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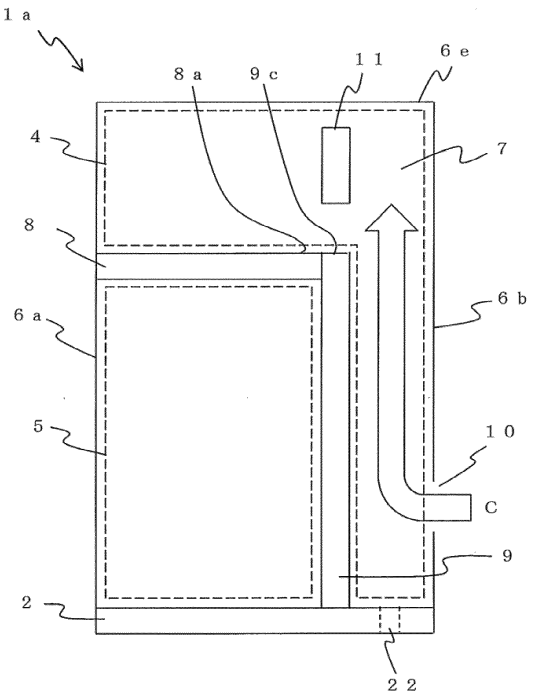
(54) **OUTDOOR MACHINE**

(57) Provided is an outdoor unit, which is capable of cooling electric components, discharging dew condensation water generated in a machine chamber, and enhancing a soundproof effect. The outdoor unit includes: a base metal plate which has a base water-discharge hole; a plurality of outer shell panels; a first partition plate which is mounted to the base metal plate so as to extend upward; a second partition plate which is mounted to one surface of the first partition plate so as to be parallel to the base metal plate; a third partition plate, which is mounted to the base metal plate so as to extend upward, and has an upper end portion continuous with the second partition plate; an air-sending device chamber, which is formed in a casing formed of the base metal plate and the plurality of outer shell panels; an electric component chamber formed, which is formed in the casing; and a machine chamber, which is formed in the casing, the electric component chamber including: the base water-discharge holes; a first airflow hole formed in at least one of the plurality of outer shell panels; and a second airflow hole, which is formed in the first partition plate, communicates with the first airflow hole, and defines an air passage extending upward along the third partition plate between the first airflow hole and the second airflow hole, the machine chamber having a sealed structure without an air intake hole.

FIG. 5

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## Description

Technical Field

**[0001]** The present invention relates to an outdoor unit, and more particularly, to a soundproof structure of the outdoor unit.

Background Art

**[0002]** For example, in an outdoor unit configuring a heat pump apparatus, noise generated during operation needs to be reduced as much as possible because the noise leads to complaints from neighborhood residents. Under such circumstance, local administrations or governments request manufacturers to take measures in some cases. For example, a maximum noise value is provided by standards or laws.

**[0003]** For example, in Patent Literature 1, there has been proposed a technology for suppressing noise generated by a compressor by covering the compressor with a soundproof cover. Further, in Patent Literature 2, there has been proposed a configuration in which a compressor is arranged in a soundproof box.

Citation List

Patent Literature

**[0004]**

Patent Literature 1: Japanese Unexamined Patent Application Publication No. Hei 2-97833
Patent Literature 2: Japanese Unexamined Patent Application Publication No. 2012-242027

Summary of Invention

Technical Problem

**[0005]** As described above, a soundproof member is used with respect to a compressor arranged in a machine chamber so as to reduce noise. However, the soundproof member cannot be provided to a lower part of the compressor because dew condensation water is generated near the lower part of the compressor. Accordingly, sound generated from a refrigerant circuit component other than a compressor, such as sound generated from a refrigerant pipe, cannot be suppressed. Even in a case in which the compressor is covered with the soundproof cover as disclosed in Patent Literature 1, dew condensation water needs to be discharged. Therefore, it is difficult to prevent leakage of sound through water-discharge holes formed in a base metal plate or other members.

**[0006]** In Patent Literature 2, it is described that a plurality of opening portions such as cutout portions and piping holes, which are opened to a space in which the air-sending device is arranged, are formed in the soundproof box accommodating the compressor. The sound of the compressor having leaked through those openings leaks to an outside with an outside air from the space in which the air-sending device is arranged. Thus, it is difficult to prevent the leakage of sound to the outside.

**[0007]** The present invention has been made to solve the above-mentioned problem, and has an object to provide an outdoor unit, which is capable of cooling electric components, discharging dew condensation water generated in a machine chamber, and enhancing a soundproof effect.

Solution to Problem

**[0008]** According to one embodiment of the present invention, there is provided an outdoor unit, including: a base metal plate which has a base water-discharge hole; a plurality of outer shell panels which surround the base metal plate; a first partition plate which is mounted to the base metal plate so as to extend upward; a second partition plate which is mounted to one surface of the first partition plate so as to be parallel to the base metal plate; a third partition plate, which is mounted to the base metal plate so as to extend upward, and has an upper end portion continuous with the second partition plate; an air-sending device chamber, which is formed in a casing formed of the base metal plate and the plurality of outer shell panels and partitioned by the first partition plate, and is a space opposite to the second partition plate across the first partition plate; an electric component chamber, which is formed in the casing and partitioned by the first partition plate and the third partition plate, and is a space defined by a surface of the first partition plate to which the second partition plate is mounted and an upper surface of the second partition plate; and a machine chamber, which is formed in the casing and partitioned by the first partition plate and the third partition plate, and is a space defined by the surface of the first partition plate to which the second partition plate is mounted and a lower surface of the second partition plate, the electric component chamber including: the base water-discharge holes; a first airflow hole formed in at least one of the plurality of outer shell panels; and a second airflow hole, which is formed in the first partition plate, communicates with the first airflow hole, and defines an air passage extending upward along the third partition plate between the first airflow hole and the second airflow hole, the machine chamber having a sealed structure without an air intake hole.

Advantageous Effects of Invention

**[0009]** In the outdoor unit according to one embodiment of the present invention, the electric component chamber is defined by the second partition plate, which is mounted perpendicular to the first partition plate configured to partition the casing. The machine chamber,

which is sealed by the third partition plate mounted to the second partition plate at a right angle and accommodates the compressor, is defined. On the side of the third partition plate opposite to the machine chamber, the air passage for allowing flow of air is formed. Thus, electric components can be cooled, and leakage of noise to the outside through an opening can be prevented.

Brief Description of Drawings

**[0010]**

[Fig. 1] Fig. 1 is a perspective view of an outdoor unit according to one embodiment of the present invention when viewed from a front side.
[Fig. 2] Fig. 2 is a back view of the outdoor unit of Fig. 1.
[Fig. 3] Fig. 3 is a perspective view of a base metal plate of Fig. 1.
[Fig. 4] Fig. 4 is a perspective view for illustrating structures of partition plates provided in the outdoor unit 1 of Fig. 1.
[Fig. 5] Fig. 5 is a schematic view for illustrating an inside of the outdoor unit of Fig. 4 when viewed from a direction indicated by the arrow A, and is a cross section taken along the line a-a.
[Fig. 6] Fig. 6 is a schematic view for illustrating the inside of the outdoor unit of Fig. 4 when viewed from a direction indicated by the arrow B.
[Fig. 7] Fig. 7 is an exploded perspective view of a compressor sound-insulation box which accommodates a compressor.
[Fig. 8] Fig. 8 is a perspective view for illustrating a state in which a sound-insulation-box metal plate is mounted in the outdoor unit.
[Fig. 9] Fig. 9 is a partial enlarged view for illustrating a joining portion of a third partition plate of Fig. 8.

Description of Embodiments

Embodiment

**[0011]** An outdoor unit according to an embodiment of the present invention configures, for example, a heat pump apparatus. Fig. 1 is a perspective view of an outdoor unit 1 according to the embodiment. As illustrated in Fig. 1, an outer shell panel 6a on a front side, an outer shell panel 6b on a back side, outer shell panels 6c and 6d on lateral sides, an outer shell panel 6e on a top side, and a base metal plate 2 form outer portions of the outdoor unit 1. Specifically, the base metal plate 2 and the outer shell panels 6a to 6e surrounding the base metal plate 2 form a casing 1a of the outdoor unit 1. The outdoor unit 1 accommodates a fan, a fan motor, an air-heat exchanger, and a compressor. Air is caused to flow from the outer shell panel 6b on the back side to the outer shell panel 6a on the front side by drive of the fan, thereby performing heat exchange between the air and refrigerant in the air-heat exchanger. The outdoor unit 1, which accommodates the air-heat exchanger and the compressor, and an indoor unit, which accommodates an indoor-side heat exchanger and an expander, are connected to each other by a refrigeration circuit, to thereby form a refrigeration cycle. A four-way valve configured to switch a flow direction of the refrigerant and an accumulator configured to accumulate the refrigerant may be connected to the refrigeration circuit forming the refrigeration cycle as appropriate.

**[0012]** Fig. 2 is a back view of the outdoor unit 1 of Fig. 1. As illustrated in Fig. 2, an opening for taking in air for performing heat exchange in the air-heat exchanger and a first airflow hole 10 having a rectangular shape are formed in the outer shell panel 6b on the back side. The first airflow hole 10 is formed so as to take in air for cooling electric components accommodated in the outdoor unit 1.

**[0013]** Fig. 3 is a perspective view of the base metal plate 2 of Fig. 1. As illustrated in Fig. 3, a plurality of recessed portions 12, a plurality of protruding portions 13, and a plurality of base water-discharge holes 22 are formed in the base metal plate 2 on a bottom side of the outdoor unit 1. The base metal plate 2 is a region for receiving dew condensation water generated in the outdoor unit 1. The plurality of recessed portions 12 and the plurality of protruding portions 13 form water-discharge passages 14. The water-discharge passages 14 cause the dew condensation water received in the base metal plate 2 to gather, to reach the base water-discharge holes 22 communicating with the water-discharge passages 14, and to be discharged to the outside through the base water-discharge holes 22. The water-discharge passages 14 may be formed by, for example, subjecting a metal plate to drawing. It is not always required that the water-discharge passages 14 have a constant width, and a shape thereof is not particularly limited. However, it is preferred that the water-discharge passages 14 be formed into, for example, a plurality of lines which extend toward the lateral sides and merge at the lateral sides.

**[0014]** Fig. 4 is a perspective view for illustrating configurations of partition plates provided in the outdoor unit 1 of Fig. 1. The arrow B of Fig. 4 indicates a direction toward the front side of the outdoor unit 1. As illustrated in Fig. 4, the inside of the outdoor unit 1 is partitioned by a first partition plate 7, a second partition plate 8, and a third partition plate 9. The first partition plate 7 is mounted to the base metal plate 2 so as to extend upward, and has a second airflow hole 11 having a rectangular shape in an upper part of the first partition plate 7. The air taken in through the first airflow hole 10 formed in the outer shell panel 6b on the back side reaches and flows through the second airflow hole 11. The second partition plate 8 is mounted to one surface of the first partition plate 7 so as to be parallel to the base metal plate 2, and is positioned below the second airflow hole 11 and above the first airflow hole 10. Further, a cutout 8a having a rectangular shape is formed in a corner portion at which the second partition plate 8 is in contact with the first partition

plate 7. The cutout 8a is formed to cause the air taken in through the first airflow hole 10 to flow through and reach the second airflow hole 11. The third partition plate 9 is mounted to the base metal plate 2 so as to extend upward. Further, the third partition plate 9 is bent into an L shape in front view. One end portion 9a of the third partition plate 9 is mounted perpendicular to the first partition plate 7, and an other end portion 9b of the third partition 9 is mounted perpendicular to the outer shell panel 6b on the back side. An upper end 9c of the third partition plate 9 is continuous with the cutout 8a of the second partition plate 8 at a right angle, and defines an air passage which extends from the first airflow hole 10 to reach the second airflow hole 11.

**[0015]** Fig. 5 is a schematic view for illustrating the inside of the outdoor unit 1 of Fig. 4 when viewed from a direction indicated by the arrow A, and is a cross section taken along the line a-a. An outlined arrow of Fig. 5 indicates an air passage C formed from the first airflow hole 10 to the second airflow hole 11. Fig. 6 is a schematic view for illustrating the inside of the outdoor unit 1 of Fig. 4 when viewed from a direction of the arrow B. As illustrated in Fig. 5 and Fig. 6, the first partition plate 7, the second partition plate 8, and the third partition plate 9 divide a space in the casing 1a into an air-sending device chamber 3, an electric component chamber 4, and a machine chamber 5.

**[0016]** The air-sending device chamber 3 is a space opposite to the second partition plate 8 in the casing 1a which is partitioned by the first partition plate 7. The air-sending device chamber 3 accommodates the heat exchanger, the fan, the fan motor, and other components. Openings are formed in the outer shell panel 6a on the front side and the outer shell panel 6b on the back side, respectively. Through drive of the fan, the air is taken in through the opening formed in the outer shell panel 6b on the back side, and is caused to flow toward the outer shell panel 6a on the front side, while being in contact with the air-heat exchanger.

**[0017]** The electric component chamber 4 is a space defined by a surface of the first partition plate 7 to which the second partition plate 8 is mounted and an upper surface of the second partition plate 8 in a space of the casing 1a which is partitioned by the first partition plate 7 and the third partition plate 9. On the upper surface of the second partition plate 8 of the electric component chamber 4, electric components such as a controller are arranged. The electric component chamber 4 extends downward along the third partition plate 9 continuous with the second partition plate 8, and the base metal plate 2 forms a lowermost portion of the electric component chamber 4. The third partition plate 9 defines the air passage C between the third partition plate 9 and the outer shell panel 6b on the back side, and causes the air taken in through the first airflow hole 10 to flow upward and flow out to the air-sending device chamber 3 through the second airflow hole 11. The base water-discharge holes 22 are positioned in the base metal plate 2 being the lowermost portion of the electric component chamber 4, and the dew condensation water received by the base metal plate 2 is discharged.

**[0018]** The machine chamber 5 is a space defined by the surface of the first partition plate 7 to which the second partition plate 8 is mounted and a lower surface of the second partition plate 8 in the casing 1a which is partitioned by the first partition plate 7 and the third partition plate 9. The surfaces defining this space have no opening. Thus, the space has a sealed structure having no path directly communicating to the outside. Herein, the sealed structure refers to a closed space having such a degree of sealing similar to that of a closed room having a gap allowing flow of air or fluid, and is not strictly sealed to an extent of blocking entry of air. In the machine chamber 5, the compressor and a refrigerant pipe are accommodated. Low-temperature and low-pressure refrigerant having been transferred through the refrigerant pipe is compressed to be formed into high-temperature and high-pressure refrigerant, and is discharged. The low-temperature and low-pressure refrigerant is refrigerant to be discharged from any one of the indoor-side heat exchanger provided in the indoor unit and the air-heat exchanger provided in the outdoor unit 1, which functions as an evaporator.

**[0019]** Fig. 7 is an exploded perspective view of a compressor sound-insulation box 16 which accommodates the compressor 18. As illustrated in Fig. 7, the compressor 18 is accommodated in the compressor sound-insulation box 16. The compressor sound-insulation box 16 is a box body having a shape of a quadrangular prism formed of sound-insulation-box metal plates 17a to 17f. Among the sound-insulation-box metal plates 17a to 17f, the sound-insulation-box metal plate 17f on the bottom side has a sound-insulation-box water-discharge hole 20 for discharging the dew condensation water generated in a periphery of the compressor 18. Further, sound-absorbing members 19a to 19e such as sound-absorbing felt are mounted to an inner surface of the sound-insulation-box metal plate 17a on the top side and inner surfaces of the sound-insulation-box metal plates 17b to 17e on lateral sides, respectively. The compressor 18 is arranged in the machine chamber 5 under a state of being accommodated in the compressor sound-insulation box 16.

**[0020]** Fig. 8 is a perspective view for illustrating a state in which the sound-insulation-box metal plate 17f is mounted in the outdoor unit 1. As illustrated in Fig. 8, the sound-insulation-box metal plate 17f is arranged so that the sound-insulation-box water-discharge hole 20 is positioned directly above the recessed portion 12 on the upper surface of the base metal plate 2, and is fixed to the protruding portions 13. The sound-insulation-box water-discharge hole 20 causes the dew condensation water generated in the compressor sound-insulation box 16 to be discharged to the water-discharge passages 14. The water-discharge passages 14 causes the dew condensation water having been discharged to flow and

reach the base water-discharge holes 22 positioned in the lowermost portion of the electric component chamber 4.

**[0021]** Fig. 9 is a partial enlarged view for illustrating a joining portion of the third partition plate 9 of Fig. 8. As illustrated in Fig. 9, the third partition plate 9 is joined to the base metal plate 2 at a lower end of the third partition plate 9, and partitions the electric component chamber 4 and the machine chamber 5. The lower end of the third partition plate 9 is joined to the protruding portion 13 of the base metal plate 2, and defines the water-discharge passages 14 with the adjacent recessed portion 12, thereby allowing the water-discharge passages 14 to reach the base water-discharge holes 22 formed in the electric component chamber 4. As described above, the sound-insulation-box water-discharge hole 20, which is formed in a lower part of the compressor sound-insulation box 16, and the base water-discharge holes 22 communicate with each other through the water-discharge passages 14, and hence the machine chamber 5 accommodating the compressor 18 communicates to the outside through the base water-discharge holes 22. The dew condensation water having been discharged through the sound-insulation-box water-discharge hole 20 reaches the base water-discharge holes 22 from the sound-insulation-box water-discharge hole 20 through the water-discharge passages 14, and is discharged to the outside of the outdoor unit 1.

**[0022]** Next, actions of the outdoor unit 1 are described. When operation of the outdoor unit 1 is started, the controller accommodated in the electric component chamber 4 starts processing. With this action, operation of the compressor 18 in the machine chamber 5 and operation of an air-sending device in the air-sending device chamber 3 are started, and hence circulation of refrigerant in the refrigeration circuit is started. The air-sending device sends air to the air-heat exchanger. The compressor 18 compresses low-temperature and low-pressure refrigerant having flowed into the compressor 18 to be formed into high-temperature and high-pressure refrigerant, and causes the high-temperature and high-pressure refrigerant to be discharged through the refrigerant pipe. During the operation of the outdoor unit 1, the actions described above are repeated.

**[0023]** At this time, drive of the compressor 18 generates sound, and the dew condensation water is generated in a periphery of the pipe through which the low-temperature refrigerant flows. The dew condensation water flows downward along the compressor 18 and the periphery of the pipe, and reaches the bottom side of the compressor sound-insulation box 16. The dew condensation water flows out through the sound-insulation-box water-discharge hole 20, which is formed on the bottom side of the compressor sound-insulation box 16, and drops to the recessed portion 12 of the base metal plate 2, which is positioned directly below the sound-insulation-box water-discharge hole 20. The water-discharge passages 14 defined by the recessed portions 12 guides the dew condensation water to the electric component chamber 4, which is separated from the machine chamber 5 by the third partition plate 9. Then, the dew condensation water reaches the base water-discharge holes 22 arranged in the electric component chamber 4, and is discharged to the outside of the outdoor unit.

**[0024]** Meanwhile, the sound generated by the compressor 18 hits the sound-insulation-box metal plates 17a to 17f of the compressor sound-insulation box 16 accommodating the compressor 18. The sound having hit the sound-insulation-box metal plates 17a to 17e is absorbed by the sound-absorbing members 19a to 19e, and is eliminated. Further, the sound having hit the sound-insulation-box metal plate 17f having none of the sound-absorbing members 19a to 19e leaks through the sound-insulation-box water-discharge hole 20 to the base metal plate 2. The sound is blocked by the plurality of recessed portions 12 and the plurality of protruding portions 13, which are formed in the base metal plate 2, and is eventually eliminated.

**[0025]** Further, drive of the air-sending device in the air-sending device chamber 3 adjacent to the electric component chamber 4 causes air to flow through the second airflow hole 11 formed in the electric component chamber 4. When the air flows out through the second airflow hole 11, the air is taken in through the first airflow hole 10, and flows through the air passage C defined by the third partition plate 9. With this action, the air flowing through the air passage C flows in the vicinity of an upper surface of the second partition plate 8, thereby being capable of cooling the electric components generating heat caused by the drive.

**[0026]** As described above, the base metal plate 2, which has the plurality of recessed portions 12 and the plurality of protruding portions 13, and the compressor sound-insulation box 16 have a two-layer structure in which a space is defined. With this structure, the dew condensation water generated in the periphery of the compressor 18 flows out through the sound-insulation-box water-discharge hole 20, and can be discharged to the outside through the base water-discharge holes 22 via the water-discharge passages 14. Further, the sound generated by the compressor 18 is absorbed by the sound-absorbing members 19a to 19e of the compressor sound-insulation box 16. The sound having leaked through the sound-insulation-box water-discharge hole 20 is reflected and absorbed by the water-discharge passages 14 defined by the plurality of recessed portions 12 and the plurality of protruding portions 13, and is eliminated. Thus, leakage of the sound to the outside is prevented. Further, the air passage C is defined by the third partition plate 9 partitioning the machine chamber 5 and the electric component chamber 4. Thus, the electric components in the electric component chamber 4 can be cooled without leakage of the sound through the first airflow hole 10 for taking in the air.

**[0027]** In the outdoor unit 1 according to the embodiment described above, the electric component chamber

is defined by the second partition plate 8 perpendicular to the first partition plate 7 partitioning the casing 1a, and the machine chamber 5 accommodating the compressor 18 is defined by the third partition plate 9 joining the second partition plate 8 at a right angle. The machine chamber 5 has a sealed structure having no path directly communicating to the outside. Thus, leakage of the sound of the compressor 18 is prevented, and the dew condensation water generated in the periphery of the compressor 18 flows through the water-discharge passages 14 of the base metal plate 2 to reach the base water-discharge holes 22. Further, the electric components are cooled by the air flowing through the air passage C formed from the first airflow hole 10 to the second airflow hole 11 in the electric component chamber 4. With this action, discharge of the dew condensation water and cooling of the electric components can sufficiently be performed while leakage of the noise to the outside through the openings formed in the outdoor unit 1 can be prevented.

**[0028]** The air passage C is defined from the first airflow hole 10 formed below the second partition plate 8 toward the second airflow hole 11 formed above the second partition plate 8. Thus, the electric components can efficiently be cooled.

**[0029]** The air passage C defined from the first airflow hole 10 to the second airflow hole 11 passes through the cutout 8a formed in the second partition plate 8.

**[0030]** The sound having leaked through the sound-insulation-box water-discharge hole 20 is absorbed by the side surfaces of the water-discharge passages 14, or is eliminated through transmission in a direction extending along the side surfaces of the water-discharge passages 14. Thus, the sound is less liable to reach the base water-discharge holes 22.

**[0031]** The dew condensation water having flowed through the water-discharge passages 14 passes through gaps of the recessed portions 12 formed between the third partition plate 9 and the base metal plate 2, and reaches the base water-discharge holes 22, so that the dew condensation water can be discharged.

**[0032]** The compressor sound-insulation box 16 which accommodates the compressor 18 includes the sound-insulation-box water-discharge hole 20 through which the dew condensation water generated in the compressor 18 is discharged, and the sound-absorbing members 19a to 19e which absorb the sound. Thus, leakage of the noise through the base water-discharge holes 22 is prevented, and the dew condensation water can be discharged.

**[0033]** The compressor sound-insulation box 16 is fixed to the protruding portions 13 of the base metal plate 2. Thus, the dew condensation water having dropped from the compressor sound-insulation box 16 to the water-discharge passages 14 can flow out through the recessed portions 12 between the compressor sound-insulation box 16 and the base metal plate 2.

**[0034]** The dew condensation water generated in the compressor sound-insulation box 16 drops to the water-discharge passages 14, and flows through the water-discharge passages 14 between the compressor sound-insulation box 16 and the base metal plate 2, so that the dew condensation water can be discharged to the outside of the compressor sound-insulation box 16.

**[0035]** The sound having leaked through the sound-insulation-box water-discharge hole 20 does not directly reach the base water-discharge holes 22 through the sound-insulation-box water-discharge hole 20, but hits the walls of the water-discharge passages 14, which are formed in the middle way to the sound-insulation-box water-discharge hole 20. Thus, the sound is eliminated before reaching the base water-discharge holes 22.

**[0036]** The electric components are accommodated in the electric component chamber 4, and the compressor is accommodated in the machine chamber 5. Thus, the sound generated by the compressor 18 can be suppressed, and the electric components can be cooled.

Reference Signs List

**[0037]** 1 outdoor unit 1a casing 2 base metal plate 3 air-sending device chamber 4 electric component chamber5 machine chamber 6a-6e outer shell panel 7 first partition plate 8 second partition plate 8a cutout 9 third partition plate 9a end portion 9b end portion 9c upper end 10 first airflow hole 11 second airflow hole 12 recessed portion 13 protruding portion 14 water-discharge passage 16 compressor sound-insulation box 17a-17f sound-insulation-box metal plate 18 compressor 19a-19e sound-absorbing member 20 sound-insulation-box water-discharge hole 22 base water-discharge hole

## Claims

**1.** An outdoor unit, comprising:

a base metal plate having a base water-discharge hole;
a plurality of outer shell panels surrounding the base metal plate;
a first partition plate mounted to the base metal plate so as to extend upward;
a second partition plate mounted to one surface of the first partition plate to be parallel to the base metal plate;
a third partition plate mounted to the base metal plate to extend upward, and has an upper end portion continuous with the second partition plate;
an air-sending device chamber formed in a casing formed of the base metal plate and the plurality of outer shell panels and partitioned by the first partition plate, and being a space opposite to the second partition plate across the first partition plate;
an electric component chamber formed in the

casing and partitioned by the first partition plate and the third partition plate, and being a space defined by a surface of the first partition plate to which the second partition plate is mounted and an upper surface of the second partition plate; and

a machine chamber formed in the casing and partitioned by the first partition plate and the third partition plate, and being a space defined by the surface of the first partition plate to which the second partition plate is mounted and a lower surface of the second partition plate,

the electric component chamber including

the base water-discharge hole,

a first airflow hole formed in at least one of the plurality of outer shell panels, and

a second airflow hole formed in the first partition plate, communicating with the first airflow hole, and defining an air passage extending upward along the third partition plate between the first airflow hole and the second airflow hole,

the machine chamber having a sealed structure, without an air intake hole.

**2.** The outdoor unit of claim 1, wherein
the first airflow hole is formed at a position below the second partition plate, and
the second airflow hole is formed at a position above the second partition plate.

**3.** The outdoor unit of claim 1 or 2, wherein
the second partition plate is continuous with an upper end portion of the third partition plate, and has a cutout which defines the air passage.

**4.** The outdoor unit of any one of claims 1 to 3, wherein
the base metal plate has a recessed portion and a protruding portion on an upper surface of the base metal plate, and
the recessed portion and the protruding portion define a water-discharge passage connected to the base water-discharge hole.

**5.** The outdoor unit of claim 4, wherein
the recessed portion defines a gap between the base metal plate and the third partition plate, and
the gap defines the water-discharge passage.

**6.** The outdoor unit of claim 4 or 5, wherein
the outdoor unit further comprises a compressor sound-insulation box, which accommodates a compressor and is arranged in the machine chamber,
the compressor sound-insulation box has
a lower surface in which a sound-insulation-box water-discharge hole is formed, and
sound-absorbing members arranged on inner side surfaces and an inner upper surface of the compressor sound-insulation box.

**7.** The outdoor unit of claim 6, wherein the compressor sound-insulation box is fixed to the protruding portion of the water-discharge passage.

**8.** The outdoor unit of claim 6 or 7, wherein the base metal plate and the compressor sound-insulation box have a gap which defines the water-discharge passage.

**9.** The outdoor unit of any one of claims 6 to 8, wherein the water-discharge passage comprises a plurality of water-discharge passages which are formed between the sound-insulation-box water-discharge hole and the base water-discharge hole.

**10.** The outdoor unit of any one of claims 1 to 9, wherein the air-sending device chamber accommodates a fan, a fan motor, and a heat exchanger,
the machine chamber accommodates the compressor and a refrigerant pipe, and
the electric component chamber accommodates an electric component.

FIG. 1

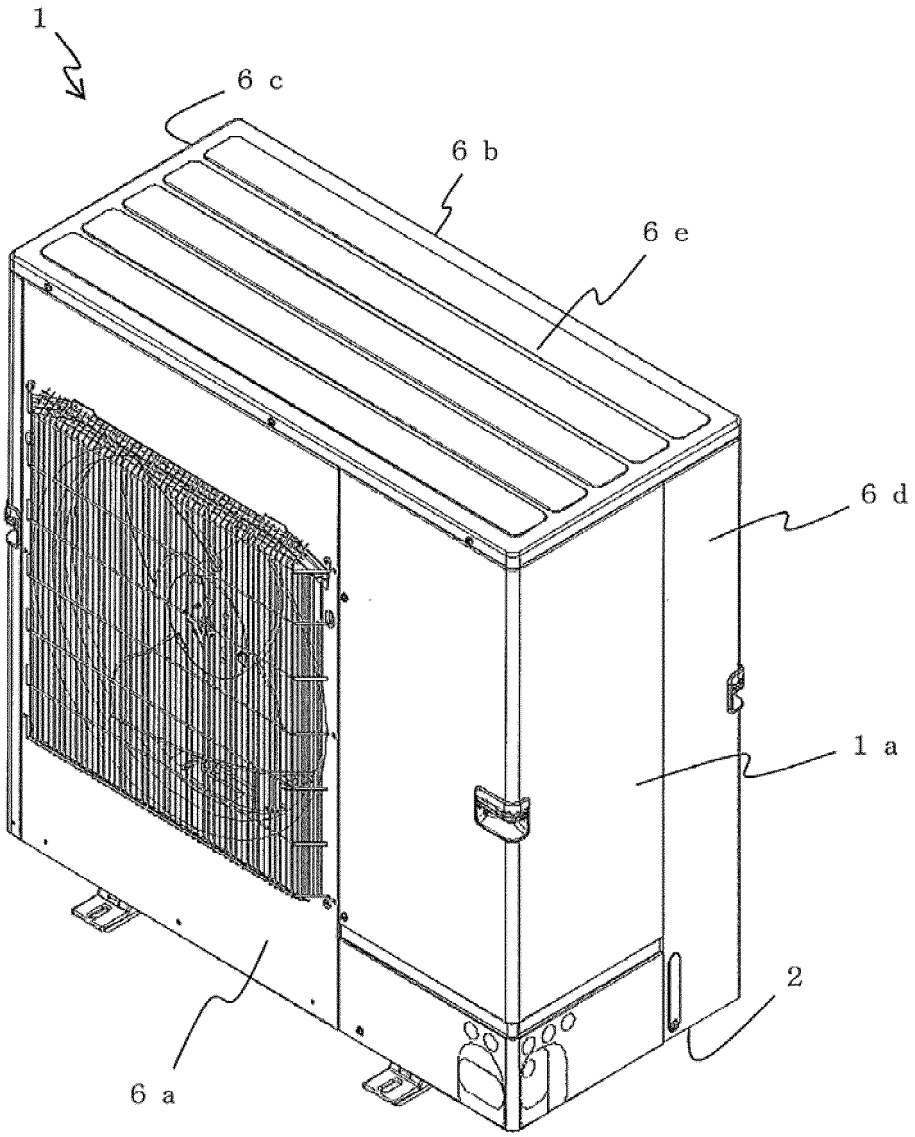


FIG. 2

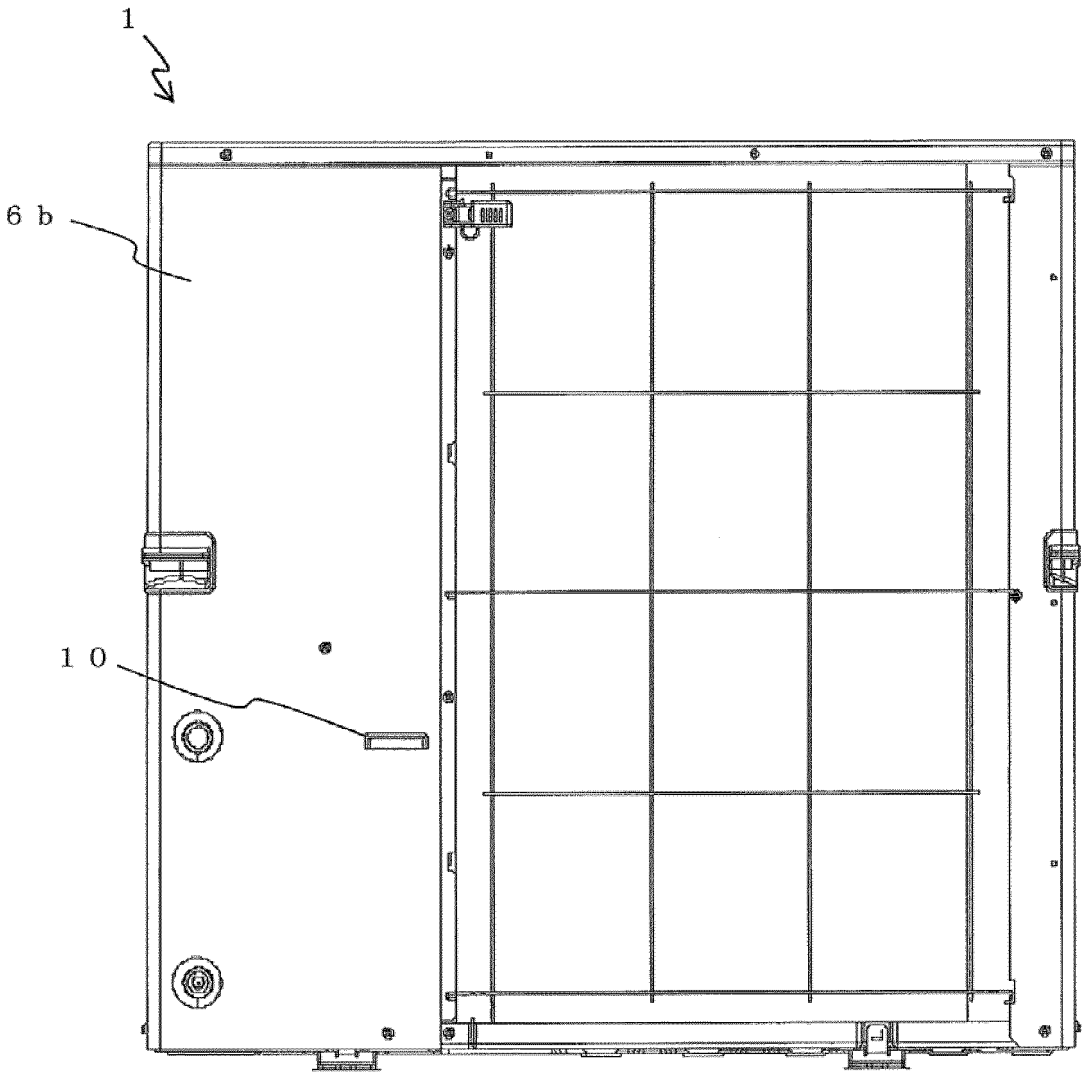


FIG. 3

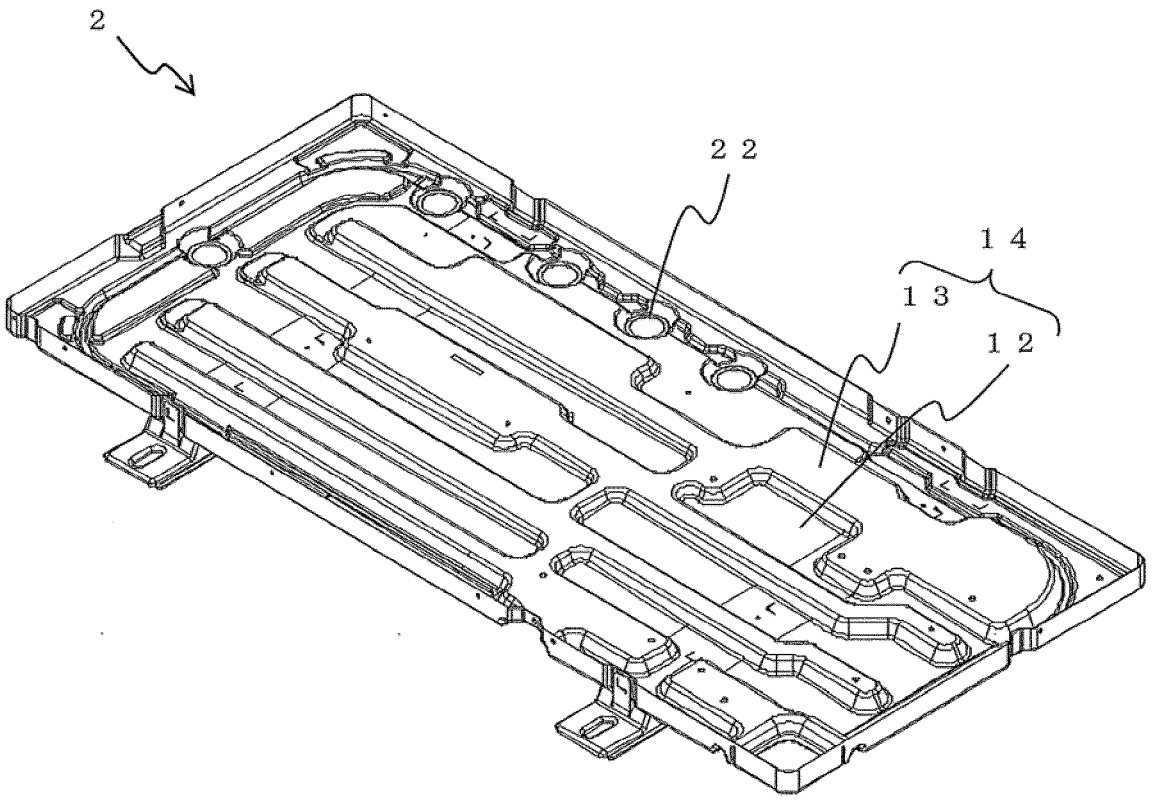


FIG. 4

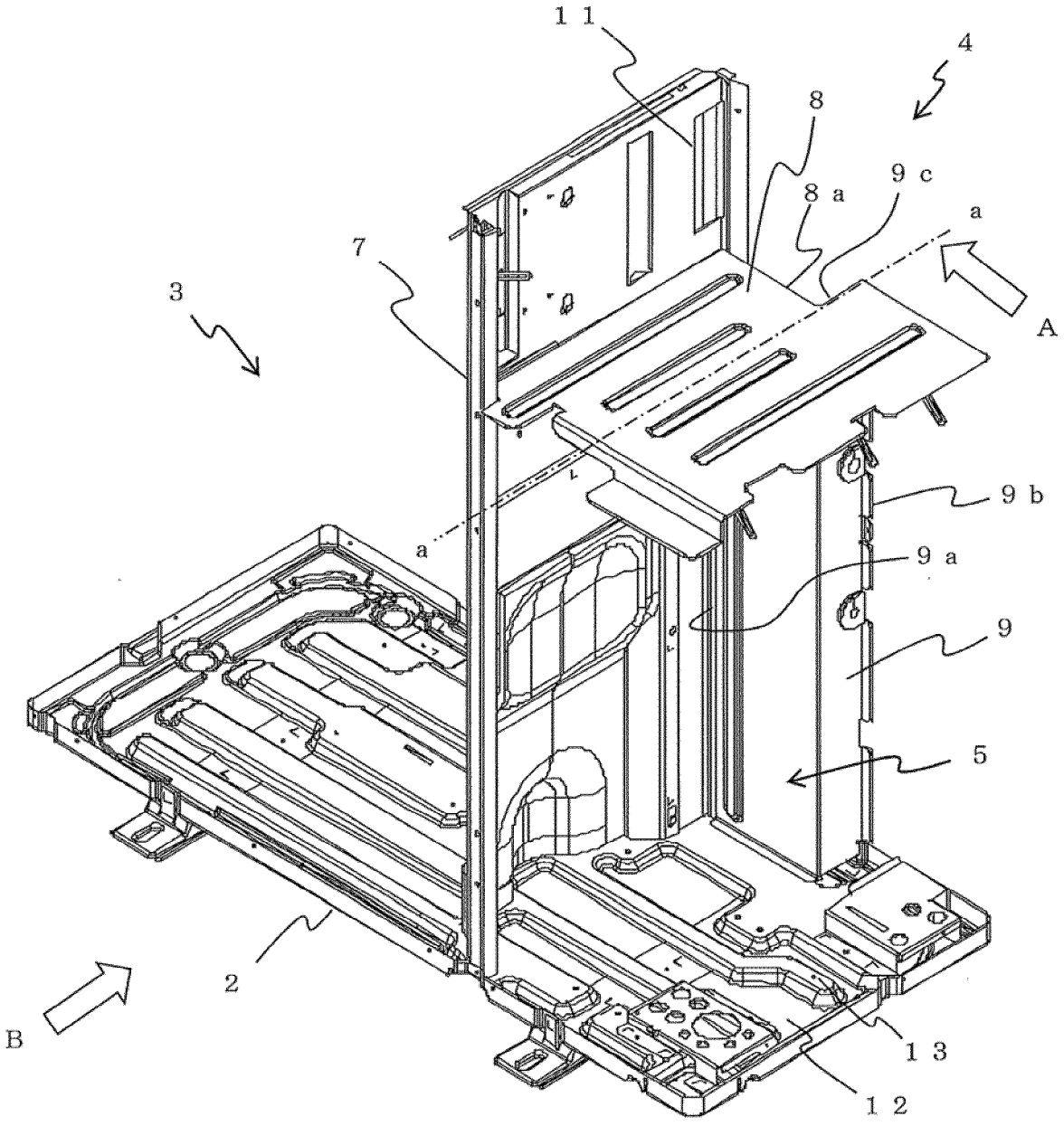


FIG. 5

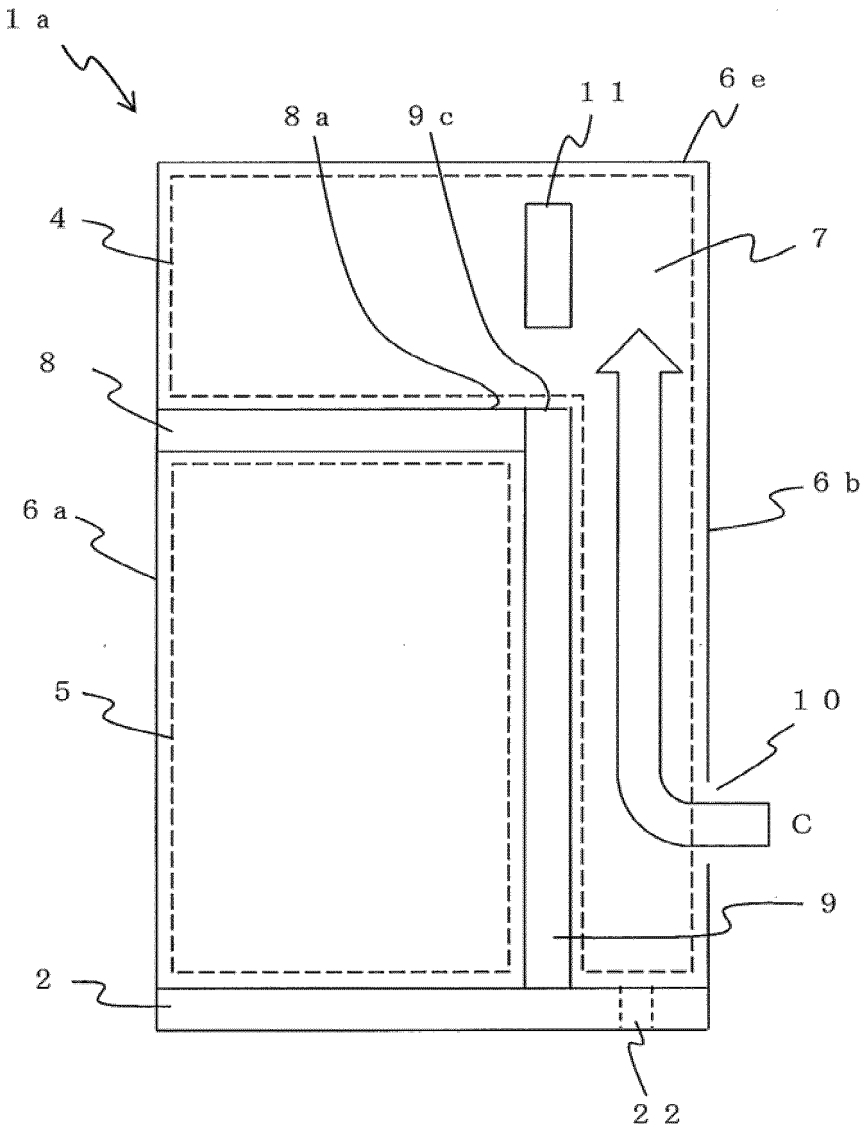


FIG. 6

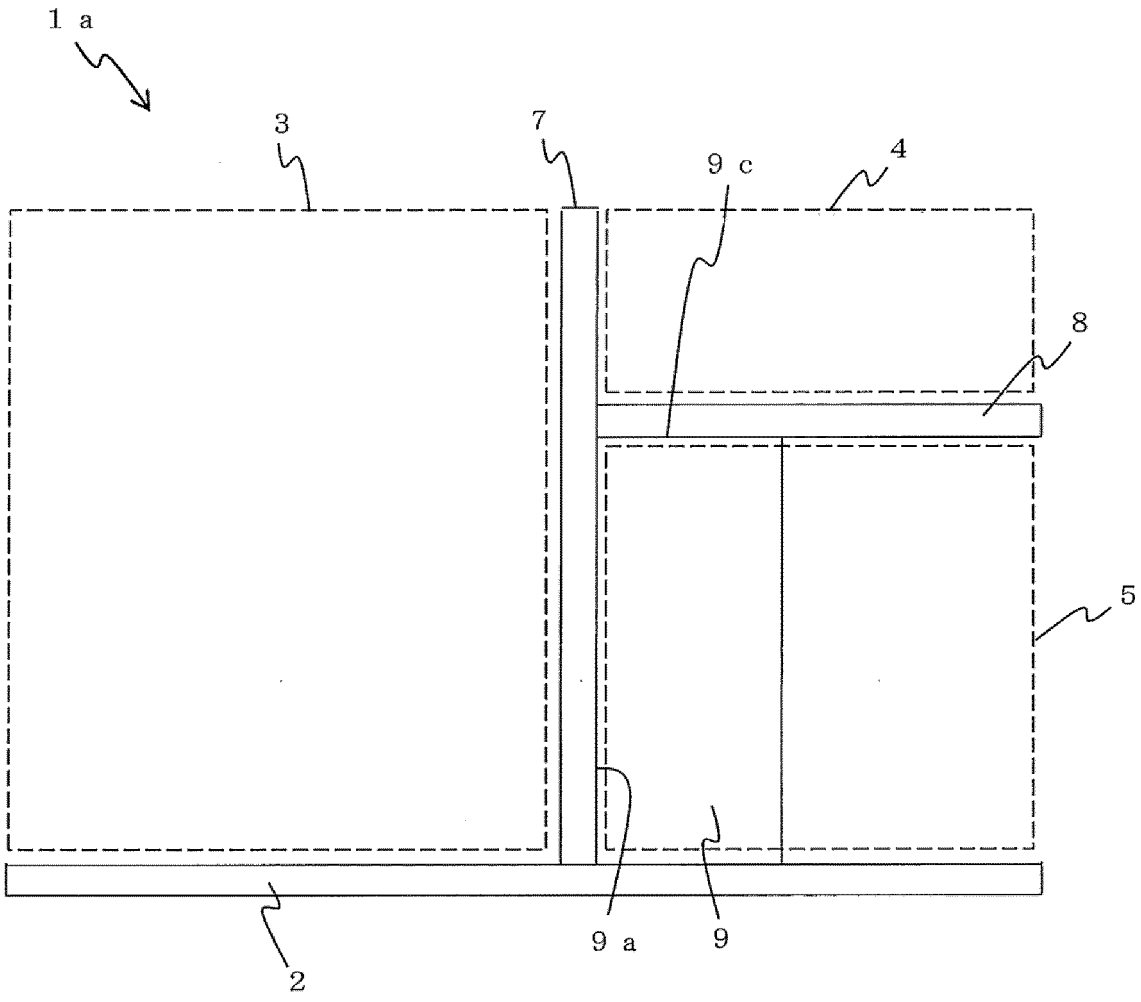


FIG. 7

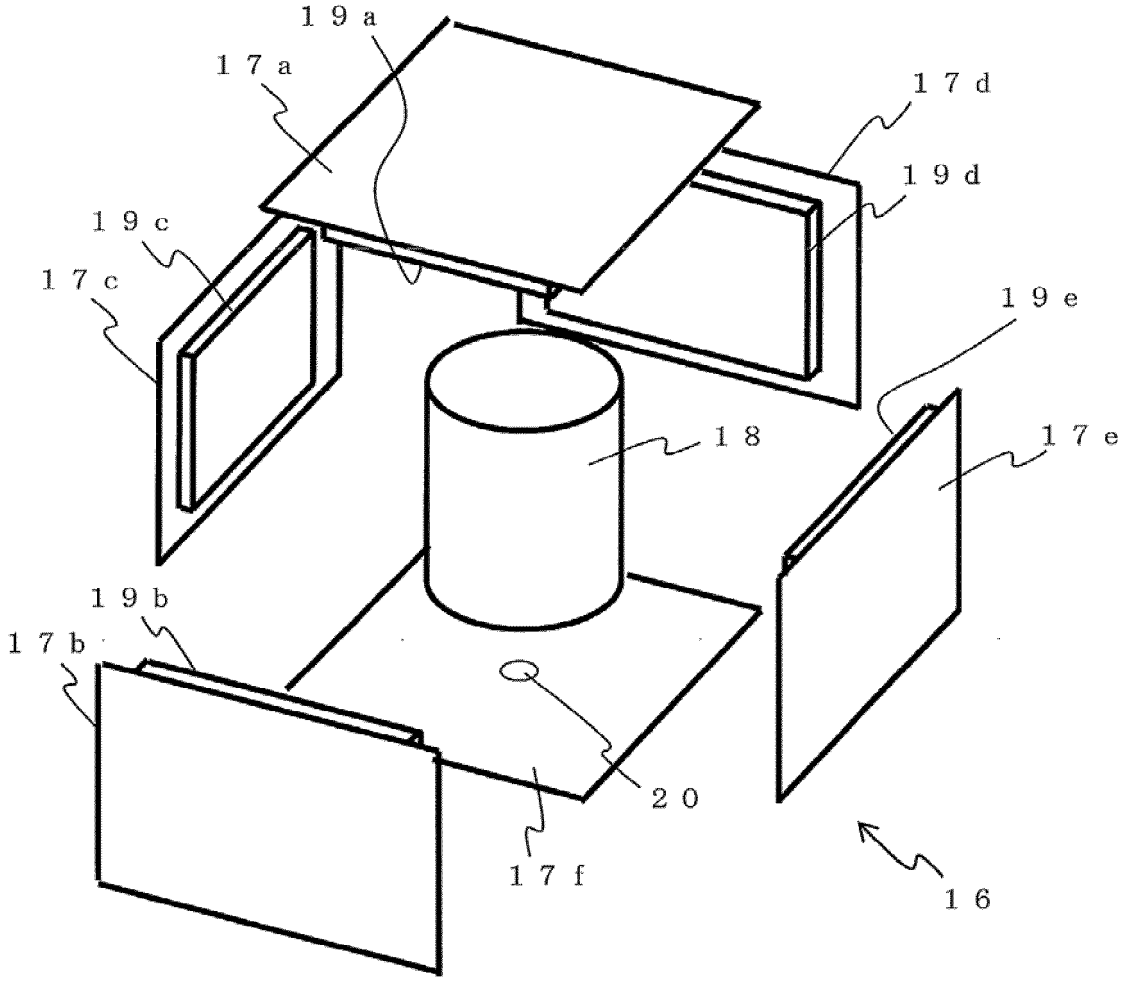


FIG. 8

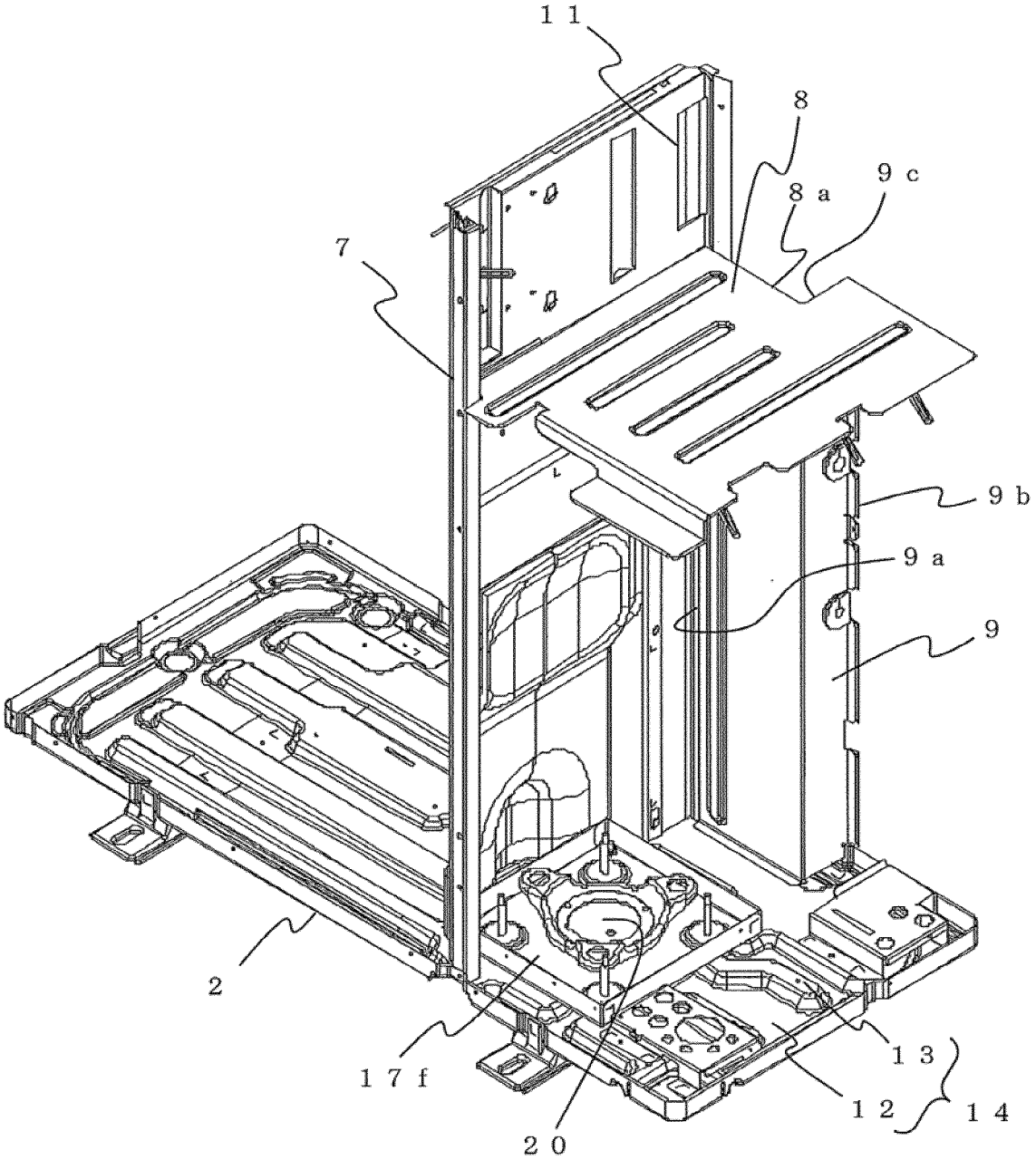
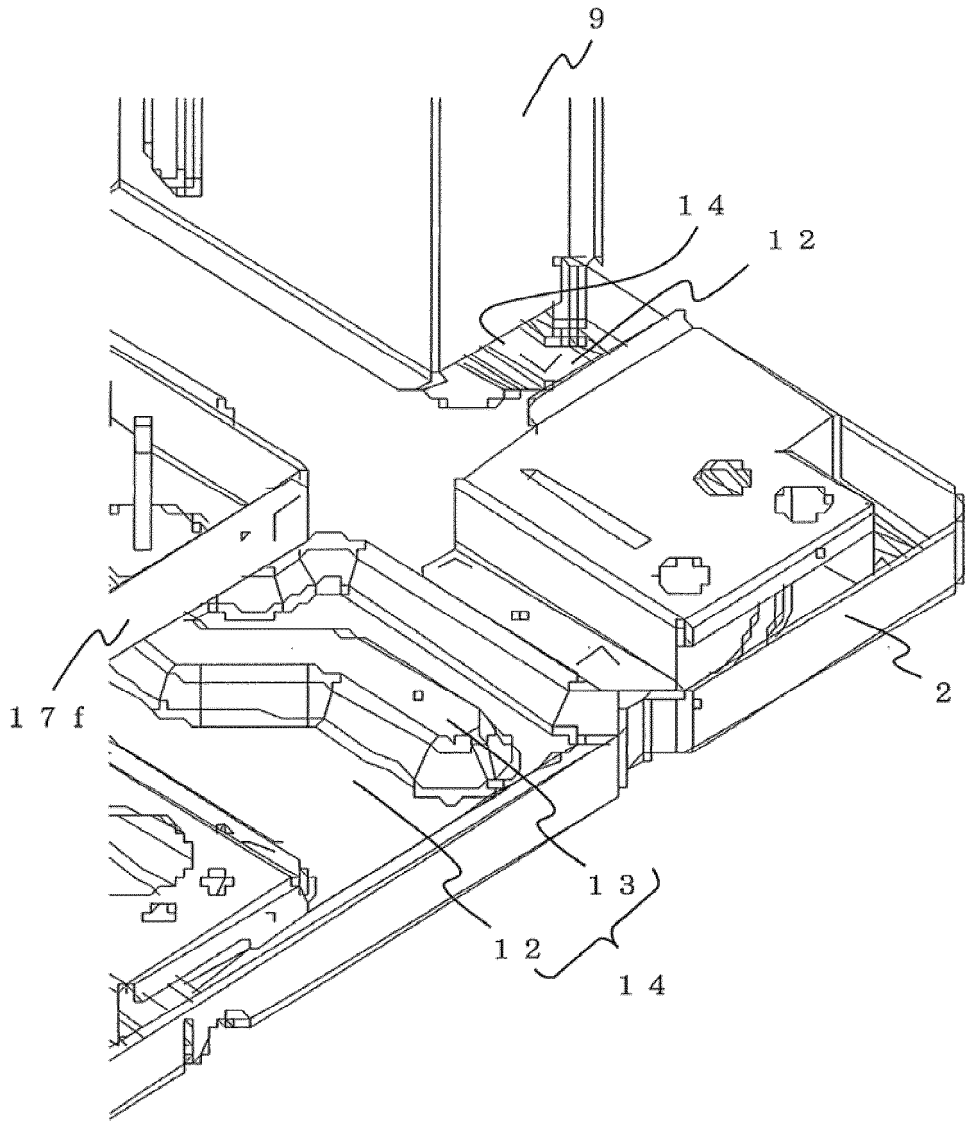


FIG. 9



**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2015/084219

A. CLASSIFICATION OF SUBJECT MATTER
*F24F1/12*(2011.01)i, *F24F1/40*(2011.01)i, *F24F13/22*(2006.01)i, *F24F13/24*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F24F1/12, F24F1/40, F24F13/22, F24F13/24

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 1996-2016
Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

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<br>A | Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 3306/1990(Laid-open No. 97127/1991) (Mitsubishi Electric Corp.), 04 October 1991 (04.10.1991), page 1, line 15 to page 4, line 16; fig. 1 to 3 (Family: none) | 1-2,4,10<br>3,5-9 |
| Y | JP 2-97833 A (Mitsubishi Electric Corp.), 10 April 1990 (10.04.1990), page 2, upper right column, line 13 to page 3, upper left column, line 4; fig. 1 to 5 (Family: none) | 1-2,4,10 |

☒ 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 | Date of mailing of the international search report |
|---|---|
| 12 February 2016 (12.02.16) | 23 February 2016 (23.02.16) |
| Name and mailing address of the ISA/<br>Japan Patent Office<br>3-4-3,Kasumigaseki,Chiyoda-ku,<br>Tokyo 100-8915,Japan | Authorized officer<br><br>Telephone No. |

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**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2015/084219

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 2003-106570 A (Sanyo Electric Co., Ltd.), 09 April 2003 (09.04.2003), paragraphs [0010] to [0019]; fig. 1 to 3 & KR 10-2003-0027765 A & CN 1410717 A | 1-2,4,10 |
| Y | JP 2013-50255 A (Fujitsu General Ltd.), 14 March 2013 (14.03.2013), paragraphs [0002] to [0004], [0014] to [0026]; fig. 1 to 5 (Family: none) | 1-2,4,10 |
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| A | JP 2014-77595 A (Daikin Industries, Ltd.), 01 May 2014 (01.05.2014), paragraphs [0027] to [0028], [0037] to [0039]; fig. 1 to 3 (Family: none) | 1-10 |
| A | JP 8-49883 A (Toshiba Corp.), 20 February 1996 (20.02.1996), paragraphs [0002] to [0041]; fig. 1 to 5 (Family: none) | 1 |
| A | JP 2005-188837 A (Sanyo Electric Co., Ltd.), 14 July 2005 (14.07.2005), paragraphs [0004] to [0017]; fig. 1 to 5 & KR 10-2005-0065253 A | 4-9 |

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## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- JP HEI297833 B **[0004]**
- JP 2012242027 A **[0004]**