

TAP WATER COLLECTING SYSTEM

BACKGROUND

1. Technical Field

[0001] The present disclosure relates to a tap water collecting system, in particular, to a tap water collecting system on which a shower head is easily and stably located and placed without falling off.

2. Description of Related Art

[0002] The earliest way people can bathe can be a bath or a shower. As a shower head is provided, it changes the world, and the people now mostly take a shower when bathing. The structure of the conventional shower head has a hollow grip disposed on an top end of a water outlet, and a terminal end of the grip is connected to a water-tap via a soft tube, such that the water flow is spurted out from the water outlet with a splash or beam shape, and the user can use the shower head to take the shower.

[0003] However, some the water amount of some shower device is not enough due to the too long path from the tube or water heater to the shower head, or most some shower device firstly outputs cold water from the shower head since the time of the water heater for heating the water is too long. Currently, the user lets the cold water flow to a drainage hole, and thus this cause the waste of the water resource. Further, to make sure the water is hot, the user usually use her/his hand or leg skin to sense the temperature of the water as the basis of controlling and adjusting the water temperature. However, such manner may have a potential danger, especially when the temperature of the output water is too high, the user cannot react in real time, and only after her/his skin is burned and feels hurt, she/he knows how to adjust

the water temperature, which easily causes the improperly handled and burned events. Thus, how to design a novel hardware to efficiently collect and reuse the firstly output water of the shower head, to indicate the output water temperature of the shower head to the user, and to achieve the objective of absence of wasting the water resource without burning the user is an issue which the bath product manufacturers and researcher try to solve and overcome.

SUMMARY

[0004] Accordingly, the present disclosure provides an improved tap water collecting system on which a shower head is located and placed easily and stably without falling off. By the hardware design of the surrounding on wall and the opening slot, the shower head can efficiently contact the opening slot and smoothly slide from the expanded oblique sections tapered arc sections, and be located and hanged at the stop straight section, such that the objectives of easily placing and stably fixing without falling off can be achieved. The tap water collecting system collects the cold water firstly output from the shower head, and the laterally disposed temperature display can indicate the water temperature, such that the danger that the user tests the water temperature by her/his body can be avoided. Accordingly, the objectives of fixing the shower head to a location and easily collecting the water without wasting the water resource can be achieved, and the present disclosure can have benefits of recycling economic.

[0005] According to the objective of the present disclosure, a tap water collecting system is illustrated, and the tap water collecting system provides a fixed hanging location to a shower head to collect the water output from the shower head. The tap water collecting system comprises a pendant, a temperature display, a bent tube and a water collecting tank.

The pendant comprises a surrounding, an opening disposed on a top end of the surrounding and a tapered tube portion disposed on a bottom end of the surrounding, and the surrounding comprises an opening slot, a fixing portion and a sleeve hole, wherein the opening slot is disposed at a side of the surrounding, the opening slot comprises two opposite vertical straight sections connected to the opening, two opposite expanded oblique sections disposed corresponding to the opening and respectively connected to terminal ends of the vertical straight sections, two opposite tapered arc sections respectively disposed corresponding to the vertical straight sections and respectively connected to terminal ends of the expanded oblique sections and a stop straight section connected to the tapered arc sections and closing the opening slot, the vertical straight section and the expanded oblique section have a first angle therebetween, the sleeve hole is disposed in an internal end of the fixing portion, and a first sleeve portion is disposed on a bottom end of the tapered tube portion. The temperature display is fixed and connected to the fixing portion, and the temperature display has a temperature sensing convex, wherein the temperature sensing convex extends to interior of the surrounding via the sleeve hole. The bent tube is connected to the bottom end of the tapered tube portion, a second sleeve portion is disposed on a terminal end of the bent tube, the terminal end of the bent tube contacts the tapered tube portion, another terminal end of the bent pipe is bent to form a curved part, and the other terminal end of the bent pipe is disposed corresponding to the second sleeve portion, wherein the bent pipe has inner threads, such that the second sleeve portion is sleeved to the first sleeve portion of the tapered tube portion via the inner threads, and the bent pipe is fixed to the pendant. The water collecting tank comprises a main pipe and at least one branch pipe connected to the main pipe, wherein the branch pipe is connected to the curved part. Therefore, the branch pipe receives

(comprising cold or hot water) the water output from the shower head, and the water flows to the main pipe and is collected by the water collecting tank.

[0006] In an embodiment of the present disclosure, the first angle is 5 degrees through 30 degrees.

[0007] In an embodiment of the present disclosure, the tapered arc section and the stop straight section have a second angle therebetween.

[0008] In an embodiment of the present disclosure, the second angle is 5 degrees through 30 degrees.

[0009] In an embodiment of the present disclosure, the opening slot further has an outer cover layer covering the opening slot.

[0010] In an embodiment of the present disclosure, the fixing portion further comprises an engaging portion and a slot portion disposed in an internal end of the engaging portion.

[0011] In an embodiment of the present disclosure, the temperature display is engaged to the engaging portion via a latch.

[0012] In an embodiment of the present disclosure, the fixing portion further comprises a fixing hole and a first screw screwing through the fixing hole.

[0013] In an embodiment of the present disclosure, the bent pipe has a washer.

[0014] In an embodiment of the present disclosure, the curved part further has a decoration sheet or a fixing nut, and the decoration sheet or the fixing nut is sleeved to the curved part.

[0015] In an embodiment of the present disclosure, the surrounding has a decoration portion disposed on another side of the surrounding, and the other side of the surrounding is disposed corresponding to the opening slot.

[0016] In an embodiment of the present disclosure, the decoration portion is one of a convex wavy decoration portion or a straight convex decoration portion.

[0017] In an embodiment of the present disclosure, the decoration portion has multiple through holes.

[0018] In an embodiment of the present disclosure, the pendant is fixed to a wall by screwing at least two second screws through the through holes.

[0019] In an embodiment of the present disclosure, a terminal end of the shower head is connected to a grip.

[0020] To sum up, by the hardware design of the surrounding on wall and the opening slot, the shower head can efficiently contact the opening slot and smoothly slide from the expanded oblique sections tapered arc sections, and be located and hanged at the stop straight section, such that the objectives of easily placing and stably fixing without falling off can be achieved. The tap water collecting system collects the cold water firstly output from the shower head, and the laterally disposed temperature display can indicate the water temperature, such that the danger that the user tests the water temperature by her/his body can be avoided. Accordingly, the objectives of fixing the shower head to a location and easily collecting the water without wasting the water resource can be achieved, and the present disclosure can have benefits of recycling economic.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The accompanying drawings are included to provide a further understanding of the present disclosure, and are incorporated in and constitute a part of this specification. The

drawings illustrate exemplary embodiments of the present disclosure and, together with the description, serve to explain the principles of the present disclosure.

[0022] FIG. 1 is a three dimensional schematic diagram of a tap water collecting system according to an embodiment of the present disclosure.

[0023] FIG. 2 is an explosive diagram of a tap water collecting system according to an embodiment of the present disclosure.

[0024] FIG. 3 is a plan view of a tap water collecting system according to an embodiment of the present disclosure.

[0025] FIG. 4 is a schematic diagram showing an angle of an opening slot of a tap water collecting system according to an embodiment of the present disclosure.

[0026] FIG. 5 is a sectional view of a water collecting tank according to an embodiment of the present disclosure.

[0027] FIG. 6 is a plan view of an outer cover layer of a tap water collecting system according to another embodiment of the present disclosure.

[0028] FIG. 7 is a schematic diagram showing an operation of a temperature display of a tap water collecting system according to an embodiment of the present disclosure.

[0029] FIG. 8 is a first schematic diagram showing installation of shower head of a tap water collecting system according to an embodiment of the present disclosure.

[0030] FIG. 9 is a second schematic diagram showing installation of shower head of a tap water collecting system according to an embodiment of the present disclosure.

[0031] FIG. 10 is an explosive diagram of a tap water collecting system according to another embodiment of the present disclosure.

[0032] FIG. 11 is a three dimensional schematic diagram of a tap water collecting system according to another embodiment of the present disclosure.

[0033] FIG. 12 is a three dimensional schematic diagram of a tap water collecting system according to another embodiment of the present disclosure.

DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0034] To understand the technical features, content and advantages of the present disclosure and its efficacy, the present disclosure will be described in detail with reference to the accompanying drawings. The drawings are for illustrative and auxiliary purposes only and may not necessarily be the true scale and precise configuration of the present disclosure. Therefore, the scope of the present disclosure should not be limited to the scale and configuration of the attached drawings.

[0035] Firstly, referring to FIG. 1 through FIG. 5, the drawings show a three dimensional diagram, an explosive diagram and a plan view of a tap water collecting system according to an embodiment of the present disclosure, a schematic diagram of an angle of an opening slot and a sectional view of a water collecting tank. The tap water collecting system (1) of the present disclosure provide a fixed hanging location to a shower head (2) which can collect the output water of the shower head (2), and the tap water collecting system (1) at least comprises a pendant (11), a temperature display (12), a bent tube (13) and a water collecting tank (14).

[0036] The pendant (11) comprises a surrounding (111), an opening (112) disposed on a top end of the surrounding (111) and a tapered tube portion (113) disposed on a bottom end

of the surrounding (111), the surrounding comprises (111) an opening slot (1111), a fixing portion (1112) and a sleeve hole (1113), wherein the opening slot (1111) is disposed at a side of the surrounding (111), the opening slot (1112) comprises two opposite vertical straight sections (11111) connected to the opening (112), two opposite expanded oblique sections (11112) disposed corresponding to the opening (112) and respectively connected to terminal ends of the vertical straight sections (11111), two opposite tapered arc sections (11113) respectively disposed corresponding to the vertical straight sections (11111) and respectively connected to terminal ends of the expanded oblique sections (11112) and a stop straight section (11114) connected to the tapered arc sections (11113) and closing the opening slot (1111). The vertical straight section (11111) and the expanded oblique section (11112) have a first angle (θ_1) therebetween, and the sleeve hole (1113) is disposed in an internal end of the fixing portion (1112). A bottom end of the tapered tube portion (113) has a first sleeve portion (1131), and the first sleeve portion (1131) has outer threads (11311). Further, the first angle (θ_1) is 5 degrees through 30 degrees. Moreover, the tapered arc section (11113) and the stop straight section (11114) have a second angle (θ_2) therebetween, wherein the second angle (θ_2) is 5 degrees through 30 degrees. In a preferred embodiment of the present disclosure, the pendant (11) is formed by the surrounding (111), the opening (112) and the tapered tube portion (113), wherein the opening (112) is disposed on the top end of the surrounding (111), and the tapered tube portion (113) is connected to and disposed on the bottom end of the surrounding (111). Further, the surrounding (111) further has the opening slot (1111), the fixing portion (1112) and the sleeve hole (1113), wherein the opening slot (1111) is disposed on the side of the surrounding (111) with a square shape, the fixing portion (1112) is formed on the other side of the surrounding (111), and the sleeve hole (1113) is formed on the internal

end of the fixing portion (1112). Moreover, the opening slot (1111) comprises two opposite vertical straight sections (11111) extending downward from the opening (112), two opposite expanded oblique sections (11112) disposed corresponding to the opening (112) and respectively extending from the terminal ends of the vertical straight sections (11111), two opposite tapered arc sections (11113) respectively extending from the terminal ends of the expanded oblique sections (11112) and a stop straight section (11114) connected to the tapered arc sections (11113), wherein the vertical straight section (11111) and the expanded oblique section (11112) have the first angle (θ_1) being 5 degrees through 30 degrees, therebetween, the first angle (θ_1) is the better guiding angle which the shower head (2) placed in the opening slot (1111), the tapered arc section (11113) and the stop straight section (11114) have the second angle (θ_2) being 5 degrees through 30 degrees, therebetween, and the second angle (θ_2) is the better guiding angle which the shower head placed in the opening slot (1111). That is, when the shower head (2) is to be placed on the pendant (11), the shower head (2) is firstly placed in the opening slot (1111) via the opening (112), then the shower head (2) contacts the opening slot (1111) and smoothly slides and displaces from the expanded oblique sections (11112) and the tapered arc sections (11113) via the first angle (θ_1) and the second angle (θ_2), and thus the shower head (2) is hooked by and located at the stop straight section (11114) to achieve the objectives of easily placing and being stable without falling off. The output water of the shower head (2) can be collected by the tapered tube portion (113), and then smoothly outputs. In addition, as shown in FIG. 6 which is a plan view of an outer cover layer of a tap water collecting system according to another embodiment of the present disclosure, the opening slot (1111) has the outer cover layer (1115) which covers the opening slot (1111), such that via the protection of the outer cover layer (1115), it prevents

the shower head (2) from being scratched during the locating procedure which the shower head (2) slides into the opening slot (1111).

[0037] The temperature display (12) is fixed and connected to the fixing portion (1112), and the temperature display (12) has a temperature sensing convex (121), wherein the temperature sensing convex (121) extends to interior of the surrounding (111) via the sleeve hole (1113). Further, the fixing portion (1112) comprises an engaging portion (11121) and a slot portion (11122) disposed in an internal end of the engaging portion (11121). Moreover, the temperature display (12) is engaged to the engaging portion (11121) via a latch (122). Further referring to FIG. 7 simultaneously, which is a schematic diagram showing an operation of the tap water collecting system according to an embodiment of the present disclosure, the temperature display (12) is engaged into the slot portion (11122) of the fixing portion (1112) to connect with the engaging portion (11121). When the temperature display (12) is damaged, the temperature display (12) can be detached and replaced easily. The temperature sensing convex (121) disposed at the terminal end of the temperature display (12) is protruding out from the interior of the surrounding (111) via the sleeve hole (1113), such that when the shower head (2) outputs the hot water, the temperature sensing convex (121) directly contacts the hot water, and the temperature display (12) can display the water temperature of the shower head in real time.

[0038] The bent tube (13) is connected to a bottom end of the tapered tube portion (113), a sleeve (131) is disposed on a terminal end of the tube (13), the terminal end of the tube (13) contacts of the tapered tube portion (113), another terminal of the bent pipe (13) is bent to form a curved part (131), and the other terminal end of the bent pipe (13) is disposed corresponding to the second sleeve portion (131), wherein an internal end of the second sleeve

portion (131) has inner threads(1311), such that the second sleeve portion (131) is sleeved to the first sleeve portion (1131) of the tapered tube portion (113) via the inner threads (1311), and the bent pipe (13) is fixed to the pendant (11). Further, the first sleeve portion (1131) and the inner threads (1311) have a washer (133) disposed therebetween. Further, as shown in FIG. 2, the curved part (132) further has a decoration sheet (1321); or alternatively, as shown in FIG. 12, the curved part (132) further has a fixing nut (1322). In a preferred embodiment of the present disclosure, the bent tube (13) is connected to the bottom end of the tapered tube portion (113), the sleeve (131) is disposed on the terminal end of the tube (13), the terminal end of the tube (13) contacts of the tapered tube portion (113), the other terminal of the bent pipe (13) is bent to form the curved part (131), the other terminal end of the bent pipe (13) is disposed corresponding to the second sleeve portion (131), and the decoration sheet (1321) is sleeved to the curved part (132), wherein the bent pipe (13) has the a inner threads (1311) therein, such that the second sleeve portion (131) is sleeved to the first sleeve portion (1131) of the tapered tube portion (113) via the inner threads(1311), the bent pipe (13) is fixed to the pendant (11), and the washer (133) disposed between the first sleeve portion (1131) and the inner threads (1311) can be utilized to prevent the leakage of the tap water.

[0039] The water collecting tank (14) comprises a main pipe (141) and at least one branch pipe (142) connected to the main pipe (141), wherein the branch pipe (142) is connected to the curved part (132) to receives the water (comprising cold or hot water) output from the shower head (2), and the water flows to the main pipe (141) and is collected by the water collecting tank (14). In a preferred embodiment of the present disclosure, the water collecting tank (14) comprises the main pipe (141) and the branch pipe (142), the branch pipe (142) is connected to the curved part (132) of the bent pipe (13) to receive the water output

from the shower head (2), and the water flows to the main pipe (141) and is collected by the water collecting tank (14).

[0040] That is, referring to FIG. 8 and FIG. 9 simultaneously, which are the first and second schematic diagrams showing installation of shower head of a tap water collecting system according to an embodiment of the present disclosure, the tap water collecting system (1) can be adopted by the shower heads (2) different dimensions via the expanded oblique sections (11112) and the tapered arc sections (11113). A terminal end of the shower head (2) is connected to a grip (21), and the shower head (2) fixed to and placed in the pendant (11) is guided to smoothly displace via the expanded oblique sections (11112) and the tapered arc sections (11113), such that it can efficiently prevent the shower head (2) from being stuck and unable to fall in the stop straight section (11114). The tap water collecting system (1) is helpful to the shower head (2) placed in the pendant (11) for being successfully guided to displace and stably located. When the shower head (2) is switched to output the hot water, the tap water collecting system (1) can collect the cold water firstly output from the shower head (2), and the tapered tube portion (113) collects the cold water and smoothly outputs the cold water to the water collecting tank (14) for storing the cold water.

[0041] In addition, the fixing portion (1112) can further comprises a fixing hole (11123) and a first screw (not shown in the drawings) being screwed through the fixing hole (11123). Referring to FIG. 10, which is an explosive diagram of a tap water collecting system according to another embodiment of the present disclosure, the fixing portion (1112) is formed by the fixing hole (11123) and the first screw, the temperature display (12) is fixed to the fixing hole (11123) via the first screw, and the temperature sensing convex (121) is protruding out from the interior of the surrounding (111) via the sleeve hole (1113). When

the shower head (2) outputs the hot water, the temperature sensing convex (121) directly contacts the hot water, and the temperature display (12) can display the water temperature of the shower head (2) in real time.

[0042] Further, the other terminal end of the surrounding (111) corresponding to the opening slot (1111) further has a decoration portion (1114), wherein the decoration portion (1114) is one of a convex wavy decoration portion or a straight convex decoration portion, and the decoration portion (1114) has multiple through holes (11141). Moreover, the pendant (11) can be fixed and screwed to a wall (3) via at least two second screws (11142) which screw through the through holes (11141). Referring to FIG. 1 again, the decoration portion (1114) being the convex wavy decoration portion is disposed on the terminal end of the decoration portion (1114) corresponding to the opening slot (1111), the decoration portion (1114) has three through holes (11141), and the tap water collecting system (1) is fixed and screwed to the wall (3) via the three second screws (11142) which screw through the through holes (11141) as shown in FIG. 7. Referring to FIG. 11 simultaneously, which is a three dimensional schematic diagram of a tap water collecting system according to another embodiment of the present disclosure, the decoration portion (1114) being the straight convex decoration portion is disposed on the terminal end of the decoration portion (1114) corresponding to the opening slot (1111), the decoration portion (1114) has three through holes (11141), and the tap water collecting system (1) is fixed and screwed to the wall (3) via the three second screws (11142) which screw through the through holes (11141).

[0043] According to the above descriptions, compared to the conventional product and technology, the present disclosure has the advantages as follows.

[0044] By the hardware design of the surrounding on wall and the opening slot, the shower head can efficiently contact the opening slot and smoothly slide from the expanded oblique sections tapered arc sections, and be located and hanged at the stop straight section, such that the objectives of easily placing and stably fixing without falling off can be achieved. The tap water collecting system collects the cold water firstly output from the shower head, and the laterally disposed temperature display can indicate the temperature, such that the danger that the user tests the water temperature by her/his body can be avoided. Accordingly, the objectives of fixing the shower head to a location and easily collecting the water without wasting the water resource can be achieved, and the present disclosure can have benefits of recycling economic.

[0045] To sum up, the tap water collecting system provided by the present disclosure is not anticipated by publications or used in public, which meets patentability of the invention. Examination of the present disclosure is respectfully requested, as well as allowance of the present disclosure.

[0046] The above-mentioned descriptions represent merely the exemplary embodiment of the present disclosure, without any intention to limit the scope of the present disclosure thereto. Various equivalent changes, alternations or modifications based on the claims of present disclosure are all consequently viewed as being embraced by the scope of the present disclosure.

Amended Claims

WHAT IS CLAIMED IS:

1. A tap water collecting system, comprising:

a pendant comprising a surrounding, an opening disposed on a top end of the surrounding and a tapered tube portion disposed on a bottom end of the surrounding, the surrounding comprises an opening slot, a fixing portion and a sleeve hole, wherein the opening slot is formed at a side of the surrounding and is extended downward from the opening, the opening slot comprises two opposite vertical straight sections, two opposite expanded oblique sections, two opposite tapered arc sections and a stop straight section in such a manner that the two opposite vertical straight sections extend downward from the opening, the two opposite expanded oblique sections obliquely extend outward by a first angle in a longitudinal direction from the vertical straight sections, the two opposite tapered arc sections taperingly extend inward from the expanded oblique sections, the stop straight section extends from two ends of each tapered arc sections, wherein an accommodating space is formed as being enclosed by the two opposite expanded oblique sections, the two opposite tapered arc sections and the stop straight section such that a shower head passes through the opening slot to hang on the accommodating space as being confined in the accommodating space by the two opposite vertical straight sections and two opposite expanded oblique sections, wherein a lowest point of the vertical straight section is in a higher position than a highest position of a neck portion of the hanging shower head, the fixing portion is mounted at the sleeve hole, a first sleeve portion is disposed on a bottom end of the tapered tube portion, and the first sleeve portion has outer threads;

a temperature display fixed and connected to the fixing portion, the temperature display has a temperature sensing convex, wherein the temperature sensing convex extends to interior of the surrounding via the sleeve hole; and

a bent tube connected to the bottom end of the tapered tube portion, a second sleeve

portion is movably sleeved to a terminal end of the bent tube, the terminal end of the bent tube contacts the tapered tube portion, another terminal end of the bent tube is bent to form a curved part, and the other terminal end of the bent tube is disposed corresponding to the second sleeve portion, wherein the bent tube has inner threads, such that the second sleeve portion is movably sleeved to the first sleeve portion of the tapered tube portion via the inner threads and the outer threads, and the bent tube is fixed to the pendant, or the bent tube is capable of being detached from the pendant; and

a water collecting tank comprising a main pipe and at least one branch pipe connected to the main pipe, wherein the branch pipe is connected to the curved part.

2. The tap water collecting system according to claim 1, wherein the first angle is 5 degrees through 30 degrees.
3. The tap water collecting system according to claim 1, wherein the tapered arc section and the stop straight section have a second angle therebetween.
4. The tap water collecting system according to claim 3, wherein the second angle is 5 degrees through 30 degrees.
5. The tap water collecting system according to claim 1, wherein the opening slot further has an outer cover layer covering the opening slot.
6. The tap water collecting system according to claim 1, wherein the fixing portion further comprises an engaging portion and a slot portion disposed in an internal end of the engaging portion.
7. The tap water collecting system according to claim 6, wherein the temperature display is engaged to the engaging portion via a latch.
8. The tap water collecting system according to claim 1, wherein the fixing portion further comprises a fixing hole and a first screw screwing through the fixing hole.

9. The tap water collecting system according to claim 1, wherein the curved part further has a decoration sheet or a fixing nut, and the decoration sheet or the fixing nut is sleeved to the curved part.
10. The tap water collecting system according to claim 1, wherein the surrounding has a decoration portion disposed on another side of the surrounding, and the other side of the surrounding is disposed corresponding to the opening slot.
11. The tap water collecting system according to claim 10, wherein the decoration portion is one of a convex wavy decoration portion or a straight convex decoration portion.
12. The tap water collecting system according to claim 10, wherein the decoration portion has multiple through holes.
13. The tap water collecting system according to claim 12, wherein the pendant is fixed to a wall by screwing at least second screws through the through holes.
14. The tap water collecting system according to claim 1, wherein the bent tube has a washer.
15. The tap water collecting system according to claim 1, wherein the branch pipe receives output water of a shower head, and the water flows to the main pipe and collected by the water collecting tank, and a terminal end of the shower head is connected to a grip.

ABSTRACT

A tap water collecting system provides a fixed hanging location to a shower head to collect output water of the shower head, and has a pendant, a temperature display, a bent pipe and a water collecting tank. By the hardware design of the surrounding on wall and the opening slot, the shower head can contact the opening slot and smoothly slide from the expanded oblique sections tapered arc sections, and be located and hanged at the stop straight section, such that the objectives of easily placing and stably fixing without falling off can be achieved. The tap water collecting system collects the cold water firstly output from the shower head, and the laterally disposed temperature display can indicate the water temperature, such that the danger that the user tests the water temperature by her/his body can be avoided. Accordingly, the objectives of fixing the shower head to a location and easily collecting the water without wasting the water resource can be achieved, and the present disclosure can have benefits of recycling economic.

Figure 1

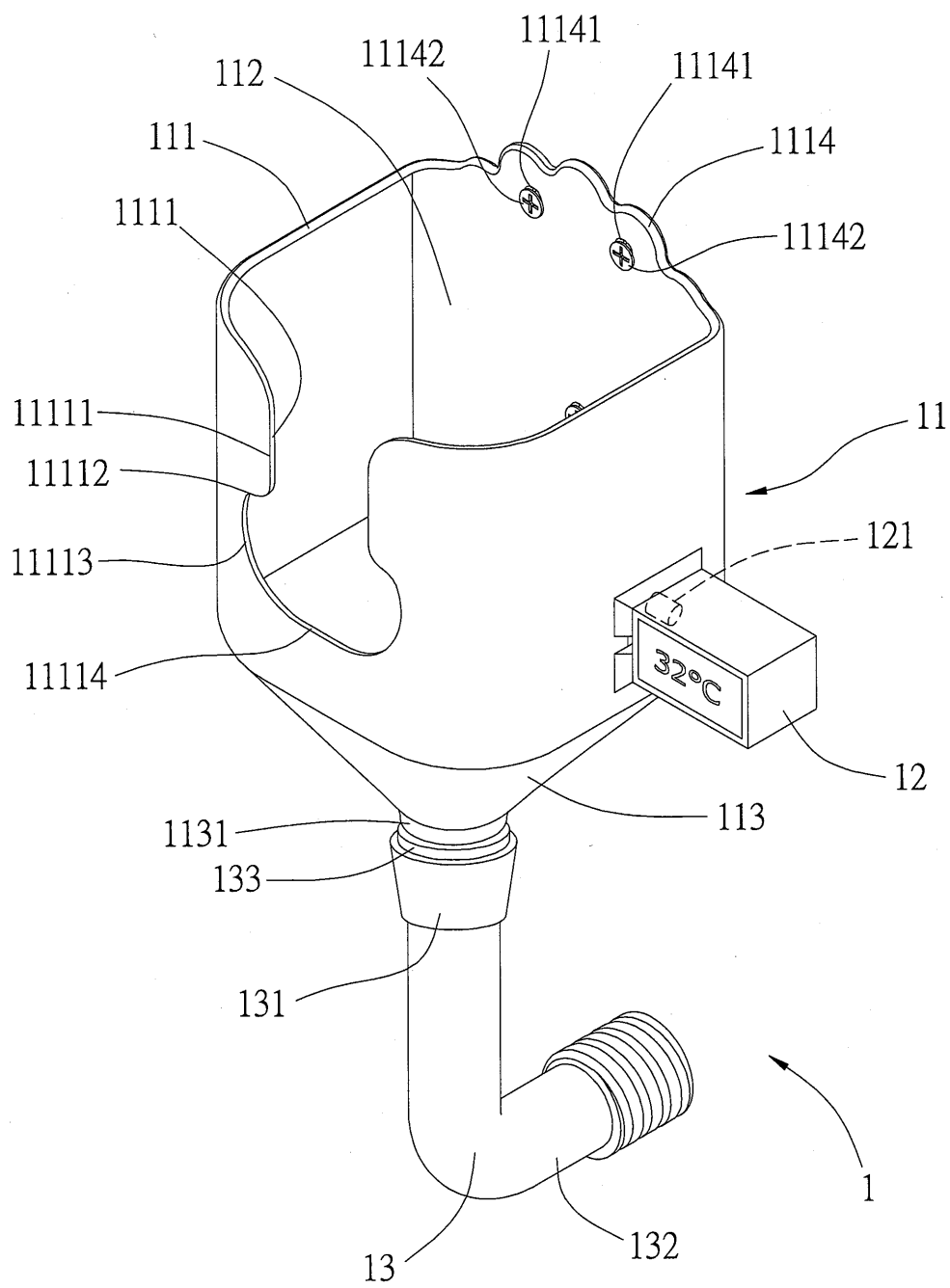


FIG.1

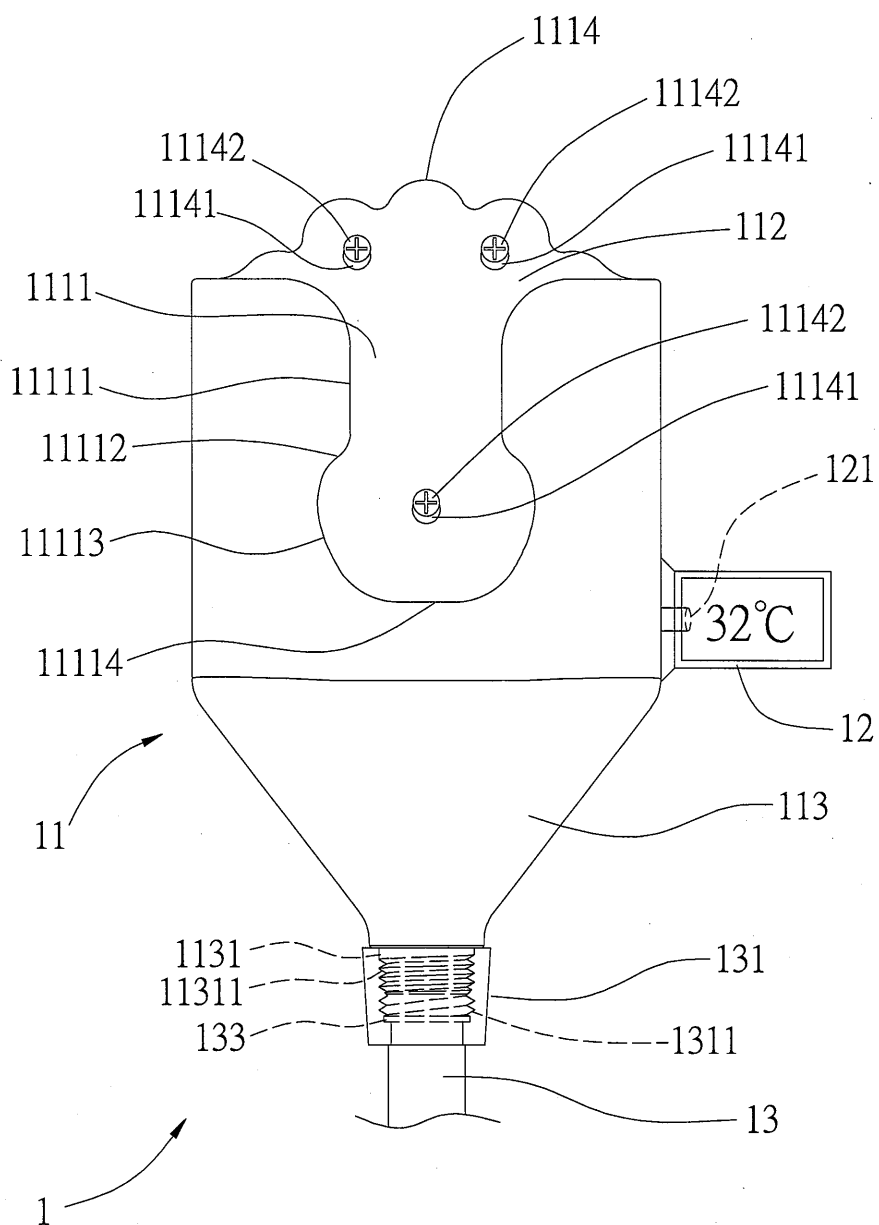


FIG.3

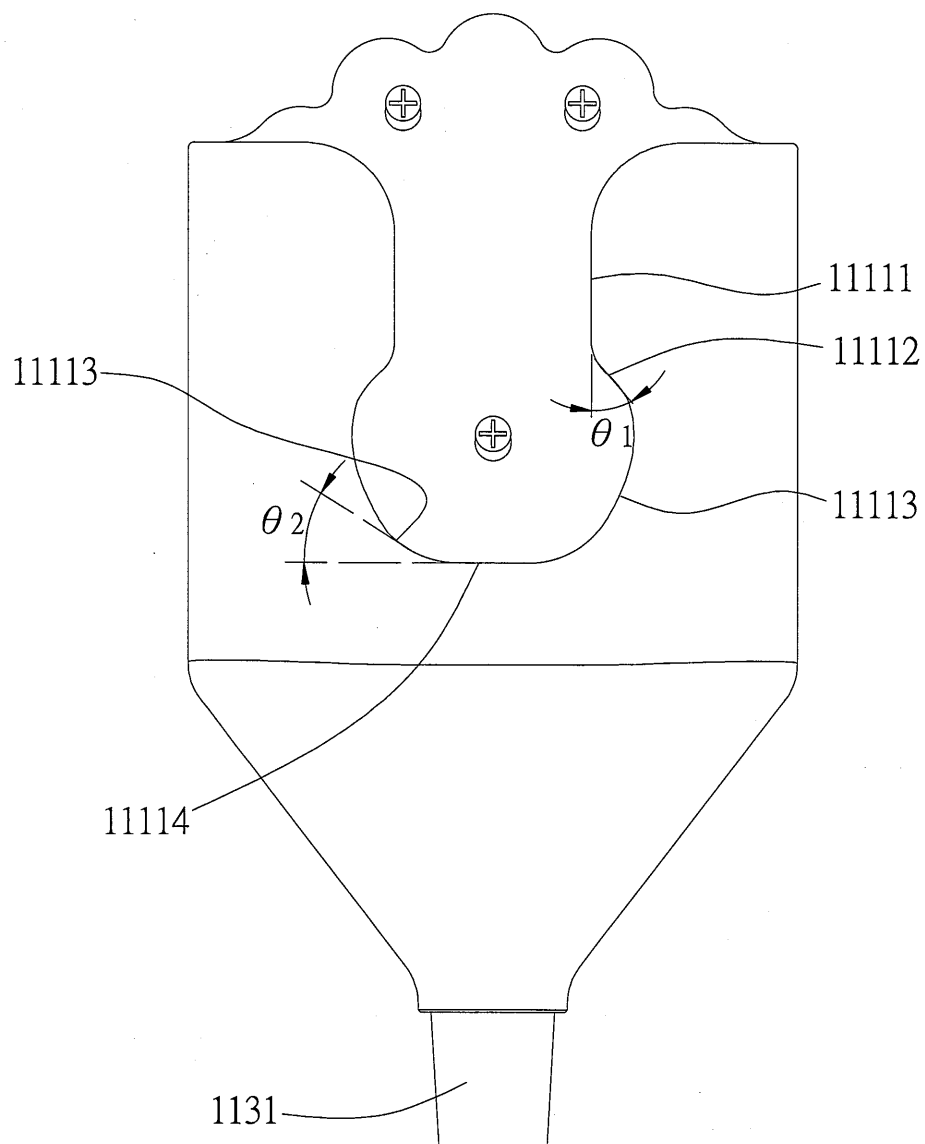


FIG.4

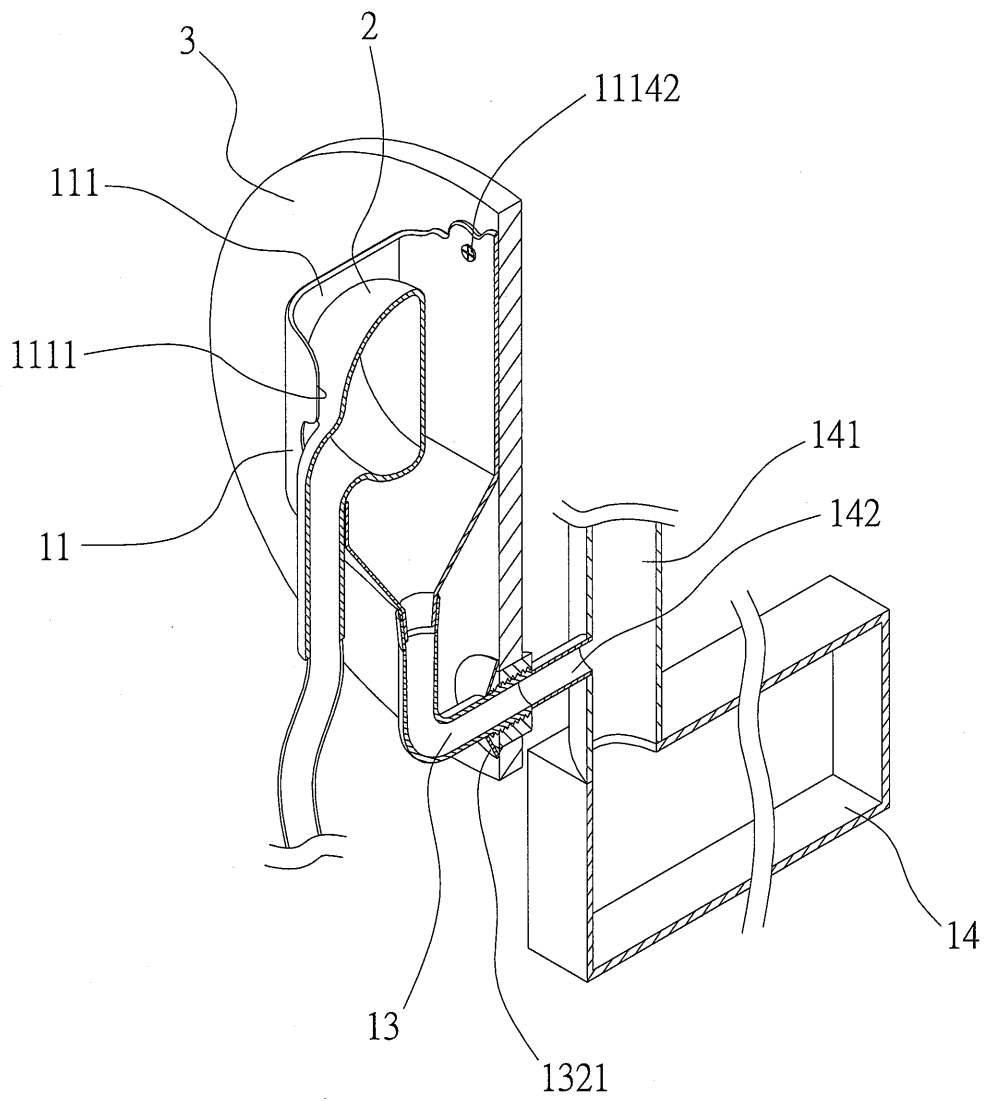


FIG.5

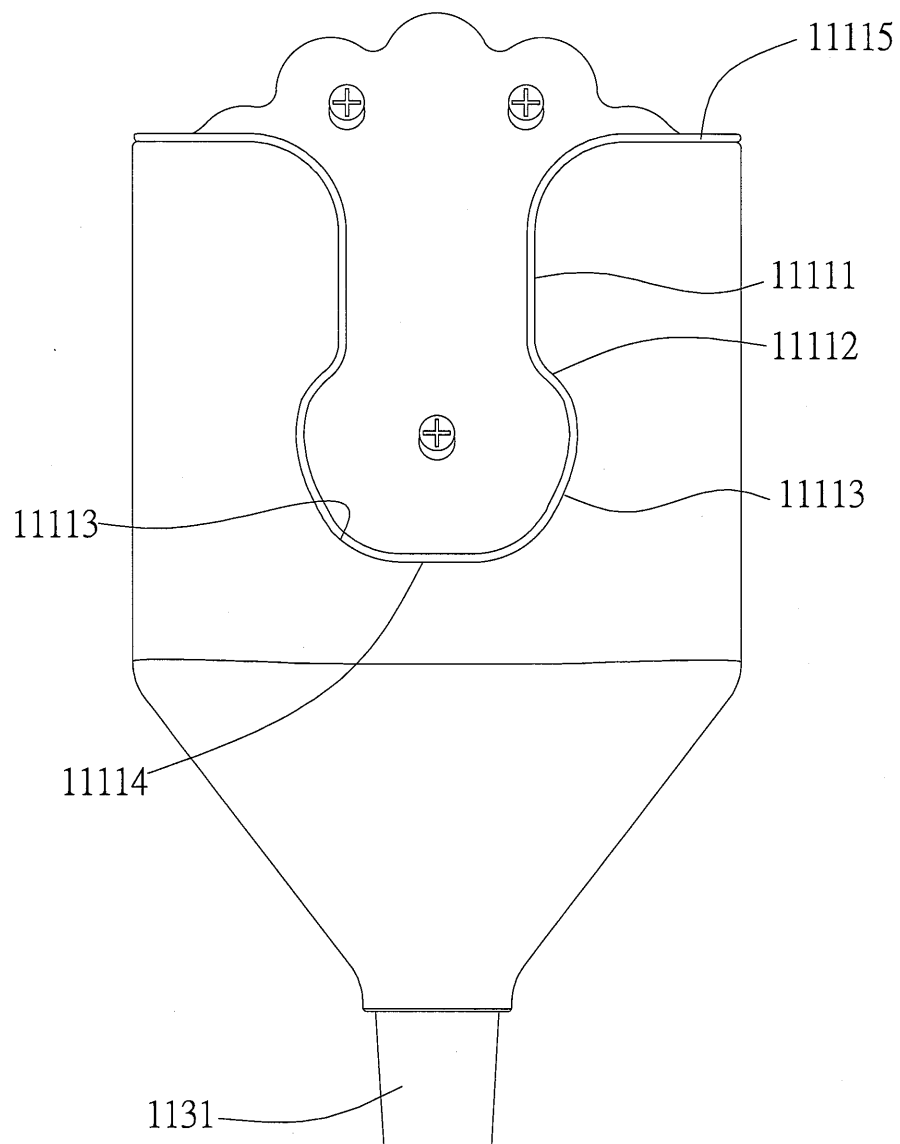


FIG.6

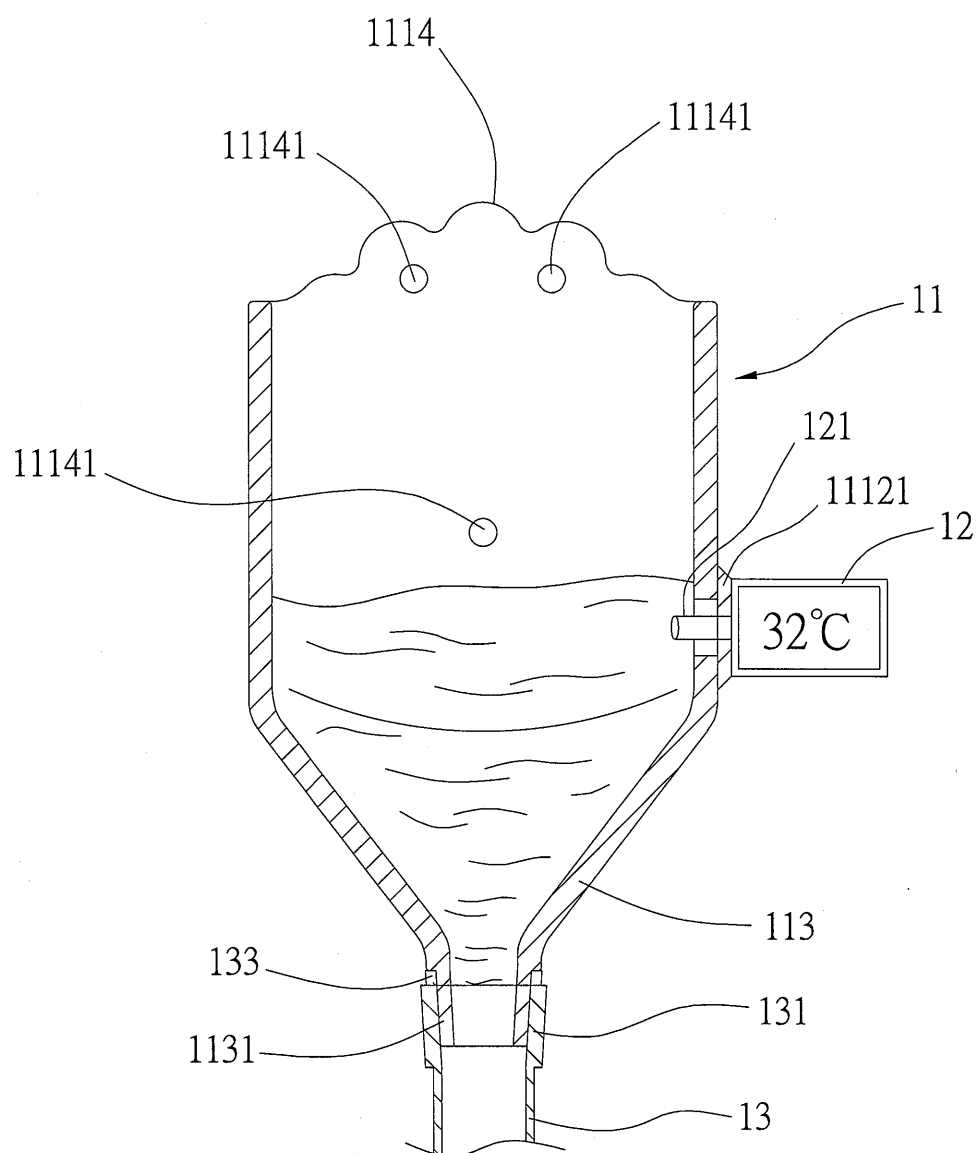


FIG.7

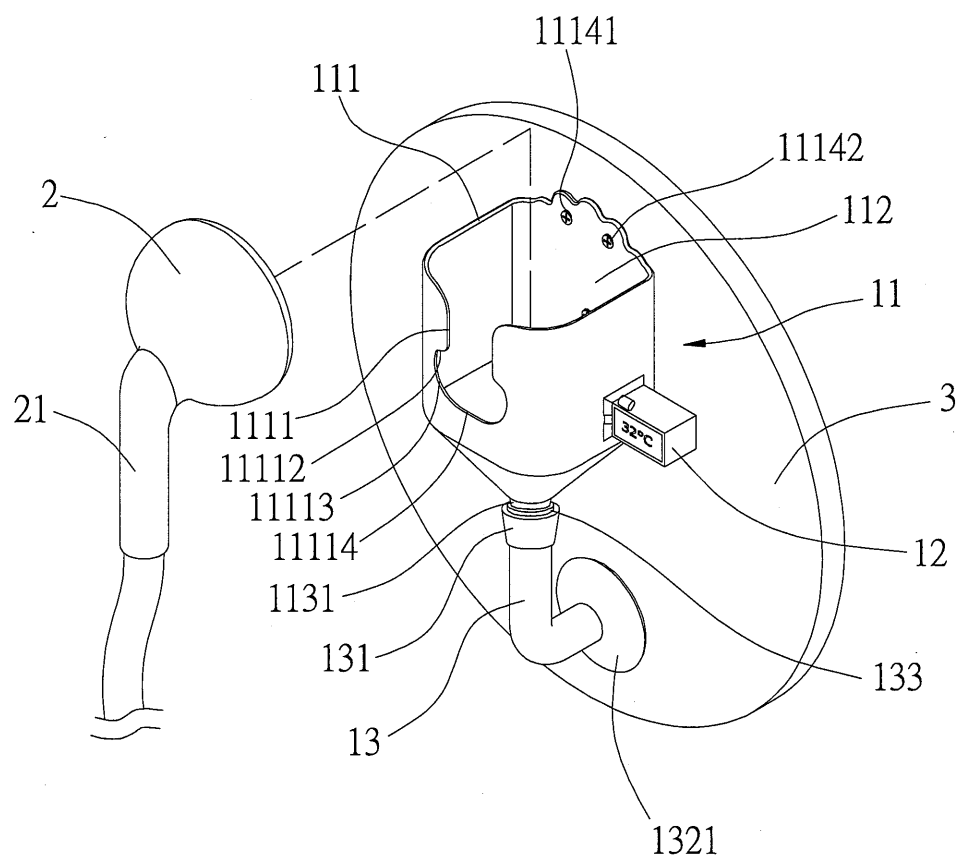


FIG.8

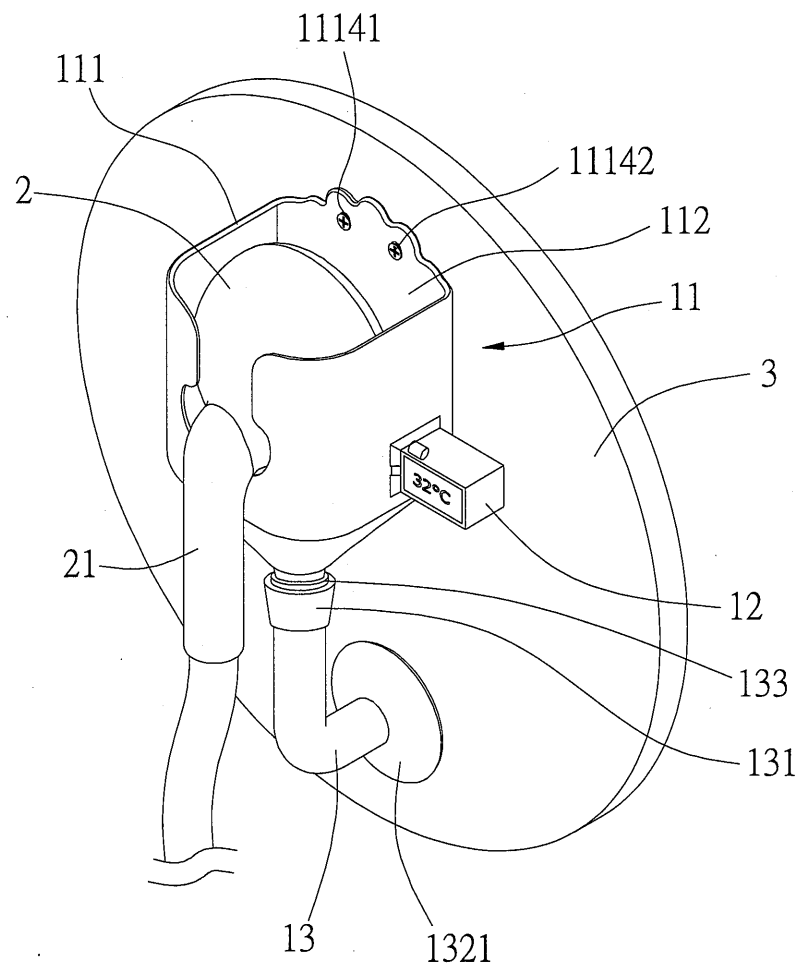


FIG.9

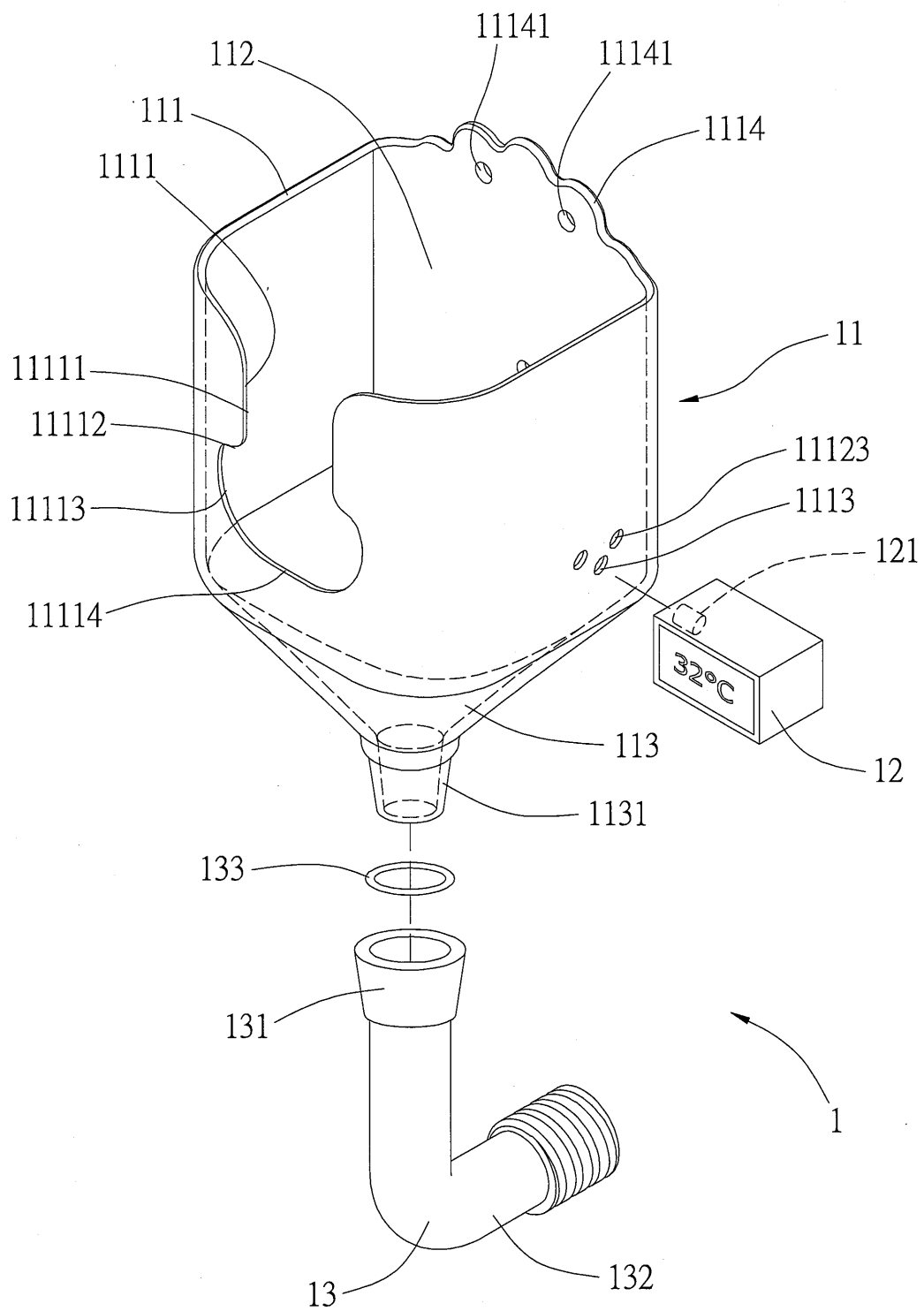


FIG.10

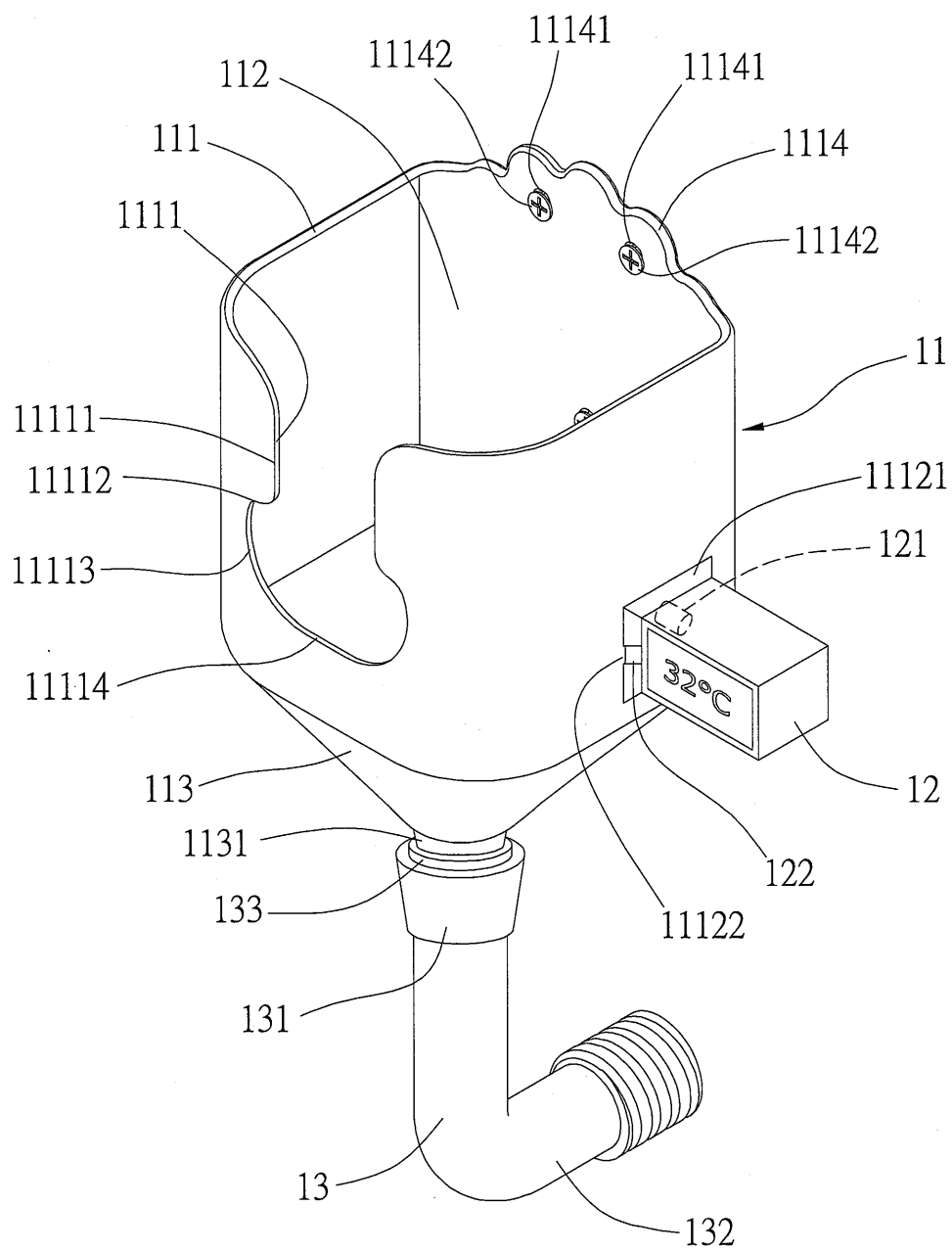


FIG.11

