as much cold air as possible is introduced from the switching chamber opening sections 42 (step S8). Then, the operation is continued.

[0031]

As described above, the control unit 10 of Embodiment 1 controls the internal temperature of the refrigeration chamber 20, the freezing chamber 30, or the switching chamber 40 to be a predetermined temperature. Consequently, even if the capacity of the switching chamber 40 is increased, the internal temperature of the switching chamber 40 can be appropriately controlled. Thus, the refrigerator 1 suited to a lifestyle of the user can be realized.

[0032]

In addition, in Embodiment 1, the refrigeration chamber 20, the freezing chamber 30, and the switching chamber 40 are disposed in the named order from the upper side of the refrigerator 1, and the ice-making chamber 50 and the sub-switching chamber 60 are disposed between the refrigeration chamber 20 and the freezing chamber 30. Therefore, if the target switching chamber temperature TS of the switching chamber 40 is in the freezing temperature range, all the storage chambers except the refrigeration chamber 20, which is located at the uppermost part, are set to have a temperature lower than the refrigeration temperature range. Consequently, if the target switching chamber temperature TS of the switching chamber 40 is in the freezing temperature range, the refrigerator 1 is segmented as the refrigeration chamber 20 located at the upper part and the other storage chambers, the temperatures of which are lower than the temperature of the refrigeration chamber 20. Thus, a heat insulator used in the refrigerator 1 is substantially installed between the refrigeration chamber 20, and the ice-making chamber 50 and the sub-switching chamber 60, between which the temperature region is ~~segemented~~segmented, thereby reducing the amount of the heat insulator to be used in the entire refrigerator 1.

[0033]

Furthermore, if the target switching chamber temperature TS is in the freezing temperature range, the target freezing chamber temperature reducing unit 12a reduces the target freezing chamber temperature TF set for the freezing chamber 30. As described above, the switching chamber 40 allows not only the freezing temperature range but also the refrigeration temperature range, which is higher than the freezing temperature range, and therefore the switching chamber opening sections 42 are set to be small, and thereby, compared with the freezing chamber 30, cooling of the switching chamber 40 is less advanceable. As a result, if the target freezing chamber temperature TF of the freezing chamber 30 and the target switching chamber temperature TS of the switching chamber 40 are the same, there is a possibility that the temperature of the switching chamber 40 will not reach the target switching chamber temperature TS even when the temperature of the freezing chamber 30 reaches the target freezing chamber temperature TF.

[0034]

In contrast, in Embodiment 1, the target freezing chamber temperature reducing unit 12a reduces the target freezing chamber temperature TF set for the freezing chamber 30, and thereby the target freezing chamber temperature TF of the freezing chamber 30 is higher than the target switching chamber temperature TS of the switching chamber 40. Therefore, while the temperature of the freezing chamber 30 reaches the target freezing chamber temperature TF, the temperature of the switching chamber 40 reaches the target switching chamber temperature TS. As described above, in Embodiment 1, the internal temperature of the switching chamber 40 can be appropriately controlled. Note that, by reducing the target freezing chamber temperature TF, the internal temperature of the freezing chamber 30 decreases below the usual temperature,

CLAIMS

[Claim 1]

A refrigerator comprising:

a refrigerant circuit formed by connecting, by pipes, a compressor, a condenser, an expansion device, and a cooler to allow refrigerant to flow therethrough;

a refrigeration chamber configured to have an internal temperature therein set within a refrigeration temperature range;

a freezing chamber provided below the refrigeration chamber, and configured to have an internal temperature therein set within a freezing temperature range lower than the refrigeration temperature range; and

a switching chamber provided below the freezing chamber, and configured to have an internal temperature therein changeable within the refrigeration temperature range and the freezing temperature range.

[Claim 2]

The refrigerator of claim 1, further comprising a controller configured to control the internal temperature of the refrigeration chamber, the freezing chamber, or the switching chamber to reach a predetermined temperature,

wherein the controller includes

a switching determination unit configured to determine whether or not a target switching chamber temperature set for the switching chamber is in the freezing temperature range, and

an operation control unit configured to control the internal temperature of the switching chamber to reach the target switching chamber temperature when the switching determination unit determines that the target switching chamber temperature is in the freezing temperature range.

[Claim 3]

The refrigerator of claim 2,

wherein the operation control unit includes a target freezing chamber temperature reducing unit configured to reduce a target freezing chamber temperature set for the freezing chamber when the switching determination unit determines that the target switching chamber temperature is in the freezing temperature range.

[Claim 4]

The refrigerator of claim 2, further comprising:

a freezing temperature detection unit configured to detect an internal temperature of the freezing chamber; and

a switching temperature detection unit configured to detect an internal temperature of the switching chamber,

wherein the operation control unit includes

a detection change unit configured to control operation of the compressor based on the internal temperature of the switching chamber detected by the switching temperature detection unit when the switching determination unit determines that the target switching chamber temperature is in the freezing temperature range.

[Claim 5]

The refrigerator of claim 2, further comprising a freezing temperature detection unit configured to detect an internal temperature of the freezing chamber,

wherein the switching determination unit is configured to determine whether the target switching chamber temperature is in the freezing temperature range, the refrigeration temperature range, or a soft-freezing temperature range, the soft-freezing temperature range being between the freezing temperature range and the refrigeration temperature range, and

wherein the operation control unit includes

a compressor control unit configured to control operation of the compressor based on the internal temperature of the freezing chamber detected by the freezing temperature detection unit and

a temperature range of the target switching chamber temperature determined by the switching determination unit.

[Claim 6]

The refrigerator of any one of claims 1 to 5, further comprising a heater for adjusting a temperature of the switching chamber.

[Claim 7]

The refrigerator of any one of claims 1 to 6, further comprising:

an air blower configured to blow air into the refrigeration chamber, the freezing chamber, and the switching chamber; and

a damper configured to adjust an air volume of the air blower flowing into the switching chamber to adjust the temperature of the switching chamber.

[Claim 8]

The refrigerator of any one of claims 1 to 7, further comprising a sub-switching chamber having a capacity smaller than a capacity of the switching chamber, and in which an internal temperature thereof is changeable within the refrigeration temperature range and the freezing temperature range.

[Claim 9]

The refrigerator of any one of claims 1 to 8,

wherein a width of the switching chamber is same as a width of the freezing chamber.

as much cold air as possible is introduced from the switching chamber opening sections 42 (step S8). Then, the operation is continued.

[0031]

As described above, the control unit 10 of Embodiment 1 controls the internal temperature of the refrigeration chamber 20, the freezing chamber 30, or the switching chamber 40 to be a predetermined temperature. Consequently, even if the capacity of the switching chamber 40 is increased, the internal temperature of the switching chamber 40 can be appropriately controlled. Thus, the refrigerator 1 suited to a lifestyle of the user can be realized.

[0032]

In addition, in Embodiment 1, the refrigeration chamber 20, the freezing chamber 30, and the switching chamber 40 are disposed in the named order from the upper side of the refrigerator 1, and the ice-making chamber 50 and the sub-switching chamber 60 are disposed between the refrigeration chamber 20 and the freezing chamber 30. Therefore, if the target switching chamber temperature TS of the switching chamber 40 is in the freezing temperature range, all the storage chambers except the refrigeration chamber 20, which is located at the uppermost part, are set to have a temperature lower than the refrigeration temperature range. Consequently, if the target switching chamber temperature TS of the switching chamber 40 is in the freezing temperature range, the refrigerator 1 is segmented as the refrigeration chamber 20 located at the upper part and the other storage chambers, the temperatures of which are lower than the temperature of the refrigeration chamber 20. Thus, a heat insulator used in the refrigerator 1 is substantially installed between the refrigeration chamber 20, and the ice-making chamber 50 and the sub-switching chamber 60, between which the temperature region is segmented, thereby reducing the amount of the heat insulator to be used in the entire refrigerator 1.

[0033]

Furthermore, if the target switching chamber temperature TS is in the freezing temperature range, the target freezing chamber temperature reducing unit 12a reduces the target freezing chamber temperature TF set for the freezing chamber 30. As described above, the switching chamber 40 allows not only the freezing temperature range but also the refrigeration temperature range, which is higher than the freezing temperature range, and therefore the switching chamber opening sections 42 are set to be small, and thereby, compared with the freezing chamber 30, cooling of the switching chamber 40 is less advanceable. As a result, if the target freezing chamber temperature TF of the freezing chamber 30 and the target switching chamber temperature TS of the switching chamber 40 are the same, there is a possibility that the temperature of the switching chamber 40 will not reach the target switching chamber temperature TS even when the temperature of the freezing chamber 30 reaches the target freezing chamber temperature TF.

[0034]

In contrast, in Embodiment 1, the target freezing chamber temperature reducing unit 12a reduces the target freezing chamber temperature TF set for the freezing chamber 30, and thereby the target freezing chamber temperature TF of the freezing chamber 30 is lower than the target switching chamber temperature TS of the switching chamber 40. Therefore, while the temperature of the freezing chamber 30 reaches the target freezing chamber temperature TF, the temperature of the switching chamber 40 reaches the target switching chamber temperature TS. As described above, in Embodiment 1, the internal temperature of the switching chamber 40 can be appropriately controlled. Note that, by reducing the target freezing chamber temperature TF, the internal temperature of the freezing chamber 30 decreases below the usual temperature,

CLAIMS

[Claim 1]

A refrigerator comprising:

a refrigerant circuit formed by connecting, by pipes, a compressor, a condenser, an expansion device, and a cooler to allow refrigerant to flow therethrough;

a refrigeration chamber configured to have an internal temperature therein set within a refrigeration temperature range;

a freezing chamber provided below the refrigeration chamber, and configured to have an internal temperature therein set within a freezing temperature range lower than the refrigeration temperature range;

a switching chamber provided below the freezing chamber, and configured to have an internal temperature therein changeable within the refrigeration temperature range and the freezing temperature range, and

a controller configured to control the internal temperature of the refrigeration chamber, the freezing chamber, or the switching chamber to reach a predetermined temperature,

the controller including

a switching determination unit configured to determine whether or not a target switching chamber temperature set for the switching chamber is in the freezing temperature range, and

an operation control unit configured to control the internal temperature of the switching chamber to reach the target switching chamber temperature when the switching determination unit determines that the target switching chamber temperature is in the freezing temperature range.

[Claim 2]

The refrigerator of claim 1,

wherein the operation control unit includes a target freezing chamber temperature reducing unit configured to reduce a target freezing chamber temperature set for the freezing chamber when the switching determination unit

determines that the target switching chamber temperature is in the freezing temperature range.

[Claim 3]

The refrigerator of claim 1, further comprising:

a freezing temperature detection unit configured to detect an internal temperature of the freezing chamber; and

a switching temperature detection unit configured to detect an internal temperature of the switching chamber,

wherein the operation control unit includes

a detection change unit configured to control operation of the compressor based on the internal temperature of the switching chamber detected by the switching temperature detection unit when the switching determination unit determines that the target switching chamber temperature is in the freezing temperature range.

[Claim 4]

The refrigerator of claim 1, further comprising a freezing temperature detection unit configured to detect an internal temperature of the freezing chamber,

wherein the switching determination unit is configured to determine whether the target switching chamber temperature is in the freezing temperature range, the refrigeration temperature range, or a soft-freezing temperature range, the soft-freezing temperature range being between the freezing temperature range and the refrigeration temperature range, and

wherein the operation control unit includes

a compressor control unit configured to control operation of the compressor based on the internal temperature of the freezing chamber detected by the freezing temperature detection unit and

a temperature range of the target switching chamber temperature determined by the switching determination unit.

[Claim 5]

The refrigerator of claims 1 to 4, further comprising a heater for adjusting a temperature of the switching chamber.

[Claim 6]

The refrigerator of any one of claims 1 to 5, further comprising:

an air blower configured to blow air into the refrigeration chamber, the freezing chamber, and the switching chamber; and

a damper configured to adjust an air volume of the air blower flowing into the switching chamber to adjust the temperature of the switching chamber.

[Claim 7]

The refrigerator of any one of claims 1 to 6, further comprising a sub-switching chamber having a capacity smaller than a capacity of the switching chamber, and in which an internal temperature thereof is changeable within the refrigeration temperature range and the freezing temperature range.

[Claim 8]

The refrigerator of any one of claims 1 to 7,

wherein a width of the switching chamber is same as a width of the freezing chamber.