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(54) **REFRIGERATOR**

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(57) **ABSTRACT**

Provided is a refrigerator. A dispenser is provided inside the refrigerator. A water discharge port can be withdrawably disposed to conveniently utilize the refrigerator.

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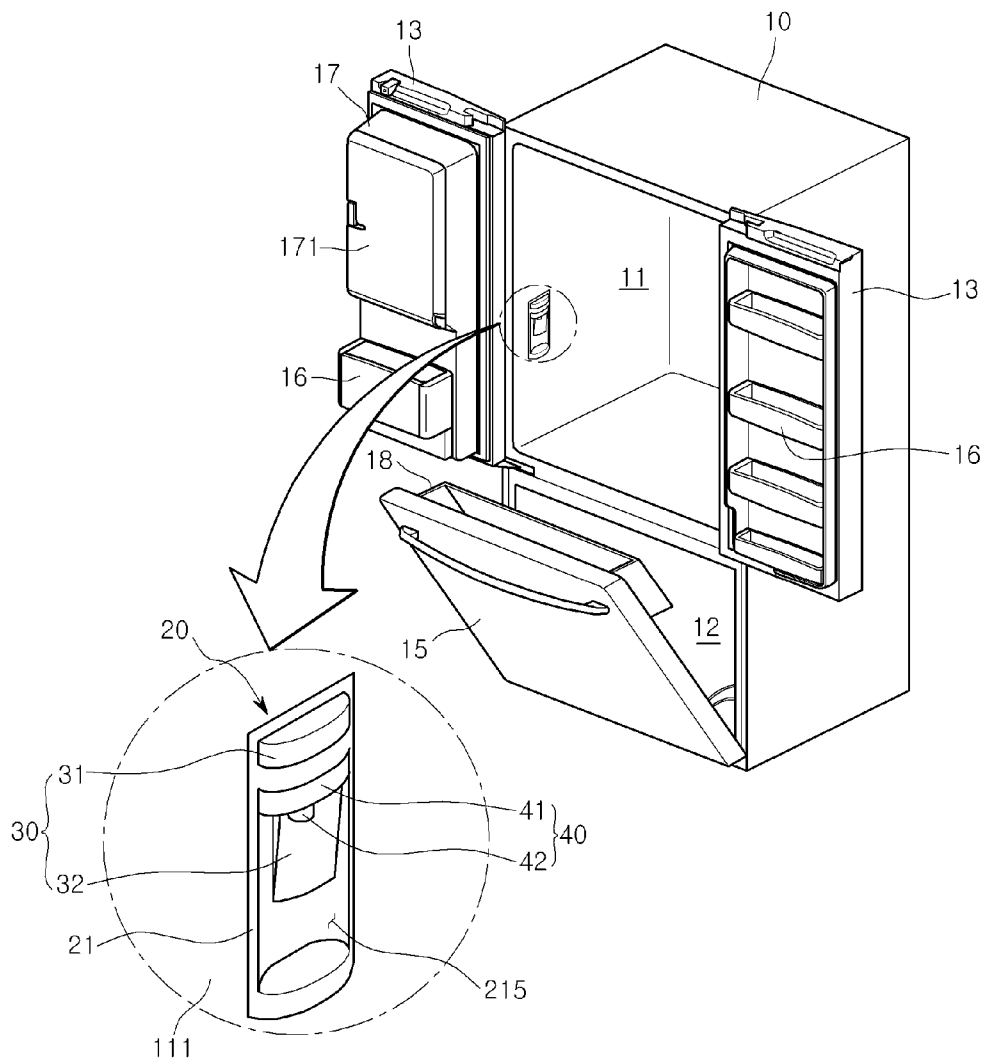


Fig. 1

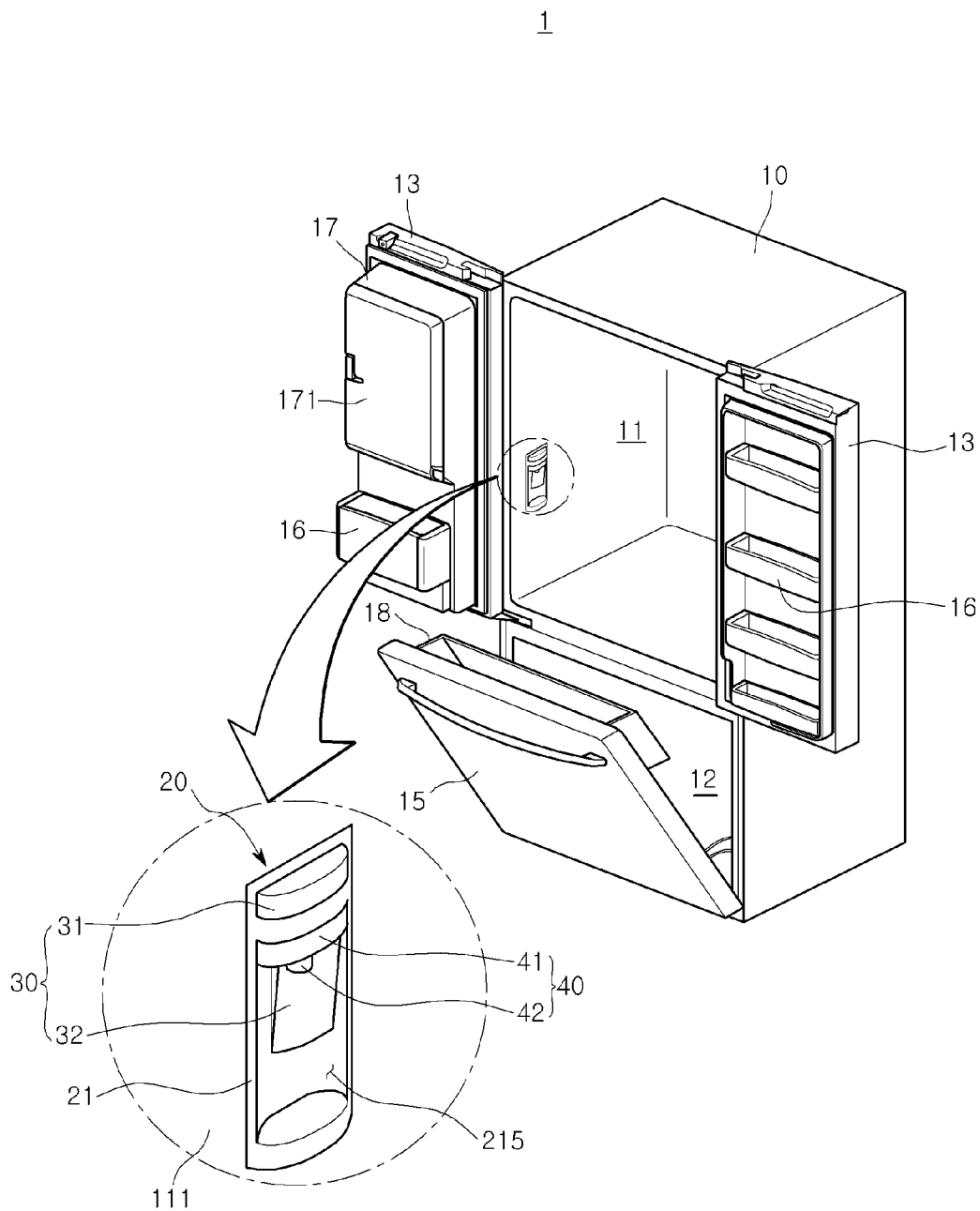


Fig. 2

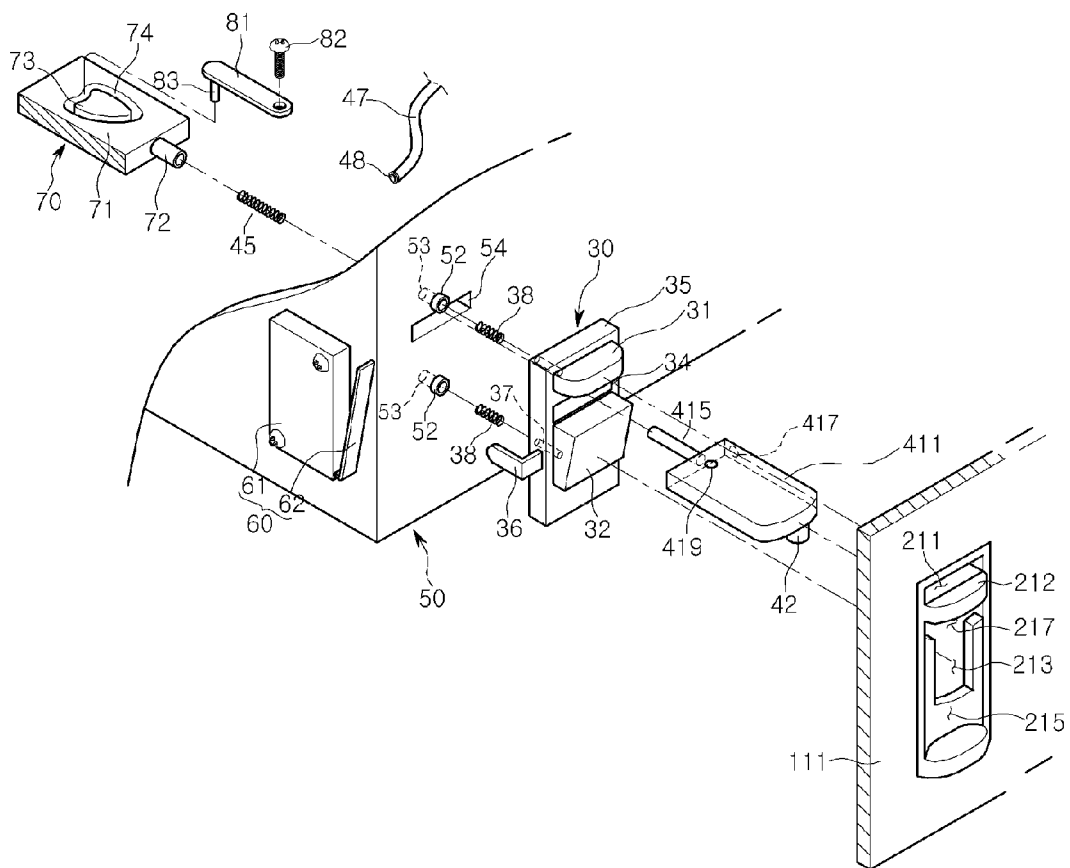


Fig. 3

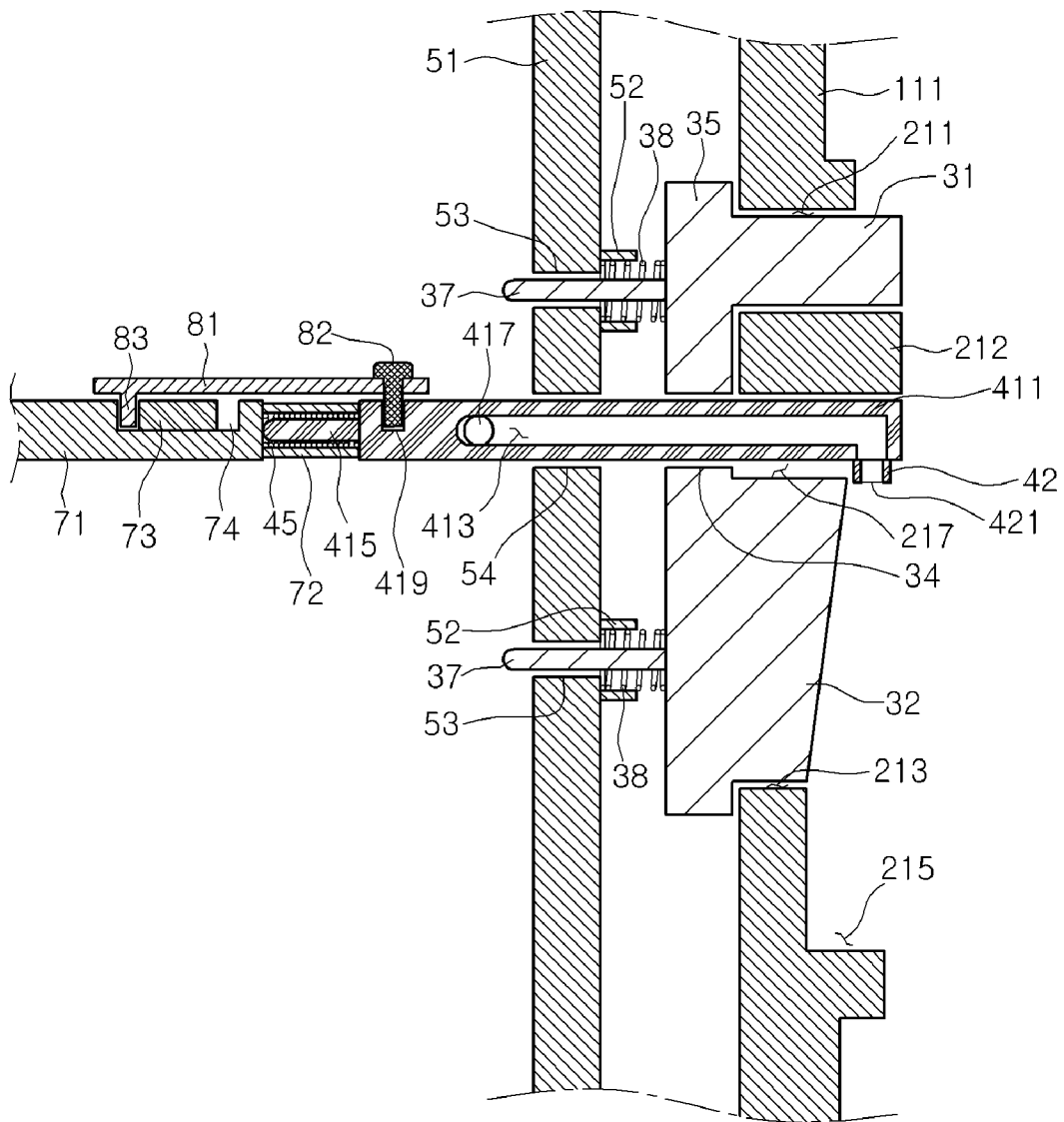


Fig. 4

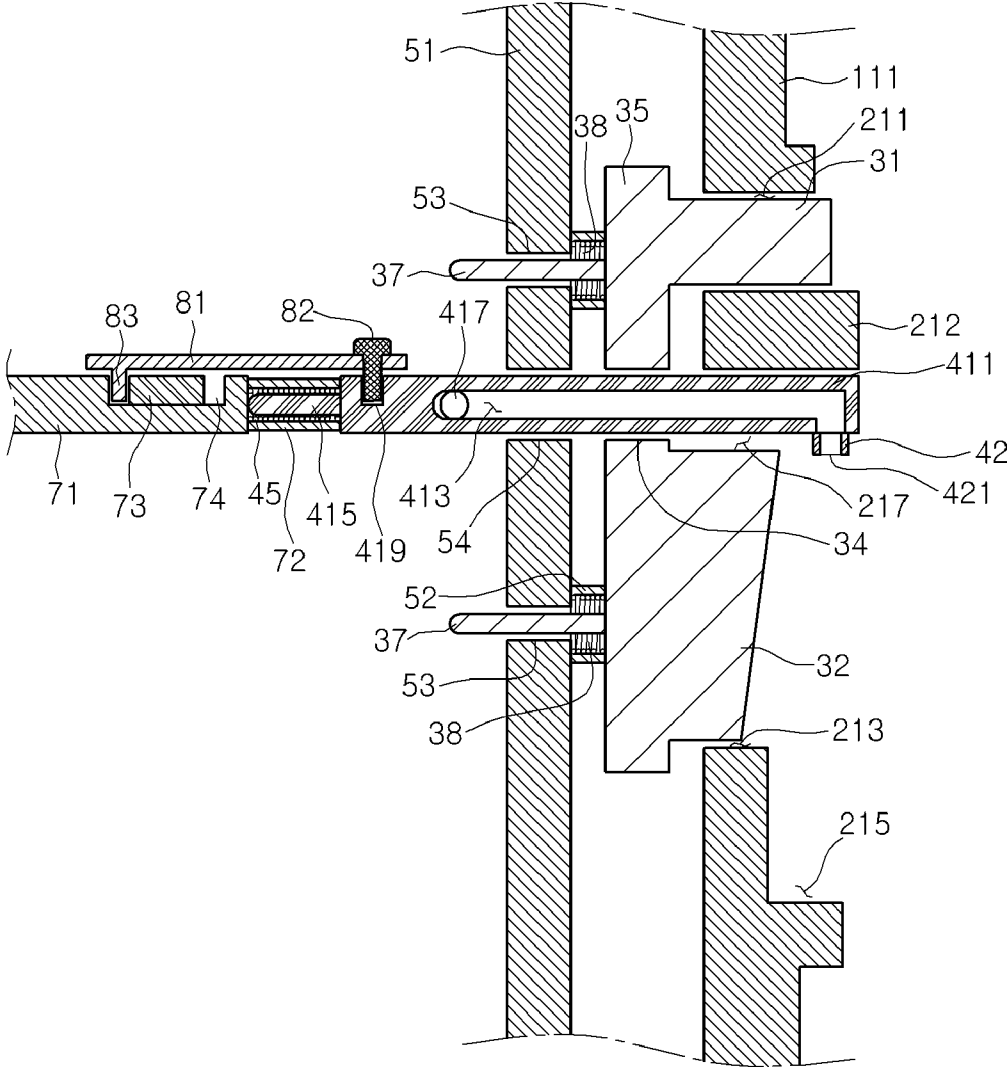


Fig. 5

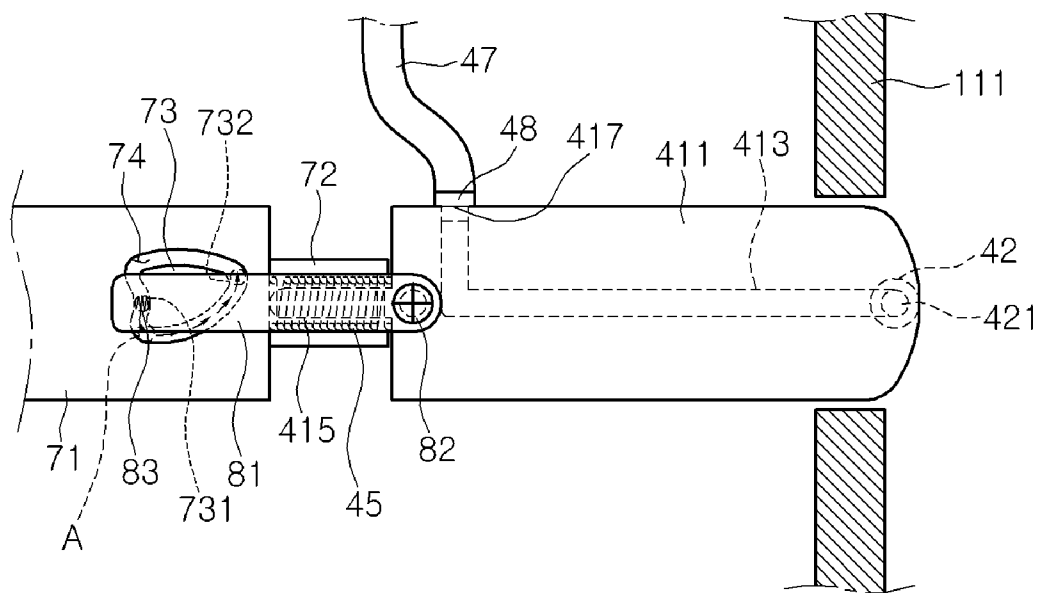


Fig. 6

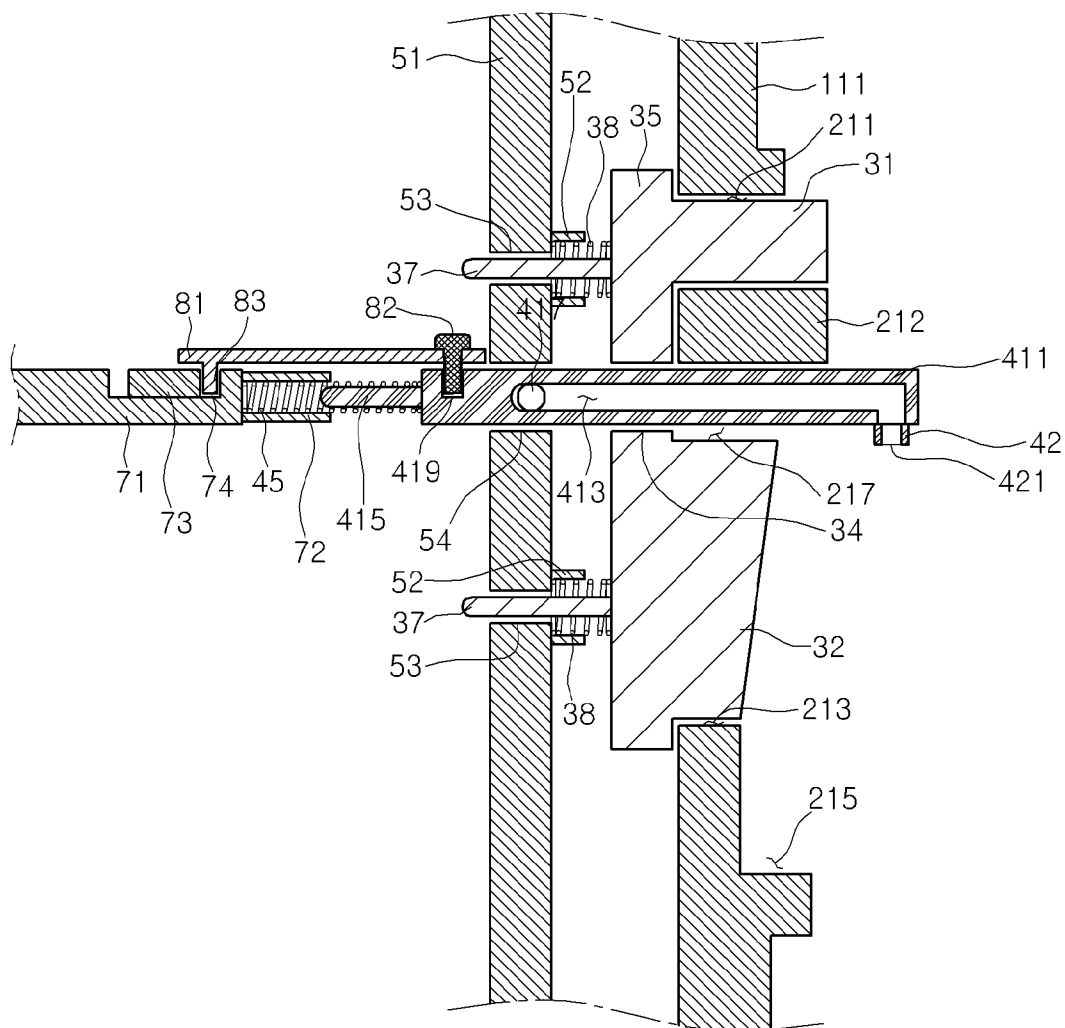


Fig. 7

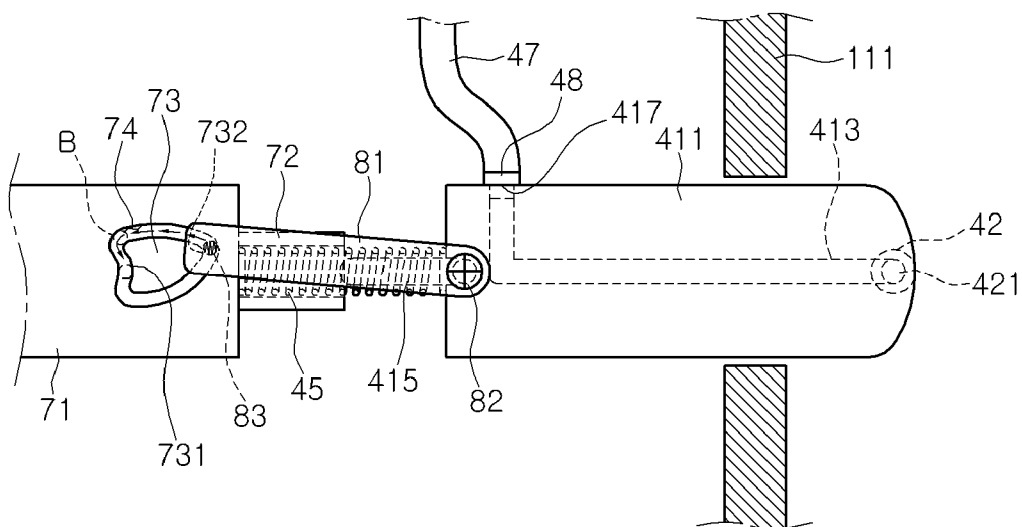
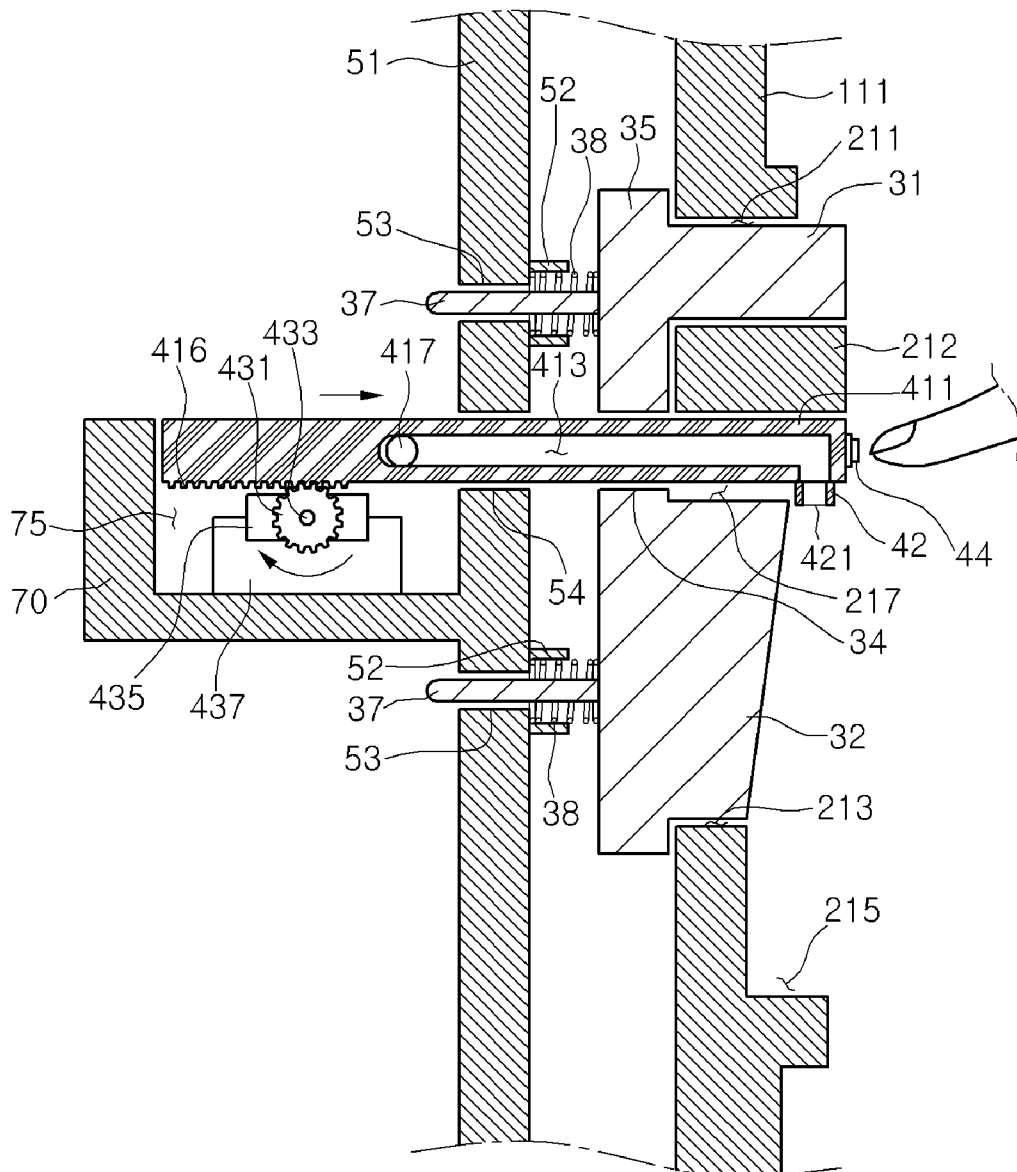


Fig. 8



REFRIGERATOR

BACKGROUND

[0001] Embodiments relate to a refrigerator.

[0002] In general, a refrigerator is an apparatus for storing foods at a low temperature, and is configured to store foods according to type in frozen or refrigerated states.

[0003] The inside of the refrigerator is cooled by continually supplied cool air generated through heat exchange of refrigerant in a repeating compression-condensation-expansion-evaporation cycle. The cool air is supplied inside the refrigerator is uniformly circulated throughout the inside of the refrigerator by means of convection currents, to enable the foods to be stored in the refrigerator at a desired temperature.

[0004] A main body of the refrigerator has a rectangular parallelepiped shape having an opened front surface. The main body includes a refrigerator compartment and freezer compartment therein. A refrigerator compartment door and a freezer compartment door for selectively covering the opened front surface are provided on the front surface of the main body.

[0005] A plurality of drawers, shelves and receiving boxes is provided inside the refrigerator to store various foods in an optimum state. In addition, a plurality of baskets is provided on a back surface of the refrigerator compartment door or the freezer compartment door. A storage space within the refrigerator can be partitioned by the shelves, the receiving boxes, and the baskets to store suitable foods.

[0006] In recent, a refrigerator including a dispenser on the front surface of the door is appearing on the market. The dispenser can allow a user to dispense purified water or ice without opening the door.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective view illustrating an inner structure of a refrigerator according to an embodiment.

[0008] FIG. 2 is an exploded perspective view illustrating a configuration of a dispenser according to an embodiment.

[0009] FIG. 3 is a side cross-sectional view illustrating a fundamental condition of a dispenser according to an embodiment.

[0010] FIG. 4 is a side cross-sectional view of a state in which a water button of FIG. 3 is pushed.

[0011] FIG. 5 is a view of a state in which a discharge unit of FIG. 3 is connected to a fixed part in a state where the discharge unit is inserted.

[0012] FIG. 6 is a side cross-sectional view of a state in which a discharge unit of FIG. 3 is withdrawn.

[0013] FIG. 7 is a view of a state in which a discharge unit is connected to a fixed part in a state where the discharge unit is withdrawn.

[0014] FIG. 8 is a side cross-sectional view of a state in which a discharge unit of a dispenser of a refrigerator is inserted according to another embodiment.

[0015] FIG. 9 is a side cross-sectional view of a state in which a discharge unit of FIG. 8 is withdrawn.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0016] In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration specific preferred embodiments in which the

invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is understood that other embodiments may be utilized and that logical structural, mechanical, electrical, and chemical changes may be made without departing from the spirit or scope of the invention. To avoid detail not necessary to enable those skilled in the art to practice the invention, the description may omit certain information known to those skilled in the art. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined only by the appended claims.

[0017] Hereinafter, a front direction and a rear direction or corresponding expressions denote a forward and a rearward of a refrigerator, respectively. Also, a left side and a right side or corresponding expressions denote a left direction and a right direction when a user views the refrigerator at the front.

[0018] FIG. 1 is a perspective view illustrating an inner structure of a refrigerator according to an embodiment.

[0019] Hereinafter, a 3-door bottom freezer type refrigerator will be described as an example. However, the present disclosure is not limited thereto. For example, the refrigerator according to this embodiment may be applied to following various refrigerators: a top mount type refrigerator in which a refrigerator compartment is disposed under a freezer compartment; a side by side type refrigerator in which a refrigerator compartment and a freezer compartment are respectively disposed in left and right sides.

[0020] Referring to FIG. 1, a refrigerator 1 according to this embodiment includes a main body 10 defining an outer appearance thereof, a refrigerator compartment 11 provided in an upper portion of a storage space defined by the main body 10 to store foods in a refrigeration state, and a freezer compartment 12 provided in lower portion of the storage space to store the foods in a freezing state. Refrigerator compartment doors 13 (hereinafter, referred to as a "refrigerator compartment door 13" for descriptive convenience) for selectively covering the refrigerator compartment 11 using a rotary motion are provided on end portions of both sides of a front surface of the main body 10. A freezer compartment door 15 rotatably coupled to selectively cover the freezer compartment 12 is provided at a lower end portion of the main body 10.

[0021] Although not shown, a plurality of shelves and receiving boxes may be provided inside the refrigerator compartment 11 and the freezer compartment 12 to allow a user to conveniently receive the foods.

[0022] A plurality of baskets 16 for storing foods such as milks and cheeses that require separate receiving spaces is provided on a back surface of the refrigerator compartment door 13. In addition, a freezer compartment basket 18 is provided on a back surface of the freezer compartment door 15.

[0023] An ice-making device 17 for making ice may be provided on an upper portion of the back surface of the refrigerator compartment door 13. The ice-making device 17 is selectively covered by a rotary motion of an ice-making door 171, and the user opens the ice-making door 171 to obtain the ice.

[0024] A dispenser 20 for dispensing water is provided in a sidewall of the inside of the refrigerator compartment 11. The dispenser 20 may be provided at the front of the refrigerator compartment 11 such that the user can directly approach the dispenser 20 after the user opens the refrigerator compart-

ment door 13. In addition, the dispenser 20 is disposed such that the dispenser 20 does not interfere with the shelves and receiving boxes provided inside the refrigerator compartment 11.

[0025] The dispenser 20 includes a housing 21 defining an outer appearance thereof, an insertable and withdrawable discharge unit 40 insertedly installed in the sidewall of the refrigerator compartment 11, and a button unit 30 including a first button 31 provided over the discharge unit 40 and a second button 32 provided under the discharge unit 40.

[0026] The housing 21 protrudes distinguishably from an inner case 111 defining the refrigerator compartment 11 to allow the user to recognize the dispenser 20. The housing 21 has an approximately rectangular shape extending in a vertical direction. The first button 31 is disposed on an upper portion of the housing 21, and the discharge unit 40 is disposed under the first button 31. A water discharge part 42 for discharging water protrudes downwardly from an end portion of the discharge unit 40. A container receiving recess 215 is disposed under the discharge unit 40. The water may be easily dispensed through the container receiving recess 215 using a relatively small cup. The container receiving recess 215 is formed by being depressed toward an inner case 111 by a predetermined depth. The second button 32 is provided inside the container receiving recess 215. That is, the second button 32 is provided under the discharge unit 40.

[0027] The user pushes one of the first button 31 and the second button 32 to dispense the water from the discharge unit 40. Also, the water may be dispensed by manipulating the first button or the second button 32 after the discharge unit 40 is withdrawn in a front direction. A specific explanation with respect to this operation will be described later.

[0028] FIG. 2 is an exploded perspective view illustrating a configuration of a dispenser according to an embodiment, and FIG. 3 is a side cross-sectional view illustrating a fundamental condition of a dispenser according to an embodiment.

[0029] A fundamental condition of the dispenser 20 is defined as a condition in which the first button 31 and the second button 32 are not pushed, and the discharge unit 40 is inserted.

[0030] Referring to FIGS. 2 and 3, the housing 21 constitutes a portion of the inner case 111. The housing 21 protrudes distinguishably from an inner case 111 toward the refrigerator compartment 11 to allow the user to easily recognize the dispenser 20. That is to say, a region recognized by the housing 21 corresponds to the dispenser 20. Components constituting the dispenser 20 are provided inside a circumference of the housing 21.

[0031] The container receiving recess 215 is depressed by the predetermined depth in an inward direction of the inner case 111, and an inner surface of the container receiving recess 215 may be rounded to easily utilize a container such as a cup.

[0032] The housing 21 includes a first button insertion hole 211 through which the first button 31 passes, a first button support 212 provided under the first button insertion hole 211 to support the first button 31, a first through hole 217 provided under the first button support 212 and punched such that the discharge unit 40 passes, and a second button insertion hole 213 through which the second button 32 passes and provided under the first through hole 217.

[0033] In detail, the inner case 111 is punched to form the first button insertion hole 211 such that the first button insertion hole 211 has a shape corresponding to that of the first

button 31. The first button support 212 is disposed under the first button insertion hole 211 to stably support the first button 31 in a state where the first button 31 protrudes from the inner case 111 by a predetermined length. That is, the first button support 212 has a shape corresponding to that of an end portion of the first button 31, and the first button support 212 protrudes from the inner casing 111 by a predetermined length.

[0034] The first through hole 217 through which the discharge unit 40 passes is disposed under the first button support 212. The first through hole 217 has a shape corresponding to that of the discharge unit 40 such that the discharge unit 40 is not shaken in a state where the discharge unit 40 is inserted into the first through hole 217. The first through hole 217 is connected to the second button insertion hole 213 such that the water discharge part 42 extending downwardly from the discharge unit 40 passes through the second button insertion hole 213 to expose the water discharge part 42 to the inside of the refrigerator compartment 11.

[0035] The second button insertion hole 213 is disposed under the first through hole 217 and connected to the first through hole 217. The second button insertion hole 213 extends downwardly from an approximately central portion of the first through hole 217. The second button insertion hole 213 has a shape corresponding to that of the second button 32. The water discharge part 42 passes through the second button insertion hole 213 and is exposed to the inside of the refrigerator compartment 11.

[0036] The first through hole 217 and the second button insertion hole 213 define a portion of an inner surface of the container receiving recess 215. Thus, the first through hole 217 and the second button insertion hole 213 may be rounded in cross-section.

[0037] The discharge unit 40 includes a discharge unit body 411, the water discharge part 42, and a discharge unit guide bar 415. The discharge unit body 411 has a rectangular parallelepiped shape. The water discharge part 42 protrudes downwardly from a bottom surface of a right end portion of the discharge unit body 411, and the water is discharged through the water discharge part 42. The discharge unit guide bar 415 extends from a left side surface of the discharge unit body 411 in a left direction.

[0038] In detail, the discharge unit body 411 is horizontally disposed in left and right directions, and has a uniform size in widths of front and rear directions such that the discharge unit body 411 is slidably moved. At this time, the discharge unit body 411 has a width corresponding to that of the first through hole 217.

[0039] The water discharge part 42 is connected to a discharge passage 413 that will be described later, extends downwardly from a bottom surface of the discharge unit body 411, and is exposed to the outside the refrigerator compartment 11. The water discharge port 421 connected to the discharge passage 413 is disposed at a lower end portion of the discharge part 42. The water discharge port 421 is disposed over the container receiving recess 215 and opened downwardly such that the water drops from an upper side toward a lower side.

[0040] The discharge unit guide bar 415 extends along a sliding movement direction of the discharge unit body 411 at an approximately central portion of a left side surface of the discharge unit body 411. That is, the discharge unit guide bar 415 is horizontally disposed in left and right directions. At this time, the discharge unit guide bar 415 is sufficiently long

to pass through the button unit 30 and a fixed part housing 50 that will be described later. The discharge unit guide bar 415 may have a cylindrical shape such that a second elastic member 45 that will be described later is fitted into the discharge unit guide bar 415.

[0041] A water supply port 417 connected to a water supply tube 47 connected to a water storage tank (not shown) provided inside the main body 10 and a supply valve 48 is provided in a rear surface of the discharge unit body 411. That is, the discharge passage 413 passes through the discharge unit body 411 such that the discharge passage 413 has one end portion connected to the water supply port 417 and the other end portion connected to the water discharge part 42. The water supply port 417 is disposed at a position close to a left end portion of the discharge unit body 411 such that the water supply port 417 is disposed in a left side of the fixed part housing 50 that will be described later in both states of insertion and withdrawal of the discharge unit 410. That is to say, the water supply tube 47 and the supply valve 48 does not interfere with the fixed part housing 50 even if the discharge unit 40 is slidingly moved.

[0042] The water supply tube 47 connects the water storage tank to the discharge unit 40 such that the water stored in the water storage tank flows up to the dispenser 40. Also, the water supply tube 47 may be formed of a soft material such that the water supply tube 47 is moved together with the discharge unit 40 when the discharge unit 40 is moved. The supply valve 48 is provided between the water supply tube 47 and the water supply port 417. The supply valve 48 selectively passes the water supplied through the water supply tube 47 according to a manipulation of the button unit 30. At this time, a portion of the supply valve 48 may pass through the water supply port 417 and inserted inside the discharge passage 413 to prevent the water from leaking.

[0043] A depressed connection bar coupling recess 419 to which a connection bar 81 that will be described later is coupled is disposed in a left end portion of a top surface of the discharge unit body 411.

[0044] The button unit 30 includes a button body 35, the first button 31, a second through hole 34, a second button 32, a switch push part 36, and a button guide 37. The button body 35 has a vertically long plate shape. The first button 31 protrudes from an upper portion of a right side surface of the button body 35. The second through hole 34 is provided under the first button 31, and the discharge unit 40 passes through the second through hole 34. The second button 32 is provided under the second through hole 34 and protrudes in the same direction as the first button 31. The switch push part 36 is provided on a front surface of the button unit 30 and operates a switch part 60 that will be described later. The button guide 37 protrudes from a left side surface of the button body 35.

[0045] In detail, the first button 31 and the second button 32 have shapes corresponding to those of the first button insertion hole 211 and the second button insertion hole 213 in vertical section, respectively. Thus, the buttons 31 and 32 is not well shaken after the buttons 31 and 32 is fitted into the housing 21. The first button 31 and the second button 32 protrude further longer than a thickness of the inner case 111 to expose right end portions of the first button 31 and the second button 32 to the inside of the refrigerator compartment 11. Thus, the user can push the first button 31 and the second button 32 through the inside of the refrigerator compartment 11. Here, the right end portion of the first button 31 may be rounded to improve manipulability. Also, the second button 32 may protrude so as to incline backwardly from an upper side to a lower side to allow the user to easily press the second button 32 using the container such as the cup.

[0046] The second through hole 34 through which the discharge unit 40 passes is disposed between the first button 31 and the second button 32. The second through hole 34 is punched in left and right directions of the button body 35 such that the second through hole 34 has a shape corresponding to that of the discharge unit 40. The second through hole 34 is spaced a length corresponding to a height of the first button support 212 from the first button 31.

[0047] The second through hole 34 may be disposed adjacent to the second button 32 such that the second button 32 is disposed just below the discharge unit 40. Thus, the user can smoothly compress the second button 32 by putting the container such as the cup into a lower space of the discharge unit 40.

[0048] The switch push part 36 extends forwardly from a front surface of the button body 35 by a predetermined length, and then, is bent in a left direction. Thus, when the button unit 30 is moved in left and right directions, the switch push part 36 is moved together. Therefore, the switch part 60 turns on/off.

[0049] The button guide 37 guides a movement of the button unit 30 to uniformly move the button unit 30 in the left and right directions. The button guide 37 sufficiently extends to pass through the fixed part housing 50. The button guide 37 extends in a movement direction, i.e., the left and right directions of the button unit 30. The button guide 37 may have a cylindrical shape such that an elastic member 38 that will be described later is fitted into the bottom guide 37. A plurality of button guides 37 may be provided to stably support and move the button unit 30.

[0050] Although two button guides 38 is vertically provided in this embodiment as an example, the present disclosure is not limited thereto. In addition, the bottom unit 30 may have one side hinge-coupled to the fixed part housing 50, and thus, may be rotatably movable.

[0051] The fixed part housing 50 including the switch part 60 and the fixed part 70 is provided at a left side of the button unit 30. The button unit 30 and the discharge unit 40 are movably fixed to the fixed part housing 50. The fixed part housing 50 is provided in a space between the inner case 111 and the main body 10.

[0052] In detail, the fixed part housing 50 has a plate shape parallel to the left side surface of the button body 35. The fixed part housing 50 includes a button unit support 52 in which the button guide 37 is inserted and a third through hole 54 through which the discharge unit 40 passes. The fixed part housing 50 has one side bent in a left direction to provide the switch part 60. That is, the switch part 60 is coupled to the bent surface of the fixed part housing 50.

[0053] In further detail, the button unit support 52 has a cylindrical shape and protrudes from a right side surface of the fixed part housing 50. The button unit support 52 is disposed at a position corresponding to that of the button guide 37. The button unit support 52 protrudes and is spaced a predetermined distance from the button body 35 such that the button unit 30 is movable in a rear direction. Also, a recess in which the button guide 37 is inserted is defined in the button unit support 52. The recess has a diameter greater than those of the button guide 37 and a first elastic member 38.

[0054] A guide through hole 53 through which the button guide 37 passes is defined in the fixed part housing 50. That is, the guide through hole 53 is concentric with a cross-section of the button unit support 52 and is disposed in a just rear direction of the button unit support 52. The guide through hole 53 is punched with a size corresponding to a diameter of the button guide 37. That is, the button guide 37 is inserted

into the button unit support 52, and then, passes through the guide through hole 53 to protrude in a rear direction of the fixed part housing 50.

[0055] Here, the button guide 37 is inserted into the button unit support 52 in a state where the button guide 37 is fitted in the first elastic member 38. In detail, a compression spring having a cylindrical shape and a size greater than a diameter of the button guide 37 and less than a diameter of the button unit support 52 may be provided as the first elastic member 38. Thus, the first elastic member 38 may have one side end portion in contact with the button body 35 and the other side end portion in contact with the fixed part housing 50. In this case, when the button unit 30 is pushed in a left direction, the first elastic member 38 generates a force pushing the button unit 30 in a right direction. That is, in the fundamental condition, the first elastic member 38 does not receive the force in a state where the first elastic member 38 is in contact with the button body 35 and the fixed part housing 50. Also, the button unit 30 is compressed while the button unit 30 is moved in the left direction by the user's manipulation.

[0056] The number of the button unit support 52, the guide through hole 53, and the first elastic member 38 correspond to that of the button guide 37, and the button unit support 52, the guide through hole 53, and the first elastic member 38 are disposed at positions corresponding to that of the button guide 37.

[0057] The third through hole 54 has a shape corresponding to that of a cross-section of the discharge unit body 411. Thus, the discharge unit 40 may be insertedly installed in the third through hole 54 and be movable in left and right directions.

[0058] The fixed part 70 to which the discharge unit 40 is movably connected is disposed in a left side of the third through hole 54. The fixed part 70 includes a fixed part case 71, a guide bar insertion part 72, a latch guide 73, and a latch guide recess 74. The fixed part case 71 is connected and supported to a side of the fixed part housing 50. The guide bar insertion part 72 protrudes from a right side surface of the fixed part case 71, and the discharge unit guide bar 415 is inserted into the guide bar insertion part 72. The latch guide 73 is disposed on a top surface of the case 72 and guides such that the discharge unit 40 is maintained in inserted and withdrawn states.

[0059] In detail, the top surface of the fixed part case 71 is flush with that of the discharge unit 40. The fixed part case 71 is spaced a predetermined distance from the third through hole 54 in a left direction.

[0060] A recess of the guide bar insertion part 72 protrudes in a cylindrical shape in which the discharge unit guide bar 415 is insertable and extends along a movement direction of the discharge unit 40. In addition, the recess has a diameter greater than those of the discharge unit guide bar 415 and the second elastic member 45 that will be described later. A compression spring having a diameter greater than that of the discharge unit guide bar 415 and less than that of the guide bar insertion part 72 may be provided as the second elastic member 45. That is, the second elastic member 45 may have one side end portion in contact with a left side surface of the discharge unit body 411 and the other side end portion in contact with a right side surface of the fixed part case 71. A state in which a force is not applied to the second elastic member 45 is a state in which the discharge unit 40 is withdrawn. That is, an elastic force due to the second elastic member 45 is not applied in the state where the discharge unit 40 is withdrawn. The second elastic member 45 is compressed to apply the elastic force to a direction in which the discharge unit 40 is withdrawn in a state where the discharge unit 40 is inserted.

[0061] The latch guide recess 74 is depressed and has a size corresponding to that of a latch disposed on a connection bar 81 that will be described later. The latch guide recess 74 has a closed curve with a predetermined shape and is configured to rotate the latch 83 only in one direction. Also, the latch guide 73 has one side in which a hook part 731 is disposed to maintain the latch 83 in a state where the latch 83 is moved to a left side and the other side in which a direction conversion part 732 is disposed to convert a movement direction of the latch 83. That is to say, the discharge unit 40 is maintained in an inserted state because the latch 83 is hooked on the hook part 731 and in a withdrawn state because the latch 83 is disposed in the direction conversion part 732. Structures of the latch guide and the latch guide recess 74 and insertion and withdrawal operations of the discharge unit 40 will be described later.

[0062] The discharge unit 40 and the fixed part 70 are connected to each other by the connection bar 81. The connection bar 81 has one side rotatably fixed to the discharge unit 40 and the other side connected to the latch guide recess 74. In detail, the connection bar 81 has one side end portion in which a bolt hole is defined to rotatably bolt-couple the connection bar 81 to a connection bar coupling recess 419. Since the top surface of the fixed part case 71 is flush with that of the discharge unit 40, the connection bar 81 is coupled parallel to the top surface of the discharge unit 40. The connection bar has the other side end portion in which the latch 83 protrudes from a bottom surface thereof. The latch 83 has a size corresponding to a width of the latch guide recess 74 such that the latch 83 is movable in a state where the latch 83 is inserted into the latch guide recess 74. The latch 83 may have a circular shape in vertical section such that the latch 83 is movable in a state where the latch 83 is in contact with the latch guide 73.

[0063] The switch part 60 is disposed at a position corresponding to that of the switch push part 36 on the bent surface of the fixed part housing 50. The switch part 60 includes a pushing part 62 and a switch body 61. The pushing part 62 is rotatably provided and pushed by an external force. The switch body 61 detects an operation in which the pushing part is pushed to generate an electrical signal and transmit the generated signal to a control part (now shown) for controlling the refrigerator 1. The pushing part 62 is disposed in contact with the switch push part 36 in the fundamental condition such that the pushing part 62 can be pushed by the switch push part 36. Thus, when the button unit 30 is moved in a rear direction, the switch push part 36 compresses the pushing part 62, and the pushing part 62 rotates. As a result, the electrical signal is generated in the switch body 61, and then transmitted to the control part. When the control part receives the signal from the switch body 61, the control part controls a supply valve 48 that will be described later to supply the water into the discharge unit 40.

[0064] An assembly process and the fundamental condition of the dispenser 20 including the above-described components according to this embodiment will be now described.

[0065] The discharge unit 40 is inserted into the second through hole 34. The button unit 30 and the discharge unit 40 are coupled to the inner case 111 through a left side of the inner case 111 to respectively insert the first button 31, the discharge unit 40, and the second button 32 into the first button insertion hole 211, the first through hole 217, and the second button insertion hole 213.

[0066] The fixed part housing 50 is coupled to the button unit through a left side of the button unit 30 after the first elastic member 38 is coupled to the button guide 37. At this time, the button guide 37 and the first elastic member 38 are inserted into the button unit support 52. The button guide 37

passes through the guide through hole 53 to protrude toward a left side of the fixed part housing 50.

[0067] In the fundamental condition, since a displacement of the first elastic member 38 is zero, any force is not applied. Thus, a right end portion of the first button 31 is disposed at a position corresponding to that of a right end portion of the first button support 212, and the right end portion of the second button 32 protrudes from the container insertion recess 215 by a predetermined length.

[0068] Since the button unit 30 is coupled to the fixed part housing 50, the switch push part 36 is in contact with the pushing part 62 of the switch part 60. Here, the pushing part 62 is not pushed in the fundamental condition.

[0069] The button unit 30 is coupled to the fixed part housing 50, and simultaneously, the discharge unit guide bar 415 is inserted into the guide bar insertion part 72 together with the second elastic member 45. A displacement of the second elastic member 45 is zero in a state where the discharge unit 40 is withdrawn. Thus, in order to position the discharge unit 40 in the fundamental condition, after the connection bar 81 is bolt-coupled to the connection bar coupling recess 419, the latch 83 is inserted into the latch guide recess 74 and is positioned at the hook part 731. Thus, the discharge unit 40 may be maintained in the inserted state, i.e., the fundamental condition.

[0070] The supply tube 47 and the supply valve 48 are connected to the water supply port 417. In detail, the water supply port 417 is disposed at the left side of the fixed part housing 50 in a state where the discharge unit 40 is fixed to the fixed part 70. Thus, the supply tube 47 and the supply valve 48 are connected to the water supply port 417 through the left side of the fixed part housing 50.

[0071] According to the refrigerator 1 of this embodiment, since the dispenser 20 for dispensing the water is provided inside the refrigerator compartment 11, water having a low temperature can be dispensed always without having an influence on a temperature of the outside of the refrigerator 1.

[0072] Since the dispenser 20 is provided inside the main body 10, the passage does not need to extend up to the refrigerator door 13. Thus, the refrigerator 1 can be simply manufactured, and also, manufacturing costs can be reduced.

[0073] In addition, the user can selectively push the buttons 31 and 32 to dispense the water, and the discharge unit 40 can be disposed at the right side to further conveniently dispense the water.

[0074] Hereinafter, operations of the button unit 30 and the discharge unit 40 will be described in detail with reference to an accompanying drawing.

[0075] FIG. 4 is a side cross-sectional view of a state in which a water button of FIG. 3 is pushed.

[0076] Referring to FIG. 4, the button unit 30 is moved in a left direction when one of the first button 31 or the second button 32 is pushed.

[0077] In detail, since the first button 31 and the second button 32 are connected to the button body 35, the whole button unit 30 is moved in the left direction when one of the first button 31 or the second button 32 is pushed. That is, the other one button is moved together with the pushed button.

[0078] In further detail, when the button unit 30 is moved in the left direction, the switch push part 36 connected to the button body 35 is moved together. Thus, the switch push part 36 pushes the pushing part 62 of the switch part 60, and the switch body 61 can detect the operation in which the pushing part 62 is pushed. The switch body 61 transmits the electrical signal to the control part, and the control part opens the supply valve 48. When the supply valve 48 is opened, the water stored in the water storage tank is supplied into the discharge

unit 40 through the supply tube 47. Then, the water is moved through the discharge passage 413 and discharged through the water discharge port 421.

[0079] When the button unit 30 is moved in the left direction, the button body 35 presses the first elastic member 38. Thus, the elastic force due to the first elastic member 38 is applied to the button body 35 in a right direction. That is, if the user does not continuously push the first button 31 or the second button 32, the button unit 40 returns to the fundamental condition due to the elastic force of the first elastic member 38.

[0080] When the button unit 40 returns to the fundamental condition, since the switch push part 36 does not compress the pushing part 62, the switch body 61 generates an electrical signal according to this operation, and thus, the control part closes the supply valve 48 to prevent the water from being discharged.

[0081] The movement toward the left direction of the buttons 31 and 32 is continuously performed until the button body 35 is moved in the left direction and in contact with the button unit support 52. The movement toward the right direction of the buttons 31 and 32 is continuously performed until the button body 35 interferes with the inner case 11. That is, the button unit 30 is moved in left and right directions between the button unit support 52 and the inner case 11.

[0082] The water can be dispensed even through the user pushes only one of the first button 31 and the second button 32.

[0083] In detail, in case where the water is dispensed using the small container such as the cup, the second button 32 may be directly pushed by the small container to dispense the water. In this case, since the second button 32 is provided inside the container receiving recess 215, there is no problem.

[0084] However, in case where a large container such as a pot is used, the second button 32 is not directly pushed using the large container. In this case, the user positions an opening of the large container under the water discharge port 421 and pushes the first button 31 to dispense the water. That is, the water can be dispensed from the dispenser 20 irrespective of a size of the container.

[0085] In order to further safely dispense the water using the containers, the discharge unit 40 may be withdrawn. This will be described later.

[0086] FIG. 5 is a view of a state in which a discharge unit of FIG. 3 is connected to a fixed part in a state where the discharge unit is inserted, FIG. 6 is a side cross-sectional view of a state in which a discharge unit of FIG. 3 is withdrawn, and FIG. 7 is a view of a state in which a discharge unit is connected to a fixed part in a state where the discharge unit is withdrawn.

[0087] Referring to FIGS. 5 to 7, a recess having a predetermined shape is defined by being depressed from a top surface of the fixed part case 71. The latch guide 73 is provided in the recess. The latch guide 73 has a shape corresponding to that of the recess, and protrudes and is spaced a predetermined distance from an inner surface of the recess. That is, since the latch guide 73 protrudes, the latch guide recess 74 in which the latch 83 is movable in the inserted state is defined.

[0088] The hook part 731 hooked with the latch 83 is depressed in a left direction at an approximately central portion of a left end portion of the latch guide 73. The direction conversion part 732 inclined in a different direction with respect to a vertex is disposed at a right end portion of the latch guide 73.

[0089] In the fundamental condition, the latch guide recess 74 is configured to move the latch 83 in a front direction (a

downward direction of FIG. 5) when the latch 83 is pushed in a left direction. In detail, the latch guide recess 74 is configured to support a rear side of the latch 83 when the latch 83 is hooked on the hook part 731. Thus, the latch 83 is moved in only one direction (front direction).

[0090] When the latch 83 is pushed in left and front directions, and thus, is moved to a position "A", the latch 83 is moved along the latch guide recess 74 up to the vertex of the direction conversion part 732 due to the elastic force of the second elastic member 45.

[0091] In detail, in the fundamental condition, since the second elastic member 45 is in a compressed state, a force due to the second elastic member 45 is applied to the discharge unit 40 in a right direction. Thus, in case where the latch 83 is moved up to the position "A", the force due to the second elastic member 45 is applied also to the discharge unit 40. When the latch 83 is released from the hook part 731, since a restriction of the discharge unit 40 is released, the discharge unit 40 is moved in the right direction. Thus, the latch 83 is moved up to the vertex of the direction conversion part 732.

[0092] When the latch is disposed at the vertex of the direction conversion part 732, i.e., when the discharge unit 40 is in the withdrawn state, the discharge unit 40 is moved in the left direction in case where the user pushes the discharge unit 40 in the left direction. At this time, the latch 83 is moved along a rear side surface of the latch guide 73.

[0093] In detail, when the latch 83 is disposed at the vertex of the direction conversion part 732, the latch guide recess 74 supports a front portion of the latch 83 to move the latch 83 in only one direction (a rear direction).

[0094] When the latch 83 is moved up to a position "B", the latch 83 is induced to the hook part 731 along a configuration of the latch guide recess 74.

[0095] In summary, when the user slightly pushes the inserted discharge unit 40, the latch 83 is released from the hook part 731, and thus, the latch 83 is moved up to the direction conversion part 732 along a front surface of the latch guide 73 due to the elastic force of the second elastic member 45. Thus, the discharge unit 40 is moved also in a right direction and becomes in a withdrawn state. When the user pushes the discharge unit 40 by a predetermined distance in a left direction, the latch 83 is moved up to the hook part 731 along the rear surface of the latch guide 73, and thus, is hooked on the hook part 731. Thus, the discharge unit 40 is moved also in the left direction and becomes in an inserted state.

[0096] Since the discharge unit 40 is insertably and withdrawably provided as described above, the user can withdraw the discharge unit 40 as necessary.

[0097] Particularly, as described above, in case where the water is directly dispensed from the dispenser 20 into the large container, the discharge unit 40 is withdrawn, and then the first button 31 may be pushed to dispense the water.

[0098] Also, in case where the water is dispensed using the small container, when the discharge unit 40 is withdrawn, since a distance between the second button 32 and the water discharge port 421 is far, it can prevent residual water from dropping into the outside of the container even though the container is separated from the second button 32.

[0099] Hereinafter, a refrigerator according to another embodiment will be described with reference to accompanying drawings. When comparing this embodiment with the previous embodiment, this embodiment is identical to the previous embodiment except for a method and a structure for moving the discharge unit 40. Therefore, the same reference numbers will be used throughout the drawing to refer to the same or like parts as those in the previous embodiment.

[0100] FIG. 8 is a side cross-sectional view of a state in which a discharge unit of a dispenser of a refrigerator is inserted according to another embodiment, and FIG. 9 is a side cross-sectional view of a state in which a discharge unit of FIG. 8 is withdrawn.

[0101] Referring to FIGS. 8 and 9, a rack 416 is disposed on a left side of a bottom surface of a discharge unit 40. The rack 416 has a length corresponding to a movement distance of the discharge unit 40. When the discharge unit 40 is coupled to a fixed part housing 50, the rack 416 is disposed in a left side of the fixed part housing 50.

[0102] A fixed part 70 is provided in a left side of the fixed part housing 50. A drive part receiving groove 75 in which a drive part 43 for moving the discharge unit 40 in left and right directions is installed is defined in the fixed part 70. The drive part receiving groove 75 has an opened top surface. When discharge unit 40 is inserted, a left side surface of the drive part receiving groove 75 may be in contact with the discharge unit 40. That is, the left side surface of the drive part receiving groove 75 functions as a movement limitation portion of the discharge unit 40. Also, a right side of the drive part receiving groove 75 is disposed adjacent to a third through hole 54.

[0103] The drive part 54 includes a drive motor 435 providing a power for moving the discharge unit 40, a pinion 431 connected to a rotation shaft 433 of the drive motor 435 and in contact with the rack 416, and a motor support 437 for supporting the drive motor 435.

[0104] The motor support 437 protrudes from a bottom surface of the drive part receiving groove 75 and has a predetermined shape. The motor support 437 supports the drive motor 435 to prevent the drive motor 435 from being shaken.

[0105] The drive motor 435 is disposed such that the rotation shaft 433 crosses a movement direction of the discharge unit 40. Considering a diameter of a pinion 431 coupled to the rotation shaft 433, a rack 416 and the pinion 431 are in contact with each other, and also cooperate with each other. That is, when the rotation shaft 433 rotates, the pinion 431 rotates. As a result, the rack 416 is moved.

[0106] An insertion and withdrawal button 44 for inserting or withdrawing the discharge unit 40 is provided on a rear surface of the discharge unit 40. In detail, the insertion and withdrawal button 44 is provided at an approximately central portion of a right side surface of a discharge unit body 411. The insertion and withdrawal button 44 protrudes by a predetermined length such that a user can push the button 44. In addition, the insertion and withdrawal button 44 may be connected to a control part along a wiring disposed inside the discharge unit body 411.

[0107] Although the insertion and withdrawal button 44 is provided on the discharge unit 40 in this embodiment, the present disclosure is not limited to a position of the insertion and withdrawal button 44. For example, the insertion and withdrawal button 44 may be disposed at a right side end portion of a first button support 212.

[0108] Hereinafter, operations of the discharge unit 40 and the drive part 43 of a refrigerator including the above-described components according to this embodiment will be described.

[0109] The user may push a first button 31 or a second button 32 to dispense water. Here, the user may selectively withdraw the discharge unit 40.

[0110] In detail, in a state where the discharge unit is inserted, when the user pushes the insertion and withdrawal button 44, an electrical signal is transmitted to the control

part. The control part operates the drive motor 435 to rotate the pinion 431 in one direction (a clockwise direction of FIG. 2). The rack 416 cooperates with the pinion 431 to withdraw the discharge unit 40 by a predetermined length in a right direction.

[0111] In a case where the discharge unit 40 is withdrawn, when the user pushes the insertion and withdrawal button 44, an electrical signal is transmitted to the control part. The control part operates the drive motor 435 to rotate the pinion 431 in the other direction (a counter-clockwise direction of FIG. 2). The rack 416 cooperates with the pinion 431 to insert the discharge unit 40 in a left direction.

[0112] As described above, the user can further conveniently withdraw the discharge unit 40 to utilize the discharge unit 40.

[0113] The spirit of the preset disclosure is not limited to embodiments described above, and it is possible to modify, add, and delete the embodiments within the spirit of the present disclosure.

What is claimed is:

- 1. A refrigerator comprising:
 - a body having a door; and
 - a dispenser comprising:
 - a dispenser housing;
 - a conduit configured to supply water;
 - an outlet located at the end of the conduit;
 - a receiving area located below the outlet; and
 - a button movable in the lateral direction, wherein the button comprises:
 - a first button part located within the receiving area; and
 - a second button part located above the outlet.
- 2. The refrigerator of claim 1, wherein the first button part and the second button part are integrally formed as a one-piece unitary member.
- 3. The refrigerator of claim 1, wherein the dispenser is located on an inner wall of the body.
- 4. The refrigerator of claim 1, wherein the conduit comprises:
 - a discharge unit body having an inlet port; and
 - a water hose connected to the discharge unit body at the inlet port.
- 5. The refrigerator of claim 4, further comprising:
 - a fixed part case; and
 - a spring located between the fixed part case and the discharge unit body, the spring biasing the discharge unit body outwardly.
- 6. The refrigerator of claim 5, further comprising:
 - a connection member located between the discharge unit body and the fixed part case, the connection unit configured to hold the discharge unit inwardly.
- 7. The refrigerator of claim 6, further comprising:
 - a recess located in a top surface of the fixed part case, the recess forming a closed figure; and
 - the connection member further comprising a projection at one end fitting within the recess and a second end pivotally connected to the discharge unit body.

- 8. The refrigerator of claim 4, further comprising:
 - a rack formed on the discharge unit body; and
 - a pinion engaging the rack,
 wherein rotation of the pinion causes movement of the discharge unit body.
- 9. The refrigerator of claim 8, further comprising:
 - a motor attached to the pinion.
- 10. The refrigerator of claim 1, further comprising:
 - a valve configured to open and close to regulate water flow through the conduit; and
 - a switch configured to open and close the valve.
- 11. A refrigerator comprising:
 - a body having a door;
 - a dispenser comprising:
 - a dispenser housing;
 - a conduit configured to supply water, the conduit comprising a discharge unit body having an inlet port; an outlet located at the end of the conduit; and
 - a receiving area located below the outlet;
 - a water hose connected to the discharge unit body at the inlet port;
 - a fixed part case; and
 - an elastic member located between the fixed part case and the discharge unit body, the elastic member biasing the discharge unit body outwardly.
- 12. The refrigerator of claim 11, further comprising:
 - a connection member located between the discharge unit body and the fixed part case, the connection unit configured to hold the discharge unit inwardly.
- 13. The refrigerator of claim 12, further comprising:
 - a recess located in a top surface of the fixed part case, the recess forming a closed figure; and
 - the connection member further comprising a projection at one end fitting within the recess and a second end pivotally connected to the discharge unit body.
- 14. A refrigerator comprising:
 - a body having a cooling compartment, the cooling compartment having an inner wall;
 - a dispenser located at the inner wall, the dispenser comprising:
 - a dispenser housing;
 - a conduit configured to supply water, the conduit comprising a discharge unit body having an inlet port; an outlet located at the end of the conduit; and
 - a receiving area located below the outlet;
 - a water hose connected to the discharge unit body at the inlet port; and
 - a drive unit configured to move the discharge unit body.
- 15. The refrigerator of claim 14, wherein the drive unit comprises:
 - a rack formed on the discharge unit body; and
 - a pinion engaging the rack,
 wherein rotation of the pinion causes movement of the discharge unit body
- 16. The refrigerator of claim 15, further comprising:
 - a motor attached to the pinion to rotate the pinion.

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