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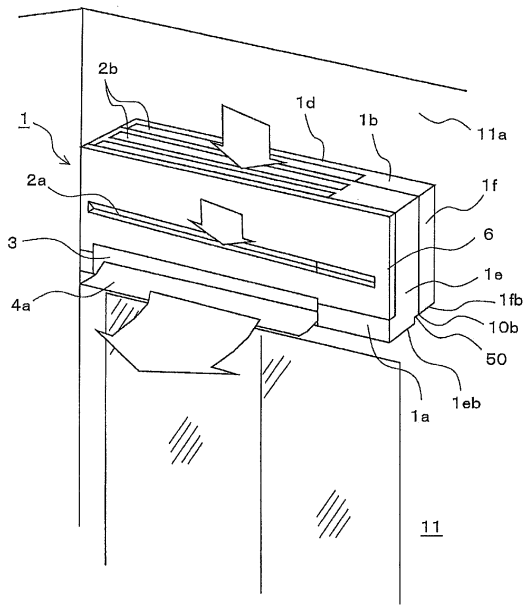
(54) INDOOR UNIT OF AIR CONDITIONER

(57) An indoor unit of an air-conditioning apparatus includes a main body, the main body including a back case shaped like a box and provided with an open front face, and a front case joined to the front face of the back case, wherein on a bottom face of the front case, at a location away from a joining portion between the back case and the front case, a step is formed protruding downward.

FIG. 1



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Description

Technical Field

[0001] The present invention relates to an indoor unit of an air-conditioning apparatus, the indoor unit being installed on a wall surface

Background Art

[0002] Conventionally, an indoor unit of an air-conditioning apparatus which has been proposed includes, for example, a frame body serving as a framework; and side panels, a front open/close panel, an L-shaped panel, and a bottom panel installed on faces of the frame body, wherein the bottom panel protrudes below a bottom face of the frame body (see, for example, Patent Literature 1).

Citation List

Patent Literature

[0003] Patent Literature 1: Japanese Patent No. 5388998

Summary of Invention

Technical Problem

[0004] In installing an indoor unit of an air-conditioning apparatus on a wall surface, the indoor unit is fixed to the wall surface by hooking a back face of a main body of the indoor unit to a mounting plate mounted on the wall surface. In such an installation operation, with an upper part of the indoor unit hooked to the mounting plate, an operator raises a lower part of the indoor unit in a direction away from the wall surface. Then, with the indoor unit kept raised from the wall surface by placing a stay rod for installation between a bottom face of the indoor unit and the wall surface, the operator performs an operation such as pipe connection work.

[0005] However, with the indoor unit of an air-conditioning apparatus that is described in Patent Literature 1, a joining portion between the bottom panel and frame body protrudes below the bottom face of the frame body, and thus will be hit by hands of the operator, the stay rod for installation, or other tools during an installation operation. Consequently, there is a problem in that forces will be exerted on the joining portion between the bottom panel and frame body, causing the bottom panel to come off the frame body.

[0006] The present invention has been made to solve the above problem and has an object to provide an indoor unit of an air-conditioning apparatus, where the indoor unit can improve working efficiency in installing the indoor unit on a wall surface.

Solution to Problem

[0007] An embodiment of the present invention provides an indoor unit of an air-conditioning apparatus, the indoor unit comprising a back case shaped like a box and provided with an open front face, and a front case joined to the front face of the back case, wherein on a bottom face of the front case, at a location away from a joining portion between the back case and the front case, a step is formed protruding downward.

Advantageous Effects of Invention

[0008] On the indoor unit of an air-conditioning apparatus according to an embodiment of the present invention, a step protruding downward is formed at such a location on the bottom face of the back case that is away from a joining portion between the back case and the front case.

[0009] This allows an operator to raise the indoor unit by hooking his/her fingers behind the step when installing the indoor unit on a wall surface. Also, with the indoor unit raised, a stay rod or another tool for installation can be placed between the step and wall surface, keeping the indoor unit in the raised state. This makes it possible to improve working efficiency in installing the indoor unit on the wall surface.

[0010] Also, it is possible to keep any force from being exerted on the joining portion between the back case and the front case, and thereby keep the front case from coming off the back case.

Brief Description of Drawings

[0011]

[Fig. 1] Fig. 1 is a perspective view showing external appearance of an indoor unit of an air-conditioning apparatus according to Embodiment 1.

[Fig. 2] Fig. 2 is an exploded view schematically showing a side face of the indoor unit of Fig. 1.

[Fig. 3] Fig. 3 is a diagram schematically showing a back face of the indoor unit of Fig. 1.

[Fig. 4] Fig. 4 is a diagram schematically showing a longitudinal section of the indoor unit of Fig. 1.

[Fig. 5] Fig. 5 is a diagram explaining a method for installing the indoor unit of the air-conditioning apparatus according to Embodiment 1.

[Fig. 6] Fig. 6 is a longitudinal section schematically showing a step on the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[Fig. 7] Fig. 7 is a longitudinal section explaining an air current in the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[Fig. 8] Fig. 8 is an enlarged view of principal part in Fig. 7.

[Fig. 9] Fig. 9 is a longitudinal section schematically showing Variation 1 of the indoor unit of an air-con-

ditioning apparatus according to Embodiment 1.

[Fig. 10] Fig. 10 is a longitudinal section explaining an air current in Variation 1 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[Fig. 11] Fig. 11 is a rear view schematically showing Variation 2 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[Fig. 12] Fig. 12 is a longitudinal sectional view schematically showing Variation 3 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[Fig. 13] Fig. 13 is a longitudinal section schematically showing a step on an indoor unit of an air-conditioning apparatus according to Embodiment 2.

[Fig. 14] Fig. 14 is a longitudinal section schematically showing Variation 1 of the indoor unit of an air-conditioning apparatus according to Embodiment 2.

[Fig. 15] Fig. 15 is a longitudinal sectional view showing Variation 2 of the indoor unit of an air-conditioning apparatus according to Embodiment 2.

Description of Embodiments

Embodiment 1.

[0012] A configuration of an indoor unit of an air-conditioning apparatus according to Embodiment 1 will be described below with reference to drawings. Note that in the following description, the indoor unit of an air-conditioning apparatus will be referred to simply as the "indoor unit."

[0013] Fig. 1 is a perspective view showing external appearance of the indoor unit of an air-conditioning apparatus according to Embodiment 1. Fig. 2 is an exploded view schematically showing a side face of the indoor unit of Fig. 1.

[0014] A main body 1 of the indoor unit is installed on a wall surface 11a of a room 11 to be air-conditioned. The main body 1 includes a front case 1e and a back case 1f. The back case 1f is formed in a box shape with an open front face. The front case 1e is joined to the front face of the back case 1f. For example, a rear side of the front case 1e and the back case 1f are fitted together. Note that the method for joining together the front case 1e and back case 1f is not limited to this. For example, the front case 1e and back case 1f may be joined together by bonding or by screwing.

[0015] A front grille 6 is attached to the main body 1 on the side of a front face 1a. The front grille 6 is detachably attached to the front case 1e. In the front grille 6, an air inlet port 2a, which is an opening port through which air is passed, is formed in a width direction of the main body 1. In the front case 1e, an upper air inlet 2b, which is an opening port through which air is passed, is formed on the side of a top face 1b.

[0016] An air outlet 3 through which air is blown out is formed in a lower part including a bottom face 1eb of the front case 1e. A lower part of the air outlet 3 in the front case 1e is formed by a lower jaw 10a. That is, the lower jaw 10a is formed integrally with the front case 1e, making up a lower end of the front case 1e on the rear side. The lower jaw 10a is joined to the back case 1f. Note that the lower jaw 10a may be constructed separately from the front case 1e. A horizontal louver 4a and after-mentioned vertical louvers 4b are provided in the air outlet 3.

[0017] A step 50 is formed at such a location on the bottom face 1eb of the front case 1e, protruding downward. The step 50 is formed at a location away from a joining portion 10b between the back case 1f and front case 1e.

[0018] On the side of a back face 1d, the back case 1f is mounted on the wall surface 11a. On the side of a top face 1b, the upper air inlet 2b adapted to pass air therethrough is formed in the back case 1f. Also, a guide wall 10 is formed inside the back case 1f.

[0019] Fig. 3 is a diagram schematically showing a back face of the indoor unit of Fig. 1.

[0020] As shown in Fig. 3, the step 50 formed on the bottom face 1eb of the front case 1e, protrudes below a bottom face 1fb of the back case 1f. Also, the step 50 is formed extending along a width direction of the front case 1e.

[0021] Fig. 4 is a diagram schematically showing a longitudinal section of the indoor unit of Fig. 1.

[0022] As shown in Fig. 4, a fan 8 adapted to send air is disposed in the main body 1. The fan 8 sucks air into an inlet-side flow path E1 through the air inlet port 2a and upper air inlet 2b and blows out the air into an outlet-side flow path E2 on the side of the air outlet 3. The fan 8 can be, for example, any of a cross-flow fan, axial fan, and other fans. A heat exchanger 7 adapted to exchange heat between refrigerant and air is disposed on an upstream side of the fan 8. A filter 5 adapted to remove dust is disposed behind the air inlet port 2a and upper air inlet 2b but in front of the heat exchanger 7. In the back case 1f, a spiral-shaped guide wall 10 is formed on an outlet side of the fan 8. Refrigerant pipes 12 connected to the outdoor unit are housed between the guide wall 10 and back face 1d.

[0023] A tongue 9a adapted to separate the inlet-side flow path E1 and outlet-side flow path E2 is formed on the front case 1e. Also, on a front side of the tongue 9a in the front case 1e, a drain pan 9b is formed to temporarily store drops of water dripping from the heat exchanger 7. Also, the horizontal louver 4a pivotal in an up/down direction and the vertical louvers 4b pivotal in a left-right direction are provided in the air outlet 3. The air outlet 3 is open downward on the side of the front face 1a of the main body 1. A top wall of the air outlet 3 is made up of a diffuser 3a of the tongue 9a and sidewalls of the air outlet 3 are made up of vertical planes extending in a manner continuous with the diffuser 3a. Also, a bottom face of the air outlet 3 is made up of the guide wall 10 and a downstream end of the air outlet 3 is made up of the lower jaw 10a.

[0024] Next, a method for installing the indoor unit on the wall surface 11a of the room 11 will be described.

[0025] Fig. 5 is a diagram explaining a method for installing the indoor unit of the air-conditioning apparatus according to Embodiment 1.

[0026] Note that in Fig. 5, a lower part of the indoor unit is shown as being raised in a direction away from the wall surface 11a. Note that Fig. 5 schematically shows a longitudinal section of the main body 1.

[0027] As shown in Fig. 5, in installing the indoor unit on the wall surface 11a, a mounting plate 13 is mounted on the wall surface 11a in advance. Then, by hooking the back face 1d of the main body 1 of the indoor unit to the mounting plate 13, the indoor unit is hung on the wall surface 11a.

[0028] To raise the lower part of the indoor unit in the direction away from the wall surface 11a, with an upper part of the indoor unit on the side of the back face 1d hooked to the mounting plate 13, the operator raises the indoor unit by hooking his/her fingers behind the step 50 formed on the bottom face 1eb of the front case 1e.

[0029] Then, with the indoor unit raised, a stay rod 14 or another tool for installation is mounted between the step 50 and wall surface 11a, keeping the indoor unit raised from the wall surface 11a.

[0030] With the indoor unit raised from the wall surface 11a, the operator does work such as connecting pipes and wires to the outdoor unit.

[0031] Subsequently, the operator removes the stay rod 14 for installation placed between the step 50 on the indoor unit and wall surface 11a, moves the indoor unit toward the wall surface 11a by hooking his/her fingers behind the step 50 formed on the bottom face 1eb of the front case 1e, and fixes the main body 1 of the indoor unit to the mounting plate 13.

[0032] Next, a detailed configuration of the step 50 formed on the bottom face 1eb of the front case 1e will be described.

[0033] Fig. 6 is a longitudinal section schematically showing the step on the indoor unit of an air-conditioning apparatus according to Embodiment 1. Note that Fig. 6 shows an enlargement of a longitudinal section at the position of the air outlet 3 in the main body 1. Note that the left-to-right direction in Fig. 6 corresponds to the depth direction of the main body 1 of the indoor unit while the vertical direction in Fig. 6 corresponds to the height direction of the main body 1.

[0034] As shown in Fig. 6, the step 50 is formed on the bottom face 1eb of the front case 1e, protruding downward. Desirably a height Hd of the step 50 is about high enough to be gripped by operator's fingers. Also, desirably the height Hd of the step 50 is about high enough to be propped by the stay rod 14 or another tool for installation. Preferably the height Hd of the step 50 is 4 mm or above. On the other hand, if the height Hd of the step 50 is too large, size of the main body 1 will increase. Also, if the height Hd of the step 50 is too large, degradation of design will occur. Thus, desirably the height Hd of the step 50 is not too large. Preferably the height Hd of the step 50 is 10 mm or below. Thus, in the indoor unit of an air-conditioning apparatus according to Embodiment 1, the height Hd of the step 50 is set to be between 4 mm and 10 mm, both inclusive. Also, the step 50 is formed at a location away from the joining portion 10b between the back case 1f and front case 1e. Desirably a distance Ld between the step 50 and joining portion 10b is such that the operator's fingers or the stay rod 14 or another tool for installation will not touch the joining portion 10b between the back case 1f and front case 1e. Preferably the distance Ld between the step 50 and joining portion 10b is 10 mm or above.

[0035] Also, between the step 50 and a tip 10a1 of the lower jaw 10a, a bottom face of the lower jaw 10a includes a flat portion 10a2 formed into a flat shape. That is, the flat portion 10a2 is formed on the bottom face 1eb of the front case 1e, extending a predetermined distance between the step 50 and air outlet 3. Note that the entire area between the step 50 and the tip 10a1 of the lower jaw 10a does not need to be flat, and it is enough that at least part of the area is flat.

[0036] Next, operation of the flat portion 10a2 formed between the step 50 and air outlet 3 will be described.

[0037] Fig. 7 is a longitudinal section explaining an air current in the indoor unit of an air-conditioning apparatus according to Embodiment 1. Fig. 8 is an enlarged view of principal part in Fig. 7. Note that Figs. 7 and 8 schematically show a longitudinal section at the position of the air outlet 3 in the main body 1.

[0038] As shown in Fig. 7, the air blown out into the outlet-side flow path E2 by the fan 8 is led to the air outlet 3 by the guide wall 10 and blown out as outlet airflow 20 through the air outlet 3. The outlet airflow 20 induces air in the room 11, and thereby produces induced airflow 30 flowing from the side of the wall surface 11a to the side of the air outlet 3 in a lower part of the main body 1. Then, the induced airflow 30 joins the outlet airflow 20.

[0039] As shown in Fig. 8, the induced airflow 30 flows along the bottom face 1fb of the back case 1f and the bottom face 1eb of the front case 1e. Then, when the induced airflow 30 hits the step 50, part of the induced airflow 30 flows downward. That is, the induced airflow 30 turns downward at the step 50 spaced away from the tip 10a1 of the lower jaw 10a by a distance equivalent to a length of the flat portion 10a2. Consequently, the induced airflow 30 gradually joins the outlet airflow 20 at a location below the tip 10a1 of the lower jaw 10a.

[0040] As described above, according to Embodiment 1, the indoor unit includes the main body 1, the main body 1 including the back case 1f shaped like a box and provided with an open front face, and a front case 1e joined to the front face of the back case 1f, wherein on the bottom face 1eb of the front case 1e, at a location away from the joining portion 10b between the back case 1f and the front case 1e, the step 50 is formed protruding downward.

[0041] Therefore, when installing the indoor unit on the wall surface 11a, the operator can raise the indoor unit

by hooking his/her fingers behind the step 50. Also, with the indoor unit raised, the stay rod 14 or another tool for installation can be placed between the step 50 and wall surface 11a, keeping the indoor unit raised from the wall surface 11a. This makes it possible to improve the working efficiency in installing the indoor unit on the wall surface 11a. This in turn makes it possible to prevent pipe connection errors and other errors made by the operator. Also, since the indoor unit is kept raised by the stay rod 14 or another tool for installation, an installation operation can be performed by a single operator.

[0042] Also, it is possible to keep any force from being exerted on the joining portion 10b between the back case 1f and the front case 1e, and thereby keep the front case 1e from coming off the back case 1f.

[0043] Also, according to Embodiment 1, the step 50 is formed extending along the width direction of the front case 1e.

[0044] Consequently, the operator can hook his/her fingers behind the step 50 at any position in the width direction of the main body 1 of the indoor unit. Also, the stay rod 14 for installation can be placed at any position in the width direction of the main body 1 of the indoor unit.

[0045] Also, according to Embodiment 1, the height Hd of the step 50 is between 4 mm and 10 mm, both inclusive.

[0046] This allows the operator to raise the indoor unit from the wall surface 11a by hooking his/her fingers behind the step 50. Also, the indoor unit can be kept raised from the wall surface 11a with the step 50 being propped by the stay rod 14 or another tool for installation.

[0047] Also, according to Embodiment 1, the step 50 is formed at a location 10 mm or more away from the joining portion 10b.

[0048] This makes it possible to keep any force from being exerted on the joining portion 10b between the back case 1f and the front case 1e and thereby keep the front case 1e from coming off the back case 1f.

[0049] Also, according to Embodiment 1, between the step 50 and air outlet 3, the bottom face 1eb of the front case 1e includes the flat portion 10a2 formed into a flat shape.

[0050] Consequently, part of the induced airflow 30 can be caused to turn downward at the step 50 spaced away from the tip 10a1 of the lower jaw 10a by a distance equivalent to a length of the flat portion 10a2. Thus, part of the induced airflow 30 can be mixed with the outlet airflow 20 below the tip 10a1 of the lower jaw 10a, making it possible to reduce a volume of the induced airflow 30 joining the outlet airflow 20 at the tip 10a1 of the lower jaw 10a.

[0051] This makes it possible to inhibit condensation on the lower jaw 10a during cooling operation. That is, an amount of moisture condensing from air in the induced airflow 30 at the tip 10a1 of the lower jaw 10a can be reduced, making it possible to reduce an amount of condensation collecting on the lower jaw 10a.

[0052] Note that only part of the step 50 may be formed at a location spaced away from the joining portion 10b. For example, the step 50 extending along the width direction of the front case 1e may include a portion spaced away from the joining portion 10b in the depth direction and a portion that coincides with the joining portion 10b in the depth direction. In that case, that portion of the step 50 that is spaced away from the joining portion 10b in the depth direction achieves effects similar to those described above.

(Variation 1)

[0053] Fig. 9 is a longitudinal section schematically showing Variation 1 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[0054] The shape of the step 50 is not limited to a shape protruding vertically downward, and may be any shape. For example, as shown in Fig. 9, the step 50 may be shaped to slope to a front side of the main body 1. Also, a section of the step 50 is not limited to a rectilinear shape, and may be formed in a curvilinear shape. That is, the step 50 may have any shape as long as the step 50 can be gripped by operator's fingers and propped by the stay rod 14 or another tool for installation.

[0055] This configuration also achieves effects similar to those described above.

[0056] Fig. 10 is a longitudinal section explaining an air current in Variation 1 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[0057] As shown in Fig. 10, again in Variation 1, between the step 50 and air outlet 3, the bottom face 1eb of the front case 1e includes a flat portion 10a2 formed into a flat shape.

[0058] Consequently, part of the induced airflow 30 can be caused to turn downward at the step 50 spaced away from the tip 10a1 of the lower jaw 10a by a distance equivalent to a length of the flat portion 10a2.

[0059] This configuration also achieves effects similar to those described above.

(Variation 2)

[0060] Fig. 11 is a rear view schematically showing Variation 2 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[0061] A length of the step 50 in the width direction of the front case 1e may be shorter than the width of the front case 1e. Also, plural steps 50 may be formed in the width direction of the front case 1e.

[0062] For example, as shown in Fig. 11, two steps 50 shorter than the width of the front case 1e may be formed being spaced away from each other. The length of the step 50 in the width direction may be set to be, for example, at least approximately equal to the width of one finger of the operator. Also, if the two steps 50 are provided near left and right ends of the front case 1e in the width direction, the operator can hook fingers of both hands behind the steps 50.

[0063] This configuration also achieves effects similar

to those described above.

(Variation 3)

[0064] Fig. 12 is a longitudinal sectional view schematically showing Variation 3 of the indoor unit of an air-conditioning apparatus according to Embodiment 1.

[0065] As shown in Fig. 12, instead of the step 50 described above, a groove 60 recessed above a lower end of the joining portion 10b may be formed in the bottom face 1eb of the front case 1e.

[0066] That is, the indoor unit of an air-conditioning apparatus according to Variation 3 includes a main body 1, the main body 1 including a back case 1f shaped like a box and provided with an open front face, and a front case 1e joined to the front face of the back case 1f, wherein in the bottom face 1eb of the front case 1e, at a location away from the joining portion 10b between the back case 1f and the front case 1e, the groove 60 is formed being recessed above.

[0067] This configuration also allows operator's fingers or the stay rod 14 or another tool for installation to be applied to the groove 60 and achieves effects similar to those described above.

Embodiment 2.

[0068] In Embodiment 2, a configuration in which a step 50 is formed on the bottom face 1fb of the back case 1f will be described.

[0069] Note that the same components as those in Embodiment 1 are denoted by the same reference numerals as the corresponding components in Embodiment 1. Description will be given below by focusing on differences from Embodiment 1 described above.

[0070] Fig. 13 is a longitudinal section schematically showing a step on an indoor unit of an air-conditioning apparatus according to Embodiment 2. Note that the left-to-right direction in Fig. 13 corresponds to the depth direction of the main body 1 of the indoor unit while the vertical direction in Fig. 6 corresponds to the height direction of the main body 1.

[0071] As shown in Fig. 13, the step 50 is formed on the bottom face 1fb of the back case 1f, protruding downward. The step 50 is formed at a location away from the joining portion 10b between the back case 1f and front case 1e. For example, the height Hd of the step 50 is set to be between 4 mm and 10 mm, both inclusive. Also, the distance Ld between the step 50 and joining portion 10b is set to 10 mm or above.

[0072] As described above, according to Embodiment 2, the indoor unit includes the main body 1, the main body 1 including the back case 1f shaped like a box and provided with an open front face, and the front case 1e joined to the front face of the back case 1f, wherein on the bottom face 1fb of the back case 1f, at a location away from the joining portion 10b between the back case 1f and the front case 1e, the step 50 is formed protruding downward.

[0073] Therefore, when installing the indoor unit on the wall surface 11a, the operator can raise the indoor unit by hooking his/her fingers behind the step 50. Also, with the indoor unit raised, the stay rod 14 or another tool for installation can be placed between the step 50 and wall surface 11a, keeping the indoor unit raised from the wall surface 11a. This makes it possible to improve the working efficiency in installing the indoor unit on the wall surface 11a. This in turn makes it possible to prevent pipe connection errors and other errors made by the operator. Also, since the indoor unit is kept raised by the stay rod 14 or another tool for installation, an installation operation can be performed by a single operator.

[0074] Also, it is possible to keep any force from being exerted on the joining portion 10b between the back case 1f and the front case 1e, and thereby keep the front case 1e from coming off the back case 1f.

[0075] Also, according to Embodiment 2, the height Hd of the step 50 is between 4 mm and 10 mm, both inclusive.

[0076] This allows the operator to raise the indoor unit from the wall surface 11a by hooking his/her fingers behind the step 50. Also, the indoor unit can be kept raised from the wall surface 11a with the step 50 being propped by the stay rod 14 or another tool for installation.

[0077] Also, according to Embodiment 2, the step 50 is formed at a location 10 mm or more away from the joining portion 10b.

[0078] This makes it possible to keep any force from being exerted on the joining portion 10b between the back case 1f and the front case 1e and thereby keep the front case 1e from coming off the back case 1f.

[0079] Note that the step 50 may be formed extending along a width direction of the back case 1f.

[0080] Consequently, the operator can hook his/her fingers behind the step 50 at any position in the width direction of the main body 1 of the indoor unit. Also, the stay rod 14 for installation can be placed at any position in the width direction of the main body 1 of the indoor unit.

[0081] Note that a length of the step 50 in the width direction of the back case 1f may be shorter than the width of the back case 1f. Also, plural steps 50 may be formed in the width direction of the back case 1f.

[0082] For example, two steps 50 shorter than the width of the back case 1f may be formed being spaced away from each other. The length of the step 50 in the width direction may be set to be, for example, at least approximately equal to the width of one finger of the operator. Also, if the two steps 50 are provided near left and right ends of the back case 1f in the width direction, the operator can hook fingers of both hands behind the steps 50.

[0083] Note that only part of the step 50 may be formed at a location spaced away from the joining portion 10b. For example, the step 50 extending along the width direction of the back case 1f may include a portion spaced away from the joining portion 10b in the depth direction and a portion that coincides with the joining portion 10b in the depth direction. In that case, that portion of the step

50 that is spaced away from the joining portion 10b in the depth direction achieves effects similar to those described above.

(Variation 1)

[0084] Fig. 14 is a longitudinal section schematically showing Variation 1 of the indoor unit of an air-conditioning apparatus according to Embodiment 2.

[0085] The shape of the step 50 formed on the bottom face 1fb of the back case 1f is not limited to a shape protruding vertically downward, and may be any shape.

[0086] For example, as shown in Fig. 14, the step 50 may be shaped to slope to a front side of the main body 1. Also, a section of the step 50 is not limited to a rectilinear shape, and may be formed in a curvilinear shape. That is, the step 50 may have any shape as long as the step 50 can be gripped by operator's fingers and propped by the stay rod 14 or another tool for installation.

[0087] This configuration also achieves effects similar to those described above.

(Variation 2)

[0088] Fig. 15 is a longitudinal sectional view showing Variation 2 of the indoor unit of an air-conditioning apparatus according to Embodiment 2.

[0089] As shown in Fig. 15, instead of the step 50 described above, a groove 60 recessed above a lower end of the joining portion 10b may be formed in the bottom face 1fb of the back case 1f.

[0090] That is, the indoor unit of an air-conditioning apparatus according to Variation 2 includes a main body 1, the main body 1 including a back case 1f shaped like a box and provided with an open front face, and a front case 1e joined to the front face of the back case 1f, wherein in the bottom face 1fb of the back case 1f, at a location away from the joining portion 10b between the back case 1f and the front case 1e, the groove 60 is formed being recessed above.

[0091] This configuration also allows operator's fingers or the stay rod 14 or another tool for installation to be applied to the groove 60 and achieves effects similar to those described above.

Reference Signs List

[0092] 1 main body 1a front face 1b top face 1d back face 1e front case 1eb bottom face of front case 1f back case 1fb bottom face of back case 2a air inlet port 2b upper air inlet 3 air outlet 3a diffuser 4a horizontal louver 4b vertical louver 5 filter 6 front grille 7 heat exchanger 8 fan 9a tongue 9b drain pan 10 guide wall 10a lower jaw 10a1 tip 10a2 flat portion 10b joining portion 11 room 11a wall surface 12 refrigerant pipe 13 mounting plate 14 stay bar 20 outlet airflow 30 induced airflow 50 step 60 groove E1 inlet-side flow path E2 outlet-side flow path

Claims

1. An indoor unit of an air-conditioning apparatus, the indoor unit comprising a main body, the main body including:

   a back case shaped like a box and provided with an open front face, and
   a front case joined to the front face of the back case, wherein
   on a bottom face of the front case, at a location away from a joining portion between the back case and the front case, a step is formed protruding downward.

2. The indoor unit of an air-conditioning apparatus of claim 1, wherein the step is formed extending along a width direction of the front case.

3. The indoor unit of an air-conditioning apparatus of claim 1 or 2, wherein a length of the step in a width direction of the front case is shorter than a width of the front case.

4. The indoor unit of an air-conditioning apparatus of any one of claims 1 to 3, wherein a plurality of the steps are formed in a width direction of the front case.

5. The indoor unit of an air-conditioning apparatus of any one of claims 1 to 4, further comprising a fan provided inside the main body, wherein
   an air outlet adapted to blow out air sent from the fan is formed in the bottom face of the front case, and between the step and the air outlet, the bottom face of the front case includes a flat portion formed into a flat shape.

6. An indoor unit of an air-conditioning apparatus, the indoor unit comprising a main body, the main body including:

   a back case shaped like a box and provided with an open front face, and
   a front case joined to the front face of the back case, wherein
   on a bottom face of the back case, at a location away from a joining portion between the back case and the front case, a step is formed protruding downward.

7. The indoor unit of an air-conditioning apparatus of claim 6, wherein the step is formed extending along a width direction of the back case.

8. The indoor unit of an air-conditioning apparatus of claim 6 or 7, wherein a length of the step in a width direction of the back case is shorter than a width of the back case.

9. The indoor unit of an air-conditioning apparatus of any one of claims 6 to 8, wherein a plurality of the steps are formed in a width direction of the back case.

10. The indoor unit of an air-conditioning apparatus of any one of claims 1 to 9, wherein a height of the step is between 4 mm and 10 mm, both inclusive.

11. The indoor unit of an air-conditioning apparatus of any one of claims 1 to 10, wherein the step is formed at a location 10 mm or more away from the joining portion.

FIG. 1

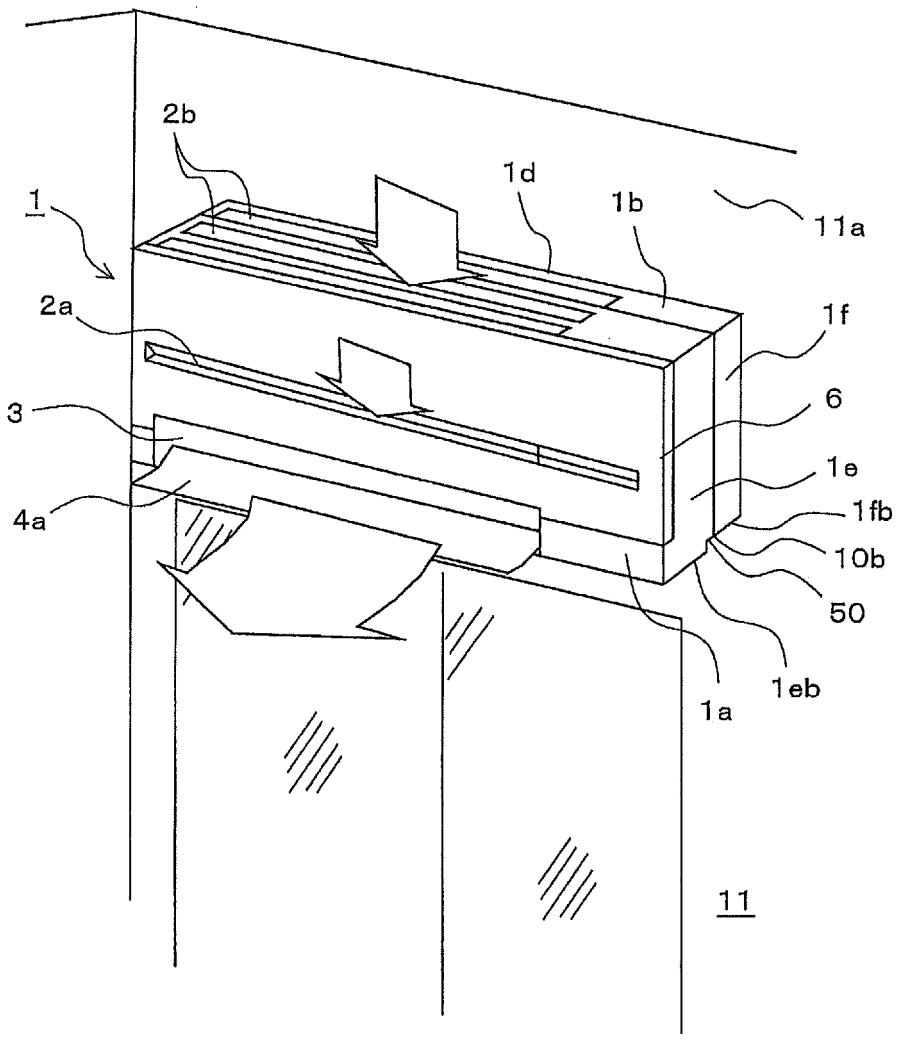


FIG. 2

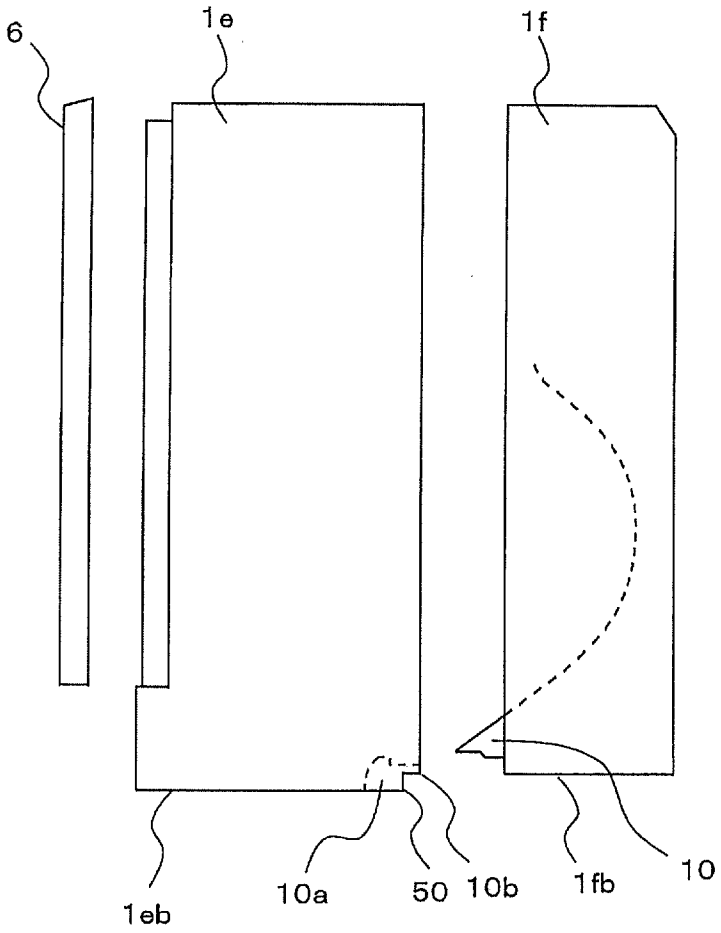


FIG. 3

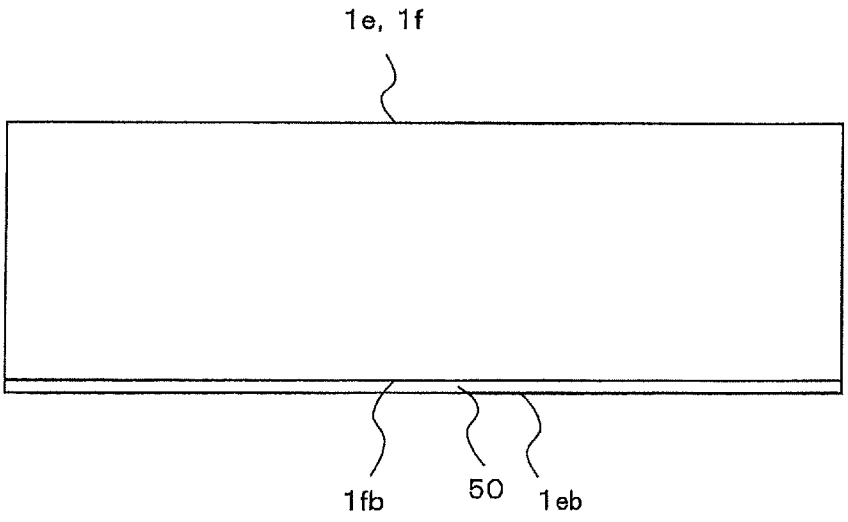


FIG. 4

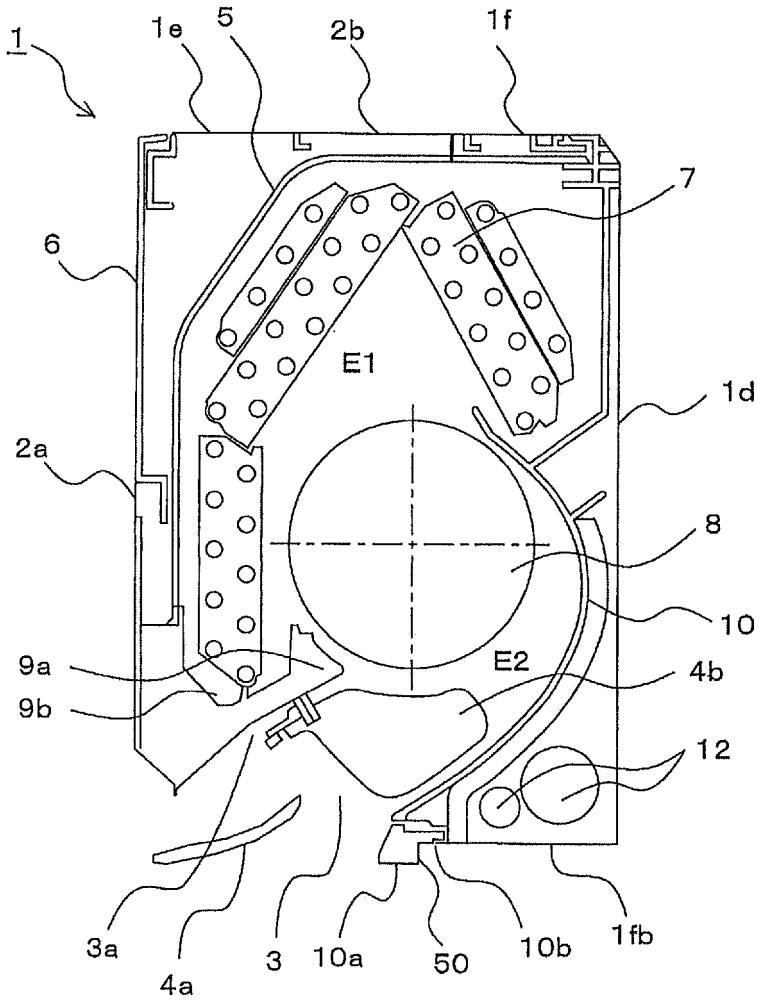


FIG. 5

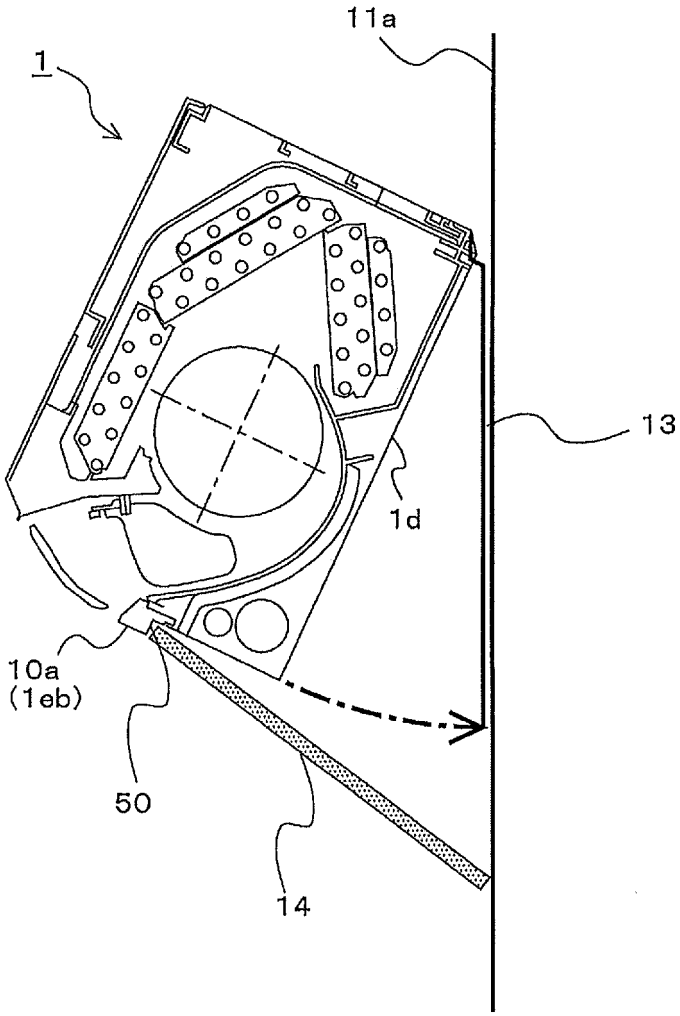


FIG. 6

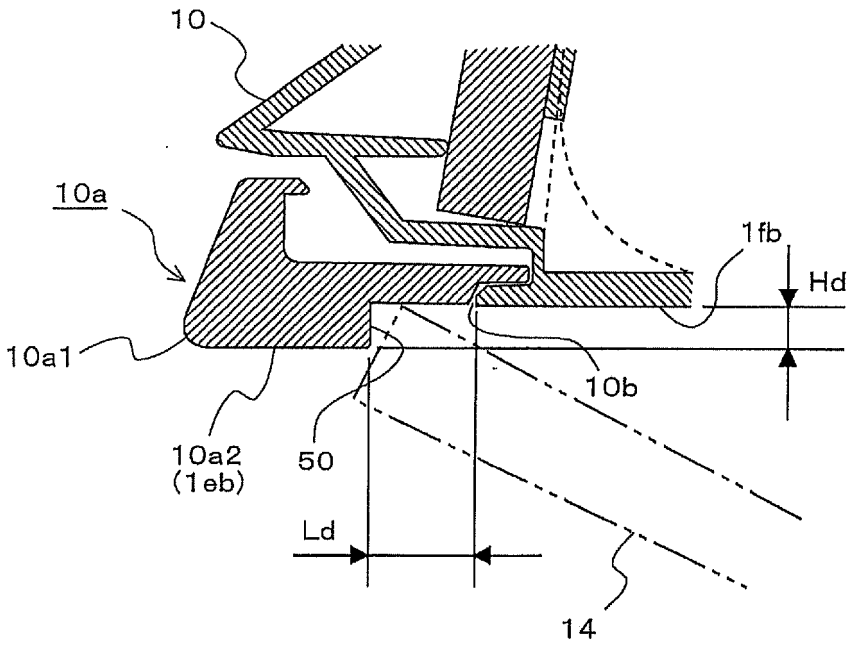


FIG. 7

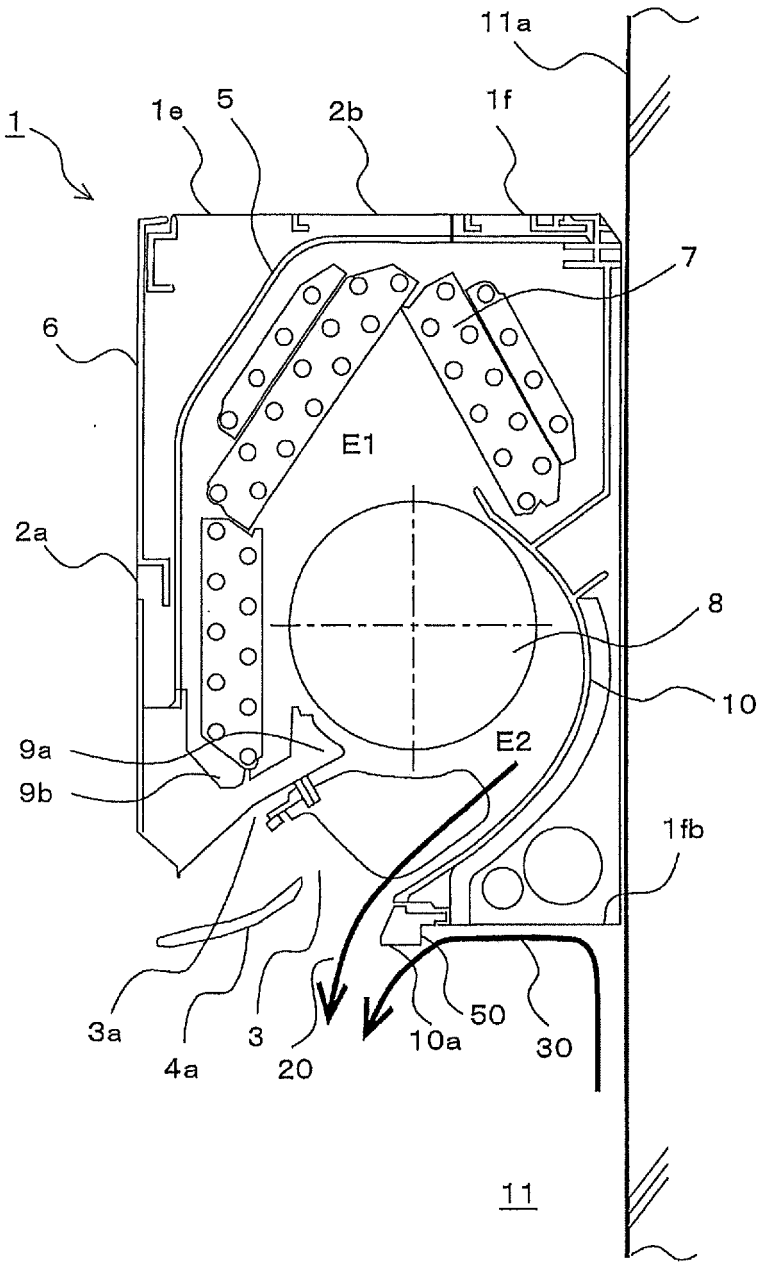


FIG. 8

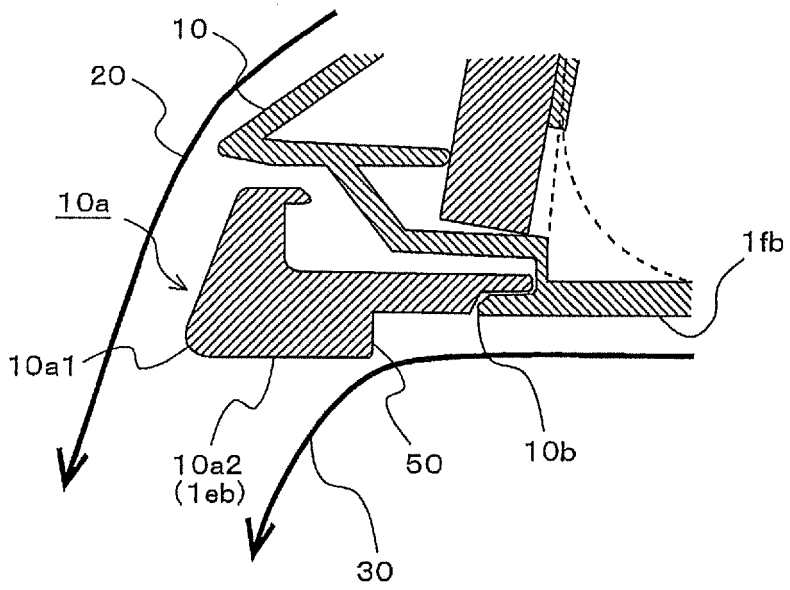

10
20
10a
1fb
10a1
10a2
(1eb)
50
10b
30

FIG. 9

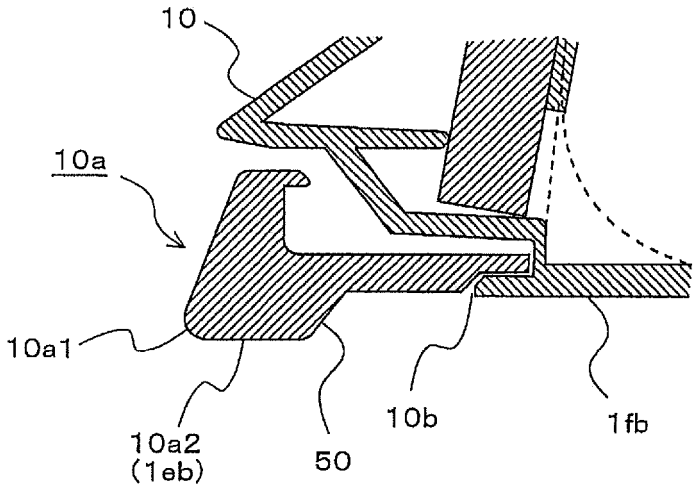

10
10a
10a1
10a2
(1eb)
50
10b
1fb

FIG. 10

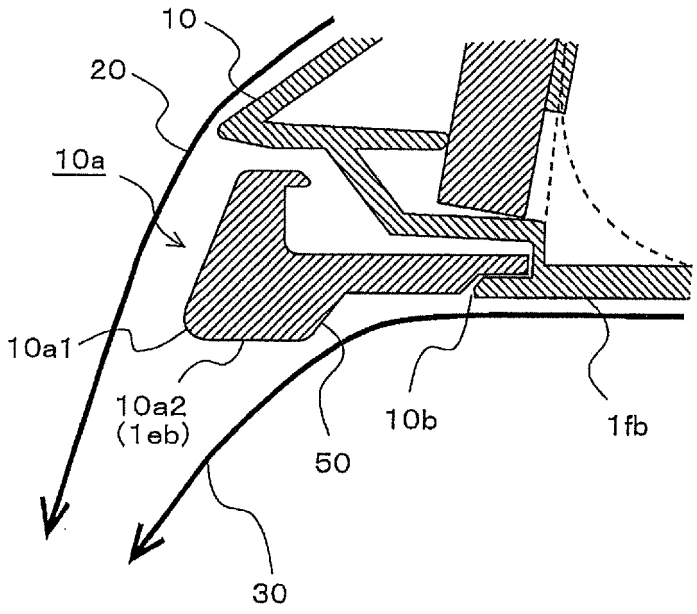


FIG. 11

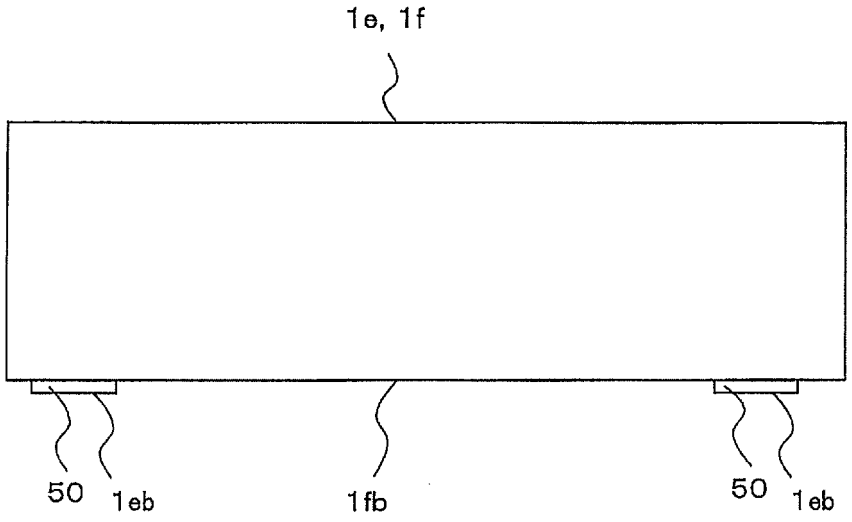


FIG. 12

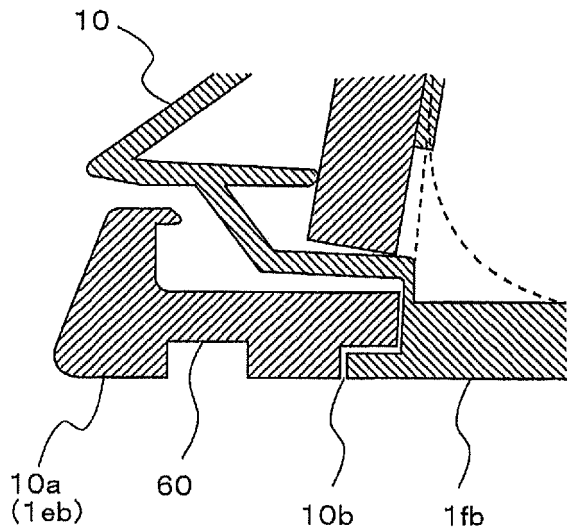


FIG. 13

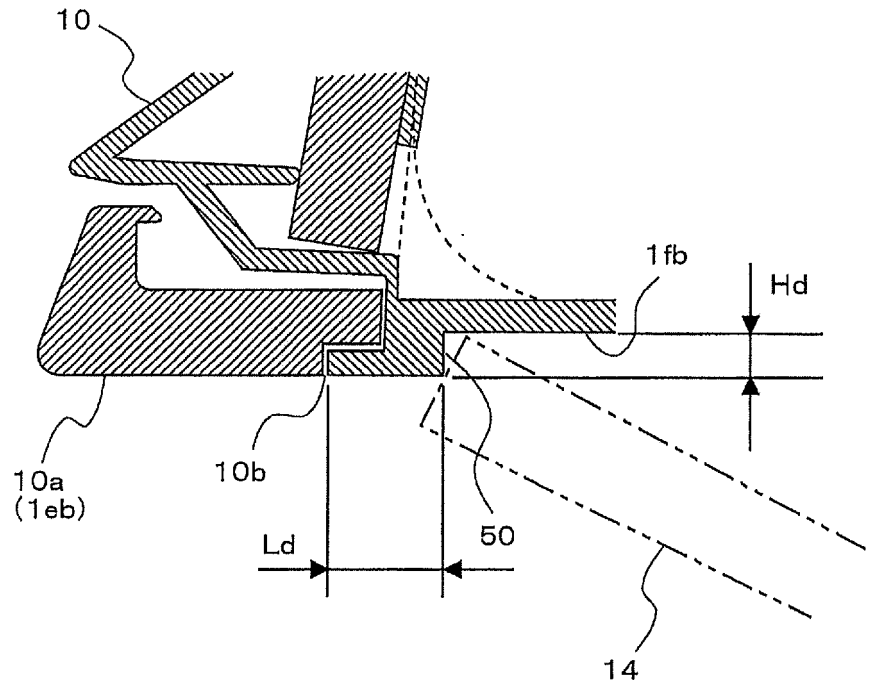


FIG. 14

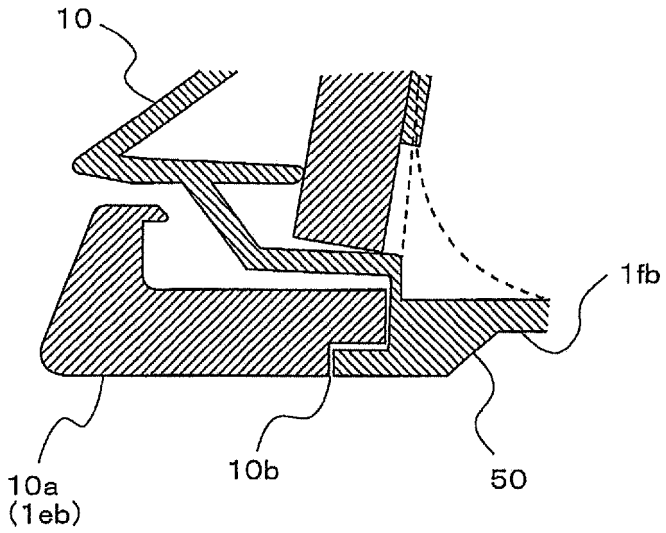
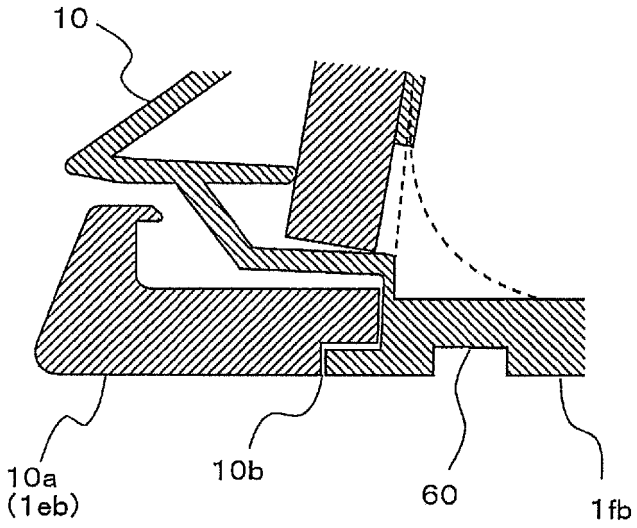


FIG. 15



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2015/073613

A. CLASSIFICATION OF SUBJECT MATTER
F24F13/20(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F24F13/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2015
Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015

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.
X Y	WO 2013/108654 A1 (Sharp Corp.), 25 July 2013 (25.07.2013), paragraphs [0017] to [0028]; fig. 1 to 8 & JP 2013-148228 A & CN 104024757 A	1-5 10-11
X Y	JP 09-324927 A (Fujitsu General Ltd.), 16 December 1997 (16.12.1997), paragraphs [0026] to [0028]; fig. 1 to 3 (Family: none)	6-9 10-11
X Y	JP 07-167457 A (Sharp Corp.), 04 July 1995 (04.07.1995), paragraphs [0038] to [0040]; fig. 13 to 14 (Family: none)	6-8 10-11

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

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Date of the actual completion of the international search	Date of mailing of the international search report
05 November 2015 (05.11.15)	17 November 2015 (17.11.15)
Name and mailing address of the ISA/ Japan Patent Office 3-4-3,Kasumigaseki,Chiyoda-ku, Tokyo 100-8915,Japan	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2015/073613

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2014-231959 A (Mitsubishi Electric Corp.), 11 December 2014 (11.12.2014), claims; paragraphs [0020] to [0026], [0047] to [0051]; fig. 3, 13 & EP 2808615 A2 & CN 203949283 U & NZ 623803 A	6-7 10-11
A	JP 2000-055452 A (Hitachi, Ltd.), 25 February 2000 (25.02.2000), entire text; all drawings (Family: none)	1-11

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 5388998 B **[0003]**