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(54) REFRIGERATOR AND METHOD FOR CONTROLLING THE REFRIGERATOR

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(57) **ABSTRACT**

A refrigerator and a method for controlling the refrigerator including a plurality of storage chambers which is capable of reducing a continuous operation time of a compressor or frequent ON/OFF operations of the compressor of the refrigerator, to thereby enhancing the operation efficiency of the compressor. When the control method is applied to a refrigerator including a compressor, a first storage chamber having a first fan to circulate cold air, and a second storage chamber having a second fan to circulate cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber, the control method includes turning off the second fan, to turn off the compressor, when the first storage chamber is at a temperature satisfying a first predetermined temperature corresponding to an OFF condition of the first fan, such that the second fan is turned off even when the second storage chamber is at a temperature not satisfying a second predetermined temperature.

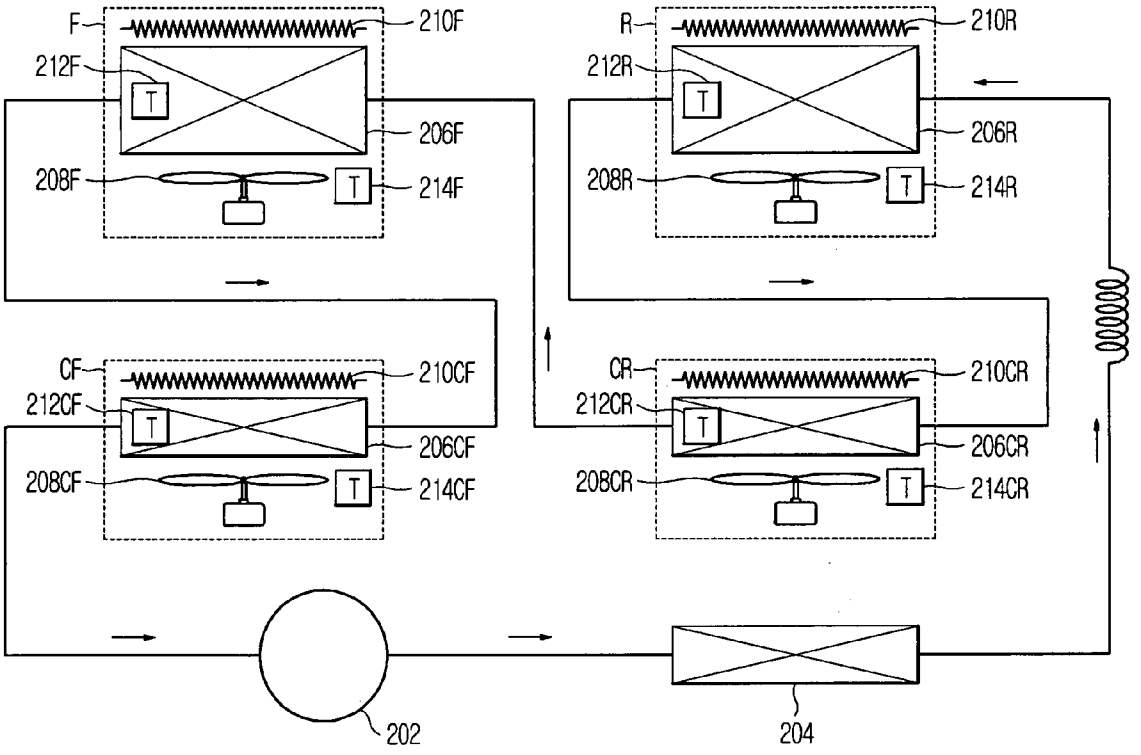


FIG.1

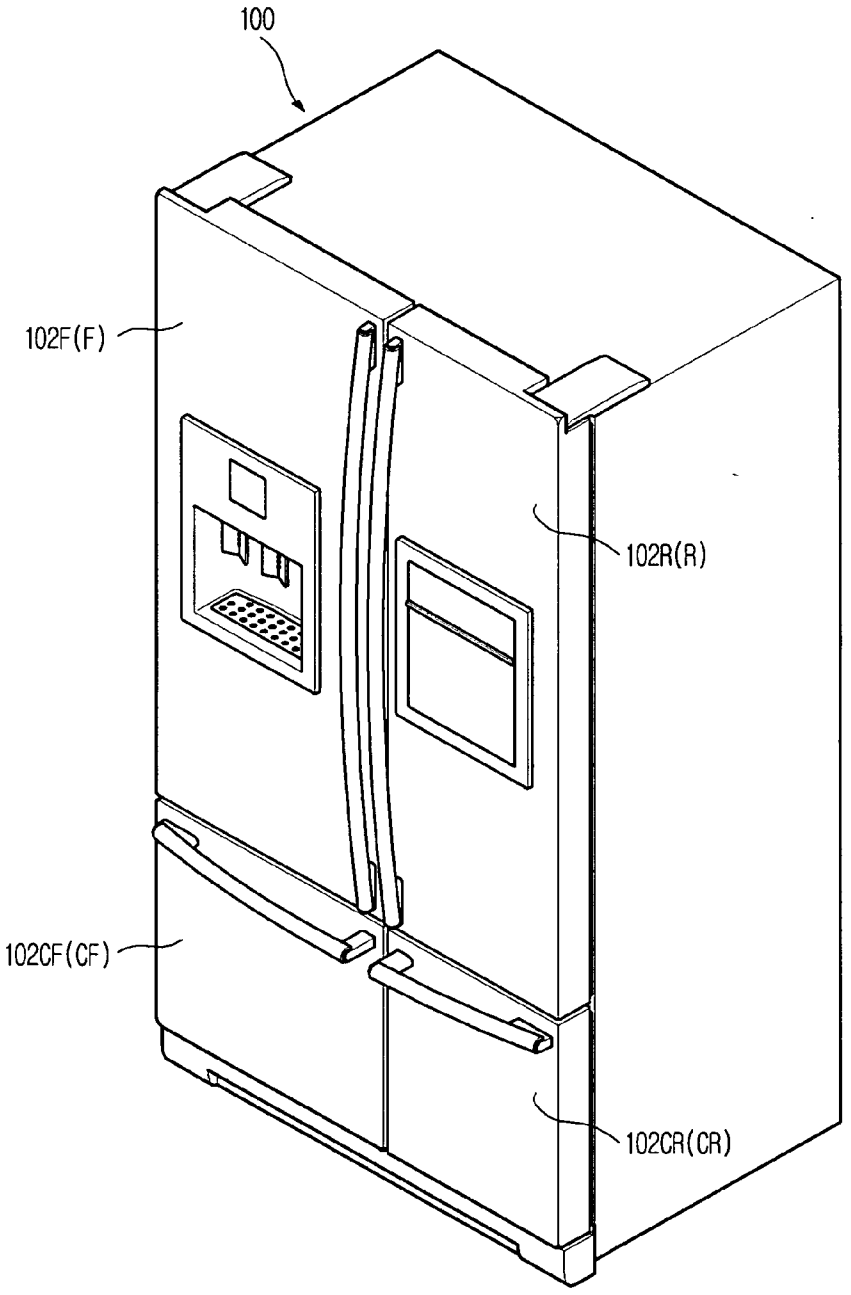


FIG.2

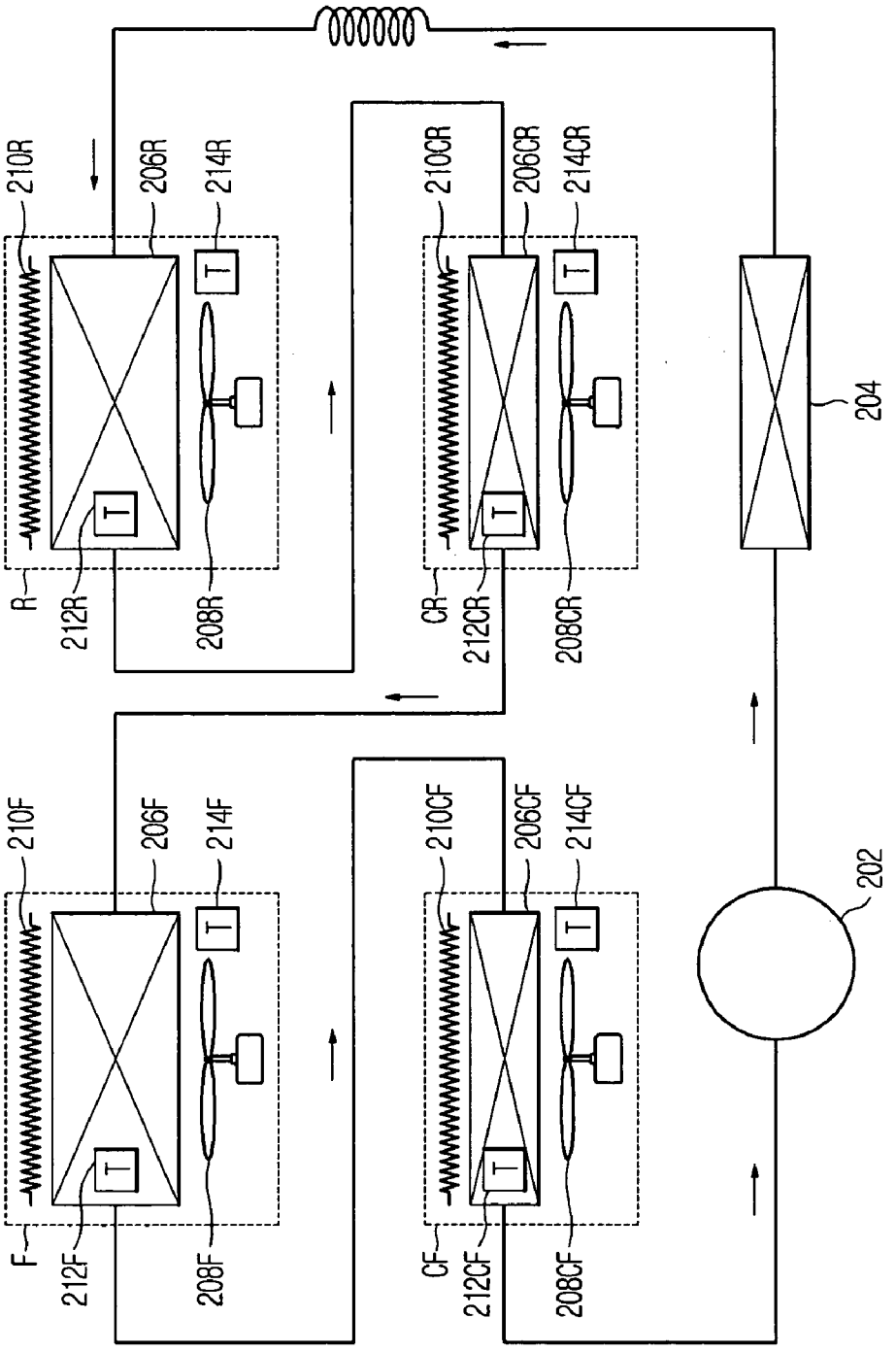

210R
206R
214R
210CR
206CR
214CR
204
R
212R
208R
CR
212CR
208CR
210F
206F
214F
210CF
206CF
214CF
202
F
212F
208F
CF
212CF
208CF
T

FIG.3

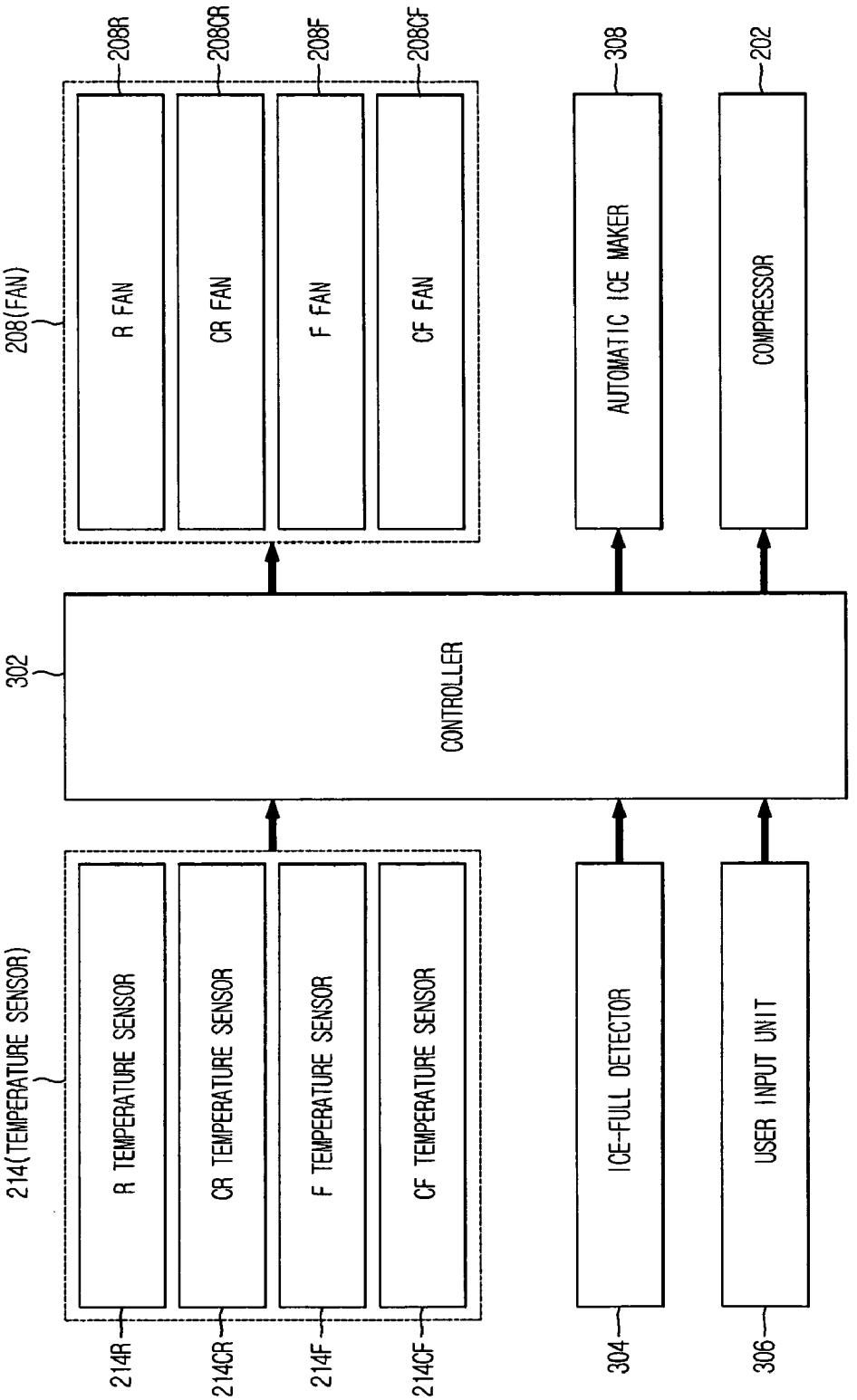
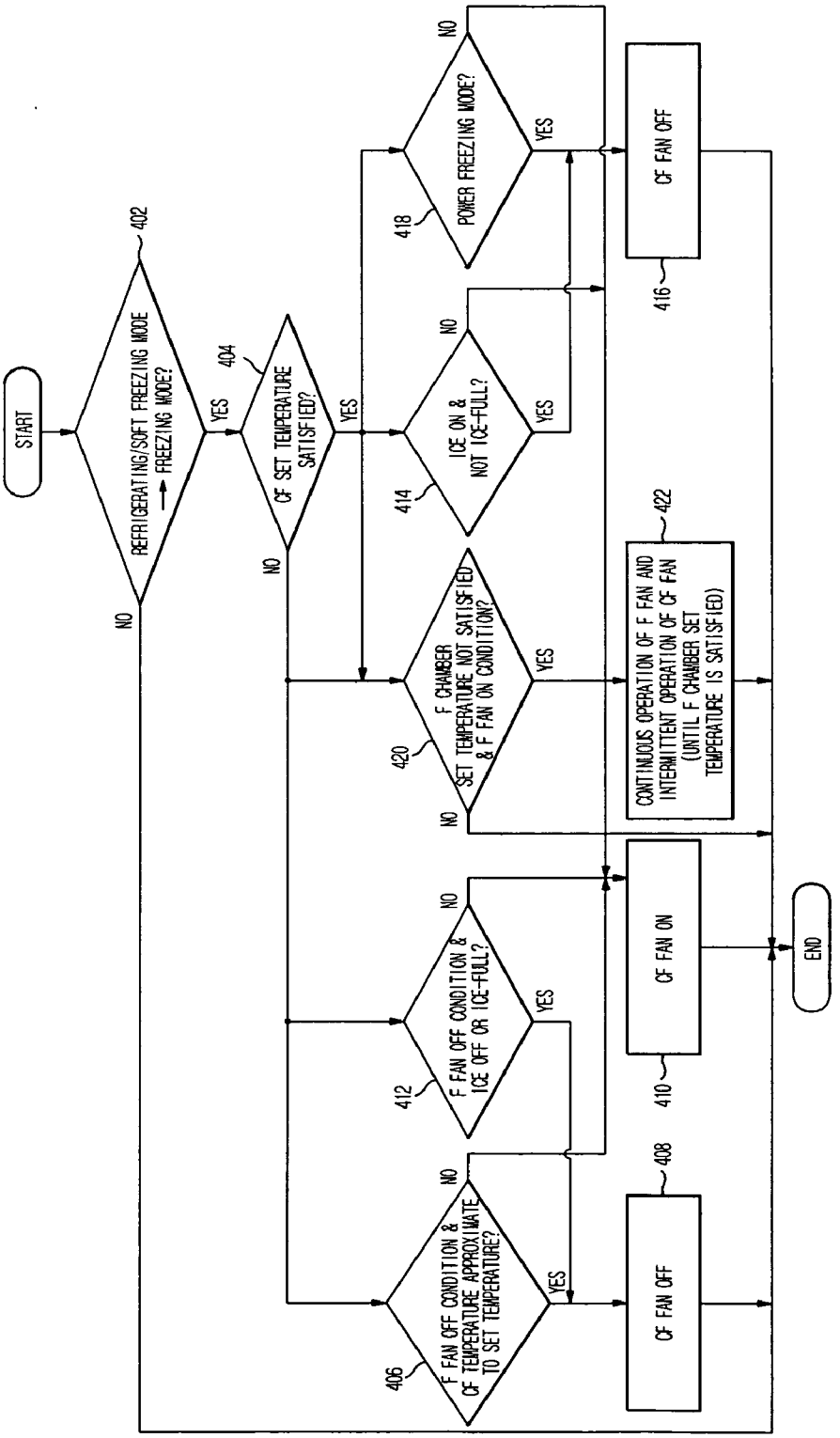

208R
208CR
208F
208CF
308
202
208(FAN)
R FAN
CR FAN
F FAN
CF FAN
AUTOMATIC ICE MAKER
COMPRESSOR
302
CONTROLLER
214(TEMPERATURE SENSOR)
R TEMPERATURE SENSOR
CR TEMPERATURE SENSOR
F TEMPERATURE SENSOR
CF TEMPERATURE SENSOR
ICE-FULL DETECTOR
USER INPUT UNIT
214R
214CR
214F
214CF
304
306

FIG.4


START
402
REFRIGERATING/SOFT FREEZING MODE → FREEZING MODE?
YES
NO
404
CF SET TEMPERATURE SATISFIED?
YES
NO
418
POWER FREEZING MODE?
YES
NO
414
ICE ON & NOT ICE-FULL?
YES
NO
420
F CHAMBER SET TEMPERATURE NOT SATISFIED & F FAN ON CONDITION?
YES
NO
412
F FAN OFF CONDITION & ICE OFF OR ICE-FULL?
YES
NO
406
F FAN OFF CONDITION & CF TEMPERATURE APPROXIMATE TO SET TEMPERATURE?
YES
NO
416
CF FAN OFF
422
CONTINUOUS OPERATION OF F FAN AND INTERMITTENT OPERATION OF CF FAN (UNTIL F CHAMBER SET TEMPERATURE IS SATISFIED)
410
CF FAN ON
408
CF FAN OFF
END

REFRIGERATOR AND METHOD FOR CONTROLLING THE REFRIGERATOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application Nos. 10-2005-0127309 and 10-2006-0070014, respectively filed on Dec. 21, 2005 and July 25, 2006 in the Korean Intellectual Property Office, the disclosures of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a refrigerator and method for controlling the refrigerator. More particularly, to refrigerator including a plurality of evaporators and a method for controlling the same.

[0004] 2. Description of the Related Art

[0005] Refrigerators operate to decrease the internal temperature of a storage chamber thereof, through a cooling cycle performing compression, condensation, expansion, and evaporation of a refrigerant, and thus, to store food in a fresh state at a low temperature for a prolonged period of time.

[0006] A conventional refrigerator includes a compressor which compresses a low-temperature/low-pressure gaseous refrigerant, to increase the temperature and pressure of the refrigerant to a high-temperature/high-pressure gas state, a condenser which heat-exchanges the refrigerant emerging from the compressor with ambient air, to condense the refrigerant, an expansion device which reduces the pressure of the condensed refrigerant emerging from the condenser, and an evaporator which heat-exchanges the pressure-reduced refrigerant emerging from the expansion device with air present in a storage chamber to cause the refrigerant to be evaporated, while absorbing heat from the air in the storage chamber. The refrigerator also includes a fan to circulate cold air through the storage chamber. A plurality of storage chambers are also included in the refrigerator, such that the user may set target cooling temperatures for the respective storage chambers. In this case, the compressor operates together with fans, to circulate cold air through the storage chambers, and thus, to maintain the storage chambers at the set temperatures, respectively.

[0007] When respective current temperatures of the storage chambers are different, and when the set temperatures of the storage chambers are also different, the points of time when the temperatures of the storage chambers reach the associated set temperatures, respectively, may be different. The operation of the compressor is stopped only when the temperatures of all the storage chambers reach the associated set temperatures. Since the points of time when the temperatures of the storage chambers reach the associated set temperatures, respectively, may be different, as described above, one storage chamber, which has reached the set temperature thereof, may be again heated to a temperature requiring a cooling operation before the compressor has not yet been stopped. For this reason, the continuous operation time of the compressor may be increased. Furthermore, the compressor may be frequently turned on and off. As a result, the operation efficiency of the compressor is degraded.

SUMMARY OF THE INVENTION

[0008] Accordingly, it is an aspect of the present invention to provide a method for controlling a refrigerator including a plurality of storage chambers, which is capable of reducing a continuous operation time of a compressor or frequent ON/OFF operations of the compressor, to thereby enhance an operation efficiency of the compressor.

[0009] Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the invention.

[0010] The foregoing and/or other aspects of the present invention are achieved by providing a method for controlling a refrigerator including a compressor, a first storage chamber having a first fan to circulate cold air, and a second storage chamber having a second fan to circulate cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber, the method including turning off the second fan, to turn off the compressor, when the first storage chamber is at a temperature satisfying a first predetermined temperature corresponding to an OFF condition of the first fan, such that the second fan and the compressor are turned off even when the second storage chamber is at a temperature not satisfying a second predetermined temperature.

[0011] According to an aspect of the present invention, the second fan includes an OFF condition corresponding to a third predetermined temperature which is lower than the second predetermined temperature of the second storage chamber. Thus, according to an aspect of the present invention, the method further includes turning off the second fan when the temperature of the second storage chamber reaches the third predetermined temperature, to satisfy the OFF condition of the second fan.

[0012] According to an aspect of the present invention, the second storage chamber includes a switchable chamber having an operation mode switchable between a refrigerating mode and a freezing mode. Thus, according to an aspect of the present invention, the method further includes turning off the second fan in an OFF condition of the first fan when the operation mode of the second storage chamber is switched from the refrigerating mode to the freezing mode, such that the second fan is turned off even when the temperature of the second storage chamber does not satisfy a predetermined temperature for the freezing mode.

[0013] According to an aspect of the present invention, the first storage chamber includes a freezing chamber. Thus, according to an aspect of the present invention, the method further includes turning on the second fan when the temperature of the first storage chamber does not satisfy the first predetermined temperature corresponding to an OFF condition of the first fan, such that the second fan is turned on even when the temperature of the second storage chamber satisfies the second predetermined temperature.

[0014] The method further includes continuously operating the first fan until the temperature of the first storage chamber satisfies the first predetermined temperature, and intermittently operating the second fan after the temperature of the second storage chamber satisfies the second predetermined temperature.

[0015] The method further includes turning off the second fan when the first storage chamber is in a power freezing mode.

[0016] It is another aspect of the present invention to provide a method to control a refrigerator including a compressor, a freezing chamber having a first fan to circulate cold air, and a switchable chamber having a second fan to circulate of cold air, the switchable chamber having an operation mode switchable between a freezing mode and a refrigerating mode, the method includes turning off the second fan in an OFF condition of the first fan, when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode, such that the second fan is turned off even when the switchable chamber is at a temperature not satisfying a first predetermined temperature for the freezing mode, turning on the second fan, when the temperature of the switchable chamber does not satisfy a second predetermined temperature, and the freezing chamber is in a general freezing mode, and turning off the second fan, when the temperature of the switchable chamber satisfies the second predetermined temperature, and the freezing chamber is in a power freezing mode.

[0017] According to an aspect of the present invention, the turn-on/off of the second fan is executed when an operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode.

[0018] The freezing chamber further includes an automatic ice maker to make ice. In this case, the method further includes turning on the automatic ice maker, when the freezing chamber is in the power freezing mode.

[0019] It is another aspect of the present invention to provide a method for controlling a refrigerator including a compressor, a freezing chamber having a first fan to circulate cold air and an automatic ice maker to make ice, and a switchable chamber having a second fan to circulate cold air, the switchable chamber having an operation mode switchable between a freezing mode and a refrigerating mode, the method including turning off the second fan in an OFF condition of the first fan when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode, such that the second fan is turned off even when the switchable chamber is at a temperature not satisfying a first predetermined temperature for the freezing mode, and turning off the second fan in an ON condition of the automatic ice maker when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode.

[0020] The method further includes turning off the second fan when the freezing chamber is at a temperature satisfying the first predetermined temperature corresponding to an OFF condition of the first fan, or when the freezing chamber is in an ice-full state requiring no further ice making operation of the automatic ice maker, such that the second fan is turned off even when the temperature of the switchable chamber does not satisfy a second predetermined temperature.

[0021] According to another aspect of the present invention, the second fan includes an OFF condition corresponding to a third predetermined temperature lower than the second predetermined temperature of the switchable chamber. Thus, the method further includes turning off the second fan when the temperature of the switchable chamber reaches the third predetermined temperature, to satisfy the OFF condition of the second fan.

[0022] It is another aspect of the present invention to provide a method for controlling a refrigerator including a compressor, a first storage chamber having a first fan to circulate cold air, and a second storage chamber having a second fan to circulate of cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber, the method including turning off the second fan when the first storage chamber is at a temperature satisfying a first predetermined temperature corresponding to an OFF condition of the first fan, such that the second fan is turned off even when the second storage chamber is at a temperature not satisfying a second predetermined temperature, and continuously operating the first fan until the temperature of the first storage chamber satisfies the first predetermined temperature, and intermittently operating the second fan after the temperature of the second storage chamber satisfies the second predetermined temperature.

[0023] The intermittent operation of the second fan continues until the temperature of the first storage chamber satisfies the first predetermined temperature.

[0024] It is another aspect of the present invention, to provide a refrigerator including a compressor to compress refrigerant, first and second storage chambers to store food, and respectively comprising first and second fans to circulate cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber, wherein the second fan and the compressor are turned off when the first storage chamber is at a first predetermined temperature, such that the second fan and the compressor are turned off even when the second storage chamber is not at a second predetermined temperature.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

[0026] FIG. **1** is a perspective view illustrating a refrigerator having a plurality of storage chambers according to an embodiment of the present invention according to an embodiment of the present invention;

[0027] FIG. **2** is a schematic diagram illustrating configurations of multiple storage chambers in the refrigerator shown in FIG. **1**, and a cooling cycle of the refrigerator, according to an embodiment of the present invention;

[0028] FIG. **3** is a block diagram illustrating a control system of the refrigerator shown in FIGS. **1** and **2**; and

[0029] FIG. **4** is a flow chart illustrating a method for controlling a refrigerator having a plurality of storage chambers in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0030] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein line reference numerals refer to the elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

[0031] An embodiment of the present invention will now be described with reference to FIGS. **1-4**. FIG. **1** is a

perspective view illustrating a refrigerator having a plurality of storage chambers according to an embodiment of the present invention. As shown in FIG. **1**, the refrigerator **100** comprises four independent storage chambers R, CR, F, and CF which are opened or closed by doors **102**R, **102**CR, **102**F, and **102**CF provided for the storage chambers R, CR, F, and CF, respectively. In the present invention, the number of the storage chambers is not limited to four, as described above. That is, the present invention may be applied to any refrigerator, as long as the refrigerator includes at least one storage chamber, in addition to a freezing chamber and a refrigerating chamber.

[0032] FIG. **2** is a schematic diagram illustrating configurations of multiple storage chambers in the refrigerator shown in FIG. **1**, and a cooling cycle of the refrigerator according to an embodiment of the present invention. FIG. **2**, four storage chambers, namely, the storage chambers R, CR, F, and CF, are provided in the refrigerator. The storage chamber F is a first storage chamber functioning as a freezing chamber, the storage chamber CF is a second storage chamber functioning as an auxiliary freezing chamber, the storage chamber R is a third storage chamber functioning as a refrigerating chamber, and the storage chamber CR is a fourth storage chamber functioning as an auxiliary refrigerating chamber. If the refrigerator is provided with only the freezing chamber F, auxiliary freezing chamber CF, and refrigerating chamber R, without the auxiliary refrigerating chamber CR, the provided freezing chamber F, auxiliary freezing chamber CF, and refrigerating chamber R may be classified into first, second, and third storage chambers, respectively. Thus, in this embodiment of the present invention, the auxiliary freezing chamber CF is a switchable chamber, wherein the operation mode of the auxiliary freezing chamber is switched between a refrigerating mode and a freezing mode. The auxiliary freezing chamber CF comprises cooling capacity(i.e., a cooling load), relatively smaller than that of the freezing chamber F.

[0033] Each storage chamber R, CR, F or CF comprises an evaporator **206**R, **206**CR, **206**F and **206**CF, a fan **208**R, **208**CR, **208**F or **208**CF, a defrosting heater **210**R, **210**CR, **210**F or **210**CF, a defrosting sensor **212**R, **212**CR, **212**F or **212**CF, and a storage chamber temperature sensor **214**R, **214**CR, **214**F or **214**CF respectively. Each evaporator **206**R, **206**CR, **206**F or **206**CF and each fan **208**R, **208**CR, **208**F or **208**CF are provided to circulate air through an associated one of the storage chambers R, CR, F and CF. Each defrosting heater **210**R, **210**CR, **210**F or **210**CF defrosts the surface of an associated one of the evaporator **206**R, **206**CR, **206**F or **206**CF. Each defrosting sensor **212**R, **212**CR, **212**F or **212**CF detects a surface temperature of an associated one of the evaporator **206**R, **206**CR, **206**F or **206**CF during a defrosting operation, in order to enable determination of the point of time when an associated one of the defrosting heater **210**R, **210**CR, **210**F or **210**CF is to be turned off, based on the detected surface temperature. Each storage chamber temperature sensor **214**R, **214**CR, **214**F or **214**CF detects an internal temperature of an associated one of the storage chambers R, CR, F, and CF. When the refrigerator of FIG. **2** comprises only the freezing chamber F, auxiliary freezing chamber CF, and refrigerating chamber R, without the auxiliary refrigerating chamber CR, the freezing chamber fan **208**F, auxiliary freezing chamber fan **208** CF, and refrigerating chamber fan **208**R are classified into first, second, and third fans, respectively.

[0034] In the refrigerator according to the embodiment of the present invention shown in FIG. **2**, the refrigerating chamber R and freezing chamber F store food in a refrigerating state and in a freezing state, respectively, same as that of the refrigerating and freezing chambers in conventional refrigerators. The auxiliary freezing chamber CF comprises operation modes such as a refrigerating mode COOL, a soft freezing mode SOFT FREEZE, and a freezing mode FREEZE. The set temperature for the refrigerating mode is approximately 3° C., the set temperature for the soft freezing mode is approximately −5° C., and the set temperature for the freezing mode is between approximately −15° C. to −25° C. The set temperature of the freezing mode of the auxiliary freezing chamber CF is similar to that of a general operation mode of the freezing chamber F. In an embodiment of the present invention, the set temperature of the freezing chamber F is a "first predetermined temperature", and the set temperature of the auxiliary freezing chamber CF is a "second predetermined temperature" . A third predetermined temperature is set as a condition for turning off the auxiliary freezing chamber fan **208**CF. The third predetermined temperature is slightly lower than the second predetermined temperature. The third predetermined temperature is set to turn off the auxiliary freezing chamber fan **208**CF, when necessary, when the current temperature of the auxiliary freezing chamber CF satisfies the third predetermined temperature even though it has not reached the second predetermined temperature yet.

[0035] The freezing chamber F also comprises an ice making mode which is a mode for freezing water, to thereby make ice. In this mode, the freezing chamber F is maintained at a temperature of not higher than approximately 0° C. (for example, −25° C.). The user can switch the ice making mode between an activation state "ICE ON" and a deactivation state "ICE OFF" through a user input unit (shown in FIG. **3**). In the activation state "ICE ON", ice making is carried out. On the other hand, in the deactivation state "ICE OFF", no ice making is carried out. The freezing chamber F further comprises a power freezing mode POWER FREEZE in which the compressor **202** and fan **208***f* operate continuously for 2 hours and 30 minutes.

[0036] FIG. **3** is a block diagram illustrating a control system of the refrigerator shown in FIGS. **1** and **2**. In FIG. **3**, a controller **302** is illustrated which controls an overall operation of the refrigerator. The storage chamber temperature sensors **214**R, **214**CR, **214**F and **214**CF of the storage chambers R, CR, F, and CF, an ice full detector **304**, and the user input unit **306** are connected to an input of the controller **302**. The fans **208**R, **208**CR, **208**F and **208**CF, an automatic ice maker **308**, and the compressor **202** are connected to an output of the controller **302**. The controller **302** receives information as to the internal temperatures of the storage chambers R, CR, F, and CF from the storage chamber temperature sensors **214**R, **214**CR, **214**F and **214**CF, and controls the compressor **202**, condenser **204**, and fans **208**R, **208**CR, **208**F and **208**CF, based on the received information, to cause the refrigerator to perform a desired cooling operation. The automatic ice maker **308** is arranged in the freezing chamber F, to automatically make a predetermined amount of ice in the ice making mode ICE ON. Once the predetermined amount of ice is made, the automatic ice maker **308** no longer makes ice even when the ice making mode ICE ON is still in an activation state thereof.

[0037] FIG. **4** is a flow chart illustrating a method for controlling the refrigerator, which comprises a plurality of storage chambers, as described above, in accordance with an embodiment of the present invention. The control method according to an embodiment of the present invention as illustrated in FIG. **4**, for example, minimizes an operation of the auxiliary freezing chamber fan **208**CF during operation of the auxiliary freezing chamber CF in the freezing mode FREEZE, and thus, reduces the number of continued operations or repeated ON/OFF operations of the compressor **202**.

[0038] As shown in FIG. **4**, in accordance with the control method, when the auxiliary freezing chamber CF is switched from the soft freezing mode SOFT FREEZE or refrigerating mode COOL to the freezing mode FREEZE ("YES" at operation **402**), it is monitored whether the temperature of the auxiliary freezing chamber CF reaches (satisfies) a set target temperature (the second predetermined temperature), in order to control an ON/OFF operation of the auxiliary freezing chamber fan **208**CF in accordance with the result of the monitoring.

[0039] When it is determined in operation **406** that the temperature of the auxiliary freezing chamber CF approximates to the set temperature in an OFF condition of the freezing chamber fan **208**CF ("YES" at operation **406**), the auxiliary freezing chamber fan **208**CF is turned off (operation **408**). On the other hand, when the temperature of the auxiliary freezing chamber CF is too insufficient to reach the set temperature ("NO" at operation **406**) even though the freezing chamber fan **208**F is in an OFF condition thereof, the auxiliary freezing chamber fan **208**CF is maintained in an ON state thereof (operation **410**). Although the compressor **202** must be turned off in the OFF condition of the freezing chamber fan **208**F, the compressor **202** may still operate continuously without being turned off, due to operation of the auxiliary freezing chamber fan **208**CF, even in the OFF condition of the freezing fan **208**F. In this case, the continuous operation time of the compressor **202** is undesirably increased. When a condition to turn off the auxiliary freezing chamber fan **208**CF is subsequently established, the compressor **202** must be turned off. However, the compressor **202** may still operate continuously without being turned off when the OFF condition of the auxiliary freezing chamber fan **208**CF is established in an ON condition of the freezing chamber fan **208**F. Also, even in the case in which the compressor **202** is turned off in accordance with the OFF condition of the auxiliary freezing chamber fan **208**CF, the compressor **202** will be again turned on in accordance with a subsequent ON condition of the freezing chamber fan **208**F. Thus, the number of repeated ON/OFF operations of the compressor **202** will be increased. To this end, when the temperature of the auxiliary freezing chamber CF approximates to the set temperature in the OFF condition of the freezing chamber fan **208**F (for example, when the current temperature is about 23° C., and the set temperature is 25° C.), the auxiliary freezing chamber fan **208**CF is forcibly turned off even when the temperature of the auxiliary freezing chamber CF has not reached the set temperature yet, in order to prevent an increase in the continuous operation time of the compressor **202** or an increase in the number of repeated ON/OFF operations of the compressor **202** caused by an operation of the auxiliary freezing chamber fan **208**CF in the OFF state of the freezing chamber fan **208**F. That is, when the difference between the current temperature of the auxiliary freezing chamber CF and the set temperature is small, even though the temperature of the auxiliary freezing chamber CF has not reached the set temperature yet, the operation of the compressor **202** is stopped, in order to reduce the continuous operation time of the compressor **202** or the number of repeated ON/OFF operations of the compressor **202**. The difference between the current temperature and the set temperature required for the forcible turn-off of the auxiliary freezing chamber fan **208**CF is determined to be within a range having no significant influence on the cooling operation required in the auxiliary freezing chamber CF even though the range causes the temperature of the auxiliary freezing chamber CF to insufficiently satisfy the set temperature.

[0040] When it is determined in operation **412** that the freezing chamber F is not in the ice making mode ("ICE OFF"), or the freezing chamber F is in the ice making mode, but is in an ice-full state in accordance with completion of an ice making operation, namely, in a state requiring no further ice making operation, in the OFF condition of the freezing chamber fan **208**CF ("YES" operation **412**), the auxiliary freezing chamber fan **208**CF is forcibly turned off (operation **408**). In this case, similarly to the above-described case, the auxiliary freezing chamber fan **208**CF is also turned off because the freezing chamber F is not required to be cooled, in order to prevent the compressor **202** from being further operated due to the operation of the auxiliary freezing chamber fan **208**CF alone, and thus, to reduce the continuous operation time of the compressor **202** or the number of repeated ON/OFF operations of the compressor **202**.

[0041] When it is determined in operation **414** that the freezing chamber F is in the ice making mode ("ICE ON"), but is not in an ice-full state, so that an ice making operation is continued ("YES" at operation **414**), it is unnecessary to forcibly turn off the auxiliary freezing chamber fan **208**CF because the freezing chamber F must be maintained at −25° C. In other words, when the compressor **202** should operate to cool the freezing chamber F, it is unnecessary to forcibly turn off the auxiliary freezing chamber fan **208**CF. In this case, the auxiliary freezing chamber fan **208**CF is selectively turned on or off in accordance with whether or not the auxiliary freezing chamber CF is required to be cooled (operation **416**). On the other hand, when the freezing chamber F is not in the ice making mode ("ICE OFF"), or when the freezing chamber F is in the ice making mode, but is in an ice-full state ("NO" at operation **414**), the auxiliary freezing chamber fan **208**CF is turned on to enable the temperature of the auxiliary freezing chamber CF to reach the set temperature (**410**).

[0042] When it is determined in operation **418** that the freezing chamber F is in a power freezing mode, so that the compressor **202** operates continuously for a predetermined long time (for example, 2 hours and 30 minutes) ("YES" at operation **418**), the auxiliary freezing fan **208**CF is turned off (**416**). On the other hand, when the freezing chamber F is not in the power freezing mode ("NO" at operation **418**), the auxiliary freezing chamber fan **208**CF is maintained in an ON state thereof, to enable the temperature of the auxiliary freezing chamber CF to reach the set temperature (operation **410**).

[0043] When it is determined in operation **420** that the temperature of the freezing chamber F does not satisfy a set target temperature (the first predetermined temperature) in an ON condition of the freezing chamber fan **208**F ("YES"

at operation **420**), the auxiliary freezing chamber fan **208**CF is turned on, irrespective of whether or not the temperature of the auxiliary freezing chamber CF satisfies the set temperature associated therewith. That is, in this case, the auxiliary freezing chamber fan **208**CF is turned on even when the temperature of the auxiliary freezing chamber CF satisfies the set temperature associated therewith.

[0044] In this case, the freezing chamber fan **208**F is continuously operated, but the auxiliary freezing chamber fan **208**CF is intermittently operated such that the auxiliary freezing chamber fan **208**CF is repeatedly turned on and off, until the temperature of the freezing chamber F reaches the set temperature associated therewith. That is, when the temperature of the freezing chamber F has not satisfied the set temperature associated therewith yet, the auxiliary freezing chamber fan **208**CF is intermittently operated to contribute to a freezing operation for the freezing mode of the freezing chamber CF, because the compressor **202** should operate continuously.

[0045] As apparent from the above description, in accordance with the control method of and embodiment as the present invention, which controls a cooling operation of a refrigerator including a plurality of storage chambers, the cooling control for one or more of the storage chambers depends on cooling conditions of the remaining storage chambers, in order to prevent an increase in the continuous operation time of a compressor or an increase in the number of repeated ON/OFF operations of the compressor possibly occurring when the remaining storage chambers are independently controlled.

[0046] Although a few embodiments of the present invention have been shown and described, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. A method for controlling a refrigerator comprising a compressor, a first storage chamber having a first fan to circulate cold air, and a second storage chamber having a second fan to circulate cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber, the method comprising:

turning off the second fan, to turn off the compressor, when the first storage chamber is at a temperature satisfying a first predetermined temperature corresponding to an OFF condition of the first fan, such that the second fan and the compressor are turned off even when the second storage chamber is at a temperature not satisfying a second predetermined temperature.

2. The method according to claim **1**, wherein the second fan comprises an OFF condition corresponding to a third predetermined temperature lower than the second predetermined temperature of the second storage chamber, further comprising:

turning off the second fan when the temperature of the second storage chamber reaches the third predetermined temperature, to satisfy the OFF condition of the second fan.

3. The method according to claim **2**, wherein the second storage chamber is a switchable chamber having an operation mode switchable between a refrigerating mode and a freezing mode, further comprising:

turning off the second fan in the OFF condition of the first fan when the operation mode of the second storage chamber is switched from the refrigerating mode to the freezing mode, such that the second fan is turned off even when a temperature of the second storage chamber does not satisfy a predetermined temperature for the freezing mode.

4. The method according to claim **2**, wherein the first storage chamber is a freezing chamber, further comprising:

turning on the second fan when the temperature of the first storage chamber does not satisfy the first predetermined temperature corresponding to the OFF condition of the first fan, such that the second fan is turned on even when the temperature of the second storage chamber satisfies the second predetermined temperature.

5. The method according to claim **4**, further comprising:

continuously operating the first fan until the temperature of the first storage chamber satisfies the first predetermined temperature; and

intermittently operating the second fan after the temperature of the second storage chamber satisfies the second predetermined temperature.

6. The method according to claim **1**, further comprising:

turning off the second fan when the first storage chamber is in a power freezing mode.

7. The method according to claim **2**, further comprising:

turning off the second fan when the first storage chamber is in a power freezing mode.

8. The method according to claim **3**, further comprising:

turning off the second fan when the first storage chamber is in a power freezing mode.

9. A method for controlling a refrigerator including a compressor, a freezing chamber having a first fan to circulate cold air, and a switchable chamber having a second fan to circulate cold air, the switchable chamber having an operation mode switchable between a freezing mode and a refrigerating mode, the method comprising:

turning off the second fan in an OFF condition of the first fan when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode, such that the second fan is turned off even when the switchable chamber is at a temperature not satisfying a first predetermined temperature for the freezing mode;

turning on the second fan, when the temperature of the switchable chamber does not satisfy a second predetermined temperature, and the freezing chamber is in a general freezing mode; and

turning off the second fan, when the temperature of the switchable chamber satisfies the second predetermined temperature, and the freezing chamber is in a power freezing mode.

10. The method according to claim **9**, wherein the turn-on and off of the second fan is executed when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode.

11. The method according to claim **9**, further comprising:

turning on an automatic ice maker of the refrigerator, when the freezing chamber is in the power freezing mode.

12. The method according to claim **10**, further comprising:

turning on an automatic ice maker of the refrigerator, when the freezing chamber is in the power freezing mode.

13. A method for controlling a refrigerator including a compressor, a freezing chamber having a first fan to circulate cold air and an automatic ice maker to make ice, and a switchable chamber having a second fan to circulate cold air, the switchable chamber having an operation mode switchable between a freezing mode and a refrigerating mode, the method comprising:

turning off the second fan in an OFF condition of the first fan when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode, such that the second fan is turned off even when the switchable chamber is at a temperature not satisfying a first predetermined temperature for the freezing mode; and

turning off the second fan in an ON condition of the automatic ice maker when the operation mode of the switchable chamber is switched from the refrigerating mode to the freezing mode.

14. The method according to claim **13**, further comprising:

turning off the second fan when the freezing chamber is at a temperature satisfying the first predetermined temperature corresponding to an OFF condition of the first fan, or when the freezing chamber is in an ice-full state requiring no further ice making operation of the automatic ice maker, such that the second fan is turned off even when the temperature of the switchable chamber does not satisfy a second predetermined temperature.

15. The method according to claim **14**, wherein the second fan has an OFF condition corresponding to a third predetermined temperature lower than the second predetermined temperature of the switchable chamber, further comprising:

turning off the second fan when the temperature of the switchable chamber reaches the third predetermined temperature, to satisfy the OFF condition of the second fan.

16. A method for controlling a refrigerator including a compressor, a first storage chamber having a first fan to circulate cold air, and a second storage chamber having a second fan to circulate cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber, the method comprising:

turning off the second fan when the first storage chamber is at a temperature satisfying a first predetermined temperature corresponding to an OFF condition of the first fan, such that the second fan is turned off even when the second storage chamber is at a temperature not satisfying a second predetermined temperature; and

continuously operating the first fan until the temperature of the first storage chamber satisfies the first predetermined temperature, and intermittently operating the second fan after the temperature of the second storage chamber satisfies the second predetermined temperature.

17. The method according to claim **16**, wherein the intermittent operation of the second fan is continued until the temperature of the first storage chamber satisfies the first predetermined temperature.

18. A refrigerator comprising:

a compressor to compress refrigerant;

first and second storage chambers to store food, and respectively comprising first and second fans to circulate cold air, the second storage chamber having a load relatively lower than a load of the first storage chamber,

wherein the second fan and the compressor are turned off when the first storage chamber is at a first predetermined temperature, such that the second fan and the compressor are turned off even when the second storage chamber is not at a second predetermined temperature.

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