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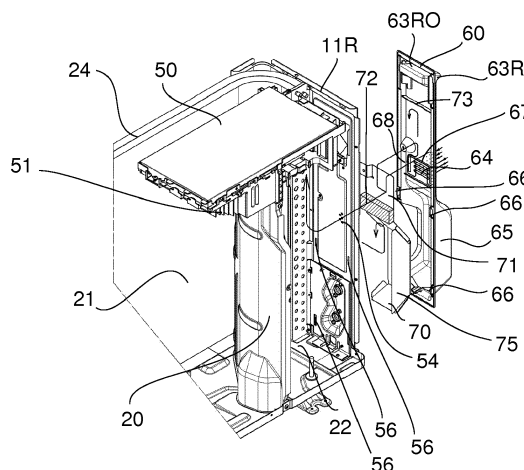
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(54) **OUTDOOR UNIT OF AN AIR-CONDITIONER**

(57) The invention relates to an outdoor unit of an air conditioner, incorporating a compressor, a heat exchanger, and a blower in a housing, wherein in an upper part of the one side face of the housing, an opening is provided, in a lower part of the one side face of the housing, a piping connection section is arranged to which re-

frigerant piping is connected, a recess provided, to serve as a handle, in a cover covering the piping connection section is inserted in the opening, and an upper wall of the opening makes contact with an outer wall of the recess.

FIG.6



Description

Technical Field

[0001] The present invention relates to outdoor units of air conditioners.

Background Art

[0002] A conventional outdoor unit of an air conditioner is disclosed in Patent Document 1. This outdoor unit incorporates a compressor, a heat exchanger, a blower, and an electrical section in a housing. The electrical section includes a circuit board, and is electrically connected to the compressor and the blower. On one side face of the housing, a piping connection section is provided to which refrigerant piping for air conditioning is connected, and the side face including the piping connection section is covered by a cover made of resin. In a lower part of the rear face of the cover, a passage opening is open through which refrigerant piping connected to the piping connection section is led out of the cover.

[0003] For effective cooling of the electrical section incorporated in the housing, in the side face of the housing, a ventilation hole is provided, and in the cover, a suction hole is provided. Between the ventilation hole and the suction hole, a shield plate is provided so that a current of air that has flowed in through the suction hole first passes downward along the outer face of the shield plate and then passes upward along the inner face of the shield plate so as to flow into the ventilation hole. On the other hand, in an upper part of the cover, a recess is provided to serve as a handle. Here, the cover is fixed to the housing as a result of an engagement claw provided on the inner face of the cover being inserted in a slit-form engagement hole formed in the side face of the housing and then the cover being slid.

List of Citations

Patent Literature

[0004] Patent Document 1: Japanese Patent registered as No. 4391368

Summary of the Invention

Technical Problem

[0005] With the conventional outdoor unit described above, when the passage opening is exposed to a strong wind pressure, raindrops and dust that have got inside the cover is carried by a current of air to enter the housing through the ventilation hole, inconveniently causing failure of the electric system of the electrical section.

[0006] Moreover, when fingers are put in the recess provided in an upper part of the cover to serve as a handle and the outdoor unit is carried, the cover deforms under

the weight of the outdoor unit and a gap is formed between the cover and the housing, inconveniently causing raindrops and dust to get inside the cover.

[0007] Moreover, when the engagement claw is inserted in the engagement hole and then the cover is slid, a gap is formed in the engagement hole, inconveniently causing noise inside the housing to leak to the outside.

[0008] In view of the inconveniences mentioned above, one object of the present invention is to provide an outdoor unit of an air conditioner that can prevent entry of raindrops and dust into the housing while introducing outside air into the housing for more effective cooling of the electrical section.

[0009] In view of the inconveniences mentioned above, another object of the present invention is to provide an outdoor unit of an air conditioner in which the recess provided, to serve as a handle, in an upper part of the cover fixed to one side face of the housing is less likely to deform when the outdoor unit is carried.

[0010] In view of the inconveniences mentioned above, yet another object of the present invention is to provide an outdoor unit of an air conditioner that prevents noise inside the housing from leaking to the outside through a gap in the engagement hole.

Means for Solving the Problem

[0011] To achieve the above objects, according to one aspect of the present invention, in an outdoor unit of an air conditioner that includes, arranged in a housing, a compressor, a heat exchanger, a blower, and an electrical section having a circuit board connected to the compressor and the blower, there are formed, in one side face of the housing, a piping connection section to which refrigerant piping is connected and a ventilation hole which is open above the piping connection section. The outdoor unit further includes a cover which covers the ventilation hole and the piping connection section and in which a suction hole and a passage opening for the refrigerant piping are open, a shield plate which is upright between the ventilation hole and the suction hole and of which the upper end is located above the ventilation hole and the suction hole, a first shield portion which stops the gap between the cover and the shield plate below the suction hole, a second shield portion which stops the gap between the shield plate and the housing below the ventilation hole, and a third shield portion which stops the gap between the cover and the housing above the upper end of the shield plate. Here, a current of air that flows in through the suction hole first passes upward along the shield plate, then bends downward between the upper end of the shield plate and the third shield portion, and then passes downward along the shield plate so as to be guided to the ventilation hole.

[0012] With this structure, raindrops and dust that have got inside the cover through the passage opening are shielded by the first, second, and third shield portions so as not to reach the ventilation hole.

[0013] In the outdoor unit of an air conditioner structured as described above, preferably, there is further provided a guide portion which is formed by a rib protruding from the inner face of the cover in a C-shape open at the bottom and which guides downward the current of air that flows in through the suction hole. Here, the current of air having flowed out of the guide portion passes upward along the shield plate.

[0014] In the outdoor unit of an air conditioner structured as described above, preferably, the wall face of the guide portion facing the one side face of the housing is formed by the shield plate.

[0015] In the outdoor unit of an air conditioner structured as described above, preferably, there is further provided an anti-flame plate made of metal which is arranged on the inner face of the cover so as to cover the piping connection section. Here, the shield plate is formed by the anti-flame plate integrally therewith.

[0016] In the outdoor unit of an air conditioner structured as described above, preferably, the interior of the housing is partitioned by a partition wall into a heat exchanger chamber where the blower and the heat exchanger are arranged and a machine chamber where the electrical section and the compressor are arranged. Here, the heat exchanger chamber and the machine chamber communicate with each other through a communication hole provided in the electrical section.

[0017] To achieve the above objects, according to another aspect of the present invention, in an outdoor unit of an air conditioner that incorporates a compressor, a heat exchanger, and a blower in a housing, there are provided, in an upper part of the one side face of the housing, an opening and, in a lower part of the one side face of the housing, a piping connection section to which refrigerant piping is connected. Here, a recess provided, to serve as a handle, in a cover covering the piping connection section is inserted in the opening, and the upper wall of the opening makes contact with the outer wall of the recess.

[0018] With this structure, when fingers are put in the recess and the outdoor unit is lifted up, the upper wall of the opening in the housing is supported by the fingers from inside the recess.

[0019] In the outdoor unit of an air conditioner structured as described above, preferably, the upper wall of the opening forms a bent portion that is bent into the housing, and the bent portion and the outer wall of the recess make face contact with each other.

[0020] In the outdoor unit of an air conditioner structured as described above, preferably, the bent portion is inclined upward into the housing.

[0021] In the outdoor unit of an air conditioner structured as described above, preferably, inserting the recess in the opening and then sliding the cover upward causes the cover to be fixed to the housing.

[0022] In the outdoor unit of an air conditioner structured as described above, preferably, through the gap between the opening and the recess, electric wiring is

led out of the housing into the space between the housing and the cover.

[0023] To achieve the above objects, according to yet another aspect of the present invention, in an outdoor unit that incorporates a compressor, a heat exchanger, and a blower in a housing, there are provided a piping connection section which is arranged in one side face of the housing and to which refrigerant piping is connected and a cover which covers the piping connection section. Here, inserting an engagement claw provided on the inner face of the cover in a slit-form engagement hole formed in the one side face of the housing and sliding the cover causes the cover to be fixed to the housing. On the inner face of the cover, there are formed an annular circumferential rib which is arranged around a circumferential part of the cover and which makes contact with the housing and a shield rib which protrudes to the same height as the circumferential rib. Here, when the cover is fixed, the shield rib surrounds the engagement hole.

[0024] With this structure, the current of air that flows into the space between the side face of the housing and the inner face of the cover through the gap that is left in the engagement hole when the engagement claw is inserted in the engagement hole and the cover is then slid is shielded by the shield portion so as not to pass through the space between the side face of the housing and the inner face of the cover.

[0025] In the outdoor unit of an air conditioner structured as described above, preferably, part of the shield portion is formed by the circumferential rib.

Advantageous Effects of the Invention

[0026] In an outdoor unit of an air conditioner according to the present invention, the upper end of a shield plate is located above a ventilation hole and a suction hole, the gap between a cover and the shield plate is stopped by a first shield portion, the gap between the shield plate and a housing is stopped by the second shield portion, and the gap between the cover and the housing is stopped by a third shield portion above the upper end of the shield plate. The current of air that flows in through the suction hole passes upward along the shield plate, then bends downward in the gap between the upper end of the shield plate and the third shield portion, and then passes downward along the shield plate to be guided into the ventilation hole. Thus, waterdrops and dust that have got inside the cover are prevented from entering the housing through the ventilation hole.

[0027] With an outdoor unit of an air conditioner according to the present invention, when fingers are put in a recess and the outdoor unit is lifted up, the upper wall of an opening in the housing is supported by the fingers from inside the recess. Thus, the weight of the outdoor unit borne by the cover is reduced, the cover is prevented from deforming.

[0028] In an outdoor unit of an air conditioner according

to the present invention, the current of air that flows into the space between the side face of the housing and the cover through the gap that is left in an engagement hole when an engagement claw is fit in the engagement hole and the cover is then slid is shielded by a shield portion so as not to flow into the space between the side face of the housing and the inner face of the cover. Thus, noise is prevented from occurring.

Brief Description of Drawings

[0029]

Fig. 1 is a front view of an outdoor unit according to a first embodiment of the present invention;

Fig. 2 is a perspective view showing a rear to right side part of the outdoor unit according to the first embodiment of the present invention;

Fig. 3 is a perspective view showing a rear to left side part of the outdoor unit according to the first embodiment of the present invention;

Fig. 4 is an exploded perspective view of the outdoor unit according to the first embodiment of the present invention;

Fig. 5 is an exploded perspective view showing part of a right side part, as seen from the right side, of the outdoor unit according to the first embodiment of the present invention;

Fig. 6 is an exploded perspective view showing part of a right side part, as seen from the left side, of the outdoor unit according to the first embodiment of the present invention;

Fig. 7 is a perspective view showing the inner face of a cover according to the first embodiment of the present invention;

Fig. 8 is a perspective view showing the inner face of the cover according to the first embodiment of the present invention;

Fig. 9 is a diagram illustrating an air current passage in the outdoor unit according to the first embodiment of the present invention;

Fig. 10 is a diagram illustrating an air current passage in the outdoor unit according to the first embodiment of the present invention;

Fig. 11 is a perspective view showing, on an enlarged scale, an engagement claw according to the first embodiment of the present invention;

Fig. 12 is a top view showing, on an enlarged scale, an engagement claw according to the first embodiment of the present invention;

Fig. 13 is a sectional view showing the engagement claw according to the first embodiment of the present invention in a state fitted in an engagement hole;

Fig. 14 is a front sectional view of a recess serving as a handle according to the first embodiment of the present invention in a state where the cover is fixed to a housing;

Fig. 15 is a perspective view showing the recess

serving as a handle according to the first embodiment of the present invention;

Fig. 16 is a perspective view showing the recess serving as a handle, as seen from the rear, according to the first embodiment of the present invention;

Fig. 17 is a diagram illustrating an air current passage in an outdoor unit according to a second embodiment of the present invention; and

Fig. 18 is a diagram illustrating an air current passage in an outdoor unit according to a third embodiment of the present invention.

Description of Embodiments

15 <First Embodiment>

[0030] Embodiments of the present invention will be described below with reference to the accompanying drawings. Fig. 1 is a front view of an outdoor unit 10, and Figs. 2 and 3 are perspective views of the outdoor unit 10, showing respectively a right side part and a left side part thereof as seen from the rear. The outdoor unit 10 has a box-shaped housing 11. In the housing 11, a top plate 11U is arranged at the top, and a bottom plate 11D is arranged at the bottom. On the circumferential face of the housing 11, a front plate 11F is arranged at the front, a rear plate 11B is arranged at the rear, a left side plate 11L is arranged at the left, and a right side plate 11R is arranged at the right. The left side plate 11L and the right side plate 11R are each formed in an L-shape as seen from above, with part thereof bent at the rear.

[0031] In a central part of the front plate 11F of the housing 11, an exhaust opening 12 is open, and the exhaust opening 12 is fitted with a circular grille 12a. In the rear plate 11B, a rear suction opening 11BS is open, and in the left side plate 11L, a left side suction opening 11LS is open. In the right side plate 11R, in a part of its rear part, a right side suction opening 11RS is open. The left side suction opening 11LS and the right side suction opening 11RS are each formed in the shape of a lattice. In upper parts of the right side plate 11R and the left side plate 11L, recesses 63R and 63L are respectively provided to serve as handles.

[0032] Fig. 4 is an exploded perspective view of the outdoor unit 10, and Figs. 5 and 6 are exploded perspective views each showing part of a right side part of the outdoor unit 10. In Figs. 5 and 6, a blower 30 and a compressor 40 are omitted from illustration. On a rear side inside the housing 11, a heat exchanger 24 is arranged. The heat exchanger 24 is bent at both ends to have a substantially C-shape (which may instead be a substantially L-shape) as seen from above. The heat exchanger 24 is arranged to face the left side suction opening 11LS, the rear suction opening 11BS, and the right side suction opening 11RS, and is exposed to outside the housing 11 through the left side suction opening 11LS, the rear suction opening 11BS, and the right side suction opening 11RS.

[0033] Inside the housing 11, a partition wall 20 which isolates and separates the heat exchanger 24 is provided upright from the bottom plate 11D. The partition wall 20 is formed in an L-shape as seen from above; it partitions between the blower 30 and the compressor 40, and extends to reach the rear of the compressor 40 to partition between the heat exchanger 24 and the compressor 40. Thus, the interior of the housing 11 is partitioned into a heat exchanger chamber 21 and a machine chamber 22 across the partition wall 20, with the heat exchanger 24 arranged in a rear part of the heat exchanger chamber 21 and the blower 30 arranged in a front part of the heat exchanger chamber 21.

[0034] As the blower 30 is driven, its suction force causes outside air to flow into the heat exchanger chamber 21 through the left side suction opening 11LS, the rear suction opening 11BS, and the right side suction opening 11RS. The outside air that has flowed in undergoes heat exchange with the heat exchanger 24, passes through the heat exchanger chamber 21, and is discharged to the outside through the exhaust opening 12.

[0035] The machine chamber 22 is partitioned into an upper part and a lower part, with an electrical section 50 arranged in the upper part and the compressor 40 arranged in the lower part. The electrical section 50 includes a circuit board (unillustrated), and is electrically connected to the blower 30 and the compressor 40. The electrical section 50 controls the operation of the outdoor unit 10. On the outer face of the right side plate 11R, a terminal section 55 is arranged across which power leads and control leads are led into the electrical section 50 from outside the outdoor unit 10.

[0036] On the bottom face of the electrical section 50, a heat sink (unillustrated) is provided. The heat sink has fins 51 on the heat exchanger chamber 21 side, and the fins 51 are exposed into the heat exchanger chamber 21. Thus, the fins 51 are cooled by the current of air passing through the heat exchanger chamber 21. Heat-emitting components on the circuit board are cooled via the heat sink and the fins 51.

[0037] In the right side plate 11R, which forms a side wall of the machine chamber 22, a ventilation hole 54 is provided. In the electrical section 50, a communication hole (unillustrated) is provided through which the heat exchanger chamber 21 and the machine chamber 22 communicate with each other. Thus, as the blower 30 is driven, the air in the machine chamber 22 is dragged into the heat exchanger chamber 21 through the communication hole. With this suction force, outside air can be introduced into the machine chamber 22 through the ventilation hole 54, and this helps achieve more effective cooling of the electrical section 50.

[0038] In an upper part of the outer face of the right side plate 11R, an opening 53 is open, and in a lower part of the outer face of the right side plate 11R, a piping connection section 52 is arranged to which two refrigerant pipes (unillustrated) are connected. Between the opening 53 and the piping connection section 52, a ven-

tilation hole 54 is provided. The opening 53, the piping connection section 52, and the ventilation hole 54 are covered with a cover 60 made of resin. At this time, the outer wall 63RO of the recess 63R, which serves as a handle, is inserted in the opening 53.

[0039] The piping connection section 52 includes a two-way valve 52a and a three-way valve 52b, via which the refrigerant pipes are connected to it. Through the refrigerant pipe connected to the two-way valve 52a, liquid refrigerant passes during cooling operation. On the other hand, through the refrigerant pipe connected to the three-way valve 52b, gaseous refrigerant passes during cooling operation.

[0040] Figs. 7 and 8 are perspective views showing the inner face of the cover 60, Fig. 8 showing it having an anti-flame plate 70 fitted in it. In a lower part of the cover 60, a bulge 65 is formed for covering the two-way valve 52a and the three-way valve 52b, and in a rear part of the bulge 65, a passage opening 65a is open. Through the passage opening 65a, the refrigerant pipes connected to the piping connection section 52 and the power leads and control leads connected to the terminal section 55 are led out of the cover 60. In an upper part of the cover 60, the recess 63R which serves as a handle is provided, and between the recess 63R and the bulge 65, a suction hole 64 is provided which communicates with the ventilation hole 54.

[0041] Between the right side plate 11R and the cover 60, an anti-flame plate 70 made of metal is arranged. In a lower part of the anti-flame plate 70, a bulge 75 is formed that so bulges as to cover the piping connection section 52. The bulge 75 of the anti-flame plate 70 is fitted inside the bulge 65 of the cover 60. In case of a fire around the outdoor unit 10, the anti-flame plate 70 prevents flames from entering the housing 11 through the piping connection section 52.

[0042] With an upper part of the anti-flame plate 70, a shield plate 71 is formed integrally. The shield plate 71 is provided upright between the ventilation hole 54 and the suction hole 64, and the upper end of the shield plate 71 is located above the ventilation hole 54 and the suction hole 64.

[0043] On the inner face of the cover 60, above the suction hole 64, an upper rib 67 is provided. At both ends of the upper rib 67, side ribs 68 are provided which extend downward passing by the side of the suction hole 64. The upper rib 67 and the side ribs 68 are formed in a C-shape open at the bottom. Under the side ribs 68, a lower rib (first shield portion) 69 is provided. The upper rib 67, the side ribs 68, and the lower rib 69 protrude from the inner face of the cover 60 and make contact with the outer face of the shield plate 71.

[0044] Thus, a guide portion 90 (see Fig. 9) is formed that has the upper rib 67 as an upper wall, the side ribs 68 as side walls, and part of the outer face of the shield plate 71 as a circumferential wall. The guide portion 90 guides the current of air that has flowed in through the suction hole 64 to the bottom of the shield plate 71. Here,

the wall face of the guide portion 90 is formed by the shield plate 71, and this helps reduce the distance between the shield plate 71 and the inner face of the cover 60. It is thus possible to make the outdoor unit 10 compact. In a structure where, as here, the anti-flame plate 70 and the shield plate 71 are formed integrally and the anti-flame plate 70 stops the gap between the cover 60 and the shield plate 71, the lower rib 69 may be omitted.

[0045] Below the ventilation hole 54, a shield portion (second shield portion) 72 is provided which stops the gap between the shield plate 71 and the right side plate 11R. By the shield portion 72, raindrops and dust that have got inside the cover 60 through the passage opening 65a are prevented from entering through the ventilation hole 54f. On the inner face of the cover 60, above the upper end of the shield plate 71, a rib (third shield portion) 73 is provided which stops the gap between the cover 60 and the right side plate 11R. By the rib 73, raindrops and dust that have got into the cover 60 through the passage opening 65a are prevented from entering the housing 11 through the opening 53.

[0046] Figs. 9 and 10 are diagrams illustrating the air current passage A between the ventilation hole 54 and the suction hole 64, Fig. 9 being a plan view of the cover 60 showing the suction hole 64 as seen from inside, Fig. 10 being a front sectional view of the air current passage A observed with the cover 60 fixed to the right side plate 11R. The current of air that has entered the air current passage A through the suction hole 64 passes downward along the guide portion 90. Having passed downward along the guide portion 90 and then out of the guide portion 90, the current of air is then shielded by the lower rib 69, and then passes sideways along the lower rib 69. Having passed sideways, the current of air then passes around the lower ends of the side ribs 68, and then passes upward along the outer face of the shield plate 71, outward of the side ribs 68.

[0047] Having passed upward, outward of the side ribs 68, the current of air bends between the upper end of the shield plate 71 and the rib (third shield portion) 73, and then passes downward along the inner face of the shield plate 71 so as to enter the housing 11 through the ventilation hole 54. By bending the air current passage A a plurality of times up and down, it is possible to further reduce waterdrops that enter through the suction hole 64 and then through the ventilation hole 54.

[0048] Figs. 11 and 12 are a perspective view and a top view, respectively, showing an engagement claw 66 on an enlarged scale, and Fig. 13 is a sectional view showing the engagement claw 66 in a state fitted in an engagement hole 56. At the edge of the inner face of the cover 60, an engagement claw 66 is provided; fitting the engagement claw 66 in a slit-form engagement hole 56 provided in the right side plate 11R, then sliding the cover 60 upward, and then fastening it with a screw permits the cover 60 to be fixed to the right side plate 11R (see Figs. 5 and 6).

[0049] Here, on the inner face of the cover 60, in a

circumferential part thereof, a protruding annular circumferential rib 66a (see Figs. 7 and 8) is provided, and the circumferential rib 66a makes contact with the right side plate 11R. Around the engagement claw 66, a shield rib 66b is formed that protrudes to the same height as the circumferential rib 66a, and part of the shield rib 66b is formed by the circumferential rib 66a.

[0050] With the cover 60 fixed to the right side plate 11R, the shield rib 66b is located around the engagement hole 56. Thus, the shielding rib 66b shields the noise (indicated by arrow N) that leaks to the outside through the gap S1 that is left in the engagement hole 56 when the engagement claw 66 is fitted in the engagement hole 56 from inside the housing 11 and is then slid. Thus, it is possible to prevent the noise occurring inside the housing 11, such as the noise occurring as the compressor 40 and the like are driven, from leaking to the outside through the gap S1.

[0051] Between the engagement claw 66 and the shield rib 66b, a recess-like thin portion 66c is provided to prevent a "sink mark" (concavity) from being formed during molding.

[0052] Fig. 14 is a front sectional view of the recess 63R in a state where the cover 60 is fixed to the right side plate 11R. When the cover 60 is fixed to the right side plate 11R, the outer wall 63RO of the recess 63R which serves as a handle is inserted in the opening 53 formed in the right side plate 11R. At this time, the outer wall 63RO of the recess 63R makes contact with an upper wall 53a of the opening 53. Thus, when fingers are put in the recess 63R and the outdoor unit 10 is lifted up, the upper wall 53a of the opening 53 is supported by the fingers. This reduces the weight of the cover 60 borne on the cover 60, and helps prevent deformation of the cover 60.

[0053] Moreover, the upper wall 53a of the opening 53 forms a bent portion 53b that is bent into the housing 11, and the bent portion 53b and the outer wall 63RO of the recess 63R make face contact with each other. Thus, when the outdoor unit 10 is lifted up, the upper wall 53a is supported stably, and this helps prevent deformation of the cover 60 more effectively. The bent portion 53a is inclined upward into the housing 11. Thus, when fingers are put in the recess 63R, they are easily caught in the recess 63R, and this enhances the ease of transportation.

[0054] Moreover, the opening 53 is wide open in the up/down direction with respect to the outer wall 63RO of the recess 63R, and when the cover 60 is slid upward and fixed to the right side plate 11R, a gap S2 is left between the lower wall 53c of the opening 53 and the outer wall 63RO of the recess 63R. Thus, through the gap S2, the power leads and control leads can be led out of the electrical section 50 to the terminal section 55.

[0055] Figs. 15 and 16 are perspective views of the recess 63L which is provided in the left side plate 11L to serve as a handle. The recess 63L is made of resin, and is fixed by being inserted in an opening (unillustrated)

formed in an upper part of the left side plate 11L. In the circumferential wall of the recess 63L, a plurality of slit-form through holes 63LH2 that extend in the up/down direction are provided parallel to each other. In the bottom wall of the recess 63L, a plurality of slit-form through holes 63LH1 that extend in the front/rear direction are provided parallel to each other. Thus, through the through holes 63LH1 and 63LH2, outside air is sucked into the housing 11. This helps enhance the heat exchange efficiency of the heat exchanger 24.

[0056] The through holes 63LH1 and 63LH2 are formed continuously, and on the rear side of the through holes 63LH1 and 63LH2, reinforcing ribs are provided to reinforce the circumferential wall and the bottom wall of the recess 63L. This prevents deformation of the recess 63L when the outdoor unit 10 is lifted up.

[0057] According to the first embodiment, the upper end of the shield plate 71 is arranged above the ventilation hole 54 and the suction hole 64, the gap between the cover 60 and the shield plate 71 is stopped by the lower rib (first shield portion), and the gap between the shield plate 71 and the housing 11 is stopped by the shield portion 72 (second shield portion). The current of air that flows in through the suction hole 64 first passes upward along the shield plate 71, then bends downward between the upper end of the shield plate 71 and the rib (third shield portion) 73, and then passes downward along the shield plate 71 to be guided to the ventilation hole 54. In this way, it is possible to prevent entry of waterdrops and dust through the passage opening 65a and then through the ventilation hole 54.

[0058] Moreover, the ribs on the cover 60 form the guide portion which guides downward the current of air that flows in through the suction hole 64. Thus, the air current passage A bends up and down a plurality of times, and this helps further reduce waterdrops that enters through the suction hole 64 and then through the ventilation hole 54.

[0059] Moreover, the wall face of the guide portion facing the side face of the housing 11 is formed by the shield plate 71. This helps reduce the distance between the shield plate 71 and the inner face of the cover 60. It is thus possible to make the outdoor unit 10 compact.

[0060] Moreover, the anti-flame plate 70 made of metal which is arranged on the inner face of the cover 60 so as to cover the piping connection section 52 is provided, and the shield plate 71 is formed integrally with the anti-flame plate 70. This helps reduce the number of components of the anti-flame plate 71 and thereby achieve cost reduction.

[0061] Moreover, through the communication hole (unillustrated) provided in the electrical section 50, the heat exchanger chamber 21 and the machine chamber 22 communicate with each other. Thus, as the blower 30 is driven, the air in the machine chamber 22 is dragged into the heat exchanger chamber 21 through the communication hole. With this suction force, outside air can be dragged into the machine chamber 22 through the suc-

tion hole 64 and the ventilation hole 54, and this permits the interior of the electrical section 50 to be cooled more effectively.

[0062] Moreover, the recess 63R provided in the cover 60 so as to serve as a handle is inserted in the opening 53, and the upper wall 53a of the opening 53 makes contact with the outer wall 63RO of the recess 63R; thus, when fingers are put in the recess 63R and the outdoor unit 10 is lifted up, the upper wall 53a of the opening 53 is supported by the fingers. This helps reduce the weight of the outdoor unit 10 that is borne by the cover 60, and thus helps prevent deformation of the cover 60.

[0063] Moreover, the upper wall 53a of the opening 53 forms the bent portion 53b that is bent into the housing 11, and the bent portion 53b and the outer wall 63RO of the recess 63R make face contact with each other. Thus, when the outdoor unit 10 is lifted up, the upper wall 53a is supported stably, and this helps prevent deformation of the cover 60 more effectively.

[0064] Moreover, the bent portion 53b is inclined upward into the housing 11. Thus, when fingers are put in the recess 63R, they are easily caught in the recess 63R, and this enhances the ease of transportation.

[0065] The cover 60 is fixed to the housing 11 as a result of the engagement claw 66 provided on the inner face of the cover 60 being fitted into the slit-form engagement hole 56 formed in the side face of the housing 11. On the inner face of the cover 60, the circumferential rib 66a which protrudes from around it and the shield rib 66b which protrudes to the same height as the circumferential rib 66a are formed, and when the cover 60 is fixed, the shield rib 66b is arranged around the engagement hole 56. Thus, the noise (indicated by arrow N) that leaks to the outside through the gap S1 in the engagement hole 56 is shielded by the shield rib 66b. It is thus possible to prevent the noise occurring inside the housing 11 as when the compressor 40 and the like are driven from leaking to the outside through the gap S1.

<Second Embodiment>

[0066] Fig. 17 is a diagram illustrating an air current passage A in a outdoor unit 10 according to a second embodiment of the present invention. Such parts as find their counterparts in the first embodiment are identified by common reference numerals, and no overlapping description will be repeated. Unlike in the first embodiment, in the second embodiment, the upper rib 67 does not make contact with the shield plate 71, and the outer face of the shield plate 71 does not form the guide portion 90.

[0067] Specifically, the guide portion 90 is formed by a guide plate 91 that extends from the tip end of the upper rib 67 and of which the lower end is located below the suction hole 64. Thus, the current of air that has flowed in through the suction hole 64 passes downward along the outer face of the guide plate 91, then bends around toward the inner face of the guide plate 91 below the lower end of the guide plate 91, and then passes upward

along the outer face of the shield plate 71.

<Third Embodiment>

[0068] Fig. 18 is a diagram illustrating an air current passage A in an outdoor unit 10 according to a third embodiment of the present invention. Such parts as find their counterparts in the first embodiment are identified by common reference numerals, and no overlapping description will be repeated. Unlike in the first embodiment, in the third embodiment, the shield portion 72 is formed by bending the anti-flame plate 70. This helps reduce the number of components of the shielding portion 72 and thereby achieve cost reduction.

Industrial Applicability

[0069] The present invention find application in outdoor units of separate-type air conditioners.

List of Reference Signs

[0070]

10	outdoor unit
11	housing
11R	right side plate
12	exhaust opening
12a	grille
20	partition wall
21	heat exchanger chamber
22	machine chamber
24	heat exchanger
30	blower
40	compressor
50	electrical section
51	fin
52	piping connection section
52a	two-way valve
52b	three-way valve
53	opening
53a	upper wall
53b	bent portion
54	ventilation hole
55	terminal section
56	engagement hole
60	cover
63R	recess
63RO	outer wall
64	suction hole
65	bulge
65a	passage opening
66	engagement claw
66a	circumferential rib
66b	shield portion
66c	thin portion
67	upper rib
68	side rib

69	lower rib (first shield portion)
70	anti-flame plate
71	shield plate
72	shield portion (second shield portion)
73	rib (third shield portion)
90	guide portion

Claims

1. An outdoor unit of an air conditioner incorporating a compressor, a heat exchanger, and a blower in a housing, wherein
in an upper part of the one side face of the housing, an opening is provided,
in a lower part of the one side face of the housing, a piping connection section is arranged to which refrigerant piping is connected,
a recess provided, to serve as a handle, in a cover covering the piping connection section is inserted in the opening, and
an upper wall of the opening makes contact with an outer wall of the recess.
2. The outdoor unit of claim 1, wherein
the upper wall of the opening forms a bent portion that is bent into the housing, and
the bent portion and the outer wall of the recess make face contact with each other.
3. The outdoor unit of claim 2, wherein
the bent portion is inclined upward into the housing.
4. The outdoor unit of any one of claims 1 to 3, wherein
inserting the recess in the opening and then sliding the cover upward causes the cover to be fixed to the housing.
5. The outdoor unit of any one of claims 1 to 4, wherein
through a gap between the opening and the recess, electric wiring is led out of the housing into a space between the housing and the cover.

FIG.1

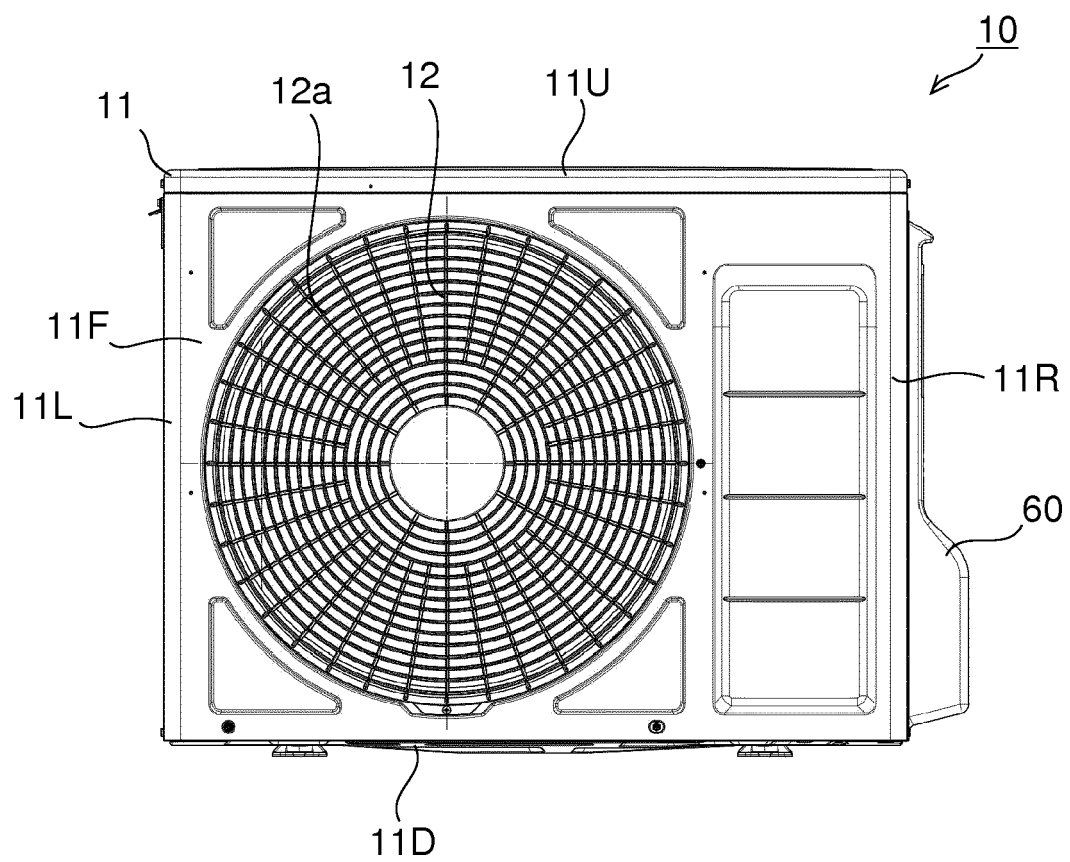


FIG.2

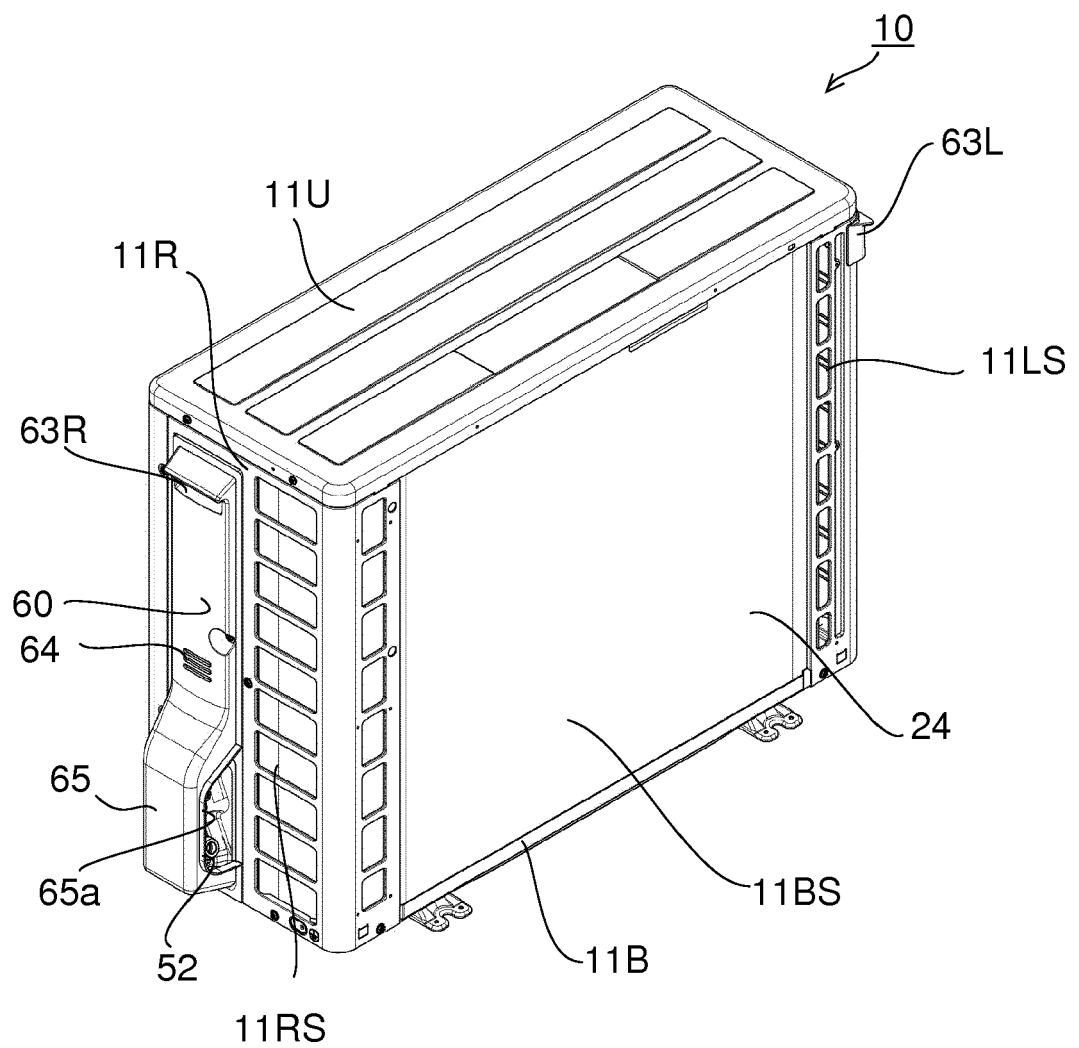


FIG.3

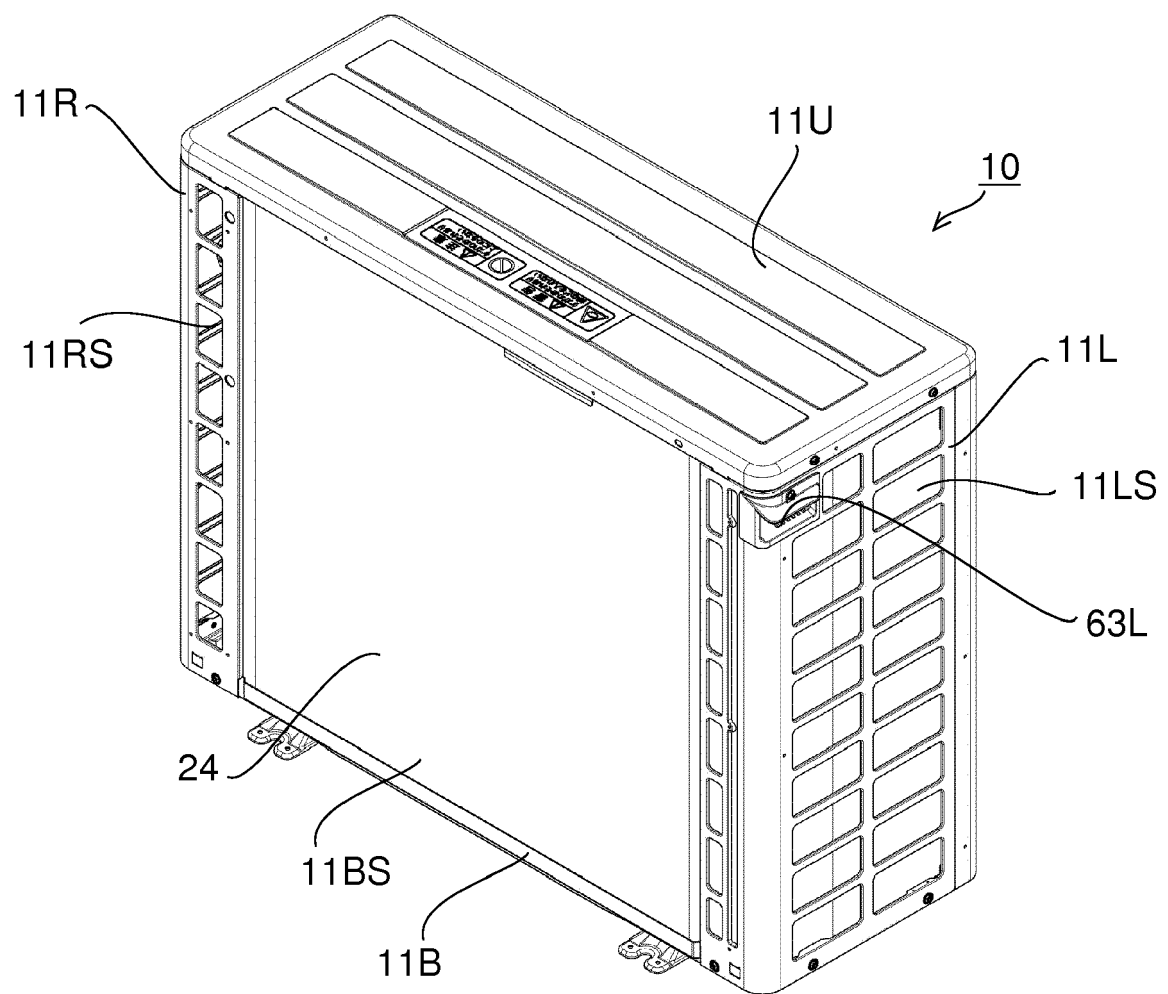


FIG.4

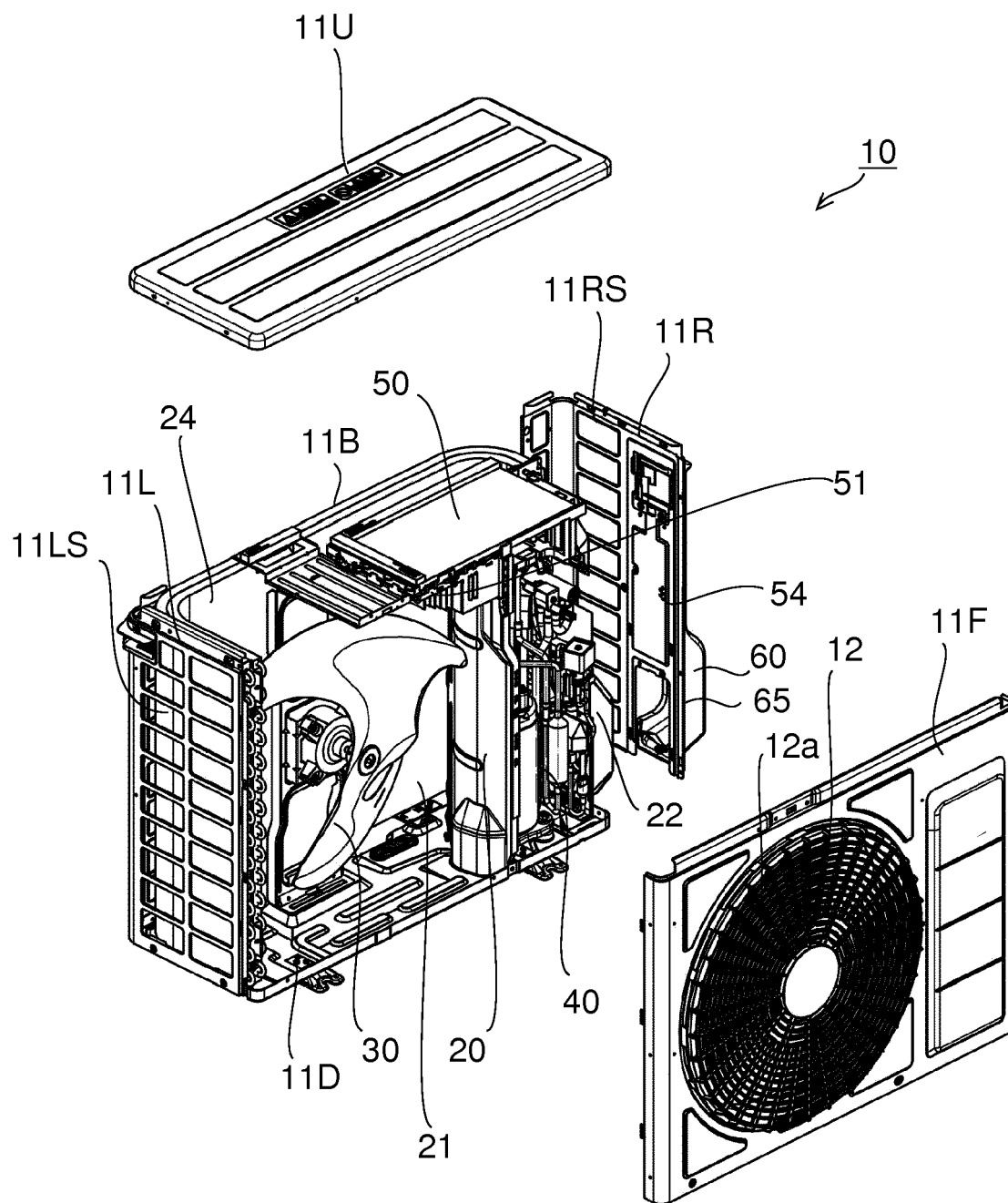


FIG.5

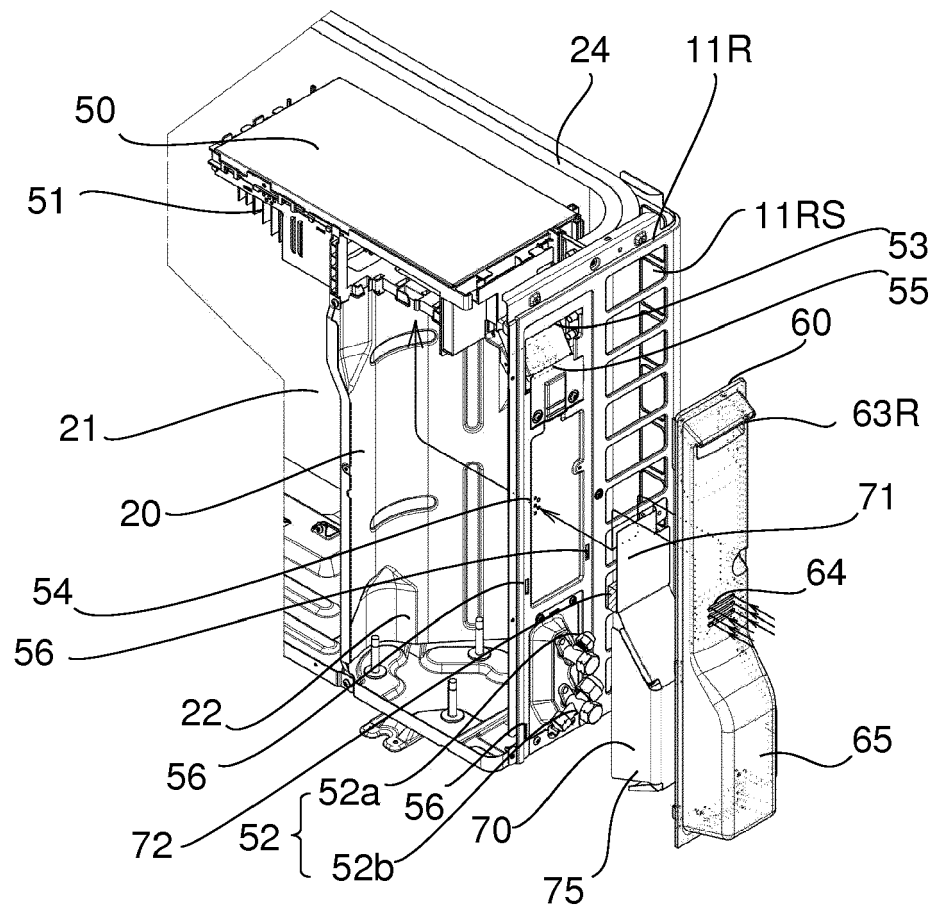


FIG.6

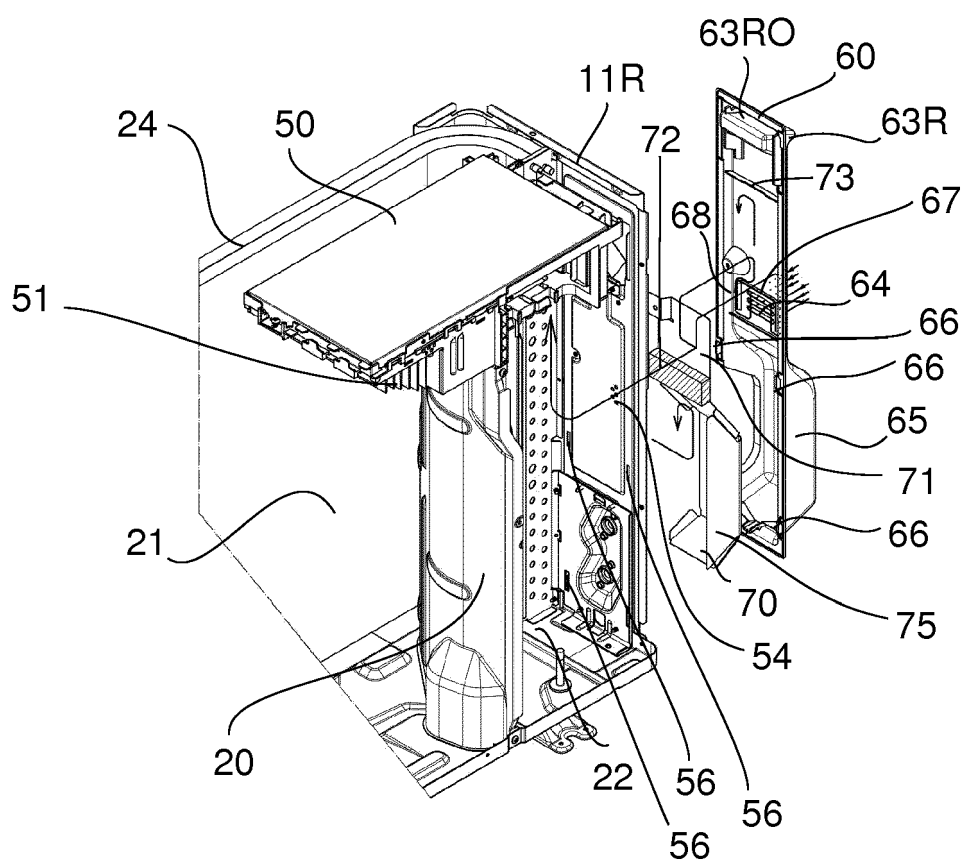


FIG.7

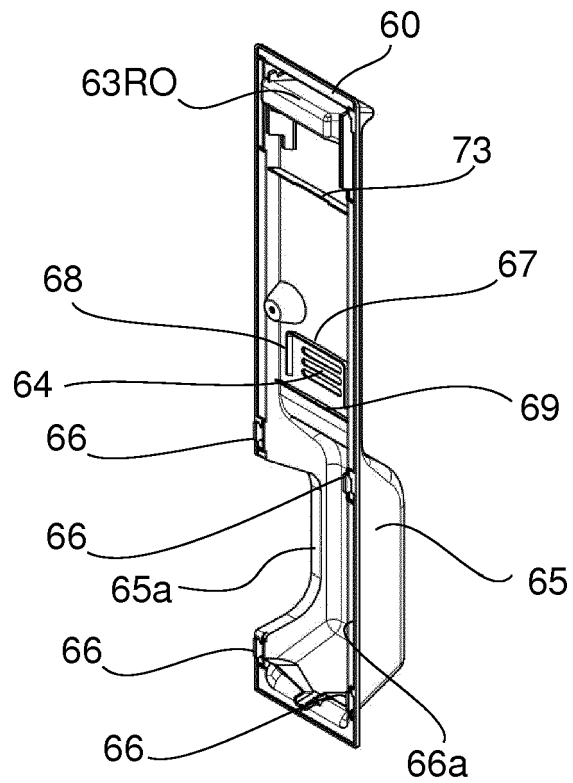


FIG.8

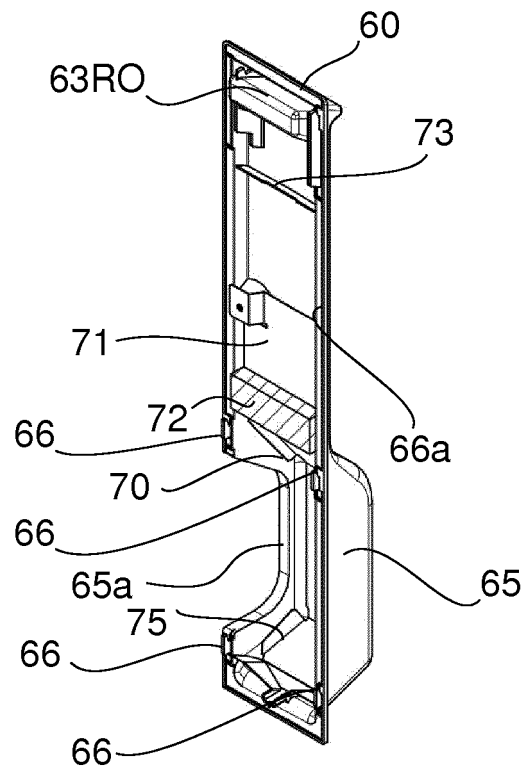


FIG.9

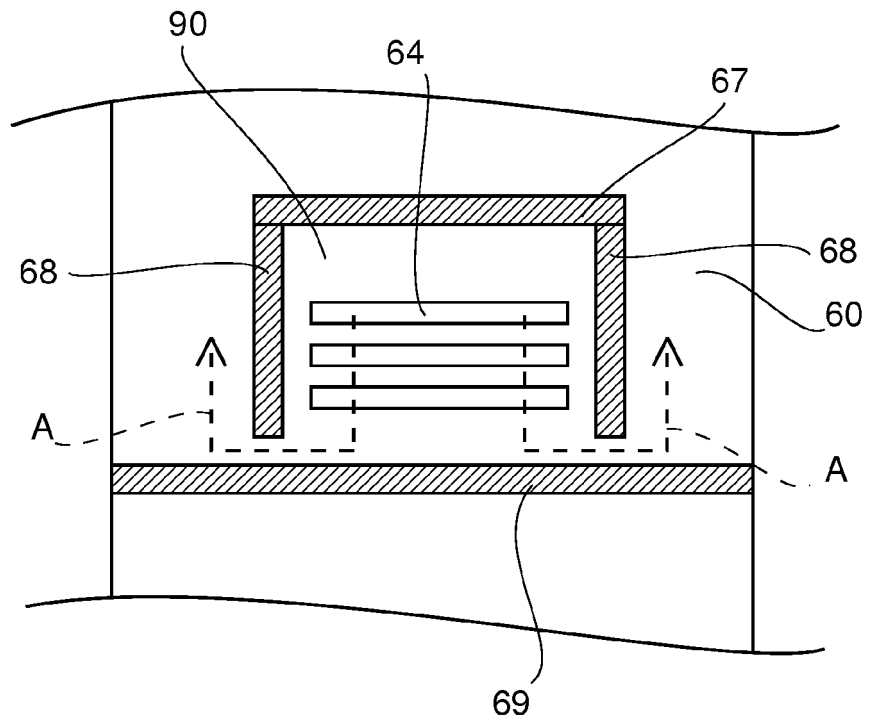


FIG.10

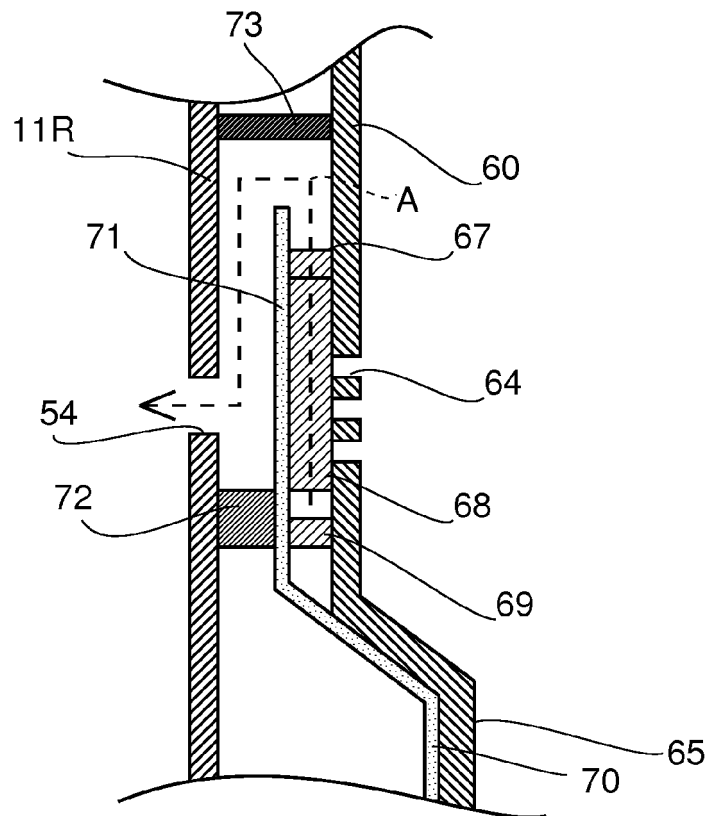


FIG.11

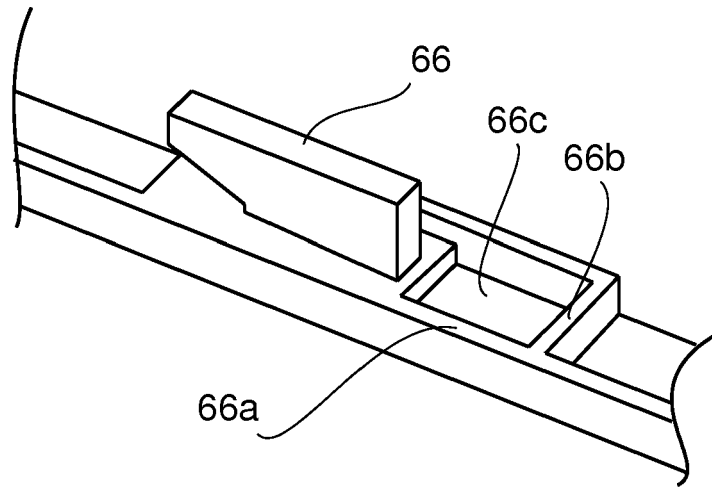


FIG.12

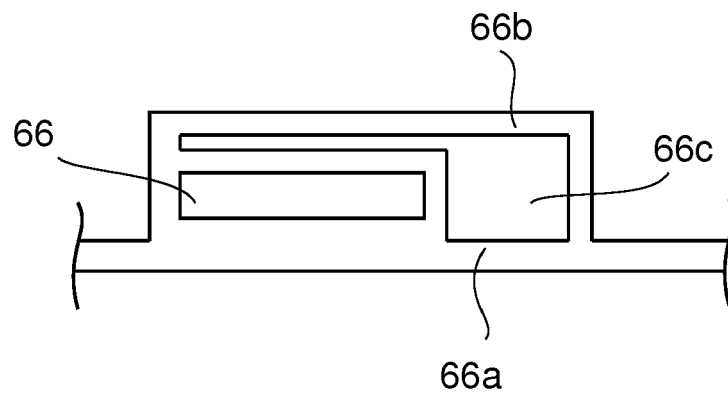


FIG.13

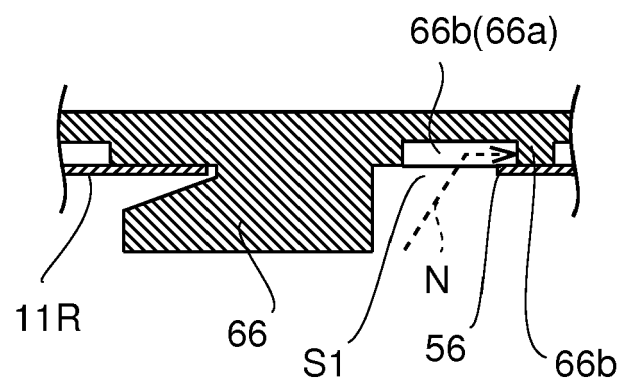


FIG.14

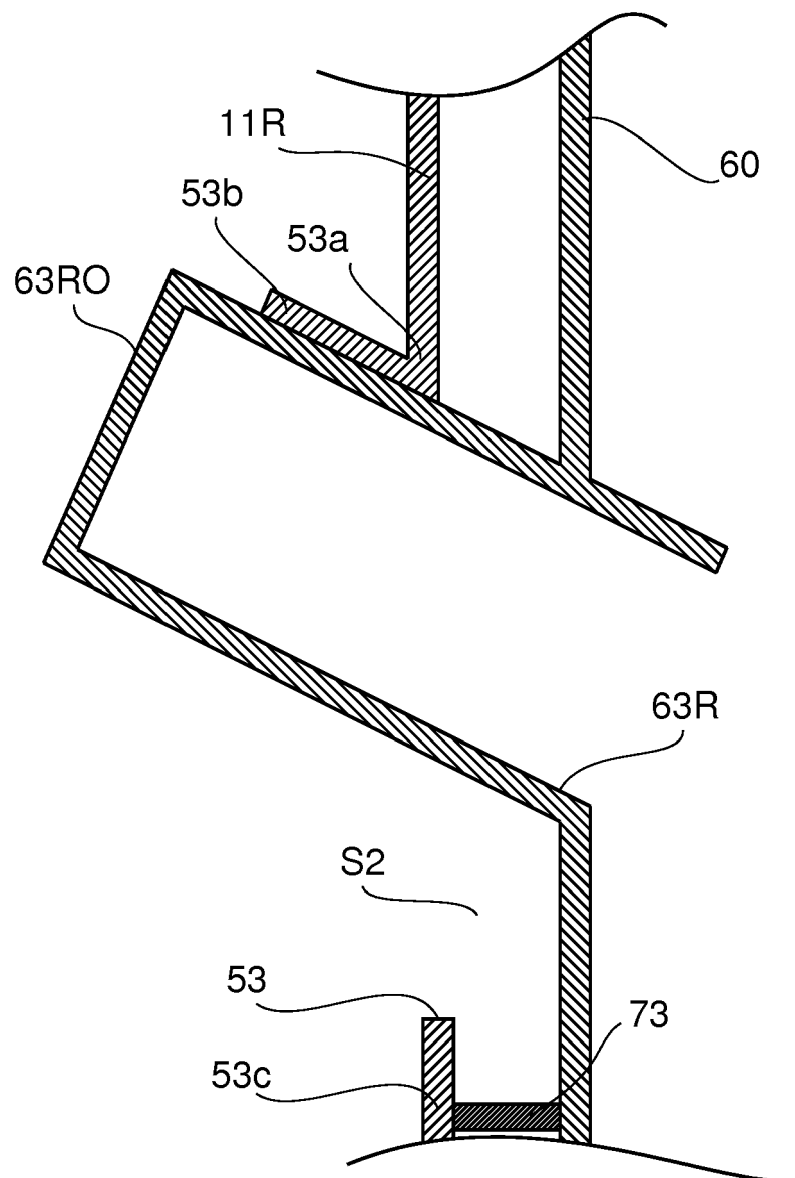


FIG.15

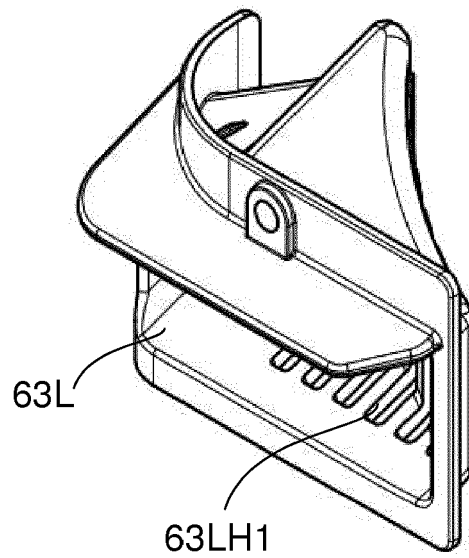


FIG.16

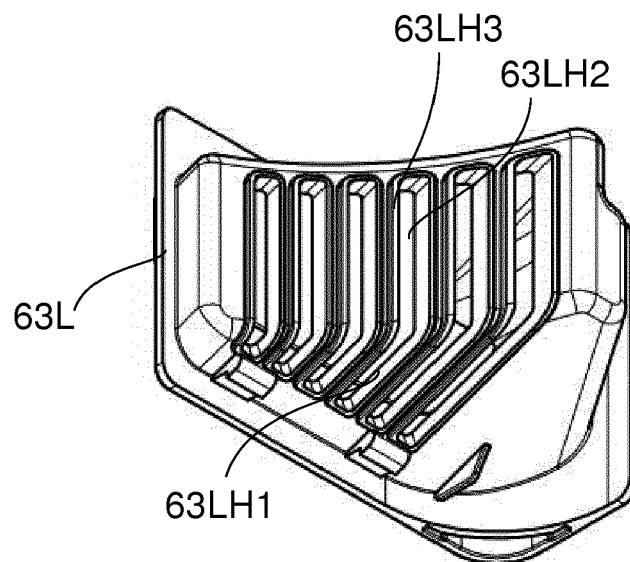


FIG.17

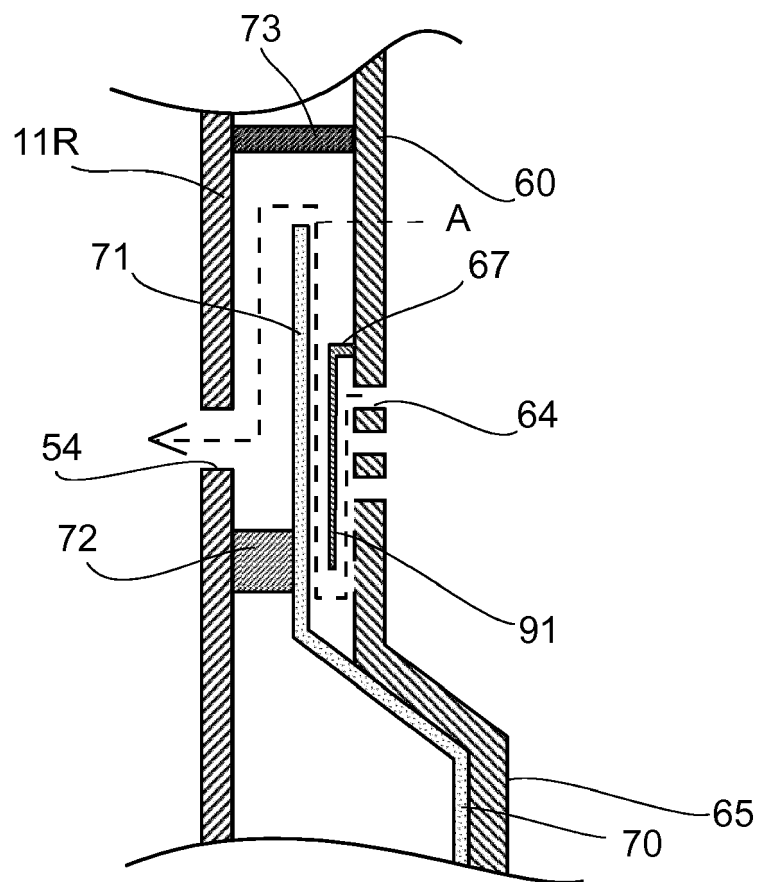
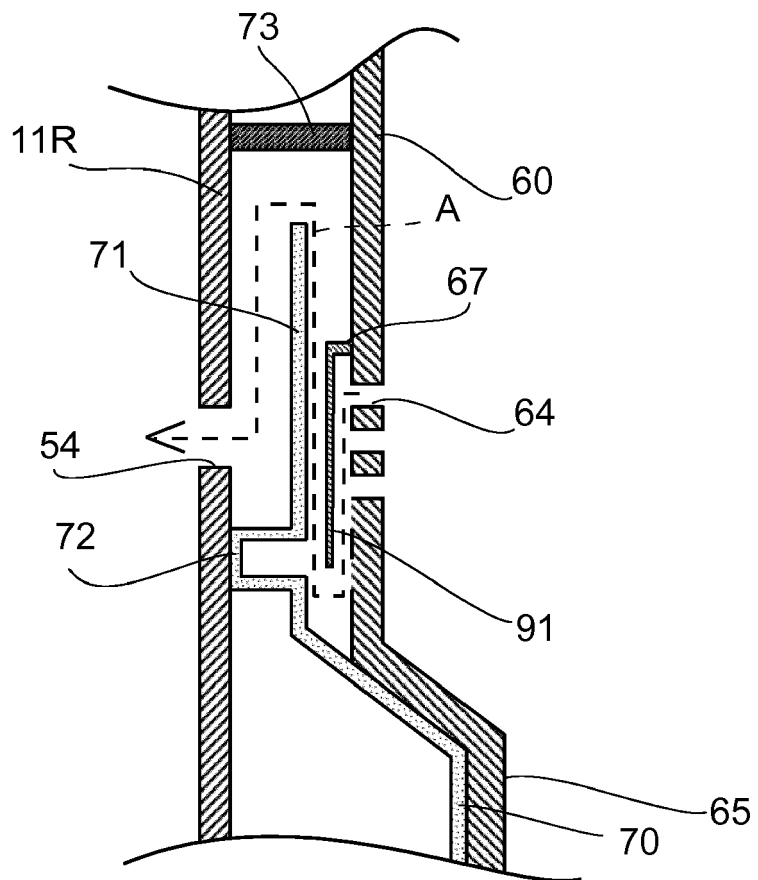


FIG.18



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 4391368 B [0004]