

(19)



(11)

**EP 2 871 427 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**18.12.2019 Bulletin 2019/51**

(51) Int Cl.:  
**F24F 1/06** <sup>(2011.01)</sup> **F24F 1/26** <sup>(2011.01)</sup>  
**F24F 11/00** <sup>(2018.01)</sup>

(21) Application number: **14190909.3**

(22) Date of filing: **29.10.2014**

(54) **Outdoor unit for air-conditioning device**

Außeneinheit und Klimaanlagevorrichtung

Unité extérieure pour dispositif de climatisation

(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**

(30) Priority: **07.11.2013 JP 2013231388**

(43) Date of publication of application:  
**13.05.2015 Bulletin 2015/20**

(73) Proprietor: **Mitsubishi Electric Corporation**  
**Chiyoda-ku**  
**Tokyo 100-8310 (JP)**

(72) Inventors:  
• **Yamaguchi, Koji**  
**Tokyo, 100-8310 (JP)**  
• **Yamashita, Tetsuo**  
**Tokyo, 100-8310 (JP)**

- **Hatta, Masatomo**  
**Tokyo, 100-8310 (JP)**
- **Ishii, Minoru**  
**Tokyo, 100-8310 (JP)**
- **Morioka, Reiji**  
**Tokyo, 100-8310 (JP)**
- **Tazawa, Tetsuya**  
**Tokyo, 102-0073 (JP)**

(74) Representative: **Pfenning, Meinig & Partner mbB**  
**Patent- und Rechtsanwälte**  
**Theresienhöhe 11a**  
**80339 München (DE)**

(56) References cited:  
**WO-A1-2013/051166 WO-A1-2013/088713**  
**JP-A- 2008 096 018 JP-A- 2011 052 941**  
**KR-B1- 100 795 605**

**EP 2 871 427 B1**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

**Description**

[Technical Field]

**[0001]** The present invention relates to an outdoor unit for an air-conditioning device.

[Background Art]

**[0002]** In heat pump air-conditioning devices, during a heating operation in which an outdoor heat exchanger serves as an evaporator, heat exchange may be interrupted due to frost formed on the outdoor heat exchanger. Accordingly, heat pump air-conditioning devices have conventionally been proposed which perform a defrost operation to remove frost when frost formation is detected.

**[0003]** When a defrost operation is performed, frost adhered on the outdoor heat exchanger melts into drain water and, by extension, into water vapor. The drain water generated by the defrost operation drops on the upper surface of a bottom panel which forms the bottom of a housing of the outdoor unit, and is then discharged to the outside of the outdoor unit through a drain discharging hole which is formed on the bottom panel. Further, water vapor generated by the defrost operation is discharged to the outside of the outdoor unit by natural convection or by rotation of a fan during a heating operation after the end of the defrost operation.

**[0004]** Particularly in a cold climate where the outside air temperature stays considerably low, frost is likely to be formed, and the drain water dropped on the upper surface of the bottom panel from the outdoor heat exchanger may refreeze on the upper surface of the bottom panel before being discharged to the outside of the outdoor unit through the drain discharging hole. Accordingly, in order to prevent the drain water from refreezing on the upper surface of the bottom panel, an outdoor unit having a heater (sheath heater) disposed on the upper surface of the bottom panel has conventionally been available (see, for example, Patent Literature 1).

[Citation List]

[Patent Literature]

**[0005]** [Patent Literature 1] Japanese Unexamined Patent Application Publication No. 2011-52941 (p. 10, Figs. 1 & 2)

**[0006]** WO 2013/051166 A1 discloses a refrigeration cycle apparatus which includes a compressor, a condenser, expansion means, and an evaporator that are connected by refrigerant pipes to form a refrigeration cycle. The evaporator is a heat exchanger including a plurality of plate-like heat transfer fins arranged in parallel. The refrigeration cycle apparatus further includes a drain pan disposed below the evaporator, an evaporator fan for producing an air current flowing to the evaporator,

and a heating unit disposed at a position below the heat transfer fins and on a leeward side of the heat transfer fins.

[Summary of Invention]

[Technical Problem]

**[0007]** Upon wide use of heat pump air-conditioning devices, the outdoor unit is sometimes installed in an extremely cold climate (where the outside air temperature is 0 degrees C or below) in addition to a cold climate, as in the conventional case. In the extremely cold climate, the surface temperatures of the outdoor heat exchanger and the housing are 0 degrees C or below, as well as the outside air temperature. Accordingly, water vapor generated during a defrost operation may collect and refreeze in the housing, which remains frosted. Further, ice which is generated from frozen water vapor does not melt during a defrost operation. Upon repeated defrost operations, the ice may grow into icicles by repeating refreezing. In the heater described in Patent Literature 1, there is a problem that the water vapor adhered on a member other than the bottom panel cannot sufficiently be prevented from freezing since the heater is disposed on the upper surface of the bottom panel.

**[0008]** Particularly, the amount of air flowing on the outer periphery of a bell mouth during a fan operation is small and air stagnation occurs. As a result, water vapor generated during the defrost operation tends to accumulate and ice tends to grow on the bell mouth. In such a case, there is a problem that ice generated from the frozen water vapor adhered on the bell mouth may come into contact with a propeller fan disposed inside the outdoor unit, and break the propeller fan, or may apply a load to a fan motor which drives the propeller fan, and break the propeller fan.

**[0009]** The present invention is made in light of the above problems, and has as its object to provide an outdoor unit for an air-conditioning device that prevents water vapor adhered on the bell mouth from freezing.

[Solution to Problem]

**[0010]** An outdoor unit for an air-conditioning device according to the present invention includes a housing having a front panel in which an opening is formed, a fan disposed in an air-sending device chamber which is formed inside the housing, an outdoor heat exchanger disposed in the air-sending device chamber, a bell mouth which is disposed in the air-sending device chamber and extends backwards from a periphery of the opening, and a heater which is disposed in the air-sending device chamber and extends in the up and down direction, wherein the outdoor heat exchanger has an L-shape and is provided to extend along a side face and a back face of the housing which forms the air-sending device chamber, and the heater is disposed between part of the bell

mouth that opposes the side face of the housing forming the air-sending device chamber and the part of the outdoor heat exchanger which is provided to extend along the side face of the housing forming the air-sending device chamber.

#### [Advantageous Effects of Invention]

**[0011]** According to the present invention, a heater which extends in the up and down direction is provided in an air-sending device chamber in which a bell mouth is provided. Accordingly, even if water vapor adheres to the bell mouth during a defrost operation, the temperature of the water vapor adhered on the bell mouth becomes 0 degrees C or higher due to heat generated by the heater. As a result, it is possible to prevent the water vapor adhered on the bell mouth from freezing in an extremely cold environment where the outside air temperature is 0 degrees C or below.

#### [Brief Description of Drawings]

#### [0012]

[Fig. 1] Fig. 1 is a perspective view of an outdoor unit 100 of an air-conditioning device according to Embodiment.

[Fig. 2] Fig. 2 is an exploded perspective view of an outdoor unit 100 of an air-conditioning device according to Embodiment.

[Fig. 3] Fig. 3 is an exploded perspective view of the outdoor unit 100 of the air-conditioning device according to Embodiment, and shows details of Fig. 2.

[Fig. 4] Fig. 4 is a cross-sectional view taken along the line X-X of Fig. 1.

[Fig. 5] Fig. 5 is a cross-sectional view taken along the line Y-Y of Fig. 1.

[Fig. 6] Fig. 6 is a view showing how a heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment.

[Fig. 7] Fig. 7 is a cross-sectional view taken along the line X-X of Fig. 1, and shows how the heater 30 is disposed in the outdoor unit 100.

[Fig. 8] Fig. 8 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment.

[Fig. 9] Fig. 9 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment.

[Fig. 10] Fig. 10 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment.

#### [Description of Embodiment]

**[0013]** An embodiment of the present invention will be described below with reference to the accompanying drawings. In the drawings including Fig. 1, the relation-

ships of size between components may be different from the actual relationships. Also, in the drawings including Fig. 1, the same reference numerals denote the same or equivalent components, and this applies to the entire specification. Further, the modes of the components described in the entire specification are merely illustrative examples, and the invention is not limited thereto.

**[0014]** Fig. 1 is a perspective view of an outdoor unit 100 of an air-conditioning device according to Embodiment. Fig. 2 is an exploded perspective view of the outdoor unit 100 of the air-conditioning device according to Embodiment. Fig. 3 is an exploded perspective view of the outdoor unit 100 of the air-conditioning device according to Embodiment, and shows details of Fig. 2.

**[0015]** As shown in Fig. 1, an outer cover of the outdoor unit 100 is implemented in a housing 50. As shown in Fig. 2, the housing 50 includes a front and side panel 50a, a right side panel 50b, a bottom panel 50c, a top panel 50d and a back panel 50e (see Fig. 4). The front and side panel 50a is implemented using, for example, a member having an L shape, as seen in a plan view, and forms the front face and the left side face of the housing 50. Again, as shown in Fig. 2, a partition 1 is provided in the housing 50. Using the partition 1, the inner space of the housing 50 is divided into a machine chamber 10 and an air-sending device chamber 20.

**[0016]** The front and side panel 50a may be implemented using separate members, which individually form the front face and the left side face of the housing 50. That is, the front and side panel 50a may be divided into a front panel which forms the front face of the housing 50, and a left side panel which forms the left side face of the housing 50.

**[0017]** A compressor 11 and an electrical component box 12 are provided in the machine chamber 10. A control board (not shown) is provided in the electrical component box 12. The control board (not shown) serves as a member for controlling the rotation speed of the compressor 11 and driving, for example, a heater 30 (to be described later). Further, the control board (not shown) is implemented using hardware such as a circuit device that implements its function, or software running on an arithmetic unit such as a microcomputer or CPU.

**[0018]** The air-sending device chamber 20 is provided with an outdoor heat exchanger 21, a fan 22, a fan motor 23 (see Fig. 4), a fan motor supporting plate 24, an upper plate 25 and a supporting plate connection portion 26. The outdoor heat exchanger 21 is positioned more to the back of the outdoor unit 100 than the fan 22, the fan motor 23, the fan motor supporting plate 24, the upper plate 25 and the supporting plate connection portion 26.

**[0019]** The outdoor heat exchanger 21 has an L shape, as seen in a plan view, and is disposed to extend along the surface of the left side face of the front and side panel 50a and the back panel 50e. The fan 22 serves as an air-sending means implemented in, for example, a propeller fan, and generates an air circulating flow for effectively exchanging heat. The fan 22 serves to introduce

the outside air from the back side of the outdoor unit 100 into the outdoor unit 100, and exhausting it to the front face of the outdoor unit 100.

**[0020]** The fan motor 23 serves as a driving means for driving the fan 22, and is mounted on the fan motor supporting plate 24 by using a fixing means such as a screw. The fan motor supporting plate 24 serves to support the fan motor 23, and is a frame-shaped member which extends upwards from the bottom panel 50c. Note that a plurality of fan motor supporting plates 24 may be provided, instead of a single fan motor supporting plate 24 as shown in the drawings.

**[0021]** The upper plate 25 is implemented using a plate member which is, for example, almost parallel to the bottom panel 50c. The upper plate 25 serves as a member for reinforcing the strength of the fan motor supporting plate 24 to cope with the situation in which the fan motor 23 is comparatively large. The upper plate 25 is connected to the fan motor supporting plate 24. The upper plate 25 is mounted, for example, on the top end of the fan motor supporting plate 24 and extends to the front.

**[0022]** The supporting plate connection portion 26 is, for example, a U-shaped member, and is integrated with the fan motor supporting plate 24. The inner surface of the supporting plate connection portion 26 is in contact with the upper surface of the outdoor heat exchanger 21. Thus, the fan motor supporting plate 24 is fixed to the outdoor heat exchanger 21 by mounting the supporting plate connection portion 26 on the outdoor heat exchanger 21.

**[0023]** As shown in Fig. 3, an opening 50a1 is formed in the front and side panel 50a. The opening 50a1 serves to exhaust, to the outside of the outdoor unit 100, the outside air introduced into the outdoor unit 100. Further, a bell mouth 27 is provided on the back side of the front and side panel 50a so as to surround the outer periphery of the fan 22.

**[0024]** The bell mouth 27 includes, for example, a convergent portion 27a which extends backwards so that its diameter is smaller in areas more radially inward and farther from the periphery of the opening 50a1, and a divergent portion 27b which extends backwards so that its diameter is larger in areas more radially outward and farther from the back end of the convergent portion 27a. The bell mouth 27 is integrated with the front and side panel 50a. The bell mouth 27 serves to guide the outside air introduced in the housing 50 to the opening 50a1. Note that the bell mouth 27 may be formed to have a portion extending in the front and back direction between the convergent portion 27a and the divergent portion 27b.

**[0025]** Fig. 4 is a cross-sectional view taken along the line X-X of Fig. 1. Fig. 5 is a cross-sectional view taken along the line Y-Y of Fig. 1. Referring to Figs. 4 and 5, a flow of air is schematically shown as an air flow A using arrows. An air flow passage formed inside and outside the housing 50 will be described below with reference to Figs. 4 and 5.

**[0026]** When a fan 22 rotates by driving the fan motor

23, the outside air is introduced into the housing 50. The outside air introduced in the housing 50 is blown to a member such as the bell mouth 27 through the outdoor heat exchanger 21. After circulating inside the housing 50, the outside air is exhausted to the outside of the housing 50 through the opening 50a1. As shown in Figs. 4 and 5, air stagnation A1 tends to occur on the outer periphery of the bell mouth 27.

**[0027]** Fig. 6 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment. Fig. 7 is a cross-sectional view taken along the line X-X of Fig. 1, and shows how the heater 30 is disposed in the outdoor unit 100. As shown in Fig. 6, the heater 30 which extends in the up and down direction is mounted in the outdoor heat exchanger 21 via a heater supporting member 28.

**[0028]** The heater 30 serves as a heating means implemented in, for example, a sheath heater, and heats the water vapor generated inside the heater 30. A nichrome wire is provided inside the heater 30. Note that the heater 30 may be implemented in a flexible heater. This configuration facilitates positioning of the heater 30 in the housing 50. As shown in Fig. 7, the heater 30 has a circular cross-section.

**[0029]** The heater 30 is disposed between a portion of the outdoor heat exchanger 21 which extends in the front and back direction along the left side face of the front and side panel 50a and the back end of the convergent portion 27a of the bell mouth 27 which opposes the left side face of the front and side panel 50a. The heater 30 is bent in the vicinity of the heater supporting member 28 to form an inverted U shape, as seen in a side view, and is located around the outdoor heat exchanger 21.

**[0030]** The heater 30 is used with a power consumption of, for example, 100 W at a temperature of, for example, 30 degrees C. The heater 30 is activated when an outside air temperature sensor (not shown) detects a predetermined temperature or below during a heating operation. Note that the power consumption and temperature of the heater 30 are not limited to the above-mentioned values, and are determined as appropriate so that the water vapor generated in the housing 50 is heated.

**[0031]** The heater 30 further extends in the right and left direction on the upper surface of the bottom panel 50c. The heater 30 is desirably disposed on the front part of the bottom panel 50c. Specifically, the heater 30 is preferably disposed, for example, on the upper surface of the bottom panel 50c more to the front than the back end of the bell mouth 27 as seen in a plan view. With this configuration, it is possible to reliably prevent the water vapor adhered on the bell mouth 27 from freezing, and, in turn, to prevent the water flowing out of the outdoor heat exchanger 21 from freezing.

**[0032]** Note that a configuration is also possible in which the heater 30 extends in the up and down direction in the vicinity of the left side face of the front and side panel 50a and does not extend on the front part of the upper surface of the bottom panel 50c. In this configura-

tion as well, it is possible to prevent the water vapor adhered on the bell mouth 27 from freezing.

**[0033]** Also, a configuration is also possible in which the heater 30 extends in the up and down direction while curving to the right and left instead of the use of a heater 30 extending straight in the up and down direction as shown in Fig. 6. With this configuration, since the surface area of the heater 30, at which it emits heat to the bell mouth 27, increases, it is possible to reliably prevent the water vapor adhered on the bell mouth 27 from freezing.

**[0034]** The operation of the outdoor unit 100 in an extremely cold climate where the outside air temperature is 0 degrees C or below will be described next. The above-described control board (not shown) controls the operation of the outdoor unit 100 in response to, for example, an operation of an operation means (not shown) through which a user sets an operation mode. Although the operation mode can be, for example, a heating operation or a cooling operation, the following description assumes a heating operation as the set operation mode.

**[0035]** When a heating operation is set, the fan 22 rotates and the outside air is introduced into the housing 50, as described above. Since the outdoor heat exchanger 21 functions as an evaporator, the outside air introduced in the housing 50 exchanges heat with the refrigerant in the outdoor heat exchanger 21 and has its temperature lowered. The outside air whose temperature is lowered is blown to a member such as the bell mouth 27 in the air-sending device chamber 20. When the temperature of the outside air detected by the outside air temperature sensor reaches a predetermined temperature or below, the control board activates the heater 30. Accordingly, when the heater 30 is activated, heat generated by the heater 30 is transmitted to the bell mouth 27, thereby suppressing frost formation on the bell mouth 27.

**[0036]** At a predetermined time after the start of a heating operation, the control board stops the operation of the compressor 11 and switches a four-way valve (not shown) to enable a cooling operation. Then, the control board resumes the operation of the compressor 11 and stops the rotation of the fan 22. Upon this operation, a defrost operation starts.

**[0037]** In the defrost operation, since the outdoor heat exchanger 21 functions as a condenser, the refrigerant discharged from the compressor 11 flows into the outdoor heat exchanger 21 so as to generate heat in the outdoor heat exchanger 21. Accordingly, by the defrost operation the temperature inside the housing 50 can be increased using the heat in the outdoor heat exchanger 21.

**[0038]** Upon the defrost operation, the temperature of the frost adhered on the bell mouth 27 increases and the frost turns into water vapor. The water vapor naturally refreezes if it remains untreated in an extremely cold climate where the outside air temperature is 0 degrees C or below. However, the heater 30 provided on the bell mouth 27 heats the water vapor adhered on the bell mouth 27. This makes it possible to prevent the water vapor adhered on the bell mouth 27 from refreezing.

**[0039]** Note that the heater 30 may be implemented using a hot gas bypass (not shown) which directly supplies to the outdoor heat exchanger 21 at least a part of the refrigerant discharged from the compressor 11. In this case, a refrigerant stream having a temperature and pressure higher than those of a refrigerant stream discharged from the compressor 11 and supplied to the outdoor heat exchanger 21 through an indoor heat exchanger (not shown) flows in the hot gas bypass. Accordingly, the bell mouth 27 can be heated by using heat generated by the refrigerant which flows in the hot gas bypass.

**[0040]** As described above, the outdoor unit 100 according to this Embodiment includes the housing 50 having the front and side panel 50a in which the opening 50a1 is formed, the fan 22 disposed in the air-sending device chamber 20 which is formed inside the housing 50, the outdoor heat exchanger 21 disposed in the air-sending device chamber 20, the bell mouth 27 which is disposed in the air-sending device chamber 20 and extends backwards from the periphery of the opening 50a1, and the heater 30 which is disposed in the air-sending device chamber 20 and extends in the up and down direction.

**[0041]** With this arrangement, even if water vapor adheres to the bell mouth 27 during a defrost operation, the temperature of the water vapor adhered on the bell mouth 27 becomes 0 degrees C or higher due to heat generated by the heater. As a result, it is possible to prevent the water vapor adhered on the bell mouth 27 from freezing in an extremely cold environment where the outside air temperature is 0 degrees C or below. Particularly, even if air stagnation occurs on the outer periphery of the bell mouth 27, the water vapor adhered on the outer peripheral surface of the bell mouth 27 can be prevented from freezing.

**[0042]** Further, the heater 30 is disposed more to the side of the outdoor heat exchanger 21 which is provided to extend along the side face of the air-sending device chamber 20 than the bell mouth 27. Accordingly, it is possible to transmit heat generated by the heater 30 to a portion of the bell mouth 27 where heat generated by the compressor 11 is less likely to be transmitted and water vapor is most likely to freeze.

**[0043]** Fig. 8 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment. Fig. 9 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment. Fig. 10 is a view showing how the heater 30 is disposed in the outdoor unit 100 of the air-conditioning device according to Embodiment.

**[0044]** As shown in Fig. 8, a configuration is also possible in which the heater has a plurality of portions bent to form a plurality of inverted and non-inverted U shapes. With this configuration, since the surface area of the heater 30, at which it emits heat to the bell mouth 27, is relatively large, it is possible to reliably prevent the water vapor adhered on the bell mouth 27 from freezing.

[0045] Further, as shown in Fig. 9, a configuration is also possible in which the heater 30 extends in the right and left direction in a portion above the top end of the bell mouth 27. With this configuration, it is possible to prevent the water vapor adhered on the upper area of the bell mouth 27 as well as the water vapor adhered on the lower and side areas of the bell mouth 27 from freezing.

[0046] Further, as shown in Fig. 10, a configuration is also possible in which the heater is bent around the center of the bell mouth 27 in the up and down direction. In the heater 30 having this configuration, it is possible to heat the central portion of the bell mouth 27 where air stagnation is most likely to occur. Accordingly, even if a sufficient space for installing the heater 30 is not provided, the water vapor adhered on the bell mouth 27 can be efficiently prevented from freezing.

[Reference Signs List]

[0047] 1 partition 10 machine chamber 11 compressor 12 electrical component box 20 air-sending device chamber 21 outdoor heat exchanger 22 fan 23 fan motor 24 fan motor supporting plate 25 upper plate 26 upper plate connection portion 27 bell mouth 27a convergent portion 27b divergent portion 28 heater supporting member 30 heater 50 housing 50a front and side panel 50a1 opening 50b right side panel 50c bottom panel 50d top panel 50e back panel 100 outdoor unit A air flow A1 air stagnation

## Claims

1. An outdoor unit for an air-conditioning device comprising:

a housing (50) which includes a front panel in which an opening (50a1) is formed;  
a fan (22) disposed in an air-sending device chamber (20) which is formed inside the housing (50);

an outdoor heat exchanger (21) disposed in the air-sending device chamber (20);

**characterized in** furthermore comprising:

a bell mouth (27) which is disposed in the air-sending device chamber (20) and extends backwards from a periphery of the opening (50a1); and

a heater (30) which is disposed in the air-sending device chamber (20) in which the bell mouth (27) is disposed, and extends in an up and down direction.

wherein the outdoor heat exchanger (21) has an L-shape and is provided to extend along a side face and a back face of the housing (50) which forms the air-sending device chamber (20), and the heater (30) is

disposed more to a side of the outdoor heat exchanger (21) which is provided to extend along the side face of the air-sending device chamber (20) than the bell mouth (27).

2. The outdoor unit for an air-conditioning device of claim 1, further comprising:

a compressor (11); and

a partition (1) that divides an inner space of the housing (50) into a plurality of spaces, wherein the partition (1) divides the inner space of the housing (50) into a machine chamber (10) which houses the compressor (11) and the air-sending device chamber (20).

3. The outdoor unit for an air-conditioning device of claim 1 or 2, wherein the heater (30) is provided to form an inverted U shape as seen in a side view.

4. The outdoor unit for an air-conditioning device of any one of claims 1 to 3, wherein the heater (30) is further provided on an upper surface of a bottom panel (50c) which forms the housing (50).

5. The outdoor unit for an air-conditioning device of any one of claims 1 to 4, wherein the heater (30) is provided to extend in a right and left direction in a portion above a top end of the bell mouth (27).

6. The outdoor unit for an air-conditioning device of any one of claims 1 to 5, wherein the heater (30) includes a plurality of bent portions.

7. The outdoor unit for an air-conditioning device of any one of claims 1 to 6, wherein the heater (30) is implemented using a hot gas bypass pipe which directly supplies to the outdoor heat exchanger (21) at least a part of a refrigerant discharged from a compressor (11) which is disposed in the housing (50).

## Patentansprüche

1. Außeneinheit für eine Klimaanlage, umfassend:

ein Gehäuse (50), das eine vordere Blende aufweist, in der eine Öffnung (50a1) ausgebildet ist;  
einen Lüfter (22), der in einer Luftsendeeinrichtungskammer (20), die innerhalb des Gehäuses (50) ausgebildet ist, angeordnet ist;  
einen Außenwärmetauscher (21), der in der Luftsendeeinrichtungskammer (20) angeordnet ist;

**dadurch gekennzeichnet, dass** sie ferner umfasst:

eine Trichterdüse (27), die in der Luftsen-

- deeinrichtungskammer (20) angeordnet ist und sich von einer Peripherie der Öffnung (50a1) nach hinten erstreckt; und einen Erwärmer (30), der in der Luftsendeeinrichtungskammer (20), in der die Trichterdüse (27) angeordnet ist, angeordnet ist und sich in einer Aufwärts- und Abwärtsrichtung erstreckt, wobei der Außenwärmetauscher (21) eine L-Form aufweist und vorgesehen ist, sich entlang einer seitlichen Fläche und einer hinteren Fläche des Gehäuses (50), das die Luftsendeeinrichtungskammer (20) bildet, zu erstrecken, und der Erwärmer (30) näher als die Trichterdüse (27) zu einer Seite des Außenwärmetauschers (21) angeordnet ist, die vorgesehen ist, sich entlang der seitlichen Fläche der Luftsendeeinrichtungskammer (20) zu erstrecken.
2. Außeneinheit für eine Klimaanlage nach Anspruch 1, ferner umfassend:
- einen Verdichter (11); und
- einen Trennwand (1), die einen Innenraum des Gehäuses (50) in eine Vielzahl von Räume unterteilt,
- wobei die Trennwand (1) den Innenraum des Gehäuses (50) in eine Maschinenkammer (10), in der der Verdichter (11) untergebracht ist, und die Luftsendeeinrichtungskammer (20) unterteilt.
3. Außeneinheit für eine Klimaanlage nach Anspruch 1 oder 2, wobei der Erwärmer (30) vorgesehen ist, um eine invertierte U-Form, betrachtet in einer Seitenansicht, zu bilden.
4. Außeneinheit für eine Klimaanlage nach einem der Ansprüche 1 bis 3, wobei der Erwärmer (30) ferner auf einer oberen Oberfläche einer das Gehäuse (50) bildenden Bodenblende (50c) vorgesehen ist.
5. Außeneinheit für eine Klimaanlage nach einem der Ansprüche 1 bis 4, wobei der Erwärmer (30) vorgesehen ist, um sich in einer rechten und linken Richtung in einem Abschnitt über einem oberen Ende der Trichterdüse (27) zu erstrecken.
6. Außeneinheit für eine Klimaanlage nach einem der Ansprüche 1 bis 5, wobei der Erwärmer (30) eine Vielzahl von gekrümmten Abschnitten aufweist.
7. Außeneinheit für eine Klimaanlage nach einem der Ansprüche 1 bis 6, wobei der Erwärmer (30) realisiert ist unter Verwendung einer Heißgas-Umgehungsleitung, die dem Außenwärmetauscher (21) zumindest einen Teil des aus einem im Gehäuse (50) angeordneten Verdichters (11) abgegebenen Kältemittels zuführt.
- ## 5 Revendications
1. Unité extérieure pour un dispositif de climatisation comprenant :
- un boîtier (50) qui comprend un panneau avant dans lequel une ouverture (50a1) est formée ; un ventilateur (22) disposé dans une chambre de dispositif d'émission d'air (20) qui est formée à l'intérieur du boîtier (50) ; un échangeur de chaleur extérieur (21) disposé dans la chambre de dispositif d'émission d'air (20) ;
- caractérisée en ce qu'elle comprend en outre :**
- une tulipe d'aspiration (27) qui est disposée dans la chambre de dispositif d'émission d'air (20) et s'étend vers l'arrière à partir d'une périphérie de l'ouverture (50a1) ; et un dispositif de chauffage (30) qui est disposé dans la chambre de dispositif d'émission d'air (20) dans laquelle la tulipe d'aspiration (27) est disposée, et s'étend dans une direction ascendante et descendante, dans laquelle l'échangeur de chaleur extérieur (21) a une forme de L et est prévu pour s'étendre le long d'une face latérale et d'une face arrière du boîtier (50) qui forme la chambre de dispositif d'émission d'air (20), et le dispositif de chauffage (30) est disposé davantage vers un côté de l'échangeur de chaleur extérieur (21) qui est prévu pour s'étendre le long de la face latérale de la chambre de dispositif d'émission d'air (20), que la tulipe d'aspiration (27).
2. Unité extérieure pour un dispositif de climatisation selon la revendication 1, comprenant en outre :
- un compresseur (11) ; et une séparation (1) qui divise un espace interne du boîtier (50) en une pluralité d'espaces, dans laquelle la séparation (1) divise l'espace interne du boîtier (50) en une chambre de machine (10) qui loge le compresseur (11) et en une chambre de dispositif d'émission d'air (20).
3. Unité extérieure pour un dispositif de climatisation selon la revendication 1 ou 2, dans laquelle : le dispositif de chauffage (30) est prévu pour former une forme de U inversé, comme observé sur une vue latérale.
4. Unité extérieure pour un dispositif de climatisation

selon l'une quelconque des revendications 1 à 3, dans laquelle le dispositif de chauffage (30) est en outre prévu sur une surface supérieure d'un panneau inférieur (50c) qui forme le boîtier (50).

5

5. Unité extérieure pour un dispositif de climatisation selon l'une quelconque des revendications 1 à 4, dans laquelle le dispositif de chauffage (30) est prévu pour s'étendre dans une direction droite et gauche d'une partie au-dessus d'une extrémité supérieure de la tulipe d'aspiration (27). 10
6. Unité extérieure pour un dispositif de climatisation selon l'une quelconque des revendications 1 à 5, dans laquelle le dispositif de chauffage (30) comprend une pluralité de parties pliées. 15
7. Unité extérieure pour un dispositif de climatisation selon l'une quelconque des revendications 1 à 6, dans laquelle le dispositif de chauffage (30) est mis en œuvre en utilisant un tuyau de dérivation de gaz chaud qui amène, directement à l'échangeur de chaleur extérieur (21), au moins une partie d'un réfrigérant déchargé par un compresseur (11) qui est disposé dans le boîtier (50). 20 25

30

35

40

45

50

55



FIG. 1

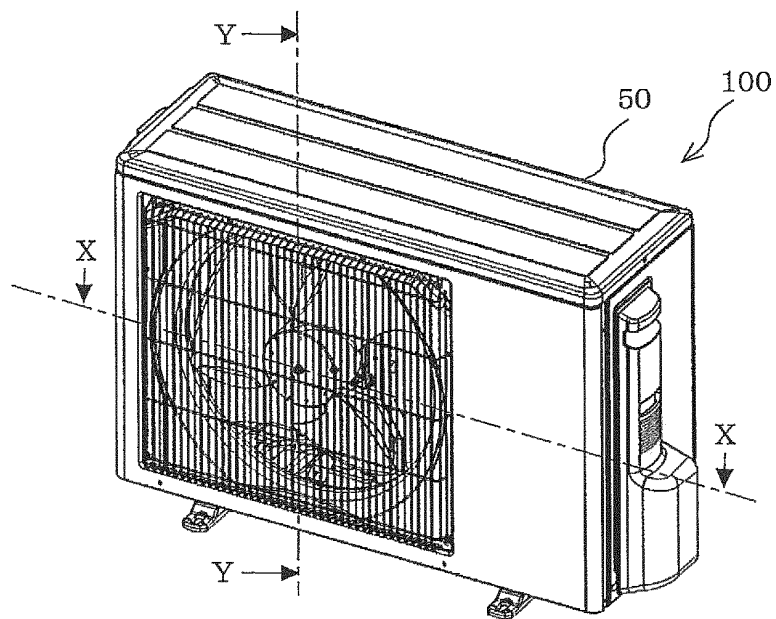


FIG. 2

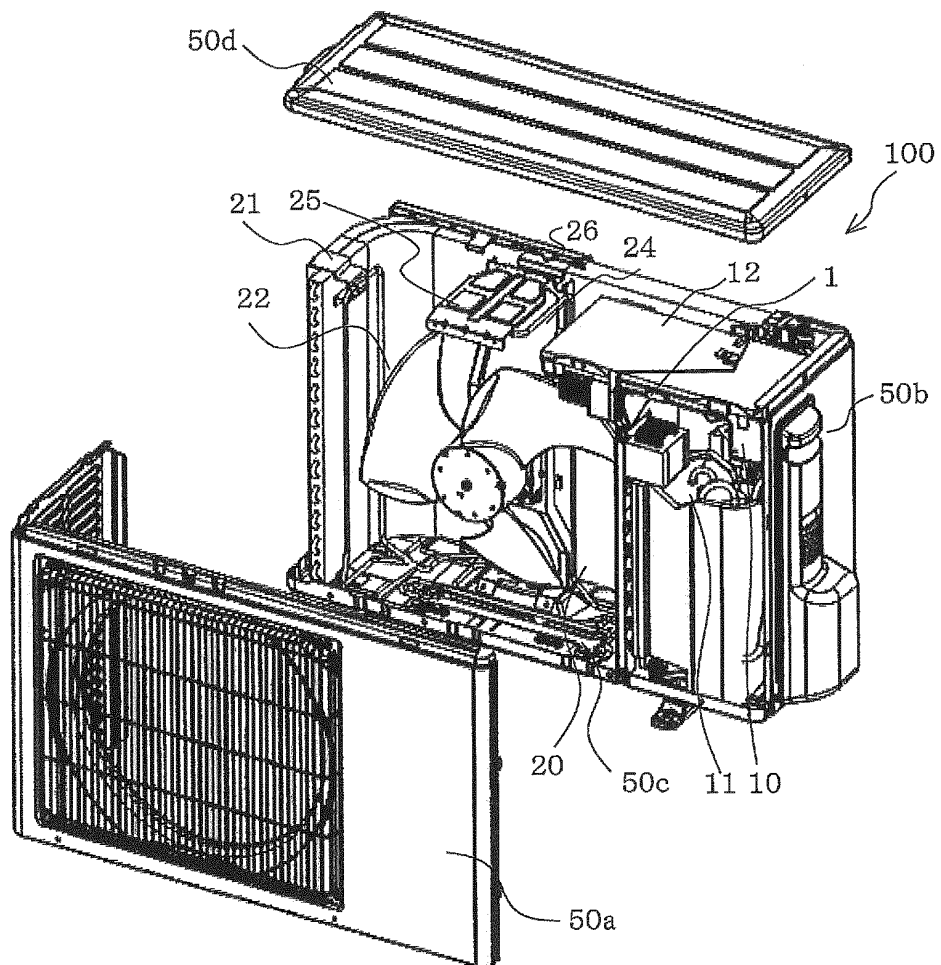


FIG. 3

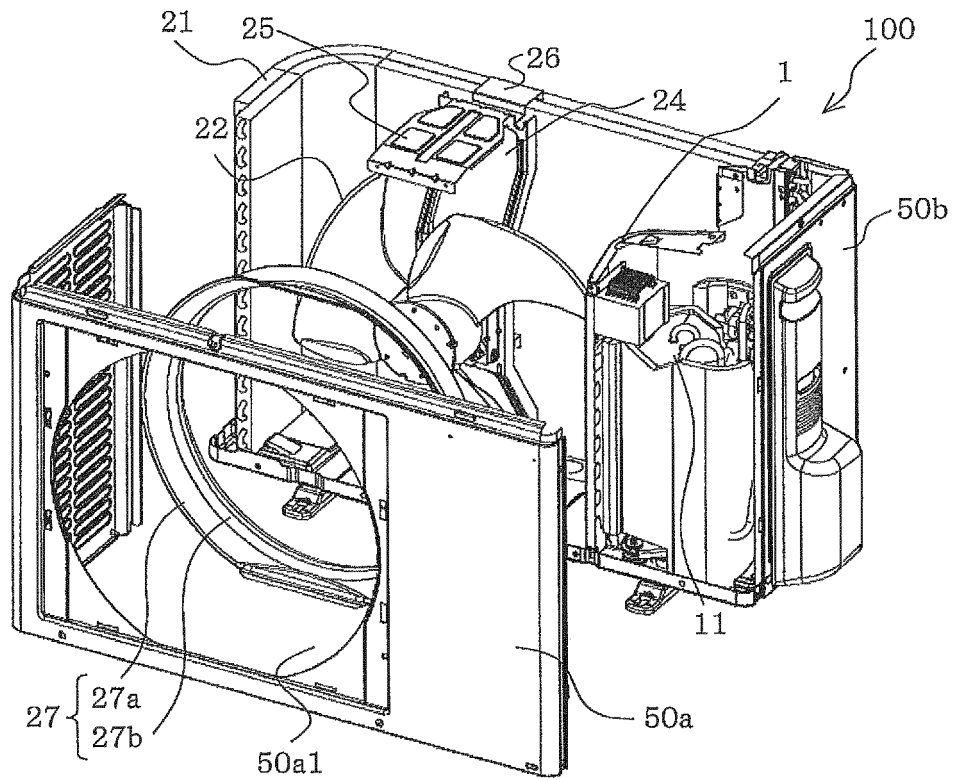


FIG. 4

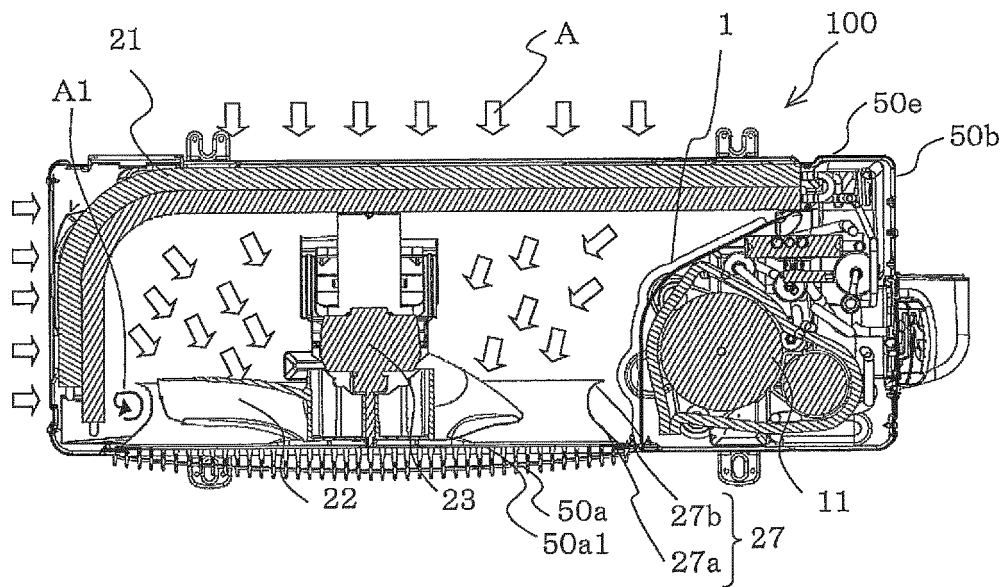


FIG. 5

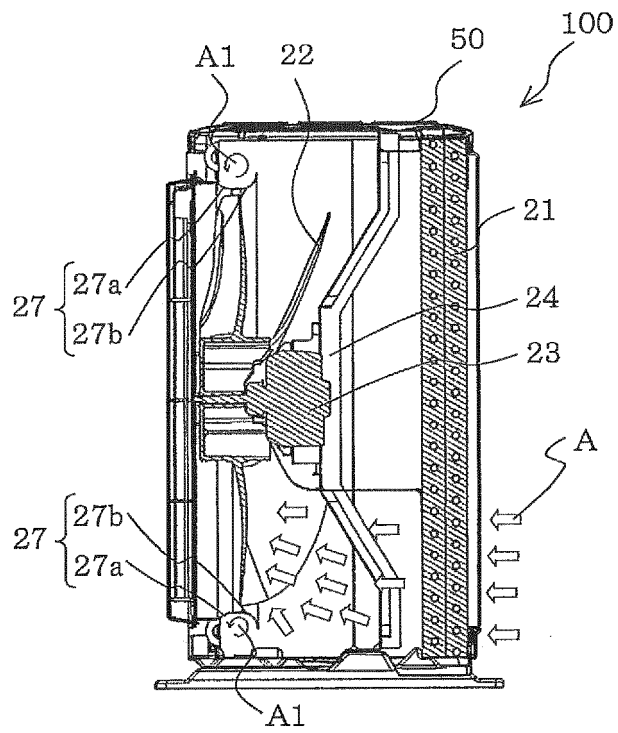


FIG. 6

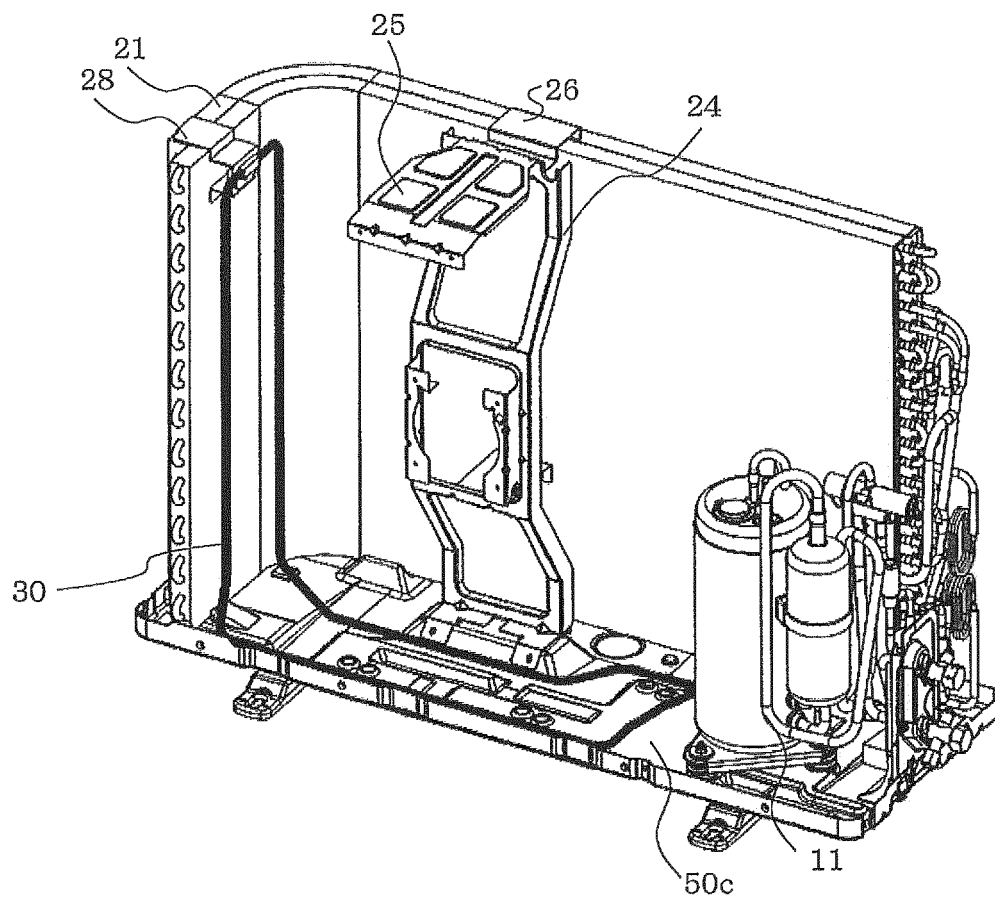


FIG. 7

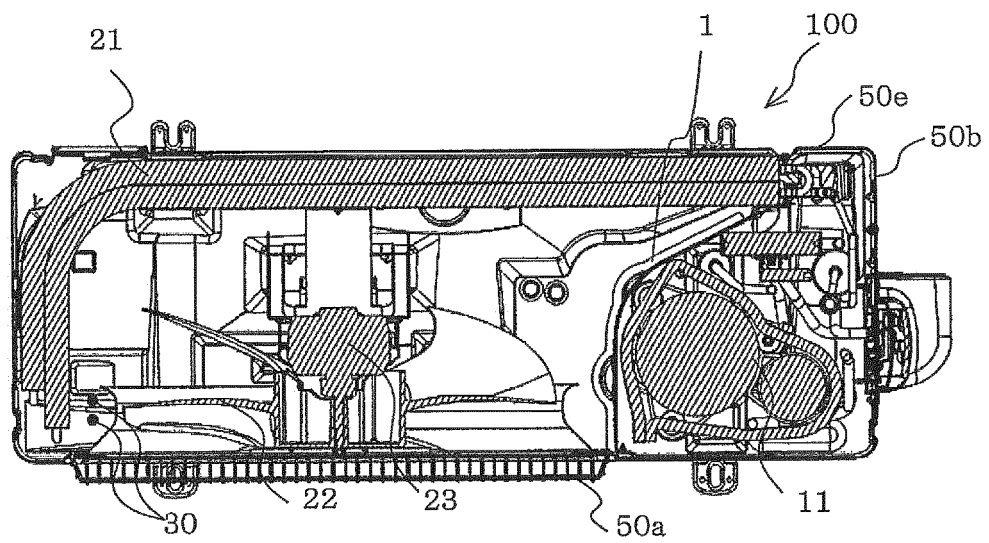


FIG. 8

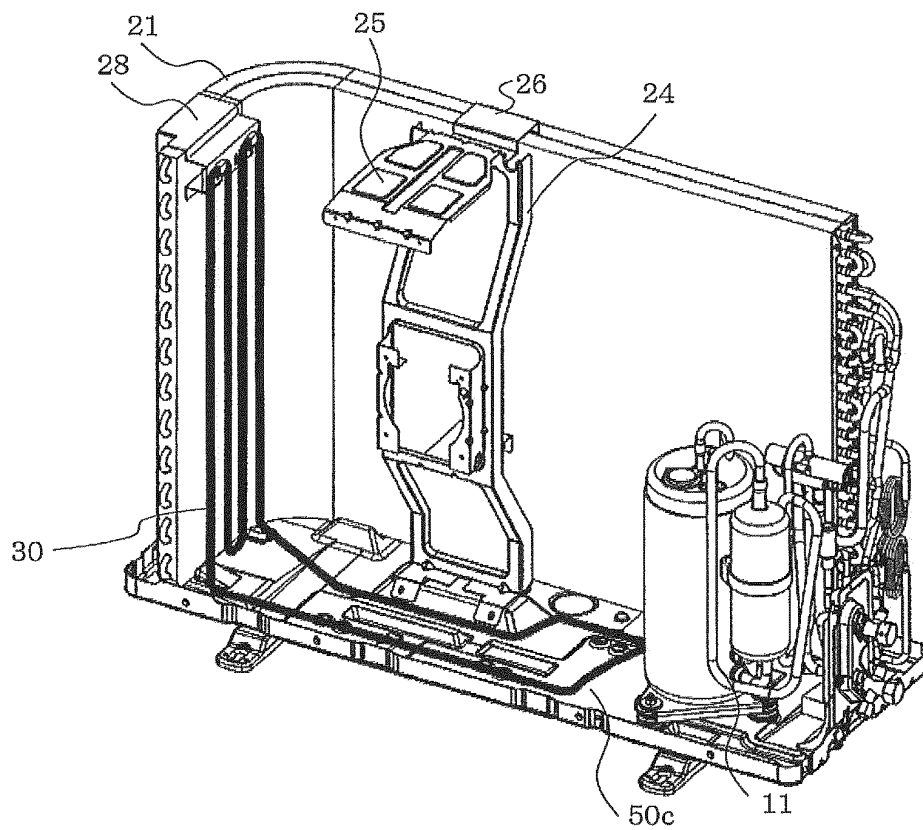


FIG. 9

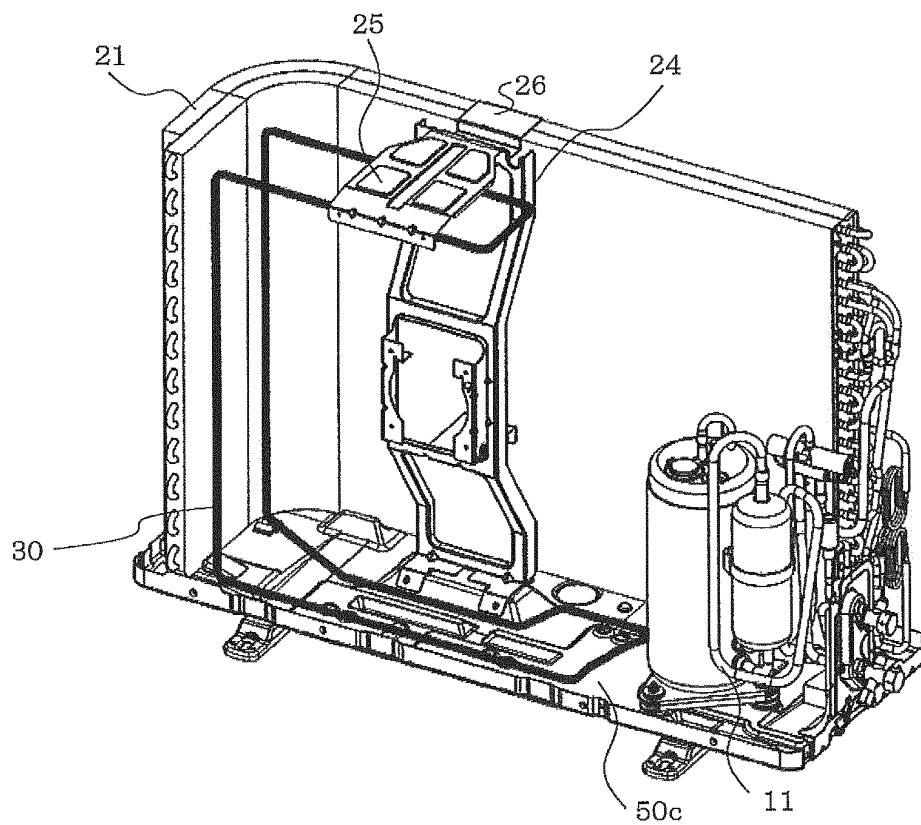
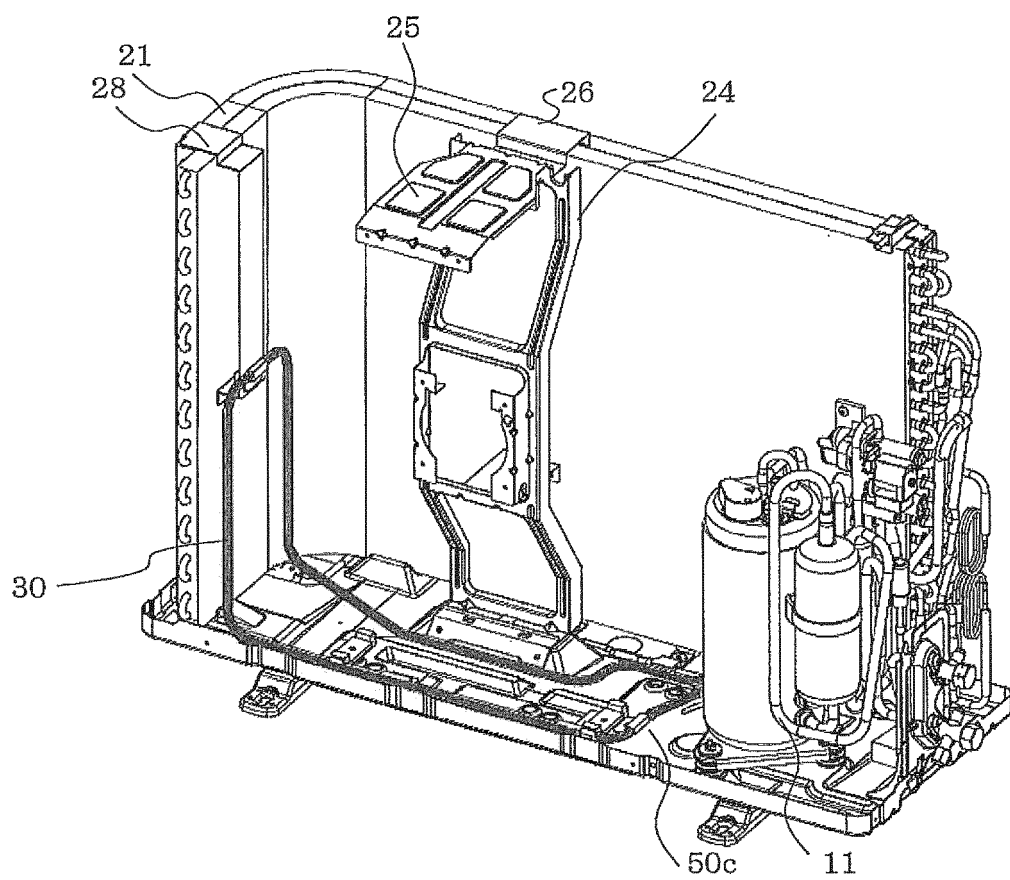


FIG. 10



**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- JP 2011052941 A [0005]
- WO 2013051166 A1 [0006]