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(54) **ELECTRONIC CONTROL ASSEMBLY, AIR CONDITIONER OUTDOOR UNIT AND AIR CONDITIONER**

(57) An electronic control assembly (100), an air conditioner outdoor unit and an air conditioner, which relate to the technical field of air conditioners, and are used for solving the technical problem of layout difficulty caused by the large space occupied in an air conditioner due to the assembly mode of electronic-control circuit boards (120). The electronic control assembly (100) comprises a mounting support (110) and a plurality of electronic-control circuit boards (120). The mounting support (110) comprises a first mounting plate (111), a second mounting plate (112) and a support member (113). The plurality of electronic-control circuit boards (120) are respectively arranged on the first mounting plate (111) and the second mounting plate (112). The first mounting plate

(111) is connected to the second mounting plate (112), and an included angle is formed between the first mounting plate (111) and the second mounting plate (112). The support member (113) is connected between the first mounting plate (111) and the second mounting plate (112). The air conditioner outdoor unit comprises a housing (200), a middle partition plate (300), a fan assembly (400), a compressor assembly (500), and the electronic control assembly (100). The air conditioner comprises an air conditioner indoor unit and the air conditioner outdoor unit, which are connected to each other. The electronic control assembly (100) is used for controlling the operation of the air conditioner outdoor unit.

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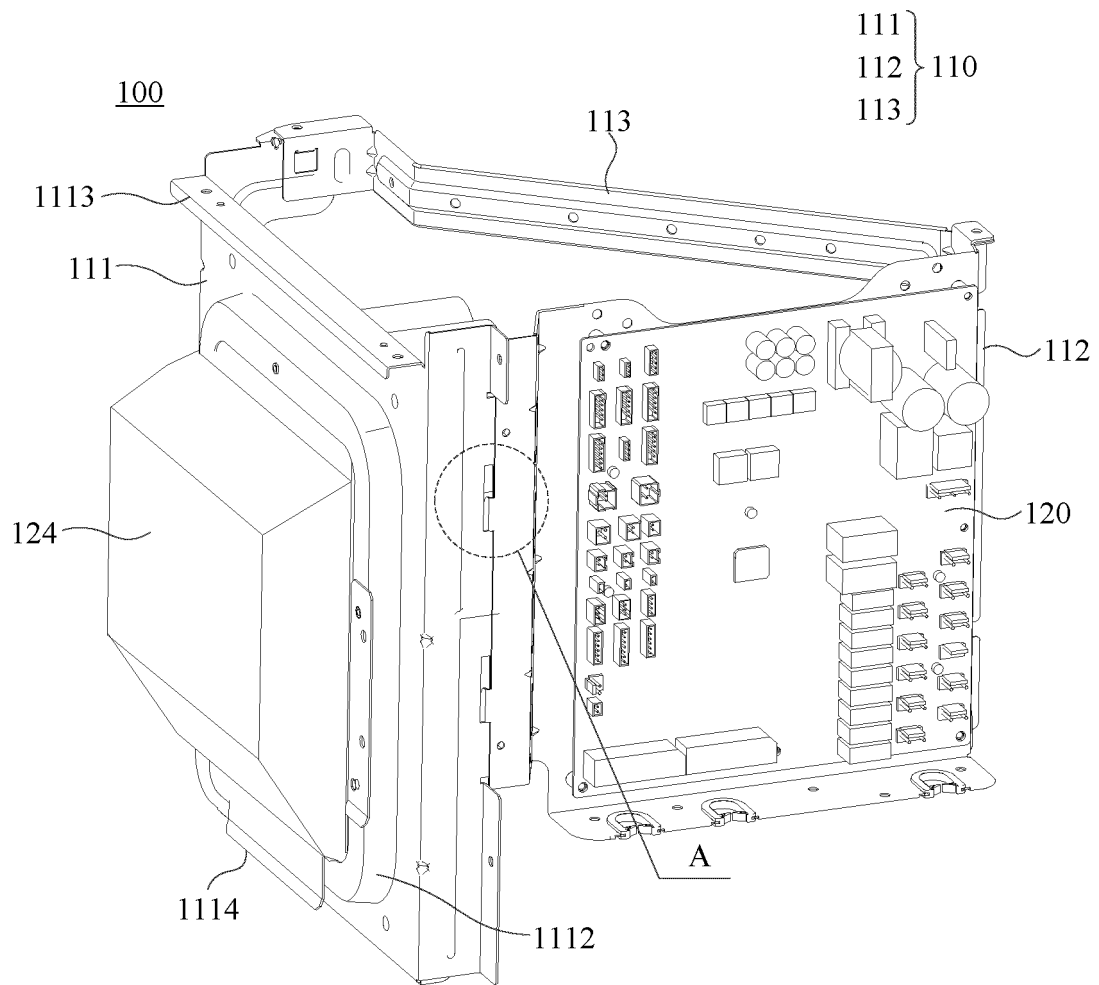


FIG. 1

Description

[0001] This application claims priority to the Chinese patent application No. 202220898036.6, entitled "ELECTRONIC CONTROL COMPONENT, AIR-CONDITIONING OUTDOOR UNIT AND AIR CONDITIONER" and filed with the China National Intellectual Property Administration on April 18, 2022, the disclosure of which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] This disclosure relates to the technical field of air conditioning, and specifically to an electronic control component, an air-conditioning outdoor unit and an air conditioner.

BACKGROUND

[0003] The interior of a master unit casing of electrical devices such as an air conditioner and a warm air blower is provided with an electronic control component for controlling startup and operation of the devices. The electronic control component may be disposed in an electric control box, which is installed as a whole inside the master unit. Alternatively, the electronic control component is disposed on an electronic control board and is assembled in the master unit. In related technologies, when facing a circuit layout with a relatively complex power consumption structure and a large number of the electronic control components, the size or number of the corresponding electronic control boards will be increased. Multiple brackets are required to install and fix the electronic control boards in the master unit. However, the current way of assembling the electronic control boards takes up a large space, leading to a difficult layout.

SUMMARY

[0004] The main purpose of this disclosure is to provide an electronic control component, an air-conditioning outdoor unit and an air conditioner, aiming to solve the technical problem that assembling the electronic control boards takes up a large space, resulting in difficult layout.

[0005] In order to achieve the above purpose, this disclosure provides an electronic control component. The electronic control component includes a mounting bracket and a plurality of electronic control circuit boards. The mounting bracket includes a first mounting plate, a second mounting plate and a support member. The plurality of electric control circuit boards are respectively provided on the first mounting plate and the second mounting plate. The first mounting plate is connected to the second mounting plate, and an included angle is formed between the first mounting plate and the second mounting plate. The support member is connected between the first mounting plate and the second mounting plate.

[0006] The beneficial effects of this disclosure are: the

plurality of electronic control circuit boards are fixed through the first and second mounting plates that are connected to each other and their structures are strengthened using the support member, thereby ensuring a mounting reliability of the electronic control circuit boards, reducing an overall space occupied by the electronic control component.

[0007] On the basis of the above technical solution, the disclosure may be further improved as follows.

[0008] Further, one side edge of the first mounting plate is connected to one side edge of the second mounting plate. A first end of the support member is connected to the other side edge of the first mounting plate that is farther away from the second mounting plate than the one side edge of the first mounting plate. A second end of the support member is connected to the other side edge of the second mounting plate that is farther away from the first mounting plate than the one side edge of the second mounting plate. Such a configuration may improve the reliability of the support structure.

[0009] Further, a surface of the first mounting plate is perpendicular to a surface of the second mounting plate, and the support member forms a triangular support structure with the first mounting plate and the second mounting plate. Such a configuration may improve the overall structural strength of the mounting bracket.

[0010] Further, one of the one side edge of the first mounting plate and the one side edge of the second mounting plate is provided with a slot, and the other one of the one side edge of the first mounting plate and the one side edge of the second mounting plate is provided with a buckle, and the buckle is engaged in the slot. Such a configuration may improve the convenience for assembling the first mounting plate and the second mounting plate.

[0011] Further, a plurality of buckles and slots may be disposed, and the plurality of buckles correspond to the plurality of slots one by one, and the plurality of buckles and the plurality of slots are respectively arranged at intervals along extending directions of the one side edge of the first mounting plate and of the one side edge of the second mounting plate. Such a configuration may ensure that all positions of the one side edges of the first mounting plate and of the second mounting plate that are connected to each other can maintain an effective and reliable connection.

[0012] Further, the support member may include a support section and two connection sections. The two connection sections are respectively connected to two ends of the support section. The side edge of the first mounting plate and the side edge of the second mounting plate are each provided with a flange. The two connection sections are respectively connected to the flange of the first mounting plate and the flange of the second mounting plate. Such a configuration may facilitate the assembling of the support member with the first mounting plate and the second mounting plate.

[0013] Further, the connection section is provided with

a plug-in portion, the flange is provided with a socket, and the plug-in portion may pass through the socket and is folded toward a direction away from an inner wall of the socket. With such a configuration, the support member may be positioned upon assembling the support member with the first mounting plate or the second mounting plate.

[0014] Further, the connection section has a first bending portion extending in a horizontal direction, and a side edge of the flange has a second bending portion extending in the horizontal direction. The first bending portion may be located above the second bending portion and abut with the second bending portion. As a result, the flange plays a load-bearing role on the support member.

[0015] Further, the plurality of electric control circuit boards may include a first electric control board, a second electric control board, a third electric control board and a radiator. The first electric control board may be located on a side of the first mounting plate facing the second mounting plate, the radiator may be located on a side of the first mounting plate away from the second mounting plate, and the second electronic control board and the third electronic control board may be located on opposite sides of the second mounting plate. With such a configuration, the assembly space on the first mounting plate and the second mounting plate may be fully utilized.

[0016] This disclosure further provides an air-conditioning outdoor unit. The air-conditioning outdoor unit includes a casing, a middle partition, a fan component, a compressor component and the electronic control component in the above technical solutions. The middle partition may be disposed inside the casing and divide an interior of the casing into a first accommodation chamber and a second accommodation chamber. The fan component is disposed in the first accommodation chamber, and the compressor component is disposed in the second accommodation chamber. The electronic control component may be installed on a side of the middle partition facing the second accommodation chamber. Such a configuration may make full use of the space inside the casing and improve space utilization.

[0017] Further, the electronic control component may include a first mounting plate and a second mounting plate that are connected to each other. A gap is disposed at a top of the middle partition and extends along a height direction of the middle partition. The first mounting plate is plugged into the gap from top to bottom. The second mounting plate extends in a direction away from the middle partition. With such a configuration, an installation guidance of the first mounting plate may be improved, thereby improving the convenience of assembling the electronic control component and the middle partition.

[0018] Further, opposite sides of the gap may be each provided with a first folded edge, which extends along an edge of the gap. A side of the first mounting plate facing the middle partition has a protruding portion, and a shape of the protruding portion matches with a shape of the gap, and a side edge of the protruding portion abuts with

the first folded edge. With such a configuration, it is possible to delimit left and right positions of the first mounting plate, thereby preventing the first mounting plate from shaking significantly relative to the gap.

[0019] Further, the electronic control component may include a radiator disposed on the protruding portion, and at least part of the radiator extends into the first accommodation chamber. With such a configuration, a heat dissipation speed of the radiator may be accelerated through the fan component in the first accommodation chamber, thereby improving heat dissipation effect.

[0020] Further, a top side of the middle partition may be provided with a second folded edge, and a top side of the first mounting plate may be provided with a hooking portion abutted with the second folded edge. With such a configuration, the middle partition may support the first mounting plate.

[0021] Further, a third folded edge may be disposed at a bottom of the gap and a limiting portion may be disposed at a bottom of the first mounting plate and abuts with the third folded edge. With such a configuration, the bottom of the first mounting plate may be supported and fixed.

[0022] This disclosure further provides an air conditioner, which includes an air-conditioning indoor unit and the air-conditioning outdoor unit in the above technical solutions. The air-conditioning indoor unit is connected to the air-conditioning outdoor unit.

[0023] The beneficial effects of the air-conditioning outdoor unit and air conditioner provided by this disclosure are the same as those of the above-mentioned electronic control component, and will not be repeated here.

BRIEF DESCRIPTION OF DRAWINGS

[0024]

FIG. 1 is a schematic structural diagram of an electronic control component provided by an embodiment of this application.

FIG. 2 is a schematic structural diagram of the electronic control component provided by an embodiment of this application viewed from another perspective.

FIG. 3 is a schematic structural diagram of position A in FIG. 1.

FIG. 4 is a schematic structural diagram of position B in FIG. 2.

FIG. 5 is a schematic diagram of an internal structure of an air-conditioning outdoor unit provided by an embodiment of this application.

FIG. 6 is a schematic diagram of the internal structure of the air-conditioning outdoor unit provided by an embodiment of this application viewed from another perspective.

FIG. 7 is a schematic assembly diagram of an electronic control component and a middle partition of the air-conditioning outdoor unit provided by an em-

bodiment of this application.

FIG. 8 is a schematic structural diagram of position C in FIG. 7.

FIG. 9 is a schematic assembly diagram of a reactance component of the air-conditioning outdoor unit provided by an embodiment of this application.

FIG. 10 is a schematic assembly diagram of the reactance component and the middle partition of the air-conditioning outdoor unit provided by an embodiment of this application.

FIG. 11 is an exploded view of the reactance component of the air-conditioning outdoor unit during assembling provided by an embodiment of this application.

FIG. 12 is a partial view of position D in FIG. 11.

FIG. 13 is a partial view of position E in FIG. 11.

DESCRIPTION OF EMBODIMENTS

[0025] In related technologies, the interior of a master unit casing of electrical devices such as an air conditioner and a warm air blower is provided with an electronic control component for controlling startup and operation of the devices. The electronic control component may be disposed in an electric control box, which is installed as a whole inside the master unit. Alternatively, the electronic control component is disposed on an electronic control board and is assembled in the master unit. The electric control box occupies a large space, so the electric control board will be assembled directly into the casing of the master unit for many small-sized master units. Facing a circuit layout with a relatively complex electricity consumption structure and a large number of the electronic control components, the size or number of the corresponding electronic control boards will be increased. Multiple brackets are required to install and fix the electronic control boards in the master unit. For example, in a three-phase electric control (380V) layout, a circuit mechanism of the three-phase circuit is more complex, which needs more electric control circuit boards to be fixed. However, the current way of assembling the electronic control boards takes up a large space. Setting up multiple electric control circuit boards separately will occupy the layout space of the fan and compressor pipelines in the master unit, resulting in low space utilization and difficulty in overall layout.

[0026] In view of this, in the electronic control component of an embodiment of this disclosure, a plurality of electronic control boards may be fixed simultaneously through a structural design of a mounting bracket, and the edge space inside the master unit may be fully utilized. While ensuring permanent convenience and reliability, the space occupied is reduced in the master unit and the space utilization is improved, thereby facilitating the arrangement of other components, and improving a layout convenience.

[0027] The technical solutions in the embodiments of this disclosure will be clearly and completely described

below with reference to the accompanying drawings in the embodiments of this disclosure. Obviously, the described embodiments are only some of the embodiments, rather than all of the embodiments in this disclosure. Based on the embodiments in this disclosure, all other embodiments obtained by those skilled in the art without creative efforts fall within the protection scope of this disclosure.

[0028] FIG. 1 is a schematic structural diagram of an electronic control component provided by an embodiment of this application. FIG. 2 is a schematic structural diagram of an electronic control component provided by an embodiment of this application viewed from another perspective.

[0029] As shown in FIG. 1 and FIG. 2, this embodiment provides an electronic control component 100. The electronic control component 100 includes a mounting bracket 110 and a plurality of electronic control circuit boards 120. The electronic control component 100 may be applied in an air-conditioning outdoor unit. When the electronic control component 100 is assembled, the mounting bracket 110 may be connected to the air-conditioning outdoor unit. The plurality of electronic control circuit boards 120 may be installed on the mounting bracket 110. Circuit elements may be provided on the electronic control circuit board 120 to control the operation of the air-conditioning outdoor unit.

[0030] The mounting bracket 110 includes a first mounting plate 111, a second mounting plate 112 and a support member 113. The plurality of electronic control circuit boards 120 are respectively installed on the first mounting plate 111 and the second mounting plate 112. The first mounting plate 111 and the second mounting plate 112 are connected to each other, and an included angle is formed between the first mounting plate 111 and the second mounting plate 112. The support member 113 is connected between the first mounting plate 111 and the second mounting plate 112 to support and stabilize a connection between the first mounting plate 111 and the second mounting plate 112.

[0031] It may be understood that in the embodiment of this application, the plurality of electronic control circuit boards 120 are fixed through the first mounting plate 111 and the second mounting plate 112 that are connected to each other, and the support member 113 is configured to strengthen the structure, thereby ensuring the installation reliability of the electronic control circuit boards 120. Meanwhile, the included angle is formed between the first mounting plate 111 and the second mounting plate 112. When laying out components in the air-conditioning outdoor unit, it is possible to avoid other components in the air-conditioning outdoor unit, thereby making full use of edge gaps in the air-conditioning outdoor unit, reducing the overall space occupied by the electronic control component 100 and improving the layout convenience.

[0032] It should be noted that the first mounting plate 111 may contain materials including but not limited to

metals, such as iron and aluminum, or their alloys, or plastics, etc. Correspondingly, the first mounting plate 111 may be formed by plate process molding or injection molding. The second mounting plate 112 and the support member 113 may contain similar materials or use similar molding modes as the first mounting plate 111, which are not specifically limited in the embodiment of this application.

[0033] In some embodiments, one side edge of the first mounting plate 111 is connected to one side edge of the second mounting plate 112, and a first end of the support member 113 may be connected to the other side edge of the first mounting plate 111. The other side edge of the first mounting plate 111 is farther away from the second mounting plate 112 than the one side edge of the first mounting plate 111. A second end of the support member 113 may be connected to the other side edge of the second mounting plate 112. The other side edge of the second mounting plate 112 is farther away from the first mounting plate 111 than the one side edge of the second mounting plate 112. Therefore, the reliability of the support structure is improved.

[0034] It may be understood that the first mounting plate 111 may have a same or similar size as the second mounting plate; or, when there is a difference in size between the first mounting plate 111 and the second mounting plate 112, a top side of the first mounting plate 111 is approximately aligned with a top side of the second mounting plate 112. When the first mounting plate 111 and the second mounting plate 112 are disposed in the air-conditioning outdoor unit, plate surfaces of the two have different orientations to utilize the gaps at different positions in the internal space of the air-conditioning outdoor unit. When the support member 113 is connected with the first mounting plate 111 and the second mounting plate 112, the support member 113 may be disposed on a top of the first mounting plate 111 and a top of the second mounting plate 112. In this way, the main space located between the first mounting plate 111 and the second mounting plate 112 is left empty to facilitate the arrangement of other components.

[0035] Exemplarily, the surface of the first mounting plate 111 and the surface of the second mounting plate 112 may be perpendicular to each other, that is, the first mounting plate 111 and the second mounting plate 112 form a cantilever structure relative to each other. Two ends of the support member 113 are connected to two ends, which are away from each other, of the first mounting plate 111 and of the second mounting plate 112, respectively. The support member 113 may form a triangular support structure together with the first mounting plate 111 and the second mounting plate 112, thereby improving the overall structural strength of the mounting bracket 110.

[0036] It should be noted that the included angle between the first mounting plate 111 and the second mounting plate 112 may be adapted to the layout scenario of the air-conditioning outdoor unit, and may have different

angles according to different application scenarios. For example, the angles used may include 30°, 60°, 90°, etc., which is not specifically limited in the embodiments of this application.

[0037] In addition, a bending technology for sheet metal may be configured for molding the first mounting plate 111 and the second mounting plate 112. Alternatively, the two mounting plates may be formed independently and assembled through welding connection or detachable connection. Taking the detachable connection as an example, a specific connection between the first mounting plate 111 and the second mounting plate 112 is described.

[0038] FIG. 3 is a schematic structural diagram of position A in FIG. 1. Continuing referring to FIG. 1 to FIG. 3, in a possible implementation, one of the one side edge of the first mounting plate 111 and the one side edge of the second mounting plate 112 is provided with a slot 1111, and the other one of the one side edge of the first mounting plate 111 and the one side edge of the second mounting plate 112 is provided with a buckle 1121, and the buckle 1121 is engaged in the slot 1111, thereby improving the convenience for assembling the first mounting plate 111 and the second mounting plate 112.

[0039] It may be understood that the first mounting plate 111 may be provided with the slot 1111 and the second mounting plate 112 may be provided with the buckle 1121; or, the first mounting plate 111 may be provided with the buckle 1121 and the second mounting plate 112 may be provided with the slot 1111; or, each of the first mounting plate 111 and the second mounting plate 112 is provided with the slot 1111 and the buckle 1121, provided that the slot 1111 corresponds to the buckle 1121.

[0040] Exemplarily, when the first mounting plate 111 is provided with the slot 1111 and the second mounting plate 112 is provided with the buckle 1121, the first mounting plate 111 may function to suspend and support the second mounting plate 112. For the sake of the buckle 1121 being inserted into the slot 1111, the slot 1111 may have a length greater than the buckle 1121. Further, in order to prevent the first mounting plate 111 and the second mounting plate 112 from shaking relative to each other, the side edge of the first mounting plate 111 and the side edge of the second mounting plate 112 may be each provided with a folded edge for butting. The folded edges of the two may be provided with mounting holes, and the first mounting plate 111 and the second mounting plate 112 may be fixed reliably by a threaded connector passing through the mounting holes of the folded edges of the first mounting plate 111 and the second mounting plate 112.

[0041] In some embodiments, there may be a plurality of buckles 1121 and a plurality of slots 1111. The plurality of buckles 1121 and the plurality of slots 1111 correspond one-to-one, and are arranged at intervals respectively along extending directions of the side edges of the first mounting plate 111 and the second mounting plate 112,

thereby ensuring that an effective and reliable connection may be maintained at each position of the side edges of the first mounting plate 111 and the second mounting plate 112 that are connected to each other.

[0042] It may be understood that the number of the buckles 1121 and the slots 1111 may be two, three or more. During the assembly process, the first mounting plate 111 and the second mounting plate 112 may be connected and fixed, and then either the first mounting plate 111 or the second mounting plate 112 may be installed with an inner wall or an internal structural member of the air-conditioning outdoor unit.

[0043] A specific connection mode between the support member 113 and the first mounting plate 111 and the second mounting plate 112 will be described in detail below.

[0044] FIG. 4 is a schematic structural diagram of position B in FIG. 2. Referring to FIG. 1, FIG. 2 and FIG. 4, in a possible implementation, the support member 113 may include a support section 1131 and two connection sections 1132. The two connection sections 1132 are respectively connected to both ends of the support section 1131. Each of the side edge of the first mounting plate 111 and the side edge of the second mounting plate 112 is provided with a flange 114. The two connection sections 1132 are connected respectively to the flanges 114 of the first mounting plate 111 and of the second mounting plate 112, thereby facilitating the assembling of the support 113 with the first mounting plate 111 and the second mounting plate 112.

[0045] It may be understood that the two connection sections 1132 may be connected to the first mounting plate 111 and the second mounting plate 112 in a similar manner, one of which is illustrated below by way of example.

[0046] In some embodiments, the connection section 1132 has a plug-in portion 1133, and the flange 114 may be provided with a socket 1141. The plug-in portion 1133 may pass through the socket 1141 and be folded toward a direction away from an inner wall of the socket 1141, so that when the support member 113 is assembled with the first mounting plate 111 or the second mounting plate 112, the support member 113 is positioned.

[0047] It may be understood that the socket 1141 may be connected to opposite sides of the flange 114, and the plug-in portion 1133 may penetrate from one side of the socket 1141 to the other side of the socket 1141. During assembly, the plug-in portion 1133 may be inserted into the socket 1141 from top to bottom, and its connecting end may be overlapped on the flange 114. For the sake of plugging, the size of socket 1141 may be larger than that of the plug-in portion 1133.

[0048] In addition, the connection section 1132 may be provided with a first bending portion 1134 extending in a horizontal direction, and a side edge of the flange 114 may be provided with a second bending portion 1142 extending in a horizontal direction. The first bending portion 1134 may be located above the second bending por-

tion 1142 and abut with the second bending portion 1142, so that the flange 114 plays a load bearing role for the support member 113. Opposite mounting holes may be respectively disposed in the first bending portion 1134 and the second bending portion 1142, and the first bending portion 1134 and the second bending portion 1142 may be fixed with a threaded connector passing through the mounting holes of the first bending portion 1134 and the second bending portion 1142, so that the support member 113 is fixed to the first mounting plate 111 and the second mounting plate 112.

[0049] It should be noted that, during assembly, the first mounting plate 111 and the second mounting plate 112 may be connected to each other firstly, and then the plug-in portion 1133 is inserted into the socket 1141 to complete a positioning of the support member 113 between the first mounting plate 111 and the second mounting plate 112, followed by connecting the first bending portion 1134 and the second bending portion 1142.

[0050] In some embodiments, the plurality of electric control circuit boards 120 may include a first electric control board 121, a second electric control board 122, and a third electric control board 123. The electronic control component 100 may further include a radiator 124. The first electric control board 121 may be located on a side of the first mounting plate 111 facing the second mounting plate 112. The radiator 124 may be located on a side of the first mounting plate 111 away from the second mounting plate 112. The second electric control board 122 and the third electric control board 123 may be respectively located on two opposite sides of the second mounting plate 112, which may fully utilize the assembly spaces on the first mounting plate 111 and the second mounting plate 112.

[0051] It may be understood that the radiator 124 may dissipate heat for the plurality of electronic control circuit boards 120 when the electronic control component 100 works. The first electronic control board 121 and the radiator 124 are provided on opposite sides of the first mounting plate 111, and the radiator 124 has a better heat dissipation effect for the first electric control board 121. Therefore, the first electric control board 121 may be provided with electronic components that generate high heat.

[0052] It should be noted that the electronic components on the electronic control circuit board 120 may include capacitors, resistors, processors, memory and other components, fuse, filter, etc. Different electronic components may be connected by cables according to the design of circuit. The specific circuit layout and functions of the electronic control circuit board 120 are not limited in the embodiment of this application.

[0053] FIG. 5 is a schematic diagram of the internal structure of the air-conditioning outdoor unit provided by an embodiment of this application. FIG. 6 is a schematic diagram of the internal structure of the air-conditioning outdoor unit provided by an embodiment of this application viewed from another perspective. FIG. 7 is a sche-

matic assembly diagram of the electronic control component and the middle partition of the air-conditioning outdoor unit provided by an embodiment of this application. FIG. 8 is a schematic structural diagram of position C in FIG. 7.

[0054] Referring to FIG. 5 to FIG. 8, the embodiment of this application further provides an air-conditioning outdoor unit. The air-conditioning outdoor unit includes a casing 200, a middle partition 300, a fan component 400, a compressor component 500 and the electronic control component 100 in the above technical solutions. The middle partition 300 may be disposed inside the casing 200 and divide the interior of the casing 200 into a first accommodation chamber 210 and a second accommodation chamber 220. The fan component 400 is disposed in the first accommodation chamber 210. The compressor component 500 is disposed in the second accommodation chamber 220. The electronic control component 100 may be disposed on a side of the middle partition 300 facing the second accommodation chamber 220, thereby fully utilizing the space inside the casing 200 and improving space utilization.

[0055] It may be understood that a fan of the fan component 100 in the first accommodation chamber 210 has a large rotation space. Comparatively speaking, pipes of the compressor component 500 are mainly disposed in the second accommodation chamber 220, where the usable gap space is larger. Exemplarily, a compressor may be arranged in a lower portion of the second accommodation chamber 220, and the electronic control component 100 may be arranged in an upper portion of the second accommodation chamber 220. Other electronic control components may also be provided in the air-conditioning outdoor unit.

[0056] The electronic control component may include a reactance component, which includes a three-phase reactor 600 and a holder 700. The three-phase reactor 600 is disposed on the first mounting plate 111 or the second mounting plate 112 through the holder 700.

[0057] Exemplarily, in a solution of three-phase electric control, there may also be a three-phase reactor 600. The three-phase reactor 600 may be separately provided at an upper end of the middle partition 300 at its side facing the first accommodation chamber 210 by means of the holder 700.

[0058] In some embodiments, the electronic control component 100 may include the mounting bracket 110 and an electric control circuit board 120 disposed on the mounting bracket 110. The electric control circuit board 120 may control the operation of the fan component 400 and the compressor component 500. The mounting bracket 110 includes the first mounting plate 111 and the second mounting plate 112 that are connected to each other. A gap 301 may be disposed at a top of the middle partition 300. The gap 301 extends along a height direction of the middle partition 300. The first mounting plate 111 is inserted into the gap 301 from top to bottom, that is, along the X direction in FIG. 7. The second mounting

plate 112 extends in a direction away from the middle partition 300, which may improve the installation guidance for the first mounting plate 111, thereby improving the assembling convenience between the electronic control component 100 and the middle partition 300.

[0059] It may be understood that the first mounting plate 111 corresponds to a plate surface of the middle partition 300 facing the second accommodation chamber 220, and the second mounting plate 112 corresponds to an inner wall of the second accommodation chamber 220 at its side. The support member 113 may be located on a top of the second accommodation chamber 220 and connect with the first mounting plate 111 and the second mounting plate 112, so that the entire electronic control component 100 may be kept away from pipelines of the compressor component 500 in the second accommodation chamber 220.

[0060] The butting mode of the first mounting plate 111 and the middle partition 300 will be described in detail below.

[0061] Referring to FIG. 5 to FIG. 8, in a possible implementation, two opposite sides of the gap 301 are provided with first folded edges 310, which may extend along the edge of the gap 301 so as to define a moving track from top to bottom in the gap 301. A protruding portion 1112 is disposed at a side of the first mounting plate 111 facing the middle partition 300. A shape of the protruding portion 1112 matches with a shape of the gap 301, and side edges of the protruding portion 1112 abuts with the first folded edges 310. When the first mounting plate 111 is installed on the middle partition 300, the protruding portion 1112 may move along the first folded edges 310. In this way, the left and right positions of the first mounting plate 111 are delimited to prevent the first mounting plate 111 from shaking sharply relative to the gap 301.

[0062] It may be understood that the radiator 124 of the electronic control component 100 may be disposed on the protruding portion 1112, and at least part of the radiator 124 extends into the first accommodation chamber 210, so that the heat dissipation speed of the radiator 124 may be accelerated by the fan component 400 in the first accommodation chamber 210, thereby improving the heat dissipation effect.

[0063] Exemplarily, the protruding portion 1112 may be square, and each corner of the protruding portion 1112 may be chamfered to facilitate processing and shaping. The protruding portion 1112 may also have a shape including but not limited to circle, ellipse, or other regular shapes, which is not specifically limited in the embodiments of this application.

[0064] After the first mounting plate 111 is inserted into the gap 301, the first mounting plate 111 needs to be supported and fixed through a structure of the middle partition 300. In some embodiments, a top side of the middle partition 300 may be provided with a second folded edge 320 and a top side of the first mounting plate 111 may be provided with a hooking portion 1113 abutting with the second folded edge 320. With such a configu-

ration, the middle partition 300 may support the first mounting plate 111.

[0065] In addition, the first folded edge 310 and the hooking portion 1113 may be provided with opposite mounting holes. After the first mounting plate 111 is inserted into the gap 301 and the hooking portion 1113 abuts with the first folded edges 310, the first mounting plate 111 may be fixed with the middle partition 300 through thread connectors passing through the hooking portion 1113 and the first folded edge 310 in sequence.

[0066] Exemplarily, the hooking portion 1113 may include a first extension section and a second extension section. The first extension section may extend toward a direction of the first accommodation chamber 210, and the second extension section may be connected to an end of the first extension section and extend downward. When the hooking portion 1113 matches with the first folded edge 310, the first extension section may abut with an upper surface of the first folded edge 310, and the second extension section may be located at a side of the first folded edge 310, thereby preventing the first mounting plate 111 from being dislodged from the gap 301.

[0067] In some embodiments, a third folded edge 330 may be disposed at a bottom of the gap 301, and a limiting portion 1114 may be disposed at a bottom of the first mounting plate 111. The limiting portion 1114 abuts with the third folded edge 330, thereby supporting and fixing the bottom of the mounting plate 111.

[0068] It may be understood that the third folded edge 330 may extend toward a direction of the first accommodation chamber 210, and a lower end of the limiting portion 1114 may be bent at a certain angle relative to the protruding portion 1112 in a direction away from the first mounting plate 111, thereby ensuring that the lower end of the limiting portion 1114 may abut with the upper surface of the third folded edge 330.

[0069] It should be noted that a size of the gap 301 may be set according to a size of the first mounting plate 111, and the size of the first mounting plate 111 may be set according to the electronic control circuit board 120 to be laid out, which is not specifically limited in the embodiments of this application. In addition, both sides of the middle partition 300 may also be provided with folded edges to facilitate installation and connection between the middle partition 300 and an inner wall of the casing 200.

[0070] FIG. 9 is a schematic assembly diagram of the reactance component of the air-conditioning outdoor unit provided by an embodiment of this application. FIG. 10 is a schematic assembly diagram of the reactance component and the middle partition of the air-conditioning outdoor unit provided by an embodiment of this application. FIG. 11 is an exploded view of the reactance component of the air-conditioning outdoor unit provided by an embodiment of this application during assembling. FIG. 12 is a partial view of position D in FIG. 11. FIG. 13 is a partial view of position E in FIG. 11.

[0071] Referring to FIG. 9 to FIG. 13, in some embod-

iments, the electronic control component 100 includes the reactance component. The reactance component includes a three-phase reactor 600 and a holder 700. The three-phase reactor 600 is disposed at an upper end of the middle partition 300 on its side facing the first accommodation chamber 210 through the holder 700.

[0072] In some embodiments, the fan component 400 includes a fan bracket and a fan. The fan bracket is installed in the first accommodation chamber 210 and supports the fan. A top plate 800 is disposed at a top of the fan bracket. Two ends of the holder 700 are respectively disposed on the top plate 800 and at an upper end of the middle partition 300 on its side facing the first accommodation chamber 210.

[0073] In some embodiments, the gap 301 is disposed at a top of the middle partition 300, and the first mounting plate 111 of the electronic control component 100 is embedded in the gap 301. A top side of the middle partition 300 is provided with the second folded edge 320, and a top side of the first mounting plate 111 is provided with the hooking portion 1113 abutting with the second folded edge 320. An end of the holder 700 close to the middle partition 300 is provided with a first connecting portion 710, which is connected to the hooking portion 1113 and is provided on the second folded edge 320 through the hooking portion 1113. An end of the holder 700 away from the middle partition 300 is provided with a second connecting portion 720, and the second connecting portion 720 is connected to the top plate 800.

[0074] In some embodiments, the first connecting portion 710, the hooking portion 1113, and the second folded edges 320 are overlapped in sequence, and each of the first connecting portion 710, the hooking portion 1113, and the second folded edge 320 is provided with a connecting hole 900, and a fastener penetrates through the respective connecting holes of the first connecting portion 710, the hooking portion 1113, and the second folded edge 320.

[0075] In some embodiments, the hooking portion 1113 has a first horizontal portion 1113a and a first stopper 1113b bent from the first horizontal portion 1113a. The first horizontal portion 1113a is overlapped with upper surfaces of the second folded edges 320. An inner side face of the stopper 1113b is blocked by a side face of the second folded edge 320. The first connecting portion 710 has a second horizontal portion 711 and a second stopper 712 bent from the second horizontal portion 711. The second horizontal portion 711 is overlapped with an upper surface of the first horizontal portion 1113a, and the second stopper 712 is blocked by an outer side face of the first stopper 1113b.

[0076] This embodiment adopts all technical solutions of the electronic control component in the above embodiments, and therefore has at least all beneficial effects brought by the technical solutions in the above embodiments, which will not be repeated here.

[0077] Embodiments of this application further provide an air conditioner. The air conditioner may include an air-

conditioning indoor unit and an air-conditioning outdoor unit in the above technical solutions. The air-conditioning outdoor unit is communicated with the air-conditioning indoor unit through a pipeline for the flow of heat exchange medium. The air-conditioning outdoor unit is provided with the electronic control component in the above embodiments.

[0078] The air conditioner may be a central air conditioner, the air-conditioning indoor unit is installed indoors, and the air-conditioning outdoor unit is installed outdoors. The air-conditioning indoor units and air-conditioning outdoor units may be both multiple. The multiple air-conditioning indoor units may be installed in a same indoor space, or may be installed in different indoor spaces. The multiple air-conditioning outdoor units may be equipped with electric control boxes for controlling different air-conditioning outdoor units respectively. The different air-conditioning outdoor units may be communicated and cooperate with each other to achieve an integrated work with multiple master units.

[0079] The air conditioner of this embodiment adopts all technical solutions of the electronic control component and the air-conditioning outdoor unit in the previous embodiments, and therefore has at least all beneficial effects brought by the technical solutions of the above embodiments, which will not be repeated here.

[0080] In the description of this disclosure, it should be understood that the orientation or positional relationship indicated by the terms "center", "longitudinal", "lateral", "length", "width", "thickness", "upper", "lower", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", "clockwise", "counterclockwise", "axial direction", "radial direction", "circumferential direction" and so on is based on the orientation or positional relationships shown in the drawings. They are only for describing this disclosure and simplifying the description, and do not indicate or imply that the referred devices or elements must have a specific orientation and be constructed and operated in a specific orientation, which cannot be understood as limitations on the disclosure.

[0081] In addition, the terms "first" and "second" are only used for descriptive purposes and cannot be understood as indicating or implying relative importance or implicitly indicating the quantity of indicated technical feature. Therefore, the feature defined by "first" and "second" may explicitly or implicitly includes at least one feature. In the description of this disclosure, unless otherwise specifically specified, "a plurality of" means at least two, such as two, three, etc.

[0082] In this disclosure, unless otherwise explicitly specified and limited, the terms "installation", "connection", "connected/connecting", "fixed/fixing" and the like should be understood in a broader sense. For example, it may be a fixed connection or a detachable connection, or integrated into one. It may be a mechanical connection or an electrical connection. It may be a direct connection or an indirect connection through an intermediate medium. It may be an internal connection between two ele-

ments or an interactive relationship between two elements, unless otherwise expressly specified. For those skilled in the art, the specific meanings of the above terms in this disclosure may be understood according to specific circumstances.

[0083] In this disclosure, unless otherwise explicitly stated and limited, a first feature being "above" or "below" a second feature may mean that the first and second features are in direct contact, or the first and second features may be in indirect contact through an intermediate medium. Further, the first feature being "on", "above" and "over" the second feature may mean that the first feature is located directly or diagonally above the second feature, or simply mean that the first feature is higher than the second feature in a horizontal height. The first feature being "under", "below" and "beneath" the second feature may mean that the first feature is located directly or diagonally below the second feature, or simply mean that the first feature is lower than the second feature in a horizontal height.

[0084] In the description of this specification, the description with reference to the terms such as "one embodiment", "some embodiments", "an example", "specific examples" or "some examples" means that specific features, structures, materials, or characteristics described in combination with the embodiment or example are included in at least one embodiment or example of the disclosure. In this specification, the schematic expressions of the above terms are not directed to the same embodiment or example. Further, the specific features, structures, materials or characteristics described may be combined in any suitable manner in any one or multiple embodiments or examples. Further, those skilled in the art may combine and integrate different embodiments or examples and features thereof described in this specification, without contradicting with each other.

[0085] Although the embodiments of this disclosure have been shown and described above, it may be understood that the above-mentioned embodiments are illustrative and should not be understood as limitations on this disclosure. Those skilled in the art may make changes, modifications, substitutions and variations to the above-mentioned embodiments within the scope of this disclosure.

Claims

1. An electronic control component, **characterized in that:**

the electronic control component comprises a mounting bracket and a plurality of electric control circuit boards, wherein the mounting bracket comprises a first mounting plate, a second mounting plate and a support member; the plurality of electric control circuit boards are respectively provided on the first mounting plate

- and the second mounting plate; and the first mounting plate and the second mounting plate are connected to each other and arranged at an angle to each other; the support member is connected between the first mounting plate and the second mounting plate.
2. The electronic control component according to claim 1, wherein one side edge of the first mounting plate is connected to one side edge of the second mounting plate; a first end of the support member is connected to the other side edge of the first mounting plate, and the other side edge of the first mounting plate is farther away from the second mounting plate than the one side edge of the first mounting plate; a second end of the support member is connected to the other side edge of the second mounting plate, and the other side edge of the second mounting plate is farther away from the first mounting plate than the one side edge of the second mounting plate.
 3. The electronic control component according to claim 2, wherein a surface of the first mounting plate and a surface of the second mounting plate are perpendicular to each other.
 4. The electronic control component according to claim 2, wherein one of the one side edge of the first mounting plate and the one side edge of the second mounting plate is provided with a slot, and the other one of the one side edge of the first mounting plate and the one side edge of the second mounting plate is provided with a buckle, and the buckle is engaged in the slot.
 5. The electronic control component according to claim 4, comprising a plurality of the slots and a plurality of the buckles, wherein the plurality of buckles correspond to the plurality of slots one by one, and are respectively arranged at intervals along extending directions of the one side edge of the first mounting plate and of the one side edge of the second mounting plate.
 6. The electronic control component according to any one of claims 1 to 5, wherein:

the support member comprises a support section and two connection sections, and the two connection sections are respectively connected to two ends of the support section; and the side edge of the first mounting plate and the side edge of the second mounting plate are each provided with a flange, and the two connection sections are respectively connected to the flange of the first mounting plate and the flange of the second mounting plate.
 7. The electronic control component according to claim 6, wherein the connection section is provided with a plug-in portion, the flange is provided with a socket, and the plug-in portion passes through the socket and is folded toward a direction away from an inner wall of the socket.
 8. The electronic control component according to claim 6, wherein a side of the connection section has a first bending portion, and a side edge of the flange has a second bending portion bending relative to the flange; the first bending portion is located above the second bending portion and abuts with the second bending portion.
 9. The electronic control component according to any one of claims 1 to 5, wherein the plurality of electronic control circuit boards comprise a first electronic control board, a second electronic control board, and a third electronic control board; the electronic control component further comprises a radiator; the first electronic control board is located on a side of the first mounting plate facing the second mounting plate, and the radiator is located on a side of the first mounting plate away from the second mounting plate; the second electric control board and the third electric control board are respectively located on opposite sides of the second mounting plate.
 10. The electronic control component according to claim 1, wherein the electronic control component comprises a reactance component comprising a three-phase reactor and a holder, and the three-phase reactor is provided on the first mounting plate or the second mounting plate through the holder.
 11. An air-conditioning outdoor unit, comprising a casing, a middle partition, a fan component, a compressor component and the electronic control component according to any one of claims 1-10, wherein the middle partition is disposed inside the casing and divides an interior of the casing into a first accommodation chamber and a second accommodation chamber; the fan component is disposed in the first accommodation chamber, and the compressor component is disposed in the second accommodation chamber; the electronic control component is installed on a side of the middle partition facing the second accommodation chamber.
 12. The air-conditioning outdoor unit according to claim 11, wherein a gap is provided at a top of the middle partition, and the first mounting plate of the electronic control component is self-embedded in the gap, and the second mounting plate of the electronic control component extends in a direction away from the middle partition.

13. The air-conditioning outdoor unit according to claim 12, wherein side edges of the gap on its opposite sides extend in a vertical direction, and the side edge of the gap is provided with a first folded edge; and a side of the first mounting plate facing the middle partition has a protruding portion protruding toward the second accommodation chamber, and a shape of the protruding portion matches with a shape of the gap, and a side edge of the protruding portion abuts with the first folded edge.
14. The air-conditioning outdoor unit according to claim 13, wherein the electronic control component includes a radiator disposed on the protruding portion, and at least part of the radiator extends into the first accommodation chamber.
15. The air-conditioning outdoor unit according to claim 12, wherein:
a top side of the middle partition is provided with a second folded edge, and a top side of the first mounting plate is provided with a hooking portion abutted with the second folded edge; and/or a third folded edge is disposed at a bottom of the gap, and a limiting portion is disposed at a bottom of the first mounting plate and abuts with the third folded edge.
16. The air-conditioning outdoor unit according to claim 11, wherein the electronic control component comprises a reactance component comprising a three-phase reactor and a holder, and the three-phase reactor is provided on an upper end of the middle partition on its side facing the first accommodation chamber through the holder.
17. The air-conditioning outdoor unit according to claim 16, wherein the fan component comprises a fan bracket and a fan, the fan bracket is installed in the first accommodation chamber and configured to support the fan; a top plate is disposed at a top of the fan bracket, and two ends of the bracket are respectively provided on the top plate and an upper end of the middle partition on its side facing the first accommodation chamber.
18. The air-conditioning outdoor unit according to claim 17, wherein:
a gap is disposed at a top of the middle partition, and the first mounting plate of the electronic control component is embedded in the gap;
a top side of the middle partition is provided with a second folded edge, and a top side of the first mounting plate is provided with a hooking portion abutted with the second folded edge; and an end of the holder close to the middle partition is provided with a first connecting portion, the first connecting portion is connected to the hooking portion and is provided on the second folded edge through the hooking portion; an end of the holder away from the middle partition is provided with a second connecting portion connected to the top plate.
19. The air-conditioning outdoor unit according to claim 16, wherein the first connecting portion, the hooking portion, and the second folded edge are overlapped to each other in sequence, and each of the first connecting portion, the hooking portion and the second folded edge is provided with a connecting hole, and a fastener is configured to penetrate through the connecting hole of each of the first connecting portion, the hooking portion, and the second folded edge.
20. The air-conditioning outdoor unit according to claim 19, wherein the hooking portion is provided with a first horizontal portion and a first stopper bent from the first horizontal portion, the first horizontal portion is overlapped to an upper surface of the second folded edge, and an inner side face of the first stopper is blocked by a side face of the second folded edge; the first connecting portion is provided with a second horizontal portion and a second stopper bent from the second horizontal portion; the second horizontal portion is overlapped to an upper surface of the first horizontal portion, and the second stopper is blocked by an outer side surface of the first stopper.
21. An air conditioner, comprising an air-conditioning indoor unit and the air-conditioning outdoor unit according to any one of claims 11 to 20, wherein the air-conditioning indoor unit is connected to the air-conditioning outdoor unit.

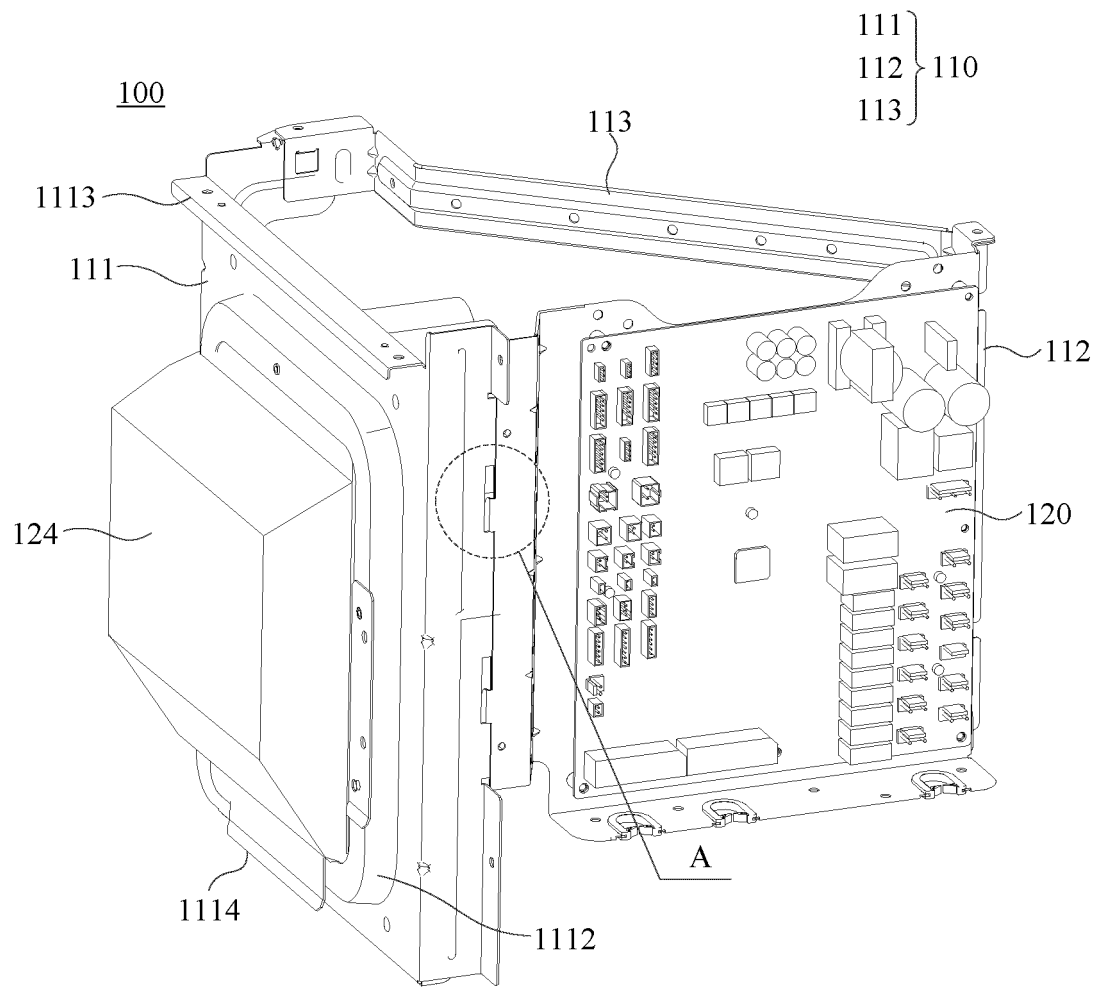


FIG. 1

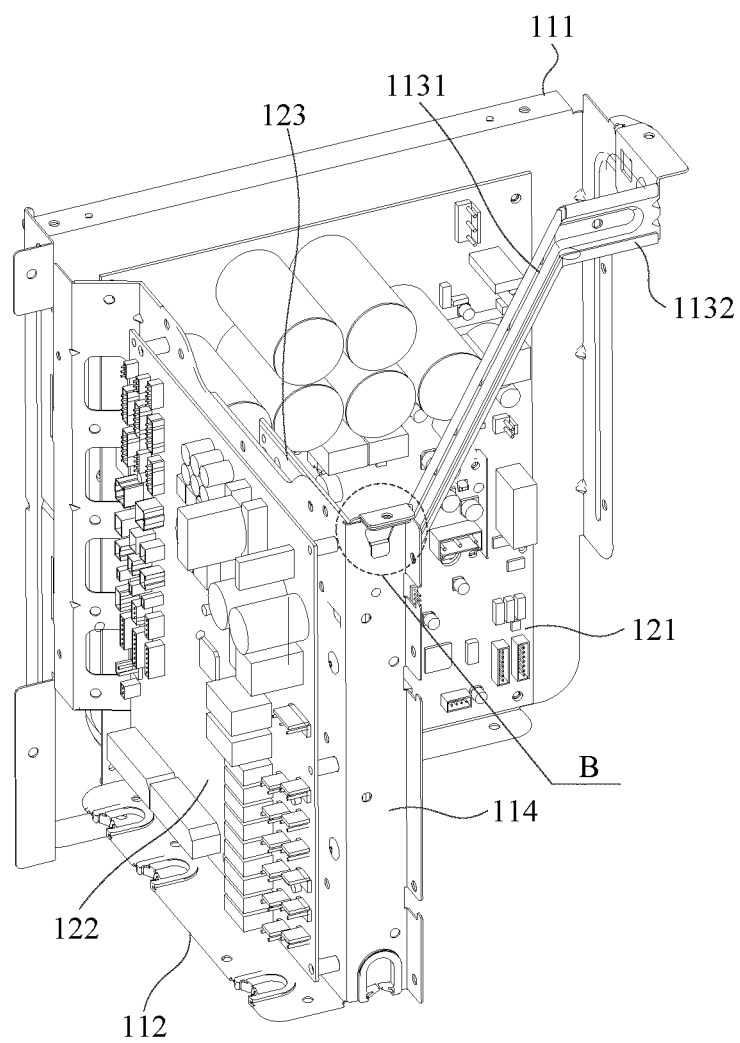
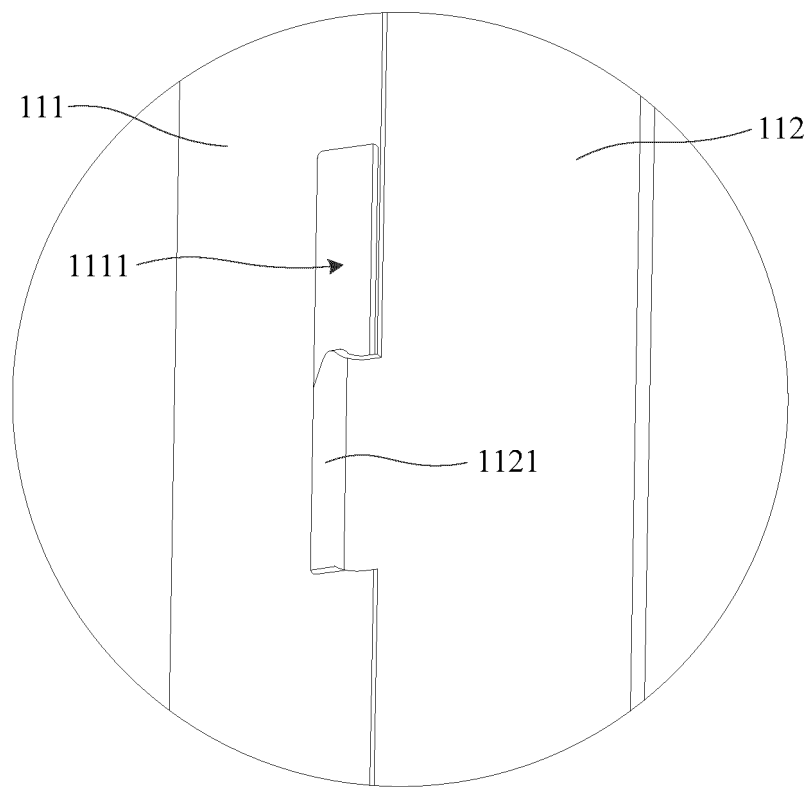


FIG. 2



A

FIG. 3

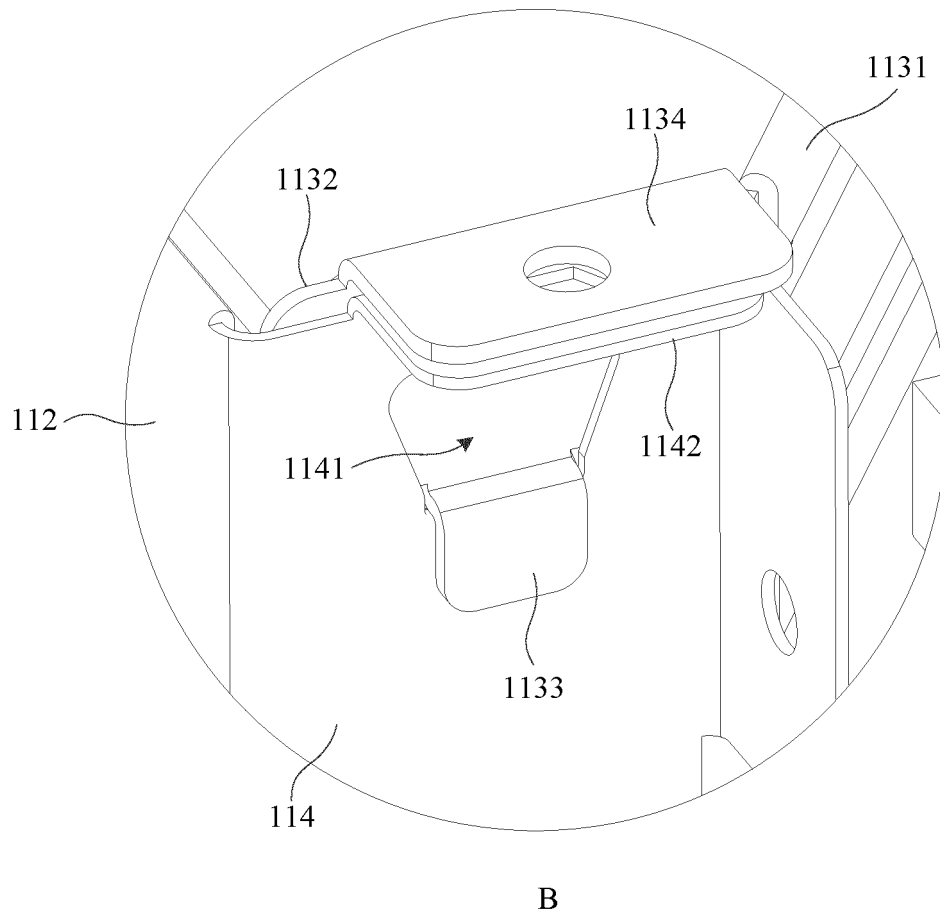


FIG. 4

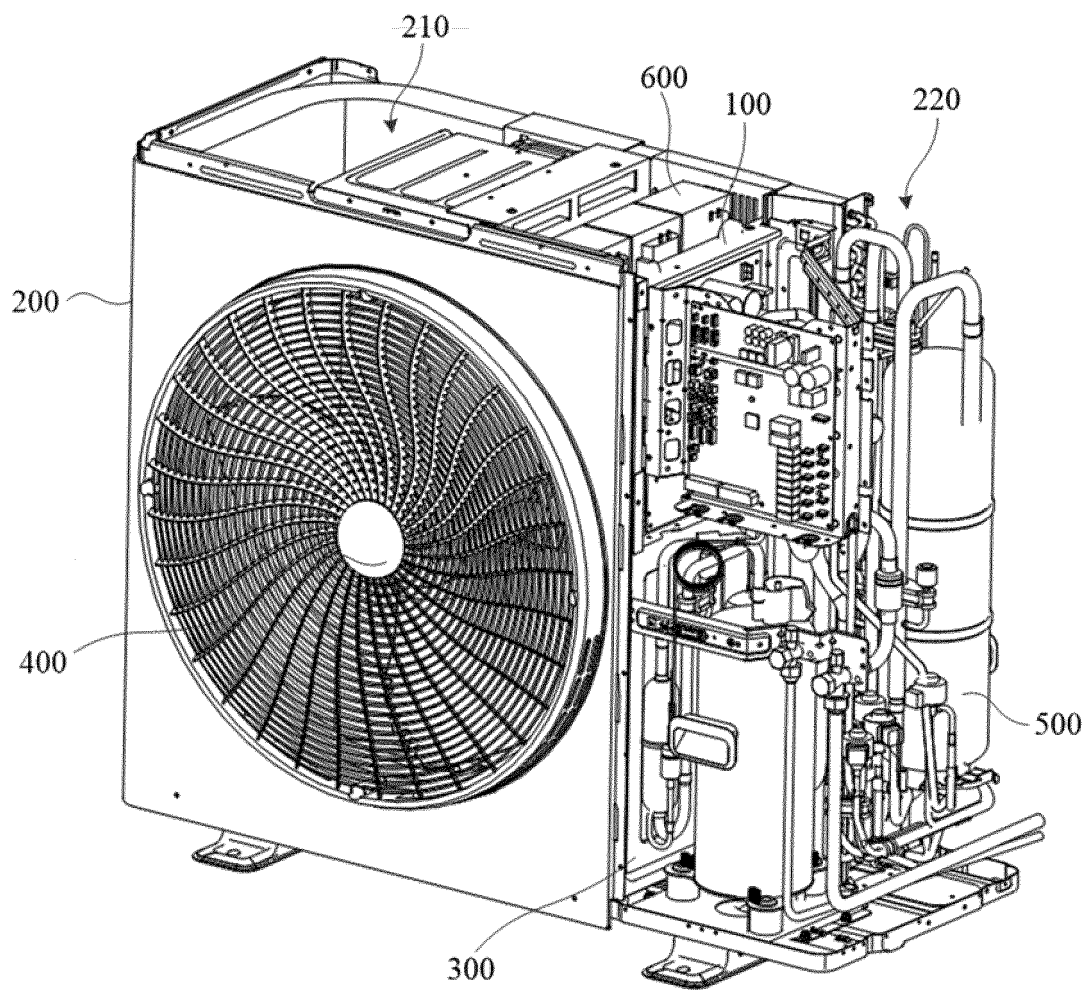


FIG. 5

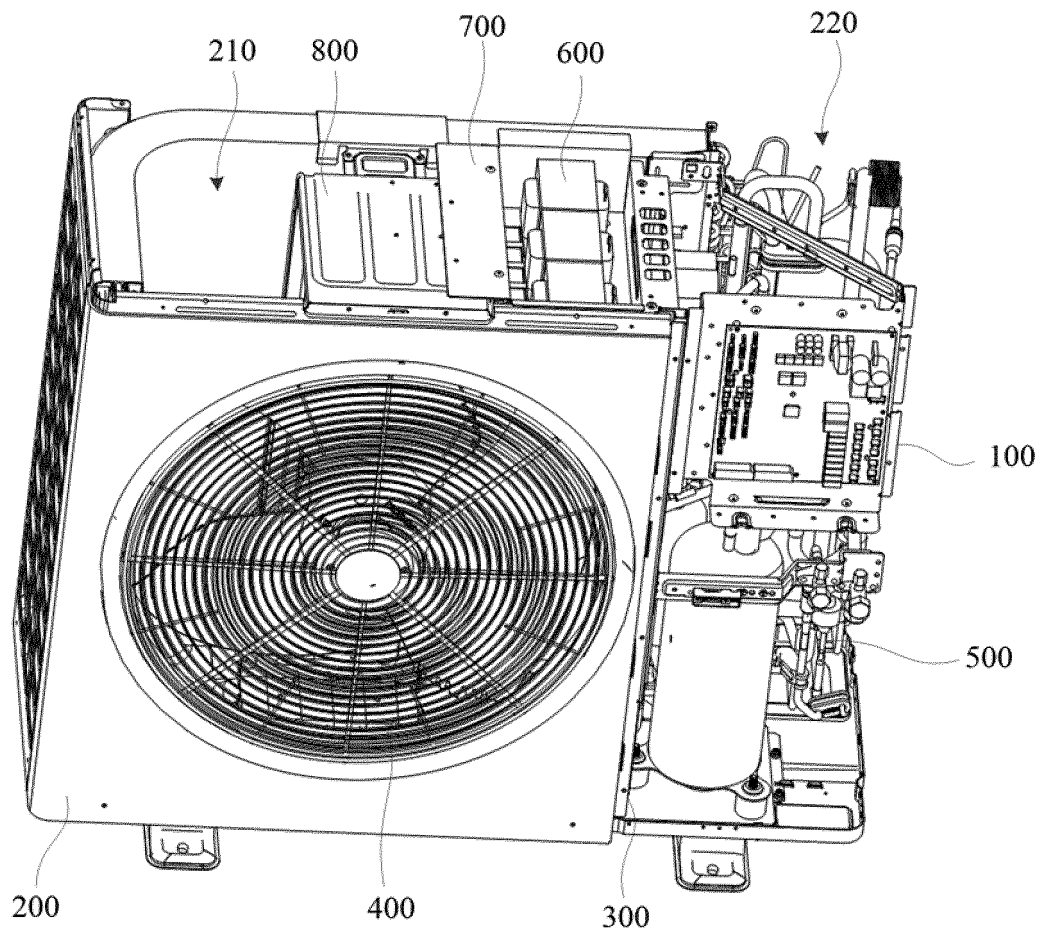


FIG. 6

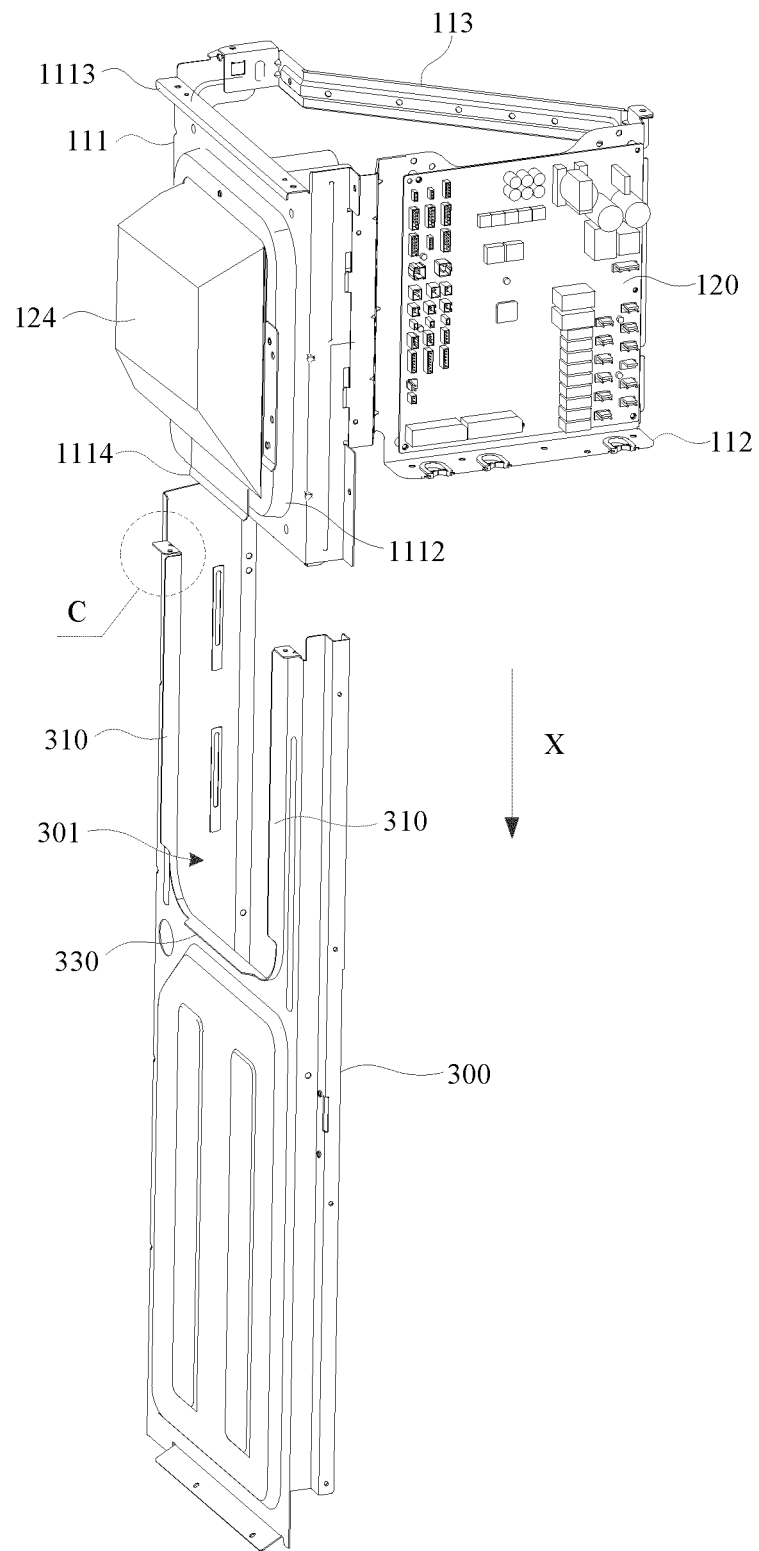
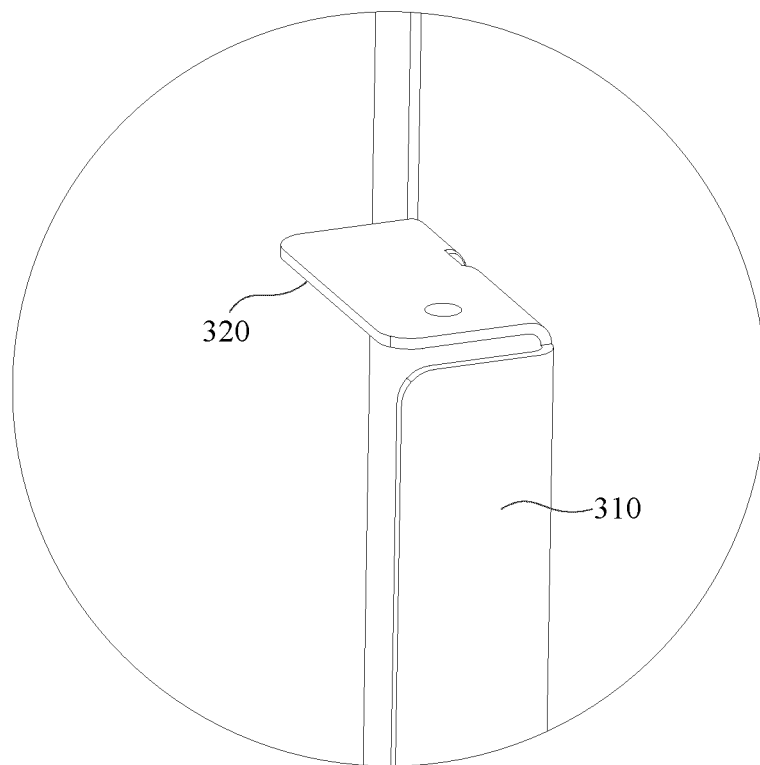


FIG. 7



C

FIG. 8

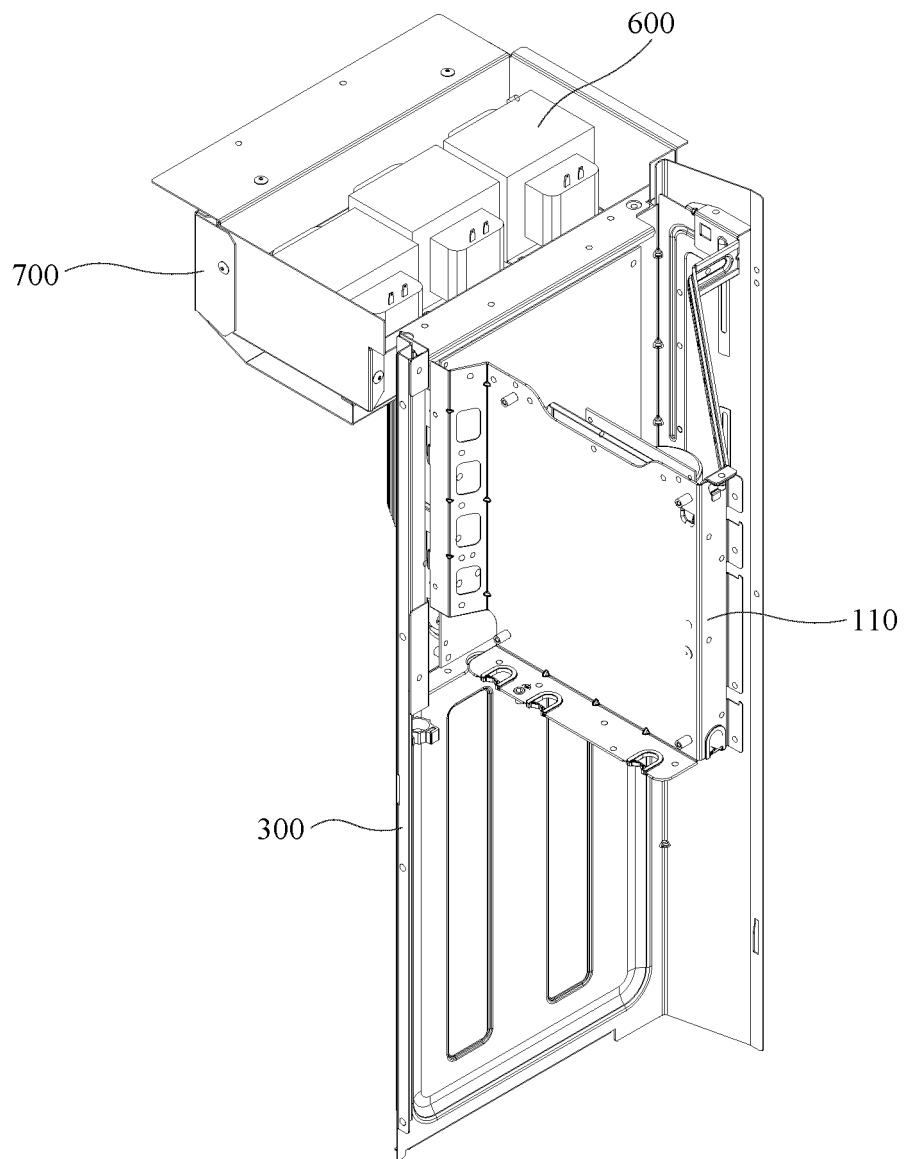


FIG. 9

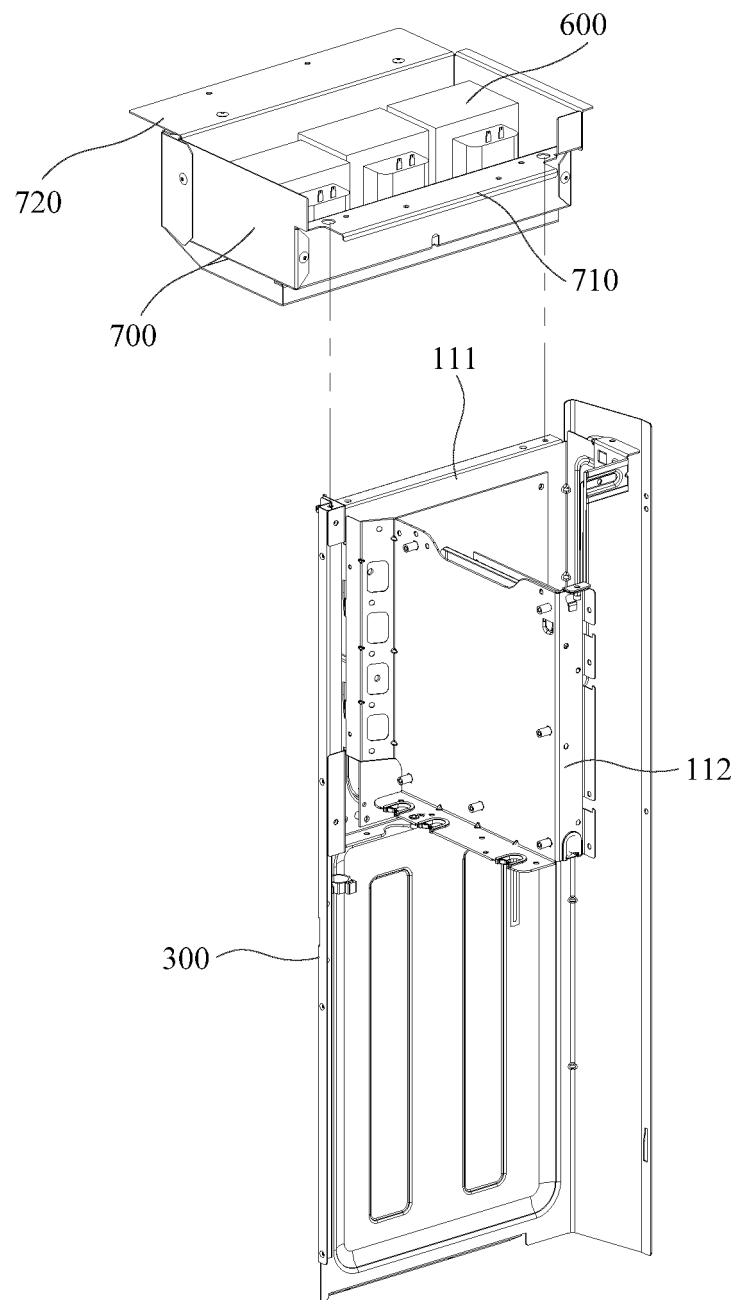


FIG. 10

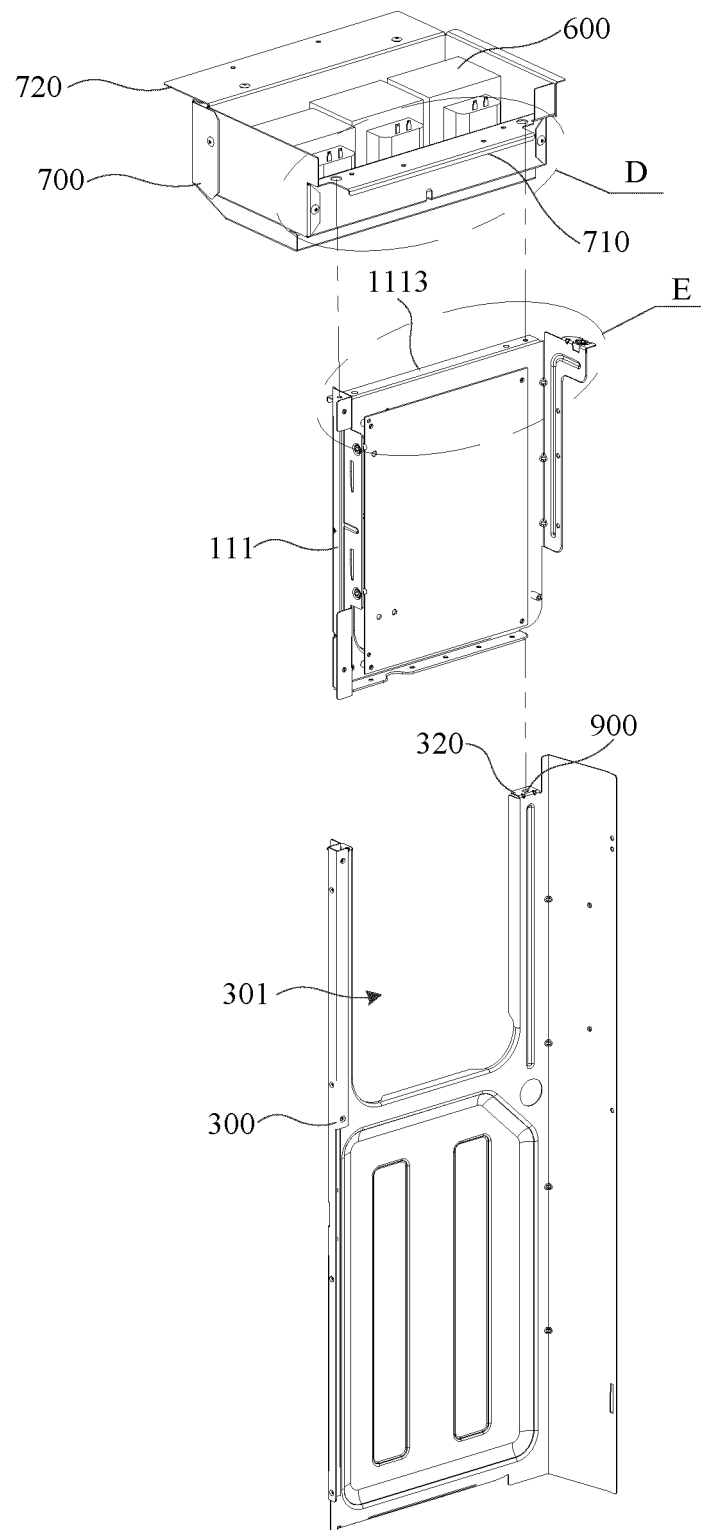
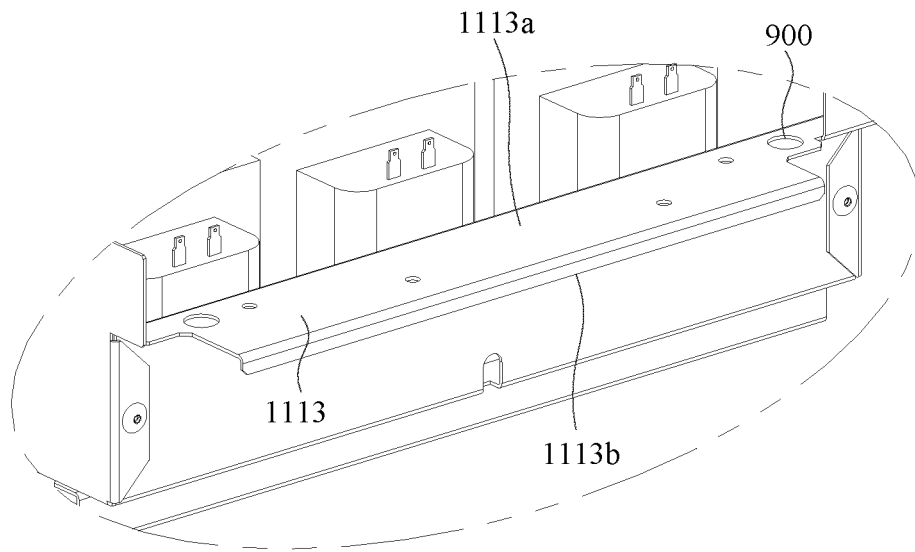
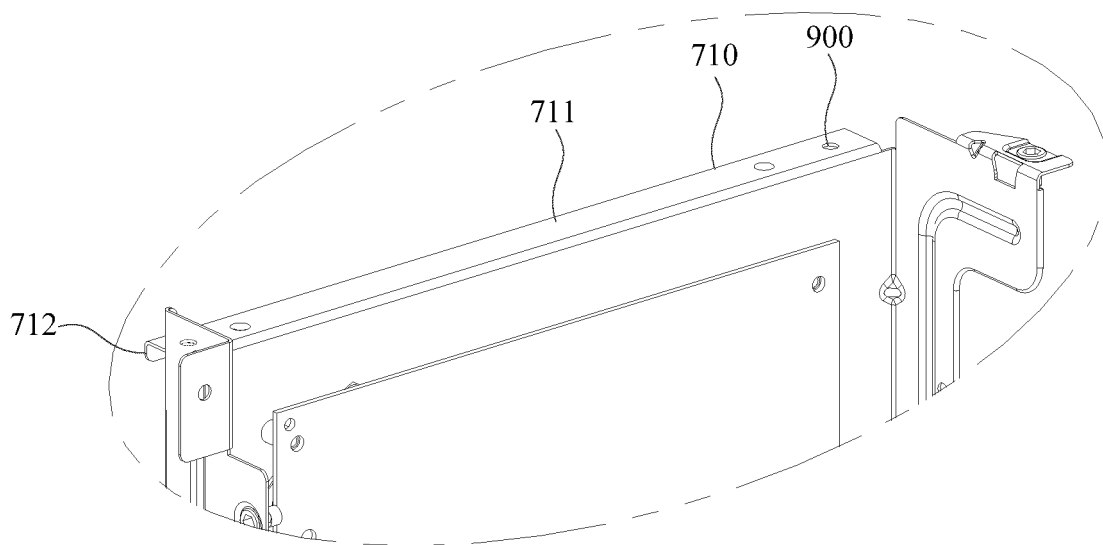


FIG. 11



D

FIG. 12



E

FIG. 13

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/088971

A. CLASSIFICATION OF SUBJECT MATTER		
F24F11/89(2018.01)i; F24F13/20(2006.01)i; F24F1/24(2011.01)i; F24F1/22(2011.01)i; F24F1/56(2011.01)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)		
IPC: 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)		
CNTXT, EXTXT, WPABS, DWPI, EXTXT, PATENTICS, 中国期刊网全文数据库, CJFD: 美的, 空调, 室外机, 外机, 电控, 电子, 电气, 电抗, 支架, 支撑, 安装架, 连接件, 连杆, 臂, 三角, 夹角, 角度, electric+, frame, hold+, support+, arm+, air w condition+, outdoor		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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"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		
Date of the actual completion of the international search		Date of mailing of the international search report
06 July 2023		11 July 2023
Name and mailing address of the ISA/CN		Authorized officer
China National Intellectual Property Administration (ISA/CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088		
		Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
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Information on patent family members

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		JP 6452829 B2	16 January 2019
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CN 107621020 A	23 January 2018	None	

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