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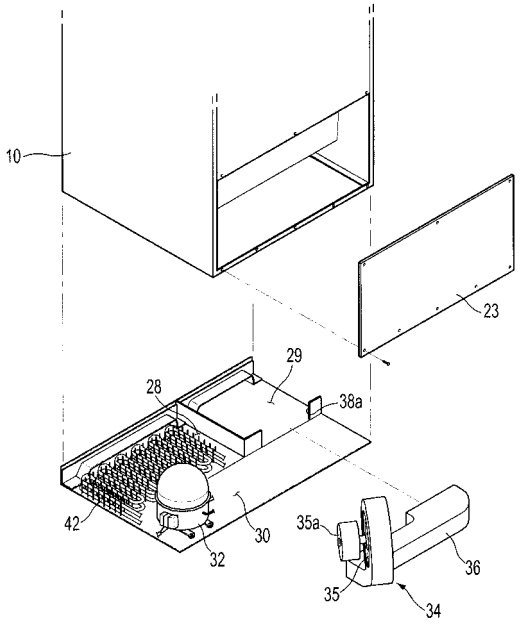
(54) An apparatus for refrigeration

(57) A refrigerator including a blowing unit optimized for a bottom type condenser. The refrigerator includes a main body (10) having a storage compartment (12) defined therein, a condenser (42) mounted at the bottom of the main body (10), and a blowing unit to blow air that has already passed through the condenser. The blowing unit (34) includes a centrifugal fan mounted in a machine compartment (30) and a blowing guide member (36) to guide air blown by the centrifugal fan to the front of the main body (10). Consequently, it is possible to discharge the air that has already passed through the bottom type condenser (42), to the front of the main body (10), thereby accomplishing the smooth discharge of air and reducing the power consumption necessary to blow the air.

Fig. 2



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Description

BACKGROUND

1. Field

[0001] The present invention relates to a refrigerator, and, more particularly, to a refrigerator including a blowing unit optimized for a bottom type condenser.

2. Description of the Related Art

[0002] A refrigerator is a machine that generates cool air using the movement of heat due to the phase change of refrigerant and supplies the cool air to a storage compartment, in which various kinds of food are stored, through a specific channel to maintain the freshness of the food for a long time. A refrigerator generally includes a compressor to compress a refrigerant, a condenser to condense the compressed refrigerant, an expansion device to expand the condensed refrigerant and an evaporator to evaporate the expanded refrigerant to cool a storage compartment.

[0003] The compressor and the condenser must be cooled using external air. For this reason, the compressor and the condenser are mounted in a machine compartment partitioned from the storage compartment. In the machine compartment are also mounted a blowing unit, i.e., a blowing fan, to blow air necessary to cool the compressor and the condenser.

[0004] The blowing fan mounted in the machine compartment is an axial flow fan. The axial flow fan is mounted in the machine compartment in consideration of the direction of air flow occurring at the rear of a main body of the refrigerator, where no large resistance is applied to the axial flow fan, which is developed in consideration of the flow direction.

[0005] In the refrigerator with the above-stated construction, the air, blown through the axial flow fan, is discharged through a discharge port formed at the rear of the main body. However, when air is blown through the axial flow fan, then discharged to the rear of the main body, the discharge of the air may be impeded.

[0006] The difficulty of efficient air discharge is especially present for a built-in type refrigerator. The main body of such refrigerators, are mounted in the wall of a building further impeding the smooth discharge of air to the rear of the main body.

[0007] Furthermore, an increase in power consumption of the blowing unit results from the impedance of smooth discharge of air.

SUMMARY

[0008] Additional aspects and/or advantages will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the invention.

[0009] Therefore, it is an aspect of the invention to provide a refrigerator that is capable of smoothly discharging air using a blowing unit.

[0010] It is another aspect of the invention to provide a refrigerator that is capable of reducing the power consumption through the smooth discharge of air by the blowing unit.

[0011] In accordance with one embodiment, the present invention provides a refrigerator including a main body having a storage compartment defined therein, a condenser mounted at the bottom of the main body, and a blowing unit to blow air having passed the condenser, wherein the blowing unit includes a centrifugal fan and a blowing guide member to guide air blown by the centrifugal fan.

[0012] In an embodiment, the blowing guide member includes a fan casing surrounding the centrifugal fan and a guide duct to guide air introduced through the fan casing.

[0013] In an embodiment, the fan casing has a suction port, through which air blown by the centrifugal fan is suctioned.

[0014] In an embodiment, the guide duct communicates with the fan casing to guide the air suctioned through the suction port.

[0015] In an embodiment, the guide duct has a discharge port, through which the air, suctioned through the suction port and guided, is discharged, and the discharge port is directed to the front of the main body.

[0016] In an embodiment, the main body is provided at the bottom thereof with an air discharge channel having one end communicating with the discharge port of the guide duct to discharge the air, guided along the guide duct and discharged, to the front of the main body.

[0017] Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings, of which:

FIG. 1 is a sectional view schematically illustrating a refrigerator according to an embodiment of the present invention;
FIG. 2 is an exploded perspective view of the refrigerator shown in FIG. 1; and
FIG. 3 is a sectional view taken along line III-III of FIG. 1.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0019] Reference will now be made in detail to the em-

bodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

[0020] FIG. 1 is a sectional view illustrating a refrigerator according to an embodiment of the present invention, and FIG. 2 is an exploded perspective view of the refrigerator.

[0021] Referring to FIGS. 1 and 2, the refrigerator according to an embodiment of the present invention includes a main body 10 having a storage compartment 12, which is divided into a refrigerating compartment and a freezing compartment by a middle partition (not shown), defined therein. To the front of the storage compartment 12 are mounted doors to open and close the refrigerating compartment and the freezing compartment.

[0022] To the inside rear wall of the storage compartment 12 is mounted an evaporator 16 to generate cool air. Above the evaporator 16 is mounted a cool air circulation fan 18 to blow internal air in the storage compartment 12 such that the internal air is circulated through the evaporator 16.

[0023] The evaporator 16 is disposed in a cool air generating compartment 20 defined inside the storage compartment 12.

[0024] Below the cool air generating compartment 20 is formed a cool air inlet port 22, through which the internal air in the storage compartment 12, i.e., the cool air, is introduced into the cooling air generating compartment 20 such that the air passes through the evaporator 16. Below the evaporator 16 is formed a cool air outlet port 24, through which the cool air, having passed through the evaporator 16, is discharged into the storage compartment 12 by the cool air circulation fan 18.

[0025] At the front side of the bottom of the main body 10 is mounted a condenser 42 to change a high-temperature and high-pressure refrigerant gas into a low-temperature and high-pressure refrigerant liquid. The condenser 42 is a bottom type condenser mounted in a built-in type refrigerator to increase the capacity of the storage compartment 12. That is, the condenser 42 according to an embodiment of the present invention includes superior space efficiency as compared to a conventional condenser, thus increasing the capacity of the refrigerator.

[0026] At the rear side of the bottom of the main body 10 is defined a machine compartment 30. Access panel 23 may be affixed to main body 10. Access panel 23 can be removed and later reaffixed to main body 10 to allow access to machine compartment 30 for servicing. In the machine compartment 30 are mounted a compressor 32 to change a gaseous refrigerant into a high-temperature and high-pressure refrigerant gas and a blowing unit 34 to blow air having passed through the condenser 42 and the compressor 32.

[0027] As shown in FIG. 3, the blowing unit 34 includes a blowing fan 35 and a blowing guide member 36 to guide air blown by the blowing fan.

[0028] The blowing fan suctions air into the machine compartment 30, during the operation of the blowing fan, to cool the condenser 42 and the compressor 32. According to an embodiment of the present invention, the blowing fan is not a conventional axial flow fan but a multi-blade centrifugal fan 35. At one side of the centrifugal fan 35 is mounted a motor 35a to drive the centrifugal fan 35.

[0029] The blowing guide member 36 includes a cylindrical fan casing 37 surrounding the centrifugal fan 35 and a guide duct 38 communicating with the fan casing 37 to guide air introduced through the fan casing 37.

[0030] At one side of the fan casing 37 is formed a suction port 37a, through which air is suctioned during the rotation of the centrifugal fan 35.

[0031] The guide duct 38 communicates with the fan casing 37, as described above. During the rotation of the centrifugal fan 35, the guide duct 38 guides the air suctioned through the suction port 37a of the fan casing 37 such that the air is discharged toward the front of the main body 10. To this end, a discharge port 38a is formed at one side of the guide duct 38 such that the discharge port 38a is directed to the front of the main body 10.

[0032] At the bottom of the main body 10 is also formed an air supply channel 28 to guide the introduction of external air into the machine compartment 30 and an air discharge channel 29 to guide the discharge of the air from the machine compartment 30. The air supply channel 28 and the air discharge channel 29 extend in the forward-and-backward direction of the main body 10 such that the interior of the machine compartment 30 communicates with the front side of the bottom of the main body 10. One end of the air discharge channel 29 communicates with the discharge port 38a of the guide duct 38, and the other end of the air discharge channel 29 communicates with a discharge port (not shown) formed at the lower front of the main body 10.

[0033] Hereinafter, the air circulating operation of the refrigerator according to an embodiment of the present invention will be described.

[0034] First, when the centrifugal fan 35 is rotated by the motor 35a, air outside the machine compartment is introduced into the machine compartment 30 while the air is heat-exchanged with the bottom type condenser 42. The air, introduced into the machine compartment 30, cools the compressor 32 by the continuous rotation of the centrifugal fan 35.

[0035] The air inside the machine compartment 30, having passed through the condenser 42 and the compressor 32, is introduced into the fan casing 37, surrounding the centrifugal fan 35, through the suction port 37a by the centrifugal fan 35. The air, introduced into the fan casing 37, is guided along the guide duct 38, and is then discharged through the discharge port 38a of the guide duct 38.

[0036] The air, discharged through the discharge port 38a of the guide duct 38, moved to the air discharge channel 29, in which the air is discharged to the front of

the main body 10.

[0037] According to an embodiment of the present invention, therefore, the air, having passed through the bottom type condenser 42 and the compressor 32, is discharged to the front of the main body 10 by the blowing unit 34, which includes the centrifugal fan 35 and the blowing guide member 36 to guide the air blown by the centrifugal fan 35. Consequently, the smooth discharge of air is accomplished. In addition, the power consumption of the blowing unit 34 is reduced through the discharge of air to the front of the main body 10.

[0038] Furthermore, the air, having passed through the bottom type condenser 42 and the compressor 32, is blown using the centrifugal fan 35. Consequently, efficiency is maintained through a relatively small flow resistance, as compared to that of the conventional axial flow fan.

[0039] As apparent from the above description, the refrigerator according to an embodiment of the present invention has the effect of discharging the air, having passed through the bottom type condenser and the compressor, to the front of the main body by the centrifugal fan and the blowing guide member, thereby accomplishing the smooth discharge of air.

[0040] Furthermore, the refrigerator according to an embodiment of the present invention has the effect of smoothly discharging air to the front of the main body, thereby reducing the power consumption necessary to discharge air.

[0041] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

1. A refrigerator comprising:

a main body having a storage compartment defined therein;
a condenser mounted at the bottom of the main body; and
a blowing unit to blow air having passed the condenser;

wherein the blowing unit includes a centrifugal fan and a blowing guide member to guide air blown by the centrifugal fan.

2. The refrigerator according to claim 1, wherein the blowing guide member includes a fan casing surrounding the centrifugal fan and a guide duct to guide air introduced through the fan casing.

3. The refrigerator according to claim 2, wherein the fan casing has a suction port, through which the air blown by the centrifugal fan is suctioned.

4. The refrigerator according to claim 3, wherein the guide duct communicates with the fan casing to guide the air suctioned through the suction port.

5. The refrigerator according to claim 3, wherein:

the guide duct has a discharge port, through which the air suctioned through the suction port and guided is discharged, and
the discharge port is directed to the front of the main body.

6. The refrigerator according to claim 5, wherein the main body is provided at the bottom thereof with an air discharge channel having one end communicating with the discharge port of the guide duct to discharge the air, guided along the guide duct and discharged, to the front of the main body.

7. A refrigerator comprising:

a main body including a storage compartment;
a condenser mounted at the bottom of the storage compartment; and
a blowing unit to blow air having passed the condenser out to the front of the main body.

8. The refrigerator according to claim 7, wherein the condenser is space efficient, thereby allowing the storage compartment to have greater volume.

9. The refrigerator according to claim 7, wherein the blowing unit includes a centrifugal fan.

10. The refrigerator according to claim 7, wherein the blowing unit includes a blowing guide member comprising:

a cylindrical fan casing; and
a guide duct communicating with the cylindrical fan casing to guide air through the fan casing.

11. The refrigerator according to claim 7, wherein the blowing unit blows air having passed the condenser out to the front of the main body through an air discharge channel.

12. The refrigerator according to claim 1, wherein the blowing unit blows air in a direction towards the front of the main body through a discharge port.

13. The refrigerator according to claim 1, wherein the condenser is space efficient, thereby allowing the storage compartment to have greater volume.

Fig. 1

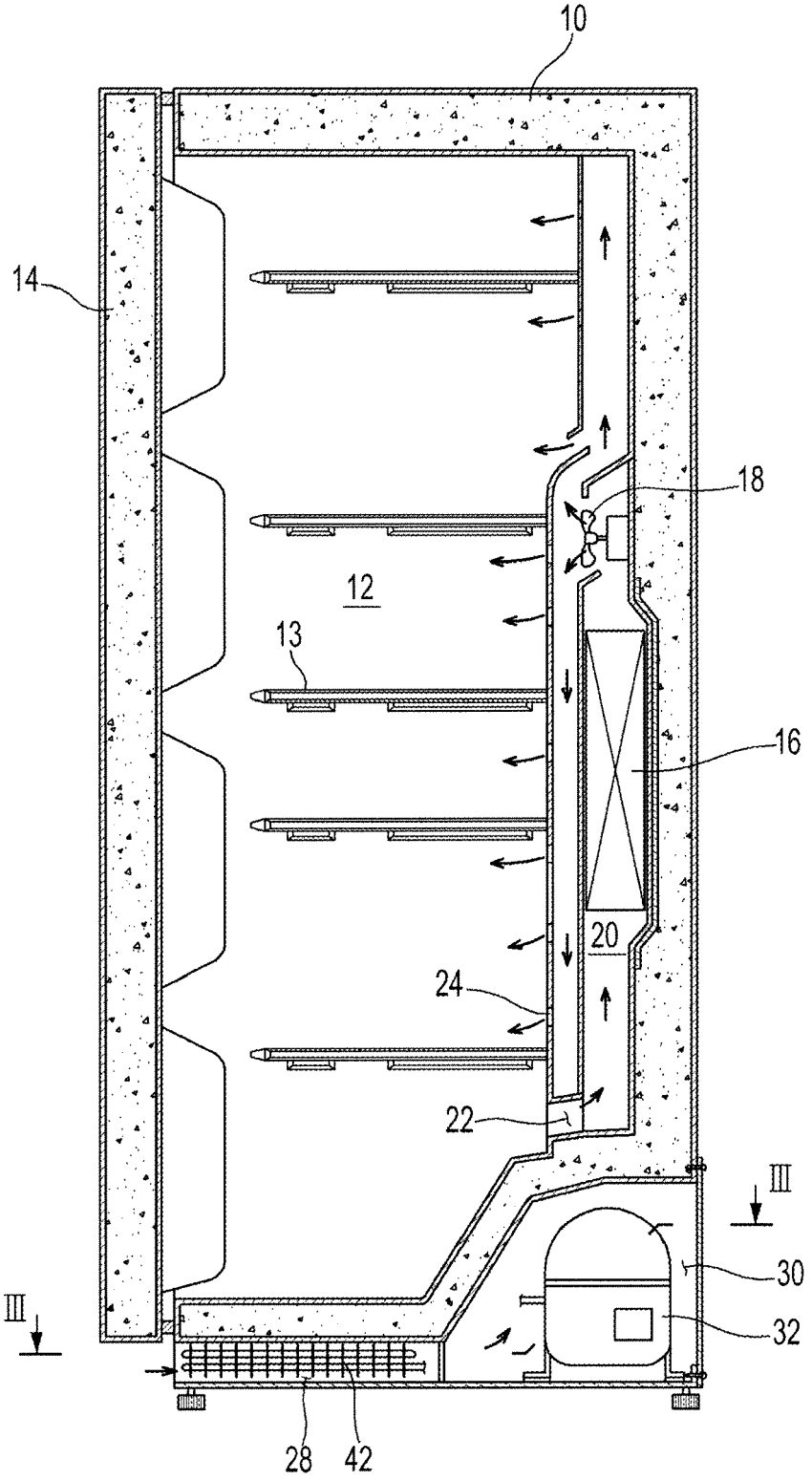

Fig. 2

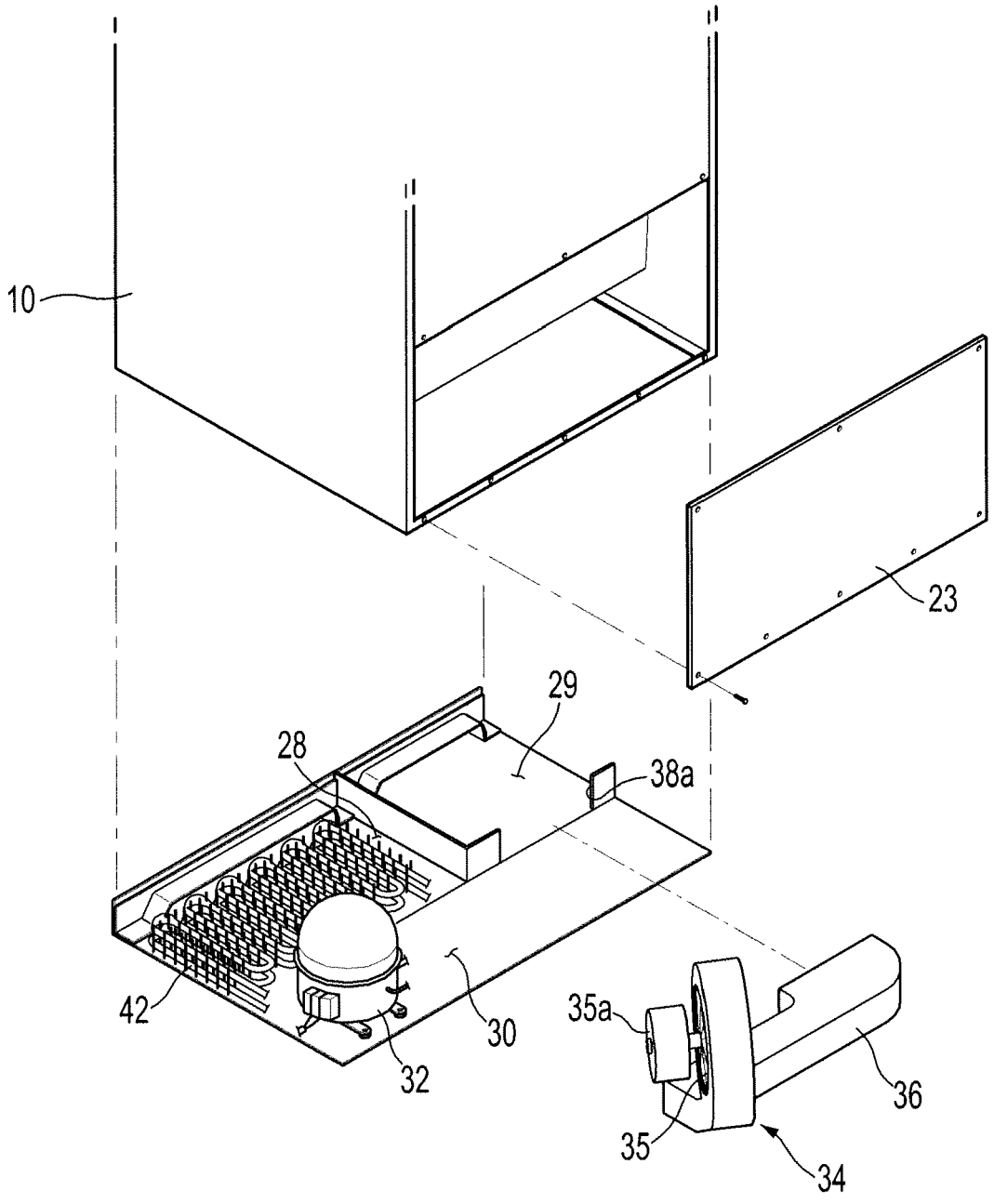

Fig. 3