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(72) Inventors:
• **TAKEUCHI, Yuto**
Tokyo 100-8310 (JP)
• **YONEHARA, Kentaro**
Tokyo 100-8310 (JP)
• **ITO, Kazuho**
Tokyo 100-8310 (JP)

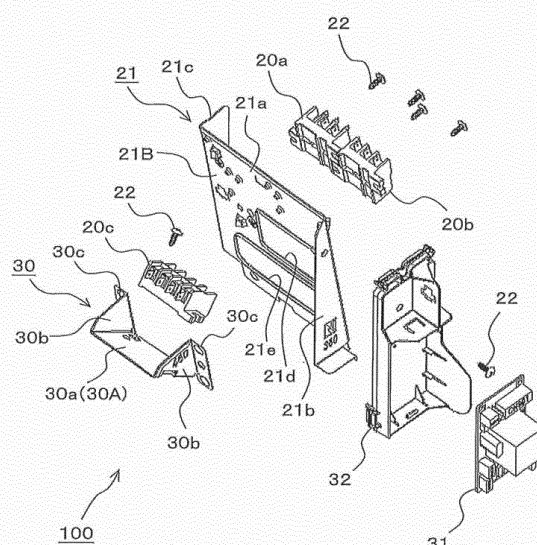
(71) Applicant: **Mitsubishi Electric Corporation**
Tokyo 100-8310 (JP)

(74) Representative: **Pfenning, Meinig & Partner mbB**
Patent- und Rechtsanwälte
Joachimsthaler Straße 10-12
10719 Berlin (DE)

(54) **OUTDOOR UNIT**

(57) An outdoor unit according to the present invention includes a first terminal block and a second terminal block that are arranged in a vertical direction. The outdoor unit also includes a terminal block securing device that includes a first terminal block securing plate to which the first terminal block is attached and a second terminal block securing plate to which the second terminal block is attached. The terminal block securing device has a first securing surface of the first terminal block securing plate to which the first terminal block is secured and a second securing surface of the second terminal block securing plate to which the second terminal block is secured. The first securing surface and the second securing surface are set at different angles.

FIG. 7



Description

Technical Field

[0001] The present invention relates to a terminal block securing device of an outdoor unit.

Background Art

[0002] In a related-art outdoor unit of an air-conditioning apparatus, components such as a compressor, a heat exchanger, and fan are housed in a housing. In this outdoor unit, the fan is driven to supply outside air to the heat exchanger and the compressor is operated to circulate refrigerant of a refrigeration cycle. A power source for operating the compressor, the fan, and so forth is supplied to a terminal block of the outdoor unit or an indoor unit through power wiring from the outside. Furthermore, the outdoor unit and the indoor unit are connected to each other through signal wiring for control and connection wiring for the power, and these types of wiring are also connected to the terminal block (see, for example, Patent Literature 1).

Citation List

Patent Literature

[0003] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2003-294272

Summary of Invention

Technical Problem

[0004] In such a related-art outdoor unit, a plurality of terminal blocks are arranged on a flat plate-shaped terminal block securing plate. Accordingly, when the number of indoor units connected to the outdoor unit is increased or external signals (for example, demand signals of a power usage amount monitoring board or control signals of a home energy management system (HEMS) or the like) are connected as extended functions, the number of terminal blocks two-dimensionally increases.

[0005] When the number of terminal blocks two-dimensionally increases on the terminal block securing plate, various types of wiring are connected to the terminal blocks while being superposed on one another. This arises a problem in that the wiring becomes complex, and accordingly, work efficiency is degraded. Furthermore, the dimension of the terminal block securing plate in the horizontal direction varies depending on the number of terminal blocks. This also arises a problem in that components of the outdoor unit including the housing of the outdoor unit cannot be standardized.

[0006] The present invention has been made in view of the above-described problems. An object of the present invention is to improve work efficiency by pre-

venting wiring from becoming complex during connection of various types of wiring to a plurality of terminal blocks and to standardize components of an outdoor unit by fixing the dimension of a terminal block securing plate in the horizontal direction. Solution to Problem

[0007] An outdoor unit according to the present invention includes a first terminal block and a second terminal block that are arranged in a vertical direction. The outdoor unit also includes a terminal block securing device that includes a first terminal block securing plate to which the first terminal block is attached and a second terminal block securing plate to which the second terminal block is attached. The terminal block securing device has a first securing surface of the first terminal block securing plate to which the first terminal block is secured and a second securing surface of the second terminal block securing plate to which the second terminal block is secured. The first securing surface and the second securing surface are set at different angles.

Advantageous Effects of Invention

[0008] With the outdoor unit according to the present invention, work efficiency is improved by decreasing the likelihood of the wiring becoming complex during connection of various types of wiring to the plurality of terminal blocks, and the components of the outdoor unit can be standardized.

Brief Description of Drawings

[0009]

[[Fig. 1] Fig. 1 is a perspective view of an outdoor unit according to Embodiment 1.

[Fig. 2] Fig. 2 is a side view of the outdoor unit according to Embodiment 1.

[Fig. 3] Fig. 3 is an exploded perspective view of the outdoor unit according to Embodiment 1.

[Fig. 4] Fig. 4 is a perspective view of a controller unit of the outdoor unit according to Embodiment 1.

[Fig. 5] Fig. 5 is a perspective view of the controller unit of the outdoor unit according to Embodiment 1 when seen at a different angle from an angle at which the controller unit is seen in Fig. 4.

[Fig. 6] Fig. 6 is an exploded perspective view of the controller unit of the outdoor unit according to Embodiment 1.

[Fig. 7] Fig. 7 is an exploded perspective view of a terminal block securing device of the outdoor unit according to Embodiment 1.

[Fig. 8] Fig. 8 is a perspective view of a second terminal block securing plate of the outdoor unit according to Embodiment 1.

[Fig. 9] Fig. 9 is a front view of the terminal block securing device of the outdoor unit according to Embodiment 1.

[Fig. 10] Fig. 10 is a rear view of the terminal block

securing device of the outdoor unit according to Embodiment 1.

[Fig. 11] Fig. 11 is a view of an A-A section of the terminal block securing device of the outdoor unit according to Embodiment 1.

[Fig. 12] Fig. 12 is a perspective view of the second terminal block securing plate of the outdoor unit according to Embodiment 1.

[Fig. 13] Fig. 13 is a sectional view of the second terminal block securing plate of the outdoor unit according to Embodiment 1.

Description of Embodiments

[0010] An outdoor unit of an air-conditioning apparatus according to the present invention will be described below with reference to the drawings.

[0011] The configuration of the outdoor unit described below is only an example. The outdoor unit according to the present invention is not limited to such a configuration. Also, in each of the drawings, the same or similar elements are denoted by the same reference signs or denoting such elements with signs is omitted. Furthermore, illustration of detailed structures is simplified or omitted where appropriate. Furthermore, duplicated or similar description is simplified or omitted where appropriate.

Embodiment 1

[0012] An outdoor unit according to Embodiment 1 is described with reference to Figs. 1 to 13.

<Configuration of the Outdoor Unit>

[0013] Fig. 1 is a perspective view of the outdoor unit according to Embodiment 1.

[0014] Fig. 2 is a side view of the outdoor unit according to Embodiment 1.

[0015] Fig. 3 is an exploded perspective view of the outdoor unit according to Embodiment 1.

[0016] As illustrated in Fig. 1, a housing 1 of the outdoor unit is formed of sheet metal and has a substantially rectangular parallelepiped shape.

[0017] Roughly, the housing 1 includes a top panel 1a, a front panel 1b, a rear panel 1c, a side panel 1d, and a bottom plate 1e.

[0018] A grille 2 functioning as an air outlet is attached to the front panel 1b. Furthermore, a service cover 3 that houses terminal blocks and so forth therein is attached to the side panel 1d. A louver 3a through which outside air is introduced into the housing 1 is formed in the service cover 3. Furthermore, a valve cover 4 is attached to a lower portion of the side panel 1d.

[0019] As illustrated in Fig. 2, a wiring opening 1f that allows access to the terminal blocks and so forth disposed inside the outdoor unit is formed in the side panel 1d of the outdoor unit according to Embodiment 1.

[0020] A first main terminal block 20a and a second main terminal block 20b which are secured to a first terminal block securing plate 21 are visible in the wiring opening 1f in side view of the housing 1. Furthermore, a terminal block opening 21d in which a sub-terminal block 20c is disposed and an air opening 21e through which the outside air having passed through the louver 3a of the service cover 3 passes are formed in the first terminal block securing plate 21.

[0021] As illustrated in Fig. 3, an inner structure of the outdoor unit according to Embodiment 1 is separated by a separator 5 into a fan chamber A and a machine chamber B. Furthermore, components inside the outdoor unit are disposed on the bottom plate 1e having legs.

[0022] A fan 6, a heat exchanger 7, and so forth are disposed in the fan chamber A. Furthermore, a compressor 8, refrigerant pipes, a controller unit 9, and so forth are disposed in the machine chamber B.

<Configuration of the Controller Unit>

[0023] Fig. 4 is a perspective view of the controller unit of the outdoor unit according to Embodiment 1.

[0024] Fig. 5 is a perspective view of the controller unit of the outdoor unit according to Embodiment 1 when seen at a different angle from an angle at which the controller unit is seen in Fig. 4.

[0025] Fig. 6 is an exploded perspective view of the controller unit of the outdoor unit according to Embodiment 1.

[0026] Roughly, as illustrated in Figs. 4 to 6, the controller unit 9 of the outdoor unit includes an electrical component support 14 that supports a control board 10 (corresponding to a first control board of the present invention) and the first terminal block securing plate 21 to which the terminal blocks are attached. When the air-conditioning apparatus is operated, the controller unit 9 performs computation in accordance with input values from a variety of sensors of a refrigeration cycle apparatus and a variety of setting values to perform capacity control on the compressor 8, fan 6, and so forth. The control board 10 includes circuits such as an inverter circuit.

[0027] The electrical component support 14 is formed of sheet metal and, as illustrated in Fig. 6, includes an L-shaped structural surface 14a having a substantially L-shape in section. The electrical component support 14 also includes a bottom plate surface 14b formed on one end side of the L-shaped structural surface 14a.

[0028] A radiator unit 12 that cools heat generating components of the control board 10 is attached to the electrical component support 14 with a radiator-unit support 13 interposed therebetween. The radiator unit 12 is, for example, a heat sink that includes fins formed of aluminum. Furthermore, a radiator-unit protecting member 15 that protects the radiator unit 12 is attached to the electrical component support 14 from the fan chamber A side to cover the radiator unit 12. The radiator-unit protecting member 15 has a duct shape having a flow path

to allow the air that cools the radiator unit 12 to flow there-through.

[0029] A first opening 14c having a rectangular shape is formed in the electrical component support 14. The radiator unit 12 is inserted into the first opening 14c. Furthermore, a second opening 14d is formed adjacent to the first opening 14c. The cooling air having cooled the control board 10 flows into the fan chamber A through the second opening 14d.

[0030] The control board 10 is attached to the electrical component support 14 with a flat-shaped board support member 11 interposed therebetween. At this time, electrical components generating large amount of heat disposed on the control board 10 are thermally coupled to the radiator unit 12.

[0031] As illustrated in Figs. 4 and 5, the first terminal block securing plate 21 stands erect on the bottom plate surface 14b of the electrical component support 14. The first main terminal block 20a and the second main terminal block 20b attached to the first terminal block securing plate 21 are connected to the control board 10 through first wiring 16. Furthermore, as has been described, the terminal block opening 21d in which the sub-terminal block 20c is disposed and the air opening 21e through which the outside air having passed through the louver 3a of the service cover 3 passes are formed in the first terminal block securing plate 21. Furthermore, as illustrated in Fig. 4, an extended board support member 32 is disposed beside the first terminal block securing plate 21. The extended board support member 32 supports an extended function control board 31, which will be described later.

[0032] The outside air having flowed into the housing 1 through the louver 3a of the service cover 3 passes through the air opening 21e of the first terminal block securing plate 21 and cools the control board 10 and the extended function control board 31. After that, this air flows into the fan chamber A through the second opening 14d of the electrical component support 14 and is discharged to the outside of the housing 1 by the fan 6.

<Structure of a Terminal Block Securing Device>

[0033] Fig. 7 is an exploded perspective view of a terminal block securing device of the outdoor unit according to Embodiment 1.

[0034] Fig. 8 is a perspective view of a second terminal block securing plate of the outdoor unit according to Embodiment 1.

[0035] Fig. 9 is a front view of the terminal block securing device of the outdoor unit according to Embodiment 1.

[0036] Fig. 10 is a rear view of the terminal block securing device of the outdoor unit according to Embodiment 1.

[0037] Fig. 11 is a view of an A-A section of the terminal block securing device of the outdoor unit according to Embodiment 1.

[0038] A terminal block securing device 100 includes the first terminal block securing plate 21 and a second terminal block securing plate 30 illustrated in Figs. 7 to 11.

[0039] As illustrated in Fig. 7, the first terminal block securing plate 21 includes a main plate 21a, a first rib 21b formed by being bent from the main plate 21a on one end side of the main plate 21a, and a second rib 21c formed by being bent from the main plate 21a on the other end side of the main plate 21a. The terminal block opening 21d and the air opening 21e that are rectangular through holes are formed in the main plate 21a.

[0040] As illustrated in Fig. 7, the first main terminal block 20a (corresponding to a first terminal block of the present invention) and the second main terminal block 20b (corresponding to a first terminal block of the present invention) are attached to the main plate 21a of the first terminal block securing plate 21 by screws 22 or the like such that the first main terminal block 20a and the second main terminal block 20b are arranged in the horizontal direction. At this time, a surface of the main plate 21a where the first main terminal block 20a and the second main terminal block 20b are attached is defined as a front surface 21A (corresponding to a first securing surface of the present invention). Furthermore, a surface of the main plate 21a on the opposite side to the front surface 21A is defined as a rear surface 21B.

[0041] The second terminal block securing plate 30 to which the sub-terminal block 20c is secured is secured to the rear surface 21B of the main plate 21a to cover the terminal block opening 21d of the first terminal block securing plate 21.

[0042] At this time, as illustrated in Fig. 9, the following elements are arranged on or in the first terminal block securing plate 21 in the following order from the upper side in the vertical direction: the first main terminal block 20a and the second main terminal block 20b; the terminal block opening 21d; and the air opening 21e.

[0043] As illustrated in Fig. 8, the second terminal block securing plate 30 includes an inclined plate 30a to which the sub-terminal block 20c (corresponding to a second terminal block of the present invention) is secured, substantially triangular support plates 30b formed at both end portions of the inclined plate 30a, and attachment piece portions 30c formed by being bent from the support plates 30b.

[0044] The inclined plate 30a includes a front surface 30A (corresponding to a second securing surface of the present invention) to which the sub-terminal block 20c is attached and a rear surface 30B being a surface on the opposite side to the front surface 30A.

[0045] The front surface 30A and the attachment piece portions 30c of the inclined plate 30a are formed to form different angles (for example, 45 degrees). An attachment holes 30e for attachment of the sub-terminal block 20c are formed in bent portions at boundaries between the inclined plate 30a and the support plates 30b. Furthermore, positioning projections 30f are formed at two positions on the inclined plate 30a. The positioning pro-

jections 30f facilitate positioning when attaching the sub-terminal block 20c.

[0046] The attachment piece portions 30c of the second terminal block securing plate 30 are, as illustrated in Fig. 10, secured to the rear surface 21B of the first terminal block securing plate 21 by, for example, spot welding 30d along two sides of the terminal block opening 21d facing each other.

[0047] As illustrated in Fig. 11, the front surface 30A of the inclined plate 30a of the second terminal block securing plate 30 is formed at a different angle from an angle of the front surface 21A of the main plate 21a of the first terminal block securing plate 21. For example, the front surface 30A of the inclined plate 30a is inclined relative to the front surface 21A of the main plate 21a by 45 degrees.

[0048] Accordingly, as illustrated in Fig. 11, the inclined plate 30a of the second terminal block securing plate 30 is attached on the rear surface 21B side of the main plate 21a of the first terminal block securing plate 21 such that the inclined plate 30a is inclined relative to the main plate 21a and extends toward a diagonally upper direction. At this time, at an upper portion of the terminal block opening 21d of the first terminal block securing plate 21, an opening 40 is formed between the inclined plate 30a of the second terminal block securing plate 30 and peripheral portion 21f of the terminal block opening 21d.

[0049] When the first main terminal block 20a, the second main terminal block 20b, and the sub-terminal block 20c are attached to such a first terminal block securing plate 21 and a second terminal block securing plate 30, the first main terminal block 20a and the second main terminal block 20b attached to the front surface 21A of the main plate 21a of the first terminal block securing plate 21 and the sub-terminal block 20c attached to the front surface 30A of the inclined plate 30a of the second terminal block securing plate 30 are attached such that the first main terminal block 20a and the second main terminal block 20b form a different angle (for example, 45 degrees) from the angle of the sub-terminal block 20c.

[0050] When seen from the front surface 21A side of the first terminal block securing plate 21, at least a part of the sub-terminal block 20c is visible in the terminal block opening 21d as illustrated in Fig. 9.

[0051] Furthermore, as illustrated in Fig. 7, the extended board support member 32 is disposed on the first rib 21b side of the first terminal block securing plate 21. The extended board support member 32 supports the extended function control board 31 (corresponding to a second control board of the present invention). The extended board support member 32 stands erect on the bottom plate surface 14b of the electrical component support 14. The extended function control board 31 is attached to the extended board support member 32 by the screws 22 or the like. The extended function control board 31 and the sub-terminal block 20c are connected to each other through second wiring 33.

[0052] Although the first terminal block securing plate

21 and the second terminal block securing plate 30 are separate plates secured to each other by the screws in the above-described structure, a tongue-shaped portion may be cut and raised from the terminal block opening 21d of the first terminal block securing plate 21 so as to obtain the first terminal block securing plate 21 having an integral structure.

<Structure of the Terminal Blocks>

[0053] Each of the first main terminal block 20a, the second main terminal block 20b, and the sub-terminal block 20c includes board connection terminals 20y and external connection portions 20z. Wiring is connected to the control board 10 and the extended function control board 31 through the board connection terminals 20y. Wiring is connected to an external power source and an external device through the external connection portions 20z. The first wiring 16 and the second wiring 33 are connected to the board connection terminals 20y through connectors. Furthermore, power source wiring and external signal wiring are connected to the external connection portions 20z.

[0054] Although the functions of each terminal block are not particularly limited, for example, the first main terminal block 20a connects a three-phase power source for operation of the outdoor unit from the outside. Furthermore, the second main terminal block 20b connects the outdoor unit and the indoor unit to each other for supplying the power source to the indoor unit and connects signal wiring for control. Furthermore, the sub-terminal block 20c is for connecting external signals of external devices (for example, demand signals of a power usage amount monitoring board or control signals of a home energy management system (HEMS) or the like) as extended functions.

<Attachment of the Sub-Terminal Block>

[0055] Next, a procedure for attaching the sub-terminal block 20c to the second terminal block securing plate 30 is described with reference to Figs. 12 and 13.

[0056] Fig. 12 is a perspective view of the second terminal block securing plate of the outdoor unit according to Embodiment 1.

[0057] Fig. 13 is a sectional view of the second terminal block securing plate of the outdoor unit according to Embodiment 1.

[0058] The sub-terminal block 20c includes a pair of attachment pieces 20d at both end portions of the sub-terminal block 20c facing each other. Each of the attachment pieces 20d has a U-shaped cut at the center of the attachment piece 20d to allow a screw to secure the attachment piece 20d.

[0059] To attach the sub-terminal block 20c to the second terminal block securing plate 30, one of the attachment pieces 20d is inserted into an attachment hole 30e of the second terminal block securing plate 30. Next, one

of a screw 22 is inserted into the U-shaped cut of the other attachment piece 20d to secure the sub-terminal block 20c to the second terminal block securing plate 30 as illustrated in Fig. 12.

[0060] At this time, the sections of the second terminal block securing plate 30 and the sub-terminal block 20c are in a state as illustrated in Fig. 13. A driver pit 50 for rotation of the screw 22 is formed to allow work to be performed with a clearance 50a left from the peripheral portion 21f of the terminal block opening 21d of the first terminal block securing plate 21.

[0061] Furthermore, angles of the terminal block opening 21d of the first terminal block securing plate 21 and the inclined plate 30a of the second terminal block securing plate 30 are adjusted to reliably obtain visibility of a terminal block identification label 20e pasted on the sub-terminal block 20c when the sub-terminal block 20c has been attached to the second terminal block securing plate 30.

[0062] Furthermore, the peripheral portion 21f of the terminal block opening 21d of the first terminal block securing plate 21 is hemmed or bent to avoid damage to the wiring connected to the sub-terminal block 20c.

[0063] Likewise, end portions 30g of the inclined plate 30a of the second terminal block securing plate 30 are also hemmed or bent.

< Effects >

[0064] The outdoor unit according to Embodiment 1 is as follows.

(1) That is, the outdoor unit includes a first terminal block (corresponding to the first main terminal block 20a and the second main terminal block 20b) and a second terminal block (corresponding to the sub-terminal block 20c) that are arranged in a vertical direction. The outdoor unit also includes the terminal block securing device 100 that includes the first terminal block securing plate 21 to which the first terminal block is attached and the second terminal block securing plate 30 to which the second terminal block is attached. The terminal block securing device 100 has a first securing surface (corresponding to the front surface 21A of the main plate 21a) of the first terminal block securing plate 21 to which the first terminal block is secured and a second securing surface (corresponding to the front surface 30A of the inclined plate 30a) of the second terminal block securing plate 30 to which the second terminal block is secured. The first securing surface and the second securing surface are set at different angles. With the above-described structure, during connection of various types of wiring to the plurality of terminal blocks, superposition of the various types of wiring in a planar direction of the terminal block securing plate is eliminated. Thus, the wiring is not becoming complex, and accordingly, work efficiency is

increased.

Furthermore, the dimension of the first terminal block securing plate 21 is fixed in the horizontal direction by arranging the terminal blocks in the vertical direction. This allows components of the outdoor unit to be standardized.

Furthermore, the outdoor unit according to Embodiment 1 is as follows. That is, in the outdoor unit described above in (1),

(2) the second terminal block securing plate 30 is formed on a rear surface of the first securing surface. With this structure, the wiring connected to the first terminal block (corresponding to the first main terminal block 20a and the second main terminal block 20b) is not two-dimensionally superposed on the wiring connected to the second terminal block (corresponding to the sub-terminal block 20c). Thus, the wiring is not becoming complex, and accordingly, work efficiency is improved.

Furthermore, the outdoor unit according to Embodiment 1 is as follows. That is, in the outdoor unit described above in (1) or (2),

(3) the terminal block opening 21d is formed in the first terminal block securing plate 21. The second terminal block securing plate 30 is disposed such that at least a part of the second terminal block is positioned in the terminal block opening 21d when seen in a direction perpendicular to the first securing surface.

With this structure, during connection of the wiring to the second terminal block from the outside, this wiring is inserted through the terminal block opening 21d. This eliminates two-dimensional superposition of the wiring connected to the first terminal block on the wiring connected to the second terminal block. Thus, the wiring is not becoming complex, and accordingly, work efficiency is improved.

Furthermore, the outdoor unit according to Embodiment 1 is as follows. That is, in the outdoor unit described above in (1) to (3),

(4) the second securing surface is set such that a lower end side of the second securing surface is closer to the first securing surface than an upper end side of the second securing surface.

With this structure, the first securing surface and the second securing surface form an angle therebetween such that the distance between the first securing surface and the second securing surface increases toward the upper side. Accordingly, wiring from the first terminal block and wiring from the second terminal block connected to the control board 10 and the extended function control board 31 are not two-dimensionally superposed on each other. Thus, the wiring is not becoming complex, and accordingly, work efficiency is improved.

Furthermore, the outdoor unit according to Embodiment 1 is as follows. That is, in the outdoor unit described above in (1) to (4),

(5) a first control board (corresponding to the control board 10) that at least controls a compressor and a second control board (corresponding to the extended function control board 31) that communicates with an external device are included. The first terminal block is connected to the first control board through the first wiring 16, and the second terminal block is connected to the second control board through the second wiring 33.

With this structure, the wiring from the first terminal block and the wiring from the second terminal block connected to the control board 10 and the extended function control board 31 are not two-dimensionally superposed on each other. Thus, the wiring is not becoming complex, and accordingly, work efficiency is improved.

Furthermore, the outdoor unit according to Embodiment 1 is as follows. That is, in the outdoor unit described above in (5) premised on the above-described (3),

(6) the second wiring 33 is inserted through the opening 40 formed between the terminal block opening 21d and the second securing surface.

With this structure, the second wiring 33 is connected to the control board 10 and the extended function control board 31 through a different route from that of the first wiring 16. Accordingly, there is no two-dimensional superposition of the wiring. Thus, the wiring is not becoming complex, and accordingly, work efficiency is improved.

Furthermore, the outdoor unit according to Embodiment 1 is as follows. That is, in the outdoor unit described above in (3) and (4) to (6) premised on the above-described (3),

(7) the first terminal block securing plate 21 has the air opening 21e which is disposed adjacent to the terminal block opening 21d and through which air flows.

[0065] With this structure, air that cools the control board 10 and the extended function control board 31 smoothly flows into the housing 1 through the air opening 21e. Thus, cooling efficiency for the control board can be improved.

Reference Signs List

[0066] 1 housing 1a top panel 1b front panel 1c rear panel 1d side panel 1e bottom plate 1f wiring opening 2 grille 3 service cover 3a louver 4 valve cover 5 separator 6 fan 7 heat exchanger 8 compressor 9 controller unit 10 control board (corresponding to the first control board of the present invention) 11 board support member 12 radiator unit 13 radiator-unit support 14 electrical component support 14a L-shaped structural surface 14b bottom plate surface 14c first opening 14d second opening 15 radiator-unit protecting member 16 first wiring 20a first main terminal block (corresponding to the first terminal

block of the present invention) 20b second main terminal block (corresponding to the first terminal block of the present invention) 20c sub-terminal block (corresponding to the second terminal block of the present invention) 20d attachment piece 20e terminal block identification label 20y board connection terminal 20z external connection portion 21 first terminal block securing plate 21a main plate 21b first rib 21c second rib 21d terminal block opening 21e air opening 21f peripheral portion 21A front surface (corresponding to the first securing surface of the present invention) 21B rear surface 22 screw 30 second terminal block securing plate 30a inclined plate 30b support plate 30c attachment piece portion 30d spot welding 30e attachment hole 30f positioning projection 30g end portion 30A front surface (corresponding to the second securing surface of the present invention) 30B rear surface 31 extended function control board (corresponding to the second control board of the present invention) 32 extended board support member 33 second wiring 40 opening 50 driver pit 50a clearance 100 terminal block securing device A fan chamber B machine chamber.

Claims

1. An outdoor unit comprising;
 - a first terminal block and a second terminal block that are arranged in a vertical direction; and
 - a terminal block securing device that includes
 - a first terminal block securing plate to which the first terminal block is attached, and
 - a second terminal block securing plate to which the second terminal block is attached,
 wherein the terminal block securing device has
 - a first securing surface of the first terminal block securing plate to which the first terminal block is secured, and
 - a second securing surface of the second terminal block securing plate to which the second terminal block is secured, and
 wherein the first securing surface and the second securing surface are set at different angles.
2. The outdoor unit of claim 1,
 - wherein the second terminal block securing plate is formed on a rear surface of the first securing surface of the first terminal block securing plate.
3. The outdoor unit of claim 1 or 2,
 - wherein a terminal block opening is formed in the first terminal block securing plate, and
 - wherein the second terminal block securing plate is disposed such that the second terminal block is po-

sitioned in the terminal block opening when seen in a direction perpendicular to the first securing surface.

4. The outdoor unit of any one of claims 1 to 3,
wherein the second securing surface is set such that
a lower end side of the second securing surface is
closer to the first securing surface than an upper end
side of the second securing surface. 5

5. The outdoor unit of any one of claims 1 to 4, further 10
comprising:

a first control board that controls at least a com-
pressor; and
a second control board that communicates with 15
an external device,
wherein the first terminal block is connected to
the first control board through first wiring, and
the second terminal block is connected to the
second control board through second wiring. 20

6. The outdoor unit of claim 5 as dependent on claim 3,
wherein the second wiring is inserted through an
opening formed between the terminal block opening
and the second securing surface. 25

7. The outdoor unit of any one of claim 3 and claims 4
to 6 as dependent on claim 3,
wherein the first terminal block securing plate has
an air opening which is disposed adjacent to the ter- 30
minal block opening and through which air flows.

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FIG. 1

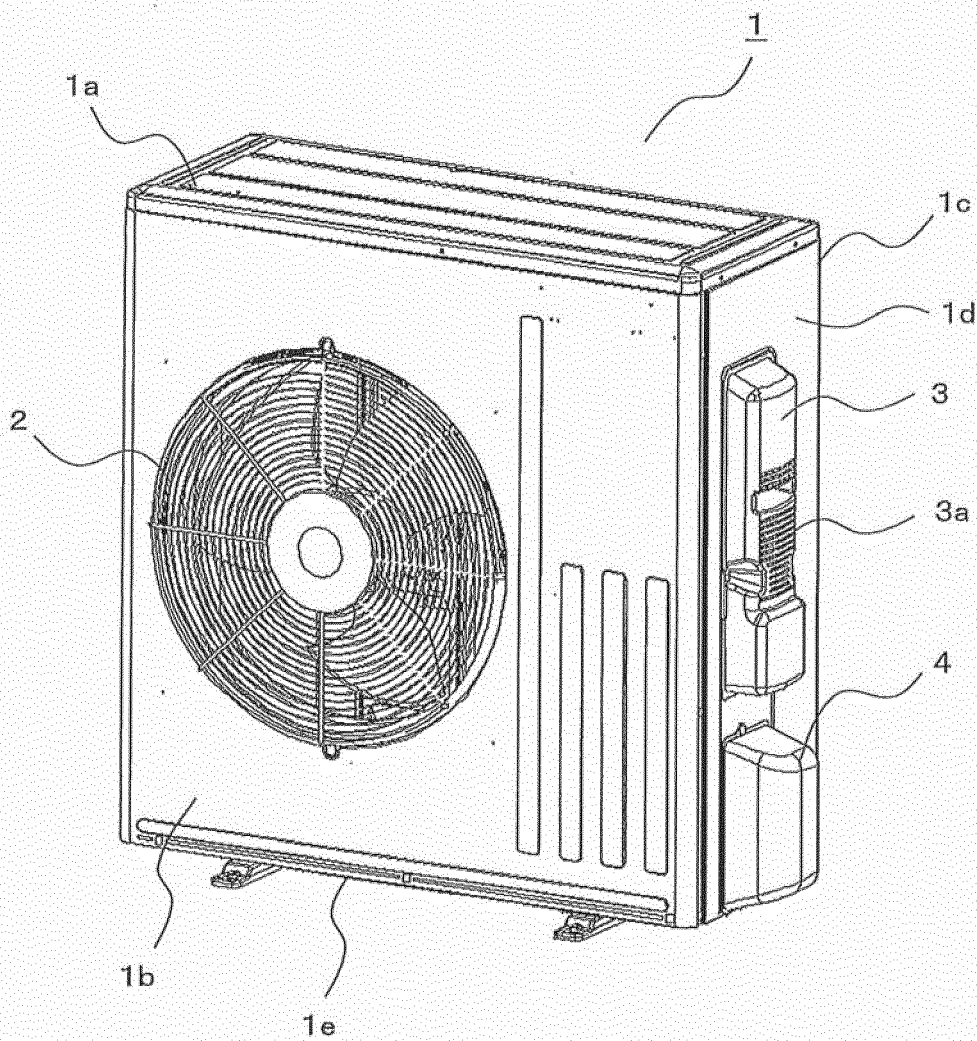


FIG. 2

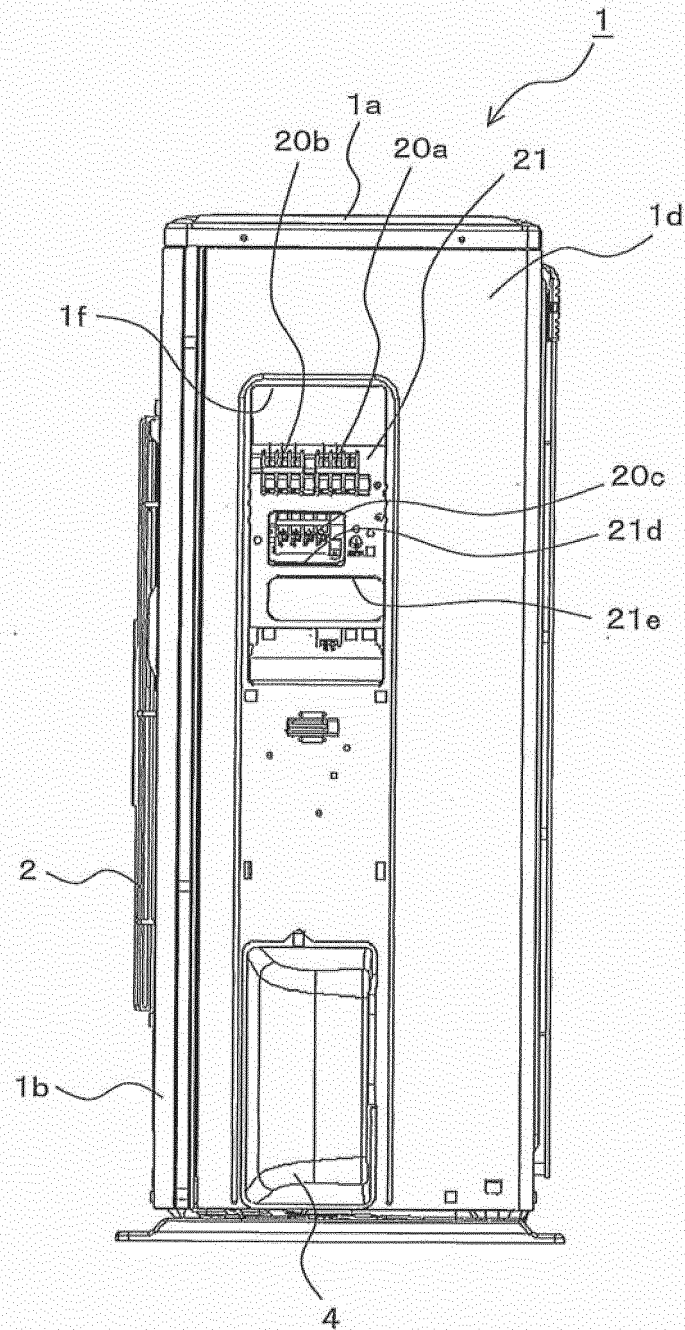


FIG. 3

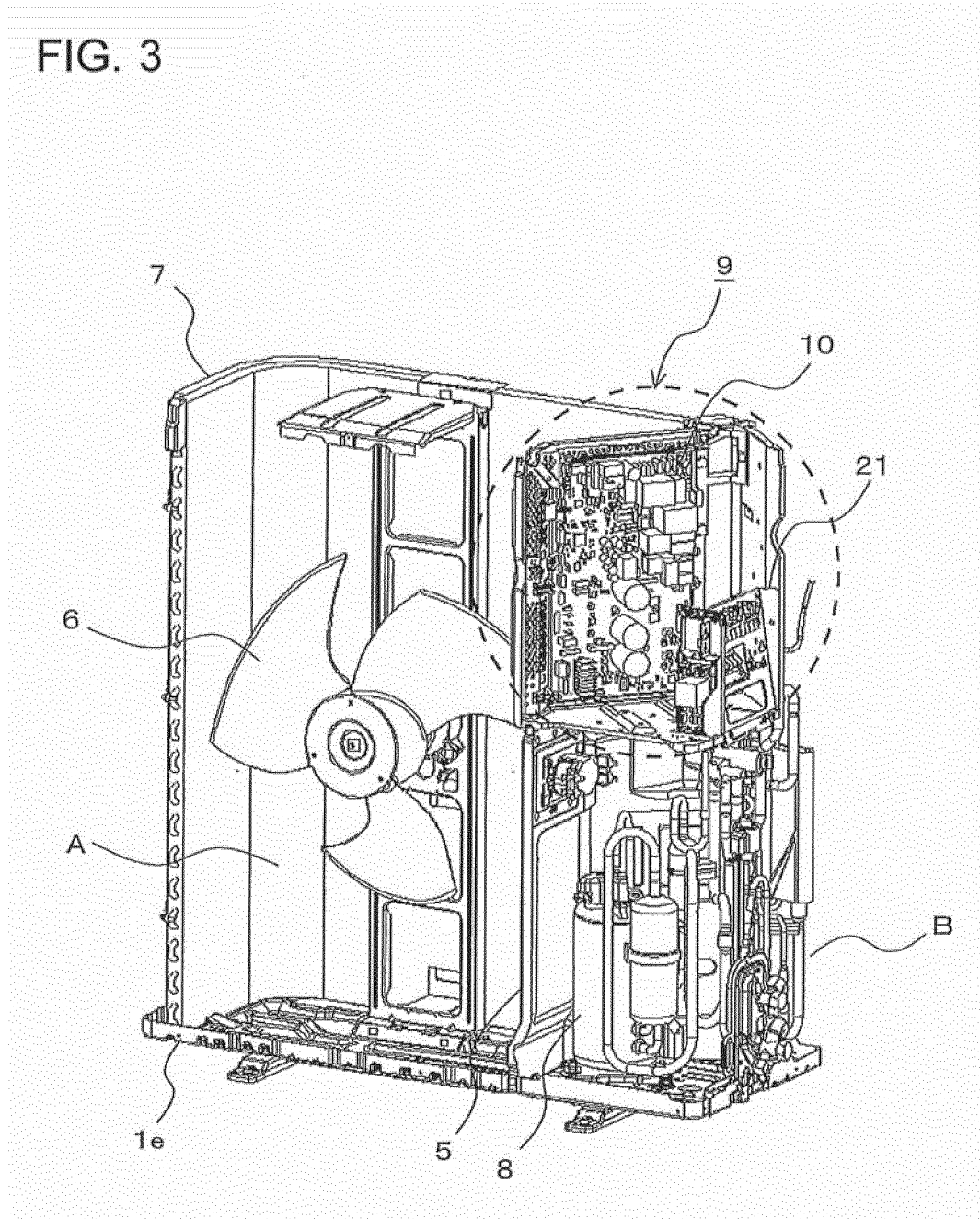


FIG. 4

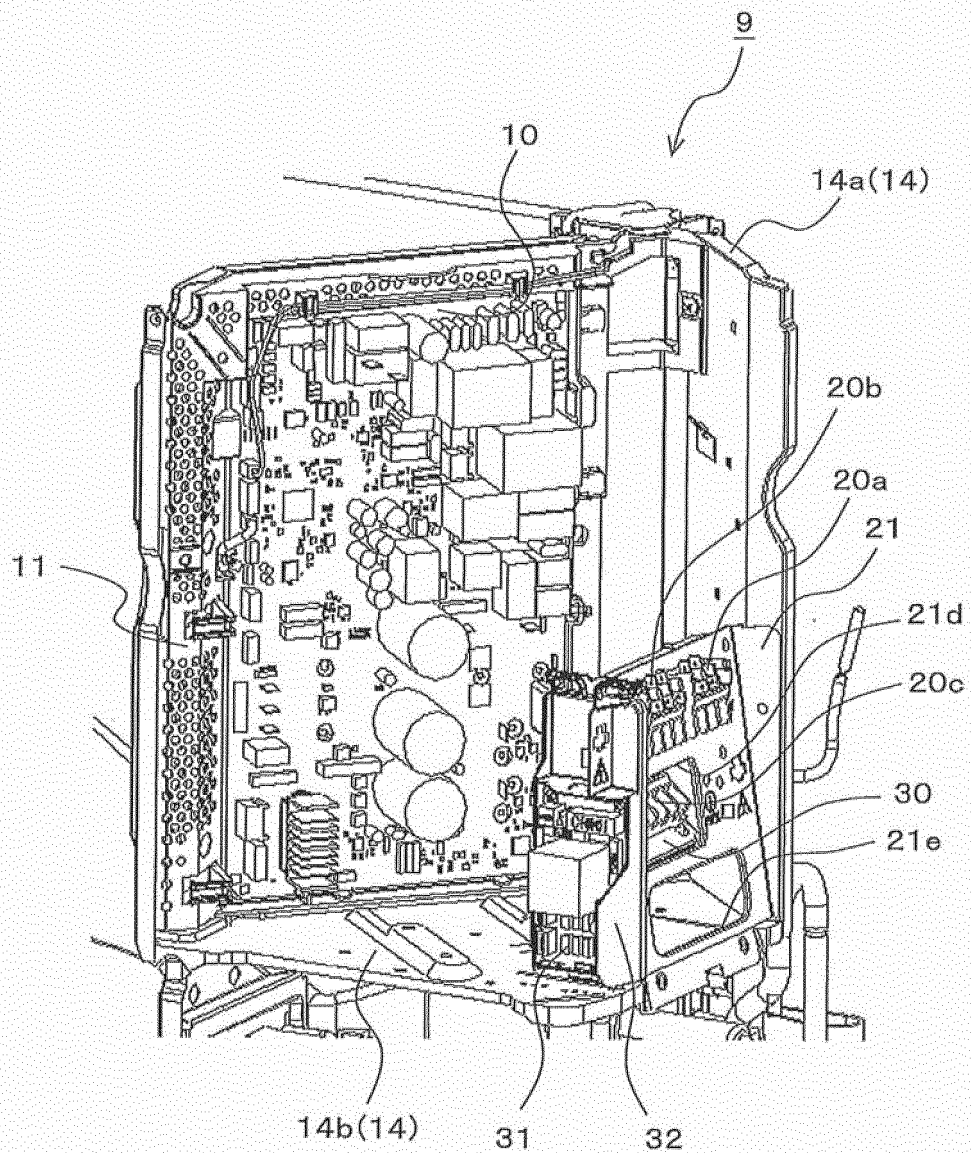


FIG. 5

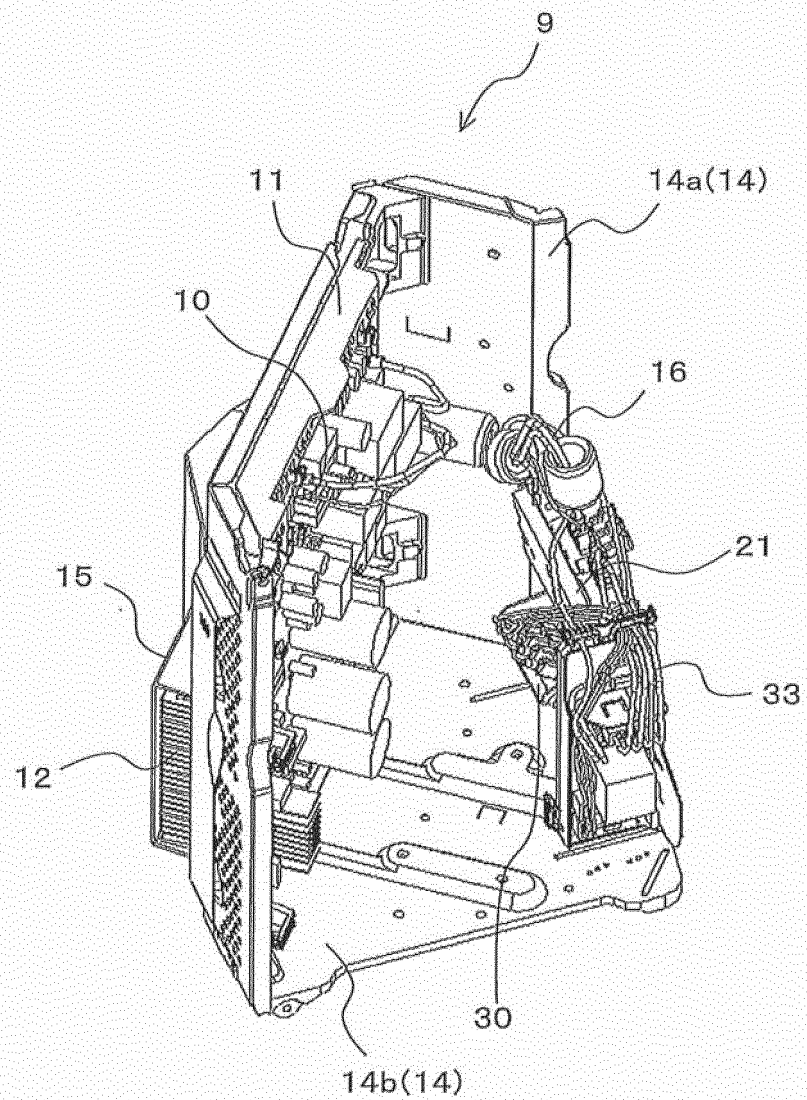


FIG. 6

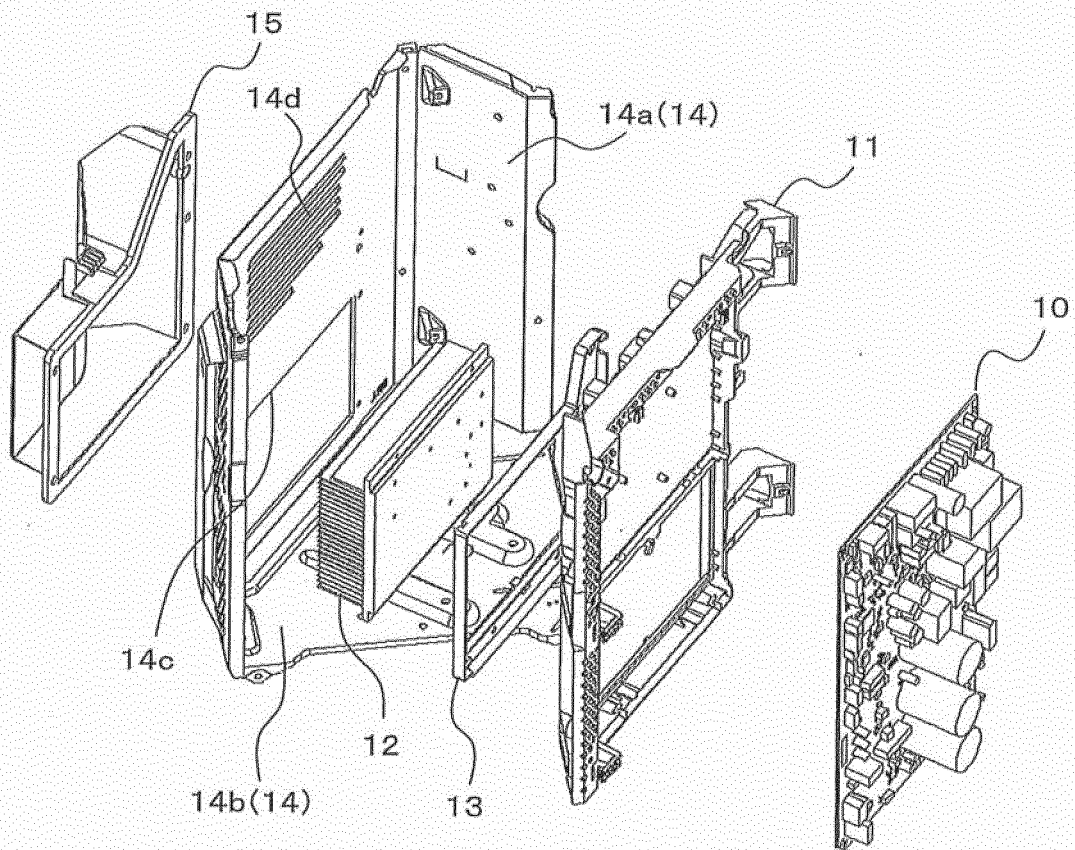


FIG. 7

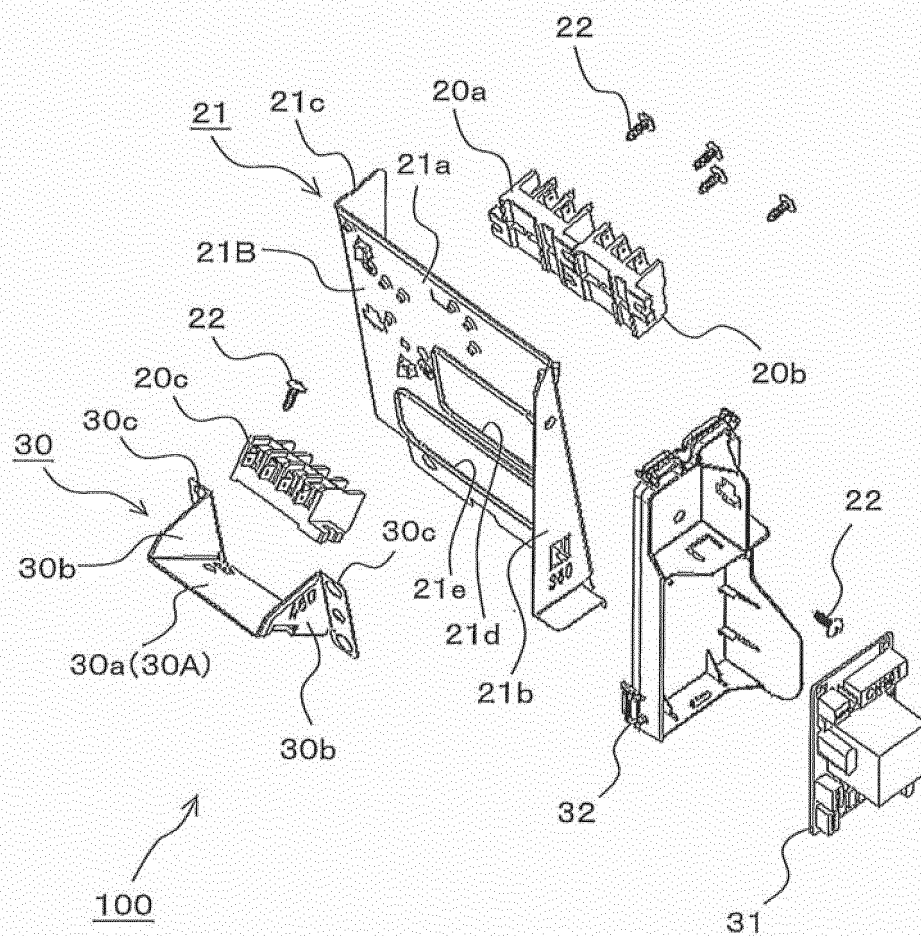


FIG. 8

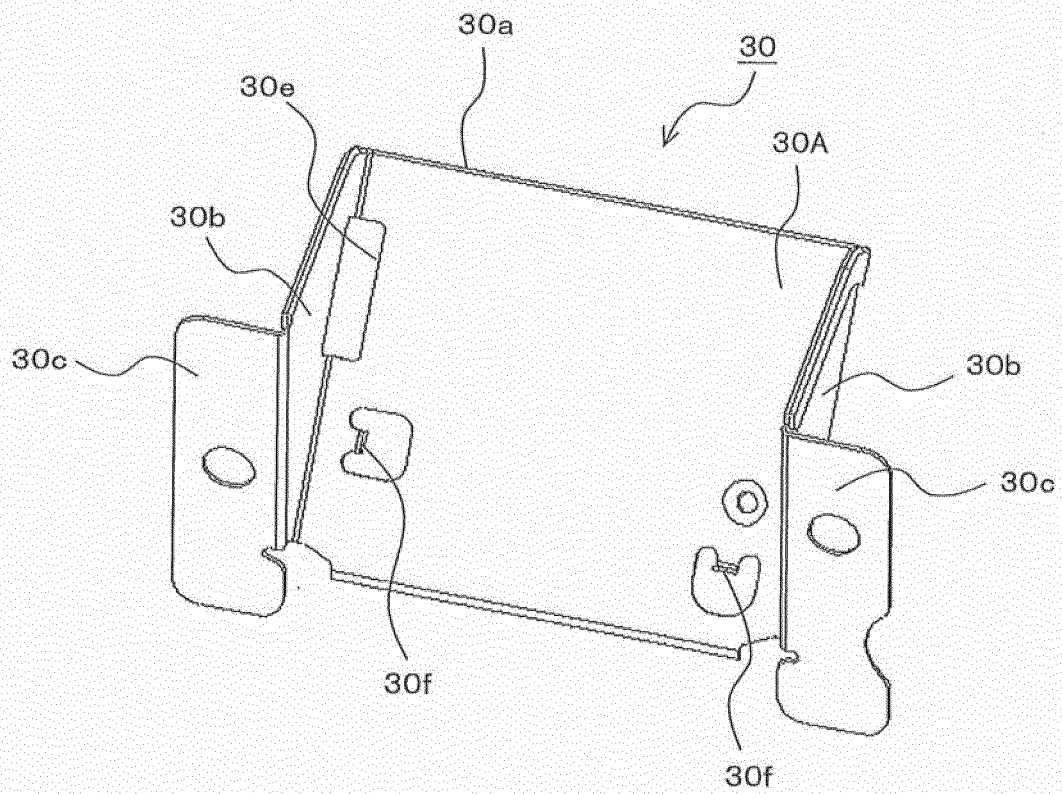


FIG. 9

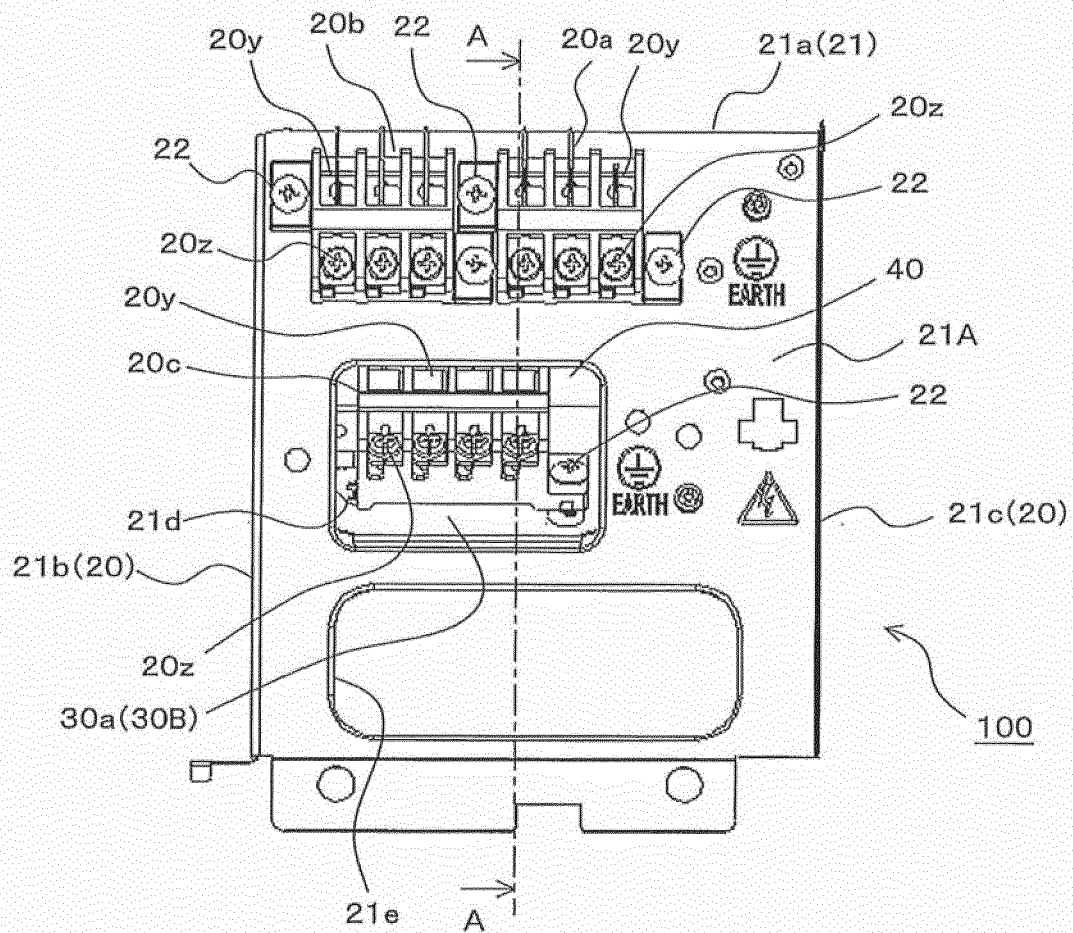


FIG. 10

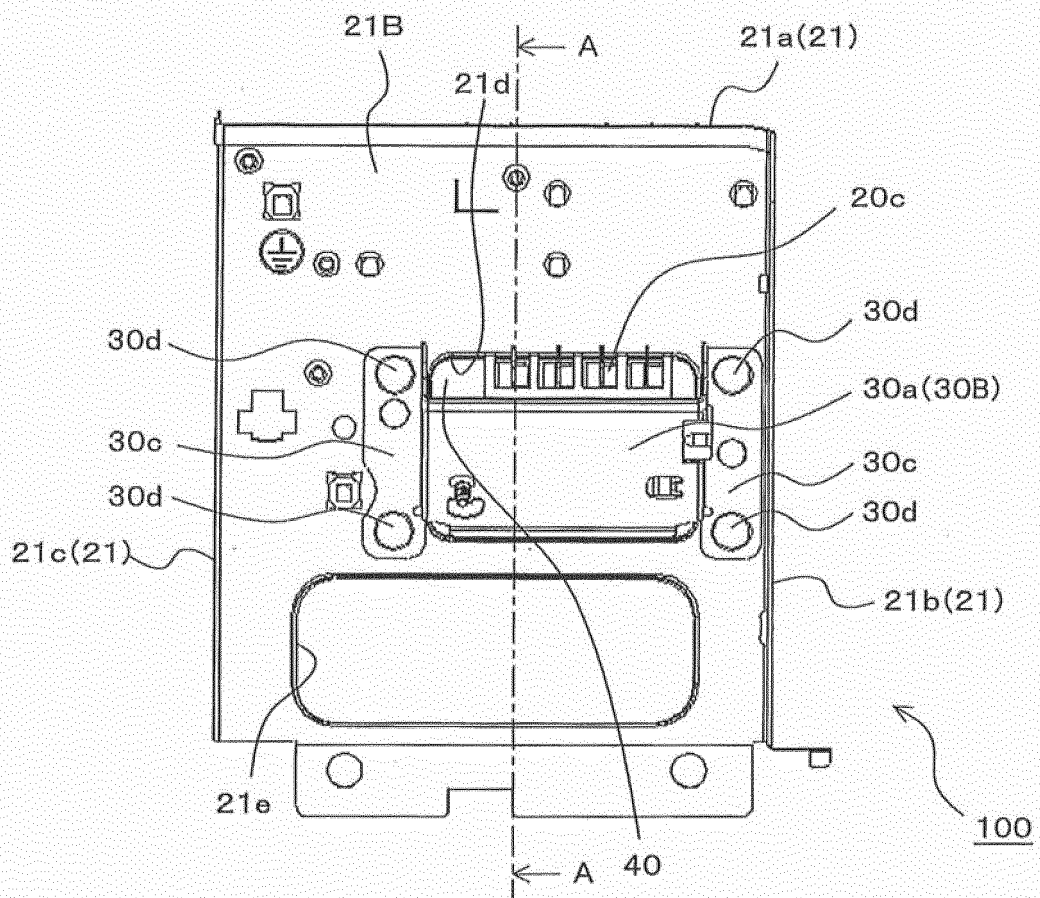


FIG. 11

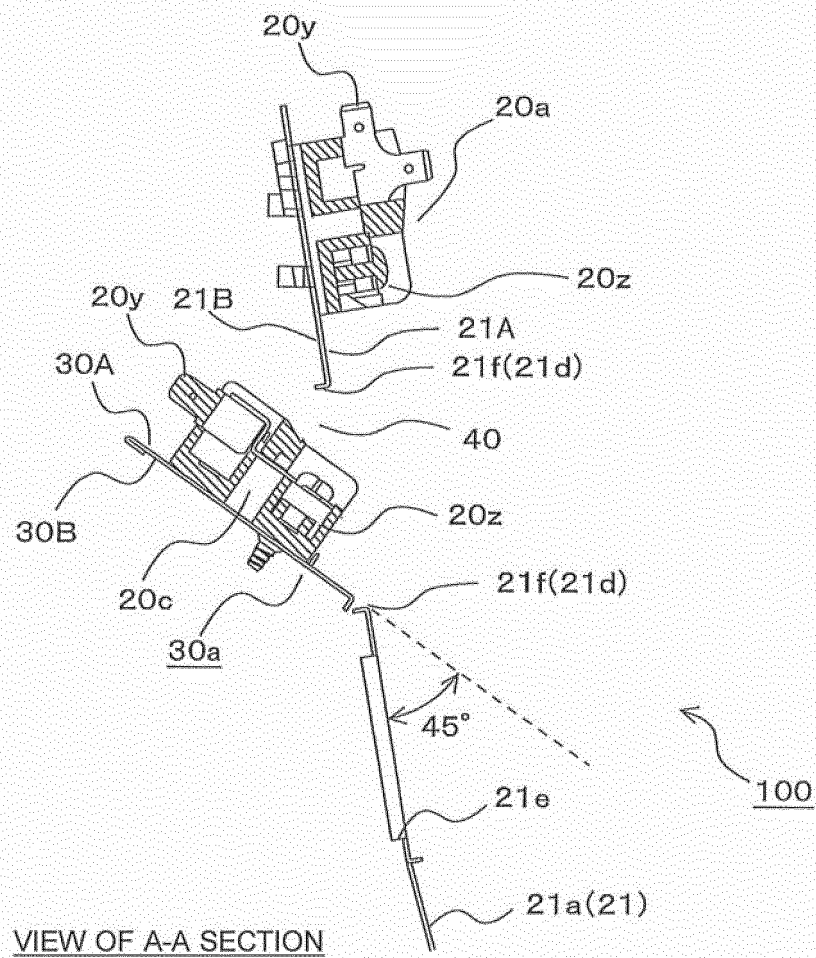


FIG. 12

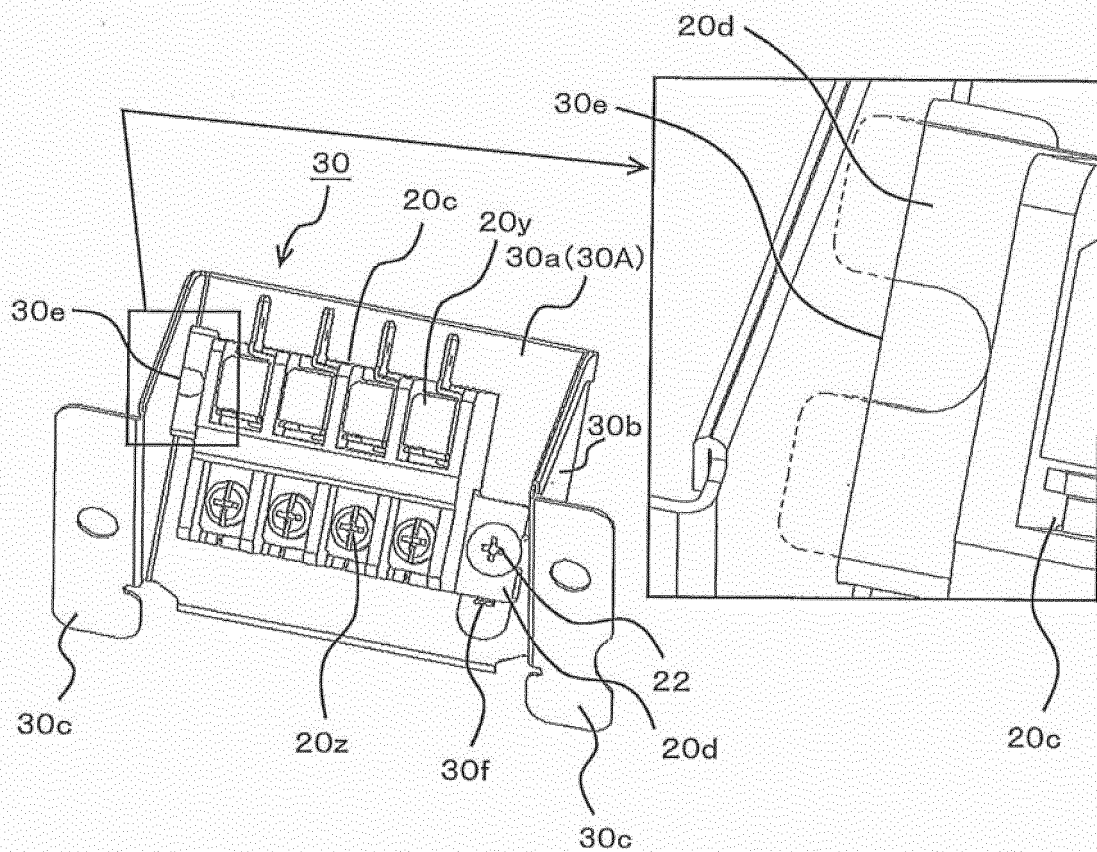
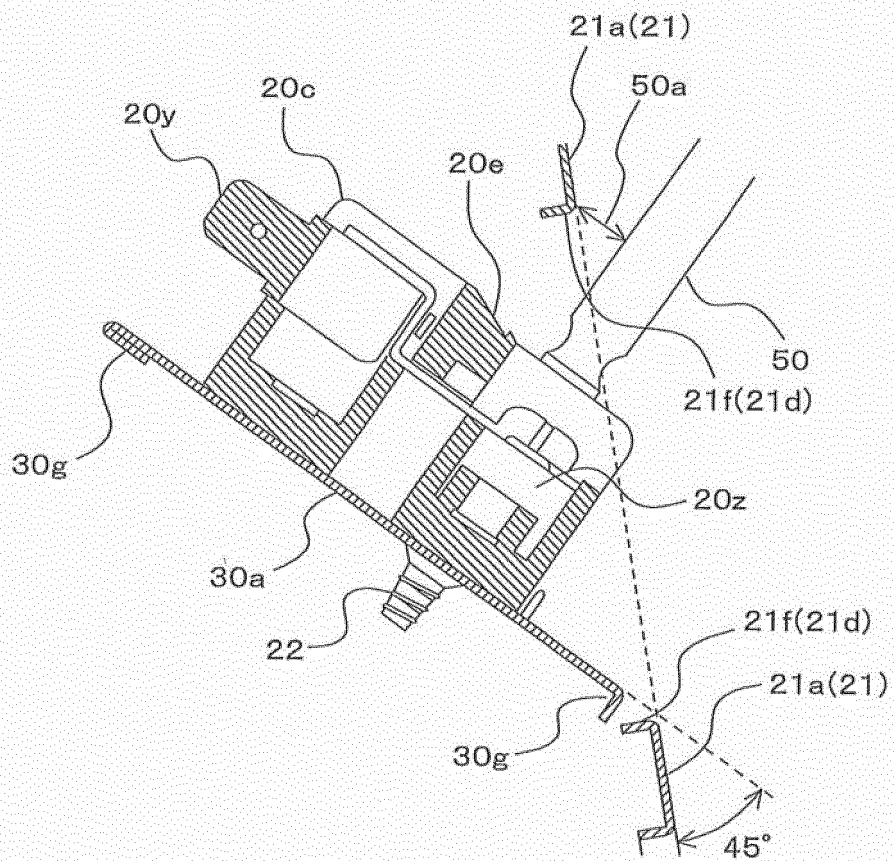


FIG. 13



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/074580

A. CLASSIFICATION OF SUBJECT MATTER

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)

F24F1/22

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.
X Y A	JP 03-125831 A (Matsushita Electric Industrial Co., Ltd.), 29 May 1991 (29.05.1991), page 1, left column, line 6 to page 2, upper left column, line 5; fig. 5 to 6 (Family: none)	1 5 2-4, 6-7
Y	JP 2009-287904 A (Fujitsu General Ltd.), 10 December 2009 (10.12.2009), paragraphs [0021], [0031], [0051]; fig. 4, 6 (Family: none)	5

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

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Date of the actual completion of the international search
06 November 2015 (06.11.15)Date of mailing of the international search report
17 November 2015 (17.11.15)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/074580

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 111527/1988 (Laid-open No. 034922/1990) (Mitsubishi Electric Corp.), 06 March 1990 (06.03.1990), entire text; all drawings (Family: none)	1-7

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2003294272 A [0003]