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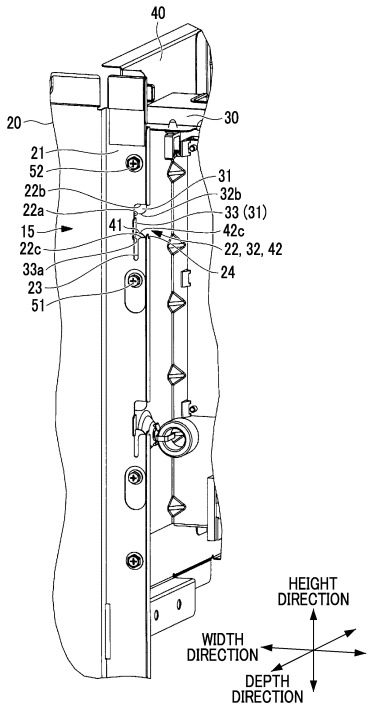
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(54) HOLDING STRUCTURE FOR ELECTRICAL COMPONENT BOX, OUTDOOR UNIT, AND MAINTENANCE METHOD

(57) Provided are: a holding structure that is for an electrical component box and that is capable of firmly fixing the electrical component box in a state where the electrical component box is positioned, and is capable of allowing the electrical component box to rotate without using a special component; an outdoor unit; and a maintenance method. A first sheet metal part (31) has a locking tab (33) extending toward the front in the depth direction. An attachment sheet metal part (21) has an attachment notch (22) into which the locking tab (33) enters from the width direction of an outdoor unit. A second sheet metal part (41) has a second notch (42) into which the locking tab enters from the width direction. A first electrical component box takes a fixed position in which the locking tab (33) enters the attachment notch (22) and the second notch (42) so that the first electrical component box is fixed in a state of being adjacent to a side edge (22a) of the attachment notch, and a rotated position in which the locking tab (33) abuts a lower edge (22c) of the attachment notch (22). When the first electrical component box is in the fixed position, the first sheet metal part (31) is overlapped with, and makes a surface contact with the second sheet metal part (41).

FIG. 7



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Description

Technical Field

[0001] The present disclosure relates to a holding structure for an electrical component box, an outdoor unit, and a maintenance method.

Background Art

[0002] For example, PTL 1 discloses a holding structure for an electrical component box that can be accessed in a room behind a door body by configuring the door body as an electrical component box to rotate around a vertical axis with respect to a wall plate in an outdoor unit of an air conditioning device.

Citation List

Patent Literature

[0003] [PTL 1] Japanese Unexamined Patent Application Publication No. 2011-232010

Summary of Invention

Technical Problem

[0004] In the configuration of PTL 1, a hinge piece provided in a door body is inserted into a hinge opening formed in a wall plate, so that the door body is fixed or rotated at the position.

[0005] At this time, it is considered that the hinge opening has a width dimension that is at least larger than a thickness dimension of the hinge piece in order to allow the hinge piece to rotate. In this case, there is always a clearance between the hinge opening and the hinge piece, and the contact state may be unstable. In this case, the number of positioning locations (abutting locations) when the door body is fixed is reduced, and there is a possibility that the door body as the electrical component box may not be firmly fixed. In particular, in a situation where vibration is easily transmitted to the outdoor unit, there is a possibility that the electrical component box may be detached unless the positioning locations are secured as many as possible.

[0006] The present disclosure has been made in view of such circumstances, and an object thereof is to provide a holding structure for an electrical component box, an outdoor unit, and a maintenance method, in which the electrical component box can be firmly fixed in a state of being positioned, and the electrical component box can be rotated without using a special component.

Solution to Problem

[0007] In order to solve the above problems, a holding structure for an electrical component box, an outdoor unit, and a maintenance method according to the present disclosure adopt the following means.

[0008] That is, according to an aspect of the present disclosure, there is provided an holding structure for an electrical component box including a front panel that is formed with an attachment sheet metal part extending in a height direction of an outdoor unit; a first electrical component box that is formed with a first sheet metal part provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit; and a second electrical component box that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part provided between the attachment sheet metal part and the first sheet metal part in the depth direction, in which the first sheet metal part has a locking tab extending to a front side in the depth direction, the attachment sheet metal part has an attachment notch into which the locking tab enters from a width direction of the outdoor unit, the second sheet metal part has a second notch into which the locking tab enters from the width direction, the first electrical component box takes a fixed position at which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge of the attachment notch, and when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part.

[0009] In addition, according to an aspect of the present disclosure, there is provided an outdoor unit including the above-described holding structure for an electrical component box; a housing to which the front panel is attached; and a fan accommodated in a room defined by the front panel and the housing.

[0010] In addition, according to an aspect of the present disclosure, there is provided a maintenance method for maintaining a holding structure for an electrical component box, the holding structure including a front panel that is formed with an attachment sheet metal part extending in a height direction of an outdoor unit, a first electrical component box that is formed with a first sheet metal part provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit, and a second electrical component box that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part provided between the attachment sheet metal part and the first sheet metal part in the depth direction, in which the first sheet metal part has a locking tab extending to a front side in the depth direction, the attachment sheet metal part has an attachment notch into which the locking tab enters from a width direction of the outdoor unit, the second sheet metal part has a second notch into which the locking tab enters from the width direction, the first electrical component box takes a fixed position at

which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge of the attachment notch, and when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part, the maintenance method including: a releasing step of releasing the fixation of the first electrical component box fixed at the fixed position; a movement step of moving the first electrical component box to the rotation position; and a rotation step of rotating the first electrical component box around an axis extending in the height direction at the rotation position.

Advantageous Effects of Invention

[0011] According to the present disclosure, the electrical component box can be firmly fixed in a state where the electrical component box is positioned, and the electrical component box can be rotated without using a special component.

Brief Description of Drawings

[0012]

Fig. 1 is a front perspective view of an outdoor unit according to an embodiment of the present disclosure.
Fig. 2 is a view in a state where a service panel is removed in Fig. 1.
Fig. 3 is a front perspective view of the vicinity of a first electrical component box and a second electrical component box.
Fig. 4 is a plan view of the vicinity of the first electrical component box and the second electrical component box.
Fig. 5 is a plan view of the vicinity of the first electrical component box and the second electrical component box.
Fig. 6 is a front perspective view of the vicinity of a holding structure.
Fig. 7 is a front perspective view of the vicinity of the holding structure in a state where the first electrical component box is at a fixed position.
Fig. 8 is a front view of the vicinity of a locking tab in a state where the first electrical component box is at the fixed position.
Fig. 9 is a front view of the vicinity of the locking tab in a state where the first electrical component box is at a rotation position.
Fig. 10 is a front perspective view of the vicinity of the locking tab in a state where the first electrical component box is at the rotation position.
Fig. 11 is a front view of the vicinity of the locking tab when the first electrical component box is removed.

Description of Embodiments

[0013] Hereinafter, a holding structure for an electrical component box, an outdoor unit, and a maintenance method according to an embodiment of the present disclosure will be described with reference to the drawings.

[Configuration of Outdoor Unit]

[0014] A holding structure 15 of the electrical component box is a structure applied to the outdoor unit 1 of the air conditioning device.

[0015] The electrical component box is a structure in which an electronic circuit board or an electric device is accommodated or an electronic circuit board or an electric device is attached.

[0016] As shown in Fig. 1, as is known, the outdoor unit 1 is configured to accommodate a heat exchanger, a fan, a compressor, an expansion valve, and other auxiliary machines (not illustrated) inside a housing 11 having a substantially rectangular parallelepiped outer shape.

[0017] A front panel 20 that closes a heat exchange chamber and a service panel 13 that closes a machine chamber are attached to a front surface (forward surface) of the housing 11.

[0018] As shown in Fig. 2, when the service panel 13 is removed, a plurality of electrical component boxes are accommodated above the machine chamber. In addition, a compressor or the like is accommodated below the machine chamber.

[0019] As shown in Figs. 3 and 4, the plurality of electrical component boxes are provided in a multi-stage structure, for example, in a depth direction of the outdoor unit 1.

[0020] The outdoor unit 1 in the present embodiment includes, for example, a first electrical component box 30 installed on a front side in the depth direction and a second electrical component box 40 installed on a back side.

[0021] The first electrical component box 30 has a form in which the first electrical component box 30 is housed in a room inside the second electrical component box 40 that has a substantially L shape in a plan view (refer to Fig. 4) .

[0022] As a result, the electronic circuit board and the electric device required for controlling the air conditioning device are efficiently accommodated in the outdoor unit 1.

[0023] However, it is necessary to easily access the second electrical component box 40 installed behind the first electrical component box 30 during maintenance.

[0024] Therefore, as shown in Figs. 4 and 5, in the present embodiment, the first electrical component box 30 is provided to be rotatable around an axis extending in a height direction with respect to the second electrical component box 40 like a door by the holding structure 15.

[Holding Structure]

[0025] The front panel 20, the first electrical component box 30, and the second electrical component box 40 are respectively formed of sheet metal.

[0026] The first electrical component box 30 and the second electrical component box 40 do not necessarily have to be a "box type".

[0027] As shown in Fig. 6, an attachment sheet metal part 21 is formed at an edge of the front panel 20.

[0028] The attachment sheet metal part 21 is a plate-shaped part extending in the height direction of the outdoor unit 1 and along a width direction of the outdoor unit 1.

[0029] An edge of the attachment sheet metal part 21 is bent toward the front side in the depth direction.

[0030] An edge of the sheet metal forming the second electrical component box 40 is bent to extend along the width direction of the outdoor unit 1.

[0031] The bent plate-shaped part is a second sheet metal part 41. The second sheet metal part 41 extends in the height direction of the outdoor unit 1 and along the width direction of the outdoor unit 1.

[0032] An edge of the sheet metal forming the first electrical component box 30 is bent to extend along the width direction of the outdoor unit 1.

[0033] The bent plate-shaped part is a first sheet metal part 31. In a case where the first electrical component box 30 is at a fixed position (to be described later), the first sheet metal part 31 extends in the height direction of the outdoor unit 1 and along the width direction of the outdoor unit 1.

[0034] The holding structure 15 is configured such that the attachment sheet metal part 21, the second sheet metal part 41, and the first sheet metal part 31 are arranged in order from the front side in the depth direction of the outdoor unit 1.

[0035] An attachment notch 22 is formed in the attachment sheet metal part 21.

[0036] The attachment notch 22 is a recessed notch defined by a side edge 22a along the height direction, and an upper edge 22b and a lower edge 22c along the width direction.

[0037] A slit 23 that extends along an extending direction of the side edge 22a and extends downward in the height direction is formed at a base end (left end in Fig. 6) of the lower edge 22c. The width dimension of the slit 23 is larger than the thickness dimension of a locking tab 33 to be described later.

[0038] A stopper (protrusion portion) 24 protruding upward in the height direction is formed at a tip of the lower edge 22c (right end in Fig. 6).

[0039] The second sheet metal part 41 is formed with a second notch 42.

[0040] The second notch 42 is a recessed notch defined by a side edge 42a along the height direction, an upper edge 42b along the width direction, and a lower edge 42c along the width direction.

[0041] The first sheet metal part 31 is formed with a first notch 32.

[0042] The first notch 32 is a recessed notch defined by a side edge 32a along the height direction, an upper edge 32b along the width direction, and a lower edge 32c along the width direction.

[0043] The locking tab 33 bent to the front side in the depth direction is formed on the side edge 32a.

[0044] For example, the locking tab 33 can be formed by leaving a part of a region of the sheet metal, which is unnecessary when the first notch 32 is punched out by a mold, and by folding the remaining part.

[0045] A hook-shaped portion 33a protruding downward in the height direction is formed at a lower end portion of the locking tab 33.

<Fixed Position>

[0046] As shown in Fig. 7, when the outdoor unit 1 is assembled (during non-maintenance), the attachment sheet metal part 21, the second sheet metal part 41, and the first sheet metal part 31 are overlapped.

[0047] Specifically, the front surface of the second sheet metal part 41 is overlapped on the back surface of the attachment sheet metal part 21 to be in surface contact with the back surface of the attachment sheet metal part 21, and the front surface of the first sheet metal part 31 is overlapped on the back surface of the second sheet metal part 41 to be in surface contact with the back surface of the second sheet metal part 41.

[0048] As shown in Fig. 8, when the outdoor unit 1 is viewed from the front, the attachment notch 22, the first notch 32, and the second notch 42 overlap each other.

[0049] At this time, the lower edge 42c of the second notch 42 extends from the side edge 22a of the attachment notch 22 to a substantially intermediate point of the lower edge 22c across the slit 23.

[0050] The contour of the lower edge 42c of the second notch 42 may smoothly incline (refer to Fig. 8) or may linearly incline.

[0051] The locking tab 33 enters the second notch 42 and the attachment notch 22 in a state where the attachment sheet metal part 21, the second sheet metal part 41, and the first sheet metal part 31 are overlapped with each other.

[0052] At this time, as shown in Figs. 7 and 8, in the first electrical component box 30, the side surface of the locking tab 33 is adjacent to the side edge 22a of the attachment notch 22, and the lower end of the locking tab 33 (a portion excluding the hook-shaped portion 33a) abuts against the lower edge 42c of the second notch 42. In addition, the hook-shaped portion 33a is hooked on the front surface side of the second sheet metal part 41.

[0053] The position of the first electrical component box 30 in this state is referred to as a "fixed position".

[0054] The first electrical component box 30 at the fixed position is fixed in this state.

[0055] Specifically, the first electrical component box 30 is fixed to the second electrical component box 40 by a screw 51 that fastens the first sheet metal part 31 and the second sheet metal part 41 to each other, and the second electrical component box 40 is fixed to the front panel 20 by a screw 52 that fastens the second sheet metal part 41 and the attachment sheet metal part 21 to each other.

[0056] At this time, the back surface of the second sheet metal part 41 and the front surface of the first sheet metal part 31 are brought into strong contact with each other by the fastening strength of the screw 51.

[0057] In addition, as shown in Figs. 3 and 4, the first electrical component box 30 and the second electrical component box 40 may be connected to each other by a reinforcing member 53.

[0058] The reinforcing member 53 is fastened to the first electrical component box 30 by a screw 54 and is fastened to the second electrical component box 40 by a screw 55.

<Rotation Position>

[0059] As shown in Figs. 9 and 10, the first electrical component box 30 can be moved (movement step) from the fixed position by releasing (releasing step) the fixation by the screw 51.

[0060] At this time, the first electrical component box 30 is moved, so that the locking tab 33 of the first sheet metal part 31 is separated from the side edge 22a of the attachment notch 22 and is positioned on a tip side of the lower edge 22c.

[0061] The position of the first electrical component box 30 in this state is referred to as a "rotation position".

[0062] When the first electrical component box 30 moves from the fixed position to the rotation position, a stopper 24 prevents the locking tab 33 from falling off from the attachment notch 22. In addition, the hook-shaped portion 33a also prevents the locking tab 33 from falling off from the attachment notch 22.

[0063] The first electrical component box 30 at the rotation position can be rotated around the axis extending in the height direction with a contact location between the lower end of the locking tab 33 and the lower edge 22c of the attachment notch 22 as a fulcrum (rotation step).

[0064] That is, the first electrical component box 30 can be rotated with respect to the front panel 20 or the second electrical component box 40 like a door by the sheet metal processing without using a special component such as a hinge. In this manner, the second electrical component box 40 on the back side of the first electrical component box 30 can be accessed to perform maintenance or the like.

[0065] As shown in Figs. 8 and 9, when the holding structure 15 is viewed from the front in the depth direction, in a case where the lower edge 42c of the second notch 42 extends from the side edge 22a of the attachment notch 22 to the lower edge 22c, in the movement step of the first electrical component box 30, the lower end of the locking tab 33 can be smoothly guided to the lower edge 22c of the attachment notch 22 by moving the lower end of the locking tab 33 along the lower edge 42c of the second notch 42.

[0066] In a case where the first electrical component box 30 is required to be completely removed from the outdoor unit 1, the first electrical component box 30 may be lifted such that the locking tab 33 rides over the stopper 24 as shown in Fig. 11.

[0067] According to the present embodiment, the following effects are achieved.

[0068] The first electrical component box 30 takes a fixed position where the locking tab 33 is fixed in a state where the locking tab 33 enters the attachment notch 22 and the second notch 42 and is adjacent to the side edge of the attachment notch 22, and a rotation position where the locking tab 33 abuts against the lower edge 22c of the attachment notch 22, and the first sheet metal part 31 is overlapped on the second sheet metal part 41 and abuts against the second sheet metal part 41 in a state where the first electrical component box 30 is at the fixed position. Therefore, the first electrical component box 30 can be firmly fixed in a state where the first electrical component box 30 is positioned with respect to the second electrical component box 40 when the first electrical component box 30 is at the fixed position.

[0069] In addition, when the fixation is released and the first electrical component box 30 is at the rotation position, the first electrical component box 30 can be rotated around an axis extending in the height direction with the contact location between the locking tab 33 and the lower edge 22c of the attachment notch 22 as a fulcrum. That is, the first electrical component box 30 can be rotated with respect to the front panel 20 or the second electrical component box 40 without using a special component such as a hinge. In this manner, the room behind the first electrical component box 30 can be easily accessed.

[0070] In addition, since the front panel 20 and the first electrical component box 30 are not connected to each other by a hinge or the like, the first electrical component box 30 can be easily removed.

[0071] In addition, since the lower edge 42c of the second notch 42 extends from the side edge 22a of the attachment notch 22 to the lower edge 22c of the attachment notch 22, the locking tab 33 that abuts against the side edge 22a of the attachment notch 22 can be guided to the lower edge 22c of the attachment notch 22 while being aligned with the lower edge 42c of the second notch 42.

[0072] In addition, when the first electrical component box 30 is at the fixed position, the locking tab 33 abuts against the lower edge 42c of the second notch 42. Therefore, the first electrical component box 30 can be firmly fixed in a state where the first electrical component box 30 is positioned at a plurality of locations in addition

to the contact between the first sheet metal part 31 and the second sheet metal part 41.

[0073] In addition, the attachment sheet metal part 21 has the slits 23, and the width dimension of the slits 23 is larger than the thickness dimension of the locking tab 33. Therefore, when the front panel 20 is attached to the outdoor unit 1 in a state where the first electrical component box 30 and the second electrical component box 40 are installed, the front panel 20 can be attached without interfering with the locking tab 33 formed in the first sheet metal part 31.

[0074] In addition, since the attachment sheet metal part 21 has the stopper 24, it is possible to prevent the locking tab 33 of the first electrical component box 30 at the rotation position from easily falling off from the attachment notch 22.

[0075] The number of the electrical component boxes arranged in the depth direction of the outdoor unit 1 may be one or may be two or more.

[0076] The holding structure for the electrical component box, the outdoor unit, and the maintenance method according to the above-described embodiment are understood as follows, for example.

[0077] That is, a holding structure (15) for an electrical component box according to an embodiment of the present disclosure includes: a front panel (20) that is formed with an attachment sheet metal part (21) extending in a height direction of an outdoor unit (1); a first electrical component box (30) that is formed with a first sheet metal part (31) provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit; and a second electrical component box (40) that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part (41) provided between the attachment sheet metal part and the first sheet metal part in the depth direction, in which the first sheet metal part has a locking tab (33) extending to a front side in the depth direction, the attachment sheet metal part has an attachment notch (22) into which the locking tab enters from a width direction of the outdoor unit, the second sheet metal part has a second notch (42) into which the locking tab enters from the width direction, the first electrical component box takes a fixed position at which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge (22a) of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge (22c) of the attachment notch, and when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part.

[0078] According to a holding structure for an electrical component box of the present aspect, the holding structure includes: a front panel, which is formed with an attachment sheet metal part extending in a height direction of an outdoor unit; a first electrical component box that is formed with a first sheet metal part provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit; and a second electrical component box (40) that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part provided between the attachment sheet metal part and the first sheet metal part in the depth direction, in which the first sheet metal part has a locking tab extending to a front side in the depth direction, the attachment sheet metal part has an attachment notch into which the locking tab enters from a width direction of the outdoor unit, the second sheet metal part has a second notch into which the locking tab enters from the width direction, the first electrical component box takes a fixed position at which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge of the attachment notch, and when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part. Therefore, when the first electrical component box is at the fixed position, the first electrical component box can be firmly fixed in a state where the first electrical component box is positioned with respect to the second electrical component box.

[0079] In addition, when the fixation is released and the first electrical component box is at the rotation position, the first electrical component box can be rotated around the axis extending in the height direction with the contact location between the locking tab and the lower edge of the attachment notch as a fulcrum. That is, the first electrical component box can be rotated with respect to the front panel without using a special component such as a hinge. In this manner, the room behind the first electrical component box can be easily accessed.

[0080] In addition, since the front panel and the first electrical component box are not connected to each other by a hinge or the like, the first electrical component box can be easily removed.

[0081] In addition, in the holding structure for an electrical component box according to the embodiment of the present disclosure, when the attachment sheet metal part and the second sheet metal part in a state of being overlapped with each other in the depth direction are viewed from a front in the depth direction, a lower edge (42c) of the second notch may extend from the side edge of the attachment notch to the lower edge of the attachment notch.

[0082] According to the holding structure for an electrical component box of the present aspect, when the attachment sheet metal part and the second sheet metal part in a state of being overlapped with each other in the depth direction are viewed from a front in the depth direction, the lower edge of the second notch may extend from the side edge of the attachment notch to the lower

edge of the attachment notch. Therefore, the locking tab that abuts against the side edge of the attachment notch can be guided to the lower edge of the attachment notch while being aligned with the lower edge of the second notch.

[0083] In addition, in the holding structure for an electrical component box according to the embodiment of the present disclosure, when the first electrical component box is at the fixed position, the locking tab may abut against the lower edge of the second notch.

[0084] According to the holding structure for an electrical component box of the present aspect, when the first electrical component box is at the fixed position, the locking tab abuts against the lower edge of the second notch. Therefore, the first electrical component box can be firmly fixed in a state where the first electrical component box is positioned at a plurality of locations in addition to the contact between the first sheet metal part 31 and the second sheet metal part 41.

[0085] In addition, in the holding structure for an electrical component box according to the embodiment of the present disclosure, the attachment sheet metal part may have a slit (23) that extends downward in the height direction along the side edge from the lower edge of the attachment notch, and a width dimension of the slit is larger than a thickness dimension of the locking tab.

[0086] According to the holding structure for an electrical component box of the present aspect, the attachment sheet metal part has a slit that extends downward in the height direction along the side edge from the lower edge of the attachment notch, and a width dimension of the slit is larger than a thickness dimension of the locking tab. Therefore, the front panel can be attached without interfering with the locking tab formed in the first sheet metal part.

[0087] In addition, in the holding structure for an electrical component box according to the embodiment of the present disclosure, the attachment sheet metal part may include a protrusion portion (24) that extends upward in the height direction from an end portion of the lower edge of the attachment notch.

[0088] According to the holding structure for an electrical component box of the present aspect, the attachment sheet metal part includes a protrusion portion (24) that extends upward in the height direction from an end portion of the lower edge of the attachment notch. Therefore, it is possible to prevent the locking tab of the first electrical component box at the rotation position from easily falling off from the attachment notch.

[0089] In addition, an outdoor unit according to the embodiment of the present disclosure includes: the holding structure for an electrical component box; a housing to which the front panel is attached; and a fan accommodated in a room defined by the front panel and the housing.

[0090] In addition, according to the present disclosure, there is provided a maintenance method for maintaining a holding structure for an electrical component box, the holding structure including a front panel that is formed with an attachment sheet metal part extending in a height direction of an outdoor unit, a first electrical component box that is formed with a first sheet metal part provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit, and a second electrical component box that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part provided between the attachment sheet metal part and the first sheet metal part in the depth direction, in which the first sheet metal part has a locking tab extending to a front side in the depth direction, the attachment sheet metal part has an attachment notch into which the locking tab enters from a width direction of the outdoor unit, the second sheet metal part has a second notch into which the locking tab enters from the width direction, the first electrical component box takes a fixed position at which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge of the attachment notch, and when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part, the maintenance method including: a releasing step of releasing the fixation of the first electrical component box fixed at the fixed position; a movement step of moving the first electrical component box to the rotation position; and a rotation step of rotating the first electrical component box around an axis extending in the height direction at the rotation position.

[0091] In addition, in the holding structure for electrical component box according to the embodiment of the present disclosure, in the holding structure for an electrical component box in which the lower edge of the second notch extends from the side edge of the attachment notch to the lower edge of the attachment notch when the attachment sheet metal part and the second sheet metal part in a state of being overlapped with each other in the depth direction are viewed in the depth direction, in the movement step, the locking tab is moved along the lower edge of the second notch.

[0092] In addition, in the holding structure for an electrical component box according to the embodiment of the present disclosure includes a removal step of removing, in the holding structure for an electrical component box in which the attachment sheet metal part includes a protrusion portion that extends upward in the height direction from an end portion of the lower edge of the attachment notch, the first electrical component box from the attachment notch by causing the locking tab to ride over the protrusion portion.

Reference Signs List

[0093]

1: outdoor unit
11: housing
13: service panel
15: holding structure
20: front panel
21: attachment sheet metal part
22: attachment notch
22a: side edge
22b: upper edge
22c: lower edge
23: slit
24: stopper (protrusion portion)
30: first electrical component box
31: first sheet metal part
32: first notch
32a: side edge
32b: upper edge
32c: lower edge
33: locking tab
33a: hook-shaped portion
40: second electrical component box
41: second sheet metal part
42: second notch
42a: side edge
42b: upper edge
42c lower edge (inducer edge)
51: screw
52: screw
53: reinforcing member
54: screw
55: screw

Claims

1. A holding structure for an electrical component box, comprising:

a front panel that is formed with an attachment sheet metal part extending in a height direction of an outdoor unit;
a first electrical component box that is formed with a first sheet metal part provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit; and
a second electrical component box that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part provided between the attachment sheet metal part and the first sheet metal part in the depth direction,
wherein the first sheet metal part has a locking tab extending to a front side in the depth direction,
the attachment sheet metal part has an attachment notch into which the locking tab enters from a width direction of the outdoor unit,
the second sheet metal part has a second notch into which the locking tab enters from the width direction,
the first electrical component box takes a fixed position at which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge of the attachment notch, and
when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part.

2. The holding structure for an electrical component box according to Claim 1,
wherein when the attachment sheet metal part and the second sheet metal part in a state of being overlapped with each other in the depth direction are viewed from a front in the depth direction, the lower edge of the second notch extends from the side edge of the attachment notch to the lower edge of the attachment notch.

3. The holding structure for an electrical component box according to Claim 1 or 2,
wherein when the first electrical component box is at the fixed position, the locking tab abuts against the lower edge of the second notch.

4. The holding structure for an electrical component box according to any one of Claims 1 to 3,

wherein the attachment sheet metal part has a slit that extends downward in the height direction along the side edge from the lower edge of the attachment notch, and
a width dimension of the slit is larger than a thickness dimension of the locking tab.

5. The holding structure for an electrical component box according to any one of Claims 1 to 4,
wherein the attachment sheet metal part includes a protrusion portion that extends upward in the height direction from an end portion of the lower edge of the attachment notch.

6. An outdoor unit comprising:

the holding structure for an electrical component box according to any one of Claims 1 to 5;
a housing to which the front panel is attached; and
a fan accommodated in a room defined by the front panel and the housing.

7. A maintenance method for maintaining a holding

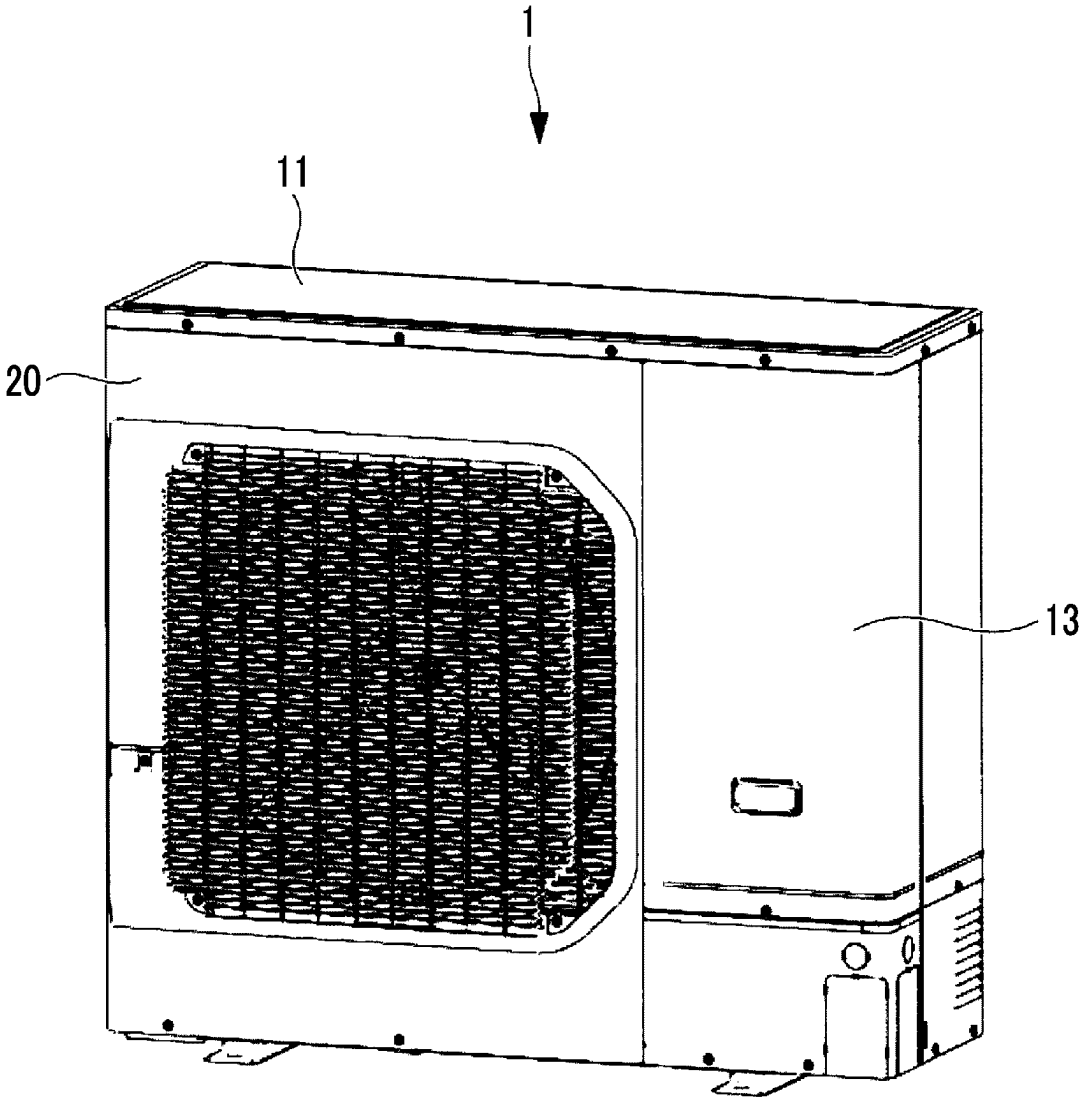
structure for an electrical component box, the holding structure including a front panel that is formed with an attachment sheet metal part extending in a height direction of an outdoor unit, a first electrical component box that is formed with a first sheet metal part provided on a back side of the attachment sheet metal part in a depth direction of the outdoor unit, and a second electrical component box that is installed on the back side of the first electrical component box in the depth direction and is formed with a second sheet metal part provided between the attachment sheet metal part and the first sheet metal part in the depth direction, in which the first sheet metal part has a locking tab extending to a front side in the depth direction, the attachment sheet metal part has an attachment notch into which the locking tab enters from a width direction of the outdoor unit, the second sheet metal part has a second notch into which the locking tab enters from the width direction, the first electrical component box takes a fixed position at which the locking tab is fixed in a state of entering the attachment notch and the second notch and being adjacent to a side edge of the attachment notch, and a rotation position at which the locking tab abuts against a lower edge of the attachment notch, and when the first electrical component box is at the fixed position, the first sheet metal part abuts against the second sheet metal part on a surface, in a state of being overlapped with the second sheet metal part, the maintenance method comprising:

a releasing step of releasing the fixation of the first electrical component box fixed at the fixed position;
a movement step of moving the first electrical component box to the rotation position; and
a rotation step of rotating the first electrical component box around an axis extending in the height direction at the rotation position.

8. The maintenance method according to Claim 7, wherein, in the holding structure for an electrical component box in which a lower edge of the second notch extends from the side edge of the attachment notch to the lower edge of the attachment notch when the attachment sheet metal part and the second sheet metal part in a state of being overlapped with each other in the depth direction are viewed in the depth direction, in the movement step, the locking tab is moved along the lower edge of the second notch.

9. The maintenance method according to Claim 7 or 8, further comprising:
a removal step of removing, in the holding structure for an electrical component box in which the attachment sheet metal part includes a protrusion portion that extends upward in the height direction from an end portion of the lower edge of the attachment notch, the first electrical component box from the attachment notch by causing the locking tab to ride over the protrusion portion.

FIG. 1


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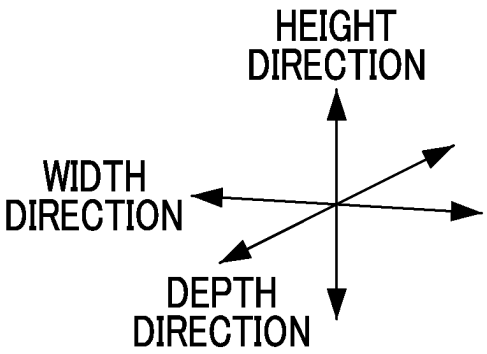
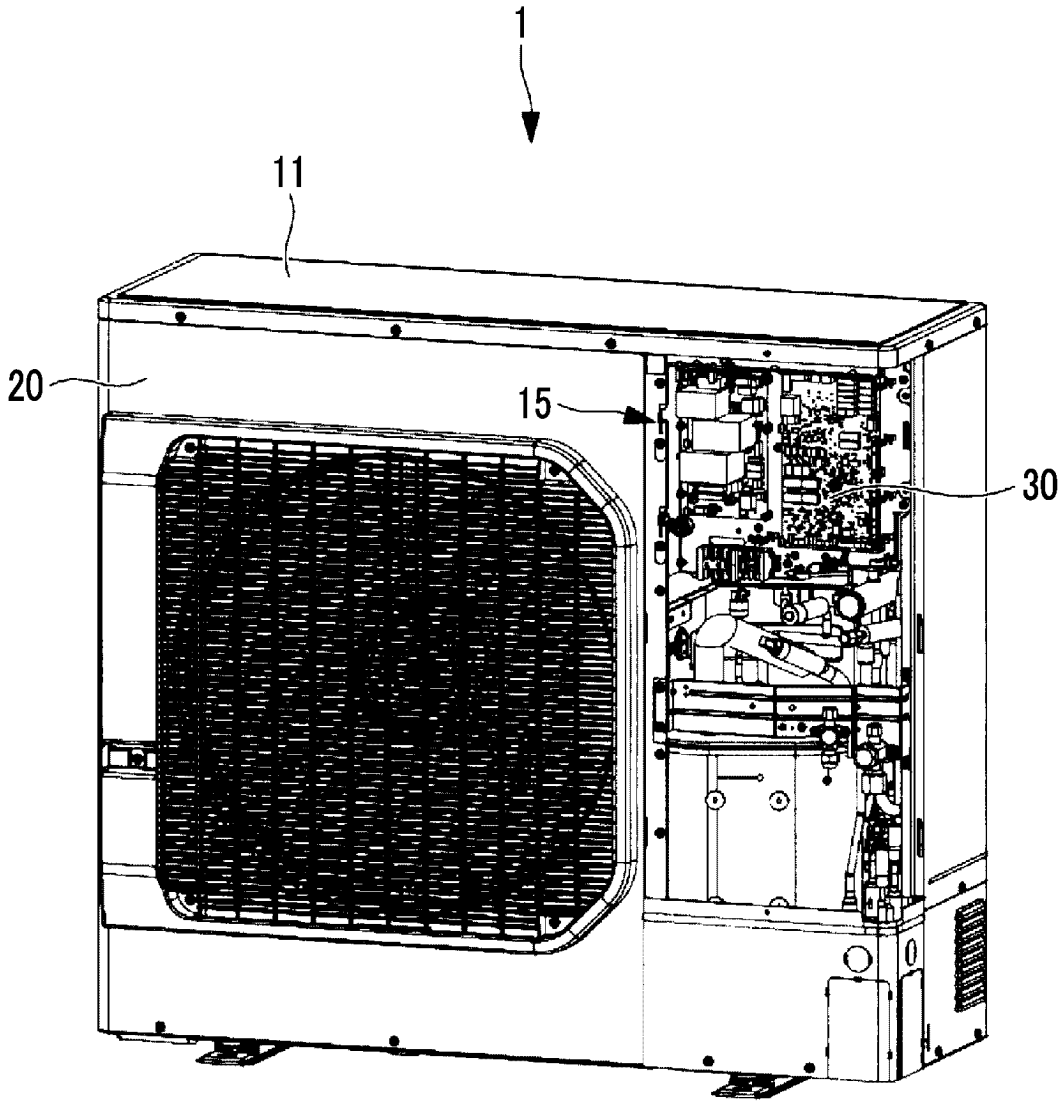

HEIGHT DIRECTION
WIDTH DIRECTION
DEPTH DIRECTION

FIG. 2


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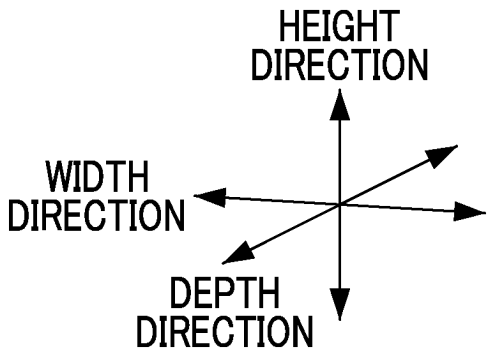

HEIGHT DIRECTION
WIDTH DIRECTION
DEPTH DIRECTION

FIG. 3

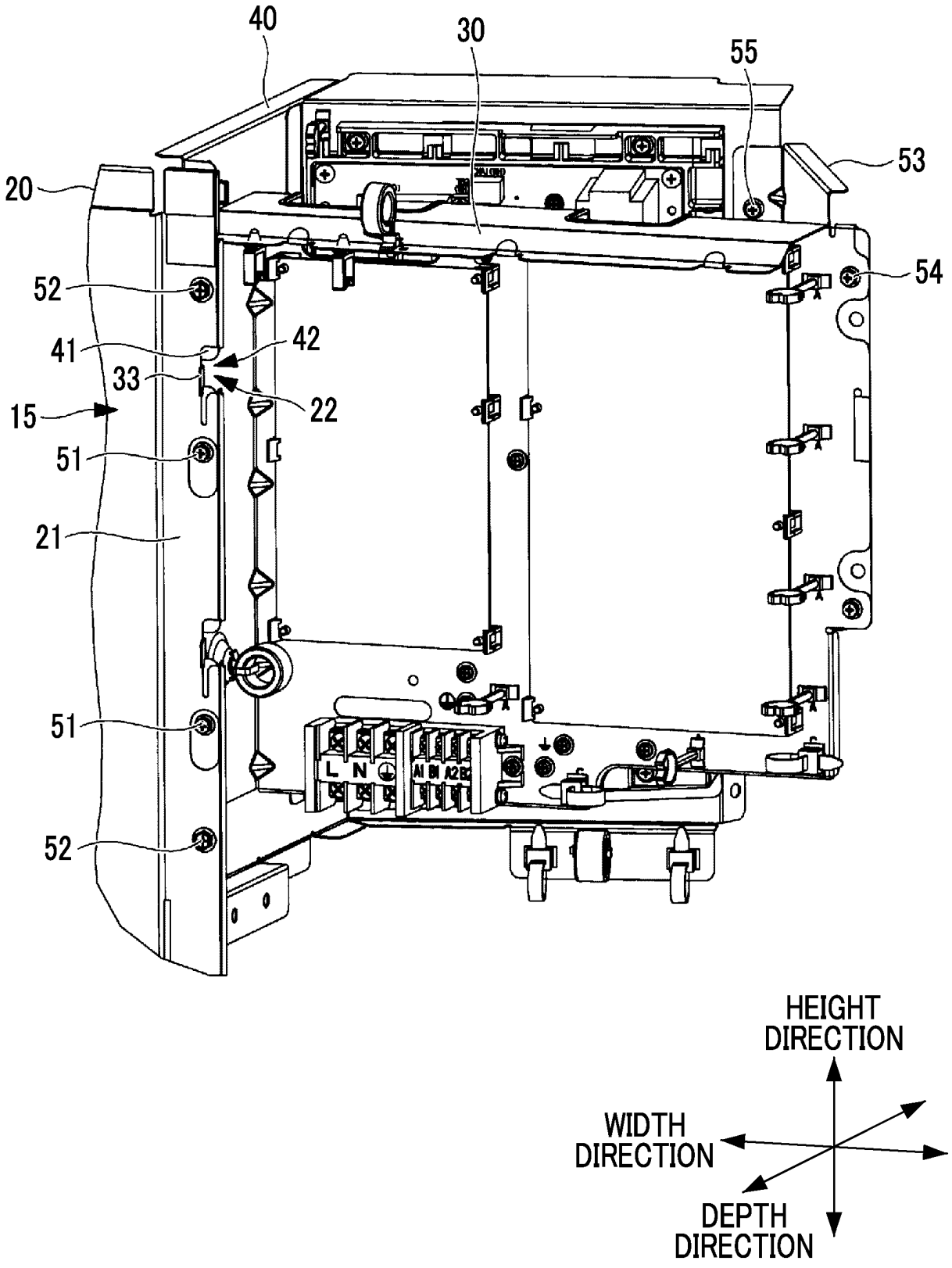

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42
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22
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51
52
L
N
HEIGHT DIRECTION
WIDTH DIRECTION
DEPTH DIRECTION

FIG. 4

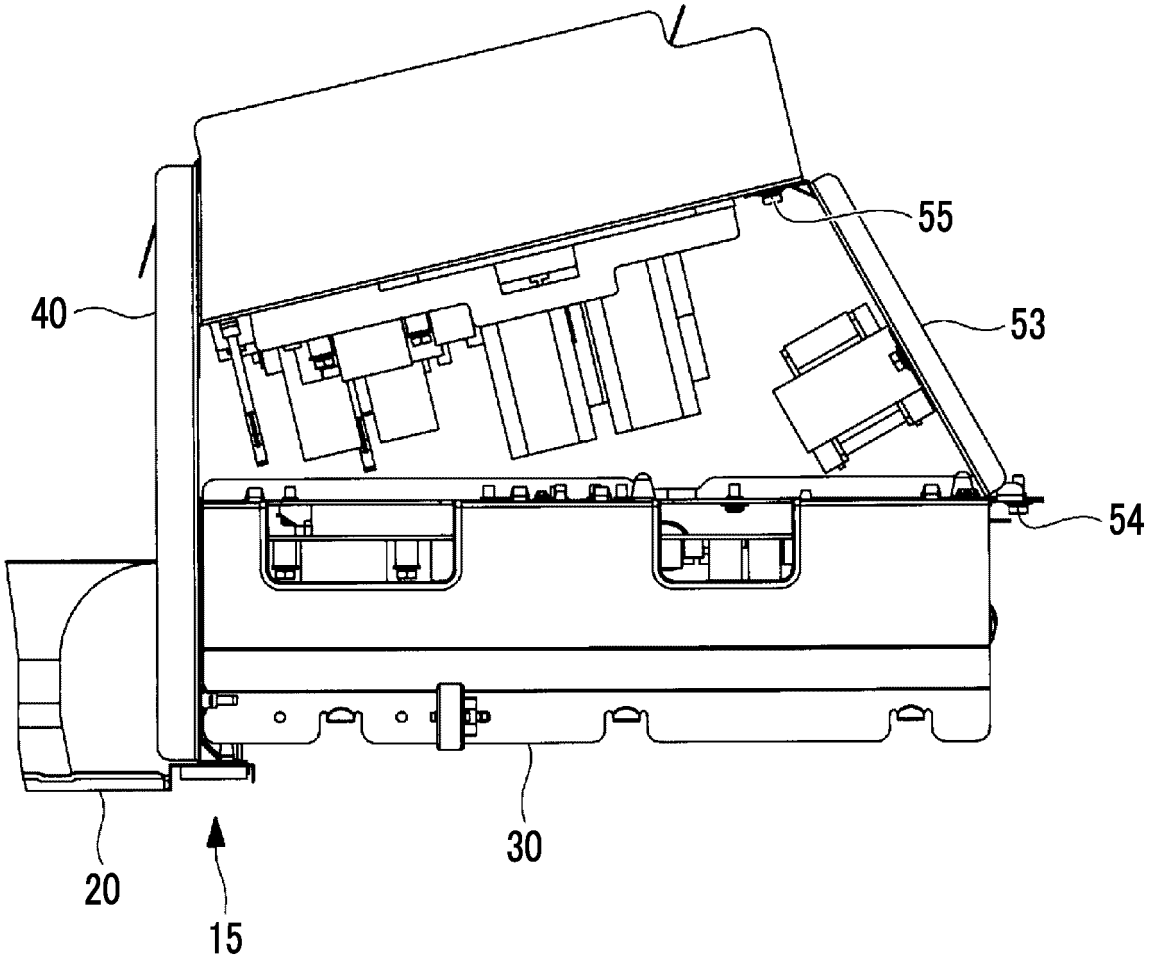


FIG. 5

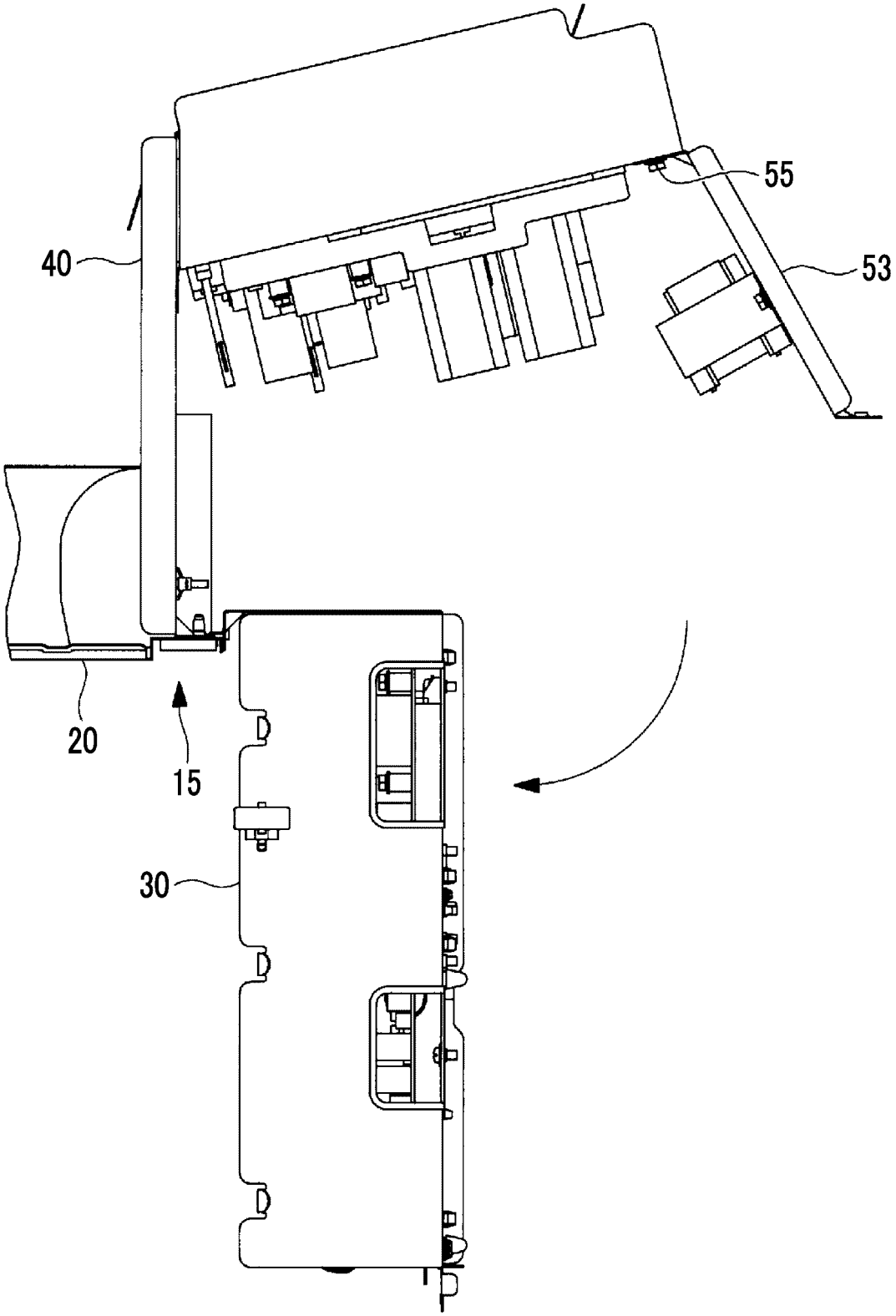


FIG. 6

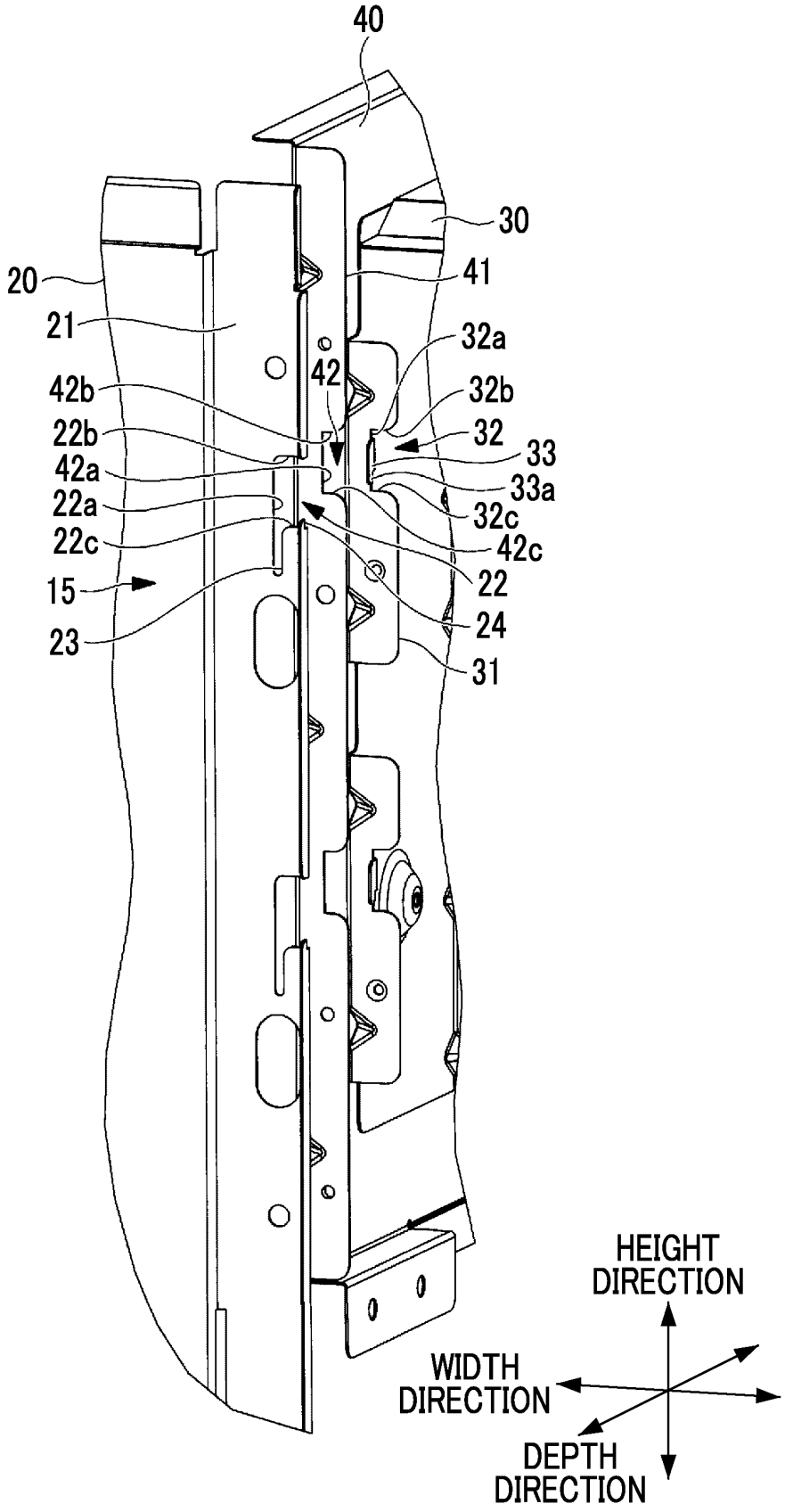

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30
20
41
21
32a
42
42b
32b
22b
32
33
42a
33a
22a
32c
22c
42c
15
22
24
23
31
HEIGHT DIRECTION
WIDTH DIRECTION
DEPTH DIRECTION

FIG. 7

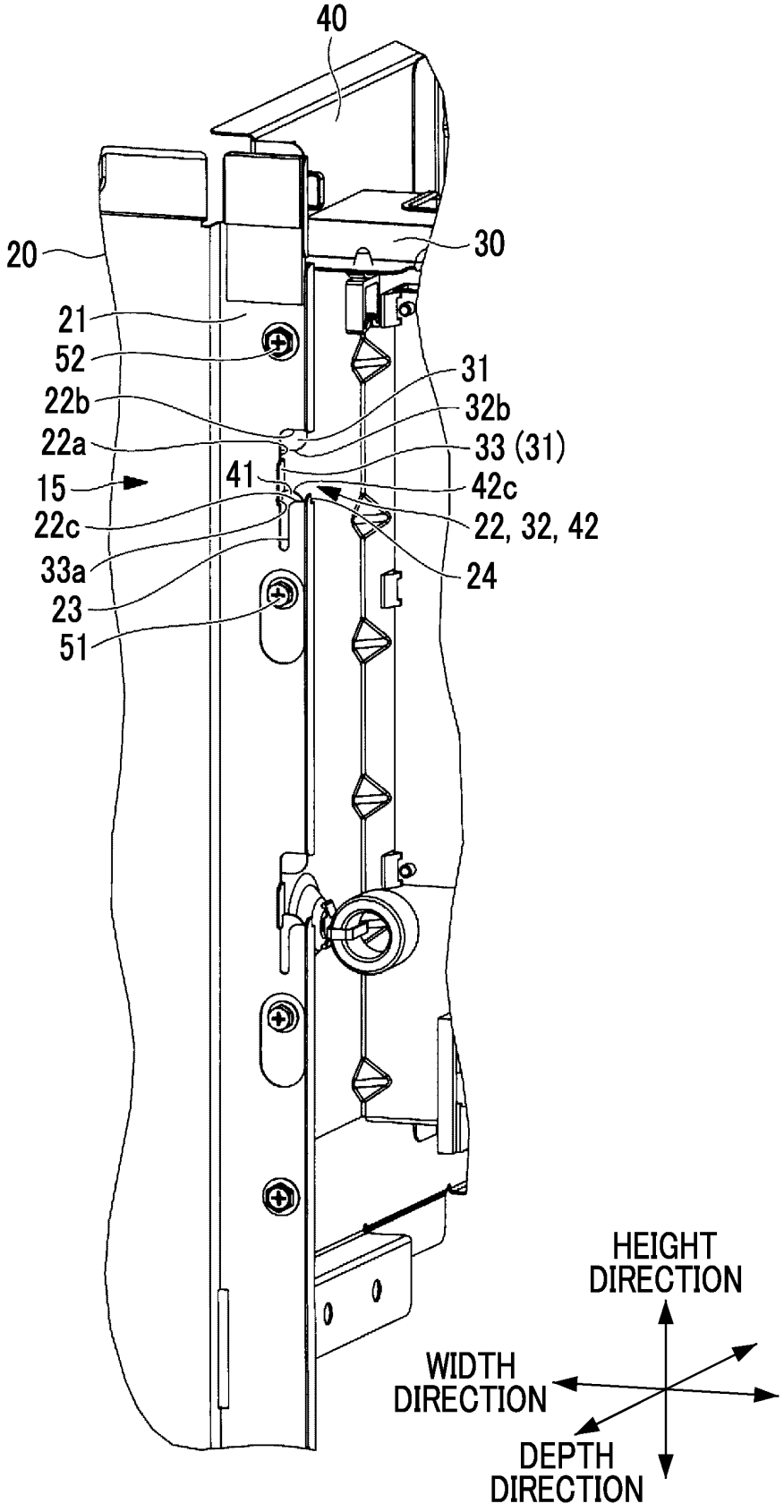

40
20
30
21
52
31
22b
32b
22a
33 (31)
15
41
42c
22c
22, 32, 42
33a
24
23
51
HEIGHT DIRECTION
WIDTH DIRECTION
DEPTH DIRECTION

FIG. 8

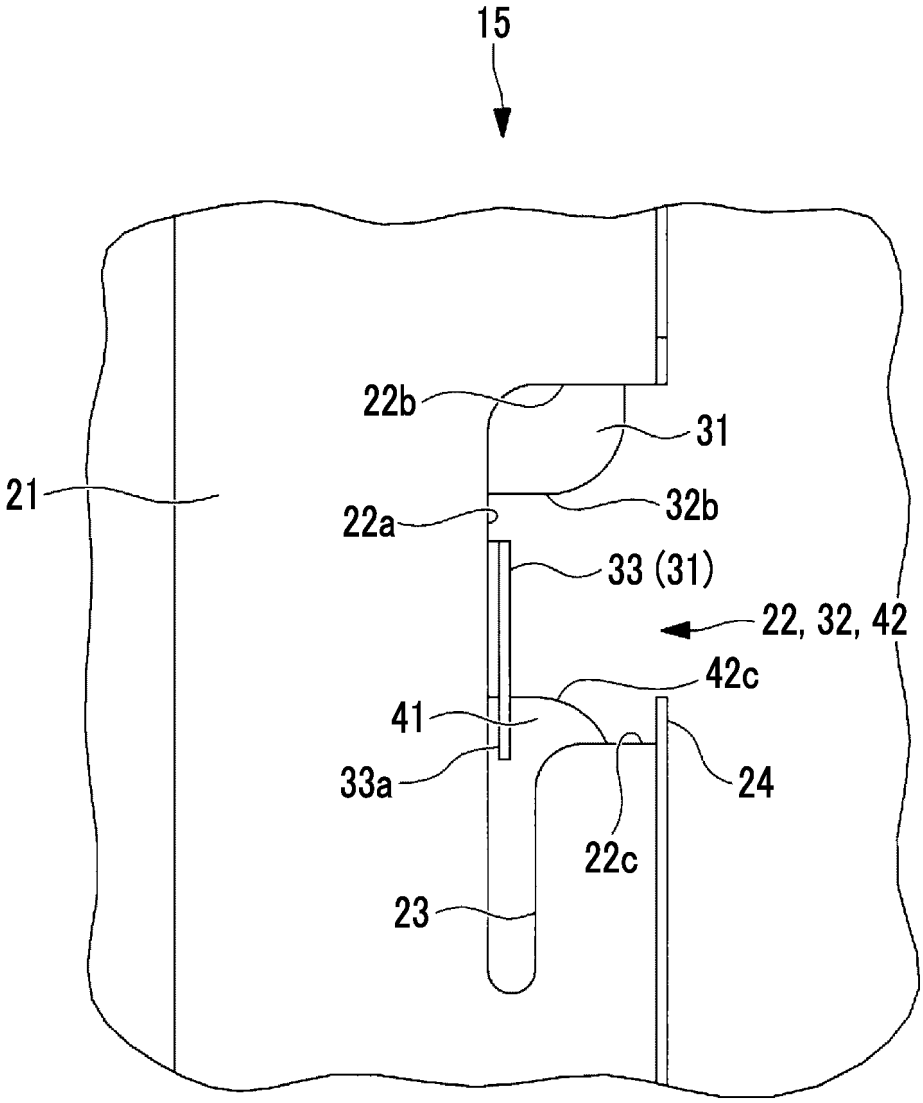


FIG. 9

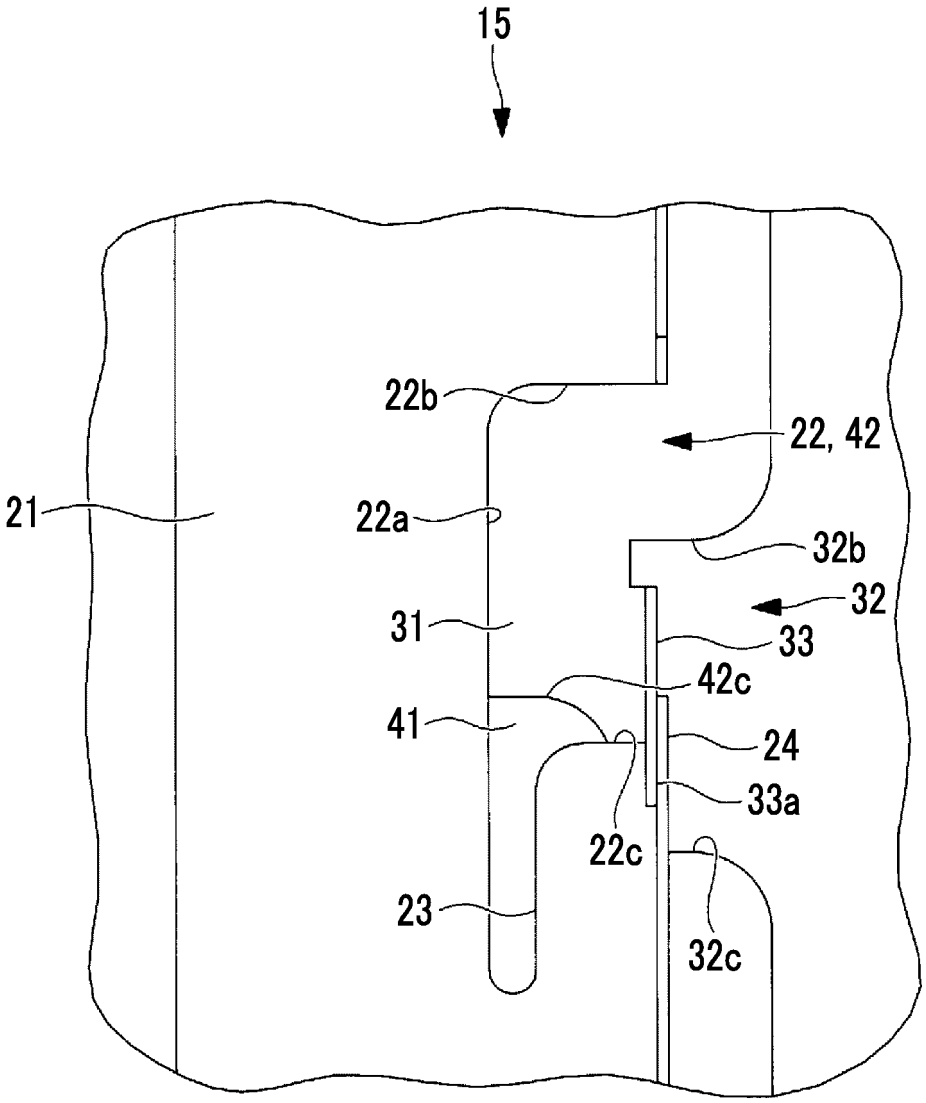


FIG. 10

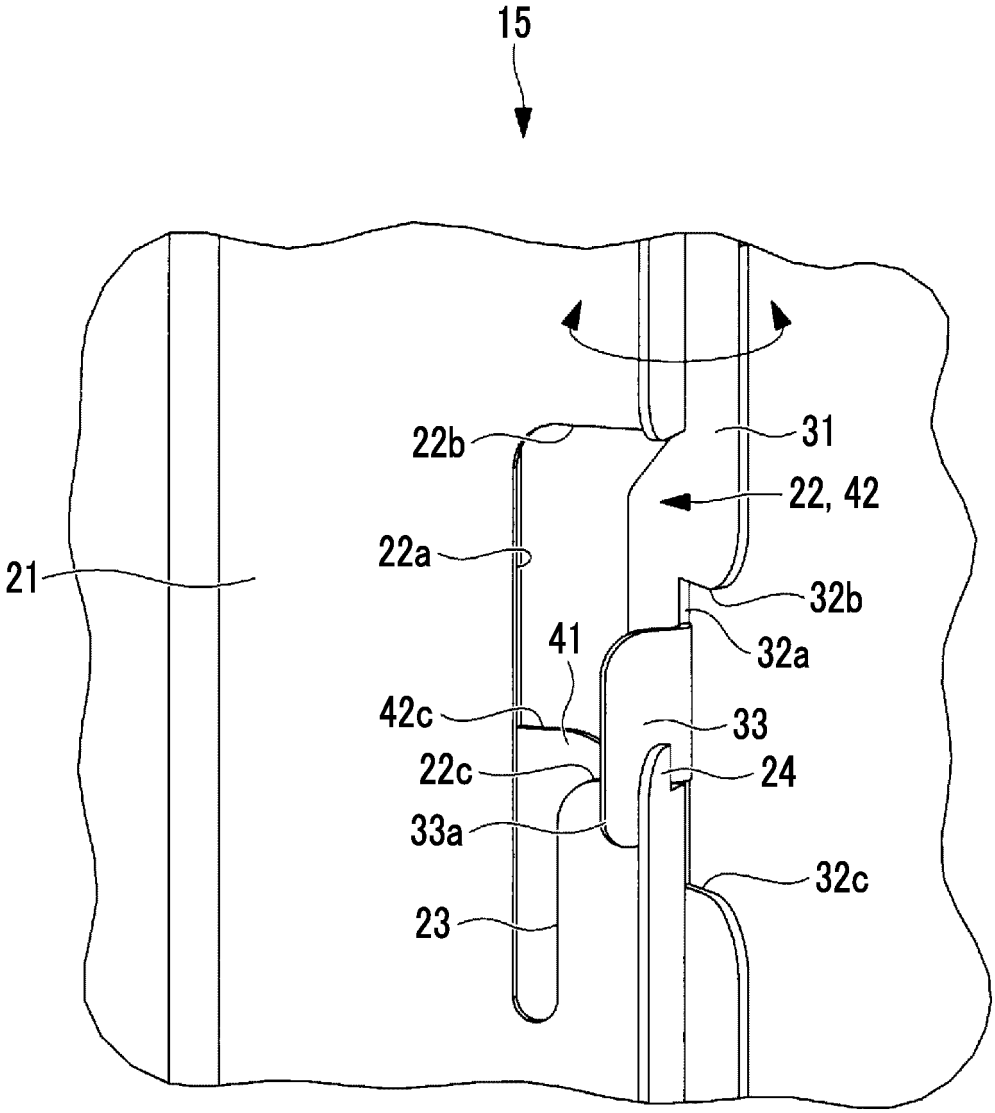
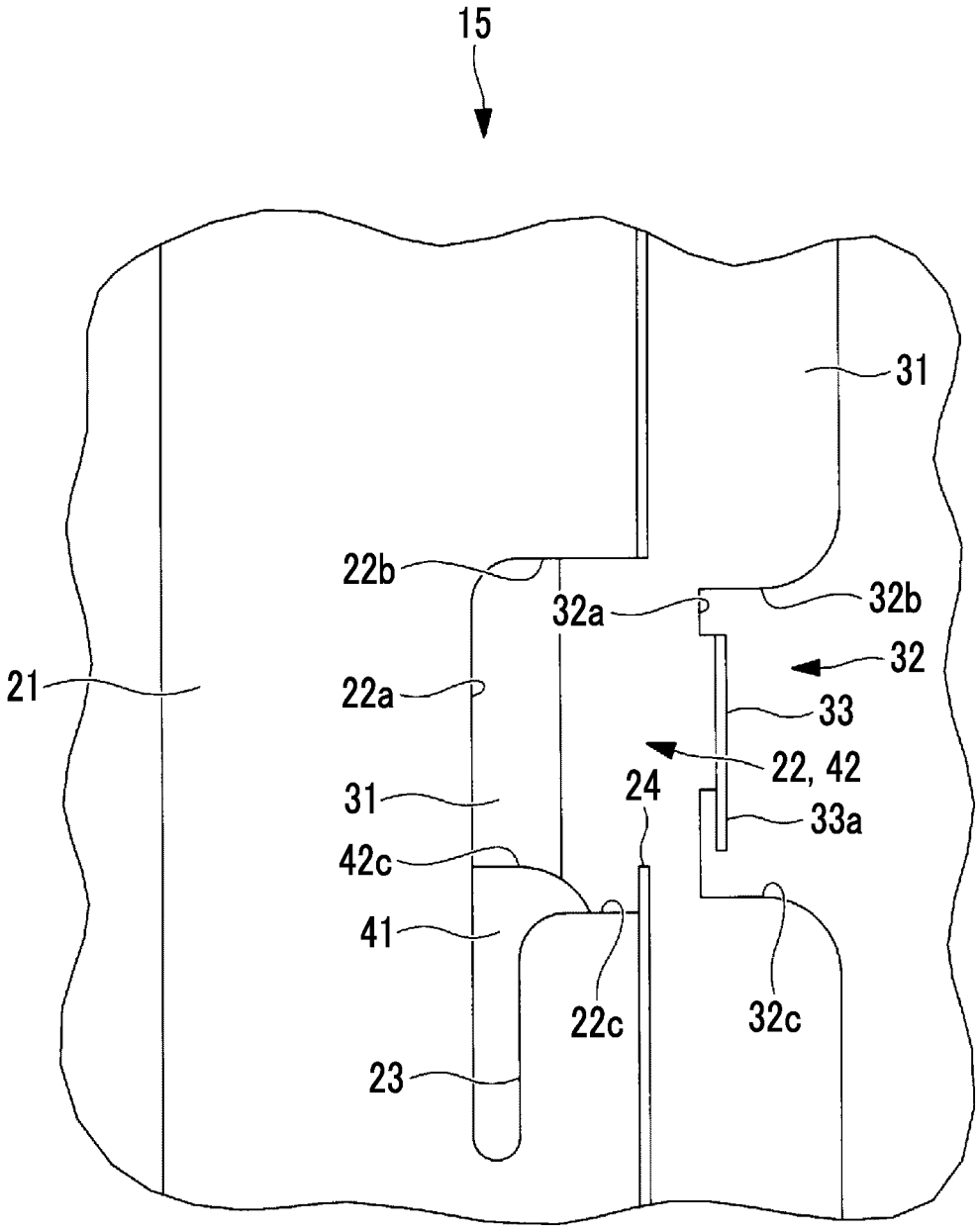


FIG. 11



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/042507

A. CLASSIFICATION OF SUBJECT MATTER

F24F 1/22(2011.01)i; ***F24F 11/89***(2018.01)i
FI: F24F1/22; F24F11/89

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F1/22; F24F11/89

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2023
Registered utility model specifications of Japan 1996-2023
Published registered utility model applications of Japan 1994-2023

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.
A	KR 10-2015-0091616 A (LG ELECTRONICS INC.) 12 August 2015 (2015-08-12) entire text, all drawings	1-9
A	JP 2019-143881 A (FUJITSU GENERAL LTD.) 29 August 2019 (2019-08-29) entire text, all drawings	1-9
A	JP 2014-066462 A (MITSUBISHI HEAVY INDUSTRIES, LTD.) 17 April 2014 (2014-04-17) entire text, all drawings	1-9

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

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 January 2023	**31 January 2023**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2022/042507

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-2015-0091616 A	12 August 2015	(Family: none)	
JP 2019-143881 A	29 August 2019	(Family: none)	
JP 2014-066462 A	17 April 2014	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2011232010 A **[0003]**