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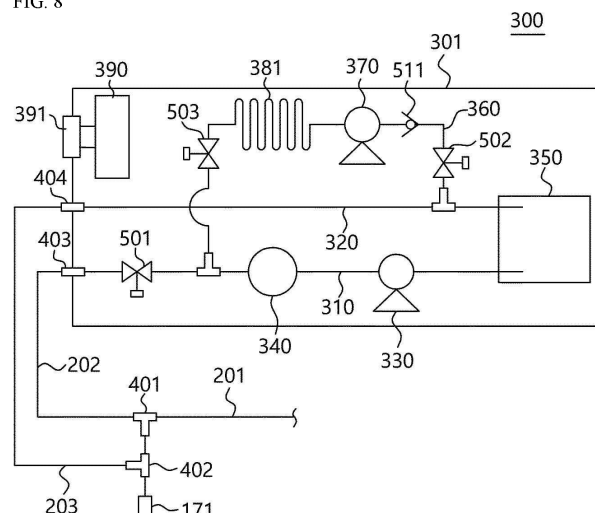
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(54) **HOT WATER KIT AND REFRIGERATOR HAVING SAME**

(57) The present invention provides a hot water kit and a refrigerator having the hot water kit, the kit comprising: a heating unit which receives drinking water from a raw water line and heats same; and a water return unit which returns and stores drinking water re-

maining on a flow path. Accordingly, hightemperature drinking water can be supplied, and drinking water remaining on the flow path when the kit is not in use can be preferentially heated during a subsequent heating operation and then provided.

FIG. 8



Description

[0001] The present disclosure relates to a new type of hot water kit that may be selectively installed in a refrigerator and may supply a beverage by using hot water, and to a refrigerator having the hot water kit.

[0002] In general, a refrigerator is a home appliance provided to store various foods or beverages for a long period of time by using cold air generated by circulation of a refrigerant according to a refrigeration cycle.

[0003] Recently, refrigerators have been configured to have various functions in addition to a function of simply storing items at a low temperature. For example, by providing a dispenser configured to purify and provide water in a refrigerator, the refrigerator may also perform a function of a water purifier.

[0004] The dispenser may be provided in a door of the refrigerator. Accordingly, a user may easily receive purified water through the dispenser without taking out water, such as bottled water, stored in the refrigerator.

[0005] Refrigerators having such dispensers are variously disclosed in Korean Patent Application Publication No. 10-2005-0004927 (Prior Art 1), Korean Patent Application Publication No. 10-2004-0078299 (Prior Art 2), Korean Patent Application Publication No. 10-2011-0060091 (Prior Art 3), Korean Patent Application Publication No. 10-2011-0084789 (Prior Art 4), Korean Patent No. 10-0590498 (Prior Art 5), and the like.

[0006] In particular, recently, hot water may also be provided through the dispenser, thereby enabling the refrigerator to be utilized in more various ways.

[0007] For the dispenser that provides the hot water, a heater for heating the hot water is disposed on a flow path through which the hot water flows to the dispenser. Accordingly, purified water or hot water may be selectively supplied by on/off control of the heater according to a user's need.

[0008] However, in the case of the dispenser that provides the hot water function, because the heater is disposed in the flow path, hot water could not be supplied from a conventional dispenser that provides only a purified water function. That is, because the work of disposing the heater in the flow path requires specialized technology, it was difficult for a general consumer to perform work of disassembling the refrigerator in order to add the hot water function to the conventional dispenser.

[0009] In addition, because a conventional dispenser that provides a hot water function merely heats water flowing according to on/off control of a valve, the hot water could not be supplied at high pressure. Accordingly, various beverages (for example, coffee prepared from ground coffee) could not be prepared using the hot water.

[0010] Meanwhile, U.S. Patent Application Publication No. 2020-0121122 (Prior Art 6) provides a structure in which a water pump is disposed in a water pipe to

which water is supplied, and a beverage making box is disposed in a dispenser. Accordingly, in a refrigerator having a dispenser, a beverage can be prepared with high-pressure hot water.

[0011] However, as in Prior Art 6, there is an inconvenience in that the water pump provided in the water pipe must be installed as close as possible to the dispenser. That is, as the length of the water pipe connecting the water pump and the dispenser increases, the amount of water remaining in the water pipe and flowing out in an unheated state increases. Accordingly, user dissatisfaction may increase.

[0012] In addition, because the water pump must be located adjacent to the dispenser, there is a problem in that maintenance is difficult. That is, when operation failure of the water pump occurs, there is an inconvenience in that the entire refrigerator door must be disassembled to take out the water pump.

[0013] An objective of the present disclosure is to allow a structure for supplying hot water to a dispenser part to be provided separately from a refrigerator and to be selectively installed in the refrigerator. That is, an objective of the present disclosure is to allow hot water to be supplied by additionally providing only a hot water kit to a refrigerator having an existing dispenser.

[0014] Another objective of the present disclosure is to allow the hot water kit for supplying hot water to the dispenser part to be easily installed or removed, thereby facilitating maintenance.

[0015] Still another objective of the present disclosure is to allow drinking water remaining in a flow path after hot water is supplied to be reused during subsequent supply of hot water without being discarded.

[0016] Still another objective of the present disclosure is to allow recovered water to be preferentially heated and supplied when hot water is supplied.

[0017] According to a refrigerator of the present disclosure, a hot water kit for heating drinking water supplied to a dispenser part may be provided.

[0018] According to the refrigerator of the present disclosure, the hot water kit may receive and heat drinking water from a raw water line.

[0019] According to the refrigerator of the present disclosure, the hot water kit may include a heating part configured to receive and heat drinking water from the raw water line. By providing the heating part, hot water may be supplied to the dispenser part.

[0020] According to the refrigerator of the present disclosure, the hot water kit may include a water recovery part configured to recover and store drinking water remaining in a flow path connected to the dispenser part. Due to the provision of the water recovery part, unheated drinking water remaining in the flow path may be prevented from being supplied when hot water is subsequently supplied.

[0021] According to the refrigerator of the present disclosure, the hot water kit may be provided in at least one of the cabinet and the door.

[0022] According to the refrigerator of the present disclosure, the hot water kit may be provided to be removable from at least one of the cabinet and the door.

[0023] According to the refrigerator of the present disclosure, a mounting recess may be formed in an outer surface of the door, and the hot water kit may be detachably mounted in the mounting recess. Accordingly, maintenance of the hot water kit may be easily performed.

[0024] According to the refrigerator of the present disclosure, the mounting recess may be formed to be recessed in an upper surface of the door. Accordingly, the hot water kit may be prevented from being exposed to the outside.

[0025] According to the refrigerator of the present disclosure, the hot water kit may include a first guide line connected to a first branch line branched from the raw water line and configured to guide a flow of drinking water to the heating part.

[0026] According to the refrigerator of the present disclosure, a first valve may be provided in the first guide line of the hot water kit. Accordingly, a flow of drinking water pumped by a water pump may be selectively blocked.

[0027] According to the refrigerator of the present disclosure, the hot water kit may include a second guide line configured to guide a discharge flow of drinking water heated in the heating part.

[0028] According to the refrigerator of the present disclosure, the second guide line of the hot water kit may be connected to the raw water line. Accordingly, drinking water heated in the heating part may pass through the second guide line and then be supplied to the dispenser part through the raw water line.

[0029] According to the refrigerator of the present disclosure, the heating part of the hot water kit may include the water pump for pumping drinking water of the raw water line through the first guide line.

[0030] According to the refrigerator of the present disclosure, the heating part of the hot water kit may include a heater for heating drinking water pumped through the first guide line.

[0031] According to the refrigerator of the present disclosure, the water recovery part of the hot water kit may include a third guide line configured to guide a flow of drinking water.

[0032] According to the refrigerator of the present disclosure, the third guide line of the hot water kit may be connected to the second guide line.

[0033] According to the refrigerator of the present disclosure, the water recovery part of the hot water kit may include a water recovery pump for pumping and recovering drinking water in the second guide line and a second branch line connected to the second guide line.

[0034] According to the refrigerator of the present disclosure, the water recovery pump may be provided

in the third guide line and may pump drinking water.

[0035] According to the refrigerator of the present disclosure, the water recovery part of the hot water kit may include a storage part for storing drinking water.

[0036] According to the refrigerator of the present disclosure, a second valve configured to selectively block a corresponding flow path may be provided at a drinking water inlet side of the water recovery pump in the third guide line.

[0037] According to the refrigerator of the present disclosure, a third valve configured to selectively block a corresponding flow path may be provided at a drinking water outlet side of the storage part in the third guide line.

[0038] According to the refrigerator of the present disclosure, the storage part of the hot water kit may be formed as a tube extending from the third guide line.

[0039] According to the refrigerator of the present disclosure, the storage part formed as a flow path may have a length greater than a length of the second guide line.

[0040] According to the refrigerator of the present disclosure, the storage part formed as a flow path may have a length greater than a length of the second branch line.

[0041] According to the refrigerator of the present disclosure, the storage part formed as a flow path may have a length greater than a combined length of the second guide line and the second branch line.

[0042] According to the refrigerator of the present disclosure, the storage part formed as a flow path may be wound multiple times.

[0043] According to the refrigerator of the present disclosure, the storage part may be formed as a chamber in which recovered water is stored.

[0044] According to the refrigerator of the present disclosure, the water recovery part of the hot water kit may include the third guide line connected to the second guide line.

[0045] According to the refrigerator of the present disclosure, the water recovery part of the hot water kit may include a fourth guide line branched from the third guide line and connected to the second branch line.

[0046] According to the refrigerator of the present disclosure, the water recovery part of the hot water kit may include a fifth guide line branched from the third guide line and connected to the first branch line.

[0047] According to the refrigerator of the present disclosure, a fourth valve provided in the fourth guide line and configured to selectively block a corresponding flow path may be included.

[0048] According to the refrigerator of the present disclosure, a fifth valve provided in the fifth guide line and configured to selectively block a corresponding flow path may be included.

[0049] According to the refrigerator of the present disclosure, the refrigerator may further include a controller configured to control operations of the heating

part and the water recovery part.

[0050] According to the refrigerator of the present disclosure, when a heating operation of the heating part is terminated, the controller may control operation of the water recovery part such that the drinking water remaining in the flow path connected to the dispenser part is recovered and stored.

[0051] According to the refrigerator of the present disclosure, when the heating operation of the heating part is started, the controller may control blocking of supply of the drinking water of the raw water line to the heating part until the drinking water stored in the water recovery part passes through the heating part and is supplied to the dispenser part.

[0052] According to the refrigerator of the present disclosure, the heating part and the water recovery part may be provided as separate modules to improve space utilization.

[0053] According to the refrigerator of the present disclosure, the heating part and the water recovery part may be respectively installed at different portions of the door.

[0054] According to the refrigerator of the present disclosure, the heating part may be installed on an upper surface of the door so as not to affect a temperature in a storage compartment.

[0055] According to the refrigerator of the present disclosure, the water recovery part may be located closer to the dispenser part than the heating part in the door.

[0056] According to the hot water kit of the present disclosure for achieving the above-described objectives, the hot water kit may include the first guide line connected to the first branch line branched from the raw water line and configured to guide a flow of drinking water; the heating part configured to heat the drinking water guided through the first guide line; the second guide line connected to the second branch line connected to an outlet side of the raw water line and configured to guide a discharge flow of the drinking water heated in the heating part; and the water recovery part configured to recover and store drinking water remaining in the second guide line or in the second guide line and the second branch line.

[0057] According to the hot water kit of the present disclosure, the heating part may include the water pump provided in the first guide line and configured to pump drinking water of the raw water line, and the heater configured to heat the drinking water pumped through the first guide line and discharge the heated drinking water to the second guide line.

[0058] According to the hot water kit of the present disclosure, the first valve configured to selectively block a flow of the drinking water pumped by the water pump may be provided in the first guide line.

[0059] According to the hot water kit of the present disclosure, the water recovery part may include the third guide line branched from the second guide line

and configured to guide a flow of drinking water, the water recovery pump provided in the third guide line and configured to pump and recover the drinking water in the second guide line and the second branch line connected to the second guide line, and the storage part configured to store the drinking water recovered by the water recovery pump.

[0060] According to the hot water kit of the present disclosure, the second valve configured to selectively block a corresponding flow path may be provided at the drinking water inlet side of the water recovery pump in the third guide line, and the third valve configured to selectively block a corresponding flow path may be provided at the drinking water outlet side of the storage part in the third guide line.

[0061] According to the refrigerator of the present disclosure, the hot water kit formed as a separate module may be additionally provided, thereby enabling hot water to be supplied.

[0062] In addition, according to the refrigerator of the present disclosure, the hot water kit may be selectively attached and detached, thereby enabling only the hot water kit to be additionally provided to an existing refrigerator having the dispenser part.

[0063] In addition, according to the refrigerator of the present disclosure, each branch line branched from the raw water line and an electric wire may be connected to the hot water kit by using connectors, thereby enabling the hot water kit to be easily attached and detached.

[0064] In addition, according to the present disclosure, water remaining in a tube after hot water is supplied may be recovered, and the recovered water may be preferentially heated and then supplied when hot water is subsequently supplied, thereby resolving user dissatisfaction due to residual water.

[0065] In addition, according to the present disclosure, high-pressure hot water may be supplied by using a water pump, thereby enabling extraction of a beverage requiring a high extraction pressure, such as ground coffee.

BRIEF DESCRIPTION OF THE DRAWINGS

[0066]

FIG. 1 is an external perspective view of a refrigerator according to an embodiment of the present disclosure.

FIG. 2 is an exploded perspective view of a door of the refrigerator to which a hot water kit according to the embodiment of the present disclosure is applied.

FIG. 3 is a cross-sectional view of the door of the refrigerator to which the hot water kit according to the embodiment of the present disclosure is applied.

FIG. 4 is a cross-sectional view of a main portion of the door of the refrigerator according to the embo-

diment of the present disclosure in a state in which the hot water kit is installed.

FIG. 5 is a perspective view of the hot water kit of the refrigerator according to the embodiment of the present disclosure.

FIG. 6 is a plan view of the hot water kit of the refrigerator according to the embodiment of the present disclosure.

FIG. 7 is a schematic view illustrating a state of the door of the refrigerator to which the hot water kit according to the embodiment of the present disclosure is applied.

FIG. 8 is a circuit diagram illustrating a state of a flow path between the hot water kit and a dispenser according to the embodiment of the present disclosure.

FIG. 9 is a state view illustrating another example of a storage part constituting the hot water kit according to the embodiment of the present disclosure.

FIG. 10 is a state view illustrating still another example of the storage part constituting the hot water kit according to the embodiment of the present disclosure.

FIGS. 11 to 16 are views illustrating states of respective operations of heating, recovering, and reheating drinking water by the hot water kit according to the embodiment of the present disclosure.

FIG. 17 is a schematic state view of a door of a refrigerator to which a hot water kit according to another embodiment of the present disclosure is applied.

FIG. 18 is a view illustrating a state of a heating part of the hot water kit according to another embodiment of the present disclosure.

FIG. 19 is a view illustrating a state of a water recovery part of the hot water kit according to another embodiment of the present disclosure.

FIGS. 20 to 22 are views illustrating states of flows of drinking water for respective situations in the water recovery part of the hot water kit according to the another embodiment of the present disclosure.

FIGS. 23 and 24 are state views illustrating still another embodiment in which the hot water kit of the refrigerator of the present disclosure is installed.

DETAILED DESCRIPTION

[0067] Prior to describing embodiments of the present disclosure, when adding reference numerals to components in each drawing, it should be noted that identical components are given the same reference numerals as much as possible even if they are shown in different drawings.

[0068] In addition, when describing the embodiments of the present disclosure, if a detailed description of the

relevant known configuration or function is judged to hinder understanding of the embodiments of the present disclosure, detailed descriptions thereof will be omitted.

[0069] In addition, in describing the components of the embodiments of the present disclosure, terms such as first, second, A, B, (a), and (b) may be used. These terms are only for distinguishing the components from other components, and the nature or order of the components is not limited by the terms. When a component is described as being "connected" or "coupled" to another component, the component may be directly connected to or coupled to the another component, but it should be understood that still another component may be "connected" or "coupled" thereto between each component..

[0070] Hereinafter, preferred embodiments of a hot water kit of the present disclosure and a refrigerator having the hot water kit will be described with reference to FIGS. 1 to 24.

[0071] FIG. 1 is an external perspective view of a refrigerator according to an embodiment of the present disclosure, FIG. 2 is an exploded perspective view of a door of the refrigerator to which a hot water kit according to the embodiment of the present disclosure is applied, and FIG. 3 is a cross-sectional view of the door of the refrigerator to which the hot water kit according to the embodiment of the present disclosure is applied.

[0072] As illustrated in these drawings, the refrigerator according to the embodiment of the present disclosure may have a dispenser part (170) and may additionally include a hot water kit (300). Accordingly, hot water may also be supplied.

[0073] The hot water kit according to the embodiment of the present disclosure and the refrigerator having the hot water kit will be described in more detail for each component.

[0074] First, the refrigerator according to the embodiment of the present disclosure may include a cabinet (110) forming an exterior appearance.

[0075] The cabinet (110) may be formed in the shape of a box having an open front surface.

[0076] A storage compartment (101) may be provided inside the cabinet (110). The storage compartment (101) may be a space in which items, such as food, beverages, or food products, are stored. The storage compartment (101) may be configured to store the items stored in the space for a long period of time by using cold air generated by a refrigeration cycle.

[0077] Next, the refrigerator according to the embodiment of the present disclosure may include a door (150).

[0078] The open front surface of the main body may be opened and closed by the door. That is, the storage compartment (101) may be opened and closed by the door (150).

[0079] The door (150) may be provided with an ice maker (160) for making ice or an ice bank (not shown)

in which ice is stored.

[0080] The door (150) may be provided as one door, or one door may be provided for each storage compartment (101).

[0081] Next, the refrigerator according to the embodiment of the present disclosure may include the dispenser part (170).

[0082] The dispenser part (170) may be defined as a portion on which a cup or container is seated to receive drinking water or ice, or as a device or structure including the portion.

[0083] The dispenser part (170) may be provided on an outer surface (a surface exposed to an indoor space) of the door (150). Accordingly, a user may receive drinking water or ice from the outside without opening the door (150).

[0084] The dispenser part (170) may be provided with a dispensing nozzle (171)(see FIGS. 3 and 8).

[0085] The dispensing nozzle (171) may receive drinking water from a raw water line (201) and supply the drinking water to a cup or container seated in the dispenser part (170). In this case, the raw water line (201) may be a tube, a pipe, or a hose connected to a water supply provided outside the refrigerator or to a container storing drinking water. In addition, the raw water line (201) may be installed to be connected along the inside of the door (150) of the refrigerator up to the dispenser part (170).

[0086] Although not shown, a filter device may be provided in the raw water line (201). The filter device may purify water supplied to the raw water line (201) into purified water suitable for drinking.

[0087] A manipulation part (151) (see FIG. 2) through which drinking water supplied through the dispenser part (170) is selected may be provided at a portion of the door (150) at which the dispenser part (170) is provided. The manipulation part (151) may be configured as a button or a touch panel. In this case, supply of any one of purified water and hot water (heated water) may be selected through the manipulation part (151). Of course, the manipulation part (151) may be configured to adjust a temperature of hot water or adjust a pressure of hot water.

[0088] The manipulation part (151) may also perform manipulation for controlling operation of the refrigerator.

[0089] Next, the refrigerator according to the embodiment of the present disclosure may include the hot water kit (300).

[0090] The hot water kit (300) may be a device configured to heat drinking water supplied to the dispensing nozzle (171) of the dispenser part (170) through the raw water line (201).

[0091] As illustrated in FIG. 2, the hot water kit (300) may be provided as a kit formed separately from the refrigerator and may be selectively installed in the refrigerator.

[0092] To this end, the hot water kit (300) may have a casing (301) forming an exterior appearance. In this

case, the casing (301) may be formed as a polygonal or rounded box having a closed inner space. Of course, the casing (301) may have an open upper surface when viewed with reference to FIG. 5, thereby allowing maintenance to be easily performed. The open upper surface of the casing (301) may be closed by a cover (301a).

[0093] The hot water kit (300) may be installed on an outer wall of the cabinet (110) of the refrigerator or an outer wall of the door (150).

[0094] For example, as illustrated in FIGS. 2 to 4, the hot water kit (300) may be installed on the upper surface of the door (150). To this end, a mounting recess (152) may be formed in the upper surface of the door (150), and the casing (301) of the hot water kit (300) may be received in the mounting recess (152) and detachably mounted therein.

[0095] That is, the above-described hot water kit (300) may be mounted on the door (150) of an existing refrigerator having the dispenser part (170) and connected to the dispenser part (170), thereby enabling hot water to be supplied to the dispenser part (170). The mounting recess (152) may be closed by a cover (154).

[0096] When the hot water kit (300) is mounted in the mounting recess (152), a vibration absorbing member (153) (see FIG. 4) may be preferably provided between an inner wall of the mounting recess (152) and an outer wall of the casing (301) of the hot water kit (300). That is, the vibration absorbing member (153) may prevent vibration generated during operation of the hot water kit (300) from being transmitted to the door (150) or the cabinet (110) of the refrigerator.

[0097] The vibration absorbing member (153) may be formed of a heat insulating material capable of preventing heat conduction. Accordingly, heat generated by the operation of the hot water kit (300) may be prevented from being conducted to the door (150) of the refrigerator.

[0098] At least a portion of the vibration absorbing member (153) may be provided on at least one surface among outer wall surfaces of the casing (301) constituting the hot water kit (300). However, in order to improve vibration blocking performance, it is most preferable that the vibration absorbing member (153) be provided at least partially on all outer wall surfaces of the casing (301).

[0099] The hot water kit (300) may be selectively connected to a branch line branched from the raw water line (201). Accordingly, the hot water kit (300) may receive raw water from the raw water line (201), selectively heat the raw water, and then provide the heated raw water through the raw water line to the dispenser part (170).

[0100] As illustrated in the accompanying FIGS. 7 and 8, the branch line may include a first branch line (202) configured to supply drinking water to the hot water kit (300). The first branch line (202) may be con-

nected to one portion of the raw water line (201) by using a first connector (401). The first connector (401) may be a three-way connector, and the first branch line (202) may be connected to one end of the first connector (401) and receive drinking water passing through the raw water line (201).

[0101] The first branch line (202) may be connected along the inside of the door (150) of the refrigerator. For example, the first branch line (202) may be formed to be connected from the raw water line (201) along the inside of the door (150) to the inside of the mounting recess (152) formed in the upper surface of the door (150).

[0102] In addition, as illustrated in the accompanying FIGS. 7 and 8, the branch line may include a second branch line (203) configured to receive heated water from the hot water kit (300). The second branch line (203) may be connected to another portion of the raw water line (201) by using a second connector (402). The second connector (402) may be a three-way connector, and the second branch line (203) may be connected to one end of the second connector (402) and provide drinking water (heated water) passing through the hot water kit (300) to the raw water line (201).

[0103] The second branch line (203) (or the second connector) may be connected to the raw water line (201) at a position between a portion of the raw water line (201) to which the first branch line (202) is connected and a portion of the raw water line (201) connected to the dispenser part (170).

[0104] The second branch line (203) may be connected along the inside of the door (150) of the refrigerator. For example, the second branch line (203) may be formed to be connected from the raw water line (201) along the inside of the door (150) to the inside of the mounting recess (152) formed in the upper surface of the door (150).

[0105] Meanwhile, check valves (not shown) may be provided to prevent backflow of drinking water in each of the branch lines (202, 203). In this case, the check valves may be provided in the branch lines (202, 203), respectively, or may be provided in the first connector (401) connected to the first branch line (202) and the second connector (402) connected to the second branch line (203), respectively.

[0106] Next, the structure of the hot water kit according to the embodiment of the present disclosure will be described in more detail with reference to the accompanying FIGS. 5 to 8. Here, FIG. 5 is a perspective view of the hot water kit of the refrigerator according to the embodiment of the present disclosure, and FIG. 6 is a plan view of the hot water kit of the refrigerator according to the embodiment of the present disclosure. In addition, FIG. 7 is a schematic view illustrating a state of the door of the refrigerator to which the hot water kit according to the embodiment of the present disclosure is applied, and FIG. 8 is a circuit diagram illustrating a flow path state between the hot water kit and the dis-

penser according to the embodiment of the present disclosure.

[0107] First, the hot water kit (300) according to the embodiment of the present disclosure may include a first guide line (310).

[0108] The first guide line (310) may be defined as a flow path provided to guide a flow of drinking water up to a heater (350). That is, drinking water introduced into the hot water kit (300) may be guided by the first guide line (310) to pass through the heater (350).

[0109] The first guide line (310) may be connected to the first branch line (202) branched from the raw water line (201) and extending to the mounting recess (152) of the door (150).

[0110] To this end, a third connector (403) may be coupled to an end of the first guide line (310), and the third connector (403) may be installed on one sidewall of the casing (301) constituting the hot water kit (300) to be exposed to the outside. The first branch line (202) may be selectively connected to the third connector (403).

[0111] The first guide line (310) may be at least one of a tube, a pipe, and a hose made of metal, ceramic, or synthetic resin.

[0112] Next, the hot water kit (300) according to the embodiment of the present disclosure may include a second guide line (320).

[0113] The second guide line (320) may be defined as a flow path provided to guide a flow of drinking water from the heater (350) until the drinking water is discharged to the outside of the hot water kit (300). That is, drinking water passing through the heater (350) in the hot water kit (300) may be guided by the second guide line (320) to be discharged to the outside of the hot water kit (300) and supplied to the second branch line (203).

[0114] The second guide line (320) may be connected to the second branch line (203) branched from the raw water line (201) and extending to the mounting recess (152) of the door (150).

[0115] To this end, a fourth connector (404) may be coupled to one end of the second guide line (320), and the fourth connector (404) may be installed on one sidewall of the casing (301) constituting the hot water kit (300) to be exposed to the outside. The second branch line (203) may be selectively connected to the fourth connector (404).

[0116] The second guide line (320) may be at least one of a tube, a pipe, and a hose made of metal, ceramic, or synthetic resin.

[0117] Next, the hot water kit (300) according to the embodiment of the present disclosure may include a heating part (302).

[0118] The heating part (302) may be defined as a combination of components provided to heat drinking water received from the raw water line (201) through the first branch line (202), or as a region in which the components are arranged. For example, the heating

part (302) may be defined as a region in which drinking water introduced into the first guide line (310) flows until being discharged to the second guide line (302), and as components provided in the region.

[0119] The heating part (302) may include a water pump (330) provided in the first guide line (310). By a pumping operation of the water pump (330), drinking water passing through the raw water line (201) may flow through the first branch line (202) along the first guide line (310). In this case, the first guide line (310) may be provided with a first valve (501) configured to selectively block the flow of the drinking water pumped by the water pump (330). The first valve (501) may be configured as a solenoid valve operable under electronic control.

[0120] In particular, the water pump (330) may allow heated water supplied to the dispenser part (170) to be supplied at a high pressure. That is, high-pressure heated water may be supplied to the dispenser part (170) by the water pump (330).

[0121] Accordingly, the dispenser part (170) may be used not only as a device that simply supplies hot water but also for various uses, such as extracting beverages (for example, beverages, coffee, tea, or the like) by using high-pressure heated water.

[0122] Meanwhile, a flow meter (340) for measuring a flow rate may be provided between the first valve (501) and the water pump (330) in the first guide line (310).

[0123] The heating part (302) may include the heater (350) for heating drinking water flowing through the first guide line (310).

[0124] The heater (350) may be formed to have various structures.

[0125] As one example, the heater (350) may be formed as a water block heated by heat generation of a heating element (not shown). In this case, drinking water flowing along the first guide line (310) may be provided into the water block, heated by heat generation of the heating element, and then discharged to the outside of the water block. In this case, the heating element may be mounted in the water block or installed to be in contact with an outer surface of the water block.

[0126] In addition, when the heater (350) is formed as a water block, the other end of the second guide line (320) may be connected to the heater (350) (the water block) of the heating part (302). That is, drinking water heated while passing through the heater (350) may flow through the second guide line (320) and then be discharged to the second branch line (203).

[0127] As another example, although not shown, the heater (350) may be formed as a coil heater or a planar heating element, each surrounding the first guide line (310). When the heater (350) is formed as the coil heater or the planar heating element, it is preferable that the heater (350) be wrapped with a heat insulating material to prevent exposure of the heater (350) to the

outside.

[0128] Next, the hot water kit (300) according to the embodiment of the present disclosure may include a water recovery part (303).

[0129] The water recovery part (303) may be defined as a combination of components provided to recover and store drinking water remaining in the second branch line (203), or as a region in which the components are arranged. For example, the water recovery part (303) may be defined as a region in which drinking water flows until drinking water remaining in the second branch line (203) is recovered and stored, and as components provided in the region.

[0130] By providing the water recovery part (303), a problem in which drinking water remaining in the second branch line (203) is supplied to the dispenser part (170) in an unheated state when hot water is subsequently supplied may be resolved.

[0131] The water recovery part (303) may include a third guide line (360). The third guide line (360) may be connected to the second guide line (320). The third guide line (360) may be defined as a flow path through which drinking water flows from a portion of the third guide line (360) connected to the second guide line (320) until the drinking water is acquired and discharged to the first guide line (310).

[0132] The third guide line (360) may be at least one of a tube, a pipe, and a hose made of metal, ceramic, or synthetic resin.

[0133] One end of the third guide line (360) may be branched from the second guide line (320) by using a connector (480). Accordingly, during a water recovery operation, drinking water discharged along the second guide line (320) may be recovered to the third guide line (360).

[0134] The other end of the third guide line (360) may be connected to a front end of the water pump (330) of the first guide line (310). For example, the other end of the third guide line (360) may be connected to an inlet of the flow meter (340) of the first guide line (310).

[0135] Accordingly, drinking water flowing through the third guide line (360) may be provided to the first guide line (310), may pass through the heating part (302) again, and may then be discharged to the second branch line (203) through the second guide line (320).

[0136] The water recovery part (303) may include a water recovery pump (370). The water recovery pump (370) may be provided in the third guide line (360), and by a pumping operation of the water recovery pump (370), drinking water in the second guide line (320) and the second branch line (203) connected to the second guide line (320) may flow to the third guide line (360), and the drinking water flowing through the third guide line (360) may be provided to the first guide line (310).

[0137] A second valve (502) may be provided at a drinking water inlet side of the water recovery pump (370) in the third guide line (360). The second valve

(502) may operate to selectively open and close the second guide line (320) and the third guide line (360). That is, through operation of the second valve (502), drinking water that has passed through the heater (350) and flows into the second guide line (320) may be pumped to the third guide line (360) by the water recovery pump (370). The second valve (502) may be configured as a solenoid valve or a check valve operable under electronic control. Of course, as illustrated, a check valve (511) may be provided in a flow path between the water recovery pump (370) and the second valve (502).

[0138] In addition, the water recovery part (303) may include a storage part (380) for storing drinking water recovered to the third guide line (360) by the water recovery pump (370). In this case, a third valve (503) configured to selectively open and close a corresponding flow path may be provided at an outlet side (a drinking water outlet side of the storage part) of the third guide line (360). Drinking water guided from the third guide line (360) to the first guide line (310) may be selectively blocked by the third valve (503). The third valve (503) may be configured as a solenoid valve operable under electronic control.

[0139] It is preferable that a capacity of drinking water that may be stored by the storage part (380) be at least equal to or greater than a capacity of drinking water remaining in the second branch line (203). That is, it is preferable that all of the drinking water remaining in the second branch line (203) be recovered to the storage part (380).

[0140] The storage part (380) may be configured in various ways.

[0141] As one example, as illustrated in FIGS. 5 and 6, the storage part (380) may be connected to the third guide line (360) or may extend from the third guide line (360), and may be formed in a shape of a flow path allowing drinking water to flow. That is, drinking water recovered from the second guide line (320) or the second branch line (203) may be stored in the storage part (380) formed in the flow path shape.

[0142] To this end, the storage part (380) formed in the flow path shape may be formed to have a length greater than a length of the second guide line (320), may be formed to have a length greater than a length of the second branch line (203), or may be formed to have a length equal to or greater than a combined length of the second guide line (320) and the second branch line (203).

[0143] The storage part (380) formed in the flow path shape may be formed to be wound around one portion in the hot water kit (300). To this end, the water recovery part (303) of the hot water kit (300) may further include a winding part (382) around which the storage part (380) formed in the flow path shape is wound. That is, the storage part (380) formed in the flow path shape may be provided in a state of being wound around the winding part (382) (see FIG. 4).

[0144] The winding part (382) may be formed to have a shaft structure around which the storage part (380) may be wound.

[0145] Of course, the storage part (380) formed in the flow path shape may be formed to extend along an empty space in the casing (301). Accordingly, the winding part (382) may be omitted. This is illustrated in FIG. 9.

[0146] As another example, as illustrated in FIG. 10, the storage part (380) may be formed as a chamber configured to provide a space in which recovered water is stored. That is, after recovered water is stored in the chamber-type storage part (380), the recovered water stored in the chamber-type storage part (380) may be discharged and then reheated when hot water is used.

[0147] The chamber-type storage part (380) may be formed to have a size sufficient to store a set amount of recovered water. For example, a fluid storage capacity of the chamber-type storage part (380) may be greater than a storage capacity of the second guide line (320), greater than a storage capacity of the second branch line (203), or greater than a combined storage capacity of the second guide line (320) and the second branch line (203).

[0148] Meanwhile, the hot water kit (300) of the present disclosure may further include a controller (390).

[0149] That is, the controller (390) may allow the water pump (330) or the heater (350) constituting the hot water kit (300) to operate and allow the water recovery pump (370) to operate. Accordingly, the hot water kit (300) may be provided as a kit formed as a module separate from the refrigerator.

[0150] The controller (390) may operate in conjunction with operation of the dispenser part (170). To this end, the controller (390) may be configured to receive part of power and control signals of the refrigerator.

[0151] The controller (390) may be provided as a circuit board having a controller.

[0152] The controller (390) may be located adjacent to one side wall surface in the casing (301). In addition, a power line or a signal line in the refrigerator may be connected through a wire connector (391) to the controller (390). In this case, the wire connector (391) may be installed to be exposed to the outside of a sidewall of the casing (301). The power line or the signal line may be connected to a power line or a signal line provided to the dispenser part (170) provided in the door (150) or to the ice maker (160).

[0153] In particular, it is preferable that the controller (390) be located to be spaced as far apart as possible from the heater (350) in the casing (301). That is, it is preferable that the heater (350) be provided on one side in the casing (301) and the controller (390) be provided on the other side. Accordingly, the controller (390) may be prevented from being damaged or an operation error of the controller (390) may be prevented from occurring due to an influence of a high temperature caused by heat generation of the heater (350).

[0154] The controller (390) may control operation of each of the valves (501, 502, 503).

[0155] For example, when a heating operation is terminated, the controller (390) may control operation of the water recovery part (303) such that drinking water remaining in the flow path connected to the dispenser part (170) is recovered to and stored in the storage part (380).

[0156] In addition, when the heating operation is started, the controller (390) may control blocking of supply of drinking water of the raw water line (201) to the first guide line (310) until drinking water stored in the storage part (380) of the water recovery part (303) passes through the heater (350) and is supplied to the dispenser part (170).

[0157] Hereinafter, a process in which the hot water kit (300) is applied to the refrigerator having the dispenser part (170) will be described.

[0158] The hot water kit (300) may be provided mounted in the refrigerator having the dispenser part (170) from an initial stage of manufacture, or may be provided separately from the refrigerator. That is, the hot water kit (300) may be provided as an option.

[0159] When the refrigerator is provided in a state in which the hot water kit (300) is not mounted, only the hot water kit (300) may be purchased and applied thereto.

[0160] When only the hot water kit (300) is purchased and applied, the hot water kit (300) may be mounted in the mounting recess (152) formed in the door (150) of the refrigerator.

[0161] In addition, the first branch line (202) may be connected to the third connector (403) exposed to the outside of the casing (301) of the hot water kit (300), and the second branch line (203) may be connected to the fourth connector (404). In addition, a connector for connecting the hot water kit (300) to a main controller of the refrigerator or to a wire disposed in the door (150) may be connected to the wire connector (391) of the hot water kit (300).

[0162] Next, an operation process of the hot water kit (300) when manipulated to receive drinking water through the dispenser part (170) will be described in more detail with reference to FIGS. 11 to 16.

[0163] First, a user may receive purified water through the dispenser part (170).

[0164] That is, when supply of purified water is selected by manipulation of the manipulation part (151) by a user, the raw water line may be controlled to be opened and supply of purified water to the hot water kit (300) may be controlled to be blocked.

[0165] Opening of the raw water line (201) may be performed under control of the main controller (not shown) that controls operation of the refrigerator. To block the supply of purified water to the hot water kit (300), the main controller may provide a corresponding signal to the controller (390) of the hot water kit (300), and the controller (390) may control the supply of pur-

ified water to the hot water kit (300) to be blocked on the basis of the corresponding signal.

[0166] In order to block supply of purified water to the hot water kit (300), the first valve (501) may be operated to block the flow path. That is, by a blocking operation of the first valve (501), a drinking water inlet side of the first guide line (501) may be blocked. Accordingly, drinking water flowing through the raw water line (201) may not be provided into the hot water kit (300), but may be directly discharged to the dispensing nozzle (171) of the dispenser part (170), thereby supplying purified water.

[0167] Next, a user may receive hot water (or heated water) through the dispenser part (170).

[0168] That is, when supply of hot water is selected by manipulation of the manipulation part (151) by a user, the controller (390) may perform a first heating operation.

[0169] During the first heating operation, the raw water line (201) may be controlled to be opened, and drinking water (purified water) may be controlled to be supplied to the hot water kit (300).

[0170] The controller (390) may control the first valve (501), the second valve (502), and the third valve (503) so that drinking water may be supplied to the hot water kit (300). The first valve (501) may be operated to open the drinking water inlet side of the first guide line (310), the second valve (502) may be operated to block a drinking water inlet side of the third guide line (360), and the third valve (503) may be operated to block a drinking water outlet side of the third guide line (360).

[0171] In addition, during the first heating operation, the controller (390) may operate the water pump (330) and the heater (350).

[0172] By operation of the water pump (330), drinking water (purified water) may flow through the raw water line (201), be provided into the first guide line (310) through the first branch line (202), and the drinking water provided in this way may pass through the flow meter (340) and the water pump (330) and may then be provided to the heater (350). Thereafter, the drinking water may be heated while passing through the heater (350), and the heated drinking water may sequentially flow through the second guide line (320) and the second branch line (203) and may then be provided to the dispensing nozzle (171) of the dispenser part (170). This is illustrated in FIGS. 11 and 12.

[0173] Meanwhile, the water pump (330) may be operated such that a supply pressure of drinking water varies according to manipulation of the manipulation part (151).

[0174] In addition, the heater (350) may be operated such that a temperature of drinking water varies according to manipulation of the manipulation part (151).

[0175] Supply of the drinking water may be stopped when a termination condition of the first heating operation is satisfied.

[0176] The termination condition of the first heating

operation may be determined to be satisfied when the water pump (330) is operated for a set time, when a set flow rate of drinking water is supplied, or when manipulation for stopping supply by a user occurs.

[0177] When the termination condition of the first heating operation is satisfied, the controller (390) may control operation of the water pump (330) to be stopped or may control the first valve (501) to be closed.

[0178] In addition, when supply of hot water is terminated by the above-described control, the controller (390) may perform a water recovery operation of the hot water kit (300).

[0179] The water recovery operation may be performed when a predetermined time has elapsed after the water pump (330) is stopped. Accordingly, when a manipulation for continuously supplying hot water is performed after hot water has been supplied, hot water may be immediately supplied. In this case, the predetermined time may be, for example, a time sufficient for residual water remaining in the second branch line (203) to cool. For example, the water recovery operation may be performed after one minute has elapsed after the water pump (330) is stopped.

[0180] Of course, the water recovery operation may be performed immediately after the water pump (330) is stopped.

[0181] During the water recovery operation, the first valve (501) and the third valve (503) may be closed, and the second valve (502) may be opened. Accordingly, as illustrated in FIGS. 13 and 14, inflow of drinking water into the first guide flow path (310) may be blocked, and the second guide flow path (320) and the third guide flow path (360) may be in communication with each other.

[0182] In addition, during the water recovery operation, the water recovery pump (370) may be operated. In this case, the water pump (330) and the heater (350) may be maintained in a state in which operation thereof is stopped.

[0183] When the water recovery pump (370) is operated by the water recovery operation, residual water in the second branch line (203) and residual water in the second guide line (320) may flow through the water recovery pump (370) through the third guide line (360) to the storage part (380) (the flow-path-type storage part or the chamber-type storage part).

[0184] The water recovery pump (370) may be stopped when a termination condition of the water recovery operation is satisfied.

[0185] The termination condition of the water recovery operation may be a condition in which residual water in the second branch line (203) and the second guide line (320) is completely stored in the storage part (380).

[0186] The termination condition of the water recovery operation may be set as an operation time of the water recovery pump (370). For example, when the

water recovery pump (370) is operated for a set time, the termination condition may be determined to be satisfied, and the water recovery pump (370) may be stopped.

[0187] When the water recovery pump (370) is stopped in this way, the second valve (502) may be closed. Accordingly, residual water recovered from the second branch line (203) and the second guide line (320) may be maintained in a state of being stored in the storage part (380), and residual water may not exist in the second branch line (203) and the second guide line (320).

[0188] Meanwhile, when a request to supply hot water is generated through manipulation of the manipulation part (151) in a state in which the water recovery operation is terminated, a second heating operation may be performed.

[0189] That is, when supply of hot water is selected by manipulation of the manipulation part (151) by a user, the controller (390) may perform the second heating operation.

[0190] During the second heating operation, the second valve (502) and the third valve (503) may be controlled to be opened, and the water pump (330) and the heater (350) may be controlled to be operated.

[0191] Accordingly, drinking water stored in the storage part (380) may be provided along the third guide line (360) to the flow meter (340) between the first valve (501) and the water pump (330) in the first guide flow path (310). Thereafter, the drinking water may sequentially pass through the flow meter (340) and the water pump (330) and may then be provided to the heater (350) to be heated. Subsequently, the heated drinking water may be supplied to the dispenser part (170) through the second guide line (360) and the second branch line (203) connected thereto. This is illustrated in the accompanying FIGS. 15 and 16.

[0192] In addition, when the drinking water stored in the storage part (380) is completely discharged by the second heating operation, the second heating operation may be terminated, and at the same time, the first heating operation may be performed.

[0193] Termination of the second heating operation may be determined on the basis of an operation time of the water pump (330). That is, after the water pump (330) is operated for a time longer than an operation time of the water recovery pump (370), the second heating operation may be terminated. That is, when complete consumption of residual drinking water in the storage part (380) is satisfied, the second heating operation may be terminated.

[0194] When the second heating operation is terminated, the second valve (502) and the third valve (503) may be closed, and the first valve (504) may be opened.

[0195] Accordingly, the first guide line (310) may be opened, and the inlet and outlet of the third guide line (360) may be blocked.

[0196] In addition, when the first heating operation is terminated, the water recovery operation may be performed again to prepare for the second heating operation.

[0197] Consequently, the refrigerator of the present disclosure may supply hot water by additionally providing the hot water kit (300) formed as a separate module.

[0198] In addition, according to the refrigerator of the present disclosure, the hot water kit (300) may be configured to be selectively attached and detached, thereby enabling hot water to be supplied through the dispenser part (170) by additionally providing only the hot water kit (300) to a refrigerator having the dispenser part (170).

[0199] In addition, according to the refrigerator of the present disclosure, the branch lines (202, 203) branched from the raw water line (201) and a wire may be connected to the hot water kit (300) by using connectors (403, 404, 391), thereby enabling the hot water kit (300) to be easily attached to and detached from the refrigerator.

[0200] In addition, according to the present disclosure, water remaining in a flow path after hot water is supplied may be recovered, and the recovered water may be preferentially heated and then supplied when hot water is subsequently supplied, thereby resolving user dissatisfaction due to residual water.

[0201] Meanwhile, the refrigerator of the present disclosure is not limited to being implemented only in the form of the above-described embodiment.

[0202] That is, the hot water kit (300) of the refrigerator of the present disclosure may be implemented in various forms. Each embodiment will be briefly described as follows.

[0203] First, as another example of the refrigerator of the present disclosure, although not shown, the water recovery pump (370) provided in the water recovery part (303) may be omitted from the hot water kit (300).

[0204] That is, the water pump (330) may be configured to perform the function of the water recovery pump (370). Accordingly, the size of the hot water kit (300) may be reduced.

[0205] As still another example of the refrigerator of the present disclosure, the components constituting the hot water kit (300) may be modularized into two or more modules and provided as the two or more modules.

[0206] For example, as illustrated in FIGS. 17 to 19, the heating part (302) and the water recovery part (303) may be separately modularized and provided in respective cases (301, 304).

[0207] That is, the heating part (302) and the water recovery part (303) may be provided as different modules, thereby resolving difficulties caused by restrictions on an installation space for installing the hot water kit (300).

[0208] For example, the heating part (302) and the

water recovery part (303) may be respectively installed at different portions of the door (150).

[0209] Preferably, the heating part (302) may be installed on the upper surface of the door (150) to minimize an influence of heat generated by heat generation of the heater (350) on the storage compartment (101).

[0210] The water recovery part (303) may be located adjacent to the dispenser part (170), thereby simplifying the flow path.

[0211] When the heating part (302) and the water recovery part (303) are provided as individual modules in this way, the raw water line (201) may be configured to be branched into the first branch line (202) and the second branch line (203) by a fifth connector (405).

[0212] In addition, when the heating part (302) and the water recovery part (303) are provided as individual modules, the water recovery part (303) may include the third guide line (360) connected to the second guide line (320), a fourth guide line (361) branched from the third guide line (360) and connected to the second branch line (203), a fifth guide line (362) branched from the third guide line (360) and connected to the first branch line (202), a fourth valve (504) provided in the fourth guide line (361) and configured to selectively open and close a corresponding flow path, and a fifth valve (505) provided in the fifth guide line (362) and configured to selectively open and close a corresponding flow path.

[0213] Here, a sixth connector (406) may be provided in the third guide line (360), and the third guide line (360) may be branched into the fourth guide line (361) and the fifth guide line (362). The fifth guide line (362) may be connected to the fifth connector (405).

[0214] One end of the second branch line (203) may be connected to the fifth connector (405), and the other end thereof may be connected to the dispensing nozzle (171) of the dispenser part (170). The second branch line (203) may be provided with a seventh connector (407), and the fourth guide line (361) may be connected to the seventh connector (407).

[0215] In the second branch line (203), a sixth valve (506) may be provided between a portion of the second branch line (203) connected to the fifth connector (405) and a portion of the second branch line (203) connected to the seventh connector (407), thereby selectively blocking a corresponding flow path.

[0216] Here, it is preferable that a length of the third guide line (360) be equal to or greater than a length of the second branch line (203) or a combined length of the second branch line (203) and the fourth guide line (361). That is, the third guide line (360) may serve as a substitute for the flow-path-type storage part (380) of the above-described embodiment of the present disclosure.

[0217] In the refrigerator of the present disclosure according to the still another example, the water recovery pump (370) may be omitted from the water recovery part (303). That is, when the heating part (302) and the

water recovery part (303) are provided separately, the water pump (330) of the heating part (302) may perform the function of the water recovery pump (370).

[0218] For example, when the water recovery operation is performed, the water pump (330) may be operated in a state in which the first valve (501) and the fifth valve (505) are opened and the fourth valve (504) and the sixth valve (506) are closed. Accordingly, drinking water in the second branch line (203) and the fourth guide line (361) may be stored in the third guide line (360), and when supply of hot water is subsequently requested, the drinking water stored in the third guide line (360) may be introduced into the first guide line (310) before drinking water of the raw water line (201) is introduced into the first guide line (310), and then pass through the heater (350) and may be supplied to the dispenser part (170).

[0219] Meanwhile, FIGS. 20 to 22 illustrate flows of drinking water in the water recovery part (302) for respective situations in the refrigerator according to another example of the present disclosure. That is, FIG. 20 illustrates a state when purified water is supplied, FIG. 21 illustrates a state when a heating operation is performed, and FIG. 22 illustrates a state when a water recovery operation is performed.

[0220] As still another example of the refrigerator of the present disclosure, although not shown, the hot water kit (300) may be integrally provided in the refrigerator rather than being detachably provided therein.

[0221] As still another example of the refrigerator of the present disclosure, the refrigerator may be configured such that even when purified water is supplied to the dispenser part (170), the purified water passes through the hot water kit (300).

[0222] That is, the raw water line (201) may not be connected to the dispenser part (170), and the second branch line (203) may be connected to the dispensing nozzle (171) of the dispenser part (170).

[0223] In this case, by operating the water pump (330) in the hot water kit (300), a flow of drinking water sequentially flowing through the raw water line (201), the first branch line (202), the first guide line (310), the heater (350), the second guide line (320), and the second branch line (203) may be generated. When the purified water is supplied, a heating operation by the heater (350) may be stopped. That is, the heating element constituting the heater (350) may be controlled not to generate heat.

[0224] As still another example of the refrigerator of the present disclosure, an extraction device for extracting ground coffee may be detachably provided at a portion at which the dispensing nozzle (171) of the dispenser part (170) is installed.

[0225] That is, according to the present disclosure, high-pressure hot water may be provided by the water pump (330), and thus when the extraction device is provided in the dispenser part (170), it is also possible to extract a beverage requiring a high extraction pres-

sure, such as a beverage made from ground coffee.

[0226] As still another example of the refrigerator of the present disclosure, the hot water kit (300) may be provided on the storage-compartment-side wall surface of the door (150). For example, as illustrated in the accompanying FIGS. 23 and 24, the mounting recess (152) for accommodating the hot water kit (300) may be formed in a portion of the inner wall surface of the door (150), and the hot water kit (300) may be mounted in the mounting recess (152).

[0227] In this case, it is preferable that a heat insulating member (156) be provided at the inlet of the mounting recess (152) so that heat generated by operation of the hot water kit (300) does not affect items stored in the storage compartment. In addition, a cover (157) for selective opening and closing may be provided at the inlet of the mounting recess (152).

[0228] Although not shown, the mounting recess (152) may be formed in any one side surface, a bottom surface, or a front surface (a surface exposed to an indoor space) of the door (150).

[0229] In addition, although not shown, the hot water kit (300) may be mounted on any one wall surface of the cabinet (110). For example, the hot water kit (300) may be placed on an upper surface of the cabinet (110). In this case, the hot water kit (300) may be located adjacent to the main controller for overall control of the refrigerator among portions of the upper surface of the cabinet (110).

[0230] As described above, the refrigerator or the hot water kit (300) of the present disclosure may be implemented in various forms.

[0231] As described above, although all the components constituting the embodiment according to the present disclosure have been described as being combined into a single unit or operating in combination, the present disclosure is not necessarily limited to such embodiments. That is, within the scope and spirit of the present disclosure, all the components may operate by being selectively combined into one or more units. In addition, the terms "include," "comprise," or "have," as used herein, unless otherwise specifically stated, imply that the relevant component may be present, and therefore should be construed to include other components rather than to exclude other components. All terms, including technical or scientific terms, unless otherwise defined, have the same meaning as commonly understood by those skilled in the art to which the present disclosure belongs. Commonly used terms, such as terms defined in the dictionary, should be interpreted to be consistent with their contextual meanings in the relevant technology and should not be interpreted in an idealized or overly formal sense unless expressly defined in the present disclosure.

[0232] The foregoing description is merely illustrative of the technical idea of the present disclosure, and it will be understood by those skilled in the art that various modifications and variations may be made without

departing from the essential characteristics of the present disclosure. Accordingly, the embodiments disclosed herein are not intended to limit the technical idea of the present disclosure, but rather to explain it, and the scope of the technical idea of the present disclosure is not limited by such embodiments. The scope of protection of the present disclosure shall be interpreted on the basis of the following claims, and all technical ideas falling within the equivalent scope thereof shall be construed as being included within the scope of rights of the present disclosure.

Claims

1. A refrigerator comprising:

a cabinet having a storage compartment provided therein and having an open front surface;
 a door configured to open and close the front surface of the cabinet;
 a dispenser part provided in the door and configured to receive and supply drinking water from a raw water line; and
 a hot water kit configured to receive and heat drinking water from the raw water line,
 wherein the hot water kit comprises:

a heating part configured to heat drinking water; and
 a water recovery part configured to recover and store drinking water remaining in a flow path connected to the dispenser part.

2. The refrigerator of claim 1, wherein a mounting recess is formed in the door, and the hot water kit is detachably mounted in the mounting recess.

3. The refrigerator of claim 1, wherein the hot water kit comprises:

a first guide line connected to a first branch line branched from the raw water line and configured to guide a flow of drinking water to the heating part; and
 a second guide line connected to a second branch line branched from the raw water line and configured to guide a discharge flow of drinking water heated in the heating part.

4. The refrigerator of claim 3, wherein the heating part of the hot water kit comprises:

a water pump provided in the first guide line and configured to pump drinking water of the

raw water line; and

a heater configured to heat the drinking water pumped through the first guide line and discharge the heated drinking water to the second guide line.

5. The refrigerator of claim 4, wherein the first guide line is provided with a first valve configured to selectively block a flow of the drinking water pumped by the water pump.

6. The refrigerator of claim 3, wherein the water recovery part of the hot water kit comprises:

a third guide line branched from the second guide line and configured to guide a flow of drinking water;
 a water recovery pump provided in the third guide line and configured to pump and recover drinking water in the second guide line and the second branch line connected to the second guide line; and
 a storage part configured to store the drinking water recovered by the water recovery pump.

7. The refrigerator of claim 6, wherein a second valve configured to selectively block a corresponding flow path is provided at a drinking water inlet side of the water recovery pump in the third guide line, and a third valve configured to selectively block a corresponding flow path is provided at a drinking water outlet side of the storage part in the third guide line.

8. The refrigerator of claim 6, wherein the storage part is connected to the third guide line to allow drinking water to flow therethrough and is formed to have a length greater than a combined length of the second guide line and the second branch line.

9. The refrigerator of claim 6, wherein the storage part is wound around one portion in the hot water kit.

10. The refrigerator of claim 6, wherein the storage part is connected to the third guide line and is formed as a chamber configured to provide a space for storing a set amount of recovered drinking water.

11. The refrigerator of claim 3, wherein the water recovery part of the hot water kit comprises:

a third guide line connected to the second guide line;
 a fourth guide line branched from the third guide line and connected to the second branch

- line;
 a fifth guide line branched from the third guide line and connected to the first branch line;
 a fourth valve provided in the fourth guide line and configured to selectively block a corresponding flow path; and
 a fifth valve provided in the fifth guide line and configured to selectively block a corresponding flow path.
12. The refrigerator of claim 1, further comprising:
 a controller configured to control operations of the heating part and the water recovery part.
13. The refrigerator of claim 12, wherein the controller is configured to:
- when a heating operation of the heating part is terminated, control operation of the water recovery part such that the drinking water remaining in the flow path connected to the dispenser part is recovered and stored; and
 when the heating operation of the heating part is started, control blocking of supply of the drinking water of the raw water line to the heating part until the drinking water stored in the water recovery part passes through the heating part and is supplied to the dispenser part.
14. The refrigerator of claim 1, wherein the heating part and the water recovery part are provided as separate modules and are respectively installed at different portions of the door.
15. The refrigerator of claim 14, wherein the hot water kit comprises:
- a first guide line connected to a first branch line branched from the raw water line and configured to guide a flow of drinking water to the heating part; and
 a second guide line connected to a second branch line branched from the raw water line and configured to guide a discharge flow of drinking water heated in the heating part, wherein the water recovery part comprises:
- a third guide line connected to the second guide line;
 a fourth guide line branched from the third guide line and connected to the second branch line;
 a fifth guide line branched from the third guide line and connected to the first branch line;
 a fourth valve provided in the fourth guide line and configured to selectively block a corresponding flow path; and
- a fifth valve provided in the fifth guide line and configured to selectively block a corresponding flow path.
16. A hot water kit comprising:
- a first guide line connected to a first branch line branched from a raw water line and configured to guide a flow of drinking water;
 a heating part configured to heat the drinking water guided through the first guide line;
 a second guide line connected to a second branch line connected to an outlet side of the raw water line and configured to guide a discharge flow of the drinking water heated in the heating part; and
 a water recovery part configured to recover and store drinking water remaining in the second guide line or in the second guide line and the second branch line.
17. The hot water kit of claim 16, wherein the heating part comprises:
- a water pump provided in the first guide line and configured to pump drinking water of the raw water line; and
 a heater configured to heat the drinking water pumped through the first guide line and discharge the heated drinking water to the second guide line.
18. The hot water kit of claim 17, wherein the first guide line is provided with a first valve configured to selectively block a flow of the drinking water pumped by the water pump.
19. The hot water kit of claim 17, wherein the water recovery part comprises:
- a third guide line branched from the second guide line and configured to guide a flow of drinking water;
 a water recovery pump provided in the third guide line and configured to pump and recover the drinking water in the second guide line and the second branch line connected to the second guide line; and
 a storage part configured to store the drinking water recovered by the water recovery pump.
20. The hot water kit of claim 19, wherein a second valve configured to selectively block a corresponding flow path is provided at a drinking water inlet side of the water recovery pump in the third guide line, and
 a third valve configured to selectively block a corresponding flow path is provided at a drinking

water outlet side of the storage part in the third guide line.

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FIG. 1

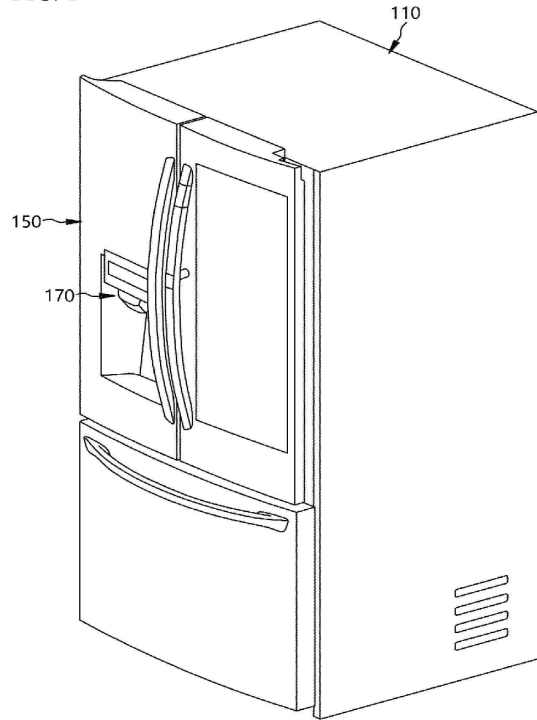


FIG. 2

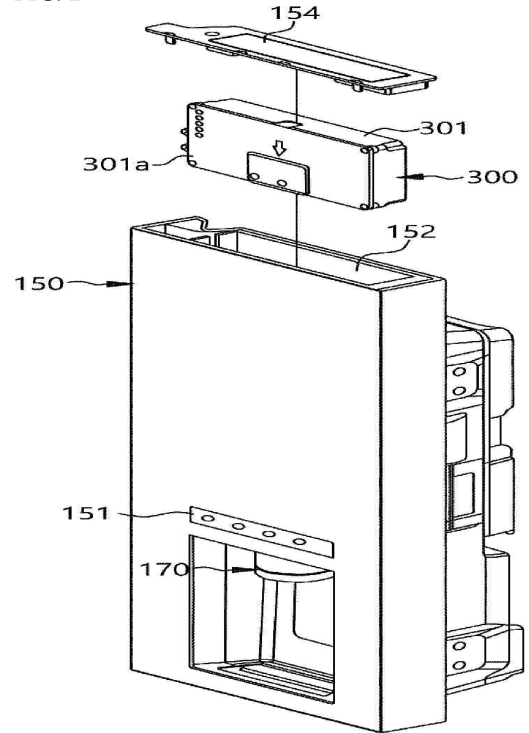


FIG. 3

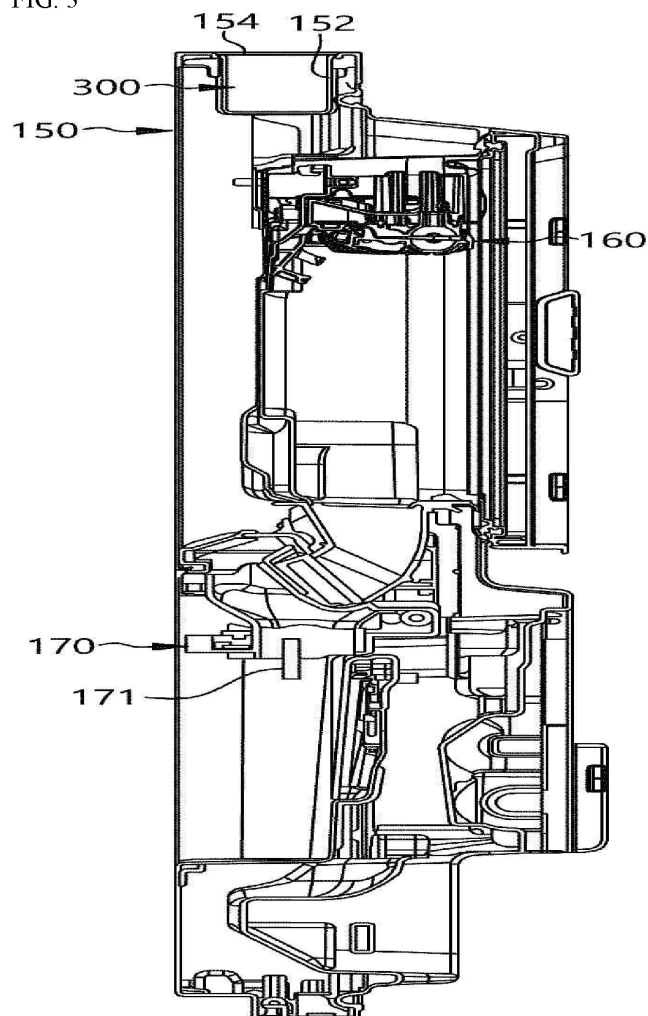


FIG. 4

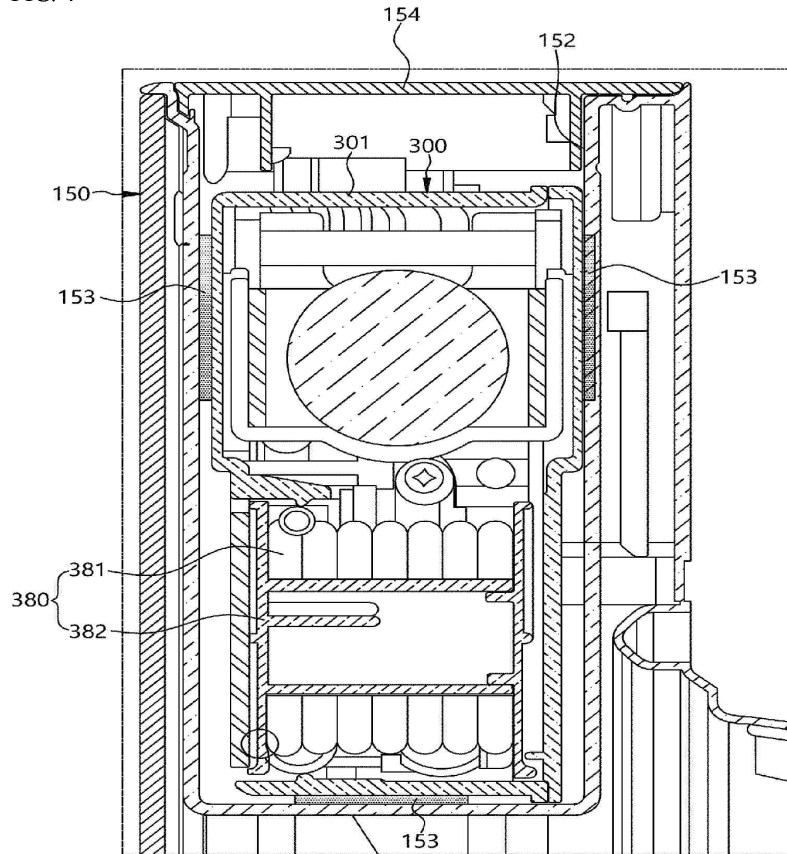


FIG. 5

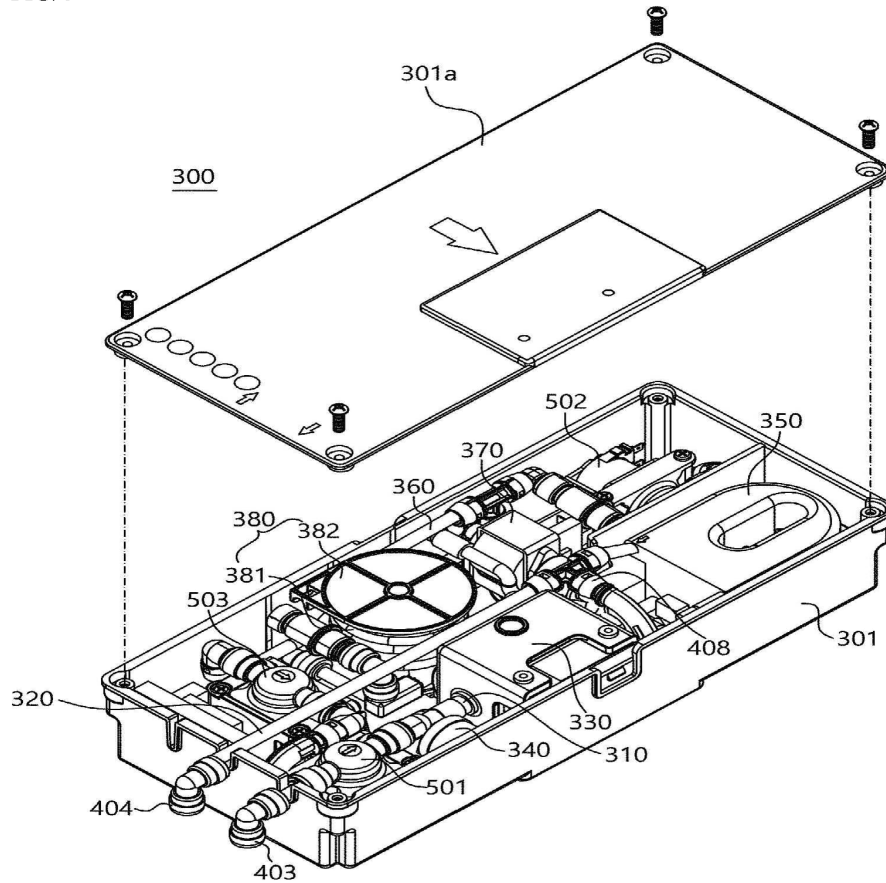


FIG. 6

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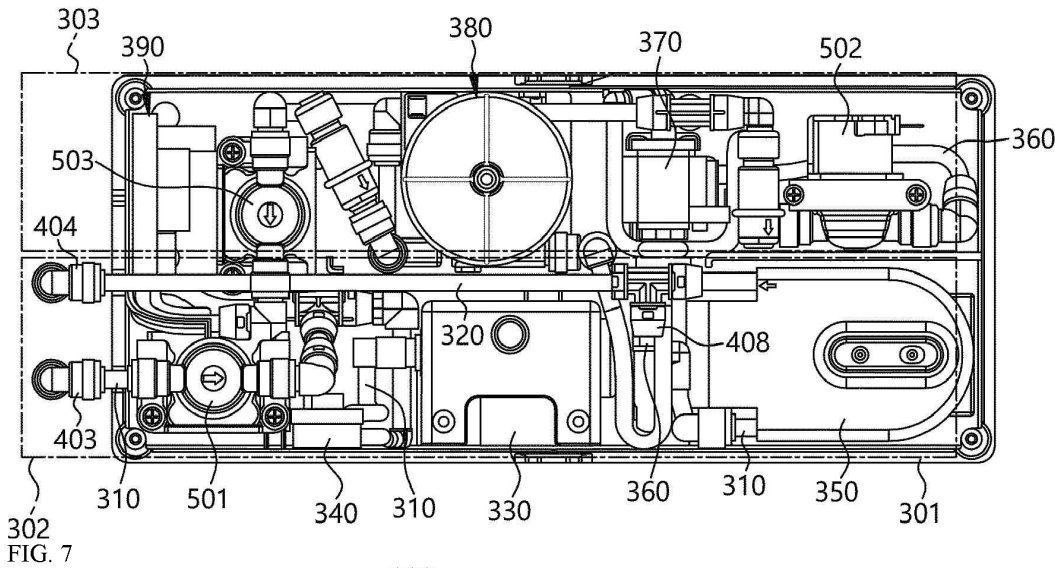


FIG. 7

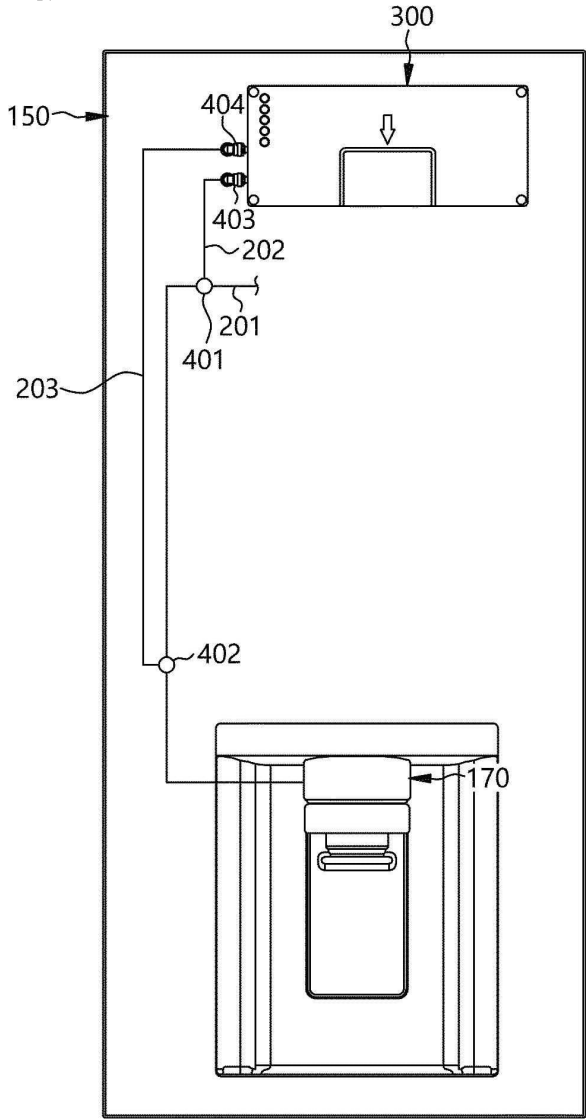


FIG. 8

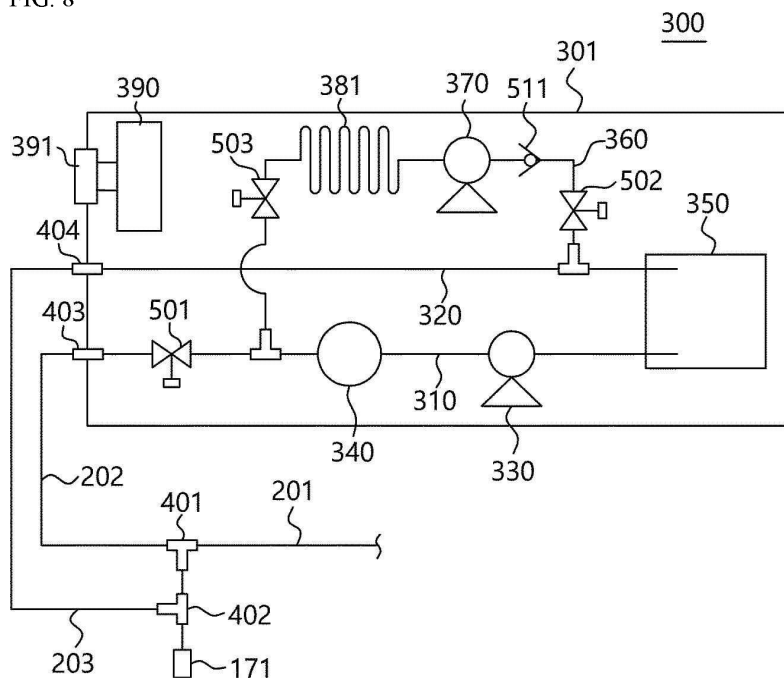


FIG. 9

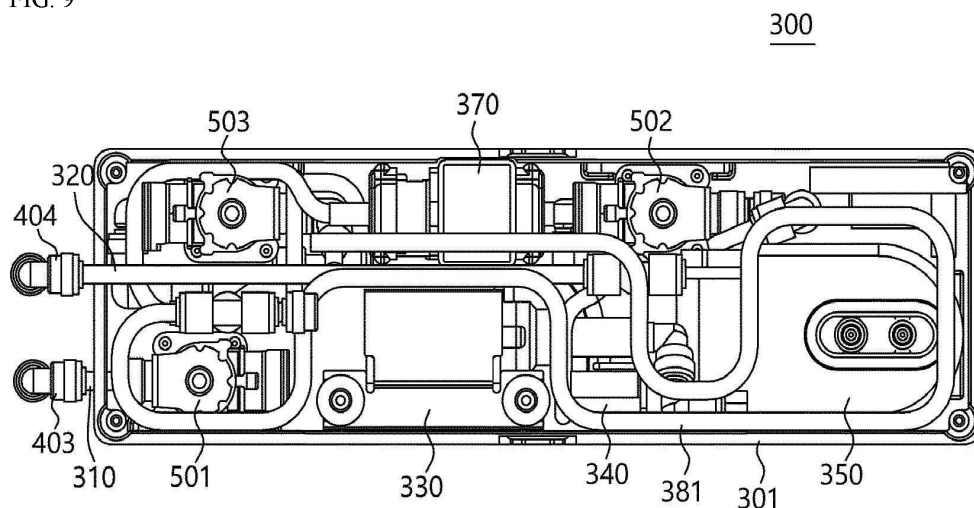


FIG. 10

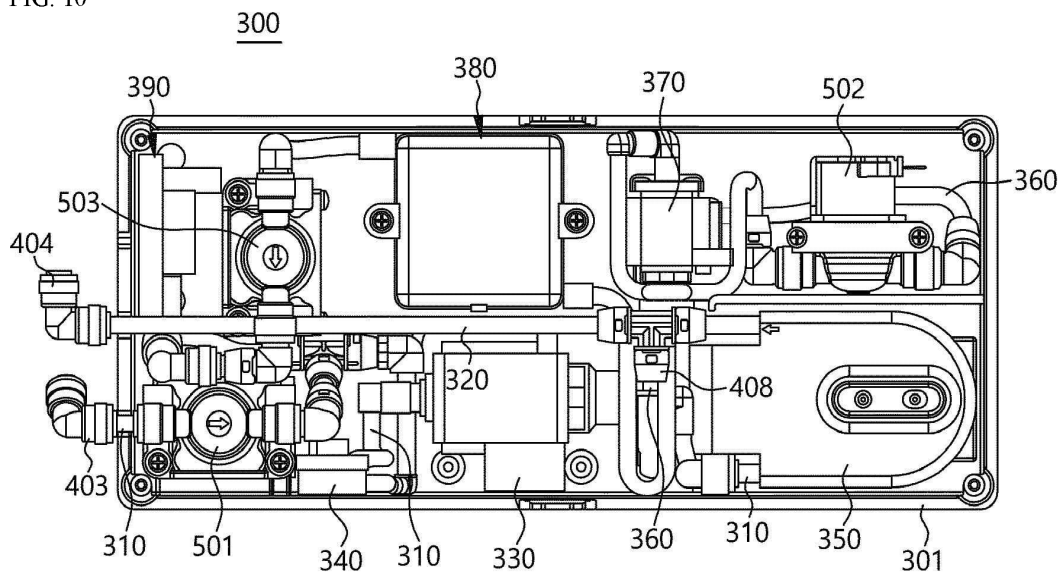


FIG. 11

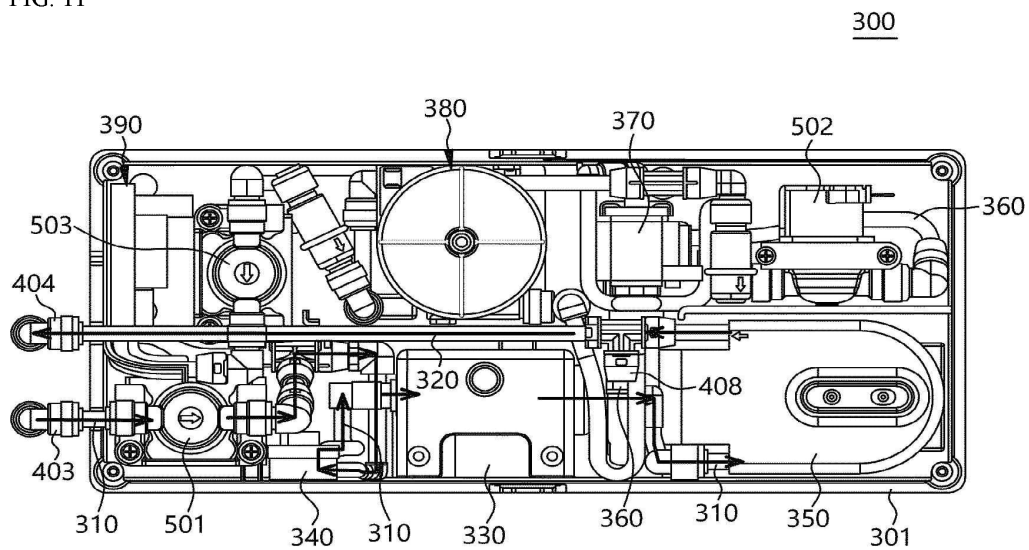


FIG. 12

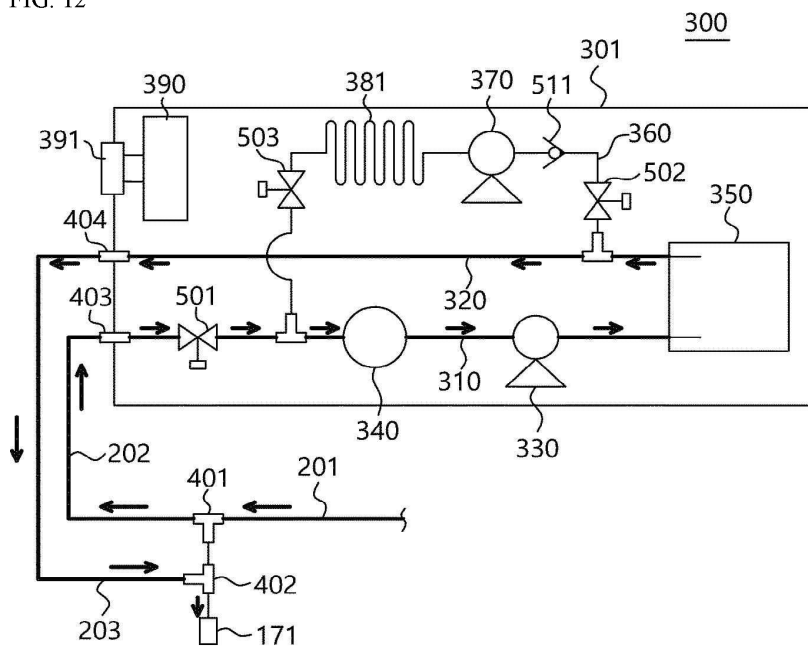


FIG. 13

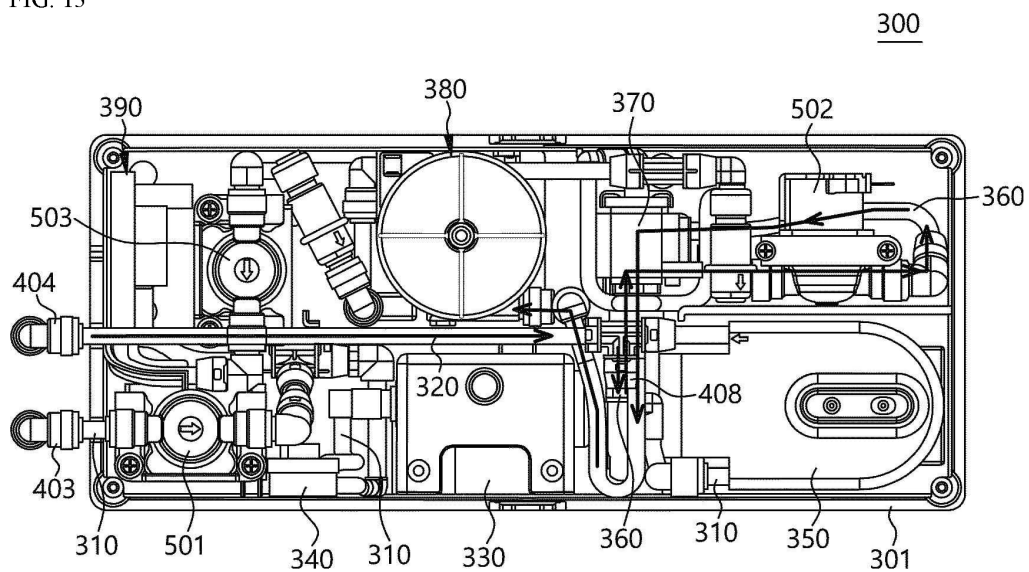


FIG. 14

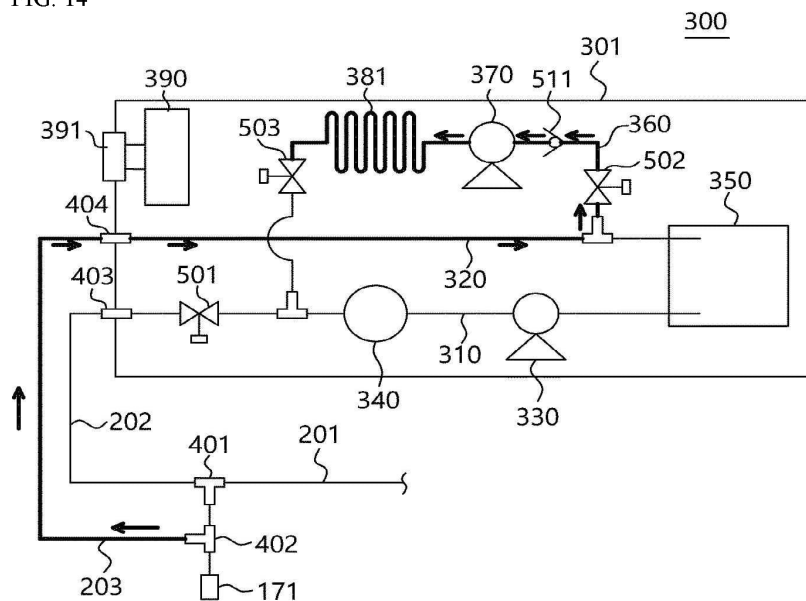


FIG. 15

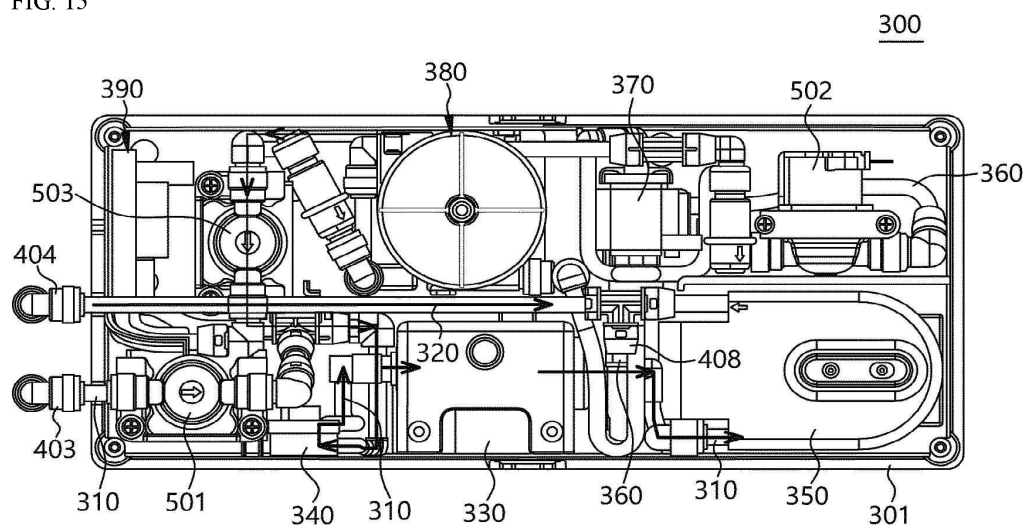


FIG. 16

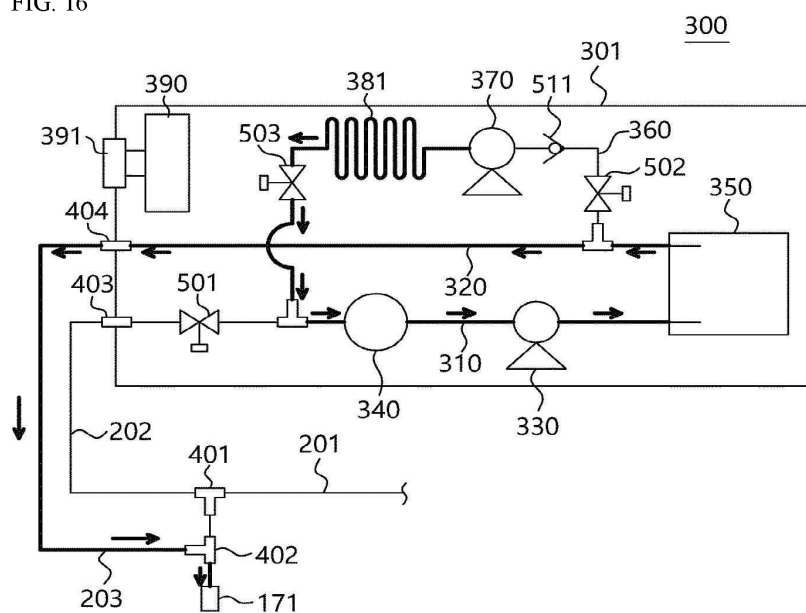


FIG. 17

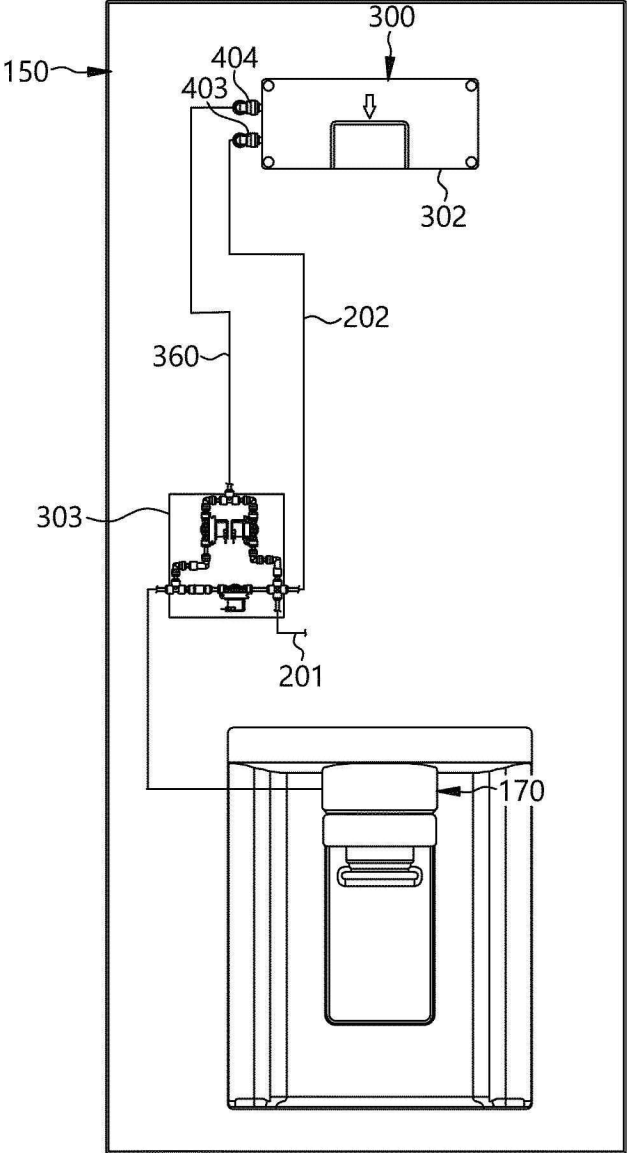


FIG. 18

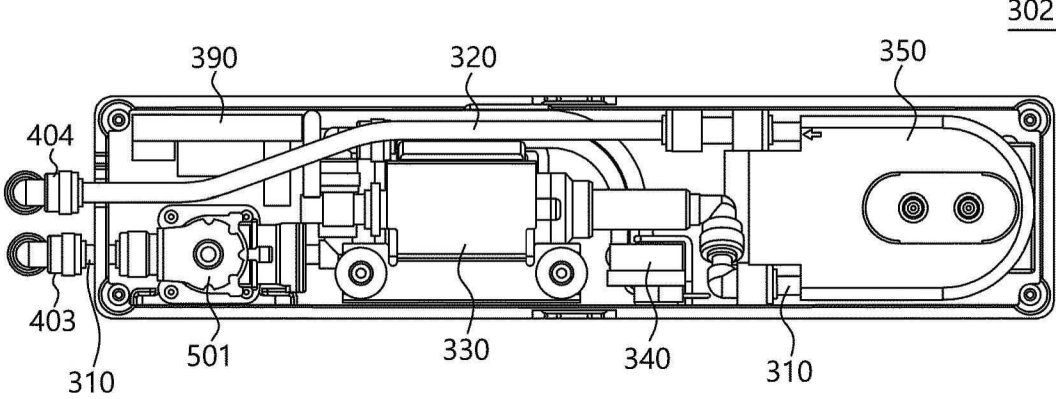


FIG. 19

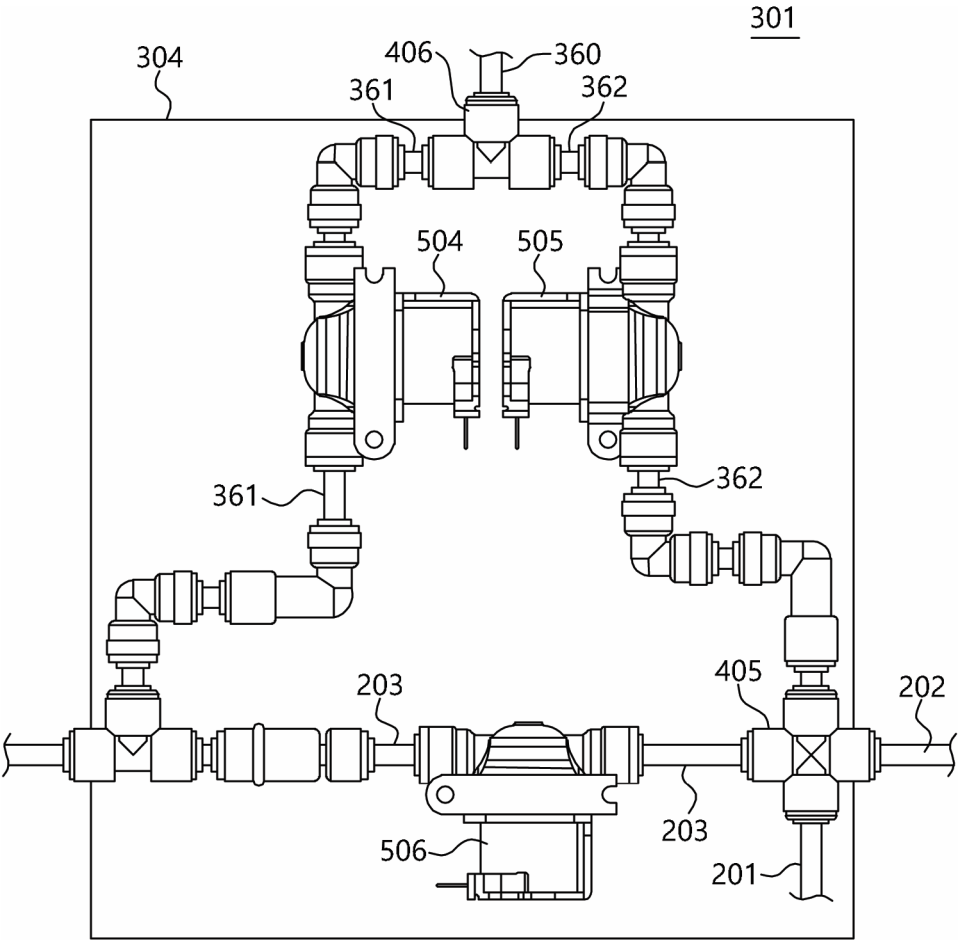


FIG. 20

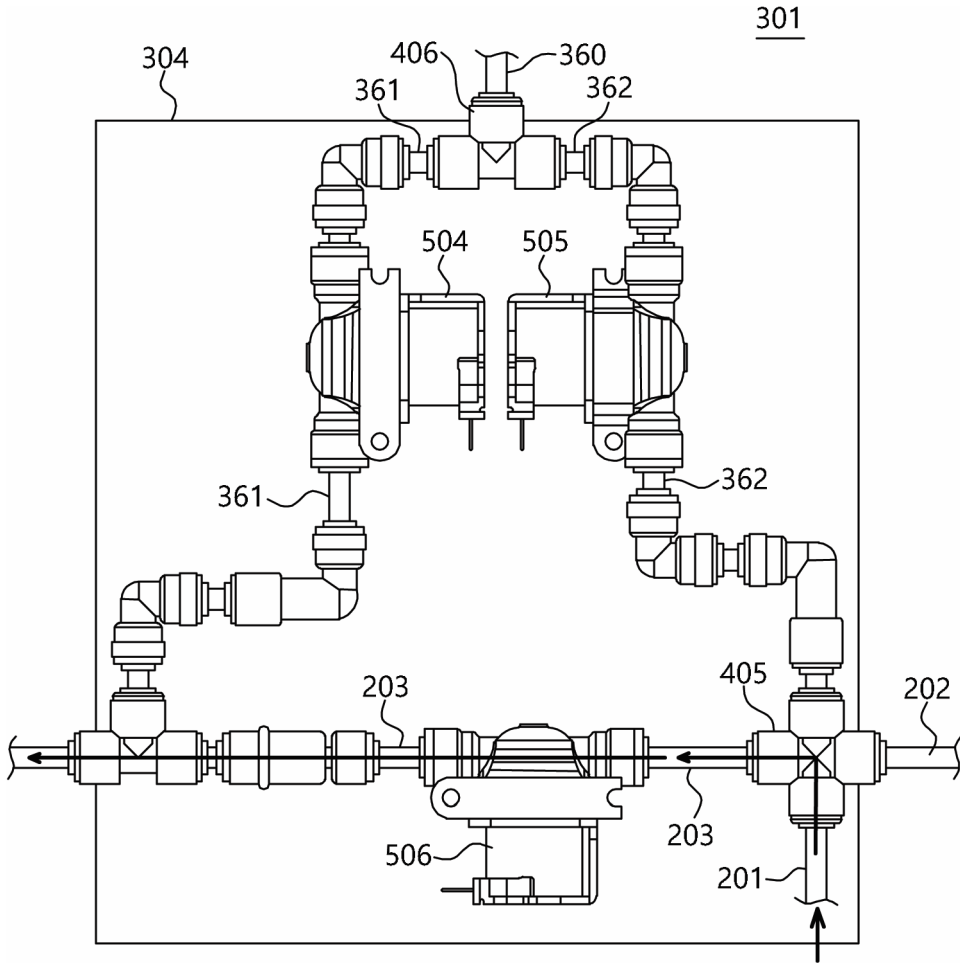


FIG. 21

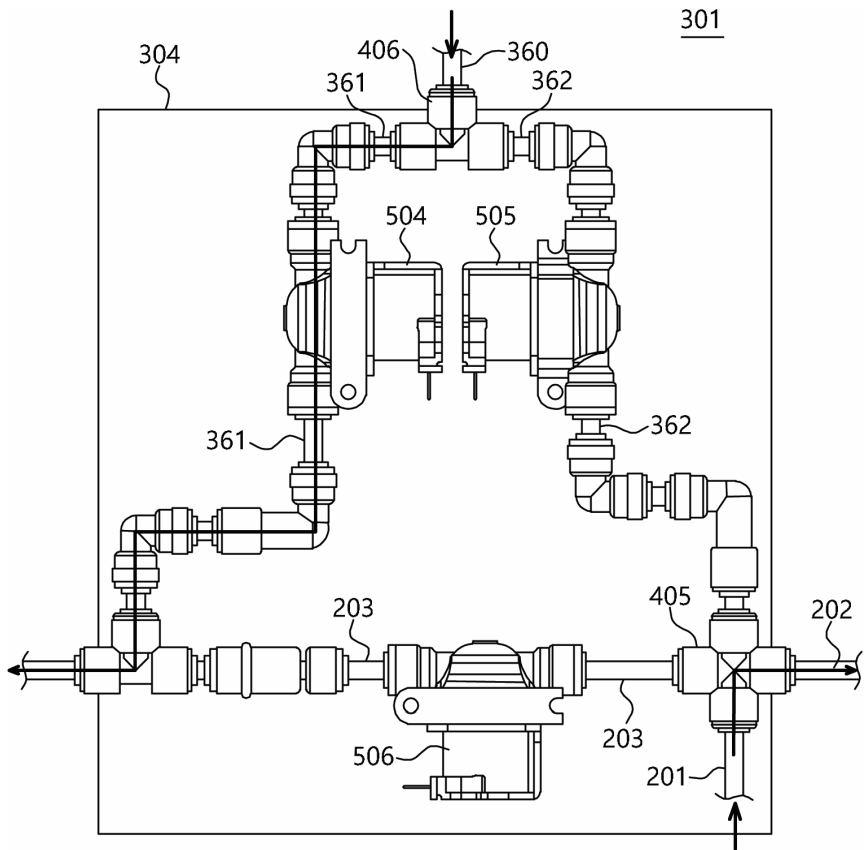


FIG. 22

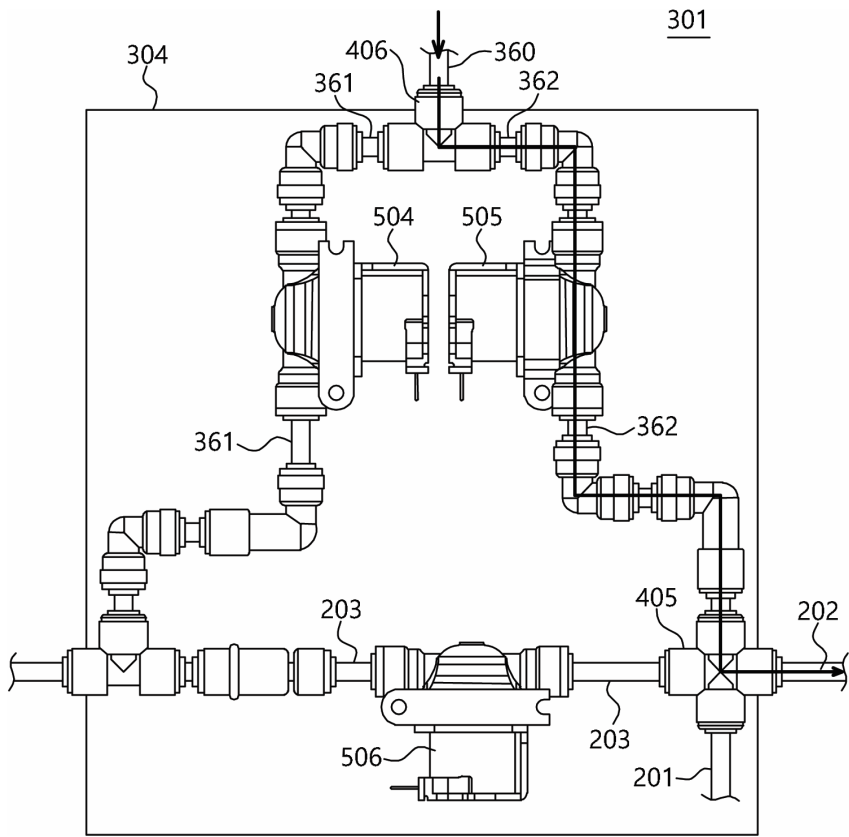


FIG. 23

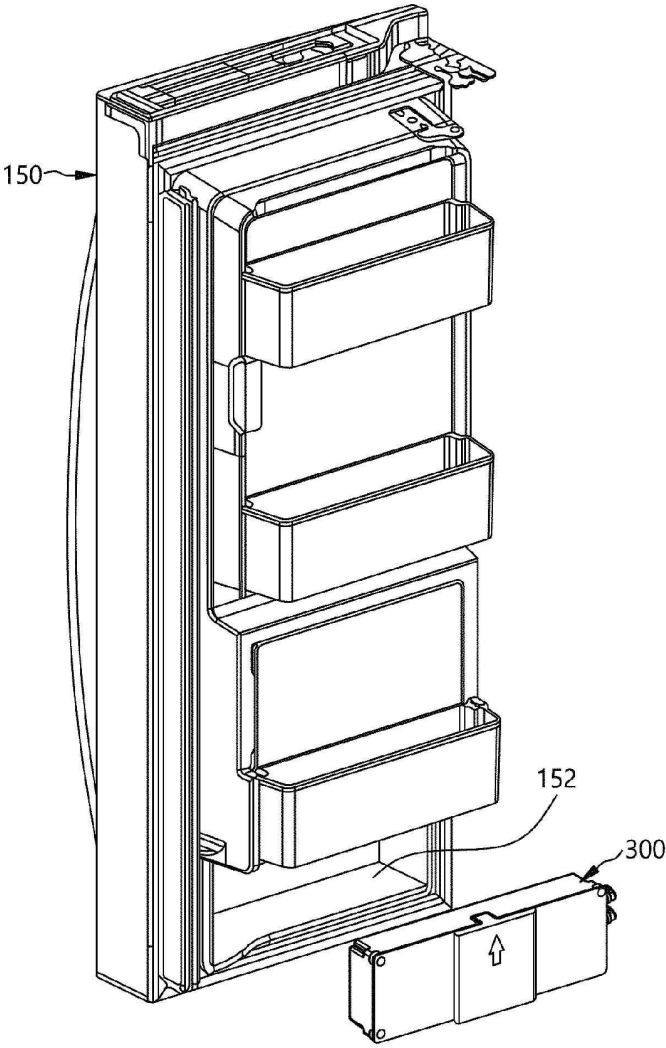
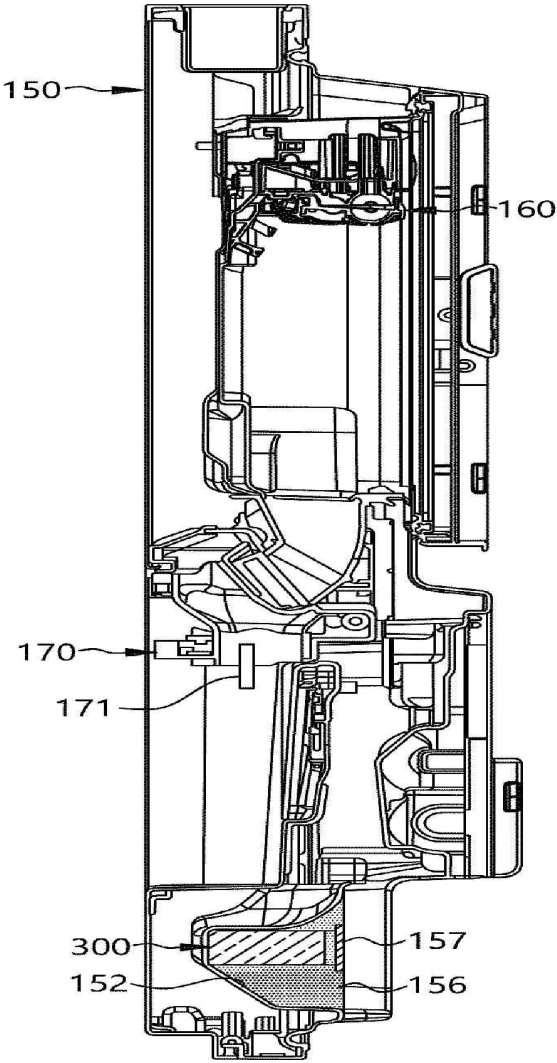


FIG. 24



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/005764

A. CLASSIFICATION OF SUBJECT MATTER**F25D 23/02**(2006.01)i; **F25D 23/04**(2006.01)i; **F25D 29/00**(2006.01)i; **F24H 1/14**(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25D 23/02(2006.01); A47J 31/46(2006.01); B67D 7/80(2010.01); F24H 1/12(2006.01); F25D 23/00(2006.01);
F25D 23/12(2006.01); F25D 3/00(2006.01); G07F 13/10(2006.01)

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

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 온수(hot water), 냉장고(refrigerator), 가열(heating), 유로(pipeline), 회수
(recovery), 분기(bypass), 밸브(valve), 펌프(pump)**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2020-0031371 A (DAE CHANG CO., LTD.) 24 March 2020 (2020-03-24) See paragraphs [0040], [0043], [0046], [0049], [0057], [0059], [0066]-[0067], [0071] and [0096] and figures 1 and 3.	1-20
Y	KR 10-0394359 B1 (SAMSUNG GWANGJU ELECTRONICS CO., LTD. et al.) 27 August 2003 (2003-08-27) See paragraphs [0024]-[0030], [0033] and [0037]-[0038] and figures 2-3.	1-20
Y	KR 10-2020-0144513 A (DRIPLAN CO., LTD.) 29 December 2020 (2020-12-29) See paragraph [0031] and figure 1.	11,15
A	US 2010-0252575 A1 (KIM et al.) 07 October 2010 (2010-10-07) See paragraph [0038] and figure 2.	1-20
A	CN 101063573 A (SAMSUNG ELECTRONICS CO., LTD.) 31 October 2007 (2007-10-31) See claim 1 and figures 1-2.	1-20

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

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

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

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

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

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

“&” document member of the same patent family

Date of the actual completion of the international search

25 September 2024

Date of mailing of the international search report

08 October 2024

Name and mailing address of the ISA/KR

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Authorized officer

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2024/005764

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Form PCT/ISA/210 (patent family annex) (July 2022)

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