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(54) ELECTRIC CONTROL COMPONENT FOR OUTDOOR UNIT OF AIR CONDITIONER, OUTDOOR UNIT OF AIR CONDITIONER AND AIR CONDITIONER

(57) An electric control assembly (1) for an outdoor unit (100) of an air conditioner, an outdoor unit (100), and an air conditioner are disclosed. The outdoor unit (100) includes a main control board (2) and a filter board (3) arranged side by side in a horizontal direction. The electric control assembly (1) includes: a wire mounting plate sheet metal (11) located below the main control board (2) and the filter board (3) and provided with a power line terminal block (12); and an electric control board (13) disposed on the wire mounting plate sheet metal (11) and provided with a wiring socket (131) and a signal line terminal block (132). The wiring socket (131), the signal line terminal block (132), and the power line terminal block (12) are arranged sequentially in a direction from the main control board (2) to the filter board (3).

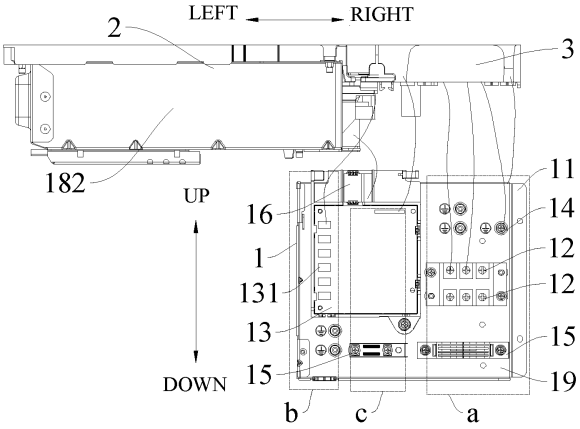

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to of Chinese Patent Application Serial No. 201811051435.3, filed on September 10, 2018, Chinese Patent Application Serial No. 201821480943.9, filed on September 10, 2018, Chinese Patent Application Serial No. 201821480967.4, filed on September 10, 2018, Chinese Patent Application Serial No. 201821480945.8, filed on September 10, 2018, and Chinese Patent Application Serial No. 201821480845.5, filed on September 10, 2018, the entire contents of which are incorporated herein by reference.

FIELD

[0002] The present disclosure relates to a technical field of air conditioners, and more particularly, to an electric control assembly for an outdoor unit of an air conditioner, an outdoor unit of an air conditioner, and an air conditioner.

BACKGROUND

[0003] In the related art, connecting wires in an electric control box assembly are crossed and arranged chaotically, which increase the maintenance difficulty. In addition, during maintenance of an electrical control assembly for an outdoor unit of an air conditioner, at least two side plates of the outdoor unit of the air conditioner need to be detached, which is time-consuming and laborious and makes the maintenance difficult.

SUMMARY

[0004] The present disclosure aims to at least solve one of the technical problems in the related art. To this end, the present disclosure proposes an electric control assembly for an outdoor unit of an air conditioner, and the maintenance difficulty of the electric control assembly is reduced and the maintenance efficiency of the electric control assembly is improved.

[0005] The present disclosure further proposes an outdoor unit of an air conditioner, and the outdoor unit includes the above electric control assembly.

[0006] The present disclosure further proposes an air conditioner, and the air conditioner includes the above outdoor unit.

[0007] For the electric control assembly for the outdoor unit according to embodiments of a first aspect of the present disclosure, the outdoor unit includes a main control board and a filter board arranged side by side in a horizontal direction. The electric control assembly includes: a wire mounting plate sheet metal located below the main control board and the filter board and provided with a power line terminal block; and an electric control board disposed on the wire mounting plate sheet metal and provided with a wiring socket and a signal line terminal block. The wiring socket, the signal line terminal block, and the power line terminal block are arranged sequentially in a direction from the main control board to the filter board.

[0008] Regarding the electric control assembly for the outdoor unit according to the embodiments of the present disclosure, since the wire mounting plate sheet metal is disposed below the main control board and the filter board, and the electric control board is disposed on the wire mounting plate sheet metal, during the maintenance of the electric control assembly, the maintenance operation can be performed by removing only one side plate of the outdoor unit opposite the wire mounting plate sheet metal, thereby avoiding the removal of multiple back plates of the outdoor unit, facilitating the disassembly, and hence lowering the maintenance difficulty of the electric control assembly. In addition, the wiring socket, the signal line terminal block, and the power line terminal block are arranged sequentially in the direction from the main control board to the filter board, such that the connecting wires at the wiring socket and the connecting wires at the power line terminal block are not easy to cross, and the arrangement of the connecting wires becomes more reasonable, which can improve the wiring and maintenance efficiency of the electric control assembly, and reduce the wiring and maintenance costs of the electric control assembly.

[0009] According to some embodiments of the present disclosure, the electric control board and the power line terminal block are arranged sequentially in a direction from the main control board to the filter board.

[0010] According to some embodiments of the present disclosure, the wiring socket is located on a side of the electric control board away from the power line terminal block.

[0011] According to some embodiments of the present disclosure, the signal line terminal block is located on a lower side of the electric control board.

[0012] According to some embodiments of the present disclosure, a plurality of power line terminal blocks is provided and divided into a plurality of groups in which the power line terminal blocks are connected in pairs; in the direction from the main control board to the filter board, the plurality of groups of power line terminal blocks are arranged sequentially.

[0013] According to some embodiments of the present disclosure, two power line terminal blocks in each group of power line terminal blocks are vertically spaced apart from each other.

[0014] According to some embodiments of the present disclosure, the outdoor unit includes a casing, and the electric control assembly includes an electric control component. The electric control component includes: a mounting board disposed in the casing and provided with a maintenance window; a printed circuit board including the main control board and the filter board, the printed

circuit board being disposed on a lower surface of the mounting board and provided with a plurality of electronic elements, wherein pins of at least a part of the electronic elements are disposed just opposite the maintenance window; and a cover plate disposed on the mounting board and configured to open or close the maintenance window.

[0015] According to some embodiments of the present disclosure, the cover plate is detachably disposed on the mounting board.

[0016] According to some embodiments of the present disclosure, a bottom wall of the cover plate is provided with a flexible buffering member.

[0017] According to some embodiments of the present disclosure, the electric control component further includes a reinforcing plate disposed on a top wall of the mounting board.

[0018] According to some embodiments of the present disclosure, the electric control assembly further includes an electric control box. The electric control box includes: an electrically controlled welding member including a bottom plate and a side plate disposed on the bottom plate, an upper end of the side plate being provided with a folding portion folded outwards; and an electrically controlled mounting member connected with the electrically controlled welding member, wherein a mounting space is defined between the electrically controlled mounting member and the electrically controlled welding member. The electrically controlled mounting member has a connecting portion connected with the folding portion, and the connecting portion is provided with a water blocking portion to prevent liquid from entering the mounting space via an assembling gap between the connecting portion and the folding portion.

[0019] According to some embodiments of the present disclosure, the water blocking portion is located outside the folding portion, and the water blocking portion is connected to a lower surface of the connecting portion and extends in an up-down direction.

[0020] According to some embodiments of the present disclosure, the folding portion includes a flat plate portion, the flat plate portion is connected to the upper end of the side plate, and a lower surface of the flat plate portion is higher than a lower end surface of the water blocking portion.

[0021] According to some embodiments of the present disclosure, an outer end of the flat plate portion is provided with a bending portion bent downward.

[0022] According to some embodiments of the present disclosure, a lower end surface of the bending portion is higher than the lower end surface of the water blocking portion.

[0023] According to some embodiments of the present disclosure, a part of the lower surface of the connecting portion is recessed upward to form a recessed groove, so as to form the water blocking portion at an outer end of the connecting portion; a middle portion of the folding portion protrudes upwards to form a protruding portion, and the protruding portion is configured to extend into the recessed groove to be fitted with the recessed groove.

[0024] The outdoor unit according to embodiments of a second aspect of the present disclosure includes a casing; and the above electric control assembly according to the embodiments of the first aspect of the present disclosure, the electric control assembly being disposed in the casing.

[0025] For the outdoor unit according to the embodiments of the present disclosure, since the wire mounting plate sheet metal is disposed below the main control board and the filter board, and the electric control board is disposed on the wire mounting plate sheet metal, during the maintenance of the electric control assembly, the maintenance operation can be performed by removing only one side plate of the outdoor unit opposite the wire mounting plate sheet metal, thereby avoiding the removal of multiple back plates of the outdoor unit, facilitating the disassembly, and hence lowering the maintenance difficulty of the electric control assembly. In addition, the wiring socket, the signal line terminal block, and the power line terminal block are arranged sequentially in the direction from the main control board to the filter board, such that the connecting wires at the wiring socket and the connecting wires at the power line terminal block are not easy to cross, and the arrangement of the connecting wires becomes more reasonable, which can improve the wiring and maintenance efficiency of the electric control assembly, and reduce the wiring and maintenance costs of the electric control assembly.

[0026] According to some embodiments of the present disclosure, the outdoor unit further includes: a middle partition plate disposed in the casing, and configured to partition an interior of the casing into a first chamber and a second chamber, a fan wheel being provided in the first chamber, wherein the electric control assembly includes a wiring component and an electric control component, the wiring component includes a wire mounting plate sheet metal and an electric control board, the wiring component is vertically arranged in the second chamber and located below the electric control component, and a wire body on the electric control component is connected to the wiring component; and an electrically controlled welding member disposed on the top of the middle partition plate, the electric control component being inverted in the electrically controlled welding member and configured to span the first chamber and the second chamber.

[0027] According to some embodiments of the present disclosure, the wiring component is adjacent to a side wall of the casing in a width direction and is parallel to the side wall, and wire bodies on the electric control component are all connected to a side of the wiring component facing the side wall.

[0028] According to some embodiments of the present disclosure, a middle partition plate flange is provided on a side of the middle partition plate in a width direction, the middle partition plate flange is formed with a catch groove, and the wiring component is provided with a

hanger configured to hang in the catch groove.

[0029] According to some embodiments of the present disclosure, the casing includes a side plate, and the side plate has a side plate flange extending toward the middle partition plate. The hanger is disposed on a first end of the wiring component, and a second end of the wiring component is provided with a wiring component flange, the wiring component flange being configured to overlap the side plate flange and be threaded with the side plate flange.

[0030] According to some embodiments of the present disclosure, the electric control component includes a radiator, a refrigerant pipe is provided in the second chamber, and a part of the refrigerant pipe extends into the electrically controlled welding member and contacts the radiator.

[0031] According to some embodiments of the present disclosure, a motor bracket is provided in the first chamber, and the electrically controlled welding member has a first end connected to the motor bracket and a second end connected to the middle partition plate.

[0032] The air conditioner according to embodiments of a third aspect of the present disclosure includes the above outdoor unit according to the embodiments of the second aspect of the present disclosure.

[0033] Additional aspects and advantages of the present disclosure will be given in part in the following descriptions, become apparent in part from the following descriptions, or be learned from the practice of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] These and/or other aspects and advantages of the present disclosure will become apparent and more readily appreciated from the following descriptions about embodiments with reference to the drawings, in which:

FIG. 1 illustrates a schematic view of an electric control assembly, a main control board, and a filter board according to an embodiment of the present disclosure.

FIG. 2 illustrates a partial schematic view of the electric control assembly shown in FIG. 1.

FIG. 3 illustrates a schematic view of an electric control board shown in FIG. 1.

FIG. 4 illustrates a partial schematic view of an outdoor unit of an air conditioner according to an embodiment of the present disclosure.

FIG. 5 illustrates another partial schematic view of the outdoor unit shown in FIG. 4.

FIG. 6 illustrates an enlarged view of part A circled in FIG. 5.

FIG. 7 illustrates an installation diagram of an electric control component shown in FIG. 5.

FIG. 8 illustrates a top view of the outdoor unit shown in FIG. 4.

FIG. 9 illustrates another partial schematic view of the outdoor unit shown in FIG. 4.

FIG. 10 illustrates an enlarged view of part B circled in FIG. 9.

FIG. 11 illustrates a schematic view of a cover plate shown in FIG. 9.

FIG. 12 illustrates a side view of an electric control box according to an embodiment of the present disclosure.

FIG. 13 illustrates a sectional view of the electric control box shown in FIG. 12.

FIG. 14 illustrates an enlarged view of part C circled in FIG. 13.

FIG. 15 illustrates a sectional view of an electrically controlled mounting member shown in FIG. 12.

FIG. 16 illustrates a sectional view of an electrically controlled welding member shown in FIG. 12.

FIG. 17 illustrates a partial sectional view of an electric control box according to another embodiment of the present disclosure.

FIG. 18 illustrates a partial sectional view of an electric control box according to still another embodiment of the present disclosure.

FIG. 19 illustrates a perspective view of an outdoor unit of an air conditioner according to an embodiment of the present disclosure.

FIG. 20 illustrates a front view of an outdoor unit of an air conditioner according to an embodiment of the present disclosure.

FIG. 21 illustrates a top view of the outdoor unit shown in FIG. 20.

FIG. 22 illustrates a partial perspective view of an outdoor unit of an air conditioner according to an embodiment of the present disclosure.

FIG. 23 illustrates an enlarged view of part D circled in FIG. 2.

FIG. 24 illustrates a partial perspective view from another angle of an outdoor unit of an air conditioner according to an embodiment of the present disclosure, in which the electric control component is not shown.

FIG. 25 illustrates an enlarged view of part E circled in FIG. 24.

FIG. 26 illustrates a top view of the outdoor unit shown in FIG. 24.

FIG. 27 illustrates another top view of an outdoor unit of an air conditioner according to an embodiment of the present disclosure, in which the electric control component is shown.

Reference numerals:

[0035]

outdoor unit 100 of air conditioner, compressor 100a, low-pressure tank 100b, condenser 100c, electric control assembly 1, main control board 2, filter board 3,

wire mounting plate sheet metal 11, power line ter-

minal block 12,
electric control board 13, wiring socket 131, signal line terminal block 132,
ground wire terminal block 14, crimping clip 15, fan adapter fixing clip 16,
first strong wire region a, second strong wire region b, weak wire region c,
electric control component 17, first assembling hole 17a for refrigerant pipe, electronic element 170,
mounting board 171, printed circuit board 172, cover plate 173, reinforcing plate 174, buffering member 175,
maintenance window 1711, limiting plate 1712, hook 1713,
through opening 1730,
electric control box 18,
electrically controlled mounting member 181, electrically controlled welding member 182,
connecting portion 1811, mounting plate 1812, enclosure plate 1813, first catch groove 1814, recessed groove 1815,
water blocking portion 1811a, first enclosure plate 1813a, second enclosure plate 1813b,
bottom plate 1821, side plate 1822, protruding portion 1823, supporting member 1824,
folding portion 1822a, flat plate portion 1822b, bending portion 1822c,
second assembling hole 1824a for refrigerant pipe, snapping portion 1824b,
electrically controlled welding member flange 1825, assembling hole 1826 for electric control component,
first assembling hole 1825 for middle partition plate, second assembling hole 1826 for middle partition plate, snapping hole 1827,
wiring component 19, hanger 191, wiring component flange 192, assembling hole 1921, casing 4, first chamber 41, second chamber 42, fan wheel 43,
side plate 44, side plate flange 441, refrigerant pipe 45,
motor bracket 46, motor bracket flange 461, assembling hole 4611 for electrically controlled welding member,
middle partition plate 5,
middle partition plate flange 51, second catch groove 510, assembling hole 511 for wiring component.

DETAILED DESCRIPTION

[0036] Embodiments of the present disclosure will be described in detail below, and examples of the embodiments will be shown in the drawings, wherein the same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the descriptions. The embodiments described herein with reference to the drawings are exemplary and used to generally understand the present disclosure. The embodiments shall not be construed to limit the present disclosure.

[0037] An electric control assembly 1 for an outdoor unit 100 of an air conditioner according to embodiments of the present disclosure will be described below with reference to the drawings.

[0038] As shown in FIGS. 1, 2 and 4, the outdoor unit 100 for the air conditioner includes a main control board 2, a filter board 3, and an electric control assembly 1. The main control board 2 and the filter board 3 are arranged side by side in the horizontal direction (a left-right direction as shown in FIG. 1), the main control board 2 can be close to one end (a left end shown in FIG. 1) of the outdoor unit 100 for the air conditioner, and the filter board 3 can be close to the other end (a right end shown in FIG. 1) of the outdoor unit 100 for the air conditioner. The electric control assembly 1 includes a wire mounting plate sheet metal 11 and an electric control board 13.

[0039] As shown in FIGS. 1 and 2, the wire mounting plate sheet metal 11 is located below the main control board 2 and the filter board 3 (as shown in FIG. 1). The wire mounting plate sheet metal 11 is provided with a power line terminal block 12. The electric control board 13 is disposed on the wire mounting plate sheet metal 11. The electric control board 13 is provided with a wiring socket 131 and a signal line terminal block 132. In a direction from the main control board 2 to the filter board 3, the wiring socket 131, the signal line terminal block 132, and the power line terminal block 12 are arranged sequentially.

[0040] It could be understood that the electric control board 13 is disposed on the wire mounting plate sheet metal 11, and the wire mounting plate sheet metal 11 is located below the main control board 2 and the filter board 3, so that the electric control board 13 is also located below the main control board 2 and the filter board 3. When the maintenance personnel repairs the electric control assembly 1, it is possible to remove only one side plate of the outdoor unit 100 opposite the wire mounting plate sheet metal 11 and hence perform the maintenance operation, thereby reducing the maintenance difficulty of the electric control assembly 1 and improving the maintenance efficiency of the electric control assembly 1.

[0041] In the related art, the main control board 2 and the electric control board 13 are separate and arranged side by side in a width direction of the outdoor unit 100. In order to provide maintenance space for the main control board 2 and the electric control board 13 during the maintenance, it is necessary to remove at least two side plates of the outdoor unit 100, which involves great workload.

[0042] In addition, the wiring socket 131, the signal line terminal block 132, and the power line terminal block 12 are arranged sequentially in the direction from the main control board 2 to the filter board 3. A valve body and an electric heating belt can be connected to the wiring socket 131 through connecting wires. As a result, the connecting wires at the wiring socket 131 and the connecting wires at the power line terminal block 12 are not easy to cross,

and the connecting wires are arranged more reasonably, which facilitates the wiring and maintenance and hence can improve the wiring and maintenance efficiency of the electric control assembly 1, thereby reducing the wiring and maintenance costs of the electric control assembly 1.

[0043] In some embodiments of the present disclosure, as shown in FIGS. 1 and 2, the main control board 2 and the filter board 3 are arranged side by side in a left-right direction (the left-right direction as shown in FIG. 1) of a casing 4 of the outdoor unit 100. It could be understood that during the detection or wiring, the detection of the main control board 2 or the wiring operation on the filter board 3 can be performance by only opening a right front side plate just opposite the main control board 2 and the filter board 3, so that the detection and wiring difficulty can be reduced.

[0044] Regarding the electric control assembly 1 for the outdoor unit 100 according to the embodiments of the present disclosure, since the wire mounting plate sheet metal 11 is disposed below the main control board 2 and the filter board 3, and the electric control board 13 is disposed on the wire mounting plate sheet metal 11, during the maintenance of the electric control assembly 1, the maintenance operation can be performed by removing only one side plate of the outdoor unit 100 opposite the wire mounting plate sheet metal 11, thereby avoiding the removal of multiple back plates of the outdoor unit 100, facilitating the disassembly, and hence lowering the maintenance difficulty of the electric control assembly 1. In addition, the wiring socket 131, the signal line terminal block 132, and the power line terminal block 12 are arranged sequentially in the direction from the main control board 2 to the filter board 3, such that the connecting wires at the wiring socket 131 and the connecting wires at the power line terminal block 12 are not easy to cross, and the arrangement of the connecting wires becomes more reasonable, which can improve the wiring and maintenance efficiency of the electric control assembly 1, and reduce the wiring and maintenance costs of the electric control assembly 1.

[0045] According to some embodiments of the present disclosure, as shown in FIG. 1 and FIG. 2, the electric control board 13 and the power line terminal block 12 are arranged sequentially in the direction from the main control board 2 to the filter board 3. Thus, the structure of the electric control board 13 can be simplified, and the positions of the electric control board 13 and the power line terminal block 12 can be determined more clearly, which helps the installation or maintenance personnel to identify the wiring socket 131, the signal line terminal block 132, and the power line terminal block 12. In addition, the main control board 2 can be connected to the electric control board 13 through connecting wires, so that the electric control board 13 can be located on a side close to the main control board 2 (a left side as shown in FIG. 1), and the arrangement of the connecting wires becomes more reasonable to facilitate the wiring and maintenance.

[0046] In some embodiments of the present disclosure, as shown in FIG. 2 and FIG. 3, the wiring socket 131 is located on a side of the electric control board 13 away from the power line terminal block 12. It should be noted that one side of the power line terminal block 12 is a strong wire region (a first strong wire region as shown in FIG. 2) and the wiring socket 131 is disposed on a side away from the power line terminal block 12, such that when the maintenance personnel inspects the wiring at the position of the wiring socket 131, the maintenance personnel can evade the strong wire region on the side of the power line terminal 12, thereby avoiding electric shock and improving the safety of the maintenance process.

[0047] In some embodiments of the present disclosure, as shown in FIGS. 1, 2 and 4, there is a plurality of wiring sockets 131, and the plurality of wiring sockets 131 are spaced apart along the vertical direction (an up-down direction shown in FIG. 1). It could be understood that the plurality of wiring sockets 131 can be connected to a plurality of different valve bodies and electric heating belts respectively, to meet the power supply requirements of the valve bodies and the electric heating belts, thereby ensuring the normal operation of the outdoor unit 100.

[0048] In the description of the present disclosure, the term "a plurality of' means two or more.

[0049] According to some embodiments of the present disclosure, as shown in FIGS. 1 and 2, the signal line terminal block 132 is located on a lower side of the electric control board 13 (a lower side shown in FIG. 2). It should be noted that a signal detection line of a detection instrument is connected to the signal line terminal block 132 from a lower end of the signal line terminal block 132. By disposing the signal line terminal block 132 on the lower side of the electric control board 13, the signal detection line can be connected to the signal line terminal block 132 conveniently, thereby reducing the detection difficulty and improving the detection efficiency.

[0050] In some embodiments of the present disclosure, as shown in FIG. 1 and FIG. 2, there is a plurality of signal line terminal blocks 132. It should be noted that the detection instrument can be connected to the electric control board 13 by using a plurality of signal detection lines to achieve the transmission of data information. By providing the plurality of signal line terminal blocks 132, the accuracy of data detection can be further enhanced on the premise of meeting the detection requirements. In addition, in the direction from the main control board 2 to the filter board 3, the plurality of signal line terminal blocks 132 is arranged side by side. Therefore, the arrangement of the plurality of signal line terminal blocks 132 can be simplified, and it is convenient for the maintenance personnel to quickly realize the alignment connection of the signal detection lines and the signal line terminal blocks 132.

[0051] According to some embodiments of the present disclosure, as shown in FIGS. 1 and 2, there is a plurality

of power line terminal blocks 12. The filter board 3 is provided with a plurality of connecting wires connected to the power line terminal blocks 12. It could be understood that the plurality of power line terminal blocks 12 can be connected to the plurality of connecting wires of the filter board 3 respectively, so that the power supply requirement of the filter board 3 can be satisfied, and the normal operation of the filter board 3 can be guaranteed.

[0052] The plurality of power line terminal blocks 12 is divided into a plurality of groups in which the power line terminal blocks are connected in pairs. In the direction from the main control board 2 to the filter board 3, the plurality of groups of power line terminal blocks 12 are arranged sequentially. One end (an upper end shown in FIG. 2) of the power line terminal block 12 is connected to the filter board 3, and the other end (a lower end shown in FIG. 2) of the power line terminal block 12 is connected to an external power line. As a result, the complexity of arranging the plurality of power line terminal blocks 12 can be reduced, and the connection of the filter board 3 with the external power line and the power line terminal blocks 12 can be facilitated.

[0053] According to some embodiments of the present disclosure, as shown in FIG. 1 and FIG. 2, two power line terminal blocks 12 in each group of power line terminal blocks 12 are spaced apart in the vertical direction (the up-down direction as shown in FIG. 2). It could be understood that the two power line terminal blocks 12 in each group are connected with connecting wires, and by spacing the two power line terminal blocks 12 apart in the vertical direction, operation space can be provided for the connection of the connecting wires, so as to reduce the difficulty of the alignment connection between the connecting wires and the power line terminal blocks 12 and improve the wiring efficiency.

[0054] It should be noted that when the electric control assembly fails and needs to be detected, it is possible to only open one side plate just opposite the main control board 2, in which case the main control board 2, the filter board 3, and the electric control board 13 are all in an operable range. By detecting the main control board 2 and the electric control board 13, fault analysis and judgment can be performed. Through detection, when it is found that the fault of the electric control assembly 1 results from the connecting wires, the connecting wires can be directly repaired or replaced, without no need to open other side plates of the outdoor unit 100, thereby reducing the maintenance difficulty and improving the maintenance efficiency.

[0055] As shown in FIG. 5 and FIG. 7, the outdoor unit 100 includes the casing 4, and the electric control assembly 1 includes an electric control component 17. The electric control component 17 includes a mounting board 171, a printed circuit board (PCB) 172, and a cover plate 173. The mounting board 171 is disposed in the casing 4 and is provided with a maintenance window 1711. The PCB 172 includes the main control board 2 and the filter board 3. The PCB 172 is disposed on a lower surface of the mounting board 171. The PCB 172 is provided with a plurality of electronic elements 170, and pins of at least a part of the electronic elements 170 are disposed just opposite the maintenance window 1711. The cover plate 173 is disposed on the mounting board 171 to open or close the maintenance window 1711.

[0056] Therefore, outside the casing 4, the operator can observe the pins of the electronic elements 170 through the maintenance window 1711 on the mounting board 171 to detect the pins on the electronic elements 170 without removing the mounting board 171 from the casing 4. Thus, the maintenance of the electric control component 17 in the outdoor unit 100 is facilitated, and the fault of the electric control component 17 can be quickly eliminated, thereby improving the maintenance efficiency.

[0057] As shown in FIG. 9, the cover plate 173 is disposed on the mounting board 171, and the cover plate 173 is configured to close the maintenance window 1711 to prevent foreign matters (such as dust) from entering the casing 4. During the maintenance of the electronic elements 170, the cover plate 173 is removed from the casing 4 to expose the maintenance window 1711. The operator can observe the connection situation of the pins of the electronic elements 170 and the PCB through the maintenance window 1711 on the mounting board 171, without removing the mounting board 171, so as to determine the fault location of the electric control component 17.

[0058] Therefore, since the mounting board 171 is provided with the maintenance window 1711 just opposite the pins of the electronic elements 170 on the PCB 172, when the electric control component 17 fails, the operator does not need to remove the mounting board 171, and instead can observe the fault location of the electronic elements 170 on the PCB 172 and eliminate the fault quickly. In such a way, the maintenance efficiency is improved, the maintenance difficulty of the electric control component 17 is lowered, the maintenance cost is reduced, and the inspection of the electric control component 17 becomes more convenient. The cover plate 173 can close the maintenance window 1711 to prevent foreign matters from entering the mounting board 171 through the maintenance window 1711 and improve the reliability of the electric control component 17.

[0059] In some embodiments of the present disclosure, the cover plate 173 is detachably disposed on the mounting board 171. When the electric control component 17 is overhauled, the cover plate 173 is removed from the mounting board 171 to expose the maintenance window 1711, so that the operator can observe the PCB 172 and the plurality of electronic elements 170 on the PCB 172 through the maintenance window 1711, and particularly can observe the pins of some electronic elements 170, to determine whether the pins of the electronic elements 170 are damaged or not, so as to eliminate the fault quickly and expedite the maintenance.

[0060] According to some embodiments of the present

disclosure, as shown in FIGS. 6 and 10, the mounting board 171 is snap-fitted with the cover plate 173, and the snap fit between the cover plate 173 and the mounting board 171 allows the cover plate 173 to be detached from the mounting board 171 conveniently. The cover plate 173 is fixed on the mounting board 171 by snap connection, which can not only ensure the reliable connection between the cover plate 173 and the mounting board 171, but also facilitate the disassembly of the cover plate 173 and the mounting board 171.

[0061] For example, as shown in FIGS. 6 and 10, the mounting board 171 is provided with a limiting plate 1712 and a hook 1713 spaced apart from each other. A first end of the cover plate 173 is provided with a through opening 1730, and a second end of the cover plate 173 extends to a lower side of the limit plate 1712. The hook 1713 passes through the through opening 1730 and is hooked onto a top wall of the cover plate 173. The maintenance window 1711 may be configured as a rectangular opening. The limiting plate 1712 and the hook 1713 can be disposed on the mounting board 171 and protrude from an upper surface of the mounting board 171. The limiting plate 1712 and the hook 1713 can be disposed on both ends of the maintenance window 1711 extending in a length direction, respectively. The limiting plate 1712 can be disposed in the horizontal plane, and the through opening 1730 penetrates the cover plate 173 in the vertical direction. A distance between the first end of the cover plate 173 and the through opening 1730 is identical to a distance between the limiting plate 1712 and the hook 1713. After the second end of the cover plate 173 extends to the lower side of the limiting plate 1712, the through opening 1730 on the first end of the cover plate 173 is fitted with the hook 1713. In order to make a hook body of the hook 1713 abut against the top wall of the cover plate 173 to restrict the vertical movement of the cover plate 173, the cover plate 173 cooperates with the mounting board 171 stably.

[0062] For example, two opposite hooks 1713 are provided on both sides of the mounting plate 130, two through openings 1730 corresponding to the hooks 1713 are provided in both ends of the cover plate 173, and the two ends of the cover plate 173 are fitted with the hooks 1713, thereby fixing the cover plate 173 and the mounting board 171.

[0063] According to some embodiments of the present disclosure, the limiting plate 1712 and the hook 1713 are disposed on opposite side walls of the maintenance window 1711. The maintenance window 1711 can be configured as a through hole penetrating the mounting board 171 in a thickness direction. An inner side wall of the maintenance window 1711 is provided with the limiting plate 1712 and the hook 1713, in which the limiting plate 1712 and the hook 1713 are disposed on two side walls of the maintenance window 1711 in a width direction to ensure that the cover plate 173 can stably close the maintenance window 1711.

[0064] According to some embodiments of the present disclosure, a catch groove is further provided in the upper surface of the mounting board 171. The catch groove is disposed on the periphery of the maintenance window 1711 and extends upward, so that the catch groove protrudes from the upper surface of the mounting board 171. The limiting plate 1712 and the hook 1713 can be disposed on opposite side walls of the catch groove, and the cover plate 173 can be embedded in the catch groove to improve a sealing effect of the cover plate 173 on the maintenance window 1711.

[0065] According to some embodiments of the present disclosure, a plurality of limiting plates 1712 can be provided, and a plurality of limiting portions 112 are used to better limit the movement of the second end of the cover plate 173. The height of the hook 1713 is the same as the height of the limiting plate 1712, such that an outer surface of the cover plate 173 is flush with an outer surface of the mounting board 171 after the cover plate 173 is snap-fitted with the mounting board 171. Since the limiting plate 1712 and the hook 1713 are disposed on the side walls of the maintenance window 1711, a part of the cover plate 173 can be embedded in the maintenance window 1711, which can reduce the volume of the outdoor unit 100 and improve the aesthetics of the outdoor unit 100.

[0066] According to other embodiments of the present disclosure, the cover plate 173 is withdrawably disposed on an outer side of the maintenance window 1711 of the mounting board 171, and the cover plate 173 can slide on the outer side of the maintenance window 1711, such that the maintenance window 1711 can be opened or closed by sliding the cover plate 173.

[0067] According to some embodiments of the present disclosure, the cover plate 173 is rotatably disposed on the mounting board 171, and the maintenance window 1711 is closed or opened by rotating the cover plate 173.

[0068] As shown in FIG. 11, according to some embodiments of the present disclosure, a bottom wall of the cover plate 173 is provided with a flexible buffering member 175. After the cover plate 173 is snap-fitted with the mounting board 171, the bottom wall of the cover plate 173 can be just opposite to the PCB 172, and the buffering member 175 can seal the maintenance window 1711 to prevent dust and the like from entering the maintenance window 1711. The buffering member 175 can also be used to buffer vibration. When the outdoor unit 100 is working, the cover plate 173 and the mounting board 171 may collide with each other due to vibration. The buffering member 175 is provided on the bottom wall of the cover plate 173 to buffer the collision between the cover plate 173 and the mounting board 171 and between the cover plate 173 and the PCB 172, so as to avoid abnormal noise and improve the reliability of the outdoor unit 100.

[0069] According to some embodiments of the present disclosure, two buffering members 175 are provided and spaced apart from each other along a width direction of the cover plate 173. Each buffering member 175 extends along a length direction of the cover plate 173. The buff-

ering member 175 can be configured as a strip-shaped buffering member 175 having the same length as the cover plate 173. The buffering member 175 can be disposed on a lower side of the cover plate 173 by gluing. The buffering member 175 can space the cover plate 173 from the PCB 172, to prevent the collision between the cover plate 173 and the PCB 172, buffer the vibration of the cover plate 173, and reduce the abnormal noise, when the outdoor unit is working.

[0070] According to some embodiments of the present disclosure, the buffering member 175 may be configured in an annular shape, and the buffering member 175 can be disposed to surround the periphery of the bottom wall of the cover plate 173, thereby improving the sealing effect between the cover plate 173 and the mounting board 171, and buffering the vibration of the cover plate 173 during the operation of the outdoor unit to prevent the cover plate 173 from generating abnormal noise due to vibration.

[0071] According to some embodiments of the present disclosure, the buffering member 175 may be configured as a rubber member or a sealing sponge member. Certainly, other vibration-damping materials may also be employed.

[0072] According to some embodiments of the present disclosure, the electric control component 17 further includes a reinforcing plate 174 disposed on a top wall of the mounting board 171. The reinforcing plate 174 can improve the structural strength of the mounting board 171 and protect the mounting board 171 and the PCB 172.

[0073] According to some embodiments of the present disclosure, there is a plurality of maintenance windows 1711, and each maintenance window 1711 corresponds to pins of a part of the electronic elements 170. The plurality of maintenance windows 1711 can correspond to pins of more electronic elements 170, such that the electronic elements 170 can be overhauled without need to disassemble the electric control component 17. The arrangement of the plurality of maintenance windows 1711 makes the maintenance more comprehensive, to eliminate the fault of the electric control component 17 conveniently.

[0074] In some embodiments of the present disclosure, as shown in FIG. 12, the electric control assembly 1 further includes an electric control box 18. The electric control box 18 can be horizontally disposed in an upper part of the casing 4, and the electric control box 18 includes an electrically controlled welding member 182 and an electrically controlled mounting member 181. The electrically controlled welding member 182 may be a sheet metal part.

[0075] For example, the electrically controlled welding member 182 includes a bottom plate 1821 and a side plate 1822. The side plate 1822 is disposed on the bottom plate 1821, and an upper end of the side plate 1822 is provided with a folding portion 1822a folded outwards. Optionally, the side plate 1822 and the bottom plate 1821 are integrally formed. For example, the side plate 1822 can be formed by folding a part of the bottom plate 1821 upwards. The structure is simple, the processing is easy, and the structural strength is high. The electrically controlled mounting member 181 and the electrically controlled welding member 182 are connected, and a mounting space is defined between the electrically controlled mounting member 181 and the electrically controlled welding member 182. The electrically controlled mounting member 181 has a connecting portion 1811, and the connecting portion 1811 is connected with the folding portion 1822a.

[0076] Referring to FIGS. 12 and 13, the side plate 1822 can be perpendicular to the bottom plate 1821, and the top of the electrically controlled welding member 182 is open. The electrically controlled mounting member 181 can be used to mount the electric control component 17 (for example, the main control board 2, the filter board 3, and etc.).

[0077] The electrically controlled mounting member 181 can include a mounting plate 1812 and an annular enclosure plate 1813. The mounting plate 1812 is disposed inside the enclosure plate 1813 and is connected to an inner side wall of the enclosure plate 1813. The main control board 2 and the filter board 3 can be mounted on a side surface (such as a lower surface in FIG. 13) of the mounting plate 1812 adjacent to the electrically controlled welding member 182. Referring to FIGS. 13 to 15, the electrically controlled mounting member 181 is formed with a first catch groove 1814, the folding portion 1822a is caught in the first catch groove 1814, and a top wall of the first catch groove 1814 is configured as the connecting portion 1811 connected to the folding portion 1822a.

[0078] The enclosure plate 1813 can include a first enclosure plate 1813a and a second enclosure plate 1813b. The first enclosure plate 1813a is located above the second enclosure plate 1813b, and the first enclosure plate 1813a is located outside the second enclosure plate 1813b, such that the first catch groove 1814 is defined between the first enclosure plate 1813a and the second enclosure plate 1813b. The second enclosure plate 1813b can extend into the electrically controlled welding member. Both ends of the connecting portion 1811 are connected to the first enclosure plate 1813a and the second enclosure plate 1813b, respectively. Thus, the connection between the folding portion 1822a of the electrically controlled welding member 182 and the connecting portion 1811 is facilitated, so that the electrically controlled mounting member 181 can be connected to the electrically controlled welding member 182 conveniently.

[0079] For example, during the assembling process, the main control board 2 and the filter board 3 can be first mounted on the mounting plate 1812, and then the electrically controlled mounting member 181 is fastened to the electrically controlled welding member 182, so that the folding portion 1822a is supported on the connecting portion 1811. Then, a fastener (for example, a screw, a

bolt, and etc.) passes through the folding portion 1822a and the connecting portion 1811 to fix the electrically controlled mounting member 181 on the electrically controlled welding member 182.

[0080] The connecting portion 1811 can extend in the horizontal direction. The structure is simple, the processing is convenient, and the assembling difficulty of the electrically controlled mounting member 181 and the electrically controlled welding member 182 can be reduced, thereby improving the assembling efficiency.

[0081] The connecting portion 1811 is provided with a water blocking portion 1811a to prevent liquid from entering the mounting space via an assembling gap between the connecting portion 1811 and the folding portion 1822a. Thus, the water climbing height and the resistance can be increased, so that the water outside the electric control box 18 (for example, water penetrating through a condenser 100c of the outdoor unit 100) can be effectively prevented from entering the electric control box 18 by means of the water blocking portion 1811a. In this case, the waterproofness of the electric control box 18 is improved effectively, thereby preventing the electric control component 17 inside the electric control box 18 from being short-circuited, and the operational reliability of the outdoor unit 100 is enhanced.

[0082] It should be noted that, in a multi-unit outdoor unit with lateral vents, when the electric control box 18 is laterally disposed on the top of the casing 4 of the outdoor unit 100, water on the condenser 100c may enter the electric control box 18 through the assembling gap which exists between the connecting portion 1811 and the folding portion 1822a. In the present disclosure, the water blocking portion 1811a is disposed on the connecting portion 1811, which increases the water climbing height and resistance, and effectively prevents water on the condenser 100c from entering the electric control box 18 through the assembling gap between the connecting portion 1811 and the folding portion 1822a.

[0083] Therefore, by providing the water blocking portion 1811a on the connecting portion 1811, the water climbing height and resistance are increased, so that the water blocking portion 1811a can effectively block the water outside the electric control box from entering the electric control box 18, which effectively improves the waterproofness of the electric control box 18, avoids the short circuit of the electric control component 17 inside the electric control box 18, and enhances the operational reliability of the outdoor unit 100.

[0084] According to some embodiments of the present disclosure, the water blocking portion 1811a is located outside the folding portion 1822a, and the water blocking portion 1811a is connected to a lower surface of the connecting portion 1811 and extends in the up-down direction. Referring to FIGS. 13 to 15, the water blocking portion 1811a is a raised structure formed on the connecting portion 1811. The water blocking portion 1811a can extend in the vertical direction. Thus, the water outside the electric control box 18 can be effectively blocked from entering the electric control box 18 by means of the water blocking portion 1811a. The structure is simple and the processing is convenient.

[0085] The water blocking portion 1811a and the electrically controlled mounting member 181 can be integrally formed. For example, in some embodiments of the present disclosure, the electrically controlled mounting member 181 is a plastic member, and the water blocking portion 1811a and the electrically controlled mounting member 181 are integrally injection-molded. Hence, the processing technique of the electrically controlled mounting member 181 can be simplified, thereby reducing the cost.

[0086] According to some embodiments of the present disclosure, the water blocking portion 1811a extends in the vertical direction. Therefore, the water blocking effect of the water blocking portion 1811a can be ensured, and the material used for the water blocking portion 1811a can be reduced, thereby reducing the material cost.

[0087] In some embodiments of the present disclosure, the folding portion 1822a includes a flat plate portion 1822b, the flat plate portion 1822b is connected to the upper end of the side plate 1822, and a lower surface of the flat plate portion 1822b is higher than a lower end surface of the water blocking portion 1811a. For example, referring to FIG. 14, an arrow in the figure shows the path of water from the outside into the electrical control box 18. Therefore, by making the lower surface of the flat plate portion 1822b higher than the lower end surface of the water blocking portion 1811a, the water blocking portion 1811a can effectively block water from entering the electric control box 18 through the assembling gap, which increases the water climbing height and resistance, and can effectively block the water from the condenser 100c in the outdoor unit 100.

[0088] According to some embodiments of the present disclosure, the flat plate portion 1822b extends in the horizontal direction, and the thickness d of the flat plate portion 1822b and the height h of the water blocking portion 1811a satisfy: d<h. Therefore, when the water outside the electric control box 18 is blown laterally toward the electric control box 18, it can be completely blocked by the water blocking portion 1811a, ensuring the water blocking effect of the water blocking portion 1811a, and reducing the assembling difficulty of the electrically controlled mounting member 181 and the electrically controlled welding member 182, so as to improve the assembling efficiency.

[0089] In some embodiments of the present disclosure, an outer end of the flat plate portion 1822b is provided with a bending portion 1822c bent downward. It should be noted herein that the direction "outward" could be understood as a direction away from the center of the electric control box 18, and the opposite direction is defined as "inward", that is, a direction toward the center of the electric control box 18. Hence, the structural strength of the folding portion 1822a can be improved effectively.

[0090] Referring to FIG. 17, the bending portion 1822c

extends in the vertical direction, and the bending portion 1822c can be perpendicular to the flat plate portion 1822b. The structure is simple and the processing is convenient.

[0091] For example, a lower end surface of the bending portion 1822c is higher than the lower end surface of the water blocking portion 1811a. Therefore, when the water outside the electric control box 18 is blown laterally toward the electric control box 18, it can be completely blocked by the water blocking portion 1811a, and the water can be prevented from climbing along the bending portion 1822c to the assembling gap between the connecting portion 1811 and the folding portion 1822a, which improves the waterproof performance of the electric control box 18.

[0092] According to some embodiments of the present disclosure, the folding portion 1822a and the water blocking portion 1811a are spaced apart from each other. Referring to FIGS. 14 and 17, when the folding portion 1822a includes only the flat plate portion 1822b, the outer end of the flat plate portion 1822b is spaced apart from the water blocking portion 1811a; when the folding portion 1822a further includes the bending portion 1822c disposed at the outer end of the flat plate portion 1822b, the bending portion 1822c is spaced apart from the water blocking portion 1811a. Hence, the water blocking ability of the water blocking portion 1811a can be further improved.

[0093] According to other embodiments of the present disclosure, a part of the lower surface of the connecting portion 1811 is recessed upward to form a recessed groove 1815, so as to form the water blocking portion 1811a at an outer end of the connecting portion 1811. A middle portion of the folding portion 1822a protrudes upwards to form a protruding portion 1823, and the protruding portion 1823 is configured to extend into the recessed groove 1815 to be fitted with the recessed groove 1815. Referring to FIG. 18, the recessed groove 1815 is formed in a middle portion of the connecting portion 1811. Therefore, the waterproof effect of the electric control box 18 can also be improved, and the connection between the connecting portion 1811 and the folding portion 1822a can be facilitated.

[0094] In some embodiments of the present disclosure, the lower end surface of the water blocking portion 1811a abuts against and is fitted with an upper surface of the folding portion 1822a. As a result, it is more difficult for the water outside the electric control box 18 to enter the electric control box 18 through a gap between the lower end surface of the water blocking portion 1811a and the upper surface of the folding portion 1822a, thereby further improving the waterproof effect of the electric control box 18.

[0095] An outdoor unit 100 for an air conditioner according to embodiments of a second aspect of the present disclosure includes a casing 4 and an electric control assembly 1 disposed in the casing 4. The electric control assembly 1 is the above electric control assembly 1 according to the embodiment of the first aspect of the present disclosure. The outdoor unit 100 may be a small multi-unit outdoor unit with lateral vents.

[0096] As shown in FIG. 22, the outdoor unit 100 for the air conditioner further includes a middle partition plate 5 disposed in the casing 4. The middle partition plate 5 partitions the interior of the casing 4 into a first chamber 41 and a second chamber 42, and a fan wheel 43 is provided in the first chamber 41. For example, referring to FIGS. 20 and 21 in combination with FIG. 22, the casing 4 is generally in a rectangular parallelepiped shape, and the middle partition plate 5 is vertically arranged in the casing 4 and close to a right side of the casing 4. The middle partition plate 5 partitions the interior of the casing 4 into left and right chambers (i.e., the first chamber 41 and the second chamber 42). The fan wheel 43, a motor, and a heat exchanger 100c can be provided in the first chamber 41 on the left, and the compressor 100a is arranged in the second chamber 42 on the right. An air inlet and an air outlet are formed in the casing 4. When the outdoor unit 100 (such as the small multi-unit outdoor unit with lateral vents) is working, the fan wheel 43 rotates, and external airflow such as air can enter the casing 4 through the air inlet and exchange heat with the heat exchanger 100c in the first chamber 41. The airflow (e.g., air) after the heat exchange flows out through the air outlet.

[0097] Referring to FIGS.7 and 22, the electric control assembly 1 includes a wiring component 19. The wiring component 19 includes a wire mounting plate sheet metal 11 and an electric control board 13. The wiring component 19 is vertically arranged in the second chamber 42, and the wiring component 19 is located below an electric control component 17, wherein a wire body on the electric control component 17 is connected to the wiring component 19. Therefore, by providing the wiring component 19 arranged vertically and by connecting the wire body on the electric control component 17 to the wiring component 19, the wiring component 19 can lead the wire body of the electric control component 17 to the wiring component 19 to perform wiring, which facilitates the wiring and maintenance.

[0098] An electrically controlled welding member 182 is provided on the top of the middle partition plate 5. In such a case, the electrically controlled welding member 182 is located on the top of the interior of the casing 4, as shown in FIGS. 22 and 24. The electric control component 17 which is inverted is disposed in the electrically controlled welding member 182. When assembled, for example, the electric control component 17 can be placed upside down and assembled into the electrically controlled welding member 182 from top to bottom (as shown in FIGS. 1 and 7). After being assembled in place, electronic elements 170 are located on a lower surface of the electric control component 17 (as shown in FIG. 22). The electric control component 17 spans the first chamber 41 and the second chamber 42. For example, in an example of FIG. 22, a left end of the electric control

component 17 extends to the left beyond the middle partition plate 5 into the first chamber 41, and a right end of the electric control component 17 extends to the right beyond the middle partition plate 5 into the second chamber 42. Therefore, by placing the electric control component 17 upside down and configuring it to span the first chamber 41 and the second chamber 42, the space in the casing 4 can be fully utilized, so that the electric control component 17 is arranged in the casing 4 more reasonably, thereby reducing the size of the entire outdoor unit 100 (such as the small multi-unit outdoor unit with lateral vents). Hence, in a case where the mounting space among the buildings is relatively small, the outdoor unit 100 (such as the small multi-unit outdoor unit with lateral vents) can be well mounted in the mounting space, thereby satisfying the needs of customers. It has been verified that the outdoor unit 100 according to the embodiments of the present disclosure, such as the small multi-unit outdoor unit with lateral vents, has a length reduced by about 90 mm, a width reduced by about 60 mm, and a height reduced by about 20 mm, compared with a conventional outdoor unit 100 (such as the small multi-unit outdoor unit with lateral vents). Moreover, the inverted electric control component 17 can not only prevent dust and the like from falling on the electronic elements 170 of the electric control component 17, but also prevent condensation, thereby effectively ensuring the normal operation of the electronic elements 170.

[0099] Therefore, by providing the wiring component 19 arranged vertically, the wiring of the electric control component 17 is facilitated. Furthermore, by disposing the electric control component 17 inverted in the electrically controlled welding member 182 and allowing the electric control component 17 to span the first chamber 41 and the second chamber 42, the space in the casing 4 is fully and reasonably utilized, so that the entire outdoor unit 100 (such as the small multi-unit outdoor unit with lateral vents) is more compact, reducing the size of the entire outdoor unit 100 (such as the small multi-unit outdoor unit with lateral vents).

[0100] For example, in the examples of FIGS. 1 and 21, the outdoor unit 100 includes the casing 4, and the electric control assembly 1 is disposed in the casing 4. The casing 4 includes a plurality of side plates 44, and the electric control assembly 1 is fixed to the middle partition plate 5 and the side plates 44. The wire mounting plate sheet metal 11 is located on a side near a right end of the outdoor unit 100. The wire mounting plate sheet metal 11 is provided with a power line terminal block 12, a ground wire terminal block 14, the electric control board 13, a fan adapter fixing clip 16, and a plurality of crimping clips 15 for fixing the connecting wires. A region where the power line terminal block 12 is located is a first strong wire region a (region a shown in FIG. 1). One end of the power line terminal block 12 (an upper end shown in FIG. 2) is connected to a filter board 3, and the other end of the power line terminal block 12 (a lower end shown in FIG. 2) is connected to an external power line.

[0101] As shown in FIG. 1 and FIG. 2, the electric control board 13 is provided with a wiring socket 131 and a signal line terminal block 132. A region where the wiring socket 131 is located is a second strong wire region b (region b shown in FIG. 1). The wiring socket 131 is connected to a valve body and an electric heating belt on a left side of the electric control board 13 through connecting wires. A region where the signal line terminal block 132 is located is a weak wire region c (region c shown in FIG. 1). The wiring socket 131 is located on a side of the electric control board 13 away from the power line terminal block 12 (i.e., a left side shown in FIG. 1), and the signal line terminal block 132 is located on an end of the electric control board 13 close to the power line terminal block 12 (i.e., a right end shown in FIG. 1) and also located on a lower side of the electric control board 13 (i.e., a lower side as shown in FIG. 1).

[0102] As shown in FIGS. 1 and 2, in a direction from the main control board 2 to the filter board 3 (a left-to-right direction shown in FIG. 1), the electric control board 13 and the power line terminal block 12 are arranged in sequence. At the same time, the wiring socket 131, the signal line terminal block 132, and the power line terminal block 12 are also arranged in sequence. There are a plurality of wiring sockets 131, and the plurality of wiring sockets 131 are spaced apart from each other in the vertical direction (an up-down direction as shown in FIG. 1).

[0103] As shown in FIG. 1 and FIG. 2, there is a plurality of signal line terminal blocks 132. In the direction from the main control board 2 to the filter board 3, the plurality of signal line terminal blocks 132 are arranged side by side. There is also a plurality of power line terminal blocks 12, and the plurality of power line terminal blocks 12 is divided into a plurality of groups in which the power line terminal blocks are connected in pairs. In the direction from the main control board 2 to the filter board 3, the plurality of groups of power line terminal blocks 12 are arranged sequentially. Two power line terminal blocks 12 in each group of power line terminal blocks 12 are spaced apart in the vertical direction.

[0104] According to some embodiments of the present disclosure, the wiring component 19 is adjacent to a side wall of the casing 4 in a width direction and is parallel to the side wall. Wire bodies on the electric control component 17 are all connected to a side of the wiring component 19 facing the side wall. For instance, in the examples of FIGS. 1, 22, and 24, the wiring component 19 is adjacent to a front side of the casing 4 and is substantially parallel to a front side wall of the casing 4. The wire bodies on the electric control component 17 are all connected to a front surface of the wiring component 19. Therefore, by arranging the wiring component 19 vertically and making the wiring component 19 face and adjacent to one side wall of the casing 4, the ends of the wire bodies on the electric control component 17 connected to the wiring component 19 are all located in front of the wiring component 19, so that the operator can perform the wiring and maintenance from this side conveniently.

[0105] For example, referring to FIGS. 7, 22, and 24, the wiring component 19 is located at an upper part in the second chamber 42, and components (such as a compressor 100a) are arranged at a lower part in the second chamber 42. Therefore, by arranging the wiring component 19 at the upper part in the second chamber 42, the layout of various components in the second chamber 42 is more reasonable, and a distance between the wiring component 19 and the electric control component 17 is relatively short, which facilitates the wiring.

[0106] According to some embodiments of the present disclosure, referring to FIGS. 22 and 24 in combination with FIG. 25, a middle partition plate flange 51 is provided on a side of the middle partition plate 5 in a width direction of the middle partition plate 5, and the middle partition plate flange 51 is formed with a second catch groove 510. The wiring component 19 is provided with a hanger 191 configured to hang in the second catch groove 510. For instance, in the examples of FIGS. 22 to 24, the middle partition plate flange 51 extends from a front side of the middle partition plate 5 to the right, and the second catch groove 510 is configured as a through hole penetrating the middle partition plate flange 51 in a front-rear direction. The hanger 191 is disposed on the front surface of the wiring component 19 and extends forwards and downwards. When assembled, the hanger 191 can pass through the second catch groove 510 from rear to front and be caught on a bottom wall of the second catch groove 510. Thus, by providing the hanger 191 and the second catch groove 510 that are fitted with each other, the wiring component 19 can be mounted on the middle partition plate 5 easily and quickly.

[0107] For example, as shown in FIG. 22 to FIG. 24, the width of the second catch groove 510 gradually decreases from top to bottom. In the process of assembling the hanger 191 to the second catch groove 510, the hanger 191 first passes through an upper part of the second catch groove 510, and since the width of the upper part of the second catch groove 510 is relatively large, the hanger 191 can pass through the second catch groove 510 conveniently and quickly. Since the width of the lower part of the second catch groove 510 is relatively small, left and right walls of the second catch groove 510 can play a good role in limiting the position of the hanger 191 and prevent the wiring component 19 from shaking randomly in the casing 4.

[0108] According to some embodiments of the present disclosure, referring to FIGS. 22 and 24 in combination with FIG. 23, the casing 4 includes a side plate 44, and the side plate 44 has a side plate flange 441 extending toward the middle partition plate 5. The hanger 191 is disposed on a first end of the wiring component 19 (for example, a left end in FIG. 23), and a second end of the wiring component 19 (for example, a right end in FIG. 23) is provided with a wiring component flange 192. The wiring component flange 192 is configured to overlap the side plate flange 441 and is threaded with the side plate flange 441. For instance, in the examples of FIGS. 3-5, the side plate flange 441 extends from a front side of the side plate 44 to the left, and the wiring component flange 192 extends from a right end of the wiring component 193 to the right and overlaps the side plate flange 441. The wiring component flange 192 can be connected to the side plate flange 441 by two vertically spaced screws or the like. Therefore, by employing the hanger 191 and the threaded connection, the wiring component 19 can be connected in the casing 4 conveniently, quickly and reliably.

[0109] FIGS. 22 to 24 show two assembling holes 1921 configured to mount screws or the like, for illustrative purposes, but after reading the following technical solution, those skilled in the art could understand that the application of the solution to other solutions with three or more assembling holes 1921 also falls within the protection scope of the present disclosure.

[0110] For example, as shown in FIGS. 7, 22, and 23, the first end of the wiring component 19 can also be threaded with the middle partition plate 5 to further improve the reliability of the connection of the wiring component 19. The middle partition plate flange 51 can also be formed with two assembling holes 511 for the wiring component, and the assembling holes 511 are spaced part in the up-down direction. In the assembling process, two screws can pass through the two assembling holes 511 and then be threaded with the wiring component 19.

[0111] According to some embodiments of the present disclosure, as shown in FIGS. 24-27, the electric control component 17 includes a radiator, a refrigerant pipe 45 is provided in the second chamber 42, and a part of the refrigerant pipe 45 extends into the electrically controlled welding member 182 and contacts the radiator. Therefore, the heat generated during the operation of the electronic elements 170 on the electric control component 17 can be absorbed by the radiator, and by configuring the refrigerant pipe 45 to be in contact with the radiator on the electric control component 17, the refrigerant pipe 45 can take away the heat on the radiator, thereby enabling the electronic elements 170 to work normally and prolonging the service life of the electric control component 17.

[0112] For example, referring to FIG. 24 and in combination with FIGS. 25 to 27, a supporting member 1824 is provided in the electrically controlled welding member 182, and the refrigerant pipe 45 is supported on the supporting member 1824. The radiator is formed with a recess for receiving the refrigerant pipe 45. The electric control component 17 is connected to the supporting member 1824 through a plurality of threaded fasteners, to enable the refrigerant pipe 45 to be in contact with a wall surface of the recess. For instance, in the examples of FIGS. 24-27, the supporting member 1824 can be snapped on a bottom surface of the electrically controlled welding member 182, the bottom of the supporting member 1824 can be provided with a snapping portion 1824b extending downwards, and the bottom surface of the electrically controlled welding member 182 is formed with

a snapping hole 1827 fitted with the snapping portion 1824b, such that the supporting member 1824 can be firmly fixed in the electrically controlled welding member 182, and the refrigerant pipe 45 is supported on an upper surface of the supporting member 1824. After the electric control component 17 is mounted in the electrically controlled welding member 182, the electric control component 17 may be threaded with the supporting member 1824 through four threaded fasteners (such as screws) spaced apart along a length direction of the refrigerant pipe 45. In such a case, the electric control component 17 can be formed with four first assembling holes 17a used for the refrigerant pipe, and the four first assembling holes are spaced apart along a length direction of the electric control component 17; accordingly, the supporting member 1824 is formed with four second assembling holes 1824a used for the refrigerant pipe, and the four second assembling holes 1824a are corresponding to the four first assembling holes 17a. In the assembling process, the screw can pass through the first assembling hole 17a and the corresponding second assembling hole 1824a sequentially from top to bottom. Since the refrigerant pipe 45 is sandwiched between the electric control component 17 and the supporting member 1824, and the threaded fastener exerts a fastening effect, the reliable contact between the refrigerant pipe 45 and the recess of the radiator can be ensured, thereby ensuring that the heat on the radiator can be taken away by the refrigerant pipe 45.

[0113] As shown in FIG. 26, the electrically controlled welding member 182 can be formed with four assembling holes 1826 used for the electric control component, and the four assembling holes 1826 are substantially at the positions of four corners of the electrically controlled welding member 182. After the electric control component 17 is placed in the electrically controlled welding member 182, the electric control component 17 can be firmly mounted in the electrically controlled welding member 182 through the fitting of the four screws and the four assembling holes 1826.

[0114] According to some embodiments of the present disclosure, as shown in FIGS. 24, 26 and 27, a motor bracket 46 is provided in the first chamber 41, and a motor for driving rotation of the fan wheel 43 can be mounted on the motor bracket 46. A first end (e.g., a left end in FIG. 26) of the electrically controlled welding member 182 is connected to the motor bracket 46, and a second end (e.g., a right end in FIG. 26) of the electrically controlled welding member 182 is connected to the middle partition plate 5. Therefore, the electrically controlled welding member 182 can be securely mounted in the casing 41, and the electric control component 17 can be better mounted in the electrically controlled welding member 182.

[0115] For example, referring to FIGS. 24, 26, and 27, the first end of the electrically controlled welding member 182 is provided with an electrically controlled welding member flange 1825 extending toward the motor bracket 46. The motor bracket 46 has a motor bracket flange 461 configured to overlap the electrically controlled welding member flange 1825, and the motor bracket flange 461 is threaded with the electrically controlled welding member flange 1825. For instance, in the examples of FIGS. 24, 26, and 27, the electrically controlled welding member flange 1825 extends horizontally to the left, and the motor bracket flange 461 extends horizontally to the right and is configured to overlap the electrically controlled welding member flange 1825. The motor bracket flange 461 can be formed with two assembling holes 4611 used for the electrically controlled welding member, and the assembling holes 4611 are spaced along a length direction of the motor bracket flange. Screws and the like pass through the assembling holes 4611 to be connected with the electrically controlled welding member flange 1825, such that the electrically controlled welding member 182 and the motor bracket 46 can be connected reliably and be convenient to assemble and disassemble.

[0116] In some embodiments of the present disclosure, the right end of the electrically controlled welding member 182 can also be threaded with the middle partition plate 5. For example, as shown in FIG. 24, the bottom surface of the electrically controlled welding member 182 can be formed with two first assembling holes 1825 for the middle partition plate, and the first assembling holes 1825 are spaced apart from each other; and a side surface of the electrically controlled welding member 182 can be formed with one second assembling hole 1826 for the middle partition plate. In the assembling process, three screws are used to pass through the two first assembling holes 1825 and the second assembling hole 1826 to be connected with the middle partition plate 5, such that the right end of the electrically controlled welding member 182 is reliably connected to the middle partition plate 5.

[0117] Other configurations of the outdoor unit 100 according to the embodiments of the present disclosure, such as a low-pressure tank 100b and the like, are known to those skilled in the art, and will not be elaborated herein.

[0118] An air conditioner according to embodiments of a third aspect of the present disclosure includes the above outdoor unit 100 according to the embodiments of the second aspect of the present disclosure.

[0119] For the air conditioner according to the embodiments of the present disclosure, the overall performance of the air conditioner can be improved by using the outdoor unit 100 described above.

[0120] Other configurations and operations of the air conditioner according to the embodiments of the present disclosure are known to those skilled in the art, and will not be elaborated herein.

[0121] In the description of the present disclosure, it is to be understood that terms such as "width," "upper," "lower," "left," "right," "vertical," "horizontal," and the like should be construed to refer to the orientation or position as then described or as shown in the drawings under

discussion. These relative terms are only for convenience and simplicity of description, and do not indicate or imply that the device or element referred to must have a particular orientation, or be constructed and operated in a particular orientation. Thus, these terms should not be constructed to limit the present disclosure.

[0122] In the present disclosure, unless specified or limited otherwise, the terms "mounted," "connected," "coupled," and the like are used broadly, and may be, for example, fixed connections, detachable connections, or integral connections; may also be mechanical or electrical connections; may also be direct connections or indirect connections via intervening structures; may also be inner communications of two elements, which could be understood by those skilled in the art according to specific situations.

[0123] Reference throughout this specification to "an embodiment," "some embodiments," "an exemplary embodiment", "an example," "a specific example," or "some examples," means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. Thus, the above terms throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0124] Although embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that various changes, modifications, alternatives and variations can be made in the embodiments without departing from principles and purposes of the present disclosure. The scope of the present disclosure is defined by the claims and their equivalents.

Claims

1. An electric control assembly for an outdoor unit of an air conditioner, wherein the outdoor unit comprises a main control board and a filter board arranged side by side in a horizontal direction, and the electric control assembly comprises:

   a wire mounting plate sheet metal located below the main control board and the filter board and provided with a power line terminal block; and
   an electric control board disposed on the wire mounting plate sheet metal and provided with a wiring socket and a signal line terminal block, wherein the wiring socket, the signal line terminal block, and the power line terminal block are arranged sequentially in a direction from the main control board to the filter board.

2. The electric control assembly according to claim 1, wherein the electric control board and the power line terminal block are arranged sequentially in a direction from the main control board to the filter board.

3. The electric control assembly according to claim 2, wherein the wiring socket is located on a side of the electric control board away from the power line terminal block.

4. The electric control assembly according to any one of claims 1 to 3, wherein the signal line terminal block is located on a lower side of the electric control board.

5. The electric control assembly according to any one of claims 1 to 4, wherein a plurality of power line terminal blocks is provided and divided into a plurality of groups in which the power line terminal blocks are connected in pairs; in the direction from the main control board to the filter board, the plurality of groups of power line terminal blocks are arranged sequentially.

6. The electric control assembly according to claim 5, wherein two power line terminal blocks in each group of power line terminal blocks are vertically spaced apart from each other.

7. The electric control assembly according to any one of claims 1 to 6, wherein the outdoor unit comprises a casing, the electric control assembly comprises an electric control component, and the electric control component comprises:

   a mounting board disposed in the casing and provided with a maintenance window;
   a printed circuit board comprising the main control board and the filter board, the printed circuit board being disposed on a lower surface of the mounting board and provided with a plurality of electronic elements, wherein pins of at least a part of the electronic elements are disposed just opposite the maintenance window; and
   a cover plate disposed on the mounting board and configured to open or close the maintenance window.

8. The electric control assembly according to claim 7, wherein the cover plate is detachably disposed on the mounting board.

9. The electric control assembly according to claim 7 or 8, wherein a bottom wall of the cover plate is provided with a flexible buffering member.

10. The electric control assembly according to any one of claims 7 to 9, wherein the electric control component further comprises a reinforcing plate disposed

on a top wall of the mounting board.

11. The electric control assembly according to any one of claims 1 to 10, further comprising an electric control box, wherein the electric control box comprises:

an electrically controlled welding member comprising a bottom plate and a side plate disposed on the bottom plate, an upper end of the side plate being provided with a folding portion folded outwards; and
an electrically controlled mounting member connected with the electrically controlled welding member, wherein a mounting space is defined between the electrically controlled mounting member and the electrically controlled welding member, the electrically controlled mounting member has a connecting portion connected with the folding portion, and the connecting portion is provided with a water blocking portion to prevent liquid from entering the mounting space via an assembling gap between the connecting portion and the folding portion.

12. The electric control assembly according to claim 11, wherein the water blocking portion is located outside the folding portion, and the water blocking portion is connected to a lower surface of the connecting portion and extends in an up-down direction.

13. The electric control assembly according to claim 12, wherein the folding portion comprises a flat plate portion, the flat plate portion is connected to the upper end of the side plate, and a lower surface of the flat plate portion is higher than a lower end surface of the water blocking portion.

14. The electric control assembly according to claim 13, wherein an outer end of the flat plate portion is provided with a bending portion bent downward.

15. The electric control assembly according to claim 14, wherein a lower end surface of the bending portion is higher than the lower end surface of the water blocking portion.

16. The electric control assembly according to claim 11, wherein a part of the lower surface of the connecting portion is recessed upward to form a recessed groove, so as to form the water blocking portion at an outer end of the connecting portion; a middle portion of the folding portion protrudes upwards to form a protruding portion, and the protruding portion is configured to extend into the recessed groove to be fitted with the recessed groove.

17. An outdoor unit of an air conditioner, comprising:

a casing; and
an electric control assembly according to any one of claims 1 to 16, the electric control assembly being disposed in the casing.

18. The outdoor unit according to claim 17, further comprising:

a middle partition plate disposed in the casing, and configured to partition an interior of the casing into a first chamber and a second chamber, a fan wheel being provided in the first chamber, wherein the electric control assembly comprises a wiring component and an electric control component, the wiring component comprises a wire mounting plate sheet metal and an electric control board, the wiring component is vertically arranged in the second chamber and located below the electric control component, and a wire body on the electric control component is connected to the wiring component; and
an electrically controlled welding member disposed on the top of the middle partition plate, the electric control component being inverted in the electrically controlled welding member and configured to span the first chamber and the second chamber.

19. The outdoor unit according to claim 18, wherein the wiring component is adjacent to a side wall of the casing in a width direction and is parallel to the side wall, and wire bodies on the electric control component are all connected to a side of the wiring component facing the side wall.

20. The outdoor unit according to claim 18 or 19, wherein a middle partition plate flange is provided on a side of the middle partition plate in a width direction, the middle partition plate flange is formed with a catch groove, and the wiring component is provided with a hanger configured to hang in the catch groove.

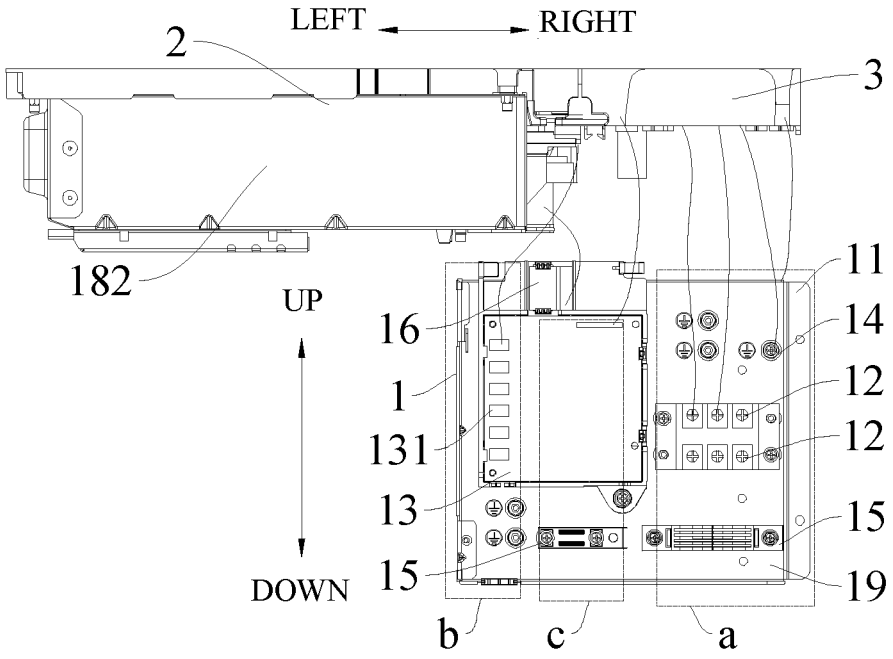
21. The outdoor unit according to claim 20, wherein the casing comprises a side plate, and the side plate has a side plate flange extending toward the middle partition plate;
the hanger is disposed on a first end of the wiring component, and a second end of the wiring component is provided with a wiring component flange, the wiring component flange being configured to overlap the side plate flange and be threaded with the side plate flange.

22. The outdoor unit according to any one of claims 18 to 21, wherein the electric control component comprises a radiator, a refrigerant pipe is provided in the second chamber, and a part of the refrigerant pipe extends into the electrically controlled welding mem-

ber and contacts the radiator.

23. The outdoor unit according to any one of claims 18 to 22, wherein a motor bracket is provided in the first chamber, and the electrically controlled welding member has a first end connected to the motor bracket and a second end connected to the middle partition plate.

24. An air conditioner, comprising an outdoor unit according to any one of claims 17 to 23.


LEFT
RIGHT
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16
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131
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DOWN
11
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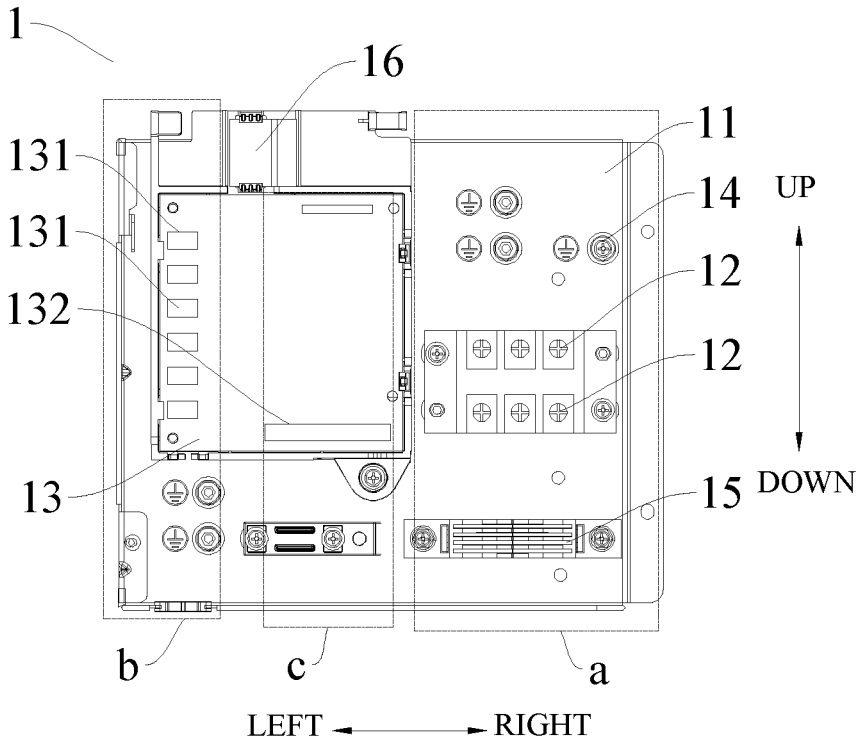
b
c
a

FIG. 1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DOWN
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LEFT
RIGHT

FIG. 2

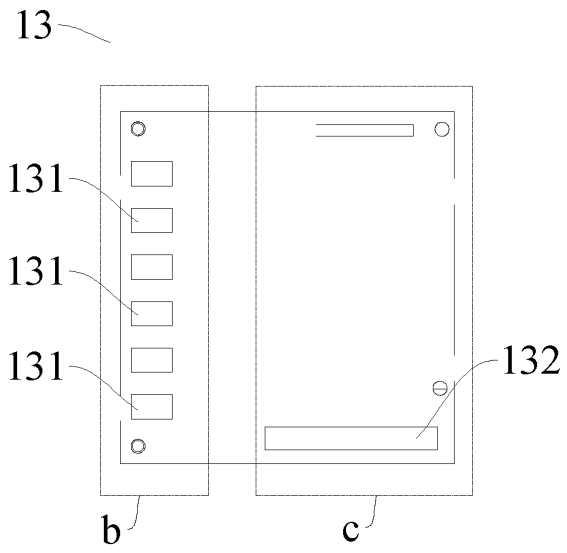
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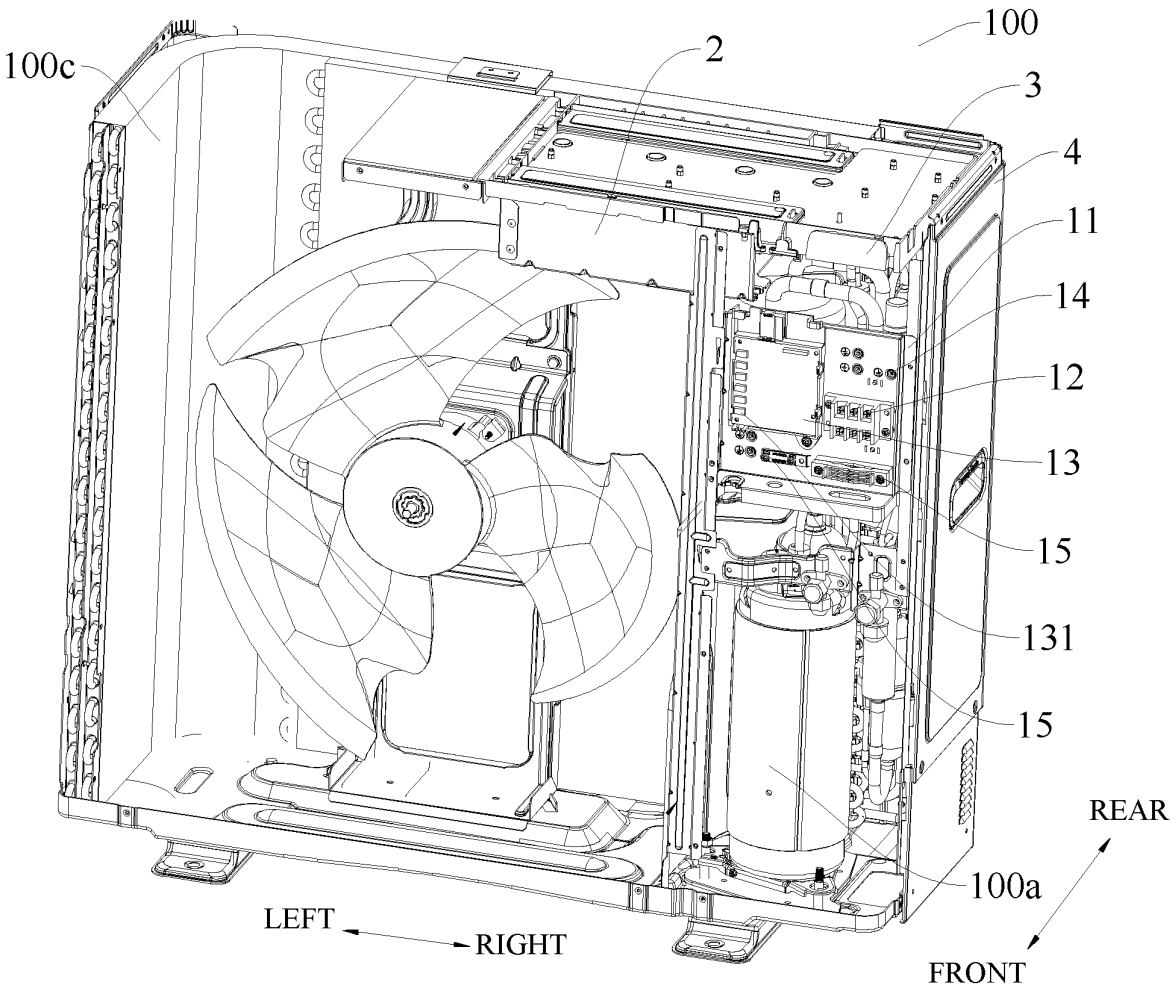
FIG. 3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FRONT

FIG. 4

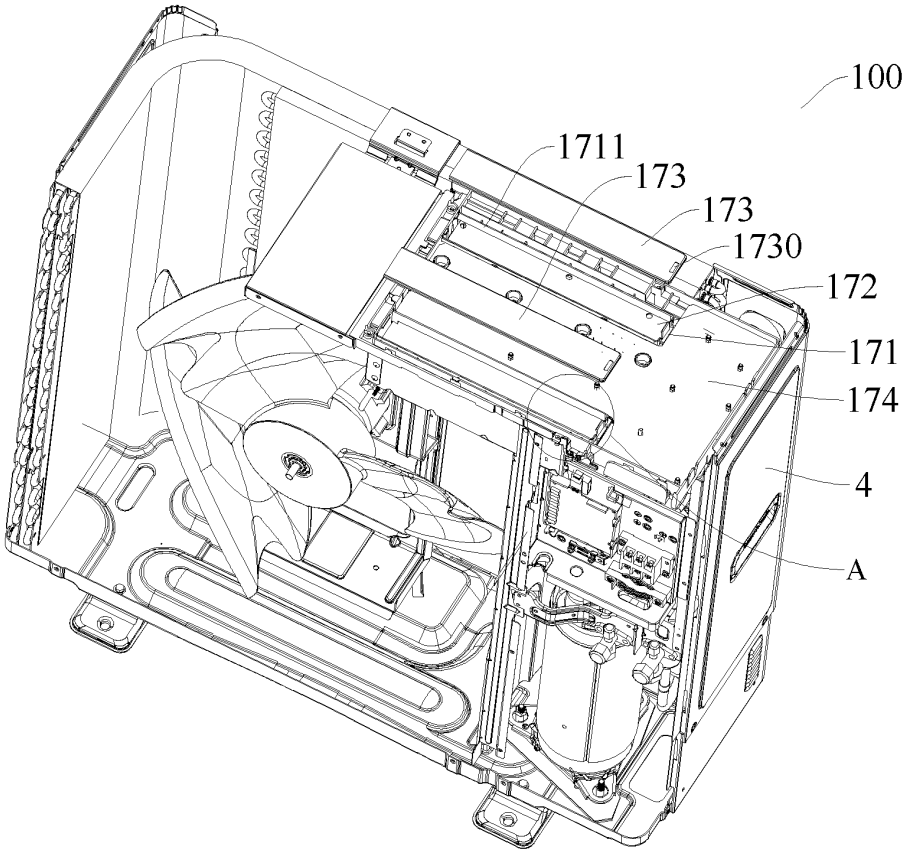

FIG. 5

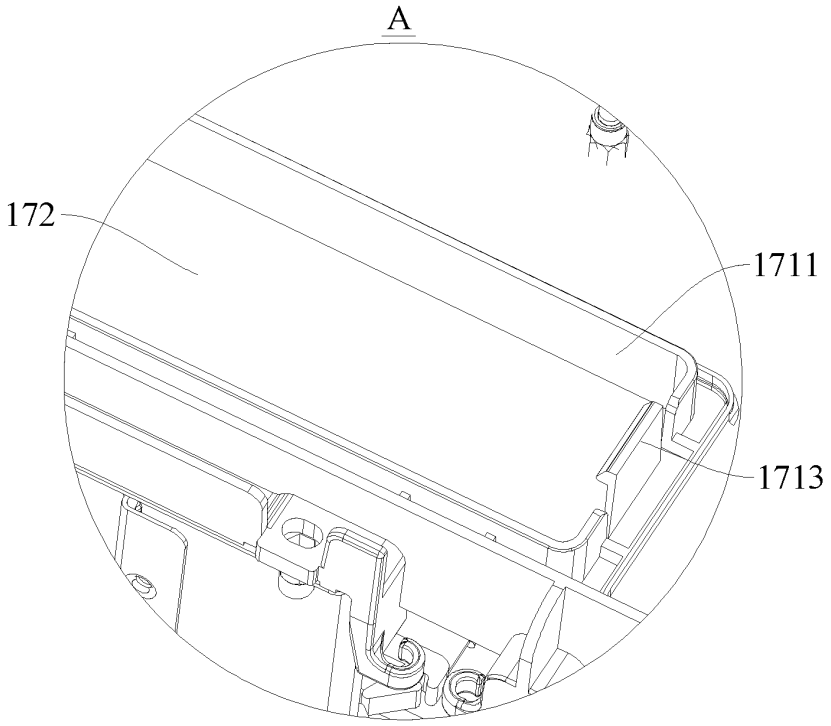

FIG. 6

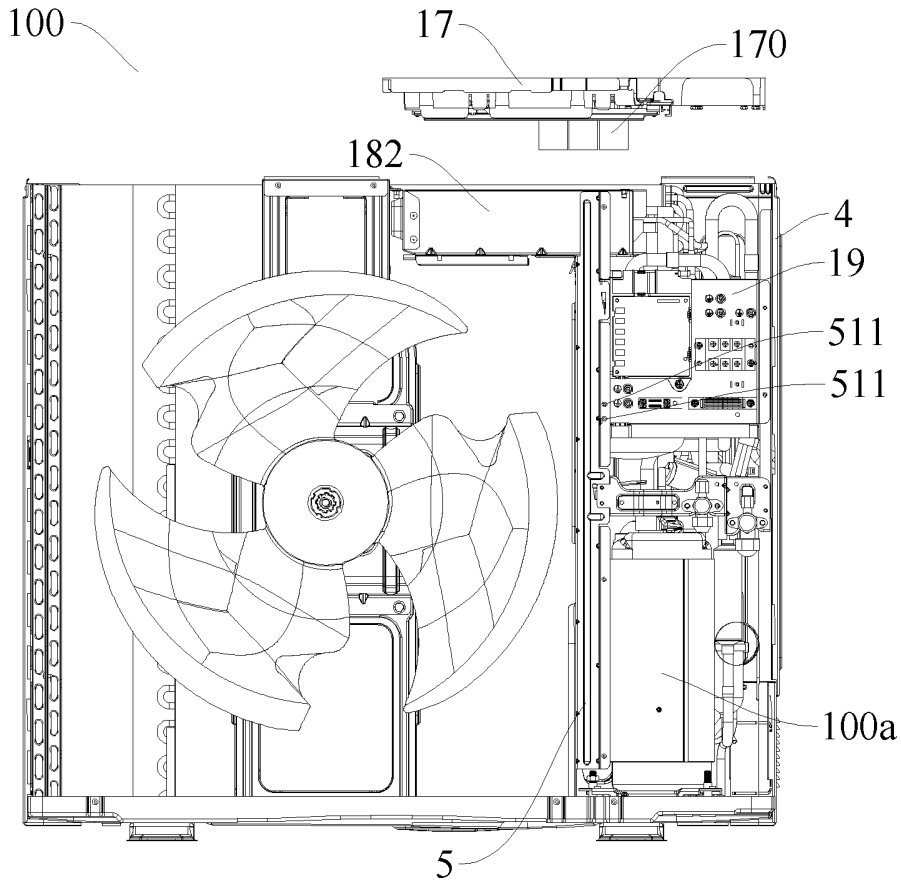
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FIG. 7

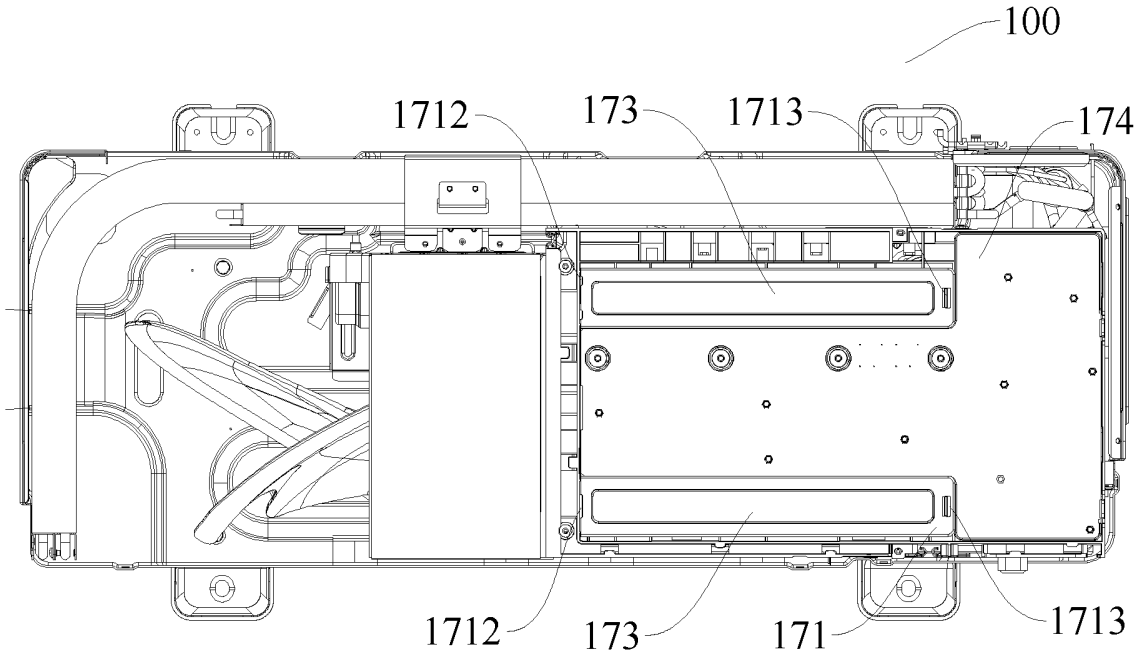
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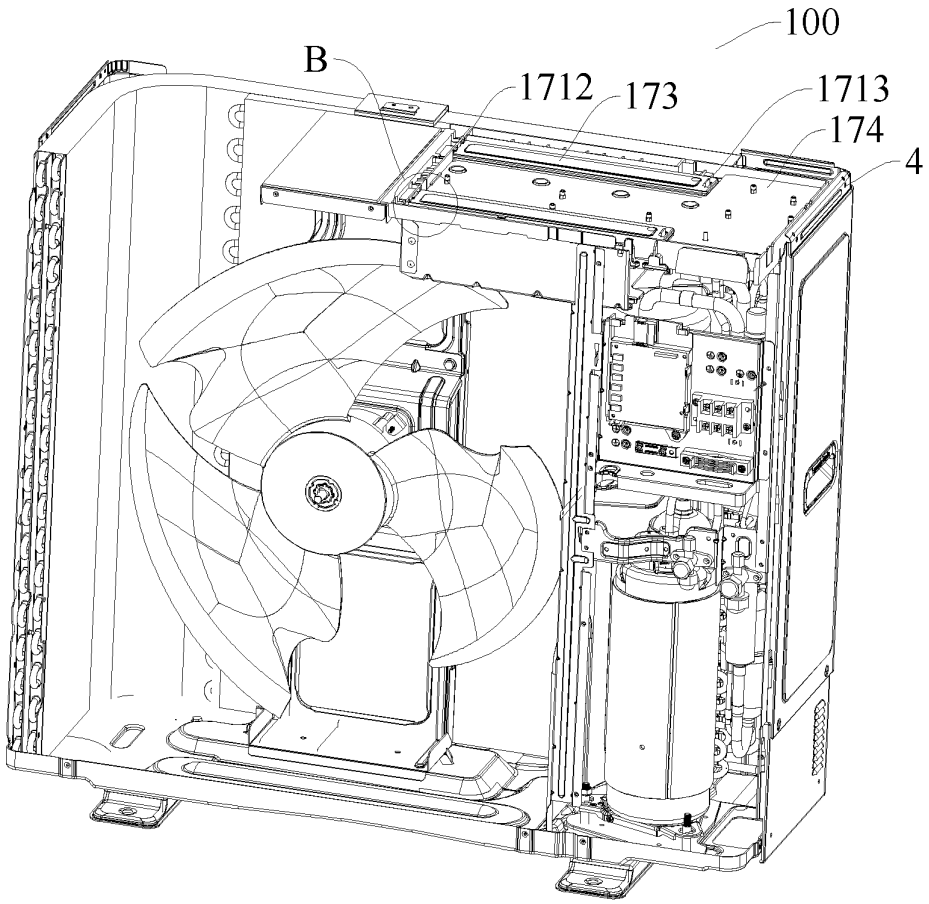
FIG. 8



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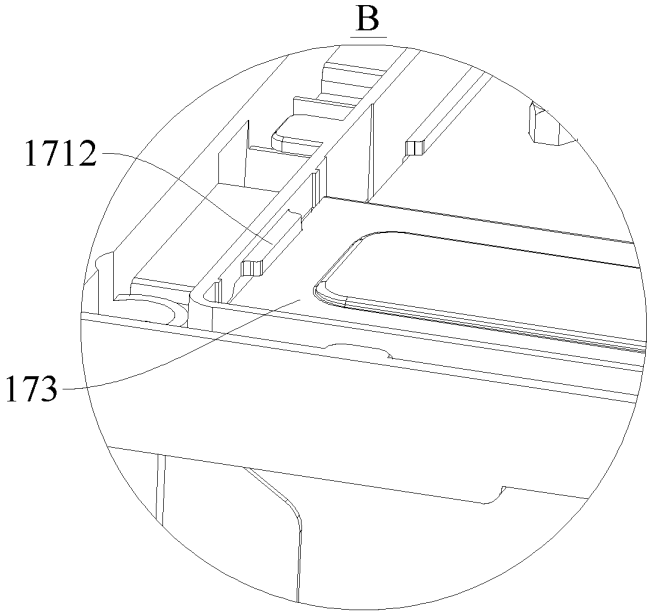


FIG. 10

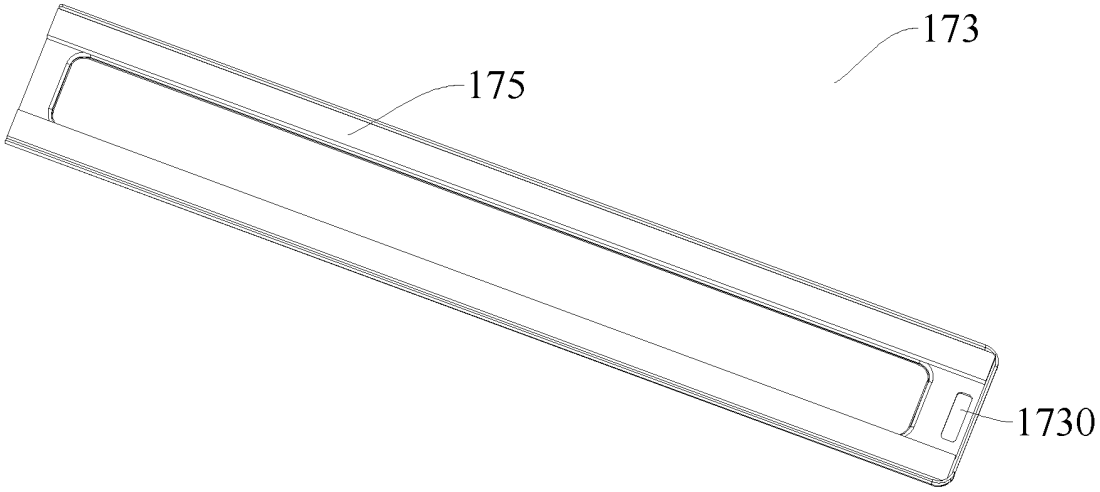


FIG. 11

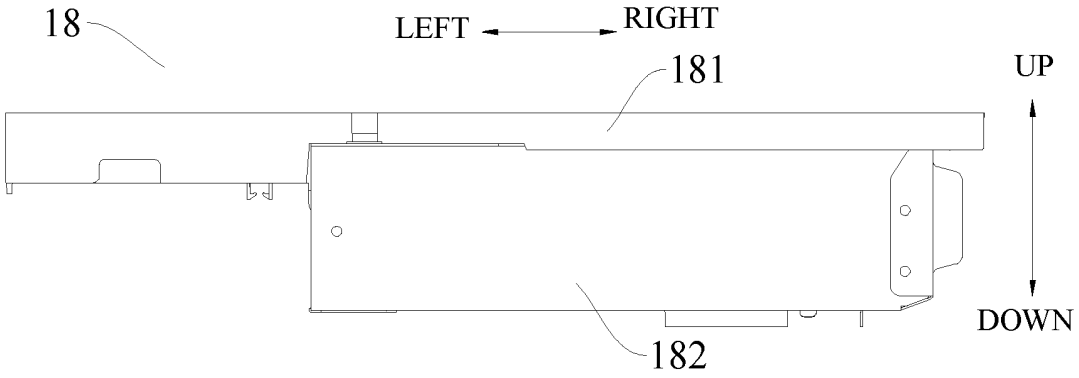


FIG. 12

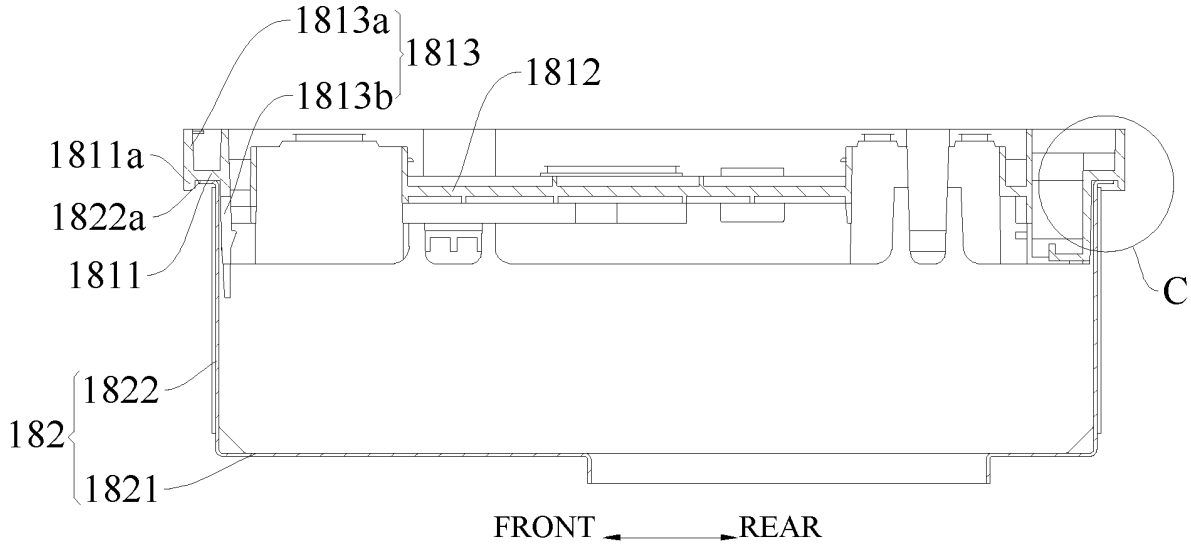


FIG. 13

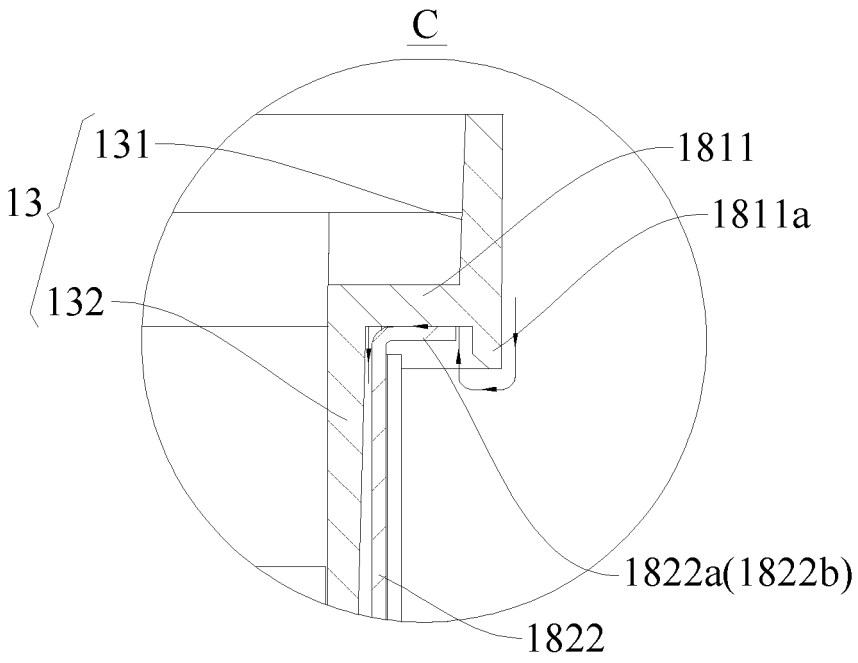


FIG. 14

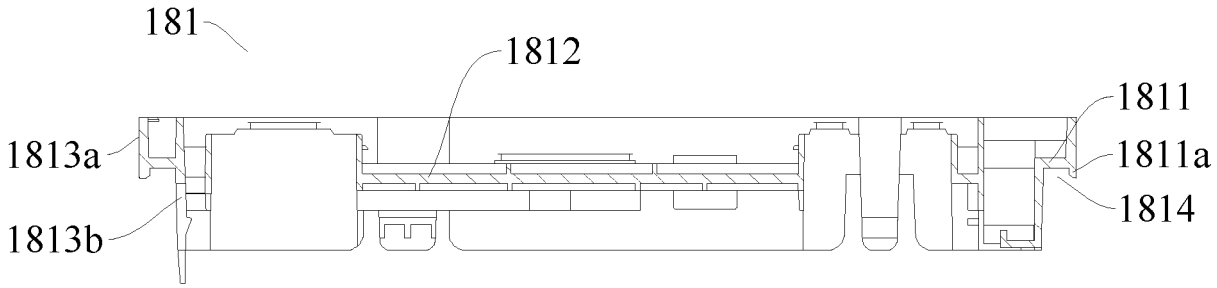


FIG. 15

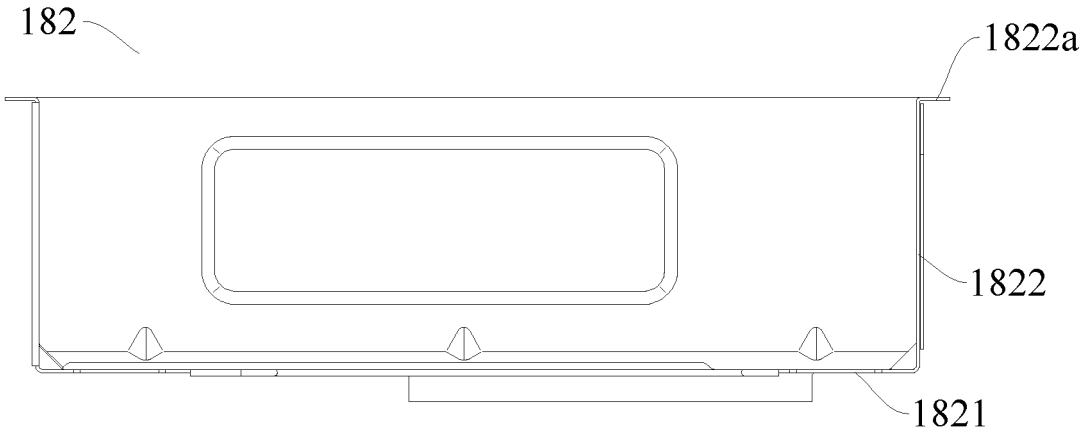
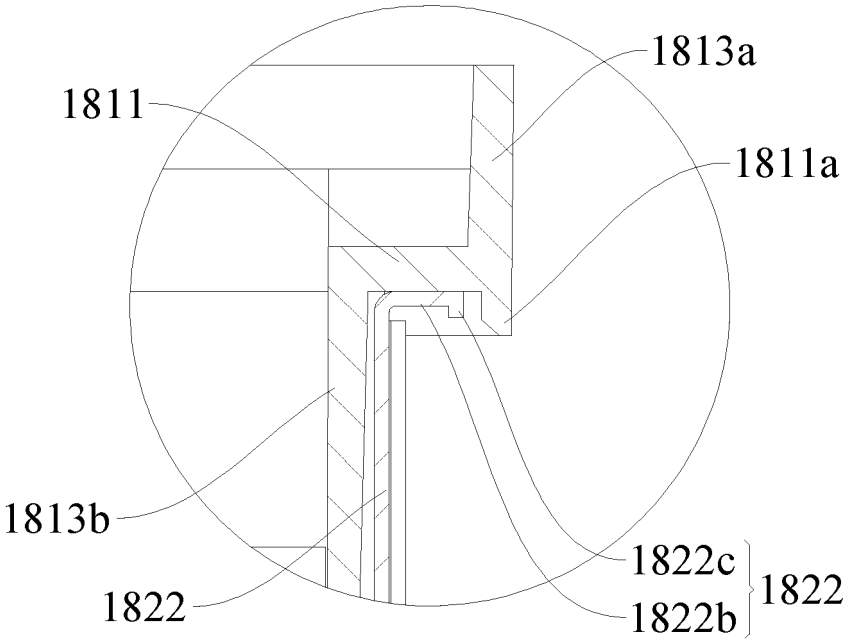


FIG. 16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1822b

FIG. 17

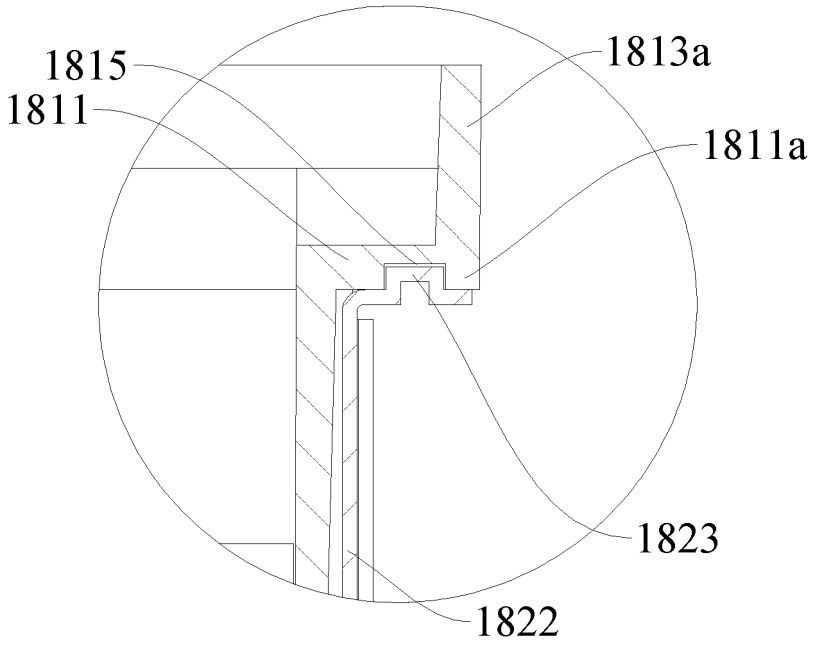
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FIG. 18

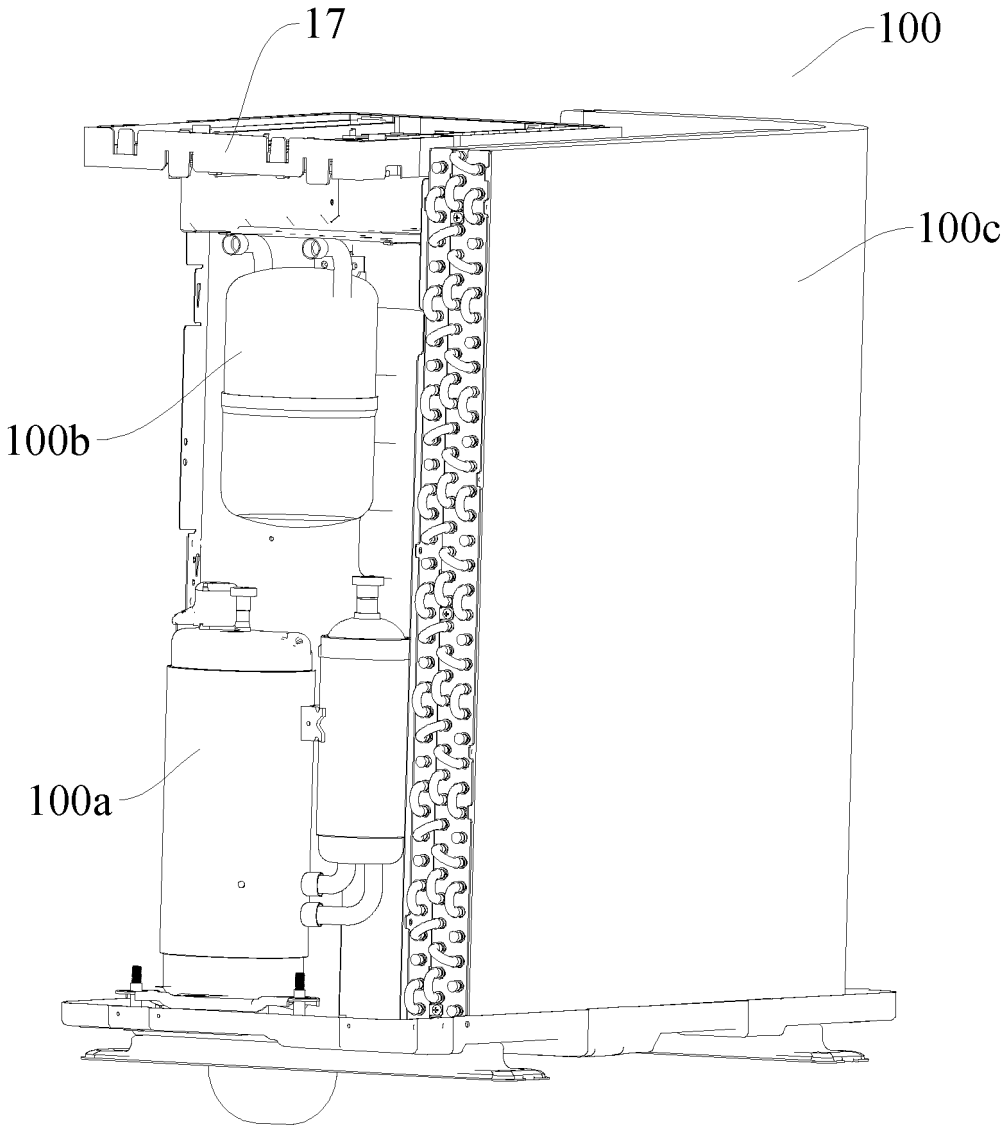


FIG. 19

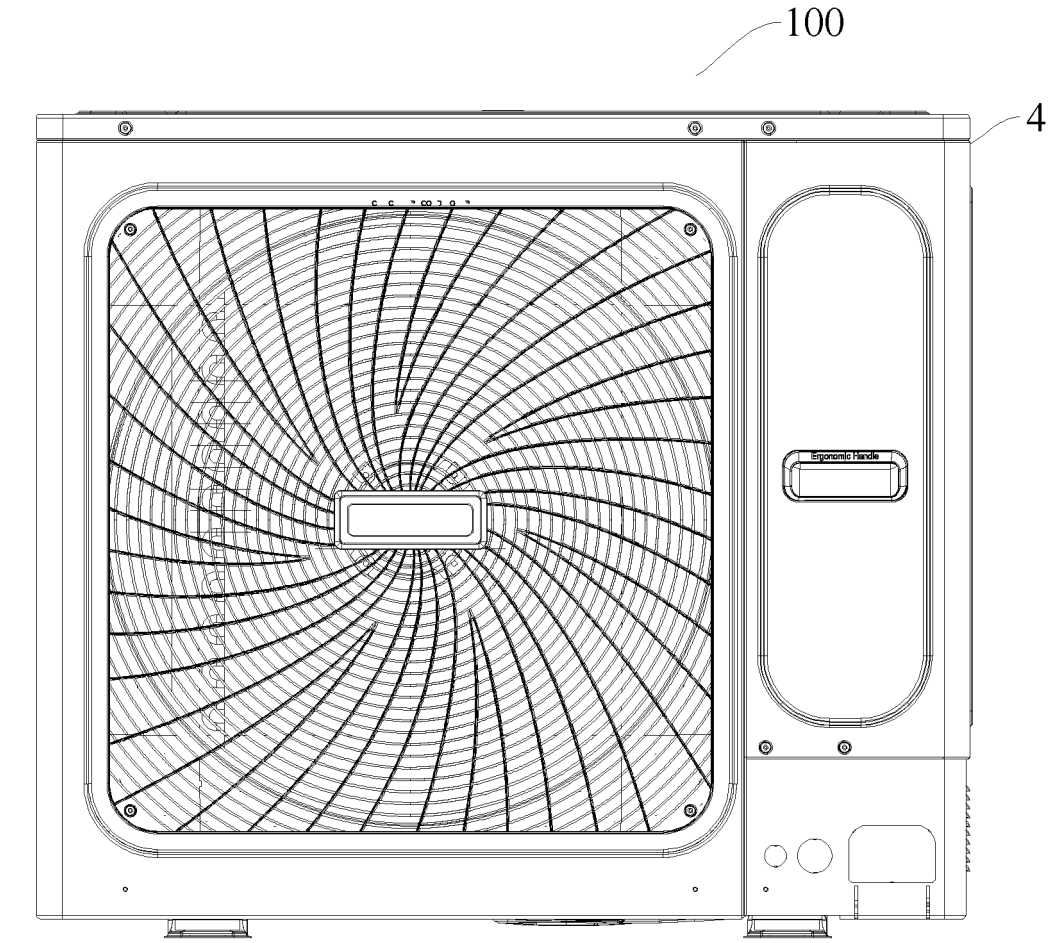
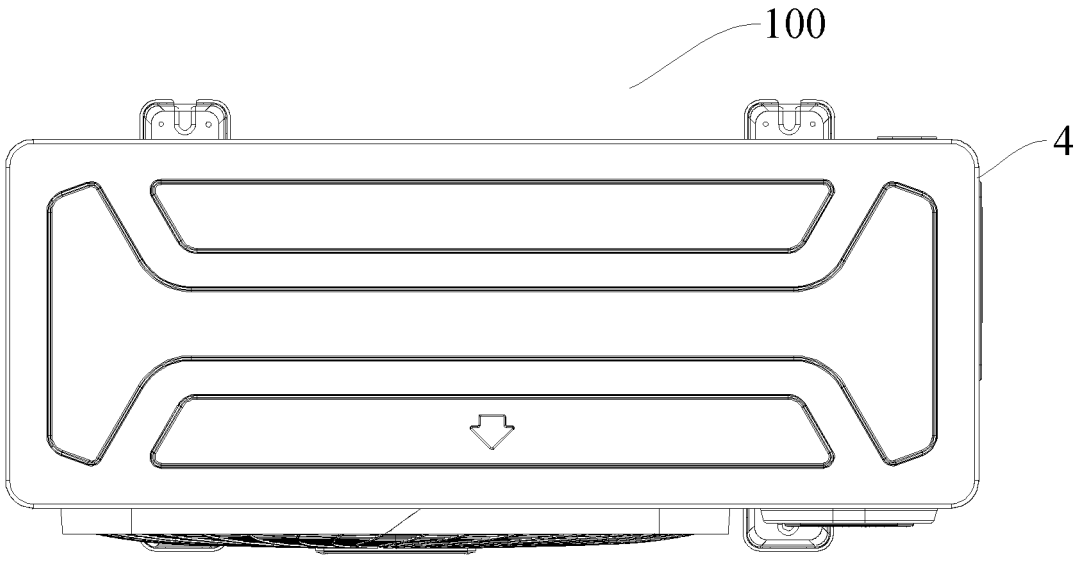


FIG. 20



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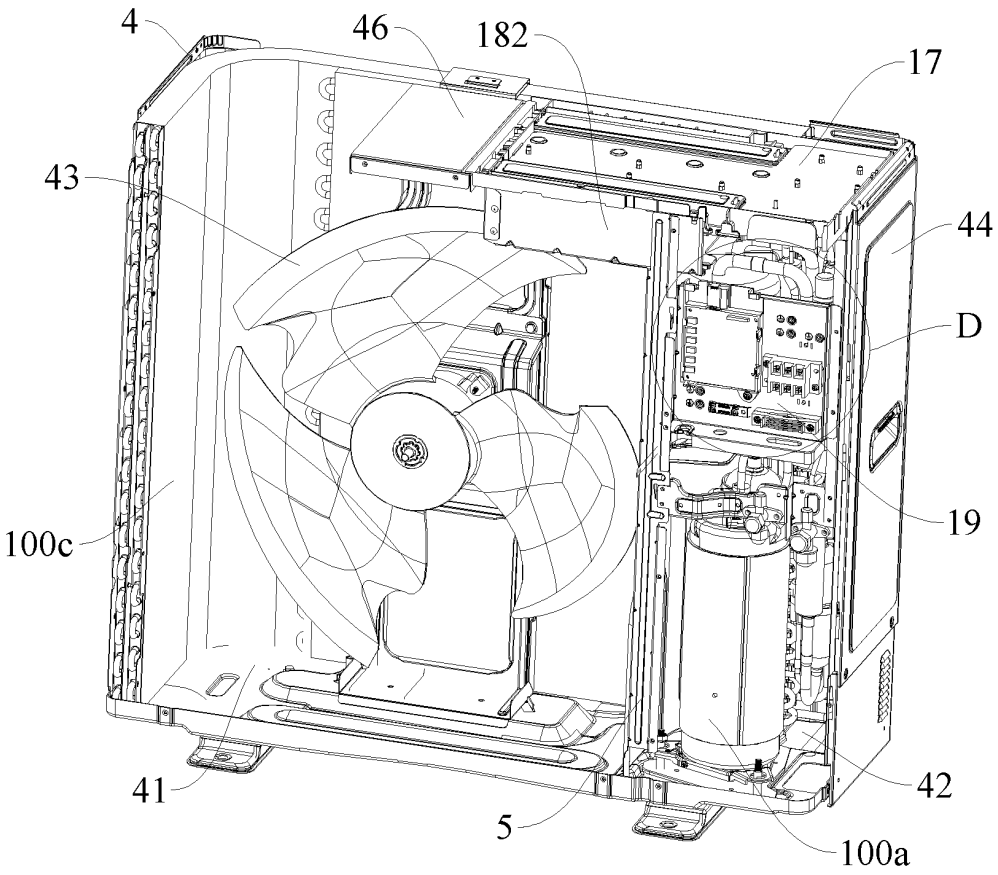
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FIG. 22

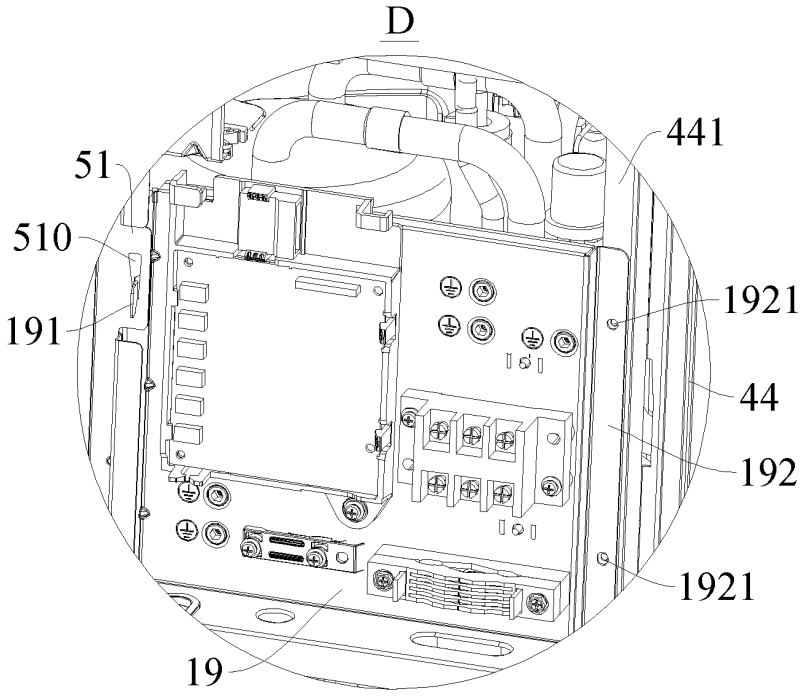
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FIG. 23

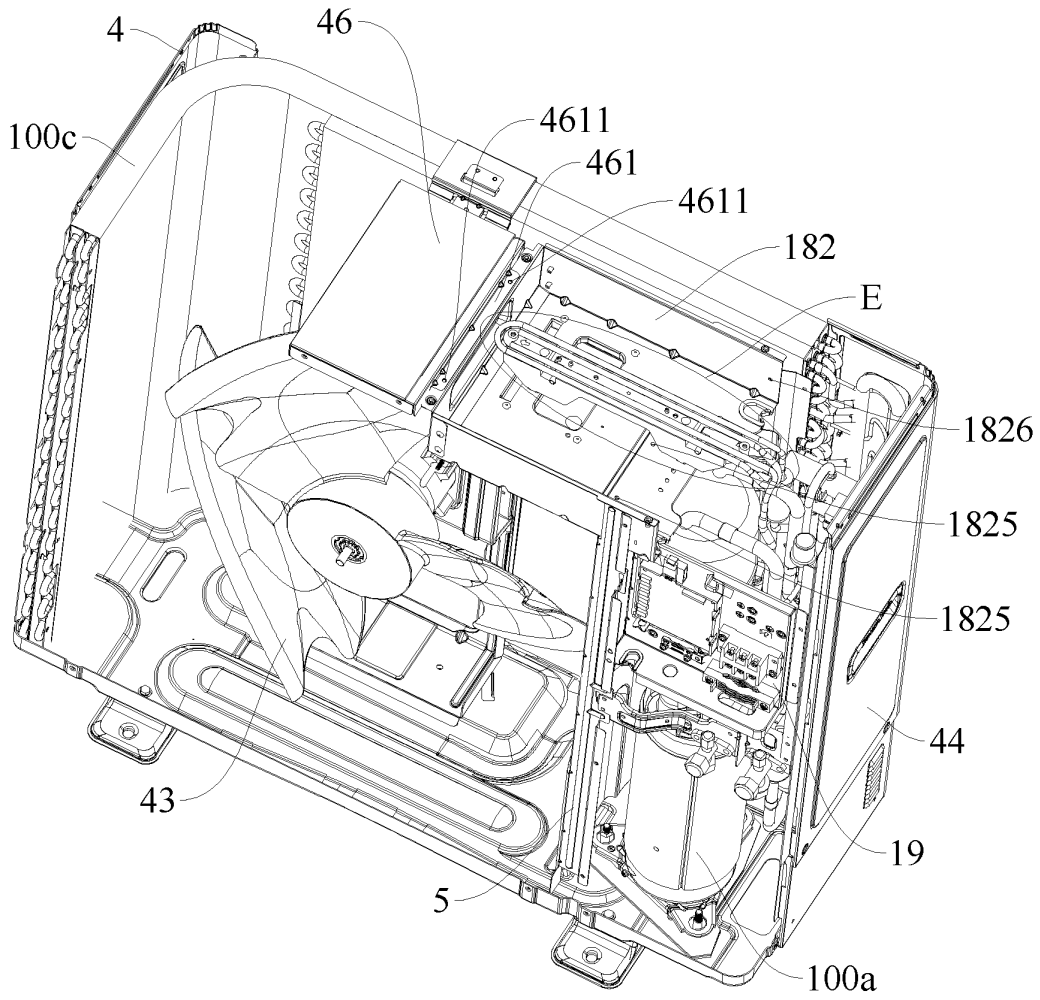
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FIG. 24

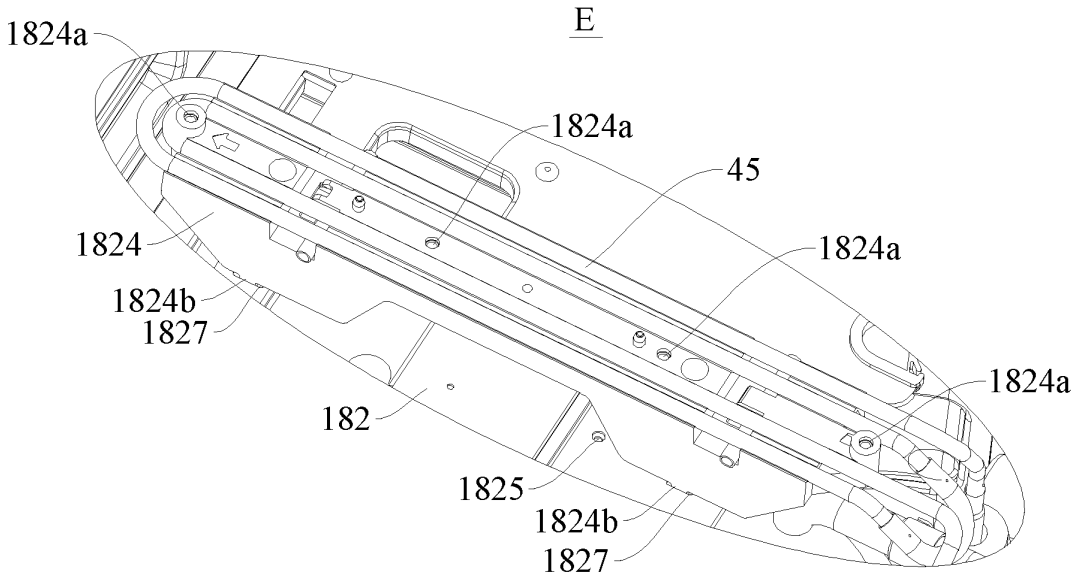
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FIG. 25

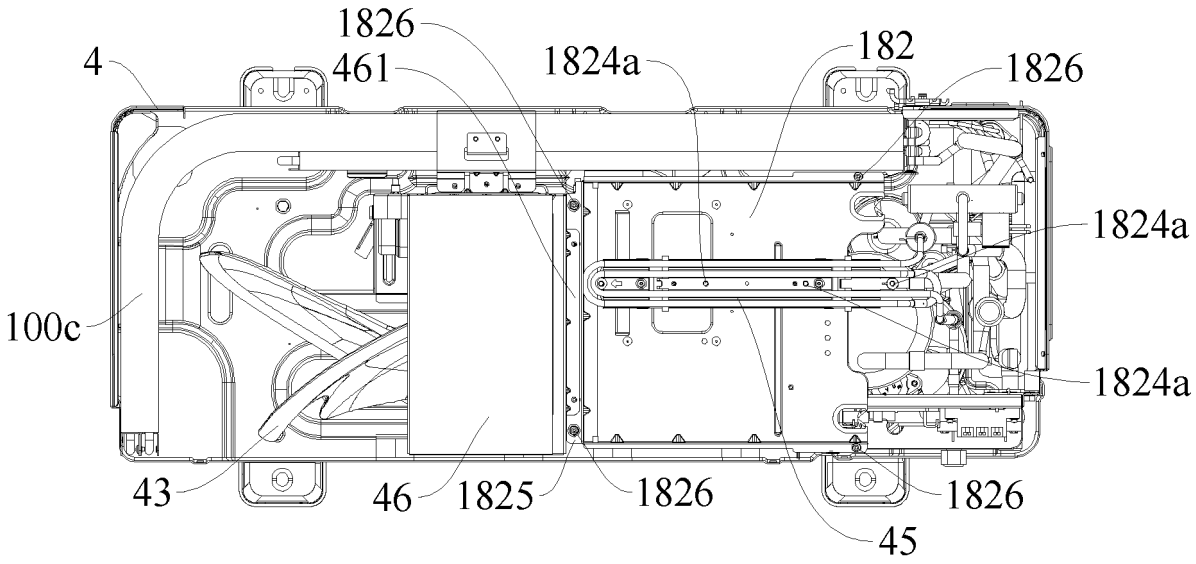
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FIG. 26

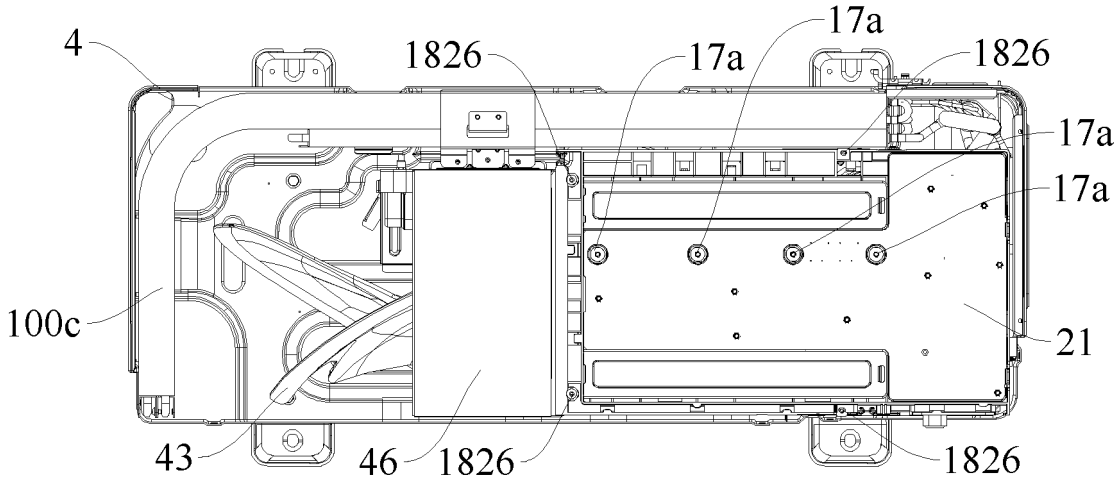
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FIG. 27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/089848

A. CLASSIFICATION OF SUBJECT MATTER

F24F 11/00(2018.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, CNKI, WPI, EPODOC 空调, 室外机, 电控组件, 主控板, 滤波板, 接线, 分隔板, 安装板, 电源线, 插座, 信号线 air, conditioner, outdoor, unit, electric control, module, master control board, filtering board, welding part, wir+, partition plate, mounting plate, power line, socket, signal line

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 207162783 U (GUANDONG MIDEA HVAC EQUIPMENT CO., LTD. ET AL.) 30 March 2018 (2018-03-30) description, paragraphs [0028]-0053], and figures 1-6	1-10, 17, 24
Y	CN 207162783 U (GUANDONG MIDEA HVAC EQUIPMENT CO., LTD. ET AL.) 30 March 2018 (2018-03-30) description, paragraphs [0028]-[0053], and figures 1-6	11-16, 18-23
Y	CN 206831704 U (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 02 January 2018 (2018-01-02) description, paragraphs [0022]-[0027], and figures 1-3	11-16, 18-23
Y	CN 104848438 A (GUANGDONG CHIGO HEATING AND VENTILATION EQUIPMENT CO., LTD.) 19 August 2015 (2015-08-19) description, paragraphs [0022]-[0028], and figure 1	22
A	CN 207162784 U (GUANDONG MIDEA HVAC EQUIPMENT CO., LTD. ET AL.) 30 March 2018 (2018-03-30) entire document	1-24

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 July 2019	**09 August 2019**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/089848

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 208804789 U (GUANDONG MIDEA HVAC EQUIPMENT CO., LTD. ET AL.) 30 April 2019 (2019-04-30) description, paragraphs [0031]-[0058], and figures 1-4	1-10, 17, 24
A	CN 205807764 U (NANJING TICA AIR-CONDITIONING CO., LTD.) 14 December 2016 (2016-12-14) entire document	1-24
A	CN 107436024 A (GUANDONG MIDEA HVAC EQUIPMENT CO., LTD. ET AL.) 05 December 2017 (2017-12-05) entire document	1-24
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