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(54) **REFRIGERATOR HAVING TEMPERATURE TRANSITION ROOM**

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Description

[0001] The present invention relates to a refrigerator having a temperature changing room, and more particularly, to a refrigerator having a temperature changing room that is capable of receiving cool air directly from an evaporator to allow the cool air to reach the set temperature of the temperature changing room and that is capable of gently supplying the cool air for a given period of time even after the operation of a compressor stops.

[0002] Generally, a refrigerator is a household appliance adapted to maintain the inside of a cold room and a freezer to low temperatures through the repetition of a refrigeration cycle in which a refrigerant is compressed, condensed, expanded and evaporated, thereby keeping the food stored therein fresh for a given period of time.

[0003] The refrigerator generally includes a body having a freezer and a cold room therein to keep the food stored therein at low temperatures and doors on the front surface of the body adapted to turn to open and close the freezer and the cold room.

[0004] Recently, the refrigerator is provided with a temperature changing room in which the storage items (for example, fish, meat and the like) can be kept in more fresh state for a long period of time.

[0005] That is, the temperature changing room maintains a lower temperature than the cold room and higher temperature than the freezer.

[0006] Accordingly, the temperature changing room is in the cold room of the body of the refrigerator and receives cool air from the freezer to maintain an appropriate low temperature according to the set temperature.

[0007] KR 100 286 029 B1 refers to a refrigerator and method for controlling operation of refrigerator is provided to keep the stored food fresh by maintaining the quick refrigerating compartment at a preset temperature in accordance with the existence of new article accommodated into the quick refrigerating compartment.

[0008] KR 2003 0058835 A refers to an apparatus for supplying chilled air to a fresh compartment of a refrigerator is provided to keep vegetables fresh for a long time by directly supplying chilled air to the fresh compartment.

[0009] EP 1 074 802 A2 refers to a home refrigerator comprising at least one freezer compartment and at least one compartment at a temperature higher than the freezer compartment and comprising a refrigeration circuit with relative condenser, compressor, evaporator and fan. Such refrigerator comprises at least one small size compartment that gets cold quickly by means of a circulation of air that is forced by the fan through the evaporator and inside said at least one small size compartment and said at least one compartment at a temperature higher than the freezer compartment by means of opportune inlet openings whose closing and opening is controlled by valve means that are controlled thermostatically.

[0010] JP 2002 090053 A refers to an utilization of a small chamber partitioned in a cold storage chamber for a special application except for a specific application by

effectively deodorizing the small chamber and upgrading circulating of a cold air in the small chamber.

[0011] JP 2001 033142 A refers to a method to improving a cooling efficiency for a refrigeration chamber and a vegetable chamber and ensure an improvement of fool insulation property and energy saving and further silencing in a refrigerator including from an upper portion the refrigeration chamber, the vegetable chamber, and a freezing chamber.

[0012] WO 2008/110516 A2 refers to a cooling device comprising a quick freezing compartment whereby the foodstuffs stored therein are quick frozen, a compressor a condenser, and an evaporator that maintain the cooling cycle, and a fan that aspirates air over the evaporator for cooling the compartment, wherein the operation of the compressor and the fan are regulated according to the food placed in the compartment thus increasing the efficiency of the quick freezing process.

[0013] Hereinafter, an explanation of a refrigerator having a temperature changing room in a conventional practice will be given with reference to FIGS. 1a and 1b.

[0014] As shown, the refrigerator having a temperature changing room in the conventional practice includes a body 10 in which a freezer and a separate cold room are on one side and the other side thereof and doors 20 that are provided to open and close the freezer and the cold room; and the temperature changing room 30 in the cold room of the body 10 of the refrigerator.

[0015] Further, a partition that separates the freezer and the cold room from the body 10 of the refrigerator has a cool air through-hole 31 formed therein to supply cool air from the freezer to the temperature changing room 30.

[0016] By the way, the refrigerator having the temperature changing room in the conventional practice is configured to supply cool air in the freezer to the temperature changing room 30, but the smell of the items stored in the freezer is also introduced into the temperature changing room 30, thereby causing the items stored in the temperature changing room 30 to be contaminated with the smell of the items stored in the freezer.

[0017] Further, an amount of power consumed for the activation of the compressor circulating the refrigerant is excessively increased so as to always maintain the set temperature of the temperature changing room 30 to a constant temperature.

[0018] In the conventional practice, in addition, after the compressor stops operating, cool air is not supplied to the temperature changing room 30 anymore, thereby failing to keep the items stored in the temperature changing room 30 fresh for a long period of time.

[0019] Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a refrigerator having a temperature changing room that is capable of receiving cool air directly from an evaporator to allow the cool air to reach the set temperature of the temperature changing room rapidly and that

is capable of gently supplying the cool air for a given period of time even after the compressor stops operating.

[0020] To accomplish the above object, according to the present invention, there is provided a refrigerator in accordance with claim 1 having a temperature changing room, including a body including a freezer and a separate cold room; doors adapted to open and close the freezer and the cold room; and the temperature changing room in the cold room to maintain a low temperature state to keep an item stored therein fresh, wherein a rear surface of the temperature changing room communicates with a rear surface of an inner case of the body in contact with the temperature changing room, and the refrigerator has a cool air supplier adapted to supply cool air directly to an interior thereof from an evaporator behind the rear surface of the inner case of the body through a communicating structure thereof, wherein a control damper is located in the body to control a supply of cool air from the evaporator to the cold room or the freezer, and the control damper is above the evaporator and closes a space including the evaporator when the compressor stops operating, wherein when the compressor operates again, initial cool air generated by the evaporator is first supplied to the temperature changing room.

[0021] According to the present invention, preferably, the cool air supplier includes a first through-hole in the rear surface of the temperature changing room; a second through-hole in the rear surface of the inner case of the body that communicates with the first through-hole; and a cool air supplying fan adapted to supply the cool air from the evaporator to the second through-hole.

[0022] According to the present invention, preferably, the cool air supplier further comprises a damper in the first through-hole or the second through-hole to control an amount of cool air introduced thereinto, and the cool air supplying fan is between the damper and the evaporator.

[0023] According to the present invention, preferably, the first through-hole extends into the second through-hole 312 and is coupled to an inner peripheral surface of the second through-hole.

[0024] According to the present invention, preferably, the temperature changing room has a temperature sensor therein, to check an internal temperature of the temperature changing room in real time, and the temperature sensor is electrically connected to the dampers.

[0025] According to the present invention, preferably, the temperature changing room is in a lower portion of the body.

[0026] According to the present invention, the temperature changing room is configured with a cool air supplier that receives cool air directly from an evaporator behind the rear surface of the inner case in the refrigerator body, thereby completely preventing the items stored in the temperature changing room from being contaminated with a peculiar smell from the freezer, and thereby allowing the cool air to rapidly reach the set temperature of the temperature changing room.

[0027] Further, the control damper is additionally mounted on the cool air duct behind the rear surface of the inner case of the body of the refrigerator to control the supply of the cool air generated from the evaporator to the cold room or the freezer, so that the cool air generated from the evaporator is first supplied to the temperature changing room and then supplied to the freezer and the cold room, and even if the operation of the compressor stops, the cool air needed in the temperature changing room can be supplied by using the cold air accumulated around the evaporator.

FIGS. 1a and 1b are front and enlarged views showing a refrigerator having a temperature changing room in a conventional practice.

FIG. 2 is a side sectional view showing a refrigerator having a temperature changing room according to the present invention.

FIG. 3 is a partially enlarged view showing the temperature changing room and the cool air supplier of FIG. 2.

FIG. 4 is a cross-sectional view showing the coupling structure of the temperature changing room of FIG. 2 and the body of the refrigerator.

[0028] Hereinafter, an explanation of a refrigerator having a temperature changing room according to the present invention will be given in detail with reference to the attached drawings.

[0029] According to the present invention, as shown in FIGS. 2 to 4, a refrigerator having a temperature changing room generally includes a body 100 including a freezer and a separate cold room, doors 200 adapted to open and close the freezer and the cold room, and the temperature changing room 300 in the cold room to maintain a low temperature state to keep an item stored therein fresh.

[0030] The body 100 of the refrigerator has a storage room 101 to store food therein, and the storage room 101 is divided in up and down directions or in left and right rights by a partition, thereby defining the freezer and the cold room.

[0031] Further, the body 100 of the refrigerator includes a cool air duct 102 and a machine room 103, respectively behind and below the rear surface 170 of the inner case thereof. An evaporator 110 is mounted in the cool air duct 102 to generate cool air therefrom, and the machine room 103 has components of the refrigeration cycle such as a compressor 120, a condenser (not shown) and the like mounted therein.

[0032] The doors 200 of the refrigerator serve to selectively open and close the storage room 101 of the body 100.

[0033] Of course, handles should be mounted on the doors 200 to easily conduct the opening and closing operations of the doors 200.

[0034] On the other hand, the body 100 of the refrigerator has the temperature changing room 300 in which

an item stored therein can be stored for a long period of time in a more fresh state in accordance with the characteristics of the item.

[0035] The temperature changing room 300 is in the cold room of the body 100 and maintains a lower temperature than the cold room and higher temperature than the freezer.

[0036] In this case, the temperature changing room 300 is configured to receive the cool air directly from the evaporator 110 mounted behind the rear surface 170 of the inner case of the body 100 of the refrigerator.

[0037] Accordingly, the rear surface of the temperature changing room 300 communicates with and contacts the rear surface 170 of the inner case of the body 100 of the refrigerator, and further, the refrigerator includes a cool air supplier 310 adapted to receive cool air directly from the evaporator 110 mounted behind the rear surface 170 of the inner case of the body 100.

[0038] That is, the temperature changing room 300 receives the cool air directly from the evaporator 110 using the cool air supplier 310, thereby preventing the items stored in the temperature changing room 300 from being contaminated with the smell of the items stored in the freezer due to the introduction of cool air into the temperature changing room 300 together with the smell of the items stored in the freezer, during the process bypassing the freezer, and further allowing the cool air to rapidly reach the set temperature of the temperature changing room 300.

[0039] In more detail, the cool air supplier 310 includes a first through-hole 311 in the rear surface of the temperature changing room 300, a second through-hole 312 in the rear surface 170 of the inner case of the body 100 of the refrigerator communicating with the first through-hole 311, and a cool air supplying fan 314 adapted to supply the cool air from the evaporator 110 to the second through-hole 312.

[0040] Especially, a damper 313 is disposed in the first through-hole 311 or the second through-hole 312 to control an amount of cool air introduced thereinto, and in this case, the cool air supplying fan 314 is mounted between the damper 313 and the evaporator 110.

[0041] The cool air supplying fan 314 is simply coupled to the rear wall of the body 100 of the refrigerator forming the cool air duct 102.

[0042] The first through-hole 311 extends into the second through-hole 312 and is coupled to the inner peripheral surface of the second through-hole 312. Accordingly, if the temperature changing room 300 and the rear surface 170 of the inner case of the body 100 of the refrigerator are coupled to each other, the first through-hole 311 can be rigidly coupled to the second through-hole 312, without any leakage of the cool air through them.

[0043] Further, a temperature sensor 320 is mounted on the inside of the temperature changing room 300, for example, on an inner wall surface thereof, to check the internal temperature of the temperature changing room 300 in real time, and the temperature sensor 320 is elec-

trically connected to the damper 313.

[0044] That is, the temperature sensor 320 and the damper 313 are electrically connected to each other, and therefore, the opening and closing angle of the damper 313 can vary in accordance with the set temperature of the temperature changing room 300.

[0045] For example, if the internal temperature of the temperature changing room 300 is drastically raised, the damper 313 completely opens to lower the internal temperature of the temperature changing room 300, and contrarily, if the internal temperature of the temperature changing room 300 is maintained at the set temperature or lower than the set temperature, the damper 313 closes.

[0046] Accordingly, the damper 313 has a well-known electrically operating configuration.

[0047] Further, the temperature changing room 300 is in the lower portion of the body 100 of the refrigerator, thereby sending cool air indirectly to a vegetable bin in the lower portion of the body 100 of the refrigerator.

[0048] On the other hand, an additional control damper 330 is mounted on the cool air duct 102 behind the rear surface 170 of the inner case of the body 100 of the refrigerator to control the supply of cool air generated by the evaporator 110 to the cold room or the freezer.

[0049] That is, the control damper 330 is adapted to first supply the cool air from the evaporator 110 to the temperature changing room 300, and after a given period of time passes, to supply the cool air to the freezer and the cold room of the body 100 of the refrigerator.

[0050] In this case, the control damper 330 is mounted on one side wall of the cool air duct 102 and has a hinge-operating structure that is capable of turning through electrical operation.

[0051] The control damper 330 is mounted above the evaporator 110 and closes a part of the space in the cool air duct 102 in which the evaporator 110 is disposed when the compressor 120 stops operating.

[0052] After the operation of the compressor 120 stops, the part of the space in the cool air duct 102 including the evaporator 110 is closed, so that even if the compressor 120 stops operating, the cool air needed in the temperature changing room 300 is supplied using the cold air accumulated around the evaporator 110.

[0053] The temperature changing room 300 according to the present invention is configured with the cool air supplier 310 that receives cool air directly from the evaporator 110 behind the rear surface 170 of the inner case of the body 100 of the refrigerator, thereby completely preventing the items stored in the temperature changing room 300 from being contaminated with a peculiar smell from the freezer, and thereby allowing the cool air to rapidly lower the temperature of the temperature changing room 300 to the set temperature.

[0054] Further, the additional control damper 330 is mounted in the cool air duct 102 behind the rear surface 170 of the inner case of the body 100 of the refrigerator to control the supply of the cool air from the evaporator 110 to the cold room or the freezer, so that the cool air

from the evaporator 110 is first supplied to the temperature changing room 300 and then to the freezer and the cold room, and even if the compressor 120 stops operating, the cool air needed in the temperature changing room 300 can be supplied using the cold air accumulated around the evaporator 110.

[0055] While the present invention has been described with reference to particular illustrative embodiments, it is not to be restricted by the embodiments, but only by the appended claims.

Claims

1. A refrigerator having a temperature changing room (300) and a compressor (120), the refrigerator comprising:

a body (100) including a freezer and a separate cold room; doors (200) adapted to open and close the freezer and the cold room, wherein the temperature changing room (300) is located in the cold room to maintain a low temperature state to keep an item stored therein fresh, wherein a rear surface of the temperature changing room (300) communicates with a rear surface of an inner case of the body (100) in contact with the temperature changing room (300), and the refrigerator has a cool air supplier (310) adapted to supply cool air directly to an interior thereof from an evaporator (110) behind the rear surface of the inner case of the body (100) through a communicating structure thereof, wherein a control damper (330) is located in the body (100) to control a supply of cool air from the evaporator (110) to the cold room or the freezer, and the control damper (330) is above the evaporator (110), **characterized in that** the control damper (330) closes a space including the evaporator (110) when the compressor (120) stops operating, wherein when the compressor (120) operates again, initial cool air generated by the evaporator (110) is first supplied to the temperature changing room (300).

2. The refrigerator according to claim 1, wherein the cool air supplier (310) comprises:

a first through-hole (311) in the rear surface of the temperature changing room (300);
a second through-hole (312) in the rear surface of the inner case of the body (100), in communication with the first through-hole (311); and
a cool air supplying fan (314) adapted to supply the cool air from the evaporator (110) to the sec-

ond through-hole (312).

3. The refrigerator according to claim 2, wherein the cool air supplier (310) further comprises a damper (313) in the first through-hole (311) or the second through-hole (312) to control an amount of cool air introduced there into, and the cool air supplying fan (314) is between the damper (313) and the evaporator (110).
4. The refrigerator according to claim 3, wherein the first through-hole (311) extends into the second through-hole (312) and is coupled to an inner peripheral surface of the second through-hole (312).
5. The refrigerator according to claim 3, wherein the temperature changing room (300) has a temperature sensor (320) therein to check an internal temperature of the temperature changing room (300) in real time, and the temperature sensor (320) is electrically connected to the damper (313).
6. The refrigerator according to claim 1, wherein the temperature changing room (300) is in a lower portion of the body (100).

Patentansprüche

1. Kühlschrank mit einem Temperaturänderungsraum (300) und einem Kompressor (120), wobei der Kühlschrank Folgendes umfasst:

einen Körper (100), der ein Gefrierabteil und ein getrenntes Kühlabteil aufweist, Türen (200), die geeignet sind, das Gefrierabteil und das Kühlabteil zu öffnen und zu schließen, wobei der Temperaturänderungsraum (300) im Kühlabteil angeordnet ist, um einen Tieftemperaturzustand aufrechtzuerhalten, um einen darin aufbewahrten Artikel frisch zu halten, wobei eine Rückfläche des Temperaturänderungsraums (300) mit einer Rückfläche eines inneren Gehäuses des Körpers (100) kommuniziert, das mit dem Temperaturänderungsraum (300) in Kontakt steht, und der Kühlschrank eine Kühlluftversorgung (310) hat, die geeignet ist, einem Innenraum davon direkt kühle Luft von einem Verdampfer (110) hinter der Rückfläche des inneren Gehäuses des Körpers (100) durch eine Kommunizierstruktur davon zuzuführen, wobei ein Steuerdämpfer (330) im Körper (100) angeordnet ist, um eine Zufuhr kühler Luft vom Verdampfer (110) zum Kühlabteil oder zum Gefrierabteil zu steuern, und der Steuerdämpfer (330) über dem Verdampfer (110) ist, **dadurch gekennzeichnet, dass** der Steuer-

- dämpfer (330) einen den Verdampfer (110) einschließenden Raum verschließt, wenn der Betrieb des Kompressors (120) stoppt, wobei anfängliche, vom Verdampfer (110) erzeugte kühle Luft zuerst dem Temperaturänderungsraum (300) zugeführt wird, wenn der Kompressor (120) seinen Betrieb wieder aufnimmt. 5
2. Kühlschranks nach Anspruch 1, wobei die Kühlluftversorgung (310) Folgendes umfasst: 10
- ein erstes Durchgangsloch (311) in der Rückfläche des Temperaturänderungsraums (300), ein zweites Durchgangsloch (312) in der Rückfläche des inneren Gehäuses des Körpers (100), das mit dem ersten Durchgangsloch (311) kommuniziert, und 15
- ein Kühlluftzufuhrgebläse (314), das geeignet ist, die kühle Luft vom Verdampfer (110) dem zweiten Durchgangsloch (312) zuzuführen. 20
3. Kühlschranks nach Anspruch 2, wobei die Kühlluftversorgung (310) ferner einen Dämpfer (313) im ersten Durchgangsloch (311) oder im zweiten Durchgangsloch (312) umfasst, um eine Menge an darin eingeführter kühler Luft zu steuern, und das Kühlluftzufuhrgebläse (314) zwischen dem Dämpfer (313) und dem Verdampfer (110) angeordnet ist. 25
4. Kühlschranks nach Anspruch 3, wobei sich das erste Durchgangsloch (311) in das zweite Durchgangsloch (312) erstreckt und an eine innere Umfangsfläche des zweiten Durchgangslochs (312) gekoppelt ist. 30
5. Kühlschranks nach Anspruch 3, wobei der Temperaturänderungsraum (300) einen Temperatursensor (320) darin hat, um eine Innentemperatur des Temperaturänderungsraums (300) in Echtzeit zu prüfen, und der Temperatursensor (320) elektrisch mit dem Dämpfer (313) verbunden ist. 35
6. Kühlschranks nach Anspruch 1, wobei der Temperaturänderungsraum (300) in einem unteren Abschnitt des Körpers (100) ist. 40
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Revendications

1. Réfrigérateur comprenant une chambre de changement de température (300) et un compresseur (120), le réfrigérateur comprenant : 50
- un corps (100) comportant un congélateur et une chambre froide séparée ; 55
- des portes (200) prévues pour ouvrir et fermer le congélateur et la chambre froide, la chambre de changement de température

(300) étant située dans la chambre froide pour maintenir un état de basse température pour conserver frais un article qui y est stocké, une surface arrière de la chambre de changement de température (300) communiquant avec une surface arrière d'une enceinte intérieure du corps (100) en contact avec la chambre de changement de température (300), et le réfrigérateur ayant un dispositif d'alimentation en air froid (310) prévu pour alimenter directement en air froid l'intérieur de celui-ci à partir d'un évaporateur (110) derrière la surface arrière de l'enceinte intérieure du corps (100) à travers une structure de communication de celle-ci, un volet de régulation (330) étant situé dans le corps (100) pour réguler une alimentation en air froid depuis l'évaporateur (110) jusqu'à la chambre froide ou au congélateur, et le volet de régulation (330) étant au-dessus de l'évaporateur (110),

caractérisé en ce que le volet de régulation (330) ferme un espace incluant l'évaporateur (110) lorsque le compresseur (120) cesse de fonctionner, de l'air froid initial généré par l'évaporateur (110) étant tout d'abord acheminé à la chambre de changement de température (300) lorsque le compresseur (120) se remet à fonctionner.

2. Réfrigérateur selon la revendication 1, dans lequel le dispositif d'alimentation en air froid (310) comprend :

un premier trou traversant (311) dans la surface arrière de la chambre de changement de température (300) ;

un deuxième trou traversant (312) dans la surface arrière de l'enceinte intérieure du corps (100) en communication avec le premier trou traversant (311) ; et

un ventilateur d'alimentation en air froid (314) prévu pour acheminer l'air froid depuis l'évaporateur (110) jusqu'au deuxième trou traversant (312).

3. Réfrigérateur selon la revendication 2, dans lequel le dispositif d'alimentation en air froid (310) comprend en outre un volet (313) dans le premier trou traversant (311) ou le deuxième trou traversant (312) pour réguler une quantité d'air froid introduite à travers ceux-ci, et le ventilateur d'alimentation en air froid (314) est disposé entre le volet (313) et l'évaporateur (110).

4. Réfrigérateur selon la revendication 3, dans lequel le premier trou traversant (311) s'étend jusque dans le deuxième trou traversant (312) et est accouplé à une surface périphérique intérieure du deuxième

trou traversant (312).

5. Réfrigérateur selon la revendication 3, dans lequel la chambre de changement de température (300) présente un capteur de température (320) dans lequel-ci pour vérifier une température intérieure de la chambre de changement de température (300) en temps réel, et le capteur de température (320) est connecté électriquement au volet (313).
6. Réfrigérateur selon la revendication 1, dans lequel la chambre de changement de température (300) est dans une portion inférieure du corps (100).

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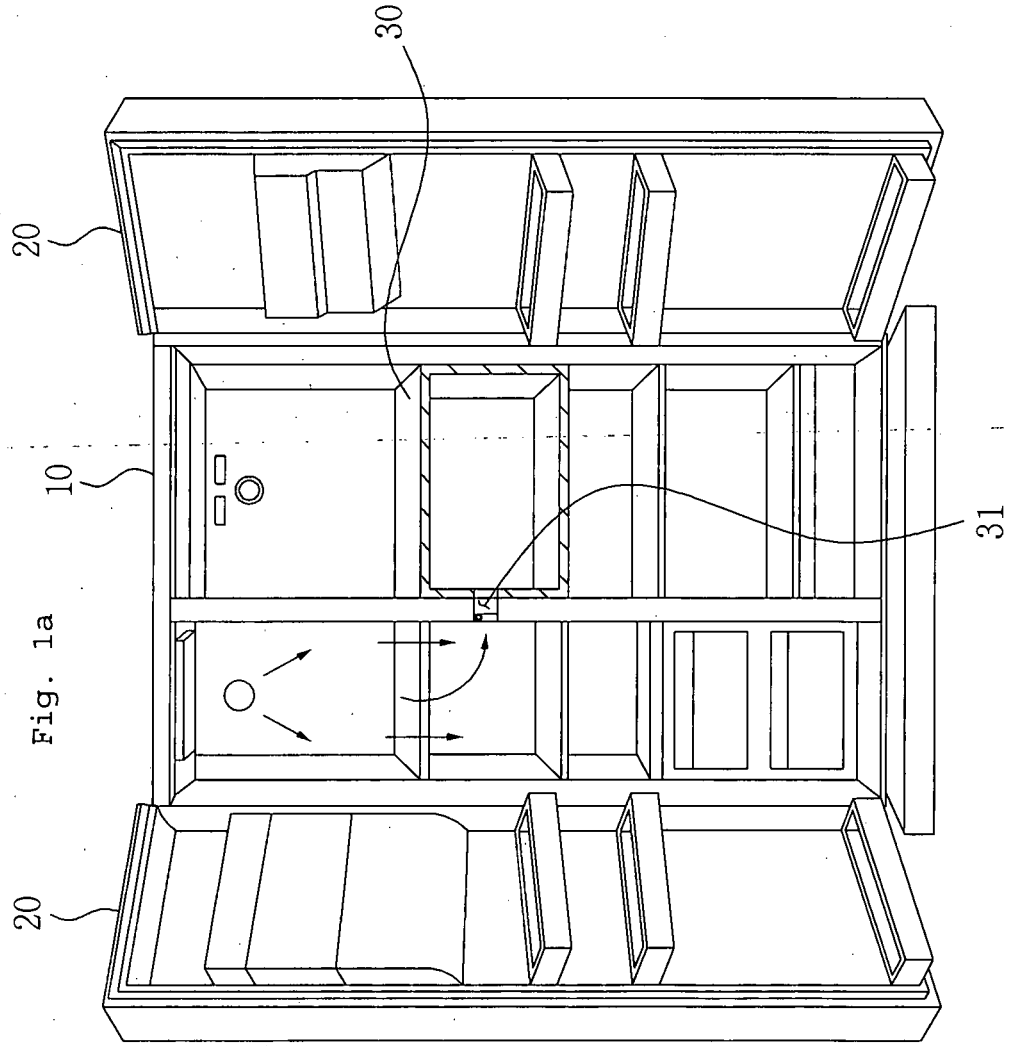
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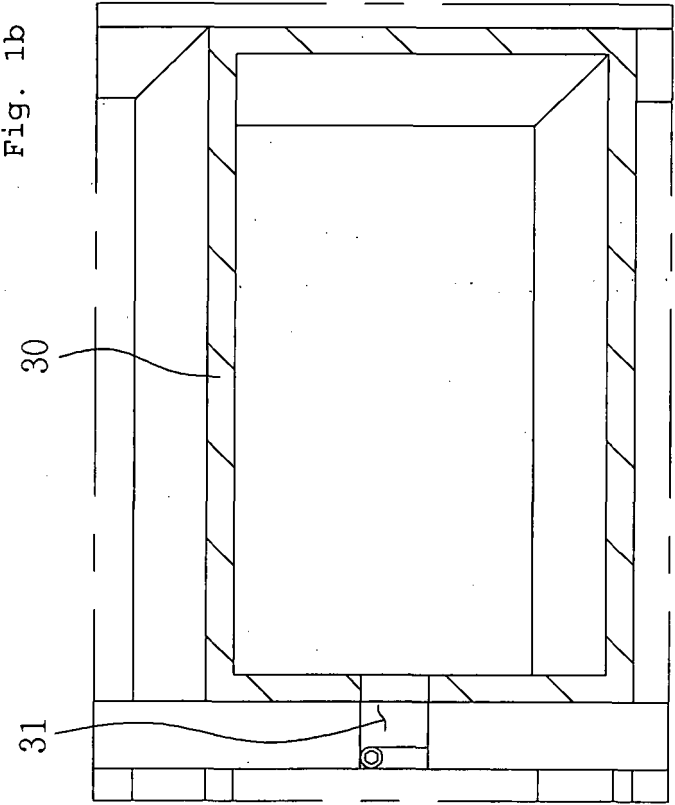
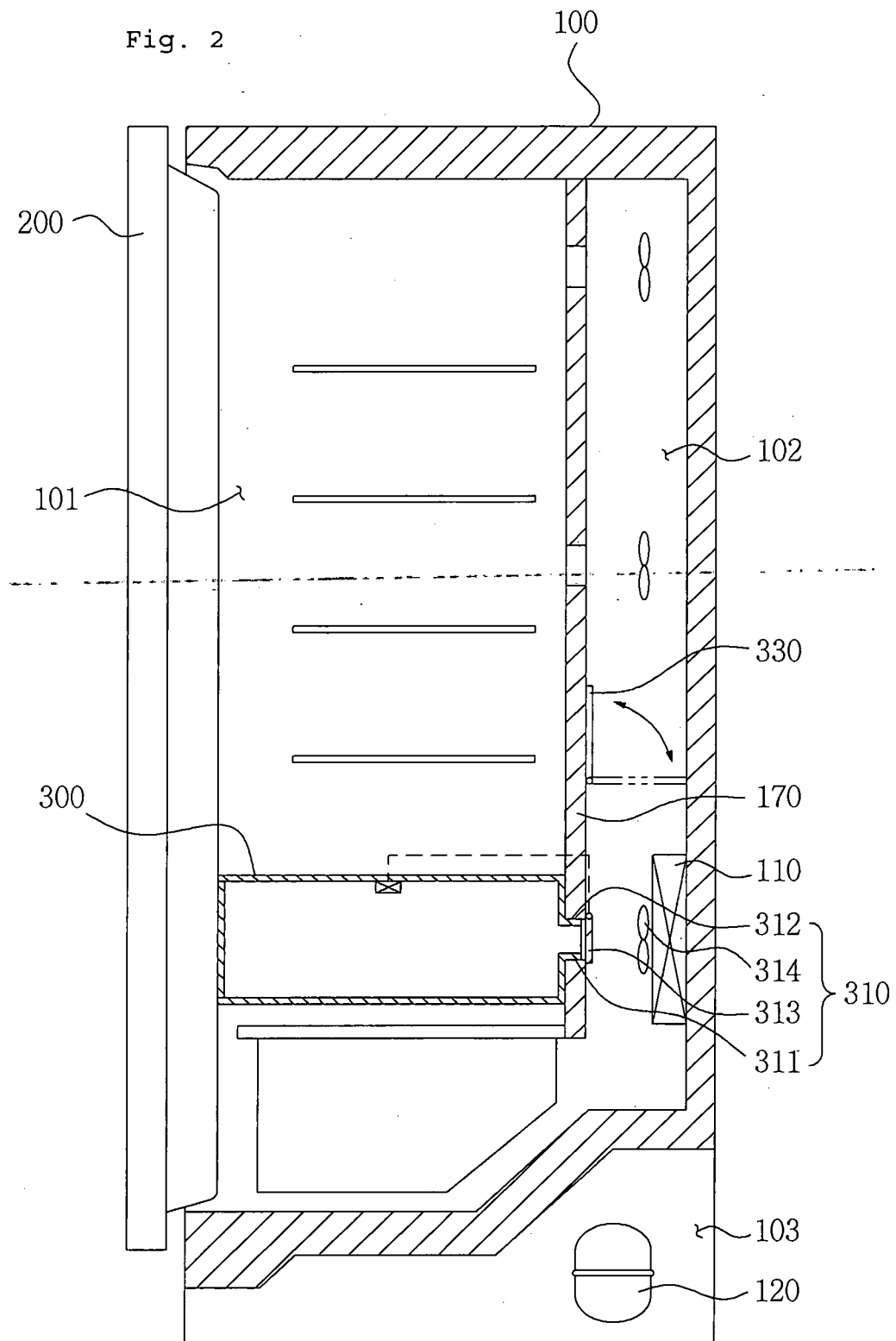


Fig. 2



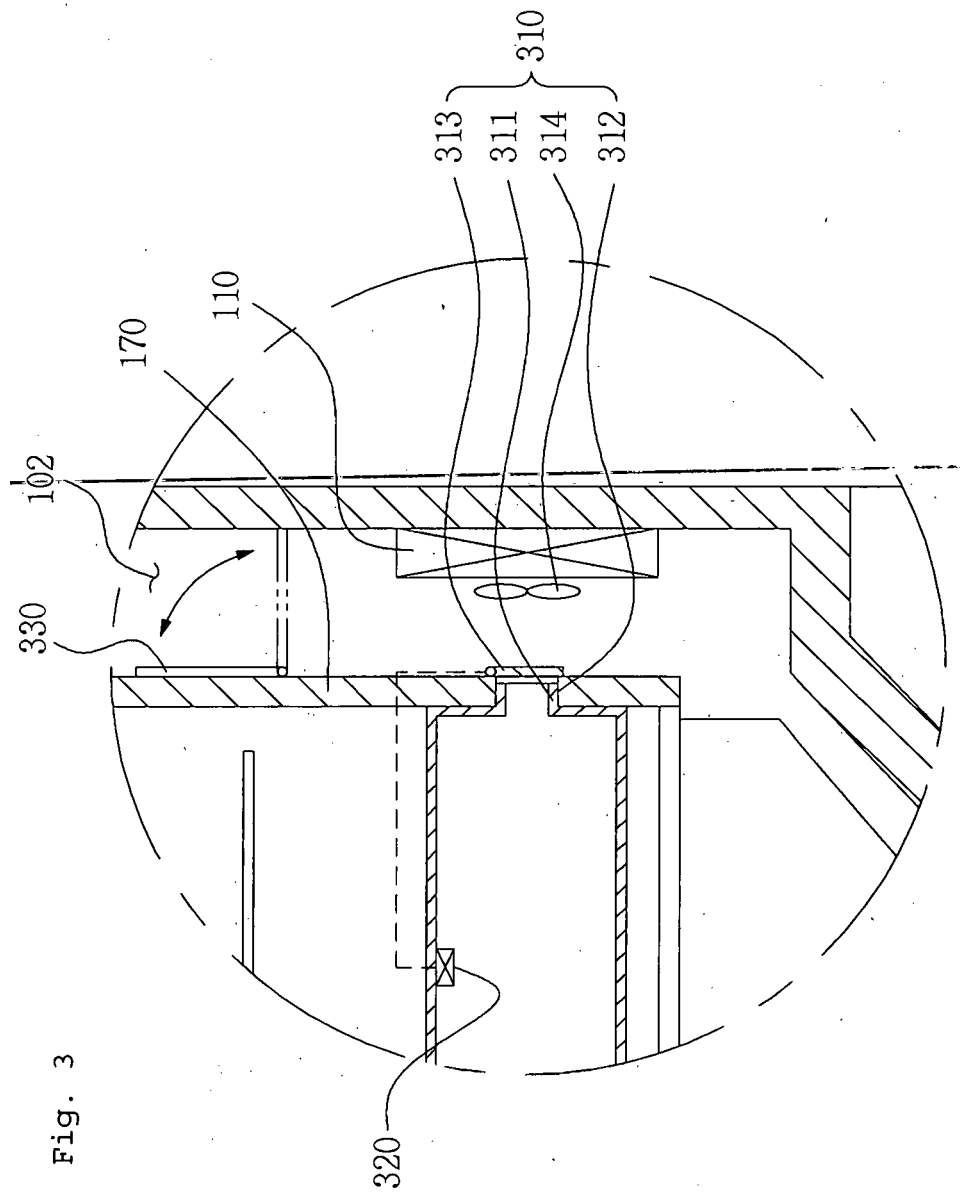


Fig. 3

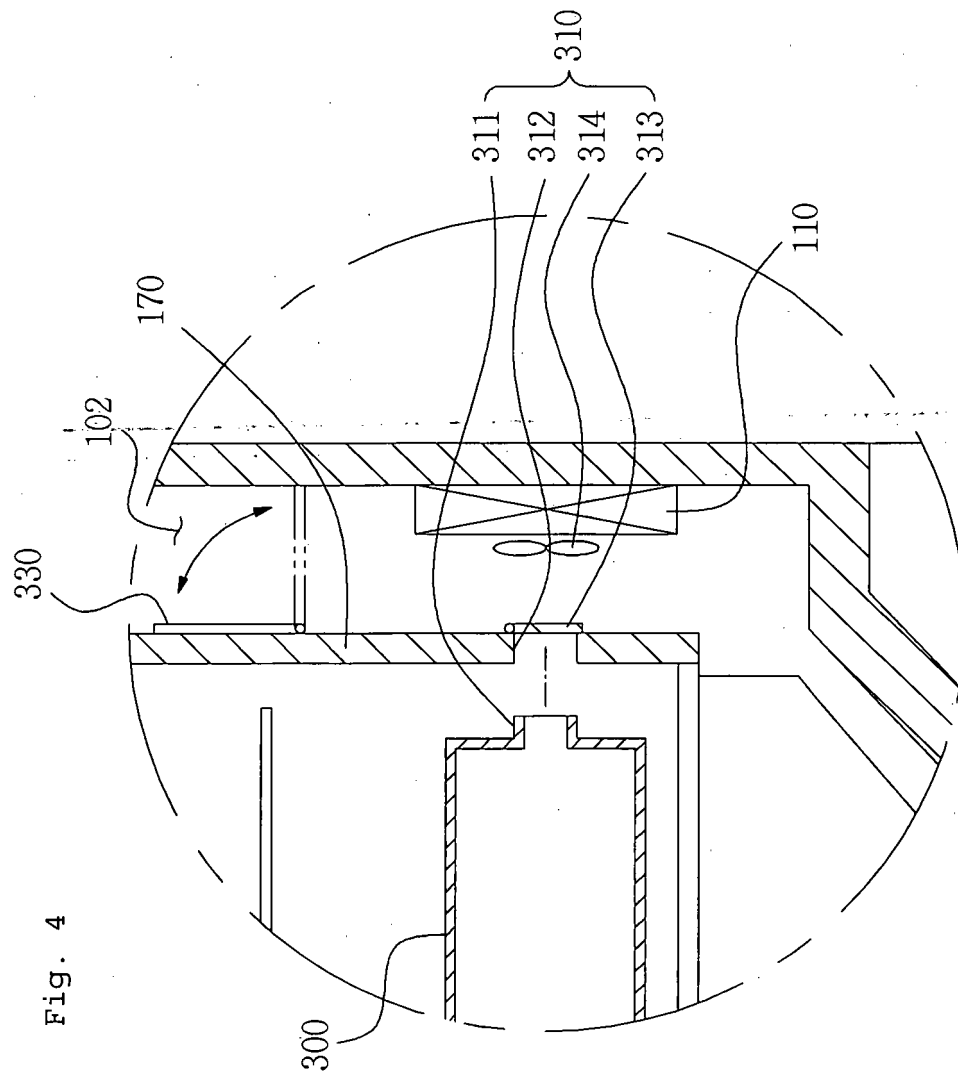


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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