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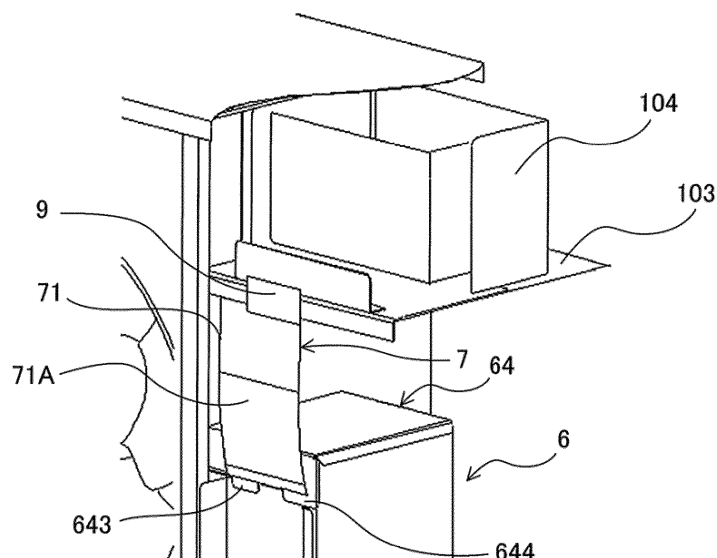
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(54) **OUTDOOR UNIT OF AIR CONDITIONER**

(57) An outdoor unit of an air-conditioning apparatus includes a casing, a compressor disposed on a bottom of the casing, a noise isolation unit, and an anti-vibration cushion. The noise isolation unit is disposed to cover the compressor and is a box-shaped component reducing or eliminating outward propagation of noise generated during operation of the compressor. The anti-vibration cushion

ion is interposed between the compressor and an inner surface of the noise isolation unit, and is a component preventing vibration of the compressor during transportation of the outdoor unit. The outdoor unit further includes an attention-attracting section giving removal instructions for removing the anti-vibration cushion.

FIG. 5



Description

Technical Field

[0001] The present invention relates to an outdoor unit of an air-conditioning apparatus, and in particular, relates to preventing forgetting to remove an anti-vibration cushioning part that is placed to reduce or eliminate excessive vibration of a compressor in transporting the outdoor unit.

Background Art

[0002] In transporting an outdoor unit of an air-conditioning apparatus, a countermeasure to prevent a compressor in the outdoor unit from being excessively vibrated is typically taken.

[0003] For example, a compressor described in Patent Literature 1 is provided with three support legs radially outwardly protruding from lower part of a side face of the compressor. To support the compressor during operation while preventing vibration of the compressor, these support legs are supported on a bottom frame by an anti-vibration supporting device. During transportation of the compressor, the compressor is lifted by a lifting support disposed on an upper surface of a transportation pallet used for packing an air-conditioning apparatus. This structure keeps the anti-vibration supporting device immobile in such a manner that the anti-vibration supporting device is not in operation. Such an immobile state is maintained to restrict movement of the compressor.

Citation List

Patent Literature

[0004] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2014-213873

Summary of Invention

Technical Problem

[0005] The anti-vibration supporting device described in Patent Literature 1, however, supports the lower part of the compressor. This device is not intended to prevent vibration of upper part of the compressor. In transporting an outdoor unit including the compressor, an anti-vibration cushioning part supports the upper part of the compressor to prevent vibration of the upper part. Such an anti-vibration cushioning part is inserted into a noise insulation unit containing the compressor. After transportation and installation of the outdoor unit, the anti-vibration cushioning part is removed. Disadvantageously, the anti-vibration cushioning part may fail to be removed as this part is disposed inside the noise insulation unit and is out of sight of an installation worker.

[0006] The present invention has been made to overcome the above-described disadvantages, and aims to

provide an outdoor unit of an air-conditioning apparatus that prevents forgetting to remove an anti-vibration cushioning part. Solution to Problem

[0007] An outdoor unit of an air-conditioning apparatus according to an embodiment of the present invention includes a casing, a compressor disposed on a bottom of the casing, a box-shaped noise isolation unit that is disposed to cover the compressor and reduces or eliminates outward propagation of noise generated during operation of the compressor, an anti-vibration cushion that is interposed between the compressor and an inner surface of the noise isolation unit and prevents vibration of the compressor during transportation of the outdoor unit, and an attention-attracting section giving removal instructions for removing the anti-vibration cushion. Advantageous Effects of Invention

[0008] The outdoor unit of an air-conditioning apparatus according to an embodiment of the present invention can prevent an installation worker who installs the outdoor unit from forgetting to remove the anti-vibration cushion.

Brief Description of Drawings

[0009]

[Fig. 1] Fig. 1 is a perspective view of an outdoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

[Fig. 2] Fig. 2 is a diagram illustrating the inside of a noise isolation unit of the outdoor unit according to Embodiment of the present invention.

[Fig. 3] Fig. 3 is an exploded perspective view of the noise isolation unit of the outdoor unit according to Embodiment of the present invention.

[Fig. 4] Fig. 4 is an exploded perspective view illustrating a manner of fastening an attention-attracting label for a compressor in Embodiment of the present invention.

[Fig. 5] Fig. 5 is a perspective view illustrating an exemplary manner of fastening the attention-attracting label for the compressor in Embodiment of the present invention.

[Fig. 6] Fig. 6 is a perspective view of another exemplary manner of fastening the attention-attracting label for the compressor in Embodiment of the present invention.

Description of Embodiment

[0010] An outdoor unit of an air-conditioning apparatus according to Embodiment of the present invention will be described in detail below with reference to the drawings. Embodiment, which will be described below, is not intended to limit the present invention. Note that the relative sizes of components in the following figures may differ from those in an actual apparatus.

Embodiment

[0011] Fig. 1 is a perspective view of the outdoor unit of an air-conditioning apparatus according to Embodiment of the present invention. For clear illustration of an internal configuration of the outdoor unit 100, some of components or parts are cut away or not illustrated in Fig. 1. The outdoor unit 100 includes a casing 101. The casing 101 includes a bottom panel 101A from which a partition 102 extends. The partition 102 divides the inside of the casing 101 into an air passage chamber 1 and a space including an electric component chamber 2 and a machine chamber 3. The air passage chamber 1 contains a fan 11. The fan 11 is, for example, a propeller fan, and serves as an air-sending unit. In the machine chamber 3, a noise isolation unit 6 is disposed on the bottom panel 101A. The noise isolation unit 6 contains a compressor, which will be described later. The space in the casing 101 is divided into the electric component chamber 2 and the machine chamber 3 by a partition 103. The electric component chamber 2 is located above the machine chamber 3. An electric component box 104 containing electric components is disposed on the partition 103.

[0012] An attention-attracting label 7 is an attention-attracting section in the present invention. The attention-attracting label 7 is fastened to the noise isolation unit 6. The attention-attracting label 7 describes removal instructions for removing an anti-vibration cushion. Part of the attention-attracting label 7 is attached to the partition 103 with an adhesive tape 9. In other words, part of the attention-attracting label 7 is positioned in proximity to the electric component chamber 2. The anti-vibration cushion and the attention-attracting label 7 will be described in detail later.

[0013] Fig. 2 is a diagram illustrating the inside of the noise isolation unit of the outdoor unit according to Embodiment of the present invention. Fig. 3 is an exploded perspective view of the noise isolation unit of the outdoor unit according to Embodiment of the present invention. The noise isolation unit 6 includes a shell 60 and an upper plate 64. In Fig. 2, the upper plate 64 is omitted for clear illustration of the inside of the noise isolation unit 6. The noise isolation unit 6 contains the compressor 4. The shell 60 includes a front plate 61, a side plate 62, a rear plate 63, and a bottom plate 65. The front plate 61, the side plate 62, the rear plate 63, the upper plate 64, and the bottom plate 65 are metal sheets.

[0014] The bottom plate 65, which is a rectangular tray-shaped component, is disposed on the bottom panel 101A of the casing 101. The bottom plate 65 has four sides with raised edges extending upward.

[0015] The front plate 61 includes a covering portion 611, a fixation portion 612, and an attachment portion 613. The covering portion 611 and the fixation portion 612 allow the front plate 61 to have an L-shaped cross-section. The attachment portion 613 is located on one of opposite sides of the covering portion 611 extending in a longitudinal direction of the covering portion 611 and

the one side of the covering portion 611 is remote from the fixation portion 612. The front plate 61 is disposed adjacent to a front surface of the outdoor unit 100 on the bottom panel 101A of the casing 101.

[0016] The side plate 62 includes a covering portion 621 and a bent portion 622. The bent portion 622 is formed by bending one of opposite sides of the covering portion 621 extending in a longitudinal direction of the covering portion 621 at a right angle. The side plate 62 is disposed adjacent to a right side of the outdoor unit 100 on the bottom panel 101A of the casing 101. The bent portion 622 has in its upper end a screw hole 622A.

[0017] The rear plate 63 includes a covering portion 631, a fixation portion 632, and a bent portion 633. The covering portion 631 and the fixation portion 632 allow the rear plate 63 to have an L-shaped cross-section. The bent portion 633 is located on one of opposite sides of the covering portion 631 extending in a longitudinal direction of the covering portion 631 and the one side of the covering portion 631 is remote from the fixation portion 632. The bent portion 633 is formed by bending the one side of the covering portion 631 at a right angle. Furthermore, the bent portion 633 is bent from the covering portion 631 in a direction opposite to a direction in which the fixation portion 632 extends from the covering portion 631. The rear plate 63 is disposed adjacent to a rear surface of the outdoor unit 100 on the bottom panel 101A of the casing 101.

[0018] The upper plate 64 includes a covering portion 641, a locking portion 642, and extending parts 643 and 644. The covering portion 641 and the locking portion 642 allow the upper plate 64 to have an L-shaped cross-section. The extending parts 643 and 644 extend from an opposite side of the locking portion 642 from the covering portion 641. The extending part 643 is located in middle part of the upper plate 64 in a lateral direction of the upper plate 64. The extending part 643 has a screw hole 643A. The extending part 644 is located in one of opposite end parts of the upper plate 64 in the lateral direction of the upper plate 64. The extending part 644 has a screw hole 644A.

[0019] The fixation portion 612 of the front plate 61 and the fixation portion 632 of the rear plate 63 are fastened to the partition 102. A lower end of the covering portion 611 of the front plate 61 is fastened to the front raised edge of the bottom plate 65. A lower end of the side plate 62 is fastened to the side raised edge of the bottom plate 65. A lower end of the covering portion 631 of the rear plate 63 is fastened to the rear raised edge of the bottom plate 65. In other words, the front plate 61 and the rear plate 63 are arranged parallel to each other, and the side plate 62 is disposed parallel to the partition 102. The attachment portion 613 of the front plate 61 is in contact with the bent portion 622 of the side plate 62 in such a manner that the attachment portion 613 is located in front of the bent portion 622. The attachment portion 613 has a vertical length less than that of the bent portion 622, so that the screw hole 622A of the bent portion 622 is

exposed. The bent portion 633 of the rear plate 63 is in contact with one of the opposite sides of the covering portion 621 of the side plate 62 extending in the longitudinal direction of the covering portion 621. The one side of the covering portion 621 is remote from the bent portion 622. The bent portion 633 is located on an outer surface of the covering portion 621. In the above-described arrangement, upper ends of the front plate 61, the side plate 62, and the rear plate 63, or an upper end of the shell 60 defines a rectangular opening. The opening is covered by the upper plate 64.

[0020] The compressor 4 is disposed on the bottom plate 65. Front part of a side face of the compressor 4 is covered with the covering portion 611 of the front plate 61, side part of the side face of the compressor 4 is covered with the covering portion 621 of the side plate 62, and rear part of the side face of the compressor 4 is covered with the covering portion 631 of the rear plate 63. In other words, part of the side face of the compressor 4 faces the shell 60. The other part of the side face of the compressor 4 faces the partition 102.

[0021] Anti-vibration cushions 51, 52, and 53 are elastic parts. The anti-vibration cushions 51, 52, and 53 are detachable parts to prevent the compressor 4 from being excessively vibrated while the outdoor unit 100 is transported to an installation place. The anti-vibration cushions 51 and 52 are arranged between the compressor 4 and an inner surface of the front plate 61 of the noise isolation unit 6. The anti-vibration cushion 53 is disposed between the compressor 4 and an inner surface of the rear plate 63 of the noise isolation unit 6.

[0022] The anti-vibration cushions 51 and 52 are placed on a terminal block 41 disposed on upper part of the side face of the compressor 4. Consequently, the anti-vibration cushions 51 and 52 are positioned vertically. The anti-vibration cushions 51 and 52 are interposed between the upper part of the side face of the compressor 4 and upper part of the inner surface of the front plate 61 of the noise isolation unit 6. Part of the anti-vibration cushion 53 is placed on an upper surface 42 of the compressor 4. Consequently, the anti-vibration cushion 53 is positioned vertically. The anti-vibration cushion 53 is interposed between the upper part of the side face of the compressor 4 and upper part of the inner surface of the rear plate 63 of the noise isolation unit 6. As described above, the anti-vibration cushions 51, 52, and 53 are interposed between the compressor 4 and an inner peripheral surface of the noise isolation unit 6.

[0023] The anti-vibration cushions 51, 52, and 53 arranged in the above-described manner reduce or eliminate vibration of the compressor 4 during transportation of the outdoor unit 100. The anti-vibration cushions 51, 52, and 53, which are interposed between the compressor and the noise isolation unit 6, do not fall during transportation of the outdoor unit 100.

[0024] Fig. 4 is an exploded perspective view illustrating a manner of fastening the attention-attracting label for the compressor in Embodiment of the present inven-

tion. The attention-attracting label 7 is a synthetic paper sheet having a predetermined strength to the extent that an installation worker can hardly tear the attention-attracting label with their hands. The attention-attracting label 7 is rectangular in overall shape. The attention-attracting label 7 includes a large-width portion 71 and a small-width portion 72 having a smaller width than does the large-width portion. A slit 73 is located at the boundary between the large-width portion 71 and the small-width portion 72. The large-width portion 71 and the small-width portion 72 define a notch 74. The large-width portion 71 has a front surface 71A on which removal instructions for removing the above-described anti-vibration cushions 51, 52, and 53 are given. The removal instructions are given as a combination of text information and image information, which are not illustrated. For example, character strings representing the removal instructions are arranged and illustrations are located below the character strings.

[0025] A manner of fastening the upper plate 64 and the attention-attracting label 7 will be described below. The small-width portion 72 of the attention-attracting label 7 is positioned adjacent to the covering portion 641 of the upper plate 64. The attention-attracting label 7 is attached to the upper plate 64 in such a manner that the extending part 643 of the upper plate 64 is inserted into the slit 73 of the attention-attracting label 7 and an edge of the extending part 644 adjacent to the extending part 643 is fitted to the corner of the notch 74 of the attention-attracting label 7. The upper plate 64, to which the attention-attracting label 7 is attached, is disposed to cover the opening defined by the upper ends of the above-described front plate 61, side plate 62, and rear plate 63, or the opening of the shell 60. At this time, the upper plate 64 is positioned in such a manner that the locking portion 642 of the upper plate 64 is located in front of the covering portion 611 of the front plate 61. A screw 81 is screwed into the screw hole 643A of the extending part 643 of the upper plate 64 and a screw hole 611A of the covering portion 611 of the front plate 61. Furthermore, a screw 82 is screwed into the screw hole 644A of the extending part 644 of the upper plate 64 and the screw hole 622A of the bent portion 622 of the side plate 62. Thus, the upper plate 64 is fastened to the noise isolation unit 6, and the attention-attracting label 7 is fastened to the noise isolation unit 6 in such a manner that the small-width portion 72 is located inside the noise isolation unit 6 and the large-width portion 71 is located outside the noise isolation unit 6. In this arrangement, the attention-attracting label 7 is sandwiched between the upper plate 64 and the front plate 61, and the front surface 71A of the attention-attracting label 7 faces the front plate 61 of the noise isolation unit 6.

[0026] Fig. 5 is a perspective view illustrating an exemplary manner of fastening the attention-attracting label for the compressor in Embodiment of the present invention. As illustrated in Fig. 5, the opposite end of the large-width portion 71 from the end of the large-width

portion 71 connecting to the small-width portion 72 of the attention-attracting label 7 is raised and is attached to the partition 103 with the adhesive tape 9. In other words, part of the attention-attracting label 7 is positioned in proximity to the electric component box 104. Consequently, the front surface 71A of the attention-attracting label 7 faces toward the front surface of the outdoor unit 100.

[0027] Fig. 6 is a perspective view illustrating another exemplary manner of fastening the attention-attracting label for the compressor in Embodiment of the present invention. As illustrated in Fig. 6, the attention-attracting label 7 hangs downward and the opposite end of the large-width portion 71 from the end of the large-width portion 71 connecting to the small-width portion 72 is attached to the front plate 61 of the noise isolation unit 6 with the adhesive tape 9. Thus, a rear surface 71B of the attention-attracting label 7 faces toward the front surface of the outdoor unit 100. In this example, the rear surface 71B also provides the removal instructions for removing the anti-vibration cushions 51, 52, and 53 given in the above-described manner.

[0028] The outdoor unit 100 according to Embodiment includes the attention-attracting label 7 giving the removal instructions for removing the anti-vibration cushions 51, 52, and 53. The attention-attracting label 7, which is visible to an installation worker who installs the outdoor unit, can prevent the installation worker from forgetting to remove the anti-vibration cushions.

[0029] The attention-attracting label 7 is sandwiched between the upper plate 64 and the front plate 61 fastened with the screws 81 and 82. In addition, the extending part 643 of the upper plate 64 extends through the slit 73 of the attention-attracting label 7. To remove the attention-attracting label 7, it is necessary to unscrew the screws 81 and 82 and remove the upper plate 64. Removing the upper plate 64 causes the inside of the noise isolation unit 6 to be exposed, as illustrated in Fig. 2, so that the anti-vibration cushions 51, 52, and 53 are visible to the installation worker. Advantageously, this visibility prompts the installation worker to remove the anti-vibration cushions 51, 52, and 53.

[0030] In Embodiment, the removal instructions for removing the anti-vibration cushions 51, 52, and 53 are given as a combination of text information and image information. This combined information enables an installation worker to understand the removal instructions in a visually intuitive manner.

[0031] In the example of Fig. 5, part of the attention-attracting label 7 is positioned in proximity to the electric component box 104. The electric component box 104 is a component that an installation worker checks without fail when installing the outdoor unit 100. Attaching the attention-attracting label 7 as illustrated in Fig. 5 allows the attention-attracting label 7 to be visible to an installation worker and thus enables the installation worker to notice the attention-attracting label 7.

[0032] In the example of Fig. 6, part of the attention-

attracting label 7 is attached to the front plate 61 of the noise isolation unit 6, and both the front surface 71A and the rear surface 71B give the removal instructions for removing the anti-vibration cushions. The noise isolation unit 6 is a component that an installation worker checks without fail when installing the outdoor unit 100. Attaching the attention-attracting label 7 as illustrated in Fig. 6 allows the attention-attracting label 7 to be visible to an installation worker and thus enables the installation worker to notice the attention-attracting label 7.

[0033] The front plate 61, the side plate 62, the rear plate 63, and the upper plate 64 have different shapes as described above. These plates can be fitted together in only one pattern. After an installation worker disassembles the noise isolation unit 6 to remove the attention-attracting label 7 and remove the anti-vibration cushions 51, 52, and 53, the installation worker can thus easily assemble the noise isolation unit 6. Reference Signs List

[0034] 1 air passage chamber 2 electric component chamber 3 machine chamber 4 compressor 6 noise isolation unit 7 attention-attracting label 9 adhesive tape 11 fan 41 terminal block 42 upper surface 51 anti-vibration cushion 52 anti-vibration cushion 53 anti-vibration cushion 60 shell 61 front plate 62 side plate 63 rear plate 64 upper plate 65 bottom plate 71 large-width portion 71A front surface 71B rear surface 72 small-width portion 73 slit 74 notch 81 screw 82 screw 100 outdoor unit 101 casing 101A bottom panel 102 partition 103 partition 104 electric component box 611 covering portion 611A screw hole 612 fixation portion 613 attachment portion 621 covering portion 622 bent portion 622A screw hole 631 covering portion 632 fixation portion 633 bent portion 641 covering portion 642 locking portion 643 extending part 643A screw hole 644 extending part 644A screw hole

Claims

1. An outdoor unit of an air-conditioning apparatus, the outdoor unit comprising:

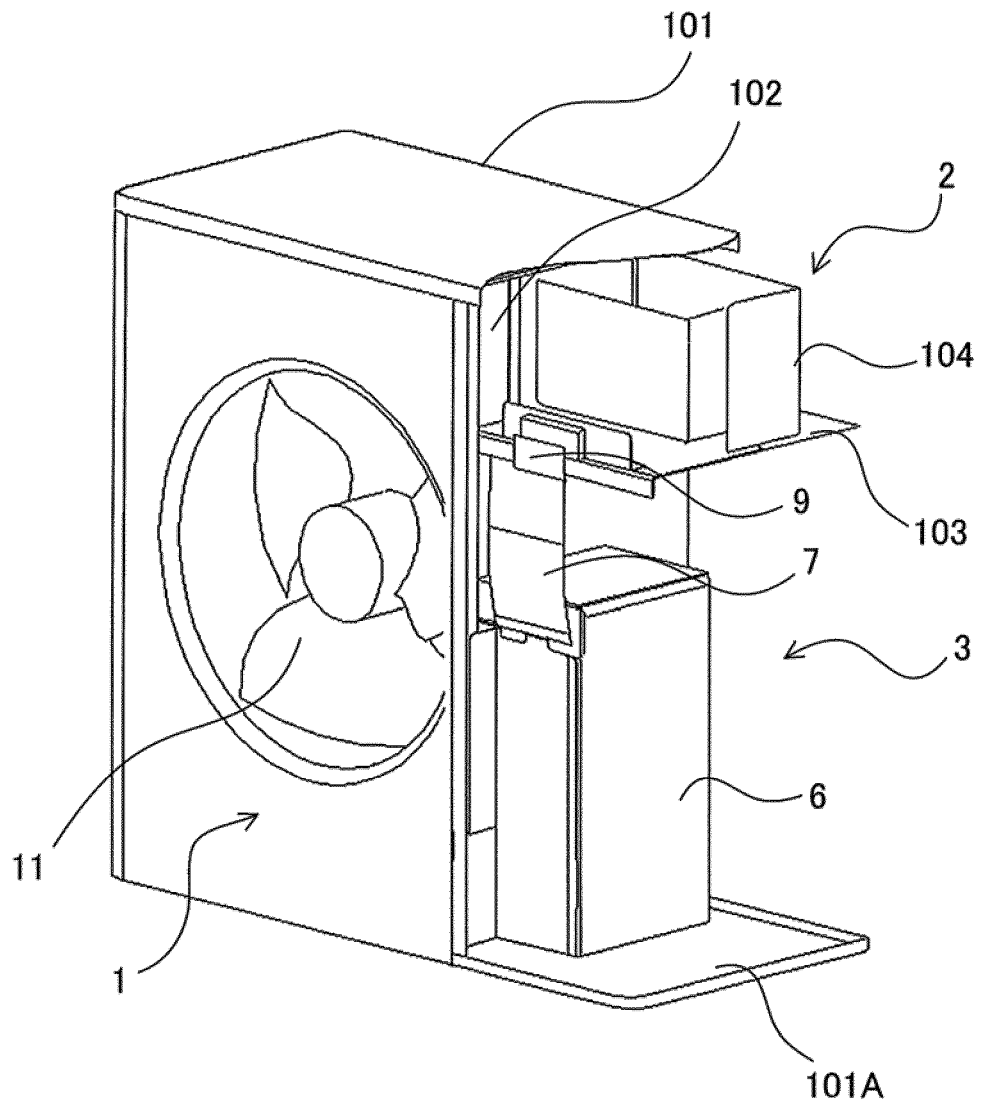
a casing;
a compressor disposed on a bottom of the casing;
a box-shaped noise isolation unit disposed to cover the compressor, the noise isolation unit reducing or eliminating outward propagation of noise generated during operation of the compressor;
an anti-vibration cushion interposed between the compressor and an inner surface of the noise isolation unit, the anti-vibration cushion preventing vibration of the compressor during transportation of the outdoor unit; and
an attention-attracting section giving removal instructions for removing the anti-vibration cushion.

2. The outdoor unit of an air-conditioning apparatus of claim 1, wherein the noise isolation unit includes a shell facing part of a side face of the compressor and having an opening at an upper end of the shell, and an upper plate covering the opening, and wherein the attention-attracting section is sandwiched between the upper plate and the shell in such a manner that a portion on which the removal instructions are given is positioned outside the noise isolation unit. 5 10
3. The outdoor unit of an air-conditioning apparatus of claim 2, wherein the shell includes a front plate disposed adjacent to a front surface of the outdoor unit, a side plate disposed adjacent to a side surface of the outdoor unit, and a rear plate disposed adjacent to a rear surface of the outdoor unit, wherein the upper plate and the front plate are fastened with a screw, and wherein the attention-attracting section is sandwiched between the upper plate and the front plate. 15 20 25
4. The outdoor unit of an air-conditioning apparatus of any one of claims 1 to 3, wherein part of the attention-attracting section is positioned in proximity to an electric component box disposed in the outdoor unit. 30
5. The outdoor unit of an air-conditioning apparatus of any one of claims 1 to 4, wherein the attention-attracting section is a synthetic paper sheet having a predetermined strength. 35
6. The outdoor unit of an air-conditioning apparatus of any one of claims 1 to 5, wherein the removal instructions are given as a combination of text information and image information. 40
7. The outdoor unit of an air-conditioning apparatus of claim 5, wherein the removal instructions are given on at least one of a front surface and a rear surface of the synthetic paper sheet. 45

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FIG. 1



100

FIG. 2

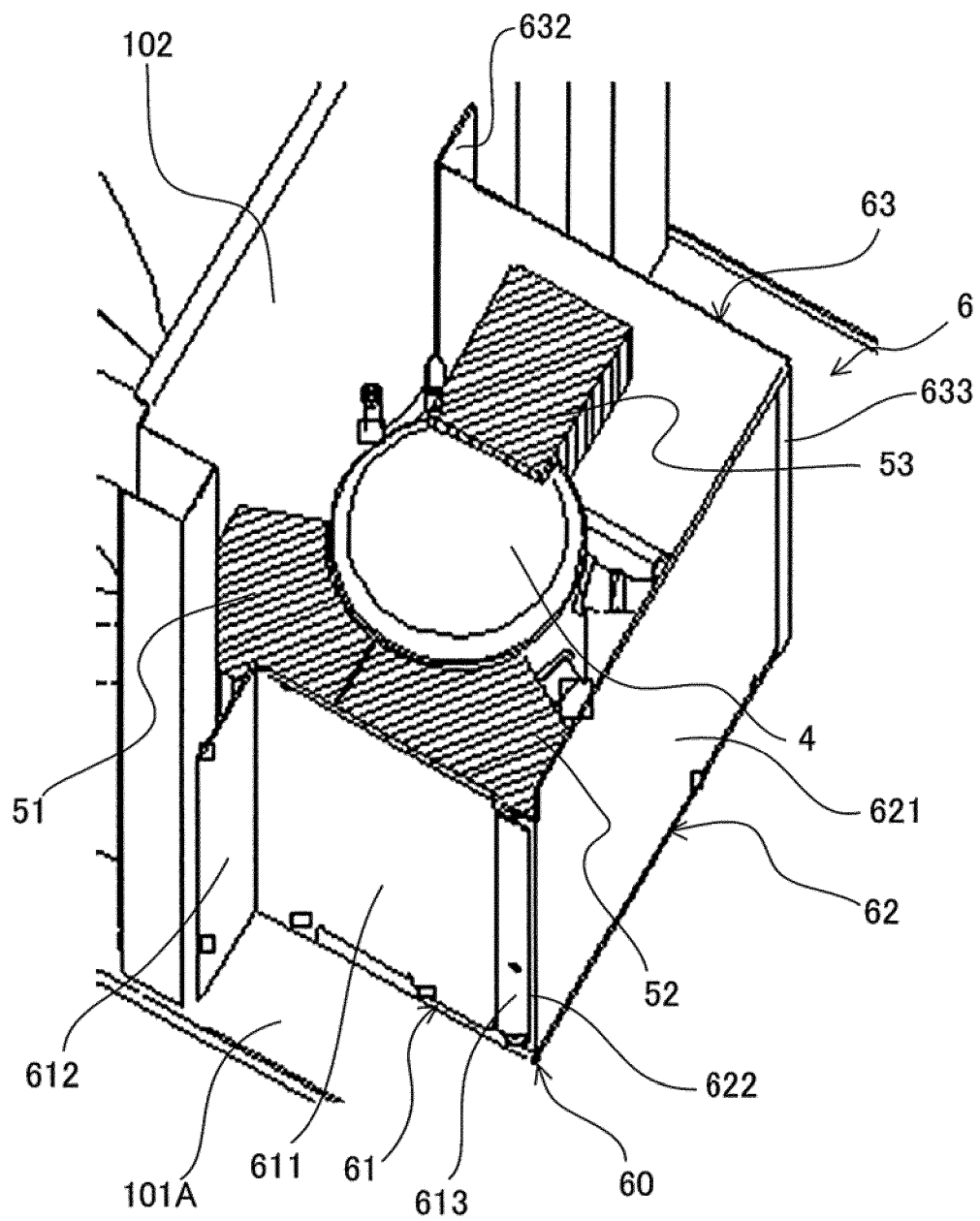


FIG. 3

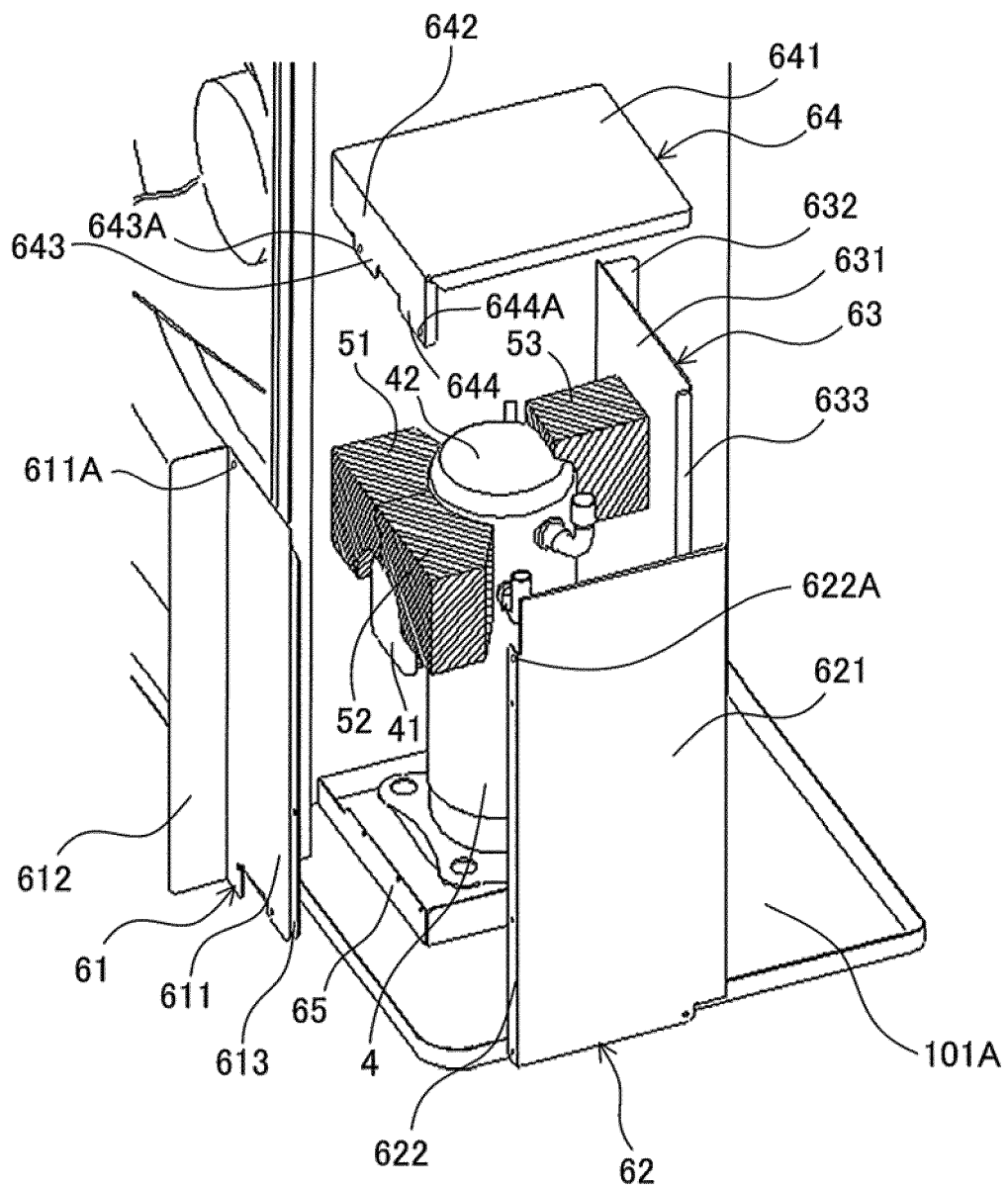


FIG. 4

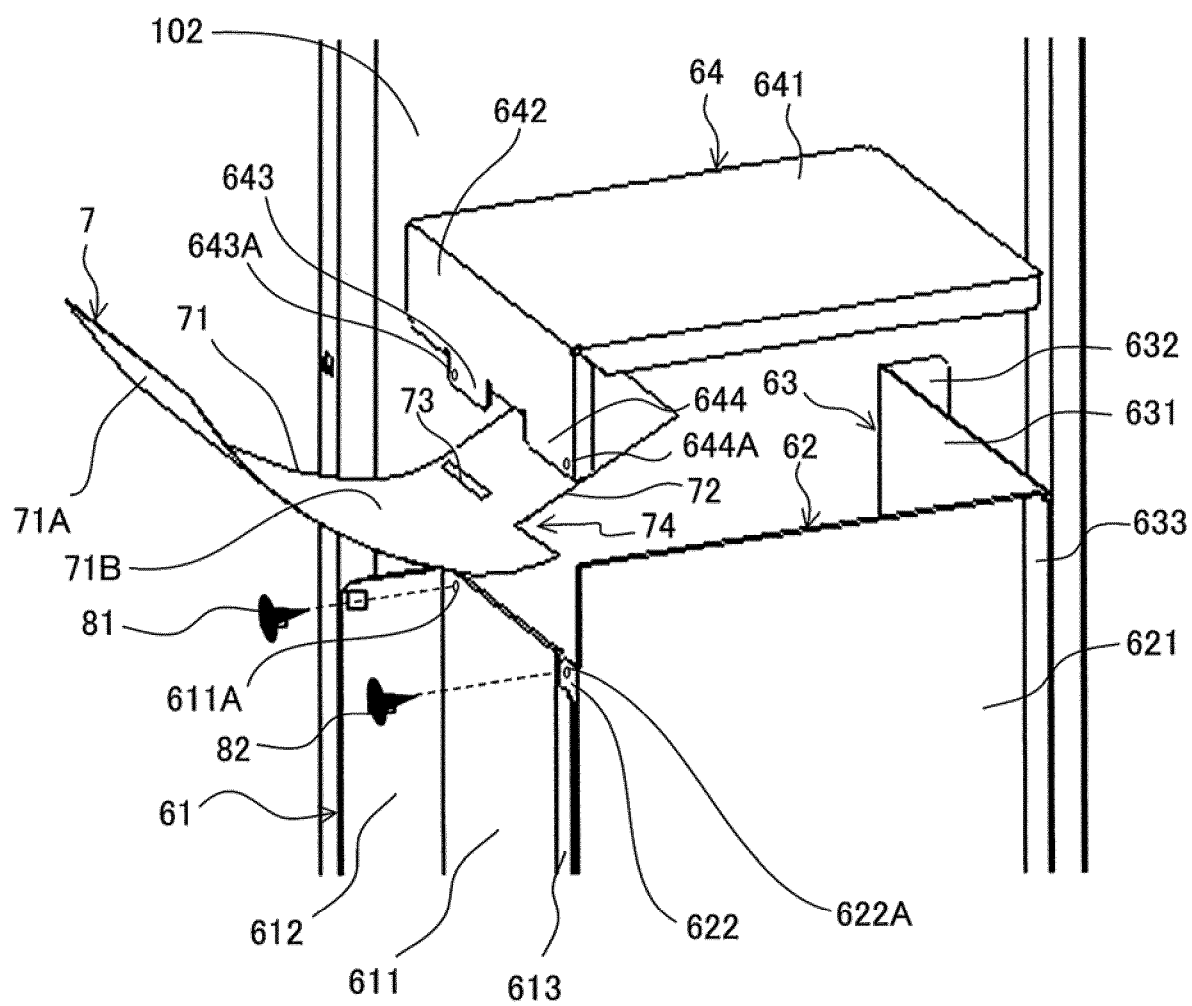


FIG. 5

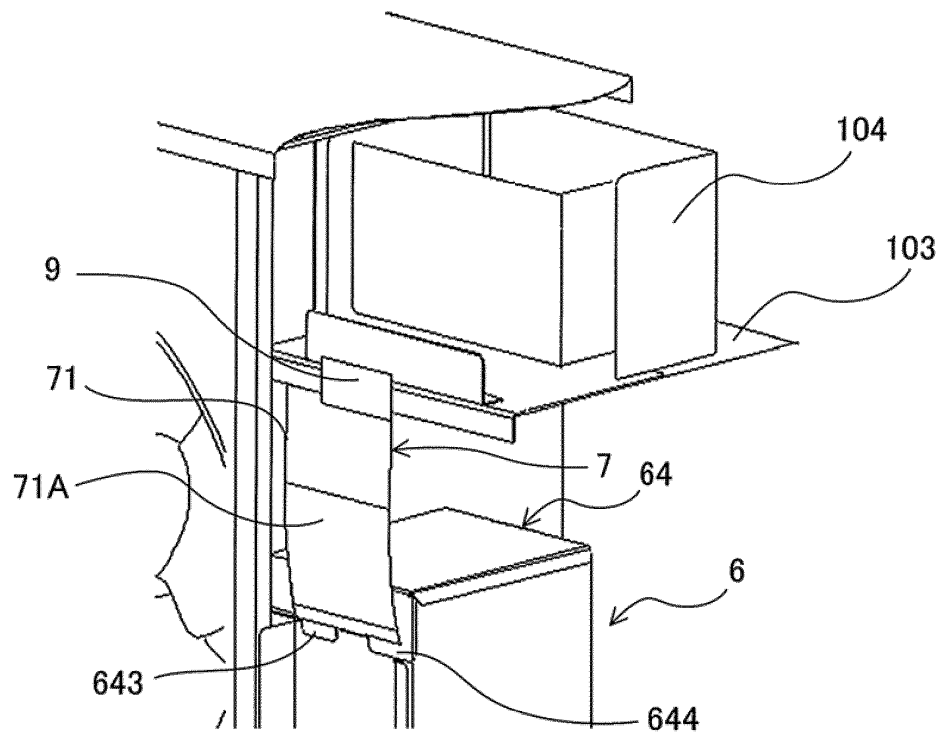
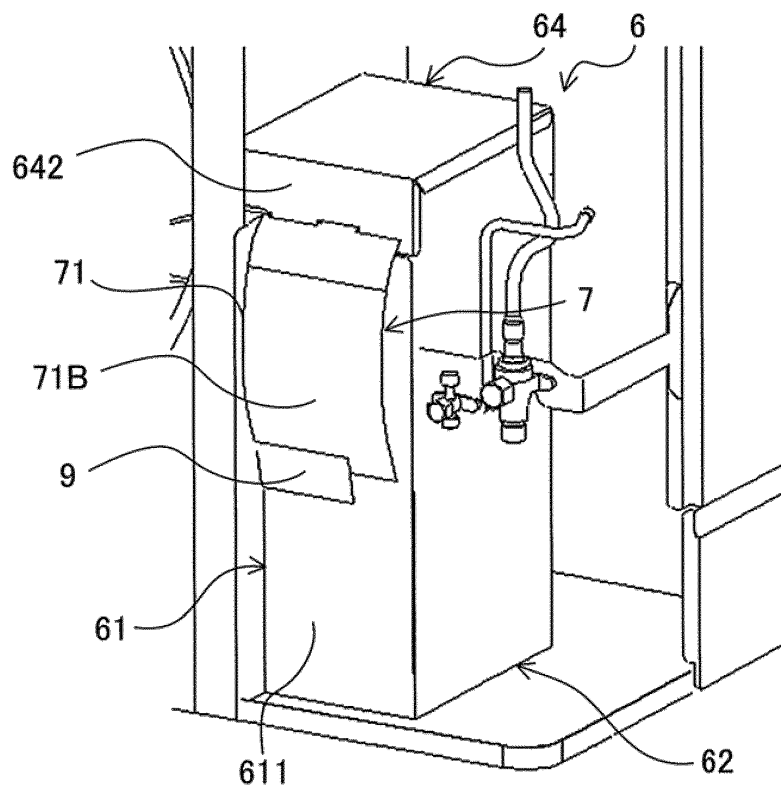


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/014829

A. CLASSIFICATION OF SUBJECT MATTER

F24F1/12(2011.01)i, F24F1/10(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)

F24F1/12, F24F1/10

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 1996-2017

Kokai Jitsuyo Shinan Koho 1971-2017 Toroku Jitsuyo Shinan Koho 1994-2017

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 4-184025 A (Matsushita Electric Industrial Co., Ltd.), 01 July 1992 (01.07.1992), page 1, upper right column, line 18 to page 2, lower right column, line 16; fig. 1 to 3 (Family: none)	1, 4-7 2-3
Y A	JP 2015-161477 A (Sharp Corp.), 07 September 2015 (07.09.2015), paragraphs [0065] to [0072]; fig. 16, 18 (Family: none)	1, 4-7 2-3
Y A	JP 2009-14228 A (Daikin Industries, Ltd.), 22 January 2009 (22.01.2009), paragraphs [0040] to [0050]; fig. 1 to 3 & WO 2009/004766 A1	1, 4-7 2-3

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

* Special categories of cited documents:

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Date of the actual completion of the international search
27 June 2017 (27.06.17)Date of mailing of the international search report
11 July 2017 (11.07.17)Name and mailing address of the ISA/
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Tokyo 100-8915, Japan

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/014829

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 2003-323665 A (Kabushiki Kaisha N&S), 14 November 2003 (14.11.2003), paragraphs [0018] to [0021]; fig. 2 to 5 (Family: none)	5-7
A	JP 7-208771 A (Toshiba Corp.), 11 August 1995 (11.08.1995), paragraphs [0039] to [0057]; fig. 1 to 4 (Family: none)	1-7
A	JP 2014-213873 A (Daikin Industries, Ltd.), 17 November 2014 (17.11.2014), paragraphs [0033] to [0038], [0041] to [0042]; fig. 1 to 4 (Family: none)	1-7
A	JP 3165835 U (Kabushiki Kaisha Watanabe Toso), 10 February 2011 (10.02.2011), paragraph [0022]; fig. 3 (Family: none)	1-7

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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