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**An et al.**(10) **Pub. No.: US 2011/0067433 A1**(43) **Pub. Date: Mar. 24, 2011**(54) **WATER TANK FOR DISPENSER AND  
REFRIGERATOR HAVING THE SAME****Publication Classification**(51) **Int. Cl.**  
**F25D 25/00** (2006.01)(52) **U.S. Cl.** ..... **62/465; 137/544**(57) **ABSTRACT**(75) Inventors: **Jae Koog An**, Gwangju (KR); **Sang Min Park**, Gwangju (KR); **Young Gwi Park**, Gwangju (KR)(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR)(21) Appl. No.: **12/805,629**(22) Filed: **Aug. 10, 2010**(30) **Foreign Application Priority Data**

Sep. 22, 2009 (KR) ..... 10-2009-89519

A water tank for a dispenser which has a sufficient capacity and allows a user to easily dispense water, and a refrigerator having the same. The water tank includes a water storage container to store water, a filter unit to purify water stored in the water storage container, and a subsidiary container including a filter mounting part, on which the filter unit is mounted, and mounted within the water storage container to divide the inner space of the water storage container, and the water storage container includes a protrusion protruded from the lower surface of the water storage container so as to secure a capacity of the subsidiary container.

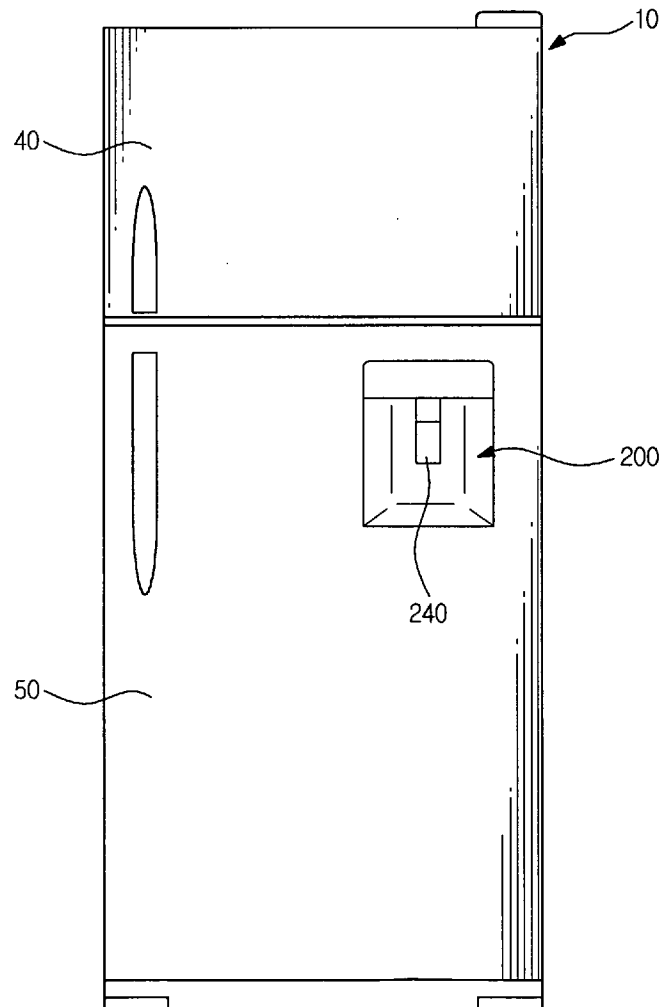
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FIG. 1

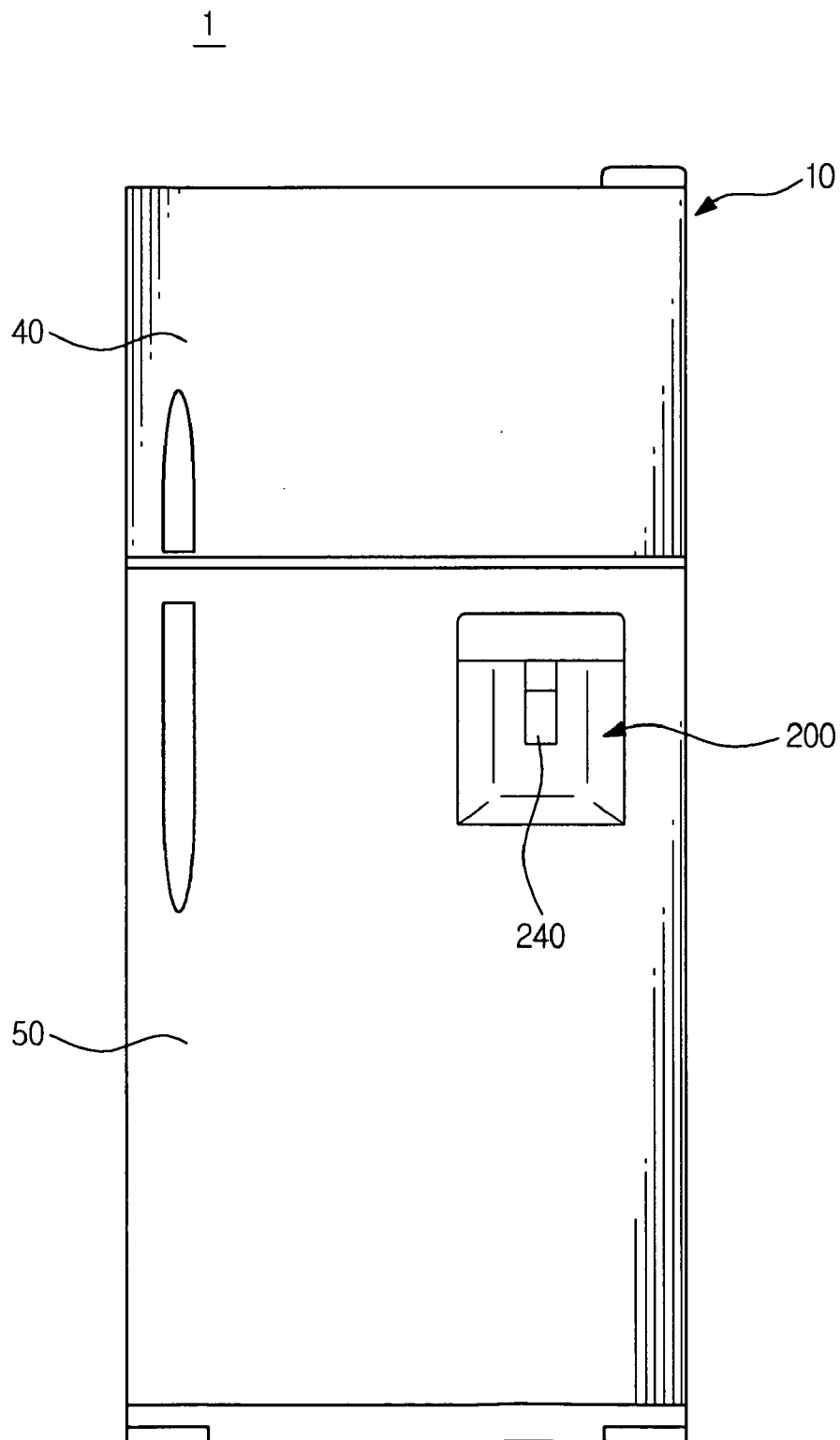


FIG. 2

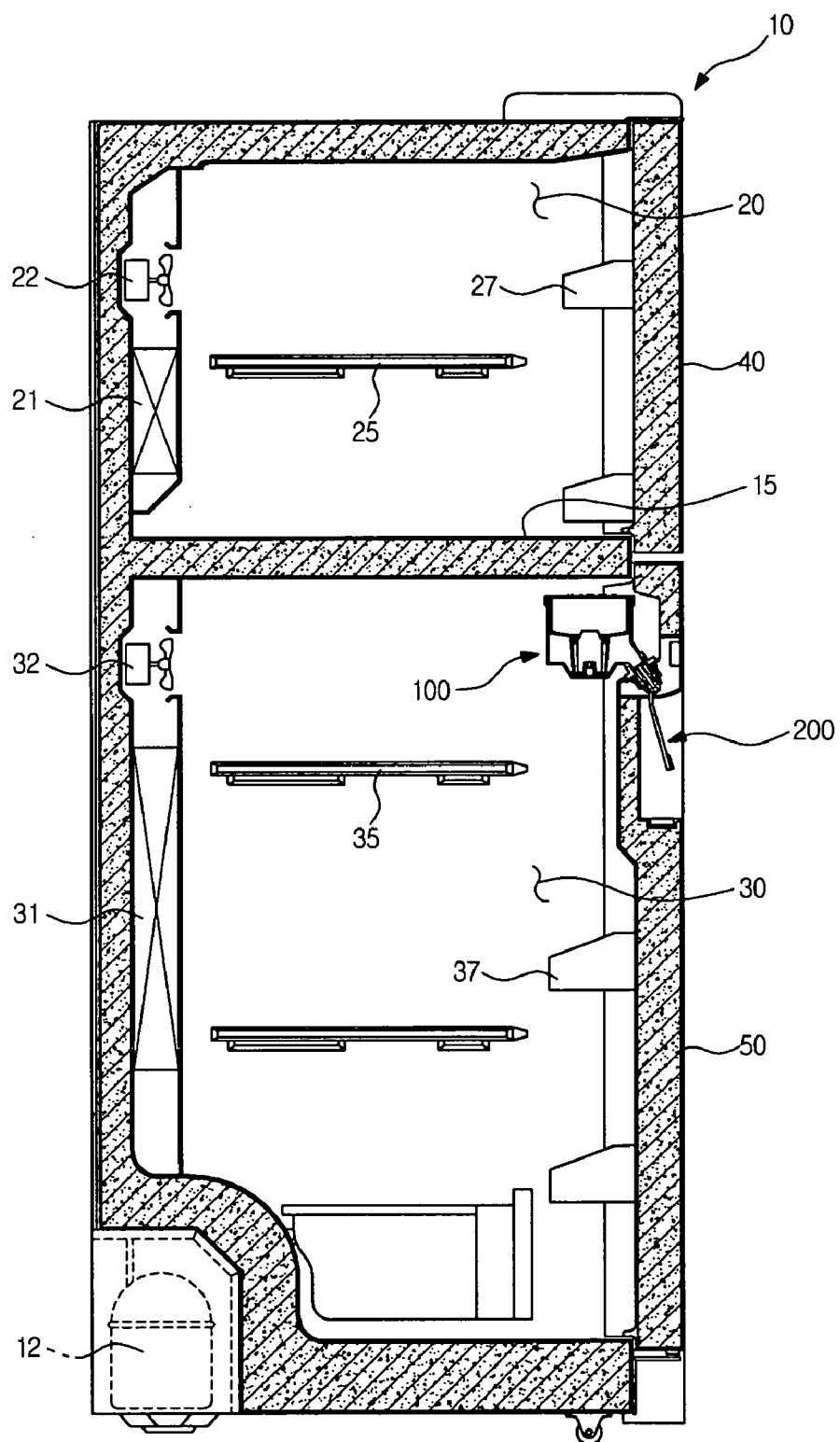


FIG. 3

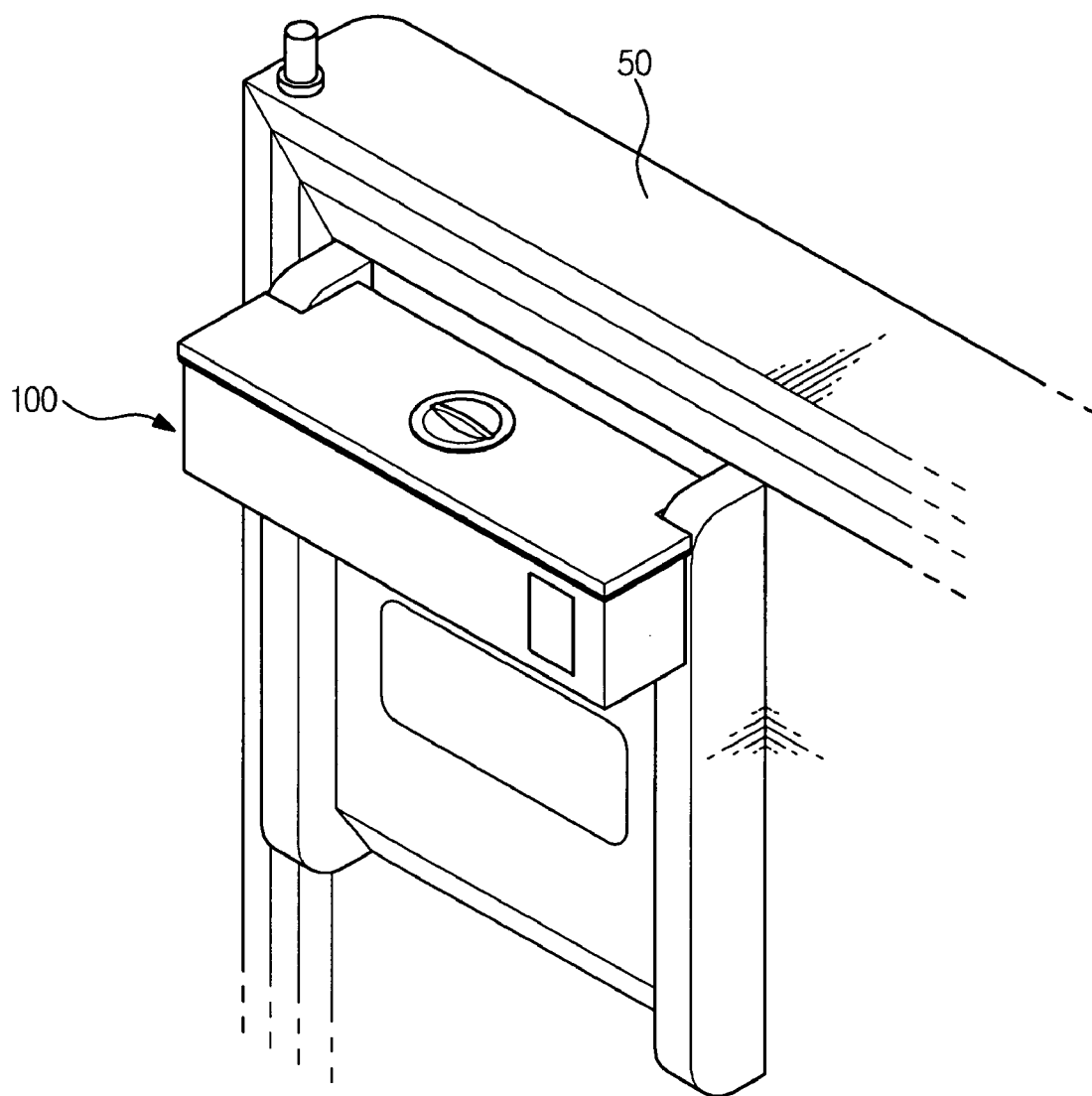


FIG. 4

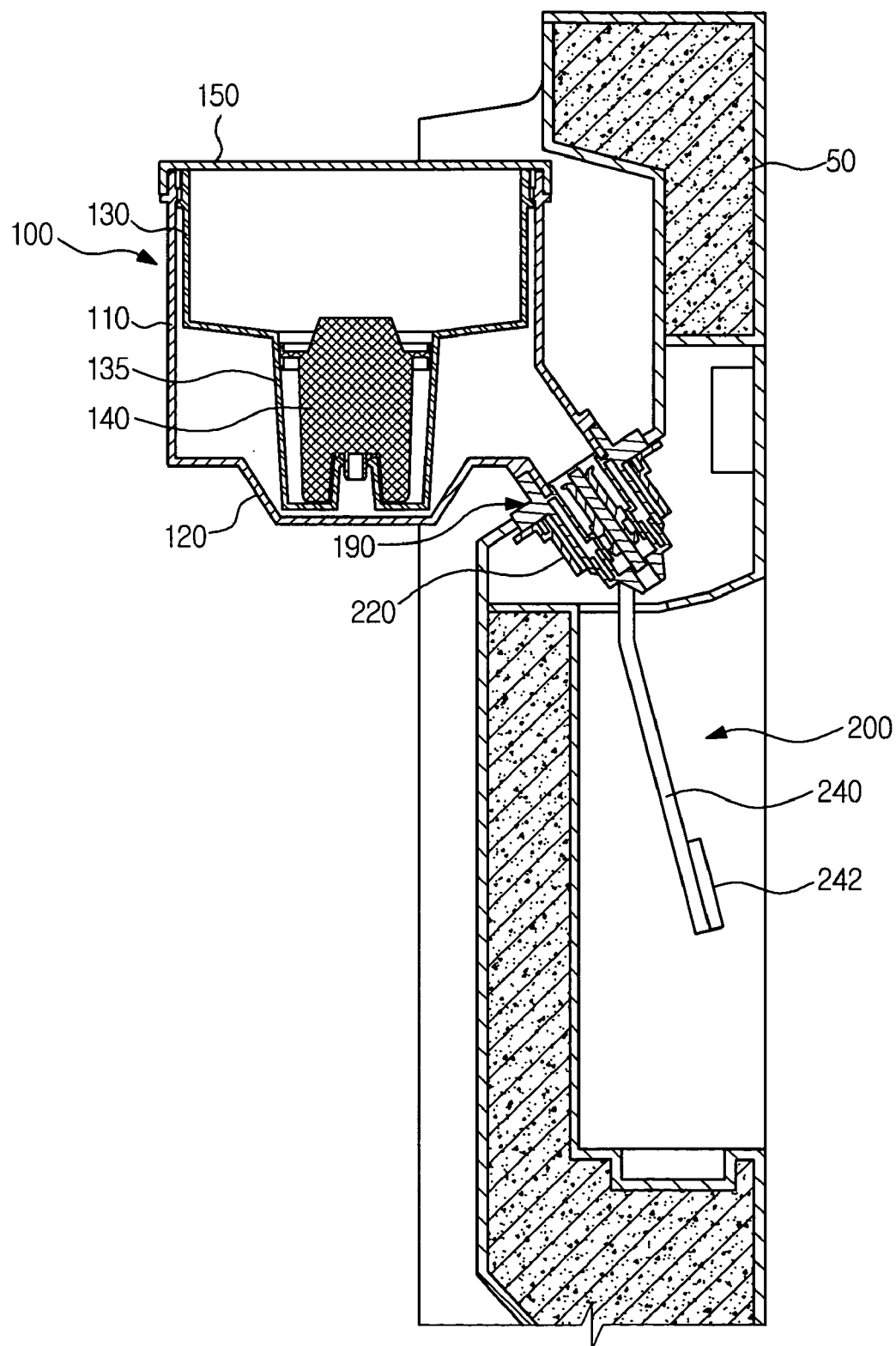


FIG. 5A

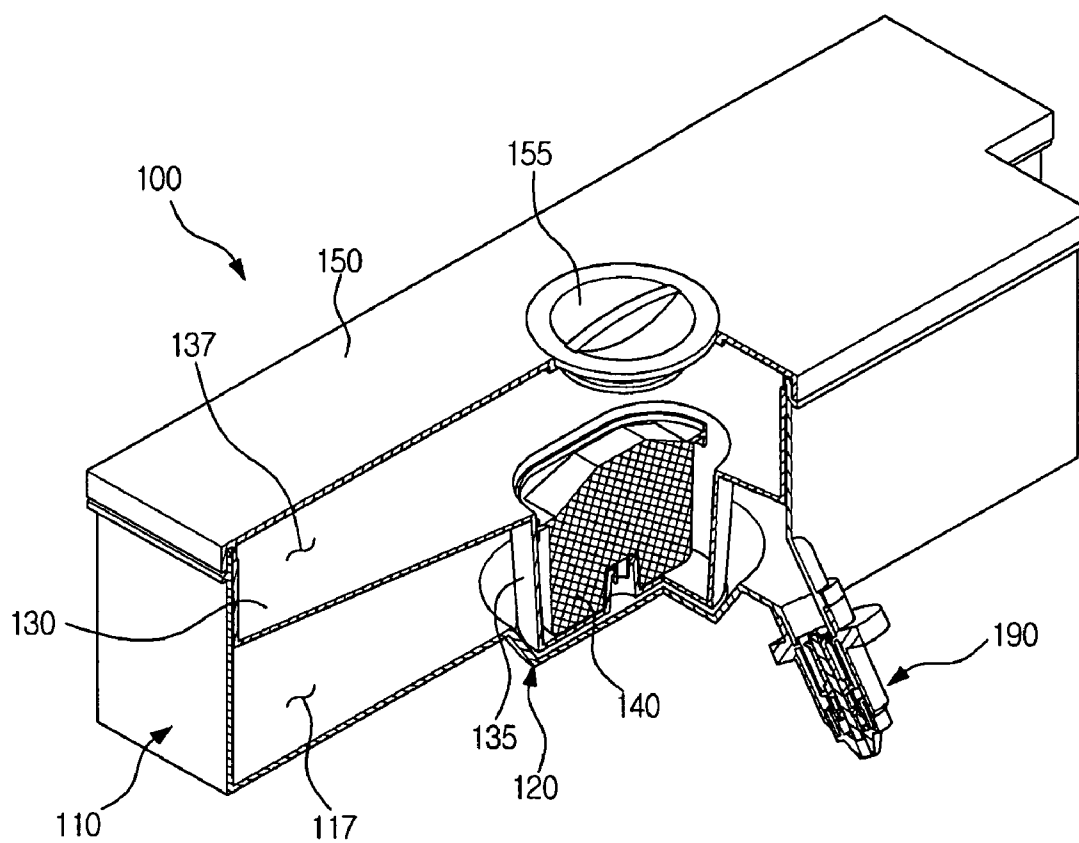


FIG. 5B

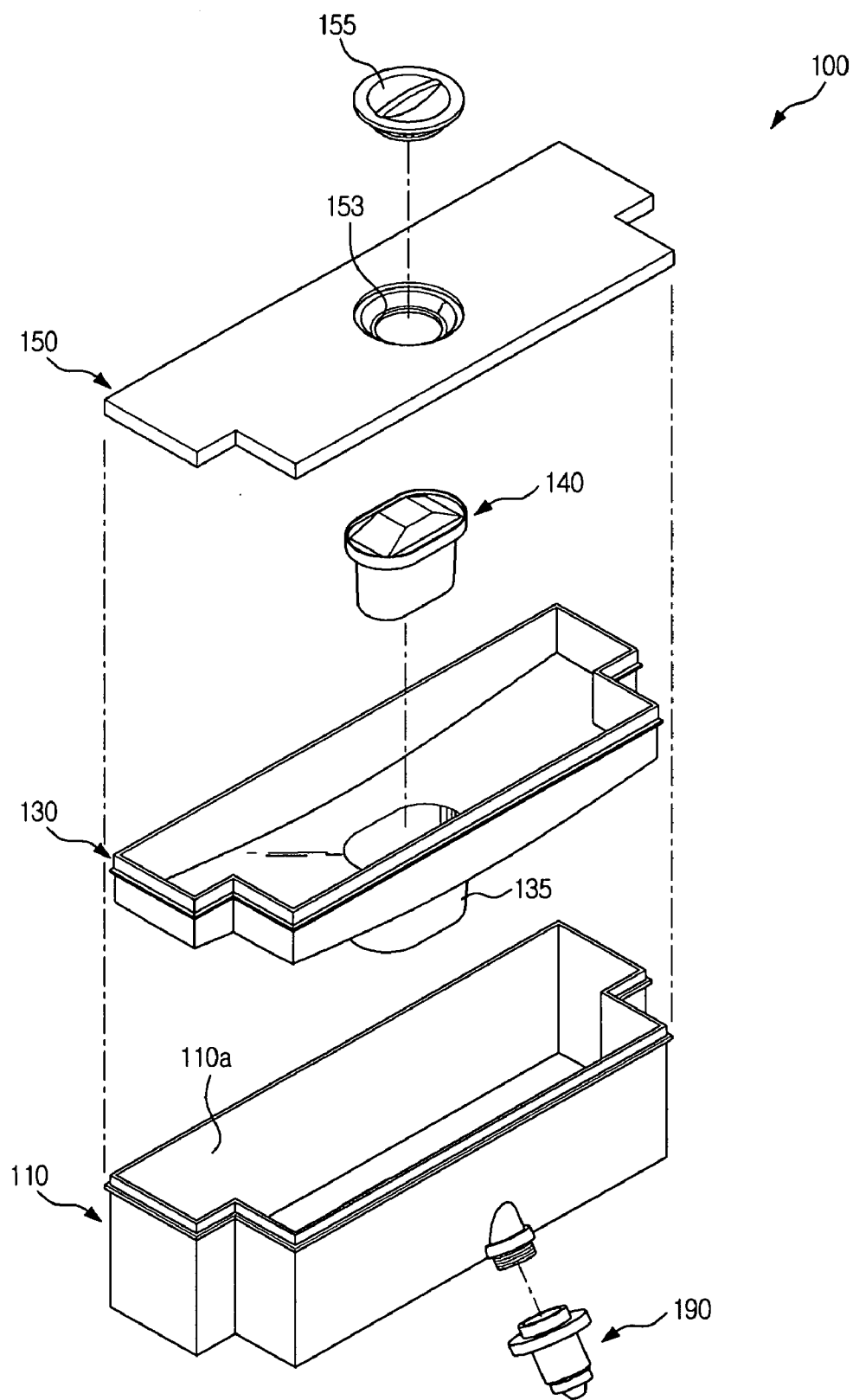


FIG. 5C

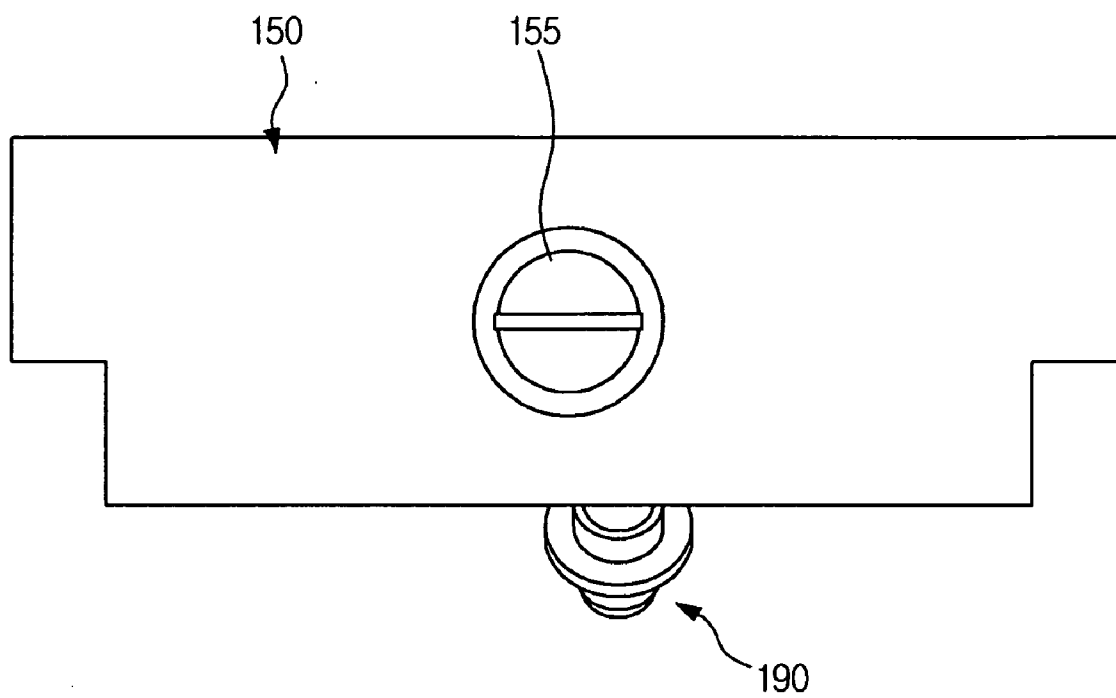


FIG. 5D

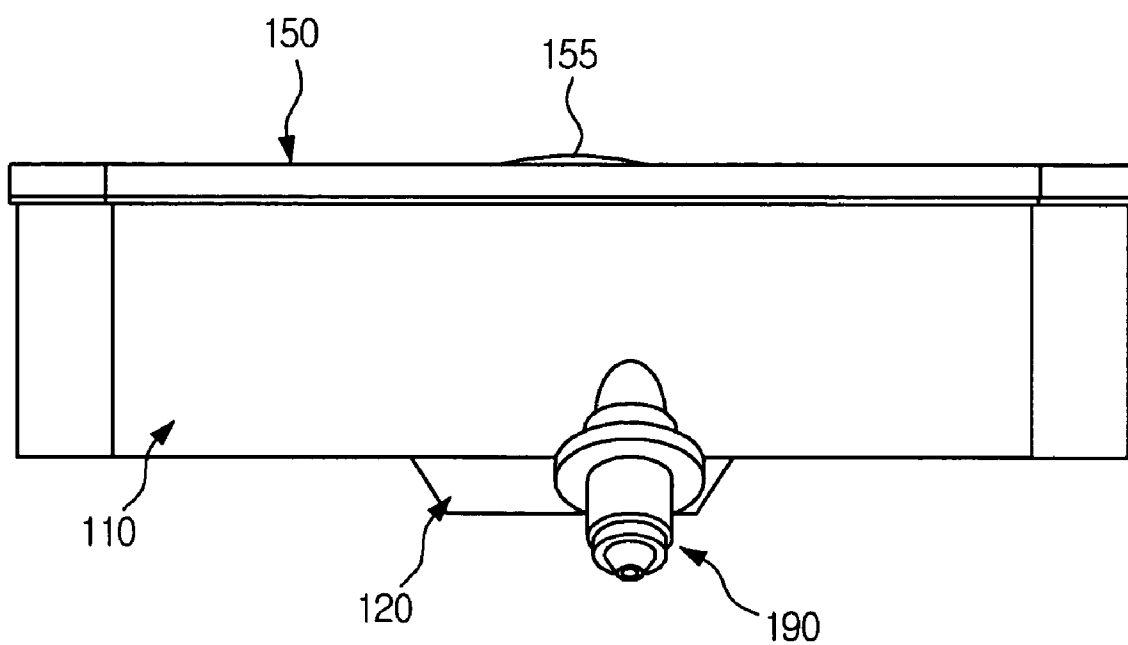


FIG. 6

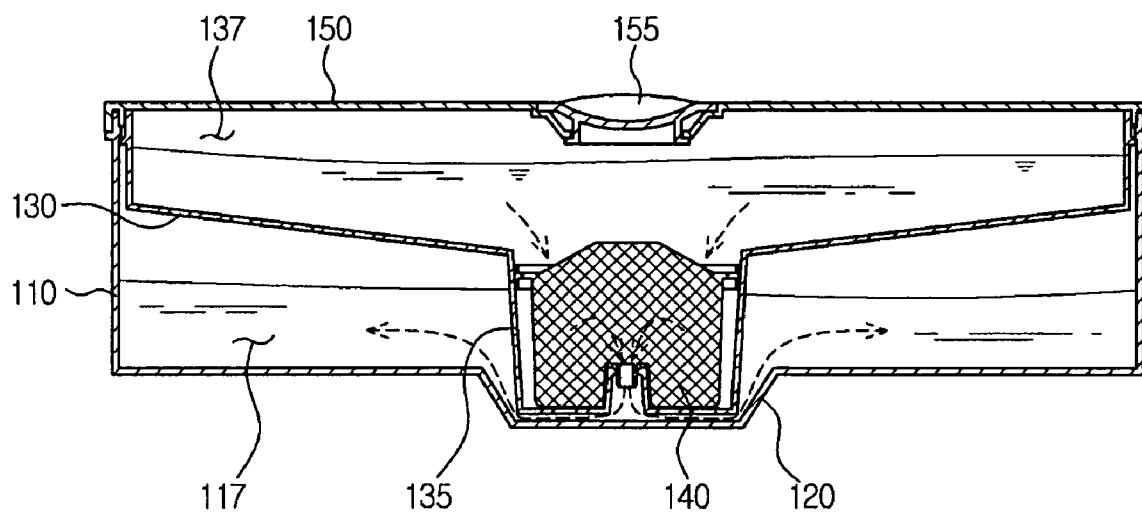
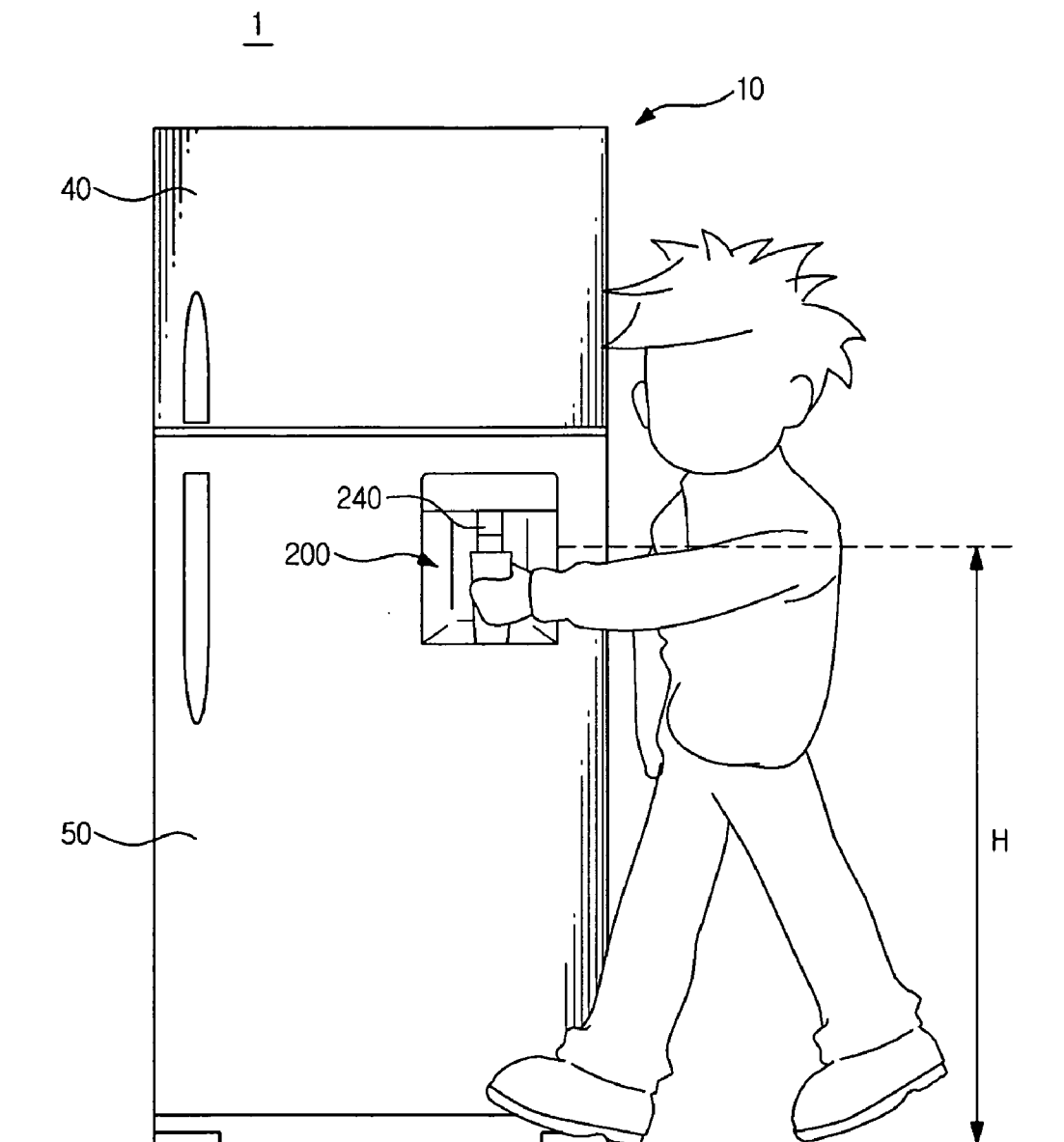


FIG. 7



## WATER TANK FOR DISPENSER AND REFRIGERATOR HAVING THE SAME

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims the benefit of Korean Patent Application No. 2009-0089519, filed on Sep. 22, 2009 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

### BACKGROUND

**[0002]** 1. Field

**[0003]** Embodiments relate to a water tank for a dispenser in which capacity of a subsidiary container is increased, and a refrigerator having the same.

**[0004]** 2. Description of the Related Art

**[0005]** In general, refrigerators are apparatuses to store food at a low temperature, and include a freezing chamber in which food is stored at a comparatively low temperature, and a refrigerating chamber in which food is stored at a higher temperature than that of the freezing chamber.

**[0006]** Refrigerators having various additional functions have been developed and produced so as to satisfy customer requirements. Further, refrigerators having various configurations, each of which is provided with a dispenser, have also been developed.

**[0007]** The dispenser is a device to automatically dispense potable water. The dispenser is connected to a water service pipe or other water sources to supply potable water to a user, or is provided with a water tank to supply water in the water tank to the user.

**[0008]** In the case of a dispenser by which water in a water tank is dispensed and then is supplied to a user, if a water tank having an increased height in order to increase the capacity of the water tank is manufactured, the position of the dispenser to dispense water is necessarily lowered, thereby forcing the user to bend over excessively in order to dispense water.

### SUMMARY

**[0009]** Therefore, it is one aspect to provide a water tank for a dispenser which secures a sufficient capacity, and a refrigerator having the same.

**[0010]** It is another aspect to provide a water tank for a dispenser which allows a user to easily dispense water, and a refrigerator having the same.

**[0011]** Additional aspects will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the invention.

**[0012]** In accordance with one aspect, a refrigerator includes a freezing chamber disposed at a relatively high position, a refrigerating chamber disposed at a relatively low position, a water tank provided on a refrigerating chamber door opening and closing the refrigerating chamber, and a dispenser unit to discharge water in the water tank to the outside, wherein the water tank includes a water storage container to store water, a filter unit to purify water stored in the water storage container, and a subsidiary container including a filter mounting part, on which the filter unit is mounted, and mounted within the water storage container to divide the inner space of the water storage container, and the water storage container includes a protrusion protruded outwardly corre-

sponding to the shape of the filter mounting part to increase a capacity of the subsidiary container.

**[0013]** The filter mounting part may be protruded downwardly from the lower surface of the subsidiary container, and the protrusion may be protruded downwardly from the lower surface of the water storage container corresponding to a space in which the filter unit and the filter mounting part invade the water storage container.

**[0014]** The dispenser unit may be disposed at the upper portion of the refrigerating chamber door such that a user may dispense water without bending over.

**[0015]** The protrusion may guide water purified by the filter unit to the inner space of the water storage container.

**[0016]** The protrusion may filter out foreign substances from water purified by the filter unit.

**[0017]** The capacity of the subsidiary container may be in the range of 1.5~2.5 liters.

**[0018]** A mounting height of the dispenser unit may be in the range of 0.8~1 m from the mounting surface of the refrigerator.

**[0019]** The filter mounting part may be disposed at the central portion of the subsidiary container, and the protrusion may be disposed at the central portion of the water storage container.

**[0020]** The water tank may further include a valve member to intermittently discharge water.

**[0021]** The water tank may further include a cover member to open and close the upper portion of the water storage container.

**[0022]** In accordance with a further aspect, a water tank for a dispenser includes a water storage container to store water, a filter unit to purify water stored in the water storage container, and a subsidiary container including a filter mounting part, on which the filter unit is mounted, and mounted within the water storage container to divide the inner space of the water storage container, wherein the water storage container includes a capacity securing part protruded from the lower surface of the water storage container so as to secure a capacity of the subsidiary container.

**[0023]** The filter mounting part may be protruded downwardly from the central portion of the subsidiary container, and the capacity securing part may accommodate the lower portion of the filter mounting part.

**[0024]** The capacity securing part may guide water purified by the filter unit to the inner space of the water storage container.

**[0025]** The capacity securing part may filter out foreign substances from water purified by the filter unit.

**[0026]** The capacity of the subsidiary container may be in the range of 1.5~2.5 liters.

**[0027]** A capacity of the water storage container may be in the range of 3~4 liters.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0028]** These and/or other aspects will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

**[0029]** FIG. 1 is a front view of a refrigerator in accordance with an embodiment;

**[0030]** FIG. 2 is a longitudinal-sectional view of the refrigerator of FIG. 1;

**[0031]** FIG. 3 is a view illustrating mounting of a water tank on a refrigerating chamber door;

[0032] FIG. 4 is a detailed longitudinal-sectional view of a dispenser unit, on which the water tank is mounted;

[0033] FIGS. 5A to 5D are detailed views of the water tank;

[0034] FIG. 6 is a detailed longitudinal-sectional view illustrating a water flow in the water tank, when water is dispensed; and

[0035] FIG. 7 is a view illustrating a user operation of dispensing water using the dispenser unit.

#### DETAILED DESCRIPTION

[0036] Reference will now be made in detail to the embodiments, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0037] Hereinafter, an embodiment will be described in detail with reference to the accompanying drawings.

[0038] FIG. 1 is a front view of a refrigerator in accordance with an embodiment, FIG. 2 is a longitudinal-sectional view of the refrigerator of FIG. 1, FIG. 3 is a view illustrating mounting of a water tank on a refrigerating chamber door, and FIG. 4 is a detailed longitudinal-sectional view of a dispenser unit, on which the water tank is mounted.

[0039] As shown in FIGS. 1 and 2, a refrigerator 1 in accordance with the embodiment includes a main body 10 having a freezing chamber 20 and a refrigerating chamber 30, which are divided from each other by a diaphragm 15.

[0040] Front surfaces of the freezing chamber 20 and the refrigerating chamber 30 are opened. The freezing chamber 20 disposed at the upper portion of the main body 10 is opened and closed by a freezing chamber door 40, and the refrigerating chamber 30 disposed at the lower portion of the main body 10 is opened and closed by a refrigerating chamber door 50.

[0041] At least one rack 25, on which articles to be stored are put, is provided in the freezing chamber 20, and at least one rack 35, on which articles to be stored are put, is provided in the refrigerating chamber 30.

[0042] A freezing chamber evaporator 21 to cool the freezing chamber 20 and a freezing chamber circulation fan 22 to circulate cool air in the freezing chamber 20 are installed at the rear region of the inside of the freezing chamber 20. Further, a refrigerating chamber evaporator 31 to cool the refrigerating chamber 30 and a refrigerating chamber circulation fan 32 to circulate cool air in the refrigerating chamber 30 are installed at the rear region of the inside of the refrigerating chamber 30. Here, non-described reference numeral 12 represents a compressor to compress a refrigerant supplied to the freezing chamber evaporator 21 and the refrigerating chamber evaporator 31.

[0043] The freezing chamber door 40 and the refrigerating chamber door 50 are rotatably connected to the main body 10 such that the freezing chamber door 40 and the refrigerating chamber door 50 are rotated right and left to open and close the freezing chamber 20 and the refrigerating chamber 30.

[0044] A plurality of receipt parts 27 and 37 to receive articles to be stored are respectively formed on the inner surfaces of the freezing chamber door 40 and the refrigerating chamber door 50.

[0045] The dispositions and structures of the freezing chamber 20 and the refrigerating chamber 30 and the doors 40 and 50 to open and close the freezing chamber 20 and the refrigerating chamber 30 in this embodiment are only exemplary, and may be variously modified.

[0046] As shown in FIGS. 3 and 4, a dispenser unit 200 to intermittently discharge water without opening of the refrigerating chamber door 50 is provided at the upper portion of the front surface of the refrigerating chamber door 50, and a water tank 100 to supply water to the dispenser unit 200 is detachably provided at the upper portion of the rear surface of the refrigerating chamber door 50.

[0047] The dispenser unit 200 includes a water supply unit 220 installed through the refrigerating chamber door 50, and a lever unit 240 pressed to discharge water.

[0048] A valve member 190 of the water tank 100 is connected to and seated on the water supply unit 220. Further, the water supply unit 220 serves as an intermediate between the valve member 190 of the water tank 100 and the dispenser unit 200.

[0049] The lever unit 240 is pressed by a user so as to discharge water. An upper end of the lever unit 240 is rotatably hinged to the water supply unit 220, and a press part 242 having a designated size, which is pressed by the user using a cup, is formed at a lower end of the lever unit 240.

[0050] When the user presses the lever unit 240 using a cup, the lever unit 240 is rotated and thus presses the valve member 190, and the valve member 190 is opened and thus water in the water tank 100 is dispensed through the front surface of the refrigerating chamber door 50.

[0051] Further, when force applied to the lever unit 240 is eliminated, the lever unit 240 is rotated and returned to its original state, and an elastic spring (not shown) within the valve member 190 is returned to its original state and thus the valve member 190 is closed.

[0052] Discharge of water in the water tank 100 may be achieved by a configuration in which a switch is provided instead of the lever unit 240 and the valve member 190 is turned on/off according to an electrical signal based on turning on/off of the switch as well as the above mechanical configuration using the lever unit 240.

[0053] Hereinafter, the water tank 100 will be described in more detail.

[0054] FIG. 5A is a detailed perspective view of the water tank, FIG. 5B is an exploded perspective view of the water tank, FIG. 5C is a rear view of the water tank, and FIG. 5D is a front view of the water tank.

[0055] As shown in FIGS. 5A to 5D, the water tank 100 has a rectangular shape on the whole, and includes a water storage container 110 forming a space to store water, a filter unit 140 to purify water stored in the water storage container 110, a subsidiary container 130 mounted within the water storage container 110 to divide the inner surface of the water storage container 110, and a cover member 150 to close the upper portion of the water storage container 110.

[0056] The water storage container 110 is provided with an opening 110a formed at the upper surface thereof, and has a designated water storage capacity. If the water tank 100 is mounted on the rear surface of the refrigerating chamber door 50, the water storage capacity of the water storage container 110 is preferably in the range of 3-4 liters. Here, in order to prevent the water storage container 110 from excessively protruding toward the refrigerating chamber 30, the height and width of the water storage container 110 may be adjusted. A protrusion 120 is formed on the lower surface of the central portion of the water storage container 110. The protrusion 120, in connection with the filter unit 140 and a filter mounting part 135, will be described in detail later.

[0057] The valve member 190 is provided at the front surface of the lower portion of the water storage container 110. The valve member 190 is connected to the water supply unit 220 of the dispenser unit 200, and serves to intermittently discharge water to the outside. Discharge of water through the valve member 190 is achieved in connection with operation of the lever unit 240 in the above-described manner.

[0058] The subsidiary container 130 is mounted within the water storage container 110. The subsidiary container 130 serves to divide the inner space of the water storage container 110 to upper and lower parts and to store water temporarily and then discharge water purified by the filter unit 140 to the outside. Therefore, water introduced into the water storage container 110 is supplied to a first water storage part 137 divided by the subsidiary container 130, is purified by passing through the filter unit 140, and then is stored in a second water storage part 117. The water storage capacity of the subsidiary container 130 is preferably in the range of 1.5-2.5 liters. Such a capacity of the subsidiary container 130 is obtained by extending a conventional subsidiary container up and down. As the capacity of the subsidiary container 130 is increased, the protrusion 120 of the water storage container 110, which will be described later, is formed.

[0059] The subsidiary container 130 includes the filter mounting part 135, on which the filter unit 140 is mounted, and the filter mounting part 135 is a space, into which the filter unit 140 is inserted. The filter mounting part 135 is protruded downwardly from the central portion of the subsidiary container 130.

[0060] The filter unit 140 serves to purify water introduced into the water tank 100, and may employ general filter products, i.e., various kinds of filters in a single product type to purify water. The filter unit 140 purifies water stored in the first water storage part 137 under the condition that the filter unit 140 is inserted into the filter mounting part 135 of the subsidiary container 130, and then discharges the purified water to the outside.

[0061] The protrusion 120 of the water storage container 110 is protruded downwardly corresponding to the filter mounting part 135 protruded downwardly, and is stepped from the lower surface of the water storage container 110.

[0062] The protrusion 120 accommodates the lower portion of the filter mounting part 135. The protrusion 120 is formed only by a portion of the lower surface of the water storage container 110 without influence on the entire height of the water storage container 110 according to extension of the capacity of the subsidiary container 130 up and down. That is, in order to increase the capacity of the subsidiary container 130, the space of the first water storage part 137 of the subsidiary container 130 is extended up and down, and a portion of the water storage container 110 invaded by the filter unit 140 and the filter mounting part 135 is protruded downwardly and thus forms the protrusion 120. Such a protrusion 120 may be referred to as a capacity securing part of the subsidiary container 130, because the protrusion 120 secures the capacity of the subsidiary container 130, which may be insufficient.

[0063] The purpose of the formation of the protrusion 120 on the water storage container 110 is to extend the capacity of the subsidiary container 130 without increasing the height of a space of the rear surface of the refrigerating chamber door 50, on which the water tank 100 is mounted. When the vertical length of the space of the rear surface of the refrigerating chamber door 50, on which the water tank 100 is mounted,

increases, the dispenser unit 200 is located at a lower position of the refrigerating chamber door 50 in direct proportion thereto, and thus a user needs to bend over much more to dispense water using the dispenser unit 200.

[0064] Further, the protrusion 120 guides water purified by the filter unit 140 such that the purified water is uniformly dispersed throughout the second water storage part 117 of the water storage container 110.

[0065] Water is temporarily stored in the protrusion 120, and then is dispersed to the second water storage part 117. Foreign substances contained in the water do not escape the protrusion 120, and are retained in the protrusion 120. Therefore, the protrusion 120 serves to filter out foreign substances from water.

[0066] The cover member 150 is provided on the upper surface of the water storage container 110. The cover member 150 closes the opening 110a of the water storage container 110, and prevents foreign substances from entering the water storage container 110. The cover member 150 includes an inlet 153, through which water is injected into the water storage container 110, formed at the central portion of the cover member 150, and a cap member 155 to open and close the inlet 153.

[0067] Hereinafter, dispensation of water using the water tank 100 in the refrigerator 1 in accordance with the embodiment of the present invention will be described.

[0068] FIG. 6 is a detailed longitudinal-sectional view illustrating a water flow in the water tank, when water is dispensed, and FIG. 7 is a view illustrating a user operation of dispensing water using the dispenser unit.

[0069] With reference to FIGS. 6 and 7, when a user opens the cap member 155 and then injects water into the first water storage part 137 of the subsidiary container 130 through the inlet 153, water flows to the filter mounting part 135 protruded downwardly and passes through the filter part 140, thus being purified.

[0070] The purified water temporarily passes through the protrusion 120, and then is uniformly dispersed throughout the second water storage part 117. Here, the protrusion 120 serves both to guide the purified water to the inside of the second storage part 117 and to filter out foreign substances from the purified water, as described above.

[0071] Thereafter, when the user presses the lever unit 240 of the dispenser unit 200 using a cup, the purified water within the second water storage part 117 of the water storage container 110 is discharged into the user's cup through the valve member 190. Here, the dispenser unit 200 is disposed at a position having a height H from the mounting surface of the refrigerator 1. The height H is a height, which allows the user to hold out his/her hand to press the lever unit 240 using the cup without excessive bending over, and is preferably in the range of 0.8~1 m. Thereby, the user may easily dispense water through the dispenser unit 200.

[0072] In a conventional refrigerator in which a refrigerating chamber is disposed at the lower portion of a main body, if water stored in a water tank on the rear surface of a refrigerating chamber door is dispensed using a dispenser, when the dispenser is disposed at a proper position for a user, the capacity of the water tank is insufficient, and when the capacity of the water tank is much increased, the position of the dispenser is located at a relatively low position of the refrigerating chamber door, the user has difficulty in using the

dispenser. The water tank 100 in accordance with the embodiment of the present invention is provided to solve the above problems.

[0073] The water tank 100 in accordance with the embodiment of the present invention is disposed at a height that is convenient to use while having an increased capacity.

[0074] Further, since the dispenser unit 200 is disposed at the upper portion of the refrigerating chamber door 50, the design of the refrigerator 1 is improved.

[0075] As is apparent from the above description, in a water tank for a dispenser and a refrigerator having the same in accordance with one embodiment of the present invention, a protrusion is formed on the lower surface of a water storage container, thereby increasing a capacity of the water tank.

[0076] Further, the total height of the water tank is reduced while increasing the capacity of the water tank.

[0077] Moreover, a dispenser unit is located at a relatively higher position of a refrigerating chamber according to the reduction of the height of the water tank, thereby allowing a user to easily dispense water.

[0078] Although a few embodiments have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. A refrigerator comprising:
  - a freezing chamber;
  - a refrigerating chamber disposed at a position lower than the freezing chamber;
  - a water tank provided on a refrigerating chamber door opening and closing the refrigerating chamber; and
  - a dispenser unit to discharge water in the water tank to the outside,
 wherein the water tank includes a water storage container to store water, a filter unit to purify water stored in the water storage container, and a subsidiary container including a filter mounting part, on which the filter unit is mounted, and mounted within the water storage container to divide the inner space of the water storage container, and
  - the water storage container includes a protrusion protruded outwardly corresponding to the shape of the filter mounting part to increase a capacity of the subsidiary container.
2. The refrigerator according to claim 1, wherein the filter mounting part is protruded downwardly from the lower surface of the subsidiary container, and
  - the protrusion is protruded downwardly from the lower surface of the water storage container corresponding to a space in which the filter unit and the filter mounting part invade the water storage container.

3. The refrigerator according to claim 1, wherein the dispenser unit is disposed at an upper portion of the refrigerating chamber door such that a user may dispense water without bending over.

4. The refrigerator according to claim 2, wherein the protrusion guides water purified by the filter unit to the inner space of the water storage container.

5. The refrigerator according to claim 2, wherein the protrusion filters out foreign substances from water purified by the filter unit.

6. The refrigerator according to claim 2, wherein the capacity of the subsidiary container is in the range of 1.5~2.5 liters.

7. The refrigerator according to claim 3, wherein a mounting height of the dispenser unit is in the range of 0.8~1 m from the mounting surface of the refrigerator.

8. The refrigerator according to claim 2, wherein the filter mounting part is disposed at a central portion of the subsidiary container, and the protrusion is disposed at a central portion of the water storage container.

9. The refrigerator according to claim 1, wherein the water tank further includes a valve member to intermittently discharge water.

10. The refrigerator according to claim 1, wherein the water tank further includes a cover member to open and close the upper portion of the water storage container.

11. A water tank for a dispenser comprising:

- a water storage container to store water;
  - a filter unit to purify water stored in the water storage container; and
  - a subsidiary container including a filter mounting part, on which the filter unit is mounted, and mounted within the water storage container to divide the inner space of the water storage container,
- wherein the water storage container includes a capacity securing part protruded from the lower surface of the water storage container so as to secure a capacity of the subsidiary container.

12. The water tank according to claim 11, wherein the filter mounting part is protruded downwardly from the central portion of the subsidiary container, and the capacity securing part accommodates the lower portion of the filter mounting part.

13. The water tank according to claim 12, wherein the capacity securing part guides water purified by the filter unit to the inner space of the water storage container.

14. The water tank according to claim 12, wherein the capacity securing part filters out foreign substances from water purified by the filter unit.

15. The water tank according to claim 12, wherein the capacity of the subsidiary container is in the range of 1.5~2.5 liters.

16. The water tank according to claim 12, wherein a capacity of the water storage container is in the range of 3~4 liters.

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