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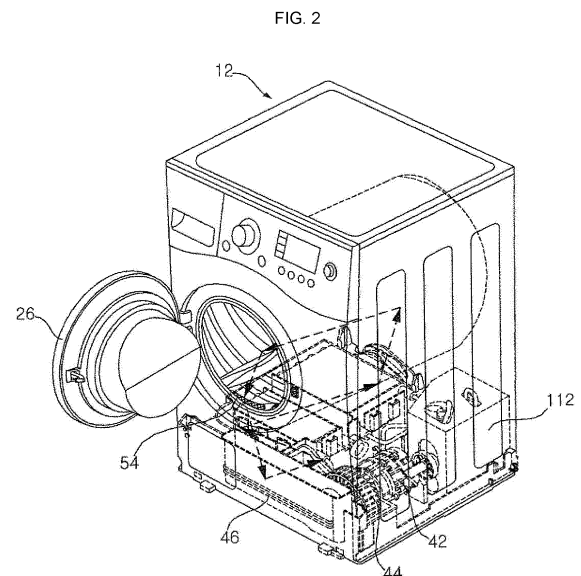
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(54) **DRYER**

(57) The present disclosure relates to a drier. The drier of the present disclosure includes a cabinet forming an exterior, a drum rotatably installed inside the cabinet, a heat pump module including an evaporator, a compressor, a condenser, and an expander through which a refrigerant circulates to supply hot and dry air into the drum, a compressor chamber housing configured to reduce noise generated by the compressor and form a compressor chamber which is a space through which air flows around an outer periphery of the compressor, and a cooling fan configured to cause air to flow into the compressor chamber.



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## Description

### BACKGROUND OF THE DISCLOSURE

#### Field of the disclosure

**[0001]** The present disclosure relates to a drier, and more particularly, to a drier including a compressor chamber for cooling a compressor while blocking noise generated by the compressor.

#### Related Art

**[0002]** In general, a laundry treatment device is a device for processing laundry through various operations such as washing, dehydration and/or drying, and collectively refers to a washing machine, a dehydrator, and a clothing drier.

**[0003]** In particular, the clothing drier is a device for drying laundry by blowing hot air into a drum into which wet laundry is loaded while rotating the drum.

**[0004]** Meanwhile, a compressor driving device is a device for controlling a motor in the compressor driving device to adjust a pressure of a refrigerant condensed in the compressor, and in particular, the compressor driving device may be used to drive the compressor in the clothing drier.

**[0005]** In the clothing drier, since noise is mainly generated by the compressor, in order to block or reduce the noise generated by the compressor, a structure may be formed in which an outer peripheral surface of the compressor is wrapped with a sound absorbing material and/or a sound insulating material.

**[0006]** However, when the periphery of the compressor is wrapped with the sound absorbing material and/or the sound insulating material, heat generated by the compressor is not discharged to the outside, and thus, a temperature of the compressor increases, which affects the operation of the compressor. In particular, in the case of a drier, since high-temperature air flows therein to maintain a high internal temperature, it is necessary to cool the compressor. Even when a separate cooling fan is operated outside the compressor surrounded by the sound absorbing material, there is a problem in that the temperature of the compressor is not easily lowered due to the sound absorbing material.

### SUMMARY

**[0007]** An object of the present disclosure is to provide a drier capable of lowering a temperature of a compressor disposed inside a drier.

**[0008]** Another object of the present disclosure is to provide a drier that reduces noise generated by the compressor while cooling the compressor.

**[0009]** Still another object of the present disclosure is to provide a drier for cooling a compressor control panel for controlling the compressor with air cooling a compres-

sor.

**[0010]** Objects of the present disclosure are not limited to the objects mentioned above, and other objects not mentioned will be clearly understood by those skilled in the art from the following description.

**[0011]** According to an aspect of the present disclosure, there is provided a drier including: a cabinet forming an exterior; a drum rotatably installed inside the cabinet; a heat pump module including an evaporator, a compressor, a condenser, and an expander through which a refrigerant circulates to supply hot and dry air into the drum; a compressor chamber housing configured to reduce noise generated by the compressor and form a compressor chamber which is a space through which air flows around an outer periphery of the compressor; and a cooling fan configured to cause air to flow into the compressor chamber. Accordingly, the compressor chamber housing can reduce the noise generated by the compressor and form the space through which air flows around the compressor.

**[0012]** In the drier according to the present disclosure, the cooling fan may be disposed to face the compressor, and thus, it is possible to directly cause air to flow around the compressor.

**[0013]** In the drier of the drier according to the present disclosure, the compressor chamber housing may include an inlet port through which air outside the cabinet flows into the compressor chamber, and an exhaust port through which air inside the compressor chamber flows to an outside of the compressor chamber housing. Accordingly, it is possible to cool the compressor with external air.

**[0014]** In the drier according to the present disclosure, the cooling fan may be disposed at the inlet port of the compressor chamber housing, disposed at the exhaust port of the compressor chamber housing, or disposed inside the compressor chamber.

**[0015]** A surface on which the inlet port of the compressor chamber housing may be formed faces one side of the cabinet, and in this case, the external air may flow into the compressor chamber.

**[0016]** When the cooling fan is disposed inside the compressor chamber, a size of the cooling fan may be larger than a size of the inlet port formed in the compressor chamber housing, and thus, it is possible to narrow a space through which noise generated by the compressor escapes to the outside.

**[0017]** The drier according to the present disclosure may further include a connecting pipe configured to connect the inlet port of the compressor chamber housing and a cabinet-inlet port formed to cause external air to flow into one side of the cabinet to each other, and thus, the compressor chamber may be disposed in an inside away from the cabinet.

**[0018]** In the drier according to the present disclosure, the cooling fan may be disposed in the cabinet-inlet port formed on one side of the cabinet, and thus, it is possible to cause the external air to flow into the compressor

chamber.

**[0019]** The compressor chamber housing of the drier according to the present disclosure may include a sound absorbing material configured to reduce noise generated by the compressor; and a structural member configured to maintain an outer shape of the compressor chamber housing. Accordingly, it is possible to maintain the shape of the compressor chamber and reduce the noise generated by the compressor.

**[0020]** The compressor chamber housing of the drier according to the present disclosure may include a skin layer disposed on both side surfaces of the sound absorbing material to insulate the noise generated by the compressor. Accordingly, it is possible to insulate the noise generated by the compressor.

**[0021]** The compressor chamber housing of the drier according to the present disclosure may include an auxiliary hole formed so as not to interfere with a structure connected to the compressor. Accordingly, it is possible to avoid interference with the structure of the compressor, and to form a passage through which air flowing through the compressor chamber communicates with the outside of the compressor chamber.

**[0022]** The drier according to the present disclosure may further include a compressor control panel configured to control driving of the compressor, a compressor control panel chamber configured to form a space in which the compressor control panel is disposed, and an inner connecting pipe configured to feed air exhausted from the compressor chamber to the compressor control panel chamber. Accordingly, it is possible to cool the compressor control panel which controls the compressor.

**[0023]** In the drier according to the present disclosure, the cooling fan may be disposed at a portion in which the compressor chamber housing and the inner connecting pipe are connected to each other, and thus, it is possible to cause air in the compressor chamber to flow to the compressor control panel chamber.

**[0024]** The details of other embodiments are included in the detailed description and drawings.

#### ADVANTAGEOUS EFFECTS

**[0025]** According to the drier of the present disclosure, there are one or more of the following effects.

**[0026]** According to the drier according to the present disclosure, the compressor chamber is provided to reduce noise generated by the compressor and form the compressor chamber which is the space through which air flows around the outer periphery of the compressor, and the cooling fan causes air to flow into the compressor chamber housing to cool the compressor.

**[0027]** Specifically, a ratio of a volume occupied by the compressor in the compressor chamber is formed above a certain level, a material of the compressor chamber housing is formed of a sound absorbing material and a structural member forming the structure, the air flow in

the compressor chamber is formed above a certain level to cool the compressor, and thus, it is possible to absorb and insulate the noise generated by the compressor.

**[0028]** In addition, the compressor chamber and the compressor control panel chamber in which the compressor control panel for controlling the compressor is disposed are connected, the cooling fan is disposed therebetween, and thus, the compressor chamber and the compressor control panel chamber can be simultaneously cooled.

**[0029]** Effects of the present disclosure are not limited to the effects mentioned above, and other effects not mentioned will be clearly understood by those skilled in the art from descriptions of claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

##### **[0030]**

FIG. 1 is a perspective view of a drier according to one embodiment of the present disclosure.

FIG. 2 is a view for describing a flow of air inside the drier according to one embodiment of the present disclosure.

FIG. 3 is a view for describing a configuration of a lower portion of the drier including a compressor chamber according to one embodiment of the present disclosure.

FIG. 4 is a view of a state in which a compressor chamber housing is removed in FIG. 3.

FIG. 5 is a rear perspective view of FIG. 3.

FIG. 6 is a plan view of FIG. 3.

FIG. 7 is a cross-sectional view taken along line VII-VII' of FIG. 6.

FIG. 8A and 8B are views for describing a material of the compressor chamber housing according to one embodiment of the present disclosure.

FIG. 9A is a view for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to one embodiment of the present disclosure.

FIG. 9B is a view for describing an embodiment having an arrangement different from the arrangement of the cooling fan in FIG. 9A.

FIG. 9C is a view for describing still another embodiment having an arrangement different from the arrangement of the cooling fan in FIG. 9A.

FIG. 9D is a view for describing still another embodiment having an arrangement different from the arrangement of the cooling fan in FIG. 9A.

FIG. 10 is a view for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to another embodiment of the present disclosure.

FIGS. 11A and 11B are views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure.

FIG. 12 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure.

FIG. 13 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure.

FIG. 14 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure.

FIG. 15 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure.

FIG. 16 is a view for describing a shape of a compressor chamber housing, an arrangement of a cooling fan, and a connection relationship of the compressor control panel chamber according to still another embodiment of the present disclosure.

## DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0031] Advantages and features of the present disclosure and methods of achieving them will become apparent with reference to the embodiments described below in detail in conjunction with the accompanying drawings. However, the present disclosure is not limited to the embodiments disclosed below, but may be implemented in various different forms. That is, only the present embodiments are provided so that the disclosure of the present disclosure is complete and the scope of the invention to those of ordinary skill in the art to which the present disclosure belongs completely, and the present disclosure is only defined by the scope of claims. Like reference numerals refer to like elements throughout.

[0032] Hereinafter, the present disclosure will be described with reference to the drawings for describing a drier according to the embodiments of the present disclosure.

### <Overall Configuration of Drier>

[0033] FIG. 1 is a perspective view of a drier according to one embodiment of the present disclosure. FIG. 2 is a view for describing a flow of air inside the drier according to one embodiment of the present disclosure.

[0034] A drier 10 according to the present embodiment includes a cabinet 12 which forms an exterior, a drum 30 which is rotatably installed inside the cabinet 12, a driving device which rotates the drum 30, and a heat pump module which supplies high-temperature air to the drum 30.

[0035] The cabinet 12 according to the present embodiment forms the exterior of the drier 10 and provides a space in which the drum 30 and other components are disposed. The cabinet 12 may have a substantially rectangular parallelepiped shape.

[0036] An inlet 24 through a drying target is loaded or taken out is formed on a front surface of the cabinet 12, and the inlet 24 may be opened or closed by the door 26. The door 26 according to the present embodiment is hinged to the front surface of the cabinet 12 to open or close the inlet 24 formed in the front of the cabinet 12.

[0037] The cabinet 12 according to the present embodiment may include a front cover 14, a top plate 16, side covers 18, and a base 20. The above components may be a structure to be fastened with each independent component, and some of the components may be formed as an integrally formed structure.

[0038] The door 26 according to the present embodiment may be rotatably coupled to the front cover 14 and include a door glass 28. The door glass 28 may be made of a transparent member so that a user can see inside the drum 30. The door 26 according to the present embodiment may have a convex shape to the inside of the drum 30.

[0039] A control panel 17 may be disposed on the front cover 14. The control panel 22 may include a display (for example, LCD, LED panel, or the like) for displaying an operation state of the drier, an operation unit (for example, button, dial, touch screen, or the like) that receives an operation command for the drier from the user, and a speaker (not illustrated) that outputs a voice guidance for the operation state, an effect sound, or a warning sound.

[0040] The drum 30 according to the present embodiment is disposed inside the cabinet 12. In order to maximize the capacity of the drum 30 in the interior space of the cabinet 12, a blower fan 44 and a heat pump module according to the present embodiment may be disposed in a lower portion of the drum 30.

[0041] The drum 30 may be formed in a cylindrical shape having open front and back surfaces. The drum 30 according to the present embodiment may have a clothes inlet 24 through which a drying target is loaded on a front surface of the drum 30. In addition, a communication hole 32 through which air circulating through the drum 30 is introduced may be formed on the rear surface of the drum 30.

[0042] At least one lift 34 is disposed on the inner peripheral surface of the drum 30. The lift 34 is formed on the inner peripheral surface of the drum 30 in a front-rear direction, and when the drum 30 rotates, the drying target is lifted and then freely dropped by the lift 34. The drum 30 according to the present embodiment may be supported by a supporter (not illustrated) provided in the cabinet 12.

[0043] The driving device according to the present embodiment includes a motor 42 fixed to the base 20 of the cabinet 12, and a driving belt (not illustrated) that transmits a rotational force of the motor 42 to the drum 30. The motor 42 according to the present embodiment may include a driving pulley on which a driving belt wound around the drum 30 is applied to a driving shaft to which the drum 30 is connected.

**[0044]** The drum 30 may rotate in a forward or reverse direction by rotation of the motor. An idle pulley (not illustrated) for adjusting the tension of the driving belt may be installed. The driving belt may surround the outer peripheral surface of the drum 30 while being caught by the driving pulley and the idle pulley. When the motor rotates, the driving belt may be transferred by the driving pulley, and the drum 30 may be rotated by a frictional force acting between the driving pulley and the driving belt.

**[0045]** The motor 42 according to the present embodiment may be connected to the blower fan 44 to rotate the blower fan 44. The motor 42 according to the present embodiment is a double-axis motor, and the drum 30 and the blower fan 44 may be connected to each drive shaft.

**[0046]** The blower fan 44 may be rotated by the motor of the driving device. By rotation of the blower fan 44, air in the drum 30 may be introduced into a suction duct 46.

**[0047]** When the blower fan 44 rotates, the air discharged from the drum 30 is guided to the suction duct 46 and supplied to the blower fan 44. The suction duct 46 is coupled to a front surface of a front supporter, and communicates with the suction port of the blower fan 44. The blower fan 44 circulates the air by allowing the air sucked from the drum to flow back into the drum through the heat pump module.

**[0048]** When the drum 30 rotates forward, air may be introduced from the rear surface side and discharged the air toward the front surface side. In addition, when the drum rotates in reverse, air may be introduced from the front surface side and discharged to the rear surface side.

**[0049]** The drum 30, the suction duct 46, and the heat pump module according to the present embodiment may form a circulation path through which the air inside the drier 10 circulates.

**[0050]** The circulation path may be configured in various ways according to embodiments. The circulation path guides the air discharged from the blower fan to be introduced into the heat pump module, and also guides the air discharged from the heat pump module to be introduced into the drum through the heater. The circulation path is also provided on the rear surface side of the drum to guide the heated air to be introduced into the drum 30.

**[0051]** The circulation path passing through the drum 30 may be formed in various ways. The circulation path may be connected to the drum to form a closed loop for air circulation. In addition, the circulation path may be connected to an exhaust duct (not illustrated) for discharging air and the suction duct 46 through which outside air is introduced.

**[0052]** A filter assembly 54 is installed in the inlet to collect lint contained in the air discharged from the drum 30 and introduced into the suction duct.

**[0053]** The heat pump module circulates the refrigerant to operate a heat pump cycle.

**[0054]** The drying target accommodated in the drum 30 is dried by the heated air supplied to the drum. The air discharged from the drum collects moisture evaporated from the laundry during a drying process, flows into

the circulation path, is heated through the heat pump module, and then supplied to the drum again.

**[0055]** The heat pump module includes an evaporator 50, a compressor 100, a condenser 52, and an expander (not illustrated) through which the refrigerant circulates, and dries and heats the air flowing into the drum 30.

**[0056]** The heat pump module includes the compressor 100 for compressing the refrigerant, the condenser 52 for condensing the compressed refrigerant, an expander for expanding the condensed refrigerant, and the evaporator 50 for evaporating the expanded refrigerant. The moisture contained in the air discharged from the drum 30 is condensed while passing through the evaporator 50, and low-humidity air heated while passing through the condenser 52 may be supplied to the drum 30.

<Compressor Chamber and Cooling Fan>

**[0057]** FIG. 3 is a view for describing a configuration of a lower portion of the drier including a compressor chamber according to one embodiment of the present disclosure. FIG. 4 is a view of a state in which a compressor chamber housing is removed in FIG. 3. FIG. 5 is a rear perspective view of FIG. 3. FIG. 6 is a plan view of FIG. 3. FIG. 7 is a cross-sectional view taken along line VII-VII' of FIG. 6. FIGS. 8A and 8B are views for describing a material of the compressor chamber housing according to one embodiment of the present disclosure.

**[0058]** The drier 10 according to the present embodiment is the compressor 100 which compresses the refrigerant flowing through the heat pump module, a compressor chamber housing 112 which is spaced apart from the outer periphery of the compressor 100 to form a space in which the compressor 100 is disposed, and a cooling fan 110 which causes air inside the compressor chamber housing 112 to flow.

**[0059]** The compressor chamber housing 112 according to the present embodiment forms a compressor chamber 114 which is the space in which the compressor 100 is disposed. In addition to the space in which the compressor 100 is disposed, the compressor chamber 114 according to the present embodiment includes a space in which air flows to the outer periphery of the compressor 100. The space other than the compressor 100 in the compressor chamber 114 may be set in a range in which a flow rate of the air flowing in the cooling fan 110 can maintain a predetermined speed or more. A ratio of a volume occupied by the compressor 100 in the compressor chamber 114 according to the present embodiment may be in the range of 1/2 to 1/4.

**[0060]** The compressor chamber housing 112 according to the present embodiment is spaced apart from the outer periphery of the compressor 100 to block noise generated by the compressor 100. The compressor chamber housing 112 according to the present embodiment forms a space in which the compressor 100 is

cooled so that the air flowing by the compressor cooling fan 110 flows along the periphery of the compressor 100.

**[0061]** Referring to FIG. 6, the compressor chamber housing 112 according to the present embodiment may have a column shape having a pentagonal cross-section. However, the shape of the cross-section may be formed differently depending on a lower space of the drier 10, and may be polygonal such as a quadrilateral or circular.

**[0062]** The compressor chamber housing 112 according to the present embodiment may include at least one inlet port 116 through which air flows into the compressor chamber 114 and at least one exhaust port 118 through which air in the compressor chamber 114 is discharged.

**[0063]** Referring to FIGS. 3 to 7, the compressor chamber housing 112 according to the present embodiment includes the inlet port 116 through which air from the outside of the drier 10 flows into the compressor chamber 114, and the exhaust port 118 through which the air inside the compressor chamber 114 is discharged to the outside of the compressor chamber 114. In the compressor chamber housing 112 according to the present embodiment, an auxiliary hole 119 is formed so as not to interfere with a structure of the compressor 100. Air outside the compressor chamber 114 may be introduced into the compressor chamber 114 through the auxiliary hole 119, or air inside the compressor chamber 114 may be discharged to the outside of the compressor chamber 114.

**[0064]** The cooling fan 110 for causing external air to flow into the compressor chamber 114 is disposed at the inlet port 116 of the compressor chamber housing 112 according to the present embodiment. However, this is one exemplary embodiment, and the cooling fan 110 may be disposed in the exhaust port 118 of the compressor chamber housing 112 or may be disposed inside the compressor chamber 114. In addition, in some cases, the cooling fan 110 may be installed to discharge the air inside the compressor chamber 114 to the outside of the drier. The compressor chamber housing 112 according to the present embodiment may be disposed to face the surface on which the communication hole 32 of the cabinet 12 is formed on one side where the inlet port 116 is formed.

**[0065]** Referring to FIG. 6, the inlet port 116 of the compressor chamber housing 112 in which the cooling fan 110 is disposed is disposed in communication with the outside of the drier 10, and the exhaust port 118 is disposed in communication with the inner space of the drier 10.

**[0066]** The compressor chamber housing 112 according to the present embodiment is formed so that air flowing by the compressor cooling fan 110 flows along the periphery of the compressor 100. The compressor chamber housing 112 according to the present embodiment guides the air flowing through the compressor chamber 114 to flow to the outer periphery of the compressor 100.

**[0067]** The compressor chamber housing 112 according to the present embodiment blocks the noise generated by the compressor 100. Referring to FIG. 8A, the

compressor chamber housing 112 according to the present embodiment includes a sound absorbing material 120 for reducing the noise generated by the compressor 100 and a structural member 130 for maintaining the outer shape of the compressor chamber housing 112. The structural member 130 according to the present embodiment may be formed of a material capable of maintaining the structure of the compressor chamber housing 112. The structural member 130 according to the present embodiment may use a sheet of an Ethylene Vinyl Acetate Copolymer (EVA) resin.

**[0068]** The sound absorbing material 120 according to the present embodiment may be formed of a material capable of absorbing the noise generated by the compressor 100 and reducing the noise escaping to the outside. The sound absorbing material 120 according to the present embodiment may be a porous member made of a material of polypropylene (PP) and polyethylene terephthalate (PET).

**[0069]** In addition, referring to FIG. 8B, the compressor chamber housing 112 according to the present embodiment may have a structure capable of absorbing or insulating noise generated by the compressor 100 by forming skin layers on both side surfaces of the sound absorbing material 120.

**[0070]** The cooling fan 110 according to the present embodiment is disposed toward the compressor 100. Here, when the cooling fan 110 is disposed toward the compressor 100, it means that an imaginary line extending from a rotation axis of the cooling fan 110 passes through the compressor 100. Accordingly, when the cooling fan 110 disposed toward the compressor 100 is operated, air may flow in the direction of the compressor 100 or may flow air in the opposite direction. The compressor cooling fan 110 according to the present embodiment cools the compressor 100 by flowing air in the compressor chamber 114.

<Shape of Compressor Chamber Housing and Arrangement of Cooling Fan>

**[0071]** FIG. 9 is a view for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to one embodiment of the present disclosure. FIG. 10 is a view for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to another embodiment of the present disclosure. FIGS. 11A and 11B are views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to another embodiment of the present disclosure. FIG. 12 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure. FIG. 13 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure. FIG. 14 is a view for views for de-

scribing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure. FIG. 15 is a view for views for describing a shape of a compressor chamber housing and an arrangement of a cooling fan according to still another embodiment of the present disclosure. FIG. 16 is a view for describing a shape of a compressor chamber housing, an arrangement of a cooling fan, and a connection relationship of the compressor control panel chamber according to still another embodiment of the present disclosure.

**[0072]** Hereinafter, the shape of the compressor chamber housing and the arrangement of the cooling fan according to various embodiments of the present disclosure will be described with reference to FIGS. 9A to 16.

**[0073]** Referring to FIG. 9A, the compressor chamber 114 according to the present embodiment may have the shape of a square box spaced apart from the periphery of the compressor 100. The compression chamber housing 112 according to the present embodiment includes an inlet port 116 through which external air flows into the compressor chamber 114 is formed on one of peripheral surfaces thereof and an exhaust port 118 through which air inside the compressor chamber 114 is discharged is formed on the other of the peripheral surfaces.

**[0074]** A cooling fan 110 according to the present embodiment is installed at the inlet port 116 of the compressor chamber housing 112. The cooling fan 110 according to the present embodiment is disposed to face the compressor 100. The cooling fan 110 causes the external air to flow to the compressor 100.

**[0075]** One surface side of the compression chamber housing 112 on which the inlet port 116 is formed according to the present embodiment may be a portion that faces the cabinet 12. In this case, the external air may be introduced into the compressor chamber 114 by the operation of the cooling fan 110 to cool the compressor 100.

**[0076]** The exhaust port 118 of the compressor chamber housing 112 according to the present embodiment may communicate with the inner space of the drier 10. The air inside the compressor chamber 114 may flow into the drier 10 through the exhaust port 118 and may be discharged from the drier 10 through a communication hole (not illustrated) provided separately on one side surface of the cabinet 12.

**[0077]** Referring to FIG. 9B, the cooling fan 110 may be spaced apart from the compressor chamber housing 112. The cooling fan 110 may be disposed outside the compressor chamber 114 formed by the compressor chamber housing 112. Specifically, the cooling fan 110 may be spaced apart from the inlet port 116 formed in the compressor chamber housing 112.

**[0078]** Referring to FIG. 9B, the cooling fan 110 is disposed outside the compressor chamber 114 and spaced apart from the inlet port 116 formed in the compressor chamber housing 112. In this case, due to the flow of air flowing through the cooling fan 110 when the cooling fan 110 is operated, air not passing through the cooling fan

110 can flow into the compressor chamber 114.

**[0079]** Referring to FIG. 9C, the cooling fan 110 may be spaced apart from the compressor chamber housing 112. The cooling fan 110 may be disposed inside the compressor chamber 114 formed by the compressor chamber housing 112. Specifically, the cooling fan 110 may be disposed inside the compressor chamber 114 spaced apart from the inlet port 116 formed by the compressor chamber housing 112.

**[0080]** Referring to FIG. 9C, the cooling fan 110 is disposed inside the compressor chamber 114 and spaced apart from the inlet port 116 formed by the compressor chamber housing 112 in the direction of the compressor 100. In this case, due to the flow of air flowing through the cooling fan 110 when the cooling fan 110 is operated, the air introduced into the inlet port 116 does not go through the cooling fan 110 and can flow in the direction in which the compressor 100 is disposed.

**[0081]** Referring to FIG. 9D, the cooling fan 110 may be disposed at the exhaust port 118 of the compressor chamber housing 112. The cooling fan 110 is disposed at the exhaust port 118, and thus, air inside the compressor chamber 114 may flow to the outside through the exhaust port 118.

**[0082]** In this case, the external air flows into the compressor chamber 114 through the inlet port 116, forms an air flow around the compressor 100, cools the compressor 100, and flows through the exhaust port 118.

**[0083]** Referring to FIG. 10, a compressor chamber 114 according to another embodiment of the present disclosure may also have a substantially rectangular box shape. In a compression chamber housing 112 according to the present embodiment, an inlet port 116 through which external air flows into the compressor chamber 114 is formed on one side surface of a peripheral surface of the housing 112, and an exhaust port 118 through which the air inside the compressor chamber 114 is discharged to the outside is formed on the other side surface of the peripheral surface.

**[0084]** The inlet port 116 of the compressor chamber housing 112 according to the present embodiment is formed to be smaller than a size of the cooling fan 110. The cooling fan 110 according to the present embodiment may be disposed inside the compressor chamber housing 112. The cooling fan 110 according to the present embodiment is disposed inside the compressor chamber 114. The cooling fan 110 according to the present embodiment causes the external air to flow into the compressor chamber 114. The cooling fan 110 according to the present embodiment is disposed to face the compressor 100.

**[0085]** In the compressor chamber housing 112 according to the present embodiment, the size of the inlet port 116 is reduced, and thus, it is possible to reduce the noise generated by the compressor 100 from escaping to the outside.

**[0086]** Referring to FIG. 11A, a compressor chamber 114 according to still another embodiment of the present

disclosure may have a cylindrical shape spaced apart from a periphery of a compressor 100. A compressor chamber housing 112 according to the present embodiment is spaced apart from each other at regular intervals along an outer periphery of the compressor 100 having a cylindrical shape. In the compressor chamber housing 112 according to the present embodiment, an inlet port 116 is formed on one side of the peripheral surface, and a cooling fan 110 may be disposed in the inlet port 116. The compressor chamber housing 112 according to the present embodiment may be spaced apart from a base 20 of a drier 10 by a predetermined interval to form an exhaust port on the lower side of the peripheral surface. In this case, the inlet port 116 may be disposed in an upper portion of the compressor chamber housing 112.

**[0087]** The inlet port 116 of the compressor chamber housing 112 in which the cooling fan 110 is disposed may be disposed in communication with a communication hole 32 formed at one side of the cabinet 12. That is, the compressor chamber housing 112 may be disposed to face the surface on which the communication hole 32 of the cabinet 12 is formed on one side where the inlet port 116 is formed.

**[0088]** Accordingly, air introduced into the compressor chamber 114 from the outside by the operation of the cooling fan 110 flows along the periphery of the compressor 100 and moves downward to exhaust the internal space of the drier 10.

**[0089]** Referring to FIG. 11B, it is also possible for the cooling fan 110 to operate so that the air flow direction inside the compressor chamber 114 is reversed. In this case, when the cooling fan 110 is operated, the air inside the drier 10 disposed outside the compressor chamber 114 flows into the compressor chamber 114 to cool the compressor 100, and is then discharged to the outside of the cabinet 12.

**[0090]** Referring to FIG. 12, according to still another embodiment, a cooling fan 110 may be disposed in an upper surface of a compressor chamber housing 112, and an exhaust port 118 may be formed at a lower side of the compressor chamber housing 112. In this case, the air inside the drier 10 is introduced into the compressor chamber 114, flows inside the compressor chamber 114, and is discharged to the outside of the compressor chamber housing 112 to cool the compressor 100.

**[0091]** Referring to FIG. 13, according to still another embodiment of the present disclosure, a cooling fan 110 may be disposed in one side surface of a cabinet 12 separated from a compressor chamber housing 112. An inlet port 116 of the compressor chamber housing 112 is connected to the cooling fan 110 through a separate connecting pipe 132.

**[0092]** The cooling fan 110 according to the present embodiment may be disposed at a higher position than the compressor chamber housing 112. The inlet port 116 according to the present embodiment may be formed on an upper side of the compressor chamber housing 112, and an exhaust port 118 may be formed on the lower

side of the compressor chamber housing 112. Accordingly, air from the outside of the drier 10 flows into the compressor chamber 114 through the connecting pipe 132 by the operation of the cooling fan 110, and the air inside the compressor chamber 114 flows from the upper side to the lower side along the periphery of the compressor 100 to cool the compressor 100.

**[0093]** Referring to FIG. 14, according to still another embodiment of the present disclosure, a cooling fan 110 may also be disposed in one side surface of the cabinet 12 separated from a compressor chamber housing 112. An inlet port 116 of the compressor chamber housing 112 is connected to the cooling fan 110 through a separate connecting pipe 132.

**[0094]** The cooling fan 110 according to the present embodiment may be disposed between the upper side and the lower side of the compressor chamber housing 112. The cooling fan 110 according to the present embodiment may be disposed in a communication hole 32 formed on one side of the cabinet 12. The inlet port 116 according to the present embodiment may be formed on a peripheral surface of the compressor chamber housing 112, and exhaust ports 118 may be formed on upper and lower sides of the compressor chamber housing 112. The inlet port 116 of the compressor chamber housing 112 according to the present embodiment may be disposed in consideration of the distance from the exhaust ports 118 respectively formed on the upper side and the lower side, and the size of each exhaust port.

**[0095]** Accordingly, air from the outside of the drier 10 flows into the compressor chamber 114 by the operation of the cooling fan 110, and the air inside the compressor chamber 114 may flow upward and downward along the peripheral surface of the compressor 100 to cool the compressor 100.

**[0096]** Referring to FIG. 15, according to still another embodiment of the present disclosure, a cooling fan 110 is disposed in an exhaust port 118 of a compressor chamber housing 112. The exhaust port 118 according to the present embodiment may be formed on the peripheral surface of the compressor chamber housing 112. The exhaust port 118 according to the present embodiment may be formed on an upper portion of the peripheral surface of the compressor chamber housing 112.

**[0097]** The inlet port 116 according to the present embodiment may be disposed in a lower portion of the peripheral surface of the compressor chamber housing 112. The inlet port 116 according to the present embodiment may be connected to a communication hole 32 of a cabinet 12 through a connecting pipe 132.

**[0098]** The cooling fan 110 according to the present embodiment causes the air inside the compressor chamber 114 to flow to the outside of the compressor chamber 114. When the cooling fan 110 is operated, air is introduced through the inlet port 116 formed on the lower side of the peripheral surface of the compressor chamber housing 112. In the compressor chamber 114, the air introduced through the inlet port 116 may flow from the



lower side to the upper side along the periphery of the compressor 100. The air flowing to the upper side of the compressor chamber 114 may flow to the outside of the compressor chamber 114 through the cooling fan 110.

**[0099]** Referring to FIG. 16, a drier 10 according to still another embodiment of the present disclosure may include a main control panel (not illustrated) for controlling the operation of the drier and a compressor control panel 140 for driving the compressor 100. The compressor control panel 140 for controlling the operation of the compressor 100 may be disposed in the compressor control panel chamber 142 in a lower portion of the drum 30. The drier 10 according to the present embodiment may further include a compressor control panel chamber 142 forming a space in which the compressor control panel 140 is disposed, and an internal connecting pipe 144 connecting the compressor control panel chamber 142 and the compressor chamber 114.

**[0100]** The compressor control panel 140 is a device for controlling a compressor motor (not illustrated) in the compressor 100 to adjust a pressure of a refrigerant discharged from the compressor 100, and in particular, controls driving of the compressor 100. The compressor control panel 140 according to the present embodiment may control the switching frequency of each switching element of the inverter 420 to be operated within a preset range in order to reduce noise generated when the compressor is driven.

**[0101]** The compressor control panel 140 according to the present embodiment may be connected to the compressor 100 by an electrical connection line 146.

**[0102]** An exhaust port 118 of a compressor chamber housing 112 according to the present embodiment may be connected to the compressor control panel chamber 142 through the internal connecting pipe 144. The compressor chamber 114 and the compressor control panel chamber 142 according to the present embodiment may be connected through the internal connecting pipe 144. The cooling fan 110 according to the present embodiment may be disposed at the exhaust port 118 of the compressor chamber housing 112. That is, the cooling fan 110 according to the present embodiment may be disposed at a portion where the compressor chamber housing 112 and the internal connecting pipe 144 are connected. However, this is an exemplary embodiment, and the cooling fan 110 may be installed in the compressor chamber 114 or in the inlet port 116 of the compressor chamber housing 112.

**[0103]** Accordingly, the air flowing through the compressor chamber 114 by the operation of the cooling fan 110 flows to the compressor control panel chamber 142 through the internal connecting pipe 144 to cool the compressor control panel 140. That is, it is possible to cool the compressor control panel 140 using the air which flows through the compressor chamber 114 and is discharged.

**[0104]** Hereinbefore, preferred embodiments of the present disclosure have been illustrated and described,

but the present disclosure is not limited to the specific embodiments described above, and various modifications can be made by those with ordinary knowledge in the technical field to which the invention belongs without departing from the gist of the present disclosure claimed in the claims, and these modified implementations should not be understood individually from the technical spirit or perspective of the present disclosure.

## Claims

### 1. A drier comprising:

a cabinet forming an exterior;  
a drum rotatably installed inside the cabinet;  
a heat pump module including an evaporator, a compressor, a condenser, and an expander through which a refrigerant circulates to perform heat exchange between flowing air and the evaporator or the condenser;  
a blower fan configured to cause the air subjected to the heat exchange in the heat pump module to flow to an inside of the drum;  
a compressor chamber housing configured to reduce noise generated by the compressor and form a compressor chamber which is a space through which air flows around an outer periphery of the compressor; and  
a cooling fan configured to cause air to flow into the compressor chamber.

### 2. The drier of claim 1, wherein the cooling fan is disposed to face the compressor.

### 3. The drier of claim 1, wherein the compressor chamber housing includes an inlet port through which air outside the cabinet flows into the compressor chamber, and an exhaust port through which air inside the compressor chamber flows to an outside of the compressor chamber housing.

### 4. The drier of claim 3, wherein the cooling fan is disposed in the inlet port of the compressor chamber housing.

### 5. The drier of claim 4, wherein a surface on which the inlet port of the compressor chamber housing is formed faces one side of the cabinet.

### 6. The drier of claim 3, wherein the cooling fan is disposed to be spaced apart from the inlet port of the compressor chamber housing.

### 7. The drier of claim 3, wherein the cooling fan is disposed at the exhaust port of the compressor chamber housing.

8. The drier of claim 3, wherein the cooling fan is disposed at the exhaust port of the compressor chamber housing.
9. The drier of claim 3, wherein the cooling fan is disposed inside the compressor chamber, and a size of the cooling fan is larger than a size of the inlet port formed in the compressor chamber housing. 5
10. The drier of claim 3, further comprising a connecting pipe configured to connect the inlet port of the compressor chamber housing and a cabinet-inlet port formed to cause external air to flow into one side of the cabinet to each other. 10
11. The drier of claim 10, wherein the cooling fan is disposed in the cabinet-inlet port formed on one side of the cabinet. 15
12. The drier of claim 1, wherein the compressor chamber housing includes a sound absorbing material configured to reduce noise generated by the compressor, and a structural member configured to maintain an outer shape of the compressor chamber housing. 20
13. The drier of claim 12, wherein the compressor chamber housing includes a skin layer disposed on both side surfaces of the sound absorbing material to insulate the noise generated by the compressor. 25
14. The drier of claim 3, wherein the compressor chamber housing further includes an auxiliary hole formed so as not to interfere with a structure connected to the compressor. 30
15. The drier of claim 1, further comprising:
  - a compressor control panel configured to control driving of the compressor; 35
  - a compressor control panel chamber configured to form a space in which the compressor control panel is disposed; and
  - an inner connecting pipe configured to feed air exhausted from the compressor chamber to the compressor control panel chamber. 40
16. The drier of claim 15, wherein the cooling fan is disposed at a portion in which the compressor chamber housing and the inner connecting pipe are connected to each other. 45

55

FIG. 1

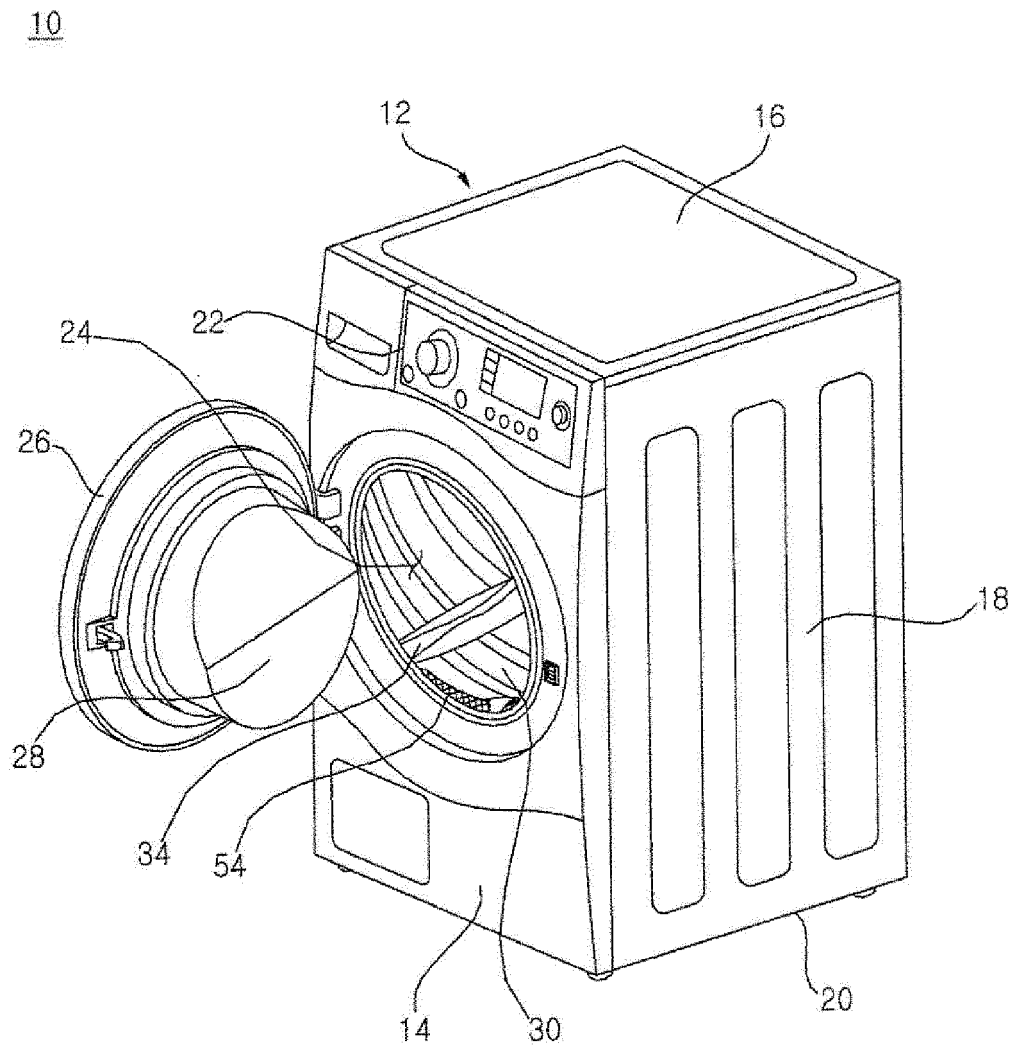


FIG. 2

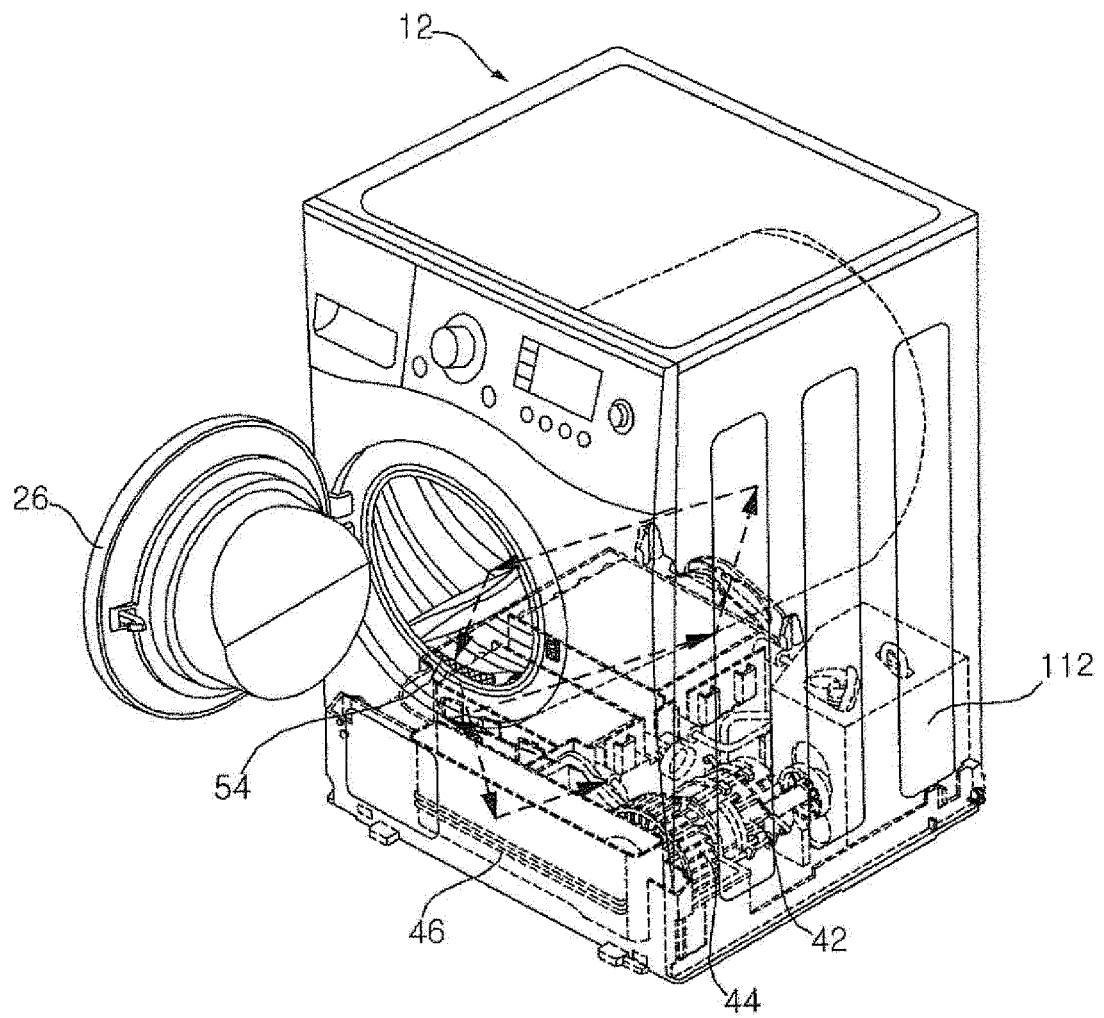


FIG. 3

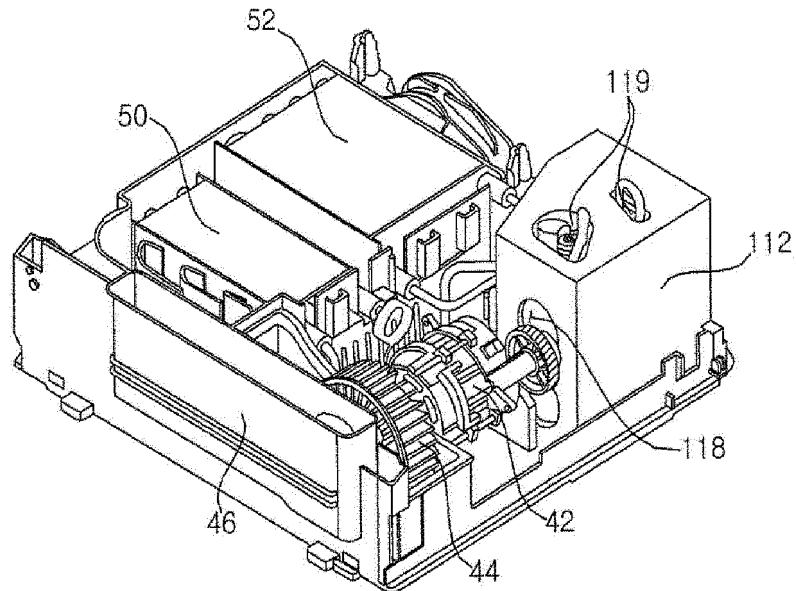


FIG. 4

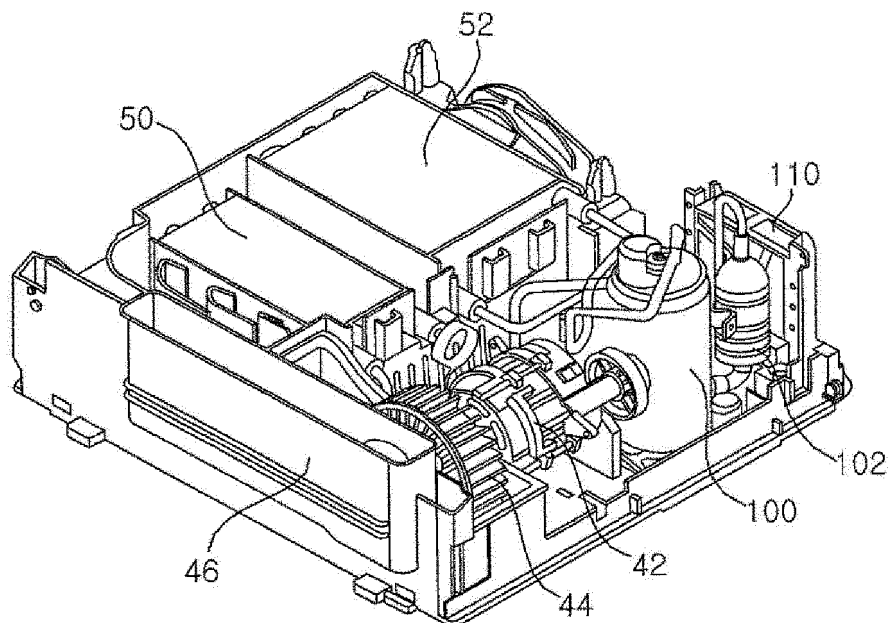


FIG. 5

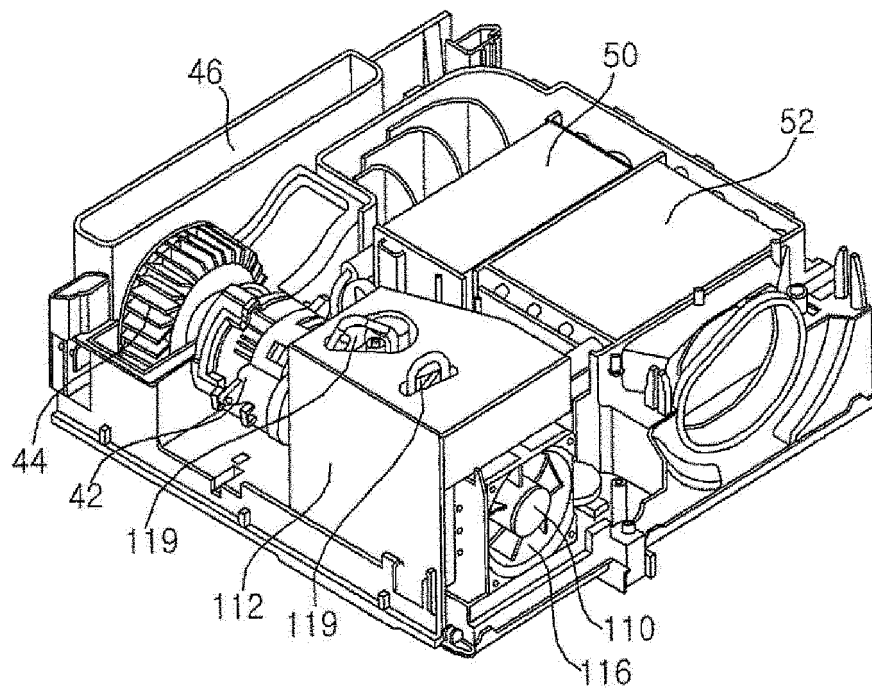


FIG. 6

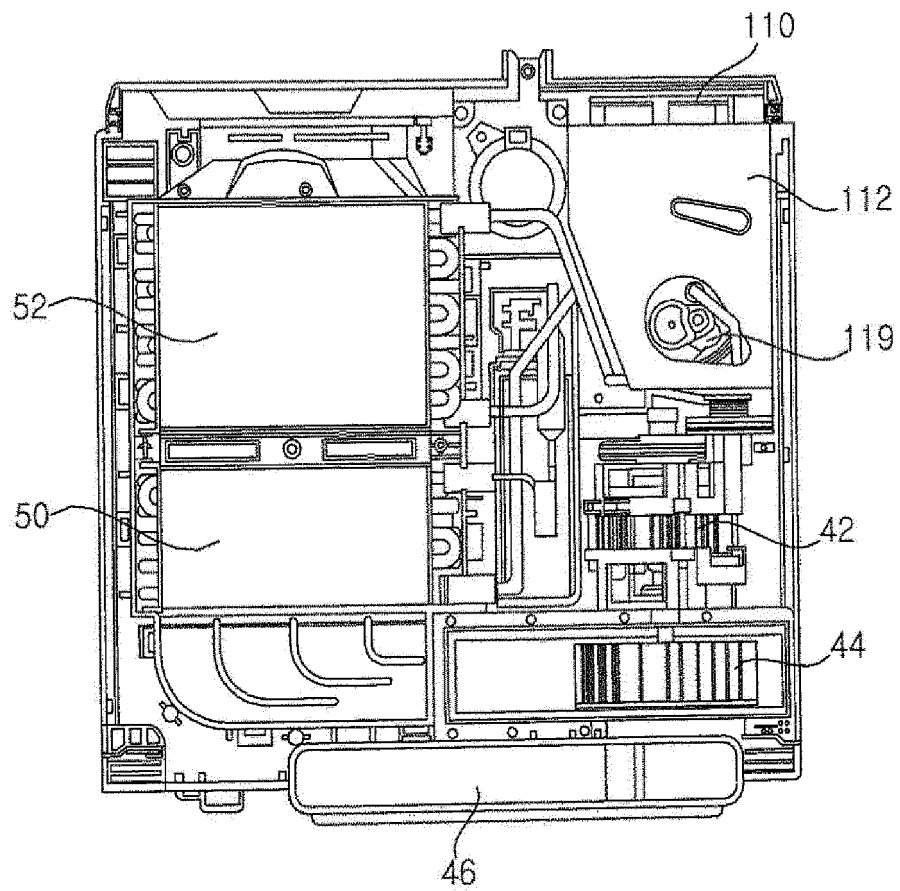


FIG. 7

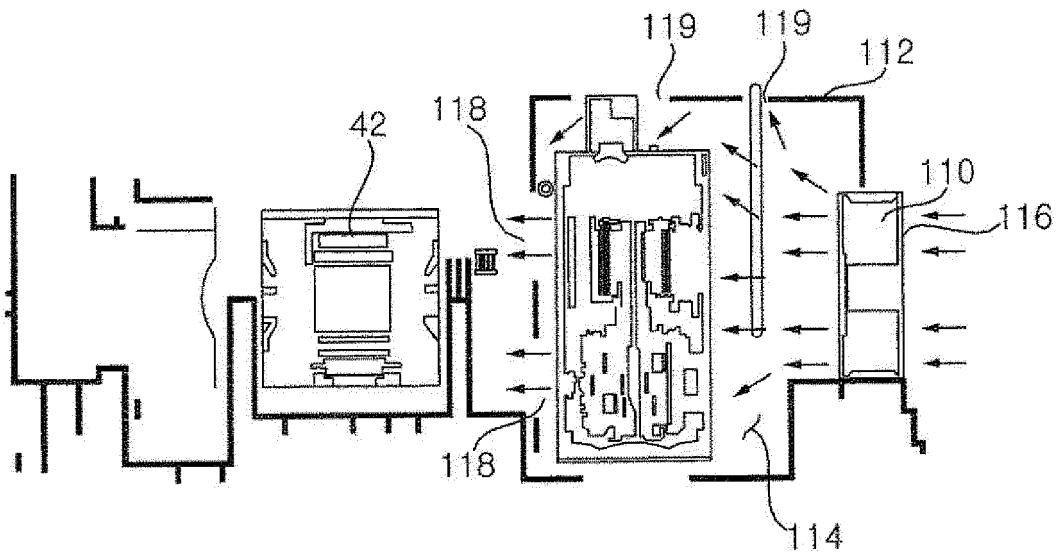


FIG. 8A

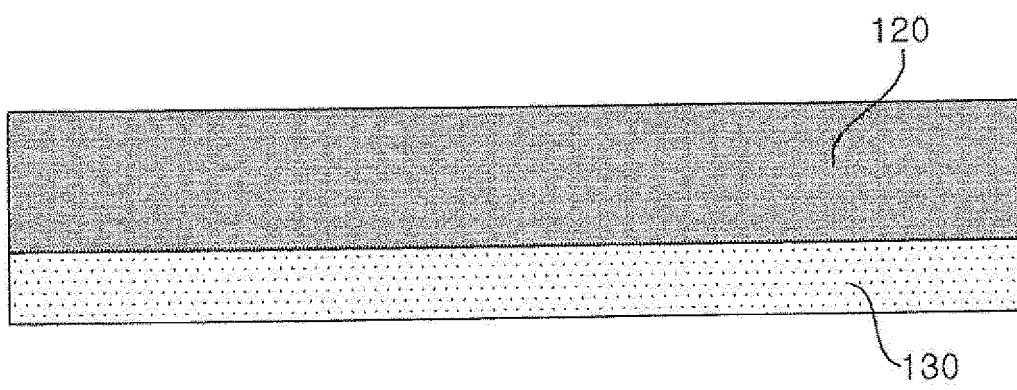




FIG. 8B

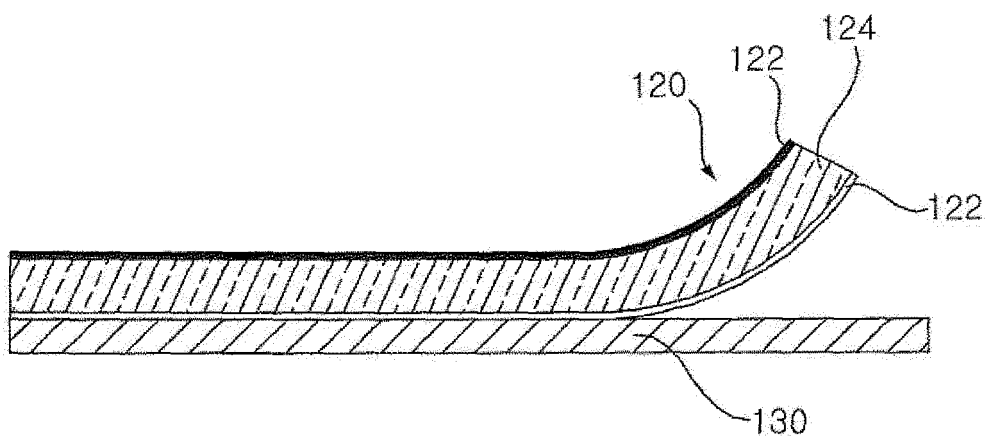


FIG. 9A

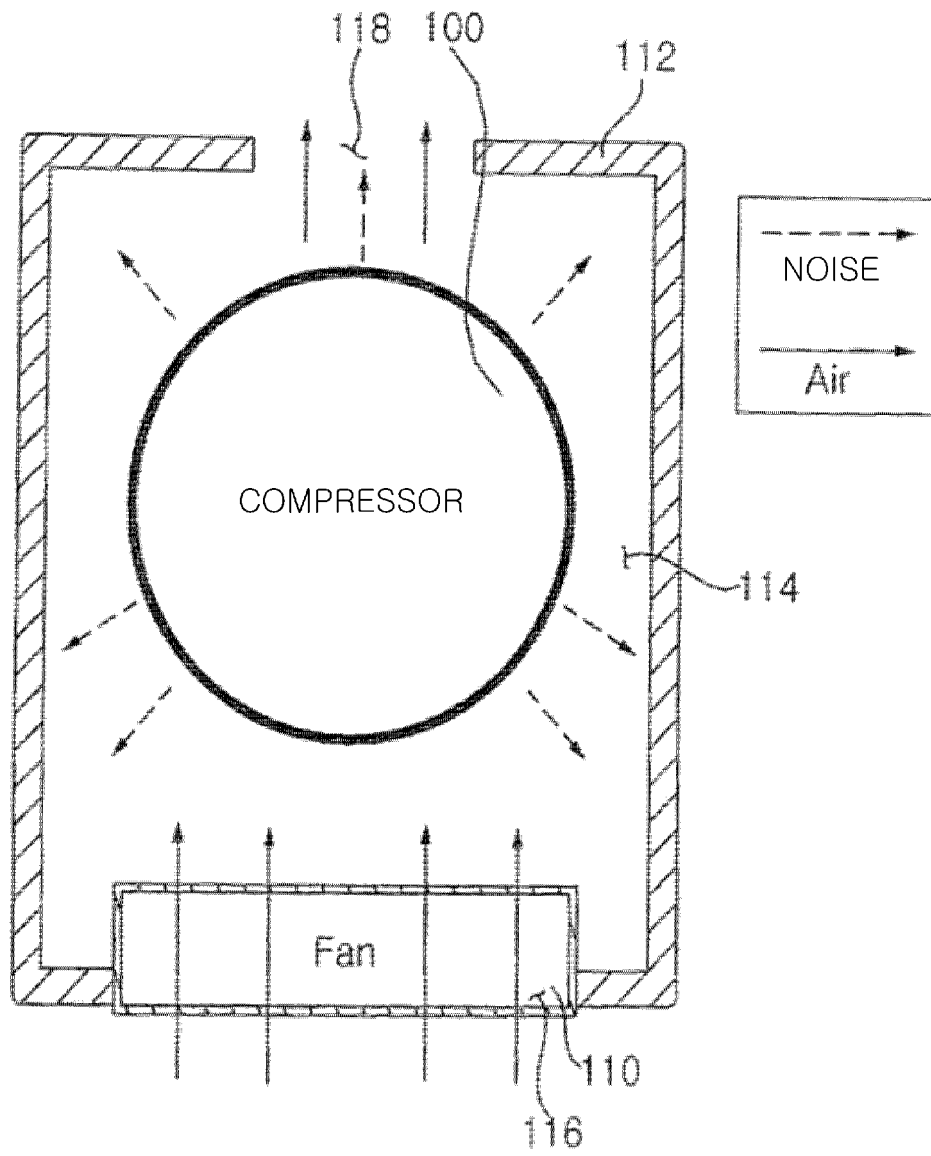


FIG. 9B

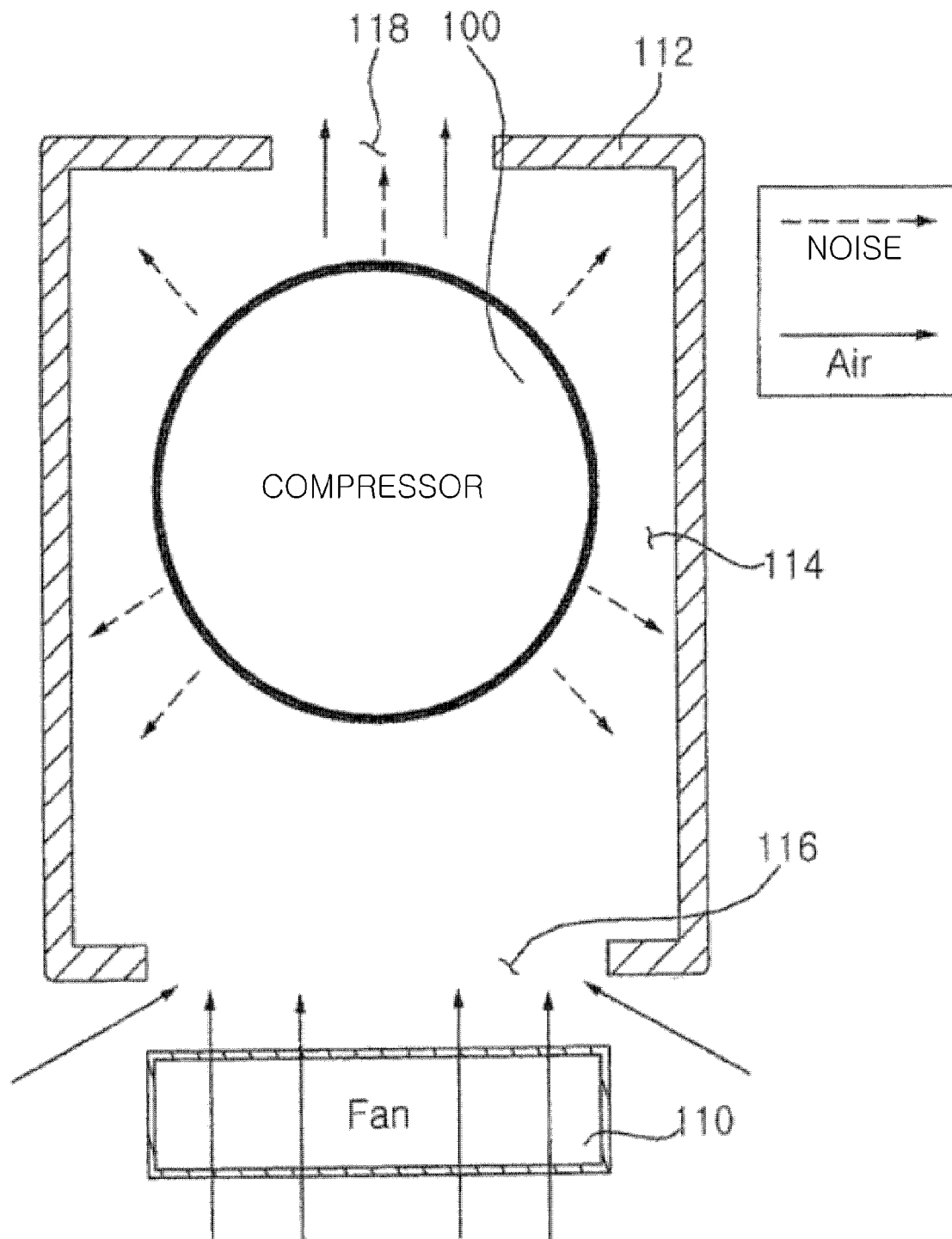


FIG. 9C

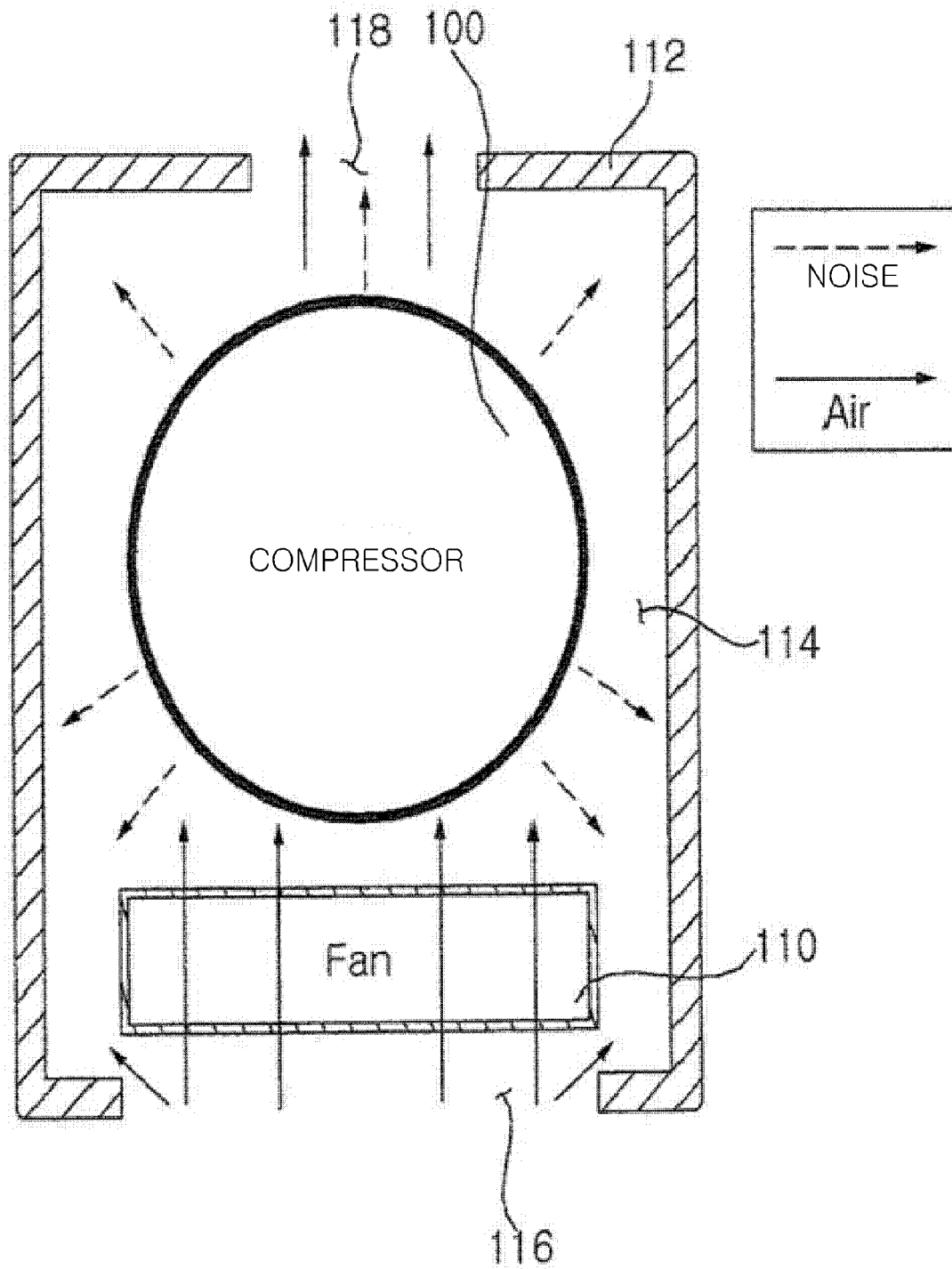


FIG. 9D

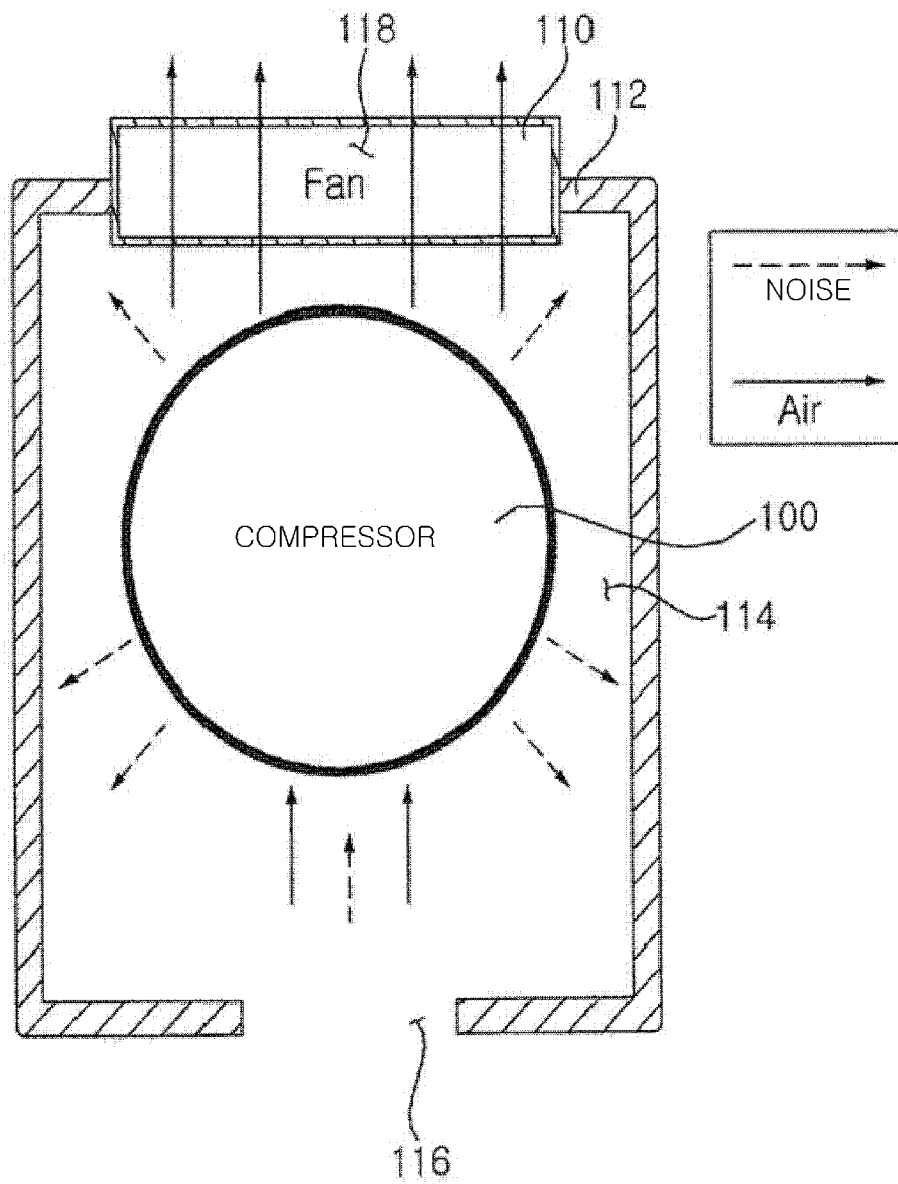


FIG. 10

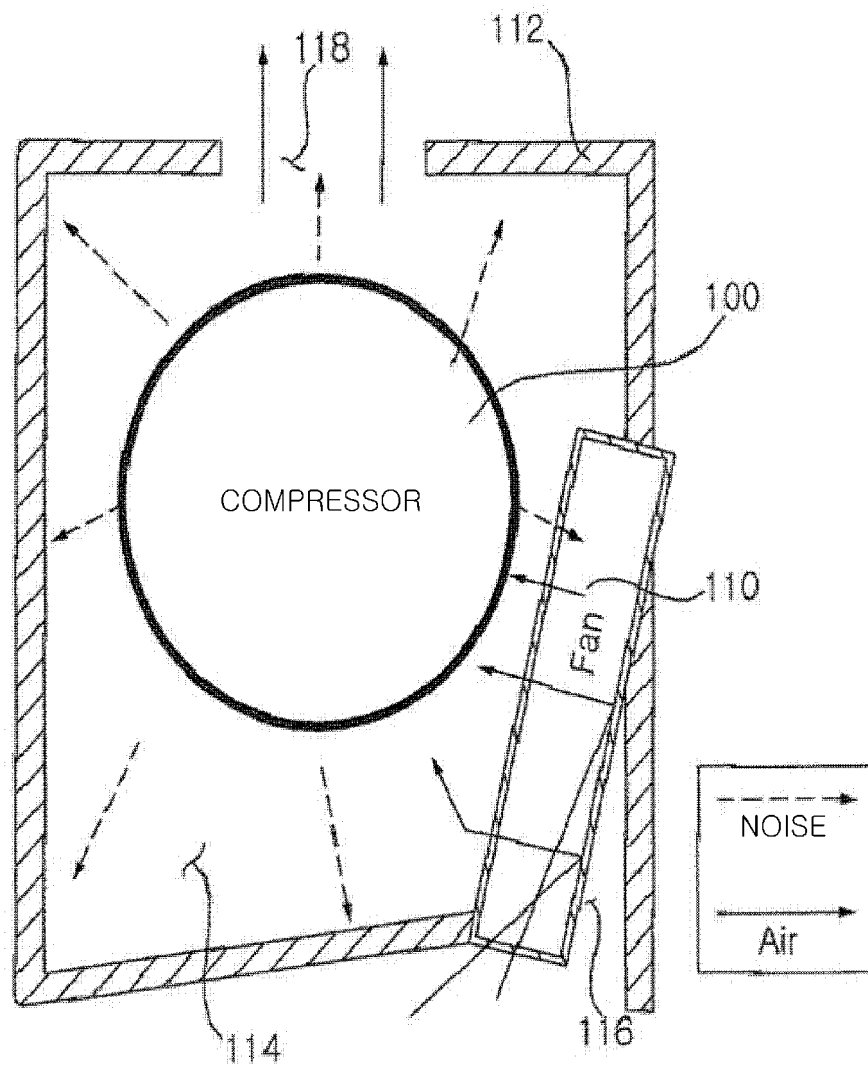


FIG. 11A

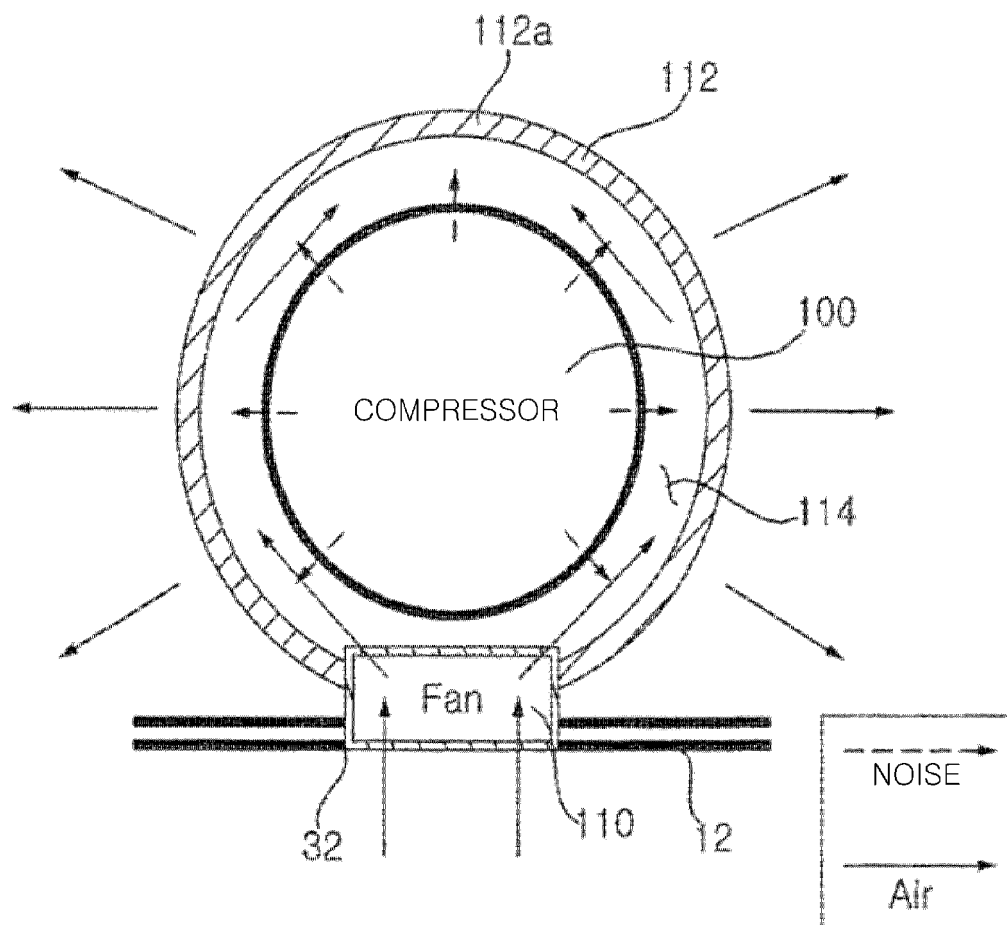


FIG. 11B

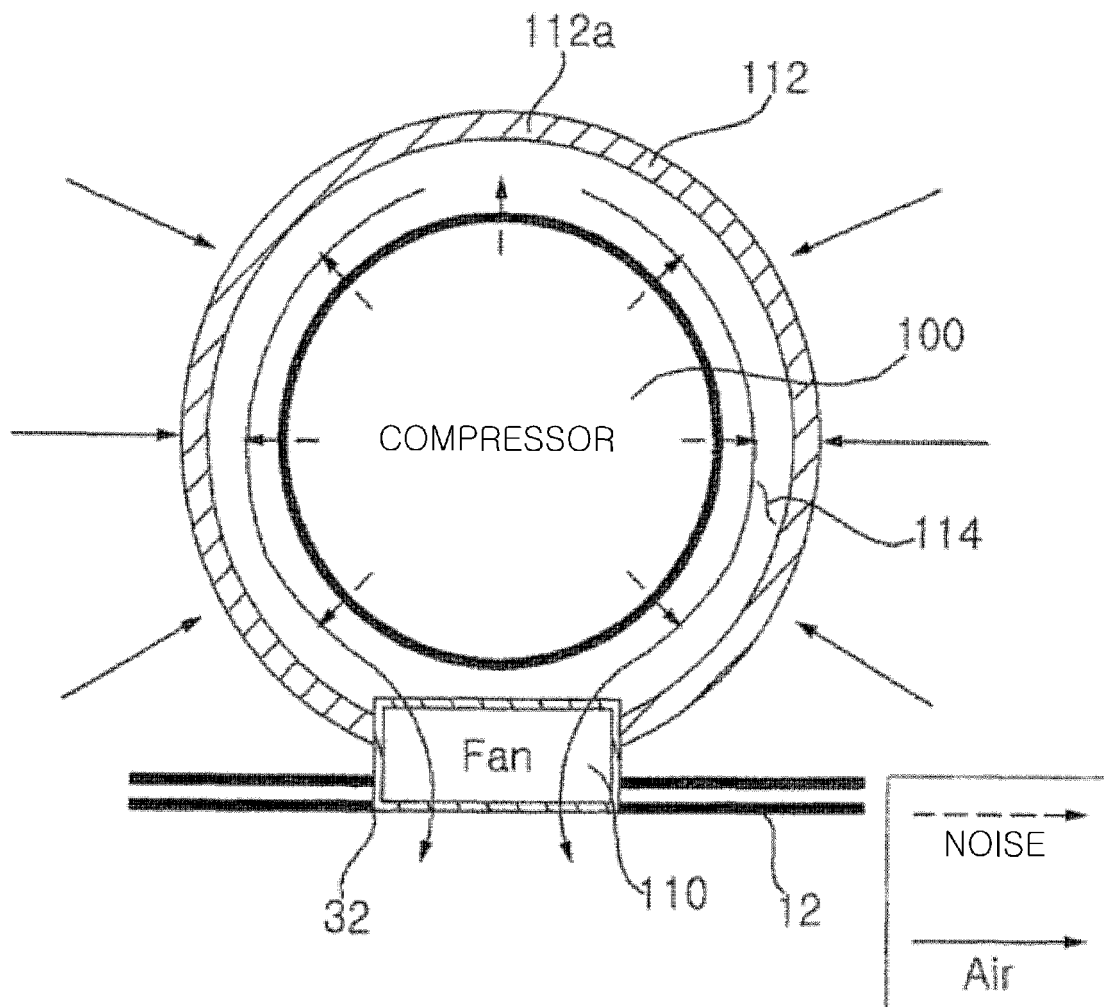




FIG. 12

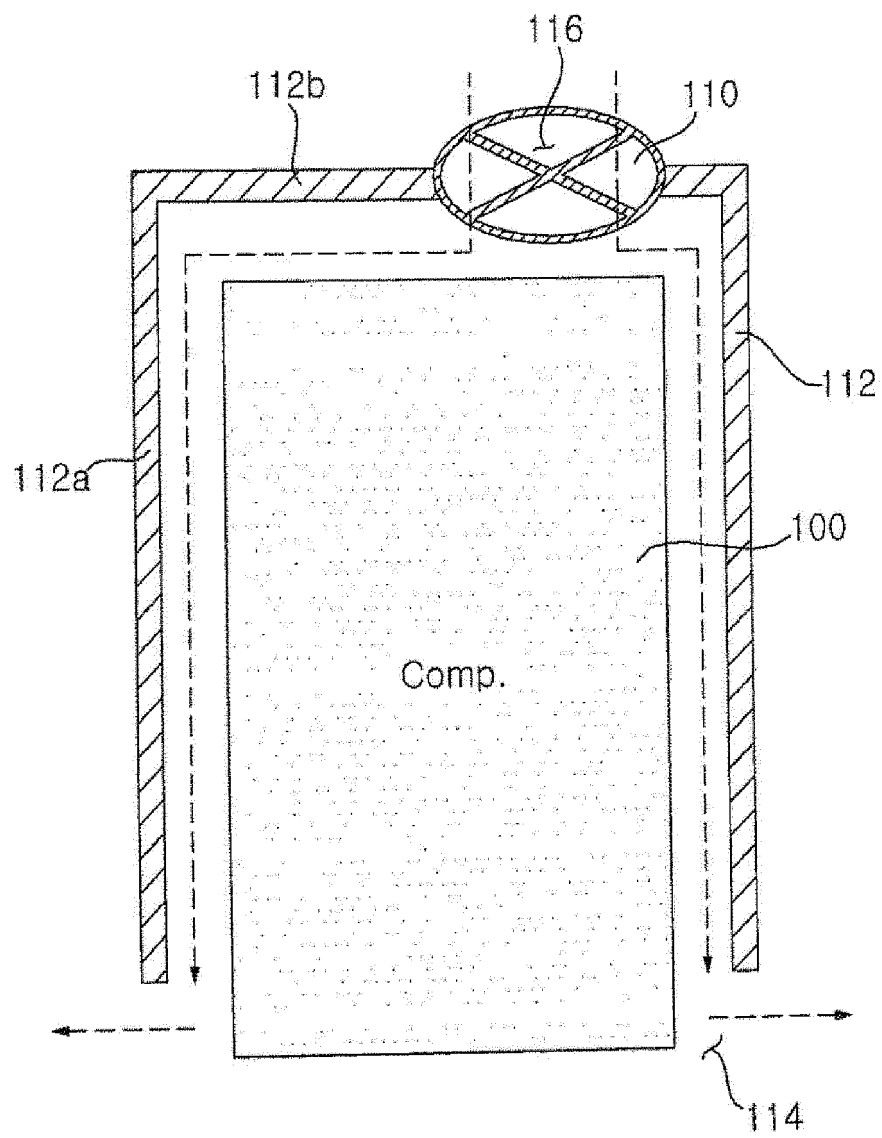


FIG. 13

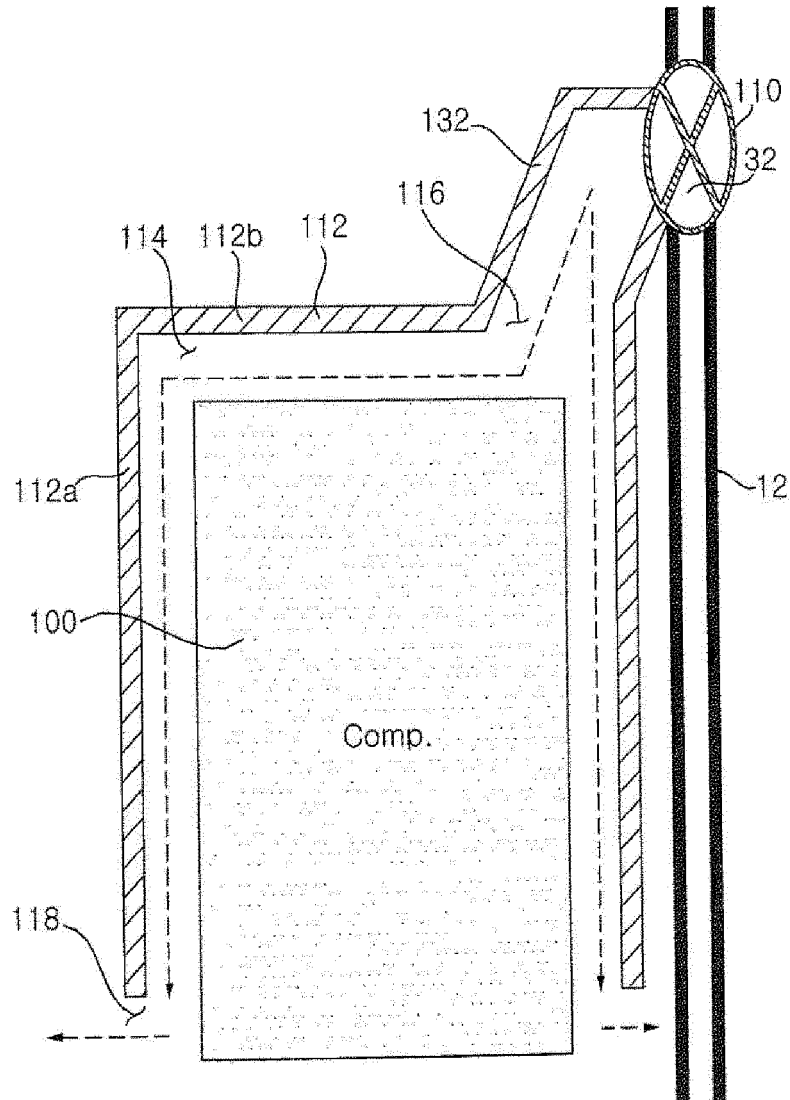


FIG. 14

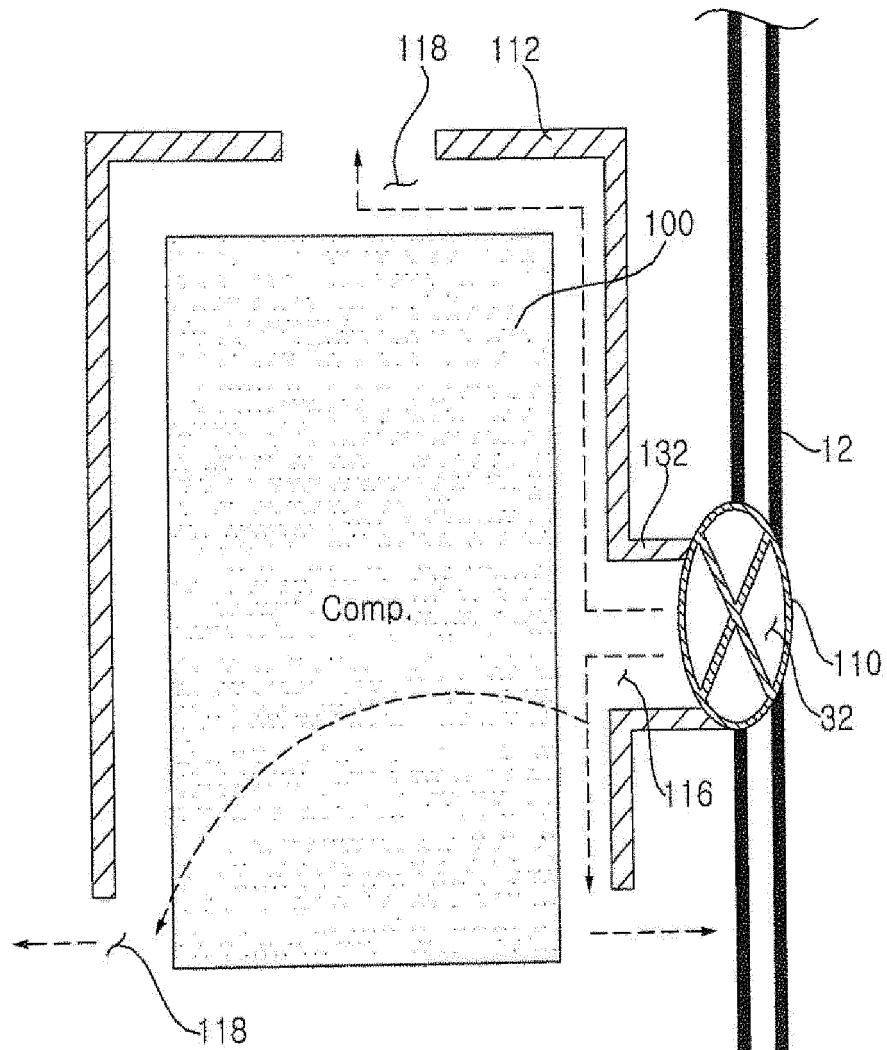


FIG. 15

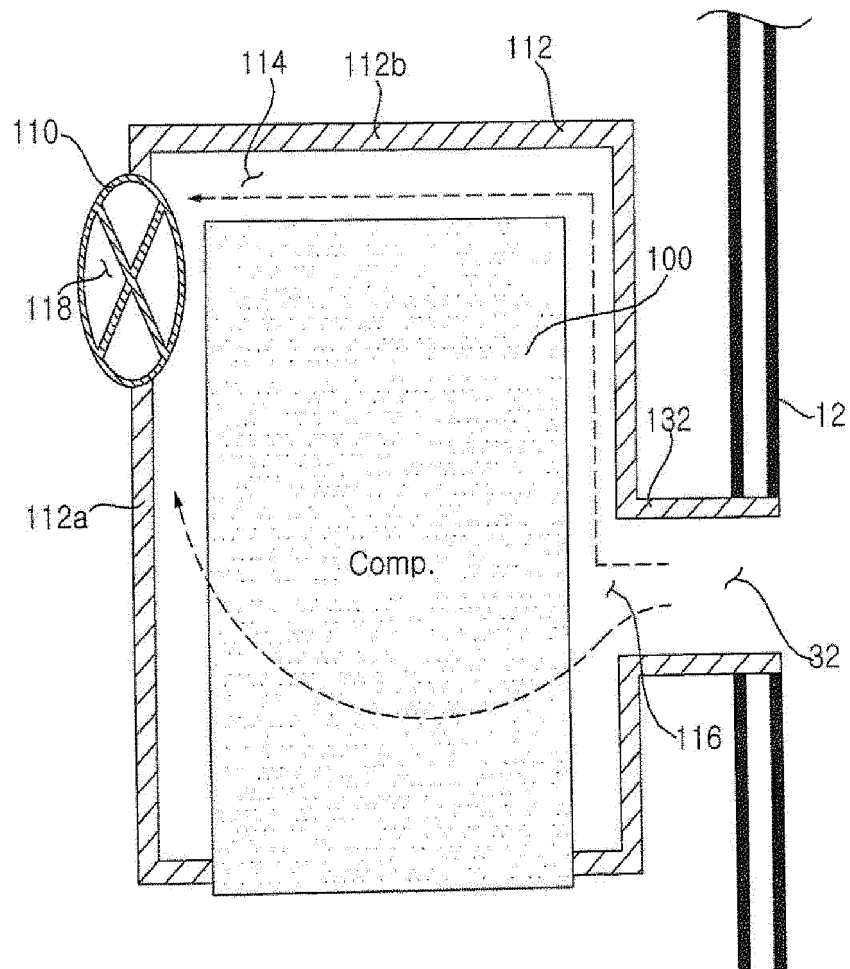
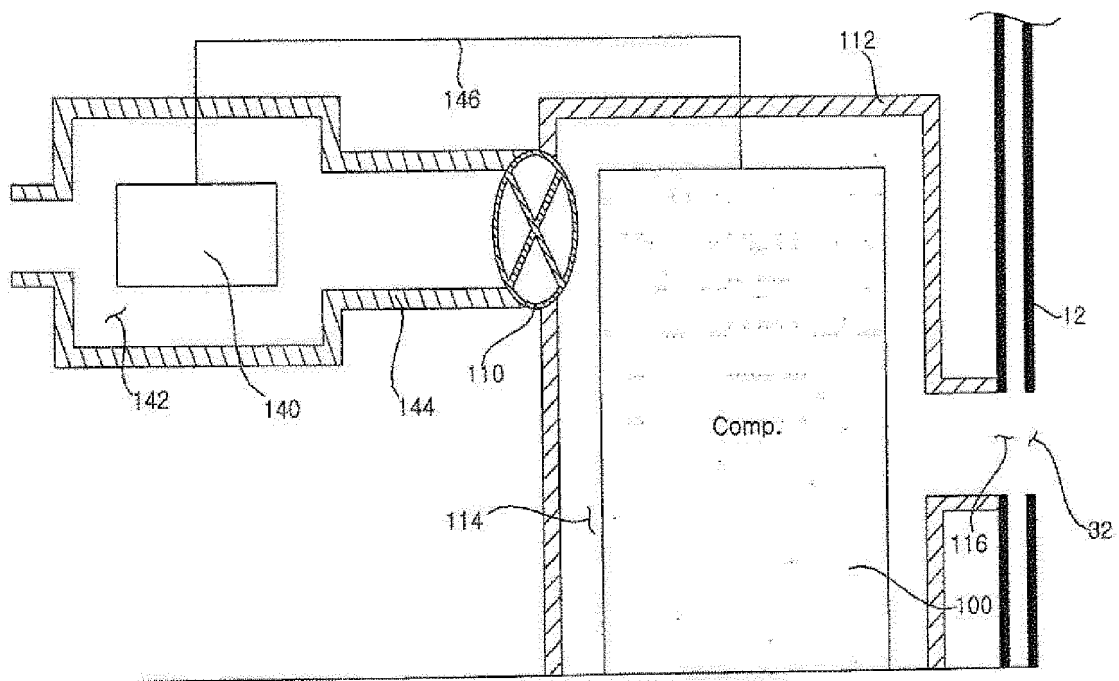


FIG. 16



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2019/008672

## A. CLASSIFICATION OF SUBJECT MATTER

*D06F 58/08(2006.01)i, D06F 58/20(2006.01)i, D06F 58/24(2006.01)i, D06F 58/30(2020.01)i*

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F 58/08; D06F 58/00; D06F 58/04; D06F 58/20; D06F 58/24; D06F 58/28; E04B 1/98; E04F 15/20; D06F 58/30

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) &amp; Keywords: sound absorption, cooling fan, compressor, dryer

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2018-0066742 A (LG ELECTRONICS INC.) 19 June 2018 See paragraphs [0034], [0043] and [0045], claim 21 and figures 3-4.	1-11, 14
Y		12-13
A		15-16
Y	KR 10-2010-0000275 A (DUT KOREA CO., LTD. et al.) 06 January 2010 See paragraphs [0020]-[0023] and figure 2.	12-13
A	KR 10-2016-0087183 A (LG ELECTRONICS INC.) 21 July 2016 See claims 1 and 7 and figure 3.	1-16
A	KR 10-2016-0059982 A (SAMSUNG ELECTRONICS CO., LTD.) 27 May 2016 See claims 1-5 and figure 11.	1-16
A	JP 2010-012073 A (PANASONIC CORP.) 21 January 2010 See claims 1-2 and figures 6 and 8.	1-16

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

\* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Date of the actual completion of the international search

10 APRIL 2020 (10.04.2020)

Date of mailing of the international search report

10 APRIL 2020 (10.04.2020)

Name and mailing address of the ISA/KR

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Authorized officer

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INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.

PCT/KR2019/008672

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Form PCT/ISA/210 (patent family annex) (January 2015)