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

(11) EP 2 719 840 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.04.2014 Bulletin 2014/16

(51) Int Cl.:
E03C 1/02 *(2006.01)*

(21) Application number: **13187811.8**

(22) Date of filing: **09.10.2013**

(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

(30) Priority: **09.10.2012 TW 101219567**

(71) Applicant: **Shang der Lih Company Co., Ltd.**
Taoyuan City, Taoyuan Country (TW)

(72) Inventors:
- **Chen, Chien-Yuen**
  Taoyuan City, Taoyuan Country (TW)
- **Chen, Chien-Cheng**
  Taoyuan City, Taoyuan Country (TW)

(74) Representative: **Gallego Jiménez, José Fernando**
Ingenias Creaciones, Signos e Invenciones S.L.P.
Avda. Diagonal 421, 2
08008 Barcelona (ES)

(54) Water faucet with function of noise reduction and pressure adjustment

(57) A water faucet with function of noise reduction and pressure adjustment, comprising an adjusting element (1) including a guiding pipe (11) and a water valve (12), wherein the guiding pipe is formed with a flowing channel (111) that runs through the both sides of the guiding pipe, and the guiding pipe is formed with a assembling opening (112) perpendicular to the periphery of the guiding pipe, and is connected with the flowing channel, and the water valve is installed in the guiding pipe by inserted into the flowing channel through the assembling opening; a outflowing element (2), which is located at the adjusting element where the flowing channel is gradually reduced, is connected with the flowing channel, wherein a outflowing unit is assembled with the outflowing element by the side opposite to the side screwed to the adjusting element.

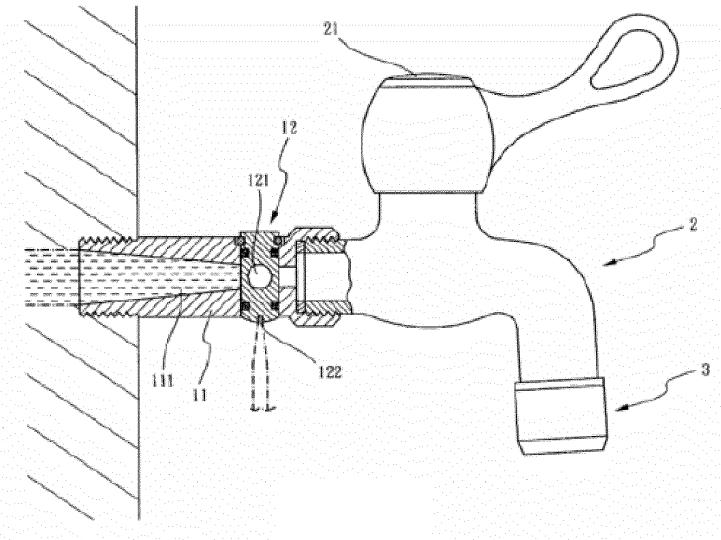

FIG. 2

EP 2 719 840 A2

Description

FIELD OF THE INVENTION

[0001] The present invention relates a water faucet with function of noise reduction and pressure adjustment, and more particularly, to a water faucet having function of noise reduction and pressure adjustment that prevents the resonance in a pipeline occurred due to the vibration of water flowing therein.

BACKGROUND OF INVENTION

[0002] With the progress of the technology, people develop more water sources and better water storage methods, i.e., such as well digging and dam constructing in response to the requests of life living needed. Nowadays, a water storage place is allocated in a higher location for supplying water to a house as a water supplying scheme with convenience, in which a pipeline is used for transporting water. As water is supplied to the house, people can regulate water flow by opening or closing a water faucet installed in the house. With the trend of energy saving, many water faucets used at home have been manufactured with a function of water adjustment.

[0003] A conventional water adjusting device can be found in a Taiwan patent No. 026242, entitled as "Integrated ball valve water faucet", generally comprising a ball valve, a flow control lever, a stable block, a leak proof ring, a reinforcement ring, and an integrated shell as a cover for covering these elements. The ball valve has an opening and is linked with the flow control lever so that the ball valve can be rotating while the flow control lever is manipulated. The fluid is flowing out from the tube opening when the ball valve opening is in a position facing toward the tube opening, and the fluid is stopped when the lateral side without the opening of the ball valve is in a position facing toward the tube opening. Thus, the flow control lever and the ball valve are operated for opening, closing, and adjusting the water flow.

[0004] However, although the conventional ball valve has the functions of opening, closing and adjusting the water flow, it is found that the vibration of water flow will generate vigorous resonance in the pipeline and it will result a noise not only annoying a user, but also leading to hearing impairment. Because of these drawbacks, the water faucet needs to be further improved.

[0005] In view of said drawbacks of the conventional water adjusting equipment, the inventor spends a lot of time in researching, creating, and testing to invent "a water faucet with function of noise reduction and pressure adjustment" of the present invention. It has improved defects as found in the conventional faucet that is incapable of adjusting flowing amount and pressure efficiency as leading that the excessive vibration of flowing water will cause resonance in the pipeline.

SUMMARY OF THE INVENTION

[0006] An object of the present invention is for improving defects of the conventional technique that the flowing pressure and the water adjustment can not be well operated as leading the resonance of noise occurred in the pipeline due to the vibration of water flowing therein.

[0007] To achieve the object, the present invention provides a water faucet with function of noise reduction and pressure adjustment comprising an adjusting element including a guiding pipe and a water valve, wherein the guiding pipe is formed with a flowing channel that runs through both sides of the guiding pipe, and the inner diameter of the flowing channel is gradually decreased from one side of the guiding pipe to the other side thereof, the guiding pipe for controlling the amount of water flowing through the flowing channel is provided with an assembling opening perpendicular to a periphery surface of the guiding pipe in a status that the assembling opening is connected with the flowing channel, and the water valve is installed in the guiding pipe by inserted the water valve into the flowing channel through the assembling opening to thus regulate flow of the flowing channel; it also comprising an outflowing element connecting between the adjusting element and a outflow connecting unit, wherein the outflowing element is connected with one end, whose inner diameter of the flowing channel is smaller than the inner diameter of the other end, of the adjusting element.

[0008] The multifunction water faucet according to the present invention further comprises technique features described below:

[0009] The water valve channel and on one side of the water valve formed with a position-controlling notch provided for turning a direction of the water valve to either a position that the water valve channel is connected with the flowing channel or a position that the water valve channel blocks the communication with the flowing channel, a fastening ring is fastening the water valve on a side opposite to the side that the position-controlling notch is provided, and the outflowing element has a controlling unit for opening, closing and adjusting the flowing amount of water.

[0010] The controlling unit is a single handle type switch or a crisscross type.

[0011] It is further comprising a connecting element (5) for connecting the outflowing element (2) and the outflow connecting unit (3), wherein the connecting element is formed with a through hole whose inner wall in one end of the through hole is provided with an internal threaded portion and a concave stepper extendedly jointing the threaded portion, and an external threaded portion provided in the other end of the through hole, wherein the internal threaded portion of the connecting element is screwed to fasten the outflowing element (2), and the external threaded portion of the connecting element is screwed to fasten the outflow connecting unit.

[0012] The outflow connecting unit includes a washer,

a throttle and a covering part, one end of the covering part is assembled with the outflowing element, and the covering parts is formed within a hole(331) for receiving the washer and the throttle in a way that the washer is between the outflow connecting unit (3) and the throttle.

[0013] The outflow connecting unit includes a washer, a throttle and a covering part, one end of the covering part is screwed to fasten the external threaded portion of the connecting element, and the covering parts is formed within a hole (331) for receiving the washer and the throttle in a way that the washer is between the outflow connecting unit (3) and the throttle.

[0014] The outflow connecting unit (3) is a rubber hose connector whose one end is screwed to fasten the outflowing element (2), and the other end is connected with a hose, and a sealing ring is supplied between the rubber hose connector and the outflowing element.

[0015] The outflow connecting unit (3) is a rubber hose connector whose one end is screwed to fasten the external threaded portion of the connecting element (5), and the other end is connected with a hose, and a sealing ring is supplied between the rubber hose connector and the connecting element.

[0016] The outflow connecting unit (3) is a lengthwise joint whose two ends are respectively provided with a fastening portion and a outflow connecting unit, the exit direction of the fastening portion and the exit direction of the outflow connecting unit are opposite, and the fastening portion is fastened to the outflowing element (2), and a sealing unit is supplied between the fastening portion and the outflow connecting unit.

[0017] The outflow connecting unit (3) is a lengthwise joint whose two ends are respectively provided with a fastening portion and a outflow connecting unit, the exit direction of the fastening portion and the exit direction of the outflow connecting unit are opposite, and the fastening portion is fastened to the external threaded portion of the connecting element (5), and a sealing unit is supplied between the fastening portion and the outflow connecting unit.

[0018] The adjusting element and the outflowing element are integrally formed or are fastened in a way of screw fastening.

[0019] According to the present invention, the water faucet with function of noise reduction and pressure adjustment as described above can reduce the resonance of a noise in the pipeline, and provides the convenience that a user can replace different water facility for different purposes as well.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG.1 is a three-dimensional diagram according to the present invention.

FIG.2 is a cross-sectional diagram that illustrates a close status between the water valve channel and the flowing channel according to the present invention.

FIG.3 is a cross-sectional diagram that illustrates a partial opening status between the water valve channel and the flowing channel according to the present invention.

FIG.4 is a cross-sectional diagram that illustrates a full opening status between the water valve channel and the flowing channel according to the present invention.

FIG.5 is three-dimensional exploded diagram according to the present invention.

FIG.6 is a three-dimensional exploded diagram according to a second embodiment of the present invention.

FIG.7 is three-dimensional exploded diagram according to the third embodiment of the present invention.

FIG.8 is three-dimensional diagram illustrating a crisscross type as a controlling unit in the present invention.

FIG.9 is three-dimensional exploded diagram illustrating that the outflowing element and adjusting element are integrated formed in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] To clearly illustrate the object and effect of the present invention, the following description is explained with reference to FIGs. 1, 2, 3 and 4, in which a water faucet with function of noise reduction and pressure adjustment in the present invention comprising an adjusting element (1) including a guiding pipe (11) and a water valve (12), wherein the guiding pipe (11) is formed with a flowing channel (111) that runs through both sides of the guiding pipe (11) and the inner diameter of the flowing channel (111) is gradually decreased from one side of the guiding pipe (11) to the other side thereof, the guiding pipe (11) for controlling the amount of water flowing though the flowing channel (111) is provided with an assembling opening (112) perpendicular to a periphery surface of the guiding pipe (11) in a status that the assembling opening (112) is connected with the flowing channel (111), and the water valve (12) is installed in the guiding pipe (11) by inserted the water valve (12) into the flowing channel (111) through the assembling opening (112) to thus regulate flow of the flowing channel (111). The present invention further comprises an outflowing element (2) connecting between the adjusting element (1) and a outflowing unit (3), wherein the outflowing element (2) is connected with one end, whose inner diameter of the flowing channel (111) is smaller than the inner diameter of the other end, of the adjusting element (1).

[0022] In the present invention, the noise caused by resonance in the pipeline can be reduced by providing a gradually reducing width of flowing channel (111) and enabling the water valve (12) to regulate the water

amount that flows through the outflowing element (2).

The above is a main embodiment of the present invention that is embodied with the essential technical features as defined in claim 1. The other claims that depend on claim 1 define other added technical features. These claims should not be deemed as a limitation of claim 1.

[0023] Please further refer to FIG. 5. For efficiently use the water valve (12) to regulate water amount flowing through the outflowing element (2), the water valve (12) is formed with a water valve channel (121) that flows through the water valve (12). On a side of the water valve (12) is formed with a position-controlling notch (122) for turning a direction of the water valve (12) to either a position that the water valve channel (121) is connected with the flowing channel (111) or a position that the water valve channel (121) blocks the communication with the flowing channel (111). A fastening ring (123) is for fastening the water valve (12) on a side opposite to the side that the position-controlling notch (122) is provided, and the outflowing element (2) has a controlling unit (21) for opening, closing and adjusting the water flow. In a preferred embodiment, to prevent from being touched or moved by children, the position-controlling notch (122) is preferably placed at bottom side of water valve (12). In addition, for ensuring that water valve (12) will not get loosed with the guiding pipe (11) while the water valve (12) is turned, the water valve (12) is provided with a fastening ring (123) fastened on the side opposite to the side that the position-controlling notch (122) is formed. The outflowing element (2) has a controlling unit (21) for regulating the water flow by means of switching.

[0024] Please refer to FIG. 2, 3 and 4. For reducing the noise of resonance in the pipeline that is caused by the vibration of flowing water, the position-controlling notch (122) is inserted and withstood by a hard material object for controlling the turning movement of the position-controlling notch (122). The water valve channel (121) formed in the water valve (12) will be rotated in relation to the connected flowing channel (111) in a gradual manner to thus reduce the resonance in the pipeline. Furthermore, because the connecting space between the water valve channel (121) and the flowing channel (111) is required to be adjusted, the flowing channel (111) is form with a gradual narrowing inner diameter so that the water flow will firstly flow through the narrowed flowing channel (111) before reaching the water valve channel (121) of the water valve (12). Therefore, it prevents the occurrence that strong flowing water flows over the outflowing element (2) so that the vibrating effect of the water flow or water pressure that is too strong will be avoided.

[0025] A conventional water faucet is usually provided with a sole water output in one end. The present invention provides different types of water output for a user by means that the outflowing unit (3) can be replaced by different modules with different function as described in the follow.

The first embodiment. Please refer to FIGs. 1 and 2. For sake of water conservation, the outflowing unit (3) includes a washer (31), a throttle (32) and a covering part (33). One end of the covering part (33) is assembled with the outflowing element(2), and the covering part (33) is formed with a hole (331) for receiving the washer (31) and the throttle (32) in a way that the washer (31) is between the outflowing unit (3) and the throttle (32). The throttle (32) is provided with several portholes (321) for dispersing water flow for water saving. The washer (31) is supplied within the hole (331) and is located between the throttle (32) and the outflowing element (2). The covering part (33) is fixed to outflowing element (2) by way of screwing. The washer (31) is supplied to prevent water flow splashing out from the screwed portion between the covering part (33) and the outflowing element (2). The screwing between the covering part (33) and the outflowing element (2) in the embodiment is only an example but not for limiting the present invention..

[0026] The second embodiment. Please refer to FIG. 6. In a case that it needs to direct the water flow to a distanced place, there may needs a peripheral hose element peripheral hose element (4), such as a hose, a rubber hose and so on, for guiding the water flow. In the present invention, the outflowing connecting unit (3) is a rubber hose connector (34). One end of the rubber hose connector (34) is screwed to a fastening portion (341) of the outflowing unit (3), and the other end thereof is a inserting portion (342) for being inserted with the peripheral hose element (4). The inner diameter of inserting portion (342) is gradually decreased form one end of the fastening portion (341) to the other, so that a user can conveniently insert the peripheral hose element (4) to the inserting portion (342). A sealing ring (343) is placed within the fastening portion (341) of the rubber hose connector (34). One side of the sealing ring (343) is withstanding against the outflowing element (2), and the other side thereof is withstanding against the fastening portion (341). By means of the replacement of the rubber hose connector (34), a user can guide the water flow to the distanced place. In the present invention, the assembling between the rubber hose connector (34) and the outflowing element (2) is implemented by means of screwing, but it not for limiting the present invention.

[0027] The third embodiment. Please refer to FIG. 7. In a case that the faucet is placed in a higher location, for preventing a splash of water flow when the water flows out from the outflowing element (2), the outflowing unit (3) is a lengthwise joint (35) with an "N" shape. The lengthwise joint (35) is formed with a fastening portion (351) at one side and a outflow connecting unit (352) at the other. The fastening portion (351) and outflow connecting unit (352) are extended perpendicular to the lengthwise joint (35) in a direction that the exiting direction of the fastening portion and the exit direction of the outflow connecting unit are opposite to each other. The fastening portion (351) is screwed to the outflowing element (2) in a side that is opposite to the side that the adjusting element (1) and outflowing element (2) are screwed. For preventing the water flow splashing out from the fasten-

ing portion (351) and the outflowing element (2), a sealing unit (353) is placed within the fastening portion (351). One side of the sealing unit is withstood by the outflowing element (2), and the other side thereof is withstood by the fastening portion (351) to thus prevent water flow from splashing out from the fastening portion (351) and the outflowing element (2). The lengthwise joint (35) is provided to lower the height that the water flow is flowing out. The lengthwise joint (35) and outflowing element (2) are assembled by means of screwing, but it is not for limiting the present invention..

[0028] According to the three embodiments as described above, in addition to screwing the outflowing unit (3) directly to the outflowing element (2), as referring to FIG. 6, a connecting element (5) is further provided to connect the outflowing element (2) and the outflowing unit (3). Here, the second embodiment is taken as an example, and the connecting manners of the connecting element (5) in the other two embodiments are the same, so the description thereof is skipped. The connecting element (5) is formed with a through hole (51). The inner wall of one end of the through hole (51) is formed with an internal threaded portion (511), and a concave stepper (512) is formed adjacent to the internal threaded portion (511). The internal threaded portion (511) of connecting element (5) is screwed to the outflowing element (2), and the outflowing element (2) is withstood by the concave stepper (512). An external threaded portion (513) is formed at the outer wall of the connecting element (5), and the internal threaded portion (511) is screwed to the outflowing unit (3), and the outflowing unit (3) is screwed to the external threaded portion (513). The connecting element (5) is used for elongating the length of the outflowing unit (3) for further restricting the flowing amount.

[0029] People becomes paying more attention to visual enjoyment with the progress of times. The present invention not only provides different faucets in functionality, but also provides variety ones in visual effect. Please refer to FIG. 1 and FIG. 8. The controlling unit (21) is a single handle type switch or a crisscross type switch in combination of different styles of outflowing unit (3) or in combination of a faucet installed with the connecting element (5), but not for limiting to this. Please refer to FIG. 9. The outflowing element (2) and adjusting element (1) can be intergraded or assembled by mean of screwing.

[0030] The above is for describing preferable embodiments of the presented invention, but not for limiting the present invention. Therefore, a person skilled in the art may make various modifications to the present invention. Those modifications still fall within the spirit and scope defined by the appended claims.

Claims

1. A water faucet with function of noise reduction and pressure adjustment, comprising:

   an adjusting element including a guiding pipe and a water valve, wherein the guiding pipe is formed with a flowing channel that runs through both sides of the guiding pipe, and the inner diameter of the flowing channel is gradually decreased from one side of the guiding pipe to the other side thereof, the guiding pipe for controlling the amount of water flowing through the flowing channel is provided with an assembling opening perpendicular to a periphery surface of the guiding pipe in a status that the assembling opening is connected with the flowing channel, and the water valve is installed in the guiding pipe by inserted the water valve into the flowing channel through the assembling opening to thus regulate flow of the flowing channel; and

   an outflowing element connecting between the adjusting element and a outflowing unit, wherein the outflowing element is connected with one end, whose inner diameter of the flowing channel is smaller than the inner diameter of the other end, of the adjusting element.

2. A water faucet of claim 1, wherein the water valve is formed with a water valve channel and on one side of the water valve formed with a position-controlling notch provided for turning a direction of the water valve to either a position that the water valve channel is connected with the flowing channel or a position that the water valve channel blocks the communication with the flowing channel, a fastening ring is fastening the water valve on a side opposite to the side that the position-controlling notch is provided, and the outflowing element has a controlling unit for opening, closing and adjusting the flowing amount of water.

3. A water faucet of claim 2, wherein the controlling unit is of a single handle type or a crisscross type.

4. A water faucet as claimed in any one of claims 1 to 3, further comprising a connecting element (5) for connecting the outflowing element (2) and the outflow connecting unit (3), wherein the connecting element is formed with a through hole whose inner wall in one end of the through hole is provided with an internal threaded portion and a concave stepper extendedly jointing the threaded portion, and an external threaded portion provided in the other end of the through hole, wherein the internal threaded portion of the connecting element is screwed to fasten the outflowing element (2), and the external threaded portion of the connecting element is screwed to fasten the outflow connecting unit.

5. A water faucet as claimed in any one of claims 1 to 3, wherein the outflow connecting unit includes a washer, a throttle and a covering part, one end of

the covering part is assembled with the outflowing element, and the covering parts is formed within a hole for receiving the washer and the throttle in a way that the washer is between the outflow connecting unit (3) and the throttle.

6. A water faucet of claim 4, wherein the outflow connecting unit includes a washer, a throttle and a covering part, one end of the covering part is screwed to fasten the external threaded portion of the connecting element, and the covering parts is formed within a hole for receiving the washer and the throttle in a way that the washer is between the outflow connecting unit (3) and the throttle.

7. A water faucet as claimed in any one of claims 1 to 3, wherein the outflow connecting unit (3) is a rubber hose connector whose one end is screwed to fasten the outflowing element (2), and the other end is connected with a hose, and a sealing ring is supplied between the rubber hose connector and the outflowing element.

8. A water faucet of claim 4, wherein the outflow connecting unit (3) is a rubber hose connector whose one end is screwed to fasten the external threaded portion of the connecting element (5), and the other end is connected with a hose, and a sealing ring is supplied between the rubber hose connector and the connecting element.

9. A water faucet as claimed in any one of claims 1 to 3, wherein the outflow connecting unit (3) is a lengthwise joint whose two ends are respectively provided with a fastening portion and a outflow connecting unit, the exit direction of the fastening portion and the exit direction of the outflow connecting unit are opposite, and the fastening portion is fastened to the outflowing element (2), and a sealing unit is supplied between the fastening portion and the outflow connecting unit.

10. A multifunction water faucet as claim 4, wherein the outflow connecting unit (3) is a lengthwise joint whose two ends are respectively provided with a fastening portion and a outflow connecting unit, the exit direction of the fastening portion and the exit direction of the outflow connecting unit are opposite, and the fastening portion is fastened to the external threaded portion of the connecting element (5), and a sealing unit is supplied between the fastening portion and the outflow connecting unit.

11. A water faucet of claim 1, wherein the adjusting element and the outflowing element are integrally formed or are fastened in a way of screw fastening.

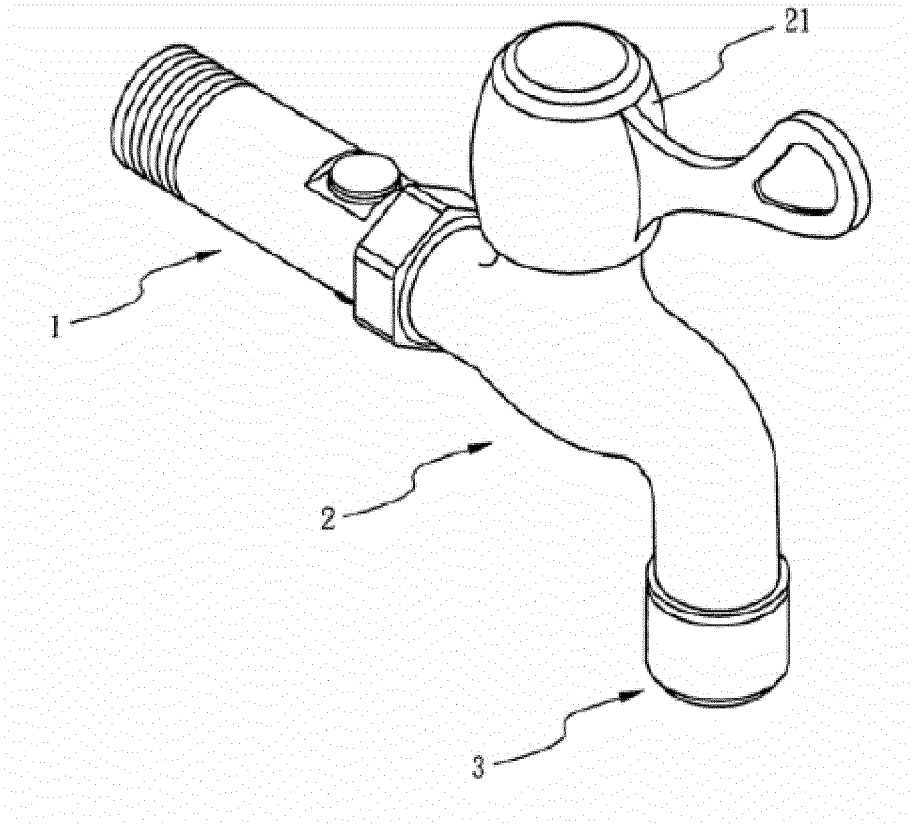

FIG. 1

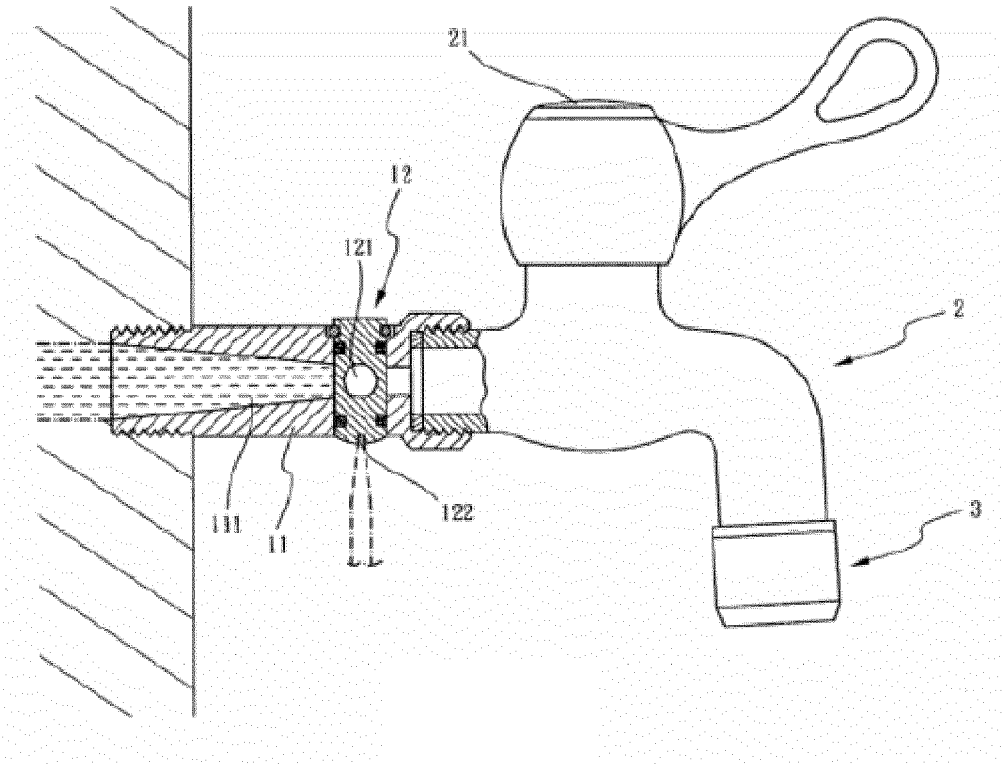

FIG. 2

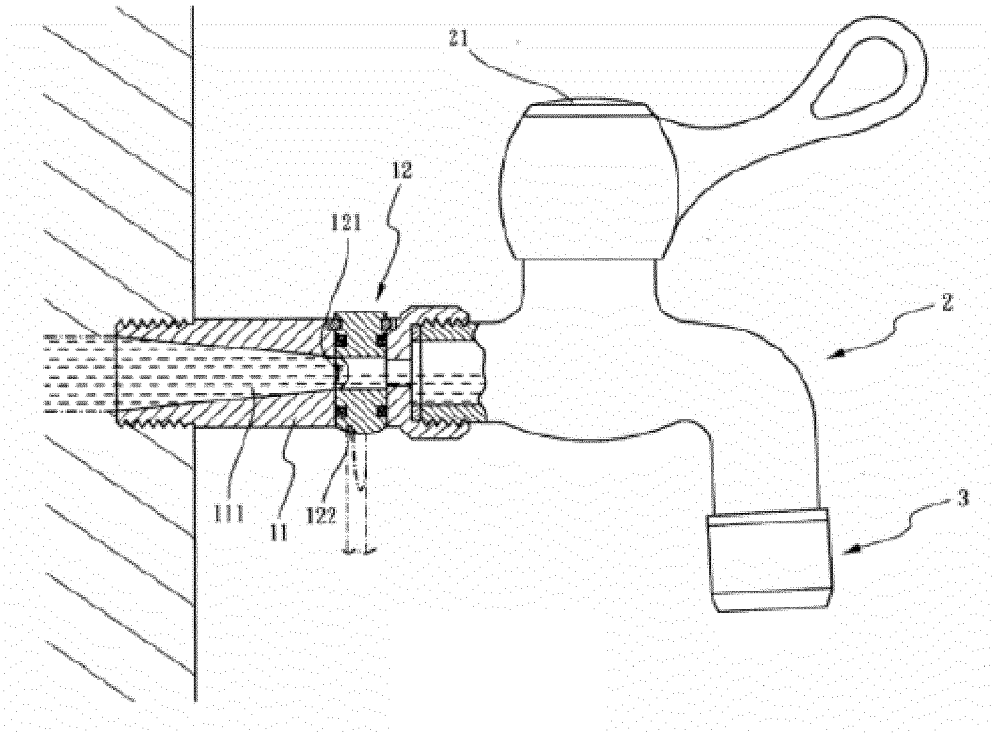

FIG. 3

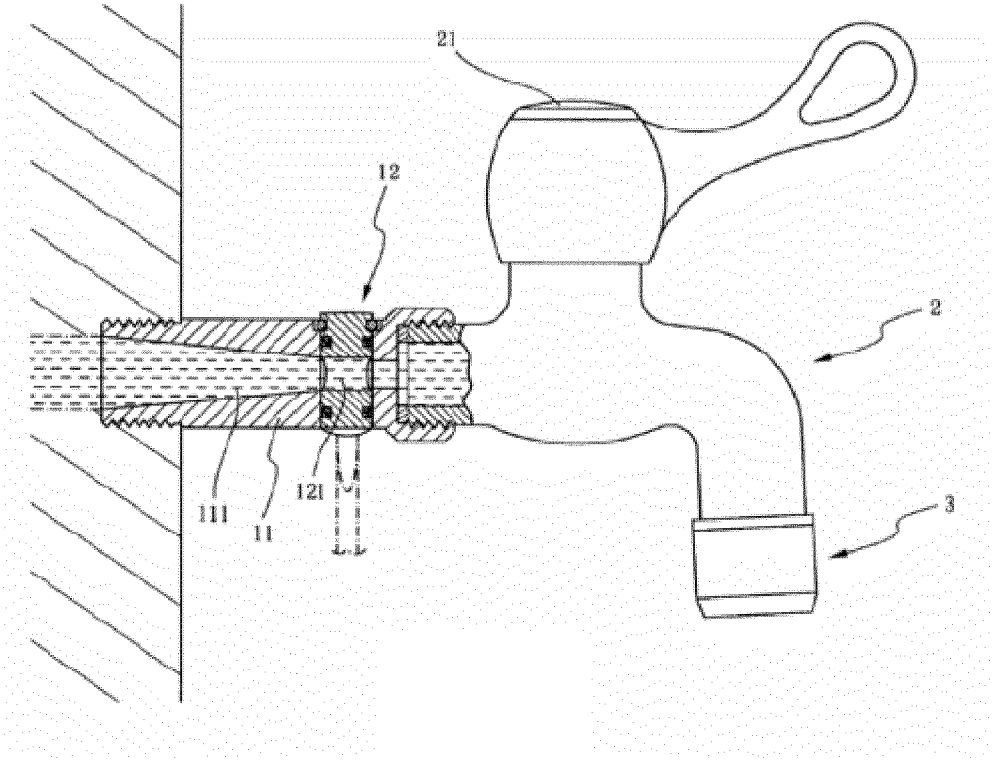

FIG. 4

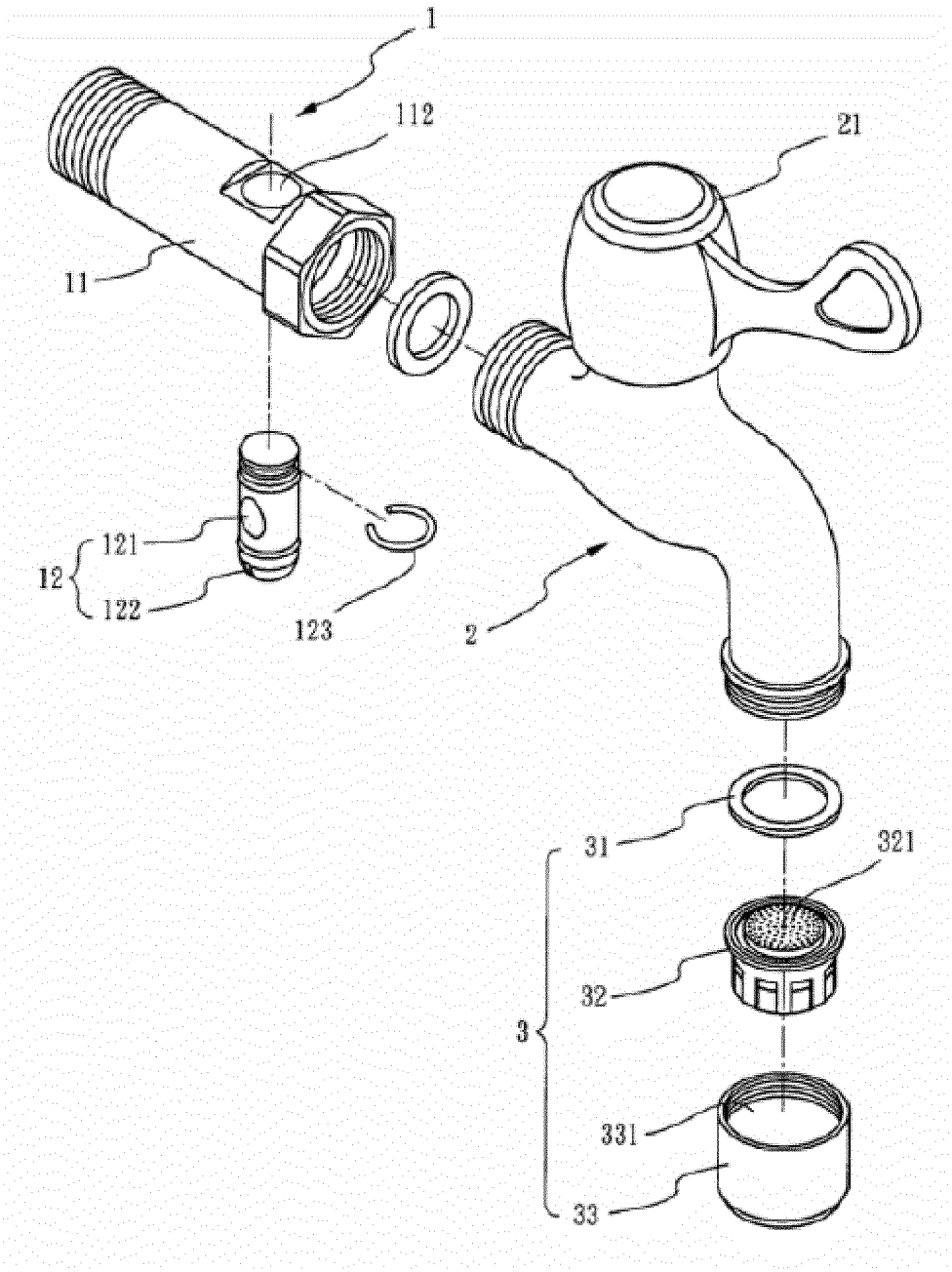

FIG. 5

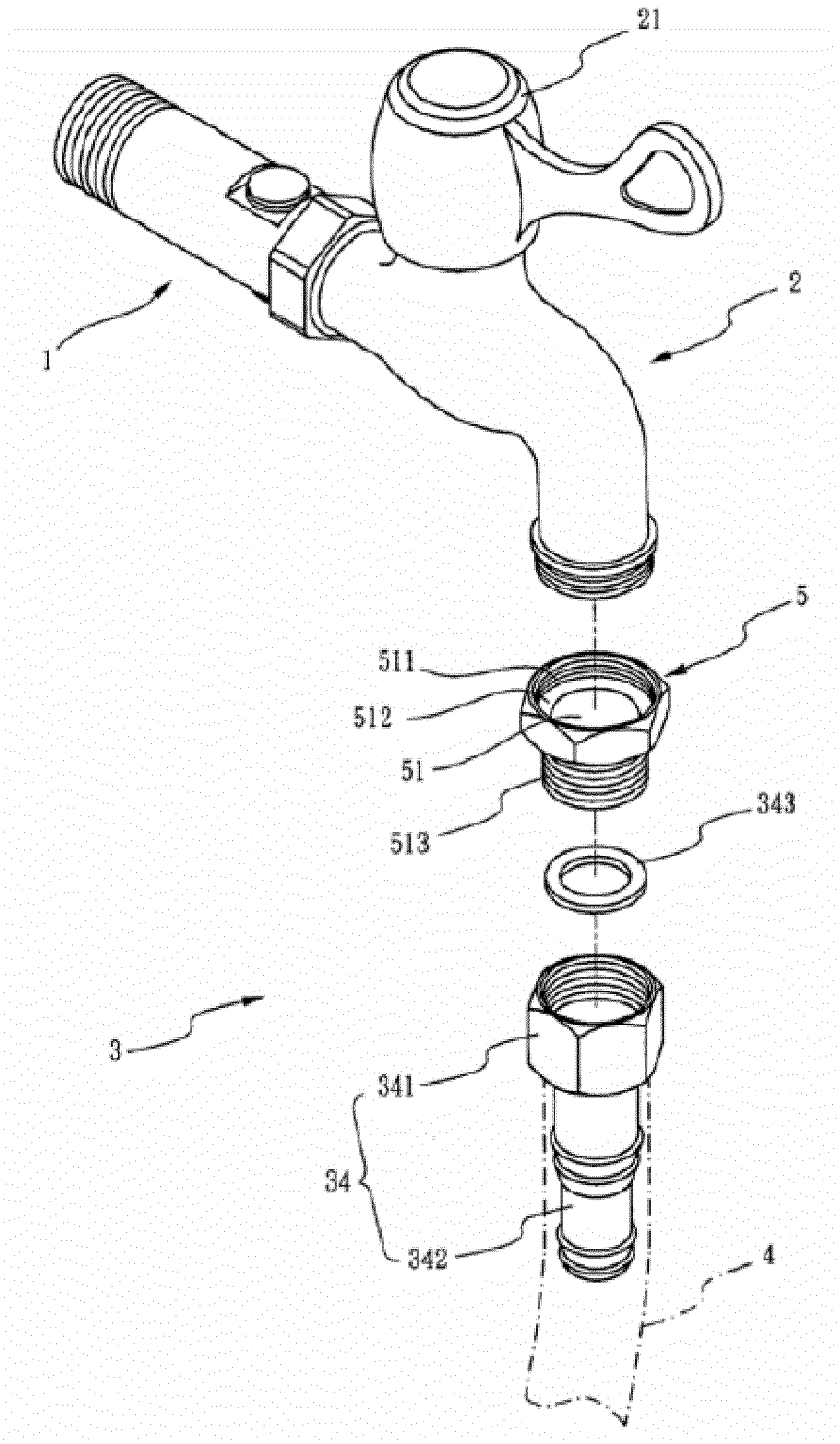

FIG. 6

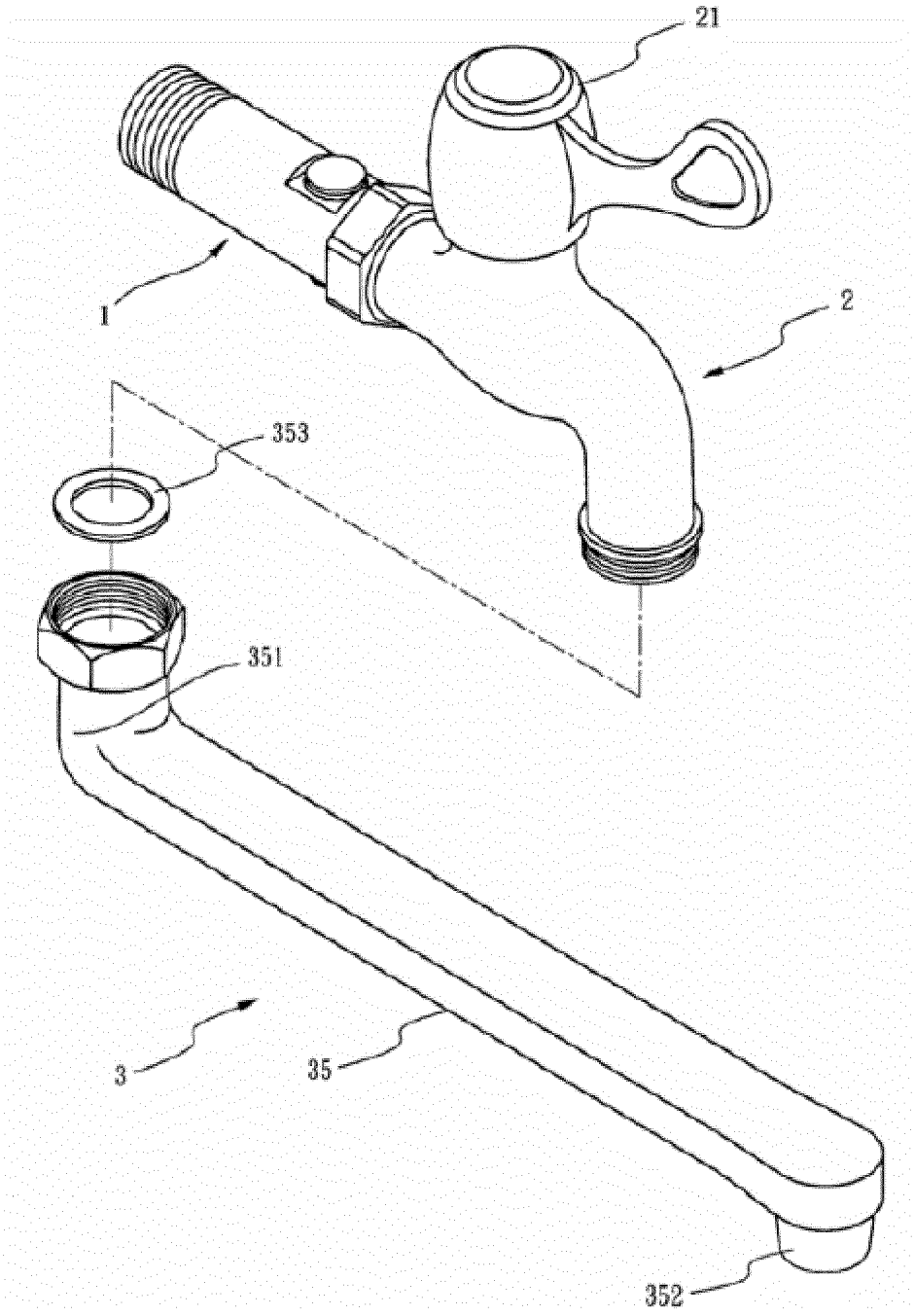

FIG. 7

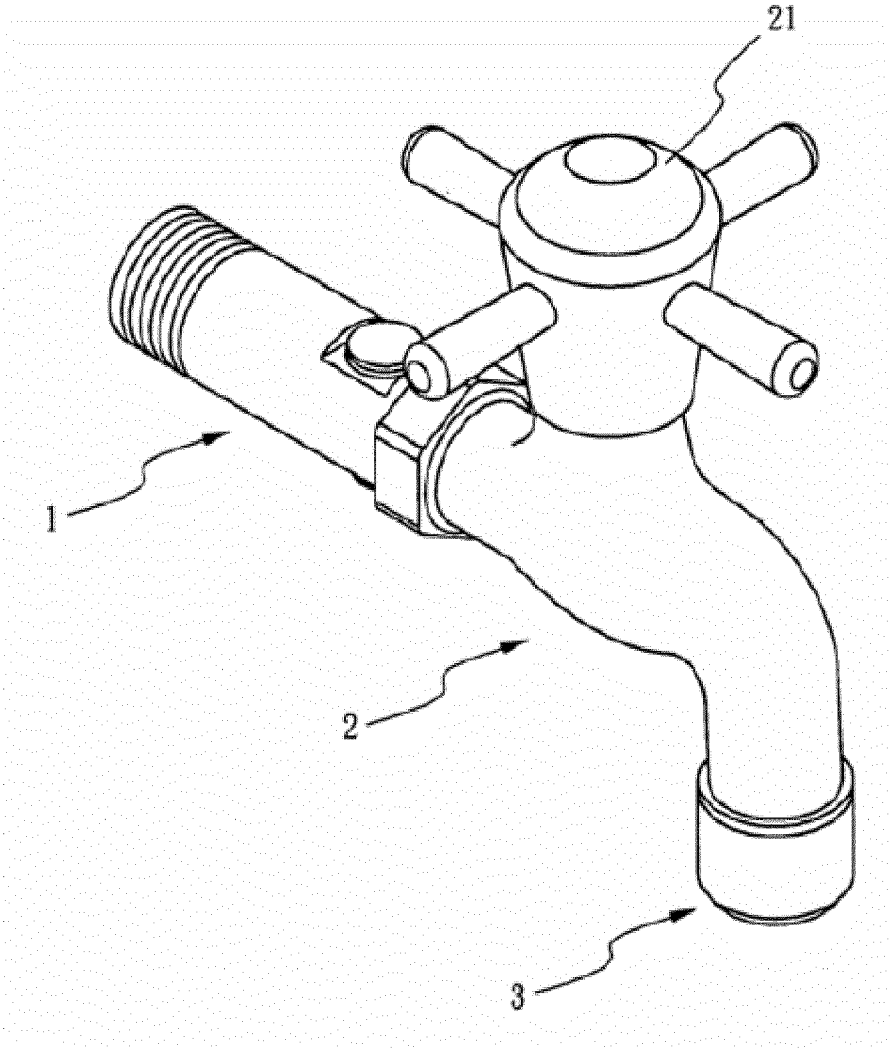

FIG. 8

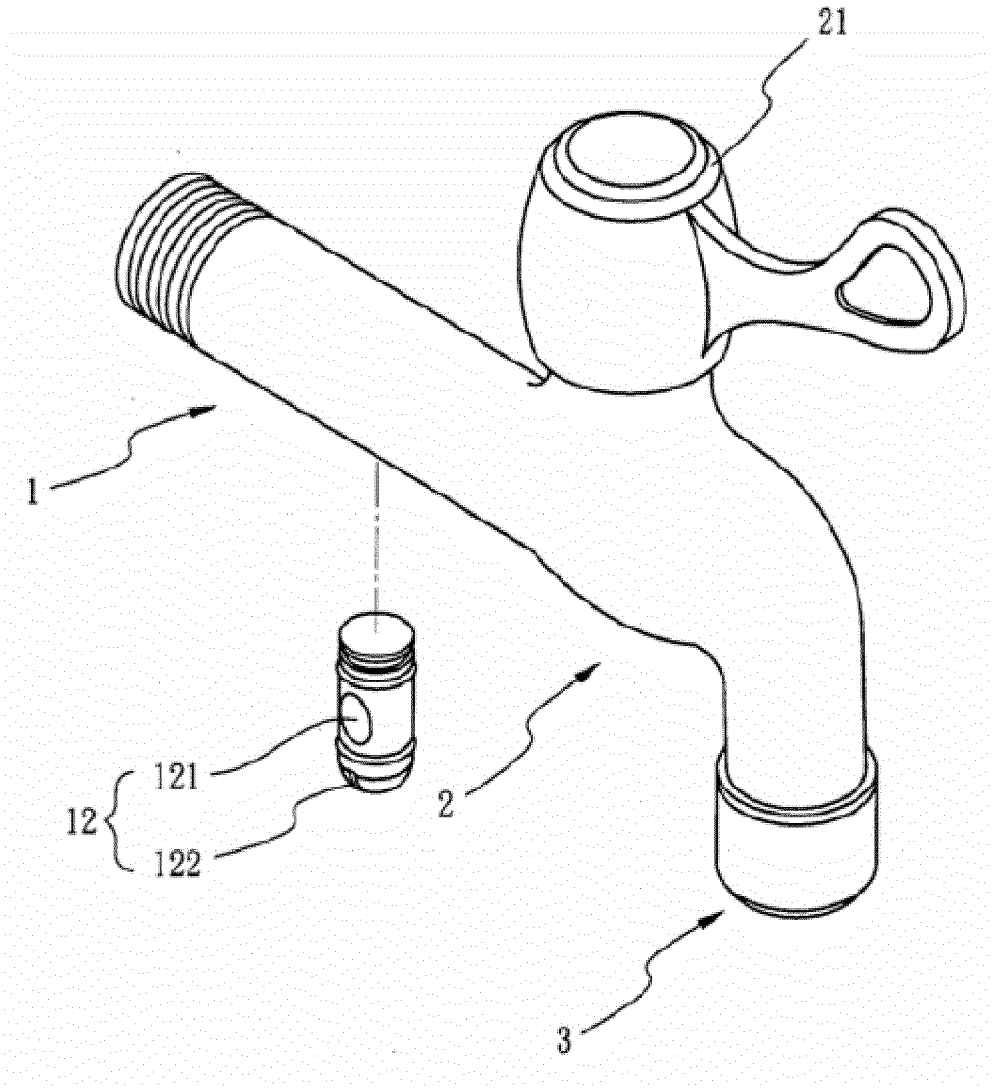

FIG. 9

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- TW 026242 **[0003]**