



EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.09.2021 Bulletin 2021/39

(51) Int Cl.:
E03C 1/04 (2006.01)

(21) Application number: **20212869.0**

(22) Date of filing: **09.12.2020**

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

(72) Inventors:
• **Lin, Xiaofu**
Fujian (CN)
• **Lin, Xiaoshan**
Fujian (CN)
• **Deng, Xiaoqing**
Fujian (CN)
• **Fu, Qinchu**
Fujian (CN)

(30) Priority: **26.03.2020 CN 202020410777 U**

(71) Applicant: **Fujian Xihe Sanitary Ware Technology
Co., Ltd.**
QuanZhou, Fujian 362304 (CN)

(74) Representative: **Patentanwälte Bals & Vogel**
Universitätsstrasse 142
44799 Bochum (DE)

(54) **MOUNTING STRUCTURE OF TAP HANDLE AND SHOWER TAP COMPRISING THIS
STRUCTURE**

(57) A mounting structure of a tap handle and a shower tap, wherein the handle(3) includes a ball-head connection part(31) rotating around a first axis vertical to an axis of a body to toggle the valve core(2) to open and close; a first limiting sleeve(4) is clamped to the inner wall of the body(1) by coaxial relative rotation, and an inner wall surface thereof is provided with an arc surface matched with the ball-head connection part(31); a second limiting sleeve(5) is coaxially arranged at an end por-

tion of a first end of the body(1) and clamps the ball-head connection part(31) between the second limiting sleeve(5) and the first limiting sleeve(4), and is detachably and fixedly connected to an inner wall of the body(1) and establishes a rotation stopping connection relationship with the first limiting sleeve(4). The handle(3) is arranged on an end portion of the body(1) by the mounting structure of the handle tap.

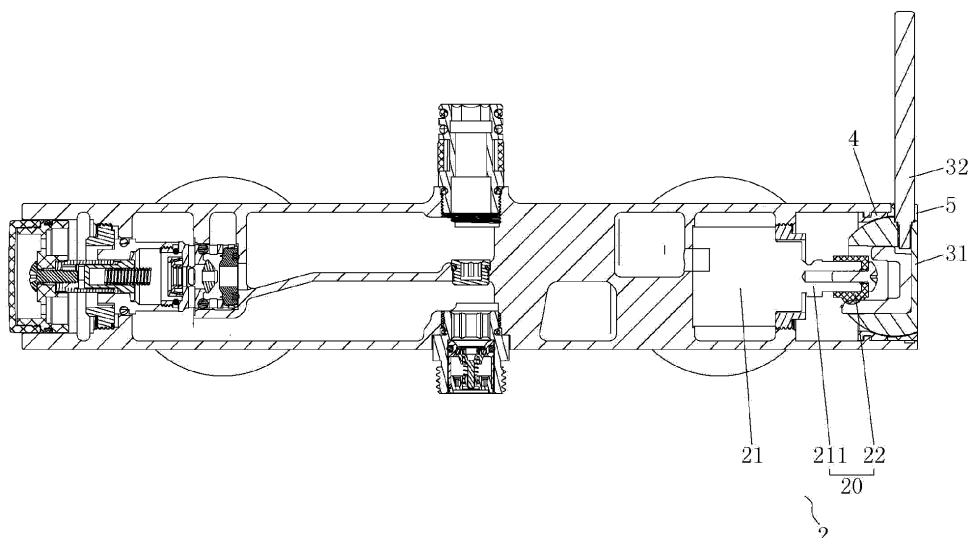


Fig. 5

Description

BACKGROUND

Technical Field

[0001] The present application relates to the field of sanitary ware, in particular, to a mounting structure of a tap handle and a shower tap.

Description of Related Art

[0002] At present, most taps on the market (including washbowl taps and shower taps) are still using a toggle valve core. The way to operate such valve core is to fixedly connect a handle to a valve rod, then the valve rod is driven by the handle directly to rotate within a certain angle relative to a valve body, so as to change the relative position of a sealing body in the valve body, thereby realizing opening and closing or other corresponding functions of the valve core.

[0003] However, for the taps using such valve core, a handle of the tap is located outside the body, and the handle and the body move relatively, therefore, irregular openings and seams will unavoidably exist at the connection position of the handle and the body, and the integrity of the product is affected. In addition, after long-time use, dirt such as toothpaste stains, body wash stains, etc. will attach to the seams, and since such dirt is difficult to remove, the appearance of the product and further the smoothness of handle operation of the product thus will be affected.

[0004] For the above problem, a mounting structure of a tap handle, which can toggle the valve core by rotating a ball head structure, appears on the market at present to fulfill the aims of reducing a size of the body by reducing a rotation stroke and improving the integrity of the product by hiding most of a rotation part of the handle into the body, wherein the ball head structure is arranged in the body through a plastic piece, an arc-shaped surface matched with the ball head structure is arranged in the plastic piece, and the plastic piece is fixedly connected with the body in a form of interference fit, such that the ball head structure is arranged in the body; however the plastic piece is difficult to disassemble and assemble and is liable to damage in the disassembling and assembling processes.

SUMMARY

[0005] In order to overcome the above defects and problems in the prior art, the present application provides a mounting structure of a tap handle and a shower tap, which are simple in structure and convenient to disassemble and assemble.

[0006] To achieve the above object, the following technical solutions are adopted: A mounting structure of a tap handle includes a body in round tubular shape, a

valve core, a handle; the handle includes a ball-head connection part which is arranged at an end portion of a first end of the body, the valve core is located in the body, the ball-head connection part rotates around a first axis to toggle the valve core to open and close, and the first axis is vertical to an axis of the body; and the mounting structure of a tap handle further includes a first limiting sleeve, the first limiting sleeve is clamped to an inner wall of the body by coaxial relative rotation, and an inner wall surface of the first limiting sleeve being provided with an arc surface matched with the ball-head connection part; and a second limiting sleeve, the second limiting sleeve being coaxially arranged on the end portion of the first end of the body and the ball-head connection part being clamped between the second limiting sleeve and the first limiting sleeve; the second limiting sleeve being detachably and fixedly connected to an inner wall of the body and preventing the first limiting sleeve from separating from the inner wall of the body in the relative rotation by establishing a rotation stopping connection relationship between the second limiting sleeve and the first limiting sleeve.

[0007] Compared with the prior art, the above solutions have the following beneficial effects:

1. In the mounting structure of the tap handle according to the technical solutions, the ball-head connection part of the handle is confined in the body by the first limiting sleeve and the second limiting sleeve, which replaces the traditional mounting connection mode of interference fit, such that the disassemble and assemble of the handle is more convenient and the service life of parts is ensured, wherein the first limiting sleeve is arranged on the body in a rotary clamping connection way, which is simple and convenient in disassembling and assembling; during assembling, the first limiting sleeve is clamped in the body in place, then the ball-head connection part is positioned in the body, and finally the second limiting sleeve is clamped to and fixed in the body to cooperate with the first limiting sleeve to limit an axial position of the ball-head connection part, such that assembling convenience and low disassembling difficulty are achieved; and meanwhile, a rotation stopping connection relationship is established between the second limiting sleeve and the first limiting sleeve to limit rotation of the first limiting sleeve relative to the body and ensure that the first limiting sleeve does not rotate relative to an inner wall of the body and disengage from clamping connection in the using process.

2. The rotary clamping connection between the first limiting sleeve and the body is realized by providing a first protrusion and a first clamping groove on the first limiting sleeve and on the body correspondingly, simple structure, easy and convenient operation and excellent limiting strength in axial direction are

achieved; and due to a first notch, reliable inserting connection between the first limiting sleeve and the body is guaranteed.

3. The rotation stopping connection relationship between the first limiting sleeve and the second limiting sleeve is established through a second clamping groove and a second protrusion arranged on the end faces of the first limiting sleeve and the second limiting sleeve correspondingly, and the second clamping groove and the second protrusion can be in an inserting connection; the structure is simple, and the inserting connection between the second protrusion and the second clamping groove is completed synchronously while plugging the second limiting sleeve into the body, thereby facilitating operation, assembling and disassembling.

4. A clamping connection relationship between the second limiting sleeve and the body for limiting relative axial movement between the second limiting sleeve and the body is realized by providing a third protrusion and a third clamping groove on the second limiting sleeve and the body correspondingly; meanwhile, the rotation stopping connection relationship between the second limiting sleeve and the body is realized by providing a fourth clamping groove and a fourth protrusion on the second limiting sleeve and the body correspondingly to form inserting connection. The above limiting relationships in the axial direction and the circumferential direction determine the detachably fixed connection relationship between the second limiting sleeve and the body, so the structure is simple and disassemble and assemble is convenient.

5. As can be seen from the structural characteristics of the second limiting sleeve, clamping connection between the second limiting sleeve and the body mainly includes the following actions: the third protrusion on a clamping connection part is clamped to the third clamping groove on the body to form clamping connection; an inserting connection part on the second limiting sleeve is inserted into and connected with a fourth clamping groove on the body to form inserting connection; and the inserting connection part on the second limiting sleeve is further inserted into and connected with the second clamping groove on the first limiting sleeve to form inserting connection. It can be seen that when the second limiting sleeve is inserted into and connected with the body in place, the inserting connection part mainly realizes the following three functions: a rotation stopping connection relationship in circumferential direction is realized with the body; a rotation stopping connection relationship to limit rotation of the first limiting sleeve relative to the body is established with the first limiting sleeve; and the inserting connection part is also used

for an operation part to stop. The multiple functions are integrated on the same structure, so the complexity of the structure is reduced, formation of spare parts is facilitated, manufacturing cost is reduced, actions can be completed in one go without too much alignment during assembling, and operation is facilitated.

It should be noted that in the process of plugging the second limiting sleeve into the body, the third protrusion is liable to wear and fail due to hard cooperation between the third protrusion and the inner wall of the body. Therefore, in the technical solutions, a certain deformation space for deformation of the clamping connection part is advantageously provided by arranging the second notch on the clamping connection part, such that the third projection on the clamping connection part can pass through the body smoothly and easily and realize clamping connection with the third clamping groove, wherein the inserting connection part is connected to the second notch, thereby reasonably utilizing a space at the opening of the clamping connection part, enabling the entire structure of the second limiting sleeve to be smoother, ensuring that not too many notches are required to be arranged on the clamping connection part, and improving the convenience of assembling and the aesthetic appearance of the structure.

6. According to the shower tap provided by the technical solutions, the handle toggles the valve core to open and close by virtue of rotation of the ball-head connection part, such that the stroke and range of rotation required by the handle operation part is effectively reduced, the rotating part of the handle can be substantially accommodated in the body, and the integrity, fineness and aesthetic degree of the body appearance are improved; moreover, the mounting structure of the ball-head connection part of the handle on the body is simple, thereby realizing rapid disassembling and assembling.

7. The toggled part of the valve core is configured to rotate around a second axis and the ball-head connection part is configured to rotate around a first axis, and the toggling part drives the toggled part to rotate in the rotation process and make the valve core open and close and effectively reduce the rotation stroke of the handle, therefore, the handle can be substantially covered by the body by slightly lengthening the body and the radial size of the body is not needed to be designed too large to meet the requirement of dodging the ball-head connection part, such that the appearance of the body is more exquisite, beautiful and integrate; and since the seam between the outer wall of the body and the handle is small, dirt is not easy to hide, cleaning is facilitated and the operating hand feeling of the handle is not affected.

8. When the ball-head connection part rotates, the toggling part rotates and toggles the toggled part to rotate around the second axis. At this time, a rotating shaft will move relative to the ball-head connection part, and since a rotating groove is designed in such a way that the rotating shaft could be allowed to radially slide along a rotating plane of the ball-head connection part, the toggled part can be reliably toggled to open and close the valve core.

9. In the valve core, a rotating base and a valve rod are detachably and fixedly connected and jointly form the toggling part, thereby ensuring that the valve body may adopt the traditional toggling valve core structure without improving the valve rod structure on the valve body; and the rotating base has a simple structure and low production cost and is convenient to disassemble and assemble with the valve body, thereby facilitating later maintenance and replacement.

10. An elastic cushion ensures that the toggled part can be toggled all the time without clearance when a user drives the ball-head connection part to rotate and enables a better operation hand feeling without affecting rotation of the rotating shaft relative to the ball-head connection part.

11. A plane is arranged on the ball-head connection part, when the valve core is closed, the plane on the ball-head connection part can be flush with the end face of the first end of the body, such that the end portion of the body is flat, material cost is reduced and visual aesthetic feeling is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] In order to explain the technical solution of the embodiment more clearly, the accompanying drawings to be used in the description will be briefly introduced below:

FIG. 1 is an exploded perspective structure schematic diagram of a shower tap according to an embodiment of the present application.

FIG. 2 is a structure schematic diagram of a position relationship between a first limiting sleeve and a body before assembling according to an embodiment of the present application.

FIG. 3 is a local section structure schematic diagram when a first limiting sleeve is assembled in a body in place according to an embodiment of the present application.

FIG. 4 is a structure schematic diagram of a position relationship between a second limiting sleeve and a

body before assembling according to an embodiment of the present application.

FIG. 5 is a first section structure schematic diagram when a mounting structure of a tap handle in a shower tap is mounted in place according to an embodiment of the present application.

FIG. 6 is a structure schematic diagram of an external view of a mounting structure of a tap handle in a shower tap being mounted in place according to an embodiment of the present application.

FIG. 7 is a second section structure schematic diagram when a mounting structure of a tap handle in a shower tap is mounted in place according to an embodiment of the present application.

FIG. 8 is a schematic structural diagram of a ball-head connection part of a handle according to an embodiment of the present application.

[0009] Descriptions of main reference numerals:

1 body; 11 first protrusion; 12 third clamping groove; 13 fourth clamping groove;

2 valve core; 20 toggled part; 21 valve body; 211 valve rod; 22 rotating base; 221 rotating shaft; 23 screw;

3 handle; 31 ball-head connection part; 311 toggling part; 3111 rotating groove; 312 plane; 313 threaded hole; 314 dodge groove; 32 operation part;

4 first limiting sleeve; 41 first clamping groove; 42 first notch; 43 second clamping groove;

5 second limiting sleeve; 51 third protrusion; 52 rotation stopping protrusion; 53 inserting connection part; 54 U-shaped opening;

6 elastic cushion.

[0010] DESCRIPTION OF THE EMBODIMENTS

[0010] The technical solutions in the embodiments will be clearly and completely described below with reference to the accompanying drawings.

[0011] Referring to FIG. 1 to FIG. 8, FIG. 1 to FIG. 8 show schematic structural diagrams of a mounting structure of a tap handle according to an embodiment of the present application. As shown in FIG. 1 to FIG. 8, in the embodiment, a tap which the mounting structure of the tap handle is applicable to takes a shower tap used in a shower device as an example, it should be understood that the tap which the mounting structure of the tap handle is applicable to may further be a washbowl tap or a tap

used at other positions, which is not limited by the embodiment.

[0012] In the embodiment, the mounting structure of the tap handle includes a body 1, a valve core 2, a handle 3, a first limiting sleeve 4 and a second limiting sleeve 5.

[0013] The body 1 is round tubular, two ends of which are open; one end of the body 1 is used for a temperature regulating assembly to mount, and the other end is used for an opening and closing assembly to mount. The mounting structure of the tap handle according to the embodiment takes a handle mounting structure of the opening and closing assembly as an example, the valve core 2 driven by the mounting structure adopts a toggling type opening and closing valve core. However, it should be understood that the mounting structure of the tap handle according to the embodiment is applicable to the toggling type opening and closing valve core applied to any scenes, for example, applied to flow channel switching, cold and hot water mixing and other function implementation scenes, which are not specifically limited by the present application.

[0014] The valve core 2 is arranged in the body 1, one end on the valve core 2 to be toggled faces towards the port of a first end of the body 1, and the first end of the body 1 herein refers to one end of the body for the opening and closing assembly to mount. For the valve core 2 in the embodiment, the characteristic of water flow could be changed by providing a valve rod 211 that rotates around a second axis to drive a sealing body in the valve core 2 to generate relative movement, thereby achieving a function of switching the valve core 2 to open and close, wherein the second axis is vertical to an axis of the body, and in actual application, the second axis is also vertical to a wall according to the mounting characteristic of the shower tap and the operation habit of a user.

[0015] The handle 3 is arranged on an end portion of the first end of the body 1 and includes a ball-head connection part 31 and an operation part 32, the ball-head connection part 31 is a sphere or a part of a sphere and rotates around a first axis to toggle the valve core 2 to open and close; the first axis is vertical to the axis of the body, and in actual application, the first axis is also vertical to a wall according to the mounting characteristic of the shower tap and the operation habit of the user; the first axis is parallel to the second axis, thereby ensuring that a rotation direction of the ball-head connection part 31 is consistent with a toggling direction of the valve core; and the operation part 32 stretches out of the body 1 for the user to hold and operate.

[0016] The operation part 32 is detachably and fixedly connected to the ball-head connection part 31; and when the valve core 2 is closed, the operation part 32 extends out of an outer wall of the body 1 in a manner of vertical to the axis of the body 1. In particular, an external thread is formed at one end of the operation part 32, a threaded hole 313 is formed on the ball-head connection part 31, and the threaded connection between the operation part 32 and the threaded hole 313 fulfills the aim of detachable

and fixed connection between the operation part 32 and the ball-head connection part 31.

[0017] For the mounting structure of the tap handle in the embodiment, a mounting structure of the ball-head connection part 31 in the body 1 is mainly introduced. In particular, the ball-head connection part 31 is confined in the body 1 by the first limiting sleeve 4 and the second limiting sleeve 5, the first limiting sleeve 4 is clamped to the inner wall of the body 1 by coaxial relative rotation, and an inner wall surface of the first limiting sleeve 4 is provided with an arc surface matched with the ball-head connection part 4; the second limiting sleeve 5 is coaxially arranged at an end portion of the first end of the body 1 and the ball-head connection part 31 is clamped between the second limiting sleeve 5 and the first limiting sleeve 4; and the second limiting sleeve 5 is detachably and fixedly connected to an inner wall of the body 1 and prevents the first limiting sleeve 4 from separating from the inner wall of the body 1 in the relative rotation by establishing a rotation stopping connection relationship between the second limiting sleeve 5 and the first limiting sleeve 4.

[0018] For the rotary clamping connection between the first limiting sleeve 4 and the body 1, an embodiment is implemented by the following manner: as for the inner wall of the body 1 and an outer wall of the first limiting sleeve 4, one is provided with a first protrusion 11, and the other one is provided with a first notch 42 for the first protrusion 11 to insert into and a first clamping groove 41 for the first protrusion 11 to clamp with; during assembling, after the first protrusion 11 is aligned with the first notch 42, the first limiting sleeve 4 is being inserted into the body 1 until the first protrusion 11 reaches a plane where the first clamping groove 41 locates, the first limiting sleeve 4 is operated to rotate by a certain angle relative to the body 1 to make the first protrusion 11 clamp to the first clamping groove 41, thereby achieving simple structure, easy and convenient operation and excellent limiting strength in the axial direction; and due to the first notch 42, reliable inserting connection between the first limiting sleeve 4 and the body 1 is guaranteed.

[0019] For the rotation stopping connection relationship between the first limiting sleeve 4 and the second limiting sleeve 5, an embodiment is implemented by the following manner: a second clamping groove 43 and a second protrusion are arranged on end faces, opposite to each other, of the first limiting sleeve 4 and the second limiting sleeve 5 correspondingly; the second protrusion is inserted into the second clamping groove 43 to establish the rotation stopping connection relationship between the first limiting sleeve 4 and the second limiting sleeve 5; during assembling, the second limiting sleeve 5 and the body 1 are fixedly connected in place, meanwhile, the second protrusion is inserted into and connected with the second clamping groove 43, that is, a function of preventing a relative rotation between the first limiting sleeve 4 and the second limiting sleeve 5 is realized; the structure is simple, and inserting connection of the sec-

ond protrusion and the second clamping groove 43 is completed synchronously while plugging the second limiting sleeve 5 into the body 1, thereby facilitating operation, assembling and disassembling.

[0020] For the detachably fixed connection relationship between the second limiting sleeve 5 and the body 1, an embodiment is implemented by the following manner: as for an outer wall of the second limiting sleeve 5 and an inner wall of the body 1, one is provided with a third protrusion 51, and the other one is provided with a third clamping groove 12 for the third protrusion 51 to clamp to; a fourth clamping groove 13 and a fourth protrusion are arranged on end faces, opposite to each other, of the body 1 and the second limiting sleeve 5 correspondingly; the fourth protrusion is inserted into the fourth clamping groove 13 to establish the rotation stopping connection between the body 1 and the second limiting sleeve 5; the above limiting relationship in axial direction and in the circumferential direction determines the detachably fixed connection between the second limiting sleeve 5 and the body 1. During assembling, the fourth protrusion is aligned with the fourth clamping groove 13, then the second limiting sleeve 5 is being sleeved in and connected to the body 1 until the third protrusion 51 is embedded into the third clamping groove 12 to be in clamping connection to the third clamping groove 12, when clamping connection is in place, the fourth protrusion is inserted into and connected to the fourth clamping groove 13, thereby realizing fixed connection between the second limiting sleeve 5 and the body 1; and during disassembling, it is only required to pull the second limiting sleeve 5 out of the body 1, thus the structure is simple and the disassembling and assembling are facilitated.

[0021] In the embodiment, the following implementation manner is specifically given for the mounting of the ball-head connection part 31 in the body 1:

two first protrusions 11 opposite to each other are arranged on an inner wall of the body 1; the first protrusions 11 are arc-shaped, and a radian of the first protrusions 11 is matched with a radian of the inner wall of the body 1; and the two first protrusions 11 are located on the same ring and are used for forming a clamping connection with the first limiting sleeve 4 in the axial direction.

[0022] An annular third clamping groove 12 is arranged on the inner wall of the body 1; compared with the first protrusions 11, the third clamping groove 12 is closer to a side of the first end of the body 1 and is used for forming a clamping connection with the second limiting sleeve 5 in the axial direction.

[0023] A fourth clamping groove 13 extending in an axial direction of the body 1 is formed on an end face of the first end of the body 1, and is used for forming a rotation stopping connection with the second limiting sleeve 5.

[0024] An arc-shaped surface matched with a spherical outer wall surface of the ball-head connection part 31 is arranged on an inner wall of the first limiting sleeve 4; a pair of first clamping grooves 41 and a pair of first notch-

es 42 which are back on to each other are arranged on an outer wall of the first limiting sleeve 4; the two first clamping grooves 41 are respectively used for being in clamping connection with the two first protrusions 11; the two first notches 42 are respectively used for the two first protrusions 11 to insert into; in particular, in the embodiment, a part, proximal to a first end of the first limiting sleeve 4, of the outer wall of the first limiting sleeve 4 is concavely provided with the first clamping grooves 41, and the two first notches 42 are formed between the two first clamping grooves 41; during actual assembling, the first limiting sleeve 4 is arranged in the body 1 in a sleeving manner and is being rotated until the two first notches 42 are corresponding to the two first protrusions 11 respectively, the first limiting sleeve 4 is being continuously plugged into an inner side of the body 1 until the two first protrusions 11 arrive at the first clamping grooves 41, and the first limiting sleeve 4 is rotated by 90 degrees, such that the two first protrusions 11 are clamped into the two first clamping grooves 41 respectively, and axial displacement of the first limiting sleeve 4 relative to the body 1 could be limited.

[0025] It should be noted that in the embodiment, the reason why the number of the first protrusions 11 on the body 1 is two and the two first protrusions 11 are arranged oppositely is to obtain a preferable solution for realizing balanced limitation and convenient operation. In fact, the number of the first protrusions 11 is 1 or greater than or equal to 2, and whether the first protrusions 11 are arranged oppositely may be designed according to the actual condition. In addition, the rotary clamping connection relationship between the first limiting sleeve 4 and the inner wall of the body 1 is not limited to the specific implementation manners given in the embodiment. It should be understood that any rotary clamping connection manners capable of limiting the relative position of the first limiting sleeve 4 and the body 1 in the axial direction may be adopted.

[0026] The second clamping groove 43 is arranged on an end face, back on to the valve core 2, of the first limiting sleeve 4, that is, the second clamping groove 43 is arranged on an end face of a second end of the first limiting sleeve 4, and the second clamping groove 43 is used for cooperating with the second limiting sleeve 5 to form a rotation stopping connection, so as to limit the rotation of the first limiting sleeve 4 relative to the body 1, thereby preventing the first limiting sleeve 4 from rotating and disengaging from the clamping connection, and ensuring the stability of the mounting structure of the tap handle.

[0027] The second limiting sleeve 5 includes a clamping connection part and an inserting connection part 53.

[0028] The clamping connection part is of a ring shape and with a second notch; a third protrusion 51 is arranged on an outer wall surface of the clamping connection part; the third protrusion 51 is matched with and in clamping connection with the third clamping groove 12; when the second limiting sleeve 5 is arranged in the body 1 in a sleeving manner, the third protrusion 51 is arranged in

the third clamping groove 12 on the inner wall of the body 1 and is prevented by the third clamping groove 12 from separating from the body 1 in an axial direction of the third clamping groove 12, thereby limiting axial movement of the second limiting sleeve 5 relative to the body 1. In order to improve the stability of the limitation in axial direction, in the embodiment, more than three third protrusions 51 are distributed on an outer wall of the second limiting sleeve 5 circumferentially and evenly. In addition, in order to facilitate disassembling and assembling of the second limiting sleeve 5, two ends, along an axis direction of the second limiting sleeve 5, of each third protrusion 51 are respectively provided with chamfers.

[0029] The inserting connection part 53 is U-shaped; two ends of the inserting connection part 53 are respectively connected to two ends of the second notch; a U-shaped bottom of the inserting connection part 53 extends towards the valve core 2 and is inserted into and connected with the second clamping groove 43 to realize a rotation stopping connection relationship between the first limiting sleeve 4 and the second limiting sleeve 5, and further is clamped to the fourth clamping groove 13 to realize a rotation stopping connection relationship between the second limiting sleeve 5 and the body 1, that is, the inserting connection part 53 forms a second protrusion that is matched and in inserting connection with the second clamping groove 43 and further forms a fourth protrusion that is matched and in clamping connection with the fourth clamping groove 13.

[0030] In the embodiment, when the valve core 2 is closed, the operation part 32 is located in a space enclosed by the second notch and a U-shaped opening 54 of the inserting connection part 53, and the space is also used for dodging the operation part during rotation.

[0031] As can be seen from the structural characteristics of the second limiting sleeve 4, clamping connection between the second limiting sleeve 5 and the body 1 mainly includes the following actions: the third protrusion 51 on the clamping connection part is clamped to and connected with the third clamping groove 12 on the body 1; the inserting connection part 53 on the second limiting sleeve 5 is inserted into and connected with the fourth clamping groove 13 on the body 1 to form inserting connection; and the inserting connection part 53 on the second limiting sleeve 5 is further inserted into and connected with the second clamping groove 43 on the first limiting sleeve 4 to form inserting connection. It can be seen that when the second limiting sleeve 5 is inserted into and connected with the body 1 in place, the inserting connection part 53 mainly realizes the following three functions: a rotation stopping connection relationship with the body 1 is realized in circumferential direction; a rotation stopping connection relationship with the first limiting sleeve 4 is established to limit rotation of the first limiting sleeve 4 relative to the body 1; and the inserting connection part 53 is also used for an operation part to stop. The multiple functions are integrated on the same structure, so the complexity of the structure is reduced, formation of spare

parts is facilitated, manufacturing cost is reduced, the assembly can be completed in one go without too much alignment during assembling, and operation is facilitated.

[0032] It should be noted that in the process of plugging the second limiting sleeve 5 into the body 1, the third protrusion 51 is liable to wear and fail due to the hard cooperation between the third protrusion 51 and the inner wall of the body 1. Therefore, in the embodiment, a certain deformation space is advantageously provided for deformation of the clamping connection part by arranging the second notch on the clamping connection part, such that the third projection 51 on the clamping connection part can pass through the body 1 smoothly and easily and realize clamping connection with the third clamping groove 12, wherein the inserting connection part 53 is connected to the second notch, thereby reasonably utilizing a space at the opening of the clamping connection part, enabling the entire structure of the second limiting sleeve to be smoother, ensuring that not too many notches arranged on the clamping connection part are required, and improving the convenience of assembling and the aesthetic appearance of the structure.

[0033] Preferably, in the embodiment, the number of the second clamping grooves 43 on the first limiting sleeve 4 is two, and the two second clamping grooves 43 are arranged symmetrically; accordingly, the second limiting sleeve is further provided with a rotation stopping protrusion 52 symmetrical with the inserting connection part 53; and the inserting connection part 53 is matched and in inserting connection with one of the second clamping grooves 43, and the rotation stopping protrusion 52 is matched and in inserting connection with the other second clamping groove 43, thus by increasing the number of structures for forming the rotation stopping connection relationship between the first limiting sleeve 4 and the second limiting sleeve 5, the strength of the rotation stopping connection will be advantageously and effectively improved.

[0034] In the mounting structure of the tab handle according to the embodiment, the ball-head connection part 31 of the handle 3 is confined in the body 1 by the first limiting sleeve 4 and the second limiting sleeve 5, which replaces the traditional mounting connection mode of interference fit, such that the disassemble and assemble of the handle 3 is more convenient and the service life of parts is ensured, wherein the first limiting sleeve 4 is arranged on the body 1 in a rotary clamping connection way, which is simple and convenient in disassembling and assembling; during assembling, the first limiting sleeve 4 is clamped in the body 1 in place, then the ball-head connection part 31 is positioned in the body 1, and finally the second limiting sleeve 5 is clamped to and fixed in the body 1 to cooperate with the first limiting sleeve 4, so as to define an axial position of the ball-head connection part 31, assembling convenience and low disassembling difficulty are achieved; meanwhile, in the embodiment, a rotation stopping connection relationship between the second limiting sleeve 5 and the first limiting

sleeve 4 is established to limit rotation of the first limiting sleeve 4 relative to the body 1 and ensure that the first limiting sleeve 4 does not rotate relative to an inner wall of the body 1 and disengage from the clamping connection during the actual use; and the entire mounting structure of the tap handle is simple in structure and convenient to disassemble and assemble, and is beneficial to realizing rapid disassembling and assembling of the ball-head connection part 31 and ensuring the production benefit of the enterprise.

[0035] Referring to FIG. 1 to FIG. 8, FIG. 1 to FIG. 8 show schematic structural diagrams of a mounting structure of a tap handle according to an embodiment of the present application. As shown in FIG. 1 to FIG. 8, the mounting structure of the tap handle is applied to the shower tap, in particular, the shower tap according to the embodiment includes the above-mentioned body 1, valve core 2, handle 3, first limiting sleeve 4, second limiting sleeve 5 and elastic cushion 6.

[0036] The handle 3 is arranged on an end portion of the body 1 via the mounting structure of the handle tap described in the above embodiment.

[0037] The valve core 2 is provided with a toggled part 20, and the toggled part 20 rotates around a second axis relative to the body 1 to switch the valve core 2 to open and close; and the ball-head connection part 31 is provided with a toggling part 311, and the toggling part 311 is used for toggling the toggled part 20.

[0038] In particular, in the embodiment, the valve core 2 includes a valve body 21, a rotating base 22 and a screw 23; the valve body 21 is a valve core body and is provided with a valve rod 211; a rotating shaft 221 is arranged on the rotating base 22; the rotating base 22 is fixedly connected to an end portion of the valve rod 211 by the screw 23, and the rotating base 22 and the valve rod 211 jointly form the toggling part 311; and the rotating shaft 221 is convex columns which are convexly arranged on two sides of the rotating base 22.

[0039] The ball-head connection part 31 is provided with a rotating groove 3111 for the rotating shaft 221 to rotatably and slidably connect with, and is further provided with a dodge groove 314 for dodging the rotating base 22; the rotating groove 3111 is used for rotatable mounting of the rotating shaft 221 and allows the rotating shaft 221 to rotate and radially slide along a rotating plane 312 of the ball-head connection part 31.

[0040] The elastic cushion 6 with a U-shaped structure is fixedly arranged on the ball-head connection part 31, abuts against the toggled part 20 and enables the ball-head connection part 31 to toggle the toggled part 20 all the time in the rotating process; in particular, lengths of two side walls of the elastic cushion 6 are different, a U-shaped bottom of the elastic cushion 6 is fixedly plugged into the dodge groove 314, the longer side wall of the elastic cushion 6 extends into the rotating groove 3111 and matches with a groove wall of the rotating groove 3111 to abut against a side wall of the rotating shaft 221, such that no clearance exists between the rotating shaft

221 and the ball-head connection part 31 for rotation, thus a situation where the handle 3 cannot directly drive the rotating shaft 221 during rotation due to a clearance can be avoided, and the operating hand feeling is improved; and the elastic cushion 6 has elasticity, thus, the existence of the elastic cushion 6 will not affect the rotation of the rotating shaft 221 relative to the ball-head connection part 31.

[0041] In the embodiment, the ball-head connection part 31 is provided with a plane 312, and when the valve core 2 is closed, the plane 312 is flush with an end face of the first end of the body 1, such that the end portion of the body 1 is flat, material cost is reduced and visual aesthetic feeling is improved.

[0042] In the shower tap according to the embodiment, the handle 3 toggles the valve core 2 to open and close by virtue of rotation of the ball-head connection part 31, such that the stroke and range of rotation required by the operation part 32 of the handle 3 is effectively reduced, the rotating part of the handle 3 can be substantially accommodated in the body 1, the integrity, fineness and aesthetic appearance of the body 1 thus are improved; moreover, the mounting structure of the ball-head connection part 31 of the handle 1 on the body 1 is simple, thereby realizing rapid disassembling and assembling; in addition, since the seam between the outer wall of the body 1 and the handle 3 is small, dirt is not easy to hide, cleaning is facilitated and the operating hand feeling of the handle 3 is not affected.

[0043] During actual assembling, the valve core 2 is fixed in the body 1 in place by a locknut, the first limiting sleeve 4 is sleeved in the body 1, the first notch 42 is aligned with the first protrusion 11 during sleeving so as to ensure that the first clamping groove 41 on the first limiting sleeve 4 and the first protrusion 11 can be located on the same circumference when the first limiting sleeve 4 is arranged in the body 1 in place, when the first limiting sleeve 4 cannot further enter into an inner side of the body 1, rotate the first limiting sleeve 4 by 90 degrees, the first protrusion 11 and the first clamping groove 41 form clamping connection, and assembling of the first limiting sleeve 4 is completed; the elastic cushion 6 is fixed in the dodge groove 314 of the ball-head connection part 31; then the ball-head connection part 31 is arranged in the body 1 and a threaded hole 313 on the ball-head connection part 31 is adjusted to be aligned with the fourth clamping groove 13 on the side wall of the body 1; while the inserting connection part 53 is aligned with the fourth clamping groove 13, the second limiting sleeve 5 is plugged into and form clamping connection with the body 1; finally, the operation part 32 is threadedly connected to the ball-head connection part 31 to complete the assembling process. Disassembling may be performed by taking the steps opposite to the above assembling steps.

[0044] In description of the embodiment of the present application, unless otherwise limited, terms "first", "second" or "third", or the like are used to distinguish different

objects and are not used to describe a specific order.

[0045] In description of the embodiment of the present application, unless otherwise limited, direction or position relations indicated by terms "center", "transverse", "longitudinal", "horizontal", "vertical", "top", "bottom", "interior", "exterior", "upper", "lower", "front", "back", "left", "right", "clockwise", "anticlockwise", or the like are based on direction or position relations shown in the accompanying drawings, and are merely for simplifying the description, but not for implying the indicated devices or components must have specific directions or be constructed and operated in specific directions.

[0046] In description of the embodiment of the present application, unless otherwise limited, terms "fixedly connected" or "fixed connection" should be broadly understood, that is, any connection manners without a displacement relationship and a relative rotation relationship between the two, that is, including non-detachably fixed connection, detachably fixed connection, integral connection, and fixed connection by other devices or components.

[0047] In description of the embodiment of the present application, unless otherwise limited, terms "comprise", "include" and variations thereof mean "including, but not limited to".

[0048] The foregoing description of the description and the embodiments are used to explain the protection scope of the application, but do not constitute a limitation to the protection scope of the application.

Claims

1. A mounting structure of a tap handle comprising a body (1) in round tubular shape, a valve core (2) and a handle (3), the handle (3) comprises a ball-head connection part (31) and is arranged on an end portion of a first end of the body (1), the valve core (2) is located in the body (1), the ball-head connection part (31) rotates around a first axis to toggle the valve core (2) to open and close, and the first axis is vertical to an axis of the body (1), **characterized in that** the mounting structure of the tap handle further comprises:
a first limiting sleeve (4), the first limiting sleeve (4) being clamped to the inner wall of the body (1) by coaxial relative rotation, and an inner wall surface of the first limiting sleeve (4) being provided with an arc surface matched with the ball-head connection part (31); a second limiting sleeve (5), the second limiting sleeve (5) being coaxially arranged on the end portion of the first end of the body (1) and clamping the ball-head connection part (31) between the second limiting sleeve (5) and the first limiting sleeve (4); the second limiting sleeve (5) being detachably and fixedly connected to an inner wall of the body (1) and preventing the first limiting sleeve (4) from separating from the inner wall of the body (1) in the relative ro-

tation by establishing a rotation stopping connection relationship between the second limiting sleeve (5) and the first limiting sleeve (4).

2. The mounting structure of the tap handle according to claim 1, **characterized in that** as for the inner wall of the body (1) and an outer wall of the first limiting sleeve (4), one is provided with a first protrusion (11), and the other one is provided with a first notch (42) for the first protrusion (11) to insert into and a first clamping groove (41) for the first protrusion (11) to clamp with.
3. The mounting structure of the tap handle according to claim 1, **characterized in that** end faces, opposite to each other, of the first limiting sleeve (4) and the second limiting sleeve (5) are correspondingly provided with a second clamping groove (43) and a second protrusion; and the second protrusion is inserted into and connected with the second clamping groove (43) to establish the rotation stopping connection relationship.
4. The mounting structure of the tap handle according to claim 1, **characterized in that** as for an outer wall of the second limiting sleeve (5) and the inner wall of the body (1), one is provided with a third protrusion (51), and the other one is provided with a third clamping groove (12) for the third protrusion to clamp with; and
end faces, opposite to each other, of the body (1) and the second limiting sleeve (5) are correspondingly provided with a fourth clamping groove (13) and a fourth protrusion; and the fourth protrusion is inserted into and connected with the fourth clamping groove (13) to establish a rotation stopping connection relationship between the body (1) and the second limiting sleeve (5).
5. The mounting structure of the tap handle according to claim 1, **characterized in that** an end face, back on to the valve core, of the first limiting sleeve (4) is provided with the second clamping groove (43); an inner wall surface of the body (1) is provided with the third clamping groove (12); an end face of the first end of the body (1) is provided with the fourth clamping groove (13);
the second limiting sleeve (5) comprises a clamping connection part and an inserting connection part (53); the clamping connection part is of a ring shape and with a second notch, and an outer wall surface of the clamping connection part is provided with a third protrusion (51); the third protrusion (51) is matched and in clamping connection with the third clamping groove (12); the inserting connection part (53) is U-shaped, two ends of the inserting connection part (53) are connected to two ends of the second notch respectively, and a U-shaped bottom of

the inserting connection part (53) extends toward a side of the valve core (2) and is inserted into and connected with the second clamping groove (43) to establish the rotation stopping connection relationship and is inserted into and connected with the fourth clamping groove (13) to establish a rotation stopping connection relationship between the second limiting sleeve (5) and the body (1);

the handle (3) further comprises an operation part (32) in straight-bar shape; the operation part (32) is detachably and fixedly connected to the ball-head connection part (31); and when the valve core (2) is closed, the operation part (32) extends out of the outer wall of the body (1) in a manner of vertical to the axis of the body (1), and is located in a space enclosed by the second notch and a U-shaped opening (54) of the inserting connection part (53).

6. A shower tap, **characterized in that** the handle (3) is arranged on an end portion of the body (1) by the mounting structure of the handle tap according to any one of claims 1 to 5.
7. The shower tap according to claim 6, **characterized in that** the valve core (2) is provided with a toggled part (20); the toggled part (20) rotates around a second axis relative to the body (1); the second axis is parallel with the first axis; the ball-head connection part (31) is provided with a toggling part (311) for toggling the toggled part (20).
8. The shower tap according to claim 7, **characterized in that** the toggled part (20) is provided with a rotating shaft (221); the rotating shaft (221) is parallel with the second axis; and the toggling part (311) is provided with a rotating groove (3111) for rotary mounting of the rotating shaft (221).
9. The shower tap according to claim 8, **characterized in that** the valve core (2) comprises a valve body (21) and a rotating base (22), the valve body (21) is provided with a valve rod (211), the rotating base (22) is fixedly connected to the valve rod (211) to form the toggled part (20), and the rotating shaft (221) is arranged on the rotating base (22).
10. The shower tap according to claim 9, **characterized by** further comprising an elastic cushion (6), the elastic cushion (6) is fixedly arranged on the ball-head connection part (31) and abuts against the toggled part (20), and enables the ball-head connection part (31) to toggle the toggled part (20) all the time in the rotating process.
11. The shower tap according to claim 7, **characterized in that** the ball-head connection part (31) is provided with a plane (312), when the valve core (2) is closed, the plane (312) is flush with the end face of the first

end of the body (1).

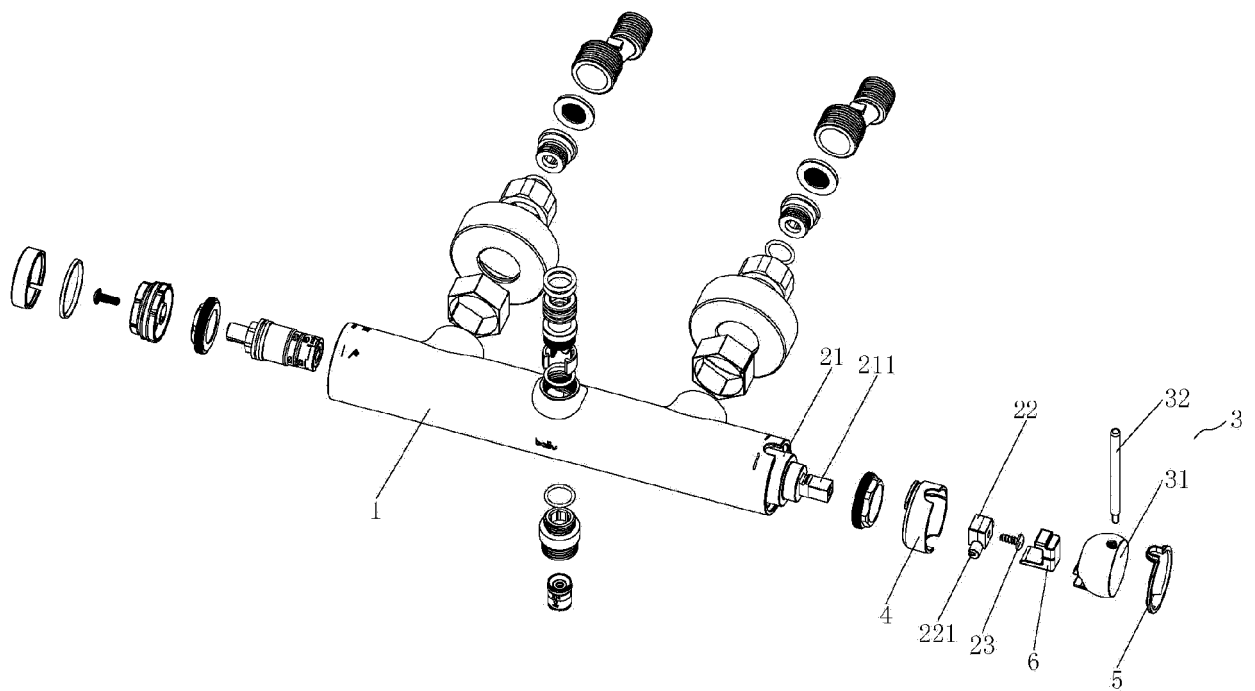


Fig. 1

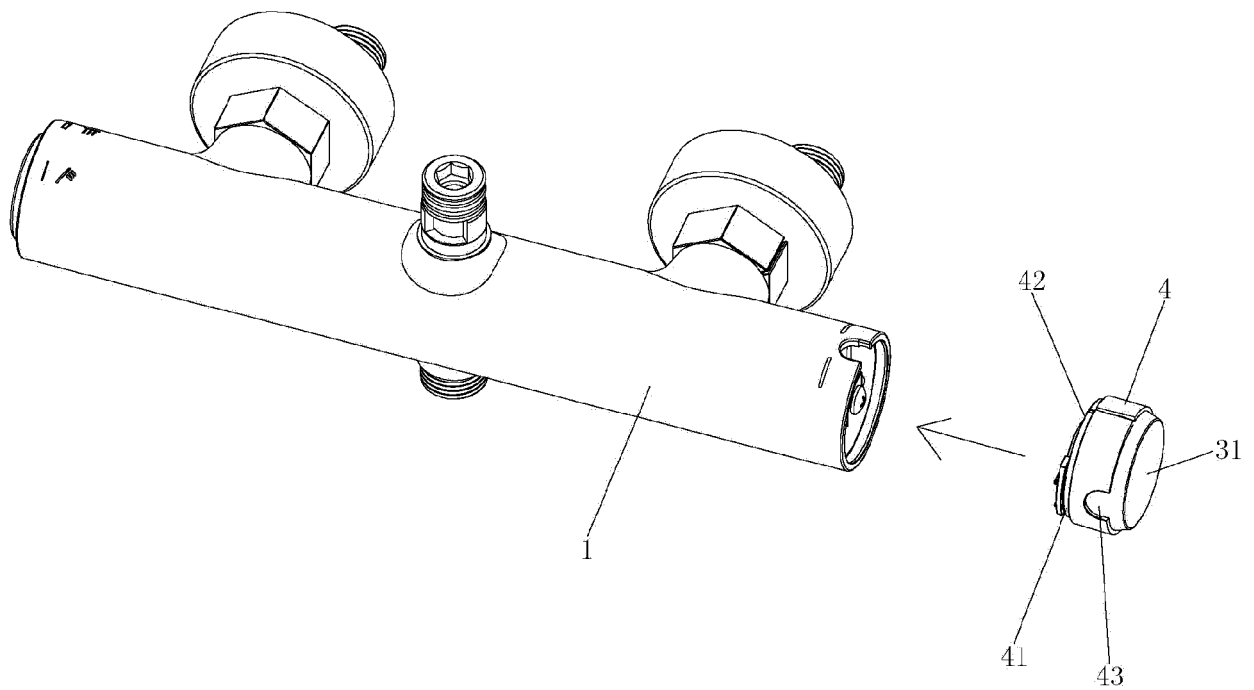


Fig. 2

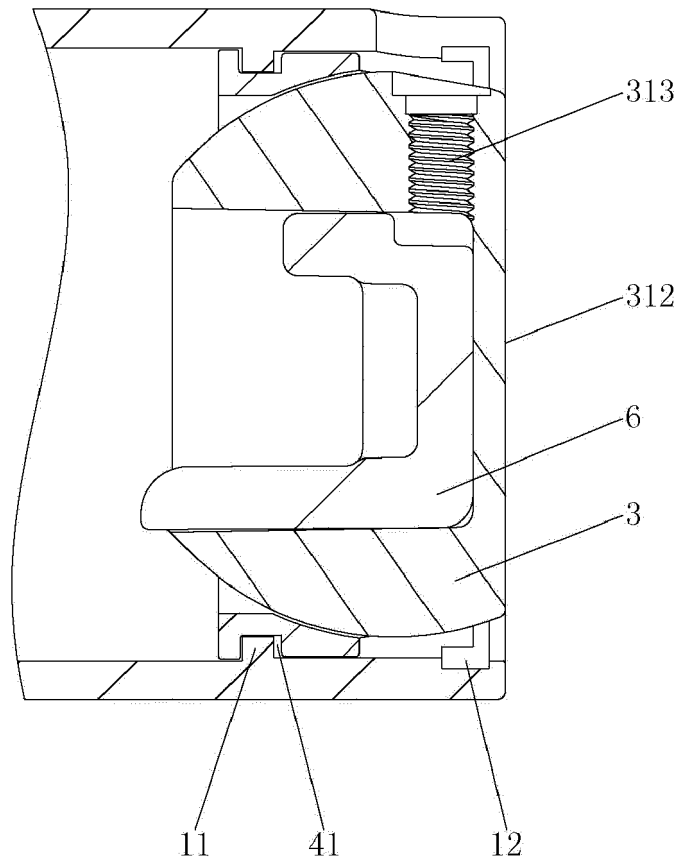


Fig. 3

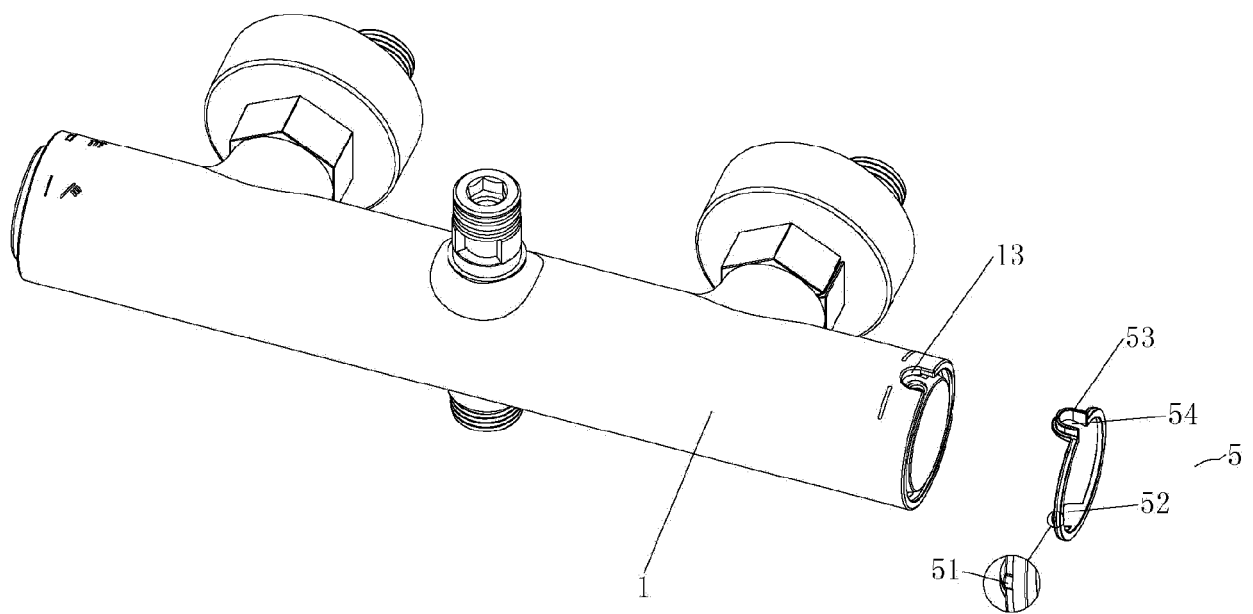


Fig. 4

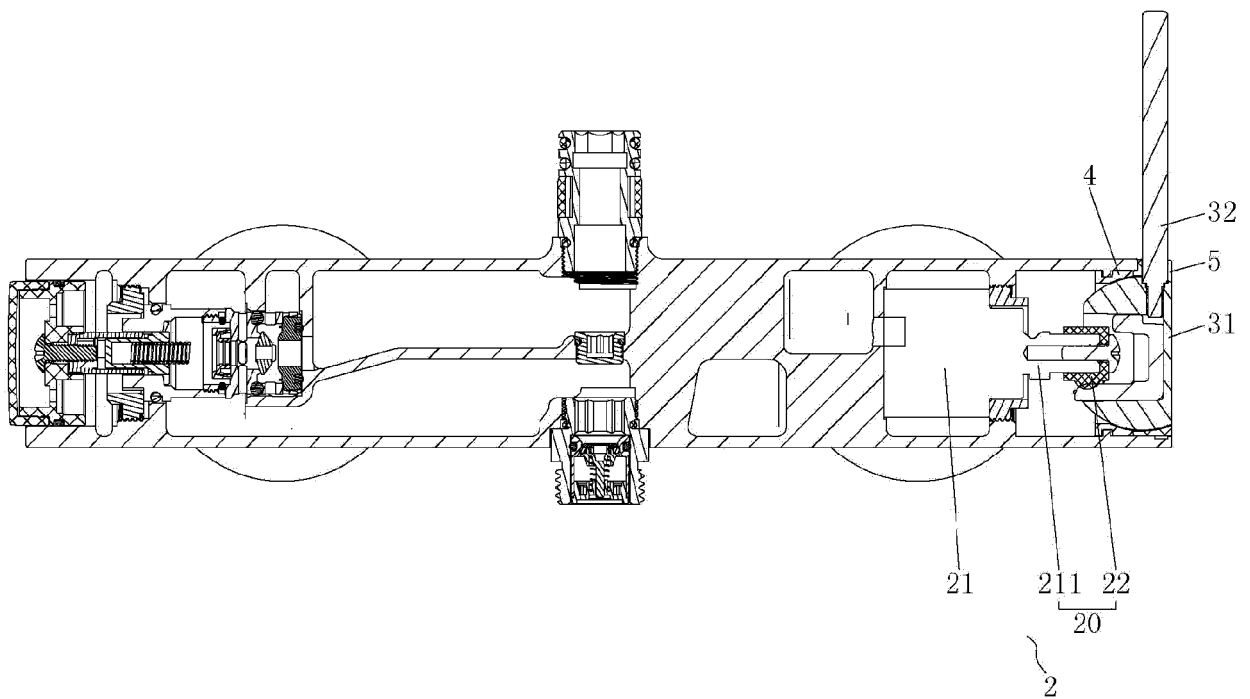


Fig. 5

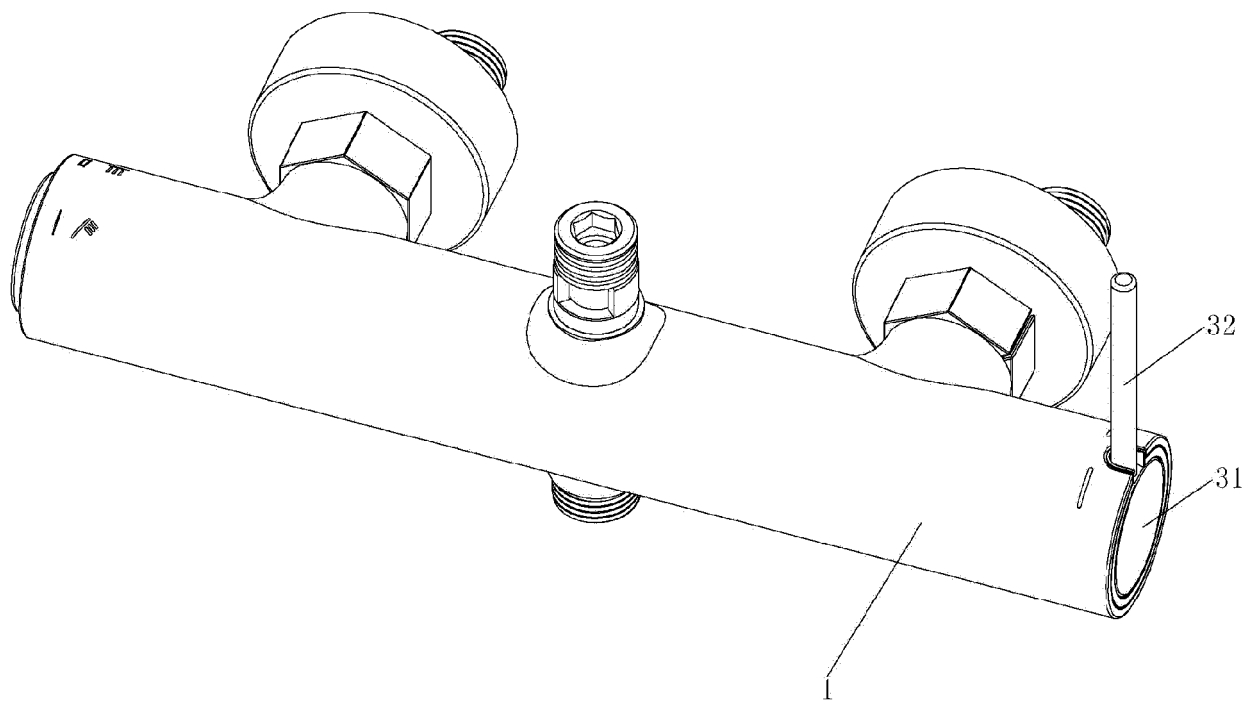


Fig. 6

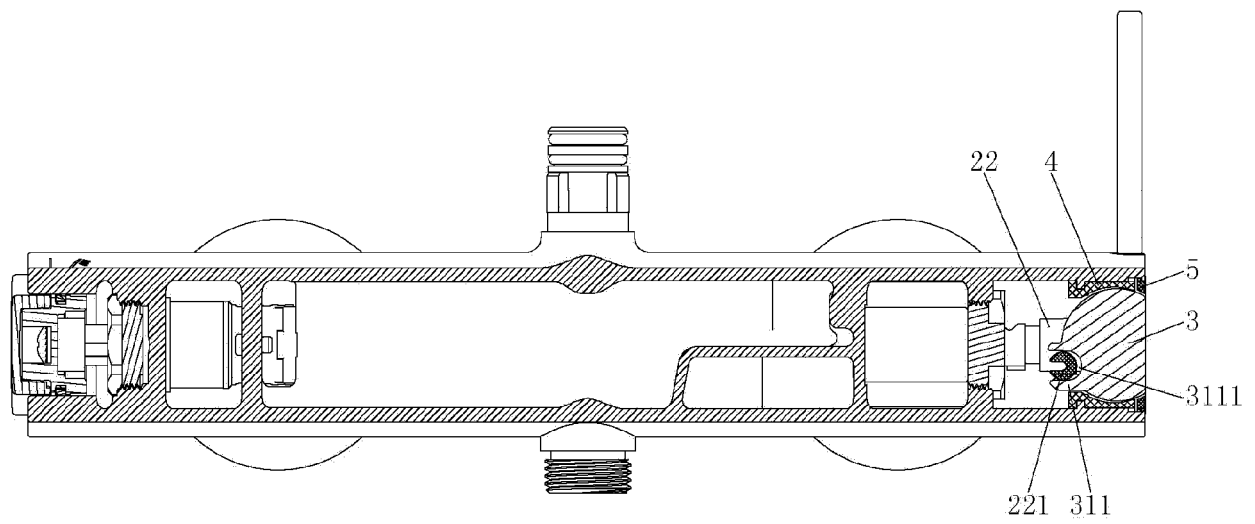


Fig. 7

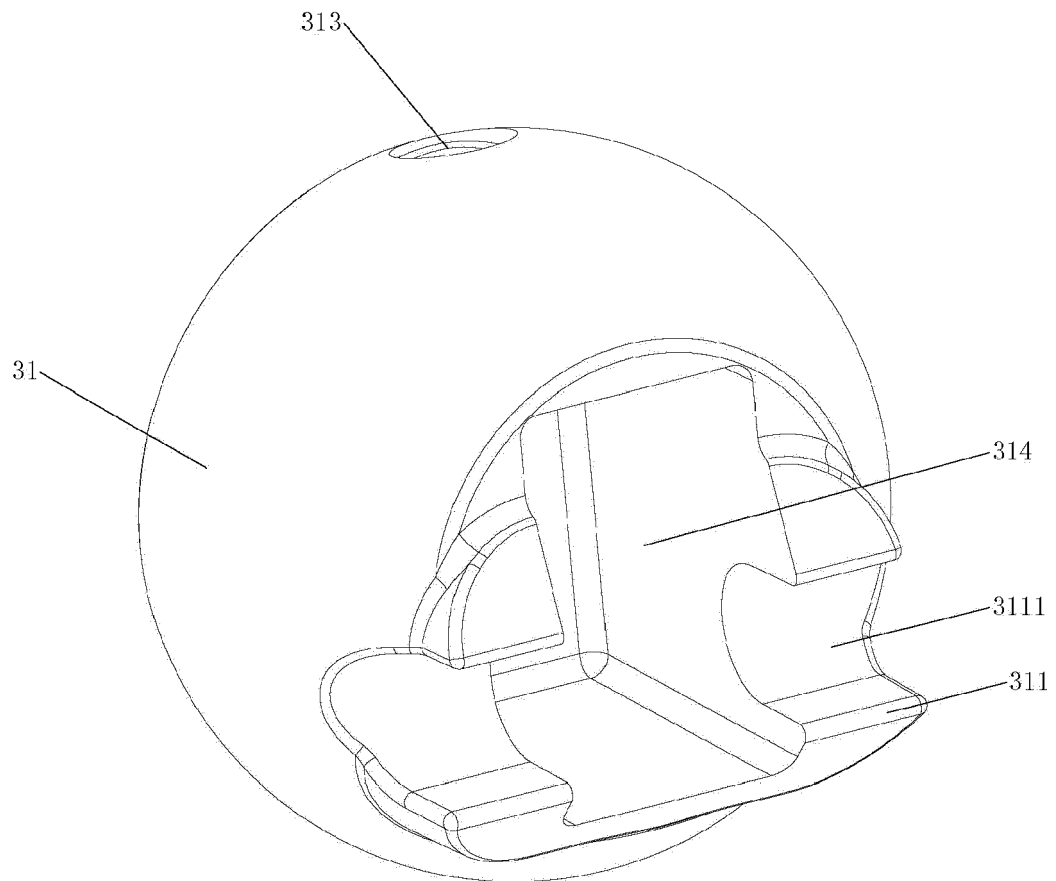


Fig. 8



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 21 2869

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2018/195258 A1 (IENTILE JOSEPH JOHN [US] ET AL) 12 July 2018 (2018-07-12) * the whole document *	1-11	INV. E03C1/04
A	US 2016/208464 A1 (DEVRIES ADAM M [US]) 21 July 2016 (2016-07-21) * the whole document *	1-11	
A	DE 101 38 304 A1 (GROHE ARMATUREN FRIEDRICH [DE]) 27 February 2003 (2003-02-27) * the whole document *	1	
A	EP 2 092 227 A1 (KOHLE CO [US]) 26 August 2009 (2009-08-26) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 May 2021	Examiner Horst, Werner
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 1
 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 21 2869

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-05-2021

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018195258 A1	12-07-2018	US 2018195258 A1	12-07-2018
		WO 2018129473 A1	12-07-2018
US 2016208464 A1	21-07-2016	CA 2916367 A1	16-07-2016
		US 2016208464 A1	21-07-2016
DE 10138304 A1	27-02-2003	NONE	
EP 2092227 A1	26-08-2009	AT 552455 T	15-04-2012
		AU 2007328415 A1	12-06-2008
		CA 2671161 A1	12-06-2008
		CN 101548124 A	30-09-2009
		CN 102330840 A	25-01-2012
		EP 2092227 A1	26-08-2009
		RU 2009125584 A	20-01-2011
		US 2008128035 A1	05-06-2008
		US 2009056821 A1	05-03-2009
		WO 2008069869 A1	12-06-2008