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(54) **OUTDOOR EQUIPMENT FOR REFRIGERATION CYCLE DEVICE**

(57) An outdoor unit of a refrigerating cycle apparatus includes an outdoor unit body (2). A storage case (20) in which circuit components (33, 34) are accommodated is arranged inside the outdoor unit body (2). The storage case (20) includes a bottom plate (31) positioned below the circuit components (33, 34). The bottom plate (31) of the storage case (20) is provided with a drain passage (51). The drain passage (51) is configured to discharge water produced within the storage case (20) by a condensation phenomenon outside the storage case (20). By the above structure, the water produced within the storage case by the condensation phenomenon can be immediately discharged outside the storage case, and damage and malfunction of the circuit components can be prevented.

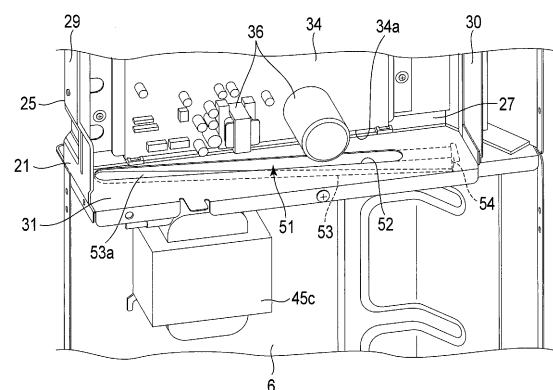


FIG. 5

Description

Technical Field

[0001] Embodiments described herein relate generally to an outdoor unit of a refrigerating cycle apparatus.

Background Art

[0002] An outdoor unit of an air conditioner, which is one of refrigerating cycle apparatuses, includes a control unit which controls the operation of a compressor or a blower, for example. The control unit is arranged inside the outdoor unit, and includes a control board accommodated in a metallic storage case.

Citation List

Patent Literature

[0003]

Patent Literature 1: JP 2012-241939 A

Patent Literature 2: JP 2011-202887 A

Summary of Invention

Technical Problem

[0004] According to a conventional control unit, when an air conditioner is operated in a heating mode, the temperature of the control board rises and a condensation phenomenon may occur within the storage case. As a result, moisture in the air condenses into water droplets inside the storage case. The water droplets flow downward through the inner surface of the storage case, and tend to stay on the bottom of the storage case as dew condensation water.

[0005] When the dew condensation water that stays on the bottom of the storage case adheres to the control board, this can be a cause of damage to the control board as a result of a short-circuit, or an unexpected malfunction of the control unit.

[0006] Embodiments described herein aim to achieve an outdoor unit of a refrigerating cycle apparatus capable of immediately discharging water produced inside the storage case by the condensation phenomenon to the outside of the storage case, and preventing damage and malfunction of circuit components.

Solution to Problem

[0007] According to an embodiment, an outdoor unit of a refrigerating cycle apparatus includes an outdoor unit body. A storage case in which the circuit components are accommodated is arranged inside the outdoor unit body. The storage case has a bottom plate disposed below the circuit components. The bottom plate of the stor-

age case is provided with a drain passage. The drain passage is structured such that water produced within the storage case by the condensation phenomenon is discharged outside the storage case.

Brief Description of Drawings

[0008]

FIG. 1 is a perspective view showing the internal structure of an outdoor unit according to a first embodiment.

FIG. 2 is a perspective view of the outdoor unit showing the state in which fan guards are arranged on an outdoor unit body in the first embodiment.

FIG. 3 is a perspective view showing the internal structure of a first electric component box.

FIG. 4 is a perspective view showing a relative positional relationship among the first to third electric component boxes.

FIG. 5 is a perspective view showing a positional relationship between a drain passage formed on a bottom plate of the first electric component box and a reactor.

FIG. 6 is a perspective view showing the internal structure of an outdoor unit according to a second embodiment.

FIG. 7 is a perspective view showing a relative positional relationship among first to third electric component boxes.

FIG. 8 is a perspective view of a storage case used in a third embodiment.

Mode for Carrying Out the Invention

[First Embodiment]

[0009] Hereinafter, a first embodiment will be described with reference to FIGS. 1 to 5.

[0010] FIGS. 1 and 2 show an outdoor unit 1 of an air conditioner, which is one of refrigerating cycle apparatuses. The outdoor unit 1 is connected to an indoor unit via a refrigerant pipe. The air conditioner can be operated in, for example, one of a cooling mode, a heating mode, and a dehumidification mode.

[0011] As shown in FIGS. 1 and 2, the outdoor unit 1 comprises an outdoor unit body 2 shaped like a vertically long box. The outdoor unit body 2 comprises a base 3, a top panel 4, a side panel 5, and a front panel not shown.

[0012] The interior of the outdoor unit body 2 is separated into a heat exchange chamber 7 and a machine chamber 8 by a partition plate 6. The partition plate 6 projects from the base 3 and extends in a depth direction of the outdoor unit body 2. Accordingly, when the outdoor unit body 2 is seen from the front side as shown in FIGS. 1 and 2, the heat exchange chamber 7 is disposed on the left side of the partition plate 6, and the machine chamber 8 is disposed on the right side of the partition

plate 6.

[0013] A heat exchanger 10 and two blowers, i.e., blowers 11a and 11b, are accommodated in the heat exchange chamber 7. The heat exchanger 10 is supported on the base 3. The heat exchanger 10 projects from a back surface of the heat exchange chamber 7, extending along a left side surface of the heat exchange chamber 7, and is exposed outside the outdoor unit body 2.

[0014] The blowers 11a and 11b are arranged on the front side of the heat exchanger 10. The blowers 11a and 11b are arranged in a height direction of the outdoor unit body 2. Each of the blowers 11a and 11b includes propeller fans 13 which are driven by a motor 12. The propeller fans 13 of the blowers 11a and 11b are covered by their respective fan guards 14a and 14b as shown in FIG. 2.

[0015] When the propeller fans 13 are driven in receipt of a torque from the motor 12, the outside air is drawn into the heat exchange chamber 7 through the heat exchanger 10 from the back of the outdoor unit body 2. The outside air subjected to heat exchange with a refrigerant by the heat exchanger 10 is discharged to the front side of the outdoor unit body 2 through the fan guards 14a and 14b.

[0016] As shown in FIGS. 1 and 2, various elements which constitute a refrigerant circuit such as a compressor 15, an accumulator 16, and refrigerant pipes 17 are accommodated in the machine chamber 8. Various elements including the compressor 15 are arranged in a lower region of the machine chamber 8 such that they are adjacent to the lower blower 11a.

[0017] Further, a control unit 19 which manages the operation of the outdoor unit 1 is accommodated in the outdoor unit body 2. The control unit 19 comprises a metallic storage case 20. The storage case 20 includes first to third electric component boxes 21, 22, and 23.

[0018] As shown in FIGS. 2 to 4, the first electric component box 21 has an elongated shape which extends in the depth direction of the outdoor unit body 2. The first electric component box 21 is an example of a first storage portion, and is composed of a box main body 25 and a cover plate 26.

[0019] The box main body 25 is shaped like a square box including a support plate 27, a top plate 28, a front plate 29, a back plate 30, and a bottom plate 31. The support plate 27 is connected to an upper end of the partition plate 6, and is interposed between an upper region of the heat exchange chamber 7 and an upper region of the machine chamber 8. In other words, the support plate 27 of the first electric component box 21 separates the interior of the outdoor unit body 2 into the heat exchange chamber 7 and the machine chamber 8 in cooperation with the partition plate 6.

[0020] The top plate 28 projects toward the machine chamber 8 from an upper edge of the support plate 27. The front plate 29 projects toward the machine chamber 8 from a front edge of the support plate 27. The back plate 30 projects toward the machine chamber 8 from a

back edge of the support plate 27 to be opposed to the front plate 29. The bottom plate 31 projects toward the machine chamber 8 from a lower edge of the support plate 27 to be opposed to the top plate 28. Accordingly, the box main body 25 is open toward the machine chamber 8. The cover plate 26 removably covers an open end of the box main body 25, and is also exposed to the upper region of the machine chamber 8.

[0021] As shown in FIG. 3, a first control board 33 and a second control board 34 are accommodated in the first electric component box 21. The first control board 33 is an element for performing, for example, inverter control of the compressor 15, and a plurality of circuit elements 35 such as capacitors are mounted on the first control board 33. The first control board 33 is fixed to an upper region of the support plate 27 of the box main body 25 by means such as screwing. The first control board 33 is surrounded by the top plate 28, the front plate 29, the back plate 30, and the cover plate 26.

[0022] The second control board 34 is an element for performing, for example, inverter control of the blowers 11a and 11b, and a plurality of circuit elements 36 such as IC chips are mounted on the second control board 34. The second control board 34 is fixed to a lower region of the support plate 27 of the box main body 25 by means such as screwing. The second control board 34 is surrounded by the front plate 29, the back plate 30, and the bottom plate 31.

[0023] According to the present embodiment, each of the first control board 33 and the second control board 34 is an example of a first circuit component, and produces heat during operation. The bottom plate 31 of the first electric component box 21 is located immediately below the second control board 34, and is adjacent to a lower edge 34a of the second control board 34.

[0024] As shown in FIGS. 3 and 4, the second electric component box 22 is overlaid on the first electric component box 21. The second electric component box 22 is an example of a second storage portion. Likewise the first electric component box 21, the second electric component box 22 has an elongated shape which extends in the depth direction of the outdoor unit body 2.

[0025] The second electric component box 22 is composed of a box main body 38 and a cover plate 39. The box main body 38 is shaped like a square box including a support plate 40, a top plate 41, a front plate 42, and a back plate 43. The support plate 40 is connected to an upper end of the support plate 27 of the first electric component box 21 such that it is located between the upper region of the heat exchange chamber 7 and the upper region of the machine chamber 8. Accordingly, the support plate 40 of the second electric component box 22 separates the interior of the outdoor unit body 2 into the heat exchange chamber 7 and the machine chamber 8 in cooperation with the support plate 27 of the first electric component box 21.

[0026] The top plate 41 projects toward the machine chamber 8 from an upper edge of the support plate 40.

The front plate 42 projects toward the machine chamber 8 from a front edge of the support plate 40, and is connected to an upper end of the front plate 29 of the first electric component box 21. The back plate 43 projects toward the machine chamber 8 from a back edge of the support plate 40, and is connected to an upper end of the back plate 30 of the first electric component box 21. Accordingly, the box main body 38 is open toward the machine chamber 8.

[0027] Further, at lower ends of the front plate 42 and the back plate 43, flange portions 42a and 43a are formed, respectively. The flange portion 42a is bent at right angle from the lower end of the front plate 42, and projects toward the inner side of the box main body 38. Similarly, the flange portion 43a is bent at right angle from the lower end of the back plate 43, and projects toward the inner side of the box main body 38. The flange portions 42a and 43a are overlaid on the top plate 28 of the first electric component box 21, and are fixed to the top plate 28 by means such as screwing. The cover plate 39 removably covers an open end of the box main body 38, and is also exposed to the upper region of the machine chamber 8.

[0028] As a result, the second electric component box 22 is fixed to an upper end of the first electric component box 21 to be selectively removable therefrom.

[0029] As shown in FIG. 3, the outdoor unit 1 of the present embodiment comprises three reactors, i.e., reactors 45a, 45b, and 45c. Two reactors, i.e., the reactors 45a and 45b, of the three reactors 45a, 45b, and 45c are accommodated in the second electric component box 22. The reactors 45a and 45b are supported on the support plate 40 of the second electric component box 22 such that they are aligned in the depth direction of the outdoor unit body 2.

[0030] Further, the remaining reactor 45c of the three reactors 45a, 45b, and 45c is supported on the upper part of a surface of the partition plate 6 which faces the machine chamber 8. According to the present embodiment, the reactor 45c is an example of a second circuit component, and is located immediately below the bottom plate 31 of the first electric component box 21.

[0031] As shown in FIGS. 2 and 4, the third electric component box 23 is projected toward the machine chamber 8 from the cover plate 26 of the first electric component box 21. The third electric component box 23 is arranged along the width direction of the outdoor unit body 2 in such a position that it is orthogonal to the first electric component box 21.

[0032] In the present embodiment, an interface substrate 47 is supported on a front surface of the third electric component box 23. Further, a support portion 48 which projects toward the bottom of the machine chamber 8 is formed at a lower end of the third electric component box 23. On the support portion 48, a terminal block 49 which is electrically connected to the interface substrate 47 is supported. Such a third electric component box 23 is accommodated within the upper region of the

machine chamber 8, and is located above the compressor 15, the accumulator 16, and the refrigerant pipe 17 which constitute the refrigerant circuit.

[0033] FIGS. 3 and 5 show the internal structure of the first electric component box 21. As shown in FIGS. 3 and 5, the bottom plate 31 of the box main body 25 comprises a drain passage 51. The drain passage 51 is defined by a groove extending in the depth direction of the outdoor unit body 2, and spans over the reactor 45c.

[0034] More specifically, a slit-shaped long hole 52 along the depth direction of the outdoor unit body 2 is formed in the bottom plate 31. The long hole 52 extends along substantially the entire length of the bottom plate 31 to be located immediately below the lower edge 34a of the second control board 34.

[0035] Further, a watershoot 53 is mounted on a lower surface of the bottom plate 31 by means such as welding. The watershoot 53 extends in the depth direction of the outdoor unit body 2 in such a way that it covers the long hole 52 from the lower side of the bottom plate 31. A back end of the watershoot 53 extends more toward the rear of the bottom plate 31 as compared to a back end of the long hole 52, and is positioned at a back end of the machine chamber 8.

[0036] A drain outlet 54 is formed at the back end of the watershoot 53. The drain outlet 54 is located at the back of the machine chamber 8 as compared to the location of the reactor 45c, and is greatly separated from the reactor 45c. Further, in the present embodiment, a bottom 53a of the watershoot 53 is inclined downward toward the drain outlet 54 from a front end of the watershoot 53.

[0037] When the outdoor unit 1 of the air conditioner is operated in a heating mode, the first and second control boards 33 and 34 of the control unit 19 generate heat. Thereby, the temperature of air in the first electric component box 21 rises. The support plate 27 of the box main body 25 which supports the first and second control boards 33 and 34 is exposed to the heat exchange chamber 7 and is cooled by the outside air which circulates in the heat exchange chamber 7.

[0038] As a result, as the air in the first electric component box 21 comes into contact with the cool support plate 27, the so-called condensation phenomenon that water vapor in the air condenses into water droplets occurs. The water droplets flow downward through an inner surface of the box main body 25 or an inner surface of the cover plate 26, and tend to stay on the bottom plate 31 as dew condensation water.

[0039] In the first embodiment, since the long hole 52 which defines the drain passage 51 is formed in the bottom plate 31, the dew condensation water flows into the watershoot 53 from the long hole 52. The watershoot 53 includes the drain outlet 54 which is open toward the machine chamber 8, and the bottom 53a of the watershoot 53 is inclined downward toward the drain outlet 54. Accordingly, the dew condensation water which flows into the watershoot 53 from the long hole 52 flows toward

the drain outlet 54 in accordance with the inclination of the watershoot 53, and is discharged to the rear of the machine chamber 8 from the drain outlet 54.

[0040] Therefore, the dew condensation water produced inside the first electric component box 21 can be immediately discharged to the outside of the first electric component box 21, and staying of the dew condensation water at the bottom of the first electric component box 21 can be prevented. Thus, it is possible to suppress adhesion of the dew condensation water to the second control board 34, and a short-circuit of the second control board 34 and a malfunction of the outdoor unit 1 can be prevented.

[0041] Further, according to the first embodiment, the drain passage 51 of the first electric component box 21 spans over the reactor 45c and extends more to the back side as compared to the location of the reactor 45c, and the drain outlet 54 is formed at a back end of the drain passage 51. Accordingly, a direction of drainage of the dew condensation water with respect to the first electric component box 21 is specified uniquely, and the dew condensation water is discharged from the drain outlet 54 to the machine chamber 8 at a position which is more separated to the back side of the outdoor unit body 2 as compared to the location of the reactor 45c.

[0042] Consequently, the reactor 45c which does not have resistance to water can be arranged immediately below the first electric component box 21.

[0043] Meanwhile, the reactors 45a and 45b which are accommodated in the second electric component box 22 each have a laminated core formed of a wound coil. Thus, the weights of the reactors 45a and 45b are greater than the weights of the first and second control boards 33 and 34 accommodated in the first electric component box 21.

[0044] In the first embodiment, the first electric component box 21 in which the first and second control boards 33 and 34 are accommodated, and the second electric component box 22 in which the reactors 45a and 45b are accommodated are separated as different elements. Accordingly, when the outdoor unit 1 is to be assembled, after installing the first electric component box 21 in which the first and second control boards 33 and 34 are accommodated on the upper end of the partition plate 6, the second electric component box 22 in which the reactors 45a and 45b, which are heavy objects, are accommodated can be installed on top of the first electric component box 21.

[0045] That is, when the first control board 33, the second control board 34, and the reactors 45a and 45b are accommodated in a single component box all together, the component box becomes heavy and large and the workability in assembling the outdoor unit 1 is deteriorated.

[0046] However, according to the first embodiment, since the second electric component box 22 in which the reactors 45a and 45b are accommodated is independent from the first electric component box 21, the second electric component box 22 which is heavy can be handled

easily. Thus, the workability in installing the second electric component box 22 can be improved.

[Second Embodiment]

[0047] FIGS. 6 and 7 disclose a second embodiment. The second embodiment discloses an outdoor unit 61 comprising three blowers. The basic structure of the outdoor unit 61 is similar to the blower 1 of the first embodiment. Accordingly, in the second embodiment, structure portions which are the same as those of the first embodiment are denoted by the same reference numbers, and explanations of such portions will be omitted.

[0048] According to the second embodiment, three blowers are arranged in a height direction of an outdoor unit body 62, and three fan guards 63a, 63b, and 63c which cover propeller fans of these blowers are arranged on a front surface of the outdoor unit body 62. Therefore, the blower 61 of the second embodiment including three blowers is higher than the blower 1 of the first embodiment.

[0049] The interior of the outdoor unit body 62 is separated into a heat exchange chamber 7 and a machine chamber 8 by a first partition plate 64 which projects from a base 3, a first electric component box 21 of a storage case 20, and a second partition plate 65. The second partition plate 65 is connected to an upper end of the first electric component box 21.

[0050] In the second embodiment, a second electric component box 22 of the storage case 20 is fixed to a lower end of the first electric component box 21 such that it is selectively removable therefrom. More specifically, as shown in FIG. 7, a top plate 41 of the second electric component box 22 is fixed to a bottom plate 31 of the first electric component box 21 by means such as screwing. A drain passage 51 of the first electric component box 21 is located between the bottom plate 31 and the top plate 41. Accordingly, dew condensation water discharged from a drain outlet 54 of the drain passage 51 is passed along an outer peripheral surface of the second electric component box 22 and is guided to a machine chamber 8.

[0051] Further, a distance between a lower end of the second electric component box 22 connected to the bottom of the first electric component box 21 and the base 3 is equal to a distance between a lower end of the first electric component box 21 of the first embodiment and the base 3. As a result, the first electric component box 21 and a third electric component box 23 are located at a higher position within the machine chamber 8 by a degree corresponding to the height of the second electric component box 22.

[0052] Accordingly, a lower region of the machine chamber 8 is enlarged, and a compressor 15 and an accumulator 16 that are tall and a refrigerant pipe 17 which is thick, for example, can be accommodated in the lower region comfortably.

[Third Embodiment]

[0053] FIG. 8 discloses a third embodiment. The third embodiment differs from the first embodiment in items related to the second electric component box 22. The other structures of the storage case 20 are the same as those of the first embodiment. Accordingly, in the third embodiment, structure portions which are the same as those of the first embodiment are denoted by the same reference numbers, and explanations of such portions will be omitted.

[0054] In the third embodiment, instead of the reactors of the first embodiment, another element, i.e., a control board 71, is accommodated within a second electric component box 22. On the control board 71, various circuit components 72 such as a capacitor and an IC chip are mounted.

[0055] According to the third embodiment, a layout of the circuit components and wiring process can be executed to be adaptable to various outdoor units. Thus, flexible design according to the type of the outdoor unit can be adopted.

[0056] While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions. Indeed, the novel embodiments described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the embodiments described herein may be made without departing from the spirit of the inventions. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the inventions.

Reference Signs List

[0057]

2, 62 ... Outdoor unit body, 20 ... Storage case, 21 ... First storage portion (First electric component box), 22 ... Second storage portion (Second electric component box), 31 ... Bottom plate, 33, 34 ... First circuit component (First control board, Second control board), 45c ... Second circuit component (Reactor), 51 ... Drain passage

Claims

1. An outdoor unit of a refrigerating cycle apparatus comprising:

an outdoor unit body;
a storage case which is arranged inside the outdoor unit body, accommodates a circuit component, and comprises a bottom plate disposed below the circuit component; and
a drain passage which is provided on the bottom

plate of the storage case, and is configured to discharge water produced within the storage case by a condensation phenomenon outside the storage case.

2. The outdoor unit of the refrigerating cycle apparatus of Claim 1, wherein the drain passage comprises a drain outlet which is open toward an exterior of the storage case, and a bottom of the drain passage is inclined downward toward the drain outlet.

3. The outdoor unit of the refrigerating cycle apparatus of Claim 2, wherein the drain passage comprises a slit-shaped hole provided in the bottom plate and a watershoot arranged on the bottom plate in such a way as to cover the hole from below, and the drain outlet is provided at an end portion of the watershoot.

4. The outdoor unit of the refrigerating cycle apparatus of any one of Claims 1 to 3, wherein the outdoor unit body comprises a heat exchange chamber in which outside air circulates and a machine chamber, the storage case is interposed between the heat exchange chamber and the machine chamber, and the storage case is exposed to the heat exchange chamber.

5. An outdoor unit of a refrigerating cycle apparatus comprising:

an outdoor unit body;
a storage case which is arranged inside the outdoor unit body, accommodates a first circuit component, and comprises a bottom plate disposed below the first circuit component;
a second circuit component which is arranged inside the outdoor unit body, and is disposed below the storage case;
a drain passage which is provided on the bottom plate of the storage case, allows water produced within the storage case by a condensation phenomenon to flow therein, and comprises a drain outlet which is open at a position away from the second circuit component.

6. The outdoor unit of the refrigerating cycle apparatus of Claim 5, wherein the drain passage is defined by a groove extending in a depth direction of the outdoor unit body in such a way as to traverse over the second circuit component, and the drain outlet is formed at a rear end portion of the drain passage which is separated from the second circuit component.

7. The outdoor unit of the refrigerating cycle apparatus of Claim 6, wherein a bottom of the drain passage is inclined downward toward the drain outlet.

8. An outdoor unit of a refrigerating cycle apparatus

comprising:

an outdoor unit body; and
a storage case which is arranged inside the outdoor unit body, and comprises a first storage portion in which a first circuit component is accommodated, and a second storage portion which is fixed to an upper end or a lower end of the first storage portion to be selectively removable, and in which a second circuit component is accommodated,
wherein the first storage portion comprises a bottom plate disposed below the first circuit component, and the bottom plate is provided with a drain passage which is configured to discharge water produced within the first storage portion by a condensation phenomenon outside the first storage portion.

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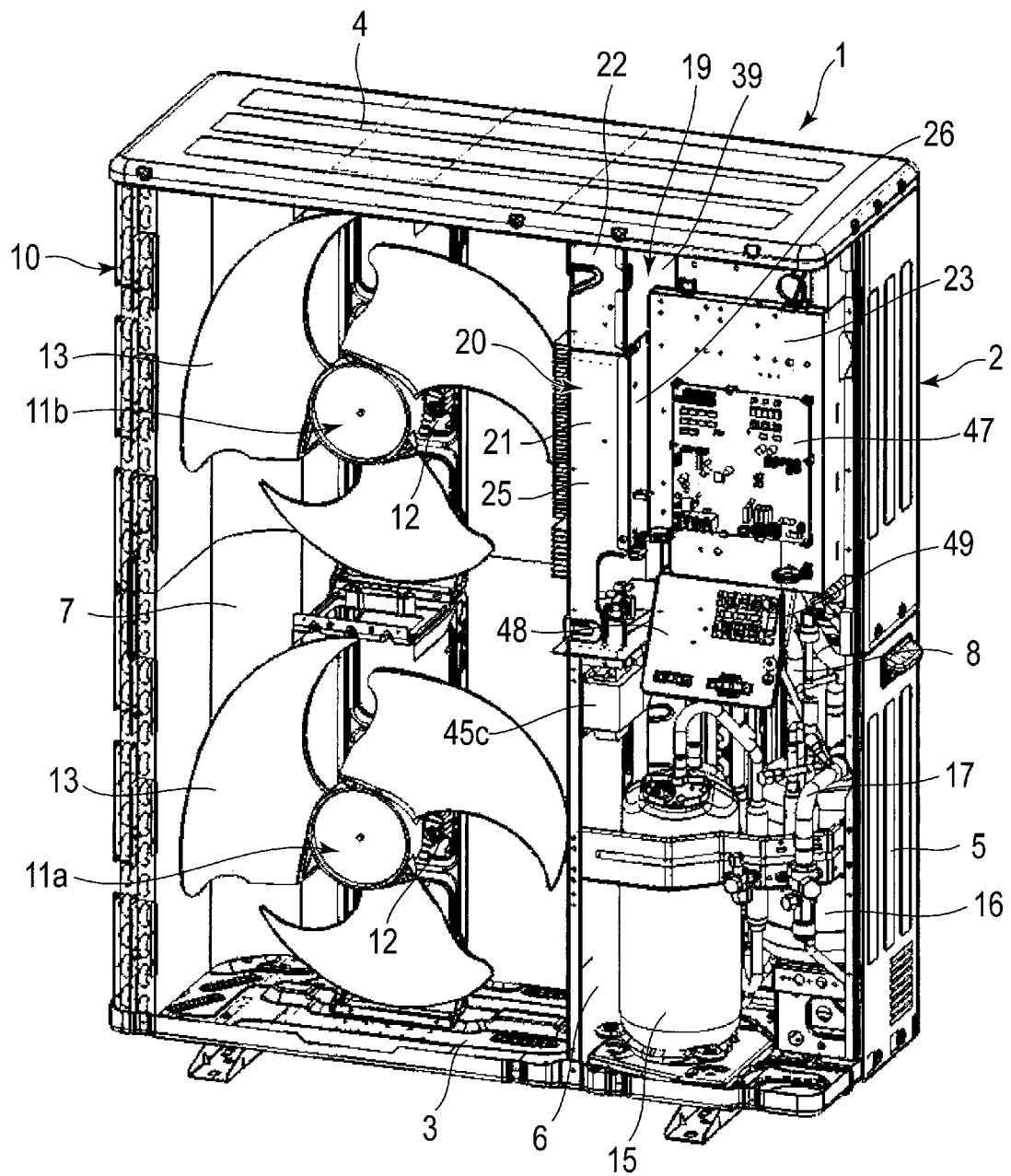


FIG. 1

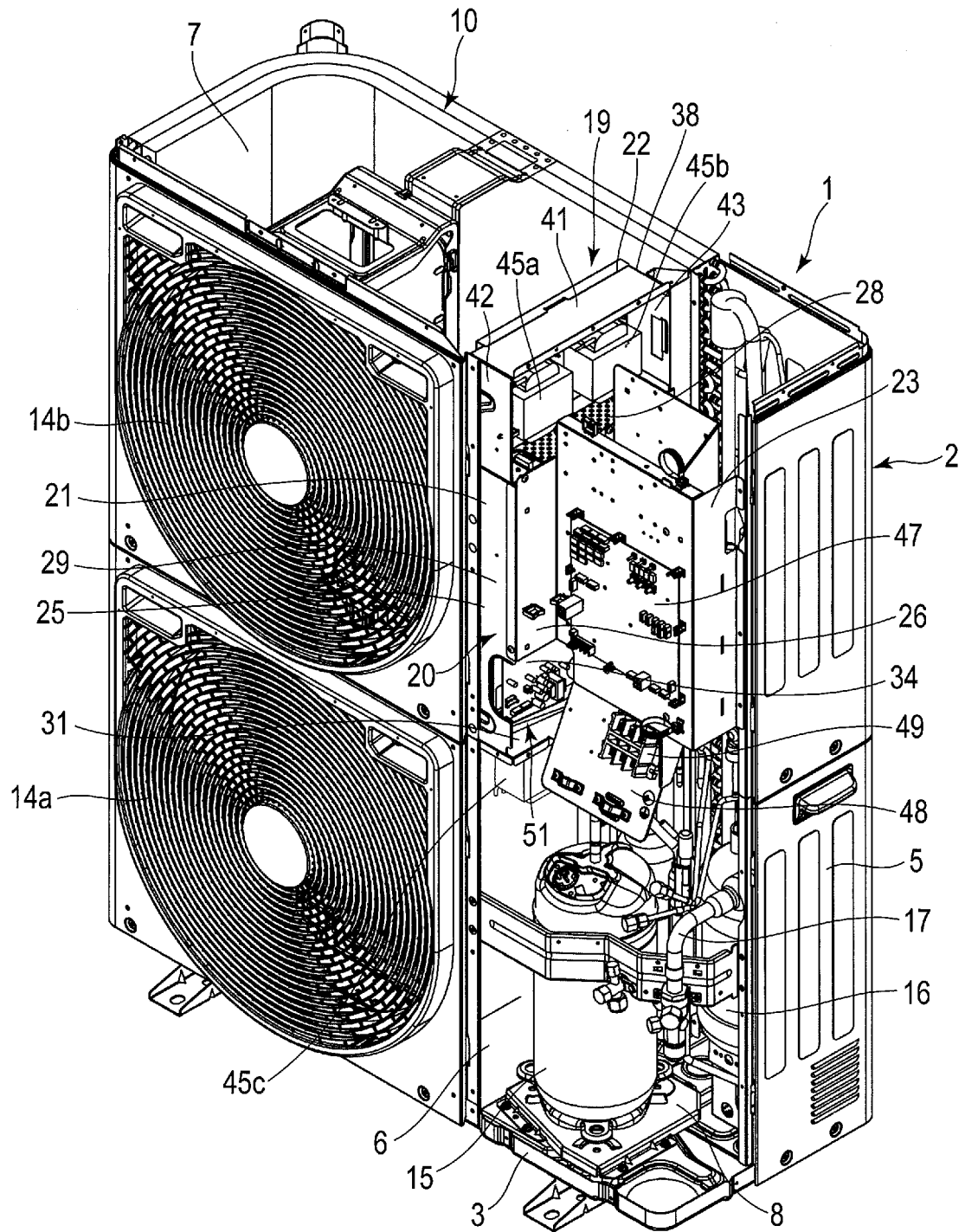


FIG. 2

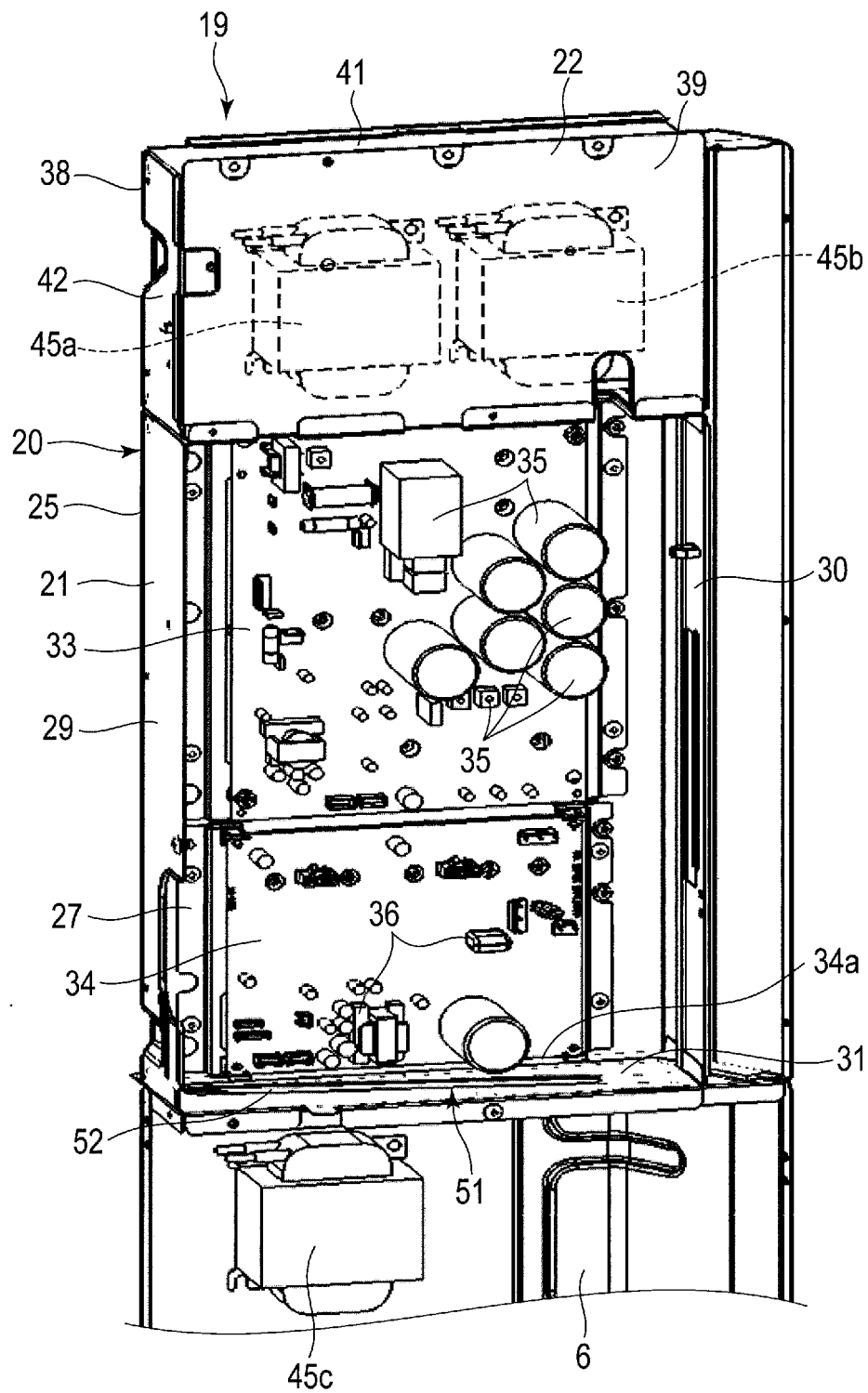


FIG. 3

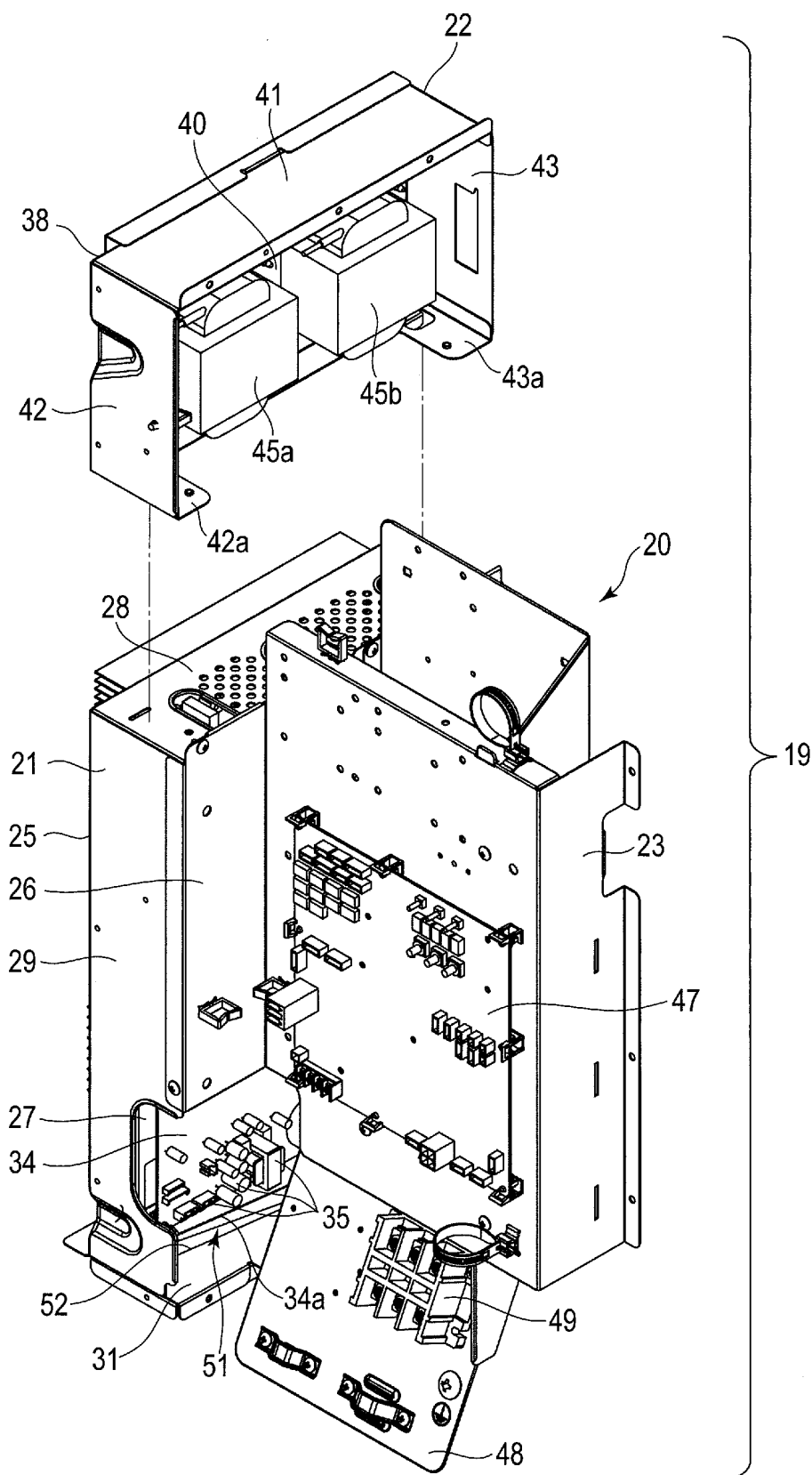


FIG. 4

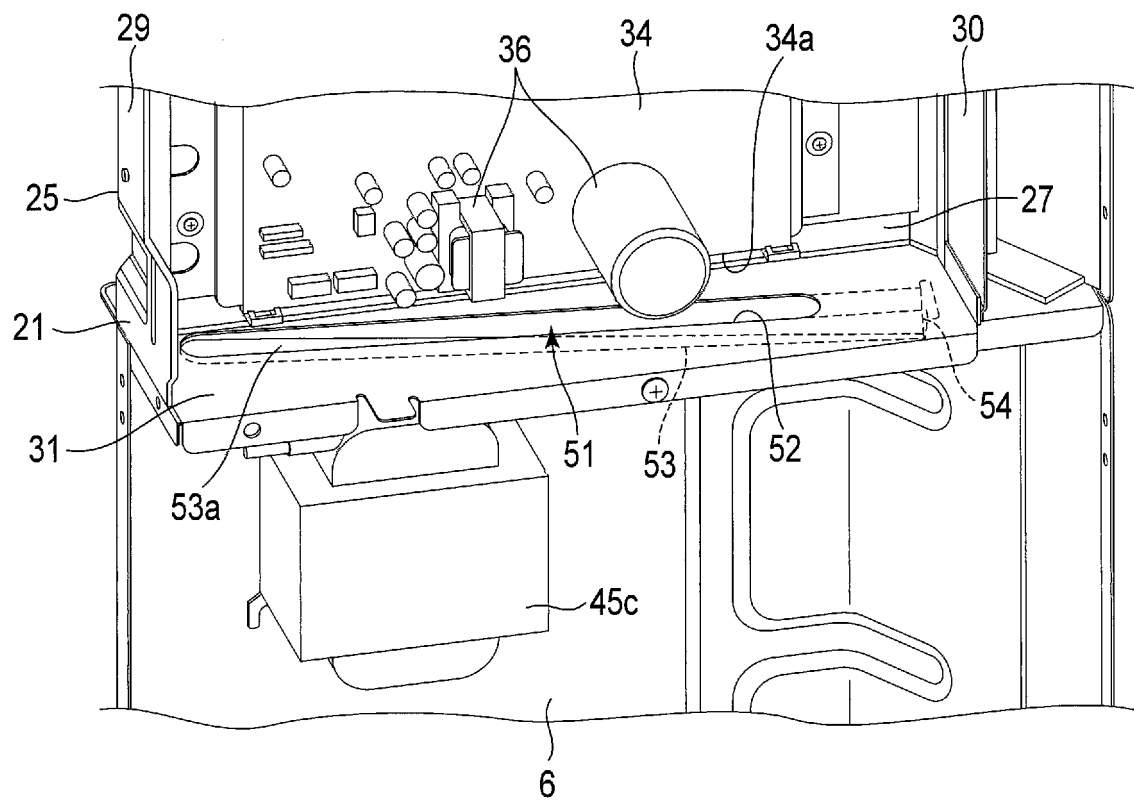


FIG. 5

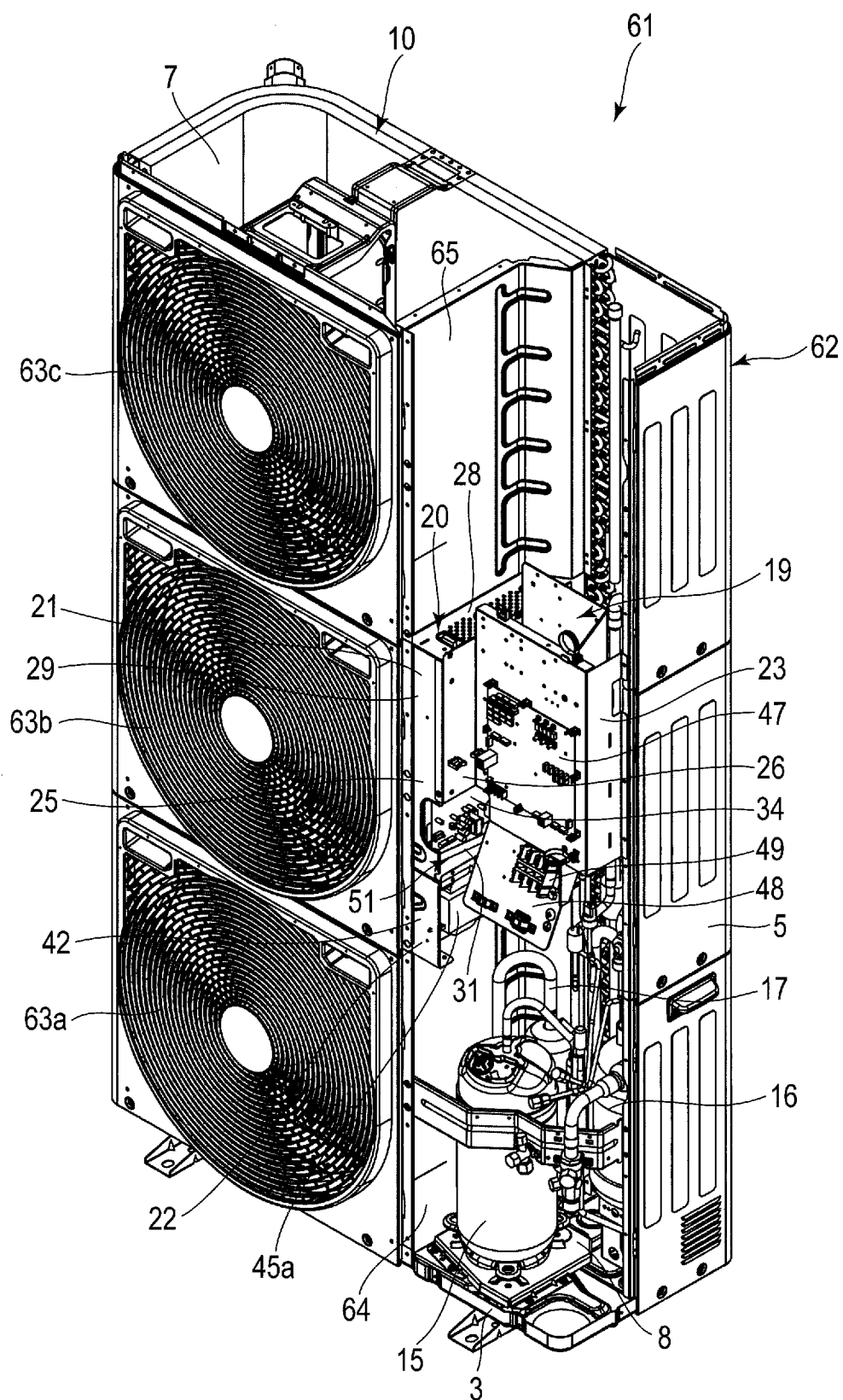


FIG. 6

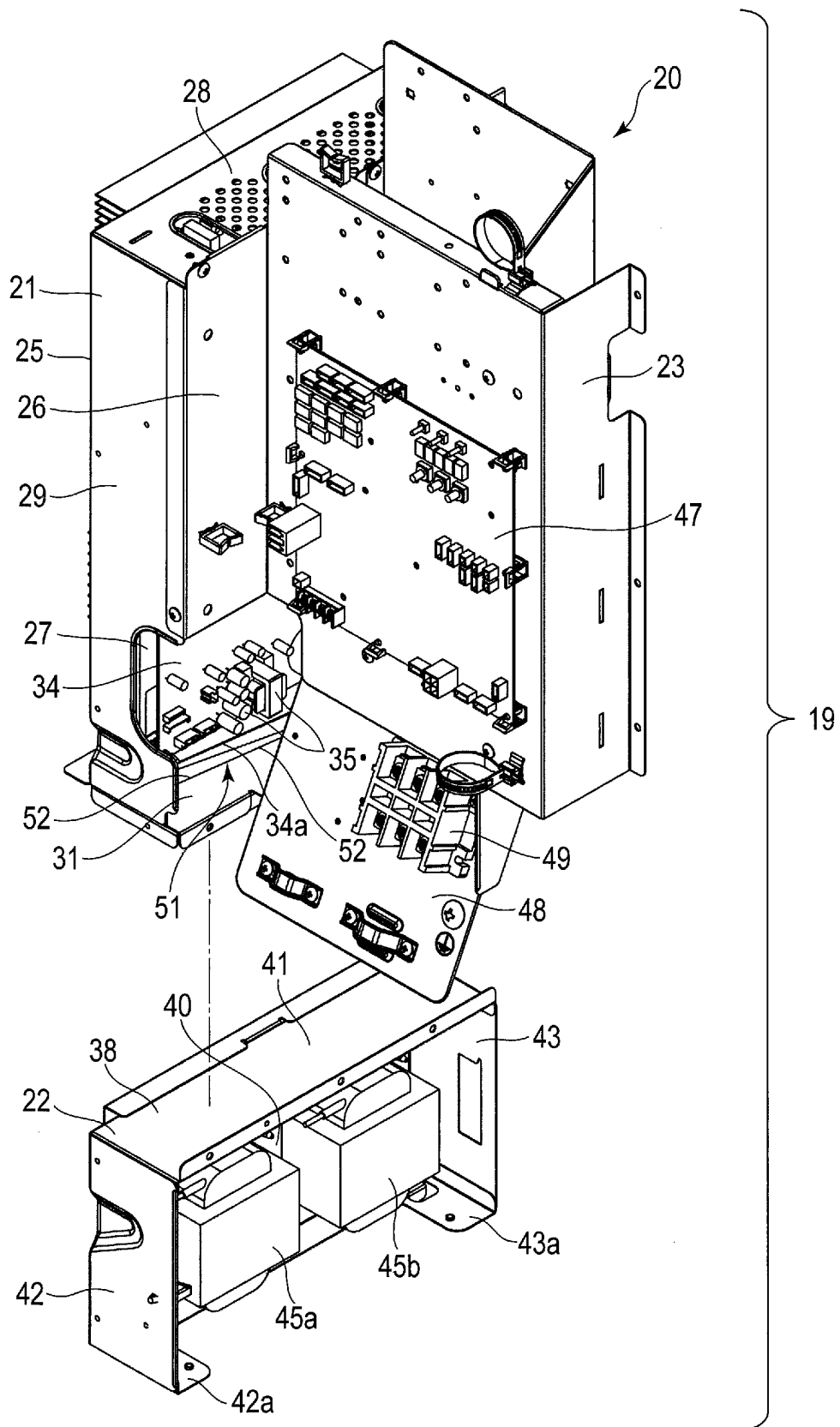


FIG. 7

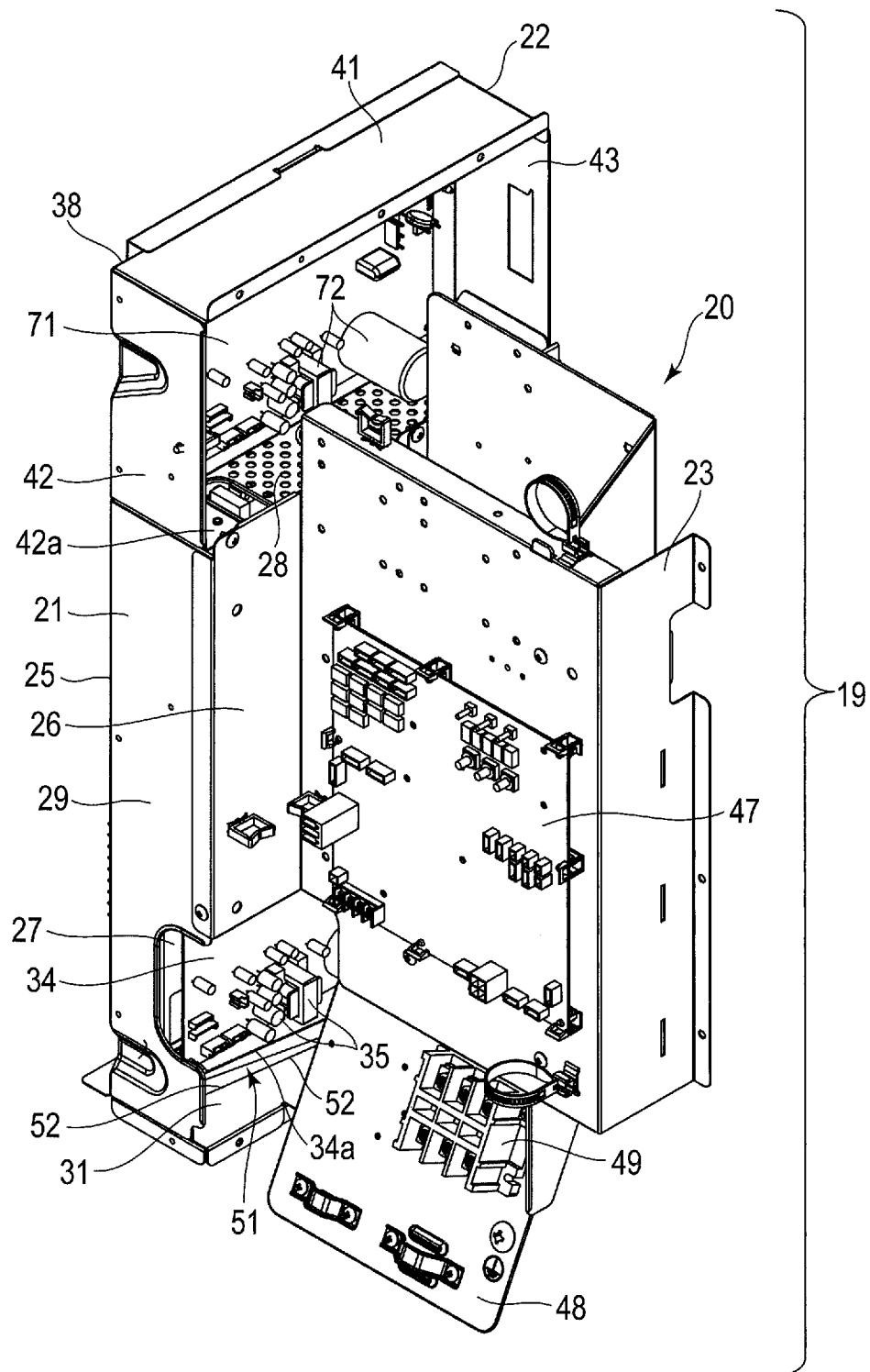


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/062714

A. CLASSIFICATION OF SUBJECT MATTER

F24F1/36(2011.01)i, F24F1/20(2011.01)i, F24F1/22(2011.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F1/36, F24F1/20, F24F1/22

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2015
 Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2008-138941 A (Daikin Industries, Ltd.), 19 June 2008 (19.06.2008), paragraphs [0056] to [0068]; fig. 3 to 7 (Family: none)	1-4, 8 5-7
Y A	JP 64-33444 A (Matsushita Electric Industrial Co., Ltd.), 03 February 1989 (03.02.1989), page 2, lower left column, line 2 to page 2, lower right column, line 11; fig. 1 to 4 (Family: none)	1-4, 8 5-7
Y	WO 2014/024405 A1 (Toshiba Carrier Corp.), 13 February 2014 (13.02.2014), paragraphs [0043] to [0044], [0093]; fig. 8 to 9 & CN 104520649 A	8

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

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search
30 July 2015 (30.07.15)Date of mailing of the international search report
11 August 2015 (11.08.15)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
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Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/062714

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	JP 2014-202398 A (Panasonic Appliances Air-Conditioning R&D Malaysia Sdn. Bhd.), 27 October 2014 (27.10.2014), paragraphs [0030] to [0038]; fig. 4 to 10a (Family: none)	1
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A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 78344/1988 (Laid-open No. 526/1990) (Toshiba Corp.), 05 January 1990 (05.01.1990), specification, page 7, line 19 to page 9, line 11; fig. 1 to 3 (Family: none)	5-7
A	JP 7-248133 A (Fujitsu General Ltd.), 26 September 1995 (26.09.1995), paragraphs [0006] to [0008]; fig. 1 to 5 (Family: none)	1-8

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