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(54) **REFRIGERATOR**

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(2013.01)

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(57) **ABSTRACT**

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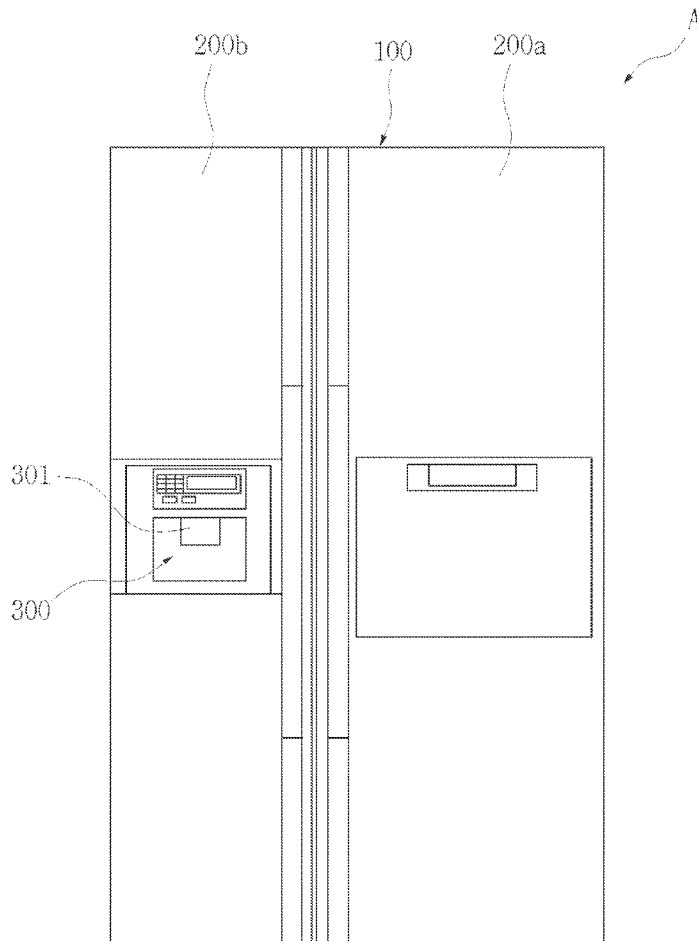
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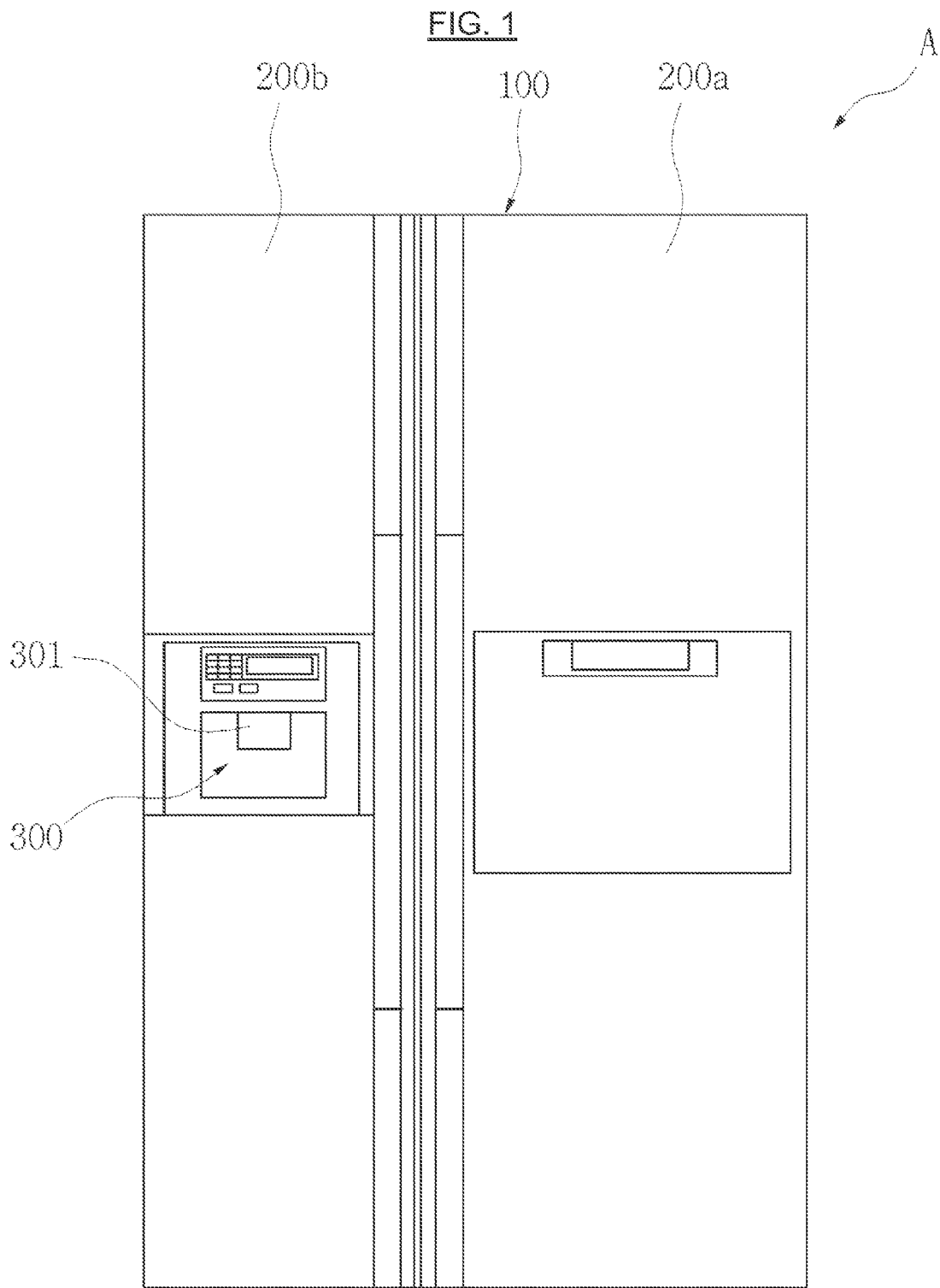
(51) **Int. Cl.**

F25C 1/00 (2006.01)

F25D 31/00 (2006.01)

The present disclosure relates to a refrigerator in which a water tank for storing water to be supplied to an ice maker and a dispenser is in a shelf in the interior thereof. The refrigerator includes an ice maker in a freezer; a dispenser in a front part of a door; a slidable water tank in a shelf in a cold storage space; a pump for pumping water in the water tank to the ice maker and the dispenser; a passage connecting the water tank to the pump; and a silicone inlet in a rear surface of the shelf and having one end connected to an outlet of the water tank and another end connected to the passage. Thus, the water tank, which stores purified water, not tap water, is in the shelf in the refrigerator to supply water to the ice maker and the dispenser through the pump.





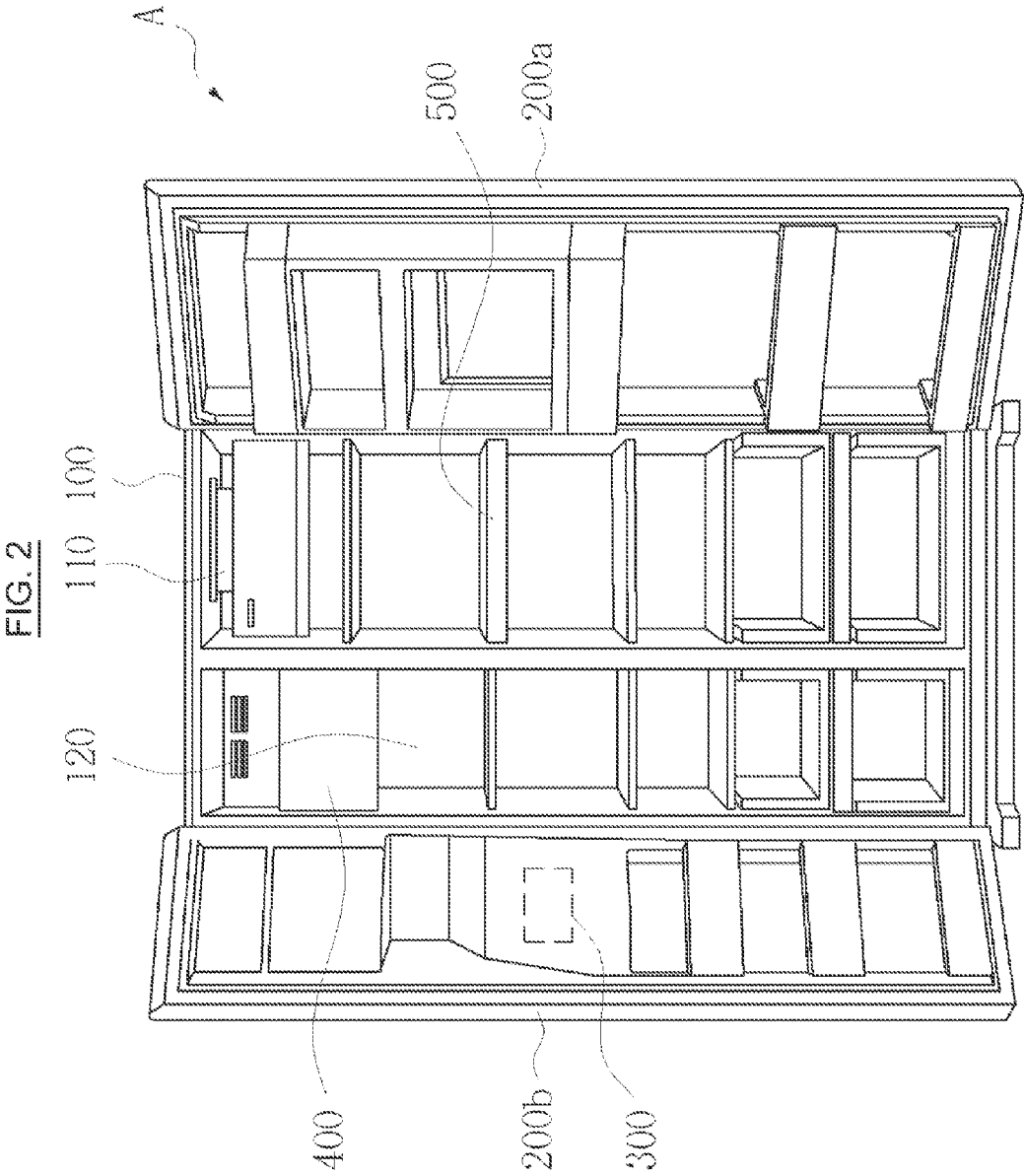


FIG. 3A

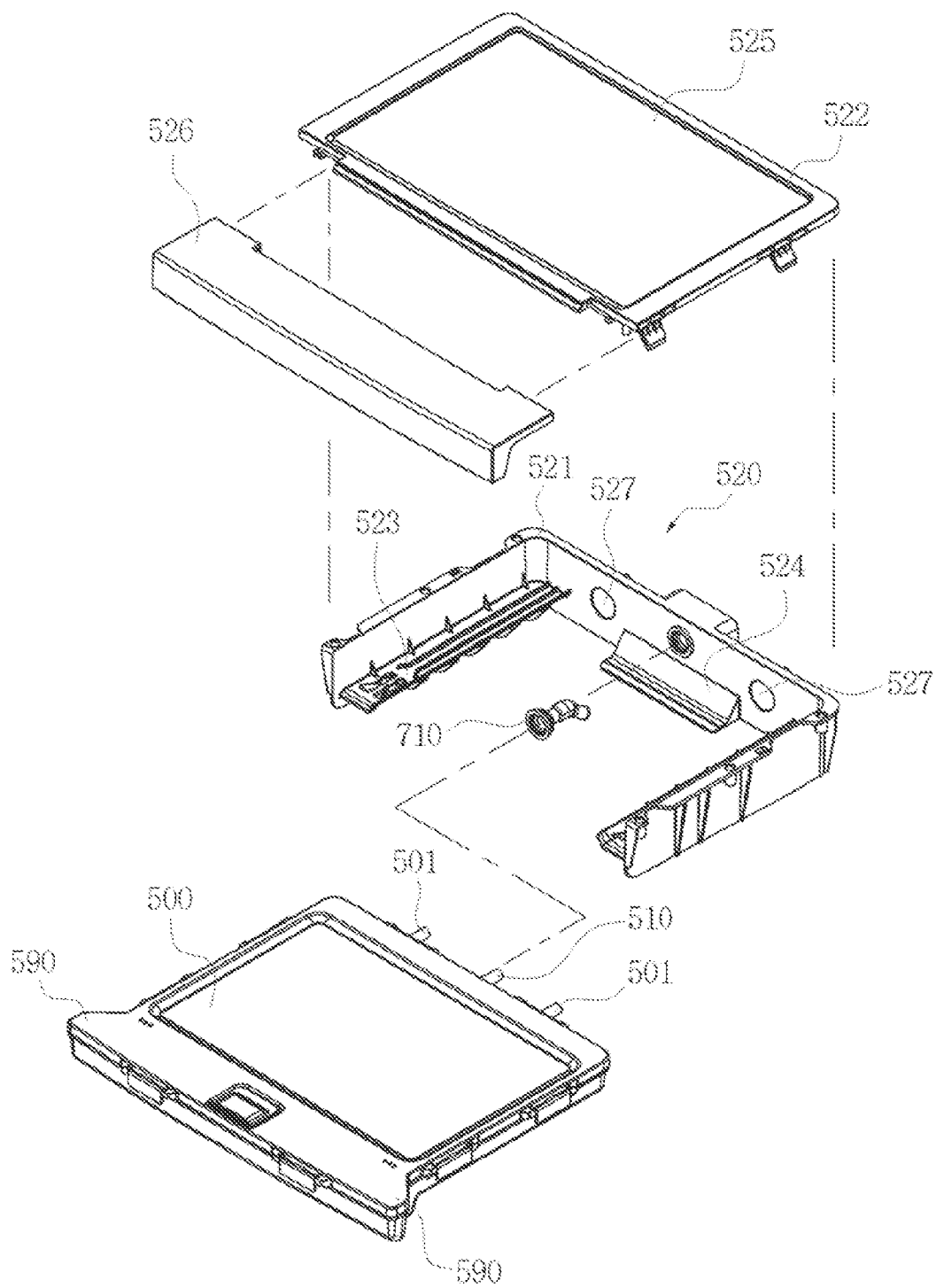


FIG. 3B

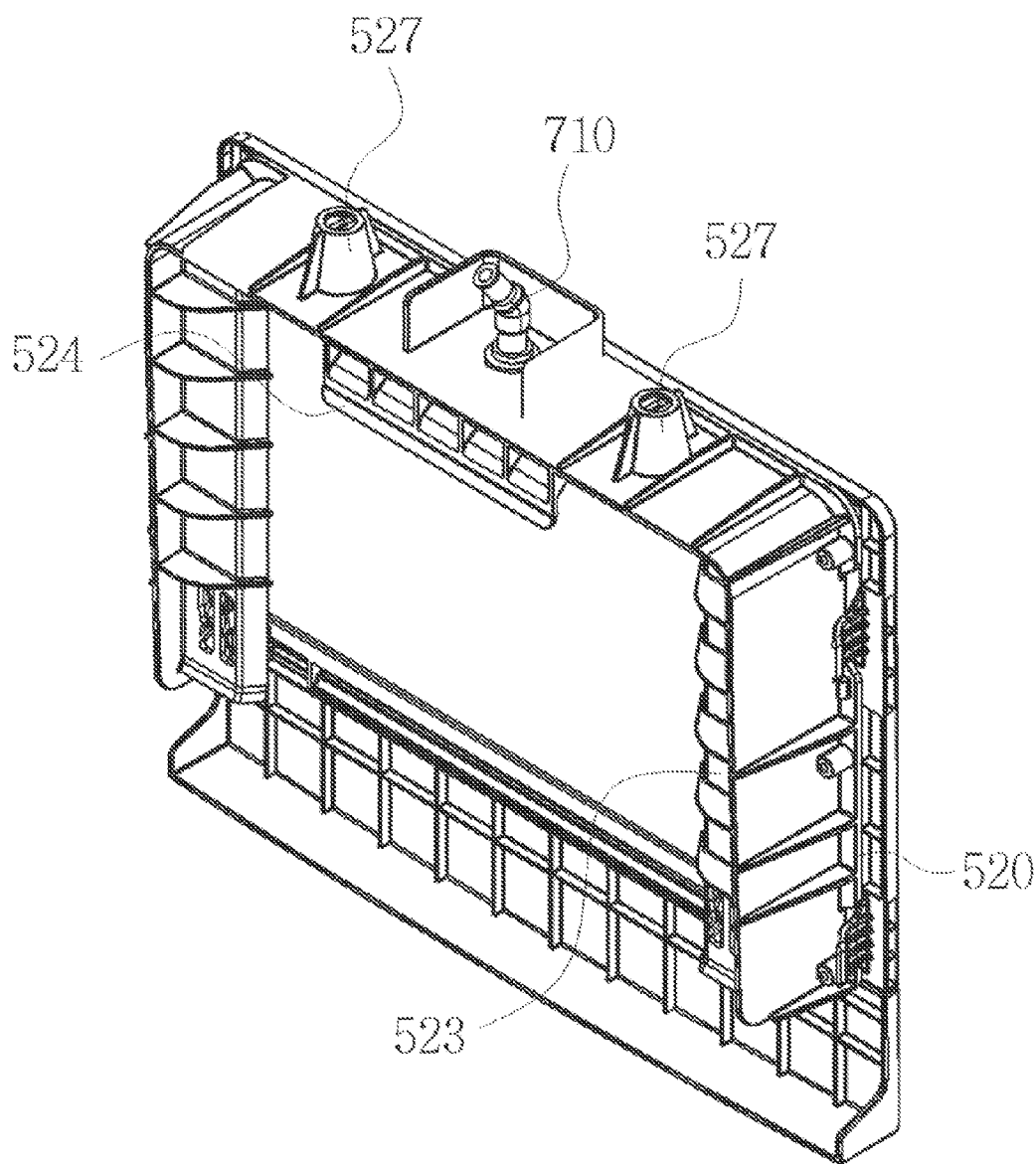


FIG. 3C

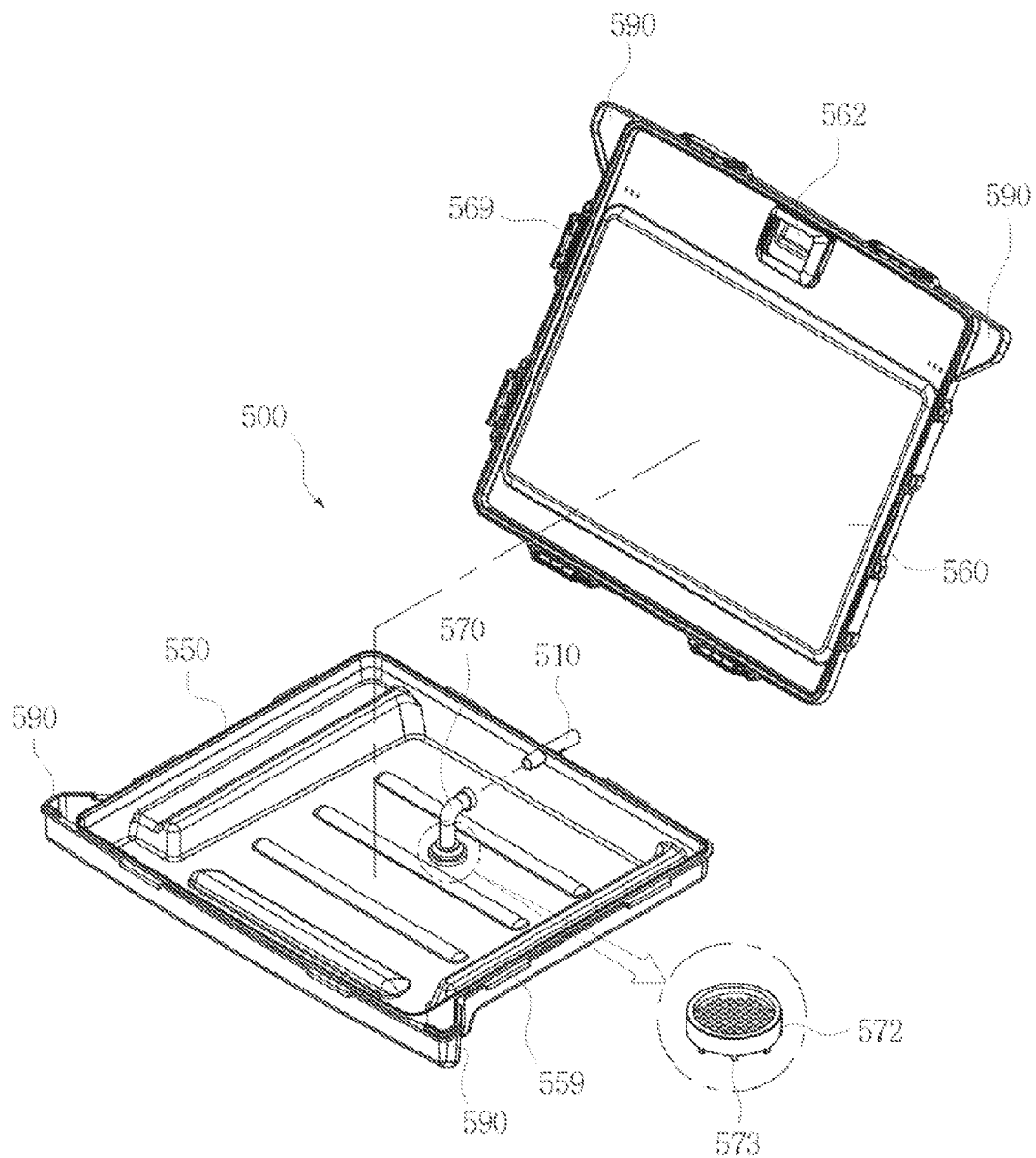


FIG. 4A

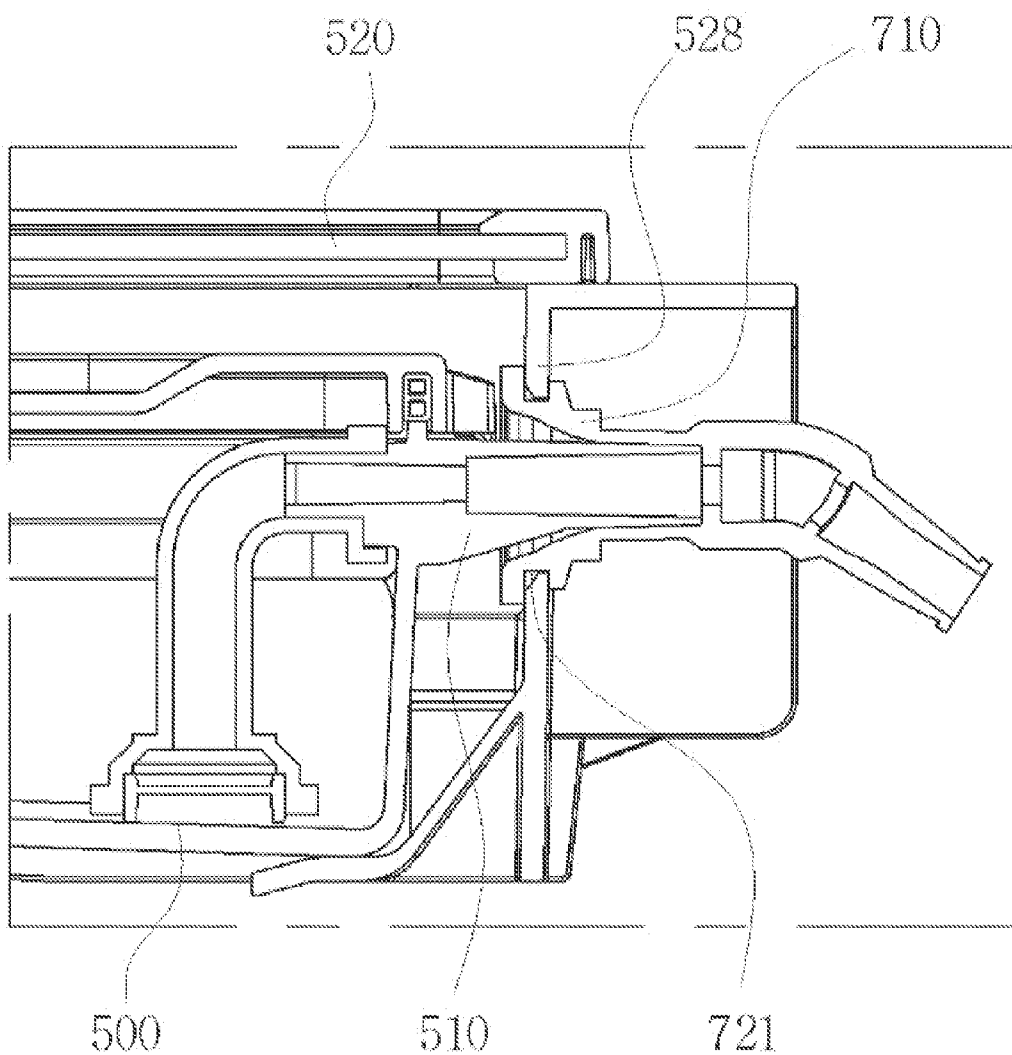


FIG. 4B

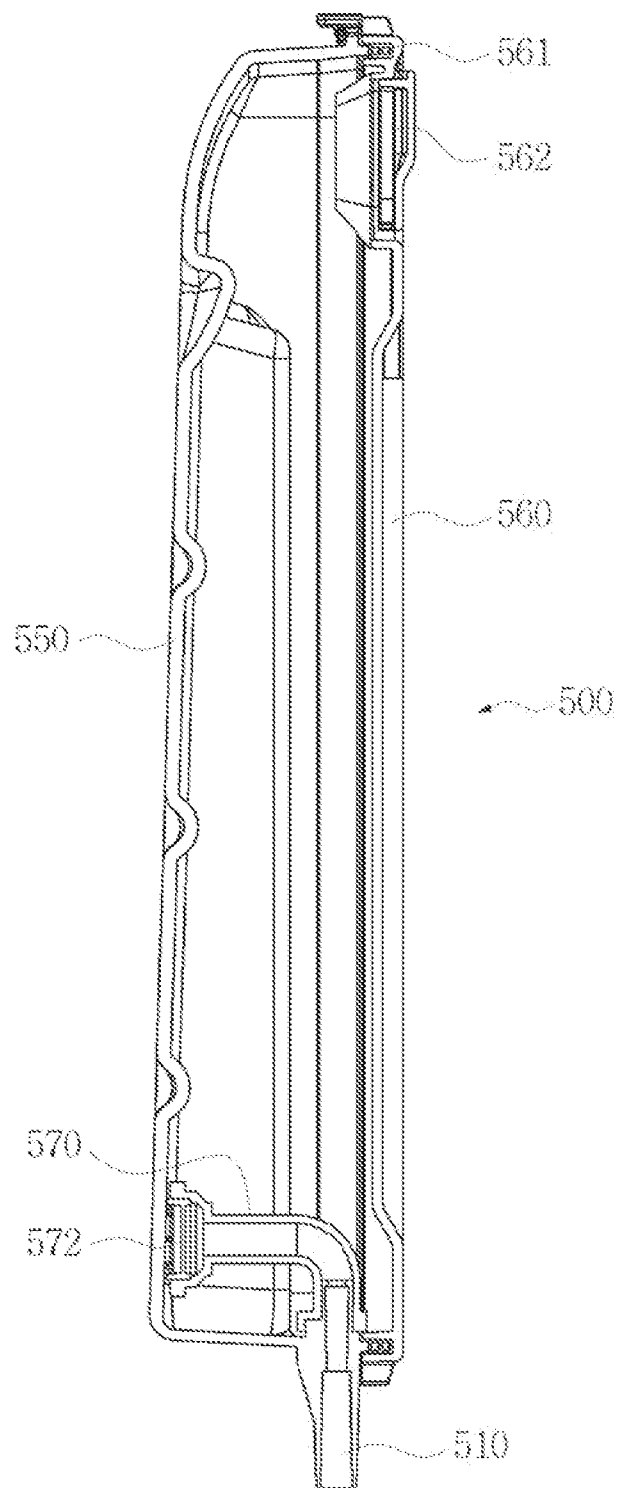


FIG. 4C

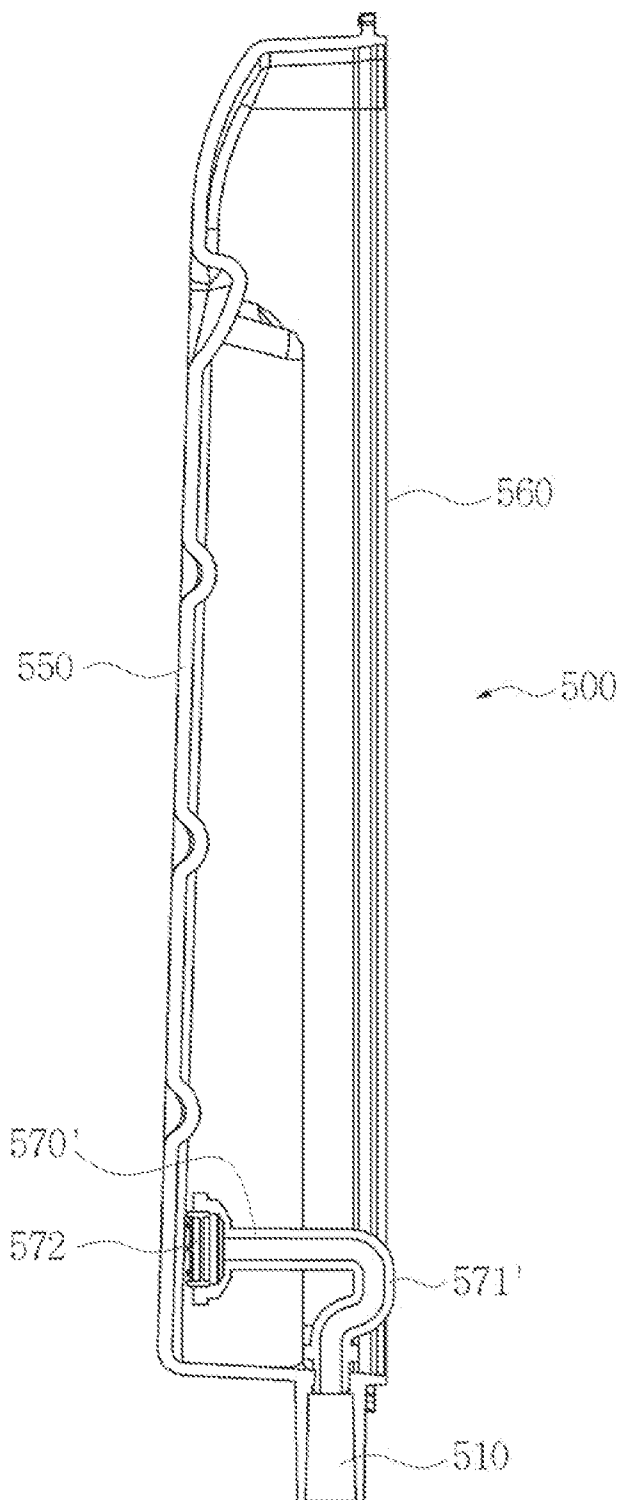


FIG. 5

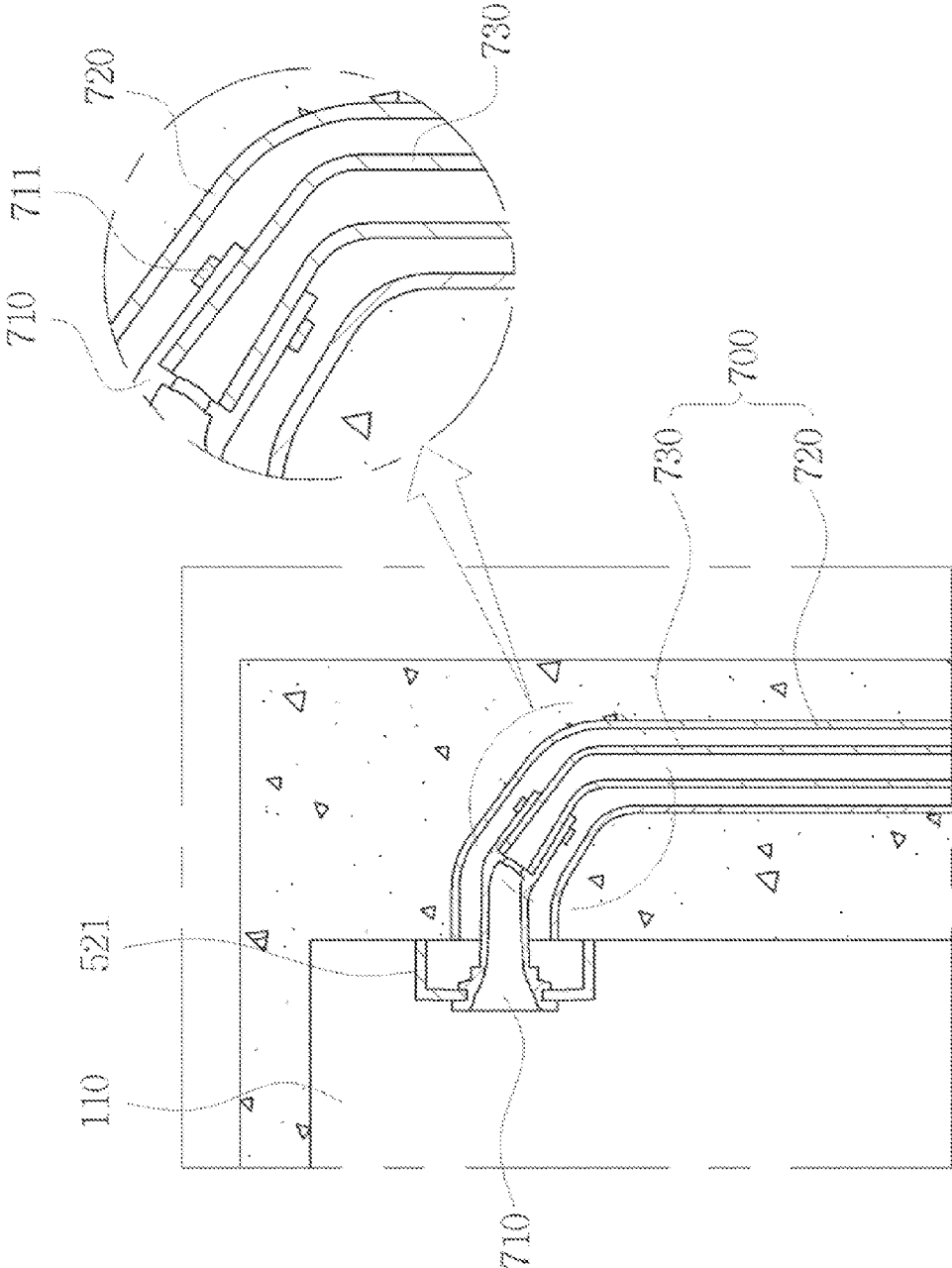


FIG. 6

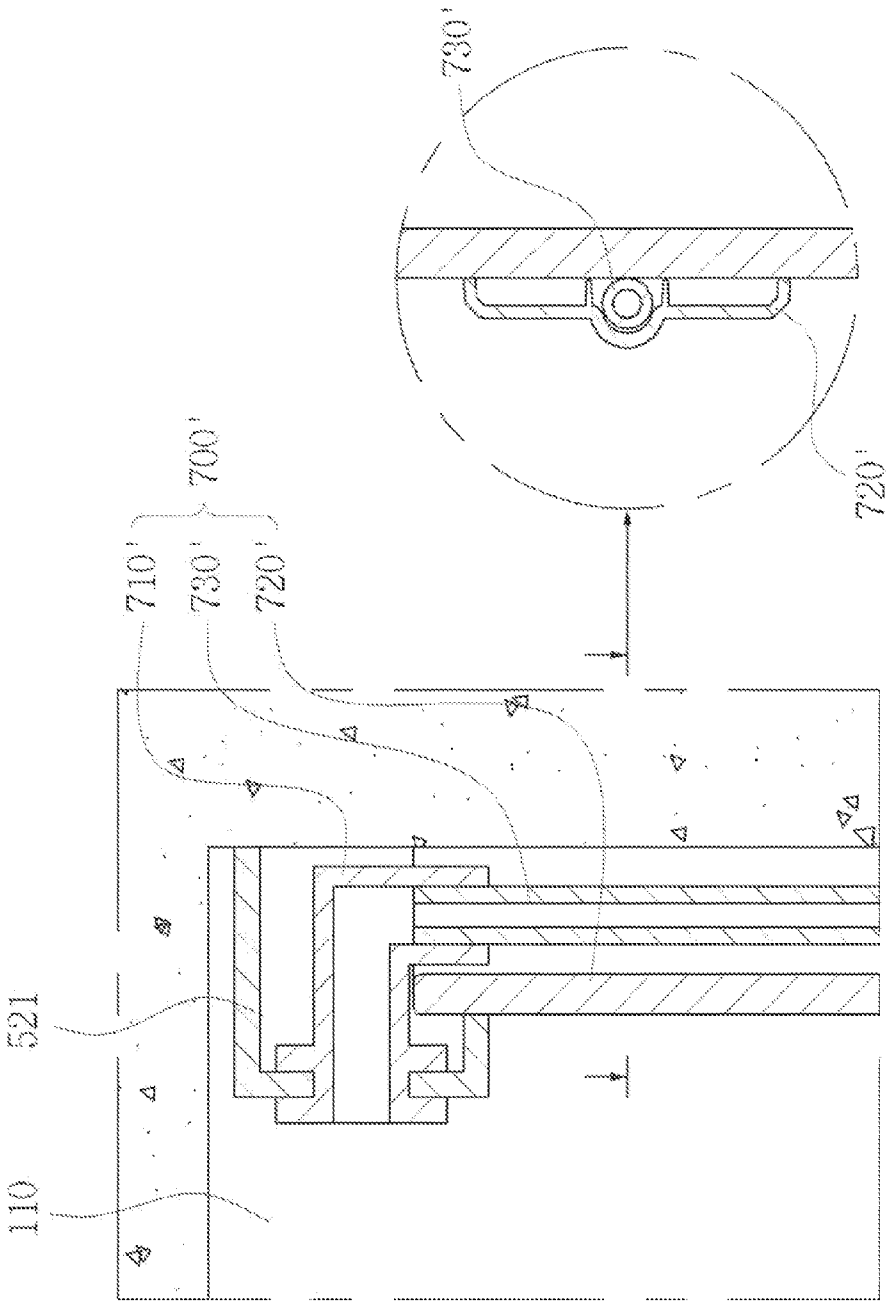


FIG. 7A

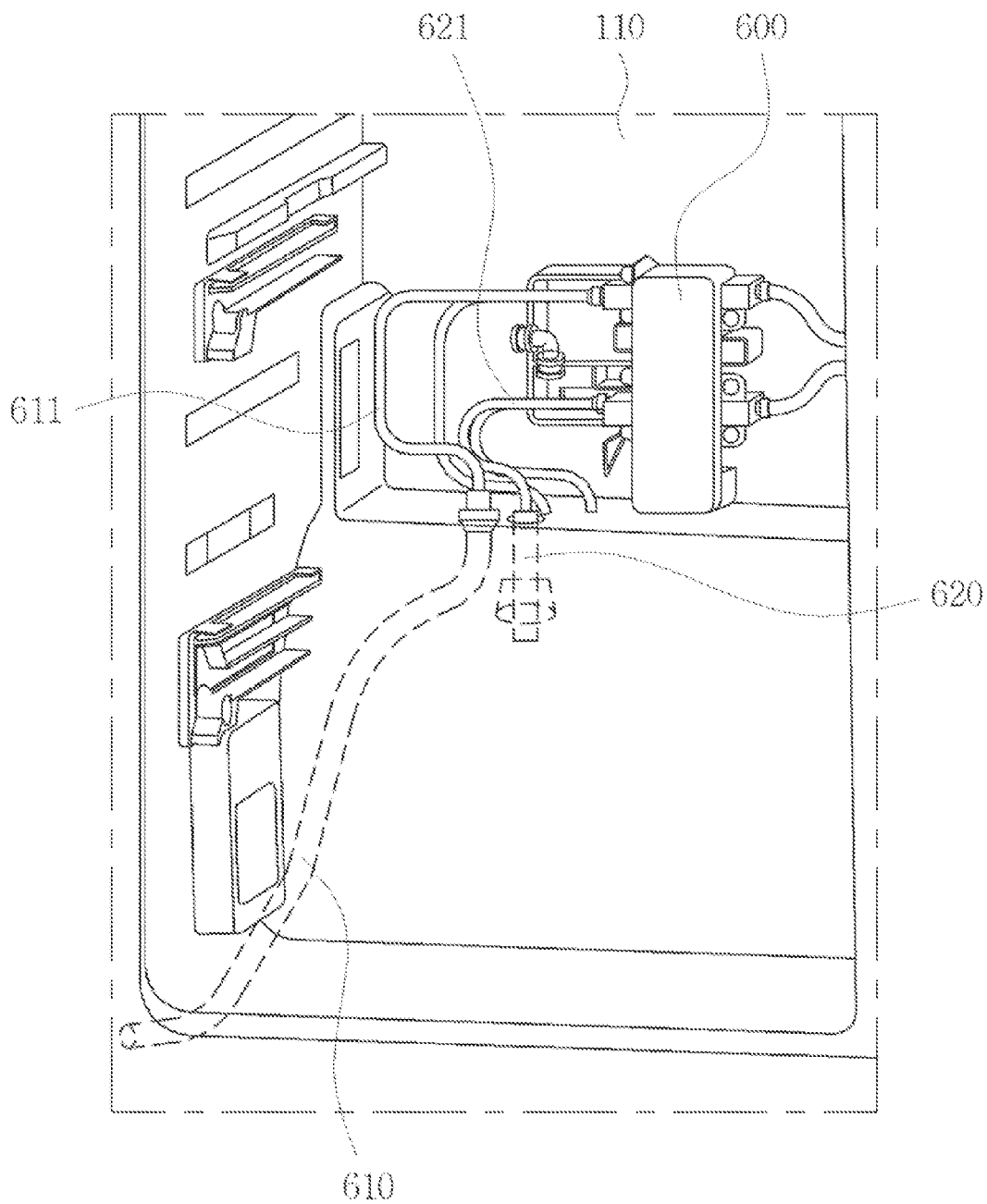


FIG. 7B

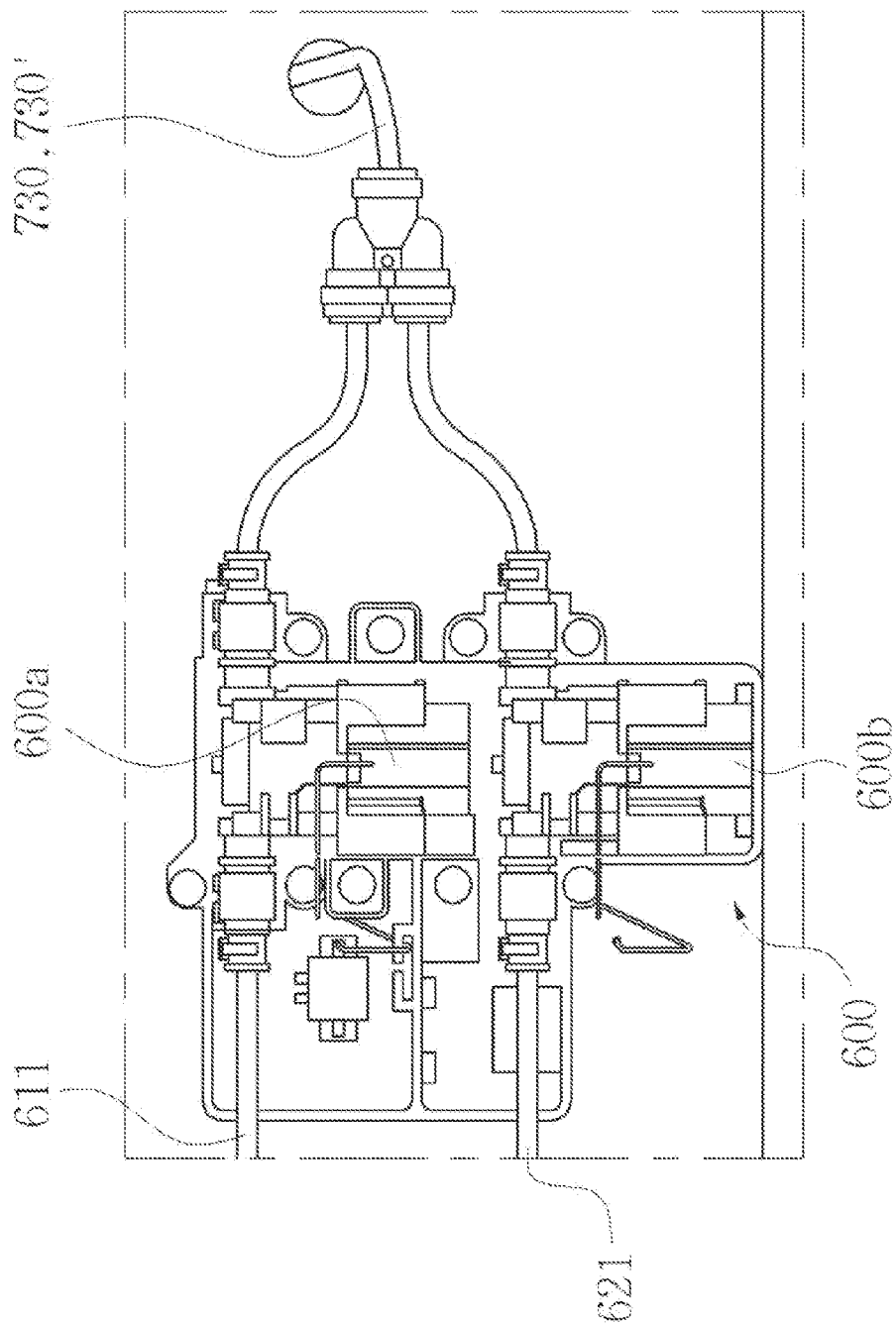
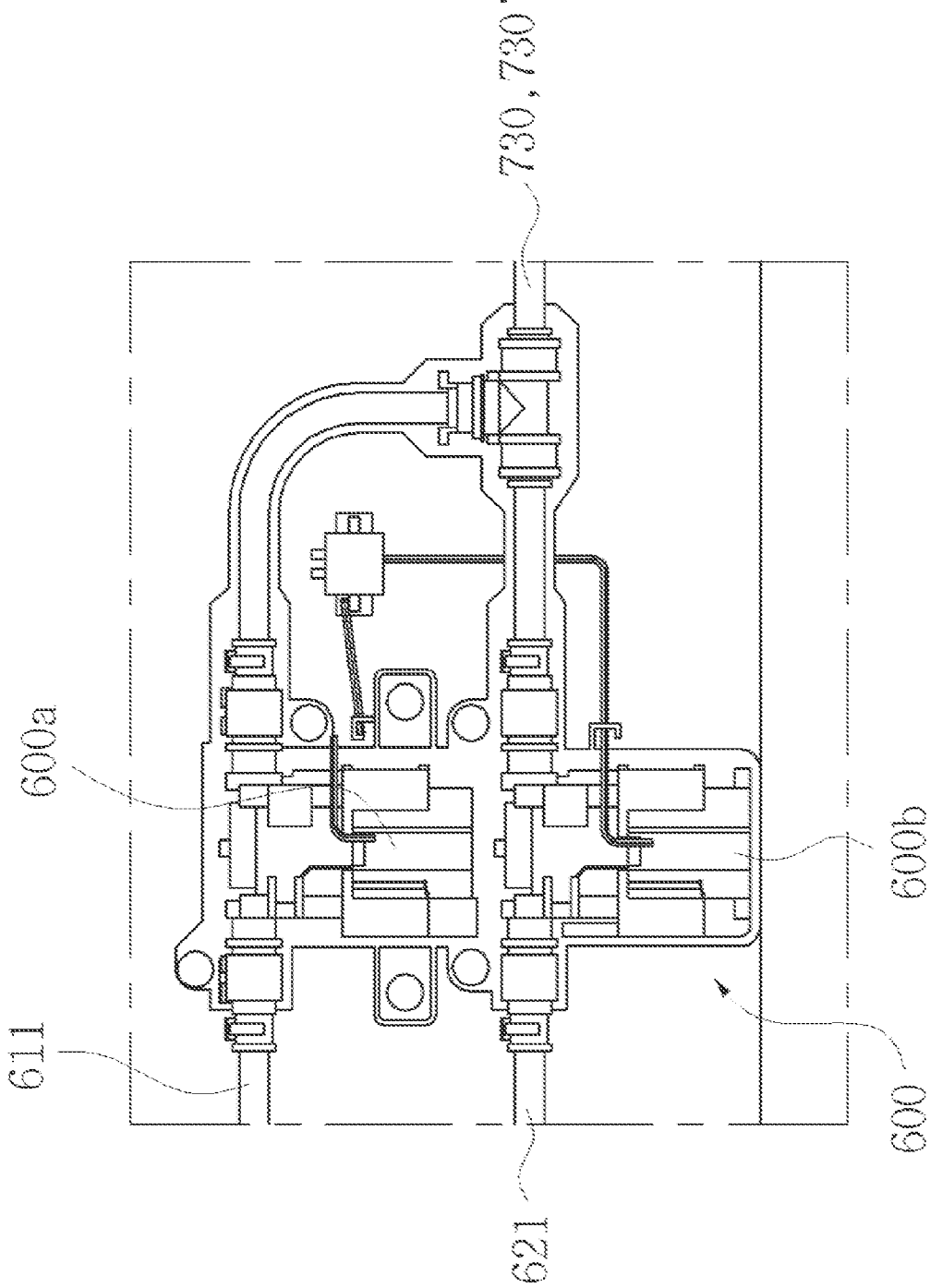


FIG. 8



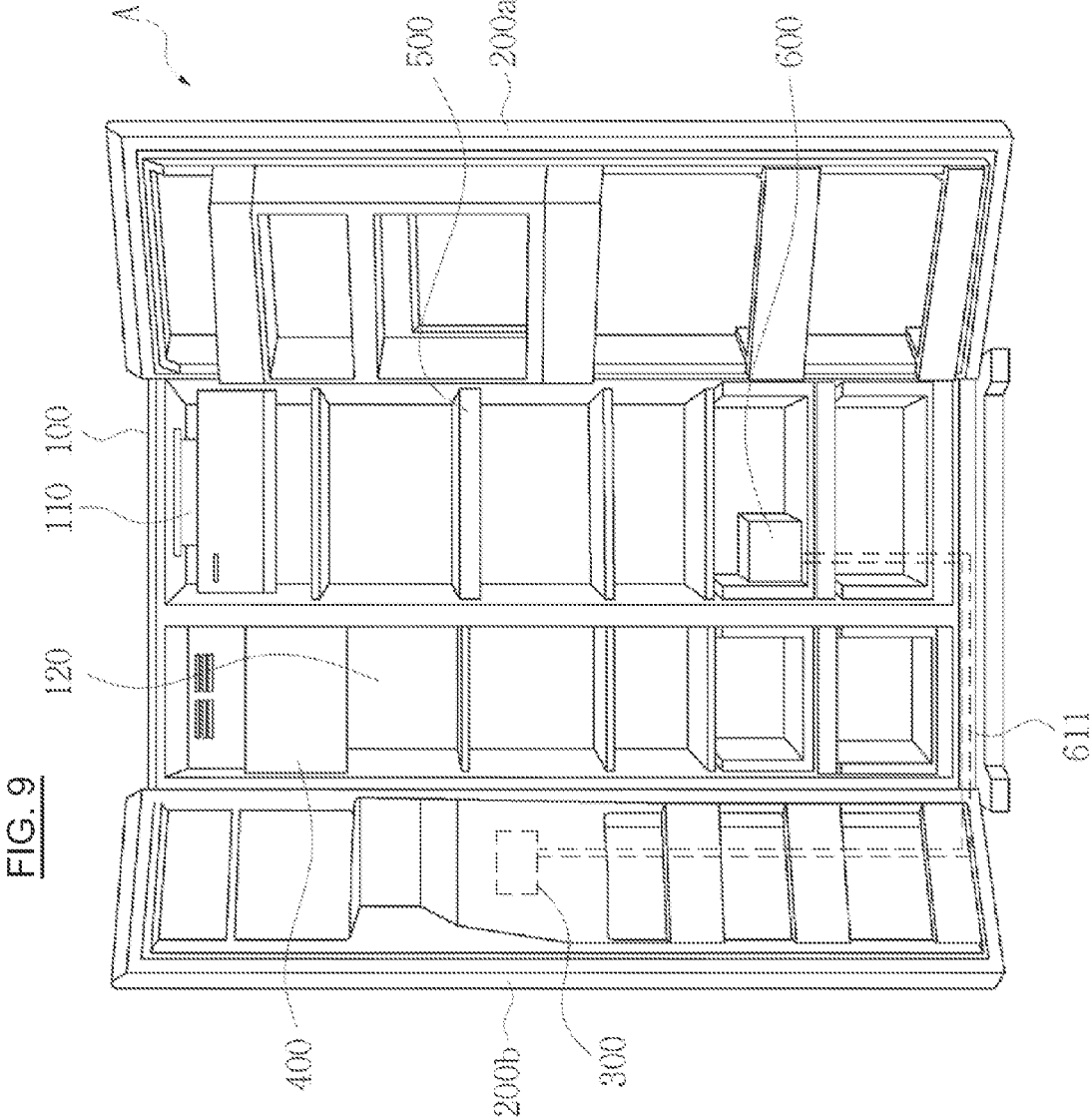
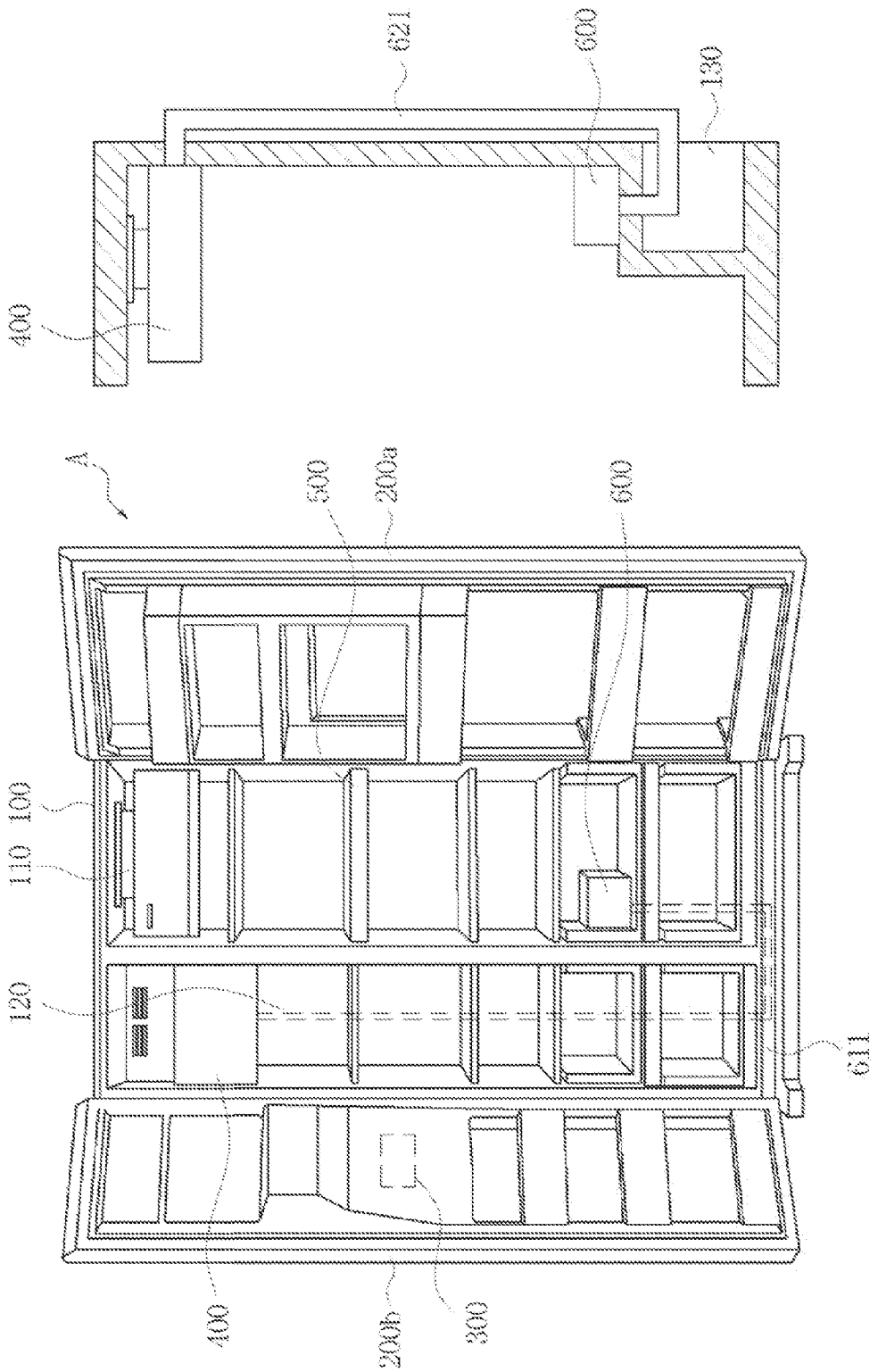


FIG. 10



REFRIGERATOR

TECHNICAL FIELD

[0001] The present invention relates to a refrigerator, and more particularly, to a refrigerator in which a water tank for storing water to be supplied to an ice maker and a dispenser is in a shelf in the interior thereof.

BACKGROUND ART

[0002] Generally, a refrigerator is a household appliance adapted to maintain the inside of a cold storage space and a freezer to low temperatures through the repetition of a refrigeration cycle in which a refrigerant is compressed, condensed, expanded and evaporated, thereby keeping the food stored therein in a fresh state for a given period of time.

[0003] Accordingly, the refrigerator is provided with a compressor adapted to compress a refrigerant, a condenser adapted to condense the refrigerant from the compressor using external air, an expansion valve adapted to reduce the pressure of the refrigerant from the condenser, and an evaporator adapted to absorb the heat in the interior of the refrigerator through the evaporation of the refrigerant passing through the expansion valve at a low pressure.

[0004] Also, the refrigerator generally includes a body forming an accommodating space partitioned into a cold storage space and a freezer, doors mounted on the front surface of the body to open and close the cold storage space and the freezer, and a machine space in the body and having the compressor and condenser mounted therein.

[0005] With the change and development of food quality and culture, recently, the size and function of the refrigerator have been increased, and further, refrigerators having various structures and convenience devices have been developed and marketed for the user's convenience.

[0006] Representative examples of the convenience devices of the refrigerator are an ice maker in the freezer to make ice using the sequential operations of water feeding, ice making and ice ejecting in an automatic manner, and a dispenser on the door to provide drinkable water.

[0007] Additionally, the refrigerator is provided with a water supply line connected directly to a tap to supply water to the ice maker and the dispenser, a water tank in which the water from the water supply line is stored, and a valve adapted to open and close the supply of water from the tap.

DISCLOSURE

Technical Problem

[0008] It is an object of the present invention to provide a refrigerator in which a water tank for storing water to be supplied to an ice maker and a dispenser is accommodated in a shelf within the interior thereof.

Technical Solution

[0009] To accomplish the above object, according to the present invention, there is provided a refrigerator having a slidable, moveable water tank mounted on a shelf in the interior of a cold storage space, the water tank having an outlet thereon to supply water to an ice maker or a dispenser.

[0010] According to the present invention, preferably, the water tank includes a water tank body and a water tank cover adapted to cover an open top portion of the water tank body, wherein the outlet is on the water tank body.

[0011] According to the present invention, preferably, the water tank has a pipe connector connected to the outlet and extending to an interior of the water tank.

[0012] According to the present invention, preferably, the pipe connector is bent toward a bottom surface of the water tank body from a wall surface of the water tank body, and has an inverted L or 'J' shape.

[0013] According to the present invention, preferably, the pipe connector is bent toward the bottom surface of the water tank body from the wall surface of the water tank body and comprises a bending part having a 'J' or inverted U shape, and the bending part has height greater than that of the outlet.

[0014] According to the present invention, preferably, the pipe connector has a filter mounted on one end thereof.

[0015] According to the present invention, preferably, the filter has a plurality of separate protrusions along an outer periphery of an underside surface, facing the bottom surface of the water tank.

[0016] According to the present invention, preferably, the water tank cover has an opening and closing injection hole thereon.

[0017] According to the present invention, preferably, the water tank has a rubber packing along edges of the water tank body, between the water tank cover and the water tank body.

[0018] According to the present invention, preferably, the water tank body has locking members along the edges thereof, and the water tank cover has fastening wings along edges thereof corresponding to the locking members.

[0019] According to the present invention, preferably, the water tank has protruding parts protruded outwardly from both sides of the front surface thereof.

[0020] According to the present invention, preferably, the shelf comprises a shelf body adapted to guide and support sliding movement of the water tank, and a shelf cover adapted to cover the top portion of the shelf body.

[0021] According to the present invention, preferably, the shelf body has guides on sides thereof and a sagging prevention member between the guides.

[0022] According to the present invention, preferably, the shelf cover has a transparent window.

[0023] According to the present invention, preferably, the shelf cover has a rotary door hinge-coupled to a front side thereof, configured to open and close up and down.

[0024] According to the present invention, preferably, a rear surface of the shelf body faces the wall surface of the cold storage space.

[0025] According to the present invention, preferably, the outlet is on a rear surface of the water tank and passes through the shelf body and is coupled thereto.

[0026] According to the present invention, preferably, the water tank has coupling protrusions thereon, and the shelf body has coupling grooves thereon or therein corresponding to the coupling protrusions.

[0027] According to the present invention, preferably, the refrigerator further includes a pump adapted to pump the water in the water tank to the ice maker and the dispenser; a passage adapted to connect the water tank to the pump; and a silicone inlet on a rear surface of the shelf and having one end connected to the outlet of the water tank and another end connected to the passage.

[0028] According to the present invention, preferably, the water tank is below the dispenser or the ice maker.

Advantageous Effects

[0029] According to the present invention, the water tank in which purified water, not tap water, is stored is accommodated in a shelf in the interior of the cold storage space and supplies the water to the ice maker or the dispenser using the pump.

[0030] Further, the water tank is in the interior of the cold storage space, so that cold water can be supplied to the dispenser. Furthermore, the cooled water in the water tank is supplied to the ice maker, thereby shortening the ice making time.

[0031] Also, the water tank is mounted on the beads of the inner case of the cold storage space, thereby also serving as a shelf.

[0032] Additionally, water can be fully stored in the water tank to the height of the outlet of the water tank and can be discharged through a pipe connector and the outlet, and the height of the pipe connector is higher than that of the outlet, thereby preventing water leakage from occurring through the outlet of the water tank.

DESCRIPTION OF DRAWINGS

[0033] FIG. 1 is a front view showing a refrigerator according to the present invention.

[0034] FIG. 2 is a front view showing the refrigerator of FIG. 1 wherein the doors are open.

[0035] FIGS. 3a to 3c are perspective views showing a water tank as shown in FIG. 2.

[0036] FIG. 4a is a cross-sectional view showing the coupling structure of a water tank and a shelf in the refrigerator according to the present invention.

[0037] FIG. 4b is a cross-sectional view showing an example of the water tank in the refrigerator according to the present invention.

[0038] FIG. 4c is a cross-sectional view showing another example of the water tank in the refrigerator according to the present invention.

[0039] FIG. 5 is a cross-sectional view showing an example of a passage in the refrigerator according to the present invention.

[0040] FIG. 6 is a cross-sectional view showing another example of a passage in the refrigerator according to the present invention.

[0041] FIGS. 7a and 7b are perspective and cross-sectional views showing an example of a pump in the refrigerator according to the present invention.

[0042] FIG. 8 is a cross-sectional view showing another example of the pump in the refrigerator according to the present invention.

[0043] FIG. 9 is a front view showing a path of a dispenser tube in the refrigerator according to the present invention.

[0044] FIG. 10 is a front view showing a path of an ice maker tube in the refrigerator according to the present invention.

DETAILED DESCRIPTION

[0045] Hereinafter, an explanation of a refrigerator according to the present invention will be in detail given with reference to the attached drawings.

[0046] FIG. 1 is a front view showing a refrigerator according to the present invention, FIG. 2 is a front view showing the refrigerator of FIG. 1 wherein the doors are open, FIGS. 3a to 3c are perspective views showing a water tank as shown in

FIG. 2, FIG. 4a is a cross-sectional view showing the coupling structure of a water tank and a shelf in the refrigerator according to the present invention, FIG. 4b is a cross-sectional view showing an example of the water tank in the refrigerator according to the present invention, FIG. 4c is a cross-sectional view showing another example of the water tank in the refrigerator according to the present invention, FIG. 5 is a sectional view showing an example of a passage in the refrigerator according to the present invention, FIG. 6 is a sectional view showing another example of the passage in the refrigerator according to the present invention, FIGS. 7a and 7b are perspective and sectional views showing an example of a pump in the refrigerator according to the present invention, FIG. 8 is a sectional view showing another example of the pump in the refrigerator according to the present invention, FIG. 9 is a front view showing a path of a dispenser tube in the refrigerator according to the present invention, and FIG. 10 is a front view showing a path of an ice maker tube in the refrigerator according to the present invention.

[0047] First, an internal structure of a refrigerator according to the present invention will be explained with reference to FIGS. 1 to 10, and the refrigerator A according to the present invention largely includes a body 100 including a cold storage space 110 and a freezer 120 separate from each other in left and right directions or in up and down directions; doors 200a and 200b mounted on one side or both sides of the body 100 to open and close the cold storage space 110 and the freezer 120; and a machine space 130 in the lower portion of the body 100 to mount mechanical devices (not shown) executing part of a refrigeration cycle like a compressor, a condenser and an evaporator therein.

[0048] Further, the refrigerator A further includes a dispenser 300 mounted on the door 200b from which cold water is directly supplied to a user.

[0049] Furthermore, the freezer 120 has an ice maker 400 therein, in which ice is made through the sequential operations of water feeding, ice making and ice ejecting, in an automatic manner.

[0050] On the other hand, preferably, a water tank 500 is mounted in the cold storage space 110. At this time, the height for the installation of the water tank 500 is lower than that of the dispenser 300 or the ice maker 400, thereby preventing water from flowing toward the dispenser 300 or the ice maker 400 and at the same time suppressing the water remaining in a passage as will be discussed later.

[0051] Further, the water tank 500 is mounted using a shelf 520 disposed on the beads of the inner case of the cold storage space 110, and the shelf 520 is inserted into the inner case of the cold storage space 110, while the water tank 500 is inserted into the shelf 520. The shelf 520 can be removed from the cold storage space 110, and the water tank 500 can be removed from the shelf 500.

[0052] Also, the refrigerator A further includes a pump 600 adapted to pump the water stored in the water tank 500 to the ice maker 400 or the dispenser 300, and a passage 700 adapted to connect the water tank 500 and the pump 600.

[0053] On the other hand, the water tank 500 has an outlet 510 formed on the rear surface thereof in such a manner as to be passed through the rear surface of the shelf 520.

[0054] The shelf 520 has a silicone inlet 710 formed on the rear surface thereof, and the silicone inlet 710 has one end connected to the outlet 510 of the water tank 500 and another end connected to the passage 700.

[0055] At this time, the silicone inlet 710 has a shape of a funnel having an outer peripheral surface and internal passage reduced from one side to the other side thereof, so that a tube 730 as will be discussed later fits to the inner or outer peripheral surface of the smaller end portion of the silicone inlet 710. The tube 730 is fixed using a cylindrical metal fastening piece 711.

[0056] On the other hand, if the end portion of the silicone inlet 710 facing the tube 730 has a shape of a long pipe, the silicone inlet 710 and the tube 730 are connected to each other using a tube fitting (not shown).

[0057] Also, the shelf 520 includes a shelf body 521 adapted to support the water tank 500 and a shelf cover 522 adapted to cover the top portion of the shelf body 521. Further, the silicone inlet 710 is formed on the shelf body 521 of the rear surface of the shelf 520 facing the inner wall surface of the cold storage space 110.

[0058] On the other hand, the shelf body 521 has guides 523 on opposite sides thereof and a sagging prevention member 524 disposed between the guides 523 of the shelf body 521 to stably support the underside of the water tank 500.

[0059] Further, the shelf cover 522 has a transparent window 525 to visually check the water tank 500 in the shelf 520.

[0060] Also, the shelf cover 522 has a rotary door 526 hinge-coupled thereto in such a manner as to be open and closed.

[0061] On the other hand, the water tank 500 has coupling protrusions 501 formed thereon, and the shelf body 521 has coupling grooves 527 formed thereon or therein corresponding to the coupling protrusions 501, so that through their coupling, the coupling position of the water tank 500 is guided and at the same time the water tank 500 is rigidly fixed to the shelf body 521.

[0062] Furthermore, the coupling grooves 527 are coupled to the inner wall surface of the cold storage space 110 using mechanical fasteners such as bolts. That is, the shelf 520 is fixed to the cold storage space 110, and the water tank 500 is removable from the shelf 520.

[0063] Also, the shelf body 521 has a fitting protrusion 528 formed thereon, and the silicone inlet 710 has a fitting groove 721 formed thereon in such a manner as to insert the fitting protrusion 528 thereinto, thereby being rigidly fixed to the shelf body 521.

[0064] Further, as shown in FIGS. 3c and 4b, the water tank 500 includes a water tank body 550 and a water tank cover 560 adapted to cover the open top portion of the water tank body 550. At this time, the water tank 500 further includes a rubber packing 561 disposed along the edges of the water tank body 550 between the water tank cover 560 and the water tank body 550 to prevent the leakage of water.

[0065] In addition, the water tank body 550 has locking members 559 formed thereon, and the water tank cover 560 has fastening wings 569 formed thereon corresponding to the locking members 559, thereby allowing the water tank body 550 and the water tank cover 560 to be maintained separate from each other or rigidly fixed to each other.

[0066] On the other hand, the outlet 510 is formed on the rear surface of the water tank body 550, and a pipe connector 570 is fitted to the outer or inner peripheral surface of the outlet 510 that protrudes inward from the water tank body 550.

[0067] The pipe connector 570 extends to the interior of the water tank 500. As shown in FIG. 4b, also, the pipe connector

570 is bent to an inverted L or ‘J’ shape toward the bottom surface of the water tank body 550 from the wall surface of the water tank body 550.

[0068] Further, as shown in FIG. 4c, a pipe connector 570' according to another example of the present invention is bent toward the bottom surface of the water tank body 550 from the wall surface of the water tank body 550 using a bending part 571' having an inverted U shape or a ‘J’ shape. The height of the bending part 571' is higher than the outlet 510, thereby preventing the water stored in the water tank body 550 from leaking through the outlet 510.

[0069] On the other hand, the pipe connector 570 has a filter 572 mounted thereon to remove foreign matter in the water.

[0070] Further, the filter 572 has a plurality of protrusions 573 formed along the outer periphery of the underside surface thereof to prevent the filter 572 and the bottom surface of the water tank body 550 from being brought into close contact with each other. That is, the formation of the plurality of protrusions 573 prevents the flow of water from being interrupted due to the contact of the filter 572 with the water tank body 550.

[0071] Further, the water tank cover 560 has an opening and closing injection hole 562 formed therein, thereby making it convenient to inject water into the water tank 500.

[0072] On the other hand, the water tank 500 has protruding parts 590 protruding outwardly from opposite sides of the front surface thereof in such a manner as to allow the beads formed on the inner case of the cold storage space 110 to be hidden.

[0073] Further, as shown in FIG. 5, the passage 700 includes a guide 720 embedded into the rear surface of the inner case of the cold storage space 110 and a tube 730 inserted into the guide 720 to connect the silicone inlet 710 and the pump 600 to each other. The guide 720 is embedded using urethane foam under the rear surface of the inner case of the cold storage space 110, thereby being not exposed to the interior of the cold storage space 110.

[0074] On the other hand, as shown in FIG. 6, a passage 700' according to another example of the present invention is disposed between the front surface of the inner case of the cold storage space 110 and the shelf 520 and has a tube 730' connecting a silicone inlet 710' and the pump 600 to each other. At this time, the silicone inlet 710' is bent to an inverted L shape or a short ‘J’ in such a manner as to be brought into completely close contact with the wall surface of the inner case of the cold storage space 110.

[0075] Further, a cover 720' adapted to cover the tube 730' is attached to the front surface of the inner case of the cold storage space 110, thereby preventing the tube 730' from being exposed to the interior of the cold storage space 110.

[0076] Also, as shown in FIGS. 7a to 8, the pump 600 is disposed on the lower portion of the cold storage space 110, that is, behind a vegetable bin (not shown), and includes a first guide 610 adapted to connect the lower portion of the cold storage space 110 and the front surface of the lower portion of the freezer 120 to each other, a second guide 620 adapted to connect the lower portion of the cold storage space 110 and a machine space (not shown) accessible from the rear of the refrigerator, and a dispenser tube 611 in the first guide 610 to connect the pump 600 and the dispenser 300 to each other. As shown in FIG. 9, the dispenser tube 611 extends from the front surface of the lower portion of the freezer 120 and connects to the dispenser 300 via the door 200b of the freezer 120.

[0077] On the other hand, the second guide 620 has an ice maker tube 621 therein to connect the pump 600 and the ice maker 400 to each other, and the ice maker tube 621 extends to the freezer 120 from the machine space behind the cold storage space 110 through the space behind the freezer 120 and is connected to the ice maker 400, as shown in FIG. 10.

[0078] Accordingly, the water tank 500 in which purified water, not tap water, is stored is accommodated in the shelf 520 within the interior of the cold storage space 110 and supplies the water to the ice maker 400 and the dispenser 300 using the pump 600.

[0079] Further, the water tank 500 is not exposed to the external air, so that cold water can be supplied to the dispenser 300. Furthermore, cooled water in the water tank 500 is supplied to the ice maker 400, thereby shortening the ice making time.

[0080] Also, the water tank 500 is mounted on the beads of the inner case of the cold storage space 110, thereby also serving as a shelf.

[0081] On the other hand, the tube 730, the dispenser tube 611 and the ice maker tube 621 are fixed to the silicone inlet 710, the pump 600, the dispenser 300 and the ice maker 400 using elastic materials and tube fittings, and a detailed explanation of the manner of attaching these components to each other will be avoided.

[0082] Further, as shown in FIGS. 7a to 8, the pump 600 includes a dispenser pump 600a and an ice maker pump 600b, and the dispenser pump 600a is driven when the lever 301 of the dispenser 300 is pressed by a user's manipulation, while the ice maker pump 600b is automatically driven in accordance with the amount of water supply demanded by the user.

[0083] If demand for water supply from the ice maker pump 600b occurs during the driving of the dispenser pump 600a, the ice maker pump 600b is driven when the driving of the dispenser pump 600a is finished.

[0084] Further, if the dispenser pump 600a is driven during the period of water supply from the ice maker pump 600b, the ice maker pump 600b and the dispenser pump 600a are driven at the same time.

[0085] While the present invention has been described with reference to particular illustrative embodiments, it is not to be restricted by the embodiment but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

1. A refrigerator having a movable, slidable water tank on a shelf in a cold storage space, the water tank having an outlet thereon to supply water to an ice maker or a dispenser.

2. The refrigerator according to claim 1, wherein the water tank comprises a water tank body and a water tank cover adapted to cover an open top portion of the water tank body, wherein the outlet is on the water tank body.

3. The refrigerator according to claim 1, wherein the water tank has a pipe connector connected to the outlet and extending into the water tank.

4. The refrigerator according to claim 3, wherein the pipe connector is bent toward a bottom surface of the water tank

body from a wall surface of the water tank body, and the pipe connector has an inverted U shape.

5. The refrigerator according to claim 3, wherein the pipe connector is bent toward a bottom surface of the water tank body from a wall surface of the water tank body and comprises a bending part having an inverted U shape and a height that is greater than that of the outlet.

6. The refrigerator according to claim 3, wherein the pipe connector has a filter on one end thereof.

7. The refrigerator according to claim 6, wherein the filter has a plurality of separate protrusions along an outer periphery of an underside surface, facing the bottom surface of the water tank.

8. The refrigerator according to claim 2, wherein the water tank cover has an opening and closing injection hole thereon.

9. The refrigerator according to claim 2, wherein the water tank has a rubber packing along edges of the water tank body between the water tank cover and the water tank body.

10. The refrigerator according to claim 2, wherein the water tank body has locking members along edges thereof, and the water tank cover has fastening wings along the edges thereof corresponding to the locking members.

11. The refrigerator according to claim 1, wherein the water tank has protruding parts protruding outwardly from sides of a front surface thereof.

12. The refrigerator according to claim 1, wherein the shelf comprises a shelf body adapted to guide and support sliding movement of the water tank and a shelf cover adapted to cover a top portion of the shelf body.

13. The refrigerator according to claim 12, wherein the shelf body has guides on sides thereof and a sagging prevention member between the guides.

14. The refrigerator according to claim 12, wherein the shelf cover includes a transparent window.

15. The refrigerator according to claim 12, wherein the shelf cover has a rotary door hinge-coupled to a front side thereof configured to open and close up and down.

16. The refrigerator according to claim 12, wherein a rear surface of the shelf body faces a wall surface of the cold storage space.

17. The refrigerator according to claim 16, wherein the outlet is on a rear surface of the water tank and passes through the shelf body.

18. The refrigerator according to claim 17, wherein the water tank has coupling protrusions thereon, and the shelf body has coupling grooves thereon or therein corresponding to the coupling protrusions.

19. The refrigerator according to claim 12, further comprising a pump adapted to pump water in the water tank to the ice maker or the dispenser; a passage adapted to connect the water tank to the pump; and a silicone inlet on a rear surface of the shelf and having one end connected to the outlet of the water tank and another end connected to the passage.

20. The refrigerator according to claim 19, wherein the water tank is below the dispenser or the ice maker.

* * * * *