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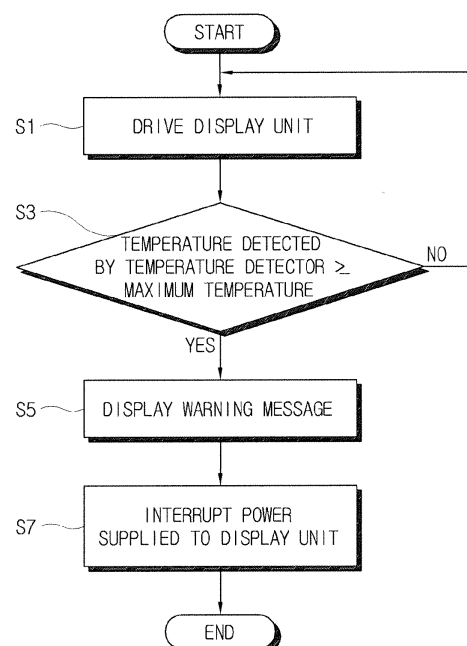
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(54) **Refrigerator and control method thereof**

(57) A refrigerator includes a main body cabinet having a storage room formed with a front opening, a door which opens and closes the front opening, and a display unit that is mounted on at least one of the main body cabinet and the door. The display unit includes a display displaying an image, a power supply unit selectively supplying power to the display, a temperature detector detecting a temperature of the display, and a controller controlling the power supply unit to interrupt the power supplied to the display when the temperature detected by the temperature detector is higher than a predetermined maximum temperature.

FIG. 3



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Description

BACKGROUND

Field

[0001] The present invention relates to a refrigerator. More particularly, a refrigerator for preventing a display unit from being overheated and a controlling method thereof.

Description of the Related Art

[0002] Generally, a conventional refrigerator includes a main body including a storage room formed with a front opening, and a door for closing and opening the front opening of the storage room.

[0003] Conventional refrigerators include various functions including a home bar for providing materials stored in the storage room to the outside without opening the door, a dispensing unit for providing ice or water to the outside without opening the door, and a display unit having a TV or Internet function.

[0004] The display unit of this conventional refrigerator may be mounted on the door to be driven, or it may be driven detachable from the door.

[0005] However, when the display unit is driven for a long time, heat is generated from electronic elements therein, to thereby increase temperature of the display unit. Accordingly, when holding the heated display unit, a user may drop the display unit so that the display unit may be broken.

SUMMARY

[0006] Accordingly, it is an aspect of the present invention to provide a refrigerator for preventing a display unit from being overheated.

[0007] It is another aspect of the present invention to provide a controlling method of a refrigerator for preventing a display unit from being overheated.

[0008] Additional aspects and/or advantages 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.

[0009] The foregoing and/or other aspects of the present invention can be achieved by providing The foregoing and/or other aspects of the present invention can be achieved by providing a controlling method of a refrigerator including a main body cabinet including a storage room formed with a front opening, a door which opens and closes the front opening, a display unit which is mounted on at least one of the main body cabinet and the door to display an image, the controlling method including detecting a temperature of the display unit, and interrupting power supplied to the display unit when the detected temperature is higher than a predetermined maximum temperature.

[0010] According to an aspect of the invention, the controlling method further includes displaying a warning message before interrupting the power supplied to the display unit.

5 **[0011]** According to an aspect of the invention, when the power supplied to the display unit is interrupted, keeping the power interrupted from the display unit until the temperature of the display unit reaches a predetermined reference temperature.

10 **[0012]** The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator comprising a display unit mounted on at least one of a main body cabinet and a door of the refrigerator, to display an image, a power supply unit to selectively supply power to the display unit, a temperature detector to detect a temperature of the display unit, and a controller to control the power supply unit to interrupt the power supplied to the display unit, when the temperature detected by the temperature detector is higher than a predetermined temperature.

[0013] According to an aspect of the invention, the predetermined temperature is set according to a user's preference.

25 **[0014]** According to an aspect of the invention, the controller outputs a warning message to be displayed on the display unit before interrupting the power supplied to the display unit, when the temperature detected by the temperature detector reaches the predetermined temperature.

30 **[0015]** According to an aspect of the invention, the controller controls the power supply unit to interrupt the power supplied to the display unit after elapsing a predetermined time from a time when the warning message is displayed.

35 **[0016]** The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator comprising a display to display an image thereon, and a temperature detector to detect a temperature of the display such that power supplied to the display is interrupted when the temperature detected exceeds a predetermined temperature.

BRIEF DESCRIPTION OF THE DRAWINGS

45 **[0017]** These and/or other aspects and advantages of the present invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

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FIG. 1 is a perspective view of a refrigerator according to an embodiment of the present invention;
FIG. 2 is a control block diagram of the refrigerator according to an embodiment of the present invention; and
FIG. 3 is a control flowchart of the refrigerator according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiments are described below so as to explain the present invention by referring to the figures.

[0019] A refrigerator 1 according to an embodiment of the present invention will now be described with reference to the figures.

[0020] As shown in FIG. 1, the refrigerator 1 according to an embodiment of the present invention, includes a main body cabinet 10 including a storage room 15 formed with a front opening 13, a door 20 for opening and closing the front opening 13 of the storage room 15, and a display unit 30 which is mounted on at least one of the main body cabinet 10 and the door 20.

[0021] The main body cabinet 10 forms an outer shape of the refrigerator 1, and the storage room 15 stores materials such as food is formed inside the main body cabinet 10.

[0022] The door 20 opens and closes the front opening 13 of the storage room 15. A display unit mounting portion (not shown) in which the display unit 30 is mounted is formed on a front surface of the door 20. A part of the door is caved in to form the display unit mounting portion on the front surface of the door 20, and a size of the caved-in part corresponds to that of the display unit 30. Various methods that have been disclosed may be applied to a configuration of which the display unit 30 is mounted in and separated from the display unit mounting portion. In addition, in this embodiment of the present invention, while the door is rotated with respect to the main body cabinet 10 to open and close the front opening 13, the door 20 is formed in a drawer type to open and close the front opening 13.

[0023] The display unit 30 is mounted in and separated from the door 20. The display unit 30 displays an image, and performs various functions such as TV, Internet, and home shopping functions. The display unit 30 includes a display 40 for displaying an image, a power supply unit 50 for selectively supplying power to the display 40, a temperature detector 60 for detecting temperature of the display 40, and a controller 70 for controlling the power supply unit 50 based on the temperature detected by the temperature detector 60.

[0024] The display 40 comprises a case unit 41 forming an outer shape thereof and formed with an exposed opening, an image display part 43 which is exposed to the outside through the exposed opening of the case unit 41 to display an image, a sound unit 45 for outputting sound, and electric elements (not shown) (e.g., a main board) for generating and transmitting a signal to the image display part 43 and the sound unit 45. Here, a flat display panel, such as a liquid crystal display (LCD) or a plasma display panel (PDP), or other known in the art is used for the image display part 43, and a speaker is used

for the sound unit 45. In addition, a control button 47 for controlling the display unit 30 (e.g., turning on/off the display unit 30 and selecting channels) is provided at one area of the case unit 41. Here, in addition to the control button, the display unit 30 comprises a remote controller (not shown) for wirelessly controlling the display unit 30.

[0025] The power supply unit 50 selectively supplies and interrupts the power to/from the display 40. The power supply unit 50 is accommodated in the case unit 41 of the display 40.

[0026] The temperature detector 60 detects the temperature of the display 40. The temperature detector 60 is mounted on the electric element (e.g., the main board) which generates heat to detect the temperature. However, the temperature detector 60 is mounted on the case unit 41 to detect the temperature. The temperature detector 60 detects the temperature of the display 40 and transmits the result to the controller 70.

[0027] The controller 70 controls the power supply unit 50 to interrupt the power from the display 40 when the temperature detected by the temperature detector 60 is greater than a predetermined maximum temperature. Here, the maximum temperature is established by controlling the display unit 30 according to user's preference. According to an embodiment of the present invention, the maximum temperature is established to be approximately 60 ° C, at which a user can feel the heat intensely. Accordingly, the display 40 is prevented from being overheated.

[0028] In addition, the controller 70 shows a warning message before interrupting the power supplied to the display unit 30. In further detail, when the temperature detected by the temperature detector 60 reaches the predetermined maximum temperature, the warning message is displayed on the image display part 43. Here, the warning message is flickered on the image display part 43, or displayed on the image display part 43 in a large size font. In addition, the controller 70 is output a warning message sound through the sound unit 45. The warning message sound is periodically output, or it may be continuously output.

[0029] When the temperature detected by the temperature detector 60 reaches the predetermined maximum temperature and the power to the display 40 is interrupted, the controller 70 controls the power supply unit 50 to maintain interrupting the power from the display 40 until the temperature detected by the temperature detector 60 reaches a predetermined reference temperature. Here, the reference temperature is established to be a temperature at which the user does not feel the heat intensely and the display 40 is stably driven. In addition, the reference temperature is variously established and changed according to the user's preference. Accordingly, while the display 40 is overheated, since the power is not supplied to the display 40 even when the user operates the control button 47 to apply the power to the display 40, the display 40 is prevented from being overheated.

[0030] Further, when the power is forcibly applied to

the display 40 by the user when the temperature detected by the temperature detector 60 reaches the predetermined maximum temperature and the power supplied to the display 40 is interrupted, the controller 70 controls the power supply unit 50 to supply the power to the display 40. In this case, when the temperature detected by the temperature detector 60 reaches the predetermined maximum temperature after supplying the power to the display 40, the warning message is output from at least one of the image display part 43 and the sound unit 45 to control the power supply unit 50 to interrupt the power supplied to the display 40.

[0031] A controlling method of the refrigerator according to an embodiment of the present invention will now be described with reference to FIG. 3.

[0032] As shown in FIG. 3, when the display unit 30 is driven by the control button 47, the controller 70 controls the power supply unit 50 to supply the power to the display 40 at operation 1.

[0033] In addition, from operation 1, the process moves to operation 3, where while the display 40 is driven, the controller 70 compares the temperature detected by the temperature detector 60 to the predetermined maximum temperature.

[0034] Here, in operation 3, when it is determined that the temperature detected by the temperature detector 60 is greater than the predetermined maximum temperature, the process moves to operation 5, where the controller 70 outputs the warning message through at least one of the image display part 43 and the sound unit 45.

[0035] In addition, the process moves to operation 7, where the controller 70 controls the power supply unit 50 to interrupt the power supplied to the display 40. According to an embodiment of the present invention, the controller 70 controls the power supply unit 50 to interrupt the power supplied to the display 40 after elapsing a predetermined time from a time when the warning message is displayed.

[0036] According to an embodiment of the present invention, when the display 40 is driven by the control button 47 while the power supplied to the display 40 is interrupted at operation 7, the controller 70 controls the power supply unit 50 to keep interrupting the power from the display 40 until the temperature detected by the temperature detector 60 reaches the predetermined reference temperature.

[0037] In addition, when the display 40 is driven by the control button 47 while the power supplied to the display 40 is interrupted at operation 7, the controller 70 controls the power supply unit 50 to supply the power to the display 40, to output the warning message in a like manner as in operation 5, when the temperature detected by the temperature detector 60 reaches the predetermined maximum temperature, and controls the power supply unit 50 to interrupt power supplied to the display portion 40.

[0038] As described above, since the refrigerator 1 according to an embodiment of the present invention, com-

prises the display unit 30 including the display 40 displaying an image, the power supply unit 50 selectively supplying the power to the display 40, the temperature detector 60 detecting the temperature of the display 40, and the controller 70 controlling the power supply unit 50 by interrupting the power supplied to the display 40 when the temperature detected by the temperature detector 60 is greater than the predetermined maximum temperature, the display 40 is prevented from being overheated.

[0039] As described above, according to an embodiment of the present invention, the refrigerator for preventing the display unit from being overheated and the controlling method thereof are provided.

[0040] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

1. A controlling method of a refrigerator comprising a main body cabinet comprising a storage room formed with a front opening, a door which opens and closes the front opening, a display unit which is mounted on at least one of the main body cabinet and the door to display an image, the controlling method comprising:

detecting a temperature of the display unit;
interrupting power supplied to the display unit when the detected temperature is higher than a predetermined maximum temperature.

2. The controlling method of claim 1, further comprising displaying a warning message before interrupting the power supplied to the display unit.

3. The controlling method of claim 2, wherein, when the power supplied to the display unit is interrupted, keeping the power interrupted from the display unit until the temperature of the display unit reaches a predetermined reference temperature.

4. A refrigerator comprising:

a display unit mounted on at least one of a main body cabinet and a door of the refrigerator, to display an image,
a power supply unit to selectively supply power to the display unit,
a temperature detector to detect a temperature of the display unit, and
a controller to control the power supply unit to interrupt the power supplied to the display unit, when the temperature detected by the temper-

ature detector is higher than a predetermined temperature.

5. The refrigerator of claim 4, wherein the predetermined temperature is set according to a user's preference. 5
6. The refrigerator of claim 4, wherein the controller outputs a warning message to be displayed on the display unit before interrupting the power supplied to the display unit, when the temperature detected by the temperature detector reaches the predetermined temperature. 10
7. The refrigerator of claim 6, wherein the controller controls the power supply unit to interrupt the power supplied to the display unit after elapsing a predetermined time from a time when the warning message is displayed. 15
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8. A refrigerator comprising a display to display an image thereon, and a temperature detector to detect a temperature of the display such that power supplied to the display is interrupted when the temperature detected exceeds a predetermined temperature. 25

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FIG. 1

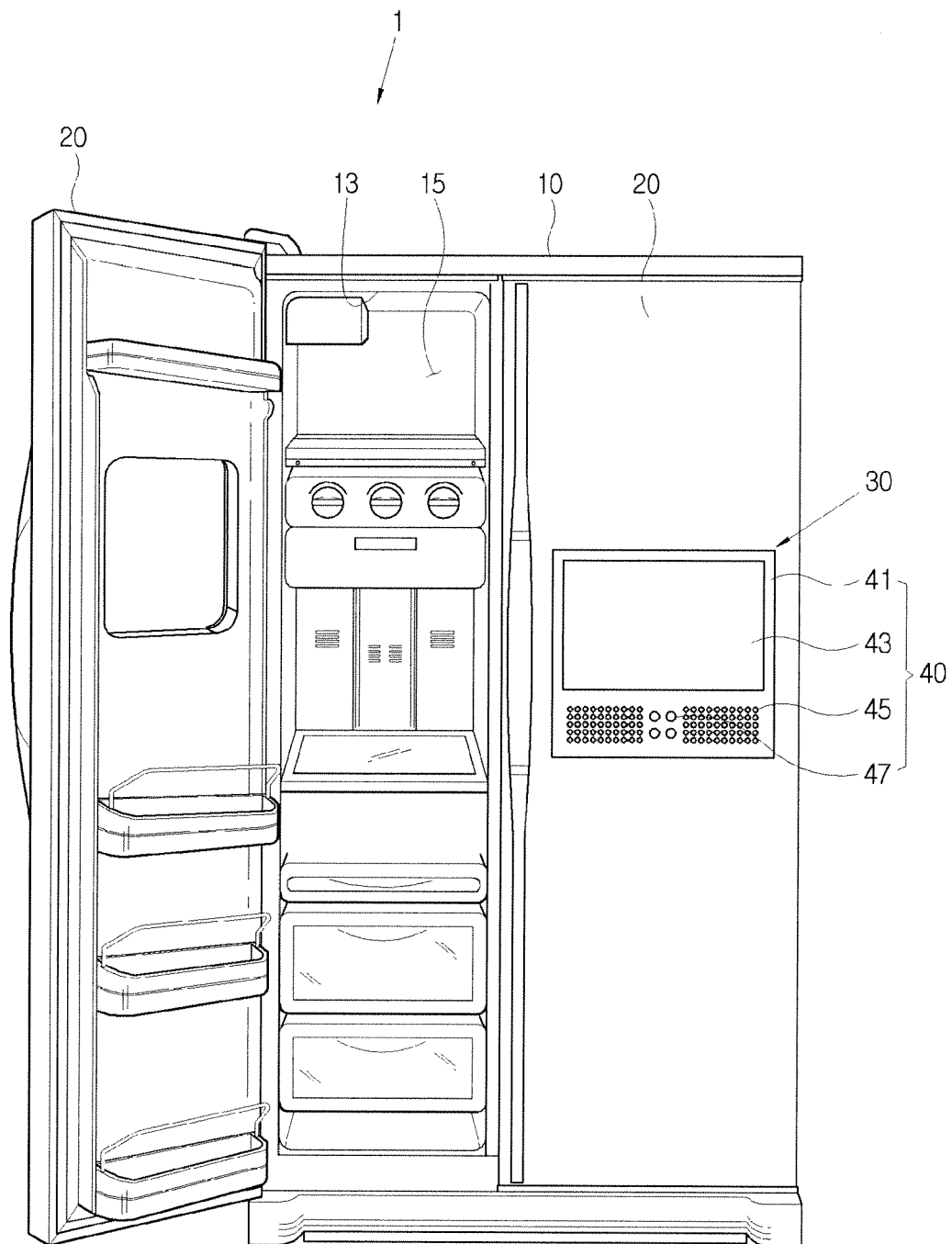


FIG. 2

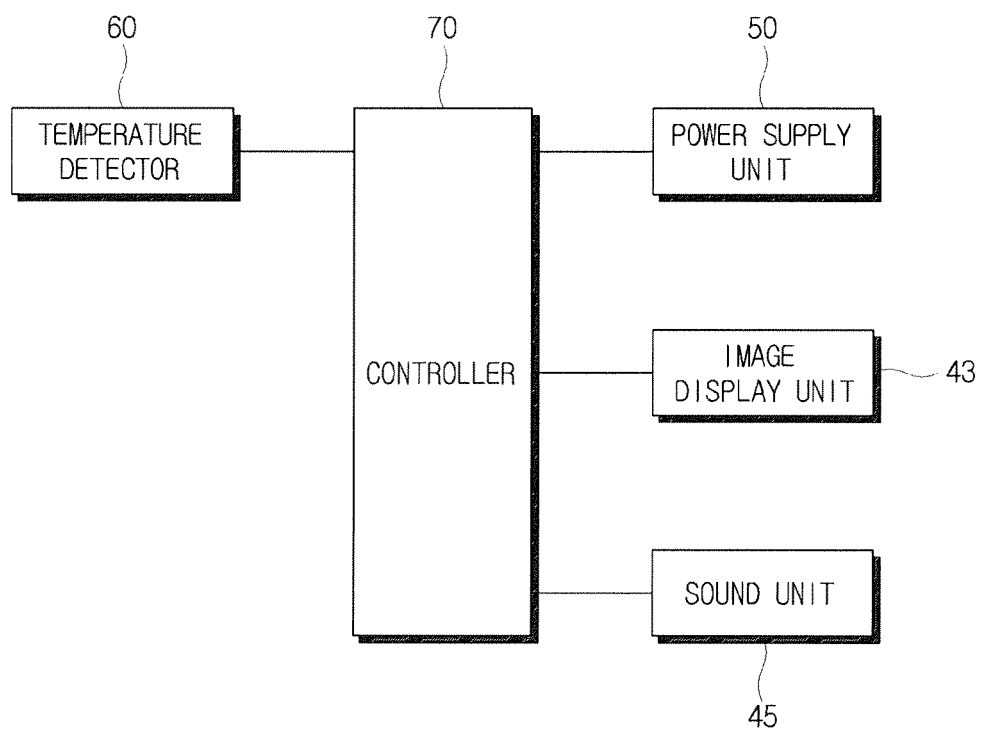


FIG. 3

