

{Description}

{Title of Invention}

COLD AND HOT STORAGE

5 {Technical Field}

{0001}

The present invention relates to a cold and hot storage that cools and heats storage material.

10 {Background Art}

{0002}

Conventionally, a wet towel, for example, a cooled or a heated wet towel is provided for a customer, depending on the season or the temperature in order to improve service for a customer at, for example, a showroom, a hotel, and a restaurant. Generally, a cold and hot storage capable of cooling or heating a wet towel is used in a case of providing a cooled or heated wet towel for a customer. Such a cold and hot storage, which is known, includes: a box-shaped thermal conductor including a metal having good thermal conductivity, such as an aluminum, an aluminum alloy or the like; an electrothermal heater wound around the peripheral wall portion of the box-shaped thermal conductor; a Peltier element in close contact with the bottom portion of the box-shaped thermal conductor; and a heat insulating layer covering the outer periphery of the box-shaped thermal

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conductor, the electrothermal heater, and the Peltier element. In a case of performing cooling, the Peltier element is energized to cool the box-shaped thermal conductor, and in a case of performing heating, the Peltier element is not energized and only the electrothermal heater is energized to heat the box-shaped thermal conductor by the electrothermal heater (for example, refer to Patent Literature 1).

10 {Citation List}

{Patent Literature}

{0003}

Patent Literature 1: JP-A-Hei-11-316074

15 {Summary of Invention}

{Technical Problem}

{0004}

Incidentally, in a case where it is necessary to provide wet towels to many customers, cooling or heating a

20 large number of wet towels simultaneously by a large-sized

cold and hot storage is possible. However, in a case where

an installation space is limited, it may be difficult to

install the large-sized cold and hot storage. Also, in a

case of heating the wet towel in the cold and hot storage

25 described in Patent Literature 1, heating of the box-shaped

thermal conductor is performed by an electrothermal heater

wound around the peripheral wall portion of the box-shaped thermal conductor, and it takes a long time to heat the wet towel because the wet towel housed in the box-shaped thermal conductor is heated by natural convection and heat

5 conduction of the air in the storage. In a case of cooling the wet towel in the cold and hot storage described in Patent Literature 1, the box-shaped thermal conductor is cooled by a Peltier element brought in close contact with the bottom portion of the box-shaped thermal conductor and
10 whereby it takes a long time to cool the wet towel because the wet towel housed in the box-shaped thermal conductor is cooled by natural convection and heat conduction of the air in the storage.

{0005}

15 In addition, the box-shaped thermal conductor is heated or cooled so as to heat or cool the wet towels housed in the box-shaped thermal conductor by natural convection and thermal conduction of the air in the storage. Therefore, although the wet towels housed at a position close to the
20 inner wall portion of the box-shaped thermal conductor are heated or cooled in a short time, it takes a very long time to heat or cool the wet towels which are housed in the center portion of the box-shaped thermal conductor while being surrounded by other wet towels.

25 {0006}

Therefore, it is desired to develop a cold and hot

storage which can rapidly cool or heat all of the wet towels housed in the cold and hot storage without increasing the size of the cold and hot storage. In addition, even when the wet towels are capable of being rapidly cooled or heated, it is preferable that the power consumption is low.

{0007}

Moreover, in the cold and hot storage described in Patent Literature 1, when cooling is performed, dew condensation occurs between the box-shaped thermal conductor and the heat insulating layer. As a result, the electrothermal heater rusts to disconnect the electrothermal heater, thereby failing to heat the wet towels. In such a case, the electrothermal heater wound around the peripheral wall portion of the box-shaped thermal conductor is covered with the heat insulating layer. Therefore, in order to repair the disconnection point of the electrothermal heater, the heat insulating layer covering the peripheral wall portion of the box-shaped thermal conductor needs to be removed. Accordingly, it is extremely difficult to repair the electrothermal heater.

{0008}

An object of the present invention is to provide a cold and hot storage capable of rapidly cooling or rapidly heating storage material with low power consumption.

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{Solution to Problem}

{0009}

A cold and hot storage of this invention includes: a main body portion including a door on a front surface; an inner tank arranged in the main body portion; a temperature control heat sink including a base plate and a plurality of fins formed on one surface of the base plate having the other surface arranged along a rear surface in the inner tank; a heater that heats the temperature control heat sink; a temperature control fan arranged on the one surface of the temperature control heat sink and blows air in the inner tank to the fins of the temperature control heat sink; a shielding plate that includes a plurality of through holes and a temperature control fan facing portion facing the temperature control fan and shields an area where the temperature control heat sink is arranged in a state that air blowing outlets are formed on upper and lower portions of the inner tank; a heat dissipation heat sink arranged outside the rear surface of the inner tank; a heat dissipation fan that blows air outside the inner tank to the heat dissipation heat sink; a Peltier module having a heat absorbing surface to be connected to the temperature control heat sink and a heat dissipating surface to be connected to the heat dissipation heat sink; and a power control unit that supplies power to the heater and the temperature control fan in a case of heating an inside of the inner tank and to the temperature control fan, the heat dissipation fan,

and the Peltier module in a case of cooling the inside of the inner tank.

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In the cold and hot storage of this invention, spaces
5 communicating with the air blowing outlets are formed on both side portions of the temperature control heat sink.

{0011}

The cold and hot storage of this invention includes a partition plate that partitions vertically an area where the
10 temperature control heat sink is arranged on both sides of the temperature control fan facing portion of a surface of a side of the temperature control heat sink of the shielding plate.

{0012}

15 The cold and hot storage of this invention includes: an outer panel and a rear panel configuring the main body portion; a partition formed between the rear panel of inner side of the outer panel and the inner tank; and an air guide that guides air between the rear panel and the partition to
20 at least one opening of the rear panel, in which the rear panel includes an air intake port at a position facing the heat dissipation fan and at least one opening at an area extending in a width direction of the rear panel above the air intake port.

25 {0013}

In the cold and hot storage of this invention, the air

guide includes: a first air guide extending from a vicinity of a lower portion of one side portion of the heat dissipation heat sink toward one side of upper inner wall of the rear panel; and a second air guide extending from a vicinity of a lower portion of the other side portion of the heat dissipation heat sink toward the other side of upper inner wall of the rear panel.

{0014}

A cold and hot storage of this invention includes: a main body portion including a door on a front surface; an inner tank arranged in the main body portion; a temperature control heat sink including a base plate and a plurality of fins formed on one surface of the base plate having the other surface arranged along a rear surface in the inner tank; a heater that heats the temperature control heat sink; a temperature control fan arranged on the one surface of the temperature control heat sink and blows air in the inner tank to the fins of the temperature control heat sink; a plate portion that is positioned on both sides of the temperature control fan and covers the upper portion of the plurality of fins; a heat dissipation heat sink arranged outside the rear surface of the inner tank; a heat dissipation fan that blows air outside the inner tank to the heat dissipation heat sink; a Peltier module having a heat absorbing surface to be connected to the temperature control heat sink and a heat dissipating surface to be connected to

the heat dissipation heat sink; and a power control unit that supplies power to the heater and the temperature control fan in a case of heating an inside of the inner tank and to the temperature control fan, the heat dissipation fan, and the Peltier module in a case of cooling the inside of the inner tank.

{0015}

In the cold and hot storage of this invention, the temperature control fan is arranged at the center of the one surface of the temperature control heat sink.

{0016}

In the cold and hot storage of this invention, the heater is a plate-shaped sheet heater arranged in close contact with the other surface of the base plate.

{0017}

In the cold and hot storage of this invention, the heater includes a heater wire and the heater wire is arranged in close contact with a base end portion of the fins between the fins.

{0018}

In the cold and hot storage of this invention, the fin is a plate-shaped fin extending toward an inner wall on both sides of the inner tank.

{0019}

In the cold and hot storage of this invention, the fin is a plate-shaped fin having a predetermined length and a

plurality of the fin is arranged at predetermined intervals in a vertical direction and a lateral direction.

{0020}

In the cold and hot storage of this invention, the fin
5 is a plate-shaped fin extending radially from the center portion of the temperature control heat sink.

{0021}

In the cold and hot storage of this invention, the temperature control fan blows air in the inner tank to the
10 plurality of fins of the temperature control heat sink and circulates the air in the inner tank through a groove formed between the plurality of fins.

{0022}

A cold and hot storage of this invention includes: a
15 main body portion including a door on a front surface; an inner tank arranged in the main body portion; a temperature control heat sink arranged near a rear surface in the inner tank; a heater that heats the temperature control heat sink; a temperature control fan arranged on a front surface of the
20 temperature control heat sink and blows air in the inner tank to the front surface of the temperature control heat sink; a heat dissipation heat sink arranged outside the rear surface of the inner tank; a heat dissipation fan that blows air outside the inner tank to the heat dissipation heat
25 sink; a Peltier module having a heat absorbing surface to be connected to the temperature control heat sink and a heat

dissipating surface to be connected to the heat dissipation heat sink; and a power control unit that supplies power to the heater and the temperature control fan in a case of heating an inside of the inner tank and to the temperature control fan, the heat dissipation fan, and the Peltier module in a case of cooling the inside of the inner tank.

{0023}

The cold and hot storage of this invention includes: an outer panel and a rear panel configuring the main body portion; a partition formed between the rear panel of inner side of the outer panel and the inner tank; and an air guide that guides air between the rear panel and the partition to at least one opening of the rear panel, in which the rear panel includes an air intake port at a position facing the heat dissipation fan and at least one opening at an area extending in a width direction of the rear panel above the air intake port.

{0024}

In the cold and hot storage of this invention, the air guide includes: a first air guide extending from a vicinity of a lower portion of one side portion of the heat dissipation heat sink toward one side of upper inner wall of the rear panel; and a second air guide extending from a vicinity of a lower portion of the other side portion of the heat dissipation heat sink toward the other side of upper inner wall of the rear panel.

{0025}

In the cold and hot storage of this invention, the inner tank houses a wet towel and heats or cools the wet towel.

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{Advantageous Effects of Invention}

{0026}

According to the present invention, the storage material can be rapidly cooled or rapidly heated with low power consumption.

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{Brief Description of Drawings}

{0027}

FIG. 1 is a perspective view illustrating a cold and hot storage with a door closed according to a first embodiment.

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FIG. 2 is a perspective view illustrating the cold and hot storage with the door opened according to the first embodiment.

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FIG. 3 is a view illustrating a temperature control unit and a heat dissipation unit attached to an inner tank according to the first embodiment.

FIG. 4 is a view illustrating a configuration of the temperature control unit according to the first embodiment.

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FIG. 5 is a view illustrating a configuration of a temperature control heat sink according to the first

embodiment.

FIG. 6 is a cross-sectional view in a front-back direction at the position where a Peltier module of the cold and hot storage according to the first embodiment is arranged.

FIG. 7 is a block diagram illustrating a system configuration of the cold and hot storage according to the first embodiment.

FIG. 8 is a perspective view illustrating a cold and hot storage with a door opened according to a second embodiment.

FIG. 9 is a front elevation view illustrating the cold and hot storage with the door opened and a cage in an inner tank removed according to the second embodiment.

FIG. 10 is a cross-sectional view (A - A cross section in FIG. 9) of the cold and hot storage according to the second embodiment.

FIG. 11 is a sectional perspective view (B - B cross section in FIG. 9) of the cold and hot storage according to the second embodiment.

FIG. 12 is a front perspective view of a shielding plate according to the second embodiment.

FIG. 13 is a rear perspective view of the shielding plate according to the second embodiment.

FIG. 14 is a view illustrating a shape of another temperature control heat sink according to the embodiment.

FIG. 15 is a view illustrating a shape of another temperature control heat sink according to the embodiment.

FIG. 16 is a perspective view of a rear panel of the cold and hot storage according to the embodiment.

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{Description of Embodiments}

{0028}

Hereinafter, a cold and hot storage according to embodiments of the present invention will be described with
10 reference to the drawings. FIG. 1 is a perspective view illustrating the cold and hot storage with a door closed according to a first embodiment. FIG. 2 is a perspective view illustrating the cold and hot storage with the door opened according to the first embodiment. The cold and hot
15 storage 2 includes a box-shaped main body portion 4 and a door 6 provided on the front surface of the main body portion 4. An inner tank 12 for housing a wet towel and the like is installed in the main body portion 4, and a cage 13 on which the wet towel is placed is installed in the inner
20 tank 12. In addition, in the inner tank 12, a temperature sensor 49 (refer to FIG. 7) for detecting the temperature in the inner tank 12 is provided. The inner tank 12 is covered with an upper cover 14, a lower cover 16 (the upper cover 14 and the lower cover 16 constitute an outer panel) and a rear
25 panel 18. Note that a rear surface portion partition 19 (refer to FIG. 6) is provided between the inner tank 12 and

the rear panel 18. Here, a heat insulating material (not illustrated) such as urethane foam is arranged between the inner tank 12 and the upper cover 14, the lower cover 16, and the rear surface portion partition 19.

5 {0029}

An operation dial 8 for setting the temperature for cooling or heating is provided on the upper right front portion of the main body portion 4, and a dew receiving tray 10 is provided at the lower front portion of the main body portion 4. Also, an opening 41 (refer to FIG. 6) for dissipating heat by a heat dissipation unit 22 (refer to FIG. 3) is formed at the rear panel 18. Here, the inner tank 12, the upper cover 14, the lower cover 16, the rear panel 18, the rear surface portion partition 19, the door 6, and the dew receiving tray 10 constituting the main body portion 4 are formed from thermally low conductive polypropylene from the viewpoint of heat resistance and chemical resistance.

15 {0030}

The right side edge portion of the door 6 is attached to the right side edge portion of the front surface of the main body portion 4 so as to rotate freely. On the left side edge portion of the door 6, a handle 6a for hooking a finger in the case of opening the door 6 is formed along the left side edge portion of the door 6. In addition, at a position facing the handle 6a of the left side edge portion of the front surface of the main body portion 4, a recess 4a for

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allowing the finger to easily hook the handle 6a is formed.
{0031}

FIG. 3 is a view illustrating a temperature control unit and the heat dissipation unit attached to the inner tank according to the first embodiment. An opening 12a is formed on the rear surface of the inner tank 12. A temperature control unit 20 and the heat dissipation unit 22 are arranged so as to face the opening 12a from the inside and the outside of the inner tank 12. To be specific, the temperature control unit 20 is arranged along the rear surface in the inner tank 12 so as to face the opening 12a. Moreover, the heat dissipation unit 22 is arranged outside the rear surface of the inner tank 12 so as to face the opening 12a.

{0032}

The heat dissipation unit 22 includes a heat dissipation heat sink 24 formed of a metal having high thermal conductivity such as aluminum and a heat dissipation fan 26. The heat dissipation heat sink 24 includes a base plate 24a having a rectangular plate shape and a plurality of plate-shaped fins 24b formed at predetermined intervals on one surface of the base plate 24a. The other surface of the heat dissipation heat sink 24, on which the fins 24b are not formed, is fixed to the outside of the rear surface of the inner tank 12. The heat dissipation fan 26 is fixed to the center portion of the heat dissipation heat sink 24 at a

position facing the fins 24b.

{0033}

FIG. 4 is a view illustrating a configuration of the temperature control unit according to the first embodiment.

5 The temperature control unit 20 includes a temperature control heat sink 30, a temperature control fan 32, a temperature control fan cover 34, a silicone rubber heater 36 which is a sheet heater, a heat insulating plate 38, a Peltier spacer 40, and a Peltier module 42.

10 {0034}

FIG. 5 is a view illustrating a configuration of the temperature control heat sink. The temperature control heat sink 30 includes a metal with high thermal conductivity, such as aluminum and includes a base plate 30a having a rectangular plate shape and a plurality of plate-shaped fins 15 30b formed on one surface of the base plate 30a at predetermined intervals. In the inner tank 12, this temperature control heat sink 30 is arranged such that the fins 30b face the inside of the inner tank 12 and the fins 20 30b extend toward the inner walls on both sides of the inner tank 12.

{0035}

The temperature control fan 32 is fixed at the center portion of the temperature control heat sink 30 so as to 25 face the fins 30b. The temperature control fan cover 34 is constituted by a cover portion 34a covering the temperature

control fan 32 and a plate portion 34b formed on both sides of the cover portion 34a. A mesh for feeding the air in the inner tank 12 to the temperature control fan 32 is formed at the cover portion 34a. The temperature control fan cover 34 is fixed to the temperature control heat sink 30 in a state in which the cover portion 34a covers the temperature control fan 32 and the plate portion 34b covers the upper portion of the fin 30b of the temperature control heat sink 30 that is positioned on both sides of the temperature control fan 32.

{0036}

The silicone rubber heater 36 has a rectangular plate shape having substantially the same size as the base plate 30a of the temperature control heat sink 30. Two openings 36a are formed so as to be axially symmetric with respect to the center in the width direction of the silicone rubber heater 36. The silicone rubber heater 36 is superimposed and fixed in close contact with the other surface of the base plate 30a of the temperature control heat sink 30, on which the fins 30b are not formed.

{0037}

The heat insulating plate 38 has substantially the same shape as the silicone rubber heater 36. To be specific, the heat insulating plate 38 has a rectangular plate shape and two openings 38a having substantially the same size as the openings 36a of the silicone rubber heater 36. The two

openings 38a are formed so as to be axially symmetric with respect to the center in the width direction of the heat insulating plate 38. The heat insulating plate 38 is superimposed and fixed to a surface which is not in close contact with the base plate 30a of the silicone rubber heater 36.

{0038}

The Peltier spacer 40 includes a metal having high thermal conductivity, such as aluminum and has a rectangular plate shape. The temperature control unit 20 includes the two Peltier spacers. The Peltier spacers 40 are fixed in close contact with the base plate 30a in the two openings formed by the openings 36a of the silicone rubber heater 36 and the openings 38a of the heat insulating plate 38 while the silicone rubber heater 36 and the heat insulating plate 38 are superimposed on the temperature control heat sink 30.

{0039}

The Peltier module 42 includes a heat absorbing surface 42a that absorbs heat and a heat dissipating surface 42b that dissipates heat when a predetermined voltage is applied. The temperature control unit 20 includes the two Peltier modules 42. The heat absorbing surfaces 42a of the Peltier modules 42 are fixed on the Peltier spacers 40 so as to be in close contact with surfaces of the Peltier spacers 40 on which the temperature control heat sink 30 of the Peltier spacers 40 is not fixed.

{0040}

FIG. 6 is a cross-sectional view in a front-back direction at the position where the Peltier module of the cold and hot storage according to the first embodiment is arranged. As illustrated in FIG. 6, the temperature control unit 20 is arranged inside the inner tank 12 and the heat dissipation unit 22 is arranged outside the inner tank 12 at the opening 12a of the inner tank 12 of the cold and hot storage 2. To be specific, in the temperature control unit 20, the heat insulating plate 38 is brought into close contact with the rear surface in the inner tank 12, and the Peltier module 42 fixed to the Peltier spacer 40 is fixed so as to be positioned outside the inner tank 12. In addition, the heat dissipation unit 22 is fixed so that the other surface of the base plate 24a of the heat dissipation heat sink 24 is in close contact with the heat dissipating surface 42b of the Peltier module 42.

{0041}

FIG. 7 is a block diagram illustrating a system configuration of the cold and hot storage 2 according to the first embodiment. The cold and hot storage 2 includes a control unit 44 which comprehensively controls the whole of the cold and hot storage 2. To the control unit 44, the heat dissipation fan 26, the temperature control fan 32, the silicone rubber heater 36, the Peltier module 42, the operation dial 8, a power supply unit 48, and a temperature

sensor 49 are connected. The power supply unit 48 supplies power to each unit of the cold and hot storage 2.

{0042}

Next, a process of cooling the inside of the inner tank 12 of the cold and hot storage 2 according to the first embodiment will be described. When the temperature for cooling is set by operating the operation dial 8, the control unit 44 supplies power to the heat dissipation fan 26, the temperature control fan 32, and the Peltier module 42 by the power supply unit 48 in order to cool the inside of the inner tank 12. As a result, the temperature control heat sink 30 is cooled by the Peltier module 42 via the Peltier spacer 40. Also, the air in the inner tank 12 is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32 and flows toward the inner wall on both sides of the inner tank 12 through an air passage formed by the plurality of fins 30b and the plate portion 34b of the temperature control fan cover 34 that covers the upper portion of the fins 30b. The air is cooled while flowing and the cooled air flows toward the door 6 i.e., flows toward the front of the cold and hot storage 2, along the inner wall on both sides. Moreover, the air goes around the front surface of the wet towels housed in the inner tank 12. Then, the air passes over and under the wet towels and through the wet towels, and reaches the temperature control fan 32, and again, the air is blown to

the center portion of the temperature control heat sink 30 by the temperature control fan 32. Therefore, the cooled air circulating in the inner tank 12 which flows along the inner wall on both sides of the inner tank 12 to the side of the front surface in the inner tank 12 causes the wet towels housed in the inner tank 12 to be efficiently and rapidly cooled.

{0043}

In addition, power supply to the Peltier module 42 or the like by the power supply unit 48 is feedback-controlled by using the temperature in the inner tank 12 detected by the temperature sensor 49 so that the temperature in the inner tank 12 becomes the temperature set by the operation dial 8. Therefore, power consumption can be reduced.

{0044}

In addition, heat generated at the heat dissipating surface 42b of the Peltier module 42 is transmitted to the heat dissipation heat sink 24. Moreover, heat is efficiently dissipated from the heat dissipation heat sink 24 by blowing air outside the cold and hot storage 2 to the heat dissipation heat sink 24 by the heat dissipation fan 26.

{0045}

Next, a process of heating the inside of the inner tank 12 of the cold and hot storage 2 according to the first embodiment will be described. When the temperature for heating is set by operating the operation dial 8, the

control unit 44 supplies power to the silicone rubber heater 36 and the temperature control fan 32 by the power supply unit 48 in order to heat the inside of the inner tank 12. As a result, the temperature control heat sink 30 is heated by
5 the silicone rubber heater 36. Also, the air in the inner tank 12 is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32 and flows toward the inner wall on both sides of the inner tank 12 through an air passage formed by the plurality of fins
10 30b and the plate portion 34b of the temperature control fan cover 34 that covers the upper portion of the fins 30b. The air is heated while flowing and the heated air flows toward the door 6 along the inner wall on both sides, i.e., flows toward the front in the cold and hot storage 2. Moreover,
15 the air goes around the front surface of the wet towels housed in the inner tank 12. Then, the air passes over and under the wet towels and through the wet towels, and reaches the temperature control fan 32, and again, the air is blown to the center portion of the temperature control heat sink
20 30 by the temperature control fan 32. Therefore, the heated air circulating in the inner tank 12 which flows along the inner wall on both sides of the inner tank 12 to the side of the front surface in the inner tank 12 causes the wet towels housed in the inner tank 12 to be efficiently and rapidly
25 heated.

{0046}

In addition, power supply to the silicone rubber heater 36 or the like by the power supply unit 48 is feedback-controlled by using the temperature in the inner tank 12 detected by the temperature sensor 49 so that the

5 temperature in the inner tank 12 becomes the temperature set by the operation dial 8. Therefore, power consumption can be reduced.

{0047}

According to the cold and hot storage 2 of this first
10 embodiment, when cooling the inside of the inner tank 12 of the cold and hot storage 2, by blowing air in the inner tank 12 to the cooled temperature control heat sink 30, the air in the inner tank 12 is cooled, and the cooled air flows to the inner tank 12 in the front direction from the rear

15 surface side in the inner tank 12, along the inner walls on both sides of the inner tank 12 to circulate the cooled air in the inner tank 12. Therefore, the inside of the inner tank 12 can be highly efficiently cooled and all the wet towels housed in the inner tank 12 can be rapidly cooled
20 with low power consumption. Also, because the air in the inner tank 12 is circulated, it is possible to suppress the occurrence of dew condensation in the inner tank 12 and to suppress the lowering of the cooling efficiency.

{0048}

25 Also, when heating the inside of the inner tank 12 of the cold and hot storage 2, by blowing air in the inner tank

12 to the heated temperature control heat sink 30, the air in the inner tank 12 is heated, and the heated air is flowed to the inner tank 12 in the front direction from the rear surface side in the inner tank 12, along the inner walls on both sides of the inner tank 12 to circulate the heated air in the inner tank 12. Therefore, the inside of the inner tank 12 can be highly efficiently heated and all the wet towels housed in the inner tank 12 can be rapidly heated with low power consumption.

10 {0049}

In addition, because the silicone rubber heater 36 is superimposed and fixed so as to be in close contact with the temperature control heat sink 30, there is no possibility that the inside of the inner tank cannot be heated due to disconnection from rusting of an electrothermal heater included in an inner tank because of dew condensation as described in Patent Literature 1 mentioned above. Therefore, heating the inside of the inner tank 12 can be performed stably.

20 {0050}

Next, a cold and hot storage according to a second embodiment will be described. In the cold and hot storage according to the second embodiment, the temperature control fan cover 34 of the cold and hot storage 2 according to the first embodiment is changed to a shielding plate 60. Other points are the same as the configuration of the cold and hot

storage 2 according to the first embodiment. Therefore, the cold and hot storage 50 according to the second embodiment will be described while the same reference signs as those used in the description of the cold and hot storage 2

5 according to the first embodiment are given to the same configuration as that of the cold and hot storage 2 according to the first embodiment.

{0051}

FIG. 8 is a perspective view illustrating the cold and hot storage 50 with a door opened according to the second embodiment. FIG. 9 is a front elevation view illustrating the cold and hot storage 50 with the door 6 opened and a cage 13 in an inner tank 12 removed according to the second embodiment. The cold and hot storage 50 includes a box-shaped main body portion 4 and the door 6 provided on the front surface of the main body portion 4. An inner tank 12 for housing a wet towel and the like is installed in the main body portion 4, and a cage 13 on which the wet towel is placed is installed in the inner tank 12. Here, a placing portion 12b for placing the cage 13 to be installed at an upper stage is formed on an inner side wall on both sides of the inner tank 12, and a placing portion 12c for placing the cage 13 to be installed at a lower stage is also formed. An operation dial 8 for setting the temperature for cooling or heating is provided on the upper right front portion of the main body portion 4, and a dew receiving tray 10 is provided

at the lower front portion of the main body portion 4.

{0052}

FIG. 10 is an A-A cross-sectional view in FIG. 9 of the cold and hot storage 50 according to the second embodiment.

5 An opening 41 for dissipating heat by a heat dissipation unit 22 (refer to FIG. 3) is formed at the rear panel 18 of the main body portion 4. In addition, an opening 12a (refer to FIG. 3) is formed on a rear surface of the inner tank 12. A temperature control unit 20 and the heat dissipation unit
10 22 are arranged so as to face the opening 12a from the inside and the outside of the inner tank 12. To be specific, the temperature control unit 20 is arranged along the rear surface in the inner tank 12 so as to face the opening 12a. Moreover, the heat dissipation unit 22 is arranged outside
15 the rear surface of the inner tank 12 so as to face the opening 12a.

{0053}

FIG. 11 is a B-B sectional perspective view in FIG. 9 of the cold and hot storage 50 according to the second
20 embodiment. As illustrated in a front perspective view of FIG. 12 and a rear perspective view of FIG. 13, a shielding plate 60 has a plate shape, and the center portion at which a temperature control fan facing portion 62 including a plurality of through holes for feeding air in the inner tank
25 12 to a temperature control fan 32 is formed. The shielding plate 60 is arranged on a front surface side of a

temperature control heat sink 30 in a state where the temperature control fan facing portion 62 faces the temperature control fan 32 and shields the area where the temperature control heat sink 30 is arranged in a state

5 where air blowing outlets 64 are formed at top and bottom of both side portions of the inner tank 12. To be specific, a depression 60a having a U-shape is formed on the shielding plate 60 at the center portion in the vertical direction on both side portions, and the shielding plate 60 is arranged

10 on the front surface side of the temperature control heat sink 30 in a state where a placing portion 12a is positioned in the depression 60a and both side portions of the shielding plate 60 are in contact with inner side walls on both sides of the inner tank 12. In this case, the upper

15 portion and the lower portion on the rear surface side of the temperature control fan facing portion 62 provided on the shielding plate 60 are in contact with the inner wall of the inner tank 12 at the upper portion and the lower portion of the opening 12a formed in the inner tank 12. Therefore,

20 the air blowing outlets 64 are formed at upper and lower portions of both side portions of the inner tank 12. Also, spaces communicating with the air blowing outlets 64 are formed on both side portions of the temperature control heat sink 30. Moreover, a partition plate 60b for vertically

25 partitioning an area where the temperature control heat sink 30 is arranged is provided on both sides of the temperature

control fan facing portion 62 on the back surface side of the shielding plate 60.

{0054}

Next, a process of cooling the inside of the inner tank 12 of the cold and hot storage 50 according to the second embodiment will be described. When the temperature for cooling is set by operating the operation dial 8, the control unit 44 supplies power to the heat dissipation fan 26, the temperature control fan 32, and the Peltier module 42 by the power supply unit 48 in order to cool the inside of the inner tank 12. As a result, the temperature control heat sink 30 is cooled by the Peltier module 42 via the Peltier spacer 40.

{0055}

Also, air in the inner tank 12 is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32 and in the space shielded by the shielding plate 60, the air flows along the plurality of fins 30b of the temperature control heat sink 30 toward the end portions on both sides of the temperature control heat sink 30. The air is cooled while flowing and the cooled air passes through the spaces formed on the both side portions of the temperature control heat sink 30 and is blown out from the air blowing outlets 64 into the inner tank 12.

{0056}

The air blown out from the air blowing outlets 64

formed at the upper portion of the inner tank 12 flows toward the door 6, i.e., front of the cold and hot storage 50, along the upper surface and side surfaces of the wet towels housed in the cage 13 installed at an upper stage in the inner tank 12. Moreover, the air goes around the front surface of the wet towels. Then, the air passes the lower surface of the wet towels housed in the cage 13 installed at the upper stage and through the wet towels, and reaches the temperature control fan 32, and again, the air is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32.

{0057}

In addition, the air blown out from the air blowing outlets 64 formed at the lower portion of the inner tank 12 flows toward the door 6, i.e., toward the front of the cold and hot storage 50, along the lower surface and side surfaces of the wet towels housed in the cage 13 installed at a lower stage of the inner tank 12. Moreover, the air goes around the front surface of the wet towels. Then, the air passes the upper surface of the wet towels housed in the cage 13 installed at the lower stage and between the wet towels, and reaches the temperature control fan 32, and again, the air is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32. Therefore, the cooled air circulating in the inner tank 12 which flows along the upper portion, the lower

portion, and the inner wall on both sides of the inner tank 12 to the side of the front surface in the inner tank 12 causes the wet towels housed in the inner tank 12 to be efficiently and rapidly cooled. Also, because the air
5 flowing from the front surface side in the inner tank 12 toward the temperature control fan 32 passes between the wet towels, a wet towel surrounded by other wet towels is also efficiently and rapidly cooled.

{0058}

10 In addition, power supply to the Peltier module 42 or the like by the power supply unit 48 is feedback-controlled by using the temperature in the inner tank 12 detected by the temperature sensor 49 so that the temperature in the inner tank 12 becomes the temperature set by the operation
15 dial 8. Therefore, power consumption can be reduced.

{0059}

In addition, heat generated at the heat dissipating surface 42b of the Peltier module 42 is transmitted to the heat dissipation heat sink 24. Moreover, heat is efficiently
20 dissipated from the heat dissipation heat sink 24 by blowing air outside the cold and hot storage 50 to the heat dissipation heat sink 24 by the heat dissipation fan 26.

{0060}

Next, a process of heating the inside of the inner tank
25 12 of the cold and hot storage 50 according to the second embodiment will be described. When the temperature for

heating is set by operating the operation dial 8, the control unit 44 supplies power to the silicone rubber heater 36 and the temperature control fan 32 by the power supply unit 48 in order to heat the inside of the inner tank 12. As
5 a result, the temperature control heat sink 30 is heated by the silicone rubber heater 36. Also, air in the inner tank 12 is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32 and in the space shielded by the shielding plate 60, the air flows
10 along the plurality of fins 30b of the temperature control heat sink 30 toward the end portions on both sides of the temperature control heat sink 30. The air is heated while flowing and the heated air passes through the spaces formed on both the side portions of the temperature control heat
15 sink 30 and is blown out from the air blowing outlets 64 into the inner tank 12.

{0061}

The air blown out from the air blowing outlets 64 formed at the upper portion of the inner tank 12 flows
20 toward the door 6, i.e., front of the cold and hot storage 50, along the upper surface and side surfaces of the wet towels housed in the cage 13 installed at an upper stage in the inner tank 12. Moreover, the air goes around the front surface of the wet towels. Then, the air passes the lower
25 surface of the wet towels housed in the cage 13 installed at the upper stage and through the wet towels, and reaches the

temperature control fan 32, and again, the air is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32.

{0062}

5 In addition, the air blown out from the air blowing outlets 64 formed at the lower portion of the inner tank 12 flows toward the door 6, i.e., toward the front of the cold and hot storage 50, along the lower surface and side surfaces of the wet towels housed in the cage 13 installed
10 at a lower stage of the inner tank 12. Moreover, the air goes around the front surface of the wet towels. Then, the air passes the upper surface of the wet towels housed in the cage 13 installed at the lower stage and between the wet towels, and reaches the temperature control fan 32, and
15 again, the air is blown to the center portion of the temperature control heat sink 30 by the temperature control fan 32.

{0063}

 Therefore, the heated air circulating in the inner tank
20 12 which flows along the upper portion, the lower portion, and the inner wall on both sides of the inner tank 12 to the front surface side in the inner tank 12 causes the wet towels housed in the inner tank 12 to be efficiently and rapidly heated. Also, because the air flowing from the front
25 surface side in the inner tank 12 toward the temperature control fan 32 passes between the wet towels, a wet towel

surrounded by other wet towels is also efficiently and rapidly heated.

{0064}

In addition, power supply to the silicone rubber heater 36 or the like by the power supply unit 48 is feedback-controlled by using the temperature in the inner tank 12 detected by the temperature sensor 49 so that the temperature in the inner tank 12 becomes the temperature set by the operation dial 8. Therefore, power consumption can be reduced.

{0065}

According to the cold and hot storage 50 of this second embodiment, when cooling the inside of the inner tank 12 of the cold and hot storage 2, by blowing air in the inner tank 12 to the cooled temperature control heat sink 30, the air in the inner tank 12 is cooled, and the cooled air flows to the inner tank 12 in the front direction from the rear surface side in the inner tank 12, along the upper surface, the lower surface, and the inner walls on both sides in the inner tank 12 to circulate the cooled air in the inner tank 12. Therefore, the inside of the inner tank 12 can be highly efficiently cooled and the wet towels housed in the inner tank 12 can be rapidly cooled with low power consumption. Also, because the air in the inner tank 12 is circulated, it is possible to suppress the occurrence of dew condensation in the inner tank 12 and to suppress the lowering of the

cooling efficiency.

{0066}

Also, when heating the inside of the inner tank 12 of the cold and hot storage 50, by blowing air in the inner tank 12 to the heated temperature control heat sink 30, the air in the inner tank 12 is heated, and the heated air is flowed to the inner tank 12 in the front direction from the rear surface side in the inner tank 12, along the upper surface, the lower surface, and the inner walls on both sides of the inner tank 12 to circulate the heated air in the inner tank 12. Therefore, the inside of the inner tank 12 can be highly efficiently heated and the wet towels housed in the inner tank 12 can be rapidly heated with low power consumption.

15 {0067}

In addition, because the silicone rubber heater 36 is superimposed and fixed so as to be in close contact with the temperature control heat sink 30, there is no possibility that the inside of the inner tank cannot be heated due to disconnection from rusting of an electrothermal heater included in an inner tank because of dew condensation as described in Patent Literature 1 mentioned above. Therefore, heating the inside of the inner tank 12 can be performed stably.

25 {0068}

Moreover, the partition plate 60b for vertically

partitioning an area where the temperature control heat sink 30 is arranged is provided on both sides of the temperature control fan facing portion 62 on the back surface side of the shielding plate 60. Therefore, the air blown to the upper half area of the temperature control heat sink 30 by the temperature control fan 32, within the space shielded by the shielding plate 60, flows along the plurality of fins 30b of the temperature control heat sink 30 toward the end portions on both sides of the temperature control heat sink 30, and blows into the inner tank 12 from the air blowing outlets 64 formed at the upper portion of the inner tank 12. On the other hand, the air blown to the lower half area of the temperature control heat sink 30 by the temperature control fan 32, in the space shielded by the shielding plate 60, flows along the plurality of fins 30b of the temperature control heat sink 30 toward the end portions on both sides of the temperature control heat sink 30, and blows into the inner tank 12 from the air blowing outlets 64 formed at the lower portion of the inner tank 12.

{0069}

Here, in the case where the partition plate 60b is not included on the shielding plate 60, and the wet towels are housed only in the cage 13 installed at the upper stage in the inner tank 12, the air blowing load from the air blowing outlets 64 formed at the upper portion of the inner tank 12 is larger than the air blowing load from the air blowing

outlets 64 formed at the lower portion. As a result, a large amount of air is blown out from the air blowing outlets 64 formed at the lower portion of the inner tank 12 as compared with the air blowing outlets 64 formed at the upper portion of the inner tank 12. In the case where the wet towels are housed only in the cage 13 installed at the lower stage in the inner tank 12, the air blowing load from the air blowing outlets 64 formed at the lower portion of the inner tank 12 is larger than the air blowing load from the air blowing outlets 64 formed at the upper portion. As a result, a large amount of air is blown out from the air blowing outlets 64 formed at the upper portion of the inner tank 12 as compared with the air blowing outlets 64 formed at the lower portion of the inner tank 12. As a result, a large amount of air reaches the temperature control fan 32 again without being in contact with the wet towels, and therefore, it is not possible to efficiently cool or heat the wet towels.

{0070}

However, in a case where the shielding plate 60 includes the partition plate 60b, the air blown to the upper half area of the temperature control heat sink 30 by the temperature control fan 32 flows into the space higher than the partition plate 60b of the shielding plate 60 along the plurality of fins 30b of the temperature control heat sink 30 toward the end portions on both sides of the temperature control heat sink 30, and blows into the inner tank 12 from

the air blowing outlets 64 formed at the upper portion of the inner tank 12. On the other hand, the air blown to the lower half area of the temperature control heat sink 30 by the temperature control fan 32 flows into the space lower than the partition plate 60b of the shielding plate 60 along the plurality of fins 30b of the temperature control heat sink 30 toward the end portions on both sides of the temperature control heat sink 30, and blows into the inner tank 12 from the air blowing outlets 64 formed at the lower portion of the inner tank 12. Therefore, even when the wet towel is housed only in the upper or lower cage 13 in the inner tank 12, it is possible to efficiently cool or heat the wet towel.

{0071}

Note that in the embodiments described above, although the plate-shaped silicone rubber heater 36 is used for heating in the inner tank 12, a heater including a heater wire may be used. In the case of using the heater including the heater wire, the heater is arranged so that the heater wire is brought into close contact with the base end portion of the fin 30b, i.e., the bottom surface of the groove between the fins 30b, in a position between the fins 30b of the temperature control heat sink 30. In the case where the heater wire is arranged as described above, air blown to the temperature control heat sink 30 by the temperature control fan 32 flows along the heater wire heating the fins 30b

toward the inner walls on both sides. Therefore, the air can be heated more efficiently and it is possible to rapidly heat the wet towel housed in the inner tank 12 with low power consumption.

5 {0072}

In addition, the temperature control unit 20 according to each of the embodiments described above includes the temperature control heat sink 30 including a plurality of the plate-shaped fins 30b. However, the present embodiment
10 is not limited to this, and may include, as illustrated in FIG. 14, a temperature control heat sink 100 on which a plurality of plate-shaped fins 100a having a predetermined length is arranged at predetermined intervals in the vertical direction and the lateral direction. In a case of
15 including the temperature control heat sink 100, the air blown by the temperature control fan 32 flows along the groove between the fins 100a in the vertical direction and the inner wall direction on both sides. Therefore, the air not only goes around to the front side of the wet towel
20 housed in the inner tank 12 along the inner walls on both sides in the inner tank 12, but the air also goes around to the front surface side of the wet towel housed in the inner tank 12 along the upper surface and the lower surface in the inner tank 12. Therefore, the wet towel housed in the inner
25 tank 12 can be cooled or heated more efficiently. Therefore, it is possible to rapidly cool or rapidly heat the wet towel

housed in the inner tank 12 with low power consumption.

{0073}

In addition, the temperature control unit 20 may include a temperature control heat sink 102 including a plurality of plate-shaped fins 102a extending radially from the center portion of the temperature control heat sink 102 as illustrated in FIG. 15. In a case of using this temperature control heat sink 102, air blown by the temperature control fan 32 flows radially along the groove between the fins 102a and the air not only goes around to the front surface side of the wet towel housed in the inner tank 12 along the inner walls on both sides in the inner tank 12, but the air also goes around to the front side of the wet towel housed in the inner tank 12 along the upper surface and the lower surface in the inner tank 12. Therefore, the wet towel housed in the inner tank 12 can be cooled or heated more efficiently. Therefore, it is possible to rapidly cool or rapidly heat the wet towel housed in the inner tank 12 with low power consumption.

20 {0074}

In addition, a temperature control heat sink having pin-shaped fins may be included. Also, in this case. Air blown by the temperature control fan 32 passes through the pin-shaped fins and the air not only goes around to the front surface side of the wet towel housed in the inner tank 12, along the inner walls on both sides in the inner tank 12,

but the air also goes around to the front side of the wet towel housed in the inner tank 12, along the upper surface and the lower surface in the inner tank 12. Therefore, the wet towel housed in the inner tank 12 can be cooled or heated more efficiently. Therefore, it is possible to rapidly cool or rapidly heat the wet towel housed in the inner tank 12 with low power consumption.

{0075}

In addition, the rear panel 18 according to each of the embodiments described above may be changed to a rear panel 70 illustrated in FIG. 16. FIG. 16 is a perspective view illustrating the inner surface side of the rear panel 70.

The rear panel 70 includes an air intake port 70a at a position facing the heat dissipation fan 26, a plurality of openings 70b in a region extending in the width direction of the rear panel 70 above the air intake port 70a, and air guides 72a and 72b for guiding to the plurality of openings 70b the air between the rear panel 70 and the rear surface portion partition 19. To be specific, the rear panel 70

includes the first air guide 72a extending from the vicinity of the lower portion of one side of the heat dissipation heat sink 24 toward one side of the upper inner wall of the rear panel 70, and the second air guide 72b extending from the vicinity of the lower portion of the other side of the heat dissipation heat sink toward the other side of the upper inner wall of the rear panel. Note that in the rear

panel 70, although the first air guide 72a and the second air guide 72b are formed integrally with the rear panel 70, these air guides may be formed integrally with the rear surface portion partition 19 or separately from the rear panel 70 and the rear surface portion partition 19.

{0076}

With the air guides 72a and 72b, the air warmed by the heat dissipation heat sink 24 is guided to the plurality of openings 70b along the first air guide 72a and the second air guide 72b without staying around the heat dissipation heat sink 24 and is discharged to the outside of the storage from the openings 70b. Therefore, it is possible to effectively cool the inside of the inner tank 12 without reducing the cooling effect.

{0077}

Also, in each of the embodiments described above, the cold and hot storage 2 or 50 cools or heats a wet towel, but may cool or heat a canned beverage.

{0078}

Next, results of cooling and heating tests of wet towels folded into a bar shape using the cold and hot storage 50 according to the second embodiment and a conventional type cold and hot storage having a similar configuration to the cold and hot storage described in the related art will be described. In this test, a total of 30 wet towels, i.e., three layers of ten wet towels are housed

in cage 13 placed in the upper stage of the inner tank 12, and a total of 30 wet towels, i.e., three layers of ten wet towels are housed in cage 13 placed in the lower stage of the inner tank 12. When heating is performed at the

5 temperature of the wet towels of the second layer among the three layers of wet towels accommodated in the cage 13 of the upper stage and at the temperature of the second layer wet towel among the three layers of wet towels accommodated in the lower cage 13, the time to reach 50 degrees and 60
10 degrees after storing the wet towel in the cold storage was measured, and when cooling is performed at that temperature, the time to reach 15 degrees and 10 degrees was measured after storing the wet towel in the cold storage.

{0079}

15 Table 1 illustrates the time until the temperature of the wet towels reaches 50 degrees and 60 degrees after storing the wet towels in the cold and hot storage 50, in a case of heating the wet towels by the cold and hot storage 50, for each of the upper cage (upper stage) and the lower
20 cage (lower stage). Also, Table 2 illustrates the time until the temperature of the wet towels reaches 50 degrees and 60 degrees after storing the wet towels in the conventional type cold and hot storage, in a case of heating the wet towels by the conventional type cold and hot storage for
25 each of the upper cage (upper stage) and the lower cage (lower stage). As illustrated in Tables 1 and 2, the wet

towels could be heated more rapidly by heating the wet towels by the cold and hot storage 50 than the conventional type cold and hot storage. Also, the wet towels in the second layer among the wet towels layered in three could be heated rapidly in a case of heating the wet towels by the cold and hot storage 50.

{Table 1}

Wet towel temperature reaching time		
	50°C	60°C
Upper stage	75 minutes	123 minutes
Lower stage	73 minutes	120 minutes

10 {Table 2}

Wet towel temperature reaching time		
	50°C	60°C
Upper stage	165 minutes	262 minutes
Lower stage	119 minutes	229 minutes

{0080}

Table 3 illustrates the time until the temperature of the wet towels reach 15 degrees and 10 degrees after storing the wet towels in the cold and hot storage 50, in a case of cooling the wet towels by the cold and hot storage 50 for each of the upper cage (upper stage) and the lower cage (lower stage). Also, Table 4 illustrates the time until the temperature of the wet towels reaches 15 degrees and 10 degrees after storing the wet towels in the conventional type cold and hot storage, in a case of cooling the wet

towels by the cold and hot storage for each of the upper
 cage (upper stage) and the lower cage (lower stage). As
 illustrated in Tables 3 and 4, the wet towels could be
 cooled more rapidly by cooling the wet towels by the cold
 5 and hot storage 50 than the conventional type cold and hot
 storage. Also, the wet towels in the second layer among the
 wet towels layered in three could be cooled rapidly in a
 case of cooling the wet towels by the cold and hot storage
 50.

10 {Table 3}

Wet towel temperature reaching time

	15°C	10°C
Upper stage	107 minutes	199 minutes
Lower stage	103 minutes	190 minutes

{Table 4}

Wet towel temperature reaching time

	15°C	10°C
Upper stage	215 minutes	348 minutes
Lower stage	184 minutes	335 minutes

15

{Reference Signs List}

{0081}

- 2 cold and hot storage
- 4 main body portion
- 20 6 door
- 8 operation dial
- 12 inner tank

	8	rear panel
	20	temperature control unit
	22	heat dissipation unit
	24	heat dissipation heat sink
5	24b	fin
	26	heat dissipation fan
	30	temperature control heat sink
	30b	fin
	32	temperature control fan
10	34	temperature control fan cover
	36	silicone rubber heater
	38	heat insulating plate
	40	Peltier spacer
	42	Peltier module
15	48	power supply unit
	49	temperature sensor
	60	shielding plate
	60b	partition plate
	70	rear panel
20	72a, 72b	air guide

{Claims}

{Claim 1}

A cold and hot storage comprising:

5 a main body portion including a door on a front
surface;

an inner tank arranged in the main body portion;

a temperature control heat sink including a base plate
and a plurality of fins formed on one surface of the base
plate having the other surface arranged along a rear surface
10 in the inner tank;

a heater that heats the temperature control heat sink;

a temperature control fan arranged on the one surface
of the temperature control heat sink and blows air in the
inner tank to the fins of the temperature control heat sink;

15 a shielding plate that includes a plurality of through
holes and a temperature control fan facing portion facing
the temperature control fan and shields an area where the
temperature control heat sink is arranged in a state that
air blowing outlets are formed on upper and lower portions
20 of the inner tank;

a heat dissipation heat sink arranged outside the rear
surface of the inner tank;

a heat dissipation fan that blows air outside the inner
tank to the heat dissipation heat sink;

25 a Peltier module having a heat absorbing surface to be
connected to the temperature control heat sink and a heat

dissipating surface to be connected to the heat dissipation heat sink; and

a power control unit that supplies power to the heater and the temperature control fan in a case of heating an
5 inside of the inner tank and to the temperature control fan, the heat dissipation fan, and the Peltier module in a case of cooling the inside of the inner tank.

{Claim 2}

10 The cold and hot storage according to claim 1, wherein spaces communicating with the air blowing outlets are formed on both side portions of the temperature control heat sink.

{Claim 3}

15 The cold and hot storage according to claim 1 or 2 further comprising:

a partition plate that partitions vertically an area where the temperature control heat sink is arranged on both sides of the temperature control fan facing portion of a
20 surface of a side of the temperature control heat sink of the shielding plate.

{Claim 4}

The cold and hot storage according to any one of claims
25 1 to 3 further comprising:

an outer panel and a rear panel configuring the main

body portion;

a partition formed between the rear panel of inner side of the outer panel and the inner tank; and

an air guide that guides air between the rear panel and
5 the partition to at least one opening of the rear panel,

wherein the rear panel includes an air intake port at a position facing the heat dissipation fan and at least one opening at an area extending in a width direction of the rear panel above the air intake port.

10

{Claim 5}

The cold and hot storage according to claim 4, wherein the air guide comprises:

a first air guide extending from a vicinity of a lower
15 portion of one side portion of the heat dissipation heat sink toward one side of upper inner wall of the rear panel;
and

a second air guide extending from a vicinity of a lower portion of the other side portion of the heat dissipation
20 heat sink toward the other side of upper inner wall of the rear panel.

{Claim 6}

A cold and hot storage comprising:

25 a main body portion including a door on a front surface;

an inner tank arranged in the main body portion;

a temperature control heat sink including a base plate
and a plurality of fins formed on one surface of the base
plate having the other surface arranged along a rear surface
5 in the inner tank;

a heater that heats the temperature control heat sink;

a temperature control fan arranged on the one surface
of the temperature control heat sink and blows air in the
inner tank to the fins of the temperature control heat sink;

10 a plate portion that is positioned on both sides of the
temperature control fan and covers the upper portion of the
plurality of fins;

a heat dissipation heat sink arranged outside the rear
surface of the inner tank;

15 a heat dissipation fan that blows air outside the inner
tank to the heat dissipation heat sink;

a Peltier module having a heat absorbing surface to be
connected to the temperature control heat sink and a heat
dissipating surface to be connected to the heat dissipation

20 heat sink; and

a power control unit that supplies power to the heater
and the temperature control fan in a case of heating an
inside of the inner tank and to the temperature control fan,
the heat dissipation fan, and the Peltier module in a case
25 of cooling the inside of the inner tank.

{Claim 7}

The cold and hot storage according to any one of claims
1 to 6, wherein the temperature control fan is arranged at
the center of the one surface of the temperature control
5 heat sink.

{Claim 8}

The cold and hot storage according to any one of claims
1 to 7, wherein the heater is a plate-shaped sheet heater
10 arranged in close contact with the other surface of the base
plate.

{Claim 9}

The cold and hot storage according to any one of claims
15 1 to 7, wherein the heater includes a heater wire and the
heater wire is arranged in close contact with a base end
portion of the fins between the fins.

{Claim 10}

20 The cold and hot storage according to any one of claims
1 to 9, wherein the fin is a plate-shaped fin extending
toward an inner wall on both sides of the inner tank.

{Claim 11}

25 The cold and hot storage according to any one of claims
1 to 9, wherein the fin is a plate-shaped fin having a

predetermined length and a plurality of the fin is arranged at predetermined intervals in a vertical direction and a lateral direction.

5 {Claim 12}

The cold and hot storage according to any one of claims 1 to 9, wherein the fin is a plate-shaped fin extending radially from the center portion of the temperature control heat sink.

10

{Claim 13}

The cold and hot storage according to any one of claims 1 to 12, wherein the temperature control fan blows air in the inner tank to the plurality of fins of the temperature control heat sink and circulates the air in the inner tank through a groove formed between the plurality of fins.

{Claim 14}

A cold and hot storage comprising:
20 a main body portion including a door on a front surface;
an inner tank arranged in the main body portion;
a temperature control heat sink arranged near a rear surface in the inner tank;
25 a heater that heats the temperature control heat sink;
a temperature control fan arranged on a front surface

of the temperature control heat sink and blows air in the inner tank to the front surface of the temperature control heat sink;

5 a heat dissipation heat sink arranged outside the rear surface of the inner tank;

a heat dissipation fan that blows air outside the inner tank to the heat dissipation heat sink;

10 a Peltier module having a heat absorbing surface to be connected to the temperature control heat sink and a heat dissipating surface to be connected to the heat dissipation heat sink; and

a power control unit that supplies power to the heater and the temperature control fan in a case of heating an inside of the inner tank and to the temperature control fan, 15 the heat dissipation fan, and the Peltier module in a case of cooling the inside of the inner tank.

{Claim 15}

20 The cold and hot storage according to any one of claims 14, further comprising:

an outer panel and a rear panel configuring the main body portion;

a partition formed between the rear panel of inner side of the outer panel and the inner tank; and

25 an air guide that guides air between the rear panel and the partition to at least one opening of the rear panel,

wherein the rear panel includes an air intake port at a position facing the heat dissipation fan and at least one opening at an area extending in a width direction of the rear panel above the air intake port.

5

{Claim 16}

The cold and hot storage according to claim 15, wherein the air guide comprises:

10 a first air guide extending from a vicinity of a lower portion of one side portion of the heat dissipation heat sink toward one side of upper inner wall of the rear panel; and

15 a second air guide extending from a vicinity of a lower portion of the other side portion of the heat dissipation heat sink toward the other side of upper inner wall of the rear panel.

{Claim 17}

20 The cold and hot storage according to any one of claims 1 to 16, wherein the inner tank houses a wet towel and heats or cools the wet towel.