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(54) Indoor unit for air-conditioning apparatus

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EP 2 808 615 B1

Description

[Technical Field]

[0001] The present invention relates to an indoor unit for an air-conditioning apparatus, which can be installed on either of a floor surface and a wall surface.

[Background Art]

[0002] There has hitherto been an indoor unit for an air-conditioning apparatus, which can be installed on either of a floor surface and a wall surface (see, for example, Patent Literatures 1 and 2).

[0003] An air purifier described in Patent Literature 1 can be installed on a partition, which is an example of a wall surface, which is set, for example, in an office, in a state in which a part thereof (a part of a rear side) is embedded in the partition, and can also be installed on the floor with a stand being attached to a lower side thereof.

[0004] An air-conditioning apparatus described in Patent Literature 2 can be installed on a wall surface by using a rear plate as an installation plate, and can also be installed on the floor with a leg being attached to a lower side thereof.

[0005] An air-conditioning apparatus described in Patent Literature 3 comprises a filter for filtering off dust passing through the air suction hole and a cleaning unit moved along the filter for removing dust from the filter by using a suction force.

[Citation List]

[Patent Literature]

[0006]

[Patent Literature 1] Japanese Unexamined Patent Application Publication No. 2005-76908 (see, for example, Figs. 4 and 5)
[Patent Literature 2] Japanese Unexamined Patent Application Publication No. 2009-63212 (see, for example, Figs. 1 and 2)
[Patent Literature 3] EP 2 128 533 A1

[Summary of Invention]

[Technical Problem]

[0007] While installation on the floor surface is enabled by attaching the stand in the technique described in Patent Literature 1, the attached stand protrudes frontward from a front panel of the air purifier in a state of being installed on the floor surface. For this reason, in the state of being installed on the floor surface, an unnecessary space is produced on the floor surface.

[0008] In the technique described in Patent Literature 1, the stand protrudes frontward from the front panel of the air purifier, and in addition, the stand does not have the same surfaces and the same shape in a left-right direction as those of the air purifier. For this reason, the design property is impaired.

[0009] While installation on the floor surface is also enabled by attaching the leg in the technique described in Patent Literature 2, the attached leg protrudes frontward from a decorative panel of the air-conditioning apparatus in a state of being installed on the floor surface. For this reason, in the state of being installed on the floor surface, an unnecessary space is produced on the floor surface.

[0010] Further, in the technique described in Patent Literature 2, the leg protrudes frontward from the decorative panel of the air-conditioning apparatus, and in addition, the ratio of the size of the leg in the air-conditioning apparatus is comparatively high. For this reason, the design property is impaired.

[0011] The present invention has been made to solve the above-described problems, and an object of the invention is to provide an indoor unit for an air-conditioning apparatus, which can be installed on either of a floor surface and a wall surface without impairing the design property.

[Solution to Problem]

[0012] An indoor unit for an air-conditioning apparatus according to the present invention is disclosed by claim 1. Subclaims thereof forming alternative embodiments of the invention.

[Advantageous Effects of Invention]

[0013] According to the indoor unit for the air-conditioning apparatus of the present invention, the stand can offset a level difference formed by the step, and forms the flat installation surface on the floor surface. For this reason, the indoor unit can be installed on the floor surface in a stable state. Moreover, the stand does not protrude from any side of the housing. For this reason, according to the indoor unit for the air-conditioning apparatus of the present invention, the required area of the installation space on the floor surface can be minimized, and the design property is not impaired.

[Brief Description of Drawings]

[0014]

[Fig. 1] Fig. 1 is a perspective view illustrating an exterior of an indoor unit for an air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 2] Fig. 2 illustrates states of the indoor-unit for the air-conditioning apparatus according to Embodiment 1 of the present invention, as viewed from four directions.

[Fig. 3] Fig. 3 is an exploded perspective view illustrating an exploded state of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 4] Fig. 4 is an exploded side view illustrating the exploded state of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 5] Fig. 5 is an enlarged side view of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention, as viewed from a lateral side.
[Fig. 6] Fig. 6 is a perspective view illustrating a state in which a stand is removed from a housing of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 7] Fig. 7 includes structural views illustrating an exemplary structure of the stand to be attached to the housing of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 8] Fig. 8 includes structural views illustrating the exemplary structure of the stand to be attached to the housing of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 9] Fig. 9 is a side view illustrating a state in which the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention is installed on a floor surface.
[Fig. 10] Fig. 10 is a perspective view illustrating a state in which a design panel of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention is open.
[Fig. 11] Fig. 11 includes explanatory views illustrating a flow of an operation of detaching the design panel of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 12] Fig. 12 is an explanatory view illustrating the dimensional relationship of the design panel of the indoor unit for the air-conditioning apparatus according to Embodiment 1 of the present invention.
[Fig. 13] Fig. 13 is a side view illustrating an exemplary state in which an indoor unit for an air-conditioning apparatus according to Embodiment 2 of the present invention is installed on a wall surface in an air-conditioned space.
[Fig. 14] Fig. 14 is a side view illustrating another exemplary state in which the indoor unit for the air-conditioning apparatus according to Embodiment 2 of the present invention is installed on the wall surface in the air-conditioned space.
[Fig. 15] Fig. 15 includes side views illustrating an exemplary state in which an indoor unit for an air-conditioning apparatus according to Embodiment 3 of the present invention is installed on a wall surface in an air-conditioned space.

[Description of Embodiments]

[0015] Embodiments of the present invention will be described below with reference to the drawings. In Fig. 1 and subsequent drawings, the dimensional relationships of components are sometimes different from the actual ones. Moreover, in Fig. 1 and the subsequent drawings, components denoted by the same reference numerals correspond to the same or equivalent components. This is common through the full text of the description. Further, forms of components described in the full text of the description are mere examples, and the components are not limited to the described forms.

Embodiment 1

[0016] Fig. 1 is a perspective view illustrating an exterior of an indoor unit for an air-conditioning apparatus according to Embodiment 1 of the present invention (hereinafter referred to as an indoor unit 100). Fig. 2 includes views illustrating states of the indoor unit 100, as viewed from four directions. Fig. 3 is an exploded perspective view illustrating an exploded state of the indoor unit 100. Fig. 4 is an exploded side view illustrating the exploded state of the indoor unit 100. Fig. 5 is an enlarged side view of the indoor unit 100, as viewed from a lateral side. A structure of the indoor unit 100 will be described with reference to Figs. 1 to 5. Fig. 2(a) is a front view, Fig. 2(b) is a top view, Fig. 2(c) is a rear view, and Fig. 2(d) is a side view.

[0017] The indoor unit 100 can be installed on a floor surface and can be installed on a wall surface without impairing the design property. In the description of Embodiment 1, the indoor unit 100 is installed on the floor surface for example. The indoor unit 100 is connected via a refrigerant pipe to, for example, an outdoor unit installed outdoors, and has a function of supplying warm air or cool air to an air-conditioned space (a space, such as an indoor space, where the indoor unit 100 is installed) by heating energy or cooling energy generated by the outdoor unit.

[0018] The indoor unit 100 includes a rectangular parallelepiped housing 1 having a detachable stand 5 on its bottom side. The housing 1 is roughly composed of a box-shaped base (box) 2 and a frame body (panel) 3.

[0019] In the base 2, a heat exchanger 50 and an unillustrated fan for supplying air to the heat exchanger 50 are mounted. The base 2 is shaped like an open-front box having an upper surface 2a and side surfaces 2b. The frame body 3 is attached to front end portions of the upper surface 2a and the side surfaces 2b of the base 2. The stand 5 is removably attached to the bottom side of the base 2. The bottom side of the base 2 may be open with no bottom surface. Even when the bottom surface is not provided, it is better to form, on the bottom side of the base 2, a beam portion for connecting the side surfaces 2b. The front end portions of the upper surface 2a and the side surfaces 2b of the base 2 will be described

in detail later.

[0020] The heat exchanger 50 mounted in the indoor unit 100 operates as a condenser during heating operation and operates as an evaporator during cooling operation. That is, during cooling operation, the indoor unit 100 sucks air from the air-conditioned space through air inlets 51 by the fan, exchanges heat by passing the sucked air through the heat exchanger 50, and blows out cool air from an air outlet 52 into the air-conditioned space. During heating operation, the indoor unit 100 sucks air from the air-conditioned space through the air inlets 51 by the fan, exchanges heat by passing the sucked air through the heat exchanger 50, and blows out warm air from the air outlet 52 into the air-conditioned space.

[0021] The frame body 3 is attached to the base 2 to constitute the housing 1 with the base 2. The frame body 3 includes an upper surface 3a, side surfaces 3b, and a bottom surface 3c, and rear sides of these surfaces are attached to the front side of the base 2, which allows the frame body 3 to be removably attached to the base 2. The upper surface 3a of the frame body 3 has an opening serving as the air outlet 52. When the frame body 3 is attached to the base 2, the air outlet 52 is openably covered with a wind flap 56 of the base 2.

[0022] The frame body 3 also has an opening 53 penetrating the frame body 3 in a front-rear direction. The opening 53 serves as an air passage through which air sucked from the air inlets 51 provided in a design panel 4 is guided to the heat exchanger 50 mounted in the base 2. A filter 55 is removably attached to the frame body 3 to remove dust contained in the sucked air. The bottom side of the frame body 3 may be open without forming the bottom surface 3c. Even when the bottom surface 3c is not formed, it is better to form, on the bottom side of the frame body 3, a beam portion for connecting the side surfaces 3b. The filter 55 may be removably attached to the design panel 4.

[0023] The design panel 4 for openably covering the front side of the frame body 3 is removably attached to the front side of the housing 1. The design panel 4 has the air inlets 51 through which air is guided to the heat exchanger 50 in the base 2. Attachment and detachment of the design panel 4 will be described in detail with reference to Figs. 10 and 11.

[0024] The stand 5 is removably attached to the bottom side of the base 2, and forms a bottom surface of the housing 1 in a state attached to the base 2. As described above, each of the base 2 and the frame body 3 that constitute the housing 1 may have a bottom surface or may have no bottom surface. When each of the base 2 and the frame body 3 has a bottom surface, the stand 5 is attached on a lower side of the bottom surface, and the stand 5 forms the bottom surface of the housing 1. When each of the base 2 and the frame body 3 has no bottom surface, the bottom surface of the housing 1 is formed by attaching the stand 5 to the bottom side of the housing 1. The structure of the stand 5 will be described in detail with reference to Figs. 6 to 8.

[Regarding Front End Portion of Base 2]

[0025] The indoor unit 100 can be installed on a wall surface in an air-conditioned space. The wall surface in the air-conditioned space sometimes has an opening in which the indoor unit 100 is to be installed, although it will be described in conjunction with Embodiment 3. By installing the indoor unit 100 with a part thereof being embedded in the opening, a protruding portion of the indoor unit 100 in the air-conditioned space can be reduced. Accordingly, the base 2 of the indoor unit 100 can be partly embedded in the opening provided in the wall surface in the air-conditioned space.

[0026] As illustrated in Fig. 4, in the indoor unit 100, the outer size of the rear side of the base 2 is smaller than the outer size of the frame body 3. That is, when the indoor unit 100 is viewed from the front side, as illustrated in Fig. 2(a), the base 2 is hidden from view by the frame body 3. When the indoor unit 100 is viewed from the rear side, as illustrated in Fig. 2(c), an outer peripheral portion of the frame body 3 is not seen from the periphery of the base 2.

[0027] The outer size of the rear side of the base 2 is not particularly limited, and it is satisfactory as long as the outer size allows the base 2 to be embedded in the opening provided in the wall surface in the air-conditioned space. However, the opening provided in the wall surface in the air-conditioned space often has the standardized size. Hence, it is only necessary to determine the outer size of the base 2 in accordance with the standardized size.

[0028] The structure of the base 2 will be described in detail. A step 6 is provided at the front end portions of the upper surface 2a and the side surfaces 2b of the base 2. When the base 2 has a bottom surface, the step 6 is also provided at a front end portion of the bottom surface. When the base 2 does not have a bottom surface, it is only necessary to form the step 6 on the beam portion. The step 6 is formed by protruding a front peripheral end portion of the base 2 outward. That is, the step 6 is formed such that the front periphery of the base 2 protrudes toward the outer periphery like a flange. It is satisfactory as long as the protrusion length of the step 6 is set at a degree such that an outer peripheral surface of the step 6 is flush with an outer peripheral surface of the frame body 3.

[0029] Portions of the upper surface 2a and the side surfaces 2b of the base 2 closer to the rear side than the step 6, that is, portions to be embedded in the opening provided in the wall surface in the air-conditioned space are referred to as a stepped portion 7. A depth D2 of the stepped portion 7 is greater than or equal to half of a total depth D1 of the base 2. Hence, when the indoor unit 100 is viewed from the lateral side, as illustrated in Fig. 2(d), the upper surface of the indoor unit 100 forms a level difference across the step 6. Similarly, when the indoor

unit 100 is viewed from the upper side, as illustrated in Fig. 2(b), the side surfaces of the indoor unit 100 form level differences across the step 6. Further, since the outer size of the stepped portion 7 of the base 2 is smaller than the outer size of the frame body 3, when the indoor unit 100 is viewed from the lateral side, as illustrated in Fig. 2(d), the bottom side of the indoor unit 100 also has a level difference, regardless of whether or not the base 2 and the frame body 3 each have a bottom surface.

[0030] Fixing of the base 2 and the frame body 3 is not limited particularly. For example, preferably, an insertion portion is formed at a rear distal end of the frame body 3 and on an inner side of the outer peripheral surface of the frame body 3, and the base 2 and the frame body 3 are attached and fixed by inserting the insertion portion in an inner peripheral side of the step 6 of the base 2. In this case, it is preferable that the insertion portion can be fitted in the inner peripheral side of the step 6 of the base 2. Alternatively, the base 2 and the frame body 3 may be attached via a hinge or the like such that a rear distal end face of the frame body 3 can contact with a distal end face of the step 6 of the base 2. In this case, preferably, the base 2 and the frame body 3 are fixed with fastening members, such as screws, in a state in which the rear distal end face of the frame body 3 and the distal end face of the step 6 of the base 2 are in contact with each other.

[0031] Further alternatively, an engaging portion (for example, an engaging claw or a fitting projection) may be formed at the end portion or the inner portion of the rear side of the base 2, a member (for example, a member on which the engaging claw can be caught or a fitting hole in which the fitting projection can be fitted) to engage with the engaging portion may be formed in a portion corresponding to the engaging portion in the base 2, and the base 2 and the frame body 3 may be attached and fixed by engaging the engaging portion and the member.

[Regarding Structure of Stand 5]

[0032] Fig. 6 is a perspective view illustrating a state in which the stand 5 is removed from the housing 1 of the indoor unit 100. Figs. 7 and 8 include structural views illustrating an exemplary structure of the stand to be attached to the housing 1 of the indoor unit 100. Fig. 9 is a side view illustrating a state in which the indoor unit 100 is installed on a floor surface 9. The structure of the stand 5 will be described with reference to Figs. 6 to 9. Fig. 7(a) is a top view, Fig. 7(b) is a bottom view, Fig. 7(c) is a front view, Fig. 7(d) is a rear view, and Fig. 7(e) is a side view. Fig. 8(a) is a perspective view, as viewed from a diagonal upper left side, Fig. 8(b) is a perspective view, as viewed from a diagonal lower left side, Fig. 8(c) is a perspective view, as viewed from a diagonal upper right side, and Fig. 8(d) is a perspective view, as viewed from a diagonal lower right side.

[0033] As described above, a level difference is provided on the bottom side of the housing 1 (see Fig. 2(d)). It can be easily understood that the level difference is formed on the bottom side of the housing 1 when the stand 5 is removed from the housing 1, as illustrated in Fig. 6. The indoor unit 100 can be installed not only on a wall surface in an air-conditioned space but also on a floor surface in the air-conditioned space. However, in a state in which the stand 5 is removed from the housing 1, the indoor unit 100 is inevitably installed in an unstable state on the floor surface in the air-conditioned space because of the level difference provided on the bottom side of the housing 1.

[0034] Accordingly, the indoor unit 100 can be stably installed on the floor surface in the air-conditioned space by attaching the stand 5 to the housing 1. That is, the stand 5 serves to offset the level difference formed on the bottom side of the housing 1 and to form a flat bottom surface of the indoor unit 100, that is, an installation surface of the indoor unit 100 to be in contact with the floor surface upon installation thereof in a state in which the stand 5 is attached to the housing 1. A level difference corresponding to the level difference formed on the bottom side of the housing 1 is provided on an upper side of the stand 5. When the stand 5 is attached, these level differences are combined, and this can remove the level difference provided on the bottom side of the housing 1. The shape of the upper side of the stand 5 is not particularly limited, and any shape can be adopted as long as it can remove the level difference provided on the bottom side of the housing 1.

[0035] The bottom surface (surface to be placed on the floor surface or the installation surface) of the stand 5 does not always need to be entirely flat. As illustrated in Figs. 6 to 8, a plurality of irregularities may be formed on the stand 5 from the viewpoints of improvement of strength and material cost reduction of the stand 5. That is, it is only necessary that the portion of the stand 5 to be placed on the floor surface is flat. The stand 5 may have an opening, or other members may be set on the stand 5.

[0036] Preferably, the stand 5 is fixed with fastening members, such as screws, after being fitted in the base 2 from the bottom side of the housing 1. This allows the stand 5 to be attached reliably. That is, the stand 5 is fixed to the base 2, but is not fixed to the frame body 3. However, the fixing method for the stand 5 is not limited to the method using fastening members such as screws, and may be a catch method in which a catch claw or the like is formed in any of the stand 5 and the base 2 and the catch claw is caught on the other of the stand 5 and the base 2 where the catch claw is not formed.

[0037] The stand 5 has dimensions such that side surfaces and a rear surface thereof are flush with the side surfaces and the rear surface of the base 2 in a state in which the stand 5 is attached to the housing 1. Thus, even in the state in which the stand 5 is attached to the housing 1, the outer surfaces of the stand 5 and the housing 1 appear as flat surfaces. For this reason, even in the state in which the stand 5 is attached to the housing 1,

the design property of the indoor unit 100 is not impaired.

[0038] As will be described in combination with attachment and detachment of the design panel 4, the stand 5 is structured such that the front surface thereof is positioned closer to the rear side than the front surface of the frame body 3 in the state in which the stand 5 is attached to the housing 1. That is, even in the state in which the stand 5 is attached to the housing 1, it does not protrude frontward from the design panel 4. For this reason, even when the indoor unit 100 with the stand 5 attached thereto is installed on the floor surface, no unnecessary space is produced on the floor surface. In addition, since the stand 5 does not protrude frontward from the design panel 4, the design property is not impaired.

[0039] Installation of the indoor unit 100 on the floor surface 9 will be described with reference to Fig. 9. When the indoor unit 100 is installed on the floor surface 9, the stand 5 is attached to the bottom of the housing 1. By doing this, a level difference on the bottom side of the base 2 and the frame body 3 is removed by the stand 5, and the installation surface of the housing 1 to be placed on the floor surface 9 is made flat. Further, since the stand 5 has the same surfaces as the side surfaces and the rear surface of the base 2, it does not protrude from any of the four sides of the housing 1.

[0040] In addition, the stand 5 forms the same surface as the rear surface of the base 2, and the stand 5 does not protrude from any of the four sides of the housing 1. For this reason, as illustrated in Fig. 9, the indoor unit 100 can be installed on the floor surface 9 in a state in which the rear surface thereof is in contact with a wall surface 10 without forming a gap therebetween.

[Attachment and Detachment of Design Panel 4]

[0041] Fig. 10 is a perspective view illustrating a state in which the design panel 4 of the indoor unit 100 is open. Fig. 11 includes explanatory views illustrating a flow of an operation of detaching the design panel 4 of the indoor unit 100. Fig. 12 is an explanatory view illustrating the dimensional relationship of the design panel 4 of the indoor unit 100. Attachment and detachment of the design panel 4 will be described with reference to Figs. 10 to 12. Figs. 11(a) to 11(c) illustrate the flow of the operation of detaching the design panel 4.

[0042] As described above, the design panel 4 is removably attached to the front side of the frame body 3. Here, although a structure for attaching and detaching the design panel 4 is not particularly limited, a description will be given of a case in which the design panel 4 can be detached in such a manner that an upper part of the design panel 4 moves away from the frame body 3. As illustrated in Fig. 10, the design panel 4 can be detached while being pivoted on a lower part in a manner such that the upper part moves away from the frame body 3. A periphery of the design panel 4 is bent toward the rear side. In the following description, a front end portion and a rear end portion, of a lower end portion 4a of the design panel 4, are referred to as an square portion 4b and a lower-frame distal end portion 4c, respectively.

[0043] As illustrated in Fig. 11(a), in a state in which the design panel 4 is attached to the frame body 3, a lower face of the bottom surface 3c of the frame body 3 (when the bottom surface 3c is not provided, the beam portion, hereinafter it is assumed that the bottom surface 3c includes the beam portion) and a lower face of the lower end portion 4a of the design panel 4 are flush with each other. As the upper side of the design panel 4 is tilted toward the front side, the square portion 4b moves down, as illustrated in Fig. 11(b). At this time, if the square portion 4b moves to a position lower than the stand 5, the design panel 4 cannot be tilted further.

[0044] Accordingly, the indoor unit 100 is set such that the square portion 4b does not move to a position lower than the stand 5 even when the design panel 4 is tilted to a detachable position. That is, in the indoor unit 100, the square portion 4b does not contact the floor surface even when the design panel 4 is tilted to the detachable position. When the design panel 4 is tilted to the detachable position, it can be detached from the frame body 3, as illustrated in Fig. 11(c).

[0045] The dimensional relationship of the design panel 4 will be described with reference to Fig. 12. In a state in which the stand 5 is attached to the housing 1, the front surface of the stand 5 is attached closer to the rear side than the front surface of the frame body 3 by a predetermined distance greater than or equal to the depth of the design panel 4. Specifically, a distance D3 from the front surface of the frame body 3 to the front surface of the stand 5 is set to be greater than a depth D4 by which the design panel 4 protrudes toward the rear side when opened. That is, the length of the stand 5 in the front-rear direction is set to ensure the distance D3.

[0046] The stand 5 is structured such that a height from the lower surface of the stand 5 to the bottom surface 3c of the frame body 3, that is, a height H1 from the floor surface to the bottom surface 3c of the frame body 3 is greater than a height H2 by which the design panel 4 protrudes when opened. That is, the height of the stand 5 is set to ensure the height H1. Therefore, the stand 5 allows the design panel 4 to be attached and detached while keeping down the height of the housing 1.

[0047] Therefore, since the stand 5 of the indoor unit 100 is formed with the dimensions illustrated in Fig. 12, the design panel 4 can be attached and detached smoothly. That is, the floor surface does not hinder attachment and detachment of the design panel 4.

[Operational Advantages of Indoor Unit 100]

[0048] The indoor unit 100 is installed on the floor surface with the stand 5 being attached to the bottom side of the housing 1. In this case, the stand 5 can offset the level difference formed by the step 6 of the base 2, and forms a flat installation surface of the housing 1 to be placed on the floor surface. For this reason, the indoor

unit 100 can be installed on the floor surface in a stable state. Further, since the stand 5 forms the same surfaces as the side surfaces and the rear surface of the base 2 and the front surface thereof can ensure the distance D3, the stand 5 does not protrude from any of the four sides of the indoor unit 100. For this reason, according to the indoor unit 100, the required area of the installation space on the floor surface can be minimized. Further, according to the indoor unit 100, even when the stand 5 is attached, the total height can be kept small.

[0049] In addition, the stand 5 forms the same surface as the rear surface of the base 2 and the stand 5 does not protrude from any of the four sides of the indoor unit 100. Hence, degradation of the design property and entry of dust can be prevented from occuring by a gap formed between the rear surface of the indoor unit 100 and the wall surface in the air-conditioned space.

[0050] Since the front surface of the stand 5 is located closer to the rear side than the front surface of the housing 1 by a predetermined distance greater than or equal to the depth of the design panel 4, the stand 5 is not visible when the indoor unit 100 is viewed from the front side (from an obliquely upper side). For this reason, even when the indoor unit 100 is viewed from the front side (from the obliquely upper side), the design property of the indoor unit 100 is not impaired. Further, since the stand 5 ensures the distance D3 and the height H1, when the design panel 4 is opened and closed (attached and detached), it can be attached and detached with no contact with the floor surface.

[0051] The stand 5 is fixed to the base 2 from the lower side, but is not fixed to the frame body 3. For this reason, even in a state in which the stand 5 is fixed to the base 2, the frame body 3 is removable. Hence, when frame body 3 is attached and detached at the time of installation of the indoor unit 100 or for service after the installation, the attachment and detachment operation is not hindered by the stand 5.

Embodiment 2

[0052] Fig. 13 is a side view illustrating an exemplary state in which an indoor unit 100 according to Embodiment 2 of the present invention is installed on a wall surface in an air-conditioned space. Fig. 14 is a side view illustrating another exemplary state in which the indoor unit 100 according to Embodiment 2 of the present invention is installed on the wall surface in the air-conditioned space. A case in which the indoor unit 100 is installed on a wall surface 10 will be described as an example with reference to Figs. 13 and 14. There is a difference from Embodiment 1 in the installation position of the indoor unit 100. In Embodiment 2, the same parts as those adopted in Embodiment 1 are denoted by the same reference numerals, and the difference from Embodiment 1 will be described mainly.

[0053] As described in conjunction with Embodiment 1, when the indoor unit 100 is installed on a floor surface 9, if the indoor unit 100 remains installed on the floor surface 9, it is impossible to clean the floor surface 9 beneath the indoor unit 100. That is, it is impossible to meet the demand to clean the floor surface 9 beneath the indoor unit 100 without making any effort to move the indoor unit 100. For this reason, the indoor unit 100 is sometimes installed on the wall surface 10 at a fixed distance from the floor surface 9.

[0054] In such a case, the indoor unit 100 can be installed on the wall surface 10 in a state in which the stand 5 is removed, as illustrated in Fig. 13. When the stand 5 is removed, a level difference formed on a bottom side of a base 2 and a frame body 3 is exposed, and the base 2 is hardly seen when the indoor unit 100 is viewed from the front side. For this reason, the housing 1 appears thin, and the height is reduced because of removal of the stand 5. This improves the design property.

[0055] The indoor unit 100 can also be installed on the wall surface 10 in a state in which the stand 5 is attached thereto, as illustrated in Fig. 14. When a back surface of the stand 5 is formed by a design surface, even if the indoor unit 100 is installed at a height such as to be seen from below, the interior of the housing 1 is not visible. Hence, the design property is not impaired.

[0056] According to the above, when the indoor unit 100 of Embodiment 2 is installed on the wall surface 10, it can be determined, in accordance with the user's will, whether to attach or remove the stand 5. The indoor unit 100 can be installed in consideration of the design property in either of the state in which the stand 5 is attached and the state in which the stand 5 is removed.

Embodiment 3

[0057] Fig. 15 includes side views illustrating an exemplary state in which an indoor unit 100 according to Embodiment 3 of the present invention is installed on a wall surface in an air-conditioned space. A case in which the indoor unit 100 is installed on a wall surface 10 will be described as an example with reference to Fig. 15. There is a difference from Embodiment 2 in the shape of the wall surface 10 on which the indoor unit 100 is installed. In Embodiment 3, the same parts as those adopted in Embodiments 1 and 2 are denoted by the same reference numerals, and differences from Embodiments 1 and 2 will be described mainly.

[0058] In either of the case in which the indoor unit 100 is installed on the floor surface 9 as in Embodiment 1 and the case in which the indoor unit 100 is installed on the wall surface 10 as in Embodiment 2, the indoor unit 100 is entirely installed in the air-conditioned space. That is, it is impossible to meet the demand to further reduce the occupation area of the indoor unit 100 in the air-conditioned space. For this reason, to reduce the occupation area of the indoor unit 100 in the air-conditioned space, the indoor unit 100 is sometimes installed while being restricted from protruding toward the air-conditioned space. In this case, an opening 10a formed in the wall

surface 10 in the air-conditioned space is utilized.

[0059] Specifically, a stepped portion 7 on a rear side of a base 2 of the indoor unit 100 is embedded into the wall surface 10 from the opening 10a, and the indoor unit 100 is installed while being halfway embedded in the wall surface 10. This can suppress protrusion of the indoor unit 100 toward the air-conditioned space greater than in Embodiments 1 and 2, and can reduce the occupation area of the indoor unit 100 in the air-conditioned space. Further, since the indoor unit 100 is halfway embedded in the wall surface 10, the depth thereof can be made to appear small.

[0060] At that time, a stand 5 is removed from a housing 1. By doing this, a step 6 is exposed in four directions around the base 2. When the indoor unit 100 is installed on the wall surface 10 using the opening 10a, a part of the base 2 corresponding to a depth greater than or equal to half of the total depth D1 is received in the opening 10a. For this reason, the exposed part of the indoor unit 100 protruding toward the air-conditioned space can be reduced.

[0061] However, since a gap 13 is formed between the stepped portion 7 and an inner wall surface of the opening 10a, it is necessary to fill a periphery of the opening 10a with putty or the like after the indoor unit 100 is installed. However, according to the indoor unit 100, even if the gap 13 is formed between the stepped portion 7 and the inner wall surface of the opening 10a, it is covered with the step 6. That is, since the step 6 has the protrusion length such as to be caught on the periphery of the opening 10a, even when the stepped portion 7 is embedded in the wall surface 10, the step 6 is caught on the periphery of the opening 10a, and the step 6 functions as a cover for the gap 13.

[0062] According to the above, even when the indoor unit 100 of Embodiment 3 is installed using the opening 10a provided in the wall surface 10, the design property of the indoor unit 100 is not impaired, and the operation for filling the gap 13 is unnecessary.

[Reference Signs List]

[0063] 1: housing, 2: base, 2a: upper surface, 2b: side surface, 3: frame body, 3a: upper surface, 3b: side surface, 3c: bottom surface, 4: design panel, 4a: lower end portion, 4b: square portion, 4c: lower-frame distal end portion, 5: stand, 6: step, 7: stepped portion, 9: floor surface, 10: wall surface, 10a: opening, 13: gap, 50: heat exchanger, 51: air inlet, 52: air outlet, 53: opening, 55: filter, 56: wind flap, 100: indoor unit.

Claims

1. An indoor unit (100) for an air-conditioning apparatus, comprising:

a base (2) that forms a rear side of a housing (1);
a frame body (3) removably attached to a front side of the base (2) to form a front side of the housing (1); and
a stand (5) removably attached to a bottom side of the base (2),
wherein the base (2) has a step (6) formed by protruding a front end portion of a periphery of the base (2) outward, and
wherein the stand (5) does not protrude from any side of the housing (1) in a state in which the stand (5) is attached to the base (2),
wherein, when the indoor unit (100) is installed on a floor surface (9), the stand (5) is attached to the base (2) to form a flat installation surface of the housing (1), the installation surface to be placed on a floor surface,
characterized in that a level difference on the bottom side of the base (2) and the frame body (3), which is formed by the step (6) of the base (2), is removed by the stand (5), and the installation surface of the housing (1) to be placed on the floor surface is made flat.

2. The indoor unit (100) for the air-conditioning apparatus of claim 1, wherein a side surface and a rear surface of the stand (5) are flush with a side surface and a rear surface of the base (2) in the state in which the stand (5) is attached to the base (2).

3. The indoor unit (100) for the air-conditioning apparatus of claim 1 or 2, wherein a depth of a part of the base (2), the part being closer to a rear side than the step (6), is greater than or equal to half of a total depth of the base (2).

4. The indoor unit (100) for the air-conditioning apparatus of any one of claims 1 to 3, wherein an outer peripheral surface of the step (6) is flush with an outer peripheral surface of the frame body (3).

5. The indoor unit (100) for the air-conditioning apparatus of any one of claims 1 to 4, further comprising:

a design panel (4) capable of being opened and closed from an upper front side of the frame body (3),
wherein the stand (5) is attached to the base (2) such that a front surface of the stand (5) is located closer to the rear side than a front surface of the frame body (3) by a predetermined distance greater than or equal to a depth of the design panel (4).

6. The indoor unit (100) for the air-conditioning apparatus of claim 5, wherein the stand (5) is structured such that the distance from the front surface of the frame body (3) to the front surface of the stand (5) is greater than a depth by which the design panel (4)

protrudes toward the rear side when the design panel (4) is opened.

7. The indoor unit (100) for the air-conditioning apparatus of claim 5 or 6, wherein a height of the front surface of the stand (5) is greater than a height by which the design panel (4) protrudes when the design panel (4) is opened.

8. The indoor unit (100) for the air-conditioning apparatus of any one of claims 1 to 7, wherein the step (6) has a protrusion length such as to be caught on a periphery of an opening (10a) provided in a wall surface on which the indoor unit (100) is to be installed.

Patentansprüche

1. Inneneinheit (100) für eine Klimaanlage, umfassend:

eine Basis (2), die eine Rückseite eines Gehäuses (1) bildet;
einen Rahmenkörper (3), der abnehmbar an einer Vorderseite der Basis (2) befestigt ist, um eine Vorderseite des Gehäuses (1) zu bilden; und
einen Standfuß (5), der abnehmbar an einer Unterseite der Basis (2) befestigt ist,
wobei die Basis (2) eine Stufe (6) aufweist, die durch Vorstehen eines vorderen Endabschnitts einer Peripherie der Basis (2) nach au-ßen gebildet ist, und
wobei der Standfuß (5) in einem Zustand, in dem der Standfuß (5) an der Basis (2) befestigt ist, an keiner Seite des Gehäuses (1) vorsteht,
wobei, wenn die Inneneinheit (100) auf einer Bodenfläche (9) installiert wird, der Standfuß (5) an der Basis (2) befestigt ist, um eine flache Installationsfläche des Gehäuses (1) zu bilden, wobei die Installationsfläche auf einer Bodenfläche zu platzieren ist,
dadurch gekennzeichnet, dass ein Niveauunterschied an der Unterseite der Basis (2) und des Rahmenkörpers (3), der durch die Stufe (6) der Basis (2) gebildet ist, durch den Standfuß (5) beseitigt ist, und die Installationsfläche des auf der Bodenfläche zu platzierenden Gehäuses (1) flach gemacht ist.

2. Inneneinheit (100) für die Klimaanlage nach Anspruch 1, wobei eine Seitenfläche und eine Rückfläche des Standfußes (5) in dem Zustand, in dem der Standfuß (5) an der Basis (2) befestigt ist, bündig mit einer Seitenfläche und einer Rückfläche der Basis (2) sind.

3. Inneneinheit (100) für eine Klimaanlage nach Anspruch 1 oder 2, wobei eine Tiefe eines Teils der Basis (2), der näher an einer Rückseite als die Stufe (6) liegt, größer oder gleich der Hälfte der Gesamttiefe der Basis (2) ist.

4. Inneneinheit (100) für die Klimaanlage nach einem der Ansprüche 1 bis 3, wobei eine äußere periphere Fläche der Stufe (6) mit einer äußeren peripheren Fläche des Rahmenkörpers (3) bündig ist.

5. Inneneinheit (100) für die Klimaanlage nach einem der Ansprüche 1 bis 4, weiter umfassend:

ein Design-Paneel (4), das von einer oberen Vorderseite des Rahmenkörpers (3) aus geöffnet und geschlossen werden kann,
wobei der Standfuß (5) an der Basis (2) befestigt ist, so dass eine Vorderfläche des Standfußes (5) um einen vorherbestimmten Abstand, der größer oder gleich einer Tiefe der des Design-Paneels (4) ist, näher an der Rückseite angeordnet ist als eine Vorderfläche des Rahmenkörpers (3).

6. Inneneinheit (100) für die Klimaanlage nach Anspruch 5, wobei der Standfuß (5) so aufgebaut ist, dass der Abstand von der Vorderfläche des Rahmenkörpers (3) zur Vorderfläche des Standfußes (5) größer ist als eine Tiefe, um welche das Design-Paneel (4) zur Rückseite hin vorsteht, wenn das Design-Paneel (4) geöffnet ist.

7. Inneneinheit (100) für die Klimaanlage nach Anspruch 5 oder 6, wobei eine Höhe der Vorderfläche des Standfußes (5) größer ist als eine Höhe, um welche das Design-Paneel (4) vorsteht, wenn das Design-Paneel (4) geöffnet ist.

8. Inneneinheit (100) für die Klimaanlage nach einem der Ansprüche 1 bis 7, wobei die Stufe (6) eine solche Vorsprungslänge hat, dass sie an einer Peripherie einer Öffnung (10a), die in einer Wandfläche vorgesehen ist, an der die Inneneinheit (100) installiert werden soll, ergriffen wird.

Revendications

1. Unité intérieure (100) pour un appareil de climatisation, comprenant :

une base (2) qui forme une face arrière d'un boîtier (1) ;
un corps de cadre (3) fixé de manière amovible à une face avant de la base (2) pour former une face avant du boîtier (1) ; et
un support (5) fixé de manière amovible à une face inférieure de la base (2),

dans laquelle la base (2) comporte un épaulement (6) formé par la saillie vers l'extérieur d'une partie d'extrémité avant d'une périphérie de la base (2), et
dans laquelle le support (5) ne fait saillie d'aucun côté du boîtier (1) dans un état dans lequel le support (5) est fixé à la base (2),
dans laquelle, lorsque l'unité intérieure (100) est installée sur une surface au sol (9), le support (5) est fixé à la base (2) pour former une surface d'installation plane du boîtier (1), la surface d'installation devant être placée sur une surface au sol,
caractérisée en ce qu'une différence de niveau sur la face inférieure de la base (2) et du corps de cadre (3), qui est formée par l'épaulement (6) de la base (2), est supprimée par le support (5), et que la surface d'installation du boîtier (1) à placer sur la surface au sol est rendue plate.

2. Unité intérieure (100) pour l'appareil de climatisation selon la revendication 1, dans laquelle une surface latérale et une surface arrière du support (5) sont alignées avec une surface latérale et une surface arrière de la base (2) dans l'état dans lequel le support (5) est fixé à la base (2).

3. Unité intérieure (100) pour l'appareil de climatisation selon la revendication 1 ou 2, dans laquelle une profondeur d'une partie de la base (2), la partie étant plus proche d'un côté arrière que l'épaulement (6), est supérieure ou égale à la moitié d'une profondeur totale de la base (2).

4. Unité intérieure (100) pour l'appareil de climatisation selon l'une quelconque des revendications 1 à 3, dans laquelle une surface périphérique externe de l'épaulement (6) est alignée avec une surface périphérique externe du corps de cadre (3).

5. Unité intérieure (100) pour l'appareil de climatisation selon l'une quelconque des revendications 1 à 4, comprenant en outre :

un panneau esthétique (4) pouvant être ouvert et fermé à partir d'un côté avant supérieur du corps de cadre (3),
dans laquelle le support (5) est fixé à la base (2) de sorte qu'une surface avant du support (5) est située plus près du côté arrière qu'une surface avant du corps de cadre (3) à une distance prédéterminée supérieure ou égale à une profondeur du panneau esthétique (4).

6. Unité intérieure (100) pour l'appareil de climatisation selon la revendication 5, dans laquelle le support (5) est structuré de sorte que la distance de la surface avant du corps de cadre (3) à la surface avant du support (5) est supérieure à une profondeur de laquelle le panneau esthétique (4) fait saillie vers la face arrière lorsque le panneau esthétique (4) est ouvert.

7. Unité intérieure (100) pour l'appareil de climatisation selon la revendication 5 ou 6, dans laquelle une hauteur de la surface avant du support (5) est supérieure à une hauteur de laquelle le panneau esthétique (4) fait saillie lorsque le panneau esthétique (4) est ouvert.

8. Unité intérieure (100) pour l'appareil de climatisation selon l'une quelconque des revendications 1 à 7, dans laquelle l'épaulement (6) a une longueur de saillie telle qu'il est pris sur une périphérie d'une ouverture (10a) pratiquée dans une surface murale sur laquelle l'unité intérieure (100) est destinée à être installée.

F I G. 1

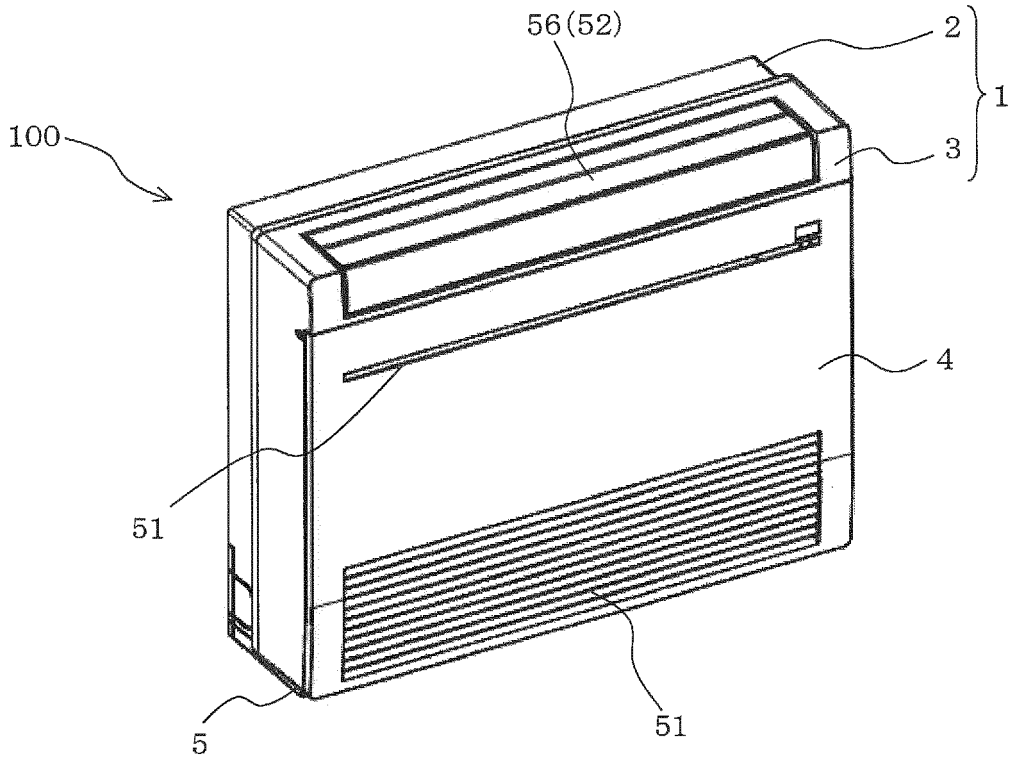


FIG. 2

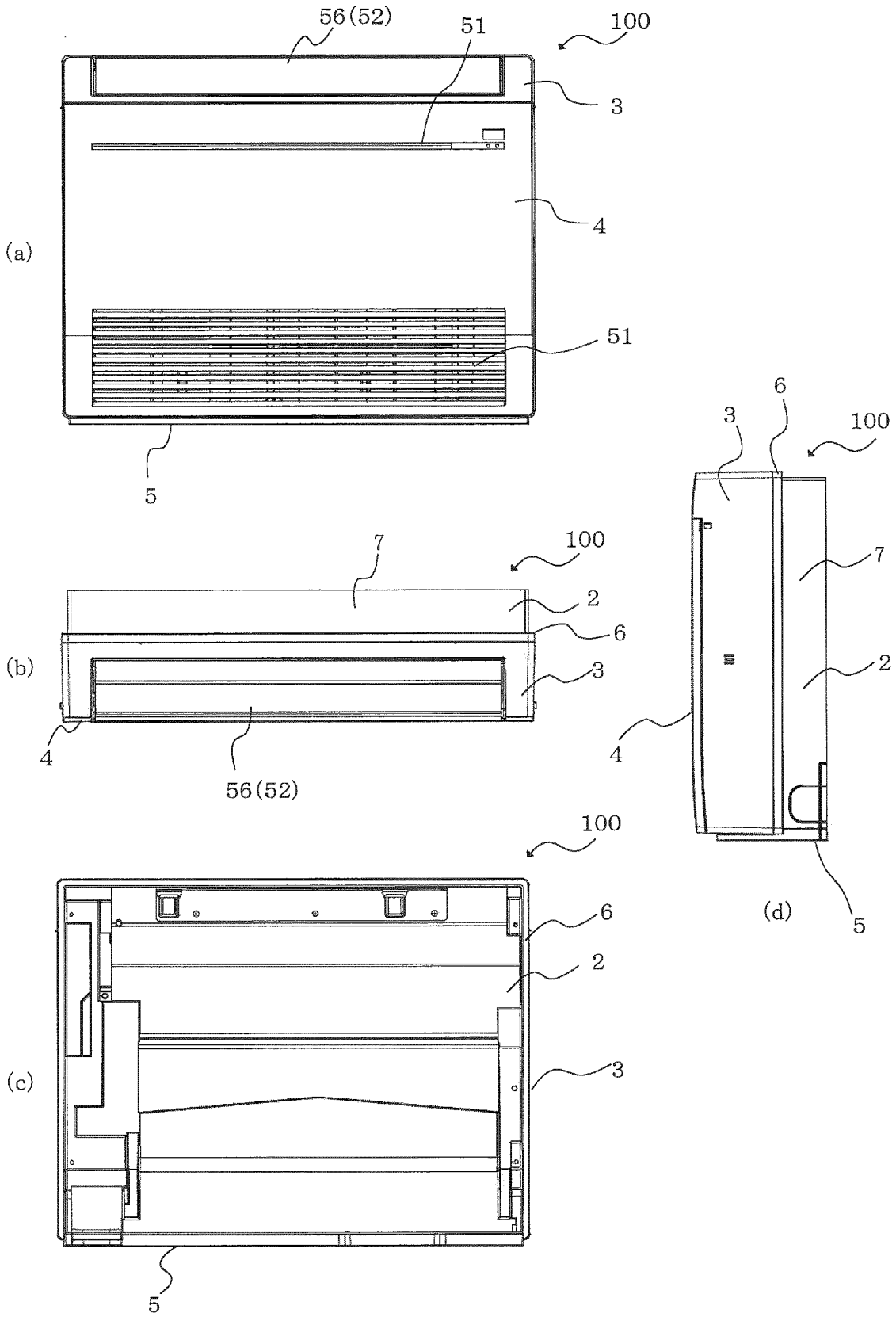


FIG. 3

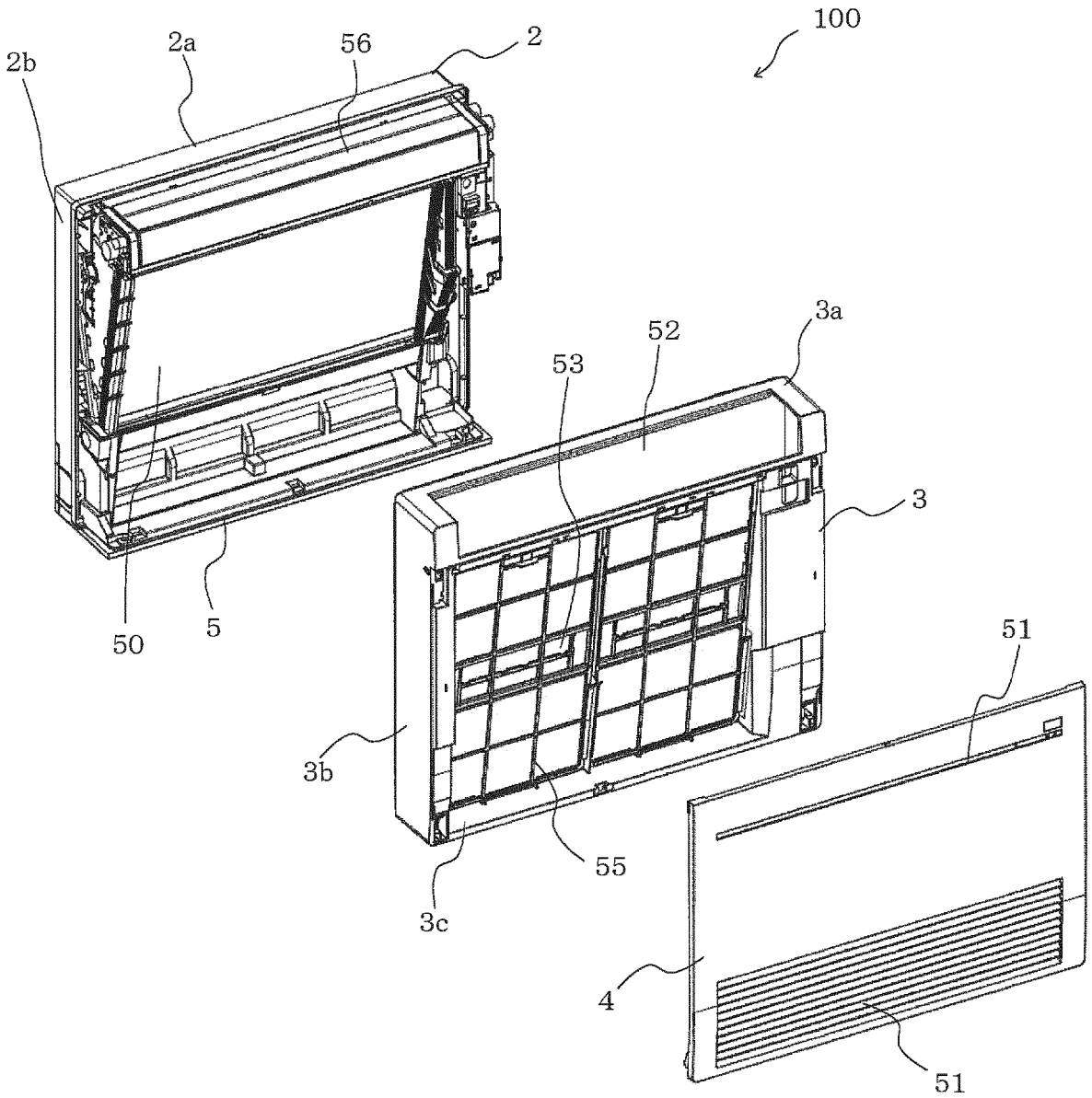


FIG. 4

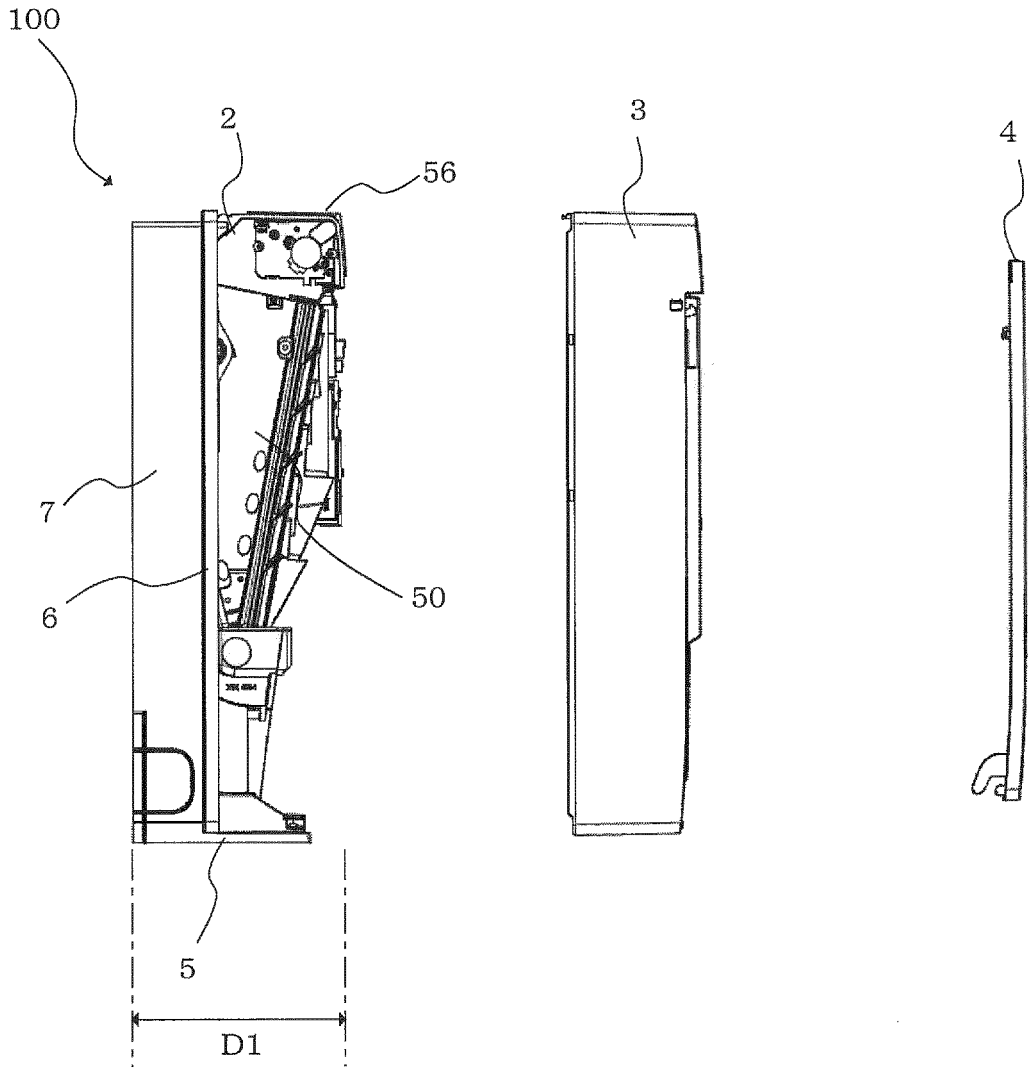


FIG. 5

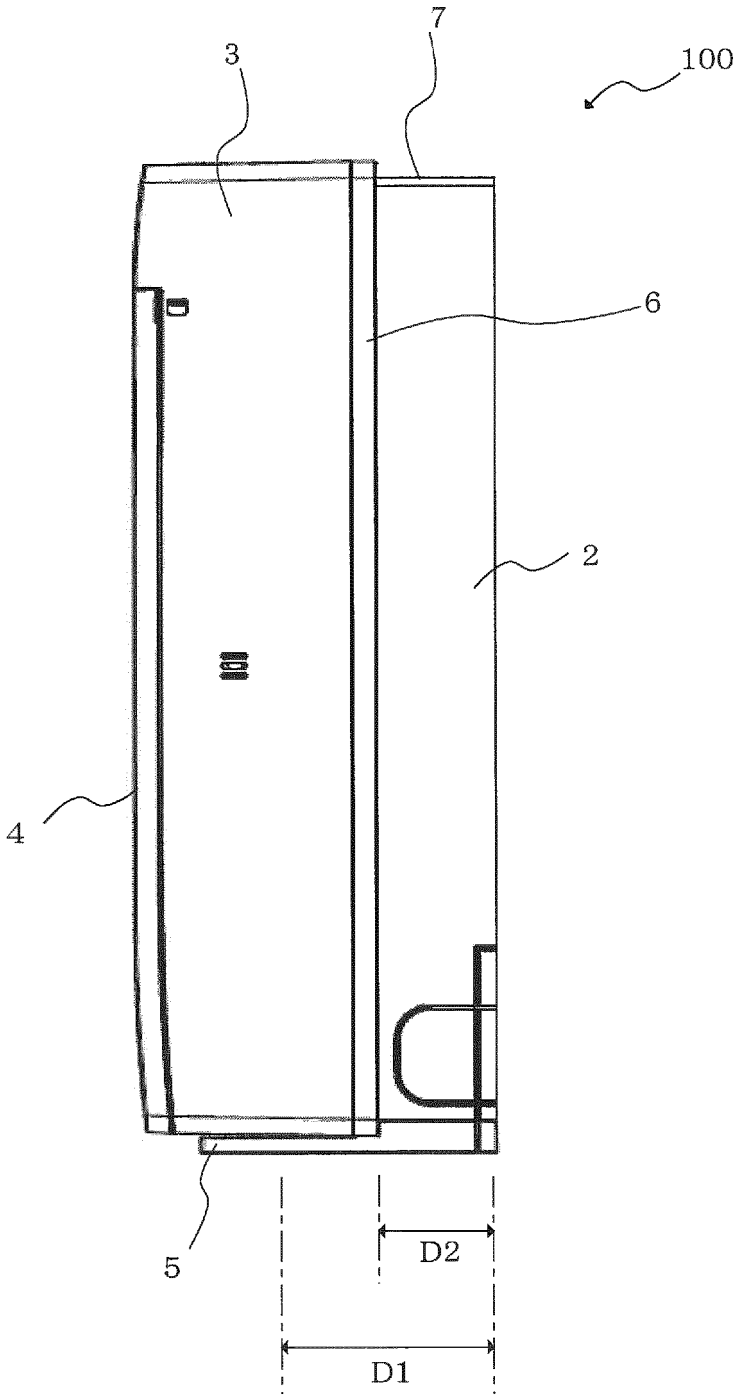


FIG. 6

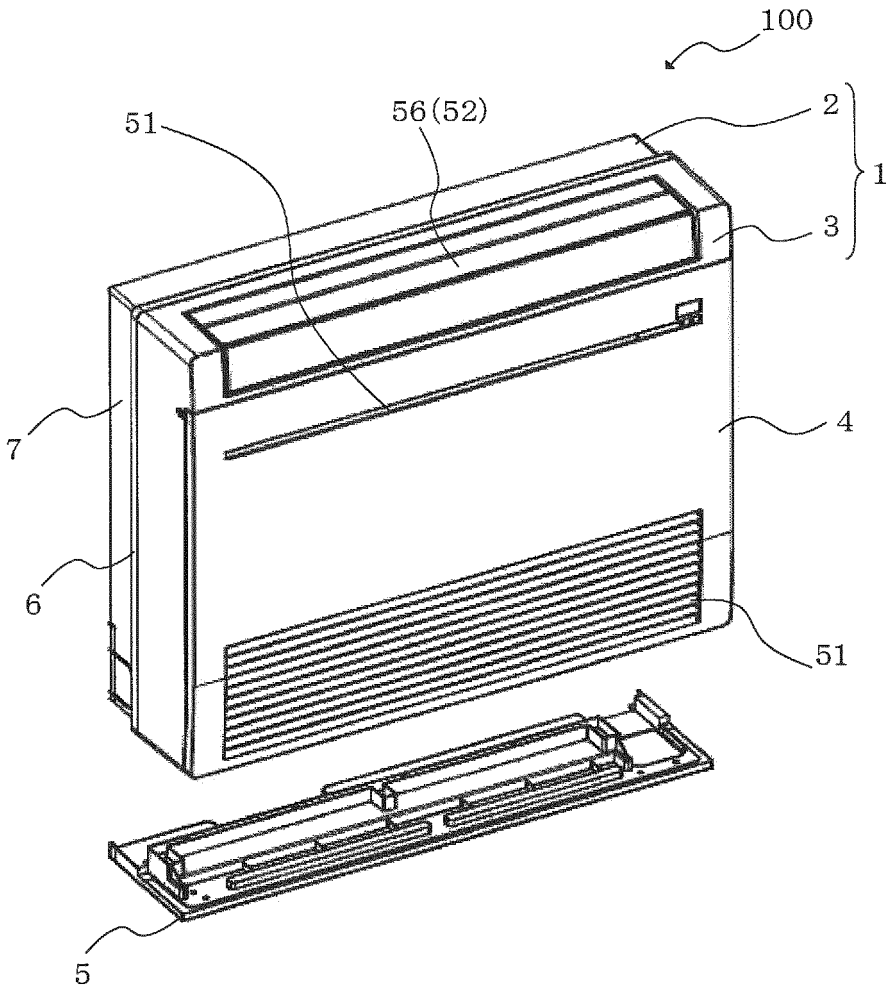


FIG. 7

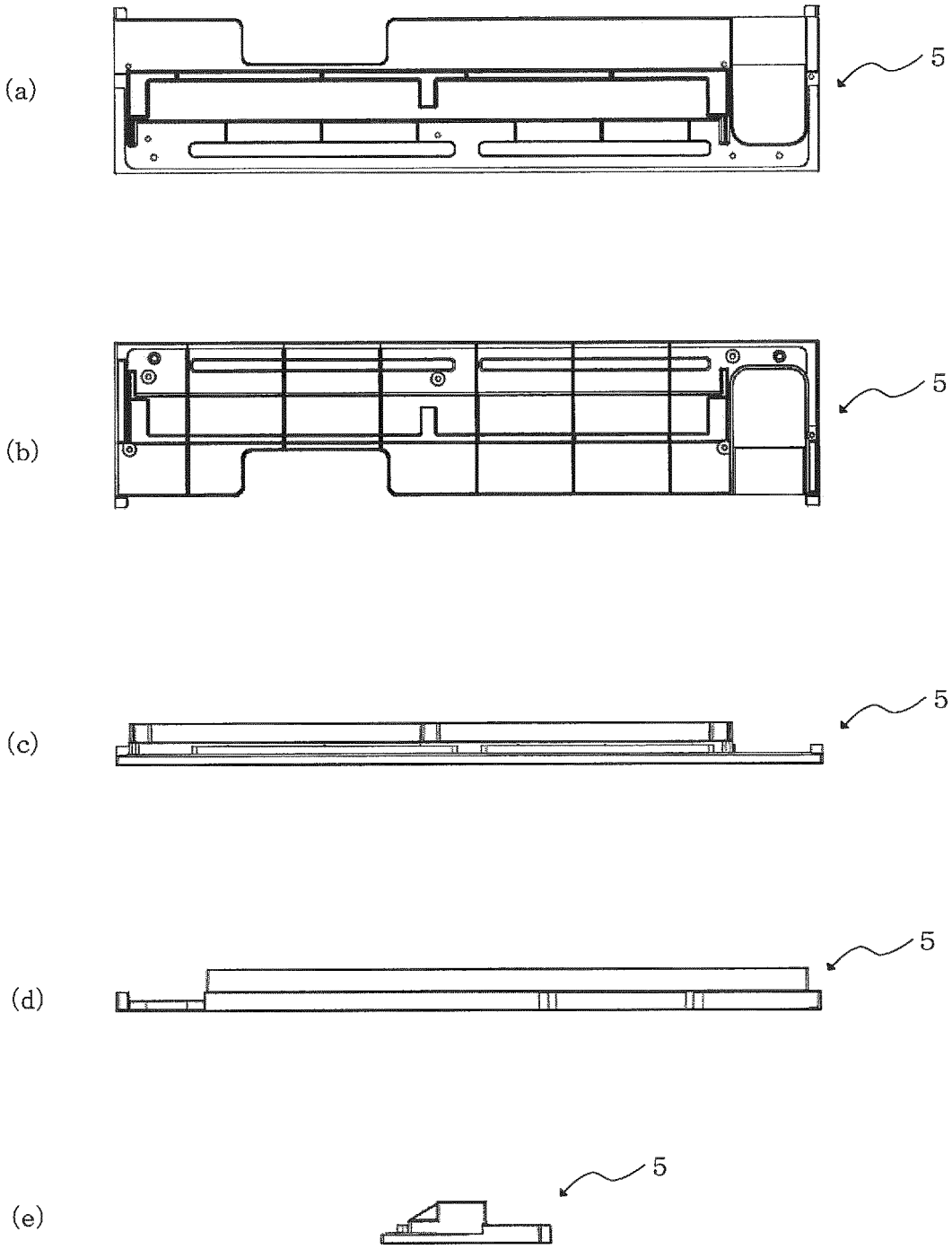


FIG. 8

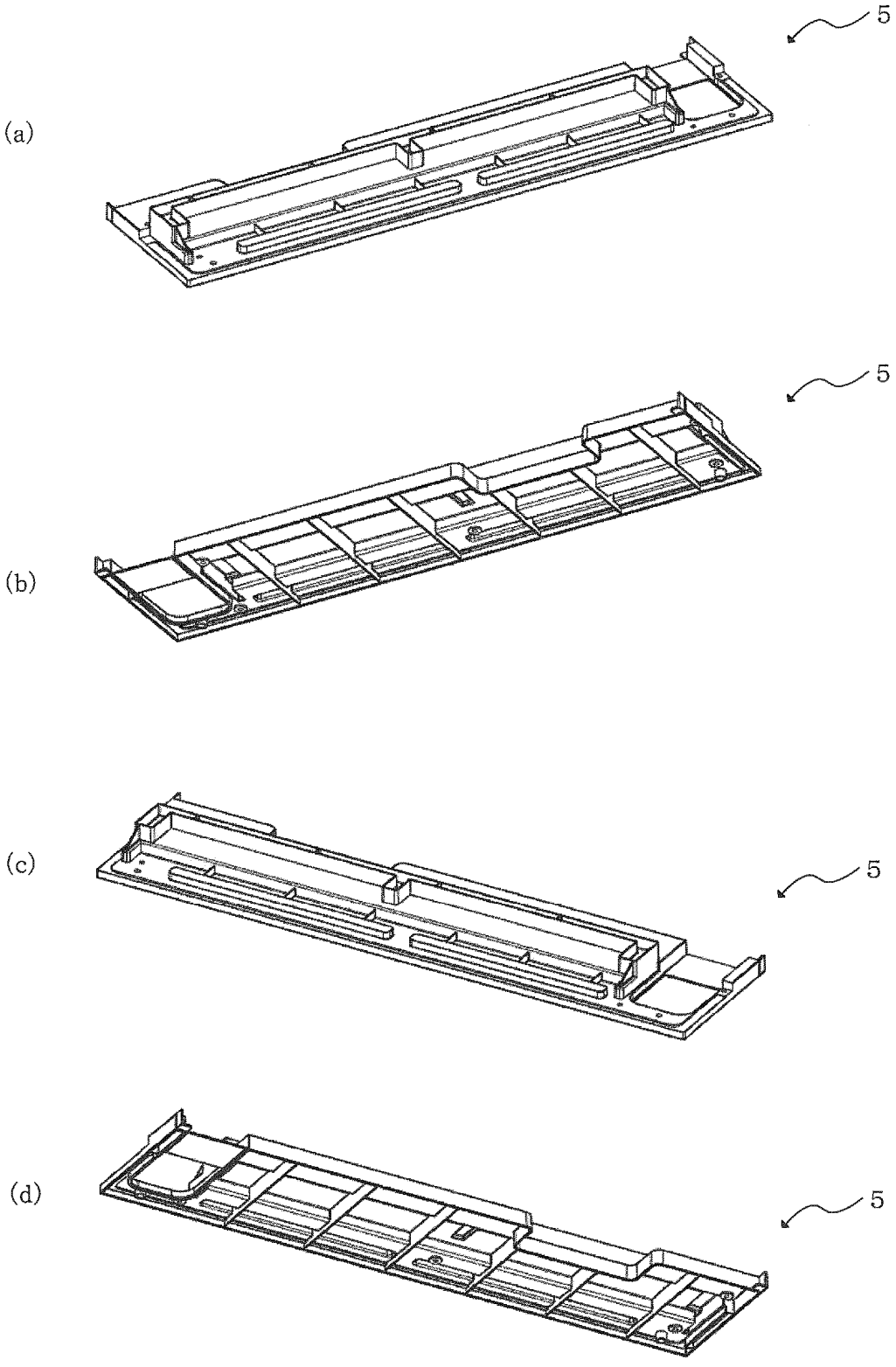


FIG. 9

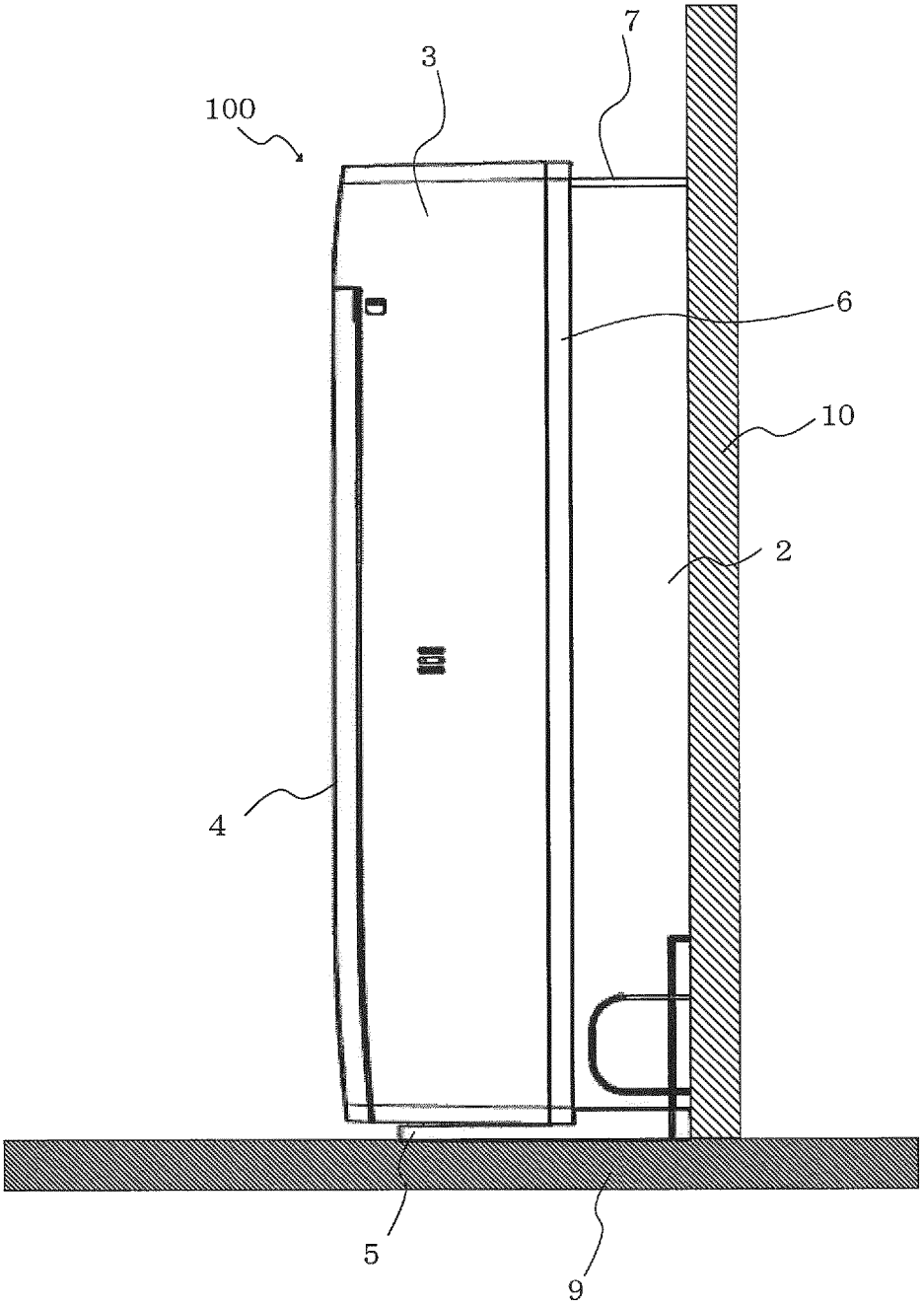


FIG. 10

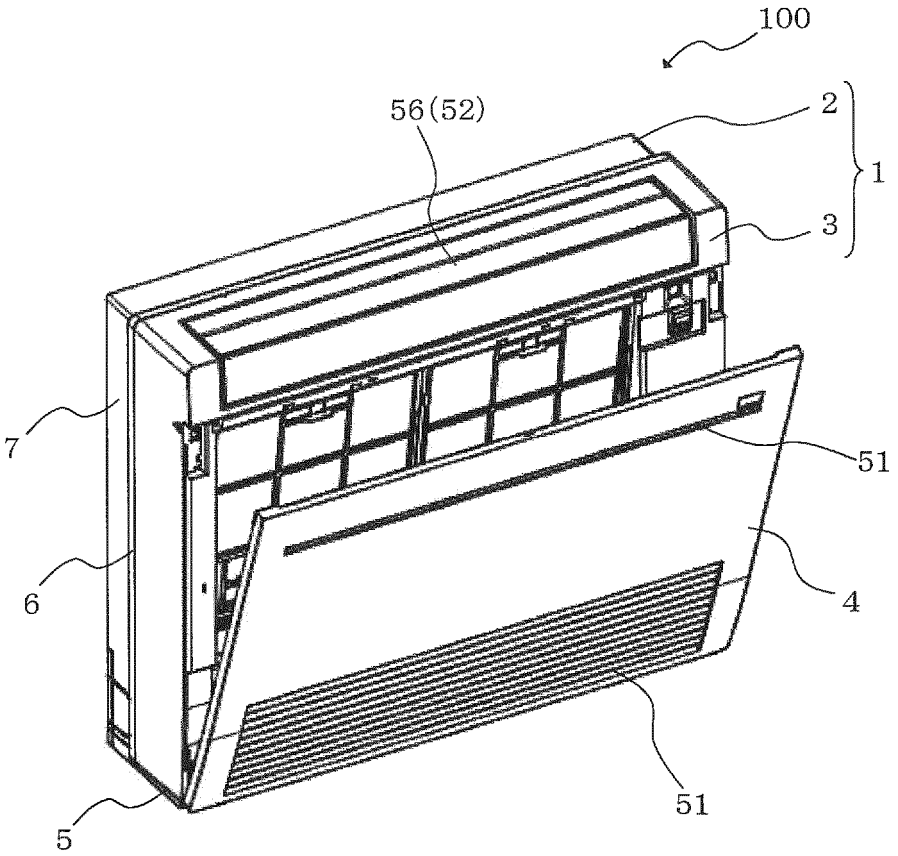


FIG. 11

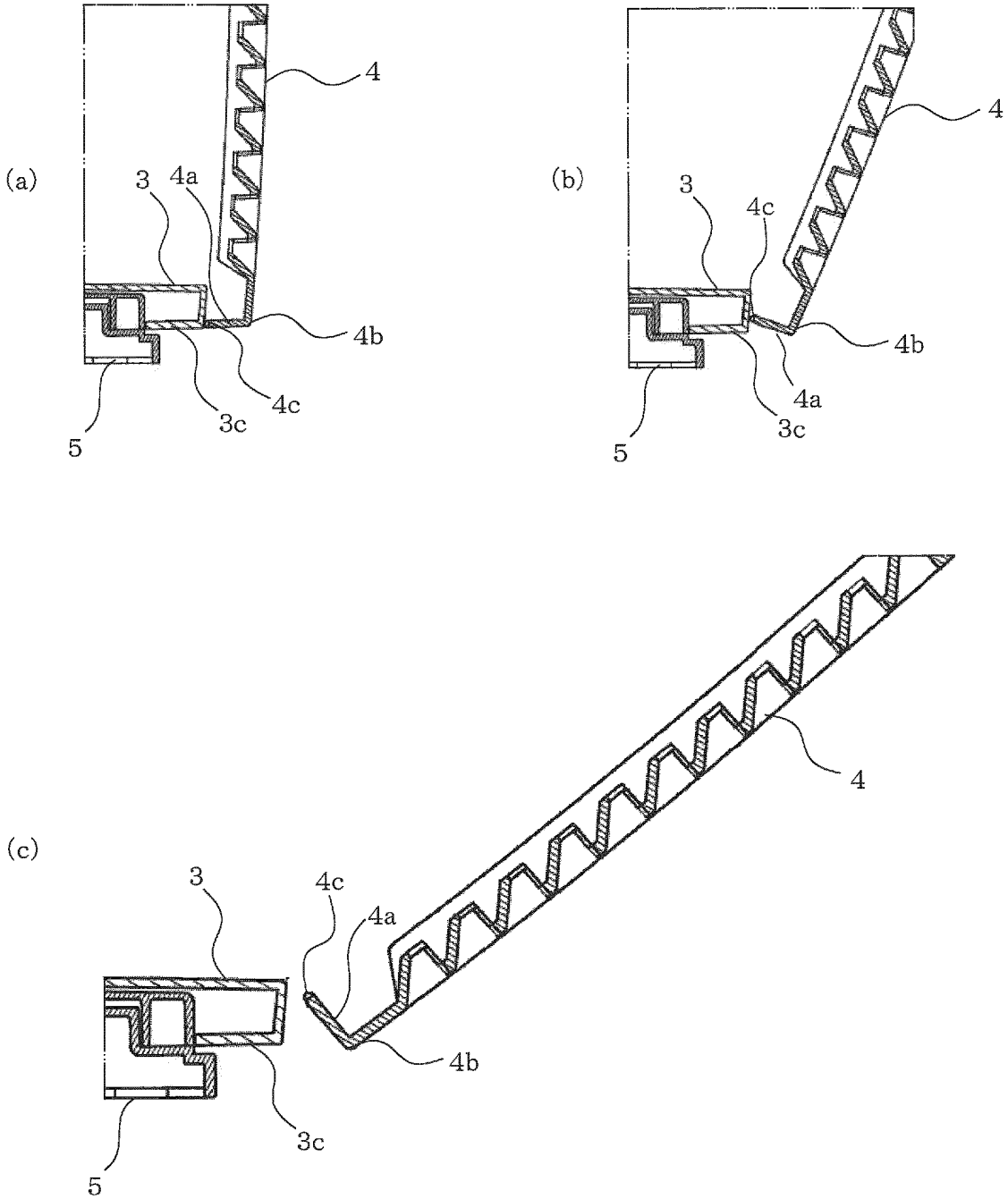


FIG. 12

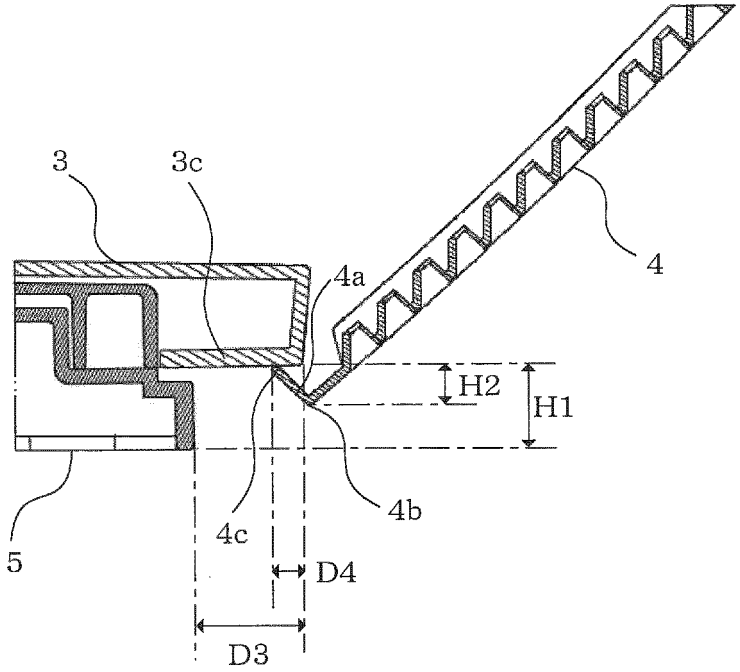


FIG. 13

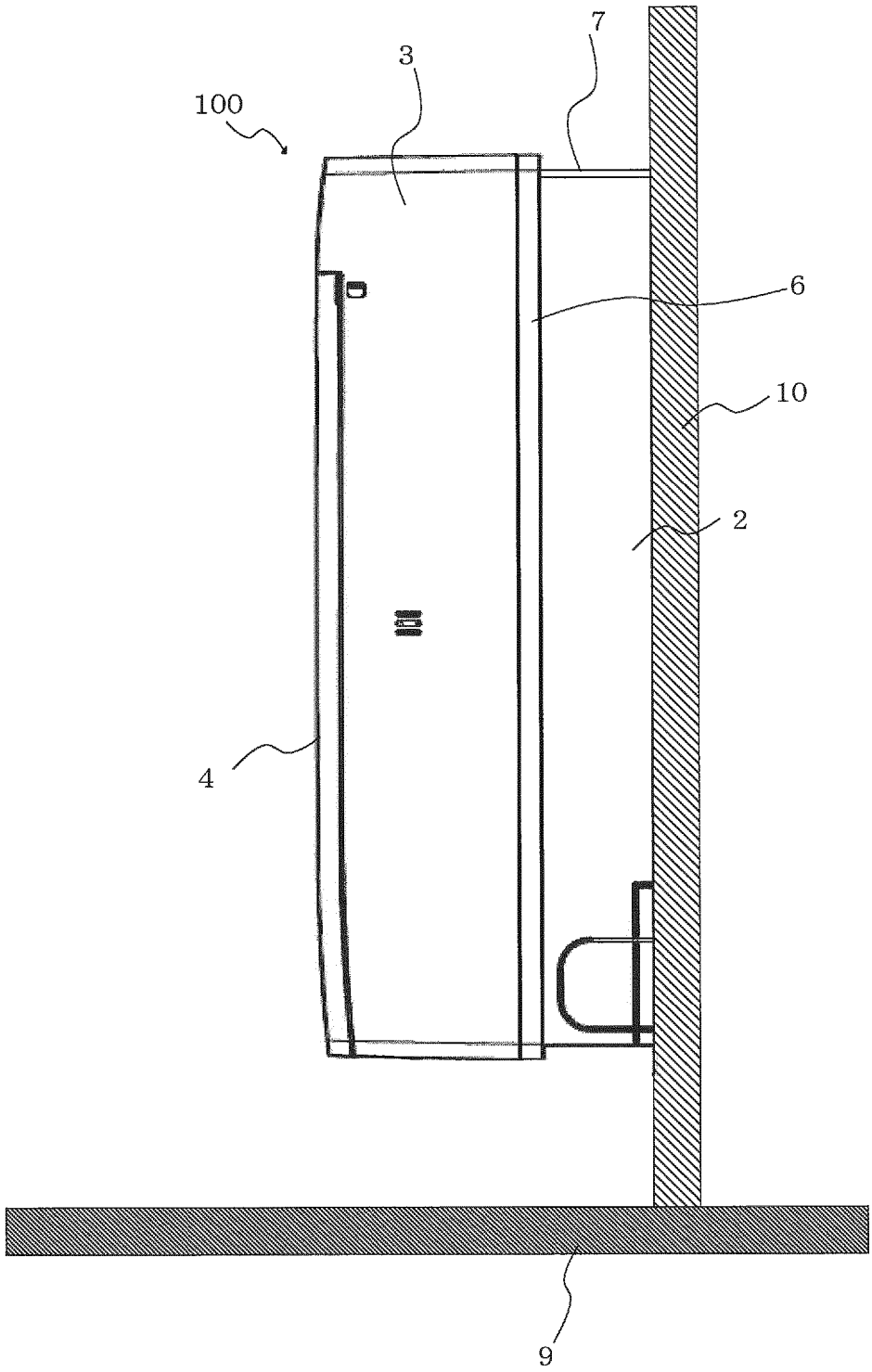


FIG. 14

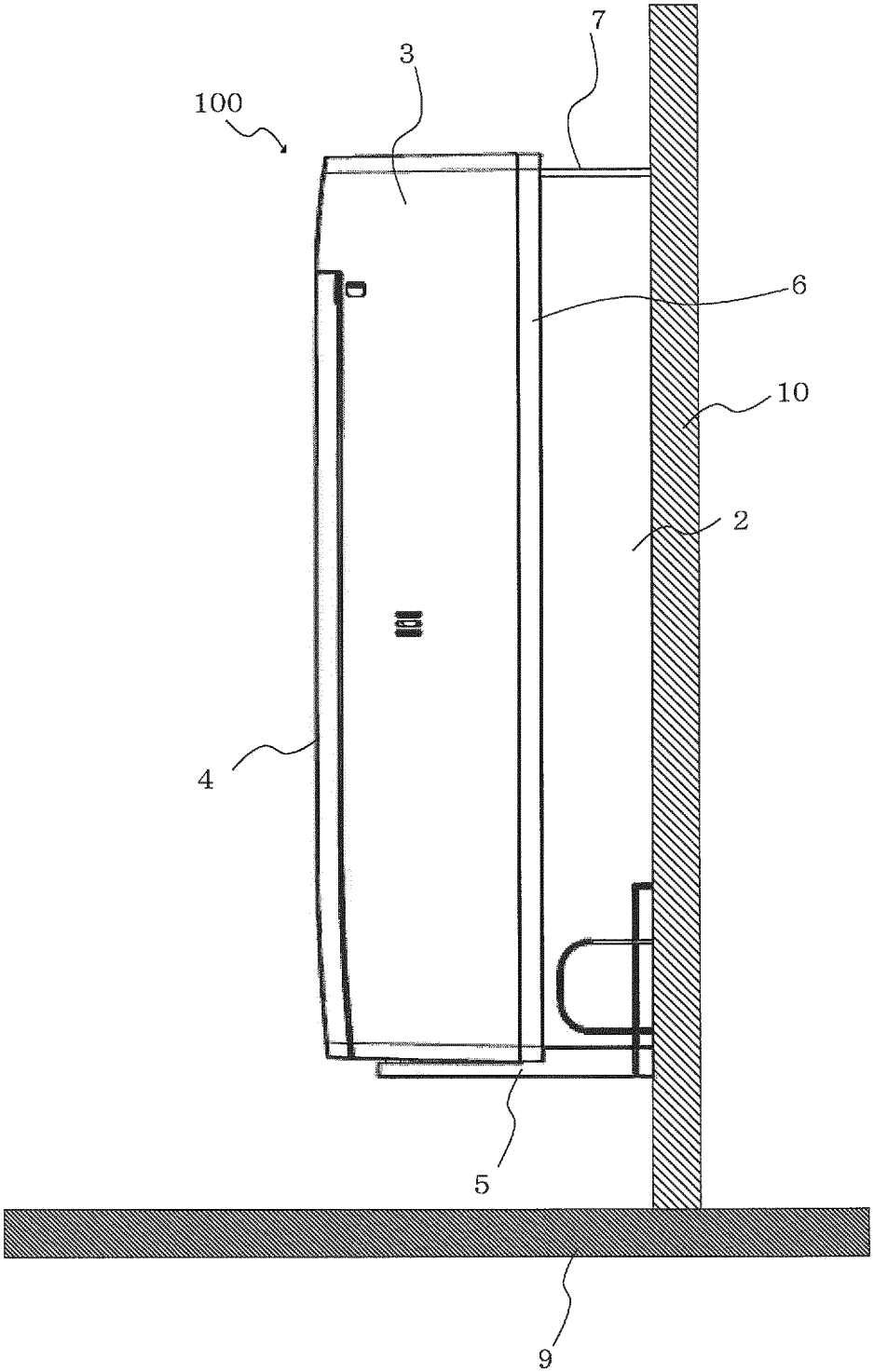
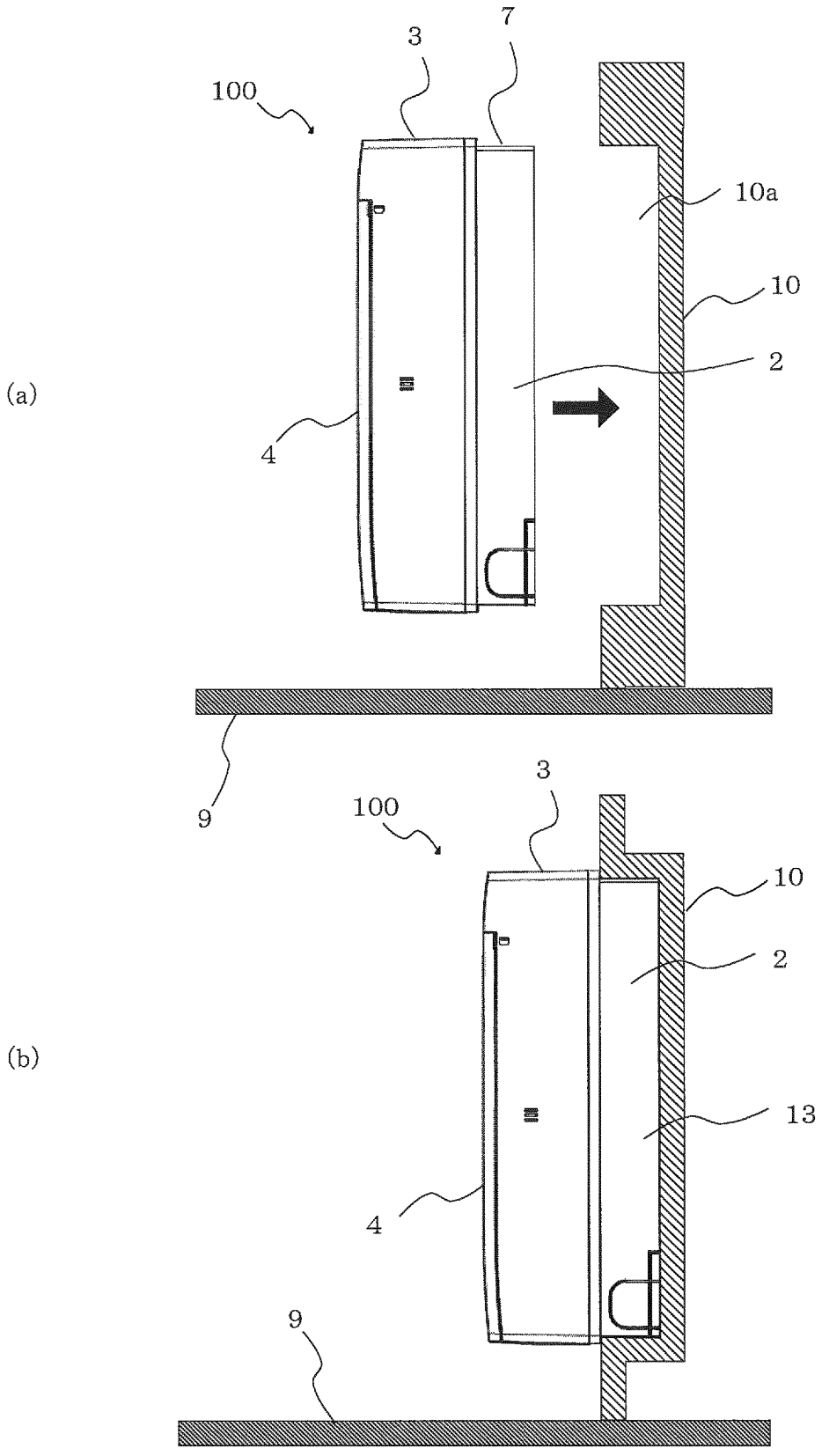


FIG. 15



REFERENCES CITED IN THE DESCRIPTION

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- JP 2005076908 A **[0006]**
- JP 2009063212 A **[0006]**
- EP 2128533 A1 **[0006]**