(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 150 929 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.04.2017 Bulletin 2017/14

(21) Application number: **16174399.2**

(22) Date of filing: **14.06.2016**

(51) Int Cl.:
F24F 1/06 *(2011.01)* ***F24F 1/50*** *(2011.01)*
F24F 1/56 *(2011.01)* ***F24F 11/02*** *(2006.01)*
F24F 11/00 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **30.09.2015 KR 20150137603**

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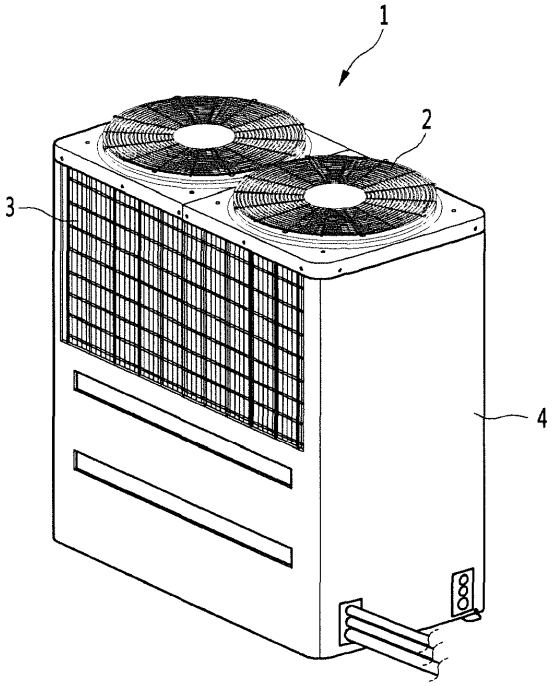
(54) AIR CONDITIONER AND METHOD FOR CONTROLLING AN AIR CONDITIONER

(57) An air conditioner and a method for controlling an air conditioner are provided. The air conditioner may include a first guide provided on at least one surface of an outdoor device of the air conditioner to guide outdoor air to an air inlet, a second guide provided on one surface of the outdoor device to guide air discharged from an air outlet to an outside, and a third guide that guides the air discharged from the air outlet to flow from the second guide to the first guide

FIG. 1



EP 3 150 929 A1

Description

[0001] An air conditioner and a method for controlling an air conditioner are disclosed herein.

[0002] An air conditioner is a device designed to alter properties of air in a specific space to conditions suitable for a specific purpose. Generally, the air conditioner includes a compressor, a condenser, an expansion device, and an evaporator. The specific space may be cooled or heated during a refrigeration cycle in which a refrigerant is compressed, condensed, expanded, and evaporated.

[0003] The specific space may be a place in which the air conditioner is installed. For example, if the air conditioner is installed at a home or office, the specific space may be an interior space of a house or a building. As another example, if the air conditioner is installed in a vehicle, the specific space may be an occupant compartment in which a person sits.

[0004] If the air conditioner performs a cooling operation, an outdoor heat exchanger provided in an outdoor unit or device performs functions of a condenser, and an indoor heat exchanger provided in an indoor unit or device performs functions of an evaporator. Alternatively, if the air conditioner performs a heating operation, the indoor heat exchanger performs functions of a condenser and the outdoor heat exchanger performs functions of an evaporator.

[0005] FIG. 1 is a schematic diagram of an outdoor unit or device of an air conditioner according to related art. Referring to FIG. 1, the air conditioner includes an outdoor unit or device 1, in which a compressor and a heat exchanger are provided, a plurality of distribution units or devices (not shown) connected to the outdoor device 1, and a plurality of indoor units or devices (not shown) which are connected to the plurality of distribution devices, respectively, and in which an indoor heat exchanger is provided.

[0006] For example, as illustrated in FIG. 1, the outdoor device 1 includes an air outlet 2 provided on a top surface of the outdoor device 1, an air inlet 3 provided on a side surface of the outdoor device 1, and a case 4 that defines an outer appearance of the outdoor device 1. The outdoor device 1 may further include a compressor (not shown), a heat exchanger (not shown), a fan (not shown), and a refrigerant pipe (not shown). Outdoor air flows into the outdoor device 1 through the air inlet 3, is heat-exchanged in the heat exchanger, and then is discharged to the outside through the air outlet 2.

[0007] However, when the outdoor air is at a low temperature and the related art air conditioner performs a cooling operation, high pressure and low pressure during a refrigeration cycle are excessively lowered, so that a load of the compressor may be excessive. As a result, an operation efficiency of a system may be degraded.

[0008] That is, the refrigerant is excessively heat-exchanged with outdoor air at a low temperature, leading to an excessive amount of heat exchange. As a result, a condensing temperature is reduced, and therefore, a condensing rate may increase excessively.

[0009] Due to the excessively increased condensation rate, an evaporation pressure and evaporation temperature may also be reduced, and thus, the indoor heat exchanger which performs functions of an evaporator may be frozen. As a result, it is hard to perform a continuous operation.

[0010] It is an object of the invention to provide an improved air conditioner and method for controlling an air conditioner. This object is achieved with the subject matter of the independent claims. The dependent claims relate to further aspects of the invention.

[0011] To solve this problem, a method of forcibly increasing an evaporation pressure in an indoor heat exchanger has been proposed. However, in a case of forcibly increasing the evaporation pressure, a pressure ratio may be reduced, so that a cooling efficiency and product reliability may be degraded.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Embodiments will be described in detail with reference to the following drawings in which like reference numerals refer to like elements, and wherein:

FIG. 1 is a schematic diagram of an outdoor device of an air conditioner according to a related art;
FIG. 2 is a front perspective view of an outdoor unit or device of an air conditioner according to an embodiment;
FIG. 3 is a rear perspective view of the outdoor device of FIG. 2;
FIG. 4 is a cross-sectional view, taken along line A-A' in FIG. 2;
FIG. 5 is a cross-sectional view, taken along line B-B' in FIG. 2;
FIG. 6 is a schematic diagram illustrating airflow in the outdoor device when an air conditioner according to an embodiment operates in a normal mode;
FIG. 7 is a schematic diagram illustrating airflow in an outdoor device when an air conditioner according to an embodiment operates in a heating mode;
FIG. 8 is a flow chart of a method for controlling an outdoor device of an air conditioner according to an embodiment; and
FIG. 9 is a schematic diagram illustrating airflow in an outdoor device when an air conditioner according to another embodiment operates.

DETAILED DESCRIPTION

[0013] Reference will now be made in detail to embodiments, examples of which are illustrated in the accompanying drawings. Where possible, the same or like reference numerals have been used to indicate the same or like elements, and repetitive disclosure has been omitted.

[0014] FIG. 2 is a front perspective view of an outdoor

unit or device of an air conditioner according to an embodiment. FIG. 3 is a rear perspective view of the outdoor device of FIG. 2. FIG. 4 is a cross-sectional view, taken along line IV-IV' of FIG. 2. FIG. 5 is a cross-sectional view, taken alone line V-V' of FIG. 2.

[0015] Referring to FIGS. 2 to 4, an outdoor unit or device 20 of an air conditioner 10 according to an embodiment may include at least one of a compressor 12, a heat exchanger 13, a pipe (not shown), a fan 15, an air outlet 16, an air inlet 17, a hood 100, and a skirt 200, or may include all of the aforementioned components. The compressor 12 may compress a flowing refrigerant and cause the refrigerant to flow along the pipe.

[0016] The heat exchanger 13 may perform heat exchange between air flowing into the outdoor device 20 and the refrigerant. The heat exchanger 13 may perform functions of a condenser during a cooling operation of the air conditioner 10, while performing functions of an evaporator during a heating operation of the air conditioner 10.

[0017] The heat exchanger 13 may be provided inside of the outdoor device 20 and face the air inlet 17, which will be described hereinafter. Depending on a heat exchange capacity, the heat exchanger 13 may be provided in multiple rows. When viewed from a top, the heat exchanger 13 may be I-shaped, L-shaped, or U-shaped, for example.

[0018] The pipe may guide the flow of the refrigerant, and the fan 15 may cause circulation of the air which passes through the outdoor device 20. The fan 15 may be provided in an upper portion of the outdoor device 20. In addition, the fan 15 may cause the air contained inside of the outdoor device 20 to flow toward an upper portion of the outdoor device 20.

[0019] The air inlet 17 may be provided on at least one of a side surface or a rear surface of the outdoor device 20 so as to face the heat exchanger 13, and the air outlet 16 may be provided on a top surface of the outdoor device 20 so as to face the fan 15. Accordingly, outdoor air may flow into the outdoor device 20 through the air inlet 17 provided on the side surface or the rear surface of the outdoor device 20.

[0020] Although this embodiment shows that the air inlet 17 provided on at least one of the side surface or the rear surface of the outdoor device 20 and the air outlet 16 provided on the top surface of the outdoor device 20, embodiments are not limited thereto. That is, depending on a capacity and shape of the outdoor device 20, the air inlet 17 and the air outlet 16 may be provided at any position on an outer surface of the outdoor device 20.

[0021] The hood 100 may be provided on the top surface of the outdoor device 20, and may be connected to the air outlet 16 through an opening formed on a bottom surface of the hood 100. The hood 100 may include a housing having a guide surface that guides an airflow, a vent 110, which may be formed on an open front surface of the housing and through which the air may be discharged, and circulation guides 120 and 121 formed on at least one of the rear surface or the side surface of the outdoor device 20.

[0022] The vent 110 may discharge air contained inside of the hood 100 to the outside, and air flowing into the air inlet 17 may pass through the hood 100 to be discharged to the vent 110. In addition, the hood 100 may include first dampers 310, which may selectively shield the vent 110. The first dampers 310 may adjust an amount of air flowing from the hood 100, and a degree of opening of the first dampers 310 may increase or decrease depending on the amount of air flowing from the hood 100.

[0023] The circulation guides 120 and 121 may selectively discharge air contained inside of the hood 100 to the skirt 200, which will be described hereinafter. Air flowing from the air inlet 16 passes through the hood 100 to be discharged to the circulation guides 120 and 121.

[0024] In addition, the hood 100 may include second dampers 320 to selectively shield the circulation guides 120 and 121. The second dampers 320 may adjust the amount of air circulating in the outdoor device 20, and a degree of opening of the second dampers 320 may increase or decrease depending on the amount of air circulating in the outdoor device 20.

[0025] The skirt 200 may be provided on at least one of the side surface or the rear surface of the outdoor device 20, and face the air inlet 17 and the circulation guides 120 and 121. The skirt 200 may be connected to the air inlet 17 and the circulation guides 120 and 121 through an opening formed on one side of the outdoor device 20.

[0026] The skirt 200 may include a housing having a guide surface that guides an airflow, and air intakes 211 and 212, which may be formed on an open bottom surface of the housing and through which air may be suctioned.

[0027] The air intakes 211 and 212 may suction outdoor air into the skirt 200, and the air flowing into the skirt 200 may pass the skirt 200 to be discharged to the air inlet 17. The skirt 200 may include third dampers 330 that selectively shields the air intakes 211 and 212.

[0028] The third dampers 330 may adjust the amount of air flowing into the skirt 200, and a degree of opening of the third dampers 330 may increase or decrease depending on the amount of air flowing into the skirt 200. In addition, even air flowing into the skirt 200 through the circulation guides 120 and 121 may flow into the outdoor device 20 through the air inlet 17. Accordingly, air contained inside of the skirt 200 may flow into the outdoor device 20 through the air inlet 17, and air contained inside the outdoor device 20 may flow into the hood 100 through the air outlet 16. Then, circulation passage P3 may be formed through which air contained inside of the hood 100 may flow into the skirt 200 again through the circulation guides 120 and 121.

[0029] The skirt 200 may include at least one of a rear skirt 201 provided on the rear surface of the outdoor device 20 and a side skirt 202 provided on the side surface

of the outdoor device 20. The rear skirt 201 and the side skirt 202 may be provided at different positions, but may have a same function, and thus, the rear skirt 201 and the side skirt 202 may be considered to include the same components.

[0030] In addition, although this embodiment shows that skirts are provided on the rear surface and the side surface of the outdoor device 20, embodiments are not limited thereto. That is, the skirts may be provided on any surface on which the air inlet 17 of the outdoor device 20 and the circulation guides 120 and 121 are provided.

[0031] In addition, at least one of the hood 100 or the skirt 200 may be detachable from the outdoor device 20. For example, the outdoor device 20 may further include fixing members to allow the hood 100 and the skirt 200 to be installed and detached from the outdoor device 20, and the fixing members may be between the hood 100 and the outdoor device 20 and between the skirt 200 and the side surface of the outdoor device 20.

[0032] In addition, the skirt 200 may be referred to as "a first guide", the hood 100 may be referred to as "a second guide", and the circulation guides and the second dampers may be referred to as "third guides."

[0033] FIG. 6 is a schematic diagram illustrating airflow in the outdoor device when an air conditioner according to an embodiment operates in a normal mode. FIG. 7 is a schematic diagram illustrating airflow in the outdoor device when an air conditioner according to an embodiment operates in a heating mode.

[0034] With reference to FIGS. 6 and 7, when the an air conditioner according to an embodiment operates in a normal mode, the vent 110 of the hood 100 and the air intakes 211 and 212 of the skirt 200 may be open whereas the circulation guides 120 and 121 may be closed. That is, a degree of opening of the first dampers 310 provided in the vent 110 and a degree of opening of the third dampers 330 provided in the air intakes 211 and 212 may be maximized and/or open, whereas a degree of opening of the second dampers 320 provided in the circulation guides 120 and 121 may be minimized and/or closed.

[0035] Accordingly, outdoor air may flow into the skirt 200 through the air intakes 211 and 212 which are open. Then, the air contained inside of the skirt 200 may flow into the outdoor device 20 through the air inlet 17. Then, when passing through the heat exchanger 13, the air may be heat-exchanged with a refrigerant contained inside of the heat exchanger 13, i.e. ,passage P1.

[0036] After passing through the heat exchanger 13, the air may be discharged to the hood 100 through the air outlet 16 provided on the top surface of the outdoor device 20 and then discharged to the outside , i.e., passage P2. At this point, the circulation guides 120 and 121 may be closed, so the air having passed through the heat exchanger 13 may be unable to move into the skirt 200. That is, the above circulation passage, i.e., passage P3, may be closed. Therefore, air in the passage P1 may flow along the passage P2.

[0037] However, a degree of opening of the second dampers 220 may increase in multiple stages. That is, the second damper 320 may be closed in multiple stages at a low condensing pressure of a system. Alternatively, the second damper 320 may be open in multiple stages at a high condensing pressure of a system.

[0038] When an air conditioner according to an embodiment operates in a heating mode, the vent 110 of the hood 100 and the air intakes 211 and 212 of the skirt 200 may be closed whereas the circulation guides 120 and 121 may be open. That is, a degree of opening of the first and third dampers 310 and 330 may be minimized and/or closed, whereas a degree of opening of the second dampers 320 may be maximized and/or open.

[0039] As the first and third dampers 310 and 330 are closed, outdoor air may not flow into the skirt 200 and air contained inside of the hood 100 may not leak to the outside. That is, the passage P1 and the passage P2 are closed. However, as the second dampers 320 are open, the circulation passage, i.e., the passage P3, is open.

[0040] Accordingly, air contained inside of the outdoor device 20 after passing through the fan 15 may be discharged to the hood 100 through the air outlet 16, i.e., the first circulation passage. Then, the air discharged to the hood 100 may pass through the circulation guides 120 and 121 to be discharged to the skirt 200, i.e., the second circulation passage. Then, the air discharged to the skirt 200 may pass through the air inlet 17 to flow into the outdoor device 20, i.e., the third circulation passage.

[0041] The air flowing into the skirt 200 through the circulation guides 120 and 121 has already passed through the heat exchanger 13 and absorbed heat of the refrigerant flowing in the heat exchanger 13. Therefore, the air may be heated in proportion to a number of times the air passes through the heat exchanger 13 along the first to third circulation passages. In addition, a temperature of the air may increase in proportion to a duration of a heating mode.

[0042] As the outdoor device 20 is able to increase a temperature of the air which passes through the heat exchanger 13, a condensing temperature and a condensing pressure of the refrigerant may increase, so that a condensing rate may be limited.

[0043] FIG. 8 is a flow chart of a method for controlling an outdoor device of an air conditioner according to an embodiment. Referring to FIG. 8, upon starting an operation, an air conditioner according to an embodiment may drive a compressor, such as compressor 12 discussed above, to circulate a refrigerant in step or operation S1.

[0044] Then, the air conditioner may be driven in a normal mode in step or operation S2. That is, a degree of opening of first and third dampers, such as first and third dampers 310 and 320 discussed above, may be set to be maximized and/or open, whereas a degree of opening of second dampers, such as second dampers 320 discussed above, may be set to be minimized and/or closed. Accordingly, the passage P1 and the passage P2 may be open, and the passage P3 may be closed.

[0045] Then, the air conditioner may operate for longer

than a first preset or predetermined time in step or operation S3. The refrigerant may not be circulated in a normal cycle immediately after the air conditioner starts to operate. That is, the cycle may be stabilized only when the air conditioner operates for longer than a specific time. Thus, the air conditioner may operate for the first predetermined time to wait until the cycle becomes stabilized. For example, the first predetermined time may be between about two minutes and about five minutes.

[0046] After the first predetermined time has lapsed, an outdoor temperature and a high operating pressure may be detected in step or operation S4. Then, whether the outdoor temperature of the air conditioner is lower than a first predetermined temperature or whether the high operating pressure is lower than a first predetermined pressure may be determined in step or operation S5.

[0047] The first predetermined temperature may indicate a state in which the outdoor temperature is low. For example, the first predetermined temperature may be about -10°.

[0048] If it is determined in step or operation in step or operation S5 that the outdoor temperature is higher than the first predetermined temperature or that the high operating pressure is higher than the first predetermined pressure, step or operation S3 may be performed again. That is, the air conditioner may operate for the first predetermined time again in step or operation S3. Then, the outdoor temperature and the high operating pressure may be detected in step or operation S4. Then, a determination as to the outdoor temperature and the high operating pressure may be made again in step or operation S5. At this point, the first predetermined time of S3 may be a cycle not for securing stabilization of the system, but rather, for recursively determining whether the system is stable.

[0049] If it is determined in step or operation S5 that the outdoor temperature is lower than the first predetermined temperature or that the high operating pressure is lower than the first predetermined pressure, a degree of opening of the first and third dampers may be reduced in step or operation S6.

[0050] As a degree of opening of the first and third dampers is reduced, an amount of air to flow into a skirt, such as skirt 200 discussed above, and an amount of air to be discharged from a hood, such as hood 100 discussed above, may be reduced. As the amount of air to pass through a heat exchanger, such as heat exchanger 13 discussed above is reduced, a heat exchange rate of the heat exchanger may be reduced. As a result, a condensing rate may be limited.

[0051] Then, the air conditioner may operate for a second preset or predetermined time in step or operation S7. The second predetermined time may be time which is required until a cycle of the air conditioner is changed as the degree of opening of the first and third dampers is changed.

[0052] After the second predetermined time has lapsed, whether the high operating pressure is higher than the first predetermined pressure may be determined in step or operation S8. If it is determined in step or operation S8 that the high operating pressure is higher than the first predetermined pressure, the air conditioner may return to a normal mode in step or operation S9. As the operating pressure has already reached a preset or predetermined target range, the air conditioner may return to the normal mode by increasing a degree of opening of the first and third dampers. Once the air conditioner returns to the normal mode, step or operation S2 or S10 may be performed again.

[0053] Alternatively, if it is determined in step or operation S8 that the high operating pressure is lower than the first predetermined pressure, whether the first and third dampers are closed may be determined in step or operation S10. If it is not determined in step or operation S10 that the first and third dampers are closed, step or operation S6 may be performed again. That is, a degree of opening of the first and third dampers may be further reduced in step or operation S6, the air conditioner may operate for the second predetermined time in step or operation S7, and a determination as to the high operating pressure may be made again in step or operation S8. As a degree of opening of the first and third dampers is further reduced, the amount of air passing through the outdoor device 20 may be further reduced. As a result, a condensing rate may be further limited.

[0054] If it is determined in step or operation S10 that the first and third dampers 310 and 330 are closed, the second dampers may be opened in step or operation S11. At this point, a degree of opening of the first and third dampers may be set to be minimized and/or closed, so that it is not possible to increase the high operating pressure by adjusting the degree of opening of the first and third dampers. Therefore, the second dampers may be open so as to open the circulation passage, i.e., the passage P3, so that air contained inside the outdoor device may circulate along the circulation passage. The circulation passage may be a passage through which air contained in a closed space repetitively passes through the heat exchanger, and therefore, a temperature of the air may increase in proportion to a number of times the air passes through the heat exchanger. As the temperature of the air heat-exchanged with the refrigerant increases, the high operating pressure of the system may increase.

[0055] Then, with the second dampers opened, and the air conditioner may operate for a third preset or predetermined time in step or operation S12. After the third predetermined time has lapsed, whether the high operating pressure is higher than the second predetermined pressure may be determined in step or operation S13. At this point, the air conditioner may set a target operating pressure to be higher than the first predetermined pressure and lower than the second predetermined pressure. The second predetermined pressure may be higher than the first predetermined pressure.

[0056] If the high operating pressure is higher than the second predetermined pressure, the second dampers may be closed in step or operation S14. Because the high operating pressure has already exceeded the target operating pressure, it is not necessary to further increase the temperature of the air, and thus, the circulation passage may be closed by closing the second dampers. At this point, the first and third dampers may already be closed.

[0057] The second dampers may be closed in step or operation S14. Then, the method may return to step or operation S12 to wait for the third predetermined time to lapse. Then, whether the high operating pressure is higher than the second predetermined pressure may be determined in step or operation S13.

[0058] Alternatively, if the high operating pressure is lower than the second predetermined pressure, step or operation S8 may be performed again. That is, whether the high operating pressure is higher than the first predetermined pressure may be determined in step or operation S8, and, if so, the air conditioner may return to a normal mode in step or operation S9 and finishes the above process.

[0059] FIG. 9 is a schematic diagram illustrating airflow in an outdoor unit or device when an air conditioner according to another embodiment operates. Referring to FIG. 9, an air conditioner according to another embodiment may operate in a same manner of the previous embodiment, except for operations of the first to third dampers 310 and 330.

[0060] In this embodiment, the air conditioner may operate while the first, second, and third dampers 310, 320, and 330 are open. At this point, the condensing temperature and the condensing pressure may be adjusted by adjusting a degree of opening of the first, second, and third dampers 310, 320, and 330 based on a target condensing temperature and a target condensing pressure. That is, depending on a degree of opening of the first, second, and third dampers 310, 320, and 330, the amount of air to pass through the passage P1, the passage P2, and the passage P3 may be adjusted.

[0061] More specifically, when a condensing pressure of a system is low, it is possible to reduce the amount of air flowing along the passage P1 and the passage P3 while increasing the amount of air flowing along the passage P2. Alternatively, when the condensing pressure of a system is high, it is possible to increase the amount of air flowing along the passage P1 and the passage P3 while reducing the amount of air flowing along the passage P2.

[0062] Depending on an airflow direction, the passage P1 may be referred to as an "intake passage", the passage P2 may be referred to as a "discharge passage", and the passage P3 may be referred to as a "circulation passage." In addition, the first dampers 310 provided on the passage P1 or the third dampers 330 provided on the passage P2 may be referred to as "suctioning and discharging dampers", and the second dampers 320 provided on the passage P3 may be referred to as "circulation dampers".

[0063] According to embodiments disclosed herein, a condensing capacity may be limited to a specific range so that a continuous operation is possible even when outdoor air is at a low temperature. In addition, it is possible to control a refrigerant to be condensed at a required condensing temperature, so that the air conditioner may operate efficiently.

[0064] Further, it is possible to control a temperature of air which passes through a heat exchanger of an outdoor device, so that a high operating pressure and a low operating pressure of a system may be controlled. Further, it is possible to prevent a foreign substance, such as snow or rain, from coming into the outdoor device as an outlet/inlet of the outdoor device may be selectively closed. Also, it is possible to prevent the outdoor device from being frozen when outdoor air is at a low temperature.

[0065] Embodiments disclosed herein provide an air conditioner which is capable of preventing a condensing rate from excessively increasing when outdoor air is at a low temperature. Embodiments disclosed herein also provide an air conditioner which is capable of adjusting a temperature of air which is to be heat-exchanged in an outdoor device.

[0066] Further, embodiments disclosed herein provide an air conditioner which is capable of increasing a temperature of air passing through the outdoor device without using additional power. Moreover, embodiments disclosed herein provide an air conditioner which is capable of controlling a high temperature and a low temperature of a system.

[0067] Embodiments disclosed herein may include a first guide device or guide provided on at least one surface of an outdoor unit or device to guide outdoor air to an air inlet; a second guide device or guide provided on one surface of the outdoor unit to guide air discharged from an air outlet to an outside; and a third guide device or guide that guides the air discharged from the air outlet to flow from the second guide device to the first guide device. The third guide device may include a circulation guide that circulates the air discharged from the air outlet to the air inlet, and a circulation damper that adjusts an amount of air to circulate in the circulation guide. The first guide device or the second guide device may include a housing, an opening which may be formed on one open surface of the housing through which air may flow, and a suctioning and discharging damper installed on or in the opening.

[0068] Circulation passages may be formed in the outdoor unit. The first guide device, the second guide device, and the third guide device may form a circulation passage. The circulation passages may include a first circulation passage along which air contained inside of the outdoor unit may pass through a fan to flow into the second guide device; a second circulation passage along which air contained in the second guide device may pass

through a circulation guide unit or guide to flow into the first guide device; and a third circulation passage along which air contained inside the first guide device may pass through the heat exchanger to flow into the outdoor unit.

[0069] In addition, embodiments disclosed herein may include depending on a detected high operating pressure or an outdoor air temperature, adjusting a degree of opening of the first guide device or the second guide device; and, in response to the high operating pressure exceeding a predetermined range after the degree of opening of the first guide device or the second guide device is adjusted, circulating air contained inside the outdoor unit from the second guide device to the first guide device.

[0070] In response to the high operating pressure being higher than a first preset or predetermined pressure or in response to the outdoor air temperature being lower than a preset or predetermined temperature, a degree of opening of the first guide device or the second guide device may be reduced. In response to the high operating pressure being lower than the first preset pressure, the air contained inside the outdoor unit may be caused to circulate from the second guide device to the first guide device.

[0071] Circulating the air contained inside the outdoor unit from the second guide device to the first guide device may include closing a damper of the first guide device or the second guide device. The control method further includes, in response to the high operating pressure being higher than a second preset or predetermined pressure when the air circulates from the second guide device to the first guide device, blocking the air from circulating from the second guide device to the first guide device.

[0072] Any reference in this specification to "one embodiment," "an embodiment," "example embodiment," etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

[0073] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. An air conditioner (10), comprising:

   an outdoor device (20) including a compressor (12) that circulates a refrigerant, a heat exchanger (13) that performs heat exchange between the refrigerant and air, a fan (15) that causes the air to flow; an air inlet (17) through which the air is suctioned into the air conditioner (10), and an air outlet (16) through which the air heat-exchanged in the heat exchanger (13) is discharged;
   a first guide provided on at least one surface of the outdoor device (20) to guide outdoor air to the air inlet (17);
   a second guide provided on at least one surface of the outdoor device to guide air discharged from the air outlet (16) to an outside; and
   a third guide that guides the air discharged from the air outlet (16) to flow from the second guide to the first guide.

2. The air conditioner (10) according to claim 1, wherein the third guide includes a circulation guide (120), and wherein the air discharged through the air outlet (16) circulates to the air inlet (17) through the circulation guide (120).

3. The air conditioner (10) according to claim 2, wherein the third guide includes a circulation damper that adjusts an amount of air to circulate in the circulation guide (120) by adjusting a degree of opening of the circulation guide.

4. The air conditioner (10) according to any of claims 1 to 3, wherein the first guide or the second guide includes:

   a housing having a guide surface that guides an airflow; and
   an opening formed on one open surface of the housing and through which the air is suctioned or discharged.

5. The air conditioner (10) according to claim 4, wherein the first guide or the second guide includes a suctioning and discharging damper, which is installed on the opening and adjusts an amount of air flow.

6. The air conditioner (10) according to any of claims 1 to 5, wherein circulation passages are formed in the outdoor device (20), the first guide, the second guide, and third guide.

7. The air conditioner (10) according to claim 6, wherein the circulation passages include a first circulation passage through which air contained inside of the

outdoor device (20) passes through the fan (15) to flow into the second guide.

8. The air conditioner (10) according to claim 7, wherein the circulation passages further include a second circulation passage through which air contained inside of the second guide passes through the third guide to flow into the first guide.

9. The air conditioner (10) according to claim 8, wherein the circulation passages further include a third circulation passage through which air contained inside the first guide passes through the heat exchanger (13) to flow into the outdoor device (20).

10. A method for controlling an air conditioner (10), the air conditioner (10) including an outdoor device (20) having a compressor (12) that circulates a refrigerant, a heat exchanger (13) that performs heat exchange between the refrigerant and air, a fan (15) that causes the air to flow; an air inlet (17) through which the air is suctioned into the air conditioner (10), and an air outlet (16) through which the air heat-exchanged in the heat exchanger (13) is discharged; a first guide that suctions outdoor air into the outdoor device (20) and a degree of opening of which is adjustable; a second guide that discharges air contained inside the outdoor device (20) and a degree of opening of which is adjustable, the method comprising:

driving the fan (15) so as to cause outdoor air to flow into the outdoor device (20) through the first guide;
detecting a high operating pressure or outdoor air temperature;
depending on the detected high operating pressure or outdoor air temperature, adjusting a degree of opening of at least one of the first guide or the second guide; and
in response to the high operating pressure exceeding a predetermined range after the degree of opening of the first guide or the second guide is adjusted, circulating air contained inside the outdoor device (20) from the second guide to the first guide.

11. The method according to claim 10, wherein at least one of the first guide or the second guide includes a damper that controls an amount of air flow.

12. The method according to claim 10 or 11, wherein, in response to the high operating pressure being higher than a first predetermined pressure an/or in response to the outdoor air temperature being lower than a predetermined temperature, a degree of opening of the first guide or the second guide is reduced so as to reduce an amount of air to be suctioned into the outdoor device (20) or to be discharged from the outdoor device (20).

13. The method according to any of claims 10 to 12, further including:

after the degree of opening of the at least one of first guide or the second guide is adjusted, waiting for a predetermined period of time to lapse; and
after the predetermined period of time has lapsed, redetecting the high operating pressure;

14. The method according to any of claims 10 to 13, further including:

in response to the high operating pressure being lower than the first predetermined pressure, circulating the air contained inside the outdoor device (20) from the second guide to the first guide.

15. The method according to any of claims 10 to 14, further including:

in response to the high operating pressure being higher than a second predetermined pressure when the air is circulating from the second guide to the first guide, blocking the air from circulating from the second guide to the first guide.

FIG. 1

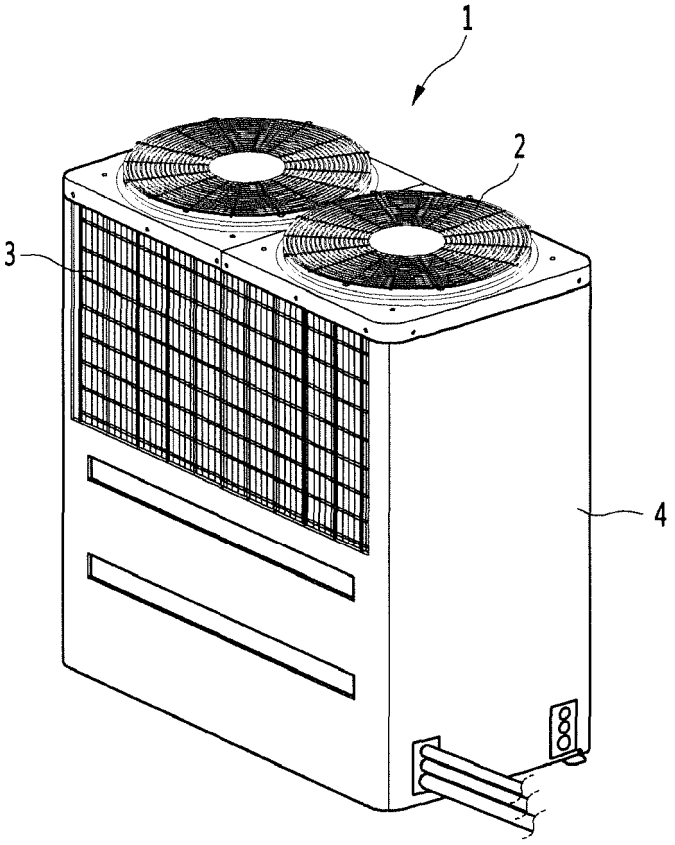


FIG. 2

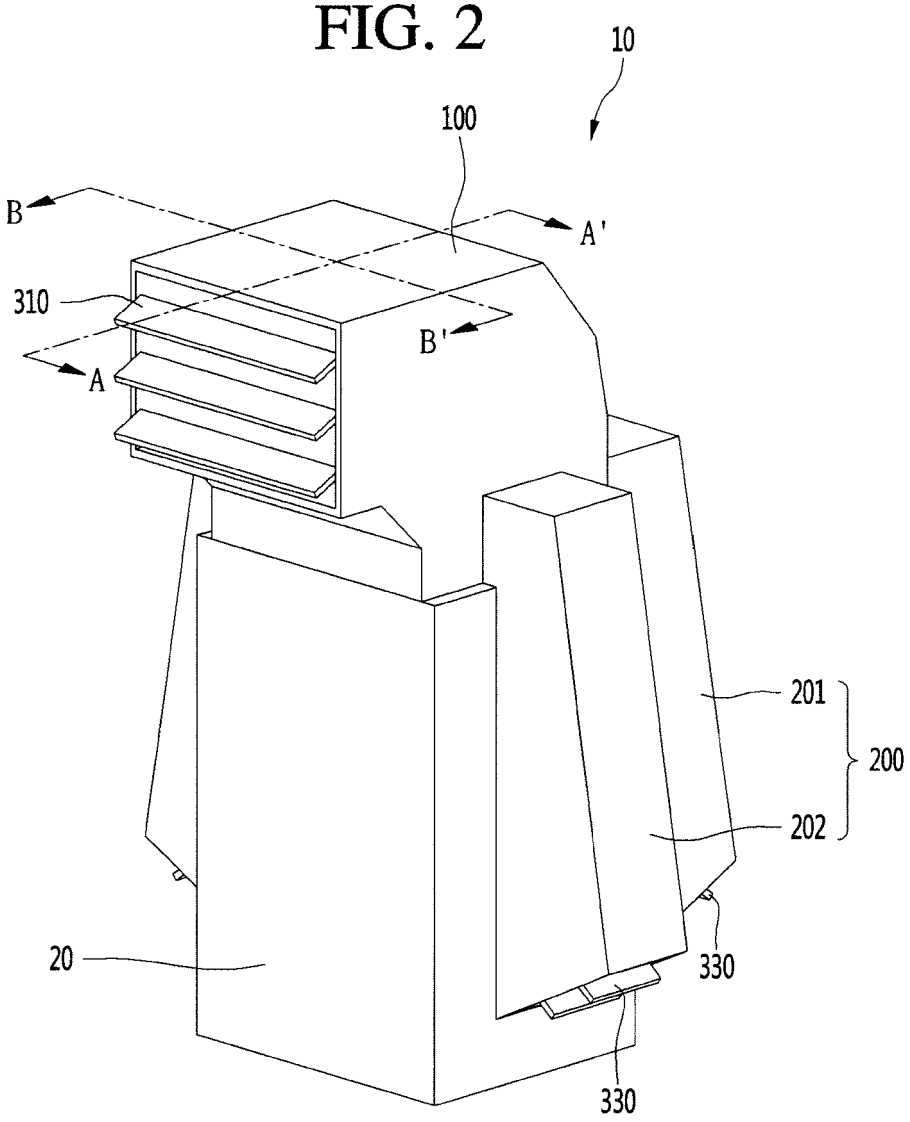


FIG. 3

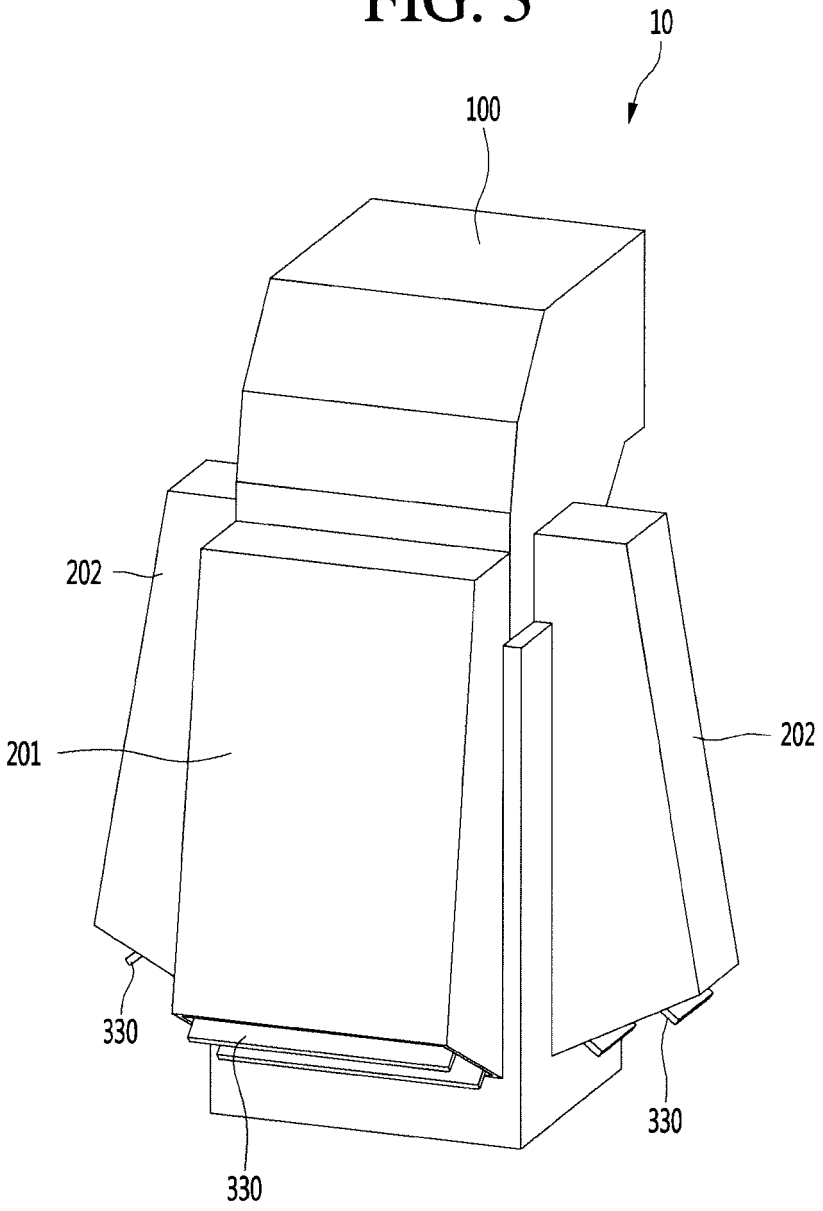


FIG. 4

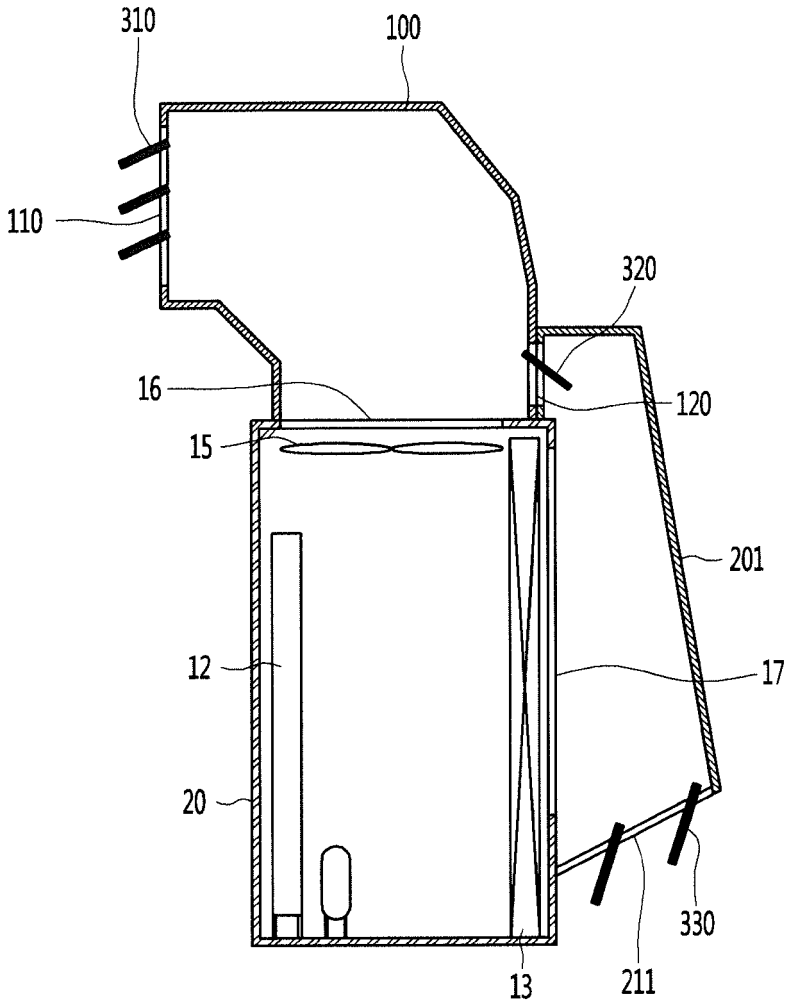


FIG. 5

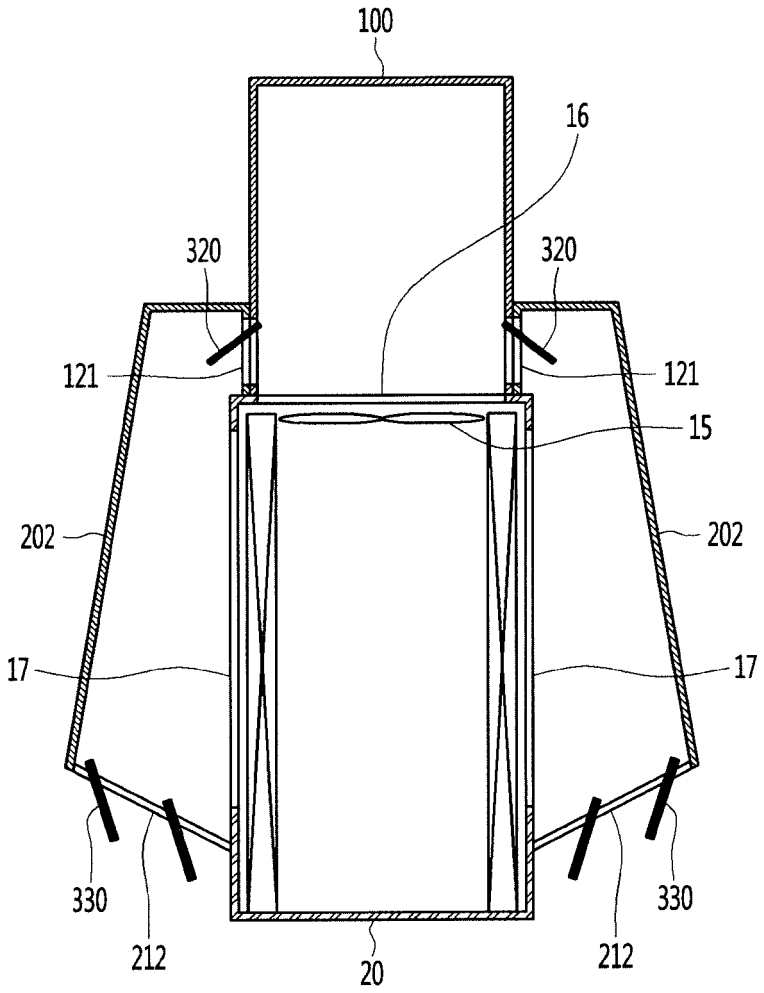


FIG. 6

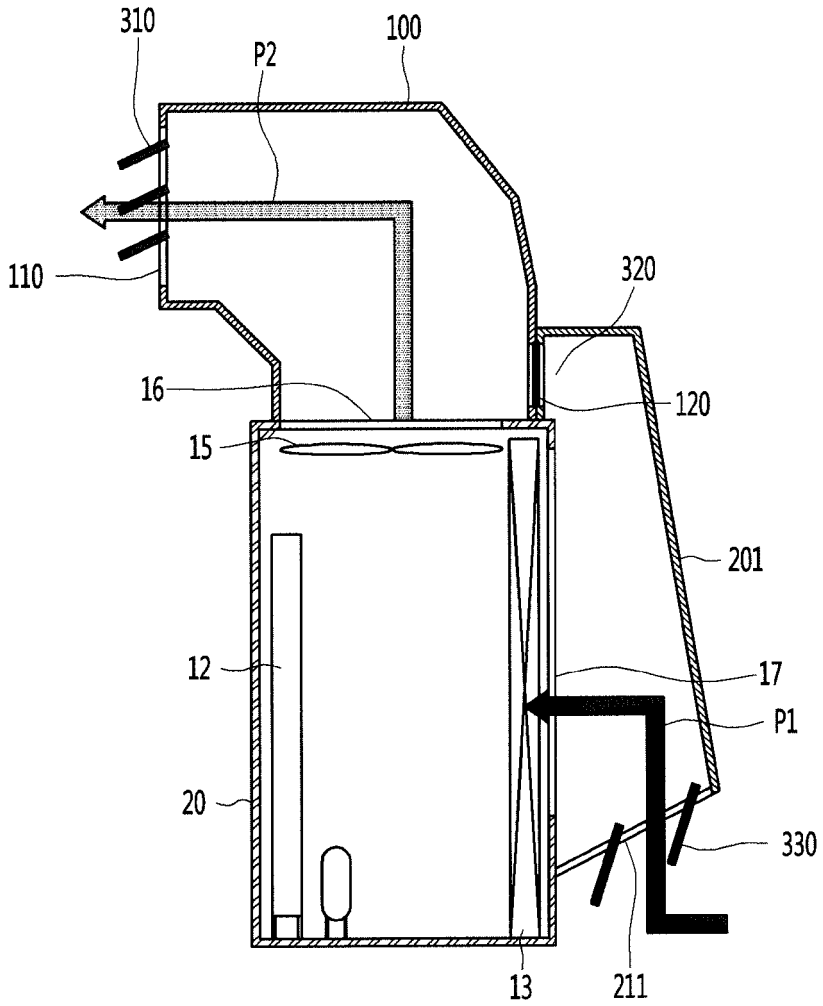


FIG. 7

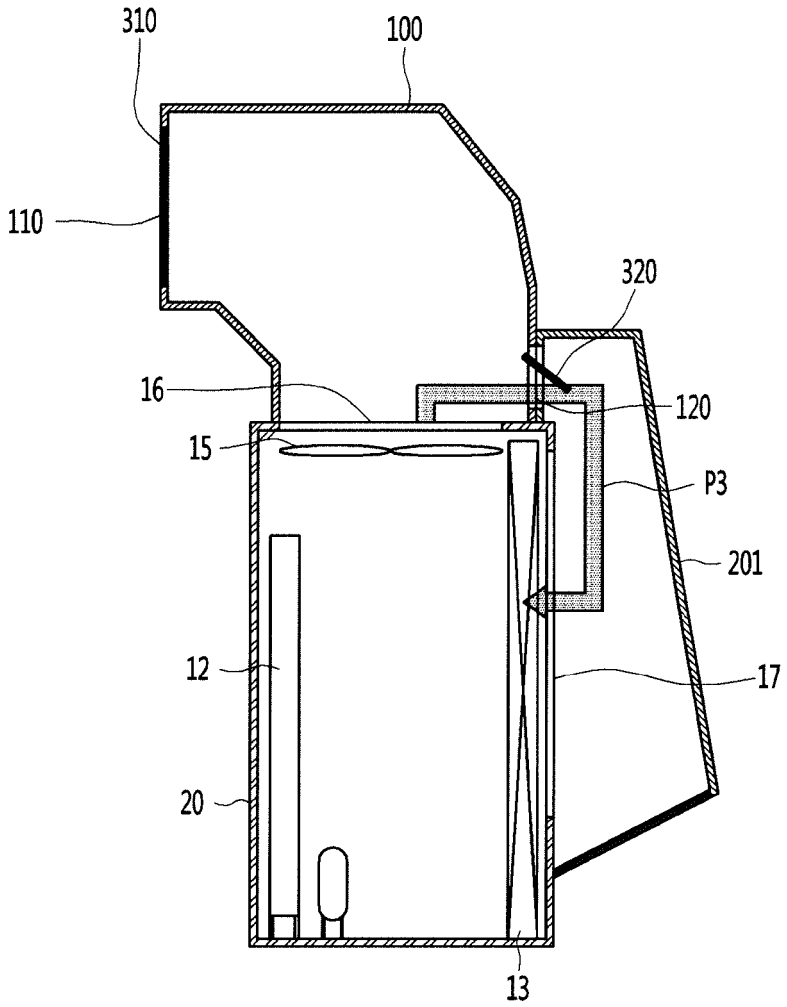


FIG. 8

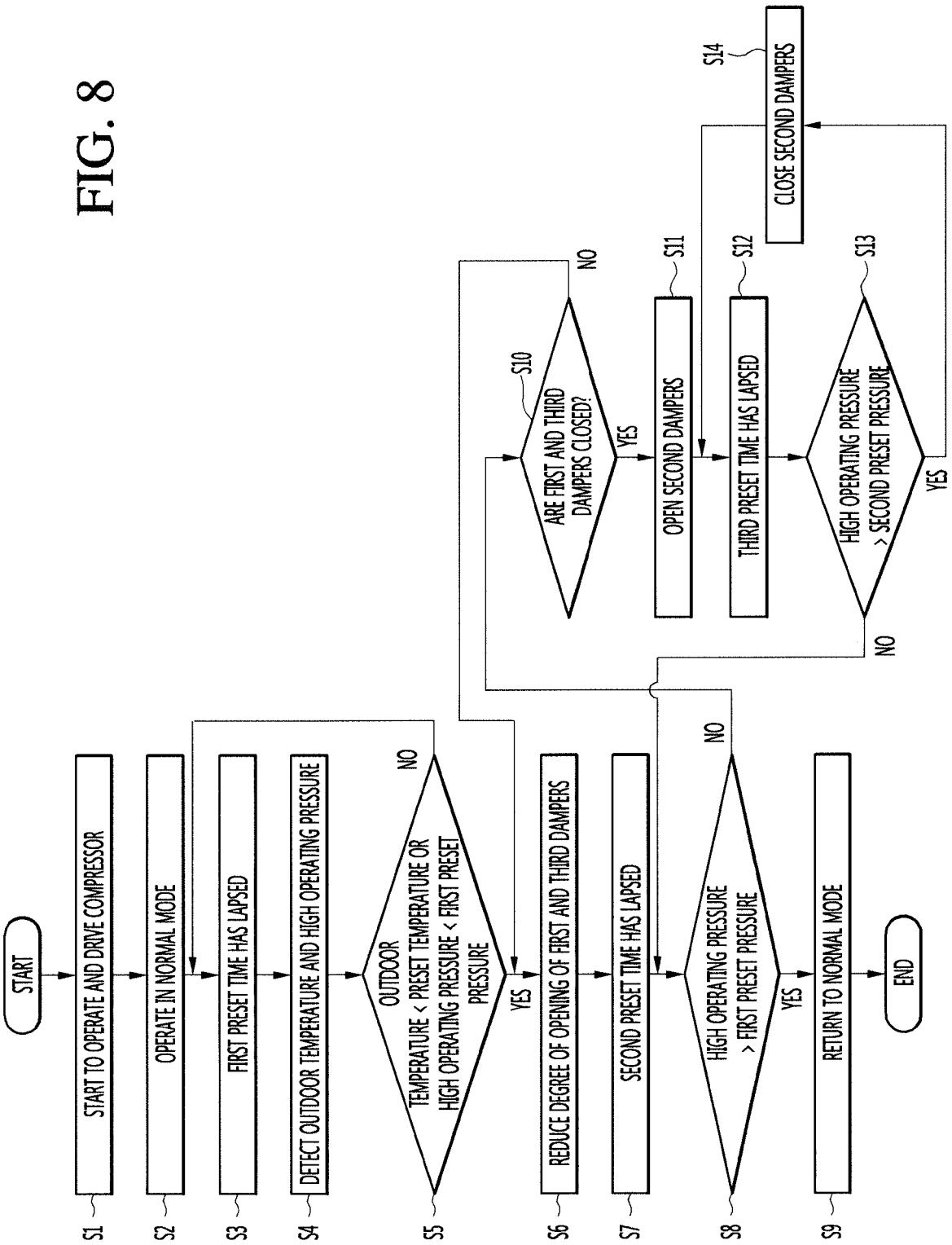
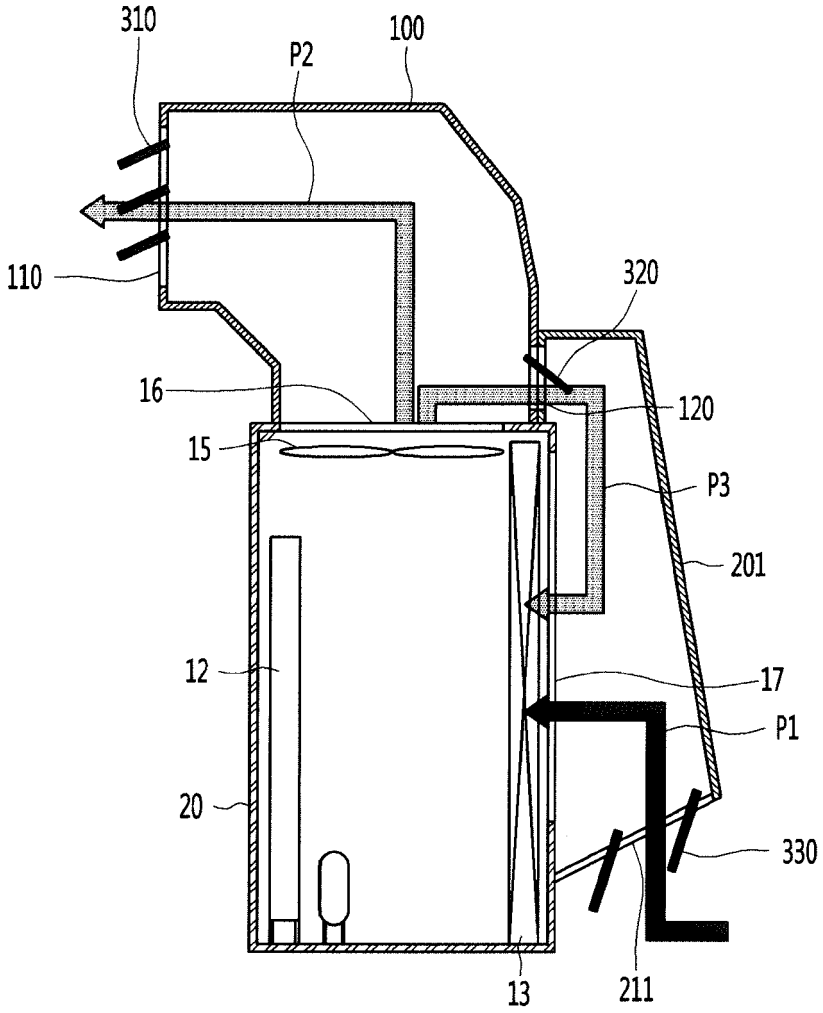

START
START TO OPERATE AND DRIVE COMPRESSOR
S1
OPERATE IN NORMAL MODE
S2
FIRST PRESET TIME HAS LAPSED
S3
DETECT OUTDOOR TEMPERATURE AND HIGH OPERATING PRESSURE
S4
OUTDOOR TEMPERATURE < PRESET TEMPERATURE OR HIGH OPERATING PRESSURE < FIRST PRESET PRESSURE
S5
NO
YES
REDUCE DEGREE OF OPENING OF FIRST AND THIRD DAMPERS
S6
SECOND PRESET TIME HAS LAPSED
S7
HIGH OPERATING PRESSURE > FIRST PRESET PRESSURE
S8
NO
YES
RETURN TO NORMAL MODE
S9
END
ARE FIRST AND THIRD DAMPERS CLOSED?
S10
NO
YES
OPEN SECOND DAMPERS
S11
THIRD PRESET TIME HAS LAPSED
S12
HIGH OPERATING PRESSURE > SECOND PRESET PRESSURE
S13
NO
YES
CLOSE SECOND DAMPERS
S14

FIG. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 16 17 4399

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 February 2017	Lienhard, Dominique

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