Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2013-148326

Summary of Invention

Technical Problem

[0004]

The refrigerator disclosed in Patent Literature 1, however, operates such that the foods or other items are in the supercooled state even during a time zone in which the user uses the refrigerator. To deal with a temperature rise caused by an inflow of air from outside the refrigerator when the door is opened, the refrigerator in Patent Literature 1 sends cold air to a storage compartment. That is, the storage compartment undergoes sudden temperature changes. Typically, the sudden temperature changes may cause the foods or other items to leave the supercooled state. Accordingly, the refrigerator disclosed in Patent Literature 1 tends to undergo sudden temperature changes occurring with the opening and closing of the door, and that may cause freezing of the preserved foods or other items.

[0005]

The present disclosure ~~is made to solve the above problems and~~seeks to provide~~s~~ a refrigerator capable of operating such that a supercooled state of preserved foods or other items ~~is~~ may be maintained and the freezing of those foods or other items ~~is~~ may be avoided.

Solution to Problem

[0006]

A refrigerator according to an embodiment of the present disclosure includes a heat insulation casing whose inside defines a storage compartment for storing an object, the heat insulation casing having a box shape and having a front covered with a door, a temperature adjuster provided at the heat insulation casing and configured to adjust a temperature of the storage compartment, ~~and~~ a controller provided at the heat insulation casing and configured to control the temperature adjuster, and a door opening detector provided at the heat insulation casing and configured to detect a number of times of door opening, the number of times of door opening representing a number of times the door is opened. The controller is configured to set a supercooling temperature as a target temperature in an unused time zone. The supercooling temperature is a temperature lower than a predetermined normal temperature. The target temperature is a temperature targeted in adjusting the

temperature of the storage compartment by the temperature adjuster such that a temperature of the object is equal to or lower than a freezing point. The unused time zone represents a time zone in which a frequency of opening and closing the door is low. The controller is also configured to set, as the unused time zone, a time zone in which the number of times of door opening detected by the door opening detector is lower than a threshold value. The controller is further configured to set a day having a time zone in which the number of times of door opening is in a predetermined special threshold value range in a period of time other than the unused time zone, as a special control day representing a day in which a special temperature is set as the target temperature.

[0006a]

A refrigerator according to another embodiment of the present disclosure includes a heat insulation casing whose inside defines a storage compartment for storing an object, the heat insulation casing having a box shape and having a front covered with a door, a temperature adjuster provided at the heat insulation casing and configured to adjust a temperature of the storage compartment, and a controller provided at the heat insulation casing and configured to control the temperature adjuster. The controller is configured to set a supercooling temperature as a target temperature in a unused time zone. The supercooling temperature is a temperature lower than a predetermined normal temperature. The target temperature is a temperature targeted in adjusting the temperature of the storage compartment by the temperature adjuster such that a temperature of the object is equal to or lower than a freezing point. The unused time zone represents a time zone in which a frequency of opening and closing the door is low. The controller is also configured to set an elevated temperature as the target temperature in the unused time zone after setting the supercooling temperature as the target temperature. The elevated temperature exceeds the normal temperature.

Advantageous Effects of Invention

[0007]

According to an embodiment of the present disclosure, the refrigerator cools an object, such as foods or other items, to temperatures at or below the freezing point in the unused time zone. In the unused time zone, the user does not frequently use the refrigerator. Thus, temperature changes caused by the opening and closing of the door in the refrigerator are small, and the foods or other items preserved in the

refrigerator remains in the supercooled state. Accordingly, the refrigerator can operate such that the supercooled state of the preserved foods or other items is maintained and the freezing of those foods or other items is avoided.

Brief Description of Drawings

[0008]

[Fig. 1] Fig. 1 is a front view illustrating a refrigerator 1 according to Embodiment 1.

[Fig. 2] Fig. 2 is a schematic diagram illustrating a chill compartment 32 according to Embodiment 1.

[Fig. 3] Fig. 3 is a functional block diagram illustrating a controller 7 according to Embodiment 1.

[Fig. 4] Fig. 4 is a flow chart illustrating the working of the controller 7 according to Embodiment 1.

[Fig. 5] Fig. 5 illustrates line charts representing the numbers of times of door opening and the temperatures of a storage compartment 22 according to Embodiment 1.

[Fig. 6] Fig. 6 is a flow chart illustrating the working of the controller 7 according to Embodiment 1.

CLAIMS

[Claim 1]

A refrigerator comprising:

a heat insulation casing whose inside defines a storage compartment for storing an object, the heat insulation casing having a box shape and having a front covered with a door;

a temperature adjuster provided at the heat insulation casing and configured to adjust a temperature of the storage compartment; ~~and~~

a controller provided at the heat insulation casing and configured to control the temperature adjuster~~,~~; and

a door opening detector provided at the heat insulation casing and configured to detect a number of times of door opening, the number of times of door opening representing a number of times the door is opened,

wherein the controller is configured to set a supercooling temperature as a target temperature in a unused time zone, the supercooling temperature being a temperature lower than a predetermined normal temperature, the target temperature being a temperature targeted in adjusting the temperature of the storage compartment by the temperature adjuster such that a temperature of the object is equal to or lower than a freezing point, the unused time zone representing a time zone in which a frequency of opening and closing the door is low,

wherein the controller is configured to set, as the unused time zone, a time zone in which the number of times of door opening detected by the door opening detector is lower than a threshold value, and

wherein the controller is configured to set a day having a time zone in which the number of times of door opening is in a predetermined special threshold value range in a period of time other than the unused time zone, as a special control day representing a day in which a special temperature is set as the target temperature.

~~[Claim 2]~~

~~The refrigerator of claim 1, further comprising:~~

~~a door opening detector provided at the heat insulation casing and configured to detect a number of times of door opening, the number of times of door opening representing the number of times the door is opened,~~

~~wherein the controller is configured to set, as the unused time zone, a time zone in which the number of times of door opening detected by the door opening detector is lower than a threshold value.~~

~~[Claim 3]~~

~~The refrigerator of claim 2, wherein the controller is configured to set a day having a time zone in which the number of times of door opening is in a predetermined special threshold value range in a period of time other than the unused time zone, as a special control day representing a day in which a special temperature is set as the target temperature.~~

[Claim ~~4~~2]

The refrigerator of claim ~~3~~1, wherein the controller is configured to set a special supercooling temperature as the target temperature in the unused time zone in the special control day such that the temperature of the object is equal to or lower than the freezing point, the special supercooling temperature being a temperature that exceeds the supercooling temperature and that is lower than the normal temperature.

[Claim ~~5~~3]

The refrigerator of ~~any one of claims 1 to 4~~claim 1 or 2, wherein the controller is configured to set an elevated temperature as the target temperature in the unused time zone after setting the supercooling temperature as the target temperature, the elevated temperature exceeding the normal temperature.

[Claim ~~6~~4]

The refrigerator of ~~claim 5 as dependent on~~ claim 3 ~~or claim 4~~, wherein the controller is configured to set a special elevated temperature as the target temperature in the unused time zone in the special control day, the special elevated temperature being a temperature that exceeds the normal temperature and that is lower than the elevated temperature.

[Claim 5]

A refrigerator comprising:

a heat insulation casing whose inside defines a storage compartment for storing an object, the heat insulation casing having a box shape and having a front covered with a door;

a temperature adjuster provided at the heat insulation casing and configured to adjust a temperature of the storage compartment; and

a controller provided at the heat insulation casing and configured to control the temperature adjuster,

wherein the controller is configured to set a supercooling temperature as a target temperature in a unused time zone, the supercooling temperature being a temperature lower than a predetermined normal temperature, the target temperature being a temperature targeted in adjusting the temperature of the storage compartment by the temperature adjuster such that a temperature of the object is equal to or lower than a freezing point, the unused time zone representing a time zone in which a frequency of opening and closing the door is low, and

wherein the controller is configured to set an elevated temperature as the target temperature in the unused time zone after setting the supercooling temperature as the target temperature, the elevated temperature exceeding the normal temperature.