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(54) **HIGH-VOLTAGE POWER SUPPLY, PURIFICATION DEVICE AND AIR CONDITIONER**

(57) A high-voltage power supply (100), a purification device (300), and an air conditioner. The high-voltage power supply (100) comprises a housing (1), a circuit board (2), and output contact pieces (3). The circuit board (2) is arranged in the housing (1), the output contact pieces (3) are arranged on the housing (1) and are electrically connected to the circuit board (2), and the output contact pieces (3) are used for being in electric contact with a powered component (200) so as to supply power to the powered component (200).

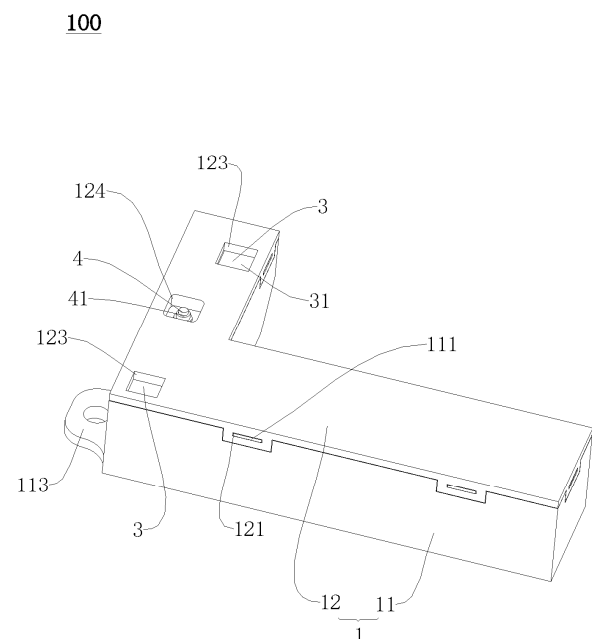


FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to two Chinese Patent Applications No. 202311119359.6 and 202322366507.6 filed on August 31, 2023, the entire contents of which are incorporated herein by reference.

FIELD

[0002] The present invention relates to the field of electrical appliance technologies, and more particularly, to a high-voltage power supply, a purification device, and an air conditioner.

BACKGROUND

[0003] When a powered component requiring power supply needs a high-voltage input, a high-voltage power supply (also known as a high-voltage generator) is typically used to boost the voltage before supplying power to the powered component. In the related art, the high-voltage power supply is usually electrically connected to the powered component (such as some purification devices requiring power supply) using wire harnesses, which necessitates wiring operations, making the electrical connection between the high-voltage power supply and the powered component inconvenient. Therefore, an improvement is needed.

SUMMARY

[0004] The present invention aims to solve at least one of the technical problems in the related art. To this end, an objective of the present invention is to provide a high-voltage power supply. By disposing an output contact piece, when the high-voltage power supply is electrically connected to a powered component, the output contact piece at the high-voltage power supply is in electrical contact with a power-receiving element of the powered component. In this way, an electrical connection between the high-voltage power supply and a power supply component can be achieved. Therefore, wiring operations are eliminated, making establishing of the electrical connection between the high-voltage power supply and the powered component simple, easy to operate, and convenient to implement.

[0005] The present invention further provides a purification device including the high-voltage power supply as described above.

[0006] The present invention further provides an air conditioner including the purification device as described above.

[0007] A high-voltage power supply according to embodiments of the present invention in a first aspect includes a housing, a circuit board disposed in the housing, and an output contact piece disposed in the housing and

electrically connected to the circuit board. The output contact piece is configured to be in electrical contact with a power-receiving element of a powered component to supply power to the powered component.

[0008] With the high-voltage power supply according to the embodiments of the present invention, the output contact piece is disposed on the housing of the high-voltage power supply to supply power to the powered component. By disposing the output contact piece, when the high-voltage power supply is electrically connected to the powered component, the output contact piece at the high-voltage power supply is in electrical contact with the power-receiving element of the powered component. As a result, an electrical connection between the high-voltage power supply and a power supply component can be achieved. Therefore, wiring operations are eliminated, making establishing of the electrical connection between the high-voltage power supply and the powered component simple, easy to operate, and convenient to implement.

[0009] According to some embodiments of the present invention, the output contact piece is located in the housing. The housing has a first avoidance through hole formed on the housing. The output contact piece includes a contact portion adapted to be in electrical contact with the power-receiving element. The contact portion faces the first avoidance through hole.

[0010] According to some optional embodiments of the present invention, the output contact piece includes a fixing portion fixed to the housing, and a connection portion connected between the contact portion and the fixing portion. The connection portion is angled to each of the fixing portion and the contact portion.

[0011] According to some optional embodiments of the present invention, a support protruding platform is provided in the housing. The support protruding platform includes a support base and a support protruding block disposed on the support base. The fixing portion is fixed to the support base. The connection portion extends along a side wall of the support protruding platform. The contact portion is located at a side of the support protruding block away from the support base. The contact portion in a natural state is spaced apart from the support protruding block.

[0012] According to some optional embodiments of the present invention, the output contact piece is detachably disposed in the housing.

[0013] According to some optional embodiments of the present invention, the housing includes a main housing and a cover detachably connected to the main housing. The circuit board and the output contact piece are disposed in the main housing. The first avoidance through hole is formed at the cover.

[0014] According to some embodiments of the present invention, the powered component is provided with the power-receiving element on an outer wall of the powered component.

[0015] According to some optional embodiments of the

present invention, the power-receiving element is an arch-shaped elastic sheet protruding towards the output contact piece.

[0016] According to some embodiments of the present invention, the high-voltage power supply further includes a switch element disposed in the housing and electrically connected to the circuit board. The switch element is connected in series within a power supply circuit of the high-voltage power supply. When the high-voltage power supply is electrically connected to the powered component, the switch element is in a switch-on state, and when the high-voltage power supply is disconnected from the powered component, the switch element is in a switch-off state.

[0017] According to some optional embodiments of the present invention, the switch element is a trigger switch. When the powered component is electrically connected to the high-voltage power supply, the powered component interacts with the switch element to trigger the switch element into the switch-on state.

[0018] According to some optional embodiments of the present invention, the switch element is disposed in the housing. The housing has a second avoidance through hole formed on the housing. The switch element has a first triggering protrusion protruding into the second avoidance through hole. The powered component has a second triggering protrusion. When the second triggering protrusion is in contact with and abuts against the first triggering protrusion, the switch element is triggered into the switch-on state.

[0019] According to some optional embodiments of the present invention, the switch element is detachably disposed in the housing.

[0020] According to some embodiments of the present invention, the housing includes a main housing having a guide groove formed on the main housing, and a cover having a guide plate formed on the cover. One of the main housing and the cover is provided with a snap, and the other one of the main housing and the cover has a snap hole. The snap is snapped into the snap hole. The guide plate is adapted to, during assembling the cover with the main housing, slide along the guide groove until the guide plate is received in the guide groove.

[0021] According to some embodiments of the present invention, the housing has a first receiving cavity and a second receiving cavity. The circuit board is disposed in the first receiving cavity. The output contact piece is located in the second receiving cavity.

[0022] According to some optional embodiments of the present invention, the first receiving cavity extends in a first direction. The second receiving cavity is located at a side of the first receiving cavity in the first direction and extends in a second direction intersecting the first direction. Two output contact pieces of the high-voltage power supply are located at two ends of the second receiving cavity in the second direction.

[0023] According to further embodiments of the present invention, the high-voltage power supply further

includes a switch element disposed in the housing and electrically connected to the circuit board. The switch element is connected in series within a power supply circuit of the high-voltage power supply, and is located between the two output contact pieces in the second receiving cavity.

[0024] According to some optional embodiments of the present invention, an input wire harness of the high-voltage power supply extends out of the first receiving cavity and is located at an end of the first receiving cavity away from the second receiving cavity.

[0025] A purification device according to embodiments in a second aspect of the present invention includes the high-voltage power supply according to the embodiments in the first aspect of the present invention, and a purification component serving as the powered component. The high-voltage power supply is electrically connected to the purification component to supply power to the purification component.

[0026] With the purification device according to the embodiments of the first the present invention, by disposing the high-voltage power supply as described above, an electrical connection is formed between the purification component and the high-voltage power supply via the power-receiving element and the output contact piece. Therefore, establishing of the electrical connection between the purification component and the high-voltage power supply is simple and easy to operate.

[0027] According to some embodiments of the present invention, the purification component is located above the high-voltage power supply. The output contact piece is located at a top of the high-voltage power supply. The power-receiving element is located at a bottom of the purification component and in electrical contact with the output contact piece.

[0028] An air conditioner according to embodiments in a third aspect of the present invention includes a shell having an air inlet and an air outlet, a heat exchange and air supply assembly disposed in the shell, the purification device according to the embodiments in the second aspect of the present invention disposed in the shell, and an electrical control box disposed in the shell and electrically connected to an input wire harness of the high-voltage power supply.

[0029] With the air conditioner according to the embodiments of the present invention, by disposing the purification device in the shell of the air conditioner, functions of the air conditioner can be further enriched. For example, the air conditioner can also have a function of purifying indoor air. In addition, an electrical connection between the purification component of the purification device and the high-voltage power supply is simple and convenient to arrange.

[0030] According to some embodiments of the present invention, the high-voltage power supply and the electrical control box are located at the same side of the heat exchange and air supply assembly.

[0031] According to some optional embodiments of the

present invention, the input wire harness is located at a side of the high-voltage power supply adjacent to the electrical control box.

[0032] According to some embodiments of the present invention, the shell extends in a left-right direction. Both the high-voltage power supply and the electrical control box are located at a left or right side of the heat exchange and air supply assembly. The high-voltage power supply is partially located at a side of the electrical control box in a front-back direction. The high-voltage power supply is partially located at a side of the electrical control box adjacent to the heat exchange and air supply assembly.

[0033] According to some embodiments of the present invention, the shell includes a front frame. The high-voltage power supply is mounted at the front frame. The front frame includes a support plate, the high-voltage power supply being supported by and connected to the support plate; and a limiting plate disposed at an upper side of the support plate and having a limiting opening, the high-voltage power supply being partially received in the limiting opening.

[0034] According to some embodiments of the present invention, the air inlet is formed on a top of the shell. The air outlet is formed on a lower front part of the shell. A negative ion generator is disposed at the air outlet. The purification component faces a front region of the air inlet.

[0035] According to some optional embodiments of the present invention, the air conditioner further includes a primary filter screen mounted at the air inlet and located at an upstream side of the purification component.

[0036] Additional aspects and advantages of the present invention will be provided at least in part in the following description, or will become apparent at least in part from the following description, or can be learned from practicing of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0037] The above and/or additional aspects and advantages of the present invention will become apparent and readily understood from the following description of embodiments in conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic perspective view of a structure of a high-voltage power supply according to some embodiments of the present invention.

FIG. 2 is a schematic assembly view of the high-voltage power supply in FIG. 1.

FIG. 3 is an exploded schematic view of the high-voltage power supply in FIG. 1.

FIG. 4 is a schematic perspective view of the high-voltage power supply in FIG. 1 with a cover removed.

FIG. 5 is a schematic perspective view of a purification device according to some embodiments of the present invention.

FIG. 6 is an exploded schematic view of a purification device according to some embodiments of the present invention.

sent invention.

FIG. 7 is an enlarged view at part B in FIG. 6.

FIG. 8 is an exploded schematic view of a partial structure of a purification component in FIG. 6.

FIG. 9 is an exploded schematic view of a front frame of an air conditioner indoor unit and a purification device according to some embodiments of the present invention.

FIG. 10 is an enlarged view at part A in FIG. 8.

FIG. 11 is an exploded schematic view of a front frame of an air conditioner indoor unit and a purification device according to some embodiments of the present invention, viewed from another perspective. FIG. 12 is an enlarged view at part C in FIG. 11.

Reference numerals of the accompanying drawings:

[0038]

100, high-voltage power supply;
1, housing; 11, main housing; 111, snap; 112, guide groove; 113, lug; 12, cover; 121, snap hole; 122, guide plate; 123, first avoidance through hole; 124, second avoidance through hole; 13, support protruding platform; 131, support base; 132, support protruding block; 14, first receiving cavity; 141, encapsulation structure; 15, second receiving cavity; 151, first region; 152, second region; 153, third region; 154, mounting column;
2, circuit board;
3, output contact piece; 31, contact portion; 32, fixing portion; 33, connection portion;
4, switch element; 41, first triggering protrusion; 42, mounting hole;
5, input wire harness;
200, powered component; 201, power-receiving element; 202, second triggering protrusion;
300, purification device; 301, purification component; 3011, purification element; 3012, upper support; 3013, lower support;
401, shell; 402, front frame; 4021, support plate; 4022, limiting plate; 4023, limiting opening; 404, electrical control box; 405, air inlet; 406, air outlet.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0039] Embodiments of the present invention will be described in detail below with reference to examples thereof as illustrated in the accompanying drawings, throughout which same or similar elements, or elements having same or similar functions, are denoted by same or similar reference numerals. The embodiments described below with reference to the drawings are illustrative only, and are intended to explain, rather than limit, the present invention.

[0040] A high-voltage power supply 100 according to an embodiment of the present invention will be described below with reference to FIG. 1 to FIG. 4.

[0041] As illustrated in FIG. 1 to FIG. 4, the high-voltage power supply 100 according to an embodiment of the present invention includes a housing 1, a circuit board 2, and an output contact piece 3. The circuit board 2 is disposed in the housing 1, and the output contact piece 3 is electrically connected to the circuit board 2.

[0042] The housing 1 has a receiving space configured for components such as the circuit board 2 of the high-voltage power supply 100 to be disposed therein. The circuit board 2 is disposed in the receiving space of the housing 1, and the housing 1 supports and protects the circuit board 2. The output contact piece 3 is disposed in the housing 1, and the housing 1 supports the output contact piece 3. The output contact piece 3 is electrically connected to the circuit board 2.

[0043] Optionally, the output contact piece 3 may be disposed in the housing 1 along with the circuit board 2.

[0044] The output contact piece 3 is configured to be in electrical contact with a power-receiving element 201 of a powered component 200 to supply power to the powered component 200. Therefore, an electrical connection between the circuit board 2 and the powered component 200 is established via the output contact piece 3, and the output contact piece 3 can supply a voltage from the circuit board 2 to the powered component 200. Both the output contact piece 3 and the power-receiving element 201 are conductive components. For example, both the output contact piece 3 and the power-receiving element 201 are metallic conductive components.

[0045] The high-voltage power supply 100, also known as a high-voltage generator, is configured to generate a high voltage. After boosting the voltage, the high-voltage power supply 100 delivers the boosted voltage to the powered component 200 to meet high-voltage power requirements of a power supply component.

[0046] It should be noted that, the high-voltage power supply 100 may include two output contact pieces 3, one of which is positive and the other one of which is negative. The powered component 200 may include two power-receiving elements 201, one of which is positive and the other one of which is negative. Each of the two power-receiving elements 201 is in contact with a corresponding one of the two output contact pieces 3.

[0047] With the high-voltage power supply 100 according to an embodiment of the present invention, the output contact piece 3 is disposed on the housing 1 of the high-voltage power supply 100 to supply power to the powered component 200. By disposing the output contact piece 3, when the high-voltage power supply 100 is electrically connected to the powered component 200, the output contact piece 3 at the high-voltage power supply 100 is in electrical contact with the power-receiving element 201 of the powered component 200, which can achieve an electrical connection between the high-voltage power supply 100 and a power supply component. Therefore, wiring operations are eliminated, making establishing of the electrical connection between the high-voltage power supply 100 and the powered component 200 simple,

easy to operate, and convenient to implement.

[0048] As illustrated in FIG. 1 and FIG. 4, according to some embodiments of the present invention, the output contact piece 3 is located in the housing 1. The housing 1 supports and protects support components. By disposing the output contact piece 3 in the housing 1, electric shock accidents or the like caused by accidental contact with the output contact piece 3 can be reduced or avoided, improving safety of the high-voltage power supply 100. The housing 1 has a first avoidance through hole 123 formed on the housing 1. The output contact piece 3 includes a contact portion 31 adapted to be in electrical contact with the power-receiving element 201 of the powered component 200. The contact portion 31 faces the first avoidance through hole 123. In this way, the first avoidance through hole 123 allows the contact portion 31 of the output contact piece 3 to be in electrical contact with the power-receiving element 201 of the powered component 200, establishing the electrical connection between the high-voltage power supply 100 and the powered component 200. In addition, the establishing of this electrical connection is simple, easy to operate, and convenient to implement. For example, when the high-voltage power supply 100 is electrically connected to the powered component 200, the power-receiving element 201 of the powered component 200 can pass through the first avoidance through hole 123 and directly contact the contact portion 31 of the output contact piece 3 to establish the electrical connection.

[0049] According to some optional embodiments of the present invention, as illustrated in FIG. 3, the output contact piece 3 includes a fixing portion 32 and a connection portion 33. The fixing portion 32 may be connected to an end of the connection portion 33. The fixing portion 32 is fixed to the housing 1. For example, the fixing portion 32 may be fixed to the housing 1 by a fastener (such as a screw, a rivet, and a welding stud). The contact portion 31 may be connected to the other end of the connection portion 33. The connection portion 33 is connected between the contact portion 31 and the fixing portion 32. The connection portion 33 is angled to the fixing portion 32. For example, an angle between the connection portion 33 and the fixing portion 32 may range from 30° to 90°. The connection portion 33 is angled to the contact portion 31. For example, an angle between the connection portion 33 and the contact portion 31 may range from 30° to 90°.

[0050] By configuring the output contact piece 3 to include the fixing portion 32, the connection portion 33, and the contact portion 31 as described above, the output contact piece 3 can have good elasticity. When the high-voltage power supply 100 is electrically connected to the powered component 200, the power-receiving element 201 of the powered component 200 can pass through the first avoidance through hole 123 and directly contact the contact portion 31 of the output contact piece 3. The power-receiving element 201 of the powered component 200 abuts against the output contact piece 3 to cause

elastic deformation of the output contact piece 3. As a result, a stable contact between the output contact piece 3 of the high-voltage power supply 100 and the power-receiving element 201 of the powered component 200 can be ensured, establishing the stable electrical connection between the high-voltage power supply 100 and the powered component 200.

[0051] For example, in some embodiments of the present invention, as illustrated in FIG. 4, the output contact piece 3 includes the fixing portion 32, connection portion 33, and contact portion 31 as described above. In addition, the angle between the connection portion 33 and the fixing portion 32 of the output contact piece 3 is a right angle, and the angle between the connection portion 33 and the contact portion 31 of the output contact piece 3 is also a right angle. The first avoidance through hole 123 is formed on a top of the housing 1, and the first avoidance through hole 123 extends through the top of the housing 1 in an up-down direction. The connection portion 33 of the output contact piece 3 extends in the up-down direction. The fixing portion 32 is connected to a lower end of the connection portion 33, and the contact portion 31 is connected to an upper end of the connection portion 33. The contact portion 31 faces the first avoidance through hole in such a manner that the contact portion 31 can be exposed to the outside through the first avoidance through hole. The power-receiving element 201 of the powered component 200 may be disposed at a bottom of the powered component 200. When the high-voltage power supply 100 is electrically connected to the powered component 200, the powered component 200 can be positioned above the high-voltage power supply 100 in such a manner that the power-receiving element 201 of the powered component 200 is located directly above the first avoidance through hole 123, and the power-receiving element 201 of the powered component 200 is in contact with the contact portion 31 through the first avoidance through hole 123 and presses the contact portion 31 downward. In this way, the stable contact between the power-receiving element 201 and the contact portion 31 is ensured, establishing the stable electrical connection between the high-voltage power supply 100 and the powered component 200.

[0052] According to some optional embodiments of the present invention, as illustrated in FIG. 3 and FIG. 4, a support protruding platform 13 is provided in the housing 1. For example, the support protruding platform 13 and the housing 1 may be integrally formed. The support protruding platform 13 includes a support base 131 and a support protruding block 132. The support base 131 is fixed to an inner wall of the housing 1. For example, the support base 131 may be fixed to a bottom wall of the housing 1. The support protruding block 132 is disposed on the support base 131. The fixing portion 32 is fixed to the support base 131. The connection portion 33 extends along a side wall of the support protruding platform 13. The support protruding platform 13 supports the output contact piece 3 through the support base 131 and the

support protruding block 132, improving stability and reliability of the connection between the output contact piece 3 and the housing 1. The contact portion 31 is located at a side of the support protruding block 132 away from the support base 131. The contact portion 31 in a natural state is spaced apart from the support protruding block 132. In this way, the contact portion 31 is located at a position closer to the first avoidance through hole 123 in the housing 1, facilitating electrical contact between the output contact piece 3 and the powered component 200. In addition, a spacing between the contact portion 31 and the support protruding block 132 provides a predetermined deformation space for the output contact piece 3, mainly for the contact portion 31. In this way, the contact portion 31 of the output contact piece 3 can deform when being in electrical contact with the power-receiving element 201 of the powered component 200, ensuring stable electrical contact between the output contact piece 3 and the power-receiving element 201.

[0053] Optionally, the support protruding block 132 and the support base 131 may be integrally formed. The support base 131 is fixed to the bottom wall of the housing 1, and the support protruding block 132 is formed above the support base 131. The fixing portion 32 extends in a front-back direction and is fixed to the support base 131. The connection portion 33 extends along a side wall extending in an up-down direction of the support protruding platform 13. The first avoidance through hole 123 is formed on the top of the housing 1 and extends along the top of the housing 1 in the up-down direction. In the up-down direction, the contact portion 31 is located at an upper side of the support protruding platform 13, in such a manner that the contact portion 31 faces the first avoidance through hole 123.

[0054] According to some optional embodiments of the present invention, the output contact piece 3 is detachably disposed in the housing 1. This detachable arrangement facilitates replacement and maintenance of the output contact piece 3. For example, the output contact piece 3 may be mounted to housing 1 by a fastener.

[0055] According to some optional embodiments of the present invention, as illustrated in FIG. 1 to FIG. 3, the housing 1 includes a main housing 11 and a cover 12 detachably connected to the main housing 11. The main housing 11 has an open side, and the cover 12 detachably covers the open side of the main housing 11. For example, an upper side of the main housing 11 is open, and the cover 12 detachably covers the upper side of the main housing 11. The circuit board 2 and the output contact piece 3 are disposed in the main housing 11. The first avoidance through hole 123 is formed on the cover 12, and the first avoidance through hole 123 may extend through the cover 12 in a thickness direction of the cover 12. For example, the cover 12 is detachably connected to a top of the main housing 11, and the first avoidance through hole 123 is formed as a hole extending through the cover 12 in the up-down direction. By configuring the housing 1 to include the main housing 11

and the cover 12 detachably connected to the main housing 11, maintenance and replacement of components in the housing 1, such as the circuit board 2 or the output contact piece 3 mounted in the housing 1, are facilitated. In addition, by disposing the cover 12, the circuit board 2 and the output contact piece 3 located in the main housing 11 can be protected, and the safety of the high-voltage power supply 100 can be improved, avoiding safety accidents caused by accidental contact with the circuit board 2, the output contact piece 3, or the like.

[0056] According to some embodiments of the present invention, as illustrated in FIG. 5 to FIG. 7, the powered component 200 is provided with a power-receiving element 201 on an outer wall of the powered component 200, and the power-receiving element 201 is adapted to be in electrical contact with the output contact piece 3. The power-receiving element 201 is disposed on the outer wall of the powered component 200 to facilitate electrical contact between the power-receiving element 201 and the output contact piece 3.

[0057] According to some optional embodiments of the present invention, as illustrated in FIG. 7, the power-receiving element 201 is an arch-shaped elastic sheet protruding towards the output contact piece 3. In this way, the power-receiving element 201 may also have elastic deformation capability, which can further improve stability of an electrical connection between the powered component 200 and the output contact piece 3 when the powered component 200 establishes the electrical connection with the output contact piece 3 through the power-receiving element 201.

[0058] According to some embodiments of the present invention, as illustrated in FIG. 3 and FIG. 4, the high-voltage power supply 100 further includes a switch element 4 disposed in the housing 1 and electrically connected to the circuit board 2. Optionally, the switch element 4 may be disposed in the housing 1 together with the circuit board 2. The switch element 4 is connected in series with a power supply circuit of high-voltage power supply 100, and the switch element 4 can control turn-on or turn-off of the power supply circuit by switching between a switch-on state and a switch-off state. When the high-voltage power supply 100 is electrically connected to the powered component 200, the switch element 4 is in a switch-on state; and when the high-voltage power supply 100 is disconnected from the powered component 200, the switch element 4 is in a switch-off state.

[0059] When the high-voltage power supply 100 is electrically connected to the powered component 200, the switch element 4 is switched into the switch-on state to turn on the power supply circuit, in such a manner that the high-voltage power supply 100 can supply power to the powered component 200. When the high-voltage power supply 100 is disconnected from the contact portion 31, the high-voltage power supply 100 does not need to supply power to the powered component 200. Since the switch element 4 is switched into the switch-off state

in this case, the power supply circuit in the high-voltage power supply 100 is also turned off. In this way, when the powered component 200 is disconnected from the high-voltage power supply 100, the high-voltage power supply 100 has a power-off protection function, preventing the high-voltage power supply 100 from causing accidental injury to the human body.

[0060] According to some optional embodiments of the present invention, the switch element 4 is a trigger switch. When the powered component 200 is electrically connected to the high-voltage power supply 100, the powered component 200 interacts with the switch element 4 to trigger the switch element 4 into the switch-on state. The trigger switch has high reliability and sensitive operation, which can accurately complete a control of the power supply circuit between the high-voltage power supply 100 and the powered component 200. Switching of the switch element 4 between the switch-on state and the switch-off state can be achieved simply by connecting the powered component 200 to the high-voltage power supply 100 and disconnecting the powered component 200 from the high-voltage power supply 100, without any other auxiliary operations. Therefore, a control method of the switch element 4 is simple and easy to operate.

[0061] According to some optional embodiments of the present invention, as illustrated in FIG. 3 and FIG. 4, the switch element 4 is disposed in the housing 1. The housing 1 has a second avoidance through hole 124 formed on the housing 1, and the switch element 4 has a first triggering protrusion 41 protruding into the second avoidance through hole 124. The powered component 200 has a second triggering protrusion 202. When the powered component 200 is electrically connected to the high-voltage power supply 100, that is, when the power-receiving element 201 of the powered component 200 is in contact with the output contact piece 3 through the first avoidance through hole 123 to establish an electrical connection between the powered component 200 and the high-voltage power supply 100, the second triggering protrusion 202 can be brought into contact with the first triggering protrusion 41 through the second avoidance through hole 124. When the second triggering protrusion 202 is in contact with and abuts against the first triggering protrusion 41, the switch element 4 is triggered into the switch-on state. The high-voltage power supply 100 and the powered component 200 can realize state switching of the switch member 4 and control of the power supply circuit by the switch member 4 through the contact and abutting between the first triggering protrusion 41 and the second triggering protrusion 202. This engagement is simple and easy to operate. The first triggering protrusion 41 and the second triggering protrusion 202 have a simple structure and small size, allowing them to complete a control of the switch element 4 in a small space.

[0062] For example, the switch element 4 is a micro-switch. The microswitch is provided with a spring-loaded contact as the first triggering protrusion 41 and a movable contact. The first triggering protrusion 41 and the movable

ble contact are stacked in a vertical direction, with the first triggering protrusion 41 located above the movable contact. When the first triggering protrusion 41 is subjected to an external pressing force from the second triggering protrusion 202, the movable contact is displaced accordingly, switching the microswitch to a switch-on state.

[0063] According to some optional embodiments of the present invention, the switch element 4 is detachably disposed in the housing 1, facilitating maintenance and replacement of the switch element 4. For example, one of the switch element 4 and the housing 1 may be provided with a mounting post 154, and the other one of the switch element 4 and the housing 1 may be provided with a mounting hole 42. The switch element 4 is detachably disposed in the housing 1 through an engagement of the mounting post 154 into the mounting hole 42.

[0064] According to some embodiments of the present invention, as illustrated in FIG. 1 to FIG. 3, the housing 1 includes a main housing 11 and a cover 12. One of the main housing 11 and the cover 12 is provided with a snap 111, and the other one of the main housing 11 and the cover 12 has a snap hole 121 into which the snap 111 is snapped. The main housing 11 is engaged with the cover 12 through the snap 111 and the snap hole 121 to form the housing 1. For example, the snap 111 is disposed on the main housing 11, and the snap hole 121 is disposed on the cover 12. For example, the snap hole 121 is disposed on the main housing 11, and the snap 111 is disposed on the cover 12. A connection between the main housing 11 and the cover 12 is simple, facilitating assembly and disassembly.

[0065] The cover 12 has a guide plate 122 formed on the cover, and the main housing 11 has a guide groove 112 formed on the main housing 11. The guide plate 122 is adapted to, during assembling the cover 12 with the main housing 11, slide along the guide groove 112 until the guide plate 122 is received in the guide groove 112. The guide groove 112 and the guide plate 122 are configured to guide the cover 12 to slide relative to the main housing 11, achieving accurate positioning and mounting of the main housing 11 and the cover 12. When the guide plate 122 slides to be completely received in the guide groove 112, the snap 111 located on the main housing 11 is just snapped into the snap hole 121 located on the cover 12, and the cover 12 is connected to the main housing 11.

[0066] According to some embodiments of the present invention, as illustrated in FIG. 3 and FIG. 4, the housing 1 has a first receiving cavity 14 and a second receiving cavity 15. The circuit board 2 is disposed in the first receiving cavity 14, and the output contact piece 3 is located in the second receiving cavity 15, in such a manner that modular arrangement of components of the high-voltage power supply 100 is achieved. Accordingly, a space is saved, simplification and optimization of a structure of the high-voltage power supply 100 is facilitated.

[0067] According to some optional embodiments of the

present invention, the first receiving cavity 14 extends in a first direction, and the second receiving cavity 15 is located at a side of the first receiving cavity 14 in the first direction and extends in a second direction intersecting the first direction. For example, the second direction intersects the first direction. For example, the housing 1 is formed into an L-shape, and two sides of the L-shape form the first receiving cavity 14 and the second receiving cavity 15, respectively. Two output contact pieces 3 of the high-voltage power supply 100 are located at two ends of the second receiving cavity 15 in the second direction. The output contact pieces 3 are spaced apart from each other in the second direction to ensure a safe distance between the two output contact pieces 3 of the high-voltage power supply 100, avoiding safety accidents such as short circuit between the two output contact pieces 3.

[0068] For example, in some embodiments, the first direction is a left-right direction and the second direction is a front-back direction.

[0069] According to a further embodiment of the present invention, as illustrated in FIG. 3 and FIG. 4, the high-voltage power supply 100 further includes a switch element 4 disposed in the housing 1 and electrically connected to the circuit board 2. For example, the switch element 4 is detachably disposed in the housing 1, and the housing 1 supports and protects the switch element 4. The switch element 4 is connected in series within a power supply circuit of the high-voltage power supply 100 and is configured to control on/off of the power supply circuit. Therefore, safety of the power supply circuit can be improved. The switch element 4 is located between the two output contact pieces 3 in the second receiving cavity 15. By arranging the switch element 4 between the two output contact pieces 3, design space of the high-voltage power supply 100 can be saved while ensuring the safety, reducing a size of the high-voltage power supply 100.

[0070] According to some optional embodiments of the present invention, as illustrated in FIG. 4, an input wire harness 5 of the high-voltage power supply 100 extends out of the first receiving cavity 14 and is located at an end of the first receiving cavity 14 away from the second receiving cavity 15. That is, the input wire harness 5 and the second receiving cavity 15 are located at two ends of the first receiving cavity 14 in the first direction, respectively. In this way, a connection of the high-voltage power supply 100 to an external power source via the input wire harness 5 is facilitated, and a length of the input wire harness 5 can be shortened as much as possible. In addition, a distance between an input terminal and an output terminal of the high-voltage power supply 100 is relatively large, reducing mutual interference between the input terminal and the output terminal, thereby facilitating overall structural layout of the high-voltage power supply 100.

[0071] According to embodiments in a second aspect of the present invention, as illustrated in FIG. 5 to FIG. 7, a

purification device 300 includes the high-voltage power supply 100 according to the embodiments in the first aspect of the present invention and a purification component 301 serving as the powered component 200 as described above. The purification component 301 may be configured to purify air. For example, the purification component 301 may be configured to perform dust removal, harmful gas removal, sterilization and disinfection, etc. on the air. The high-voltage power supply 100 is electrically connected to the purification component 301 to supply power to the purification component 301.

[0072] Optionally, the purification component 301 may be a negative ion generator, an electrostatic precipitator, a pulse germicidal lamp, etc.

[0073] With the purification device 300 according to the embodiments of the present invention, by disposing the above-described high-voltage power supply 100, an electrical connection is established between the purification component 301 and the high-voltage power supply 100 through the power-receiving element 201 and the output contact piece 3. Therefore, establishing of the electrical connection between the purification component 301 and the high-voltage power supply 100 is simple and easy to operate.

[0074] According to some embodiments of the present invention, as illustrated in FIG. 5 to FIG. 7, the purification component 301 is located above the high-voltage power supply 100. The output contact piece 3 is located at a top of the high-voltage power supply 100. The power-receiving element 201 of the purification component 301 is located at a bottom of the purification component 301 and in electrical contact with the output contact piece 3. In this way, when the purification component 301 is electrically connected to the high-voltage power supply 100, and the power-receiving element 201 is in contact with the output contact piece 3 through the first avoidance through hole 123 to establish an electrical connection, stability of the electrical connection between the power-receiving element 201 and the output contact piece 3 can be improved. In addition, by virtue of the self-weight of the purification component 301, the second triggering protrusion 202 can accurately trigger the first triggering protrusion 41, achieving accurate control of switching the switch element 4 into the switch-on state.

[0075] As illustrated in FIG. 8 to FIG. 10, an air conditioner according to embodiments in a third aspect of the present invention includes a shell 401, a heat exchange and air supply assembly, a purification device 300, and an electrical control box 404. The shell 401 has an air inlet 405 and an air outlet 406. The heat exchange and air supply assembly is disposed in the shell 401. The purification device 300 is disposed in the shell 401 and is the purification device 300 according to the embodiments in the second aspect of the present invention. The electrical control box 404 is disposed in the shell 401 and electrically connected to an input wire harness 5 of the high-voltage power supply 100. The electrical control box 404 can be electrically connected to an external power supply

to supply power to the high-voltage power supply 100.

[0076] The heat exchange and air supply assembly includes a heat exchanger component and a fan component. When the air conditioner is in operation, the fan component drives airflow from the air inlet 405 into the shell 401 to exchange heat with the heat exchanger component, and then discharges the airflow from the air outlet 406 into the room. As a result, an indoor temperature can be regulated. When the air conditioner is in operation, the purification device 300 can be controlled to operate as desired. When the purification device 300 is in operation, the high-voltage power supply 100 supplies power to the purification component 301, and the electrical control box 404 can control the purification component 301 to be turned on or turned off. If being turned on, the purification component 301 can purify the air entering the shell 401, in such a manner that the purified air is discharged from the air outlet 406. Therefore, indoor air quality is improved.

[0077] The purification component 301 can be located at the air inlet 405, between the air inlet 405 and the heat exchange and air supply assembly, between the heat exchanger assembly and the fan assembly, or between the fan assembly and the air outlet 406. During flow of the air through the purification component 301, the purification component 301 can purify the air.

[0078] Optionally, the air conditioner may be a split-type air conditioner, such as a split wall-mounted air conditioner. When the air conditioner is the split-type air conditioner, the air conditioner includes an air conditioner indoor unit and an air conditioner outdoor unit. The air conditioner indoor unit includes the shell 401, the heat exchange and air supply assembly, the purification device 300, and the electrical control box 404 as described above.

[0079] With the air conditioner according to the embodiments of the present invention, by disposing the purification device 300 in the shell 401 of the air conditioner, functions of the air conditioner can be further enriched. For example, the air conditioner can also have a function of purifying indoor air. In addition, the electrical connection between the purification component 301 of the purification device 300 and the high-voltage power supply 100 is simple and convenient to arrange.

[0080] According to some embodiments of the present invention, as illustrated in FIG. 8 to FIG. 10, the high-voltage power supply 100 and the electrical control box 404 are located at the same side of the heat exchange and air supply assembly. In this way, a distance between the high-voltage power supply 100 and the electrical control box 404 can be effectively shortened, facilitating a connection of the high-voltage power supply 100 to the electrical control box 404 via the input wire harness 5 and reducing the length of the input wire harness 5. In addition, wiring design between the high-voltage power supply 100 and the electrical control box 404 can also be simplified to a certain extent.

[0081] According to some optional embodiments of the

present invention, as illustrated in FIG. 4, FIG. 8, and FIG. 9, the input wire harness 5 is located at a side of the high-voltage power supply 100 adjacent to the electrical control box 404. As a result, the length of the input wire harness 5 can be further shortened.

[0082] According to some optional embodiments of the present invention, as illustrated in FIG. 8 and FIG. 10, the shell 401 extends in a left-right direction, and both the high-voltage power supply 100 and the electrical control box 404 are located at a left or right side of the heat exchange and air supply assembly. The high-voltage power supply 100 is partially located at a side of the electrical control box 404 in a front-back direction, and the high-voltage power supply 100 is partially located at a side of the electrical control box 404 adjacent to the heat exchange and air supply assembly. In this way, design and layout of overall circuitry in the air conditioner are facilitated.

[0083] According to some embodiments of the present invention, as illustrated in FIG. 8 and FIG. 9, the shell 401 includes a front frame 402, and the high-voltage power supply 100 is mounted at the front frame 402. The front frame 402 includes a support plate 4021 and a limiting plate 4022. The high-voltage power supply 100 is supported by and connected to the support plate 4021. The limiting plate 4022 is disposed at an upper side of the support plate 4021 and has a limiting opening 4023. The high-voltage power supply 100 is partially received in the limiting opening 4023. By providing the limiting plate 4022 and the limiting opening 4023, mounting and positioning of the high-voltage power supply 100 relative to the front frame 402 is facilitated. By providing the support plate 4021, stable support can be provided for the high-voltage power supply 100, and mounting and fixing of the high-voltage power supply 100 is facilitated. By disposing the limiting plate 4022 on the support plate 4021 and forming the limiting opening 4023 on the limiting plate 4022, reliability of relative positioning between the high-voltage power supply 100 and the front frame 402 is facilitated. Connecting the high-voltage power supply 100 to the front frame 402 of the shell 401 allows the front frame 402 to provide a predetermined supporting effect for the purification component 301 when the high-voltage power supply 100 is connected to the purification component 301. Therefore, mounting stability of the purification component 301 is enhanced.

[0084] For example, the purification device 300 may be connected to the shell 401 as follows. First, the high-voltage power supply 100 is positioned relative to the front frame 402 of the shell 401. The high-voltage power supply 100 passes through the limiting opening 4023 of the front frame 402 and is connected to the front frame 402 by causing a fastener to extend through the high-voltage power supply 100 and the support plate 402. Next, the high-voltage power supply 100 is electrically connected to the electrical control box 404 via the input wire harness 5. Then, the purification component 301 is disposed on the high-voltage power supply 100. In this

case, the power-receiving element 201 of the purification component 301 is electrically connected to the two output contact pieces 3 through the first avoidance through hole 123 and the second avoidance through hole 124, respectively. The second triggering protrusion 202 is in contact with and abuts against the first triggering protrusion 41 to switch the switch element 4 into the switch-on state. In this case, an electrical connection is established among the high-voltage power supply 100, the purification component 301, and the electrical control box 404, and the purification device 300 is connected to the shell 401.

[0085] According to some embodiments of the present invention, as illustrated in FIG. 9 and FIG. 11, the air inlet 405 is formed on a top of the shell 401, and the air outlet 406 is formed on a lower front part of the shell 401. A negative ion generator is disposed at the air outlet 406, and the purification component 301 faces a front region of the air inlet 405. When exiting through the air outlet 406, the airflow carries charged ions generated by the negative ion generator at the air outlet 406. Therefore, the airflow containing the charged ions enters the room through the air outlet 406 and adsorbs particles, dust, etc., in the indoor air. Next, part of the airflow containing the charged ions enters the air conditioner again through the air inlet 405. Since the airflow containing the charged ions enters the air conditioner again mainly through the front region of the air inlet, the purification component 301 is arranged to face the front region of the air inlet 405. In this way, the airflow containing the charged ions easily pass through the purification component 301 again for further purification. As a result, an overall purification effect of the air conditioner is improved. In addition, by positioning the purification component 301 to face the front region of air inlet 405, miniaturization of the purification component 301 can be achieved, which can save production costs.

[0086] According to some optional embodiments of the present invention, the air conditioner further includes a primary filter screen mounted at the air inlet 405 and located at an upstream side of the purification component 301. By arranging the primary filter screen, a purification function of the air conditioner can be optimized, improving a purification effect of the air conditioner. The primary filter screen can filter out some of the particles, dust, etc., contained in the airflow at the air inlet 405 before the airflow enters the purification component 301. As a result, a cleaning and maintenance frequency of the purification component 301 can be reduced, prolonging a service life of the purification component.

[0087] A high-voltage power supply 100, a purification device 300 including the high-voltage power supply 100, and an air conditioner according to an embodiment of the present invention will be described below with reference to FIG. 1 to FIG. 10.

[0088] As illustrated in FIG. 1 to FIG. 4, in this embodiment, the high-voltage power supply 100 includes a housing 1, a circuit board 2, and two output contact pieces 3. The circuit board 2 and the two output contact

pieces 3 are disposed in the housing 1, and the circuit board 2 is electrically connected to each of the two output contact pieces 3. Each of the two output contact pieces 3 is configured to be electrically connected to an external powered component 200.

[0089] As illustrated in FIG. 1 and FIG. 2, the housing 1 includes a main housing 11 and a cover 12 detachably disposed above the main housing 11. A snap hole 121 is formed on the cover 12, and a snap 111 is disposed on the main cover 12. The cover 12 is engaged above the main housing 11 through the snap 111 and the snap hole 121.

[0090] As illustrated in FIG. 3 and FIG. 4, the housing 1 is formed into an L-shape, and the two sides of the L-shape form a first receiving cavity 14 and a second receiving cavity 15, respectively. The first receiving cavity 14 extends in a left-right direction, and the second receiving cavity 15 extends in a front-back direction. A partition plate is disposed between the first receiving cavity 14 and the second receiving cavity 15 to separate them from each other. The second receiving cavity 15 is connected to a left end of the first receiving cavity 14 in the left-right direction. The circuit board 2 is disposed in the first receiving cavity 14, and the output contact pieces 3 are disposed at two ends of the second receiving cavity 15 in the second receiving cavity 15. In addition, an encapsulation structure 141 is also provided in the first receiving cavity 14. The encapsulation structure 141 is configured to encapsulate and protect a structure such as the circuit board 2 by usually adopting insulation epoxy resin or the like.

[0091] As illustrated in FIG. 3 and FIG. 4, a support protruding platform 13 is further disposed in the housing 1. The support protruding platform 13 is disposed in the second receiving cavity 15 for supporting the output contact pieces 3. The support protruding platform 13 includes a support base 131 and a support protruding block 132 disposed on the support base 131.

[0092] As illustrated in FIG. 3 and FIG. 4, each of the output contact pieces 3 is detachably disposed in the housing 1 and has a long plate-shaped structure. The output contact piece 3 includes a fixing portion 32, a connection portion 33, and a contact portion 31. The fixing portion 32 and the contact portion 31 are connected to opposite ends of the connection portion 33, respectively. The angle between the fixing portion 32 and the connection portion 33 is approximately a right angle, and the angle between the connection portion 33 and the contact portion 31 is also approximately a right angle. The output contact piece 3 extends in a direction that aligns with a structure of the support protruding platform 13. When causing the fastener through the fixing portion 32 and the support base 131 of the output contact piece 3 and fixing the fixing portion 32 to the support base 131 in the front-back direction, the connection portion 33 extends along a side wall of the support protruding block 132 in the up-down direction, and the contact portion 31 is located above the support protruding block 132 in the up-down direction. In addition, the output contact piece 3 in a

natural state is spaced apart from the support protruding block 132 in the up-down direction.

[0093] As illustrated in FIG. 3 and FIG. 4, the high-voltage power supply 100 further includes a switch element 4 detachably disposed in the housing 1. The switch element 4 is connected in series with the power supply circuit of the high-voltage power supply 100 and electrically connected to the circuit board 2. Specifically, the switch element 4 is located between the two output contact pieces 3 in the front-back direction in the second receiving cavity 15. In addition, to avoid the safety problems caused by mutual interference between the output contact pieces 3 and the switch member 4, the second receiving cavity 15 is divided into three regions by the partition plate in the front-back direction, that is, a first region 151, a second region 152, and a third region 153. The support protruding platform 13 is disposed in each of the first region 151 and the third region 153, and a mounting post 154 extending in the left-right direction is disposed in the second region 152. The two output contact pieces 3 are respectively disposed in the first region 151 and the third region 153 by the support protruding platform 13, and the switch element 4 is disposed in the second region 152 by the mounting post 154.

[0094] The switch element 4 includes a mounting hole 42, and the mounting hole 42 is a through hole extending in the left-right direction. The switch element 4 is disposed in the second region 152 by inserting the mounting post 154 into the mounting hole 42.

[0095] The switch element 4 further includes a first triggering protrusion 41 disposed at an upper portion of a switch key. The switch element 4 can switch between a switch-on state and a switch-off state through movement of the first triggering protrusion 41.

[0096] As illustrated in FIG. 1 to FIG. 3, the first avoidance through hole 123 and the second avoidance through hole 124 are formed on the cover 12 of the housing 1. Two first avoidance through holes 123 are formed and arranged in the front-back direction, and the second avoidance through hole 124 is located between the two first avoidance through holes 123. When the cover 12 is engaged with the main housing 11, in the vertical direction, the first avoidance through holes 123 face the output contact piece 3, and the second avoidance through hole 124 faces the switch element 4. Specifically, the first avoidance through holes 123 face the contact portion 31 of the output contact piece 3, and the second avoidance through hole 124 faces the first triggering protrusion 41 of the switch element 4.

[0097] As illustrated in FIG. 2 and FIG. 3, the housing 1 is further provided with a guide structure configured to guide the cover 12 to be accurately engaged with the main housing 11. The guide structure includes a guide plate 122 and a guide groove 112. The guide plate 122 is disposed at the left end of the cover 12 and formed as a plate extending in the up-down direction. The guide groove 112 is formed on the main housing 11. Specifically, the guide groove 112 is formed in the second region

152 of the second receiving cavity 15, making the second region 152 open towards the left end.

[0098] When the cover 12 is mounted at the main housing 11, the guide plate 122 slides relative to the guide groove 112 in the up-down direction until the snap 111 is engaged into the snap hole 121. In this case, the guide plate 122 makes the second region 152 be closed at the left end, and the guide plate 122 limits a movement of the switch element 4 mounted in the second region 152. As a result, the switch element 4 is stably mounted in the housing 1.

[0099] As illustrated in FIG. 4, the high-voltage power supply 100 further includes an input wire harness 5 extending out of the first receiving cavity 14. In addition, the input wire harness 5 is disposed away from the second receiving cavity 15 and close to a right end of the first receiving cavity 14. The input wire harness 5 is configured to connect the high-voltage power supply 100 to the external power supply.

[0100] As illustrated in FIG. 5 to FIG. 10, the high-voltage power supply 100 can be electrically connected to the external powered component 200 through the output contact piece 3, and supply power to the powered component 200. The power-receiving element 201 and the second triggering protrusion 202 are disposed at a lower part of the powered component 200. Two power-receiving elements 201 are provided, and the second triggering protrusion 202 is disposed between the two power-receiving elements 201. When the powered component 200 is disposed above the high-voltage power supply 100, the power-receiving elements 201 pass through the first avoidance through hole 123 and contact the output contact piece 3, establishing the electrical connection between the powered component 200 and the high-voltage power supply 100. The second triggering protrusion 202 passes through the second avoidance through hole 124 and contacts and abuts against the first triggering protrusion, switching the switch element 4 into the switch-on state.

[0101] As illustrated in FIG. 5 to FIG. 10, states of the power supply circuit of the high-voltage power supply 100 when the powered component 200 is connected to the high-voltage power supply 100 and when the powered component 200 is disconnected from the high-voltage power supply 100 will be described. In this embodiment, as an example, the powered component 200 is a purification component 301. The purification device 300 is formed after the purification component 301 is electrically connected to the high-voltage power supply 100.

[0102] The purification component 301 extends in the left-right direction and includes an upper support 3012, a purification element 3011, and a lower support 3013. The upper support 3012 and the lower support 3013 are detachably connected in the up-down direction to form a receiving space, and the purification element 3011 is disposed in the receiving space. The power-receiving element 201 configured to establish the electrical connection with the high-voltage power supply 100 is dis-

posed at a lower side of an outer wall of the left end of the purification component 301. Specifically, the power-receiving element 201 is disposed at a lower side of an outer wall of the lower support 3013, and two power-receiving elements 201 are arranged in the front-back direction. The second triggering protrusion 202 configured to be in contact with and abut against the first triggering protrusion 41 is also disposed at the lower side of the outer wall of the left end of the purification component 301, and the second triggering protrusion 202 is located between the two power-receiving elements 201 in the front-back direction.

[0103] When being disposed above the high-voltage power supply 100, the purification component 301 is electrically connected to the high-voltage power supply 100. The second triggering protrusion 202 is in contact with and abuts against the second triggering protrusion 202, switching the switch element 4 into the switch-on state. In this case, the power supply circuit is turned on. The electrical connections are established among the circuit board 2, the switch element 4, the output contact piece 3, and the purification component 301, and the high-voltage power supply 100 supplies power to the purification component 301.

[0104] When the purification component 301 is disconnected from the high-voltage power supply 100, the second triggering protrusion 202 springs back and drives the switch element 4 to switch into the switch-off state. In this case, the power supply circuit is turned off. The circuit among the circuit board 2, the switch element 4, and the output contact piece 3 is turned off, and the high-voltage power supply 100 achieves power-off protection.

[0105] As illustrated in FIG. 8 and FIG. 9, taking the powered component 200 as the purification component 301 as an example, the air conditioner including the high-voltage power supply 100 will be described. In this embodiment, the air conditioner is a split wall-mounted air conditioner.

[0106] The air conditioner indoor unit includes a shell 401, a heat exchange and air supply assembly, a purification device 300, and an electrical control box 404. The heat exchange and air supply assembly, the purification component 301, the high-voltage power supply 100, and the electrical control box 404 are all disposed in the shell 401.

[0107] The shell 401 extends in the left-right direction. The high-voltage power supply 100 and the electrical control box 404 are located at a left side of the shell 401. The heat exchange and air supply assembly is located at a right side of the shell 401, and the purification component 301 is disposed in the shell 401 in the left-right direction. The electrical control box 404 is located at a leftmost side of the shell 401. The high-voltage power supply 100 is disposed adjacent to the electrical control box 404 and is electrically connected to the electrical control box 404 by the input wire harness 5. The purification component 301 is disposed above the high-voltage power supply 100, and the purification component 301 is

electrically connected to the high-voltage power supply 100 at the left end of the purification component 301 through the contact of the power-receiving element 201 with the output contact piece 3.

[0108] Specifically, the shell 401 includes a front frame 402. The front frame 402 includes a support plate 4021 and a limiting plate 4022 disposed at the upper side of the support plate 4021. The support plate 4021 extends in a horizontal plane and has a connection hole. The limiting plate 4022 extends in a vertical plane and has a limiting opening 4023. The limiting opening 4023 is a through hole extending in the left-right direction, allowing the high-voltage power supply 100 to pass therethrough in the left-right direction. The high-voltage power supply 100 is provided with a lug 113 on the main housing 11 of the high-voltage power supply 100. The lug 113 is disposed at a lower left corner of the main housing 11 and has a connection hole in the up-down direction. The high-voltage power supply 100 is mounted on the front frame 402 through the limiting opening 4023 and the support plate 4021.

[0109] A process of mounting the high-voltage power supply 100 and the purification component 301 on the front frame 402 of the air conditioner will be described below.

[0110] First, the high-voltage power supply 100 passes through the limiting plate 4022 from left to right and is mounted to the front frame 402 through the limiting opening 4023, in such a manner that the connection hole on the lug 113 corresponds to the connection hole on the support plate 4021. In this case, the positioning of the high-voltage power supply 100 relative to the front frame 402 is completed.

[0111] Next, the fastener penetrates the lug 113 and the support plate 4021 to connect and mount the high-voltage power supply 100 onto the front frame 402. In this case, the input wire harness 5 of the high-voltage power supply 100 is close to the electrical control box 404, which enables the high-voltage power supply 100 to be electrically connected to the electrical control box 404 through the input wire harness 5.

[0112] Subsequently, the left end of the purification component 301, on which the power-receiving element 201 and the second triggering protrusion 202 are disposed, is caused to be close to the high-voltage power supply 100. Then, in the up-down direction, the two power-receiving elements 201 are caused to pass through the first avoidance through hole 123 to be electrically connected to the output contact pieces 3 of the high-voltage power supply 100, respectively. The second triggering protrusion 202 is caused to pass through the second avoidance through hole 124 and to be in contact with and abut against the first triggering protrusion 41, in such a manner that the switch element 4 of the high-voltage power supply 100 is in the switch-on state.

[0113] In this case, the electrical control box 404, the high-voltage power supply 100, and the purification component 301 of the air conditioner are electrically con-

nected.

[0114] When the high-voltage power supply 100 or the purification component 301 of the air conditioner need to be replaced or maintained, a disassembly process of the purification component 301 and the high-voltage power supply 100 is as follows:

[0115] First, the purification component 301 is removed in the up-down direction, disconnecting the power-receiving elements 201 from the output contact pieces 3. Also, the second triggering protrusion 202 is disconnected from the first triggering protrusion 41, and a pressing force exerted on the first triggering protrusion 41 is released. In this case, disassembly of the purification component 301 is completed, and the switch element 4 of the high-voltage power supply 100 is switched from the switch-on state into the switch-off state. In this way, the power supply circuit among the circuit board 2, the switch element 4, and the output contact piece 3 in the high-voltage power supply 100 is turned off, and the high-voltage power supply 100 is in a power-off protection state. As a result, the safety accidents caused by accidental contact during subsequent disassembly of the high-voltage power supply 100 can be avoided.

[0116] Next, the connection between the input wire harness 5 and the electrical control box 404 of the high-voltage power supply 100 is released. The fastener penetrating the lug 113 and the support plate 4021 is removed, and the high-voltage power supply 100 is moved from right to left to be disengaged from the limiting opening 4023. In this case, the disassembly of the high-voltage power supply 100 is completed.

[0117] In the description of the present invention, it should be understood that the orientation or the position indicated by terms such as "center", "longitudinal", "transverse", "length", "width", "thickness", "over", "below", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "axial", "radial", and "circumferential" should be construed to refer to the orientation or the position as shown in the drawings, and is only for the convenience of describing the present invention and simplifying the description, rather than indicating or implying that the pointed device or element must have a specific orientation, or be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation of the present invention.

[0118] In the description of the present invention, "plurality" means two or more.

[0119] In the description of the present invention, the first feature being "on" or "under" the second feature may include the first feature being in direct contact with the second feature, or the first feature being not in direct contact with the second feature, but being in contact with the second feature through another feature therebetween.

[0120] In the description of the present invention, the first feature being "above" the second feature includes the first feature being directly above or obliquely above the second feature, or simply means that a level of the first

feature is higher than a level of the second feature.

[0121] Reference throughout this specification to "an embodiment", "some embodiments", "schematic embodiments", "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 invention. In this specification, exemplary descriptions of aforesaid terms are not necessarily referring to the same embodiment or example. Further, the particular features, structures, materials, or characteristics can be combined in any suitable manner in one or more embodiments or examples.

[0122] Although embodiments of the present invention have been illustrated and described, it is conceivable for those of ordinary skill in the art that various changes, modifications, replacements, and variations can be made to these embodiments without departing from the principles and spirit of the present invention. The scope of the present invention shall be defined by the claims as appended and their equivalents.

Claims

1. A high-voltage power supply, comprising:

a housing;
a circuit board disposed in the housing; and
an output contact piece disposed in the housing and electrically connected to the circuit board, wherein the output contact piece is configured to be in electrical contact with a power-receiving element of a powered component to supply power to the powered component.

2. The high-voltage power supply according to claim 1, wherein:

the output contact piece is located in the housing;
the housing has a first avoidance through hole formed on the housing; and
the output contact piece comprises a contact portion adapted to be in electrical contact with the power-receiving element, the contact portion facing the first avoidance through hole.

3. The high-voltage power supply according to claim 2, wherein the output contact piece comprises:

a fixing portion fixed to the housing; and
a connection portion connected between the contact portion and the fixing portion, wherein the connection portion is angled to each of the fixing portion and the contact portion.

4. The high-voltage power supply according to claim 3,

wherein a support protruding platform is provided in the housing, wherein the support protruding platform comprises a support base and a support protruding block disposed on the support base, wherein:

the fixing portion is fixed to the support base;
the connection portion extends along a side wall of the support protruding platform; and
the contact portion is located at a side of the support protruding block away from the support base, the contact portion in a natural state being spaced apart from the support protruding block.

5. The high-voltage power supply according to any one of claims 2 to 4, wherein the output contact piece is detachably disposed in the housing.

6. The high-voltage power supply according to any one of claims 2 to 5, wherein the housing comprises:

a main housing, the circuit board and the output contact piece being disposed in the main housing; and
a cover detachably connected to the main housing, the first avoidance through hole being formed at the cover.

7. The high-voltage power supply according to any one of claims 1 to 6, wherein the powered component is provided with the power-receiving element on an outer wall of the powered component.

8. The high-voltage power supply according to claim 7, wherein the power-receiving element is an arch-shaped elastic sheet protruding towards the output contact piece.

9. The high-voltage power supply according to any one of claims 1 to 8, further comprising:

a switch element disposed in the housing and electrically connected to the circuit board, the switch element being connected in series within a power supply circuit of the high-voltage power supply, wherein:

when the high-voltage power supply is electrically connected to the powered component, the switch element is in a switch-on state; and
when the high-voltage power supply is disconnected from the powered component, the switch element is in a switch-off state.

10. The high-voltage power supply according to claim 9, wherein the switch element is a trigger switch, wherein when the powered component is electrically connected to the high-voltage power supply, the powered component interacts with the switch element to trigger the switch element into the switch-on

state.

11. The high-voltage power supply according to claim 10, wherein:

the switch element is disposed in the housing;
and
the housing has a second avoidance through hole formed on the housing, wherein:

the switch element has a first triggering protrusion protruding into the second avoidance through hole; and
the powered component has a second triggering protrusion,
wherein when the second triggering protrusion is in contact with and abuts against the first triggering protrusion, the switch element is triggered to the switch-on state.

12. The high-voltage power supply according to any one of claims 9 to 11, wherein the switch element is detachably disposed in the housing.

13. The high-voltage power supply according to claim 1, wherein the housing comprises:

a main housing having a guide groove formed on the main housing; and
a cover having a guide plate formed on the cover, wherein:

one of the main housing and the cover is provided with a snap, and the other one of the main housing and the cover has a snap hole, the snap being snapped into the snap hole; and
the guide plate is adapted to, during assembling the cover with the main housing, slide along the guide groove until the guide plate is received in the guide groove.

14. The high-voltage power supply according to any one of claims 1 to 8, wherein the housing has a first receiving cavity and a second receiving cavity, the circuit board being disposed in the first receiving cavity, and the output contact piece being located in the second receiving cavity.

15. The high-voltage power supply according to claim 14, wherein:

the first receiving cavity extends in a first direction; and
the second receiving cavity is located at a side of the first receiving cavity in the first direction and extends in a second direction intersecting the first direction,

wherein two output contact pieces of the high-voltage power supply are located at two ends of the second receiving cavity in the second direction.

16. The high-voltage power supply according to claim 15, further comprising a switch element disposed in the housing and electrically connected to the circuit board,
wherein the switch element is connected in series within a power supply circuit of the high-voltage power supply, and is located between the two output contact pieces in the second receiving cavity.

17. The high-voltage power supply according to any one of claims 14 to 16, wherein an input wire harness of the high-voltage power supply extends out of the first receiving cavity and is located at an end of the first receiving cavity away from the second receiving cavity.

18. A purification device, comprising:

the high-voltage power supply according to any one of claims 1 to 17; and
a purification component serving as the powered component,
wherein the high-voltage power supply is electrically connected to the purification component to supply power to the purification component.

19. The purification device according to claim 18, wherein:

the purification component is located above the high-voltage power supply;
the output contact piece is located at a top of the high-voltage power supply; and
the power-receiving element is located at a bottom of the purification component and in electrical contact with the output contact piece.

20. An air conditioner, comprising:

a shell having an air inlet and an air outlet;
a heat exchange and air supply assembly disposed in the shell;
the purification device according to claim 18 or claim 19, the purification device being disposed in the shell; and
an electrical control box disposed in the shell and electrically connected to an input wire harness of the high-voltage power supply.

21. The air conditioner according to claim 20, wherein the high-voltage power supply and the electrical control box are located at the same side of the heat exchange and air supply assembly.

22. The air conditioner according to claim 21, wherein the input wire harness is located at a side of the high-voltage power supply adjacent to the electrical control box. 5
23. The air conditioner according to any one of claims 21 to 22, wherein: 10
- the shell extends in a left-right direction, and both the high-voltage power supply and the electrical control box are located at a left or right side of the heat exchange and air supply assembly; 10
- the high-voltage power supply is partially located at a side of the electrical control box in a front-back direction; and 15
- the high-voltage power supply is partially located at a side of the electrical control box adjacent to the heat exchange and air supply assembly. 20
24. The air conditioner according to any one of claims 20 to 23, wherein the shell comprises a front frame, the high-voltage power supply being mounted at the front frame, wherein the front frame comprises: 25
- a support plate, the high-voltage power supply being supported by and connected to the support plate; and
- a limiting plate disposed at an upper side of the support plate and having a limiting opening, the high-voltage power supply being partially received in the limiting opening. 30
25. The air conditioner according to any one of claims 20 to 24, wherein: 35
- the air inlet is formed on a top of the shell; the air outlet is formed on a lower front part of the shell; 40
- a negative ion generator is disposed at the air outlet; and
- the purification component faces a front region of the air inlet. 45
26. The air conditioner according to any one of claims 20 to 25, further comprising a primary filter screen mounted at the air inlet and located at an upstream side of the purification component. 50

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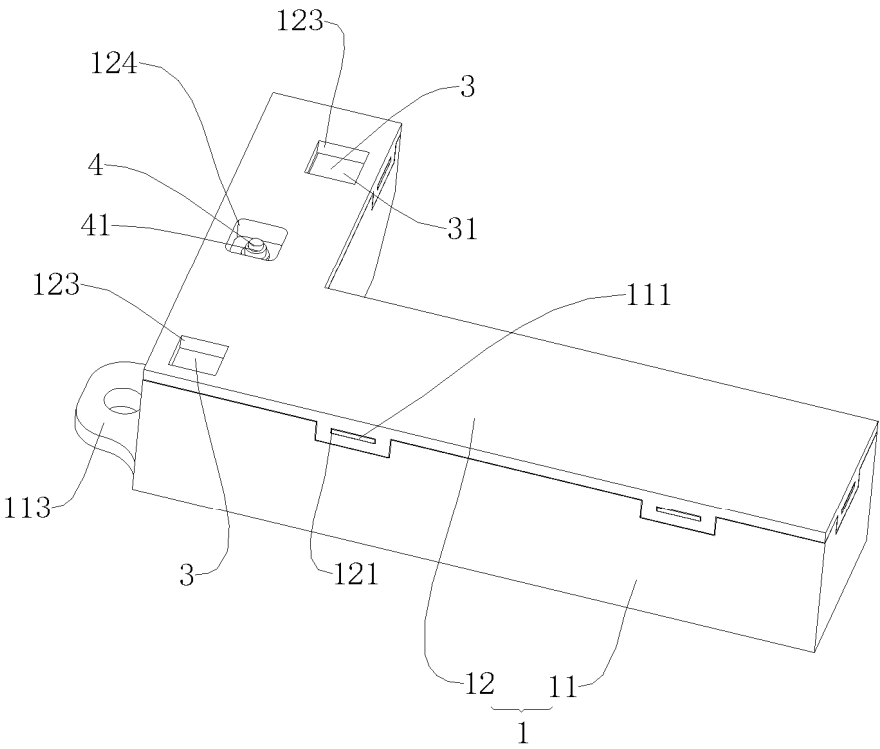
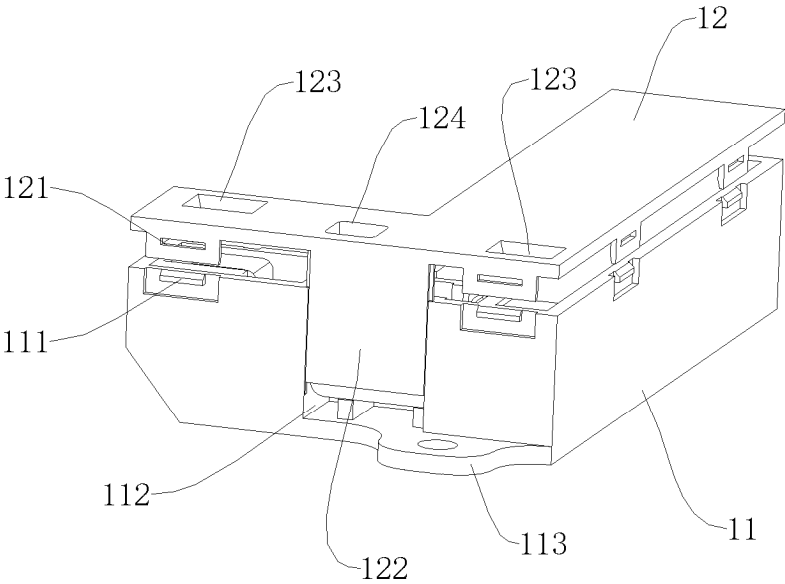


FIG. 1

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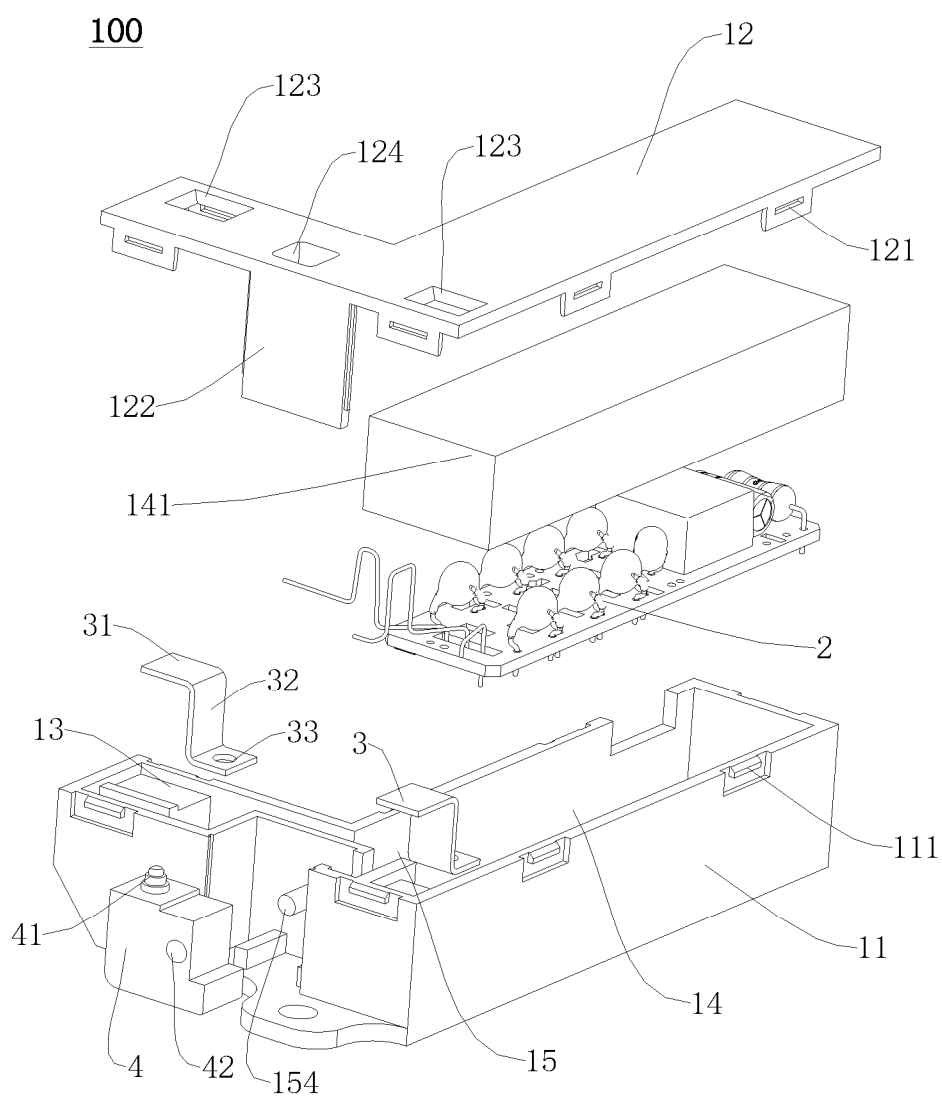
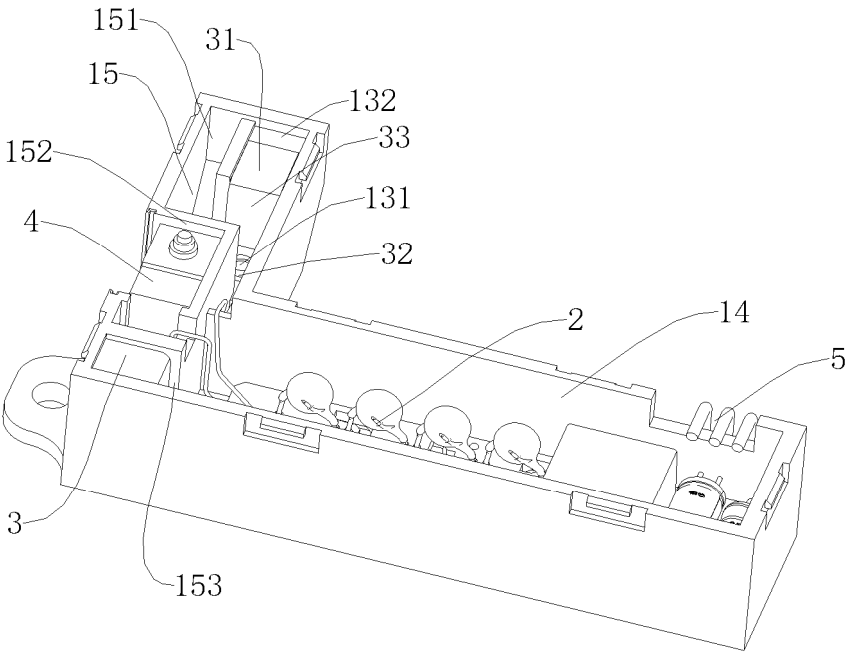
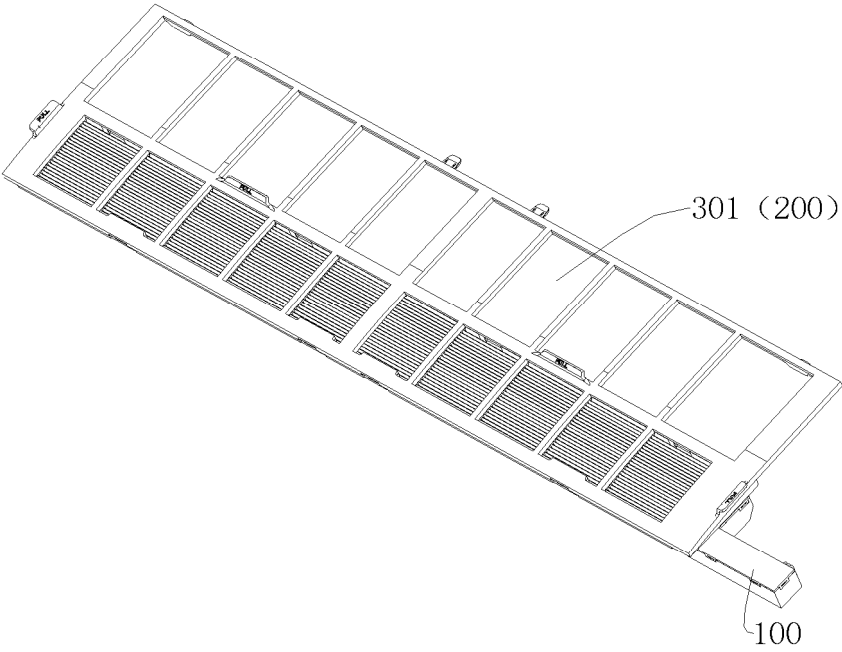


FIG. 3



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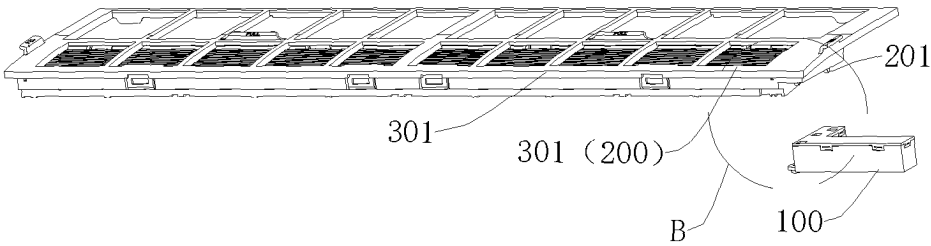


FIG. 6

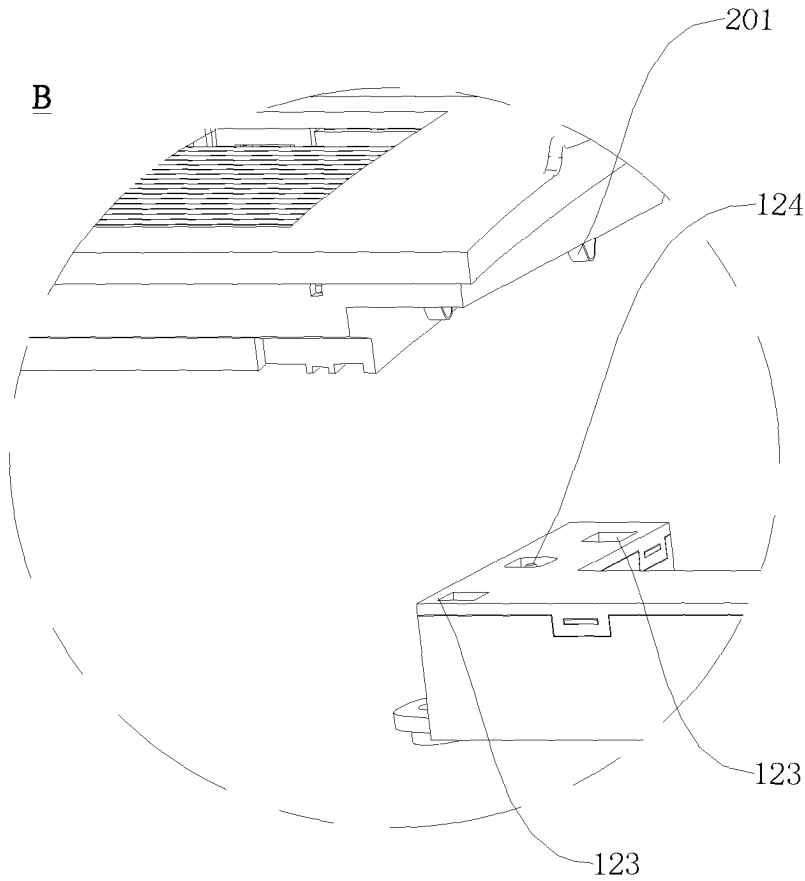


FIG. 7

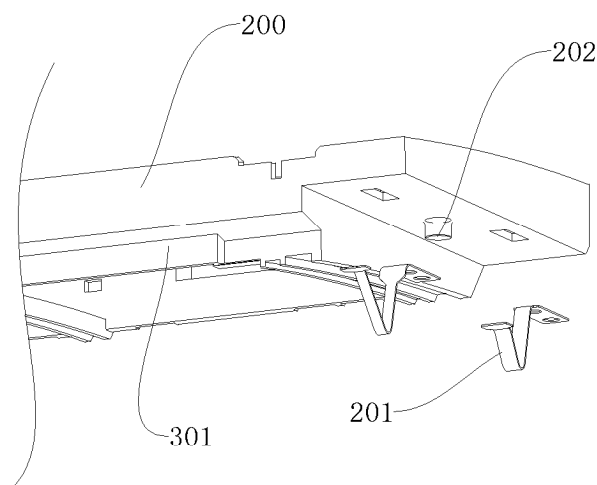


FIG. 8

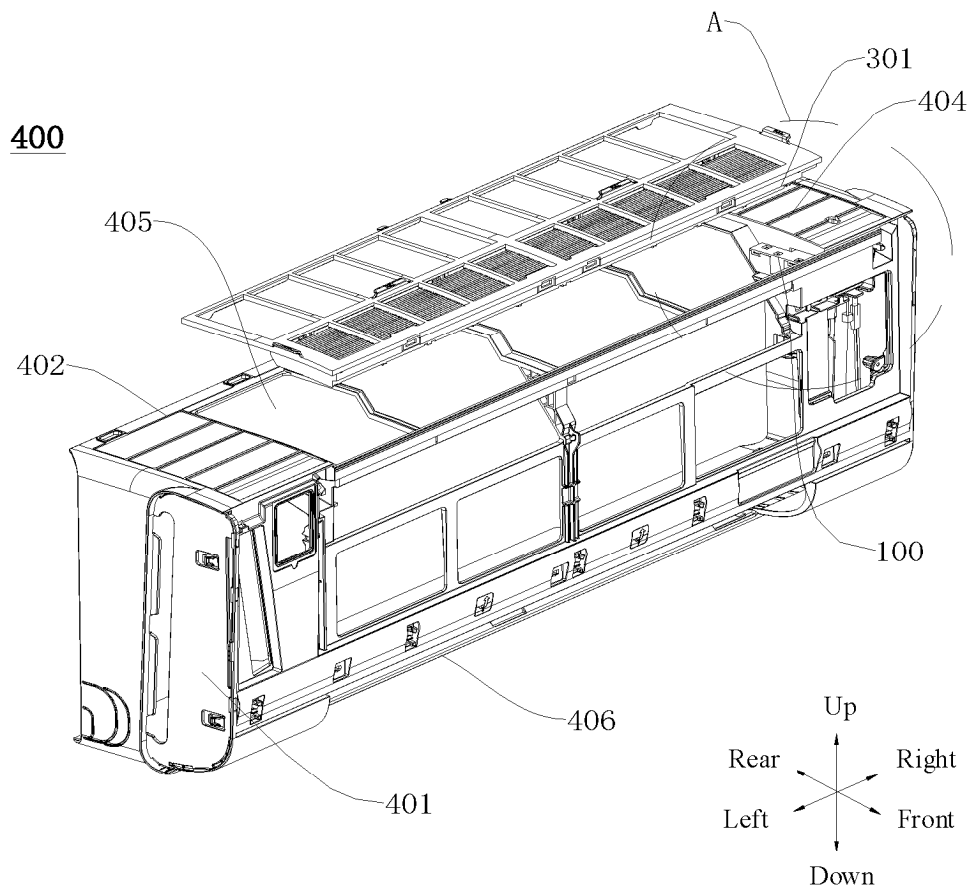


FIG. 9

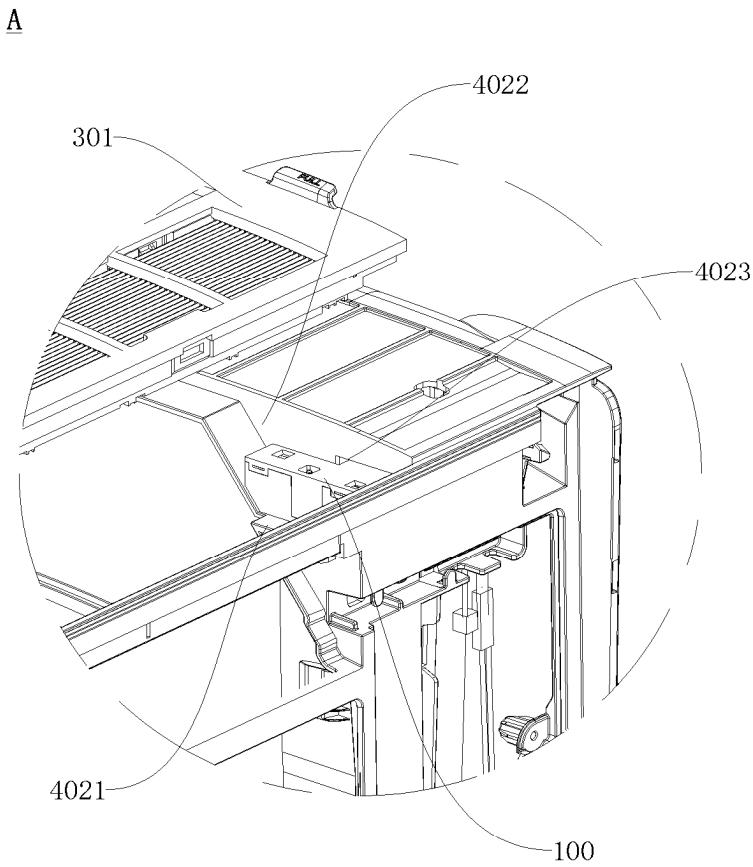


FIG. 10

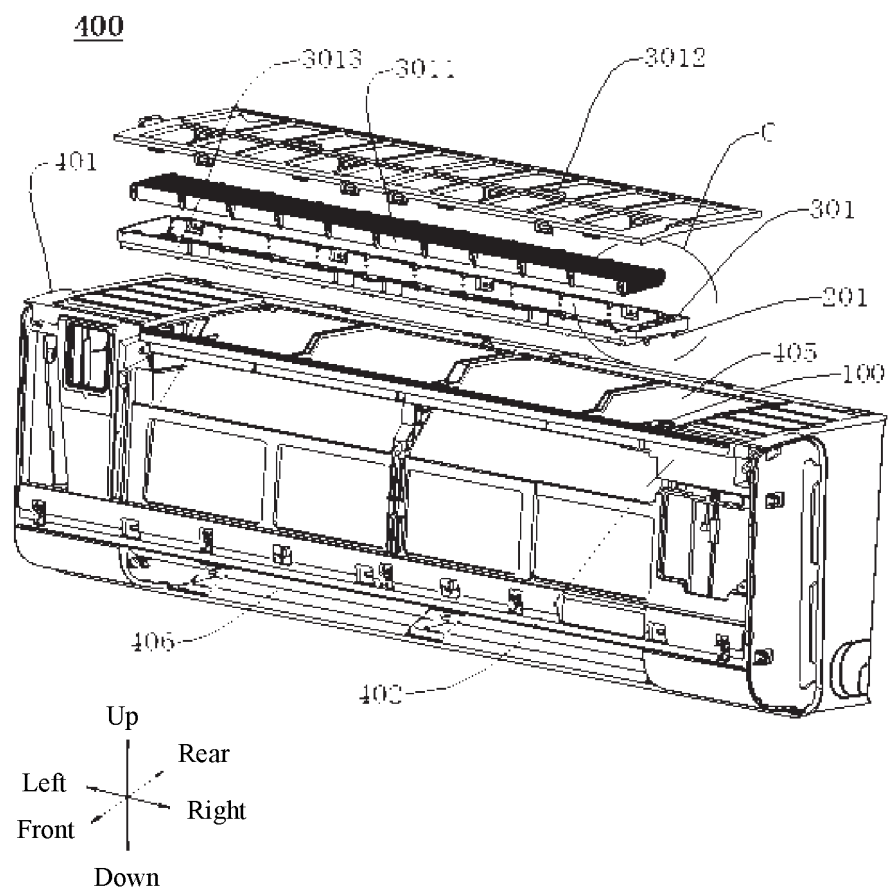


FIG. 11

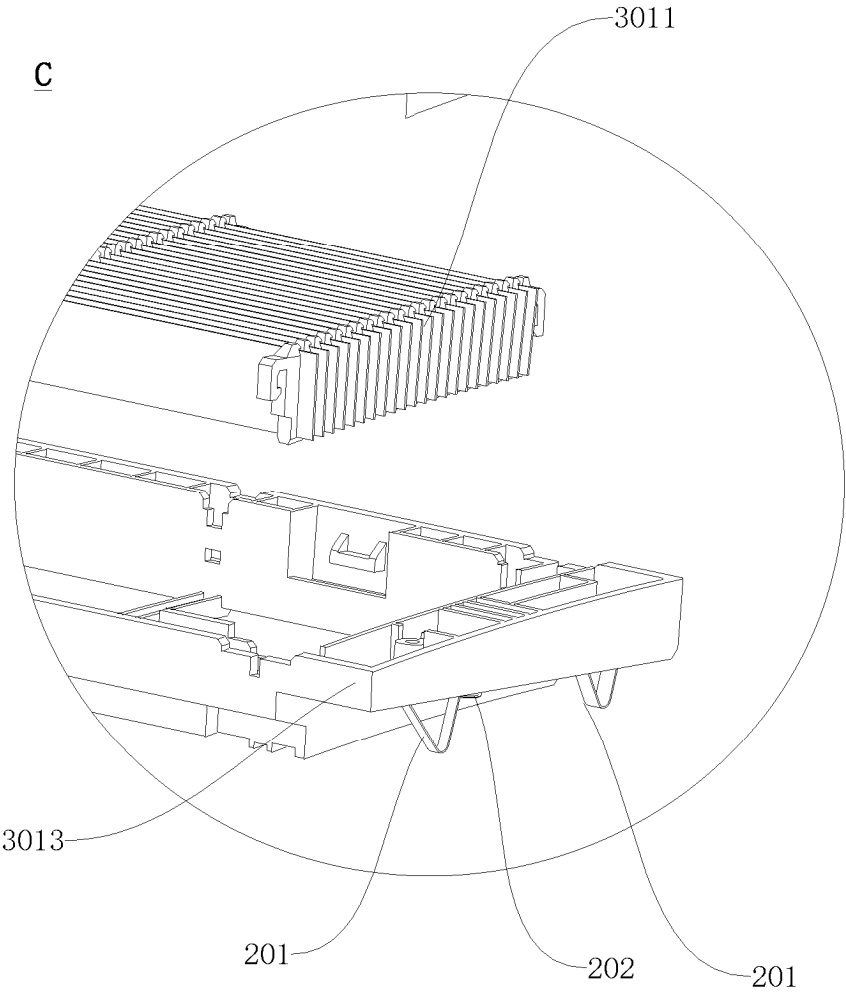


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/137541

A. CLASSIFICATION OF SUBJECT MATTER

H01R13/02(2006.01)i; H02M1/00(2007.01)i; B03C3/66(2006.01)i; F24F3/16(2021.01)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: H01R, H02M, B03C, 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)

CNKI, CNTXT, WPABSC, ENTXTC, WPABS, DWPI: 美的, 高压, 电源, 发生, 电路板, 基板, 线路板, 布线板, 触, 片, 开关, 净化, 滤, 空调; high, voltage, pressure, power, generat+, PCB, contact+, slice, piece, switch, purif+, filt+, conditioner

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 204261809 U (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 15 April 2015 (2015-04-15) description, paragraphs [0046]-[0077], and figures 1-8	1-26
Y	CN 215646583 U (SHANXI RUIHAO BIOTECHNOLOGY CO., LTD.) 25 January 2022 (2022-01-25) description, paragraphs [0032]-[0035], and figures 1-5	1-26
Y	CN 109028378 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 18 December 2018 (2018-12-18) description, paragraphs [0035]-[0070], and figures 1-6	9-12, 16
Y	CN 109806978 A (AIRQUALITY TECHNOLOGY (SHANGHAI) CO., LTD.) 28 May 2019 (2019-05-28) description, paragraphs [0049]-[0078], and figures 1-20	1-26
Y	CN 114060957 A (XI'AN AEROSPACE PURPLE DISCHARGE PLASMATECH. CO., LTD.) 18 February 2022 (2022-02-18) description, paragraphs [0026]-[0046], and figures 1-4	1-26

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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 19 April 2024	Date of mailing of the international search report 07 May 2024
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088	Authorized officer Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/137541

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2004001786 A1 (ZHAN DEJIN) 01 January 2004 (2004-01-01) entire document	1-26

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2023/137541

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CN	215646583	U	25 January 2022		None				
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REFERENCES CITED IN THE DESCRIPTION

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