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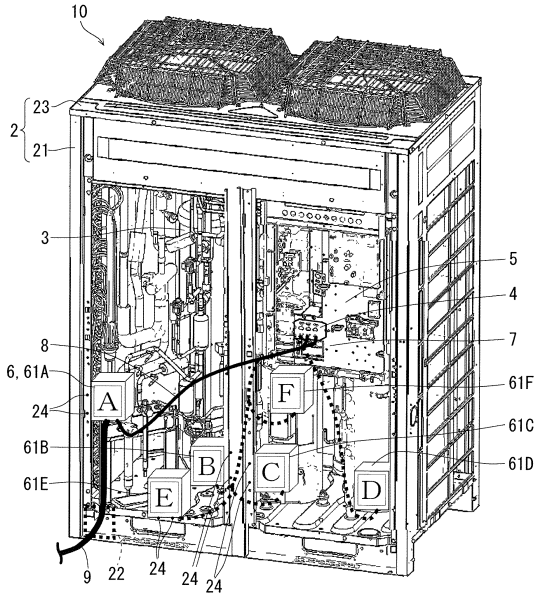
(54) OUTDOOR UNIT FOR AIR CONDITIONER

(57) An outdoor unit of an air conditioner with which renewing work can be performed using an existing power supply line is provided. The outdoor unit includes a housing (2), a first power supply terminal block (4) being fixed inside the housing (2) to be supplied with power, a second power supply terminal block (6), and a connector cable (8) connecting the first power supply terminal block (4) and the second power supply terminal block (6) to each other. The second power supply terminal block (6) is removably fixed at any of a plurality of positions inside the housing 2 for addressing power being supplied from outside. The first power supply terminal block (4) is supplied with power via the second power supply terminal block (6) and the connector cable (8).

F I G . 1



EP 2 698 585 A1

Description

Technical Field

[0001] The present invention relates to an outdoor unit of an air conditioner, and particularly, to an outdoor unit of an air conditioner that is installed when renewing an outdoor unit of an existing air conditioner.

Background Art

[0002] In order to address aging of an outdoor unit of an existing air conditioner (hereinafter simply referred to as the "outdoor unit" also) or an increase or reduction in the air conditioning load, sometimes the outdoor unit is replaced (hereinafter also referred to as "renewed"). In connection thereto, the following Patent Document 1 is disclosed. Further, the following Patent Document 2 discloses measures against the case where an existing compressor and a new compressor are different from each other in the mounting form of the power supply terminal. Further, the following Patent Document 3 discloses the technique for simplifying the installation work of the outdoor unit.

Prior Art Documents

Patent Documents

[0003]

Patent Document 1: Japanese Patent Application Laid-Open No. 2003-269739
Patent Document 2: Japanese Patent Application Laid-Open No. 2010-038057
Patent Document 3: Japanese Patent Application Laid-Open No. 7-103512

Summary of the Invention

Problems to be Solved by the Invention

[0004] An existing outdoor unit and a newly installed outdoor unit do not always agree with each other in the position of the power supply terminal block for receiving externally supplied power. Accordingly, an existing power supply line may not reach the power supply terminal block of the newly installed outdoor unit. When the outdoor unit is to be renewed under such circumstances, it is necessary to renew not only the existing outdoor unit but also the existing power supply line, and the renewing work may take a long time.

[0005] In consideration of the problem noted above, an object of the present invention is to provide an outdoor unit with which renewing work can be performed appropriating the existing power supply line.

Means for Solving the Problems

[0006] To solve the above problem, in accordance with a first aspect of the present invention, an outdoor unit (10) of an air conditioner includes: a housing (2); a first power supply terminal block (4) fixed inside the housing to be supplied with power; a second power supply terminal block (6); and a connector cable (8) connecting the first power supply terminal block and the second power supply terminal block to each other, wherein the second power supply terminal block is removably fixed at any of a plurality of positions inside the housing for addressing power being supplied from outside of the housing, and the second power supply terminal block is supplied with power from the outside of the housing.

[0007] In accordance with a second aspect of the present invention, in the outdoor unit of the air conditioner according to the first aspect, the plurality of positions are all located below the first power supply terminal block (4).

[0008] In accordance with a third aspect of the present invention, in the outdoor unit of the air conditioner according to the first and second aspects, the housing (2) further includes an opening portion (22) introducing, from the outside to the inside of the housing, a power supply line connected to the second power supply terminal block (6).

[0009] In accordance with a fourth aspect of the present invention, in the outdoor unit of the air conditioner according to the third aspect, the housing (2) further includes a position adjusting portion (24) capable of adjusting a position where the second power supply terminal block (6) is fixed to adjust a distance between the position and the opening portion (22).

Effects of the Invention

[0010] According to the first aspect of the outdoor unit of an air conditioner of the present invention, since the second power supply terminal block can be removably fixed at any of a plurality of positions capable of addressing power being supplied from the existing power supply line, the existing power supply line can be appropriated and, hence, the time required for performing the renewing work can be shortened.

[0011] According to the second aspect of the outdoor unit of the air conditioner of the present invention, since the position at which the second power supply terminal block is fixed is lower than the position where the first power supply terminal block is fixed, that is, nearer to the ground, it is suitable for connecting the existing power supply line having been arranged along the ground.

[0012] According to the third aspect of the outdoor unit of the air conditioner of the present invention, the existing power supply line can be guided toward the inside of the housing via the opening portion and, furthermore, the power supply line can be connected to the first power supply terminal block or the second power supply terminal block. That is, a portion of the power supply line on

the outdoor unit side can be stored in the housing, whereby the portion of the power supply line that deteriorates by weather or the like can be suppressed.

[0013] According to the fourth aspect of the outdoor unit of an air conditioner of the present invention, when the power supply line is to be connected to the second power supply terminal block, by adjusting the position where the second power supply terminal block is fixed to be away from the opening portion, the power supply line extending to the outside of the air conditioner can be avoided or suppressed from sagging.

[0014] These and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

Brief Description of Drawings

[0015]

[Fig. 1] A perspective view of an outdoor unit of an air conditioner according to an embodiment of the present invention.

[Fig. 2] A perspective view of a second power supply terminal block.

[Fig. 3] A perspective view showing a variation of the second power supply terminal block.

[Fig. 4] A perspective view illustrating a fixing member for fixing the second power supply terminal block.

[Fig. 5] A perspective view showing one mode of combining the second power supply terminal block and the fixing member.

[Fig. 6] A perspective view of another mode of combining the second power supply terminal block and the fixing member.

Embodiment for Carrying Out the Invention

[0016] In the following, a description will be given of an embodiment with reference to the drawings. Note that, in Fig. 1 and the drawings that follow, elements not relating to the present invention are omitted.

[0017] As shown in Fig. 1, an outdoor unit 10 according to the embodiment of the present invention includes a housing 2, a first power supply terminal block 4, a second power supply terminal block 6, and a connector cable 8, and is interconnected with an indoor unit of an air conditioner through a heating medium pipe and a control-purpose wire (the heating medium pipe, the control-purpose wire and the indoor unit are all not shown).

[0018] The housing 2 is configured by a metal plate having undergone punching and bending work or the like, or a combination of such a metal plate 21 and a molding resin plate 23 or the like. The overall shape is formed to be substantially box-shaped. Then, the housing 2 stores therein a compressor 3 for compressing a heating medium, a control unit 5 and the like. Further, the housing 2 includes an opening portion 22 for introducing an existing power supply line 9 for receiving externally supplied power into the housing 2. Note that, in order to show the inside of the outdoor unit 10, the plane of the housing 2 where the opening portion 22 is provided is not shown, and just the position of the opening portion 22 is represented by a broken line. By guiding the power supply line 9 toward the inside of the housing 2 through the opening portion 22, part of the power supply line 9 on the outdoor unit 10 side can be stored in the housing 2, whereby the portion of the power supply line 9 that deteriorates by weather or the like can be suppressed.

[0019] The first power supply terminal block 4 is fixed inside the housing 2 and supplied with power. As a specific example, the first power supply terminal block 4 is fixed to a control board 7 belonging to the control unit 5. Here, the control board 7 is fixed to the upper portion of the housing 2 in preparation for the bottom portion of the outdoor unit 10 being submerged in water or the like. That is, the first power supply terminal block 4 is also fixed to the upper portion in the housing 2.

[0020] The second power supply terminal block 6 is fixed at one of a plurality of positions in the housing 2, particularly below the first power supply terminal block 4, and is capable of being supplied with power from the outside of the housing 2. The housing 2 includes position adjusting portions 24 capable of adjusting the position where the second power supply terminal block 6 is fixed, to adjust the distance between that position and the opening portion 22. Specifically, as the position adjusting portions 24, threaded holes provided at a plurality of places in the metal plate 21 forming the housing 2 can be employed.

[0021] As shown in Fig. 2, the second power supply terminal block 6 is fixed, inside a box-shaped case 61 from which the first plane out of six planes forming the rectangular parallelepiped is removed, to the second plane 62 being opposite to the first plane. Then, the case 61 is removably fixed at any of a plurality of positions in the metal plate forming the housing 2. In Fig. 1, as an exemplary plurality of places where the case 61 can be removably fixed, the case 61 is represented by rectangular parallelepiped, to which reference signs A to F are allotted. Further, for the sake of convenience, the case 61 appears as cases 61 A to 61F in accordance with respective positions denoted by reference signs A to F. The power supply terminal block 6 is solely selected out of the positions of a plurality of cases 61A to 61F illustrated in Fig. 1. The cases 61A to 61D are respectively fixed to the threaded holes provided to the metal plate 21. Alternatively, a rail mechanism (not shown) that slides along the edge of the metal plate 21 may be provided, such that the case 61 can be fixed at any position on the edge thereof.

[0022] The connector cable 8 connects the first power supply terminal block 4 and the second power supply terminal block 6 to each other. Specifically, the connector cable 8 connects the first power supply terminal block 4

and an output side terminal 6To of the second power supply terminal block 6 to each other. In Fig. 1, the connector cable 8 connecting the first power supply terminal block 4 and the case 61A to each other is represented by a bold solid line, and the connector cable 8 connected to each of the remainder cases 61B to 61F is represented by a bold broken line.

[0023] The existing power supply line 9 is often arranged along the ground where the outdoor unit 10 is installed, for the sake of convenience in installation. The position where the second power supply terminal block 6 is fixed being below the position where the first power supply terminal block 4 is fixed, that is, being closer to the ground is suitable for connecting the existing power supply line 9 having been arranged along the ground.

[0024] At one plane (which is referred to as the "third plane" for the sake of convenience) 63, being one of the planes out of the five planes of the case 61 (the five planes being the remainder of the six planes forming the rectangular parallelepiped from which the first plane is removed) except for the second plane 62, a first hole 64 is formed. Allowing the power supply line 9 (see Fig. 1) to pass through the first hole 64, the efficiency of the renewing work can be improved. Further, a second hole 65 is formed at the third plane 63. Allowing the connector cable 8 to pass through the second hole 65, the efficiency of the renewing work can be improved. Furthermore, by fixing the case 61 in the state in which the third plane 63 is directed downward in the housing 2, waterproofness can be enhanced against droplets of water dripping from above.

[0025] Note that, the first and second holes 64, 65 may be integrated, or may be formed as notches opening toward the side (first plane side) opposite to the second plane 62. Further, though Fig. 2 shows the arrangement in which an input side terminal 6Ti of the second power supply terminal block 6 (the terminal on the side supplied with power from the outside) and the output side terminal 6To (the terminal on the side feeding power to the first power supply terminal block 4 via the connector cable 8) are arranged in the vertical direction, they may be arranged in the horizontal direction. For example, as shown in Fig. 3, the first hole 64 may be provided on the left side of the third plane 63 in the state where the second plane 62 is seen from the front side, with the second hole 65 being provided on the right side, such that fixation to the second plane 62 is carried out with the input side terminal 6Ti and the output side terminal 6To being arranged on the left and right sides, respectively. In this manner, it becomes possible to improve efficiency of the renewing work while enhancing waterproofness against droplets of water dripping from above.

[0026] When the second power supply terminal block 6 is to be fixed near the bottom plane of the housing 2, that is, when the second power supply terminal block 6 is to be fixed at the position of the case 61E shown in Fig. 1, since it is necessary to allow the connector cable 8 and the power supply line 9 to pass below the third plane 63 of the case 61, a mounting member 66 shown in Fig. 4 is employed. The mounting member 66 is in a substantial inverted U-shape. Specifically, it appears as a pair of leg portions 67A, 67B extending in the vertical direction and a bridging portion 68 bridging between one end portions of the leg portions 67A, 67B. The leg portions 67A, 67B are longer than the height of the case 61 with the third plane 63 directed downward. Then, the bridging portion 68 is substantially equal to the length in the horizontal direction of the case 61 with the third plane directed downward.

[0027] As shown in Fig. 5, the bridging portion 68 holds the outer side of the fourth plane 69 of the case 61 opposite to the third plane 63 and the leg portions 67A, 67B hold the outer side of the fifth and sixth planes 70A, 70B being the remainder planes. By fixing the end portions of the leg portions 67A, 67B to the metal plate on the bottom plane side of the housing 2, the case 61 can be fixed near the bottom plane of the housing 2 while securing the space for passing the connector cable 8 and the power supply line 9.

[0028] In the case where the second power supply terminal block 6 is to be fixed as being suspended from the bottom portion of the control unit 5, that is, when it is fixed to the position of the case 61F shown in Fig. 1, the mounting member 66 is mounted as shown in Fig. 6. That is, the bridging portion 68 holds the outer side of the third plane 63 and the leg portions 67B, 67A hold the outer sides of the fifth and sixth planes 70A, 70B, respectively. By fixing the end portions of the leg portions 67B, 67A to the bottom portion of the control unit 5, the case 61 can be fixed as being suspended from the bottom portion of the control unit 5.

[0029] While the invention has been shown and described in detail, the foregoing description is in all aspects illustrative and not restrictive. It is therefore understood that numerous modifications and variations can be devised without departing from the scope of the invention.

List of Reference Signs

[0030]

2	housing
4	first power supply terminal block
6	second power supply terminal block
8	connector cable
10	outdoor unit
22	opening portion
24	position adjusting portion

Claims

1. An outdoor unit (10) of an air conditioner comprising:

a housing (2);
a first power supply terminal block (4) fixed in-

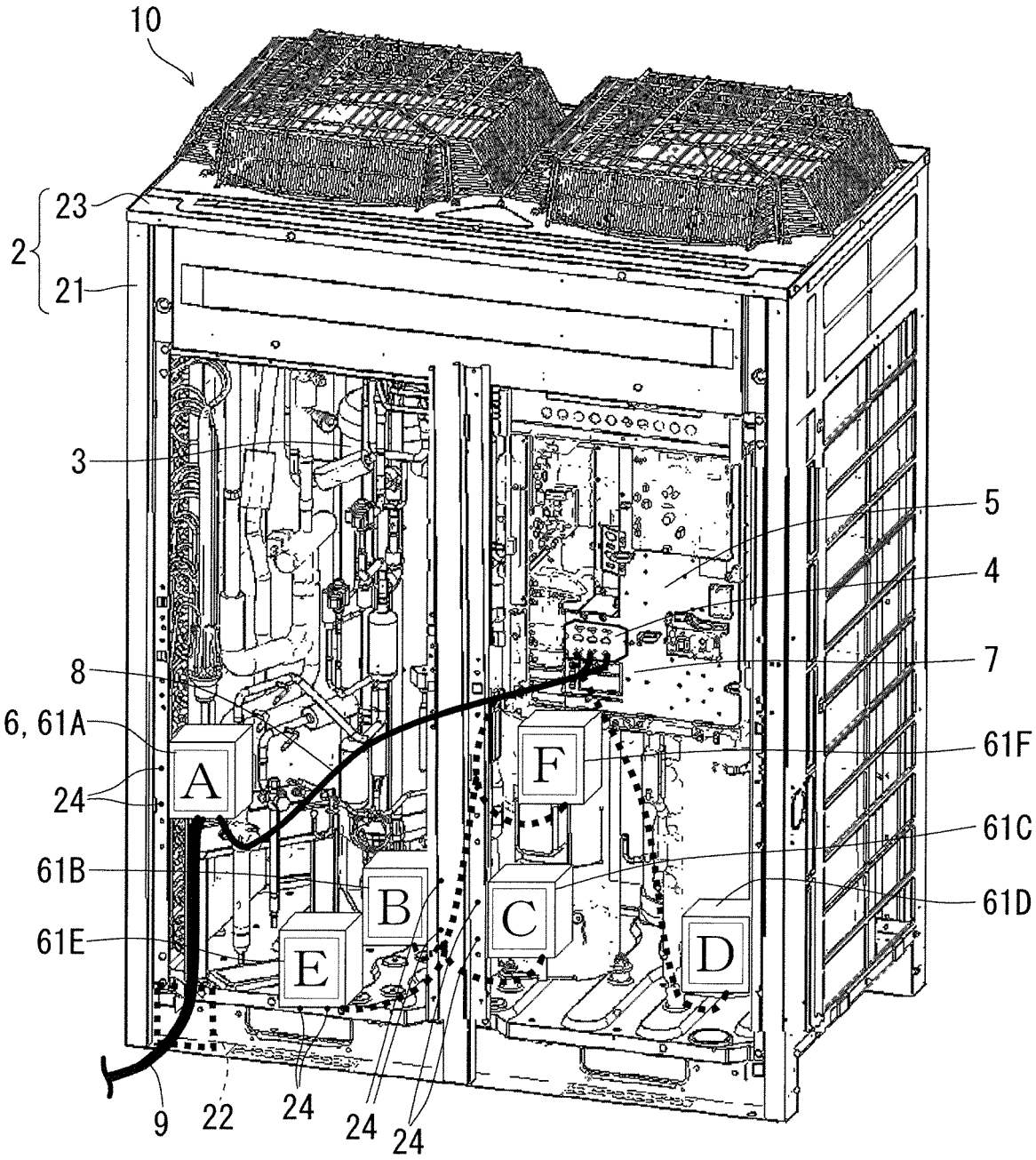
side said housing to be supplied with power;
a second power supply terminal block (6); and
a connector cable (8) connecting said first power supply terminal block and said second power supply terminal block to each other, wherein
said second power supply terminal block is removably fixed at any of a plurality of positions inside said housing for addressing power being supplied from outside of said housing, and
said second power supply terminal block is supplied with power from the outside of said housing.

2. The outdoor unit (10) of an air conditioner according to claim 1, wherein
said plurality of positions are all located below said first power supply terminal block (4).

3. The outdoor unit (10) of an air conditioner according to claim 1 or claim 2, wherein
said housing (2) further includes an opening portion (22) introducing, from the outside to the inside of said housing, a power supply line connected to said second power supply terminal block (6).

4. The outdoor unit (10) of an air conditioner according to claim 3, wherein
said housing (2) further includes a position adjusting portion (24) capable of adjusting a position where said second power supply terminal block (6) is fixed to adjust a distance between the position and said opening portion (22).

F I G . 1



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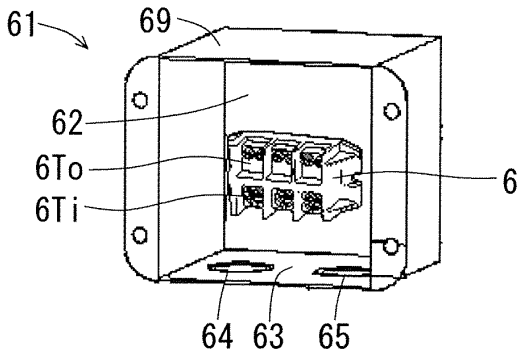

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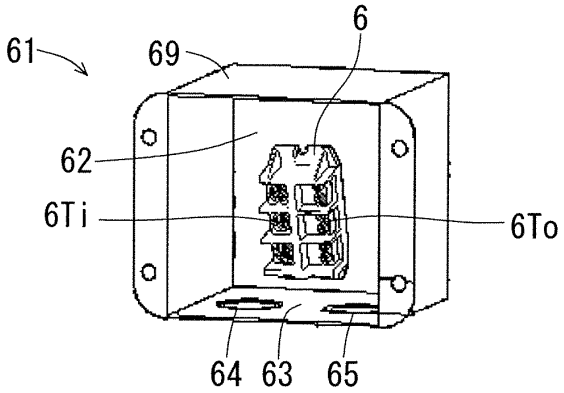

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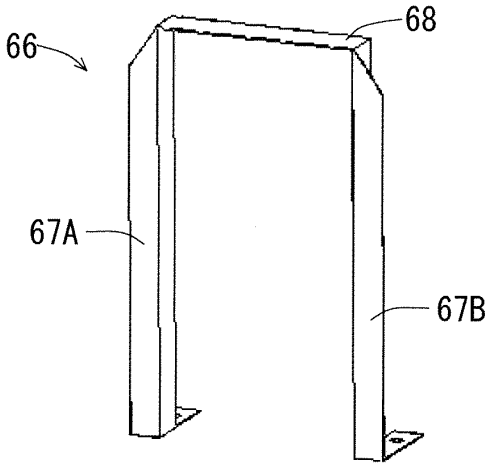
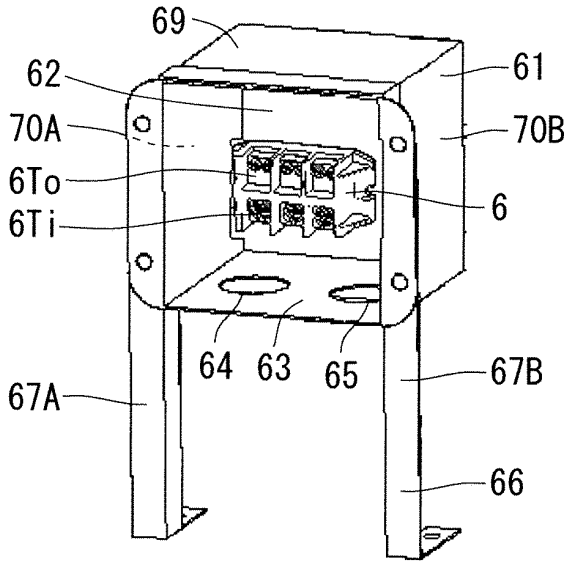


FIG. 5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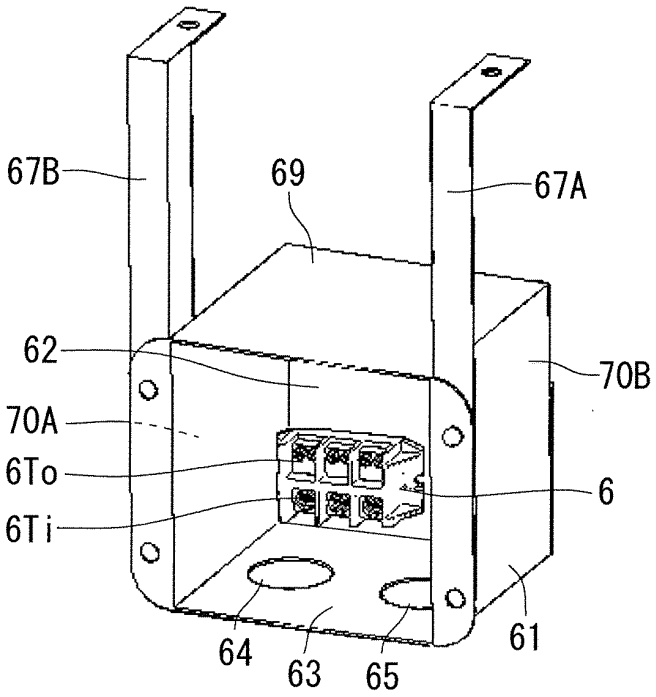
62
61
70A
70B
6To
6Ti
6
64
63
65
67B
67A
66

FIG. 6


67B
69
67A
62
70B
70A
6To
6Ti
6
64
63
65
61

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/059874

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 1996-2012
Kokai Jitsuyo Shinan Koho 1971-2012 Toroku Jitsuyo Shinan Koho 1994-2012

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	JP 2009-68741 A (Sanyo Electric Co., Ltd.), 02 April 2009 (02.04.2009), paragraphs [0023] to [0027]; fig. 1 to 6 (Family: none)	1-4
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 169842/1982(Laid-open No. 74212/1984) (Kabushiki Kaisha Okamoto Seisakusho), 19 May 1984 (19.05.1984), page 7, line 11 to page 9, line 9; fig. 1, 4 (Family: none)	1-4

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

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 June, 2012 (04.06.12)	12 June, 2012 (12.06.12)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/059874

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2008-241213 A (Toshiba Carrier Corp.), 09 October 2008 (09.10.2008), paragraph [0013]; fig. 3 (Family: none)	2
Y	JP 6-288578 A (Mitsubishi Heavy Industries, Ltd.), 11 October 1994 (11.10.1994), paragraphs [0010], [0012]; fig. 1(A) (Family: none)	2
A	JP 2004-275566 A (Aruze Corp.), 07 October 2004 (07.10.2004), paragraphs [0013] to [0018]; fig. 2, 3 (Family: none)	1-4
A	JP 2003-294272 A (Daikin Industries, Ltd.), 15 October 2003 (15.10.2003), paragraphs [0003], [0004]; fig. 5 (Family: none)	1-4
A	JP 61-169551 A (Kabushiki Kaisha Okamoto Seisakusho), 31 July 1986 (31.07.1986), page 2, lower right column, line 2 to page 6, upper right column, line 16; fig. 1 to 4 & US 4720953 A & EP 211049 A & WO 1986/004377 A1 & AU 5358186 A	1-4

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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- JP 2003269739 A **[0003]**
- JP 2010038057 A **[0003]**
- JP 7103512 A **[0003]**