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(54) OUTDOOR MACHINE OF AIR CONDITIONER

(57) An outdoor unit for an air conditioner includes an outdoor unit housing an inside of which is partitioned by a partition plate, a machine chamber for housing a compressor and an electric component box disposed above the compressor, and a heat exchanger chamber for housing an outdoor heat exchanger and a blower. An option board is mounted to a lower surface portion of the electric component box.

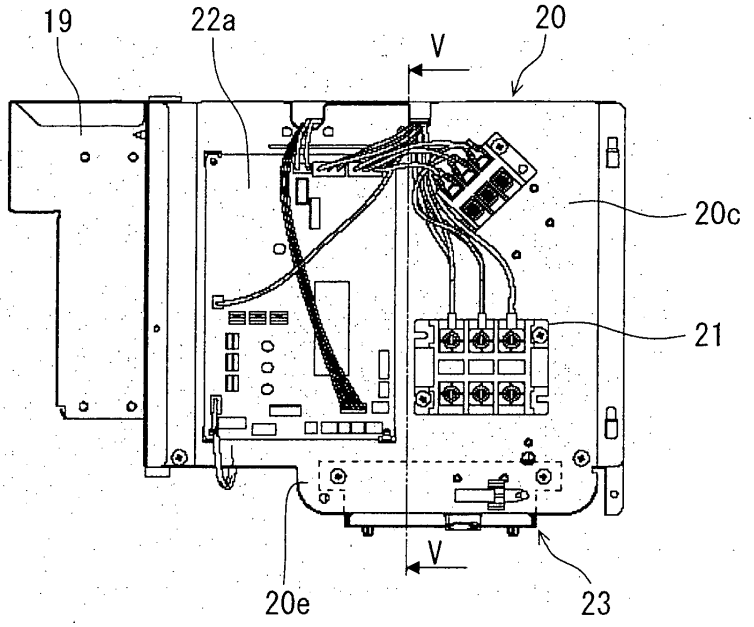

FIG. 4

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Description

Technical Field

[0001] The present invention relates to an outdoor unit for an air conditioner, and particularly, to an outdoor unit for an air conditioner in which a mounting structure of an option board is improved.

Background Art

[0002] In a conventional structure employed for an outdoor unit for an air conditioner, an inside of a housing of the outdoor unit is partitioned by using a partition plate into a compressor chamber in which a compressor and the like are disposed and a blower chamber in which a blower and an outdoor heat exchanger are disposed. A box-shaped electric component box for housing electric components such as a control board is disposed on an upper end portion of the partition plate so as to straddle the compressor chamber and the blower chamber.

[0003] It may be requested to enhance functions of this type of air conditioner after installation at a site in some cases, and an operator needs to mount an optional device for function enhancement according to the request to the electric component box of the outdoor unit for the air conditioner at the site.

[0004] For this purpose, an option board for function enhancement is mounted inside the electric component box of the outdoor unit with a conventional structure to respond to the request (see Japanese Patent Application Laid-open No. 2003-294272 (Patent Document 1)). However, with the structure described in the Patent Document 1, it is difficult to easily add or replace the option board. In addition, a space for housing the option board is al so required, which increases the electric component box in size.

[0005] Further, there is known a technology in which an option board is housed in a housing portion formed to protrude outward from a lid body of an outdoor unit housing to miniaturize the outdoor unit (see Japanese Patent Application Laid-open No. 6-2890 (Patent Document 2)). In this type of structure, it is necessary to take problems related to an appearance and a waterproof property into consideration.

Disclosure of The Invention

[0006] The present invention has been made in consideration of the above-described circumstances, and it is an object of the invention to provide an outdoor unit for an air conditioner in which addition and replacement of an option board can be easily done.

[0007] To achieve the above object, according to the present invention, there is provided an outdoor unit for an air conditioner, including:

an outdoor unit housing an inside of which is partitioned by a partition plate into two sections;
a machine chamber provided on one side in the housing partitioned by the partition plate; and
a heat exchanger chamber provided on the other side in the housing partitioned by the partition plate,

wherein an outdoor heat exchanger and a blower are housed in the heat exchanger chamber, a compressor provided on a bottom plate of the outdoor unit housing and an electric component box disposed above the compressor are housed in the machine chamber, and an option board is mounted to a lower surface portion of the electric component box.

[0008] It is preferable that an option board housing box is formed into a box by bending a sheet metal and is composed of a bottom surface on which the option board is placed, a rear surface, left and right side surfaces, and fixing chips extending from the left and right side surfaces.

[0009] Moreover, it is preferable that the option board is housed in a box which is substantially opened at side surface facing a bottom surface portion of the electric component box.

[0010] According to the outdoor unit for the air conditioner of the present invention, it is possible to provide the outdoor unit for the air conditioner in which the operations for adding and replacing the option board become easy.

[0011] Moreover, the option board housing box is provided to the lower surface portion of the outside of the electric component box. Therefore, the option board is less susceptible to heat from an outdoor control board and an inverter board, and designing is easier as compared with a case where the option board is mounted inside. Moreover, it is not necessary to consider a waterproof property of the option board housing box so much. Furthermore, the structure of the option board housing box can be simplified, and therefore, manufacturing cost can be reduced.

[0012] Moreover, since the option board housing box is mounted to the mounting chip of the electric component box, the mounting chip obstructs a view of the option board from the front, which prevents an accidental setting change of the option board.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1 is a perspective view of an outdoor unit for an air conditioner according to the present invention.
Fig. 2 is a perspective view of the outdoor unit for the air conditioner according to the present invention in a state in which a service panel is removed.
Fig. 3 is a perspective view of the outdoor unit for the air conditioner according to the present invention in a state in which a housing is removed.
Fig. 4 is a side view of an electric component box

used for the outdoor unit for the air conditioner according to the present invention.

Fig. 5 is a sectional view taken along a line V-V in Fig. 4.

Fig. 6 is a perspective view of an option board housing box used for the outdoor unit for the air conditioner according to the present invention.

BEST MODE FOR CARRYING OUR THE INVENTION

[0014] An embodiment of an outdoor unit for an air conditioner according to the present invention will be described hereunder with reference to the accompanying drawings. In the following description, expressions indicating directions such as upper, lower, left, and right are used based on states shown in the drawings or a state of the actually installed outdoor unit.

[0015] As shown in Figs. 1 to 3, the outdoor unit 1 for the air conditioner of the present embodiment includes an outdoor unit housing 2. The outdoor unit housing 2 includes a bottom plate 3, a front plate 4 standing up from the bottom plate 3 and formed with an air outlet 4a, a side plate 5 connected to the front plate 4 and rising from the bottom plate 3 so as to reach and cover a rear side end portion 14a of a heat exchanger 14, a column 6 standing up from the bottom plate 3 so as to face a corner portion of the heat exchanger 14, and a top plate 7 placed to cover an upper opening defined by the front plate 4, the side plate 5 and the column 6.

[0016] Moreover, a wire guard, not shown, for protecting the heat exchanger 14 is provided over the side plate 5, the column 6, and the front plate 4 to face the heat exchanger 14.

[0017] Furthermore, as shown in Fig. 2, the front plate 4 is divided to provide a service panel 8. By detaching the service panel 8, an inside of a machine chamber 12, which will be described later, is exposed. Moreover, a fan guard 4b is mounted to the air outlet 4a of the front plate 4.

[0018] A front piping panel 9a for leading the piping into the machine chamber 12, which will be described later, at a site of installation is provided to a front lower corner portion of the outdoor unit housing 2. Similarly, a rear piping panel 9b is provided at a lower portion of one side surface.

[0019] As shown in Fig. 3, an inside of the outdoor unit housing 2 is partitioned into a heat exchanger chamber 11 and a machine chamber 12 by a partition plate 10.

[0020] In the heat exchanger chamber 11, a blower 13 and the heat exchanger 14 are housed while placed on the bottom plate 3. The heat exchanger 14 is in an L-shape in a plan view to face a rear surface and one side surface of the outdoor unit 1 with the rear side end portion 14a thereof being fixed to the side plate 5 and the front side end portion 14b thereof being fixed to the front plate 4.

[0021] The blower 13 is mounted to a motor base 15 with its lower portion fixed to the bottom plate 3, one end of its upper portion fixed to a rear side of the top plate 7, and the other end thereof fixed to the front plate 4.

[0022] In the machine chamber 12, a compressor 16, an accumulator 17, a piping connecting valve 18 at the site, an electric component box 20, refrigerant piping, and the like are housed while placed on the bottom plate 3. The electric component box 20 is provided in the machine chamber 12 near an upper portion of the partition plate 10, and a duct 19 through which air after cooling the electric component box 20 flows is provided to an upper portion of the heat exchanger chamber 11 near the upper portion of the partition plate 10. In a rear piping panel 9b provided to a lower corner portion of the outdoor unit housing 2, an air vent 9c for taking outside air into the machine chamber 12 is formed.

[0023] As shown in Figs. 2 and 3, the site piping connecting valve 18 and the electric component box 20 are disposed so as to face the service panel 8. By detaching the service panel 8, it is possible to easily perform operations such as a maintenance check.

[0024] As shown in Figs. 4 to 6, the electric component box 20 is in a box shape formed with an air inlet 20a (Fig. 3) for cooling electric components and a air outlet 20b communicating with a duct 19. On a front surface 20c, a terminal block 21 and an outdoor control board 22a are mounted. Moreover, in the electric component box 20, a compressor driving control board (inverter) 22b is housed.

[0025] By operating the blower 13, an outside air taken through the air vent 9c (Fig. 1) into the heat exchanger chamber 11 is introduced through the air inlet 20a into the electric component box 20 and blown into the heat exchanger chamber 11 via the air outlet 20b and the duct 19.

[0026] A mounting chip 20e extending downward from a lower surface 20d of the electric component box 20 is provided to the front surface 20c of the electric component box 20 so that an option board housing box 23 for function enhancement can be mounted outside (i.e., on a side opposite to the electric component box) the lower surface 20d.

[0027] As shown in Fig. 6, the option board housing box 23 is a box formed by bending a sheet metal and is composed a bottom surface 23a on which an option board 24 is placed, a rear surface 23b, left and right side surfaces 23c, 23d, and fixing chips 23c1 and 23d 1 extending from the left and right side surfaces. A portion facing the lower surface 20d and the mounting chip 20e of the electric component box 20 are substantially opened outward.

[0028] The option board housing box 23 is mounted to an outside of the lower surface 20d of the electric component box 20 by fixing the fixing chips 23c1, 23d1 provided to the side surfaces 23c, 23d to the mounting chip 20e of the electric component box 20 by means of screws or the like. The option board housing box 23 is provided with an option board fixture 23e and a wiring guide portion 23f.

[0029] In this way, the option board housing box 23 is provided to the lower surface portion of the outside of the electric component box 20. Therefore, the option board 24 is less susceptible to heat from the outdoor control board 22a and an inverter board 22b, and the option board can be easily designed as compared with a case where the option board 24 is mounted inside. Moreover, it is not necessary to consider a waterproof property of the option board housing box 23 so much. Furthermore, the structure of the option housing box 23 can be simplified, and therefore, the cost can be reduced.

[0030] Moreover, because the option board housing box 23 is mounted to the mounting chip 20e of the electric component box, the mounting chip 20e obstructs a view of the option board 24 from the front side, so that an accidental setting change of the option board 24 is prevented.

[0031] In order to add or replace the option board 24 of the outdoor unit 1 for the air conditioner, the service panel 8 provided at the front of the outdoor unit housing 2 is detached to expose the electric component box 20 as shown in Fig. 3. Thus, the option board housing box 23 mounted to the lower surface 20d of the electric component box 20 can be detached easily, and it is possible to easily add or replace the option board 24 in the option board housing box 23.

[0032] According to the outdoor unit for the air conditioner of the described embodiment, the operations for adding and replacing the option board become easy, the outdoor unit can be miniaturized due to miniaturization of the electric component box, the cost can be reduced due to the miniaturization, and it is possible to achieve the outdoor unit for the air conditioner having the option board less susceptible to heat generated from the electric components.

Claims

1. An outdoor unit for an air conditioner, comprising:

an outdoor unit housing an inside of which is partitioned by a partition plate into two sections; a machine chamber provided on one side in the housing partitioned by the partition plate; and a heat exchanger chamber provided on another side in the housing partitioned by the partition plate,

wherein an outdoor heat exchanger and a blower are housed in the heat exchanger chamber, a compressor provided on a bottom plate of the outdoor unit housing and an electric component box disposed above the compressor are housed in the machine chamber, and an option board is mounted to a lower surface portion of the electric component box.

2. The outdoor unit for an air conditioner according to claim 1, wherein an option board housing box is formed into a box by bending a sheet metal and includes a bottom surface on which the option board is placed, a rear surface, left and right side surfaces, and fixing chips extending from the left and right side surfaces.

3. The outdoor unit for an air conditioner according to claim 1, wherein the option board is housed in a box which is substantially opened at a side surface facing a bottom surface portion of the electric component box.

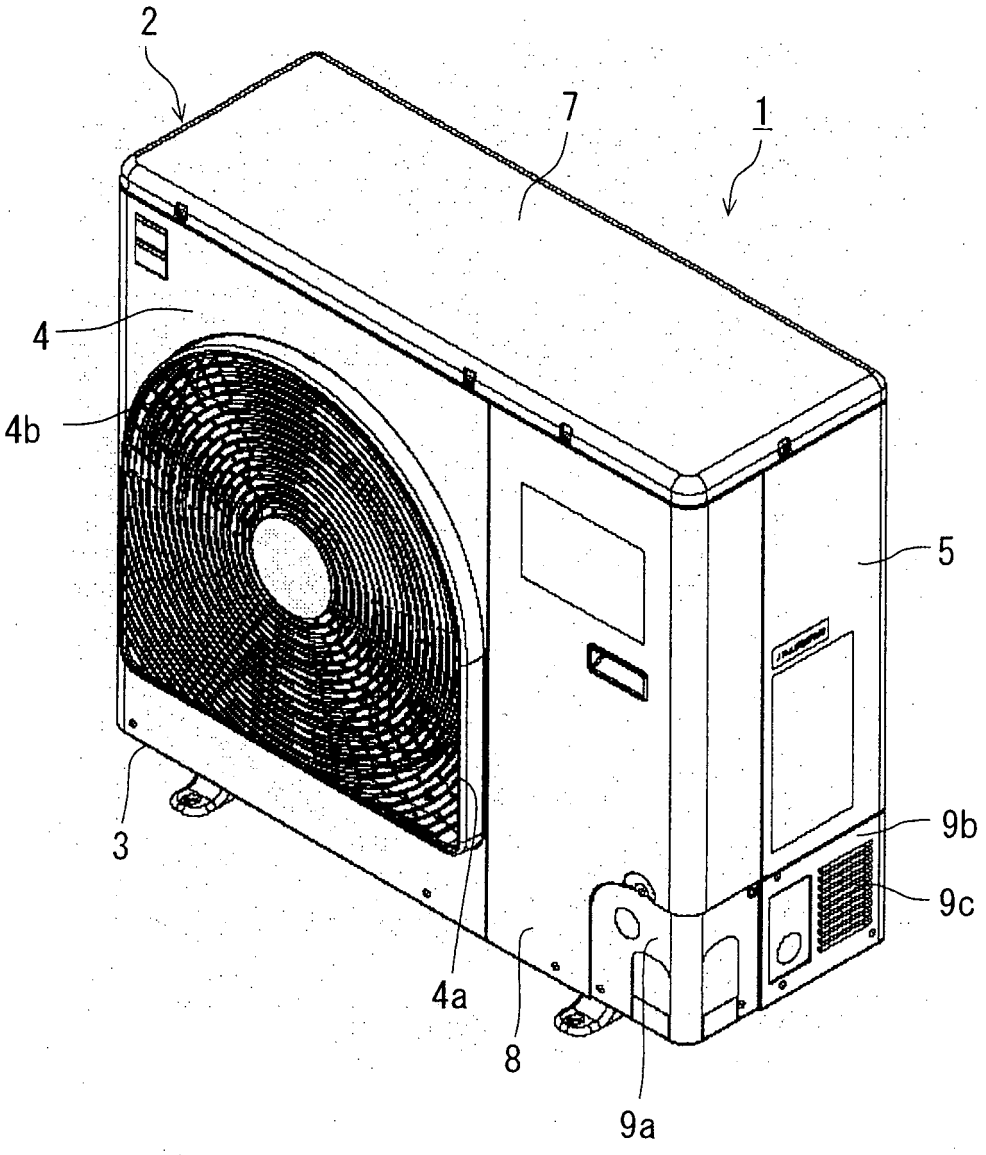

FIG. 1

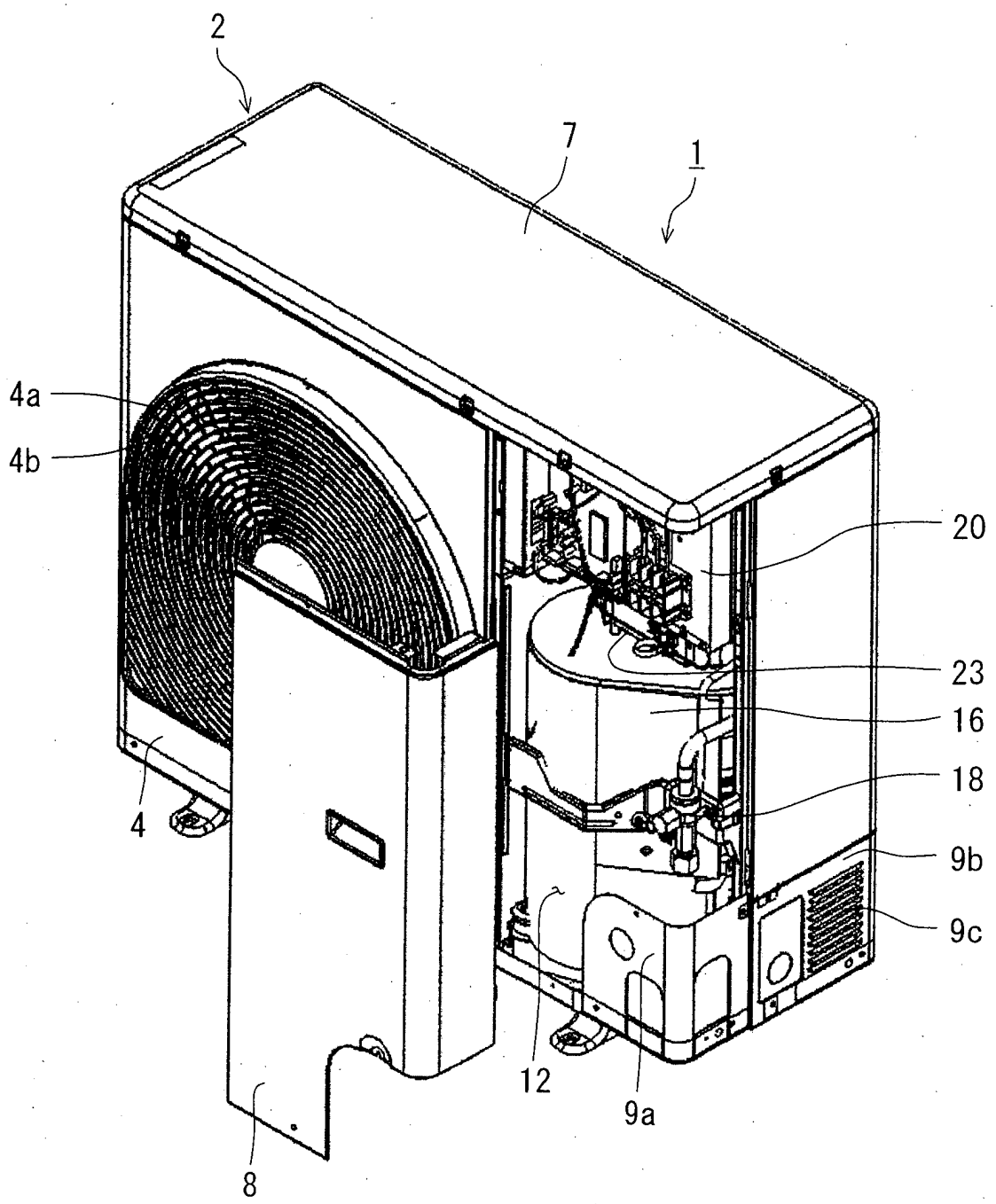

FIG. 2

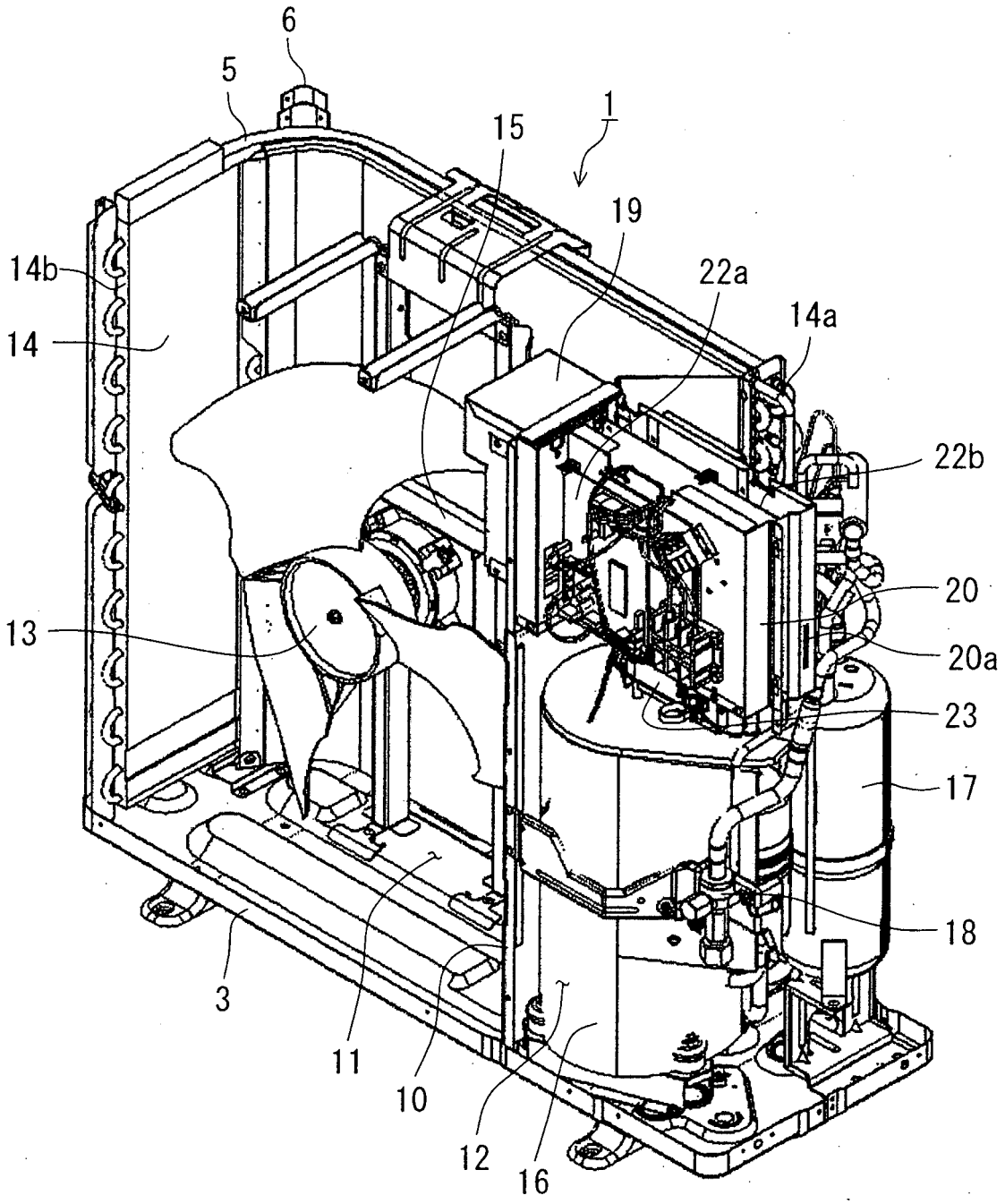

FIG. 3

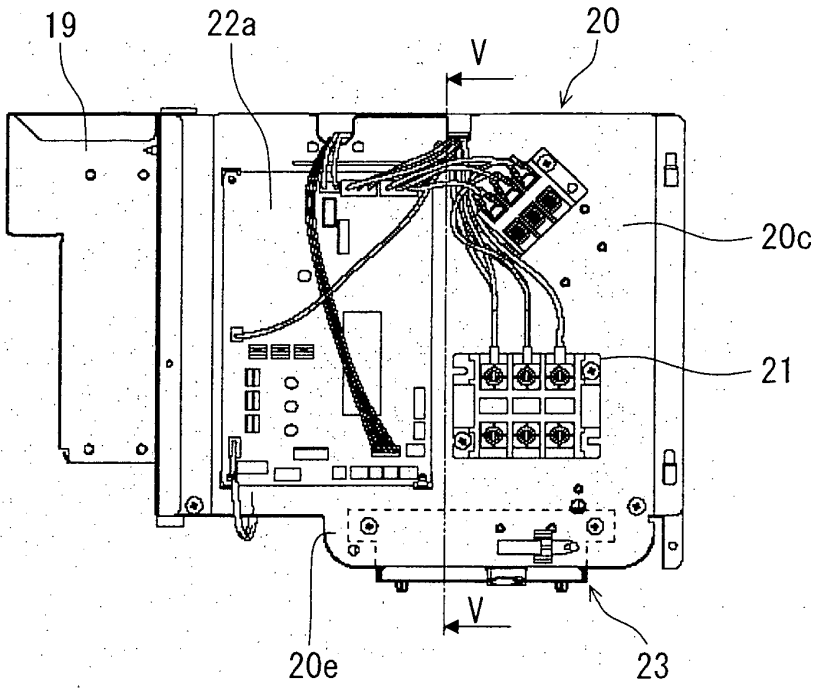
19
22a
V
20
20c
21
V
20e
23

FIG. 4

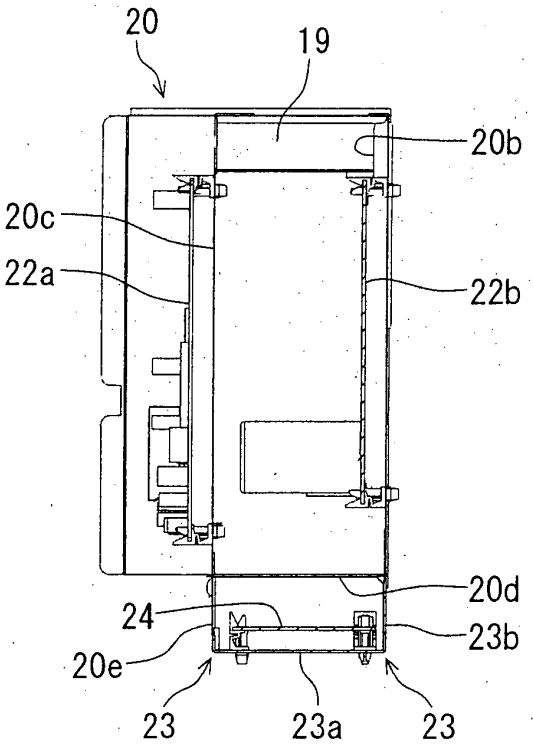
20
19
20b
20c
22a
22b
20d
24
23b
20e
23
23a
23

FIG. 5

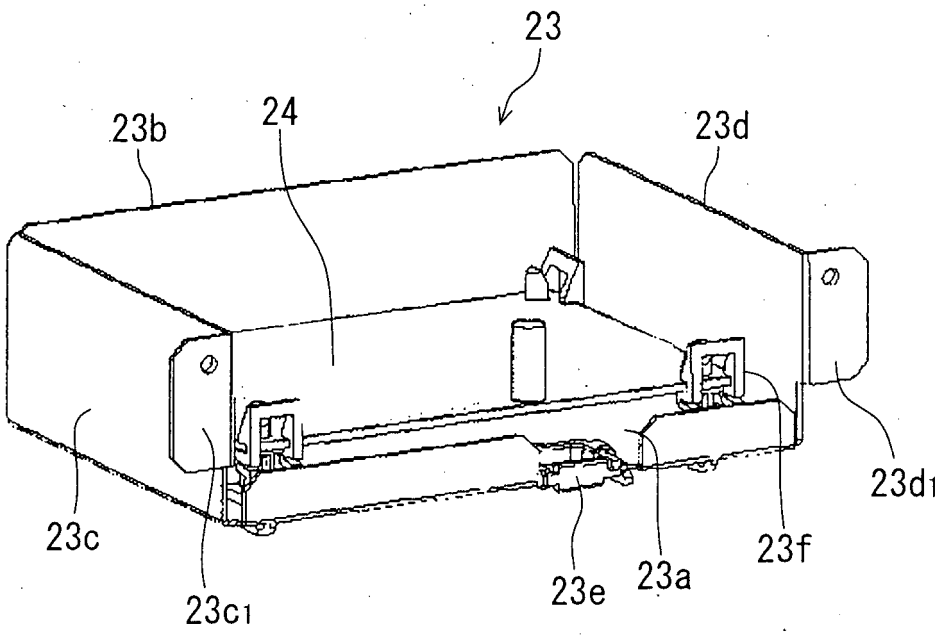

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2005/023389

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

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(2006.01)

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.
Y A	JP 2003-294272 A (Daikin Industries, Ltd.), 15 October, 2003 (15.10.03), Par. No. [0019]; Fig. 2 (Family: none)	1,3 2
Y	JP 2000-74422 A (Toshiba Corp.), 14 March, 2000 (14.03.00), Par. Nos. [0004], [0027]; Fig. 3 (Family: none)	1,3

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

* Special categories of cited documents:
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 January, 2006 (17.01.06)	24 January, 2006 (24.01.06)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2003 A **[0004]**
- JP 294272 A **[0004]**
- JP 6002890 A **[0005]**