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(54) **AIR CONDITIONER AND OUTDOOR UNIT THEREOF**

(57) The present disclosure provides an air conditioner and an outdoor unit thereof. The air conditioner outdoor unit includes: a casing; a casing; a main electric control box disposed in the casing; a spot inspection box installed at an outer surface of a side wall of the casing and connected to the main electric control box with a signal wire; and a decorating piece installed detachably at the outer surface of the side wall of the casing and covering the spot inspection box. The air conditioner outdoor unit according to embodiments of the present disclosure has advantages of being easy to be maintained and spot inspected, high water resistance and high security.

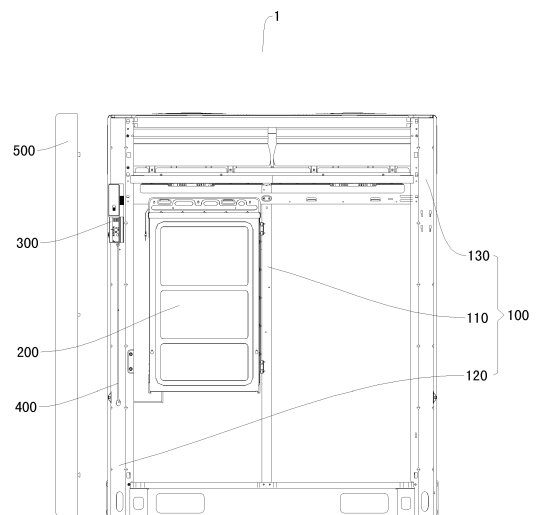


Fig. 1

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Description

FIELD

[0001] The present disclosure relates to the field of electric apparatus manufacturing technology, and more particularly to an air conditioner outdoor unit and an air conditioner having the same.

BACKGROUND

[0002] For an air conditioner outdoor unit in the related art, a spot inspection button is disposed in a main electric control box, and a fault code is also displayed inside the main electric control box. A main electric control box cover is provided with a spot inspection window at a position corresponding to that of the spot inspection button. It is required to disassemble components such as a decorating piece and a panel during maintenance, thereby operations for the maintenance are complex. Besides, it is easy to introduce water into the spot inspection window, thereby results in poor water resistance. In addition, because an electric control box is of a high voltage, there is a risk of an electrical shock when the user is operating.

SUMMARY

[0003] Embodiments of the present disclosure seek to solve at least one of the problems existing in the related art to at least some extent. Accordingly, the present disclosure provides in embodiments an air conditioner outdoor unit, which has advantages of being easy to be maintained and spot inspected, good water resistance and high security.

[0004] The present disclosure further provides in embodiments an air conditioner having the outdoor unit described above.

[0005] In order to achieve the objects described above, according to embodiments of a first aspect of the present disclosure, an air conditioner outdoor unit is provided. The air conditioner outdoor unit includes: a casing; a main electric control box disposed in the casing; a spot inspection box installed at an outer surface of a side wall of the casing and connected to the main electric control box with a signal wire; and a decorating piece installed detachably at the outer surface of the side wall of the casing and covering the spot inspection box.

[0006] The air conditioner outdoor unit according to embodiments of the present disclosure has advantages of being easy to be maintained and spot inspected, good water resistance and high security.

[0007] Furthermore, the air conditioner outdoor unit according to the above embodiments of the present disclosure may further have the following additional technical features:

According to an embodiment of the present disclosure, the casing includes: a main body; a left plate

installed at a left surface of the main body; and a right plate installed at a right surface of the main body, the spot inspection box and the decorating piece being installed at one of an outer surface of the left plate and an outer surface of the right plate. According to an embodiment of the present disclosure, the spot inspection box comprises: a spot inspection box body installed at the outer surface of the side wall of the casing; a spot inspection main panel disposed in the spot inspection box body and connected to the main electric control box with a signal wire; and a spot inspection box cover installed slidably between a cover-opening position where the spot inspection main panel is uncovered and a cover-closing position where the spot inspection main panel is covered.

According to an embodiment of the present disclosure, a first surface of two opposing inner surfaces of side walls of the spot inspection box body is provided with a securing member, a second surface of the two opposing inner surfaces of the side walls of the spot inspection box body is provided with an elastic member extending to an inner surface of a bottom wall of the spot inspection box body, and the securing member and the elastic member engage with two opposing edges of the spot inspection main panel in a snap fit way, respectively, so as to press the spot inspection main panel to the spot inspection box body.

According to an embodiment of the present disclosure, the second surface of the two opposing inner surfaces of the side walls of the spot inspection box body is provided with a U-shape groove and the elastic member is formed within the U-shape groove.

According to an embodiment of the present disclosure, the inner surface of the bottom wall of the spot inspection box body is provided with a plurality of support ribs, and the spot inspection main panel is closely pressed to the plurality of support ribs by the securing member and the elastic member.

According to an embodiment of the present disclosure, an outer surface of a side wall of the spot inspection box cover is provided with a skidproof stripe.

According to an embodiment of the present disclosure, an outer surface of a side wall of the spot inspection box body is provided with a plurality of waterproof grooves, an inner surface of a side wall of the spot inspection box cover is provided with a sliding rail, and the sliding rail engages with one of the plurality of waterproof grooves slidably.

According to an embodiment of the present disclosure, a sliding-into end of the sliding rail is bended to form a guiding section.

According to an embodiment of the present disclosure, an inner surface of a side wall of the spot inspection box cover is provided with a cover-opening member and a cover-closing member, an outer sur-

face of the side wall of the spot inspection box body is provided with a position limit member, and the cover-opening member engages with the limit member in a snap fit way when the spot inspection box cover is located at the cover-opening position, or the cover-closing member engages with the limit member in a snap fit way when the spot inspection box cover is located at the cover-closing position.

According to an embodiment of the present disclosure, the spot inspection box body is provided with a mounting member, the outer surface of the side wall of the casing is provided with a mounting hole, and the mounting member engages with the mounting hole in a snap fit way.

According to an embodiment of the present disclosure, the spot inspection box body is provided with a mounting lug, the mounting lug is provided with a mounting through-hole, the outer surface of the side wall of the casing is provided with a mounting thread hole, and the mounting lug is installed at the outer surface of the side wall of the casing by a thread fastener passing through the mounting through-hole and engaging with the mounting thread hole.

According to embodiments of a second aspect of the present disclosure, there is provided an air conditioner including the above-mentioned air conditioner outdoor unit.

[0008] The air conditioner according to embodiments of the present disclosure has advantages of being easy to be maintained and spot-inspected, good water resistance and high security.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] These and other aspects and advantages of embodiments of the present disclosure will become apparent and more readily appreciated from the following descriptions made with reference to the accompanying drawings, in which:

Fig.1 is a schematic view showing an air conditioner outdoor unit according to an embodiment of the present disclosure;

Fig.2 is an exploded view showing a spot inspection box of an air conditioner outdoor unit according to an embodiment of the present disclosure; and

Fig.3 is a schematic view showing an assembly between a spot inspection box and a spot inspection main panel of an air conditioner outdoor unit according to an embodiment of the present disclosure.

Reference:

[0010]

air conditioner outdoor unit 1, casing 100, main body 110, left plate 120, right plate 130, mounting hole

140, mounting thread hole 150, main electric control box 200, spot inspection box 300, spot inspection box body 310, spot inspection main panel 320, spot inspection box cover 330, signal wire 400, decorating piece 500, skidproof stripe 331, waterproof groove 311, sliding rail 332, guiding section 333, cover-opening member 334, cover-closing member 335, position limit member 312, mounting member 313, mounting lug 314, mounting through-hole 315, securing member 316, elastic member 317, U-shape groove 318, support rib 319, thread fastener 600.

DETAILED DESCRIPTION

[0011] Embodiments of the present disclosure will be described in detail and examples of the embodiments will be illustrated in the drawings, where same or similar reference numerals are used to indicate same or similar members or members with same or similar functions. The embodiments described herein with reference to drawings are explanatory, which are used to illustrate the present disclosure, but shall not be construed to limit the present disclosure.

[0012] With Reference to drawings, the air conditioner outdoor unit 1 is described according to embodiments of the present disclosure.

[0013] As shown in Figs.1 to 3, the air conditioner outdoor unit 1 according to embodiments of the present disclosure includes a casing 100, a main electric control box 200, a spot inspection box 300, a signal wire 400 and a decorating piece 500. The main electric control box 200 is disposed in the casing. The spot inspection box 300 is installed at an outer surface of a side wall of the casing 100 and connected to the main electric control box 200 with the signal wire. The decorating piece 500 is installed detachably at the outer surface of the side wall of the casing 100 and covering the spot inspection box 300, so as to protect the spot inspection box 300 and improve appearance of the air conditioner outdoor unit 1.

[0014] For the air conditioner outdoor unit 1 according to embodiments of the present disclosure, the spot inspection box 300 is installed at the outer surface of the side wall of the casing 100 and connected to the main electric control box 200 with the signal wire 400, so that a spot inspection function and other functions, which are convenient for users to operate, may be removed from the main electric control box 200 to or duplicated in the spot inspection box 300 located at the outer surface of the side wall of the casing 100. As a result, it only requires to disassemble the decorating piece 500 to uncover the spot inspection box 300 by users or servicemen during maintenance and spot inspection, thereby is convenient to operate. Besides, it is much safer for users to operate because the removed or duplicated part is a low voltage part. Furthermore, there is no need to provide a spot inspection window at the main electric control box 200, which improves water resistance significantly. Therefore, the air conditioner outdoor unit 1 according to embodi-

ments of the present disclosure has advantages of being easy to be maintained and spot inspected, good water resistance and high security.

[0015] The air conditioner outdoor unit 1 according to embodiments of the present disclosure is described below in conjunction with drawings.

[0016] In some embodiments of the present disclosure, as shown in Figs.1 to 3, the air conditioner outdoor unit 1 according to embodiments of the present disclosure includes a casing 100, a main electric control box 200, a spot inspection box 300, a signal wire 400 and a decorating piece 500.

[0017] Specifically, as shown in Fig.1, the casing 100 includes a main body 110, a left plate 120 and a right plate 130. The left plate 120 is installed at a left surface of the main body 110. The right plate 130 is installed at a right surface of the main body 110. The spot inspection box 300 and the decorating piece 500 are both installed at one of an outer surface of the left plate 120 and an outer surface of the right plate 130. A left-right direction is based on a left-right direction in Fig.1.

[0018] It should be understood by those skilled in the art, the drawings only illustrate that the spot inspection box 300 and the decorating piece 500 are both installed at the left plate 120 as an example. Obviously, the spot inspection box 300 and the decorating piece 500 may also be both installed at the right plate 130. For the convenience of describing, the spot inspection box 300 and the decorating piece 500 being both installed at the left plate 120 is taken as an example in the following embodiments.

[0019] In some embodiments of the present disclosure, as shown in Fig.2, the spot inspection box 300 includes a spot inspection box body 310, a spot inspection main panel 320 and a spot inspection box cover 330. The spot inspection box body 310 is installed at an outer surface of the left plate 120. The spot inspection main panel 320 is disposed in the spot inspection box body 310 and connected to the main electric control box 200 with the signal wire 400. The spot inspection box cover 330 is of a box-like shape with five wall surfaces and an opening surface. The spot inspection box cover 330 is installed at the spot inspection box body and between a cover-opening position and a cover-closing position slidably. The spot inspection main panel 320 is uncovered when the spot inspection box cover 330 is located at the cover-opening position and the spot inspection main panel 320 is covered when the spot inspection box cover 330 is located at the cover-closing position. It only needs to slide the spot inspection box cover during performing the spot inspection and maintenance, which is convenient for operations.

[0020] Furthermore, as shown in Fig.2, each of two opposing outer surfaces of side walls of the spot inspection box cover 330 is provided with a skidproof stripe 331. The spot inspection box cover 330 may be driven to slide by a frictional force between a hand and the skidproof stripe 331, which is convenient for operations.

[0021] In some embodiments of the present disclosure, as shown in Figs.2 and 3, a first surface of two opposing inner surfaces of side walls of the spot inspection box body 310 is provided with a plurality of securing members 316, and a second surface of the two opposing inner surfaces of the side walls of the spot inspection box body 310 is provided with a plurality of elastic members 317 extending to an inner surface of a bottom wall of the spot inspection box body 310 from the second surface of the two opposing inner surfaces of the side walls of the spot inspection box body 310. When assembling the check main panel 320, one edge of the spot inspection main panel 320 engages with the securing member 316 in a snap fit way, and then its opposing edge of the spot inspection main panel 320 engages with the elastic member 317 in a snap fit way by means of elastic deformation of the elastic member 317, so as to press the spot inspection main panel 320 closely to the spot inspection box body 310 using the securing member 316 and the elastic member 317, thereby to fix the spot inspection main panel 320 without screws. In addition, the elastic member 317 extends to the inner surface of the bottom wall of the spot inspection box body 310, which limits a finger of an assembly operator to be within a scope, so that the elastic member 317 is not easy to be broken when taking the spot inspection main panel out.

[0022] Specifically, the second surface of the two opposing inner surfaces of the side walls of the spot inspection box body 310 is provided with a U-shape groove 318, and the elastic member 317 is formed within the U-shape groove 318. In other words, the second surface of the two opposing inner surfaces of the side walls of the spot inspection box body 310 is provided with the U-shape groove 318 having an opening towards the spot inspection box cover 330. The U-shape groove 318 cuts through the side wall of the spot inspection box body 310 in a direction along a thickness of the side wall of the spot inspection box body 310.

[0023] Alternatively, as shown in Figs.2 and 3, the inner surface of the bottom wall of the spot inspection box body 310 is provided with a plurality of support ribs 319 connected to the inner surface of the side walls of the spot inspection box body 310. The spot inspection main panel 320 is closely pressed to the plurality of support ribs 319 by the securing member 316 and the elastic member 317, so as to support the spot inspection main panel 320 to be located above the inner surface of the bottom wall of the spot inspection box body 310 by the support ribs 319. As a result, it is easy to assemble or disassemble the spot inspection main panel 320; and it may also reduce wears of the spot inspection main panel 320.

[0024] In some embodiments of the present disclosure, as shown in Fig.2, an outer surface of a side wall of the spot inspection box body 310 is provided with a plurality of waterproof grooves 311, and each waterproof groove 311 extends to two opposing outer surfaces of side walls of the spot inspection box body 310. Two opposing inner surfaces of side walls of the spot inspection

box cover 330 are provided with two sliding rails 332, respectively. The two sliding rails 332 engage with one of the plurality of waterproof grooves slidably. Alternatively, there are at least two waterproof grooves 311. By providing the waterproof groove 311, it may not only improve the water resistance of the spot inspection box 300, but also may guide the sliding rail 332 by the waterproof grooves, so that the spot inspection box cover 330 slides steadily between the cover-opening position and the cover-closing position.

[0025] Each sliding rail 332 may cover one entirety rib position, or also may cover a plurality of rib positions arranged at intervals. Fig.2 only illustrates that each sliding rail 332 covers a plurality of rib positions arranged at intervals.

[0026] Advantageously, as shown in Fig.2, a sliding-into end of the sliding rail 332 is bended to form a guiding section 333, so that the sliding rail 332 is easy to slide into the waterproof groove 311, thereby facilitate assembling the spot inspection box cover 330 and the spot inspection box body 310. It should be understood that the sliding-into end of the sliding rail 332 refers to an end of the sliding rail 332 firstly sliding into the waterproof groove 311 during assembling the spot inspection box cover 330 and the spot inspection box body 310.

[0027] Furthermore, as shown in Fig.2, each of two opposing inner surfaces of side walls of the spot inspection box cover 330 is provided with a cover-opening member 334 and a cover-closing member 335. Two cover-opening members 334 are arranged opposite, and two cover-closing members 335 are also arranged opposite. Two opposing outer surfaces of the side walls of the spot inspection box body 310 are provided with position limit members 312, respectively, and two position limit members 312 are arranged opposite. When the spot inspection box cover 330 is located at the cover-opening position, two cover-opening members 334 engage with two position limit members 312 in a snap fit way, respectively, so as to prevent the spot inspection box cover 330 from being apart from the spot inspection box 310. When the spot inspection box cover 330 is located at the cover-closing position, two cover-closing members 335 engage with two position limit members 312 in a snap fit way, respectively, so as to ensure the spot inspection box cover 330 an excellent contact when closing, thereby to provide a sufficient effect of water resistance.

[0028] In some embodiments of the present disclosure, as shown in Fig.2, a surface of the spot inspection box body 310 towards the left plate 120 is provided with a plurality of mounting members 313, and the outer surface of the left plate 120 is provided with a plurality of mounting holes 140. The plurality of mounting members 313 engages with a plurality of mounting holes 140, respectively in a snap fit way, so that the spot inspection box body 310 may be installed detachably at the outer surface of the left plate 120.

[0029] Furthermore, as shown in Fig.2, the spot inspection box body 310 is provided with a mounting lug

314. The mounting lug 314 is provided with a mounting through-hole 315. The outer surface of the left plate 120 is provided with a mounting thread hole 150. The mounting lug 314 is installed at the outer surface of the left plate 120 by a thread fastener 600 passing through the mounting through-hole 315 and engaging with the mounting screwed hole 150. The thread fastener 600 may be a bolt or a screw. Therefore, the reliability of the spot inspection box 300 installed at the left plate 120 may be further improved.

[0030] Other parts and operations of the air conditioner outdoor unit 1 according to embodiments of the present disclosure are known by those skilled in the art, which is no more described in detail here.

[0031] The air conditioner according to the present disclosure is described below. The air conditioner according to embodiments of the present disclosure includes the air conditioner outdoor unit 1 according to the above embodiments of the present disclosure.

[0032] The air conditioner according to embodiments of the present disclosure using the air conditioner outdoor unit 1 according to the above embodiments of the present disclosure has advantages of being easy to be maintained and spot inspected, high water resistance and high security.

[0033] Other parts and operations of the air conditioner according to embodiments of the present disclosure are known by those skilled in the art, which is no more described in detail herein.

[0034] In the specification, it is to be understood that terms such as "central," "longitudinal," "lateral," "length," "width," "thickness," "upper," "lower," "front," "rear," "left," "right," "vertical," "horizontal," "top," "bottom," "inner," "outer," "clockwise," and "counterclockwise" should be construed to refer to the orientation as then described or as shown in the drawings under discussion. These relative terms are for convenience of description and do not require that the present invention be constructed or operated in a particular orientation.

[0035] In addition, terms such as "first" and "second" are used herein for purposes of description and are not intended to indicate or imply relative importance or significance or impliedly indicate quantity of the technical feature referred to. Thus, the feature defined with "first" and "second" may comprise one or more this feature. In the description of the present disclosure, "a plurality of" means at least two, e.g. two or three, unless specified otherwise.

[0036] In the present invention, unless specified or limited otherwise, the terms "mounted," "connected," "coupled," "fixed" and the like are used broadly, and may be, for example, fixed connections, detachable connections, or integral connections; may also be mechanical or electrical connections; may also be direct connections or indirect connections via intervening structures; may also be inner communications of two elements, which can be understood by those skilled in the art according to specific situations.

[0037] In the present invention, unless specified or limited otherwise, a structure in which a first feature is "on" or "below" a second feature may include an embodiment in which the first feature is in direct contact with the second feature, and may also include an embodiment in which the first feature and the second feature are not in direct contact with each other, but are contacted via an additional feature formed therebetween. Furthermore, a first feature "on," "above," or "on top of" a second feature may include an embodiment in which the first feature is right or obliquely "on," "above," or "on top of" the second feature, or just means that the first feature is at a height higher than that of the second feature; while a first feature "below," "under," or "on bottom of" a second feature may include an embodiment in which the first feature is right or obliquely "below," "under," or "on bottom of" the second feature, or just means that the first feature is at a height lower than that of the second feature.

[0038] Reference throughout this specification to "an embodiment," "some 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 disclosure. Thus, the appearances of the phrases described above throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0039] Although explanatory embodiments have been shown and described, it would be appreciated by those skilled in the art that the above embodiments cannot be construed to limit the present disclosure, and changes, amendments, alternatives and modifications can be made in the embodiments without departing from spirit, principles and scope of the present disclosure.

Claims

1. An air conditioner outdoor unit, comprising:

a casing;
a main electric control box disposed in the casing;
a spot inspection box installed at an outer surface of a side wall of the casing and connected to the main electric control box with a signal wire;
and
a decorating piece installed detachably at the outer surface of the side wall of the casing and covering the spot inspection box.

2. The air conditioner outdoor unit according to claim 1, wherein the casing comprises:

a main body;
a left plate installed at a left surface of the main body; and
a right plate installed at a right surface of the main body, the spot inspection box and the decorating piece being installed at one of an outer surface of the left plate and an outer surface of the right plate.

3. The air conditioner outdoor unit according to claim 1 or 2, wherein the spot inspection box comprises:

a spot inspection box body installed at the outer surface of the side wall of the casing;
a spot inspection main panel disposed in the spot inspection box body and connected to the main electric control box with a signal wire; and
a spot inspection box cover installed slidably between a cover-opening position where the spot inspection main panel is uncovered and a cover-closing position where the spot inspection main panel is covered.

4. The air conditioner outdoor unit according to claim 3, wherein

a first surface of two opposing inner surfaces of side walls of the spot inspection box body is provided with a securing member,
a second surface of the two opposing inner surfaces of the side walls of the spot inspection box body is provided with an elastic member extending to an inner surface of a bottom wall of the spot inspection box body, and
the securing member and the elastic member engage with two opposing edges of the spot inspection main panel in a snap fit way, respectively, so as to press the spot inspection main panel to the spot inspection box body.

5. The air conditioner outdoor unit according to claim 4, wherein the second surface of the two opposing inner surfaces of the side walls of the spot inspection box body is provided with a U-shape groove and the elastic member is formed within the U-shape groove.

6. The air conditioner outdoor unit according to claim 4, wherein the inner surface of the bottom wall of the spot inspection box body is provided with a plurality of support ribs, and the spot inspection main panel is closely pressed to the plurality of support ribs by the securing member and the elastic member.

7. The air conditioner outdoor unit according to claim 3, wherein an outer surface of a side wall of the spot inspection box cover is provided with a skidproof stripe.

8. The air conditioner outdoor unit according to claim

- 3, wherein
 an outer surface of a side wall of the spot inspection
 box body is provided with a plurality of waterproof
 grooves,
 an inner surface of a side wall of the spot inspection 5
 box cover is provided with a sliding rail, and
 the sliding rail engages with one of the plurality of
 waterproof grooves slidably.
9. The air conditioner outdoor unit according to claim 10
 8, wherein a sliding-into end of the sliding rail is bend-
 ed to form a guiding section.
10. The air conditioner outdoor unit according to claim 15
 3, wherein an inner surface of a side wall of the spot
 inspection box cover is provided with a cover-open-
 ing member and a cover-closing member,
 an outer surface of the side wall of the spot inspection
 box body is provided with a position limit member,
 and 20
 the cover-opening member engages with the limit
 member in a snap fit way when the spot inspection
 box cover is located at the cover-opening position, or
 the cover-closing member engages with the limit
 member in a snap fit way when the spot inspection 25
 box cover is located at the cover-closing position.
11. The air conditioner outdoor unit according to claim
 3, wherein
 the spot inspection box body is provided with a 30
 mounting member,
 the outer surface of the side wall of the casing is
 provided with a mounting hole, and
 the mounting member engages with the mounting
 hole in a snap fit way. 35
12. The air conditioner outdoor unit according to claim
 11, wherein
 the spot inspection box body is provided with a
 mounting lug, 40
 the mounting lug is provided with a mounting
 through-hole,
 the outer surface of the side wall of the casing is
 provided with a mounting thread hole, and
 the mounting lug is installed at the outer surface of 45
 the side wall of the casing by a thread fastener pass-
 ing through the mounting through-hole and engaging
 with the mounting thread hole.
13. An air conditioner, comprising the air conditioner out- 50
 door unit according to any one of claims 1-12.

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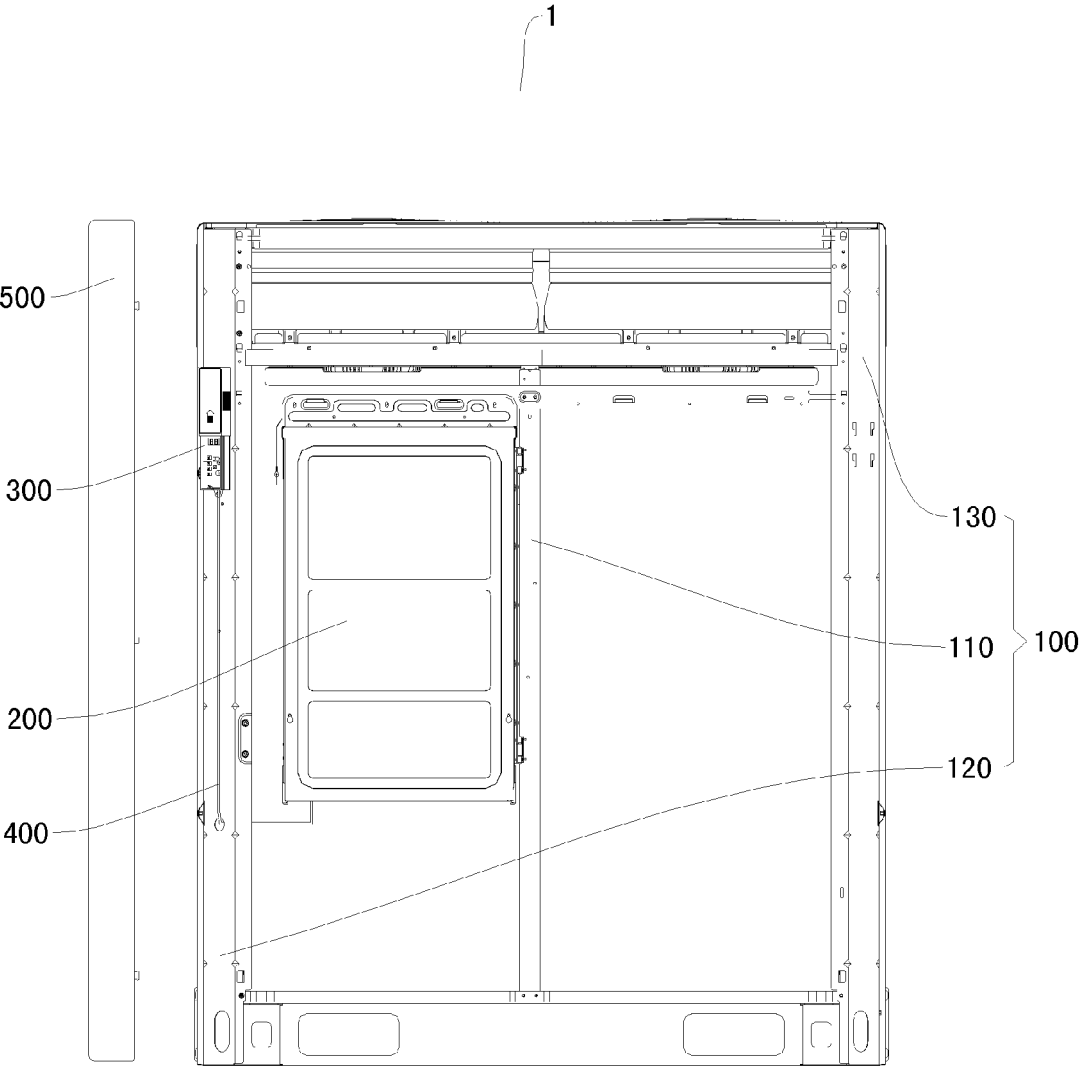


Fig. 1

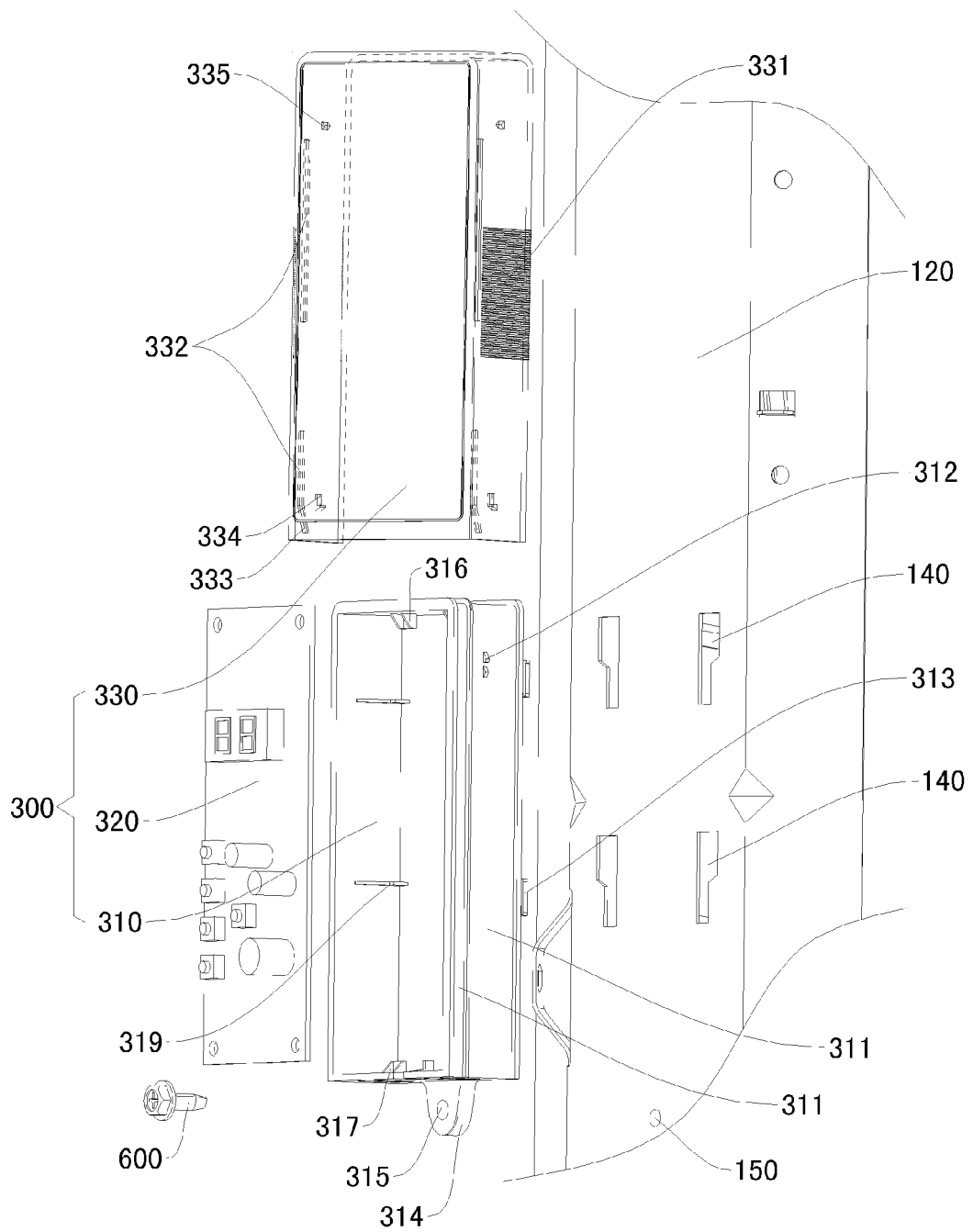


Fig. 2

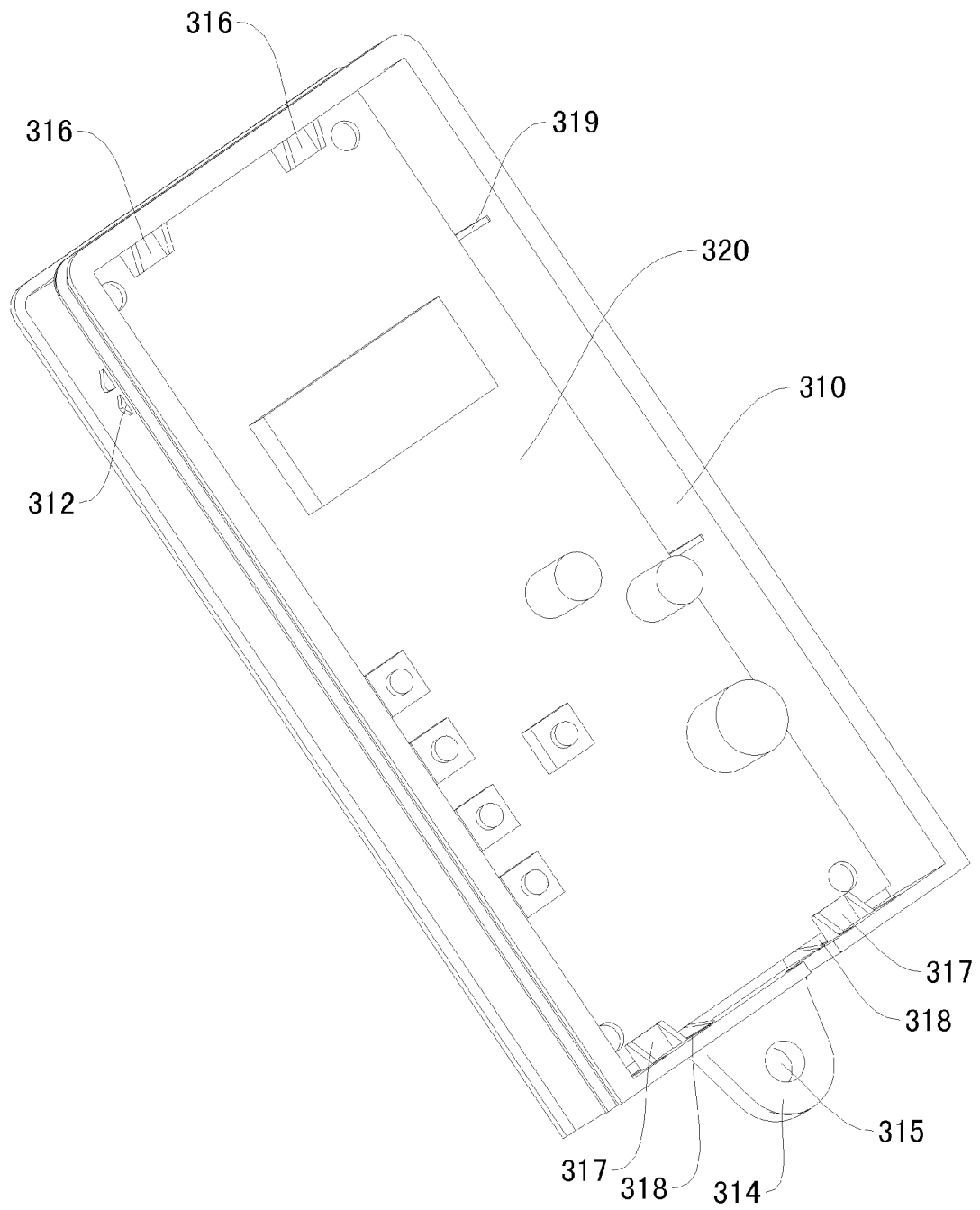


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 15 18 5628

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		11 May 2016	Lienhard, Dominique
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 18 5628

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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