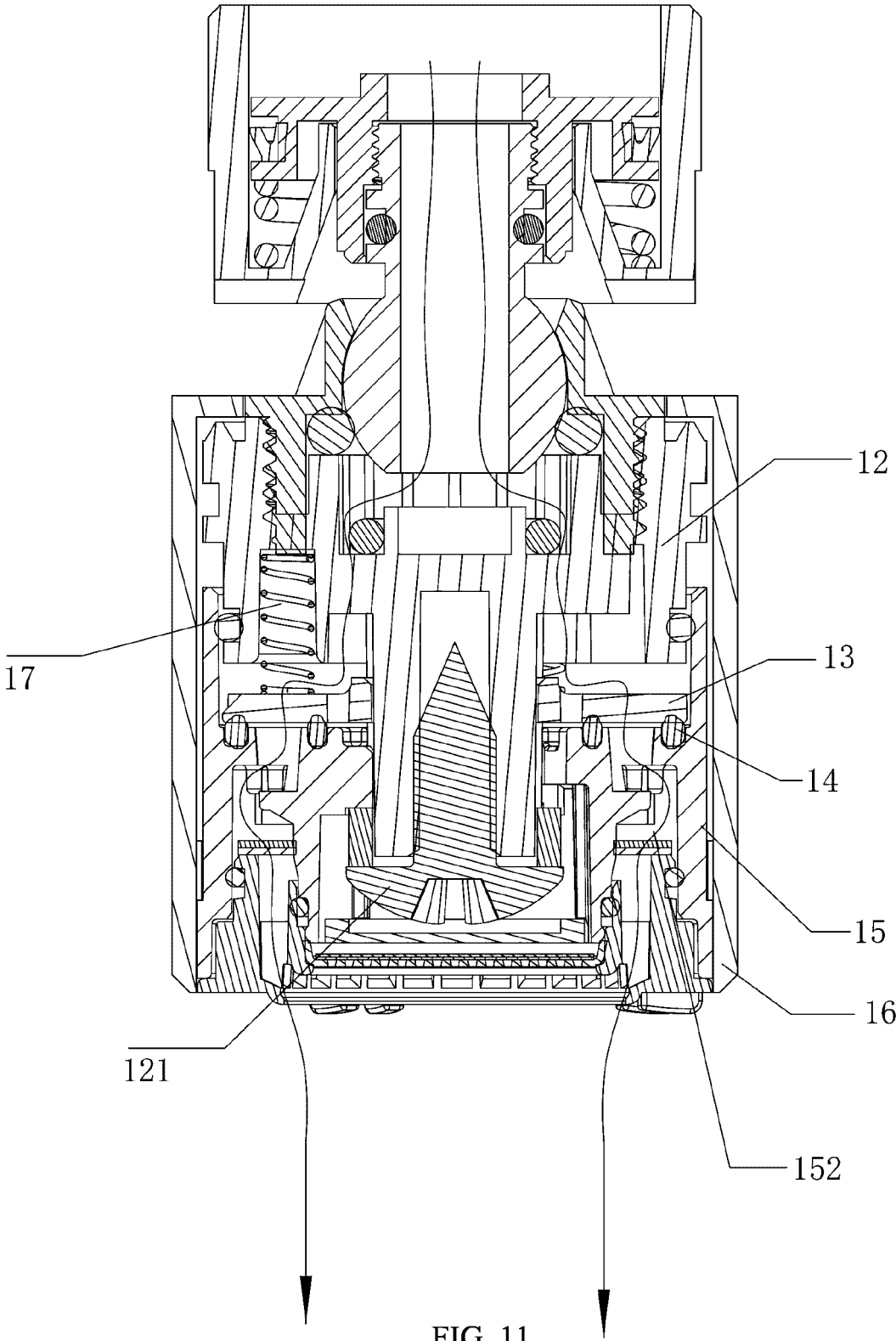


FIG. 10



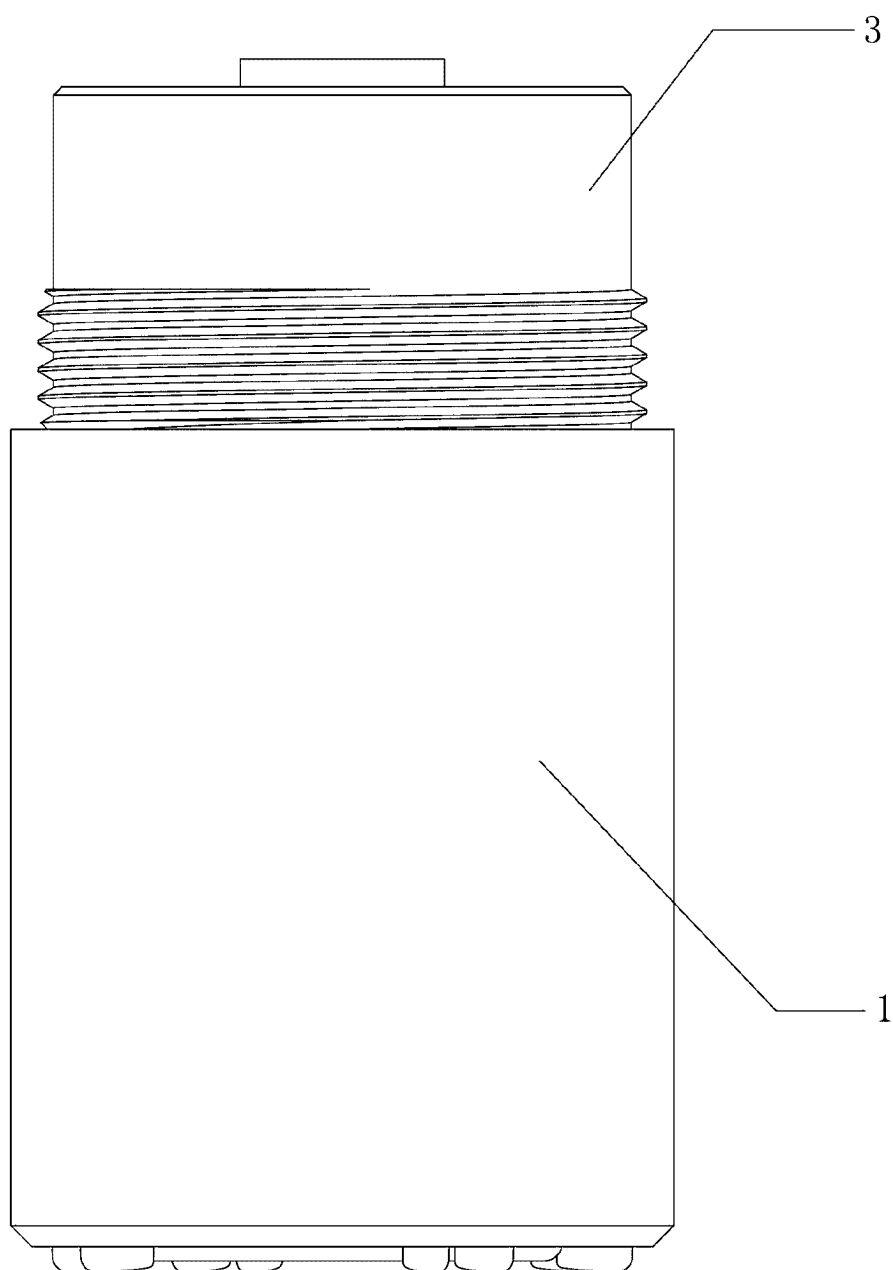


FIG. 12

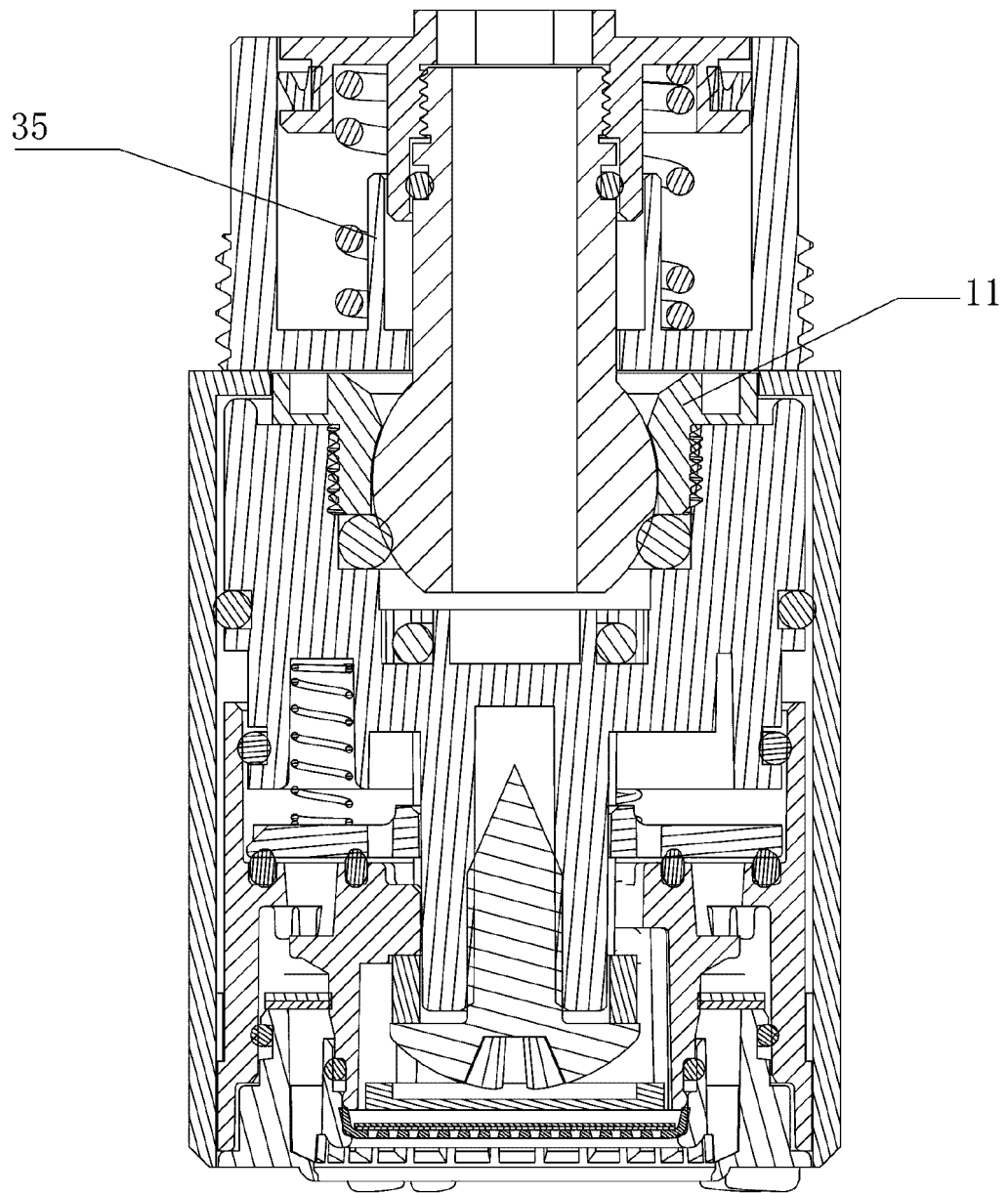


FIG. 13

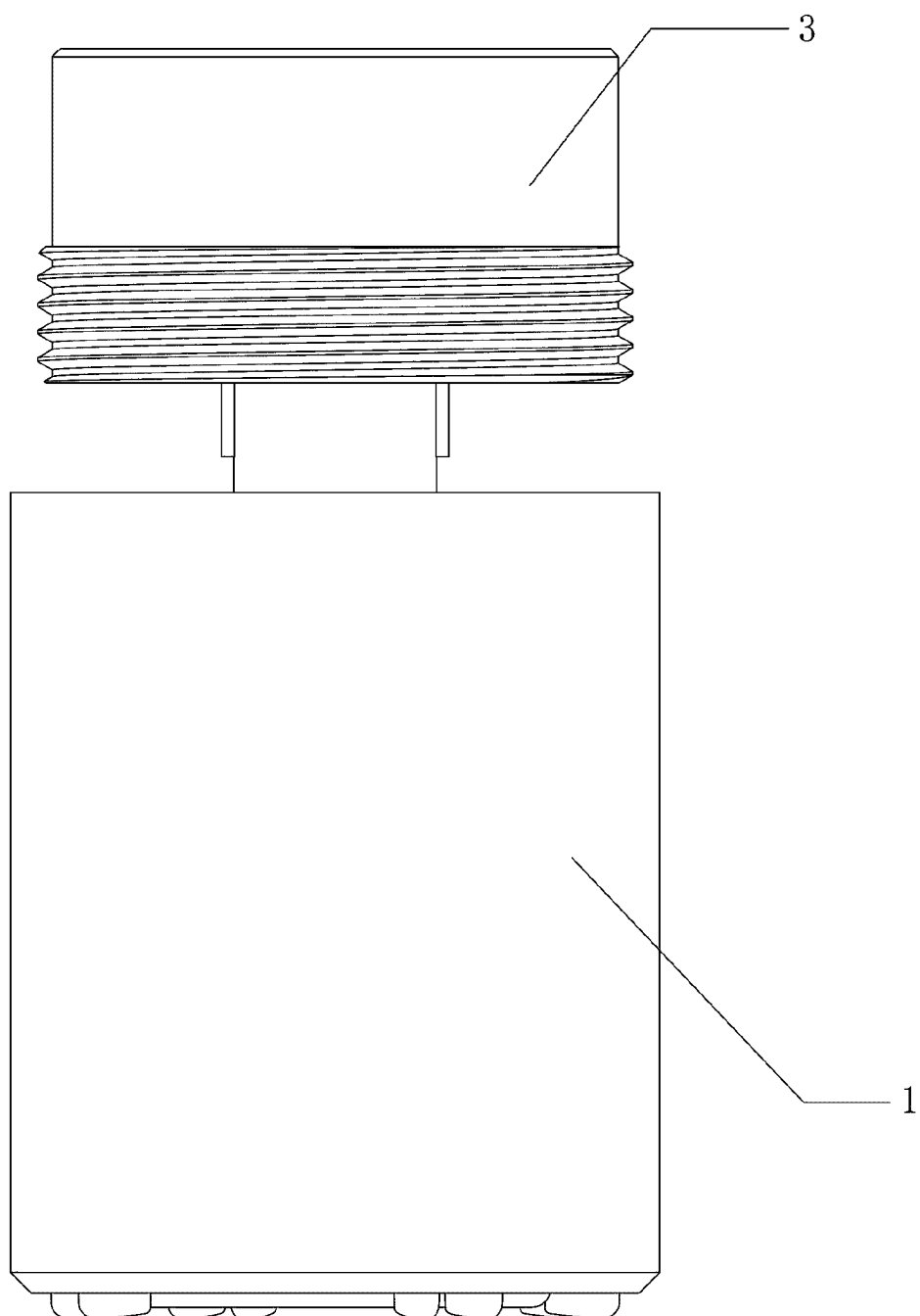


FIG. 14

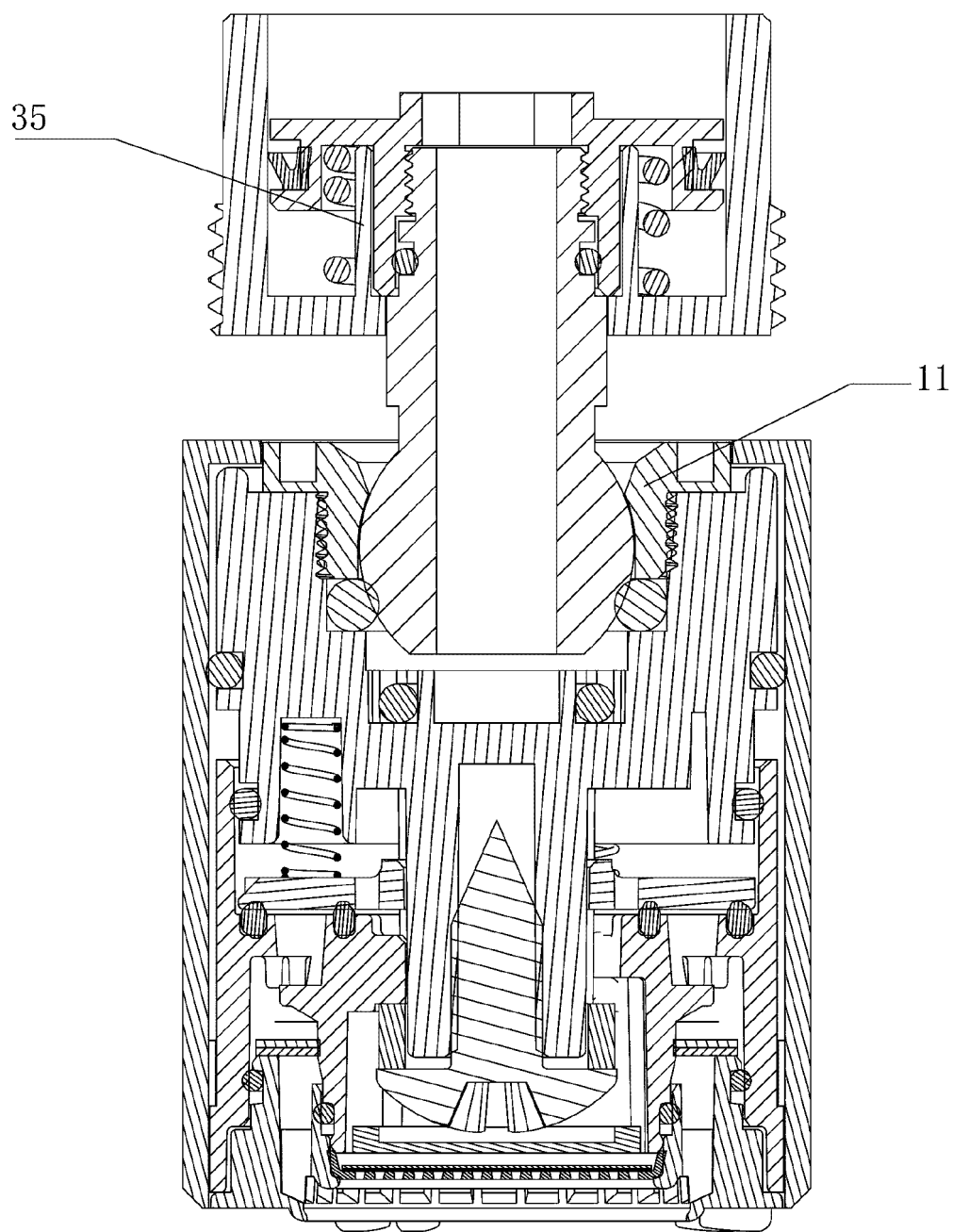


FIG. 15

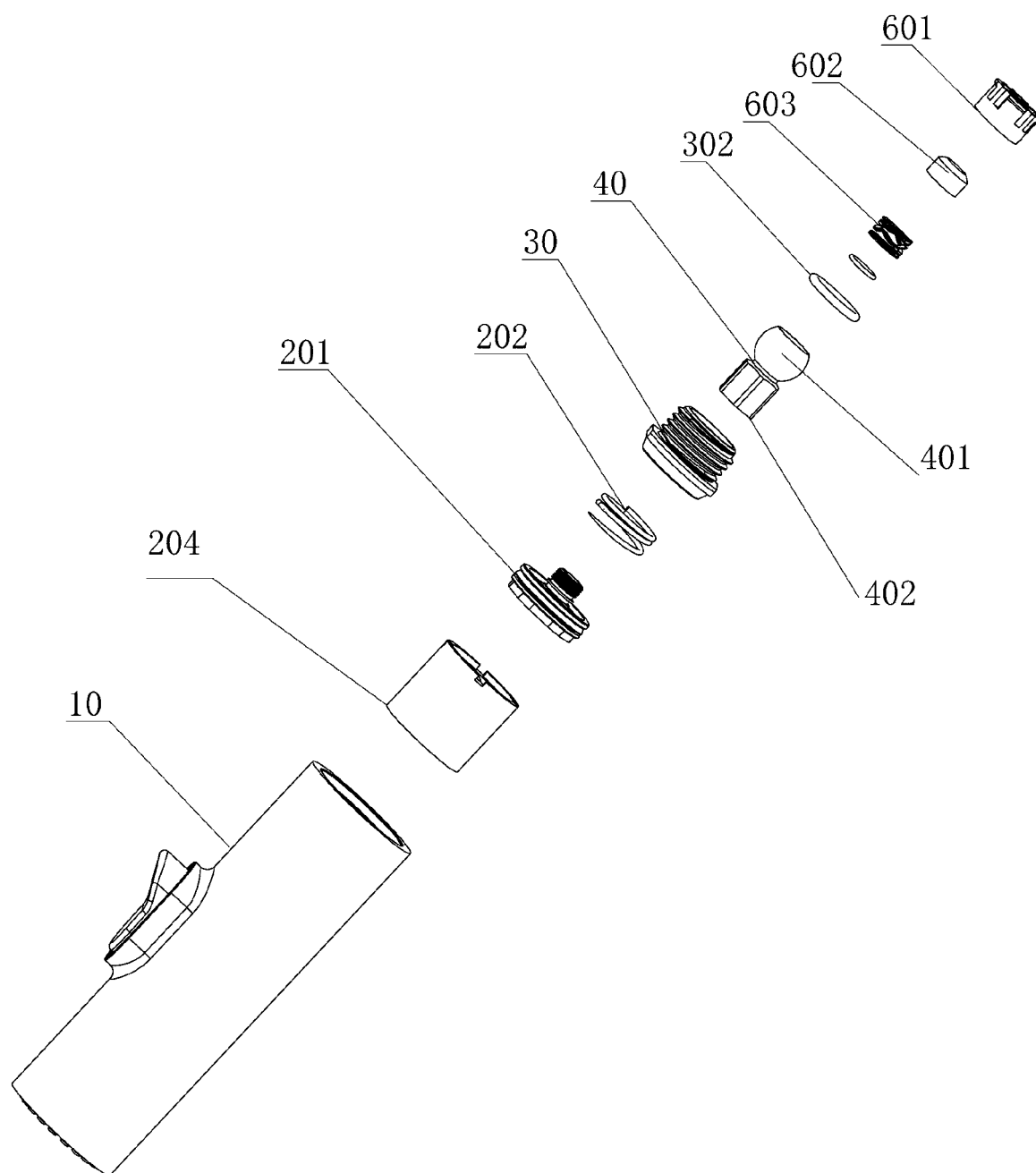


FIG. 16

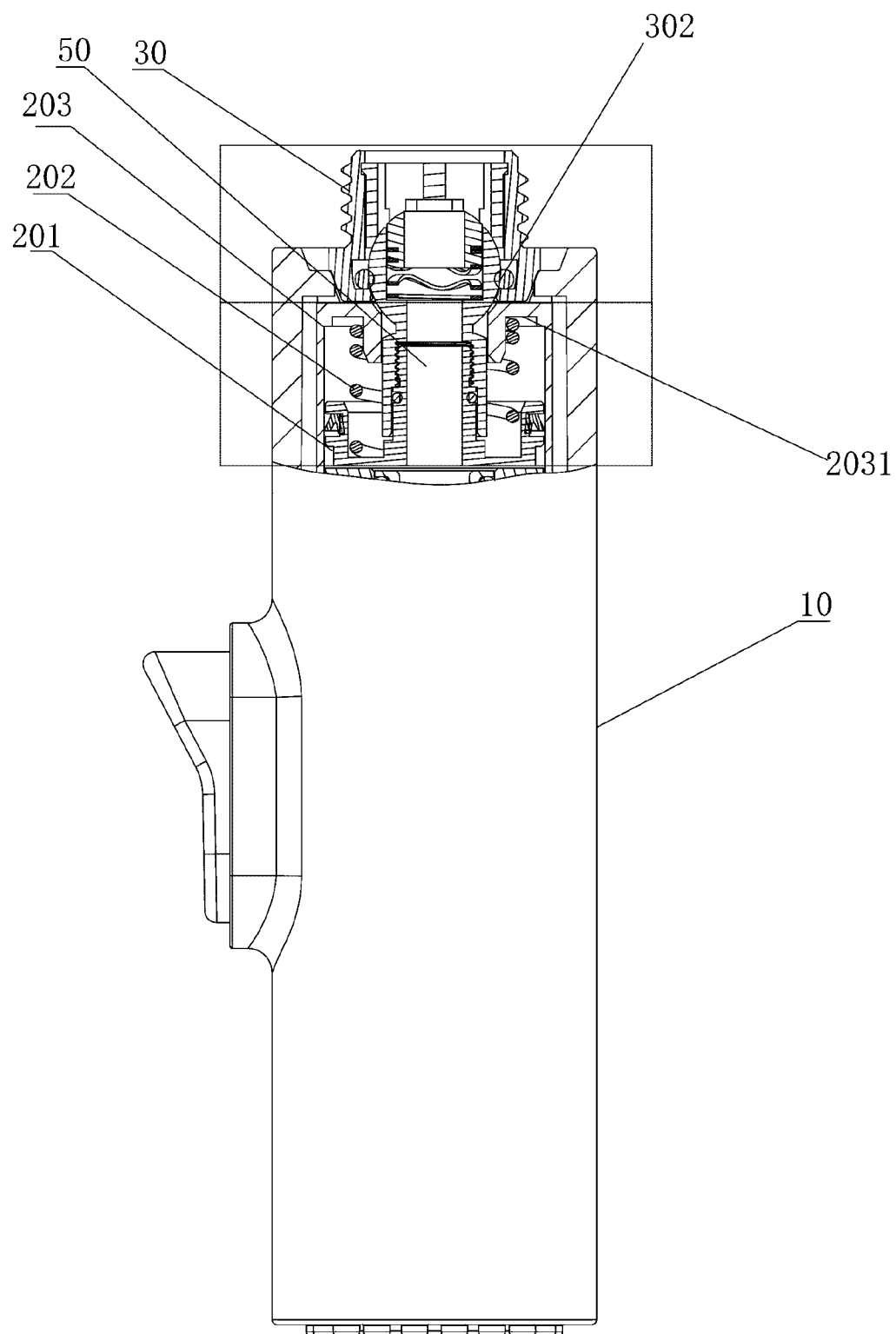


FIG. 17

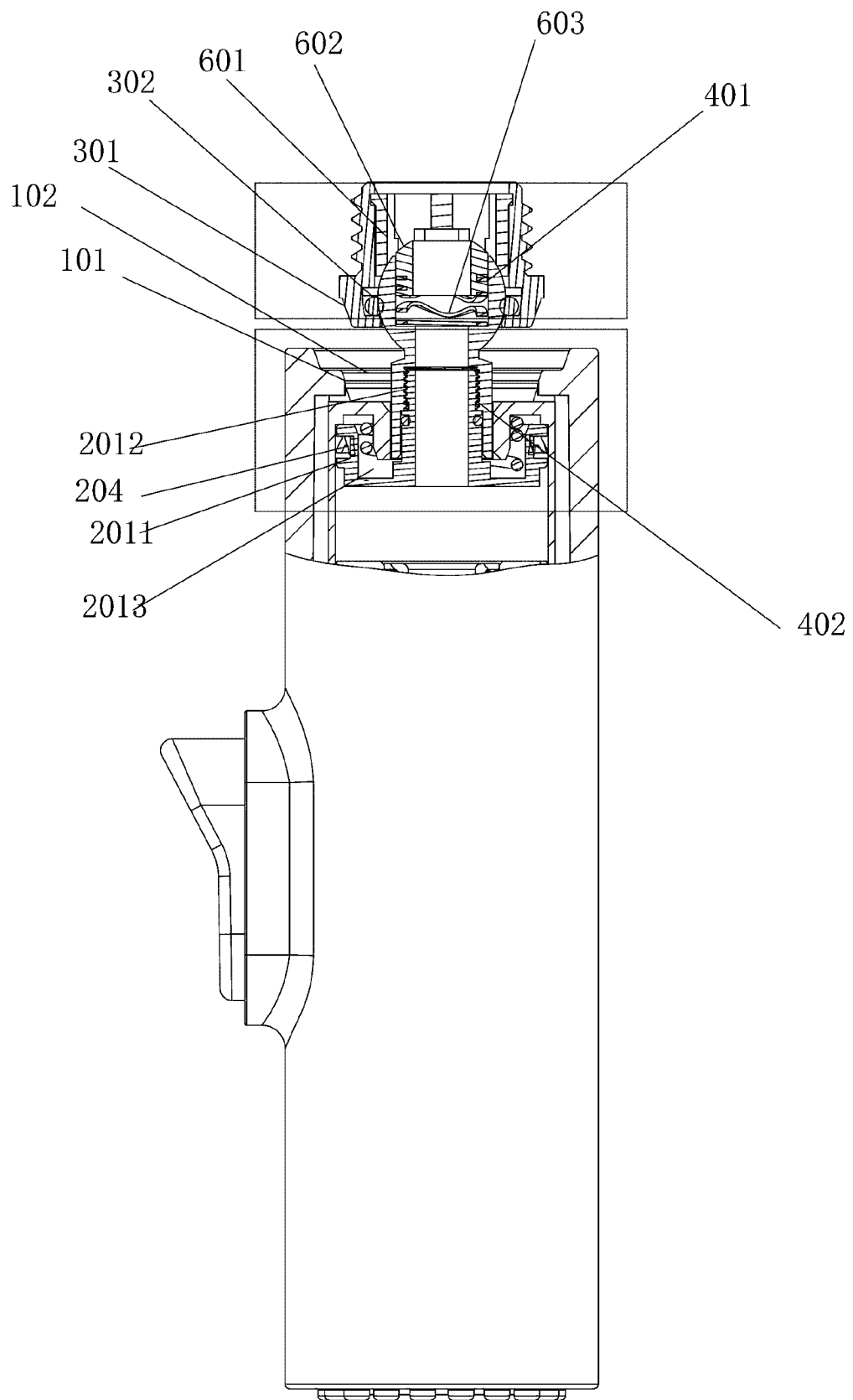


FIG. 18

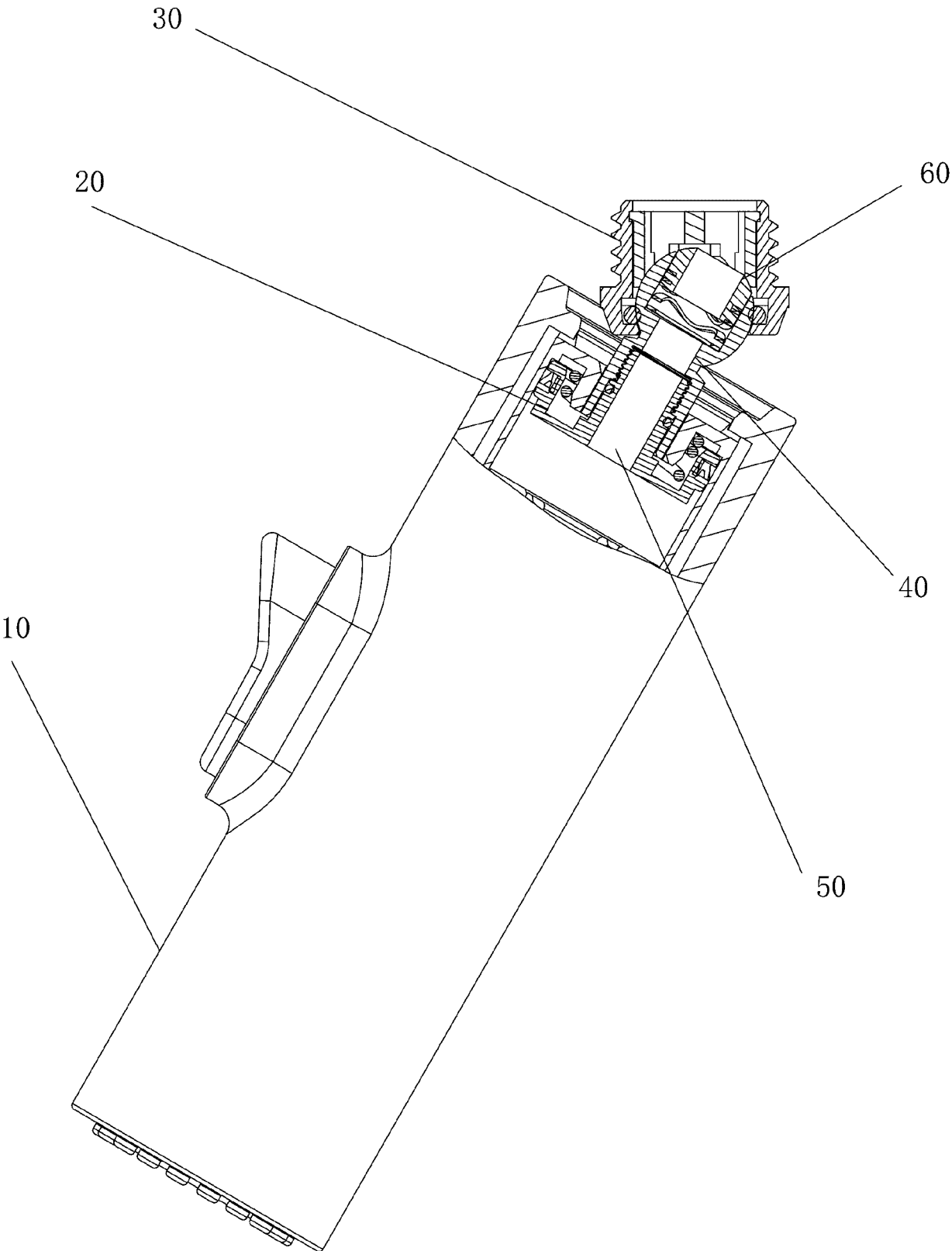


FIG. 19

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/108871

A. CLASSIFICATION OF SUBJECT MATTER

E03C1/08(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E03C1

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

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

CNABS; CNTXT; ENTXTC; VEN; CJFD: 起泡器, 球头, 第一位置, 第二位置, 弹簧, 弹性件, bubbler, ball, head, rotate, first, second, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 218437337 U (XIAMEN SOLEX HIGH-TECH INDUSTRIES CO., LTD.) 03 February 2023 (2023-02-03) claims 1-10	1-10
A	CN 215519011 U (XIAMEN WISDOM CHENXING TECHNOLOGY CO., LTD.) 14 January 2022 (2022-01-14) description, specific embodiments, and figures 1-7	1-18
A	CN 116290238 A (ARROW HOME GROUP CO., LTD.) 23 June 2023 (2023-06-23) entire document	1-18
A	CN 201567624 U (NIAGARA ENERGY CONSERVATION PRODUCTS (XIAMEN) CO., LTD.) 01 September 2010 (2010-09-01) entire document	1-18
A	CN 216810122 U (GD FINIAL PLUMBING SCIENCE CO., LTD.) 24 June 2022 (2022-06-24) entire document	1-18

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

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“D” document cited by the applicant in the international application

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

12 September 2023

Date of mailing of the international search report

19 September 2023

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)China No. 6, Xitucheng Road, Jimenqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/108871

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 218060566 U (XIAMEN SOLEX HIGH-TECH INDUSTRIES CO., LTD.) 16 December 2022 (2022-12-16) entire document	1-18
A	DE 202006010072 U1 (ZHOU HUASONG) 07 September 2006 (2006-09-07) entire document	1-18
A	US 2009020628 A1 (BELISLE CHRISTIAN) 22 January 2009 (2009-01-22) entire document	1-18
A	US 2015252555 A1 (HUANG SO-MEI) 10 September 2015 (2015-09-10) entire document	1-18
A	US 4244526 A (ARTH MICHAEL J) 13 January 1981 (1981-01-13) entire document	1-18

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2023/108871

5

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 218437337 U	03 February 2023	None	
CN 215519011 U	14 January 2022	None	
CN 116290238 A	23 June 2023	None	
CN 201567624 U	01 September 2010	None	
CN 216810122 U	24 June 2022	None	
CN 218060566 U	16 December 2022	None	
DE 202006010072 U1	07 September 2006	None	
US 2009020628 A1	22 January 2009	FR 2919003 A1	23 January 2009
		FR 2919003 B1	02 May 2014
		US 7581685 B2	01 September 2009
		CA 2637120 A1	19 January 2009
		CA 2637120 C	31 March 2015
US 2015252555 A1	10 September 2015	US 9447567 B2	20 September 2016
US 4244526 A	13 January 1981	None	