(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 394 263 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.07.2024 Bulletin 2024/27

(21) Application number: **23220249.9**

(22) Date of filing: **27.12.2023**

(51) International Patent Classification (IPC):
F24F 1/0057 *(2019.01)* ***F24F 13/20*** *(2006.01)*
F24F 13/22 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F24F 13/222; F24F 1/0057; F24F 13/20;
F24F 2013/227

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **26.12.2022 KR 20220184392**
30.05.2023 KR 20230068977

(71) Applicant: **LG Electronics Inc.**
Yeongdeungpo-gu
Seoul 07336 (KR)

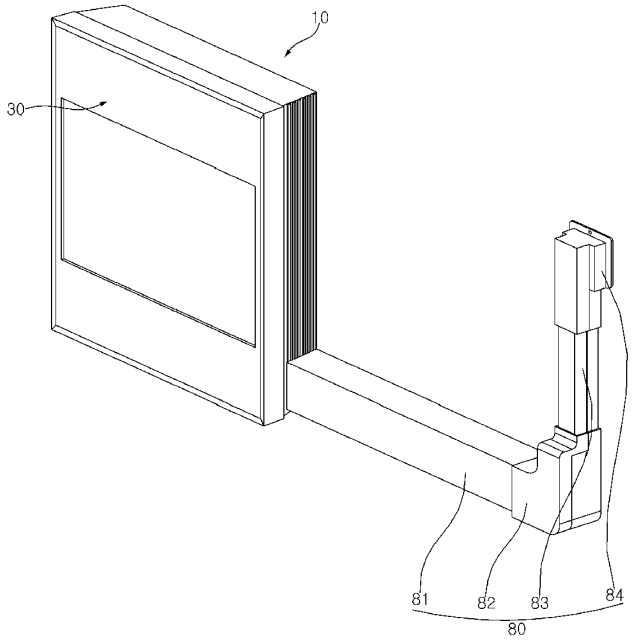
(72) Inventors:
- **Ryu, Haejun**
  08592 Seoul (KR)
- **Lee, Eunsun**
  08592 Seoul (KR)
- **Kim, Kyungtae**
  08592 Seoul (KR)

(74) Representative: **Ter Meer Steinmeister & Partner Patentanwälte mbB**
Nymphenburger Straße 4
80335 München (DE)

(54) AIR CONDITIONER

(57) An air conditioner is disclosed. The air conditioner includes a case, a heat exchanger disposed in the case, a drain pan disposed below the heat exchanger, a drain pipe connected to the drain pan and extending to the outside of the case through an outer wall of the case, a drain assembly extending in a direction away from the case to accommodate the drain pipe therein, and a pump disposed in the drain assembly and connected to the drain pipe. Accordingly, repair of the drain pipe and the pump is facilitated.

Fig. 5



EP 4 394 263 A1

Description

[0001] This application claims the priority benefit of Korean Patent Application No. 10-2023-0068977, filed on 30 May, 2023 in the Korean Intellectual Property Office.

BACKGROUND OF THE INVENTION

1. Field of the invention

[0002] The present disclosure relates to an air conditioner, and more particularly, to an air conditioner including an indoor unit configured to be mounted on a wall.

2. Description of the Related Art

[0003] An air conditioner is a device that exchanges heat with air suctioned thereinto and supplies the heat-exchanged air to an indoor area.

[0004] An air conditioner includes an outdoor unit equipped with a compressor and an indoor unit connected to the outdoor unit via a refrigerant pipe.

[0005] An indoor unit of an air conditioner may be mounted on a wall. A frame-type indoor unit, which is a type of indoor unit mounted on a wall, suctions air through a front side thereof and discharges the air through lateral sides and a lower side thereof.

[0006] A frame-type indoor unit includes a case in which a fan and a heat exchanger are disposed and a front panel configured to be movable in a forward-backward direction relative to the case.

[0007] The heat exchanger disposed in the case penetrates the case and is connected to a refrigerant pipe extending to the inside of the case, and the case has a cut portion through which the refrigerant pipe passes. In addition, a drain pan is disposed below the heat exchanger in order to collect condensed water generated from the heat exchanger. The drain pan is connected to a drain pipe through which condensed water is discharged.

[0008] However, the conventional air conditioner has a problem in that it is difficult to disassemble and assemble the refrigerant pipe and drain pipe and to draw the refrigerant pipe and the drain pipe out of the case. Therefore, repair of the refrigerant pipe and the drain pipe is difficult and time-consuming.

[0009] In addition, the conventional air conditioner has a problem in that the rigidity of the cut portion of the case through which the refrigerant pipe and the drain pipe are led out is reduced and thus the lifespan of the case is shortened.

[0010] [Related Art] (Document 0001) Korean Patent Laid-Open Publication No. 10-2006-0011656, (Document 0002) Korean Patent Laid-Open Publication No. 10-2016-0085355

SUMMARY OF THE INVENTION

[0011] It is another object of the present disclosure to provide an indoor unit including a display mounted on a front surface thereof.

[0012] It is another object of the disclosure to facilitate dissipation of heat from an indoor unit.

[0013] It is another object of the disclosure to provide an indoor unit that is easily repaired.

[0014] It is still another object of the present disclosure to provide an indoor unit that is easily disassembled and assembled.

[0015] It is still another object of the present disclosure to provide an indoor unit that facilitates management of pipes.

[0016] It is still another object of the disclosure to provide an indoor unit having robust rigidity.

[0017] It is another object of the disclosure to provide an indoor unit that facilitates discharge of water.

[0018] It is still another object of the present disclosure to provide an indoor unit that facilitates management of wires.

[0019] It is still another object of the present disclosure to provide an indoor unit in which a speaker is easily mounted.

[0020] The objects of the present disclosure are not limited to the above-described objects, and other objects not mentioned herein may be clearly understood by those skilled in the art from the following description.

[0021] The object is solved by the features of the independent claims. Preferred embodiments are given in the dependent claims.

[0022] In order to accomplish the above and other objects, an air conditioner according to one aspect of the present disclosure includes a case.

[0023] The air conditioner includes a heat exchanger disposed in the case.

[0024] The air conditioner includes a drain pan disposed below the heat exchanger.

[0025] The air conditioner includes a drain pipe connected to the drain pan and extending to the outside of the case through an outer wall of the case.

[0026] The air conditioner includes a drain assembly extending in a direction away from the case to accommodate the drain pipe therein.

[0027] The air conditioner includes a pump disposed in the drain assembly and connected to the drain pipe. Accordingly, management of the pump and the drain pipe may be facilitated. Thus, the pump might be easily replaced.

[0028] The case may include a side frame spaced apart from one side of the heat exchanger.

[0029] The drain assembly may be coupled to a lower portion of the side frame.

[0030] The drain assembly may be separably coupled to the case. This facilities the assembly.

[0031] The drain assembly may include a coupling part coupled to the case and extending in a direction away from the case.

[0032] The drain assembly may include a bent part connected to the coupling part and bent in a direction

intersecting the coupling part.

[0033] The drain assembly may include an extension part connected to the bent part and extending in the direction intersecting the coupling part.

[0034] The air conditioner may include a water container disposed in the drain assembly and connected to the drain pipe.

[0035] The pump may be disposed in the water container.

[0036] The pump may be disposed in the bent part.

[0037] The pump may include a pump inlet pipe extending toward the coupling part.

[0038] The pump may include a pump outlet pipe extending toward the extension part.

[0039] The air conditioner may include a refrigerant pipe connected to the heat exchanger and extending within the drain assembly.

[0040] The pump may be disposed at a position farther forward than the refrigerant pipe, and the drain assembly may include a front coupling part formed to be separable forward from the drain assembly.

[0041] The drain assembly may include a lower wall on which the pump is seated.

[0042] The drain assembly may include a fastening hole formed to be open in the lower wall in an upward-downward direction.

[0043] The drain assembly may include a fastening member penetrating the pump and the lower wall.

[0044] The air conditioner may include a refrigerant pipe connected to the heat exchanger and extending within the drain assembly while being spaced apart from the drain pipe.

[0045] The refrigerant pipe may be located at a position farther backward than the drain pipe.

[0046] The air conditioner may include a refrigerant pipe connector connected to the heat exchanger and extending within the case.

[0047] The refrigerant pipe may include a refrigerant-pipe end portion penetrating an outer wall of the case to be located in the case and to be separably coupled to the refrigerant pipe connector.

[0048] The refrigerant pipe may penetrate the side frame to extend to the inside of the case.

[0049] The air conditioner may include a drain pipe connector connected to the drain pan and extending within the case.

[0050] The drain pipe may include a drain-pipe end portion penetrating an outer wall of the case to be located within the case and to be separably coupled to the drain pipe connector.

[0051] The drain pipe may penetrate the side frame to extend to the inside of the case.

[0052] The air conditioner may include an assembly cover separably coupled to the case to open and close the inside of the drain assembly.

[0053] The drain pipe may be placed in the drain assembly after the assembly cover is separated from the case.

[0054] The side frame may include a cover receiving portion surrounding the assembly cover.

[0055] The side frame may include an upper holder protruding from the cover receiving portion and coupled to an upper portion of the assembly cover.

[0056] The side frame may include a lower holder protruding from the cover receiving portion and coupled to a lower portion of the assembly cover.

[0057] The air conditioner may include a reinforcement body spaced apart from a lower side of the assembly cover.

[0058] Details of other aspects are included in the detailed description and the drawings below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0059] The above and other objects, features, and other advantages of the present disclosure will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of an indoor unit of an air conditioner according to an embodiment of the present disclosure;

FIG. 2 is a perspective view of the indoor unit of the air conditioner according to the embodiment of the present disclosure;

FIG. 3 is an exploded view of the indoor unit of the air conditioner according to the embodiment of the present disclosure;

FIG. 4 is a cross-sectional view of the indoor unit of the air conditioner according to the embodiment of the present disclosure;

FIG. 5 is a perspective view of the indoor unit and an outer case according to an embodiment of the present disclosure;

FIG. 6 is an exploded view of the outer case of the embodiment of the present disclosure;

FIG. 7 is a view showing the internal structure of a case and the outer case according to the embodiment of the present disclosure;

FIG. 8 is a view showing the internal structure of the case and the outer case according to the embodiment of the present disclosure;

FIG. 9 is view showing a portion of the air conditioner of the embodiment of the disclosure;

FIG. 10 is view showing a portion of the air conditioner according to the embodiment of the disclosure;

FIG. 11 is view showing a portion of the air conditioner of the embodiment of the disclosure;

FIG. 12 is a perspective view showing the inside of the outer case of the embodiment of the disclosure;

FIG. 13 is a perspective view showing the inside of the outer case of the embodiment of the present disclosure;

FIG. 14 is a conceptual diagram showing a portion of the air conditioner according to the embodiment

of the present disclosure;
FIG. 15 is a conceptual diagram showing a portion of the air conditioner according to the embodiment of the present disclosure;
FIG. 16 is a control block diagram of the air conditioner according to the embodiment of the present disclosure;
FIG. 17 is a cross-sectional view of the outer case of the embodiment of the present disclosure;
FIG. 18 is a perspective view of an indoor unit and an outer case according to another embodiment of the present disclosure;
FIG. 19 is an exploded view of the outer case shown in FIG. 18;
FIG. 20 is a perspective view of a bent part shown in FIG. 19;
FIG. 21 is a cross-sectional view of the bent part shown in FIG. 20;
FIG. 22 is a perspective view showing a state in which a water container and a pump are separated from the outer case shown in FIG. 18;
FIG. 23 is a perspective view showing a state in which the water container and the pump are coupled to the outer case shown in FIG. 22;
FIG. 24 is a perspective view showing a state in which the water container and the pump shown in FIG. 22 are separated from each other;
FIG. 25 is a plan view of the water container shown in FIG. 24;
FIG. 26 is a perspective view of an indoor unit and an outer case according to still another embodiment of the present disclosure; and
FIG. 27 is an exploded view of the outer case shown in FIG. 26.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0060] Hereinafter, the embodiments disclosed in the present specification will be described in detail with reference to the accompanying drawings. The same or similar elements are denoted by the same reference numerals even though they are depicted in different drawings, and redundant descriptions thereof will be omitted.

[0061] In the following description, with respect to constituent elements used in the following description, the suffixes "module" and "unit" are used only in consideration of facilitation of description, and do not have mutually distinguished meanings or functions.

[0062] In the following description of the embodiments disclosed in the present specification, a detailed description of known functions and configurations incorporated herein will be omitted when the same may make the subject matter of the embodiments disclosed in the present specification rather unclear. In addition, the accompanying drawings are provided only for a better understanding of the embodiments disclosed in the present specification and are not intended to limit the technical ideas disclosed in the present specification. Therefore, it should be understood that the accompanying drawings include all modifications, equivalents, and substitutions within the scope and sprit of the present invention.

[0063] It will be understood that although the terms "first", "second", etc., may be used herein to describe various components, these components should not be limited by these terms. These terms are only used to distinguish one component from another component.

[0064] It will be understood that when a component is referred to as being "connected to" or "coupled to" another component, it may be directly connected to or coupled to another component, or intervening components may be present. On the other hand, when a component is referred to as being "directly connected to" or "directly coupled to" another component, there are no intervening components present.

[0065] As used herein, the singular form is intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0066] An air conditioner 1 will be described with reference to FIGs. 1 and 2.

[0067] FIG. 1 is a view showing an indoor unit of the air conditioner 1. FIG. 2 is a view showing a state in which a front panel 30 of the indoor unit is open.

[0068] The air conditioner 1 may include an outdoor unit and an indoor unit. With regard to the outdoor unit of the air conditioner 1, reference may be made to the description of the related art. Hereinafter, the indoor unit according to an embodiment of the present disclosure will be described with reference to FIGs. 1 to 16.

[0069] The air conditioner 1 may include a case 10. The case 10 may have a space defined therein. The case 10 may be mounted on a wall of an indoor space. The rear surface of the case 10 may be fixed to the wall.

[0070] The air conditioner 1 may include a front panel 30. The front panel 30 may be movably coupled to the case 10. The front panel 30 may be moved forward and backward relative to the case 10. The front panel 30 may cover the front side of the case 10.

[0071] The front panel 30 may include a front plate 31. The front plate 31 may be disposed in front of the case 10. The front plate 31 may cover the front side of the case 10.

[0072] The front panel 30 may include a display 32. The display 32 may be coupled to the front plate 31. The display 32 may be exposed to the outside. The display 32 may display a screen outside the indoor unit.

[0073] The air conditioner 1 may include a frame 20. The frame 20 may be coupled to the case 10. The frame 20 may be disposed between the case 10 and the front panel 30. The front panel 30 may be coupled to the frame 20. The front panel 30 may be movably disposed on the frame 20.

[0074] The front panel 30 may be moved forward and backward relative to the case 10 and the frame 20. The front panel 30 may be moved forward to be spaced apart from the frame 20.

[0075] The air conditioner 1 may include a suction port 101. The suction port 101 may be formed between the front panel 30 and the frame 20. The suction port 101 may be formed between the front panel 30 and the case 10. The suction port 101 may be opened when the front panel 30 moves away from the frame 20. The suction port 101 may be closed when the front panel 30 is coupled to the frame 20.

[0076] The air conditioner 1 may include a discharge port 102. The discharge port 102 may be open toward the outside of the case 10. The discharge port 102 may be formed along the periphery of the case 10. Air introduced into the case 10 through the suction port 101 may be discharged to the outside of the case 10 through the discharge port 102.

[0077] The air conditioner 1 will be described with reference to FIGs. 3 and 4.

[0078] FIG. 3 is an exploded view of the indoor unit. FIG. 4 is a cross-sectional view of the indoor unit taken along line 9-9 in FIG. 1.

[0079] The front panel 30 may include a front plate 31 and a display 32. The front plate 31 and the display 32 may form the front surface of the indoor unit.

[0080] The front panel 30 may include a rear plate 33. The rear plate 33 may be disposed behind the display 32. The display 32 may be disposed between the front plate 31 and the rear plate 33. The rear plate 33 may be coupled to the front plate 31.

[0081] The front panel 30 may include a lower plate 34. The lower plate 34 may be coupled to a lower portion of the front plate 31. The lower plate 34 may be disposed below the display 32. The lower plate 34 may connect the front plate 31 to the rear plate 33.

[0082] The front panel 30 may include a link 35. The link 35 may be disposed at a lower portion of the front panel 30. The link 35 may extend in the horizontal direction. The link 35 may provide a rotation axis of the front panel 30. The link 35 may connect the front panel 30 to the frame 20.

[0083] The front panel 30 may include a link motor 36. The link motor 36 may rotate the link 35.

[0084] The frame 20 may be coupled to the case 10 and the front panel 30. The frame 20 may be disposed between the case 10 and the front panel 30.

[0085] The frame 20 may include a grille 21. The grille 21 may have a grid shape. The grille 21 may face the front panel 30.

[0086] The frame 20 may include an air inlet port 22. The air inlet port 22 may be formed in the grille 21. Air flowing through the suction port 101 (refer to FIG. 2) may be introduced into the case 10 through the air inlet port 22.

[0087] The air conditioner 1 may include a filter 60. The filter 60 may be a mesh filter. The filter 60 may be disposed on the frame 20. The filter 60 may be disposed in front of the grille 21. The filter 60 may be disposed between the front panel 30 and the frame 20.

[0088] The air conditioner 1 may include a heat exchanger 50. The heat exchanger 50 may be disposed in the case 10. The heat exchanger 50 may be disposed behind the frame 20. The air that has passed through the air inlet port 22 may exchange heat with refrigerant flowing in the heat exchanger 50.

[0089] The air conditioner 1 may include a refrigerant pipe 51. The refrigerant pipe 51 may be connected to the heat exchanger 50. The refrigerant pipe 51 may extend within the case 10.

[0090] The air conditioner 1 may include a drain pan 52. The drain pan 52 may be disposed below the heat exchanger 50. Condensed water generated from the heat exchanger 50 may accumulate in the drain pan 52.

[0091] The air conditioner 1 may include an inner cover 40. The inner cover 40 may be disposed in the case 10. The inner cover 40 may be disposed between the heat exchanger 50 and a fan 14. The inner cover 40 may have an open portion.

[0092] The air conditioner 1 may include a fan 14. The fan 14 may blow air. The fan 14 may be disposed in the case 10. The fan 14 may be disposed behind the inner cover 40.

[0093] The air conditioner 1 may include a fan motor 141. The fan motor 141 may rotate the fan 14. The fan motor 141 may be disposed in the case 10.

[0094] The air conditioner 1 may include a case 10. The case 10 may have a space defined therein. The fan 14 and the heat exchanger 50 may be disposed in the case 10.

[0095] The air conditioner 1 may include a discharge port 102 (refer to FIG. 2). The discharge port 102 may be formed as an opening in the case 10. A plurality of discharge ports 102 may be formed at different positions in the case 10.

[0096] The discharge port 102 may include a first discharge port 102a. The first discharge port 102a may be open in one side of the case 10. The discharge port 102 may include a second discharge port 102b. The second discharge port 102b may be open in one side of the case 10. The first discharge port 102a and the second discharge port 102b may be formed in different side surfaces of the case 10. The discharge port 102 may include a third discharge port 102c. The third discharge port 102c may be open in the bottom of the case 10. The third discharge port 102c may be referred to as a "lower discharge port".

[0097] The air conditioner 1 may include discharge grilles 11, 12, and 13. The discharge grilles 11, 12, and 13 may be coupled to the case 10. The discharge grilles 11, 12, and 13 may be disposed at positions corresponding to the discharge ports 102a, 102b, and 102c. Air introduced into the case 10 may be discharged to the outside of the case 10 through the discharge grilles 11, 12, and 13.

[0098] The discharge grilles 11, 12, and 13 may include a first discharge grille 11. The first discharge grille 11 may be disposed at a position corresponding to the first discharge port 102a. The first discharge grille 11 may be coupled to one side of the case 10. The first discharge

grille 11 may include a first grille portion 115. The first grille portion 115 may face the first discharge port 102a.

[0099] The discharge grilles 11, 12, and 13 may include a second discharge grille 12. The second discharge grille 12 may be disposed at a position corresponding to the second discharge port 102b. The second discharge grille 12 may be coupled to one side of the case 10. The second discharge grille 12 may include a second grille portion 125. The second grille portion 125 may face the second discharge port 102b.

[0100] The discharge grilles 11, 12, and 13 may include a third discharge grille 13. The third discharge grille 13 may be disposed at a position corresponding to the third discharge port 102c. The third discharge grille 13 may be coupled to a lower side of the case 10. The third discharge grille 13 may include a third grille portion 135. The third grille portion 135 may face the third discharge port 102c. The third discharge grille 13 may be referred to as a "lower discharge grille".

[0101] Each of the discharge grilles 11, 12, and 13 may include a discharge vane 121. A plurality of discharge vanes 121 may be disposed so as to be spaced apart from each other in the forward-backward direction. The plurality of discharge vanes 121 may be disposed in all of the first to third discharge grilles 11, 12, and 13.

[0102] Each of the discharge grilles 11, 12, and 13 may include a grille discharge hole 122. A plurality of grille discharge holes 122 may be formed so as to be spaced apart from each other in the forward-backward direction. The plurality of grille discharge holes 122 may be formed between the plurality of discharge vanes 121. The plurality of grille discharge holes 122 may be disposed in all of the first to third discharge grilles 11, 12, and 13. The grille discharge holes 122 may communicate with the discharge ports 102a, 102b, and 102c.

[0103] The air conditioner 1 may include an auxiliary vane 15. The auxiliary vane 15 may be rotatably disposed in the case 10. The auxiliary vane 15 may be disposed above the third discharge grille 13. The auxiliary vane 15 may guide air to flow to the third discharge port 102c.

[0104] The air conditioner 1 may include a temperature sensor 16. The temperature sensor 16 may measure the temperature of air discharged through the discharge ports 102a, 102b, and 102c. Alternatively, the temperature sensor 16 may measure indoor temperature.

[0105] The air conditioner 1 may include a rear panel 70. The rear panel 70 may be coupled to a rear side of the case 10. The rear panel 70 may be fixed to a wall of an indoor space.

[0106] The air conditioner 1 will be described with reference to FIG. 5.

[0107] FIG. 5 is a view showing a case 10 and an outer case 80.

[0108] The indoor unit of the air conditioner 1 may include a case 10. The indoor unit of the air conditioner 1 may include a front panel 30.

[0109] The air conditioner 1 may include an outer case 80. The outer case 80 may be coupled to the case 10. The outer case 80 may be separable from the case 10. The outer case 80 may extend to the outside of the case 10. The outer case 80 may be referred to as a "drain assembly".

[0110] The drain assembly 80 may include a coupling part 81. The coupling part 81 may be connected to the case 10. The coupling part 81 may extend to the outside of the case 10. The coupling part 81 may extend from the case 10 in the horizontal direction.

[0111] The drain assembly 80 may include a bent part 82. The bent part 82 may be connected to the coupling part 81. The bent part 82 may be separable from the coupling part 81. The bent part 82 may extend upward from the coupling part 81. The bent part 82 may extend in a direction intersecting the coupling part 81.

[0112] The drain assembly 80 may include an extension part 83. The extension part 83 may be connected to the bent part 82. The extension part 83 may extend in the upward-downward direction. The extension part 83 may extend upward from the bent part 82.

[0113] The drain assembly 80 may include a fixing part 84. The fixing part 84 may be coupled to the end of the extension part 83. The fixing part 84 may protrude backward from the extension part 83. The fixing part 84 may be attached and fixed to a wall.

[0114] The air conditioner 1 will be described with reference to FIG. 6.

[0115] FIG. 6 is an exploded view of the drain assembly 80.

[0116] The coupling part 81 may have a rectangular column shape. The coupling part 81 may have a space defined therein. The coupling part 81 may extend in the horizontal direction.

[0117] The coupling part 81 may include a front coupling part 811. The front coupling part 811 may have a rectangular column shape having an open rear side.

[0118] The coupling part 81 may include a rear coupling part 812. The rear coupling part 812 may have a rectangular column shape having an open front side.

[0119] The front coupling part 811 and the rear coupling part 812 may be coupled to each other. A space may be defined between the front coupling part 811 and the rear coupling part 812.

[0120] The bent part 82 may include a front bent part 821. The front bent part 821 may have an open rear side. The front bent part 821 may be connected to the front coupling part 811.

[0121] The bent part 82 may include a rear bent part 822. The rear bent part 822 may have an open front side. The rear bent part 822 may be connected to the rear coupling part 812.

[0122] The front bent part 821 and the rear bent part 822 may be coupled to each other. A space may be defined between the front bent part 821 and the rear bent part 822.

[0123] The extension part 83 may include a front extension part 831. The front extension part 831 may have a rectangular column shape having an open rear side.

The front extension part 831 may be connected to the front bent part 821.

[0124] The extension part 83 may include a rear extension part 832. The rear extension part 832 may have a rectangular column shape having an open front side. The rear extension part 832 may be connected to the rear bent part 822.

[0125] The fixing part 84 may include a front fixing part 841. The front fixing part 841 may have a rectangular column shape having an open rear side. The front fixing part 841 may be connected to the front extension part 831.

[0126] The fixing part 84 may include a rear fixing part 842. The rear fixing part 842 may have a rectangular column shape having an open front side. The rear fixing part 842 may be connected to the rear extension part 832.

[0127] The front fixing part 841 and the rear fixing part 842 may be coupled to each other. A space may be defined between the front fixing part 841 and the rear fixing part 842.

[0128] The fixing part 84 may include a bonding rib 843. The bonding rib 843 may be formed so as to surround the front fixing part 841. The bonding rib 843 may be disposed on the upper side of the rear fixing part 842. The bonding rib 843 may be fixed to a wall.

[0129] The drain assembly 80 may include a drain pipe 85. The drain pipe 85 may be connected to the drain pan 52 (refer to FIG. 3). Condensed water generated from the heat exchanger 50 (refer to FIG. 3) may flow in the drain pipe 85. The drain pipe 85 may extend horizontally within the coupling part 81.

[0130] The drain assembly 80 may include a water container 86. The water container 86 may be connected to the drain pipe 85. The water container 86 may be disposed in the coupling part 81. Condensed water flowing in the drain pipe 85 may be stored in the water container 86.

[0131] The drain assembly 80 may include a water level sensor 87. The water level sensor 87 may detect a water level in the water container 86.

[0132] The drain assembly 80 may include a pump 88. The pump 88 may be disposed in the bent part 82. The pump 88 may be connected to the water container 86. The pump 88 may extract condensed water stored in the water container 86. The pump 88 may extract condensed water stored in the water container 86 toward the extension part 83.

[0133] The drain assembly 80 may include a pump inlet pipe 881. The pump inlet pipe 881 may connect the water container 86 to the pump 88. Condensed water stored in the water container 86 may flow into the pump 88 through the pump inlet pipe 881.

[0134] The drain assembly 80 may include a pump outlet pipe 882. The pump outlet pipe 882 may extend upward from the pump 88. Condensed water extracted by the pump 88 may flow upward through the pump outlet pipe 882.

[0135] The air conditioner 1 will be described with reference to FIGs. 7 and 8.

[0136] FIG. 7 is a cross-sectional view of the case 10 and the drain assembly 80. FIG. 8 is a view showing the structure shown in FIG. 7, with a water container cover 862 removed therefrom.

[0137] The drain assembly 80 may include a refrigerant pipe 89. The refrigerant pipe 89 may extend within the coupling part 81. The refrigerant pipe 89 may be bent within the bent part 82. The refrigerant pipe 89 may extend upward along the extension part 83.

[0138] The drain pipe 85 and the refrigerant pipe 89 may be disposed in the coupling part 81. The drain pipe 85 may be located at a position farther forward than the refrigerant pipe 89.

[0139] The drain pipe 85 may include a drain-pipe end portion 851. The drain-pipe end portion 851 may be located in the case 10. The drain-pipe end portion 851 may penetrate a side frame 11 of the case 10. The drain-pipe end portion 851 may protrude toward a lower frame 13 of the case 10.

[0140] The refrigerant pipe 89 may include a refrigerant-pipe end portion 891. The refrigerant-pipe end portion 891 may be located in the case 10. The refrigerant-pipe end portion 891 may penetrate the side frame 11 of the case 10. The refrigerant-pipe end portion 891 may protrude toward the lower frame 13 of the case 10.

[0141] The water container 86 may be disposed in the bent part 82. The water container 86 may be connected to the drain pipe 85.

[0142] The water container 86 may include a housing 861. A space in which condensed water is stored may be defined in the housing 861.

[0143] The water container 86 may include a water-container cover 862. The water-container cover 862 may be coupled to an upper portion of the housing 861. The water-container cover 862 may open and close the inner space in the housing 861.

[0144] The water container 86 may include a water inlet port 863. The water inlet port 863 may protrude to the outside of the housing 861. The drain pipe 85 may be connected to the water inlet port 863.

[0145] The pump 88 may be disposed in housing 861. The pump 88 may extract condensed water introduced into the housing 861.

[0146] The water level sensor 87 may be disposed in the housing 861. The water level sensor 87 may measure the water level of condensed water stored in the housing 861. Alternatively, the water level sensor 87 may be disposed outside the housing 861.

[0147] The air conditioner 1 will be described with reference to FIG. 9.

[0148] FIG. 9 is an enlarged view of a joint area between the drain assembly 80 and the case 10.

[0149] The drain pipe 85 may extend to the inside of the case 10. The drain-pipe end portion 851 (refer to FIG. 8) may be located in the case 10. The drain pipe 85 may penetrate the side frame 11.

[0150] The refrigerant pipe 89 may extend to the inside

of the case 10. The refrigerant-pipe end portion 891 (refer to FIG. 8) may be located in the case 10. The refrigerant pipe 89 may penetrate the side frame 11.

[0151] The air conditioner 1 may include a drain pipe connector 852. The drain pipe connector 852 may be disposed in the case 10. The drain pipe connector 852 may connect the drain pan 52 (refer to FIG. 3) to the drain pipe 85. Condensed water accumulated in the drain pan 52 may flow into the drain pipe 85 through the drain pipe connector 852.

[0152] The air conditioner 1 may include a refrigerant pipe connector 892. The refrigerant pipe connector 892 may be disposed in the case 10. The refrigerant pipe connector 892 may connect the heat exchanger 50 (refer to FIG. 3) to the refrigerant pipe 89. Refrigerant flowing in the heat exchanger 50 may flow into the refrigerant pipe 89 through the refrigerant pipe connector 892.

[0153] The air conditioner 1 will be described with reference to FIGs. 10 and 11.

[0154] FIG. 10 is an enlarged view of a connection area between the case 10 and the drain assembly 80. FIG. 11 is an enlarged view of a lower portion of the case 10.

[0155] The air conditioner 1 may include an assembly cover 801. The assembly cover 801 may open and close the inside of the drain assembly 80. The assembly cover 801 may close the inside of the coupling part 81.

[0156] The assembly cover 801 may be detachably coupled to the case 10. The assembly cover 801 may be coupled to the side frame 11. The assembly cover 801 may be located at a position lower than the heat exchanger 50. The assembly cover 801 may be located at a position lower than the drain pan 52. The assembly cover 801 may be located at a position higher than the lower frame 13. The assembly cover 801 may be located above a reinforcement body 18.

[0157] The first discharge grille 11 may be referred to as a "side frame". The third discharge grille 13 may be referred to as a "lower frame".

[0158] The assembly cover 801 may be separable from the case 10. The assembly cover 801 may be separable from the side frame 11. The drain-pipe end portion 851 (refer to FIG. 8) and the refrigerant-pipe end portion 891 (refer to FIG. 8) may penetrate a position at which the assembly cover 801 is mounted. The drain pipe connector 852 (refer to FIG. 9) may be connected to the drain pipe 85 penetrating the side frame 11. The refrigerant pipe connector 892 (refer to FIG. 9) may be connected to the refrigerant pipe 89 penetrating the side frame 11.

[0159] The air conditioner 1 may include a reinforcement body 18. The reinforcement body 18 may be detachably coupled to the case 10. The reinforcement body 18 may be disposed between the side frame 11 and the lower frame 13. A cut portion may be formed between the side frame 11 and the lower frame 13. The reinforcement body 18 may cover the cut portion between the side frame 11 and the lower frame 13. After removing the reinforcement body 18, a user may withdraw the refrigerant pipe 85 or the drain pipe 89 between the side frame 11 and the lower frame 13.

[0160] The assembly cover 801 may be coupled to the side frame 11. The assembly cover 801 may be separable from the side frame 11.

[0161] The assembly cover 801 may include a cover body 8011. The cover body 8011 may have a plate shape.

[0162] The assembly cover 801 may include a cover rim 8012. The cover rim 8012 may surround the cover body 8011.

[0163] The assembly cover 801 may include an upper protruding portion 8013. The upper protruding portion 8013 may protrude upward from the cover body 8011.

[0164] The assembly cover 801 may include a lower protruding portion 8014. The lower protruding portion 8014 may protrude downward from the cover body 8011.

[0165] The side frame 11 may include a cover receiving portion 111. The cover receiving portion 111 may surround the assembly cover 801.

[0166] The side frame 11 may include a rim holder 112. The rim holder 112 may protrude from the cover receiving portion 111. The cover rim 8012 may be coupled to the rim holder 112.

[0167] The side frame 11 may include an upper holder 113. The upper holder 113 may protrude from the cover receiving portion 111. The upper protruding portion 8013 may be coupled to the upper holder 113.

[0168] The side frame 11 may include a lower holder 114. The lower holder 114 may protrude from the cover receiving portion 111. The lower protruding portion 8014 may be coupled to the lower holder 114.

[0169] The assembly cover 801 may be moved in a first direction P to be separated from the side frame 11. When the assembly cover 801 is separated from the side frame 11, the inner space in the drain assembly 80 may be opened.

[0170] The assembly cover 801 may be moved in a second direction opposite the first direction P to be coupled to the side frame 11. When the assembly cover 801 is coupled to the side frame 11, the inner space in the drain assembly 80 may be closed.

[0171] The air conditioner 1 will be described with reference to FIGs. 12 and 13.

[0172] FIGs. 12 and 13 are views showing the structure of the drain assembly 80, with the front coupling part 811, the front bent part 821, the front extension part 831, and the water container cover 862 removed therefrom.

[0173] The housing 861 may be disposed in the bent part 82. A portion of the housing 861 may face the extension part 83 in the upward-downward direction.

[0174] The water container 86 may include a storage space 864. The storage space 864 may be defined in the housing 861. Condensed water introduced into the housing 861 through the water inlet port 863 may be stored in the storage space 864.

[0175] The water inlet port 863 may protrude from the housing 861 toward the coupling part 81. The drain pipe 85 may be connected to the water inlet port 863. At least a portion of the drain pipe 85 may be bent.

[0176] The pump inlet pipe 881 may face the water inlet port 863. The pump inlet pipe 881 may be disposed closer to the coupling part 81 than the extension part 83.

[0177] The pump outlet pipe 882 may face the extension part 83. The pump outlet pipe 882 may extend upward toward the extension part 83. The pump outlet pipe 882 may be disposed closer to the extension part 83 than the coupling part 81.

[0178] The water level sensor 87 may be disposed below the extension part 83. The water level sensor 87 may be disposed closer to the extension part 83 than the coupling part 81.

[0179] The air conditioner 1 will be described with reference to FIG. 14.

[0180] FIG. 14 is a conceptual diagram showing the structure in which condensed water generated from the heat exchanger 50 flows.

[0181] The heat exchanger 50 may perform heat-exchange on the air suctioned into the case 10. The heat exchanger 50 may generate condensed water. Condensed water generated from the heat exchanger 50 may fall into the drain pan 52.

[0182] The drain pan 52 may include a water outlet port 525. The water outlet port 525 may extend to the outside of the drain pan 52. The water outlet port 525 may be connected to the drain pipe connector 852.

[0183] The drain pipe connector 852 may be connected to the drain-pipe end portion 851. The drain pipe connector 852 may connect the water outlet port 525 to the drain-pipe end portion 852, and may be bent downward at least once.

[0184] The drain pipe 85 may extend form the inside of the drain assembly 80 to be connected to the water container 86. The drain pipe 85 may be connected to the water inlet port 863 of the water container 86.

[0185] The water level sensor 87 may be disposed in the water container 86. The water level sensor 87 may measure the water level of condensed water stored in the water container 86.

[0186] The pump 88 may be disposed in the water container 86. The pump 88 may extract condensed water stored in the water container 86. The pump 88 may include an impeller 889. The pump 88 may rotate the impeller 889 to extract the condensed water in the water container 86.

[0187] The water inlet port 863 may be located at a position lower than the drain pan 52. The water inlet port 863 may have a height difference H1 from the drain pan 52. The height difference between the water inlet port 863 and the drain pan 52 may be in the range of 36 to 40 mm.

[0188] The water level sensor 87 may be located at a position lower than the water inlet port 863. The water level sensor 87 may have a height difference H2 from the water inlet port 863. The water level sensor 87 may be a float sensor. The water level sensor 87 may be a float switch.

[0189] The water level sensor 87 may be located at a position higher than the bottom of the water container 86. The water level sensor 87 may have a height difference H3 from the bottom of the water container 86. The height difference H3 between the water level sensor 87 and the bottom of the water container 86 may be in the range of 1.5 to 2.5 mm.

[0190] The pump 88 may be located at a position lower than the water inlet port 863. The pump 88 may have a height difference H4 from the water inlet port 863. The impeller 889 of the pump 88 may have a height difference H4 from the water inlet port 863. The impeller 889 of the pump 88 may be located at a position lower than the water inlet port 863.

[0191] The air conditioner 1 will be described with reference to FIG. 15.

[0192] FIG. 15 illustrates water containers 86', 86", and 86‴ according to other embodiments of the present disclosure.

[0193] Referring to FIG. 15(a), the water container 86' may include grooves 866' and 867'. The pump 88 may be disposed in the grooves 866' and 867'. The water level sensor 87 may be disposed in the grooves 866' and 867'. The impeller 889 may extract condensed water in the grooves 866' and 867'. The grooves 866' and 867' may include a first groove 866'. The grooves 866' and 867' may include a second groove 867'. The first groove 866' and the second groove 867' may be spaced apart from each other in the horizontal direction. The pump 88 may be disposed in the first groove 866'. The water level sensor 87 may be disposed in the second groove 867'. The water container 86' may include a bottom surface 865'. The bottom surface 865' may be located below a water inlet port 863'. The grooves 866' and 867' may be formed downward in the bottom surface 865'. The water container 86' may include a connection surface 868'. The connection surface 868' may connect the first groove 866' to the second groove 867'. The connection surface 868' may be located at a position higher than the grooves 866' and 867'.

[0194] Referring to FIG. 15(b), the water container 86" may include a groove 867". The pump 88 may be disposed in the groove 867". The water level sensor 87 may be disposed in the groove 867". The impeller 889 may extract condensed water in the groove 867". The water container 86" may include a bottom surface 865". The bottom surface 865" may be located below a water inlet port 863". The groove 867" may be located at a position lower than the bottom surface 865". The water container 86" may include a connection surface 866". The connection surface 866" may connect the bottom surface 865" to the groove 867".

[0195] Referring to FIG. 15(c), the water container 86‴ may include a groove 867'". The pump 88 may be disposed in the groove 867'". The water level sensor 87 may be disposed in the groove 867'". The impeller 889 may extract condensed water in the groove 867'". The water container 86‴ may include a first bottom surface 865'". The first bottom surface 865‴ may be located below a

water inlet port 863'". The groove 867‴ may be located at a position lower than the first bottom surface 865'". The water container 86‴ may include a second bottom surface 866'". The second bottom surface 866‴ may be located at a position higher than the groove 867'". The groove 867‴ may be formed between the first bottom surface 865‴ and the second bottom surface 866'". The groove 867‴ may be formed downward in the bottom surfaces 865‴ and 866'".

[0196] The air conditioner 1 will be described with reference to FIG. 16.

[0197] FIG. 16 is a control block diagram showing a method of controlling the pump 88.

[0198] The air conditioner 1 may include a controller 90 (refer to FIG. 14). The controller 90 may be electrically connected to the fan 14, the display 32, the water level sensor 87, and the pump 88. The controller 90 may control operation of the pump 88.

[0199] The controller 90 may determine whether the indoor unit 1 is being driven (S110). The controller 90 may determine whether the fan 14 is being driven (S 110). Upon determining that the fan 14 is being driven, the controller 90 may determine that the indoor unit 1 is being driven. Upon determining that the indoor unit 1 is not being driven, the controller 90 may stop operation of the pump 88 (S400). Upon determining that the indoor unit 1 is being driven, the controller 90 may compare a value measured by the water level sensor 87 with a limit value L (S120).

[0200] The controller 90 may compare a value measured by the water level sensor 87 with a predetermined limit value L (S120). When the value measured by the water level sensor 87 is greater than the limit value L, the controller 90 may compare a duration of the value measured by the water level sensor 87 being greater than the limit value L with a first limit duration t1 (S130). When the value measured by the water level sensor 87 is less than the limit value L, the controller 90 may determine a change in the value measured by the water level sensor 87 (S170).

[0201] The controller 90 may compare a duration of the value measured by the water level sensor 87 being greater than the limit value L with a first limit duration t1 (S130). When the duration of the value measured by the water level sensor 87 being greater than the limit value L is longer than the first limit duration t1, the controller 90 may determine whether use of the pump 88 has been set (S140). When the duration of the value measured by the water level sensor 87 being greater than the limit value L is shorter than the first limit duration t1, the controller 90 may stop operation of the pump 88 (S400).

[0202] The controller 90 may determine whether use of the pump 88 has been set (S140). The user may input a setting of whether to turn the pump 88 on or off to the controller 90. The user may input a command of turning the pump 88 on or off through the display 32. When the use setting of the pump 88 is "On", the controller 90 may drive the pump 88 (S150). When the use setting of the pump 88 is "Off', the controller 90 may stop operation of the pump 88 (S400).

[0203] The controller 90 may compare a duration of the pump 88 being driven with a second limit duration t2 (S160). When the duration of the pump 88 being driven is longer than the second limit duration t2, the controller 90 may stop operation of the pump 88 (S200). When the duration of the pump 88 being driven is shorter than the second limit duration t2, the controller 90 may repeat the above-described pump on/off determination S110, S120, S130, S140, and S150.

[0204] When the duration of the pump 88 being driven is longer than the second limit duration t2, the controller 90 may display a signal indicating an error of the pump 88 (S300). The controller 90 may display a signal indicating an error of the pump 88 on the display 32 (S300).

[0205] When the value measured by the water level sensor 87 is less than the limit value L, the controller 90 may determine a change in the measured value (S170). The controller 90 may determine whether the value measured by the water level sensor 87 has changed from a value greater than the limit value L to a value less than the limit value L (S170). Upon determining that the value measured by the water level sensor 87 has changed from a value greater than the limit value L to a value less than the limit value L, the controller 90 may compare a duration of the measured value being less than the limit value L with a set duration t3 (S180). Upon determining that the value measured by the water level sensor 87 has not changed from a value greater than the limit value L to a value less than the limit value L, the controller 90 may stop operation of the pump 88 (S400).

[0206] When the duration of the value measured by the water level sensor 87 being less than the limit value L is longer than the set duration t3, the controller 90 may stop operation of the pump 88 (S400). When the duration of the value measured by the water level sensor 87 being less than the limit value L is shorter than the set duration t3, the controller 90 may again compare the value measured by the water level sensor 87 with the limit value L (S120).

[0207] The air conditioner 1 will be described with reference to FIG. 17.

[0208] FIG. 17 is a cutaway side view of the drain assembly 80.

[0209] The pump 88 may be disposed farther from the side frame 11 than the water container 86.

[0210] The drain assembly 80 may include a lower wall 802. The water container 86 and the pump 88 may be seated on the lower wall 802.

[0211] The drain assembly 80 may include a fastening hole 803. The fastening hole 803 may be open in the lower wall 802 in the upward-downward direction.

[0212] The drain assembly 80 may include a fastening member 804. The fastening member 804 may penetrate the fastening hole 803. The pump 88 may be fixed to the drain assembly 80 by means of the fastening member 804 penetrating the fastening hole 803. The fastening

member 804 may penetrate the pump 88 and the fastening hole 803.

[0213] The fastening hole 803 may be located in front of the pump 88. The fastening hole 803 may face the water container 86 in the horizontal direction. The fastening hole 803 may be located at a position farther forward than the refrigerant pipe 89. Accordingly, the user may easily manage the water container 86 and the pump 88 by removing the front bent part 821 (refer to FIG. 6).

[0214] FIG. 18 is a perspective view of an indoor unit and an outer case according to another embodiment of the present disclosure, and FIG. 19 is an exploded view of the outer case shown in FIG. 18.

[0215] Referring to FIGs. 18 and 19 showing a case 10 and an outer case 80', the outer case of the embodiment shown in FIG. 18 is characterized in that the width of a bent part 82' is constant, rather than being increased, compared to the embodiment shown in FIG. 5. Hereinafter, with regard to any component of the outer case according to the other embodiment of the present disclosure that is not described in detail, reference may be made to the description of the embodiment shown in FIG. 5.

[0216] The outer case 80' may be coupled to the case 10. The outer case 80' may extend to the outside of the case 10. The outer case 80' may be separable from the case 10. Since the side surface of the case 10 is inclined inward as it goes backward, a bracket 70 may be further included in order to connect the outer case, which extends in a direction parallel to the front surface of the case 10, to the case 10.

[0217] The bracket 70 may include an inner bracket 71 coupled to the case 10 and an outer bracket 72 coupled to the coupling part. The bracket 70 may have a rectangular ring shape in which spaces 713 and 723 through which the refrigerant pipe and drain pipe pass are defined.

[0218] The inner bracket 71 may include a wave structure 711 corresponding to the grille of the case 10 and an inner connector 712 coupled to the outer bracket 72. The outer bracket 72 may include an outer connector 722 coupled to the coupling part.

[0219] The drain assembly 80 may include a coupling part 81', a bent part 82', an extension part 83', and a fixing part 84'.

[0220] The coupling part 81' may be connected to the case 10. The coupling part 81' may be connected to the outer bracket 72. The coupling part 81' may extend to the outside of the case 10. The coupling part 81' may extend from the case 10 in the horizontal direction.

[0221] The coupling part 81' may have a rectangular column shape. The coupling part 81' may have a space defined therein. The coupling part 81' may extend in the horizontal direction. The coupling part 81' may include a front coupling part 811' and a rear coupling part 812'. The front coupling part 811' may have a rectangular column shape having an open rear side. The rear coupling part 812' may have a rectangular column shape having an open front side.

[0222] The front coupling part 811' and the rear coupling part 812' may be coupled to each other so that a space is defined between the front coupling part 811' and the rear coupling part 812'. The front coupling part 811' and the rear coupling part 812' may be coupled to each other through various coupling methods. The disclosure is not limited to any specific coupling method.

[0223] For example, the front coupling part 811' may include a front-coupling front surface 8111, a front-coupling upper surface 8112, and a front-coupling lower surface 8113.

[0224] The front-coupling front surface 8111 interconnects the front-coupling upper surface 8112 and the front-coupling lower surface 8113, which are spaced apart from each other. The front-coupling front surface 8111 interconnects the front end of the front-coupling upper surface 8112 and the front end of the front-coupling lower surface 8113.

[0225] The front-coupling upper surface 8112 may extend parallel to the front-coupling lower surface 8113, and may extend in a direction intersecting the front-coupling front surface 8111. The length of the front-coupling upper surface 8112 may be shorter than the lengths of the front-coupling lower surface 8113 and the front-coupling front surface 8111.

[0226] An upper opening 8115 may be formed in one end of the front-coupling upper surface 8112 so as to vertically overlap the front-coupling lower surface 8113. The upper opening 8115 provides a space through which the refrigerant pipe and the drain pipe pass.

[0227] A side opening 8114 of the front coupling part 811' may be covered by a coupling cover 828.

[0228] The rear coupling part 812' may include a rear-coupling rear surface 8121, a rear-coupling upper surface 8122, and a rear-coupling lower surface 8123.

[0229] The rear-coupling rear surface 8121 interconnects the rear-coupling upper surface 8122 and the rear-coupling lower surface 8123, which are spaced apart from each other. The rear-coupling rear surface 8121 interconnects the rear end of the rear-coupling upper surface 8122 and the rear end of the rear-coupling lower surface 8123.

[0230] The rear-coupling upper surface 8122 may extend parallel to the rear-coupling lower surface 8123, and may extend in a direction intersecting the rear-coupling rear surface. The length of the rear-coupling upper surface 8122 may be equal to the length of the rear-coupling lower surface 8123.

[0231] The lengths of the rear-coupling upper surface 8122, the rear-coupling lower surface 8123, and the rear-coupling rear surface may be shorter than the lengths of the front-coupling front surface 8111 and the front-coupling lower surface, and may be equal to the length of the front-coupling upper surface 8112.

[0232] The rear-coupling upper surface 8122, the rear-coupling lower surface 8123, and the rear-coupling rear surface may include a plurality of grooves 8125 formed

therein in order to increase the rigidity thereof. The grooves may extend in the longitudinal direction of the rear coupling part 812'.

[0233] The front-coupling upper surface 8112 and the front-coupling lower surface 8113 may include coupling hooks 8116 protruding therefrom. The coupling hooks 8116 may be inserted into the grooves formed in the rear-coupling upper surface 8122 or the rear-coupling lower surface 8123.

[0234] The bent part 82' connects the coupling part 81' to the extension part 83'. The bent part 82' may be separable from the coupling part 81' and the extension part 83'. The bent part 82' may include a portion extending in a direction parallel to the coupling part 81' and a portion extending in a direction intersecting the coupling part 81'.

[0235] The bent part 82' accommodates the pump and the water container. The detailed structure of the bent part 82' will be described later.

[0236] The extension part 83' may be connected to the bent part 82'. The extension part 83' may extend in the upward-downward direction. The extension part 83' may extend upward from the bent part 82'. The extension part 83' may include a front extension part 831' and a rear extension part 832'.

[0237] The front extension part 831' may have a rectangular column shape having an open rear side. The rear extension part 832' may have a rectangular column shape having an open front side. The front extension part 831' and the rear extension part 832' may be coupled to each other through various coupling methods. The disclosure is not limited to any specific coupling method.

[0238] For example, the front extension part 831' may include a front-extension front surface 8311, a front-extension left surface 8313, and a front-extension right surface 8312.

[0239] The front-extension front surface 8311 interconnects the front-extension left surface 8313 and the front-extension right surface 8312, which are spaced apart from each other. The front-extension front surface 8311 interconnects the front end of the front-extension left surface 8313 and the front end of the front-extension right surface 8312.

[0240] The front-extension left surface 8313 may extend parallel to the front-extension right surface 8312, and may extend in a direction intersecting the front-extension front surface 8311.

[0241] The rear extension part 832' may include a rear-extension rear surface 8321, a rear-extension left surface 8323, and a rear-extension right surface 8322.

[0242] The rear-extension rear surface 8321 interconnects the rear-extension left surface 8323 and the rear-extension right surface 8322, which are spaced apart from each other. The rear-extension rear surface 8321 interconnects the rear end of the rear-extension left surface 8323 and the rear end of the rear-extension right surface 8322.

[0243] The rear-extension left surface 8323 may extend parallel to the rear-extension right surface 8322, and may extend in a direction intersecting the rear-extension rear surface.

[0244] The lengths of the rear-extension left surface 8323, the rear-extension right surface 8322, and the rear-extension rear surface may be shorter than the lengths of the front-extension front surface 8311, the front-extension left surface 8313, and the front-extension right surface 8312. That is, the length of the front extension part 831' may be longer than the length of the rear extension part 832'.

[0245] A space created by the difference in length between the front extension part 831' and the rear extension part 832' may be covered by the fixing part 84' to be described later. The fixing part 84' may cover the upper ends of the front extension part 831' and the rear extension part 832' and the rear side of the upper end of the front extension part 831'.

[0246] The rear-extension left surface 8323, the rear-extension right surface 8322, and the rear-extension rear surface 8321 may include a plurality of grooves 8325 formed therein in order to increase the rigidity thereof. The grooves may extend in the longitudinal direction of the rear extension part 832'.

[0247] The front-extension left surface 8313 and the front-extension right surface 8312 may include extension hooks 8316 protruding therefrom. The extension hooks 8316 may be inserted into the grooves formed in the rear-extension left surface 8323 or the rear-extension right surface 8322.

[0248] A space defined between the front extension part 831' and the rear extension part 832' may be connected to the upper opening 8115.

[0249] The fixing part 84' may be coupled to an end portion of the extension part 83'. The fixing part 84' may cover the upper end and a portion of the rear side of the extension part 83', and may be fixed to a wall.

[0250] For example, the fixing part 84' may include an upper-end cover 844 covering the upper end of the extension part 83' and a fixing plate 8431 extending in a direction intersecting the upper-end cover 844.

[0251] The fixing plate 8431 may be fixed to a wall by means of a screw 847. The fixing plate 8431 may have formed therein a through-hole 846 through which the screw 847 passes.

[0252] The fixing plate 8431 may cover the rear side of a portion of the upper end of the front extension part 831'. The fixing plate 8431 may further include a drain hole 845 formed therein to allow the drain pipe to pass therethrough. The drain hole 845 is located so as to overlap the front extension part 831' in the forward-backward direction.

[0253] Hereinafter, the bent part will be described in detail. FIG. 20 is a perspective view of the bent part shown in FIG. 19, and FIG. 21 is a cross-sectional view of the bent part shown in FIG. 20.

[0254] Referring to FIGs. 20 and 21, the bent part 82' may include a horizontally bent part 823 and a vertically bent part 824.

[0255] The horizontally bent part extends in the longitudinal direction of the coupling part 81'. The horizontally bent part 823 may extend in the horizontal direction. The horizontally bent part 823 may be formed to have an open front side. The horizontally bent part 823 may be fitted into the coupling part 81'.

[0256] The horizontally bent part 823 may include a horizontally-bent rear surface 8233, a horizontally-bent upper surface 8232, and a horizontally-bent lower surface 8231. The horizontally-bent upper surface 8232 and the horizontally-bent lower surface 8231 are spaced apart from each other in the upward-downward direction, and the horizontally-bent rear surface 8233 interconnects the rear end of the horizontally-bent upper surface 8232 and the rear end of the horizontally-bent lower surface 8231. A horizontal receiving portion 8234 is formed between the horizontally-bent upper surface 8232 and the horizontally-bent lower surface 8231.

[0257] The width of the horizontally-bent upper surface 8232 may be shorter than the width of the horizontally-bent lower surface 8231, and the length of the horizontally-bent upper surface 8232 may be shorter than the length of the horizontally-bent lower surface 8231. A rail 8236 may be formed on the horizontally-bent lower surface 8231 in order to guide sliding movement of the water container.

[0258] The difference in width and length between the horizontally-bent upper surface 8232 and the horizontally-bent lower surface 8231 makes it easy to assemble the water container and the pump, which will be described later.

[0259] The vertically bent part 824 extends in the longitudinal direction of the extension part 83'. The vertically bent part 824 may extend in the vertical direction. The vertically bent part 824 may be formed to have an open front side. The vertically bent part 824 may be fitted into the lower end of the extension part 83'.

[0260] The vertically bent part 824 may include a vertically-bent left surface 8241, a vertically-bent right surface 8242, and a vertically-bent rear surface 8243. The vertically-bent left surface 8241 and the vertically-bent right surface 8242 are spaced apart from each other in the leftward-rightward direction, and the vertically-bent rear surface 8243 interconnects the rear end of the vertically-bent left surface 8241 and the rear end of the vertically-bent right surface 8242. A vertical receiving portion 8244 is formed between the vertically-bent left surface 8241 and the vertically-bent right surface 8242.

[0261] The width of the vertically-bent right surface 8242 may be shorter than the width of the vertically-bent left surface 8241, and the length of the vertically-bent right surface 8242 may be shorter than the length of the vertically-bent left surface 8241. The vertically-bent left surface 8241 is connected to the horizontally-bent lower surface 8231, the vertically-bent right surface 8242 is connected to the horizontally-bent upper surface 8232, and the vertically-bent rear surface 8243 is connected to the horizontally-bent rear surface 8233.

[0262] The vertically-bent rear surface 8243 and the horizontally-bent rear surface 8233 may have formed therein screw holes 825 through which screws pass.

[0263] FIG. 22 is a perspective view showing a state in which the water container and the pump are separated from the outer case shown in FIG. 18, and FIG. 23 is a perspective view showing a state in which the water container and the pump are coupled to the outer case shown in FIG. 22.

[0264] Referring to FIGs. 22 and 23, the drain pipe 85 extends in the horizontal direction within the coupling part 81', is bent within the bent part 82', and extends in the vertical direction within the extension part 83'.

[0265] The refrigerant pipe 89 may extend in the horizontal direction within the coupling part 81'. The refrigerant pipe 89 may be bent within the bent part 82'. The refrigerant pipe 89 may extend upward along the extension part 83'.

[0266] The water container 86' may be connected to the drain pipe 85. The water container 86' may be disposed in the bent part 82'. Condensed water flowing in the drain pipe 85 may be stored in the water container 86'.

[0267] The water container 86' may include a housing 861. A space 864 in which condensed water is stored may be defined in the housing 861. The water container 86' may include a water inlet port 863. The water inlet port 863 may protrude to the outside of the housing 861. The drain pipe 85 may be connected to the water inlet port 863.

[0268] The water container 86' is accommodated in the horizontally bent part 823. The water container 86' may further include a sliding protrusion 869 that is slidably coupled to the rail 8236 on the horizontally-bent lower surface 8231. The sliding protrusion 869 is coupled to the rail 8236.

[0269] The horizontally-bent lower surface 8231 may include a screw-fixing portion 826 into which a screw penetrating the water container 86' is fastened.

[0270] The pump 88' may be disposed in the bent part 82'. The pump 88' may be located in the vertically bent part 824. Since the pump 88' is accommodated in the vertically bent part 824 and the water container 86' is accommodated in the horizontally bent part 823, there is no need to increase the thickness of the case in order to accommodate the water container 86' and the pump 88', and thus the case may have a slim structure.

[0271] The pump 88' may be connected to the water container 86'. The pump 88' may extract condensed water stored in the water container 86'. The pump 88' may extract condensed water stored in the water container 86' toward the extension part 83'.

[0272] The pump 88' may be accommodated in a pump bracket 889. The pump bracket 889 may be coupled to the left end of the water container 86'.

[0273] Preferably, the pump 88' and the pump bracket 889 may extend in the vertical direction, and the water container 86' may extend in the horizontal direction, whereby the efficiency of use of the inner space in the

bent part 82' may be maximized.

[0274] FIG. 24 is a perspective view showing a state in which the water container and the pump shown in FIG. 22 are separated from each other, and FIG. 25 is a plan view of the water container shown in FIG. 24.

[0275] Referring to FIGs. 24 and 25, a pump inlet pipe 881' may connect the water container 86' to the pump 88'. The pump inlet pipe 881' may extend downward from the lower end of the pump 88'. Condensed water stored in the water container 86' may flow into the pump 88' through the pump inlet pipe 881'.

[0276] A pump outlet pipe 882' may extend laterally from the pump 88'. The pump outlet pipe 882' may extend rightward from the right end of the pump 88'. The pump outlet pipe 882' may extend from the side surface of the pump 88' toward the air conditioner 1. Condensed water extracted by the pump 88' may flow upward through the pump outlet pipe 882'.

[0277] Preferably, a pump drain pipe 883 may be connected to one end of the pump outlet pipe 882'. The pump drain pipe 883 guides the condensed water discharged from the pump outlet pipe 882' to the outside. The other end of the pump drain pipe 883 may be connected to the outside.

[0278] A portion of the pump drain pipe 883 may be located above the water container 86', and may be located in the bent part 82'. The other portion of the pump drain pipe 883 is located in the extension part 83'.

[0279] The pump drain pipe 883 may extend rightward, may change in direction so as to extend leftward, and then may change in direction so as to extend upward.

[0280] The pump bracket 889 may include a bracket screw portion 889a to which a screw to be fastened into a screw hole 867 in the water container 86' is coupled. The pump bracket 889 may further include a washer 868 that absorbs vibration when the pump 88' is coupled to the pump bracket 889.

[0281] FIG. 26 is a perspective view of an indoor unit and an outer case according to still another embodiment of the present disclosure, and FIG. 27 is an exploded view of the outer case shown in FIG. 26.

[0282] Referring to FIGs. 26 and 27, the outer case according to the still other embodiment is characterized in that the pump 88', the water container 86', the bent part 82', the extension part 83', and the fixing part 84' are eliminated and a coupling part 81" has a different structure from the embodiment shown in FIG. 18. Hereinafter, with regard to any component of the outer case according to the still other embodiment of the present disclosure that is not described in detail, reference may be made to the description of the embodiment shown in FIG. 18.

[0283] The outer case according to the still other embodiment relates to a structure of the drain assembly 80 that does not require a pump.

[0284] The coupling part 81" may include a front coupling part 811" and a rear coupling part 812". The front coupling part 811" may have a rectangular column shape having an open rear side. The rear coupling part 812" may have a rectangular column shape having an open front side.

[0285] The length of the front coupling part 811" and the length of the rear coupling part 812" may be equal to each other. A side opening 8114" of the coupling part 81" may be covered by a coupling cover 828'.

[0286] The coupling cover 828' may have formed therein a through-hole 8281 through which the drain pipe and the refrigerant pipe pass.

[0287] As is apparent from the above description, according to at least one of embodiments of the present disclosure, since the outer case in which the refrigerant pipe and the drain pipe are accommodated is provided, the refrigerant pipe and the drain pipe may be easily managed.

[0288] According to at least one of embodiments of the present disclosure, since the refrigerant pipe and the drain pipe are disposed in the same space, the space in the indoor unit may be efficiently used.

[0289] According to at least one of embodiments of the present disclosure, since the refrigerant pipe is disposed outside the case, it may be easy to inject refrigerant into a heat exchanger or to suction refrigerant from the heat exchanger.

[0290] According to at least one of embodiments of the present disclosure, since the drain pipe is disposed outside the case, it may be possible to easily discharge condensed water generated in the case to the outside of the case.

[0291] According to at least one of embodiments of the present disclosure, since the pump is disposed outside the case, the inner space in the indoor unit may be widened.

[0292] According to at least one of embodiments of the present disclosure, since the separate outer case is coupled to the case, the rigidity of the case may be increased.

[0293] The effects of the present disclosure are not limited to the above-described effects, and other effects not mentioned herein may be clearly understood by those skilled in the art from the accompanying claims.

[0294] Although the present disclosure has been described with reference to specific embodiments shown in the drawings, it is apparent to those skilled in the art that the present description is not limited to those exemplary embodiments and is embodied in many forms without departing from the scope of the present invention, which is described in the following claims. These modifications should not be individually understood from the technical scope of the present disclosure.

[0295] It will be appreciated by those skilled in the art that various modifications and variations can be made in the present disclosure without departing from the scope of the disclosures. Thus, it is intended that the present disclosure covers the modifications and variations of this disclosure provided they come within the scope of the appended claims and their equivalents.

[0296] Certain embodiments or other embodiments of the disclosure described above are not mutually exclu-

sive or distinct from each other. Any or all elements of the embodiments of the disclosure described above may be combined with another or combined with each other in configuration or function.

[0297] For example, a configuration "A" described in one embodiment of the disclosure and/or the drawings and a configuration "B" described in another embodiment of the disclosure and/or the drawings may be combined with each other. Namely, although the combination between the configurations is not directly described, the combination is possible except in the case where it is described that the combination is impossible.

[0298] The above detailed description is not intended to be construed to limit the disclosure in all aspects and to be considered by way of example. The scope of the disclosure should be determined by reasonable interpretation of the appended claims and all equivalent modifications made without departing from the disclosure should be included in the following claims.

Claims

1. An air conditioner comprising:

a case (10);
a heat exchanger (50) disposed in the case (10);
a drain pan (52) disposed below the heat exchanger (50);
a drain pipe (85) connected to the drain pan (52) and extending to an outside of the case (10) through an outer wall of the case (10);
a drain assembly (80) extending in a direction away from the case (10) to accommodate the drain pipe (85) therein; and
a pump (88) disposed in the drain assembly (80) and connected to the drain pipe (85).

2. The air conditioner according to claim 1, wherein the case (10) comprises a side frame (11) spaced apart from one side of the heat exchanger (50), and
wherein the drain assembly (80) is coupled to a lower portion of the side frame (11).

3. The air conditioner according to claim 1 or 2, wherein the drain assembly (80) is separably coupled to the case (10), wherein the drain assembly (80) comprises:

a coupling part (81) coupled to the case (10) and extending in a direction away from the case (10);
a bent part (821) connected to the coupling part (81) and bent in a direction intersecting the coupling part (81); and
an extension part (83) connected to the bent part (821) and extending in the direction intersecting the coupling part (81).

4. The air conditioner according to any one of the proceeding claims, further comprising a water container (86) disposed in the drain assembly (80) and connected to the drain pipe (85), wherein the pump (88) is disposed in the water container (86).

5. The air conditioner according to any one of the proceeding claims, wherein the drain assembly (80) comprises:

a coupling part (81) coupled to the case (10) and extending in a direction away from the case (10); and
a bent part bent (821) in a direction intersecting the coupling part (81), and
wherein the pump (88) is disposed in the bent part (821).

6. The air conditioner according to claim 5, wherein the drain assembly (80) comprises an extension part (83) extending upward from the bent part (821), and wherein the pump (88) comprises:

a pump inlet pipe (881') extending toward the coupling part (81); and
a pump outlet pipe (882') extending toward the extension part (83).

7. The air conditioner according to any one of the proceeding claims, further comprising a refrigerant pipe (51) connected to the heat exchanger (50) and extending within the drain assembly (80),

wherein the pump (88) is disposed at a position farther forward than the refrigerant pipe (51), and
wherein the drain assembly (80) comprises a front coupling part (811) formed to be separable forward from the drain assembly (80).

8. The air conditioner according to any one of the proceeding claims, wherein the drain assembly (80) comprises:

a lower wall (802) on which the pump (88) is seated;
a fastening hole (803) formed to be open in the lower wall (802) in an upward-downward direction; and
a fastening member (804) penetrating the pump (88) and the lower wall (801).

9. The air conditioner according to any one of the proceeding claims, further comprising a refrigerant pipe (51) connected to the heat exchanger (50) and extending within the drain assembly (80) while being spaced apart from the drain pipe (85),
wherein the refrigerant pipe (51) is located at a po-

sition farther backward than the drain pipe (85).

10. The air conditioner according to claim 9, comprising a refrigerant pipe connector (892) connected to the heat exchanger (50) and extending within the case (10),
wherein the refrigerant pipe (50) comprises a refrigerant-pipe end portion (891) penetrating an outer wall of the case (10) to be located in the case (10) and to be separably coupled to the refrigerant pipe connector (892).

11. The air conditioner according to claim 9, wherein the case (10) comprises a side frame (11) spaced apart from one side of the heat exchanger (50), and
wherein the refrigerant pipe (51) penetrates the side frame (11) to extend to an inside of the case (10).

12. The air conditioner according to any one of the proceeding claims, further comprising a drain pipe connector (852) connected to the drain pan (52) and extending within the case (10),
wherein the drain pipe (85) comprises a drain-pipe end portion ((51) penetrating an outer wall of the case (10) to be located within the case (10) and to be separably coupled to the drain pipe connector (852).

13. The air conditioner according to any one of the proceeding claims, wherein the case (10) comprises a side frame (11) spaced apart from one side of the heat exchanger (50), and
wherein the drain pipe (85) penetrates the side frame (11) to extend to an inside of the case (10).

14. The air conditioner according to any one of the proceeding claims, further comprising an assembly cover (801) separably coupled to the case (10) to open and close an inside of the drain assembly (80),
,wherein the drain pipe (85) is placed in the drain assembly (88) after the assembly cover (801) is separated from the case (10).

15. The air conditioner according to claim 14, wherein the case (10) comprises a side frame (11) to which the assembly cover (801) is coupled, and
wherein the side frame (11) comprises:

a cover receiving portion (111) surrounding the assembly cover (801);
an upper holder (113) protruding from the cover receiving portion (111) and coupled to an upper portion of the assembly cover (801); and
a lower holder (114) protruding from the cover receiving portion (111) and coupled to a lower portion of the assembly cover (801).

Fig. 1

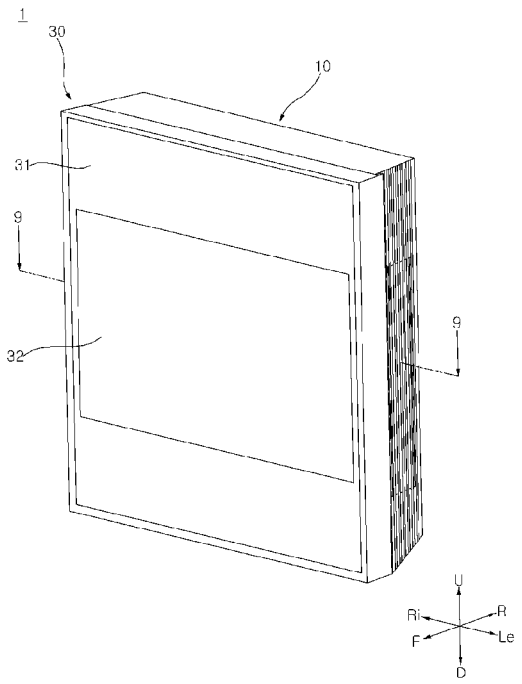


Fig. 2

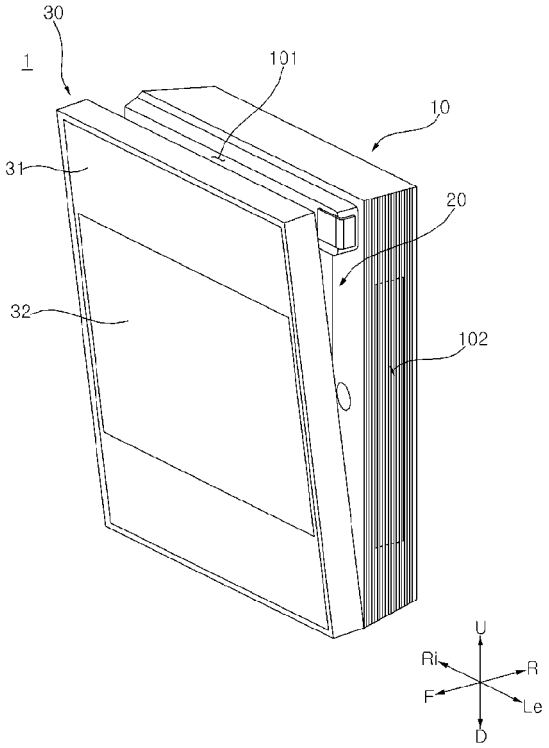


Fig. 3

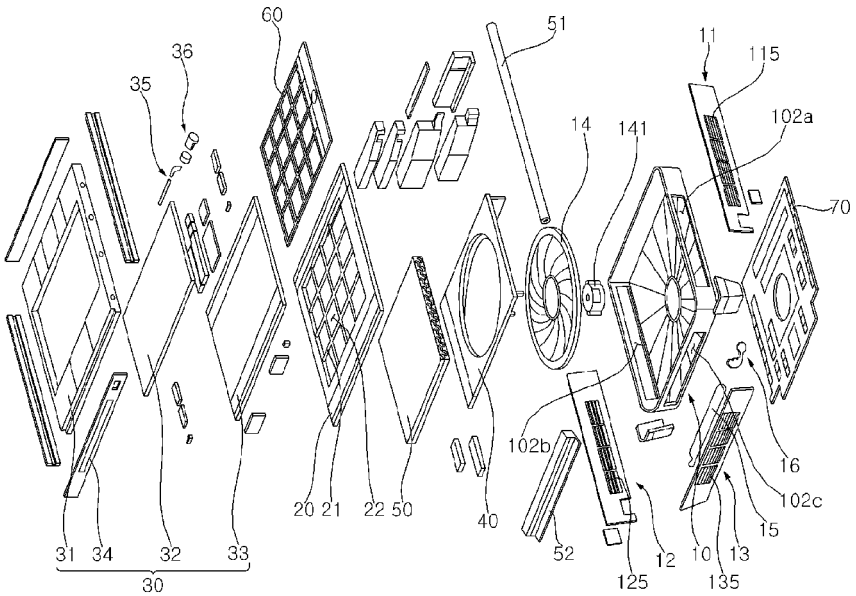


Fig. 4

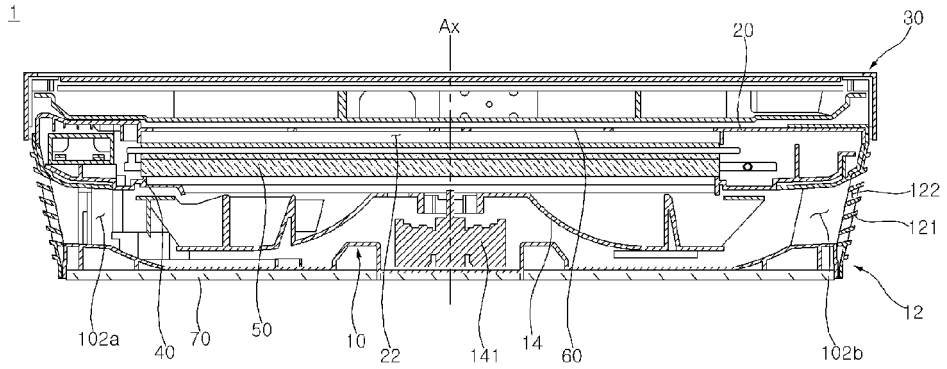


Fig. 5

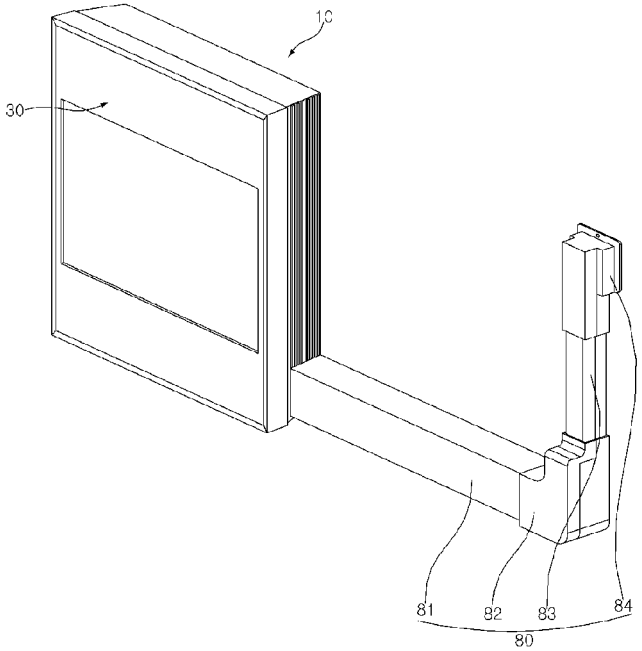


Fig. 6

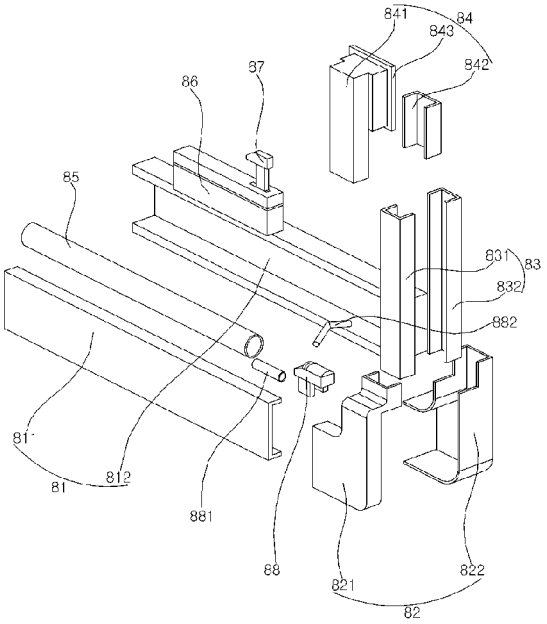


Fig. 7

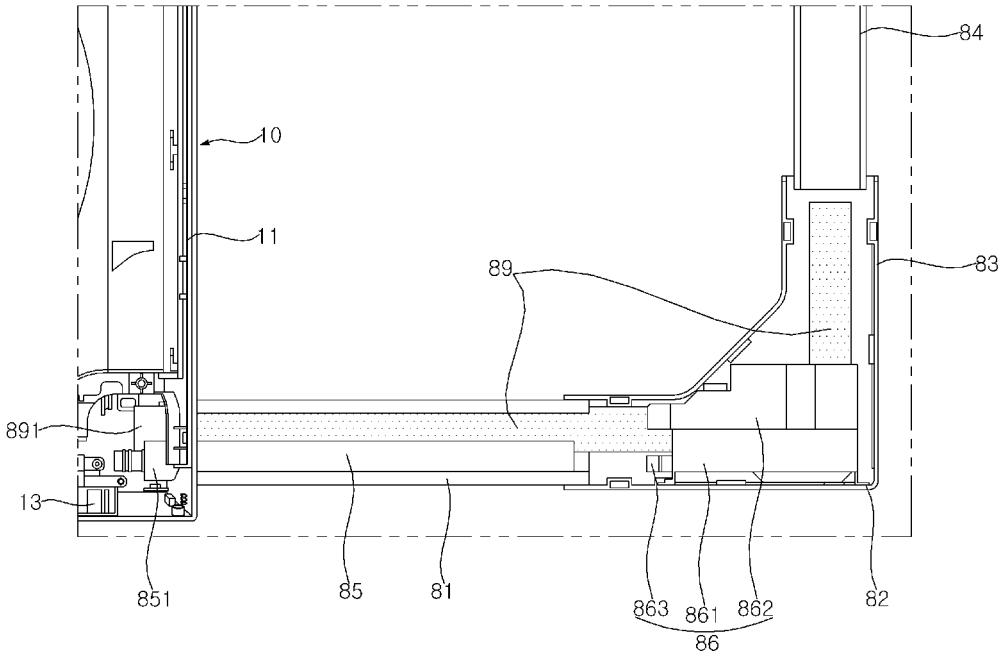

84
10
11
89
83
891
13
851
85
81
863
861
862
82
86

Fig. 8

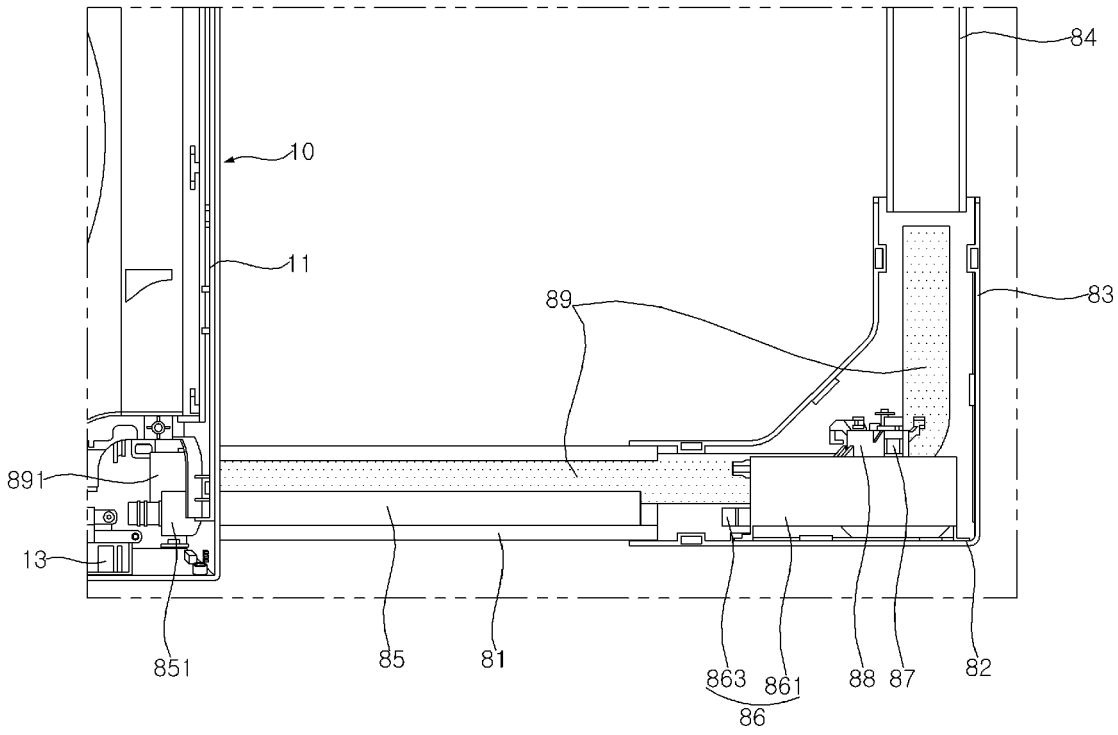

84
10
11
89
83
891
13
851
85
81
863
861
88
87
82
86

Fig. 9

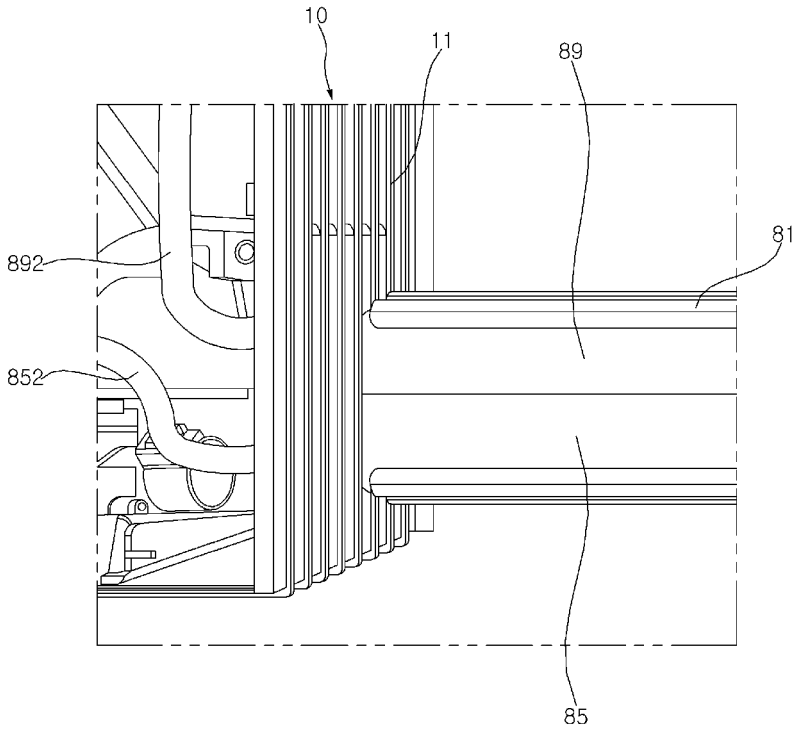


Fig. 10

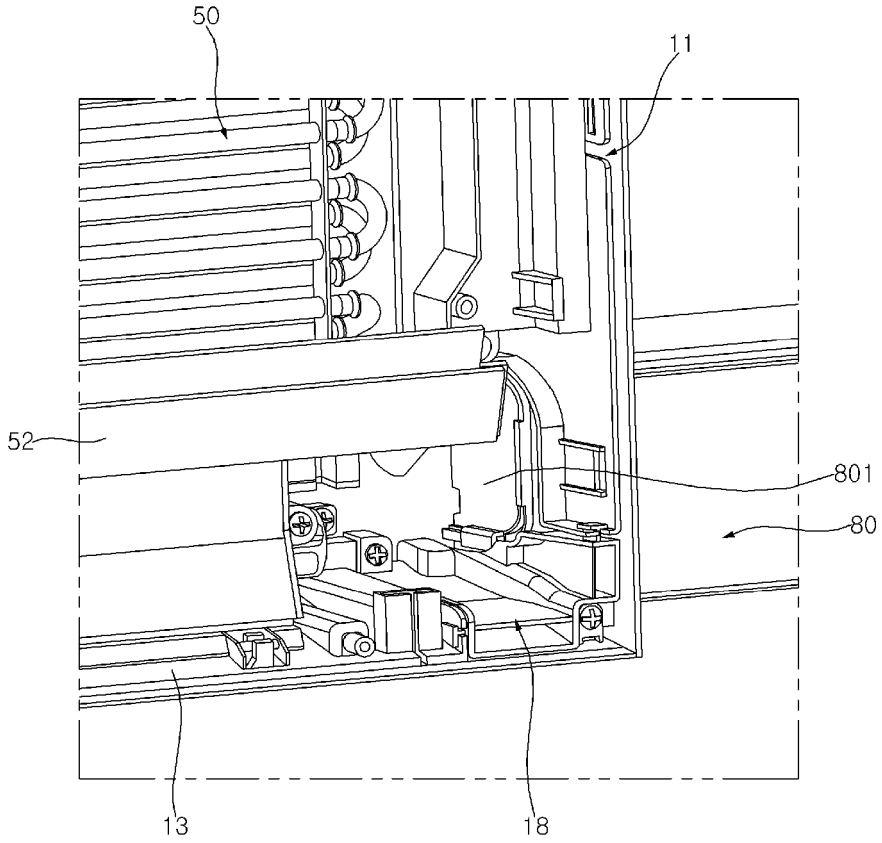


Fig. 11

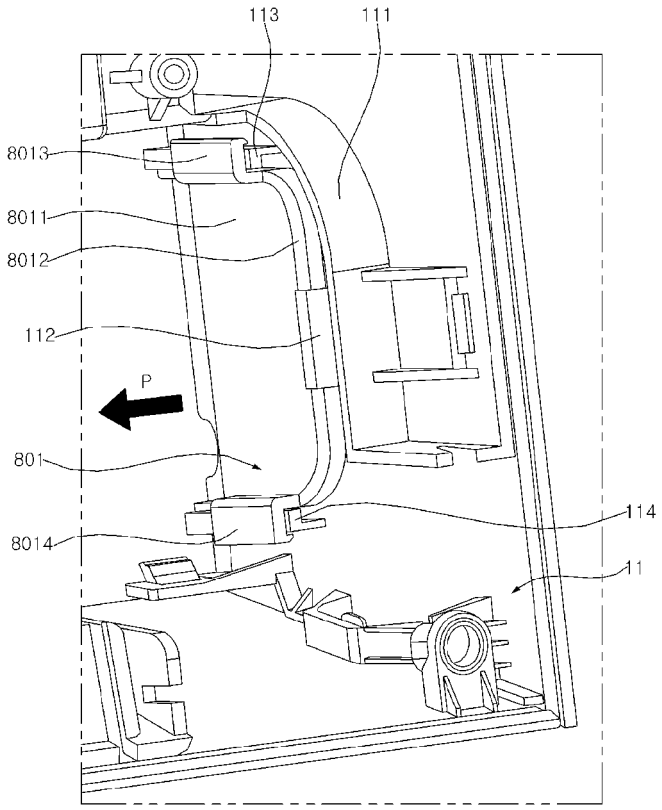

113
111
8013
8011
8012
112
P
801
8014
114
11

Fig. 12

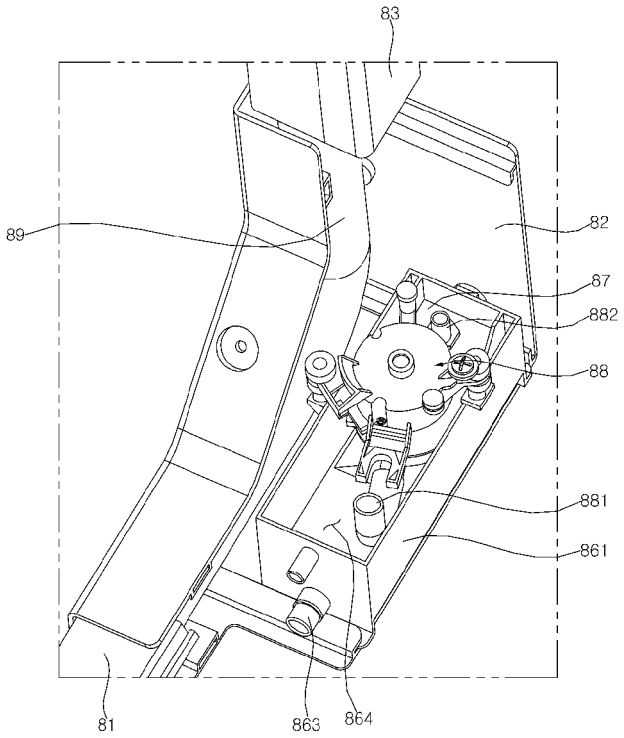

83
89
82
87
882
88
881
861
81
863
864

Fig. 13

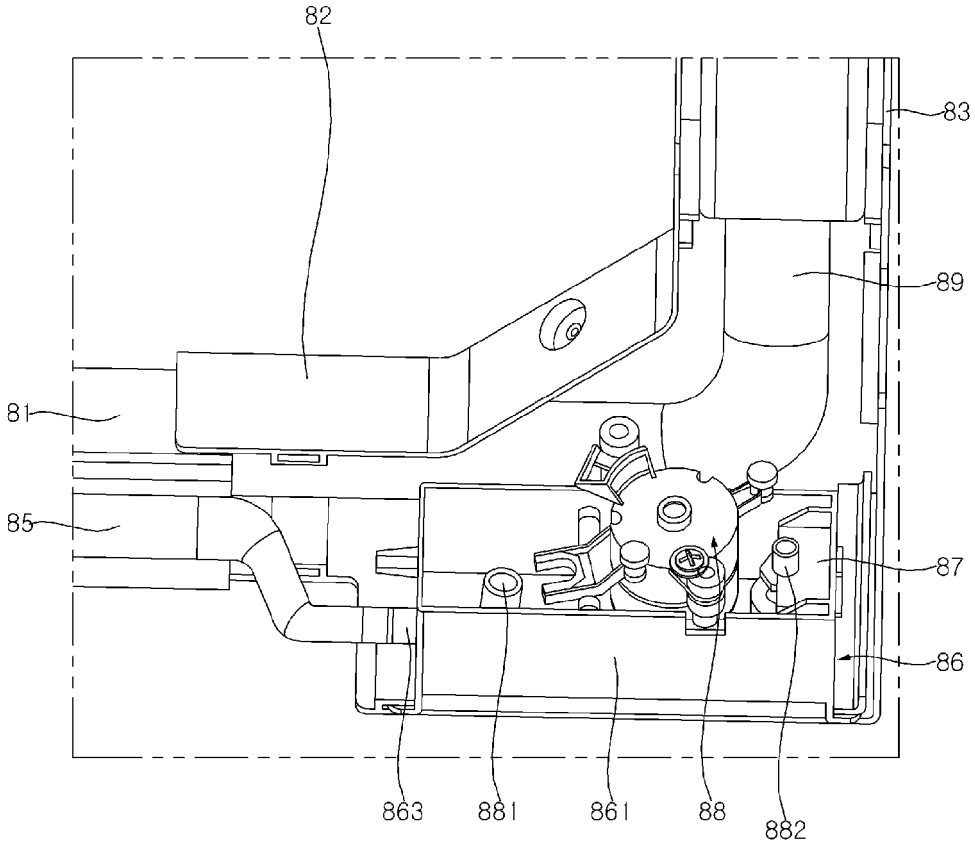

82
83
89
81
85
87
86
863
881
861
88
882

Fig. 14

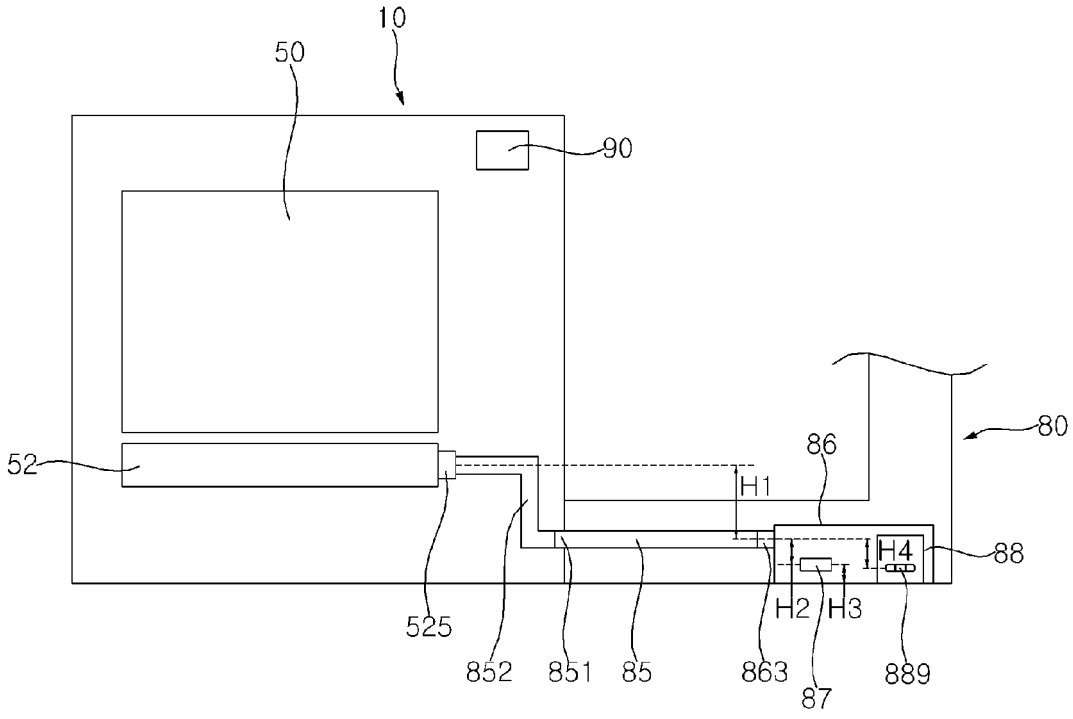

10
50
90
80
52
86
H1
H4
88
H2
H3
525
852
851
85
863
87
889

Fig. 15

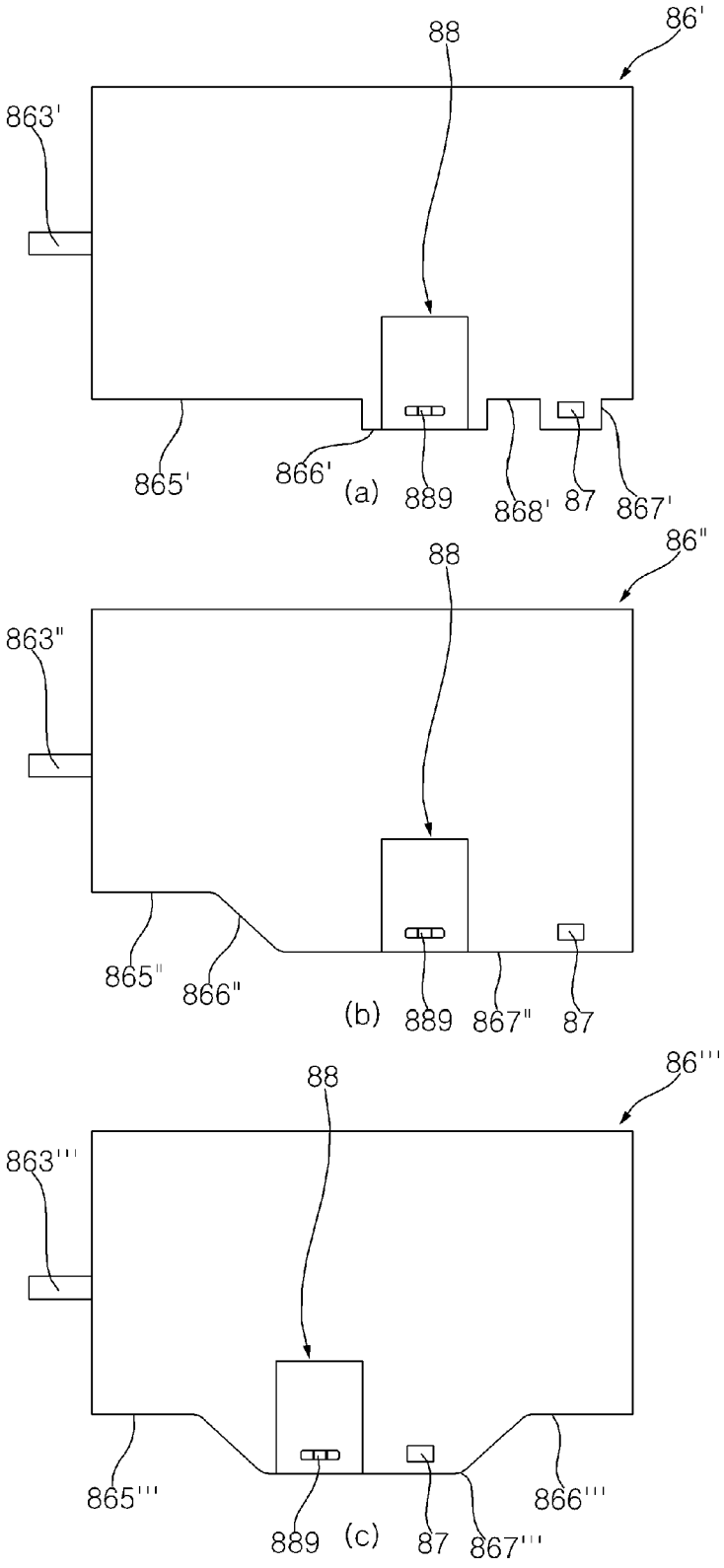

88
86'
863'
865'
866'
(a)
889
868'
87
867'
88
86"
863"
865"
866"
(b)
889
867"
87
88
86'''
863'''
865'''
889
(c)
87
867'''
866'''

Fig. 16

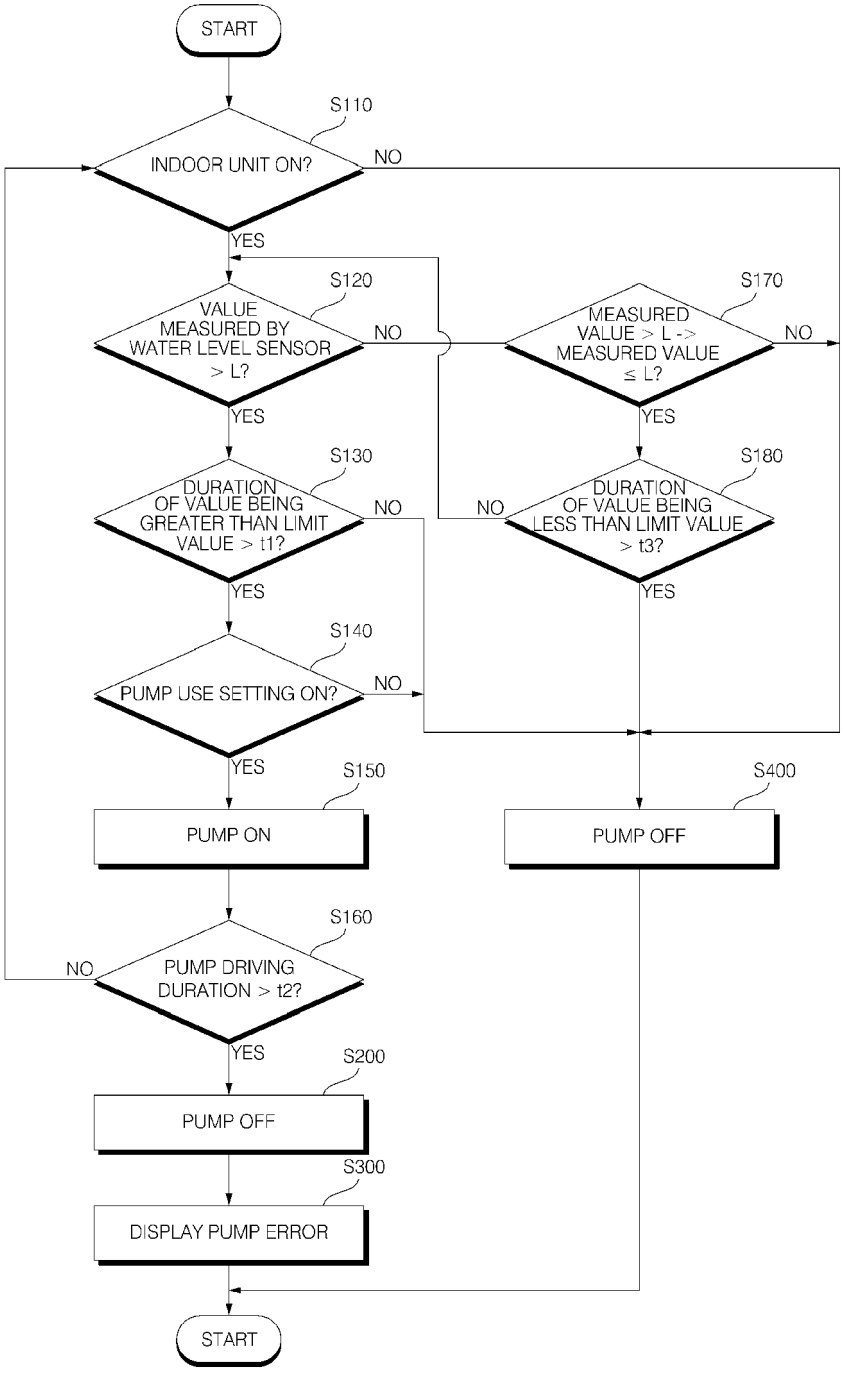

START
S110
INDOOR UNIT ON?
NO
YES
S120
VALUE MEASURED BY WATER LEVEL SENSOR > L?
NO
YES
S130
DURATION OF VALUE BEING GREATER THAN LIMIT VALUE > t1?
NO
YES
S140
PUMP USE SETTING ON?
NO
YES
S150
PUMP ON
S160
PUMP DRIVING DURATION > t2?
NO
YES
S200
PUMP OFF
S300
DISPLAY PUMP ERROR
START
S170
MEASURED VALUE > L -> MEASURED VALUE ≤ L?
NO
YES
S180
DURATION OF VALUE BEING LESS THAN LIMIT VALUE > t3?
NO
YES
S400
PUMP OFF

Fig. 17

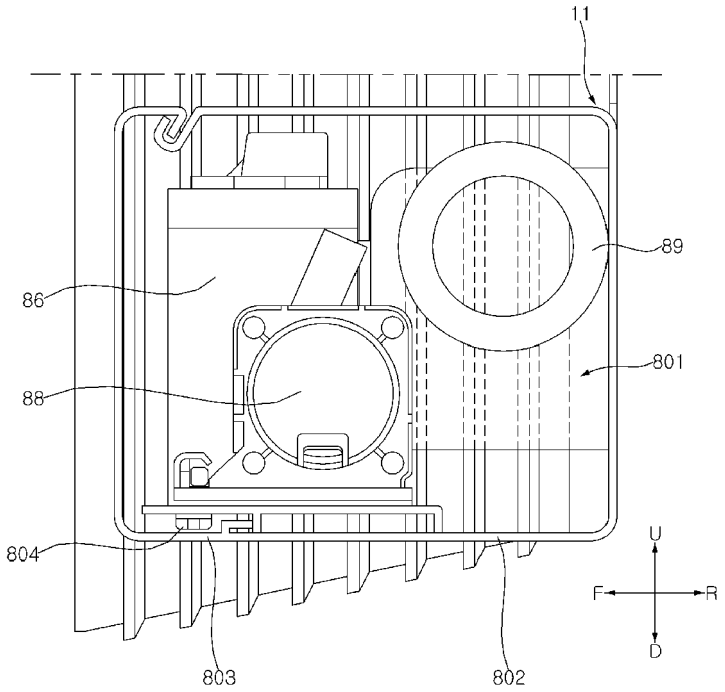


Fig. 18

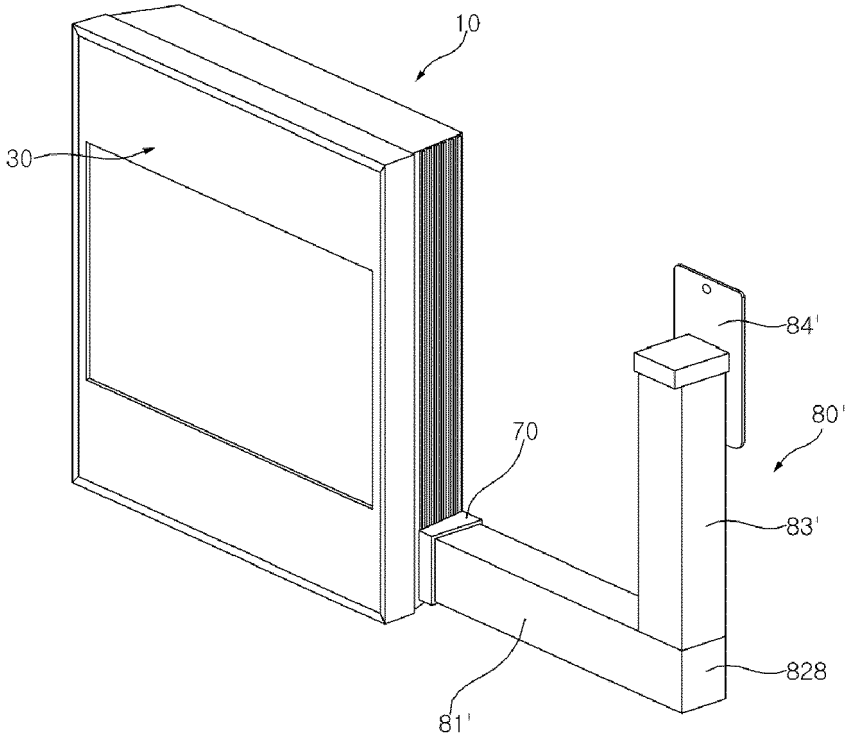


Fig. 19

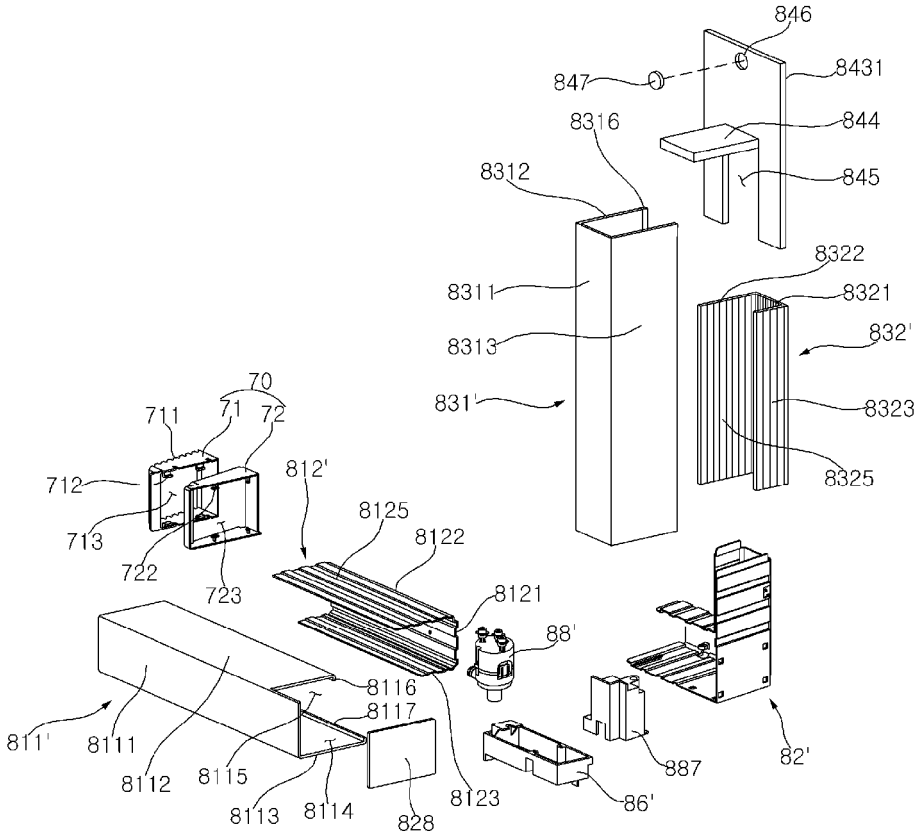

846
847
8431
8316
844
8312
845
8322
8311
8321
8313
832'
831'
8323
8325
70
711
71
72
712
812'
8125
713
8122
722
723
8121
88'
8116
8117
811'
8111
8112
8115
8113
8114
828
8123
887
82'
86'

Fig. 20

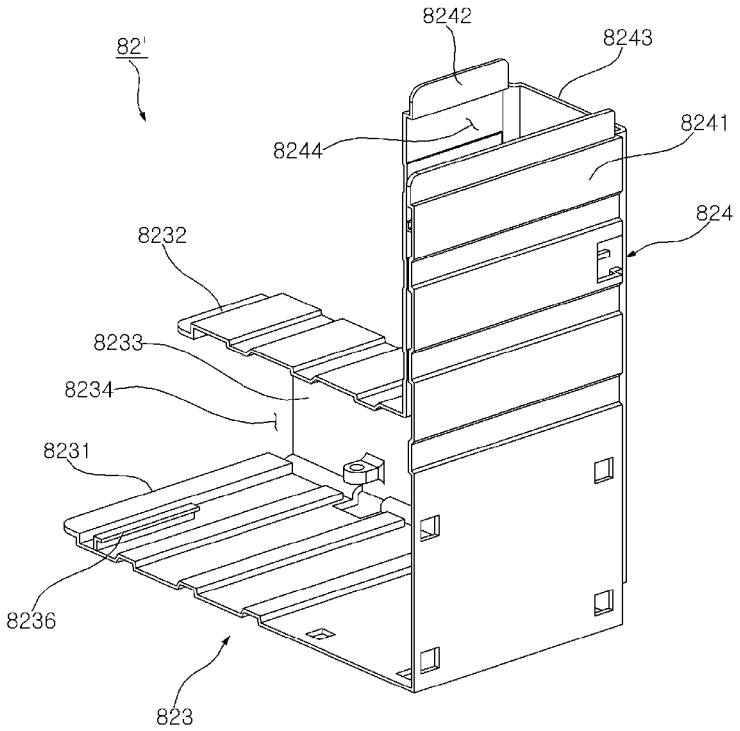

82'
8242
8243
8241
8244
824
8232
8233
8234
8231
8236
823

Fig. 21

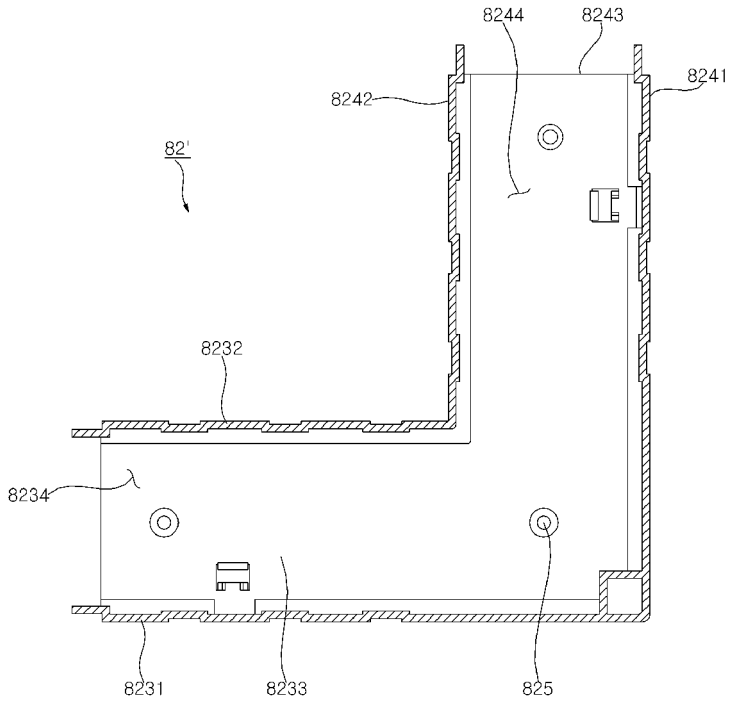

8244
8243
8241
8242
82'
8232
8234
8231
8233
825

Fig. 22

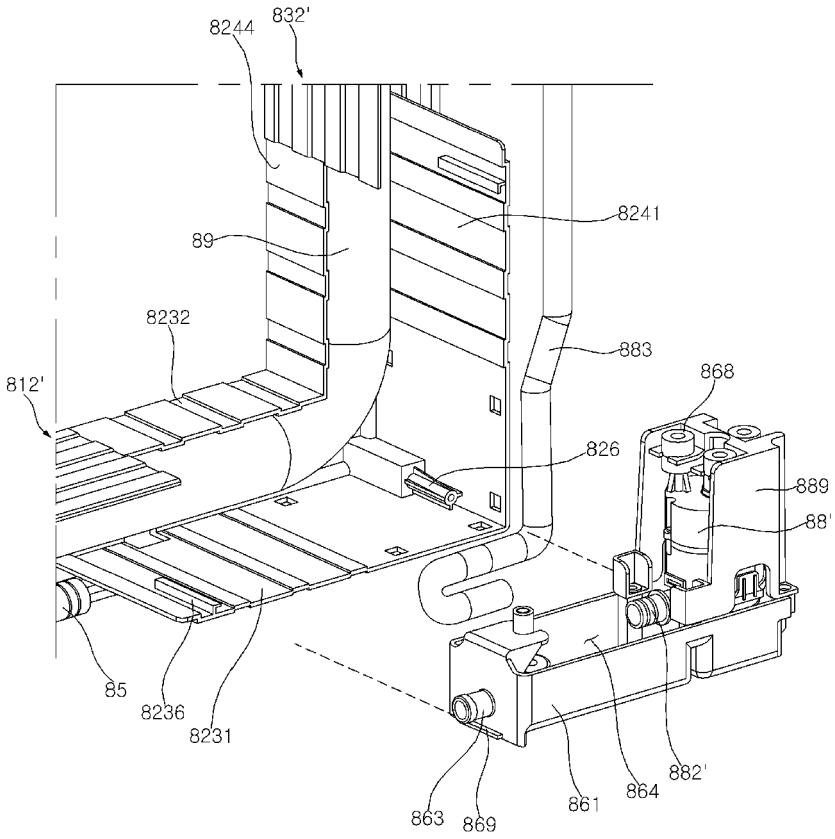

8244
832'
8241
89
8232
883
868
812'
826
889
88'
85
8236
8231
882'
864
861
863
869

Fig. 23

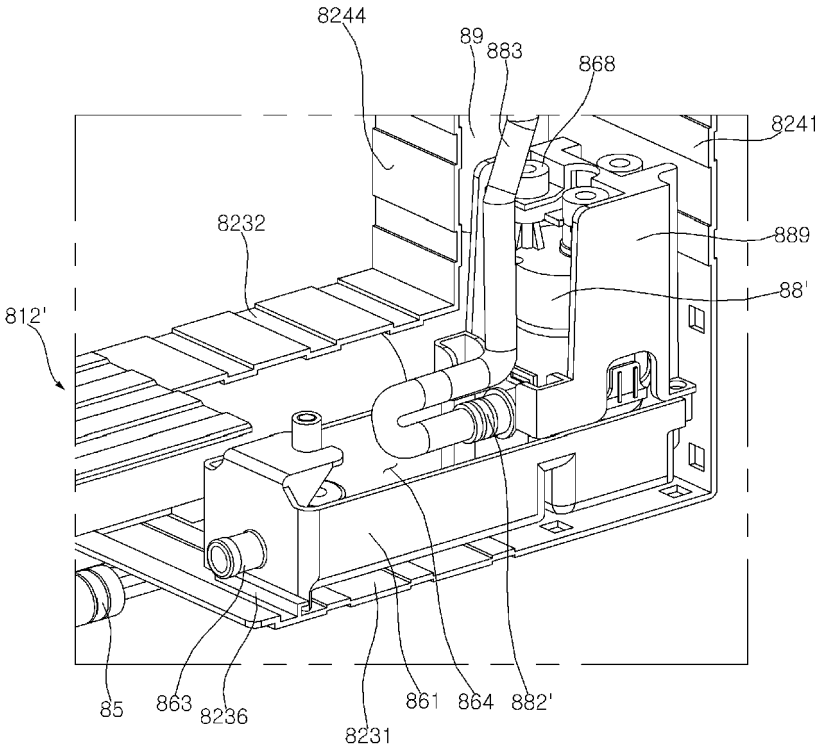

8244
89
883
868
8241
8232
889
88'
812'
85
863
8236
8231
861
864
882'

Fig. 24

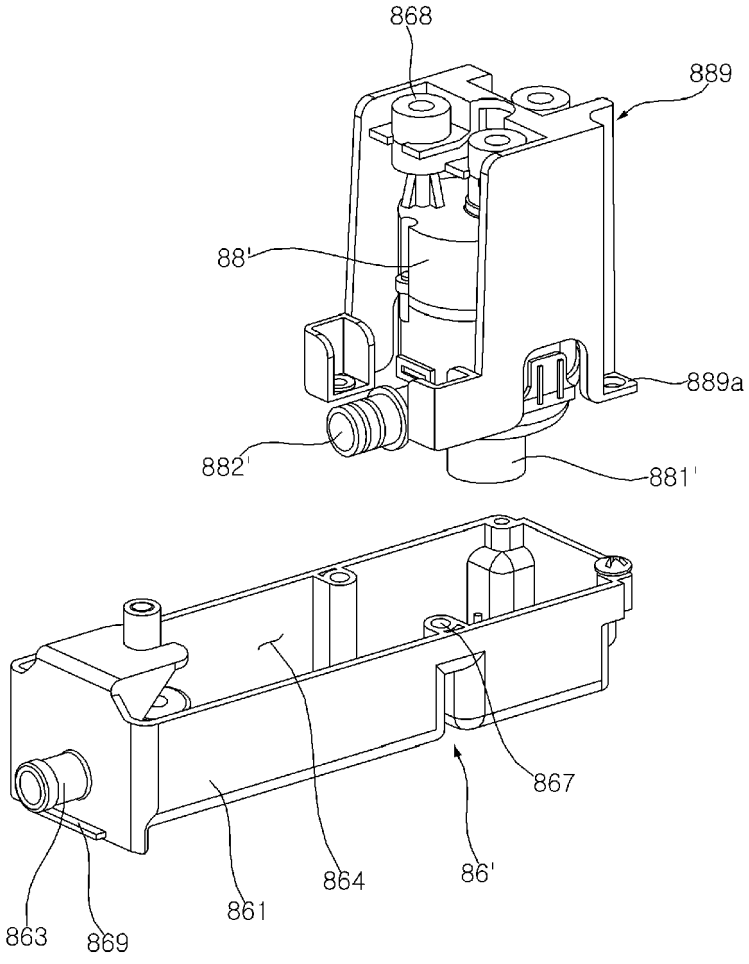

868
889
88'
889a
882'
881'
867
86'
864
861
863
869

Fig. 25

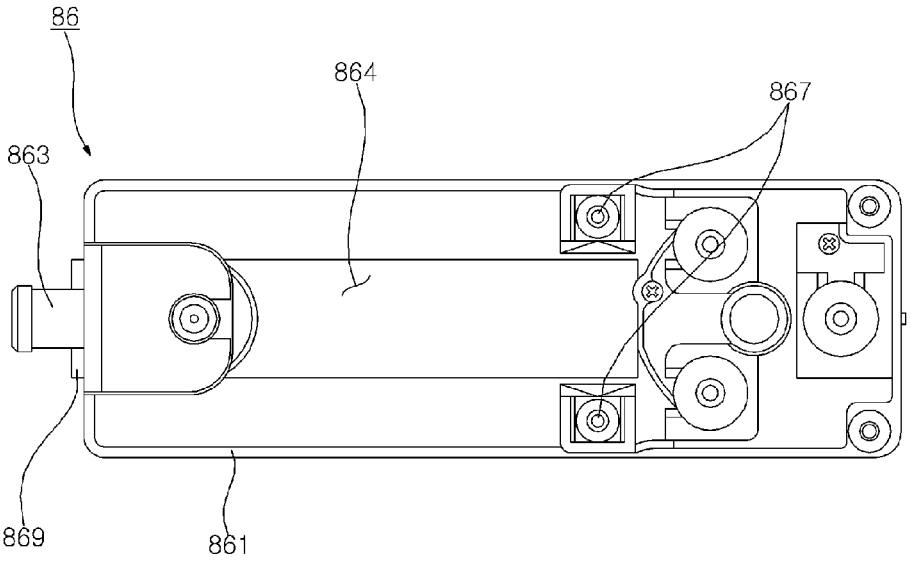


Fig. 26

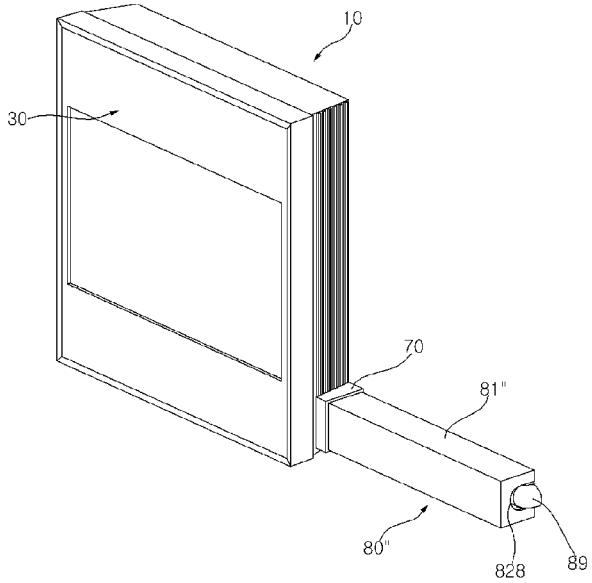
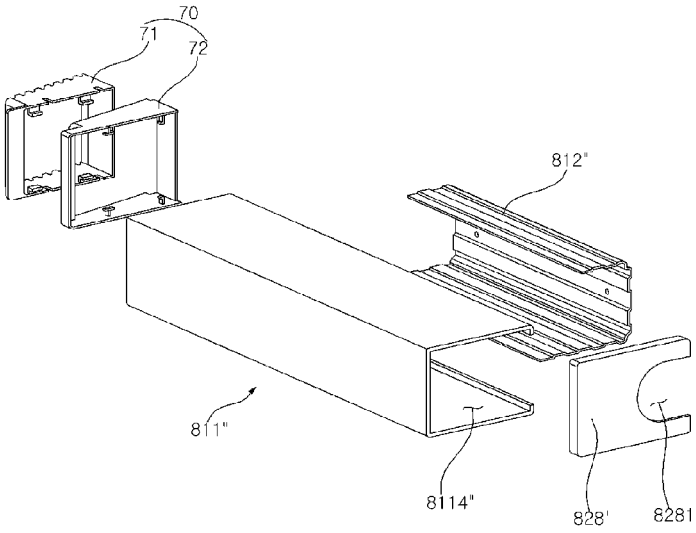


Fig. 27



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 22 0249

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 5 850716 B2 (KUBOTA KK; KUBOTA KUCHO KK) 3 February 2016 (2016-02-03) * paragraphs [0002] - [0072]; figure 6 *	1,2,4, 7-15	INV. F24F1/0057 F24F13/20 F24F13/22
A	JP 2009 063213 A (HITACHI APPLIANCES INC) 26 March 2009 (2009-03-26) * figure 3 *	1-15	
A	CN 101 384 858 A (DAIKIN IND LTD [JP]) 11 March 2009 (2009-03-11) * figures 5,6 *	1-15	
A	CN 110 382 965 A (SHINWA CONTROLS CO LTD) 25 October 2019 (2019-10-25) * figures 1-7 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC) F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 April 2024	Ismail, Youssef

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 22 0249

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-04-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 5850716 B2	03-02-2016	JP 5850716 B2	03-02-2016
		JP 2013108666 A	06-06-2013
JP 2009063213 A	26-03-2009	NONE	
CN 101384858 A	11-03-2009	AU 2007225863 A1	20-09-2007
		CN 101384858 A	11-03-2009
		EP 1995526 A1	26-11-2008
		JP 2007240112 A	20-09-2007
		KR 20080096551 A	30-10-2008
		US 2009084127 A1	02-04-2009
		WO 2007105571 A1	20-09-2007
CN 110382965 A	25-10-2019	CN 110382965 A	25-10-2019
		EP 3587944 A1	01-01-2020
		JP 6215496 B1	18-10-2017
		JP 2018136106 A	30-08-2018
		KR 20190120188 A	23-10-2019
		TW 201831842 A	01-09-2018
		US 2019383502 A1	19-12-2019
		WO 2018154909 A1	30-08-2018

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- KR 1020230068977 **[0001]**
- KR 1020060011656 **[0010]**
- KR 1020160085355 **[0010]**