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COLLECTION BOX STRUCTURE OF
HEATING BARREL****Publication Classification**

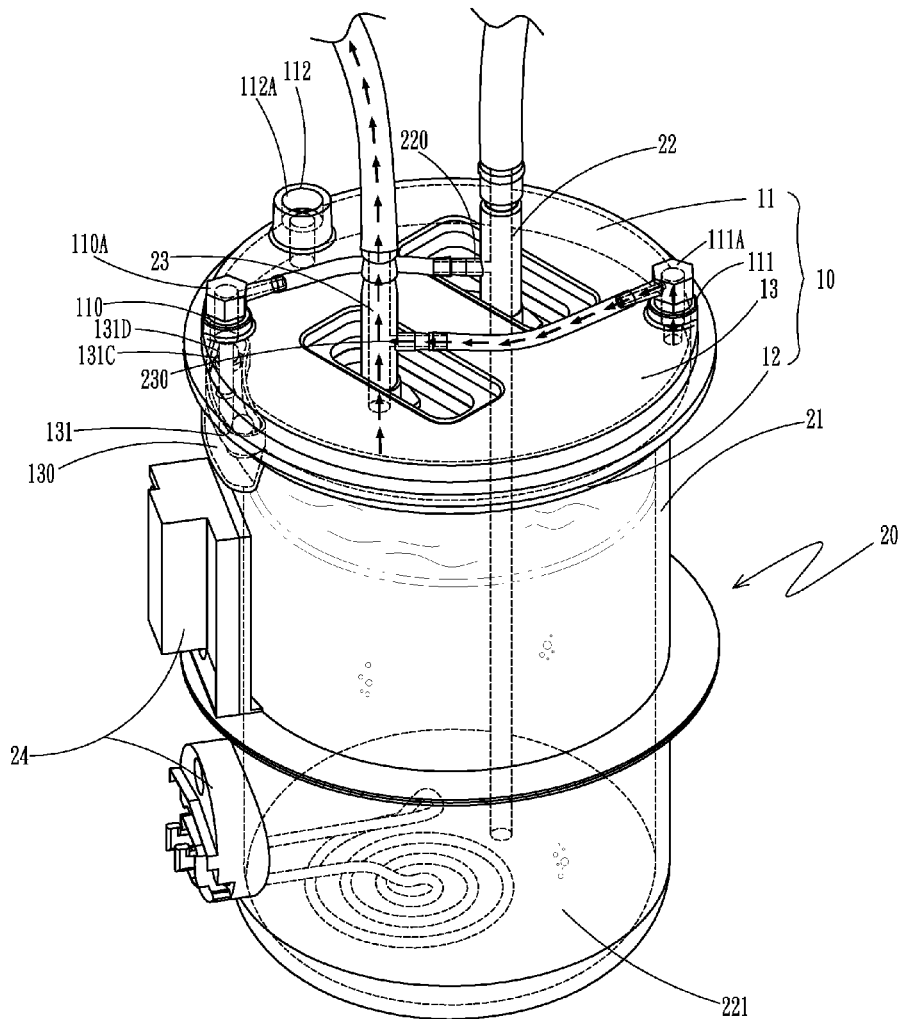
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(57) **ABSTRACT**

A vapor recovery and water collection box structure of a heating barrel includes a vapor box, a heating barrel unit, and a faucet. The faucet includes an outer tube and an inner tube. Vapor is guided into the vapor box and out from the inner tube of the faucet, preventing the accumulation of the vapor from generating biogas and preventing the outer tube from generating heat. Through the vapor box to recycle the condensed water, the heating barrel is safe for use and able to prevent leaks.



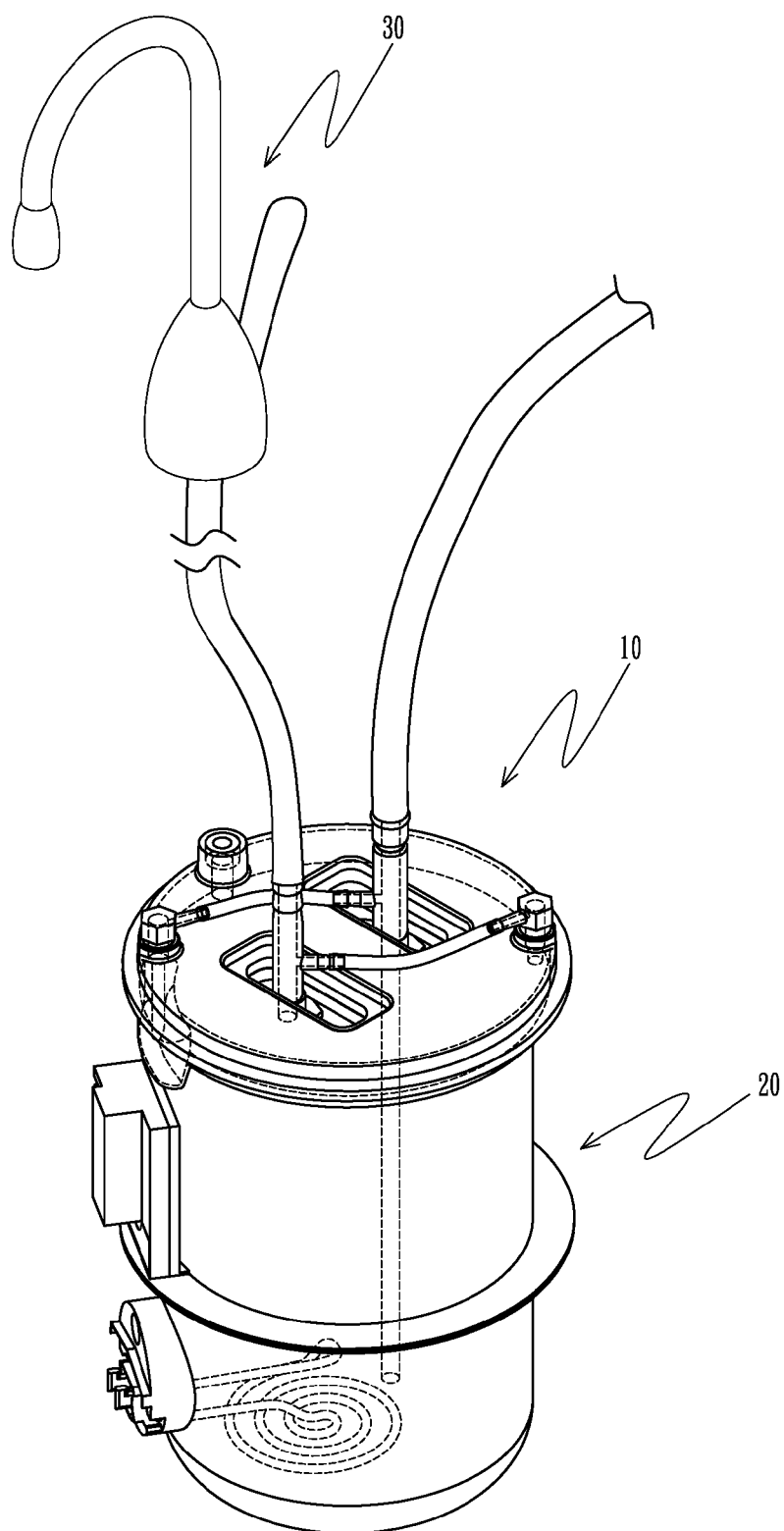


Fig.1

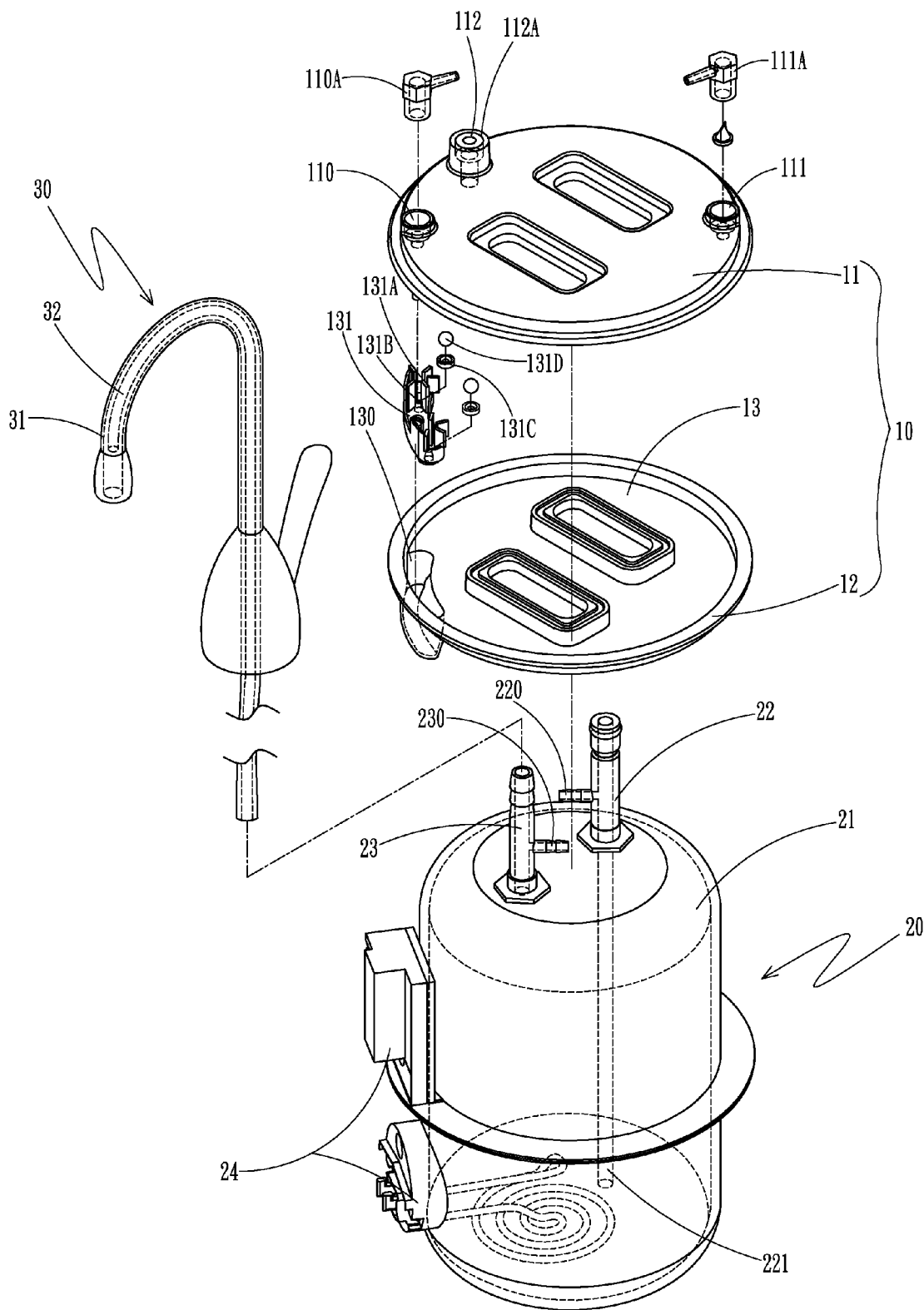


Fig.2

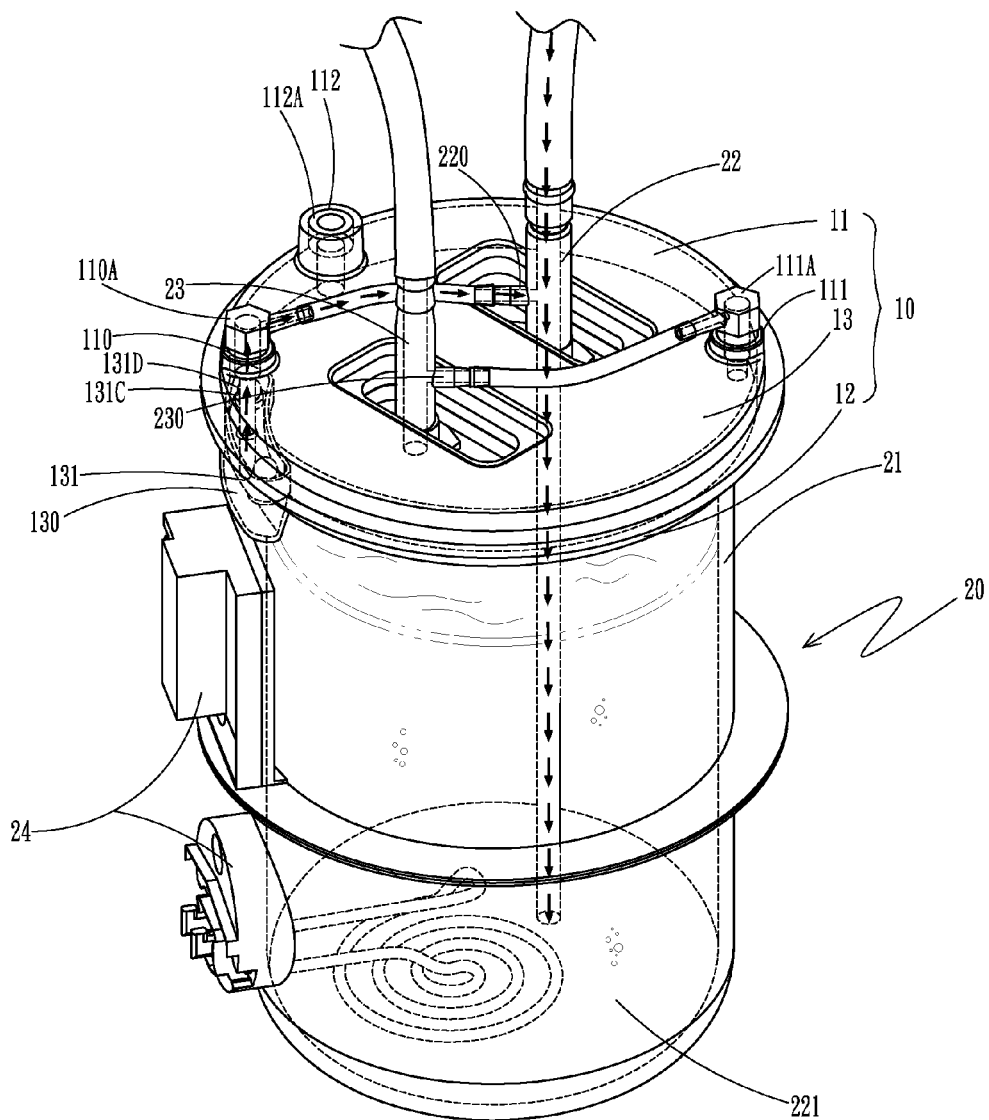


Fig.3

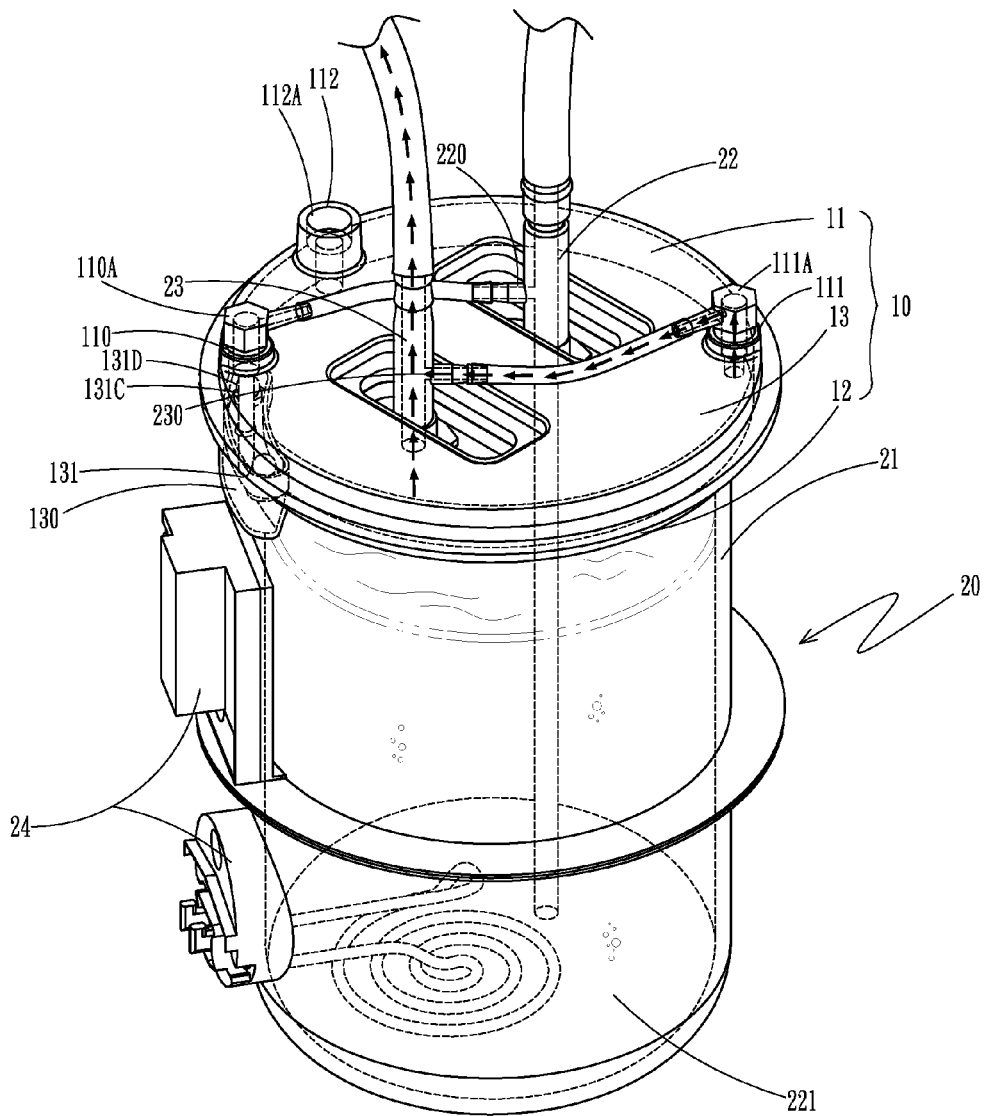


Fig.4

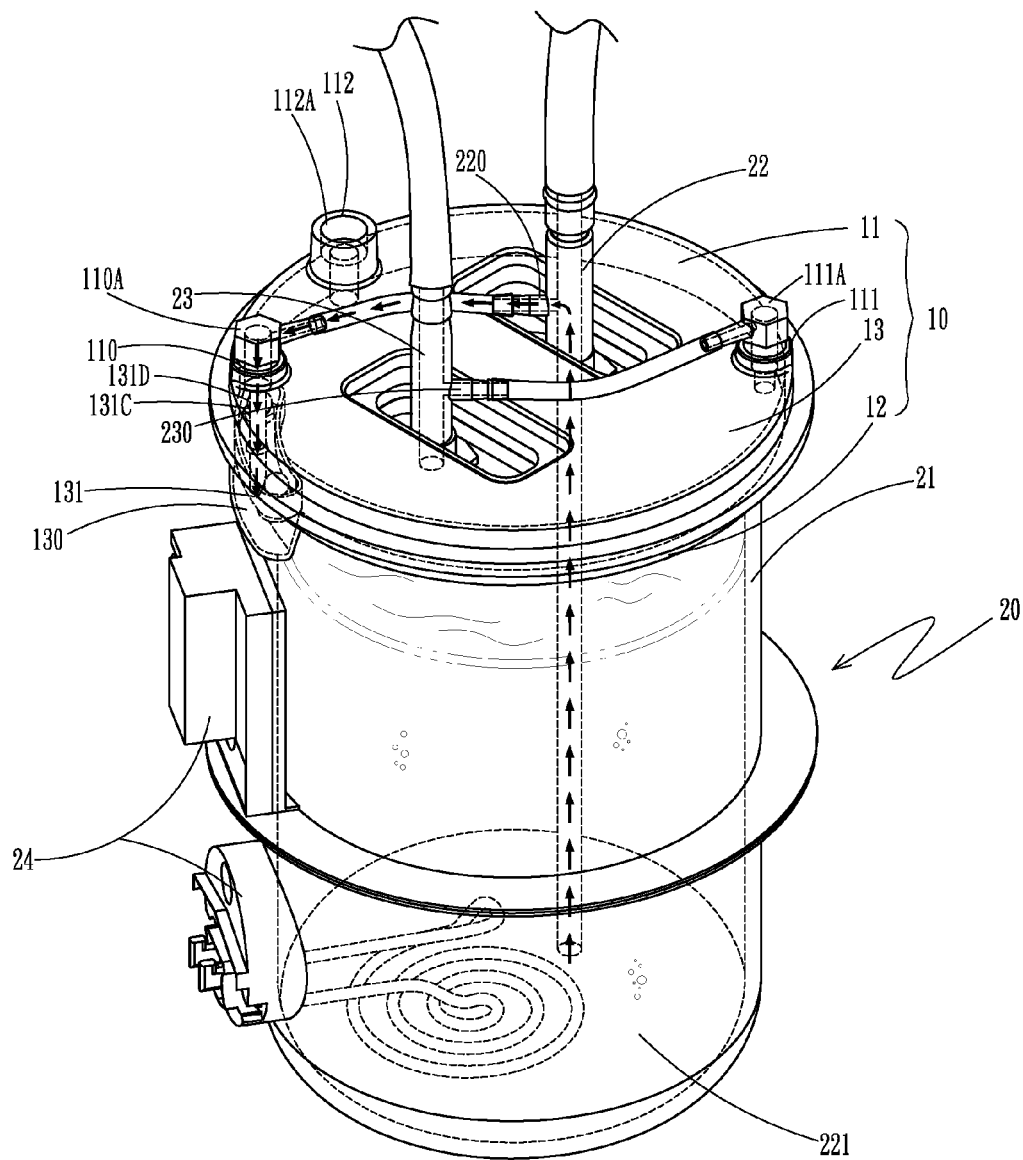


Fig.5

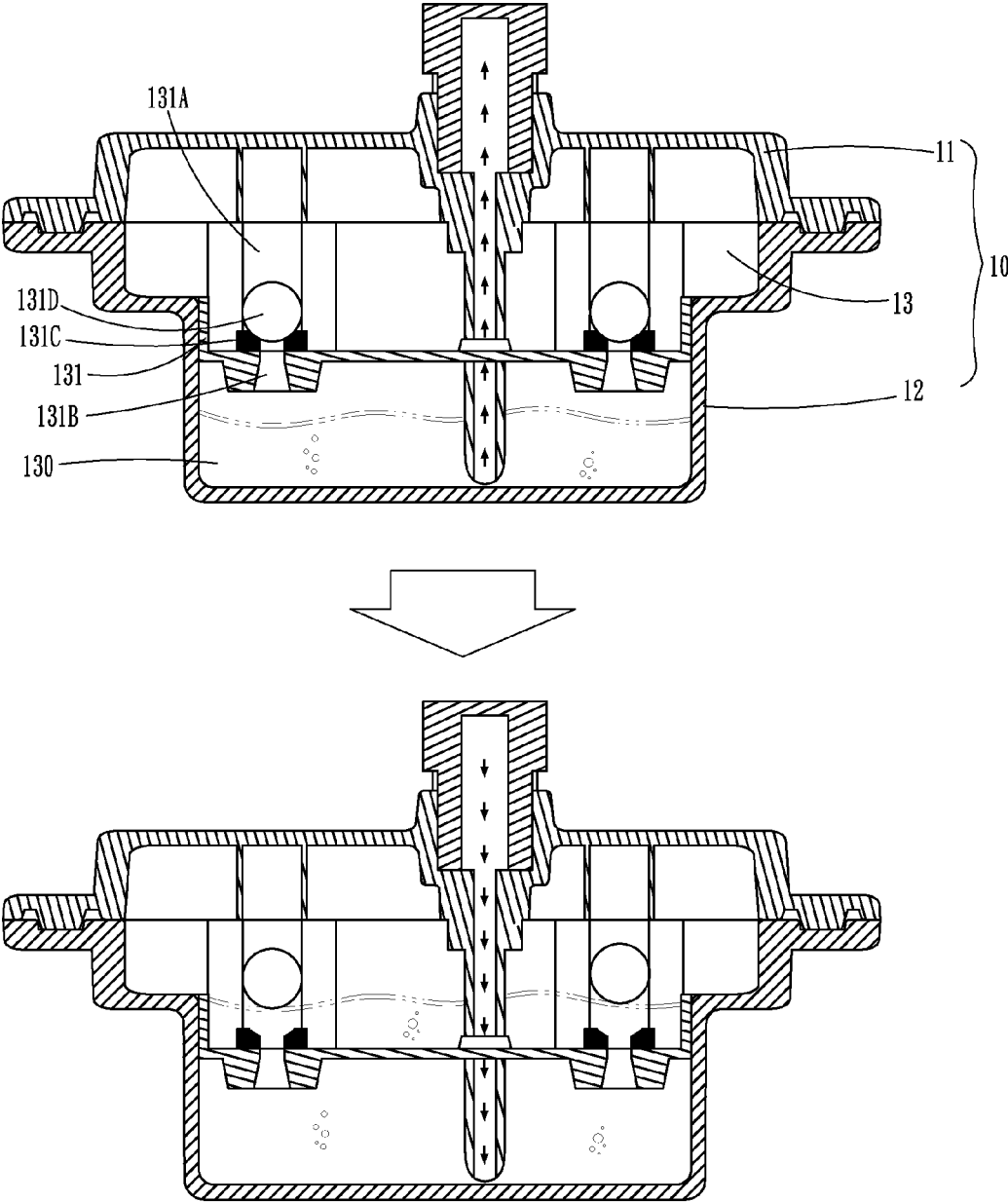
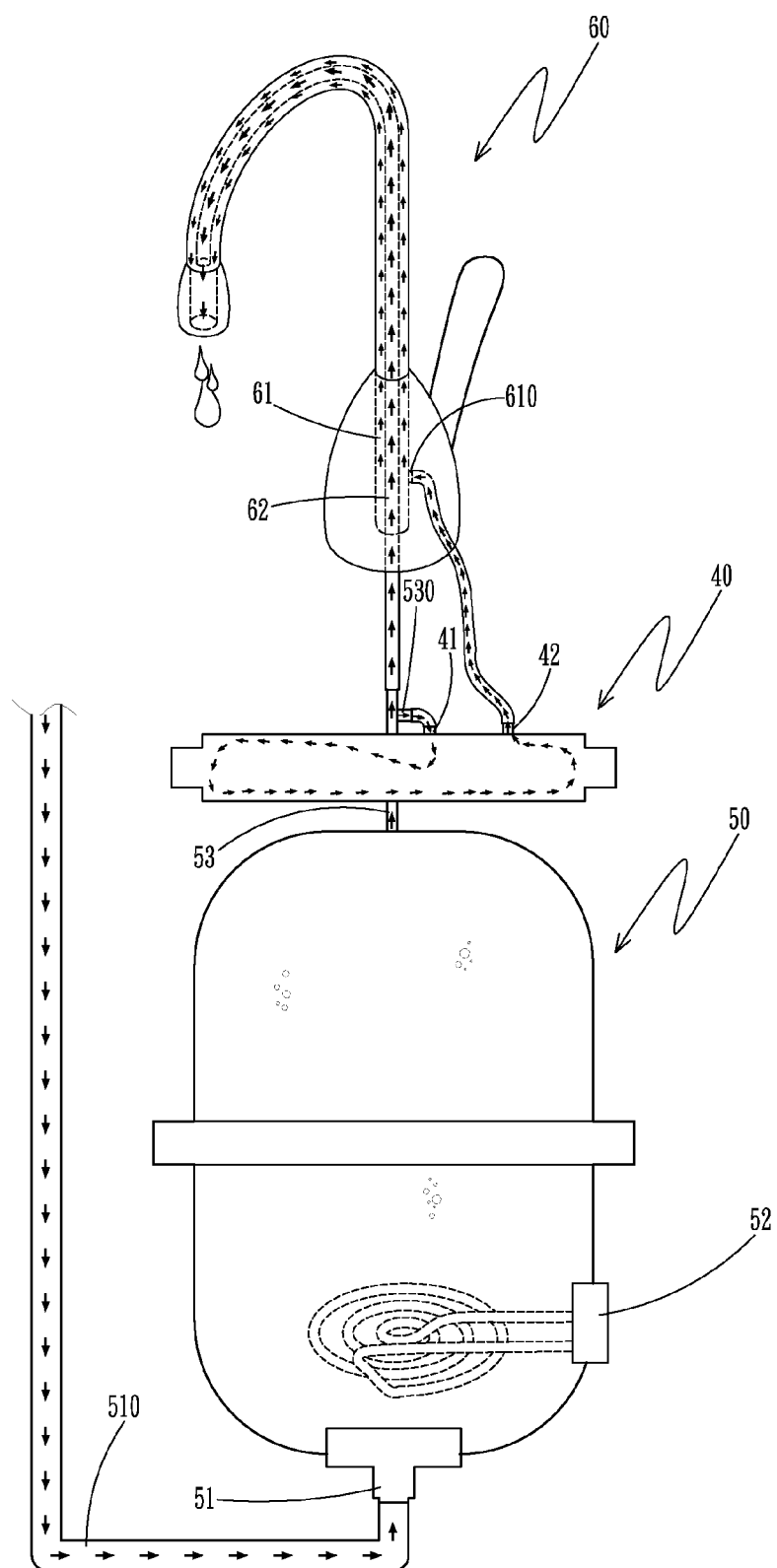


Fig.6



Prior Art
FIG. 7

VAPOR RECOVERY AND WATER COLLECTION BOX STRUCTURE OF HEATING BARREL

FIELD OF THE INVENTION

[0001] The present invention relates to a vapor recovery and water collection box structure of a heating barrel, and more particularly to a vapor recovery and water collection box structure applied to a build-in closet hot water dispenser.

BACKGROUND OF THE INVENTION

[0002] A build-in closet hot water dispenser, as shown in FIG. 7, comprises a vapor and water collection box 40, a heating barrel 50, and a kitchen faucet 60. The top side of the vapor and water collection box 40 is provided with a vapor inlet connecting tube 41 and a vapor outlet connecting tube 42. The bottom side of the heating barrel 50 has a water inlet 51. The water inlet 51 is connected with a cold water inlet tube 510. The heating barrel 50 is provided with a heating device 52 disposed close to its bottom edge thereof. The top side of the heating barrel 50 is provided with a hot water outlet tube 53. The side of the hot water outlet tube 53 has a vapor guide outlet 530. The kitchen faucet 60 comprises an outer tube 61 and an inner tube 62 in the outer tube 61. The outer tube 61 has a vapor vent 610 disposed close to its bottom edge thereof. The vapor inlet connecting tube 41 of the vapor and water collection box 40 is connected with the vapor guide outlet 530 of the hot water outlet tube 53 of the heating barrel 50. The vapor outlet connecting tube 42 of the vapor and water collection box 40 is connected with the vapor vent 610 of the outer tube 61 of the kitchen faucet 60. The hot water outlet tube 53 of the heating barrel 50 is connected with the inner tube 62 of the kitchen faucet 60. When the water stored in the heating barrel 50 is heated, the vapor generated by heating is guided from the vapor inlet connecting tube 41 to the vapor and water collection box 40 through the vapor guide outlet 530 of the hot water outlet tube 53, and then the vapor is guided to the vapor outlet connecting tube 42 and exhausted from the vapor vent 610 of the outer tube 61 of the kitchen faucet 60. When the vapor is exhausted, the outer tube 61 of the kitchen faucet 60 will generate heat which may scald the user. Besides, the water inlet 51 is disposed at the bottom side of the heating barrel 50, which may cause water seepage. Accordingly, the inventor of the present invention has devoted himself based on his many years of practical experiences to solve these problems.

SUMMARY OF THE INVENTION

[0003] In view of the shortcomings of the conventional build-in closet hot water dispenser that is not safe for use and may cause water seepage, a vapor recovery and water collection box structure of a heating barrel of the present invention is achieved.

[0004] The primary object of the present invention is to provide a vapor recovery and water collection box structure of a heating barrel. The present invention comprises a vapor box, a heating barrel unit, and a faucet. The vapor box includes an upper box lid and a lower box tray. The upper box lid has a first guide opening, a second guide opening, and an air inlet. The first guide opening is fixedly connected with a backflow connecting tube. The second guide opening is fixedly connected with a check valve connecting tube. The air inlet is provided with a non-return air inlet valve. The

upper box lid and the lower box tray are sealed against each other to form an accommodation chamber therebetween. The accommodation chamber is provided with a water collection trough and a float ball seat above the water collection trough. The float ball seat has a plurality of float ball limit grooves defined therein. A bottom side of each float ball limit groove is formed with a guide hole. An inner side of the guide hole is provided with a check ring. A float ball is provided above the check ring. The float ball is able to float and displace relative to the corresponding float ball limit groove. The heating barrel unit includes a barrel body. A top side of the barrel body is provided with a water inlet duct and a water outlet duct. The barrel body is provided with a heating controller disposed close to a bottom edge thereof. A side of the water inlet duct is provided with a recovered water guide mouth. The water inlet duct is provided with a water inlet tube extending into the barrel body close to the bottom of the barrel body. A side of the water outlet duct is provided with a vapor guide mouth. The faucet includes an outer tube and an inner tube in the outer tube. The vapor box is fixedly disposed on top of the heating barrel unit. The backflow connecting tube of the first guide opening of the vapor box is connected to the recovered water guide mouth of the water inlet duct of the heating barrel unit. The check valve connecting tube of the second guide opening is connected to the vapor guide mouth of the water outlet duct. The water outlet duct of the heating barrel unit is connected with the inner tube of the faucet. By the characteristic that the specific gravity of cold water is greater than that of hot water, when the cold water is guided from the water inlet duct into the barrel body of the heating barrel unit and heated by operating the heating controller, the hot water and vapor after heating are stored at the upper part of the barrel body. The vapor and condensed water are guided to the water collection trough and the accommodation chamber of the vapor box from the recovered water guide mouth of the water inlet duct via the backflow connecting tube. The vapor is guided from the check valve connecting tube of the second guide opening of the vapor box to the vapor guide mouth of the water outlet duct, and then guided out from the water outlet duct to the inner tube of the faucet, preventing the accumulation of the vapor from generating biogas. The check valve connecting tube only guides out the vapor and restrains backflow of the condensed water. The vapor is guided out from the inner tube of the faucet, preventing the outer tube from generating heat. When the cold water is guided from the water inlet duct into the barrel body of the heating barrel unit, the recovered water guide mouth of the water inlet duct generates siphonage, allowing the condensed water in the water collection trough and the accommodation chamber of the vapor box to be siphoned to the recovered water guide mouth of the water inlet duct and flow back into the barrel body of the heating barrel unit, preventing the waste of a water resource. After the condensed water of the water collection trough of the vapor box flows back, the float balls in the float ball seat descend relative to the float ball limit grooves, and the float balls abut against the check rings provided in the guide holes so that the vapor box is in a vacuum state to prevent the presence of air when the hot water is guided out from the water outlet duct, such that the hot water is in the form of a forward flow rather than a diffuse flow to prevent the user from being scalded. Besides, the water inlet duct and the water outlet duct are disposed on the top side of the barrel body of the

heating barrel unit, preventing water seepage. The present invention is safe for use and able to prevent leaks.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a perspective view of a vapor recovery and water collection box structure of a heating barrel of the present invention;

[0006] FIG. 2 is an exploded view of the vapor recovery and water collection box structure of the heating barrel of the present invention;

[0007] FIG. 3 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the vapor condensed into water to be recovered by siphonage;

[0008] FIG. 4 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the vapor is guided out;

[0009] FIG. 5 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the vapor and water flow back to the water collection trough;

[0010] FIG. 6 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the float ball in the water collection trough is actuated; and

[0011] FIG. 7 is a schematic view of a conventional build-in closet hot water dispenser.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] Advantages and features of the inventive concept and methods of accomplishing the same may be understood more readily by reference to the following detailed description of embodiments and the accompanying drawings. The inventive concept may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein.

[0013] FIG. 1 is a perspective view of a vapor recovery and water collection box structure of a heating barrel of the present invention. FIG. 2 is an exploded view of the vapor recovery and water collection box structure of the heating barrel of the present invention. The present invention comprises a vapor box 10, a heating barrel unit 20, and a faucet 30.

[0014] The vapor box 10 includes an upper box lid 11 and a lower box tray 12. The upper box lid 11 has a first guide opening 110, a second guide opening 111, and an air inlet 112. The first guide opening 110 is fixedly connected with a backflow connecting tube 110A. The second guide opening 111 is fixedly connected with a check valve connecting tube 111A. The air inlet 112 is provided with a non-return air inlet valve 112A. The upper box lid 11 and the lower box tray 12 are sealed against each other to form an accommodation chamber 13 therebetween. The accommodation chamber 13 is provided with a water collection trough 130 and a float ball seat 131 above the water collection trough 130. The float ball seat 131 has a plurality of float ball limit grooves 131A defined therein. A bottom side of each float ball limit groove 131A is formed with a guide hole 131B. An inner side of the guide hole 131B is provided with a check ring 131C. A float ball 131D is provided above the check ring 131C. The float ball 131D is able to float and displace relative to the corresponding float ball limit groove 131A.

[0015] The heating barrel unit 20 includes a barrel body 21. A top side of the barrel body 21 is provided with a water inlet duct 22 and a water outlet duct 23. The barrel body 21 is provided with a heating controller 24 disposed close to a bottom edge thereof. A side of the water inlet duct 22 is provided with a recovered water guide mouth 220. The water inlet duct 22 is provided with a water inlet tube 22 extending into the barrel body 21 close to the bottom of the barrel body 21. A side of the water outlet duct 23 is provided with a vapor guide mouth 230. The vapor box 10 is fixedly disposed on top of the heating barrel unit 20. The backflow connecting tube 110A of the first guide opening 110 of the vapor box 10 is connected to the recovered water guide mouth 220 of the water inlet duct 22. The check valve connecting tube 111A of the second guide opening 111 is connected to the vapor guide mouth 230 of the water outlet duct 23.

[0016] The faucet 30 includes an outer tube 31 and an inner tube 32 in the outer tube 31. The inner tube 32 is connected with the water outlet duct 23 of the heating barrel unit 20.

[0017] Through the cooperation of the aforesaid structure, the vapor recovery and water collection box structure of the heating barrel of the present invention is achieved.

[0018] FIG. 2 is an exploded view of the vapor recovery and water collection box structure of the heating barrel of the present invention. FIG. 3 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the vapor condensed into water to be recovered by siphonage. FIG. 4 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the vapor is guided out. FIG. 5 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the vapor and water flow back to the water collection trough. FIG. 6 is a schematic view of the vapor recovery and water collection box structure of the heating barrel of the present invention, showing that the float ball in the water collection trough is actuated. The vapor box 10 is fixedly disposed on top of the heating barrel unit 20. The backflow connecting tube 110A of the first guide opening 110 of the vapor box 10 is connected to the recovered water guide mouth 220 of the water inlet duct 22 of the heating barrel unit 20. The check valve connecting tube 111A of the second guide opening 111 is connected to the vapor guide mouth 230 of the water outlet duct 23. The water outlet duct 23 of the heating barrel unit 20 is connected with the inner tube 32 of the faucet 30. By the characteristic that the specific gravity of cold water is greater than that of hot water, when the cold water is guided from the water inlet duct 22 into the barrel body 21 of the heating barrel unit 20 and heated by operating the heating controller 24, the hot water and vapor after heating are stored at the upper part of the barrel body 21. The vapor and condensed water are guided to the water collection trough 130 and the accommodation chamber 13 of the vapor box 10 from the recovered water guide mouth 220 of the water inlet duct 22 via the backflow connecting tube 110A, referring to FIG. 5. The vapor is guided from the check valve connecting tube 111A of the second guide opening 111 of the vapor box 10 to the vapor guide mouth 230 of the water outlet duct 23, and then guided out from the water outlet duct 23 to the inner tube 32 of the faucet 30, preventing the accumulation of the vapor

from generating biogas. The check valve connecting tube 111A only guides out the vapor and restrains backflow of the condensed water, referring to FIG. 4. The vapor is guided out from the inner tube 32 of the faucet 30, preventing the outer tube 31 from generating heat. When the cold water is guided from the water inlet duct 22 into the barrel body 21 of the heating barrel unit 20, the recovered water guide mouth 220 of the water inlet duct 22 generates siphonage, allowing the condensed water in the water collection trough 130 and the accommodation chamber 13 of the vapor box 10 to be siphoned to the recovered water guide mouth 220 of the water inlet duct 22 and flow back into the barrel body 21 of the heating barrel unit 20, referring to FIG. 3, preventing the waste of the water resource. After the condensed water of the water collection trough 130 of the vapor box 10 flows back, the float balls 131D in the float ball seat 131 descend relative to the float ball limit grooves 131A, and the float balls 131D abut against the check rings 131C provided in the guide holes 131B so that the vapor box 10 is in a vacuum state, referring to FIG. 3, to prevent the presence of air when the hot water is guided out from the water outlet duct 23, such that the hot water is in the form of a forward flow rather than a diffuse flow to prevent the user from being scalded. Besides, the water inlet duct 22 and the water outlet duct 23 are disposed on the top side of the barrel body 21 of the heating barrel unit 20, preventing water seepage. The present invention is safe for use and able to prevent leaks.

[0019] Although particular embodiments of the present invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the present invention. Accordingly, the present invention is not to be limited except as by the appended claims.

What is claimed is:

1. A vapor recovery and water collection box structure of a heating barrel, comprising:

a vapor box, the vapor box including an upper box lid and a lower box tray, the upper box lid having a first guide opening, a second guide opening, and an air inlet, the first guide opening being fixedly connected with a backflow connecting tube, the second guide opening being fixedly connected with a check valve connecting tube, the air inlet being provided with a non-return air inlet valve, the upper box lid and the lower box tray being sealed against each other to form an accommodation chamber therebetween, the accommodation chamber being provided with a water collection trough and a float ball seat above the water collection trough, the float ball seat having a plurality of float ball limit grooves defined therein, a bottom side of each float ball limit groove being formed with a guide hole, a float ball being provided above the guide hole, the float ball being able to float and displace relative to a corresponding one of the float ball limit grooves.

2. The vapor recovery and water collection box structure of a heating barrel as claimed in claim 1, wherein an inner side of the guide hole is provided with a check ring, wherein when the float ball in the corresponding float ball limit groove descends, the float ball is to abut against the check ring.

3. A vapor recovery and water collection box structure of a heating barrel, comprising:

a vapor box, the vapor box including an upper box lid and a lower box tray, the upper box lid having a first guide opening, a second guide opening, and an air inlet, the first guide opening being fixedly connected with a backflow connecting tube, the second guide opening being fixedly connected with a check valve connecting tube, the air inlet being provided with a non-return air inlet valve, the upper box lid and the lower box tray being sealed against each other to form an accommodation chamber therebetween, the accommodation chamber being provided with a water collection trough and a float ball seat above the water collection trough, the float ball seat having a plurality of float ball limit grooves defined therein, a bottom side of each float ball limit groove being formed with a guide hole, a float ball being provided above the guide hole, the float ball being able to float and displace relative to a corresponding one of the float ball limit grooves.

a heating barrel unit, the heating barrel unit including a barrel body, a top side of the barrel body being provided with a water inlet duct and a water outlet duct, the barrel body being provided with a heating controller disposed close to a bottom edge thereof, a side of the water inlet duct being provided with a recovered water guide mouth, the water inlet duct being provided with a water inlet tube extending into the barrel body close to a bottom of the barrel body, a side of the water outlet duct being provided with a vapor guide mouth, the vapor box being fixedly disposed on top of the heating barrel unit, the backflow connecting tube of the first guide opening of the vapor box being connected to the recovered water guide mouth of the water inlet duct, the check valve connecting tube of the second guide opening being connected to the vapor guide mouth of the water outlet duct; and

a faucet, the faucet including an outer tube and an inner tube in the outer tube, the inner tube being connected with the water outlet duct of the heating barrel unit.

4. The vapor recovery and water collection box structure of a heating barrel as claimed in claim 3, wherein an inner side of the guide hole is provided with a check ring, wherein when the float ball in the corresponding float ball limit groove descends, the float ball is to abut against the check ring.

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