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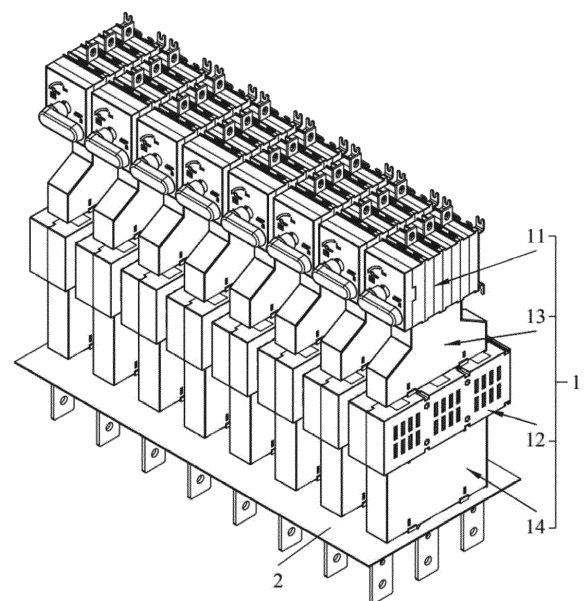
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(54) **FUSE-SWITCH-DISCONNECTOR ASSEMBLY**

(57) The present invention relates to the technical field of low-voltage power distribution systems, and in particular relates to a fuse-switch-disconnector assembly. The fuse-switch-disconnector assembly comprises at least one fuse-switch-disconnector. The fuse-switch-disconnector comprises an isolating switch and a fuse assembly that are detachably connected. The fuse assembly comprises a fuse and a protective box used for accommodating the fuse. The protective box is provided with a heat dissipation channel that dissipates heat from the fuse, and the protective box is further provided with a transparent window by means of which the state of the fuse can be observed. The fuse-switch-disconnector assembly may ensure that the normal operation of other circuits will not be affected when the fuse of a certain circuit is replaced. Moreover, the detachable connection between the isolating switch and the fuse assembly may facilitate the replacement of the fuse assembly, and by means of the transparent window, the fuse may be visualized and the state of the fuse may be promptly observed.



**FIG. 1**

**EP 4 339 991 A1**

## Description

**[0001]** This application claims the priority of the Chinese Patent Application No. 202122138159.8, titled "FUSE-SWITCH-DISCONNECTOR ASSEMBLY", filed on September 6, 2021 with the China National Intellectual Property Administration, which is incorporated herein by reference in its entirety.

## FIELD

**[0002]** The present application relates to the technical field of low-voltage power distribution systems, and in particular to a fuse-switch-disconnector assembly.

## BACKGROUND

**[0003]** In a low-voltage current combiner cabinet or a low-voltage switch cabinet, a circuit is protected by arranging a molded case circuit breaker in every branch circuit. When the branch circuit has a short-circuit fault, the molded case circuit breaker will automatically trip out to cut off short-circuit current. However, when the molded case circuit breaker of each of the branch circuits needs to be replaced, a frame circuit breaker used to control all of the branch circuits needs to be disconnected, resulting in affecting a normal operation of other circuits and causing inconvenience.

## SUMMARY

**[0004]** An object of the present application is to provide a fuse-switch-disconnector assembly, which can ensure that the normal operation of other circuits will not be affected when replacing a fuse of a certain circuit. Moreover, a detachable connection between an isolating switch and a fuse assembly may facilitate the replacement of the fuse assembly, and through a transparent window, the fuse may be visualized and state of the fuse may be promptly observed.

**[0005]** To achieve this object, the following technical solutions are provided according to the present application.

**[0006]** A fuse-switch-disconnector assembly includes at least one fuse-switch-disconnector. The fuse-switch-disconnector includes an isolating switch and a fuse assembly that are detachably connected with each other. The fuse assembly comprises a fuse and a protective box for accommodating the fuse. The protective box is provided with a heat dissipation channel that dissipates heat from the fuse, and the protective box is further provided with a transparent window, through which the state of the fuse can be observed.

**[0007]** In an embodiment, three fuses are provided in one fuse assembly, and the three fuses are arranged in the protective box at intervals along a length direction of the protective box, and multiple vents around each fuse are arranged on two opposite side walls of the protective

box to form multiple heat dissipation channels.

**[0008]** In an embodiment, the fuse-switch-disconnector further includes a connection copper bar assembly, and the connection copper bar assembly includes a connection copper bar that is detachably connected with an input terminal of the isolating switch and an output terminal of the fuse respectively.

**[0009]** In an embodiment, the connection copper bar assembly further includes a first protective shield capable of abutting against a bottom end of the isolating switch and a top end of the protective box, respectively, and the first protective shield includes a first shield body and a first cover body that are detachably connected with each other, where the first shield body is provided with a first accommodating groove inside, which is used for accommodating the connection copper bar, and the first cover body is snap-fitted with the first cover body and covers the first accommodating groove.

**[0010]** In an embodiment, the first shield body is provided with two first guide grooves located at both sides of the first accommodating groove, respectively, one of the first shield body and the first cover body is provided with a first limiting hole, and the other is provided with a first buckle that is matched with the first limiting hole, and the first cover body slides along the first guide groove until the first buckle is clamped with the first limiting hole to enable the first cover body being engaged with the first shield body.

**[0011]** In an embodiment, the fuse-switch-disconnector further includes a connection copper bar assembly, and the connection copper bar assembly includes a connection copper bar that is detachably connected with an input terminal of the fuse and an external cable respectively.

**[0012]** In an embodiment, the connection copper bar assembly further includes a second protective shield that abuts against the bottom end of the protective box, where the second protective shield includes a second shield body and a second cover body that are detachably connected with each other, and the second shield body is provided with a second accommodating groove inside, which accommodates the connection copper bar, and the second cover body is clamped with the second shield body and covers the second accommodating groove.

**[0013]** In an embodiment, the second shield body is provided with two second guide grooves located at both sides of the second accommodating groove, respectively, one of the second shield body and the second cover body is provided with a second limiting hole, and the other is provided with a second buckle that is matched with the second limiting hole, and the second cover body slides along the second guide groove until the second buckle is clamped with the second limiting hole to enable the second cover body being engaged with the second shield body.

**[0014]** In an embodiment, the fuse assembly further includes a fault indicator connected with the fuse, and the fuse is in one-to-one correspondence with the fault

indicator, so that the state of the fuse is judged through the fault indicator.

**[0015]** In an embodiment, two opposite side walls of the protective box are both provided with vents to form heat dissipation channels.

**[0016]** In an embodiment, the two opposite side walls of the protective box are both provided with multiple vents around the fuse to form multiple heat dissipation channels.

**[0017]** In an embodiment, multiple sets of fuse-switch-disconnectors are arranged at intervals along the width direction of the protective box.

**[0018]** Beneficial effects: a fuse-switch-disconnector assembly is provided according to the present application. First of all, compared with a circuit breaker, the fuse can quickly cut off the corresponding circuit to improve the safety of the circuit. Secondly, when a short-circuit fault occurs in a circuit, the isolating switch detachably connected with the fuse assembly manages to disconnect the circuit so as to directly replace the fuse assembly, thereby ensuring the safety of replacing the fuse assembly and avoiding affecting the normal operation of other circuits, and dissipating the heat from the fuse through the heat dissipation channel on the protective box to prolong the service life of the fuse as much as possible. Finally, the state of the fuse can be observed in time through the transparent window to determine whether it is necessary to replace the fuse, and the visualization of the molded case circuit breaker can also be realized. The fuse-switch-disconnector assembly can ensure that the normal operation of other circuits will not be affected when the fuse of a certain circuit is replaced. Moreover, the detachable connection between the isolating switch and the fuse assembly may facilitate the replacement of the fuse assembly, and through the transparent window, the fuse may be visualized and the state of the fuse may be promptly observed.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0019]**

FIG. 1 is a schematic structural view of a fuse-switch-disconnector assembly according to a specific embodiment of the present application;

FIG. 2 is a schematic structural view of a fuse-switch-disconnector according to a specific embodiment of the present application;

FIG. 3 is a schematic structural view of a fuse-switch-disconnector according to a specific embodiment of the present application, in which a protective box, a first protective shield and a second protective shield are not shown;

FIG. 4 is a side view of a fuse assembly according to a specific embodiment of the present application;

FIG. 5 is a schematic structural view of a first protective shield according to a specific embodiment of the present application which is not assembled;

FIG. 6 is a schematic structural view of a second protective shield according to a specific embodiment of the present application which is not assembled;

FIG. 7 is a schematic structural view of a fault indicator according to a specific embodiment of the present application being in a first state;

FIG. 8 is a schematic structural view of a fault indicator according to a specific embodiment of the present application being in a second state.

**[0020]** Reference numerals in the drawings are listed as follows:

1 fuse-switch-disconnector;

11 isolating switch;

12 fuse assembly;

121 fuse;

122 protective box, 1221 vent, 1222 transparent window;

123 fault indicator;

13 connection copper bar assembly;

131 connection copper bar ;

132 first protective shield;

1321 first shield body, 13211 first guide groove, 13212 first buckle;

1322 first cover body, 13221 first limiting hole;

14 wiring copper bar assembly;

141 wiring copper bar;

142 second protective shield;

1421 second shield body, 14211 second guide groove, 14212 second buckle;

1422 second cover body, 14221 second limiting hole;

2 insulating partition plate.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0021]** The embodiments of the present application are described in detail hereinafter, and examples of the embodiments are shown in drawings, in which the same or similar reference numerals represent the same or similar members or members having the same or similar functions throughout the description. The embodiments described below with reference to the drawings are only exemplary embodiments which are used to explain the present application, and should not be construed to limit the present application.

**[0022]** In the description of the present application, it should be noted that, the terms "center", "upper", "lower", "left", "right", "vertical", "horizontal", "inner", "outer" and the like indicate the orientation or positional relationship based on the orientation or positional relationship shown in the drawings, and are only for the convenience of describing the present application and simplifying description, and do not indicate or imply that the device or element referred to must have a specific orientation, be constructed and operated in a specific orientation, therefore, the terms cannot be understood as a limitation of the present application. In addition, the terms "first", "second" and the like are for purpose of description, and should not be construed as indicating or implying relative importance. Terms "first position" and "second position" represent two different positions.

**[0023]** In the description of the present application, unless otherwise clearly specified and limited, the terms "linked", "connected", and "fixed" shall be interpreted broadly, for example, may be interpreted as being fixedly connected, detachably connected, or integrated; the terms may be interpreted as being mechanically connected or electrically connected; the terms may also be interpreted as being directly connected or indirectly connected through an intermediate medium, and the terms may further be interpreted as internal communication between two components or interactional relationship between two components. Those skilled in the art may understand meanings of the foregoing terms in the present application according to specific conditions.

**[0024]** In the present application, unless otherwise clearly defined and limited, a first feature being "above" or "below" a second feature may include situations that the first feature and the second feature are in contact with each other directly, or the first feature and the second feature are in contact with each other indirectly via another feature between them. Furthermore, the fact that the first feature is "above", "over" and "on" the second feature includes that the first feature is directly above and obliquely above the second feature, or simply indicates that the first feature is higher in horizontal height than the second feature. The fact that the first feature is "below", "under" and "down" the second feature includes that the first feature is directly below and obliquely below the second feature, or simply indicates that the first feature is lower in horizontal height than the second feature.

**[0025]** Technical solutions of the present application will be further described through the embodiments and in conjoint with drawings.

**[0026]** As shown in FIG. 1 to FIG. 4, a fuse-switch-disconnector assembly is disclosed in this embodiment, which includes at least one fuse-switch-disconnector 1. The fuse-switch-disconnector 1 includes an isolating switch 11 and a fuse assembly 12 that are detachably connected with each other. The fuse assembly 12 includes a fuse 121 and a protective box 122 for accommodating the fuse 121. The protective box 122 is provided with a heat dissipation channel for dissipating heat from the fuse 121, and the protective box 122 is further provided with a transparent window 1222, by which the state of the fuse 121 can be observed.

**[0027]** First of all, compared with a circuit breaker, the fuse 121 can quickly cut off the corresponding circuit to improve the safety of the circuit. Secondly, when a short-circuit fault occurs in a circuit, the isolating switch 11 detachably connected with the fuse assembly 12 manages to disconnect the circuit so as to directly replace the fuse assembly 12, thereby ensuring the safety of replacing the fuse assembly 12 and avoiding affecting the normal operation of other circuits, and dissipating the heat from the fuse 121 through the heat dissipation channel on the protective box 122 to prolong the service life of the fuse 121 as much as possible. Finally, the state of the fuse 121 can be observed in time through the transparent window 1222 to determine whether it is necessary to replace the fuse 121, and the visualization of the molded case circuit breaker may also be realized. The fuse-switch-disconnector assembly can ensure that the normal operation of other circuits will not be affected when the fuse 121 of a certain circuit is replaced. Moreover, the detachable connection between the isolating switch 11 and the fuse assembly 12 facilitates the replacement of the fuse assembly 12, and by means of the transparent window 1222, the fuse 12 can be visualized and the state of the fuse 121 may be promptly observed.

**[0028]** Exemplarily, the transparent window 1222 is arranged at a top end of the protective box 122.

**[0029]** Considering the need of the replacement of the fuse 121, the protective box 122 is formed by splicing two half-protective shields to avoid a case that the whole fuse assembly 12 have to be replaced, thereby reducing the maintenance cost.

**[0030]** In this embodiment, vents 1221 are arranged at two opposite side walls of the protective box 122, respectively, to form heat dissipation channels, that is, the fuse 121 is located between the two vents, thereby ensuring the heat dissipation effect of the fuse 121.

**[0031]** Considering that the circuit is a three-phase alternating current circuit, as shown in FIG. 3, three fuses 121 are provided in one fuse assembly 12. The three fuses 121 are arranged in the protective box 122 at intervals in a length direction of the protective box 122 to correspond to phases A, B and C, respectively.

**[0032]** The two opposite side walls of the protective

box 122 are evenly provided with multiple vents 1221 around each fuse 121 to form multiple heat dissipation channels, thereby ensuring the heat dissipation effect to each fuse 121 in the protective box 122.

**[0033]** Similarly, the top end of the protective box 122 is provided with three transparent windows 1222 arranged at intervals in the length direction of the protective box 122. The three transparent windows 1222 correspond to the three fuses 121, respectively, and are located directly above the corresponding fuses 121 correspondingly, so as to accurately determine the failed fuses 121 among the three fuses 121.

**[0034]** In particular, as shown in FIG. 3, the fuse-switch-disconnector 1 further includes a connection copper bar assembly 13, which includes a connection copper bar 131. The connection copper bar 131 is detachably connected with an input terminal of the isolating switch 11 and an output terminal of the fuse 121, respectively by bolts. Also, in other embodiments, other structures can be adopted to realize the detachable connection between the isolating switch 11 and the fuse 121, which will not be specifically limited in this embodiment.

**[0035]** It can be understood that the number of output terminals of the isolating switch 11 is the same as the number of the fuses 121 in the protective box 122.

**[0036]** Further, as shown in FIG. 4, the connection copper bar assembly 13 further includes a first protective shield 132 which abuts against a bottom end of the isolating switch 11 and a top end of the protective box 122. The first protective shield 132 includes a first shield body 1321 and a first cover body 1322 which are detachably connected with each other, and a first accommodating groove which can accommodate the connection copper bars 131 is arranged in the first shield body 1321. The first cover body 1322 may be snap-fitted with the first shield body 1321 and cover the first accommodating groove, thus realizing insulation protection from the input terminal of the isolating switch 11 to the output terminal of the fuse 121 and improving the use safety of the fuse-switch-disconnector 1.

**[0037]** In particular, the first shield body 1321 is provided with two first guide grooves 13211 located on both sides of the first accommodating groove, one of the first shield body 1321 and the first cover body 1322 is provided with a first limiting hole 13221, and the other is provided with a first buckle 13212 that can cooperate with the first limiting hole 13221. The first cover body 1322 can slide along the first guide groove 13211 until the first buckle 13212 is clamped with the first limiting hole 13211 to enable the first cover body 1322 being engaged with the first shield body 1321. Similarly, when it is necessary to detach the first cover body 1322 from the first shield body 1321, it only needs to slide the first cover body 1322 in an opposite direction to detach the first buckle 13212 from the first limiting hole 13221.

**[0038]** Exemplarily, in order to ensure the stability of clamping, multiple first limiting holes 13221 and corresponding first buckles 13212 are provided.

**[0039]** In this embodiment, the fuse-switch-disconnector 1 further includes a wiring copper bar assembly 14, which includes wiring copper bars 141. The wiring copper bar 141 is detachably connected with an input terminal of the fuse 121 and an external cable, respectively. Also, in other embodiments, other structures can be adopted to realize the detachable connection between the fuse 121 and the external cable, which will not be specifically limited in this embodiment.

**[0040]** Referring to FIG. 6, the wiring copper bar assembly 14 further includes a second protective shield 142 that can abut against the bottom end of the protective box 122. The second protective shield 142 includes a second shield body 1421 and a second cover body 1422 that are detachably connected with each other, and a second accommodating groove that can accommodate the wiring copper bar 141 is arranged in the second shield body 1421. The second cover body 1422 can be snap-fitted with the second shield body 1421 and cover the second accommodating groove, thus realizing insulation protection from the input terminal of the fuse 121 to the output terminal of the external cable and improving the use safety of the fuse-switch-disconnector 1.

**[0041]** In particular, the second shield body 1421 is provided with two second guide grooves 14211 located on both sides of the second accommodating groove. One of the second shield body 1421 and the second cover body 1422 is provided with a second limiting hole 14221, and the other is provided with a second buckle 14212 that can cooperate with the second limiting hole 14221. The second cover body 1422 can slide along the second guide groove 14211 until the second buckle 14212 is clamped with the second limiting hole 14221 to enable the second cover body 1422 being engaged with the second shield body 1421. Similarly, when it is necessary to detach the second cover body 1422 from the second shield body 1421, it only needs to slide the second cover body 1422 in the opposite direction to detach the second buckle 14212 from the second limiting hole 14221.

**[0042]** Exemplarily, in order to ensure the stability of the clamping connection, multiple second limiting holes 14221 and corresponding second buckles 14212 are provided.

**[0043]** As shown in FIG. 7, in order to facilitate the maintenance personnel to observe the state of the fuse 121 through the transparent windows 1222 (that is, whether a fuse wire of the fuse 121 is fused), the fuse assembly 12 further includes a fault indicator 123 connected with the fuse 121, and the fuse 121 corresponds to the fault indicator 123 in one-to-one correspondence, so that the state of the fuse 121 may be judged by the fault indicator 123.

**[0044]** In particular, the fault indicator 123 is an elastic sheet, one end of which is arranged at the top end of the fuse 121, and the other end of which is connected with the fuse wire. When the fuse wire is not fused, as shown in FIG. 7, the elastic sheet is in a first state, that is, the elastic sheet is completely attached to the top end of the

fuse 121. When the fuse wire is fused due to short circuit, as shown in FIG. 8, the elastic sheet is in a second state, where one end of the elastic sheet connected with the fuse wire loses its fastening force due to the fuse wire being fused, which leads it to be away from the fuse 121, that is, this end of the elastic sheet is tilted compared with the top end of the fuse 121, so that the maintenance personnel can intuitively judge the state of the fuse 121.

**[0045]** In this embodiment, in order to control the states of the multiple circuits respectively, the fuse-switch-disconnector assembly includes multiple fuse-switch-disconnectors 1, which are arranged at intervals in the width direction of the protective box 122, so as to avoid the mutual interference of the heat dissipation channels of two adjacent protective boxes 122 and ensure the heat dissipation effect on each fuse 121 as much as possible.

**[0046]** The fuse-switch-disconnector assembly further includes an insulating partition plate 2, and the insulating partition plate 2 abuts against the bottom end of each second protective shield 142 to separate the connection portion of the output terminal of the external cable from other portions of the fuse-switch-disconnector 1, so as to improve the safety as much as possible.

**[0047]** During operation, each backflow current is inputted from the external cable, passes through the corresponding wiring copper bar 141, fuse 121, connection copper bar 131 and isolating switch 11 in sequence, and is converged on a bus bar. When a short-circuit fault occurs in a certain circuit, the fuse 121 corresponding to that circuit will be fused to protect the safety of the circuit, and the fault indicator 123 on the fuse 121 will pop up to indicate where the fault is. When the maintenance personnel carry out the maintenance, the specific position of the fault fuse 121 may be judged through the transparent window 1222 on the protective box 122, the connection between the circuit and the bus bar can be cut off by rotating a handle of the isolating switch 11 corresponding to the circuit, and the first protective shield 132 and the second protective shield 1422 can be quickly disassembled by sliding the first cover body 1322 and the second cover body 1422 respectively, so that the bolts can be loosened to take out the fuse assembly 12 as a whole for subsequent replacement.

**[0048]** The above contents are only the preferred embodiments of the present application. According to the idea of the present application, there will be some changes in the specific implementation and application scope for those skilled in the art, and the contents of this specification should not be understood as limitations to the present application.

## Claims

1. A fuse-switch-disconnector assembly, comprising at least one fuse-switch-disconnector (1), wherein the fuse-switch-disconnector (1) comprises an isolating switch (11) and a fuse assembly (12) that are de-

tachably connected with each other, the fuse assembly (12) comprises a fuse (121) and a protective box (122) for accommodating the fuse (121), the protective box (122) is provided with a heat dissipation channel that dissipates heat from the fuse (121), wherein the protective box (122) is further provided with a transparent window, a state of the fuse (121) is observed through the transparent window.

2. The fuse-switch-disconnector assembly according to claim 1, wherein three fuses (121) are provided in one fuse assembly (12), which are arranged in the protective box (122) at intervals in a length direction of the protective box (122).
3. The fuse-switch-disconnector assembly according to claim 1, wherein the fuse-switch-disconnector (1) further comprises a connection copper bar assembly (13), the connection copper bar assembly (13) comprises a connection copper bar (131) that is detachably connected with an input terminal of the isolating switch (11) and an output terminal of the fuse (121), respectively.
4. The fuse-switch-disconnector assembly according to claim 3, wherein the connection copper bar assembly (13) further comprises a first protective shield (132) which abuts against a bottom end of the isolating switch (11) and a top end of the protective box (122), respectively, the first protective shield (132) comprises a first shield body (1321) and a first cover body (1322) that are detachably connected with each other, wherein the first shield body (1321) is provided with a first accommodating groove inside, which is capable of accommodating the connection copper bar (131), and the first cover body (1322) is snap-fitted with the first shield body (1321) and covers the first accommodating groove.
5. The fuse-switch-disconnector assembly according to claim 4, wherein the first shield body (1321) is provided with two first guide grooves (13211), which are located at both sides of the first accommodating groove, respectively, one of the first shield body (1321) and the first cover body (1322) is provided with a first limiting hole (13221), and the other of the first shield body (1321) and the first cover body (1322) is provided with a first buckle (13212) that is matched with the first limiting hole (13221), and the first cover body (1322) slides along the first guide groove (13211) until the first buckle (13212) is clamped with the first limiting hole (13221) so as to enable the first cover body (1322) being engaged with the first shield body (1321).
6. The fuse-switch-disconnector assembly according to claim 1, wherein the fuse-switch-disconnector (1) further comprises a connection copper bar assembly

(14), and the connection copper bar assembly (14) comprises a connection copper bar (141) that is detachably connected with an input terminal of the fuse (121) and an external cable, respectively.

sets of fuse-switch-disconnector (1) are arranged at intervals in a width direction of the protective box (122).

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7. The fuse-switch-disconnector assembly according to claim 6, wherein the connection copper bar assembly (14) further comprises a second protective shield (142) that abuts against the bottom end of the protective box (122), and the second protective shield (142) comprises a second shield body (1421) and a second cover body (1422) that are detachably connected with each other, wherein the second shield body (1421) is provided with a second accommodating groove inside, which accommodates the connection copper bar (141), and the second cover body (1422) is snap-fitted with the second shield body (1421) and covers the second accommodating groove..

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8. The fuse-switch-disconnector assembly according to claim 7, wherein the second shield body (1421) is provided with two second guide grooves (14211) located at both sides of the second accommodating groove, respectively, one of the second shield body (1421) and the second cover body (1422) is provided with a second limiting hole (14221), and the other of the second shield body (1421) and the second cover body (1422) is provided with a second buckle (14212) that is matched with the second limiting hole (14221), and the second cover body (1422) slides along the second guide groove (14211) until the second buckle (14212) is clamped with the second limiting hole (14221) so as to enable the second cover body (1422) being engaged with the second shield body (1421).

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9. The fuse-switch-disconnector assembly according to claim 1, wherein the fuse assembly (12) further comprises a fault indicator (123) connected with the fuse (121), and the fuse (121) corresponds to the fault indicator (123) in one-to-one correspondence, and a state of the fuse (121) is judged by the fault indicator (123).

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10. The fuse-switch-disconnector assembly according to claim 1, wherein two opposite side walls of the protective box (122) are both provided with vents (1221) to form heat dissipation channels.

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11. The fuse-switch-disconnector assembly according to claim 10, wherein the two opposite side walls of the protective box (122) are both provided with a plurality of vents (1221) around the fuse (121) to form a plurality of heat dissipation channels.

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12. The fuse-switch-disconnector assembly according to any one of claims 1 to 11, wherein a plurality of

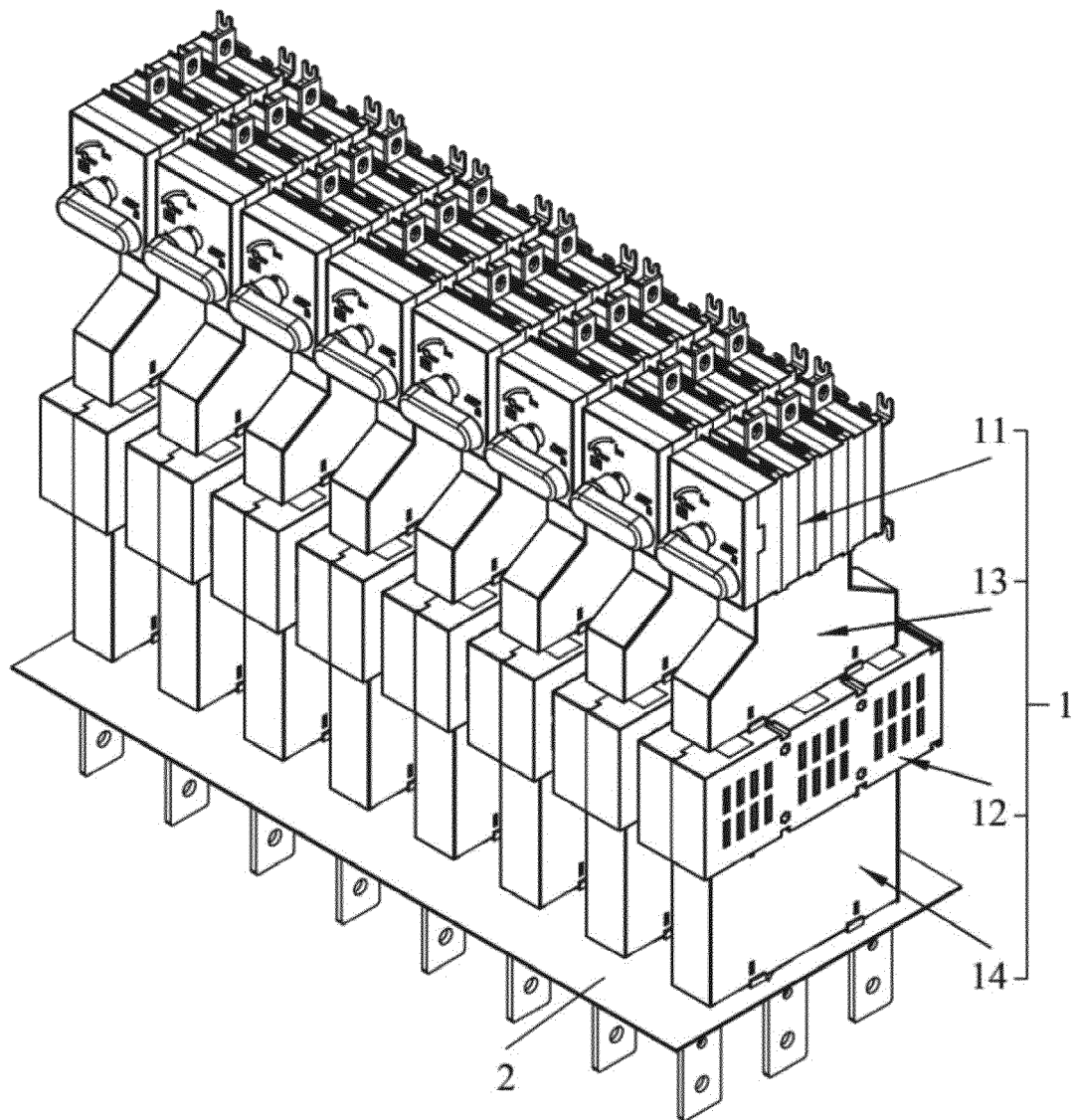


FIG. 1



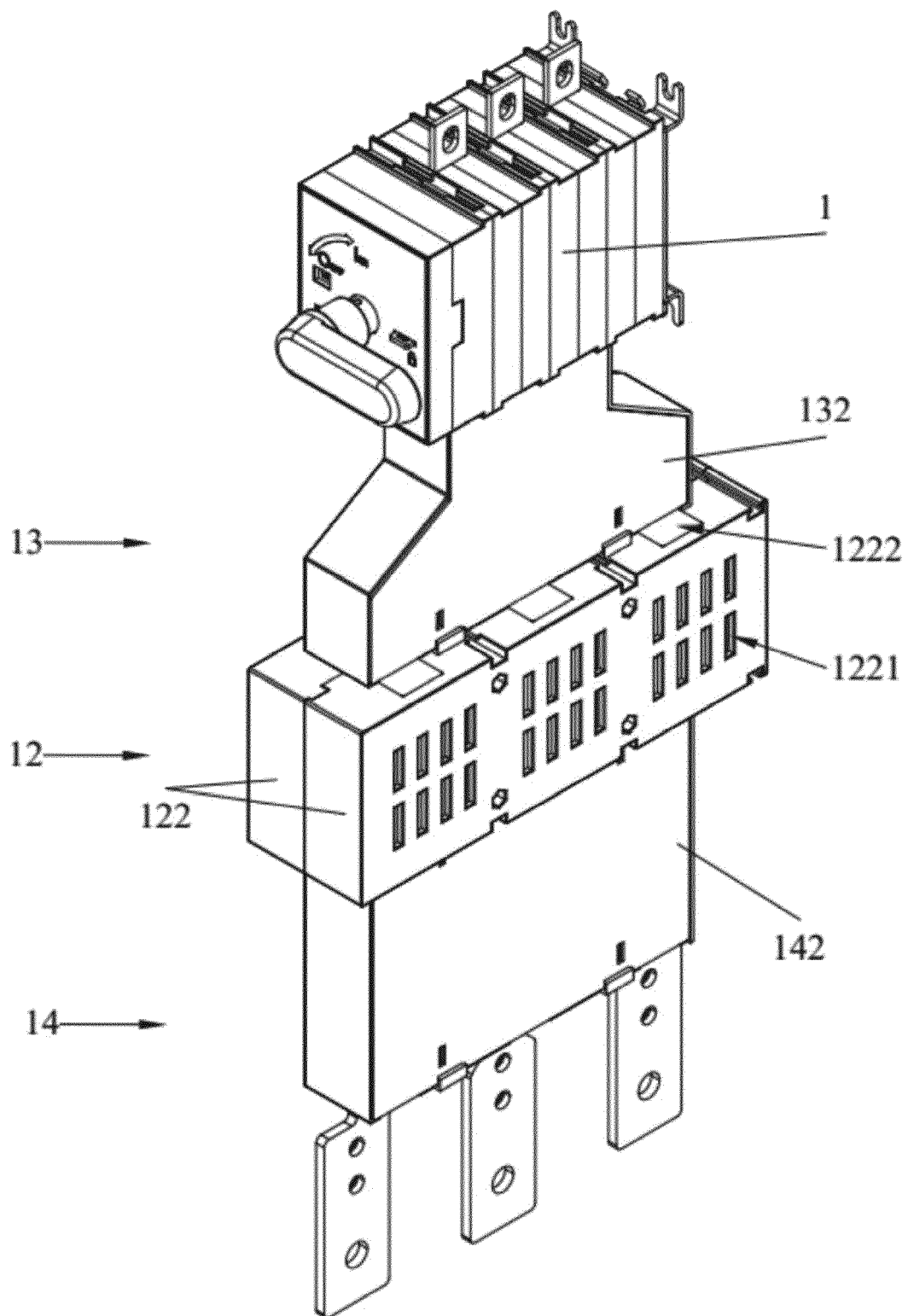


FIG. 2

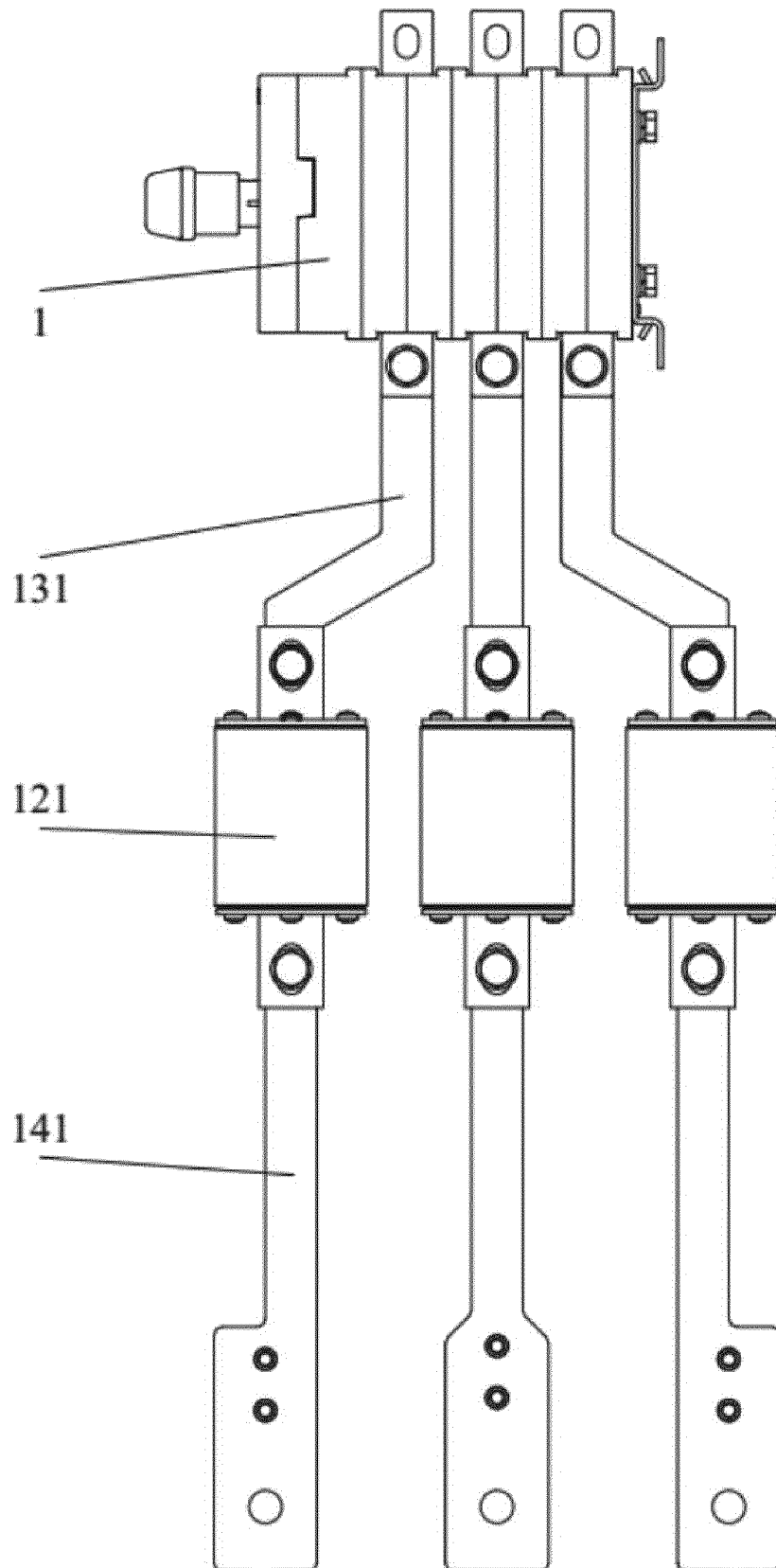


FIG. 3

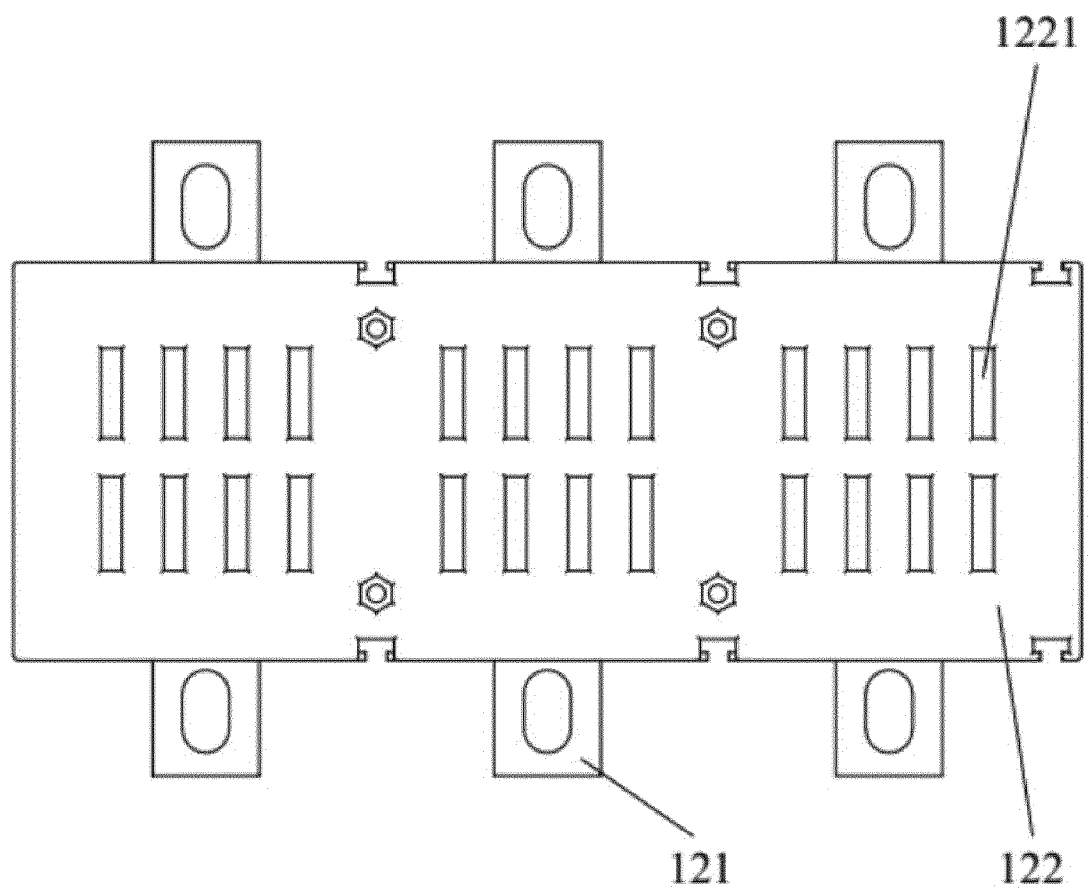


FIG. 4

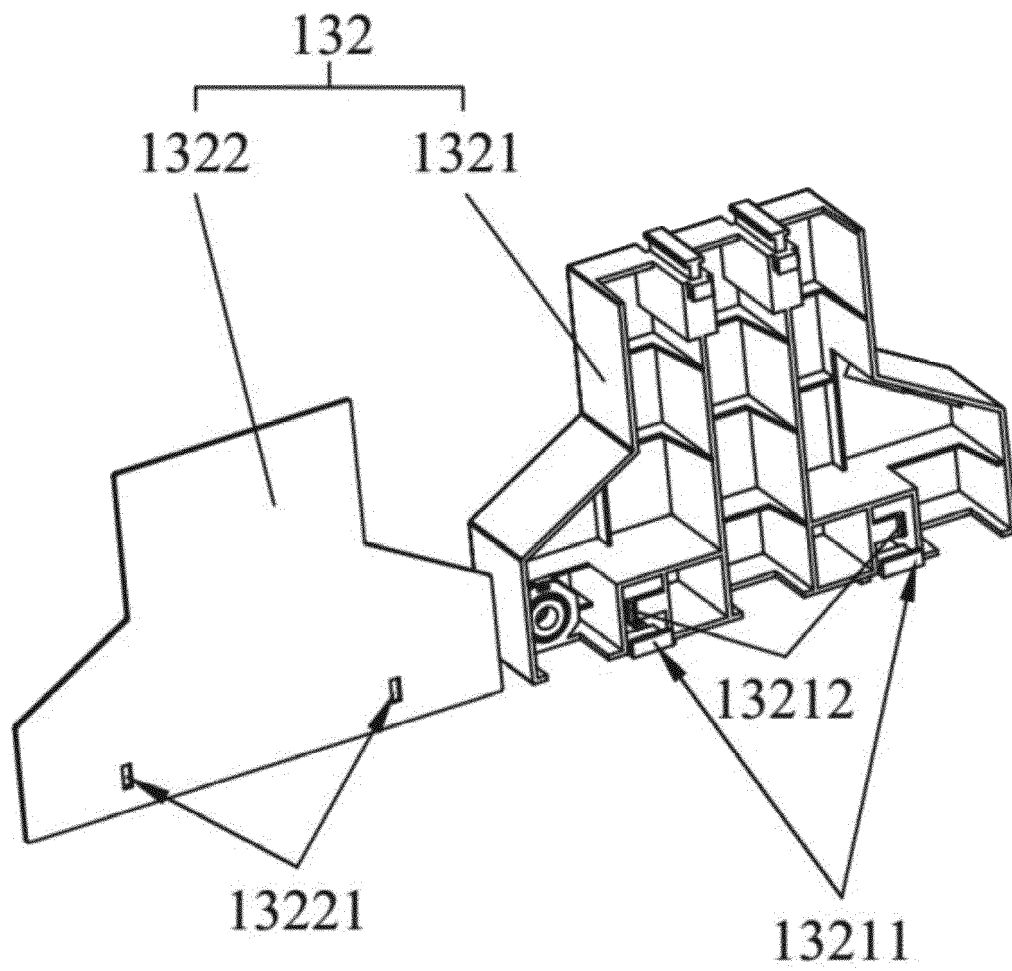


FIG. 5

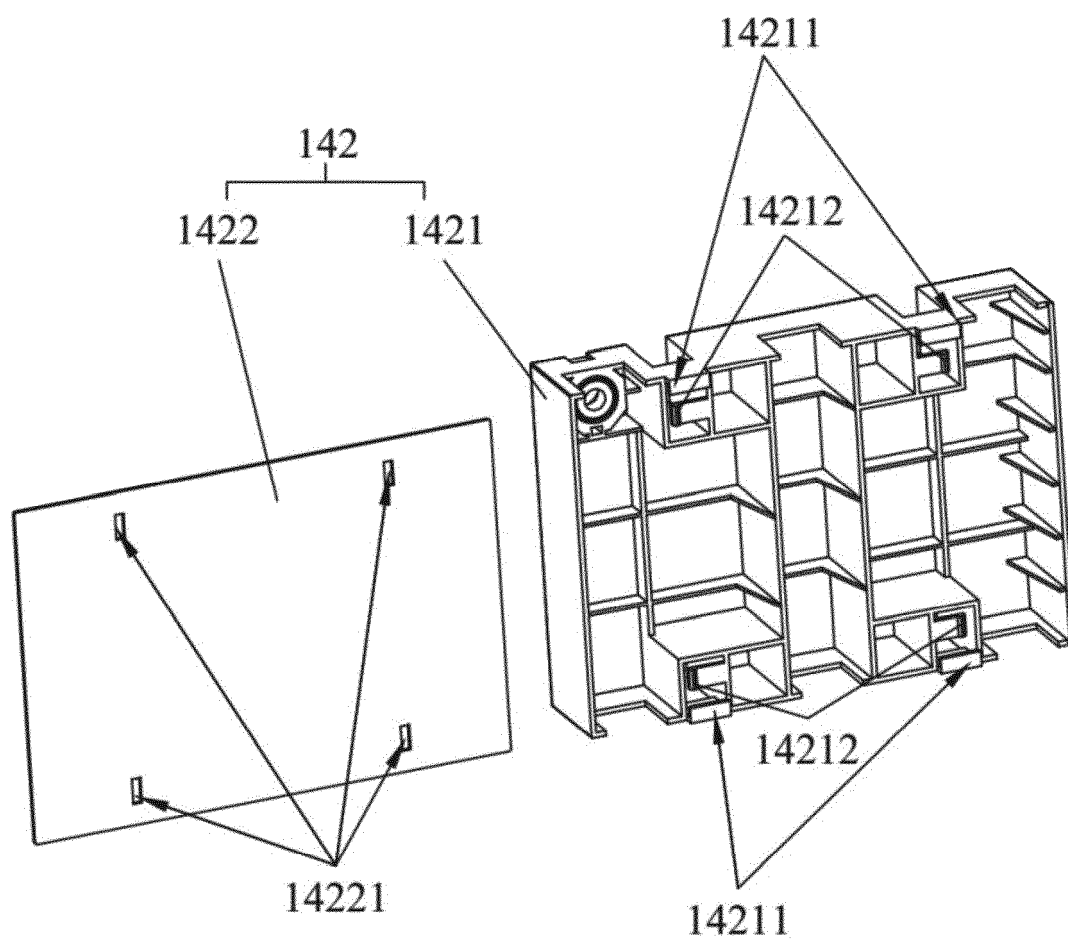


FIG. 6

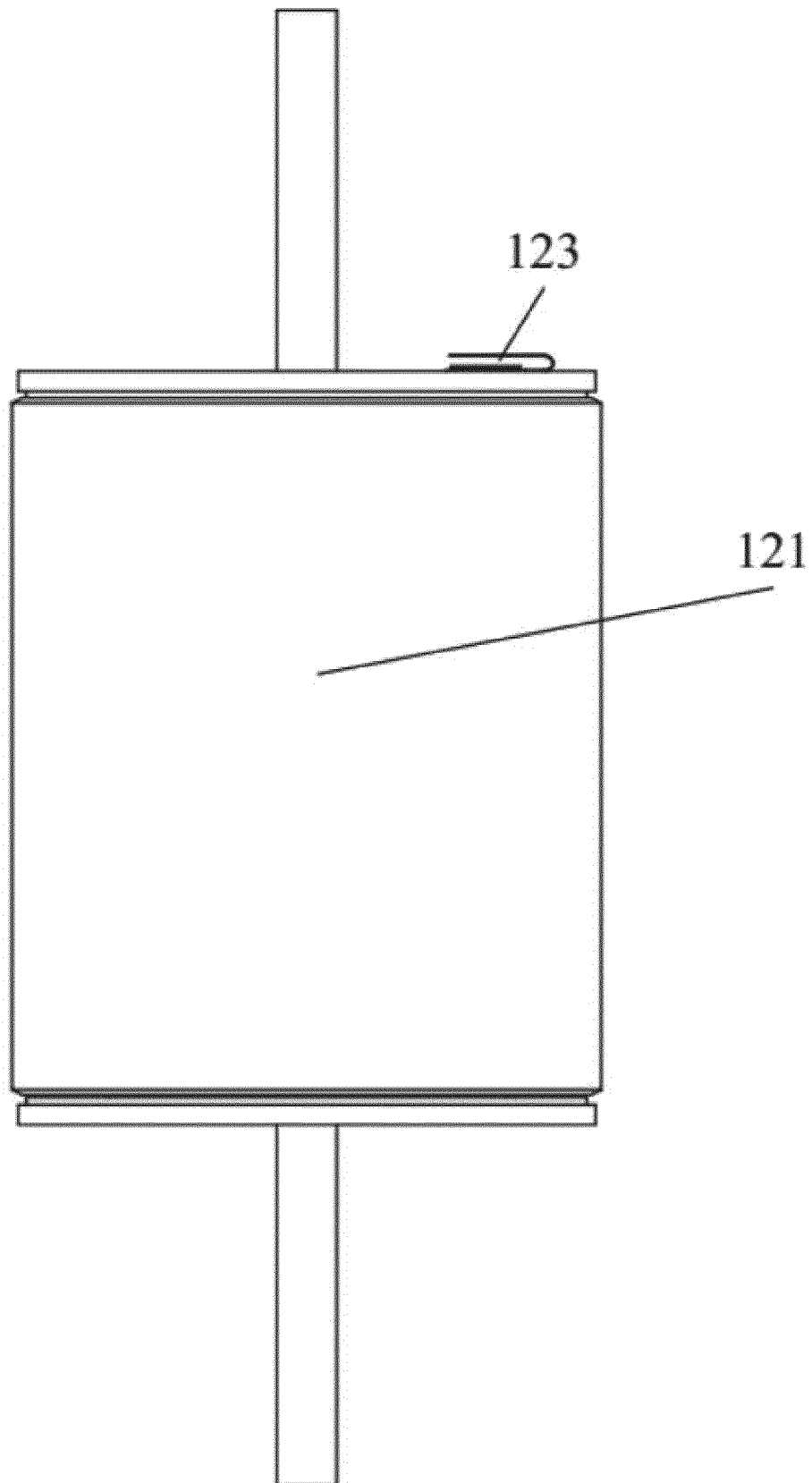


FIG. 7

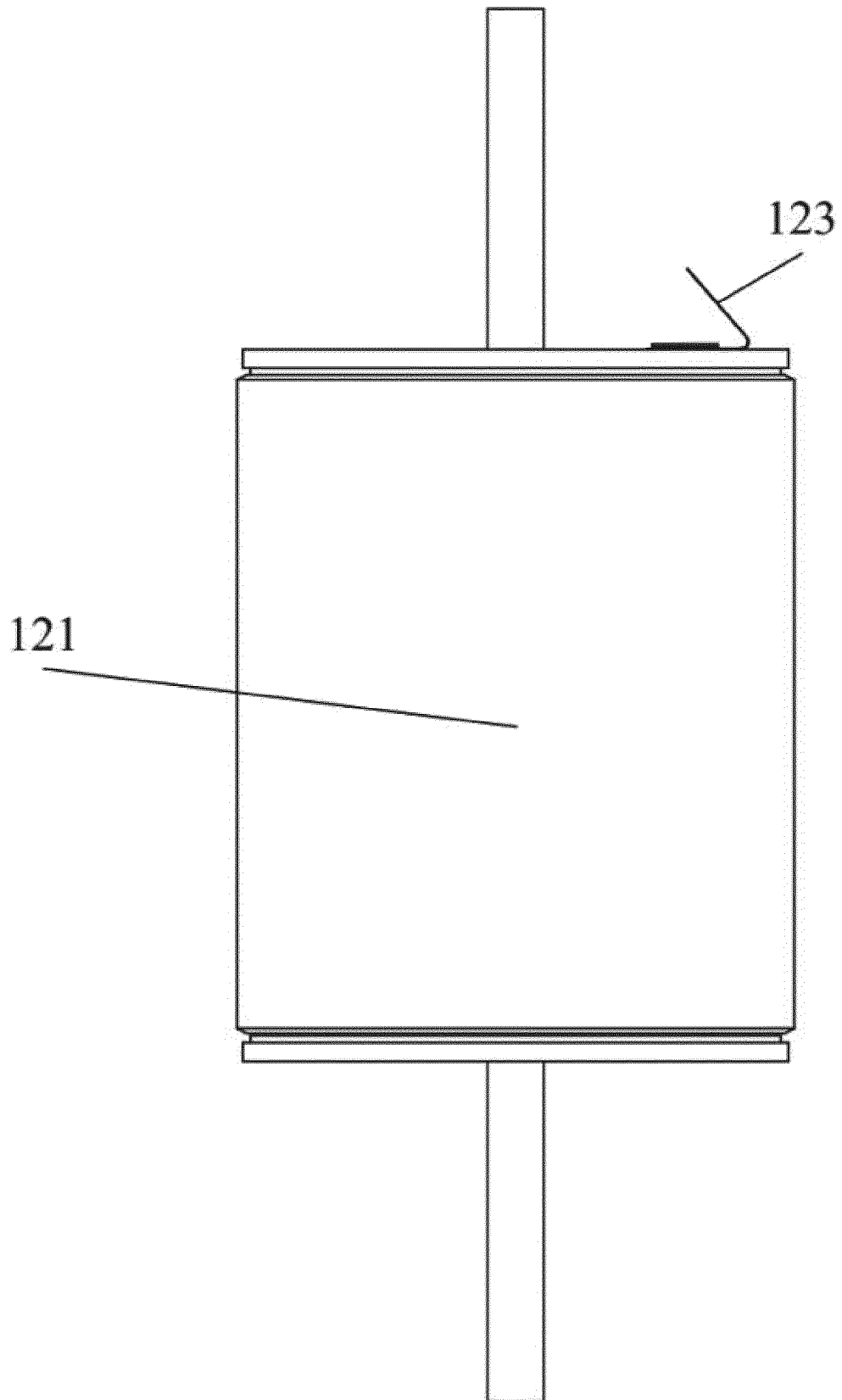


FIG. 8

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/095224

## A. CLASSIFICATION OF SUBJECT MATTER

H01H 89/00(2006.01)i; H01H 85/47(2006.01)i; H01H 85/20(2006.01)i; H01H 71/02(2006.01)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)

H01H

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

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

CNTXT, ENTXT, ENTXTC, DWPI, CNKI: 隔离开关, 熔断器, 保护, 散热, 透明窗, 铜排, isolating switch, fuse, protect, heat radiation, transparent window, copper bar

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 202917421 U (ZHOU HAIBING) 01 May 2013 (2013-05-01) description, paragraph 11 to paragraph 12, and figure 1	1-12
Y	CN 209607655 U (ZHEJIANG QIANMAO ELECTRICAL TECHNOLOGY CO., LTD.) 08 November 2019 (2019-11-08) description, paragraph 19 to paragraph 36, and figures 1-4	1-12
Y	CN 202855686 U (CHANGZHOU RUILIAN ELECTRIC POWER TECHNOLOGY CO., LTD.) 03 April 2013 (2013-04-03) description, paragraph 11 to paragraph 14, and figures 1-2g	3-8
PX	CN 216213246 U (SUNGROW POWER SUPPLY CO., LTD.) 05 April 2022 (2022-04-05) claims 1-12	1-12
A	CN 204315441 U (ZHEJIANG MINGRONG ELECTRICAL PROTECTION CO., LTD.) 06 May 2015 (2015-05-06) entire document	1-12
A	JP 2010263685 A (FUJIKURA LTD.) 18 November 2010 (2010-11-18) entire document	1-12

☐ 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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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

13 July 2022

Date of mailing of the international search report

20 July 2022

Name and mailing address of the ISA/CN

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Telephone No.



**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No.  
**PCT/CN2022/095224**

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN	202917421	U	01 May 2013	None	
CN	209607655	U	08 November 2019	None	
CN	202855686	U	03 April 2013	None	
CN	216213246	U	05 April 2022	None	
CN	204315441	U	06 May 2015	None	
JP	2010263685	A	18 November 2010	None	

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- CN 202122138159 [0001]