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(54) **Outdoor unit of air conditioner**

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Description

[0001] This application claims the priority benefit of Korean Patent Application No. 10-2013-0164377, filed on December 26, 2013 in the Korean Intellectual Property Office. The present invention relates to a blower apparatus and an outdoor unit of an air conditioner having the same and, more particularly, to a blower apparatus that guides flow of discharged air to restrain generation of an eddy in the air, thereby improving a sound insulation effect, and an outdoor unit of an air conditioner having the same.

[0002] In general, an air conditioner is an apparatus that cools or heats a room using a refrigeration cycle including a compressor, an outdoor heat exchanger, an expansion valve, and an indoor heat exchanger. That is, the air conditioner may be configured as a cooler that cools a room or as a heater that heats a room. In addition, the air conditioner may be configured as a heater and cooler that cools and heats a room.

[0003] The air conditioner may be mainly classified as a window type air conditioner or a separate type (or split type) air conditioner. The window type air conditioner and the separate type air conditioner are identical in function to each other except that the window type air conditioner, having an integrated cooling and heat dissipation function, is directly installed in an opening formed through the wall of a house or in a window of the house, whereas the separate type air conditioner includes an indoor unit, including an indoor heat exchanger, installed indoors, an outdoor unit, including a compressor and an outdoor heat exchanger, installed outdoors, and a refrigerant pipe connected between the indoor unit and the outdoor unit.

[0004] The outdoor heat exchanger of the outdoor unit performs heat exchange between outdoor air and a refrigerant. The outdoor unit includes a blower apparatus to blow the outdoor air for smooth heat exchange between the outdoor air and the refrigerant.

US 2013/125579 discloses a propeller fan rotating about a vertical axis, with a bellmouth having a wall extending such that an air passage on an outlet side spreads outward. The bellmouth has a shape satisfying: H/D>=0.04 between a length H of the sloping surface in a direction of the rotation axis from an end on an inlet; side to an end on the outlet side and a fan diameter D of the propeller fan 0<theta>=60 DEG for an angle theta formed between a line connecting the ends of the sloping surface and the rotation axis; and L/L0>=0.5 between a length L in the direction of the rotation axis from an opening on the inlet side to the end of the sloping surface on the inlet side and a length L0 of the blades of the propeller fan in the direction of the rotational axis.

[0005] It is an object of the present invention to provide a blower apparatus that guides flow of discharged air to restrain generation of an eddy in the air, thereby improving a sound insulation effect, and an outdoor unit of an air conditioner having the same.

[0006] It will be appreciated by those skilled in the art that objects of the present invention are not limited to the above object of the present invention and other unmentioned objects of the present invention will be more clearly understood from the following description.

[0007] In accordance with an aspect of the present invention, the above and other objects can be accomplished by the invention as defined in independent claim 1. Further preferred features are defined in dependent claims. An outdoor unit of the air conditioner may include a case defining an external appearance thereof, an outdoor heat exchanger disposed in the case to perform heat exchange between outdoor air and a refrigerant, and a blower apparatus to blow and guide the outdoor air, wherein the blower apparatus includes a blower fan rotated about a shaft thereof to blow the air heat-exchanged with the refrigerant by the outdoor heat exchanger in one direction and an orifice installed in the case such that an inside and an outside of the case communicate with each other through the orifice to guide the air blown by the blower fan, the orifice includes a discharge part to guide air discharged from a front to a rear of the blower apparatus in an axial direction of the blower apparatus by the blower fan, and a sectional area of the discharge part is gradually increased from the front to the rear of the blower apparatus in the axial direction of the blower apparatus.

[0008] The orifice may include a suction part located opposite to the discharge part via the blower fan to guide air suctioned from the front to the rear of the blower apparatus in the axial direction of the blower apparatus by the blower fan and a connection part connected between the suction part and the discharge part, and a sectional area of the suction part may be gradually decreased from the front to the rear of the blower apparatus in the axial direction of the blower apparatus.

[0009] A rear end of the discharge part may be located more adjacent to the rear of the blower apparatus in the axial direction of the blower apparatus than a rear end of the blower fan.

[0010] A front end of the suction part may be located more adjacent to the front of the blower apparatus in the axial direction of the blower apparatus than a front end of the blower fan.

[0011] A ratio of a width of the rear end of the discharge part to a width of the connection part may be 1.6:1 to 1.4:1.

[0012] The case may be provided with suction holes, through which outdoor air is introduced, and the suction holes may be located under the discharge part.

[0013] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a view schematically showing construction of an air conditioner according to an embodiment of the present invention;

FIG. 2 is a view showing an outdoor unit of an air

conditioner according to an embodiment of the present invention;

FIG. 3 is an exploded perspective view showing the outdoor unit of the air conditioner shown in FIG. 2;

FIG. 4 is a perspective view showing a blower apparatus according to an embodiment of the present invention;

FIG. 5 is a sectional view showing the blower apparatus according to the embodiment of the present invention; and

FIG. 6 is a view schematically showing the flow of air generated by the blower apparatus according to the embodiment of the present invention.

[0014] Advantages and features of the present invention and a method of achieving the same will be more clearly understood from embodiments described below with reference to the accompanying drawings. However, the present invention is not limited to the following embodiments but may be implemented in various different forms. The embodiments are provided merely to complete disclosure of the present invention and to fully provide a person having ordinary skill in the art to which the present invention pertains with the category of the invention. The invention is defined only by the category of the claims. Wherever possible, the same reference numbers will be used throughout the specification to refer to the same or like elements.

[0015] Hereinafter, reference will now be made in detail to embodiments, examples of which are illustrated in the accompanying drawings.

[0016] FIG. 1 is a view schematically showing construction of an air conditioner according to an embodiment of the present invention.

[0017] Referring to FIG. 1, the air conditioner 1 according to this embodiment includes a compressor 20 to compress a refrigerant, an outdoor heat exchanger 170 installed outdoors to perform heat exchange between the refrigerant and outdoor air, an indoor heat exchanger 50 installed indoors to perform heat exchange between the refrigerant and indoor air, a switching valve 80 to guide the refrigerant discharged from the compressor 20 to the outdoor heat exchanger 170 during a cooling operation and to guide the refrigerant discharged from the compressor 20 to the indoor heat exchanger 50 during a heating operation.

[0018] The air conditioner 1 includes an outdoor unit disposed outdoors and an indoor unit disposed indoors. The outdoor unit and the indoor unit are connected to each other. The outdoor unit includes the compressor 20, the outdoor heat exchanger 170, an outdoor expansion valve 70, and a gas and liquid separator 27. The indoor unit includes the indoor heat exchanger 50 and an indoor expansion valve 60.

[0019] The compressor 20 is installed in the outdoor unit to compress a low-temperature, low-pressure refrigerant, introduced into the compressor 20, into a high-temperature, high-pressure refrigerant. The compressor 20 may be configured to have various structures. Example, the compressor 20 may be a reciprocation type compressor 20 using a cylinder and a piston, a scroll type compressor 20 using a rotatable scroll and a stationary scroll, or an inverter type compressor 20 to adjust a compression rate of the refrigerant based on a real indoor temperature, a real outdoor temperature, and the number of indoor units under operation when a desired indoor temperature is set. One or more compressors 20 may be provided. In this embodiment, two compressors 20 are provided.

[0020] The compressor 20 is connected to the switching valve 80 and the gas and liquid separator 27. The compressor 20 includes an inlet port 21, through which a refrigerant evaporated by the indoor heat exchanger 50 is introduced into the compressor 20 during the cooling operation or a refrigerant evaporated by the outdoor heat exchanger 170 is introduced into the compressor 20 during the heating operation, and an outlet port 23, through which a compressed refrigerant is discharged from the compressor 20.

[0021] The compressor 20 compresses the refrigerant introduced through the inlet port 21 in a compression compartment. The compressor 20 discharges the compressed refrigerant through the outlet port 23. The refrigerant discharged through the outlet port 23 flows to the switching valve 80.

[0022] The switching valve 80 is a flow channel switching valve 80 for switching between cooling and heating. The switching valve 80 guides the refrigerant compressed by the compressor 20 to the outdoor heat exchanger 170 during the cooling operation and guides the refrigerant compressed by the compressor 20 to the indoor heat exchanger 50 during the heating operation. That is, the switching valve 80 functions to guide the refrigerant compressed by the compressor 20 to a condenser.

[0023] The switching valve 80 is connected to the outlet port 23 of the compressor 20 and the gas and liquid separator 27. In addition, the switching valve 80 is connected to the indoor heat exchanger 50 and the outdoor heat exchanger 170. During the cooling operation, the switching valve 80 connects the outlet port 23 of the compressor 20 to the outdoor heat exchanger 170 and connects the indoor heat exchanger 50 to the gas and liquid separator 27. In another embodiment, however, the switching valve 80 may connect the indoor heat exchanger 50 to the inlet port 21 of the compressor 20 during the cooling operation.

[0024] During the heating operation, the switching valve 80 connects the outlet port 23 of the compressor 20 to the indoor heat exchanger 50 and connects the outdoor heat exchanger 170 to the gas and liquid separator 27. In another embodiment, however, the switching valve 80 may connect the outdoor heat exchanger 170 to the inlet port 21 of the compressor 20 during the heating operation.

[0025] The switching valve 80 may be embodied by various modules that are capable of connecting different

flow channels to each other. In this embodiment, the switching valve 80 is a four-way valve. In another embodiment, however, the switching valve 80 may be embodied by various valves and combinations thereof, such as a combination of two three-way valves.

[0026] The outdoor heat exchanger 170 is disposed in the outdoor unit installed outdoors to perform heat exchange between the refrigerant passing through the outdoor heat exchanger 170 and outdoor air. During the cooling operation, the outdoor heat exchanger 170 functions as a condenser to condense the refrigerant. During the heating operation, on the other hand, the outdoor heat exchanger 170 functions as an evaporator to evaporate the refrigerant.

[0027] The outdoor heat exchanger 170 is connected to the switching valve 80 and the outdoor expansion valve 70. During the cooling operation, the refrigerant compressed by the compressor 20 passes through the outlet port 23 of the compressor 20 and the switching valve 80 and is then introduced into the outdoor heat exchanger 170, in which the refrigerant is condensed. The condensed refrigerant flows to the outdoor expansion valve 70. During the heating operation, on the other hand, the refrigerant expanded by the outdoor expansion valve 70 flows to the outdoor heat exchanger 170, in which the refrigerant is evaporated. The evaporated refrigerant flows to the switching valve 80.

[0028] During the cooling operation, the outdoor expansion valve 70 is fully opened to allow the refrigerant to pass therethrough. During the heating operation, on the other hand, an opening degree of the outdoor expansion valve 70 is adjusted to expand the refrigerant. The outdoor expansion valve 70 is disposed between the outdoor heat exchanger 170 and an injection module 90.

[0029] During the cooling operation, the outdoor expansion valve 70 allows the refrigerant introduced from the outdoor heat exchanger 170 to pass therethrough such that the refrigerant is guided to the injection module 90. During the heating operation, on the other hand, the outdoor expansion valve 70 may expand the refrigerant through heat exchange in the injection module 90 and guide the expanded refrigerant to the outdoor heat exchanger 170.

[0030] The indoor heat exchanger 50 is disposed in the indoor unit installed indoors to perform heat exchange between the refrigerant passing through the indoor heat exchanger 50 and indoor air. During the cooling operation, the indoor heat exchanger 50 functions as an evaporator to evaporate the refrigerant. During the heating operation, on the other hand, the indoor heat exchanger 50 functions as a condenser to condense the refrigerant.

[0031] The indoor heat exchanger 50 is connected to the switching valve 80 and the indoor expansion valve 60. During the cooling operation, the refrigerant expanded by the indoor expansion valve 60 flows to the indoor heat exchanger 50, in which the refrigerant is evaporated. The evaporated refrigerant flows to the switching valve 80. During the heating operation, on the other hand, the refrigerant compressed by the compressor 20 passes through the outlet port 23 of the compressor 20 and the switching valve 80 and is then introduced into the indoor heat exchanger 50, in which the refrigerant is condensed. The condensed refrigerant flows to the indoor expansion valve 60.

[0032] During the cooling operation, an opening degree of the indoor expansion valve 60 is adjusted to expand the refrigerant. During the heating operation, on the other hand, the indoor expansion valve 60 is fully opened to allow the refrigerant to pass therethrough. The indoor expansion valve 60 is disposed between the indoor heat exchanger 50 and the injection module 90.

[0033] During the cooling operation, the indoor expansion valve 60 expands the refrigerant flowing to the indoor heat exchanger 50. During the heating operation, on the other hand, the indoor expansion valve 60 allows the refrigerant introduced from the indoor heat exchanger 50 to pass therethrough such that the refrigerant is guided to the injection module 90.

[0034] The injection module 90 is disposed between the outdoor heat exchanger 170 and the indoor heat exchanger 50 to inject a portion of the refrigerant flowing between the outdoor heat exchanger 170 and the indoor heat exchanger 50 to the compressor 20. That is, the injection module 90 may inject a portion of the refrigerant flowing from the condenser to the expansion valve to the compressor 20. The injection module 90 is connected to the outdoor expansion valve 70 and the indoor expansion valve 60.

[0035] The injection module 90 includes an injection expansion valve 91 to expand a portion of the refrigerant flowing between the outdoor heat exchanger 170 and the indoor heat exchanger 50 and an injection heat exchanger 92 to perform heat exchange between another portion of the refrigerant flowing between the indoor heat exchanger 50 and the outdoor heat exchanger 170 and the refrigerant expanded by the injection expansion valve 91. The injection heat exchanger 92 guides the heat-exchanged and thus evaporated refrigerant to an injection port 22 of the compressor 20. In another embodiment, however, the injection module 90 may not be included in the air conditioner 1.

[0036] The gas and liquid separator 27 is disposed between the switching valve 80 and the inlet port 21 of the compressor 20. The gas and liquid separator 27 is connected to the switching valve 80 and the inlet port 21 of the compressor 20. The gas and liquid separator 27 separates the refrigerant evaporated by the indoor heat exchanger 50 during the cooling operation or the refrigerant evaporated by the outdoor heat exchanger 170 during the heating operation into a gas refrigerant and a liquid refrigerant and guides the gas refrigerant to the inlet port 21 of the compressor 20. That is, the gas and liquid separator 27 separates the refrigerant evaporated by the evaporator into a gas refrigerant and a liquid refrigerant and guides the gas refrigerant to the inlet port 21 of the compressor 20.

[0037] The refrigerant evaporated by the outdoor heat exchanger 170 or the indoor heat exchanger 50 is introduced into the gas and liquid separator 27 through the switching valve 80. Consequently, the gas and liquid separator 27 may be maintained at a temperature of about 0 to 5 °C and cold energy may be dissipated from the gas and liquid separator 27. The surface temperature of the gas and liquid separator 27 is lower than the temperature of the refrigerant condensed by the outdoor heat exchanger 170 during the cooling operation. The gas and liquid separator 27 may be formed in a cylindrical shape extending in a longitudinal direction.

[0038] FIG. 2 is a view showing an outdoor unit of an air conditioner according to an embodiment of the present invention. FIG. 3 is an exploded perspective view showing the outdoor unit of the air conditioner shown in FIG. 2.

[0039] Referring to FIGS. 2 and 3, the outdoor unit of the air conditioner 1 according to this embodiment includes an outdoor unit base 110 defining the bottom thereof, an outdoor unit body 100 coupled to the outdoor unit base 110, the outdoor unit body 100 being provided at the lateral side thereof with suction holes, through which air is suctioned, the outdoor unit body 100 being provided at the top thereof with a discharge hole 143, an outdoor heat exchanger 170 disposed in the outdoor unit body 100 such that the outdoor heat exchanger 170 corresponds to the suction holes, a blower apparatus 200 provided in the discharge hole 143 of the outdoor unit body 100 to blow air in a vertical direction, and an suction apparatus provided at the lower part of the outdoor unit body 100 to suction air in a horizontal direction.

[0040] In this embodiment, an upward and downward direction means a vertical direction, which is a direction of gravity, and a forward and backward direction and a left and right direction mean a horizontal direction perpendicular to the upward and downward direction.

[0041] An outdoor unit case, which is constituted by the outdoor unit base 110 and the outdoor unit body 100, defines the external appearance of the outdoor unit of the air conditioner 1. The outdoor unit base 110 defines the external appearance of the bottom of the outdoor unit case. A compressor 20, oil separators 28 and 29, a gas and liquid separator 27, and an outdoor heat exchanger 170 are installed at the top of the outdoor unit base 110.

[0042] The outdoor unit body 100 is coupled to the outdoor unit base 110. The outdoor unit body 100 is formed in the shape of a rectangular parallelepiped opened at the bottom thereof. The suction holes, through which air is suctioned, are formed at the lateral side of the outdoor unit body 100.

[0043] The discharge hole 143 is formed at an upper region of the outdoor unit case. Specifically, the discharge hole 143 is formed at the top of the outdoor unit body 100.

[0044] The suction holes may be formed at three side parts of the lateral side of the outdoor unit body 100. Specifically, the suction holes may be formed at the rear, the left side, and the right side of the outdoor unit body 100.

[0045] In this embodiment, the suction holes include left side suction holes 123, right side suction holes 133, and rear suction holes 163.

[0046] The outdoor unit body 100 includes a left side panel 120 defining the left side thereof, a right side panel 130 defining the right side thereof, a top panel 140 defining the top thereof, a front panel 150 defining the front thereof, and a rear panel 160 defining the rear thereof.

[0047] The left side panel 120 defines the external appearance of the left side of the outdoor unit. The left side panel 120 is coupled to the left side of the outdoor unit base 110. The left side panel 120 is provided with a left side grill 122, through which outdoor air is suctioned into the outdoor unit body 100. The left side grill 122 defines the left side suction holes 123, through which outdoor air is suctioned from the left side.

[0048] The right side panel 130 defines the external appearance of the right side of the outdoor unit. The right side panel 130 is coupled to the right side of the outdoor unit base 110. The right side panel 130 is provided with a right side grill 132, through which outdoor air is suctioned into the outdoor unit body 100. The right side grill 132 defines the right side suction holes 133, through which outdoor air is suctioned from the right side.

[0049] The top panel 140 defines the external appearance of the top of the outdoor unit. The top panel 140 is coupled to the upper end of the left side panel 120 and the upper end of the right side panel 130. The discharge hole 143 is formed at the top panel 140. The top panel 140 may be provided with a discharge grill 142, which is located above the discharge hole 143.

[0050] The front panel 150 defines the external appearance of the front of the outdoor unit. The front panel 150 is disposed at the front of a space defined by the outdoor unit base 110, the left side panel 120, the right side panel 130, and the top panel 140.

[0051] The rear panel 160 defines the external appearance of the rear of the outdoor unit. The rear panel 160 is disposed at the rear of the space defined by the outdoor unit base 110, the left side panel 120, the right side panel 130, and the top panel 140.

[0052] The rear panel 160 is provided with a rear grill 162, through which outdoor air is suctioned into the outdoor unit body 100. The rear grill 162 defines the rear suction holes 163, through which outdoor air is suctioned from the rear.

[0053] The outdoor heat exchanger 170 is disposed in the outdoor unit body 100 such that the outdoor heat exchanger 170 corresponds to the suction holes. In this embodiment, the suction holes include left side suction holes 123, the right side suction holes 133, and the rear suction holes 163. To this end, the outdoor heat exchanger 170 is formed in the shape of ⊃ in horizontal section such that the outdoor heat exchanger 170 has three sides.

[0054] The outdoor heat exchanger 170 having three

sides is disposed so as to surround the compressor 20, the oil separators 28 and 29, and the gas and liquid separator 27 installed at the top of the outdoor unit base 110.

[0055] The left side of the outdoor heat exchanger 170 is disposed so as to correspond to the left side suction holes 123 formed at the left side grill 122, the right side of the outdoor heat exchanger 170 is disposed so as to correspond to the right side suction holes 133 formed at the right side grill 132, and the rear of the outdoor heat exchanger 170, which is located between the left side and the right side of the outdoor heat exchanger 170, is disposed so as to correspond to the rear suction holes 163 formed at the rear grill 162.

[0056] The blower apparatus 200 may include a blower fan 220 rotated by a motor 230 and an orifice 210, surrounding the blower fan 220, to guide air blown by the blower fan 220.

[0057] The blower fan 220 is disposed under the top panel 140 such that the blower fan 220 corresponds to the discharge hole 143.

[0058] The blower fan 220 is supported by a discharge bracket connected to the front panel 150 and the rear panel 160. The blower fan 220 is rotated by the motor 230. The motor 230 is installed at the discharge bracket.

[0059] The blower fan 220 is rotated to generate a pressure difference between the front and the rear of the blower fan 220 such that air flows in one direction. For example, the blower fan 220 may include an axial fan. The blower fan 220 will hereinafter be described in detail.

[0060] The suction apparatus is provided at the lower part of the outdoor unit body 100 to suction air in a horizontal direction. The suction apparatus is disposed above the outdoor unit base 110. The suction apparatus includes a suction motor 196 and a suction fan 198 rotated by the suction motor 196. The suction fan 198 is supported by a suction bracket 197 connected to the top of the outdoor unit base 110. The suction fan 198 is rotated by the suction motor 196. The suction motor 196 is installed at the suction bracket 197.

[0061] The suction fan 198 circulates outdoor air together with the blower apparatus 200 such that the outdoor heat exchanger 170 performs heat exchange between the outdoor air and the refrigerant.

[0062] In a case in which the blower apparatus 200 and the suction fan 198 circulate outdoor air in cooperation with each other such that the outdoor heat exchanger 170 performs heat exchange between the outdoor air and the refrigerant, efficiency of the air conditioner 1 during a cooling/heating operation is higher than in a case in which only the blower apparatus 200 circulates the outdoor air without the suction fan 198 such that the outdoor heat exchanger 170 performs heat exchange between the outdoor air and the refrigerant.

[0063] The suction fan 198 may be an axial fan, having a horizontal shaft, to suction outdoor air into the outdoor unit body 100. The shaft of the suction fan 198 extends in a forward and backward direction to suction air in the forward and backward direction.

[0064] A controller 180 controls the compressor 20, the outdoor expansion valve 70, the indoor expansion valve 60, the switching valve 80, the suction motor 196, and the motor 230 based on required cooling and heating performance.

[0065] FIG. 4 is a perspective view showing a blower apparatus according to an embodiment of the present invention. FIG. 5 is a sectional view showing the blower apparatus according to the embodiment of the present invention.

[0066] Referring to FIGS. 4 and 5, the blower apparatus 200 according to the embodiment of the present invention includes a blower fan 220 rotated about a shaft thereof to blow air heat-exchanged with the refrigerant by the outdoor heat exchanger 170 in one direction and an orifice 210 installed in the case such that the inside and the outside of the case communicate with each other through the orifice 210 to guide the air blown by the blower fan 220. The orifice 210 includes a discharge part 211 to guide air discharged from the front F to the rear R of the blower apparatus 200 in an axial direction of the blower apparatus 200 by the blower fan 220. The sectional area of the discharge part 211 is gradually increased from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200.

[0067] The blower fan 220 is disposed under the discharge hole 143 of the outdoor unit body in an upward and downward direction to blow air in the upward and downward direction (from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200).

[0068] That is, the blower fan 220 discharges outdoor air from the outdoor unit body.

[0069] The blower fan 220 blows outdoor air such that the outdoor heat exchanger 170 performs heat exchange between the outdoor air and the refrigerant.

[0070] The blower fan 220 discharges outdoor air suctioned through the suction holes outward from the case.

[0071] In this embodiment, the blower fan 220 is an axial fan. The axial fan includes a hub 221 rotated by a motor 230 to provide rotational force and blades disposed around the tub 221 in a radial manner at predetermined intervals.

[0072] The hub 221 constitutes a rotational axis of the blades 222. A rotary shaft of the motor 230 is coupled to the hub 221. The hub 221 may be formed in various shapes. In this embodiment, the tub 221 is formed in a cylindrical shape.

[0073] The blades 222 drive air. A plurality of blades 222 may be provided around the hub 221. The blades are disposed around the tub 221 in a radial manner at predetermined intervals. The blades 222 may be formed in the shape of a twisted propeller to rotate air introduced through an inlet port 212 of the orifice 210 and to drive the air in the axial direction of the blower apparatus 200.

[0074] Specifically, the blades 222 are rotated by the motor 230 to drive air from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower

apparatus 200.

[0075] The front F of the blower apparatus 200 in the axial direction of the blower apparatus 200 may be aligned with a direction of gravity (a downward direction).

[0076] The orifice 210 is installed in the case such that the inside and the outside of the case communicate with each other through the orifice 210 to guide the air blown by the blower fan 220.

[0077] Specifically, the orifice 210 may be located at the upper region of the case such that the orifice 210 communicates with the discharge hole 143.

[0078] The blower fan 220 is disposed inside the orifice 210.

[0079] Specifically, the orifice 210 may form a closed space to surround the blower fan 220 on a horizontal plane perpendicular to the axial direction of the blower apparatus 200. The axis means a shaft about which the blower fan 220 is rotated.

[0080] The internal space of the orifice 210 may be formed in a shape in which the front F and the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 are opened and the orifice 210 surrounds the blower fan 220 in a direction perpendicular to the axial direction of the blower apparatus 200. That is, the orifice 210 is formed approximately in a cylindrical shape.

[0081] The internal space of the orifice 210 defines a flow channel to guide air blown by the blower fan 220. An inlet port 212, through which air is introduced by the blower fan 220, is formed in internal space of the orifice 210 at the front F of the blower apparatus 200 in the axial direction of the blower apparatus 200 and an outlet port 214, through which air is discharged by the blower fan 220, is formed in the internal space of the orifice 210 at the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200.

[0082] The orifice 210 may be installed in the case. Specifically, the orifice 210 is disposed under the top panel in a state in which the orifice 210 is connected to the front panel and the rear panel.

[0083] For example, the orifice 210 may include a discharge part 211, a connection part 215, and a suction part 213.

[0084] The discharge part 211 guides air discharged from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 by the blower fan 220.

[0085] The discharge part 211 defines the outlet port 214. Specifically, the discharge part 211 may have a shape having the outlet port 214 defined therein. For example, the discharge part 211 may be formed in a shape in which the front F and the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 are opened and the discharge part 211 surrounds the blower fan 220 in a direction perpendicular to the axial direction of the blower apparatus 200. That is, the discharge part 211 is formed approximately in a cylindrical shape.

[0086] The discharge part 211 is located at the rear R of the blower fan 220 in the axial direction of the blower apparatus 200.

[0087] The center of the discharge part 211 may be aligned with the shaft of the blower fan 220.

[0088] The sectional area of the discharge part 211 is gradually increased from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200. In addition, the width of the discharge part 211 is also gradually increased.

[0089] Consequently, noise of air discharged by the blower fan 220 is proportional to flow speed of air. The flow speed of the air is a value obtained by dividing the flow rate of air by a sectional area perpendicular to a flow direction of the air.

[0090] According to law of mass conservation, the flow rate of air is uniformly maintained irrespective of position in a flow direction (axial direction) of the air. When the sectional area of the discharge part 211 is gradually increased, therefore, the flow speed of the air becomes slow. As a result, noise of the discharged air is reduced.

[0091] When the flow speed of the air is decreased, a difference in flow speed between the discharged air and external air at a rear end 211A of the discharge part 211 is reduced with the result that generation of an eddy in the air is restrained. As generation of an eddy in the air is restrained, efficiency of the outdoor unit is improved.

[0092] The sectional area means the area of a plane perpendicular to the axial direction.

[0093] Specifically, the front end of the discharge part 211 is connected to the connection part 215 and the rear end 211A of the discharge part 211 is located more adjacent to the rear R in the axial direction than the rear end of the blower fan 220. Consequently, it is possible to sufficiently reduce the flow speed of the air having passed through the blower fan 220.

[0094] The front end of the discharge part 211 means an end of the discharge part 211 located at the front F in the axial direction and the rear end 211A of the discharge part 211 means an end of the discharge part 211 located at the rear R in the axial direction.

[0095] That is, the discharge part 211 may have a uniform height. The height of the discharge part 211 means the distance from the front end of the discharge part 211 to the rear end 211A of the discharge part 211.

[0096] The axial section of the discharge part 211 may have a linear or curved shape. The axial section means the sectional area of a plane parallel to the axial direction.

[0097] A ratio of a width L2 of the rear end 211A of the discharge part 211 to a width L1 of the connection part 215 may be 1.6:1 to 1.4:1. If the width L2 of the rear end 211A of the discharge part 211 is greater than 1.6 times the width L1 of the connection part 215, the sectional area of the discharge part 211 is sharply increased with the result that it is not possible to guide air flowing into the discharge port 211. On the other hand, if the width L2 of the rear end 211A of the discharge part 211 is less than 1.4 times the width L1 of the connection part 215, the sectional area of the discharge part 211 is gently in-

creased with the result that it is not possible to reduce the flow speed of the air discharged from the discharge part 211.

[0098] In a case in which the sectional shape of the discharge part 211 is circular, the width L2 of the rear end 211A of the discharge part 211 means the diameter of an internal space of the discharge part 211. On the other hand, in a case in which the sectional shape of the discharge part 211 is polygonal, the width L2 of the rear end 211A of the discharge part 211 means the average width of the internal space of the discharge part 211. In addition, in a case in which the sectional shape of the connection part 215 is circular, the width L1 of the connection part 215 means the diameter of an internal space of the connection part 215.

[0099] In addition, a difference between the width L2 of the rear end 211A of the discharge part 211 and the width L1 of the connection part 215 may be 50 % to 100 % the width L1 of the connection part 215. If the difference between the width L2 of the rear end 211A of the discharge part 211 and the width L1 of the connection part 215 is greater than 100 % the width L1 of the connection part 215, the sectional area of the discharge part 211 is sharply increased with the result that it is not possible to guide air flowing into the discharge port 211. On the other hand, if the difference between the width L2 of the rear end 211A of the discharge part 211 and the width L1 of the connection part 215 is less than 50 % the width L1 of the connection part 215, the sectional area of the discharge part 211 is gently increased with the result that it is not possible to reduce the flow speed of the air discharged from the discharge part 211.

[0100] The difference between the width L2 of the rear end 211A of the discharge part 211 and the width L1 of the connection part 215 is a value obtained by subtracting the width L1 of the connection part 215 from the width L2 of the rear end 211A of the discharge part 211. In addition, the width L1 of the connection part 215 is equal to the width of the front end of the discharge part 211.

[0101] In addition, the rear end 211A of the discharge part 211 may be located at the upper region of the case. Since the flow speed of the air discharged from the discharge part 211 is higher than that of the air introduced into the discharge part 211, noise is increased in the discharge part 211.

[0102] In a case in which the rear end 211A of the discharge part 211 is located at the upper region of the case and the front F of the blower apparatus 200 in the axial direction of the blower apparatus 200 is aligned with a direction of gravity, therefore, the air is discharged from the discharge part 211 toward the upper side of the case.

[0103] In general, the case has a predetermined height and, therefore, the discharge part 211 is installed at the predetermined height from the ground. As a result, it is possible to reduce noise that people may hear in ear.

[0104] Particularly, in a case in which the height of the rear end 211A of the discharge part 211 (which means the height from the ground) is designed to be equal to or greater than the average height of people, it is possible to further reduce noise of the air discharged from the discharge part 211.

[0105] The sectional holes may be located under the discharge part 211. Since the sectional holes are disposed at three sides of the case, the flow speed of the air suctioned through the sectional holes is reduced. Consequently, noise is low even when the sectional holes are disposed adjacent to ears of people.

[0106] The suction part 213 guides air suctioned from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 by the blower fan 220. That is, the suction part 213 increases the flow speed of the air suctioned by the blower fan 220.

[0107] The suction part 213 defines the inlet port 212 of the orifice 210. Specifically, the suction part 213 may have a shape having the inlet port 212 defined therein. For example, the suction part 213 may be formed in a shape in which the front F and the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 are opened and the suction part 213 surrounds the blower fan 220 in a direction perpendicular to the axial direction of the blower apparatus 200. That is, the suction part 213 is formed approximately in a cylindrical shape.

[0108] The suction part 213 is located at the front F of the blower fan 220 in the axial direction of the blower apparatus 200. That is, the suction part 213 is located opposite to the discharge part 211 via the blower fan 220.

[0109] The center of the suction part 213 may be aligned with the shaft of the blower fan 220.

[0110] The sectional area of the suction part 213 is gradually increased from the front F to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200. In addition, the width of the suction part 213 is also gradually increased.

[0111] Consequently, the flow speed of the air suctioned by the blower fan 220 is increased.

[0112] The sectional area means the area of a plane perpendicular to the axial direction of the blower apparatus 200.

[0113] Specifically, the rear end of the suction part 213 is connected to the connection part 215 and the front end 213A of the suction part 213 is located more adjacent to the front F of the blower apparatus 200 in the axial direction of the blower apparatus 200 than the front end of the blower fan 220.

[0114] Consequently, it is possible to sufficiently increase the flow speed of the air suctioned into the blower fan 220.

[0115] The front end 213A of the suction part 213 means an end of the suction part 213 located at the front F of the blower apparatus 200 in the axial direction of the blower apparatus 200 and the rear end of the suction part 213 means an end of the suction part 213 located at the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200.

[0116] That is, the suction part 213 may have a uniform

height. The height of the suction part 213 means the distance from the front end 213A of the suction part 213 to the rear end of the suction part 213.

[0117] The axial section of the suction part 213 may have a linear or curved shape. The axial section means the sectional area of a plane parallel to the axial direction of the blower apparatus 200.

[0118] The connection part 215 connects the suction part 213 and the discharge part 211 to each other. Alternatively, the connection part 215 may be an ideal part meaning a connection point between the rear end of the suction part 213 and the front end of the discharge part 211.

[0119] The connection part 215 guides air suctioned from the front R to the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 by the blower fan 220.

[0120] Specifically, the connection part 215 may be formed in a shape in which the front F and the rear R of the blower apparatus 200 in the axial direction of the blower apparatus 200 are opened and the connection part 215 surrounds the blower fan 220 in a direction perpendicular to the axial direction of the blower apparatus 200. That is, the connection part 215 is formed approximately in a cylindrical shape.

[0121] The blower fan 220 is disposed in the connection part 215. The connection part 215 defines an air flow channel around the blower fan 220.

[0122] The center of the connection part 215 may be aligned with the shaft of the blower fan 220.

[0123] The sectional area of the connection part 215 may be sufficient such that the blower fan 220 is disposed in the connection part 215 and the blower fan 220 is rotatable.

[0124] Specifically, the front end of the connection part 215 is connected to the rear end of the suction part 213 and the rear end of the connection part 215 is connected to the front end of the discharge part 211.

[0125] Reinforcement ribs 217 to increase rigidity of the orifice 210 are disposed at the outer circumference of the orifice 210.

[0126] The reinforcement ribs 217 are disposed around the orifice 210 in a radial manner to increase rigidity of the orifice 210.

[0127] FIG. 6 is a view schematically showing the flow of air generated by the blower apparatus according to the embodiment of the present invention.

[0128] The blower apparatus 200 with the above-stated construction according to the present invention and the air conditioner 1 having the blower apparatus 200 operate as follows.

[0129] First, the suction motor 196 is driven to rotate the suction fan 198. According to rotation of the suction fan 198, external air is introduced into the outdoor unit through the suction holes. At this time, the external air is introduced into the outdoor unit in a horizontal direction. Since the external air is introduced into the outdoor unit from three sides in the horizontal direction, the flow speed of the air is low with the result that noise is also low.

[0130] The outdoor heat exchanger 170, which surrounds the suction fan 198 in the shape of ⊃, performs heat exchange between the introduced outdoor air and a refrigerant.

[0131] The outdoor air heat-exchanged with the refrigerant by the outdoor heat exchanger 170 may be heated or cooled. Subsequently, the motor 230 of the blower apparatus 200 disposed above the outdoor heat exchanger 170 is driven to rotate the blower fan 220. According to rotation of the blower fan 220, the heat-exchanged air flows upward.

[0132] The air heat-exchanged with the refrigerant is introduced into the orifice 210.

[0133] Specifically, the air heat-exchanged with the refrigerant is introduced through the inlet port 212 of the suction part 213 of the orifice 210. At this time, the flow speed of the air is increased.

[0134] The air introduced into the orifice 210 is rotated by the blower fan 220 and is blown in the axial direction of the blower apparatus 200.

[0135] The flow speed of the air blown by the blower fan 220 is reduced since the sectional area of the discharge part 211 is increased. As a result, noise and an eddy in air are reduced.

[0136] As is apparent from the above description, the blower apparatus according to the present invention and the outdoor unit of the air conditioner having the same have one or more of the following effects.

[0137] First, the discharge part of the orifice is enlarged in the axial direction of the blower apparatus, thereby restraining generation of an eddy in air.

[0138] Second, the discharge part of the orifice is enlarged in the axial direction of the blower apparatus, thereby achieving a sound insulation effect.

[0139] It will be appreciated by those skilled in the art that the present invention pertains that the effects that can be achieved through the present invention are not limited to what has been particularly described hereinabove and other advantages of the present invention will be more clearly understood from the accompanying claims.

[0140] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope of the invention as disclosed in the accompanying claims.

Claims

1. An outdoor unit of an air conditioner comprising:

   a case defining an external appearance thereof;
   an outdoor heat exchanger (170) disposed in the case to perform heat exchange between outdoor air and a refrigerant; and

a blower apparatus (200) to blow and guide the outdoor air, wherein
the blower apparatus (200) comprises:

a blower fan (220) rotated about a shaft thereof to blow the air heat-exchanged with the refrigerant by the outdoor heat exchanger in one direction; and
an orifice (210) to guide the air blown by the blower fan,
wherein the orifice (210) comprises a discharge part (211) to guide air discharged from a front to a rear of the blower apparatus (200) in an axial direction of the blower apparatus by the blower fan (220), and
wherein a sectional area of the discharge part (211) is gradually increased from the front to the rear of the blower apparatus (200) in the axial direction of the blower apparatus,
characterized in that the orifice (210) is provided at an outer circumference thereof with reinforcement ribs (217) in a radial manner.

2. The outdoor unit according to claim 1, wherein the orifice (210) comprises:

a suction part (213) located opposite to the discharge part via the blower fan to guide air suctioned from the front to the rear of the blower apparatus in the axial direction of the blower apparatus by the blower fan; and
a connection part (215) connected between the suction part and the discharge part, and
a sectional area of the suction part (213) is gradually decreased from the front to the rear of the blower apparatus in the axial direction of the blower apparatus.

3. The outdoor unit according to claim 2, wherein
the discharge part (211) is located at the rear of the blower fan in the axial direction of the blower apparatus, and
the suction part (213) is located at the front of the blower fan in the axial direction of the blower apparatus.

4. The outdoor unit according to claim 3, wherein the blower fan (220) is located in the connection part.

5. The outdoor unit according to claim 4, wherein centers of the discharge part (211), the suction part (213), and the connection part (215) are aligned with the shaft of the blower fan.

6. The outdoor unit according to any one of claims 2 to 5, wherein a rear end of the discharge part (211) is located more adjacent to the rear of the blower apparatus (200) in the axial direction of the blower apparatus than a rear end of the blower fan (220).

7. The outdoor unit according to claim 6, wherein a front end of the suction part (213) is located more adjacent to the front of the blower apparatus (200) in the axial direction of the blower apparatus than a front end of the blower fan (220).

8. The outdoor unit according to claim 7, wherein a ratio of a width of the rear end of the discharge part (211) to a width of the connection part (215) is 1.6:1 to 1.4:1.

9. The outdoor unit according to claim 7 or 8, wherein the front of the blower apparatus (200) in the axial direction of the blower apparatus is aligned with a direction of gravity.

10. The outdoor unit according to claim 9, wherein
the orifice (210) is disposed at an upper region of the case, and
the rear end of the discharge part (211) is located at the upper region of the case.

11. The outdoor unit according to claim 10, wherein
the case is provided with suction holes, through which outdoor air is introduced, and
the suction holes are located under the discharge part (211).

12. The outdoor unit according to claim 11, wherein the suction holes are formed at a side of the case.

13. The outdoor unit according to any one of claims 8 to 12, wherein
a difference between the width of the rear end of the discharge part (211) and the width of the connection part (215) is 50 % to 100 % a width of the connection part (215).

Patentansprüche

1. Außeneinheit einer Klimaanlage, mit:

einem Gehäuse, das deren äußere Erscheinung definiert;
einem Außenwärmetauscher (170), der im Gehäuse angeordnet ist, um einen Wärmetausch zwischen der Außenluft und einem Kältemittel durchzuführen; und
einer Gebläsevorrichtung (200), um die Außenluft zu blasen und zu leiten, wobei die Gebläsevorrichtung (200) aufweist:

einen Gebläseventilator (220), der um des-

sen Welle gedreht wird, um die durch den Außenwärmetauscher mit dem Kältemittel wärmegetauschte Luft in eine Richtung zu blasen; und
eine Blende (210), um die durch den Gebläseventilator geblasene Luft zu leiten,
wobei die Blende (210) einen Ausstoßteil (211) aufweist, um durch den Gebläseventilator (220) ausgestoßene Luft in eine Achsenrichtung der Gebläsevorrichtung von einer Vorderseite zu einer Rückseite der Gebläsevorrichtung (200) zu leiten, und
wobei eine Schnittfläche des Ausstoßteils (211) in die Achsenrichtung der Gebläsevorrichtung von der Vorderseite zur Rückseite der Gebläsevorrichtung (200) allmählich vergrößert wird,
dadurch gekennzeichnet, dass die Blende (210) an ihrem Außenumfang in einer radialen Weise mit Verstärkungsrippen (217) versehen ist.

2. Außeneinheit nach Anspruch 1, wobei die Blende (210) aufweist:

einen Ansaugteil (213), der über den Gebläseventilator gegenüber dem Ausstoßteil angeordnet ist, um durch den Gebläseventilator angesaugte Luft in die Achsenrichtung der Gebläsevorrichtung von der Vorderseite zur Rückseite der Gebläsevorrichtung zu leiten; und
einen Verbindungsteil (215), der zwischen den Ansaugteil und den Ausstoßteil geschaltet ist, und
eine Schnittfläche des Ansaugteils (213) in die Achsenrichtung der Gebläsevorrichtung von der Vorderseite zur Rückseite der Gebläsevorrichtung allmählich verringert wird.

3. Außeneinheit nach Anspruch 2, wobei
der Ausstoßteil (211) in die Achsenrichtung der Gebläsevorrichtung auf der Rückseite des Gebläseventilators angeordnet ist, und
der Ansaugteil (213) in die Achsenrichtung der Gebläsevorrichtung auf der Vorderseite des Gebläseventilators angeordnet ist.

4. Außeneinheit nach Anspruch 3, wobei der Gebläseventilator (220) im Verbindungsteil angeordnet ist.

5. Außeneinheit nach Anspruch 4, wobei
die Mitten des Ausstoßteils (211), des Ansaugteils (213) und des Verbindungsteils (215) mit der Welle des Gebläseventilators ausgerichtet sind.

6. Außeneinheit nach einem der Ansprüche 2 bis 5, wobei ein hinteres Ende des Ausstoßteils (211) in die Achsenrichtung der Gebläsevorrichtung mehr benachbart zur Rückseite der Gebläsevorrichtung (200) angeordnet ist als ein hinteres Ende des Gebläseventilators (220).

7. Außeneinheit nach Anspruch 6, wobei ein vorderes Ende des Ansaugteils (213) in die Achsenrichtung der Gebläsevorrichtung mehr benachbart zur Vorderseite der Gebläsevorrichtung (200) angeordnet ist als ein vorderes Ende des Gebläseventilators (220).

8. Außeneinheit nach Anspruch 7, wobei ein Verhältnis einer Breite des hinteren Endes des Ausstoßteils (211) zu einer Breite des Verbindungsteils (215) 1.6:1 bis 1.4:1 beträgt.

9. Außeneinheit nach Anspruch 7 oder 8, wobei die Vorderseite der Gebläsevorrichtung (200) in die Achsenrichtung der Gebläsevorrichtung mit einer Richtung der Schwerkraft ausgerichtet ist.

10. Außeneinheit nach Anspruch 9, wobei
die Blende (210) an einem oberen Bereich des Gehäuses angeordnet ist, und
das hintere Ende des Ausstoßteils (211) am oberen Bereich des Gehäuses angeordnet ist.

11. Außeneinheit nach Anspruch 10, wobei
das Gehäuse mit Ansauglöchern versehen ist, durch die Außenluft eingeleitet wird, und die Ansauglöcher unter dem Ausstoßteil (211) angeordnet sind.

12. Außeneinheit nach Anspruch 11, wobei die Ansauglöcher auf einer Seite des Gehäuses ausgebildet sind.

13. Außeneinheit nach einem der Ansprüche 8 bis 12, wobei
eine Differenz zwischen der Breite des hinteren Endes des Ausstoßteils (211) und der Breite des Verbindungsteils (215) 50% bis 100% einer Breite des Verbindungsteils (215) beträgt.

Revendications

1. Unité extérieure d'un climatiseur, comprenant :

une carrosserie définissant un aspect extérieur de celle-ci ;
un échangeur de chaleur extérieur (170) disposé à l'intérieur de la carrosserie pour échanger de la chaleur entre l'air extérieur et un réfrigérant ; et
un appareil de ventilation (200) destiné à souffler et à guider de l'air extérieur, ledit appareil de ventilation (200) comportant :

un ventilateur (220) entraîné en rotation autour d'un arbre pour souffler dans une direction l'air soumis par l'échangeur de chaleur extérieur à un échange thermique avec le réfrigérant ; et
un orifice (210) pour le guidage de l'air soufflé par le ventilateur,
ledit orifice (210) présentant une partie de refoulement (211) pour le guidage de l'air évacué par le ventilateur (220) de l'avant vers l'arrière de l'appareil de ventilation (200) dans la direction axiale de l'appareil de ventilation, et
une surface de section de la partie de refoulement (211) augmentant progressivement de l'avant vers l'arrière de l'appareil de ventilation (200) dans la direction axiale de l'appareil de ventilation,
caractérisée en ce que l'orifice (210) est pourvu de nervures de renforcement (217) radialement sur sa circonférence extérieure.

2. Unité extérieure selon la revendication 1, où l'orifice (210) comporte :

une partie d'aspiration (213) opposée à la partie de refoulement en passant par le ventilateur pour le guidage de l'air aspiré par le ventilateur de l'avant vers l'arrière de l'appareil de ventilation dans la direction axiale de l'appareil de ventilation; et
une partie de raccordement (215) montée entre la partie d'aspiration et la partie de refoulement, et où
une surface de section de la partie d'aspiration (213) diminue progressivement de l'avant vers l'arrière de l'appareil de ventilation dans la direction axiale de l'appareil de ventilation.

3. Unité extérieure selon la revendication 2, où
la partie de refoulement (211) est située à l'arrière du ventilateur dans la direction axiale de l'appareil de ventilation, et
la partie d'aspiration (213) est située à l'avant du ventilateur dans la direction axiale de l'appareil de ventilation.

4. Unité extérieure selon la revendication 3, où le ventilateur (220) est situé dans la partie de raccordement.

5. Unité extérieure selon la revendication 4, où
les centres de la partie de refoulement (211), de la partie d'aspiration (213) et de la partie de raccordement (215) sont alignés avec l'arbre du ventilateur.

6. Unité extérieure selon l'une des revendications 2 à 5, où l'extrémité arrière de la partie de refoulement (211) est plus adjacente de l'arrière de l'appareil de ventilation (200) que l'extrémité arrière du ventilateur (220) dans la direction axiale de l'appareil de ventilation.

7. Unité extérieure selon la revendication 6, où l'extrémité avant de la partie d'aspiration (213) est plus adjacente de l'avant de l'appareil de ventilation (200) que l'extrémité avant du ventilateur (220) dans la direction axiale de l'appareil de ventilation.

8. Unité extérieure selon la revendication 7, où le rapport entre la largeur de l'extrémité arrière de la partie de refoulement (211) à la largeur de la partie de raccordement (215) est compris entre 1,6:1 et 1,4:1.

9. Unité extérieure selon la revendication 7 ou la revendication 8, où l'avant de l'appareil de ventilation (200) dans la direction axiale de l'appareil de ventilation est aligné avec la direction de gravité.

10. Unité extérieure selon la revendication 9, où
l'orifice (210) est situé sur une partie supérieure de la carrosserie, et
l'extrémité arrière de la partie de refoulement (211) est située sur la partie supérieure de la carrosserie.

11. Unité extérieure selon la revendication 10, où
la carrosserie est pourvue de trous d'aspiration par lesquels l'air extérieur est introduit, et
les trous d'aspiration sont situés en dessous de la partie de refoulement (211).

12. Unité extérieure selon la revendication 11, où les trous d'aspiration sont ménagés sur un côté de la carrosserie.

13. Unité extérieure selon l'une des revendications 8 à 12, où
une différence entre la largeur de l'extrémité arrière de la partie de refoulement (211) et la largeur de la partie de raccordement (215) représente entre 50 % et 100 % de la largeur de la partie de raccordement (215).

FIG. 1

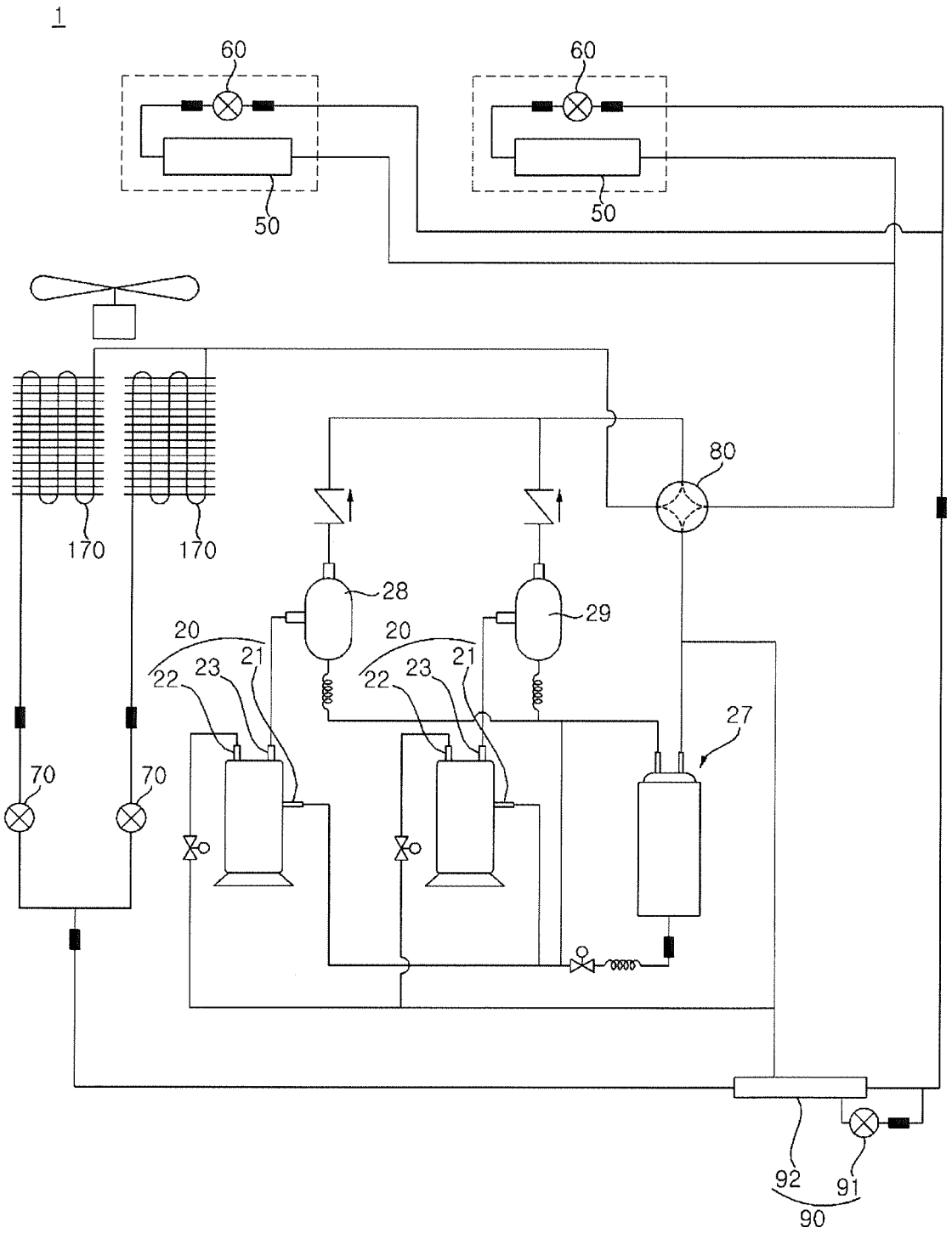


FIG. 2

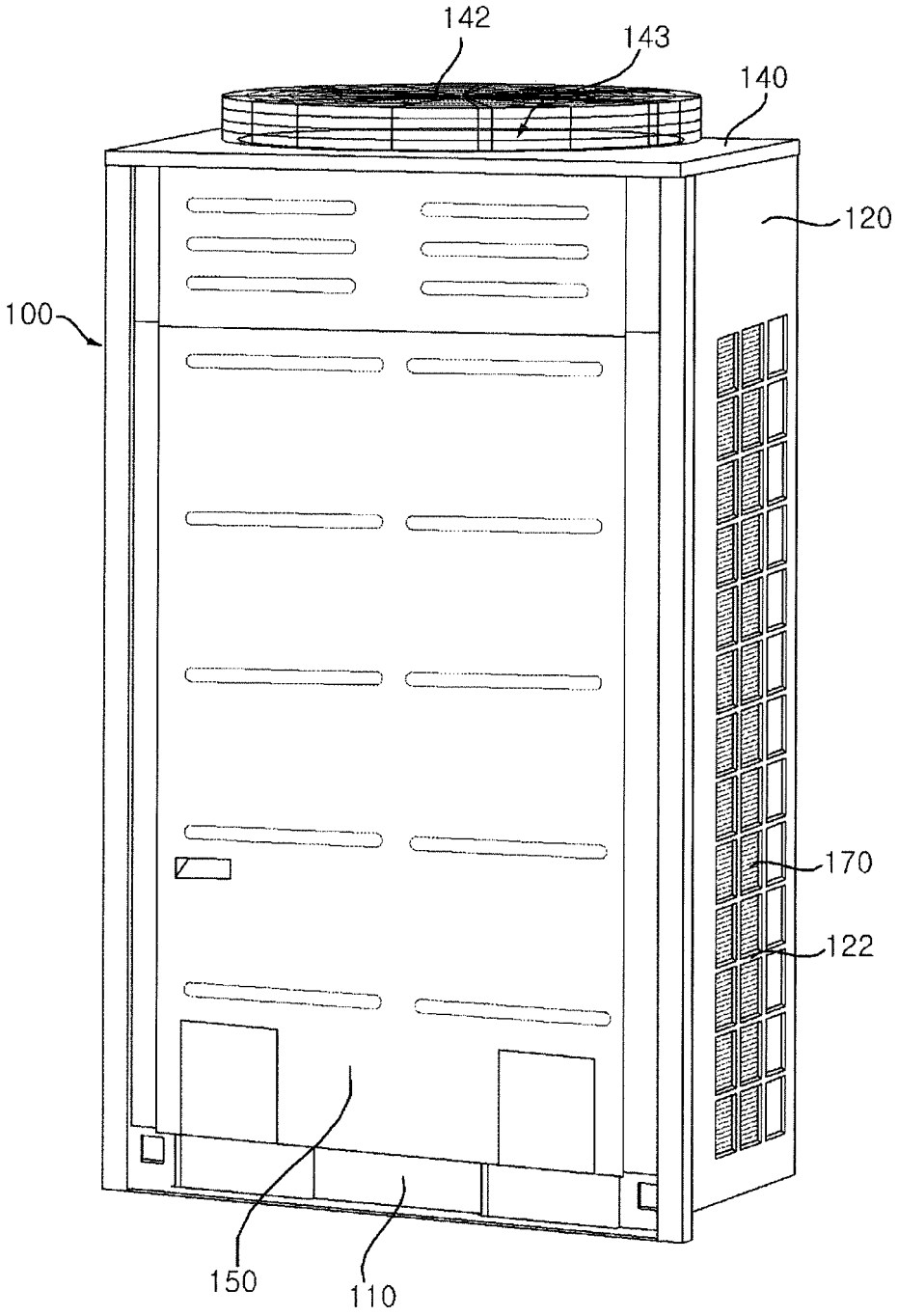


FIG. 3

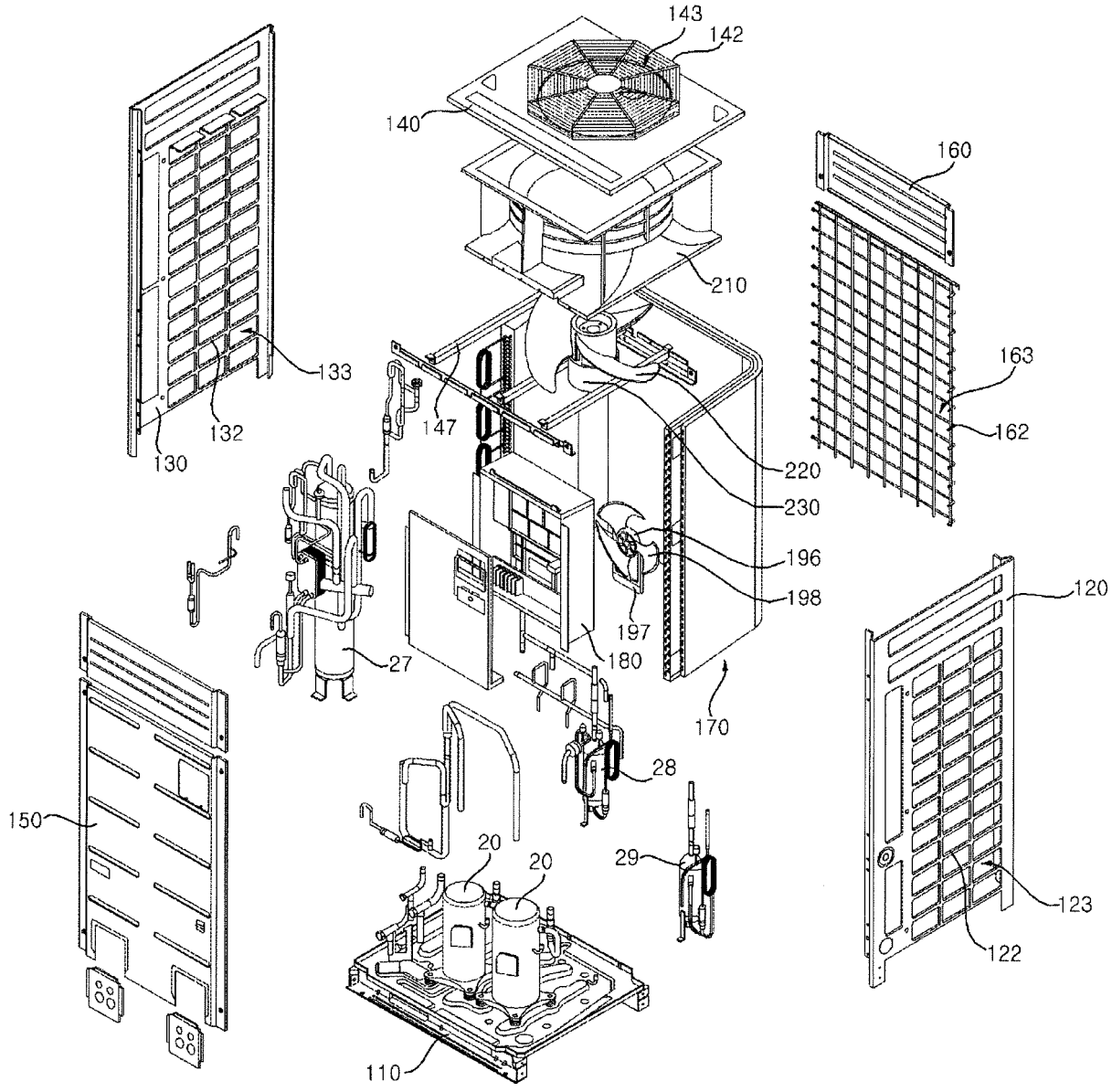

143
142
140
160
210
133
132
130
147
163
162
220
230
196
198
197
180
27
170
120
150
28
20
20
29
123
122
110

FIG. 4

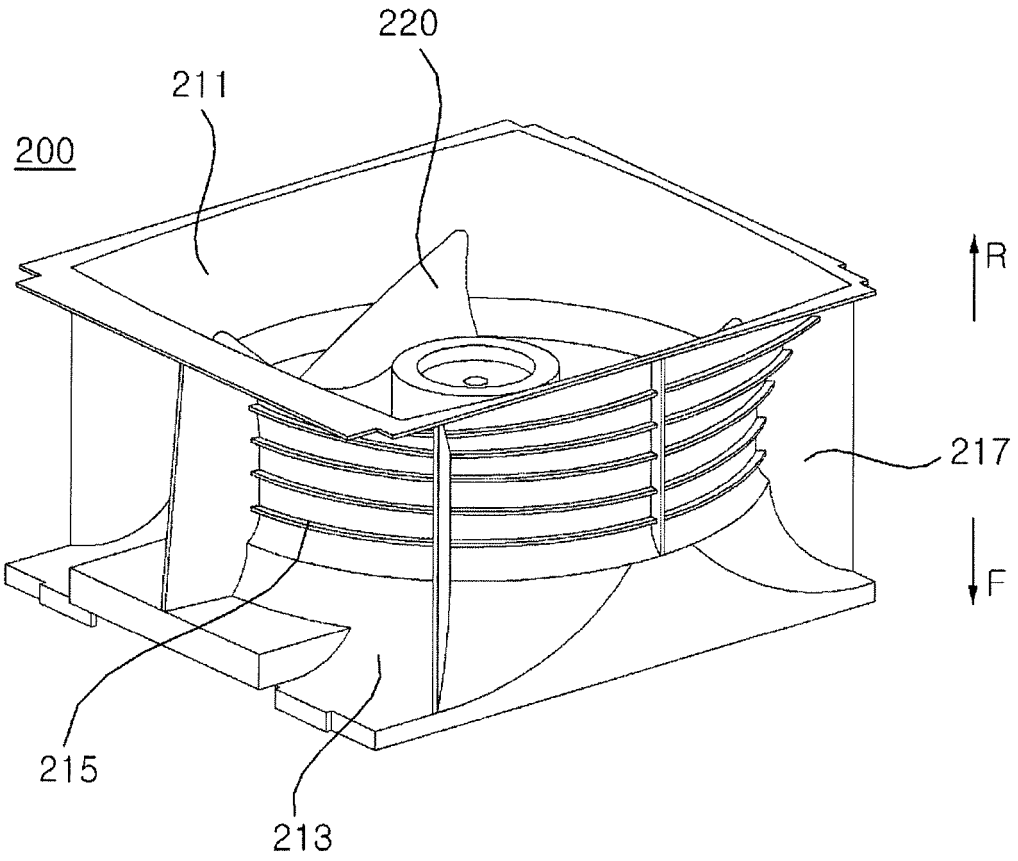


FIG. 5

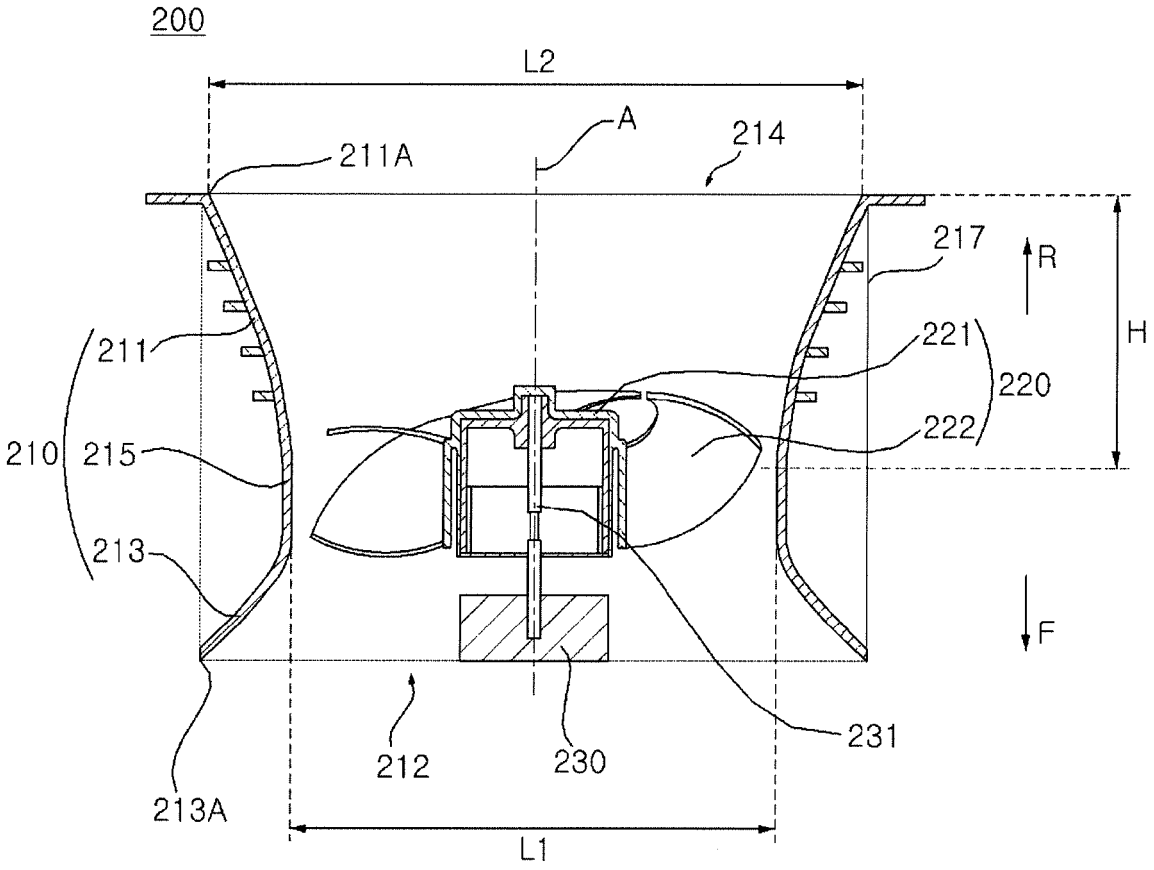
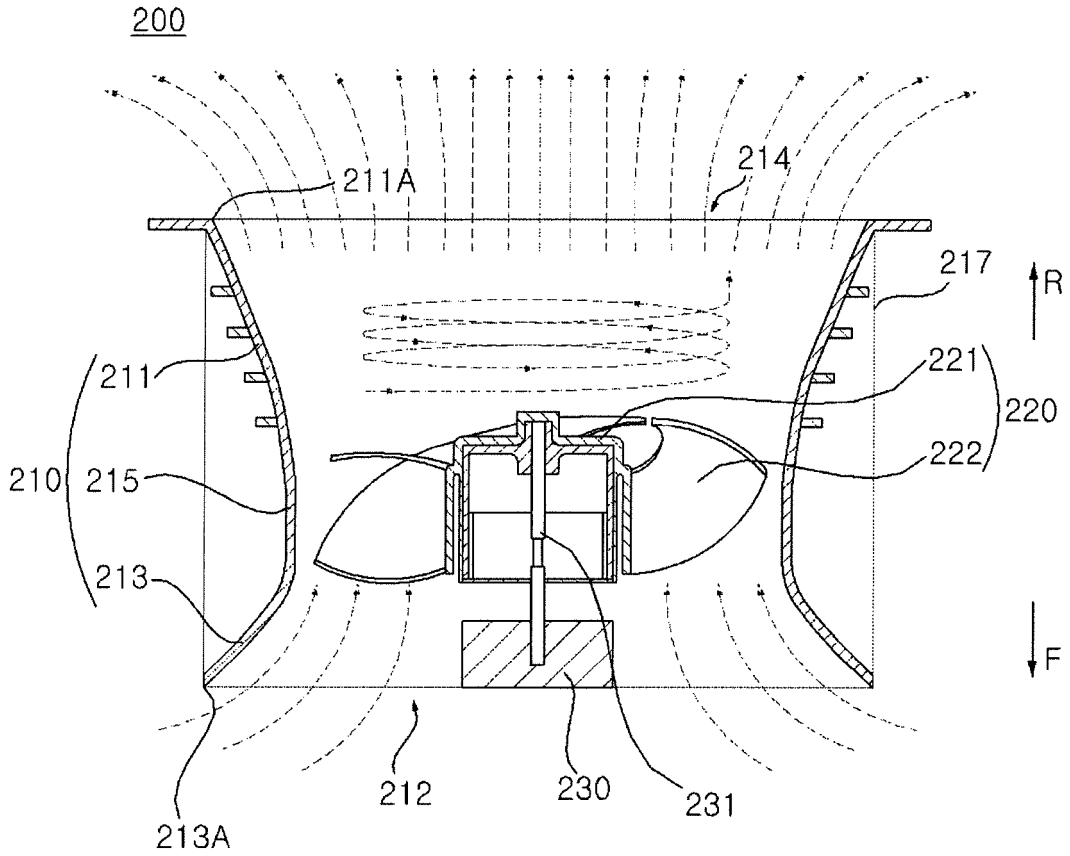

200
L2
A
214
211A
217
R
H
211
221
220
210
215
222
213
F
231
212
230
213A
L1

FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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- US 2013125579 A **[0004]**