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(54) ELECTRIC COMPONENT ASSEMBLY AND OUTDOOR UNIT OF AIR CONDITIONER EQUIPPED WITH IT

(57) In an outdoor unit of an air conditioner having a structure in which the inside of a casing having a generally rectangular parallelepiped box shape is divided into a fan chamber and a machine chamber by a partition plate extending vertically, reduction in size of an electric equipment assembly disposed in the machine chamber is achieved and the transportation of the electric equipment assembly can be efficiently performed. The electric equipment assembly (7) comprising a frame (71), a terminal block (86), and a terminal block support member (87). A control circuit board (91) mounted with an operating control element is attached to the frame (71), and the frame (71) is provided such that a substrate surface of the control circuit board (91) is inclined to a front side of a unit casing (2). The terminal block (86) is disposed so as to face the front side of the unit casing (2).The terminal block support member (87) is provided to the frame (71), and is capable of switching between a first state in which the terminal block support member (87) supports the terminal block (86) provided in the unit casing (2) and a second state in which the inclination of the terminal block support member (87) to the substrate surface is gentle compared to the first state.

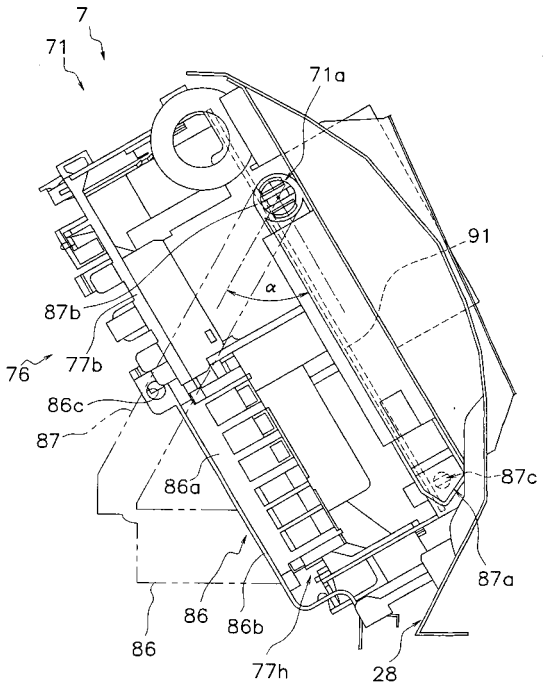

Fig. 7

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Description

TECHNICAL FIELD

[0001] The present invention relates to an electric equipment assembly and an outdoor unit of an air conditioner provided with the same. More specifically, in an outdoor unit of an air conditioner having a structure in which the inside of a casing having a generally rectangular parallelepiped box shape is divided into a fan chamber and a machine chamber by a partition plate extending vertically, the present invention relates to an electric equipment assembly disposed in the machine chamber and to an outdoor unit of an air conditioner provided with the same.

BACKGROUND ART

[0002] As a conventional outdoor unit of an air conditioner, there is known an outdoor unit having a structure in which the inside of a casing having a generally rectangular parallelepiped box shape is divided into a fan chamber and a machine chamber by a partition plate extending vertically. This fan chamber mainly includes an outdoor heat exchanger and an outdoor fan disposed therein. In addition, the machine chamber mainly includes a compressor, refrigerant circuit components comprising valves, refrigerant pipes, and the like, and an electric equipment assembly disposed therein. This type of electric equipment assembly is constructed such that an inverter control element that requires cooling during operation (for example, power transistor, diode, etc.) is disposed near the partition plate in the machine chamber and such that a terminal block to be used during on-site work is provided in the machine chamber so as to face a front side of the casing (see patent document 1).

Patent Document 1

Japanese Patent Application Publication No. 09-236284

DISCLOSURE OF THE INVENTION

[0003] However, with the above described electric equipment assembly, since the inverter control element and the terminal block are disposed separately from each other, the following problems arise: the size of the electric equipment assembly itself becomes large; reduction in size of the outdoor unit is difficult to achieve due to the need to ensure the strength of the terminal block to be used during on-site work; and the transportation of the electric equipment assembly cannot be efficiently performed due to the increased size of the electric equipment assembly.

[0004] An object of the present invention is, in an outdoor unit of an air conditioner having a structure in which the inside of a casing having a generally rectangular parallelepiped box shape is divided into a fan chamber and a machine chamber by a partition plate extending vertically, to achieve reduction in size of an electric equipment assembly disposed in the machine chamber and efficiently perform transportation of the electric equipment assembly.

[0005] An electric equipment assembly according to a first aspect of the present invention is an electric equipment assembly disposed in a machine chamber of an outdoor unit of an air conditioner having a structure in which an inside of a casing having a generally rectangular parallelepiped box shape is divided into a fan chamber and the machine chamber by a partition plate extending vertically, the electric equipment assembly comprising a frame, a terminal block, and a terminal block support member. The frame has various electric components attached thereto, the various electric components including a control circuit board mounted with an operating control element and an inverter control element. With the frame provided in the casing, the frame is disposed such that a substrate surface of the control circuit board is inclined to or perpendicular to a front side of the casing. With the terminal block provided in the casing, the terminal block is disposed so as to face the front side of the casing. The terminal block support member is provided to the frame, and is capable of switching between a first state in which the terminal block support member supports the terminal block provided in the casing and a second state in which the inclination of the terminal block support member to the substrate surface is gentle compared to the first state.

[0006] With this electric equipment assembly, the control circuit board and the inverter control element are attached to the frame, and thereby the control circuit board and the inverter control element are integrated, reducing the size of the electric equipment assembly. At the same time, the frame is disposed such that the substrate surface of the frame is inclined to or perpendicular to the front side of the casing, thus enabling cooling of the inverter control element. In addition, the terminal block is disposed so as to face the front side of the casing and is supported by the terminal block support member provided to the frame, thereby ensuring the operability during on-site work. Further, this terminal block support member is capable of switching between the first state in which the terminal block support member supports the terminal block and the second state in which the inclination of the terminal block support member to the substrate surface of the frame is gentle compared to the first state. Accordingly, the package of the electric equipment assembly at the time of the transportation can be reduced in size, thus enabling efficient transportation of the electric equipment assembly.

[0007] As described above, according to the present invention, reduction in size of the electric equipment assembly can be achieved and the transportation thereof can be efficiently performed.

[0008] An electric equipment assembly according to a second aspect of the present invention is the electric equipment assembly according to the first aspect of the present invention, in which, with the frame provided in the casing, the terminal block support member is dis-

posed so as not to protrude outside the frame in a plan view of the casing when the terminal block support member is switched to the second state.

[0009] With this electric equipment assembly, the terminal block support member is disposed so as not to protrude outside the frame in a plan view of the casing when the terminal block support member is switched to the second state. Accordingly, the package of the electric equipment assembly at the time of the transportation thereof can be further reduced in size.

[0010] An electric equipment assembly according to a third aspect of the present invention is the electric equipment assembly according to the second aspect of the present invention, in which the terminal block support member includes a first terminal block support portion configured to support the terminal block, with the frame provided in the casing, and a frame supported portion rotatably supported around a shaft that extends in an up and down direction of the frame, with the frame provided in the casing. The terminal block support member is capable of moving the first terminal block support portion closer to or away from the substrate surface, by rotating the frame supported portion.

[0011] With this electric equipment assembly, the terminal block support member is rotatably supported around the shaft that extends in the up and down direction of the frame, thus the operation of switching between the first state and the second state can be easily performed.

[0012] An electric equipment assembly according to a fourth aspect of the present invention is the electric equipment assembly according to any of the first to the third aspects of the present invention, in which the terminal block is fixed to the casing or the partition plate, with terminal block provided in the casing.

[0013] With this electric equipment assembly, apart from the frame, the terminal block is fixed to the casing or the partition plate, thus ensuring the strength of the terminal block.

[0014] An electric equipment assembly according to a fifth aspect of the present invention is the electric equipment assembly according to any of the first to the fourth aspects of the present invention, in which the frame includes a second terminal block support portion configured to attach the terminal block to the frame in a removable manner.

[0015] With this electric equipment assembly, the frame is provided with the second terminal block support portion configured to attach the terminal block to the frame in a removable manner. Accordingly, it is possible to attach the terminal block to the frame at the time of the transportation of the electric equipment assembly and remove the terminal block from the frame when disposing the electric equipment assembly in the casing. Consequently, it is possible to further efficiently transport the electric equipment assembly and install the electric equipment assembly in the casing.

[0016] An electric equipment assembly according to a sixth aspect of the present invention is the electric equipment assembly according to the fifth aspect of the present invention, in which the frame has a housing opening formed therein for housing at least part of the terminal block, with the terminal block attached to the second terminal block support portion.

[0017] With this electric equipment assembly, the housing opening is formed for housing at least part of the terminal block, with the terminal block attached to the second terminal block support portion. Thus, it is possible to prevent the terminal block from protruding from the outer surface of the frame as much as possible, and accordingly the package of the electric equipment assembly at the time of the transportation can be further reduced in size.

[0018] An electric equipment assembly according to a seventh aspect of the present invention is the electric equipment assembly according to the third aspect of the present invention, in which the terminal block is rotatably supported by the first terminal block support portion around a shaft that extends in an up and down direction of the terminal block support member, with the frame provided in the casing.

[0019] With this electric equipment assembly, the terminal block is rotatably supported around the shaft that extends in the up and down direction of the terminal block support member, thus the operation of switching between the first state and the second state can be easily performed.

[0020] An electric equipment assembly according to an eighth aspect of the present invention is the electric equipment assembly according to the seventh aspect of the present invention, in which the frame includes a first positioning portion for positioning the terminal block and the terminal block support member in the first state.

[0021] With this electric equipment assembly, the frame is provided with the first positioning portion for positioning the terminal block and the terminal block support member in the first state, thus it is possible to maintain a state in which the terminal block is disposed so as to face the front side of the casing, with the electric equipment assembly disposed in the casing.

[0022] An electric equipment assembly according to a ninth aspect of the present invention is the electric equipment assembly according to the seventh or the eighth aspect of the present invention, in which the terminal block is disposed along the outer surface of the frame in a plan view of the casing, when the terminal block support member is switched to the second state.

[0023] With this electric equipment assembly, when the terminal block support member is switched to the second state, the terminal block is disposed along the outer surface of the frame in a plan view of the casing. Thus, it is possible to prevent the terminal block from protruding from the outer surface of the frame as much as possible, and accordingly the package of the electric equipment assembly at the time of the transportation thereof can be further reduced in size.

[0024] An electric equipment assembly according to a

tenth aspect of the present invention is the electric equipment assembly according to the ninth aspect of the present invention, in which the frame includes a second positioning portion for positioning the terminal block and the terminal block support member in the second state.

[0025] With this electric equipment assembly, the frame is provided with the second positioning portion for positioning the terminal block and the terminal block support member in the second state, thus it is possible to maintain a state in which the terminal block is disposed along the outer surface of the frame in a plan view of the casing at the time of the transportation of the electric equipment assembly.

[0026] An outdoor unit of an air conditioner according to an eleventh aspect of the present invention comprises a casing having a generally rectangular parallelepiped box shape, a partition plate extending vertically so as to divide the inside of the casing into a fan chamber and a machine chamber, and the electric equipment assembly according to any of the first to the tenth aspects of the present invention, which is disposed in the machine chamber.

[0027] This outdoor unit of the air conditioner is provided with the electric equipment assembly according to any of the first to the tenth aspects of the present invention, thus reduction in size of the whole unit can be achieved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028]

Figure 1 is a plan view of an outdoor unit in which an embodiment of an electric equipment assembly according to the present invention is adopted (shown with a top plate and refrigerant circuit components other than a compressor, an outdoor heat exchanger, and shut-off valves removed).

Figure 2 is an elevation view of the outdoor unit (with left and right front plates and refrigerant circuit components other than the compressor, the outdoor heat exchanger, and the shut-off valves removed).

Figure 3 is a view of the electric equipment assembly provided in a machine chamber viewed from the bottom.

Figure 4 is a view of the electric equipment assembly provided in the machine chamber, viewed in a direction A in Figure 1.

Figure 5 is a view of the electric equipment assembly provided in the machine chamber, viewed in a direction B in Figure 1.

Figure 6 is a view of a state in which a partition plate is removed from Figure 5.

Figure 7 is a view of the electric equipment assembly viewed from the bottom, with a terminal block and a terminal block support member housed in a frame.

Figure 8 is a view of the electric equipment assembly viewed in the direction A in Figure 1, with the terminal block and the terminal block support member housed in the frame.

Figure 9 is a view of an electric equipment assembly according to an alternative embodiment, the view corresponding to Figure 3.

Figure 10 is a view of the electric equipment assembly according to the alternative embodiment, the view corresponding to Figure 7.

DESCRIPTION OF THE REFERENCE SYMBOLS

[0029]

1	outdoor unit
2	unit casing
7, 107	electric equipment assembly
28	partition plate
71, 171	frame
77h	protection plate opening (housing opening)
86, 186	terminal block
87, 187	terminal block support member
87a, 187a	first terminal block support portion
87b, 187b	frame supported portion
89	second terminal block support portion
91	control circuit board
92	inverter control element
188	first positioning portion
189	second positioning portion
S1	fan chamber
S2	machine chamber

BEST MODE FOR CARRYING OUT THE INVENTION

[0030] An embodiment of an electric equipment assembly and an outdoor unit of an air conditioner provided with the same according to the present invention is now described with reference to the drawings.

(1) ENTIRE STRUCTURE OF THE OUTDOOR UNIT

[0031] Figure 1 is a plan view of an outdoor unit 1 in which an embodiment of the electric equipment assembly according to the present invention is adopted (shown with a top plate 22 and refrigerant circuit components 5 other than a compressor 51, an outdoor heat exchanger 52, and shut-off valves 61, 62 removed). In addition, Figure 2 is an elevation view of the outdoor unit 1 (with left and right front plates 23, 24 and the refrigerant circuit components 5 other than the compressor 51, the outdoor heat exchanger 52, and the shut-off valves 61, 62 removed).

[0032] This outdoor unit 1 is installed outside, and has a so-called trunk structure in which the inside of a generally rectangular parallelepiped box shaped unit casing 2 is divided into a fan chamber S 1 and a machine chamber S2 by a partition plate 28 extending vertically. This outdoor unit 1 is connected to an indoor unit (not shown) placed in an air-conditioned room via a refrigerant pipe

(not shown). The outdoor unit 1 mainly comprises: the unit casing 2 having a generally rectangular parallelepiped box shape; outdoor fans 4; the refrigerant circuit components 5 including devices such as the compressor 51 and the outdoor heat exchanger 52, valves such as the liquid side shut-off valve 61 and the gas side shut-off valve 62, and members such as pipes so as to constitute a refrigerant circuit; and an electric equipment assembly 7 configured to control the operation of the outdoor unit 1. Note that in the description below, unless otherwise specified particularly, terms such as "up," "down," "left," "right," "front", "back," "front side," and "rear side" indicate the directions when the outdoor unit 1 shown in Figure 2 is viewed from the front side thereof.

(2) STRUCTURE OF THE UNIT CASING

[0033] The unit casing 2 mainly comprises a base plate 21, the top plate 22, the left front plate 23, the right front plate 24, and a right side plate 25.

[0034] The base plate 21 is a metallic plate-like member having a horizontally long and generally rectangular shape, which constitutes a base portion of the unit casing 2. The peripheral portion of the base plate 21 is bent upwardly. The outer surface of the base plate 21 is provided with two stationary legs 26 that are fixed on the installation surface at work site. Each of the stationary legs 26 has a generally U-shape in a front view of the unit casing 2, and is a metallic plate-like member which extends from the front side of the unit casing 2 to the rear side thereof.

[0035] The top plate 22 is a metallic plate-like member having a horizontally long and generally rectangular shape, which constitutes a top portion of the outdoor unit 1.

[0036] The left front plate 23 is a metallic plate-like member that mainly constitutes a left portion of the front side and a left side portion of the unit casing 2, and the lower portion of the left front plate 23 is fixed to the base plate 21 by a screw or the like. The left front plate 23 has an intake port 23 a formed therein for air to be drawn into the unit casing 2 by the outdoor fans 4. In addition, the left front plate 23 is provided with discharge ports 23b for blowing out the air drawn inside from the rear side and the left side of the unit casing 2 by the outdoor fans 4. There are two discharge ports 23b formed above and below, each having a fan grille 27 provided thereto.

[0037] The right front plate 24 is a metallic plate-like member that mainly constitutes a right portion of the front side and a front portion of the right side of the unit casing 2, and the lower portion of the right front plate 24 is fixed to the base plate 21 by a screw or the like. In addition, the left end portion of the right front plate 24 is fixed to the right end portion of the left front plate 23 by a screw or the like.

[0038] The right side plate 25 is a metallic plate-like member that mainly constitutes a rear portion of the right side and a right rear side portion of the unit casing 2, and the lower portion of the right side plate 25 is fixed to the base plate 21 by a screw or the like. Between the back end portion of the left front plate 23 and the rear side end portion of the right side plate 25 in the horizontal direction, there is formed an intake port 23c for air to be drawn into the unit casing 2 by the outdoor fans 4.

[0039] Inside this type of unit casing 2 is provided with the partition plate 28 and a tube sheet 29. The partition plate 28 is a vertically extending metallic plate-like member disposed on the base plate 21, and the partition plate 28 is disposed so as to divide the inside of the unit casing 2 into two spaces, i.e., a left space and a right space. In this embodiment, the partition plate 28 has a bent shape so as to protrude toward the fan chamber S1 in a plan view of the unit casing 2. The tube sheet 29 is a metallic plate-like member provided so as to face the right end side of the outdoor heat exchanger 52 having a generally L-shape and disposed so as to extend along the unit casing 2 from the left side to the rear side thereof, and the lower portion of the tube sheet 29 is fixed to the base plate 21 by a screw or the like. The end portion of the tube sheet 29 on the front side of the unit casing 2 and the end portion of the partition plate 28 on the rear side of the unit casing 2 are fixed to each other by a screw or the like. In addition, the right end portion of the left front plate 23 is fixed to the partition plate 28 at the front end portion thereof by a screw or the like. The end portion on the rear side of the right side plate 25 is fixed to the tube sheet 29 at the end portion thereof on the rear side of the unit casing 2 by a screw or the like.

[0040] In this way, the inside of the unit casing 2 is divided into the fan chamber S1 and a machine chamber S2 by the partition plate 28. More specifically, the fan chamber S1 is a space surrounded by the base plate 21, the top plate 22, the left front plate 23, and the partition plate 28, and mainly the outdoor fans 4 and the outdoor heat exchanger 52 are disposed therein. The machine chamber S2 is a space surrounded by the base plate 21, the top plate 22, the right front plate 24, the right side plate 25, and the partition plate 28, and mainly the electric equipment assembly 7 and the refrigerant circuit components 5 other than the outdoor heat exchanger 52 are disposed therein. The unit casing 2 is configured such that the inside of the machine chamber S2 will be exposed by removing the right front plate 24. In other words, the right front plate 24 is removed when working on site to perform maintenance and the like of the refrigerant circuit components 5 and the electric equipment assembly 7 housed in the machine chamber S2 of the outdoor unit 1.

(3)STRUCTURE OF THE OUTDOOR FAN

[0041] Each of the outdoor fans 4 is a propeller fan having a plurality of blades and is disposed on the front side of the outdoor heat exchanger 52 in the fan chamber S1. In this embodiment, two outdoor fans 4 are disposed above and below in the fan chamber S1 so as to face the

discharge ports 23b. Each of these outdoor fans 4 is configured to be rotatably driven by an outdoor fan electric motor 4a. When the outdoor fans 4 are driven, air is drawn into the inside of the unit casing 2 through the intake ports 23a, 23c on the rear side and the left side of the unit casing 2. After the air passes through the outdoor heat exchanger 52, the air is blown out to the outside of the unit casing 2 from the discharge ports 23b on the front side of the unit casing 2.

(4) STRUCTURE OF THE REFRIGERANT CIRCUIT COMPONENT

[0042] The compressor 51 is a hermetic compressor that houses a compressor electric motor in the housing, and is disposed in the machine chamber S2. Here, the compressor electric motor is a so-called inverter driven electric motor in which the frequency can be controlled by the electric equipment assembly 7. In this embodiment, the compressor 51 has a longitudinal cylinder shape whose height is about 1/3 to 1/2 of the overall height of the unit casing 2, and a lower portion of the compressor 51 is fixed to the base plate 21. In addition, in a plan view of the unit casing 2, the compressor 51 is disposed near in the center of the machine chamber S2 in the front and back direction and also near the partition plate 28 of the machine chamber S2.

[0043] The outdoor heat exchanger 52 is disposed in the fan chamber S1. Through the outdoor heat exchanger 52, heat exchange is performed with the air that is drawn into the unit casing 2 by the outdoor fans 4. The outdoor heat exchanger 52 has a generally L-shape in a plan view of the unit casing 2, and is disposed so as to extend along the unit casing 2 from the left side to the rear side thereof.

[0044] Inside the unit casing 2, the liquid side shut-off valve 61 and the gas side shut-off valve 62 are disposed, to which refrigerant pipes on the indoor unit side are connected. More specifically, the liquid side shut-off valve 61 and the gas side shut-off valve 62 are disposed at a position facing the right front plate 24 at the front portion of the machine chamber S2. In this embodiment, the liquid side shut-off valve 61 and the gas side shut-off valve 62 are supported by an elongated plate shaped shut-off support member 30 provided so as to extend between the right end portion of the left front plate 23 and the front end portion of the right side plate 25. The shut-off support member 30 is disposed at a height near the upper end of the compressor 51 in the machine chamber S2.

(5) STRUCTURE OF THE ELECTRIC EQUIPMENT ASSEMBLY

[0045] The electric equipment assembly 7 includes various electric components such as a control circuit board 91 mounted with the operating control element for controlling operation and the inverter control element 92. In this embodiment, the electric equipment assembly 7 is disposed near the partition plate 28 at the upper portion in the machine chamber S2. The electric equipment assembly 7 mainly includes a frame 71, a terminal block 86, and a terminal block support member 87.

[0046] Next, the structure of the electric equipment assembly 7 is described in detail with reference to Figures 3 to 6. Here, Figure 3 is a view of the electric equipment assembly 7 provided in the machine chamber S2, viewed from the bottom. Figure 4 is a view of the electric equipment assembly 7 provided in the machine chamber S2, viewed in the direction A in Figure 1. Figure 5 is a view of the electric equipment assembly 7 provided in the machine chamber S2, viewed in the direction B in Figure 1. Figure 6 is a view of the electric equipment assembly 7, with the partition plate 28 removed from Figure 5.

[0047] The frame 71 is a generally rectangular parallelepiped box shaped member made of resin, to which various electric components including the control circuit board 91 mounted with the operating control element and the inverter control element 92 are attached. The frame 71 mainly comprises a substrate attachment plate 72 to which various electric components including the control circuit board 91 and the inverter control element 92 are attached, and a substrate protection plate 76 that covers the control circuit board 91.

[0048] The substrate attachment plate 72 is a member disposed on the fan chamber S 1 side in the machine chamber S2, with the electric equipment assembly 7 disposed in the machine chamber S2. The substrate attachment plate 72 mainly includes an attachment plate portion 73 as a first plate which is inclined to the front side of the unit casing 2 (i.e., the front side portions of the left and right front plates 23, 24) and which extends vertically, and an attachment frame portion 74 which extends from the outer perimeter of the attachment plate portion 73 toward a side opposite the fan chamber S1. An attachment plate opening 73a is formed generally in the center of the attachment plate portion 73 when the attachment plate portion 73 is seen in the direction of arrow A or arrow B. The surface of the attachment plate portion 73 on the side opposite the fan chamber S1 has an inverter control element 92 attached thereto, at a position facing the attachment plate opening 73a. The inverter control element 92 is, for example, an electric component such as a power transistor, a diode, etc., which generates high temperature heat during operation. In addition, the control circuit board 91 mounted with an operating control element is attached to the surface of the attachment plate portion 73 on the side opposite the fan chamber S1, with the control circuit board 91 in parallel to the surface of the attachment plate portion 73, by using a plurality of screws 93. In other words, as is the case with the attachment plate portion 73, the substrate surface of the control circuit board 91 is inclined to the front side of the unit casing 2 and extends vertically. In this embodiment, the control circuit board 91 is disposed so as to sandwich the inverter control element 92 between the control circuit board 91 and the surface of the attachment plate portion 73 on the side opposite the fan chamber S1, and the

control circuit board 91 is integrated with the inverter control element 92. In addition, a heat sink 94 is attached to the surface of the attachment plate portion 73 on the fan chamber S1 side so as to cover the attachment plate opening 73a. The heat sink 94 mainly includes a flange portion 94a attached to the surface of the attachment plate portion 73 on the fan chamber S1 side, and a plurality of horizontal cooling fins 94b that protrude from the surface of the flange portion 94a on the fan chamber S1 side toward the inside of the fan chamber S1. The flange portion 94a is a generally rectangular shaped plate portion. An annular projecting portion 73c that protrudes toward the fan chamber S1 is formed on the surface of the attachment plate portion 73 on the fan chamber S 1 side so as to surround the outer perimeter of the flange portion 94a.

[0049] The substrate protection plate 76 is a member disposed to the substrate attachment plate 72 on the side opposite the fan chamber S1, with the electric equipment assembly 7 provided in the machine chamber S2. The substrate protection plate 76 mainly includes a protection plate portion 77 which is inclined to the front side of the unit casing 2 (i.e., the front side portions of the left and right front plates 23, 24) and which extends vertically, and a protection frame portion 78 which extends from the outer perimeter of the protection plate portion 77 toward the fan chamber S1 side. With the electric equipment assembly 7 provided in the machine chamber S2, the protection plate portion 77 mainly includes a front side protection plate portion 77a disposed closer to the front side of the unit casing 2, and a rear side protection plate portion 77b disposed further from the front side of the unit casing 2 compared to the front side protection plate portion 77a. The rear side protection plate portion 77b is integrated with the front side protection plate portion 77a, with the rear side protection plate portion 77b protruding in the direction of arrow B compared with the front side protection plate portion 77a, via a step formed generally in the center of the protection plate portion 77 in the horizontal direction, when the protection plate portion 77 is seen in the direction of arrow A. The front side protection plate portion 77a and the rear side protection plate portion 77b are disposed in parallel to the surface of the attachment plate portion 73. The protection frame portion 78 is disposed such that the end portion thereof and the end portion of the attachment frame portion 74 in the direction of arrow A or arrow B overlap with each other, when the protection frame portion 78 is seen in the direction perpendicular to the attachment frame portion 74 in the direction of arrow A or arrow B. The substrate protection plate 76 is attached to the substrate attachment plate 72 by using an engaging claw formed on the protection frame portion 78 or the attachment frame portion 74, screw, or the like. In addition, apart from the control circuit board 91, a first auxiliary circuit board 98 is attached to the outer surface of the front side protection plate portion 77a (i.e. the surface seen when the substrate protection plate 76 is viewed in the direction of arrow A). The first auxiliary circuit board 98 is mounted with a highly frequently accessed control element among various operating control elements, which requires visibility and serviceability (for example, a display element 98a such as an LED and the like, and an operating element 98b such as a switch, connector, and the like). Here, the first auxiliary circuit board 98 is fixed on a first auxiliary circuit board attachment portion 79 including a plurality of (four in this case) locking claws 77c formed on the outer surface of the front side protection plate portion 77a. Further, with the electric equipment assembly 7 disposed in the machine chamber S2, it is possible to attach second auxiliary circuit boards 99a, 99b, and 99c respectively to the lower side of the first auxiliary circuit board attachment portion 79 of the front side protection plate portion 77a, an upper portion of the rear side protection plate portion 77b, and a lower portion of the rear side protection plate portion 77b. Each of the second auxiliary circuit boards 99a, 99b, and 99c is mounted with an additional-function control element, which is an element necessary for adding an additional function (for example, communication function, demand control function, etc.). Here, the second auxiliary circuit board 99a can be fixed on a second auxiliary circuit board attachment portion 80a including a plurality of (four in this case) locking claws 77d formed on the outer surface of the front side protection plate portion 77a. The second auxiliary circuit board 99b can be fixed on a second auxiliary circuit board attachment portion 80b including a plurality of (three in this case) screw holes 77e formed on the outer surface of the rear side protection plate portion 77b. The second auxiliary circuit board 99c can be fixed on a second auxiliary circuit board attachment portion 80c including a plurality of (three in this case) locking claws 77f formed on the outer surface of the rear side protection plate portion 77b. Note that even when the frame 71 (i.e., the substrate protection plate 76) is viewed in the direction of arrow A, the frame 71 is inclined to the front side of the unit casing 2 such that the entirety of the highly frequently accessed control elements 98a, 98b (i.e., the whole first auxiliary circuit board 98) are visible, without being hidden by the lateral sides of the unit casing 2 (i.e., the lateral side portion of the right front plate 24 and the lateral side portion of the right side plate 25). More specifically, when the frame 71 (i.e., the substrate protection plate 76) is viewed in the direction of arrow A, the frame 71 is inclined to the front side of the unit casing 2 such that the front end of the lateral side of the unit casing 2 substantially overlaps with the step extending in an up and down direction of the substrate protection plate 76.

[0050] In addition, with the electric equipment assembly 7 provided in the machine chamber S2, a reactor 96 is attached to the upper surface of the frame 71 via a metallic reactor attachment plate 85, and a noise filter 97 is attached to the lower surface of the frame 71.

[0051] The frame 71 to which the above described various electric components and the heat sink 94 are attached has a frame support plate 81 that is fixed thereto

so as to cover the surface of the attachment plate portion 73 on the fan chamber S1 side. The frame support plate 81 is a metallic member. With the electric equipment assembly 7 provided in the machine chamber S2, the frame support plate 81 mainly includes a support plate portion 82 as a second plate portion in contact with the surface of the attachment plate portion 73 on the fan chamber S 1 side, and a front side extension portion 83 and a rear side extension portion 84 which extend along the bent surface of the partition plate 28 from both side edges of the support plate portion 82. Here, the support plate portion 82 covers substantially the entire surface of the attachment plate portion 73 except for the lower portion thereof. The support plate portion 82 has a support plate opening 82a formed therein as a second opening so as to surround the outer peripheral side of the annular projecting portion 73c formed on the attachment plate portion 73. Accordingly, with the frame 71 fixed to the frame support plate 81, the plurality of cooling fins 94b of the heat sink 94 attached to the frame 71 penetrate through the support plate opening 82a and protrude toward the fan chamber S1 side of the support plate portion 82. In addition, the support plate portion 82 has a tongue portion 82b formed thereon by bending and the like, whose lower end extends toward the fan chamber S1 side and then extends downwardly. With the frame 71 fixed to the partition plate 28, the frame support plate 81 is fixed to the partition plate 28 by using, for example, an engaging claw formed on the front side extension portion 83, the rear side extension portion 84, or the support plate portion 82, a screw, or the like. Here, the partition plate 28 has a generally rectangular shaped partition plate opening 28a formed therein as a first opening so as to communicate the fan chamber S1 and the machine chamber S2. The partition plate opening 28a is formed so as to face the support plate opening 82a and to surround the support plate opening 82a and the lower end of the support plate portion 82 when the partition plate opening 28a is viewed in the direction of arrow B. Accordingly, with the frame 71 fixed to the partition plate 28 via the frame support plate 81, the plurality of cooling fins 94b of the heat sink 94 and the tongue portion 82b of the frame support plate 81 protrude into the fan chamber S1 and are capable of cooling the inverter control element 92 during operation. In addition, with the frame 71 disposed in the machine chamber S2, the frame 71 is provided such that the substrate surface of the control circuit board 91 extends along the partition plate 28 and such that the substrate surface of the control circuit board 91 is inclined to the front side of the unit casing 2. Further, a corner of the frame 71 is in contact with the partition plate 28 along a bent surface thereof via a frame support plate 81, when the electric equipment assembly 7 disposed in the machine chamber S2 is viewed from the top.

[0052] The terminal block 86 mainly includes a terminal block body 86a having a plurality of terminals for power supply connection, and a terminal block fixing plate 86b to which the rear side of the terminal block body 86a is fixed. With the electric equipment assembly 7 provided in the machine chamber S2, the terminal block 86 is disposed such that a terminal portion of the terminal block body 86a faces the front side of the unit casing 2, and one end of the terminal block fixing plate 86b on the partition plate 28 side is fixed to the partition plate 28. Note that one end of the terminal block fixing plate 86b may be fixed to the front portion of the left front plate 23.

[0053] The terminal block support member 87 is a rod shaped member having a first terminal block support portion 87a configured to support the terminal block 86 with the electric equipment assembly 7 provided in the machine chamber S2, and a frame supported portion 87b rotatably supported around an engaging shaft 71a (whose shaft center is O), which is a shaft that extends in an up and down direction of the frame 71 with the electric equipment assembly 7 provided in the machine chamber S2. The terminal block support member 87 is capable of moving the first terminal block support portion 87a closer to or away from the substrate surface of the control circuit board 91, by rotating the frame supported portion 87b. The other end of the terminal block fixing plate 86b is supported by being attached to the first terminal block support portion 87a by setting the terminal block support member 87 to the first state in which the terminal block support member 87 is inclined by an angle α.

[0054] In this way, with the electric equipment assembly 7 of this embodiment, the terminal block 86, apart from the frame 71, is fixed to the partition plate 28 so as to face the front side of the unit casing 2, and the terminal block 86 is also supported by the terminal block support member 87 provided to the frame 71.

[0055] The electric equipment assembly 7 of this embodiment is configured to be capable of housing the terminal block 86 and the terminal block support member 87 in the frame 71. The housing structure of such terminal block 86 and terminal block support member 87 is now described with reference to Figures 1, 3, 4, 7, and 8. Here, Figure 7 shows the electric equipment assembly, viewed from the bottom, with the terminal block 86 and the terminal block support member 87 housed in the frame 71. Figure 8 shows the electric equipment assembly viewed in the direction A in Figure 1, with the terminal block 86 and the terminal block support member 87 housed in the frame 71.

[0056] As described above, in a state in which the terminal block support member 87 is inclined by an angle α by rotating the frame supported portion 87b of the terminal block support member 87 (hereinafter referred to as the first state), the terminal block 86 is disposed so as to face the front side of the unit casing 2. In this case, because of the inclination, the terminal block 86 and the terminal block support member 87 protrude outside of the frame 71 (specifically, from the outer surface of the substrate protection plate 76) in a plan view of the unit casing 2. Therefore, if nothing is done, the size of the package of the electric equipment assembly 7 at the time

of the transportation of a single unit thereof will be large, and the transportation of the electric equipment assembly 7 cannot be efficiently performed.

[0057] To solve this problem, with the electric equipment assembly 7 of this embodiment, the terminal block support member 87 can be switched to the second state in which the inclination of the terminal block support member 87 to the substrate surface of the frame 71 is gentle compared to the first state (parallel to the substrate surface of the frame 71 in this case), by rotating the frame supported portion 87b of the terminal block support member 87. Further, when the terminal block support member 87 is set to the second state, the terminal block support member 87 is disposed so as not to protrude outside the frame 71 (specifically from the outside of the substrate protection plate 76) in a plan view of the unit casing 2.

[0058] In addition, when the terminal block support member 87 is switched to the second state, the terminal block 86 is removed from the first terminal block support portion 87a. Here, a terminal block engaging claw 87c is formed on the first terminal block support portion 87a of the terminal block support member 87, and this terminal block engaging claw 87c has an attachment structure in which the terminal block engaging claw 87c is inserted to an engaging hole 86c formed at the other end of the terminal block fixing plate 86b of the terminal block 86. Therefore, the terminal block 86 can be easily removed from the first terminal block support portion 87a by elastically deforming the terminal block engaging claw 87c. On the other hand, when the terminal block 86 is attached to the first terminal block support portion 87a, the terminal block engaging claw 87c can be easily inserted to the engaging hole 86c by elastically deforming the terminal block engaging claw 87c.

[0059] Further, after the terminal block 86 is removed from the terminal block support member 87 and the terminal block support member 87 is switched to the second state, the terminal block 86 can be removably attached to the frame 71. Specifically, the terminal block 86 can be attached to a second terminal block support portion 89 including a plurality of (two in this case) locking claws 77g formed on the outer surface of the protection plate portion 77 (the rear side protection plate portion 77b in this case) of the substrate protection plate 76 which constitutes the frame 71. At this time, the terminal block 86 is attached such that the terminal block body 86a faces toward the fan chamber S1 side with the electric equipment assembly 7 disposed in the machine chamber S2, in other words, such that the terminal block fixing plate 86b is disposed along the protection plate portion 77. Further, the frame 71 (specifically, the front side protection plate portion 77a of the protection plate portion 77) has a protection plate opening 77h formed therein as a housing opening at a position facing the terminal block body 86a, with the terminal block 86 attached to the second terminal block support portion 89. Therefore, with the terminal block 86 attached to the second terminal block support portion 89, at least part of the terminal block 86 (specifically, the terminal block body 86a) is housed in the frame 71.

(6) CHARACTERISTICS OF THE ELECTRIC EQUIPMENT ASSEMBLY OF THE PRESENT EMBODIMENT AND THE OUTDOOR UNIT PROVIDED WITH THE SAME

[0060] The electric equipment assembly 7 of the present embodiment and the outdoor unit 1 provided with the same have the following characteristics.

(A) With the electric equipment assembly 7 and the outdoor unit 1 provided with the same as described in the present embodiment, the control circuit board 91 and the inverter control element 92 are attached to the frame 71, and thereby the control circuit board 91 and the inverter control element 92 are integrated, reducing the size of the electric equipment assembly 7. At the same time, the frame 71 is disposed such that the substrate surface of the frame 71 is inclined to or perpendicular to the front side of the unit casing 2, thus enabling cooling of the inverter control element 92. In addition, apart from the frame 71, the terminal block 86 is fixed to the unit casing 2 or the partition plate 28 such that the terminal block 86 faces the front side of the unit casing 2 and the terminal block 86 is also supported by the terminal block support member 87 provided to the frame 71, thus ensuring the operability during on-site work and the strength of the terminal block 86. Further, this terminal block support member 87 is capable of switching between the first state in which the terminal block support member 87 supports the terminal block 86 and the second state in which the inclination of the frame 71 to the substrate surface is gentle compared to the first state, thus the package of the electric equipment assembly 7 at the time of the transportation can be reduced in size, and accordingly, the transportation of the electric equipment assembly 7 can be efficiently performed.

As described above, according to the present invention, the transportation can be efficiently performed while achieving reduction in size and ensuring the strength of the terminal block. In addition, reduction in size of the whole the outdoor unit 1 can be achieved as well.

(B) With the electric equipment assembly 7 of the present embodiment, the terminal block support member 87 is disposed so as not to protrude outside the frame 71 in a plan view of the unit casing 2 when the terminal block support member 87 is switched to the second state. Therefore, the package of the electric equipment assembly 7 at the time of the transportation can be further reduced in size.

(C) With the electric equipment assembly 7 of the present embodiment, the terminal block support member 87 is rotatably supported around the shaft

(specifically, the engaging shaft 71a) that extends in the up and down direction of the frame 71, thus the operation of switching between the first state and the second state can be easily performed.

(D) With the electric equipment assembly 7 of the present embodiment, the frame 71 is provided with the second terminal block support portion 89 (specifically, the locking claws 77g formed on the outer surface of the rear side protection plate portion 77b) that attaches the terminal block 86 to the frame 71 in a removable manner. Therefore, it is possible to attach the terminal block 86 to the frame 71 at the time of the transportation of the electric equipment assembly 7 and remove the terminal block 86 from the frame 71 when disposing the electric equipment assembly 7 in the unit casing 2. Accordingly, the transportation of the electric equipment assembly 7 and the installation of the electric equipment assembly 7 in the unit casing 2 can be further efficiently performed.

(E) With the electric equipment assembly 7 of the present embodiment, the protection plate opening 77h is formed for housing at least part of the terminal block 86, with the terminal block 86 attached to the second terminal block support portion 89. Thus, it is possible to prevent the terminal block 86 from protruding from the outer surface of the frame 71 as much as possible, and accordingly the package of the electric equipment assembly 7 at the time of the transportation can be further reduced in size.

(7) ALTERNATIVE EMBODIMENT

[0061] The electric equipment assembly 7 of the above described embodiment is configured such that the terminal block 86 is fixed to the unit casing 2 or the partition plate 28 so as to face the front side of the unit casing 2, and the terminal block 86 is supported by the terminal block support member 87 provided to the frame 71. However, as in an electric equipment assembly 107 of the present alternative embodiment shown in Figures 9 and 10, it may be configured such that a terminal block 186 is supported by a terminal block support member 187 provided to a frame 171. Below, the electric equipment assembly 107 according to the present alternative embodiment is described. Note that all the components of the electric equipment assembly 107 except for the terminal block 186 and part of the terminal block support member 187 and the frame 171 (specifically, positioning portions 188, 189) are the same as the components of the electric equipment assembly 7 of the above described embodiment, thus the description thereof is omitted here.

[0062] As is the case with the terminal block 86 of the electric equipment assembly 7 of the above described embodiment, the terminal block 186 mainly includes a terminal block body 186a having a plurality of terminals for power supply connection, and a terminal block fixing plate 186b to which the rear side of the terminal block body 186a is fixed. As is the case with the terminal block 86 of the electric equipment assembly 7 of the above described embodiment, with the electric equipment assembly 107 disposed in the machine chamber S2, the terminal block 186 is disposed such that a terminal portion of the terminal block body 186a faces the front side of the unit casing 2. However, the terminal block 186 of the present alternative embodiment is different from the terminal block of the electric equipment assembly 7 of the above described embodiment in that one end of the terminal block fixing plate 186b on the partition plate 28 side is not fixed to the partition plate 28 or the front portion of the left front plate 23.

[0063] Next, as is the case with the terminal block support member 87 of the electric equipment assembly 7 of the above described embodiment, the terminal block support member 187 is a rod shaped member having a first terminal block support portion 187a configured to support the terminal block 186, with the electric equipment assembly 107 provided in the machine chamber S2, and a frame supported portion 187b rotatably supported around an engaging shaft 171 a (whose shaft center is O), which is a shaft that extends in an up and down direction of the frame 171, with the electric equipment assembly 107 provided in the machine chamber S2. The terminal block support member 187 is capable of moving the first terminal block support portion 187a closer to or away from the substrate surface of the control circuit board 91, by rotating the frame supported portion 187b. In addition, the first terminal block support portion 187a has an engaging shaft 187c (whose shaft center is P), which is a shaft that extends in an up and down direction of the frame 171 with the electric equipment assembly 107 disposed in the machine chamber S2, and a terminal block supported portion 186c, which is formed on the rear side of the terminal block fixing plate 186b, is rotatably supported by this engaging shaft 187c. The terminal block 186 is set to a state in which the terminal block support member 187 is inclined by an angle β to the substrate surface of the control circuit board 91, and in addition, the terminal block fixing plate 186b is set to a state in which the terminal block fixing portion 186b is inclined by an angle γ to the terminal block support member 187. As a result of this arrangement, the terminal block 186 is disposed so as to face the front side of the unit casing 2 (hereinafter referred to as the first state). Further, with the above described first state maintained, one end of the terminal block fixing plate 186b (here, the end portion of the partition plate 28) is supported by the frame 171. More specifically, a claw portion 186d formed on one end of the terminal block fixing plate 186b is engaged with a cutout portion 171b as a first positioning portion formed on the frame 171. In other words, the cutout portion 171b has a function of positioning the terminal block 186 and the terminal block support member 187 to the first state.

[0064] In this way, with the electric equipment assembly 107 of the present alternative embodiment, the terminal block 86 integrated with the frame 171 is disposed

so as to face the front side of the unit casing 2 via the terminal block support member 187 provided to the frame 171, and the terminal block 86 is supported by the terminal block support member 187 and the cutout portion 171b formed on the frame 171.

[0065] As is the case with the electric equipment assembly 7 of the above described embodiment, the electric equipment assembly 107 of the present alternative embodiment is configured to be capable of housing the terminal block 186 and the terminal block support member 187 in the frame 171. The housing structure of these terminal block 186 and terminal block support member 187 is described.

[0066] As described above, when the first state is achieved by rotating the frame supported portion 187b of the terminal block support member 187 and the terminal block supported portion 186c of the terminal block fixing plate 186b, the terminal block 186 is disposed so as to face the front side of the unit casing 2. In this case, because of the inclination, the terminal block 186 and the terminal block support member 187 protrude outside of the frame 171 (specifically, from the outer surface of the substrate protection plate 76) in a plan view of the unit casing 2. Therefore, if nothing is done, the size of the package of the electric equipment assembly 107 at the time of the transportation of a single unit thereof will be large, and the transportation of the electric equipment assembly 107 cannot be efficiently performed.

[0067] To solve this problem, the electric equipment assembly 107 of the present alternative embodiment is configured to be capable of switching the terminal block support member 187 to the second state in which the frame supported portion 187b of the terminal block support member 187 is rotated thereby achieving a state in which the inclination of the terminal block support member 187 to the substrate surface of the frame 171 is more gentle than the angle β of the inclination in the first state (here, the terminal block support member 187 is inclined to the substrate surface of the frame 171 by an angle δ), and the terminal block supported portion 186c of the terminal block fixing plate 186b is rotated thereby achieving a state in which the angle of the inclination of the terminal block support member 187 to the substrate surface of the frame 171 is more gentle than the angle γ of the inclination in the first state (here, the terminal block support member 187 is inclined to the terminal block support member by an angle ε).Further, the other end of the terminal block fixing plate 186b (here, the end portion on the side opposite the partition plate 28) is supported by the frame 171, with the above described second state maintained. More specifically, the other end of the terminal block fixing plate 186b is engaged with a claw portion 171c as a second positioning portion formed on the frame 171. This claw portion 171c is a portion capable of attaching the other end of the terminal block fixing plate 186b to the frame 171 along the protection plate portion 177, as is the case, for example, with the locking claws 77g formed on the frame 71 of the electric equipment assembly 7 of the above described embodiment. In other words, the claw portion 171c has a function of positioning the terminal block 186 and the terminal block support member 187 to the second state. When the terminal block support member 187 and the terminal block fixing plate 186b are switched to the second state, the terminal block 186 is disposed along the outer surface of the frame 171 in a plane view of the unit casing 2. Thus, it is possible to prevent the terminal block 186 from protruding from the outer surface of the frame 171 as much as possible, and accordingly the package of the electric equipment assembly 107 at the time of the transportation can be further reduced in size.

[0068] In this way, the electric equipment assembly 107 of the present alternative embodiment is configured to be capable of housing the terminal block 186, instead of needing to remove the terminal block 186, simply by switching the terminal block support member 187 and the terminal block fixing plate 186b to the second state.

(8) OTHER EMBODIMENT

[0069] While selected embodiments of the present invention have been described based on the drawings, specific configurations are not limited to the above embodiments, and various changes and modifications may be made herein without departing from the scope of the invention.

[0070] For example, in the above described embodiment, the frame 71 is disposed such that the substrate surface of the control circuit board 91 is inclined to the front side of the unit casing 2. However, the frame 71 may be disposed such that the substrate surface of the control circuit board 91 is perpendicular to the front side of the unit casing 2.

INDUSTRIAL APPLICABILITY

[0071] With the utilization of the present invention, in an outdoor unit of an air conditioner having a structure in which the inside of a casing having a generally rectangular parallelepiped box shape is divided into a fan chamber and a machine chamber by a partition plate extending vertically, it is possible to achieve reduction in size of an electric equipment assembly disposed in the machine chamber and efficiently perform the transportation of the electric equipment assembly.

Claims

1. An electric equipment assembly (7, 107) disposed in a machine chamber (S2) of an outdoor unit of an air conditioner having a structure in which an inside of a casing (2) having a generally rectangular parallelepiped box shape is divided into a fan chamber (S1) and the machine chamber by a partition plate (28) extending vertically, the electric equipment as-

sembly comprising:

a frame (71) to which various electric components including a control circuit board (91) mounted with an operating control element and an inverter control element (92) are attached, the frame being disposed such that a substrate surface of the control circuit board is inclined to or perpendicular to a front side of the casing, with the frame provided in the casing;
a terminal block (86, 186) disposed so as to face the front side of the casing, with the terminal block provided in the casing; and
a terminal block support member (87, 187) provided to the frame and capable of switching between a first state in which the terminal block support member supports the terminal block provided in the casing and a second state in which inclination of the terminal block support member to the substrate surface is gentle compared to the first state.

2. The electric equipment assembly (7, 107) according to claim 1, wherein the terminal block support member (87, 187) is disposed so as not to protrude outside the frame (71, 171) in a plan view of the casing (2) when the terminal block support member is switched to the second state with the frame provided in the casing.

3. The electric equipment assembly (7, 107) according to claim 2, wherein the terminal block support member (87, 187) includes a first terminal block support portion (87a, 187a) configured to support the terminal block (86, 186) with the frame (71, 171) provided in the casing (2), and a frame supported portion (87b, 187b) rotatably supported around a shaft that extends in an up and down direction of the frame, with the frame provided in the casing,
the terminal block support member being capable of moving the first terminal block support portion closer to or away from the substrate surface, by rotating the frame supported portion.

4. The electric equipment assembly (7) according to any of claims 1 to 3, wherein the terminal block (86) is fixed to the casing (2) or the partition plate (28), with the terminal block (86) provided in the casing.

5. The electric equipment assembly (7) according to any of claims 1 to 4, wherein the frame (71) includes a second terminal block support portion (89) configured to attach the terminal block (86) to the frame in a removable manner.

6. The electric equipment assembly (7) according to claim 5, wherein the frame (71) has a housing opening (77h) formed therein for housing at least part of the terminal block (86), with the terminal block attached to the second terminal block support portion (89).

7. The electric equipment assembly (107) according to claim 3, wherein the terminal block (186) is rotatably supported by the first terminal block support portion (187a) around a shaft that extends in an up and down direction of the terminal block support member (187), with the frame (171) provided in the casing (2).

8. The electric equipment assembly (107) according to claim 7, wherein the frame (171) includes a first positioning portion (188) for positioning the terminal block (186) and the terminal block support member (187) in the first state.

9. The electric equipment assembly (107) according to claim 7 or claim 8, wherein the terminal block (186) is disposed along the outer surface of the frame (171) in a plan view of the casing (2), when the terminal block support member (187) is switched to the second state.

10. The electric equipment assembly (107) according to claim 9, wherein the frame (171) includes a second positioning portion (189) for positioning the terminal block (186) and the terminal block support member (187) in the second state.

11. An outdoor unit (1) of an air conditioner comprising:

a casing (2) having a generally rectangular parallelepiped box shape;
a partition plate (28) extending vertically so as to divide the inside of the casing into a fan chamber (S1) and a machine chamber (S2); and
the electric equipment assembly (7, 107) according to any of claims 1 to 10, disposed in the machine chamber.

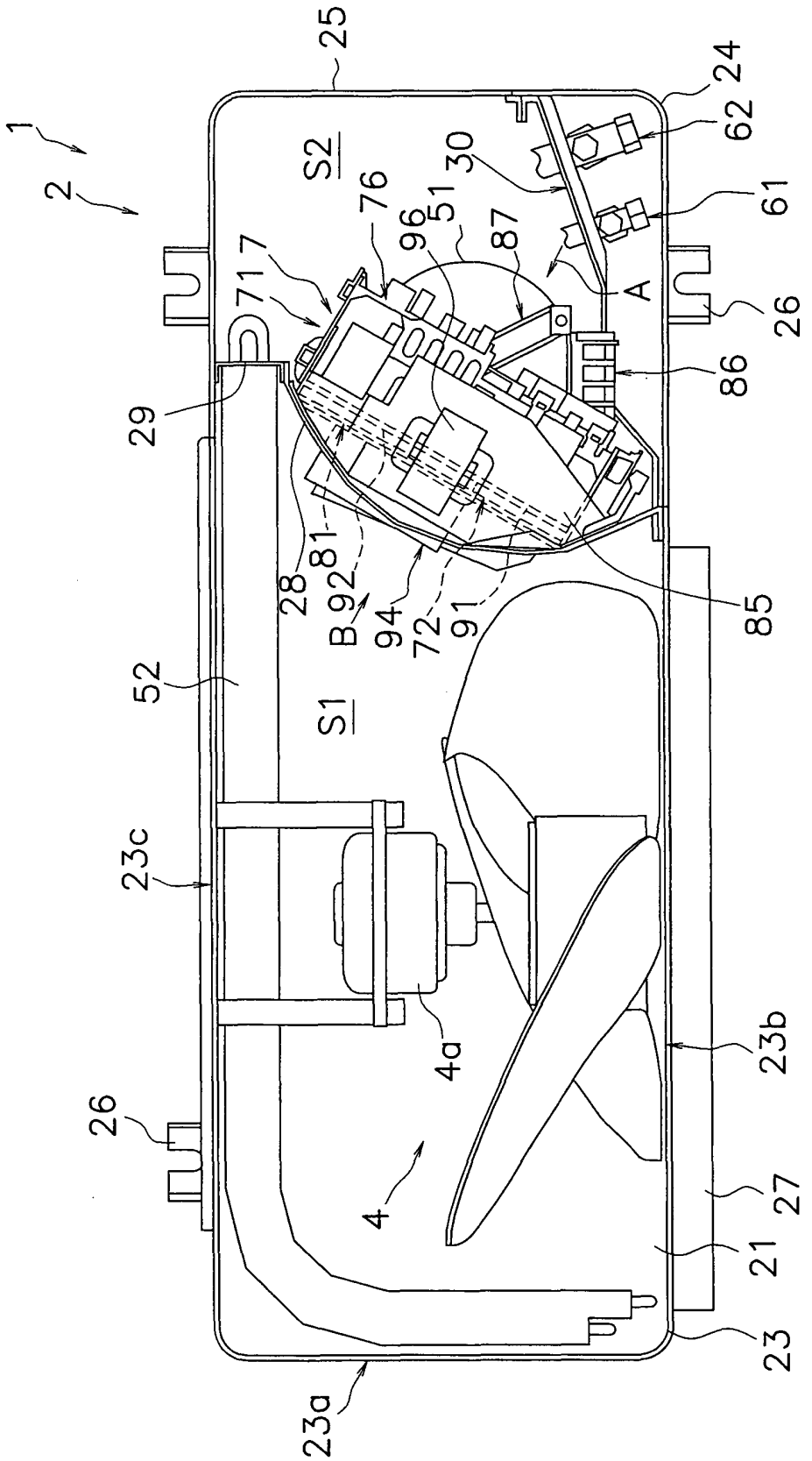
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Fig. 1

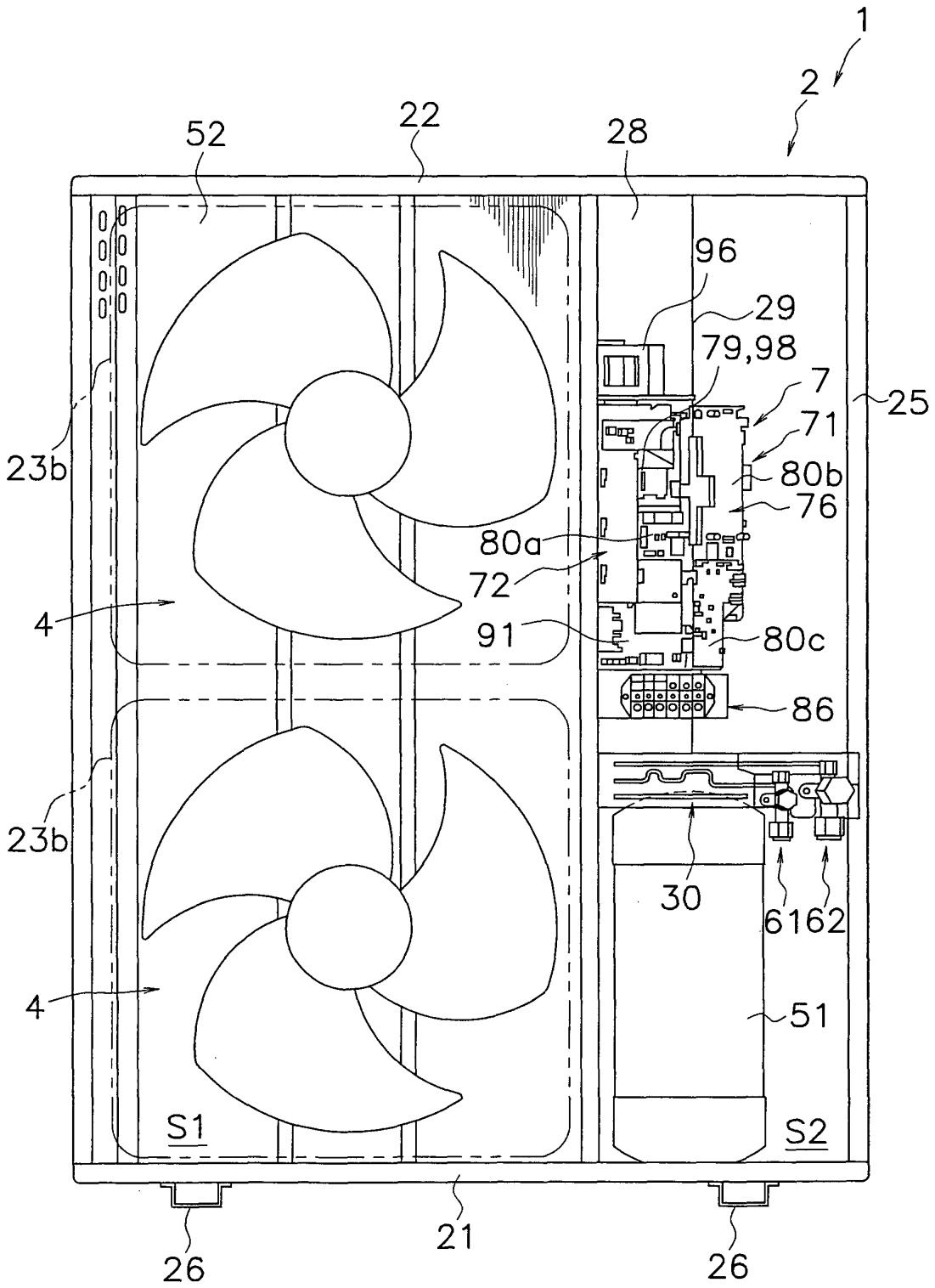
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Fig. 2

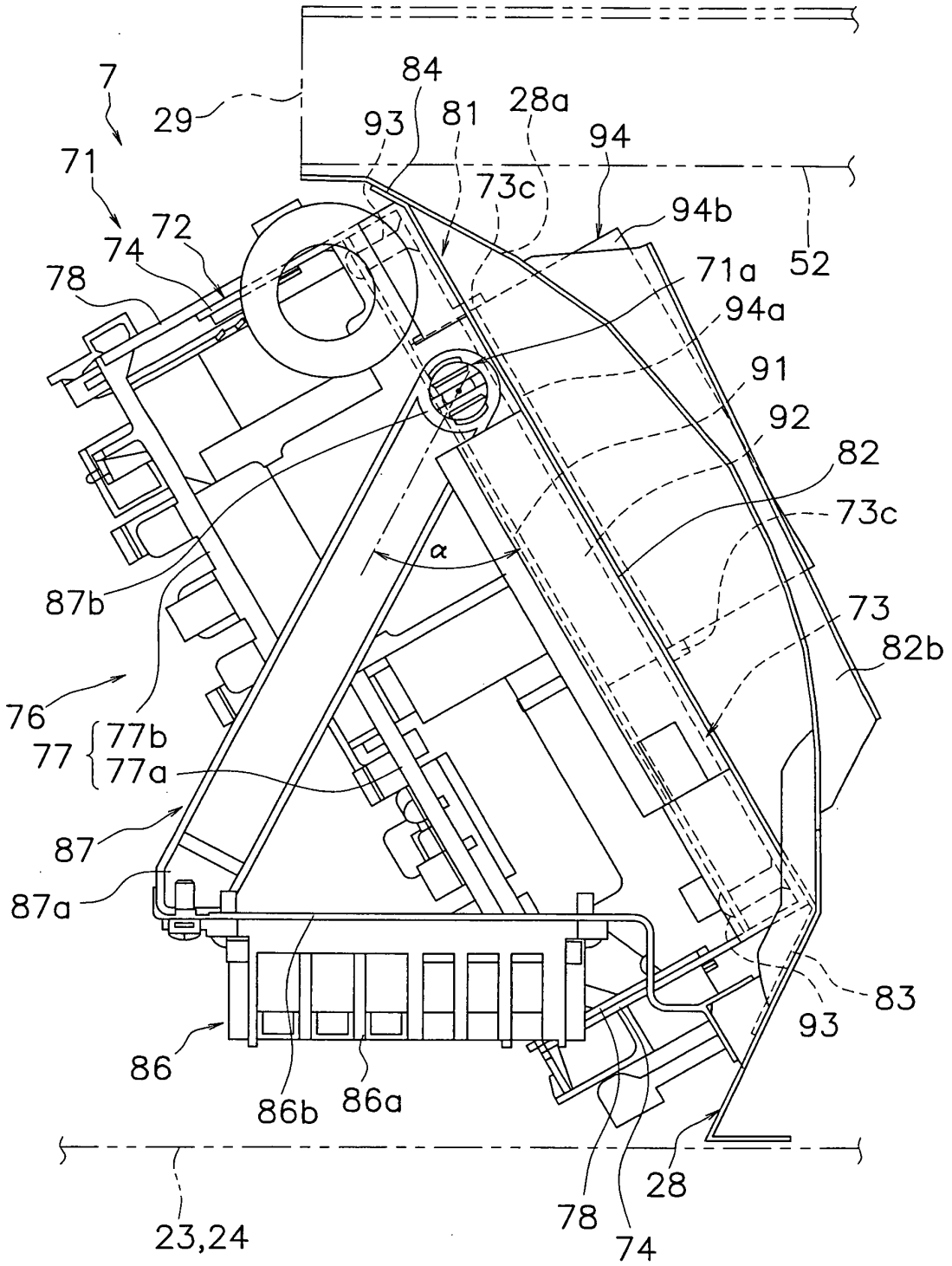
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Fig. 3

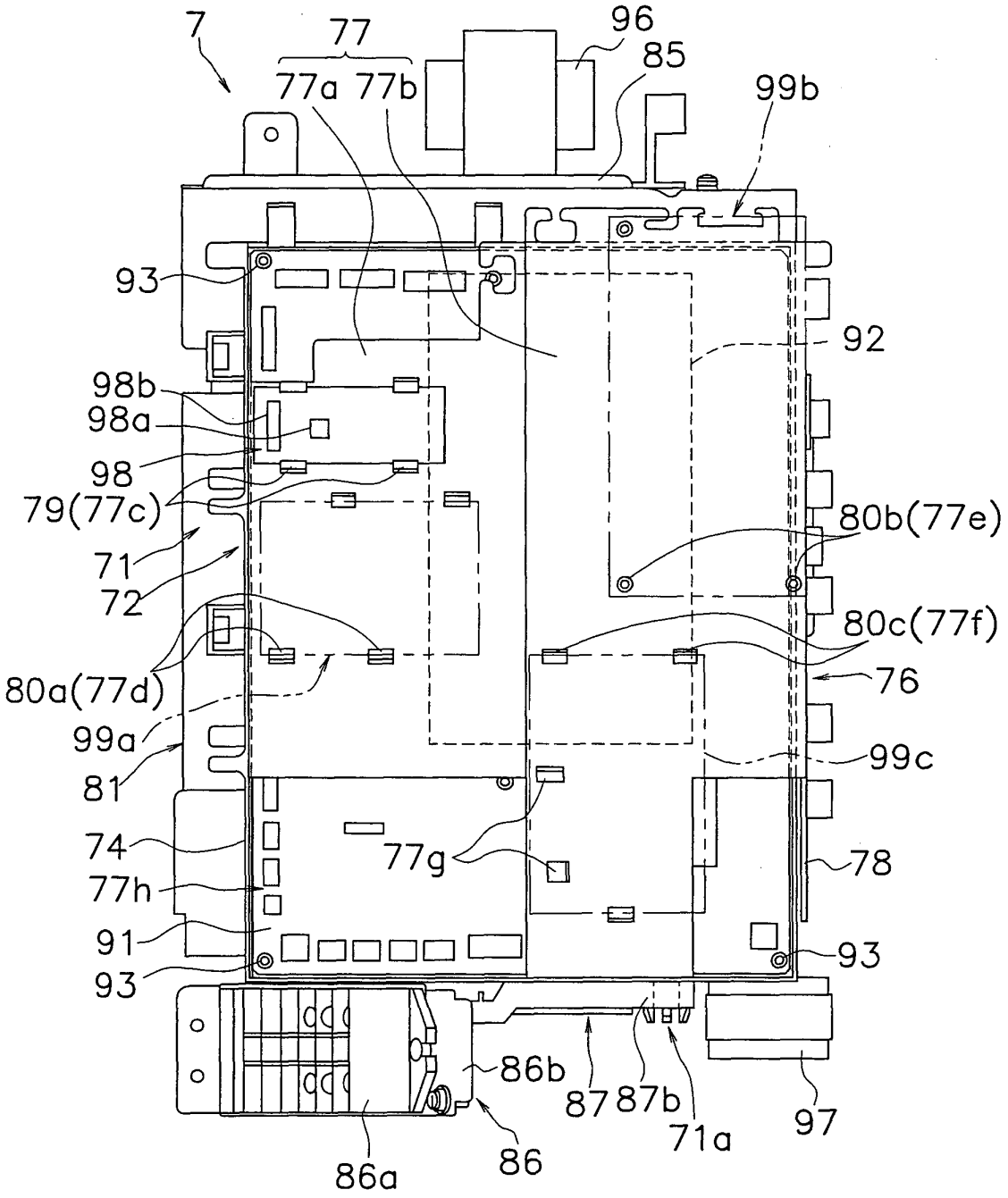
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Fig. 4

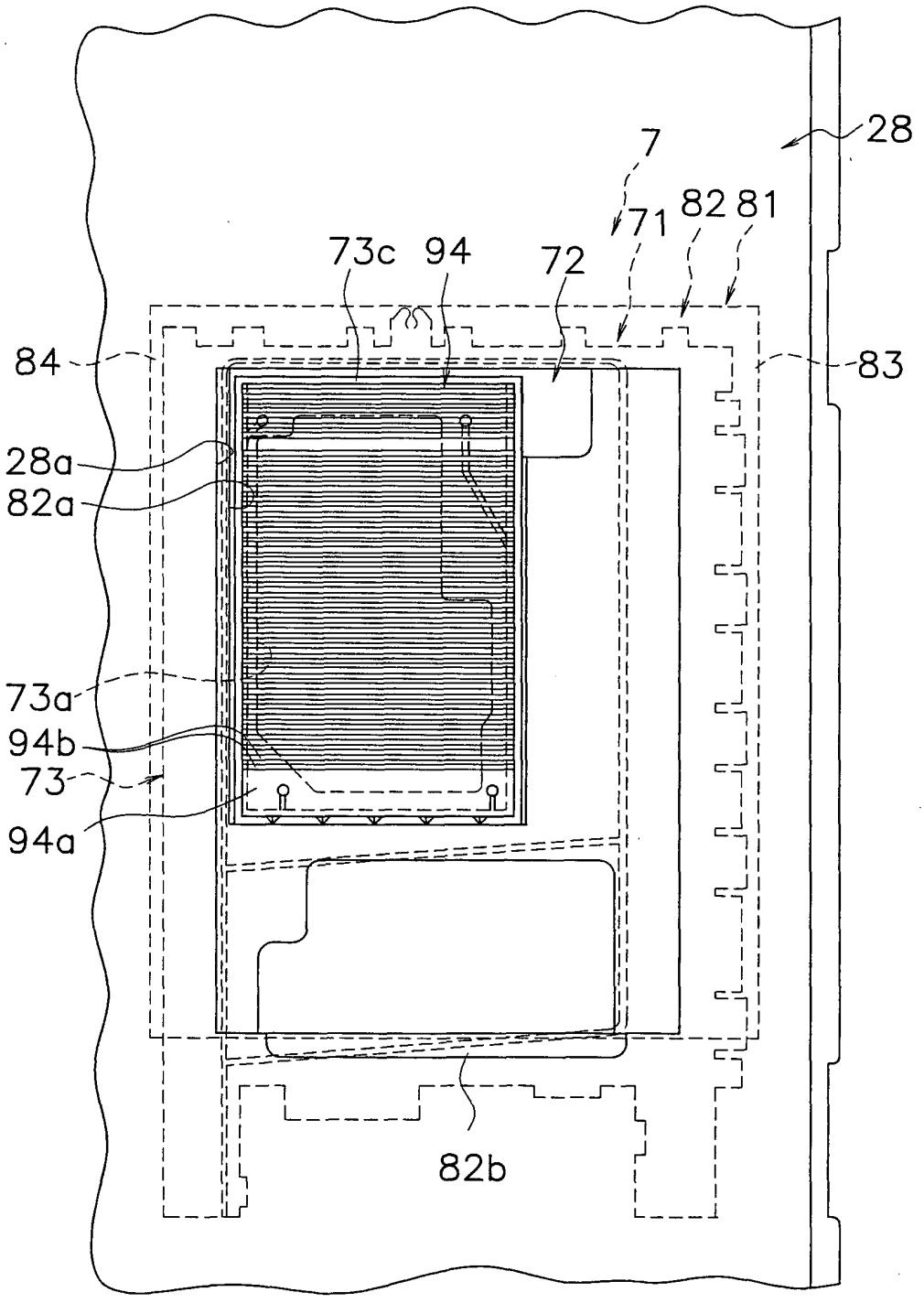

Fig. 5

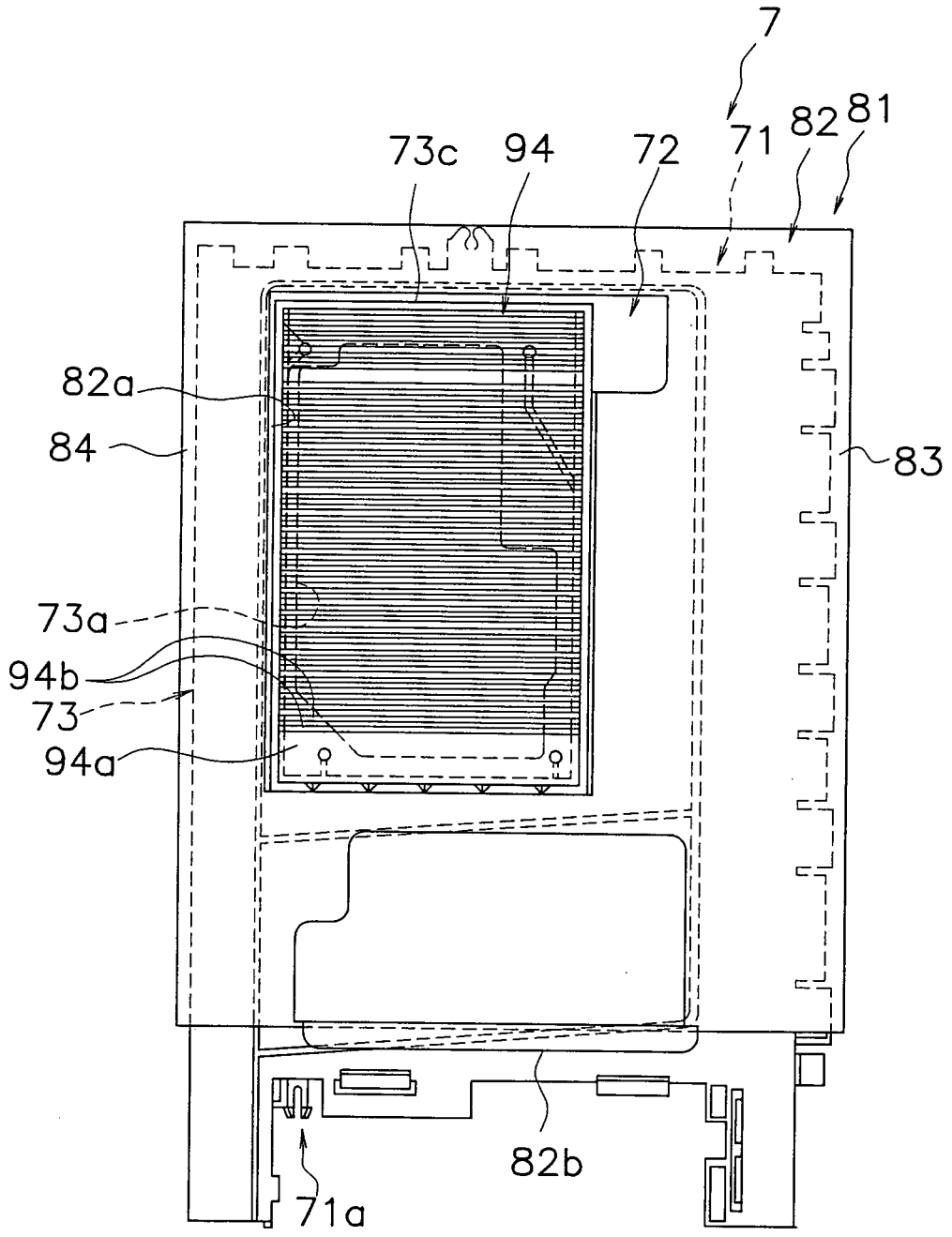

Fig. 6

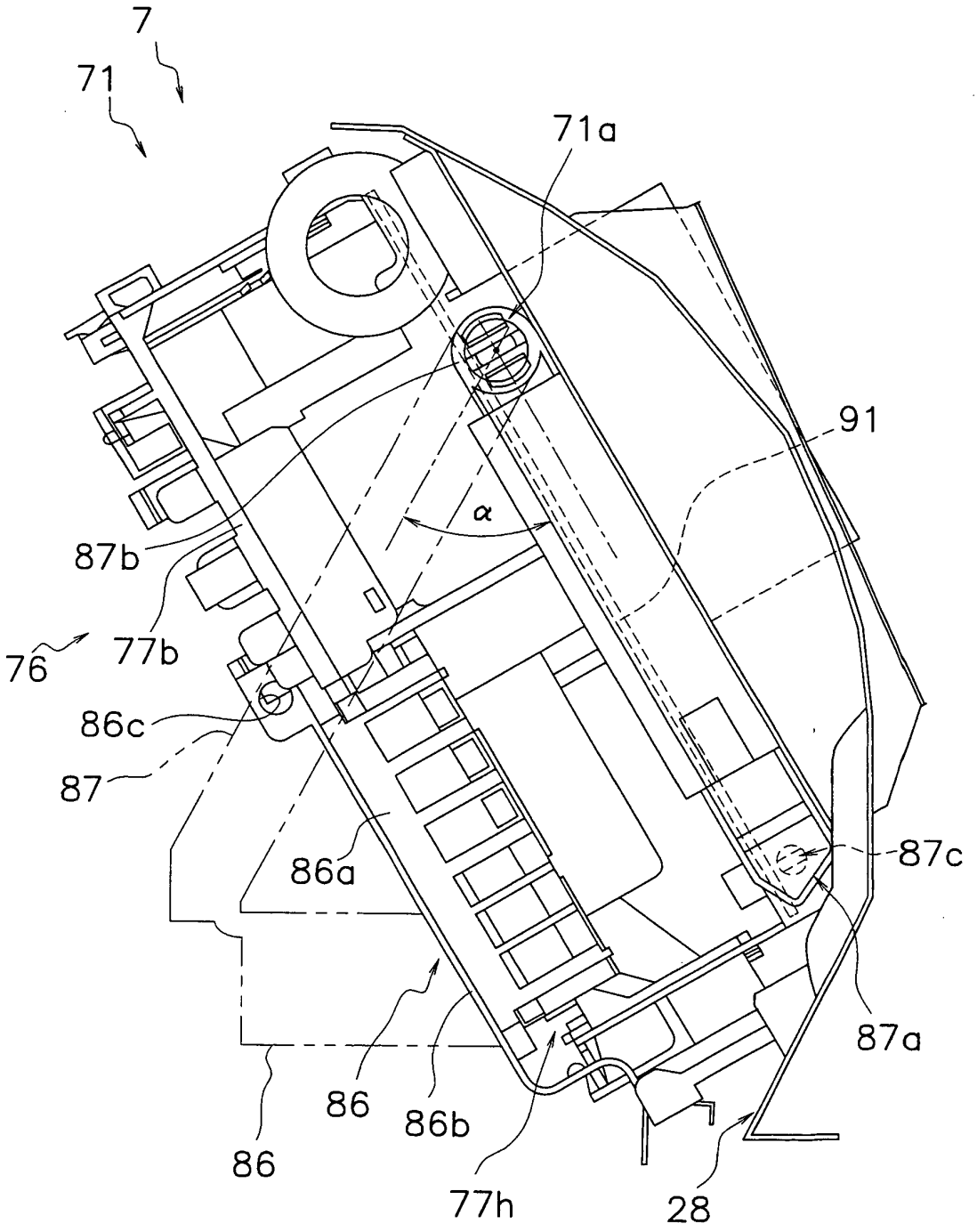

Fig. 7

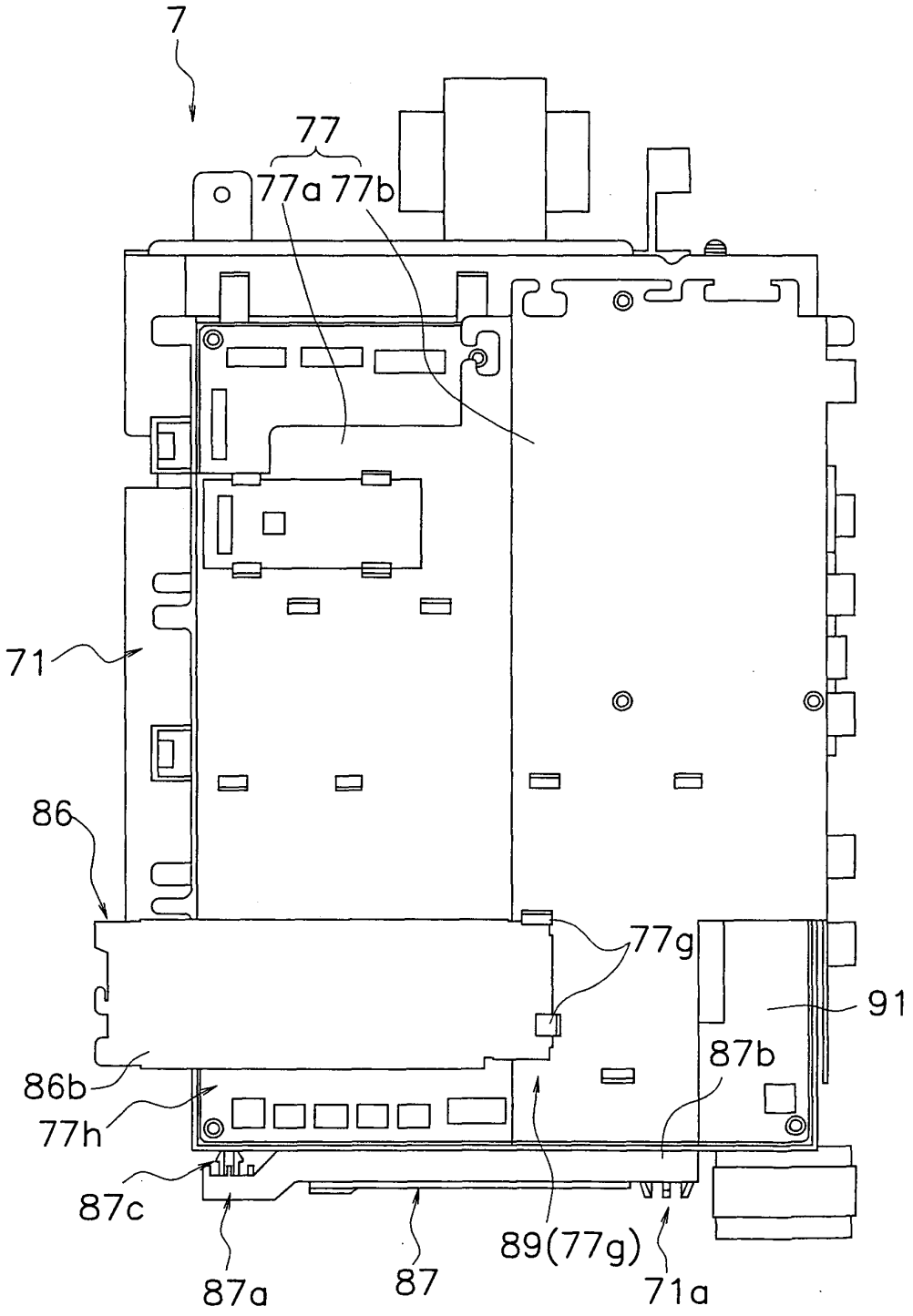

Fig. 8

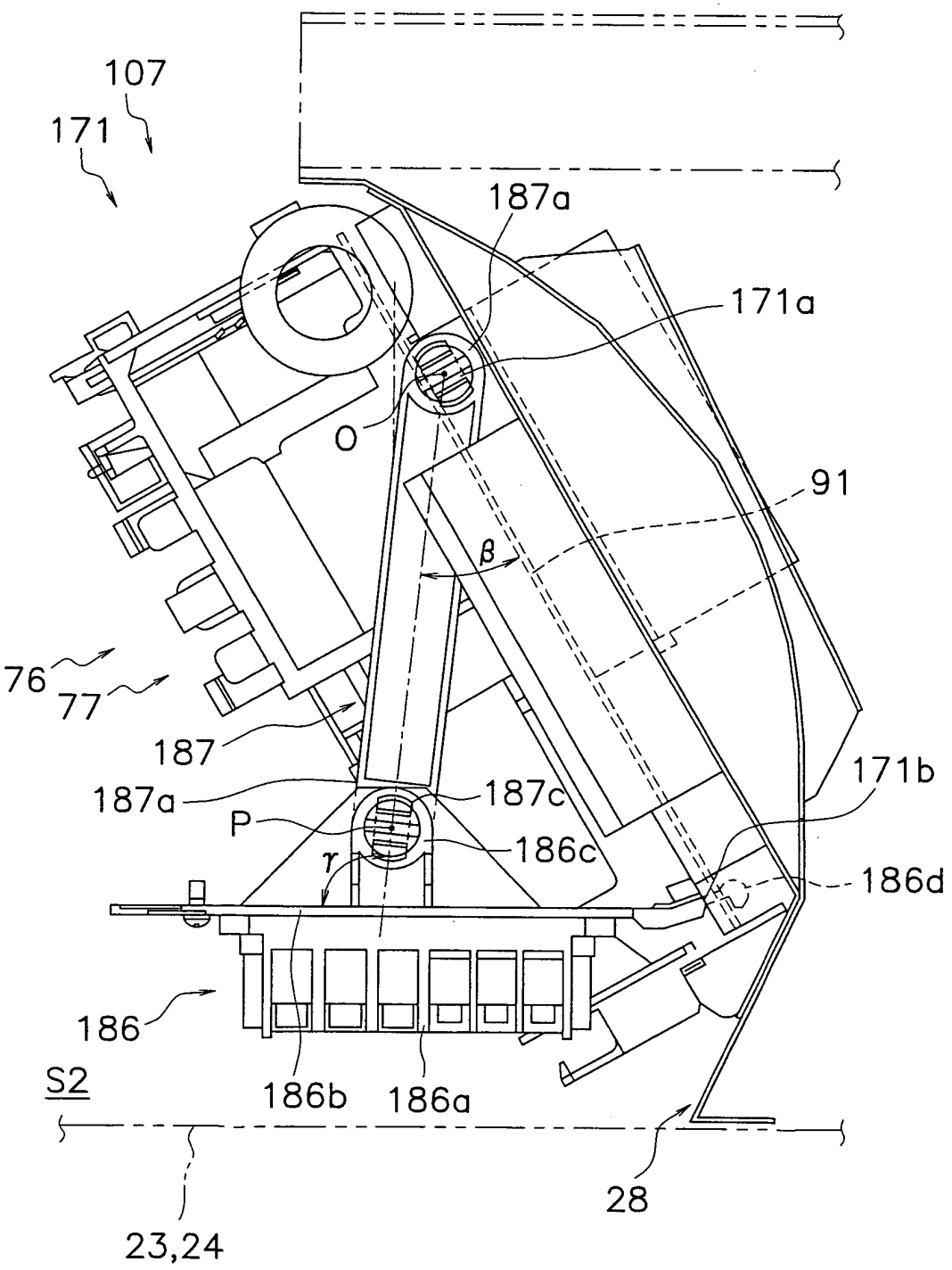
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Fig. 9

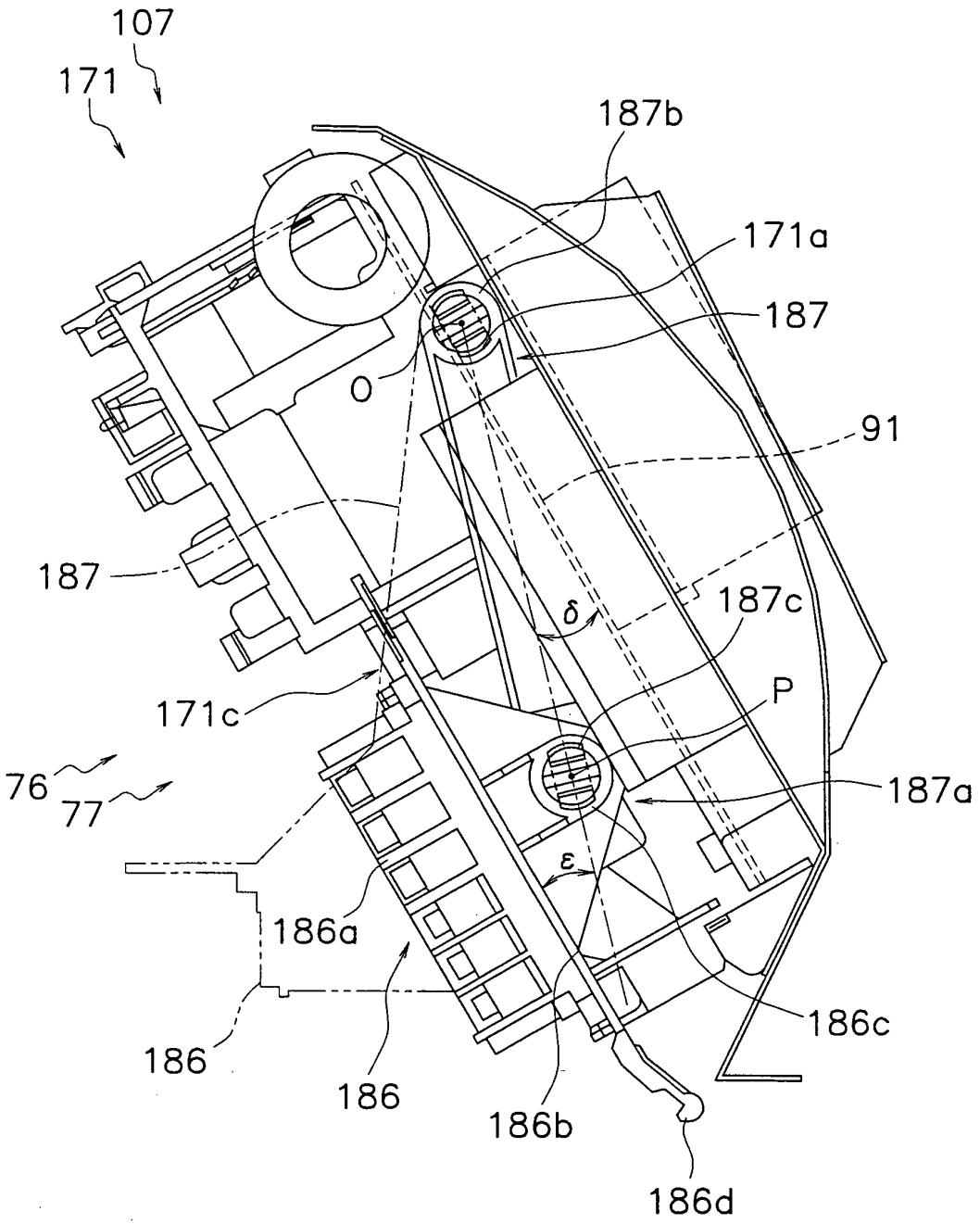
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Fig. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/321967

A. CLASSIFICATION OF SUBJECT MATTER
F24F5/00(2006.01)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)
F24F5/00

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 1996-2006
Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006

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.
A	JP 9-236286 A (Daikin Industries, Ltd.), 09 September, 1997 (09.09.97), Fig. 1 (Family: none)	1-11
A	JP 2005-77016 A (Daikin Industries, Ltd.), 24 March, 2005 (24.03.05), Fig. 4 (Family: none)	1-11

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

* Special categories of cited documents:
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21 November, 2006 (21.11.06)	28 November, 2006 (28.11.06)
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