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(54) **AIR CIRCUIT BREAKER**

(57) A air circuit breaker comprises a circuit breaker body. The circuit breaker body comprises a body base and an operating mechanism provided on one side of the body base. The body base comprises a base frame and a base bottom plate which are buckled with each other. The operating mechanism is provided on the outer side of the base frame. The circuit breaker further comprises a current transformer which is provided on the outer side of the base bottom plate. According to the air circuit

breaker of the utility model, the current transformer is provided on the outer side of the base bottom plate, such that the assembly is convenient, the production cost is reduced, and the disassembly and maintenance are convenient and rapid at the same time. Static busbar mounting cavities and transformer mounting cavities are provided vertically along the base bottom plate in opposite directions in a layered manner, such that the internal space of the base bottom plate can be used reasonably.

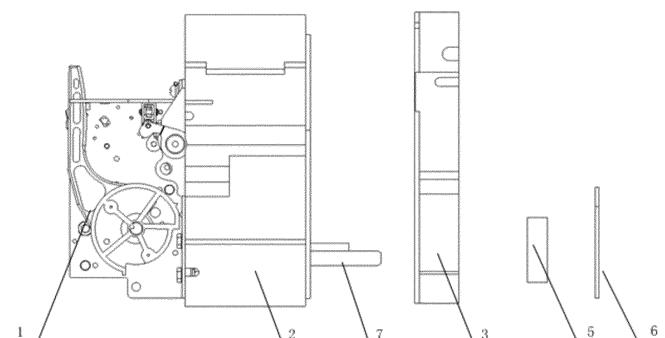


Fig. 8

Description

TECHNICAL FIELD

[0001] The utility model relates to the field of low-voltage apparatuses, and in particular, to a air circuit breaker.

BACKGROUND ART

[0002] A support for a body of a air circuit breaker is generally composed of a base and a bottom plate. An operating mechanism and a controller are provided on one side of the base.

[0003] According to the existing air circuit breaker, a controller slot is formed in one side of the base and used for placing a lead of a controller, and is then covered with a line pressing plate for protection. The line pressing plate is generally made of a DMC material by pressing, and provided with a threaded insert in the middle and threaded through holes in two ends. The current line pressing plate is relatively large in thickness and needs to be fixed with three screws, thereby resulting in high cost and bringing inconvenience for assembly.

[0004] A current transformer of the exiting air circuit breaker is provided between the base and the bottom plate. The current transformer acquires current information of a main circuit from a main circuit busbar and transmits the same to the controller. The controller determines whether the main circuit is normally energized. The assembly order of of a mounting structure for such a current transformer is: 1. mounting the main circuit busbar on the base of the body; 2. mounting the current transformer on the main circuit busbar; and 3. covering with the bottom plate of the body. The replacement of the current transformer in this structure requires the removal of the bottom plate, so the assembly is complicated, and it is also unfavorable for product maintenance. Therefore, it is necessary to improve the existing air circuit breaker.

SUMMARY OF THE INVENTION

[0005] An objective of the utility model is to overcome the defects of the prior art and provide a air circuit breaker which is simple and compact in structure, convenient to disassemble and low in cost.

[0006] To fulfill said objective, the utility model adopts the following technical solution:

a air circuit breaker comprises a circuit breaker body which comprises a body base and an operating mechanism 1 provided on one side of the body base, wherein the body base comprises a base frame 2 and a base bottom plate 3 which are buckled with each other, and the operating mechanism 1 is provided on the outer side of the base frame 2; and the air circuit breaker further comprises a current transformer 5 which is provided on the outer side of the base bottom plate 3.

[0007] Further, a main circuit busbar 7 and a static busbar are provided in the body base in rows; one end of

the main circuit busbar 7 and one end of the static busbar extend out of the base bottom plate 3; the main circuit busbar 7 is mounted on the inner side of the base frame 2; static busbar mounting cavities 32 which are used for mounting the static busbar and provided at intervals are provided on the inner side of the base bottom plate 3; transformer mounting cavities 31 for mounting the current transformer 5 are provided on the outer side of the base bottom plate 3.

[0008] Further, the static busbar mounting cavities 32 and the transformer mounting cavities 31 are provided vertically along the base bottom plate 3 in opposite directions in a layered manner.

[0009] Further, the air circuit breaker further comprises a cover plate 6 provided above the transformer mounting cavities 31 to fix the current transformer 5.

[0010] Further, a fixed column 312 fixed with the cover plate 6 is respectively provided at two ends of each transformer mounting cavity 31; a first mounting hole 313 is formed in the middle of the fixed column 312.

[0011] Further, a static busbar mounting hole 321 through which the static busbar penetrates is formed in the bottom of each static busbar mounting cavity 32; a main circuit busbar mounting hole 311 is formed in the bottom of each transformer mounting cavity 31; after the main circuit busbar 7 fixed to the base frame 2 extend out from the main circuit busbar mounting hole 311 on the inner side of the base bottom plate 3 to the transformer mounting cavity 31 on the outer side of the base bottom plate 3, the current transformer 5 sleeves the main circuit busbar 7 and is connected with the controller.

[0012] Further, phase partitions 11 for partitioning each of the pole conductive systems are provided inside the body base.

[0013] Further, the circuit breaker body further comprises a controller which is provided on one side of the base frame 2 where the operating mechanism 1 is provided; a controller slot 21 corresponding to the controller is formed in one side of the base frame 2; the controller slot 21 is provided in one end, close to the bottom, of the base frame 2; an insert 21a is provided inside the controller slot 21; a line pressing plate 4 is provided on the controller slot 21; the controller and the line pressing plate 4 are together fixed with the insert 21a of the controller slot 21; the line pressing plate is fixedly connected to the insert 21a through the controller.

[0014] Further, the insert 21a is a cylindrical insert; an insert fixing hole 211a is formed in the middle of the insert 21a; the line pressing plate 4 is provided with a first fixing hole 401 corresponding to the insert fixing hole 211a.

[0015] Further, the line pressing plate 4 is an epoxy glass flat plate.

[0016] According to the air circuit breaker of the utility model, the current transformer is provided on the outer side of the base bottom plate, such that the assembly is convenient, the production cost is reduced, and the disassembly and maintenance are convenient and rapid at the same time. The static busbar mounting cavities and

the transformer mounting cavities are provided vertically along the base bottom plate in opposite directions in a layered manner, such that the internal space of the base bottom plate can be used reasonably.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 is an overall schematic structural diagram of a circuit breaker body of the utility model;

Fig. 2 is a schematic structural diagram of a base frame covered with a line pressing plate of the utility model;

Fig. 3 is a schematic structural diagram of the base frame uncovered with the line pressing plate of the utility model;

Fig. 4 is a schematic structural diagram of the interior of a controller slot of the utility model;

Fig. 5 is a schematic structural diagram of the line pressing plate of the utility model;

Fig. 6 is a schematic structural diagram of the front side of a base bottom plate of the utility model;

Fig. 7 is a schematic structural diagram of the back side of the base bottom plate of the utility model; and

Fig. 8 is a schematic assembly structural diagram of a current transformer of the utility model.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] The specific embodiments of an air circuit breaker of the present utility model will be further described below with reference to the embodiments shown in Figs. 1 to 8. The air circuit breaker of the present utility model is not limited to the description of the following embodiments.

[0019] As shown in Fig. 1, an air circuit breaker (a four-pole circuit breaker as shown in Fig. 1) of the utility model comprises a circuit breaker body. The circuit breaker body comprises a body base, and an operating mechanism and a controller which are provided on one side of the body base. The body base comprises a base frame 2 and a base bottom plate 3. The operating mechanism 1 and the controller are provided on one side of the base frame 2. Phase partitions 11 for partitioning each of the pole conductive systems are provided inside the body base to prevent each pole conductive system from inter-phase short circuit.

[0020] As shown in Figs. 2-5, the utility model relates to an air circuit breaker (a three-pole circuit breaker in drawings). A controller slot 21 is formed in one side of the base frame 2 where the controller is provided. An insert 21a is provided inside the controller slot 21. A line pressing plate 4 is provided on the controller slot 21. The controller and the line pressing plate 4 are together fixed with the insert 21a of the controller slot 21. The line pressing plate is fixedly connected to the insert 21a through

the controller. According to the air circuit breaker of the utility model, the line pressing plate is provided above the controller slot to perform shielding and protection, the single insert is provided inside the controller slot, and the line pressing plate is fixedly connected to the insert 21a through the controller, such that it is unnecessary to provide a single insert fixing structure on the line pressing plate. The line pressing plate may be thinned, and the internal space of the controller slot becomes large.

[0021] As shown in Figs. 2 and 3, the controller slot 21 is provided on one side, close to the bottom, of the base frame 2. The insert 21a is provided at one end, close to the bottom of the base frame 2, of the controller slot 21. A line outlet hole 21 from which a lead of the controller extends out is reserved in one side of the line pressing plate 4 above the controller slot 21. The line outlet hole 41 is used for leading the lead of the controller out.

[0022] As shown in Figs. 3, 4 and 5, the insert 21a is a cylindrical insert. An insert fixing hole 211a is formed in the middle of the insert 21a. A first fixing hole 401 corresponding to the insert fixing hole 211a is formed in the line pressing plate 4. The line pressing plate 4 is an epoxy glass thin plate. When the controller and the insert 21a are connected, a screw is connected to the insert fixing hole 211a after passing through the first fixing hole 401. In the case of satisfying the original functional requirements, the production cost is reduced, the assembly workload is reduced, and the internal space of the slot becomes large. The insert 21a and the base frame 2 are integrally formed. The insert 21a may also be a metal insert, such as a copper insert, preembedded in the base frame 2 before the base frame 2 is formed.

[0023] Specifically, as shown in Fig. 4, a line inlet hole 211 for wiring is provided in one end of the controller slot 21, and two steps are arranged on the other end of the controller slot 21. The two steps include a first step surface 212 located on the upper layer and a second step surface 213 located on the lower layer. The insert 21a is provided on the first step surface. One end of the first step surface 213 is provided with a threaded hole 214.

[0024] As shown in Figs. 6-8, the air circuit breaker of the utility model further comprises a current transformer 5 (a four-pole circuit breaker in drawings). The current transformer 5 is provided on the outer side of the base bottom plate 3. According to the air circuit breaker of the utility model, the current transformer is provided on the outer side of the base bottom plate 3, such that the assembly is convenient, the production cost is reduced, and the disassembly and maintenance are convenient and rapid at the same time.

[0025] As shown in Figs. 6 and 7, a main circuit busbar 7 and a static busbar are provided in the body base in rows. One end of the main circuit busbar 7 and one end of the static busbar extend out of the base bottom plate 3. The main circuit busbar 7 is mounted on the inner side of the base frame 2. Static busbar mounting cavities 32 which are used for mounting the static busbar and provided at intervals are provided on the upper layer of the

inner side of the base bottom plate 3. Transformer mounting cavities 31 for mounting the current transformer 5 are provided on the lower layer of the outer side of the base bottom plate 3. The static busbar and the current transformer 5 are mounted at two sides of the base bottom plate 3 respectively. The static busbar mounting cavities 32 and the transformer mounting cavities 31 are provided vertically along the base bottom plate 3 in opposite directions in a layered manner. Since the static busbar mounting cavities 32 and the transformer mounting cavities 31 are provided vertically along the base bottom plate 3 in opposite directions in the layered manner, the internal space of the base bottom plate 3 can be used reasonably.

[0026] As shown in Fig. 8, the air circuit breaker further comprises a cover plate 6 which is provided above the transformer mounting cavities 31 to fix the current transformer 5. The single cover plate 6 is provided to fix the current transformer 5 to perform shielding and protection. As shown in Fig. 7, a fixed column 312 fixed with the cover plate 6 is respectively provided at two ends of each transformer mounting cavity 31. A first mounting hole 313 is formed in the middle of the fixed column 312. The fixed column 312 is respectively provided at two ends of each transformer mounting cavity 31, and the cover plate 6 and the base bottom plate 3 are connected through screws.

[0027] As shown in Figs. 6 and 7, a static busbar mounting hole 321 through which the static busbar penetrates is formed in the bottom of each static busbar mounting cavity 32. A main circuit busbar mounting hole 311 is formed in the bottom of each transformer mounting cavity 31. After the main circuit busbar 7 fixed to the base frame 2 extend out from the main circuit busbar mounting hole 311 on the inner side of the base bottom plate 3 to the transformer mounting cavity 31 on the outer side of the base bottom plate 3, the current transformer 5 sleeves the main circuit busbar 7 and is connected with the controller. The static busbar and the main circuit busbar 7 are fixed by providing the static busbar mounting holes 321 and the main circuit mounting holes 311 respectively, such that the structure is stable. The current transformer 5 sleeves the main circuit busbar 7 and is connected to the controller, so as to transmit detected current information to the controller.

[0028] During mounting, the static busbar and the main circuit busbar 7 are fixed into the body base respectively first; the base bottom plate 3 is assembled on the base frame 2; the current transformer 5 is assembled in the transformer mounting cavity 31 on the outer side of the base bottom plate 3; next, the transformer mounting cavity 31 is covered with the cover plate 6. The assembly process is concise. The current transformer can be replaced just by disassembling the cover plate 6 for replacement and maintenance.

[0029] The above content is a further detailed description of the present utility in combination with specific preferred embodiments, and it cannot be confirmed that the

specific implementation of the utility model is limited to these descriptions. For an ordinary person skilled in the art, it is also possible to make a number of simple deductions or substitutions without departing from the concept of the utility model, which all should be regarded to fall into the protection scope of the utility model.

Claims

1. A air circuit breaker, comprising a circuit breaker body which comprises a body base and an operating mechanism (1) provided on one side of the body base, wherein the body base comprises a base frame (2) and a base bottom plate (3) which are buckled with each other, and the operating mechanism (1) is provided on the outer side of the base frame (2); and the air circuit breaker further comprising a current transformer (5) which is provided on the outer side of the base bottom plate (3).
2. The air circuit breaker according to claim 1, wherein a main circuit busbar (7) and a static busbar are provided in the body base in rows; one end of the main circuit busbar (7) and one end of the static busbar extend out of the base bottom plate (3); the main circuit busbar (7) is mounted on the inner side of the base frame (2); static busbar mounting cavities (32) which are used for mounting the static busbar and provided at intervals are provided on the inner side of the base bottom plate (3); transformer mounting cavities (31) for mounting the current transformer (5) are provided on the outer side of the base bottom plate (3).
3. The air circuit breaker according to claim 2, wherein the static busbar mounting cavities (32) and the transformer mounting cavities (31) are provided vertically along the base bottom plate (3) in opposite directions in a layered manner.
4. The air circuit breaker according to claim 2 or 3, further comprising a cover plate (6) provided above the transformer mounting cavities (31) to fix the current transformer (5).
5. The air circuit breaker according to claim 4, wherein a fixed column (312) fixed with the cover plate (6) is respectively provided at two ends of each transformer mounting cavity (31); a first mounting hole (313) is formed in the middle of the fixed column (312).
6. The air circuit breaker according to claim 2, wherein a static busbar mounting hole (321) through which the static busbar penetrates is formed in the bottom of each static busbar mounting cavity (32); a main circuit busbar mounting hole (311) is formed in the bottom of each transformer mounting cavity (31); af-

ter the main circuit busbar (7) fixed to the base frame (2) extend out from the main circuit busbar mounting hole (311) on the inner side of the base bottom plate (3) to the transformer mounting cavity (31) on the outer side of the base bottom plate (3), the current transformer (5) sleeves the main circuit busbar (7) and is connected with the controller.

7. The air circuit breaker according to claim 1, wherein phase partitions (11) for partitioning each of the pole conductive systems are provided inside the body base.
8. The air circuit breaker according to claim 1, further comprising a controller which is provided on one side of the base frame (2) where the operating mechanism (1) is provided; a controller slot (21) corresponding to the controller is formed in one side of the base frame (2); the controller slot (21) is provided in one side, close to the bottom of the base frame (2); an insert (21a) is provided inside the controller slot (21); a line pressing plate (4) is provided on the controller slot (21); the controller and the line pressing plate (4) are together fixed with the insert (21a) of the controller slot (21); the line pressing plate is fixedly connected to the insert (21a) through the controller.
9. The air circuit breaker according to claim 8, wherein the insert (21a) is a cylindrical insert; an insert fixing hole (211a) is formed in the middle of the insert (21a); the line pressing plate (4) is provided with a first fixing hole (401) corresponding to the insert fixing hole (211a).
10. The air circuit breaker according to claim 8, wherein the line pressing plate (4) is an epoxy glass flat plate.

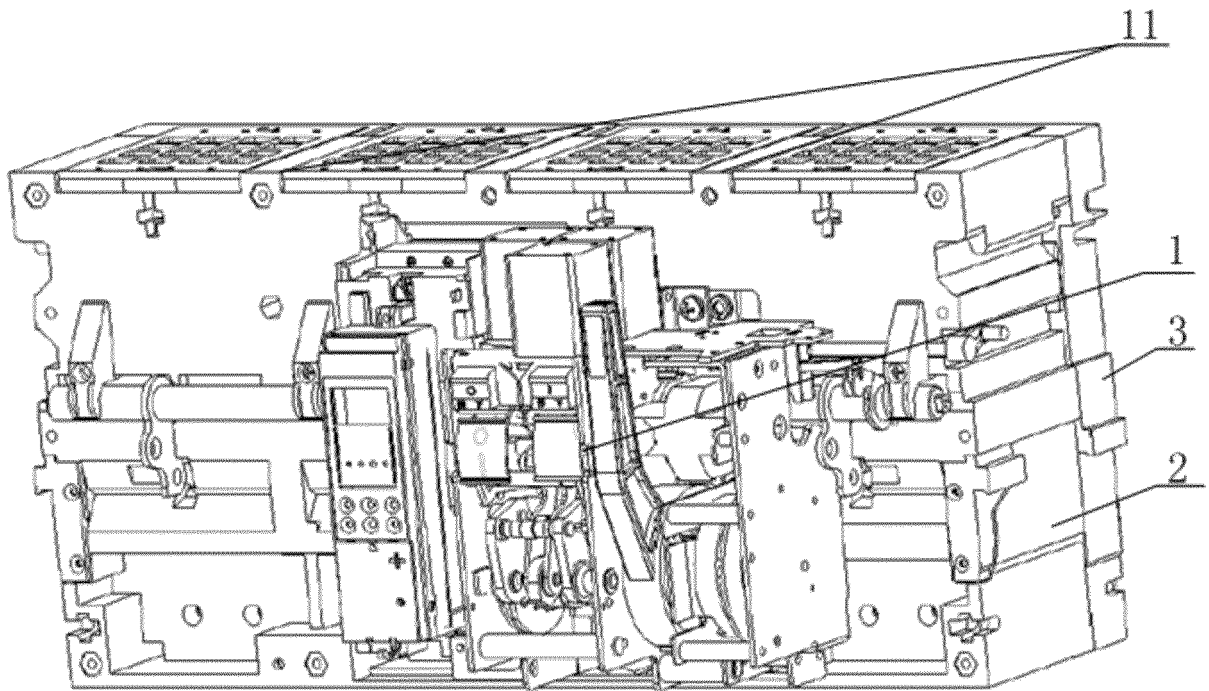


Fig. 1

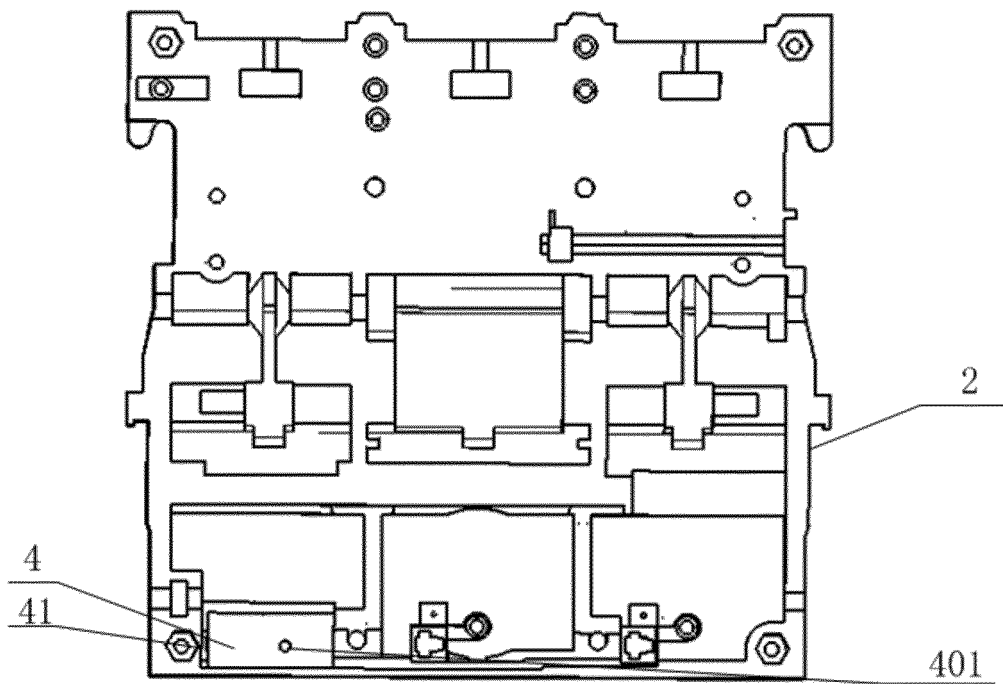


Fig. 2

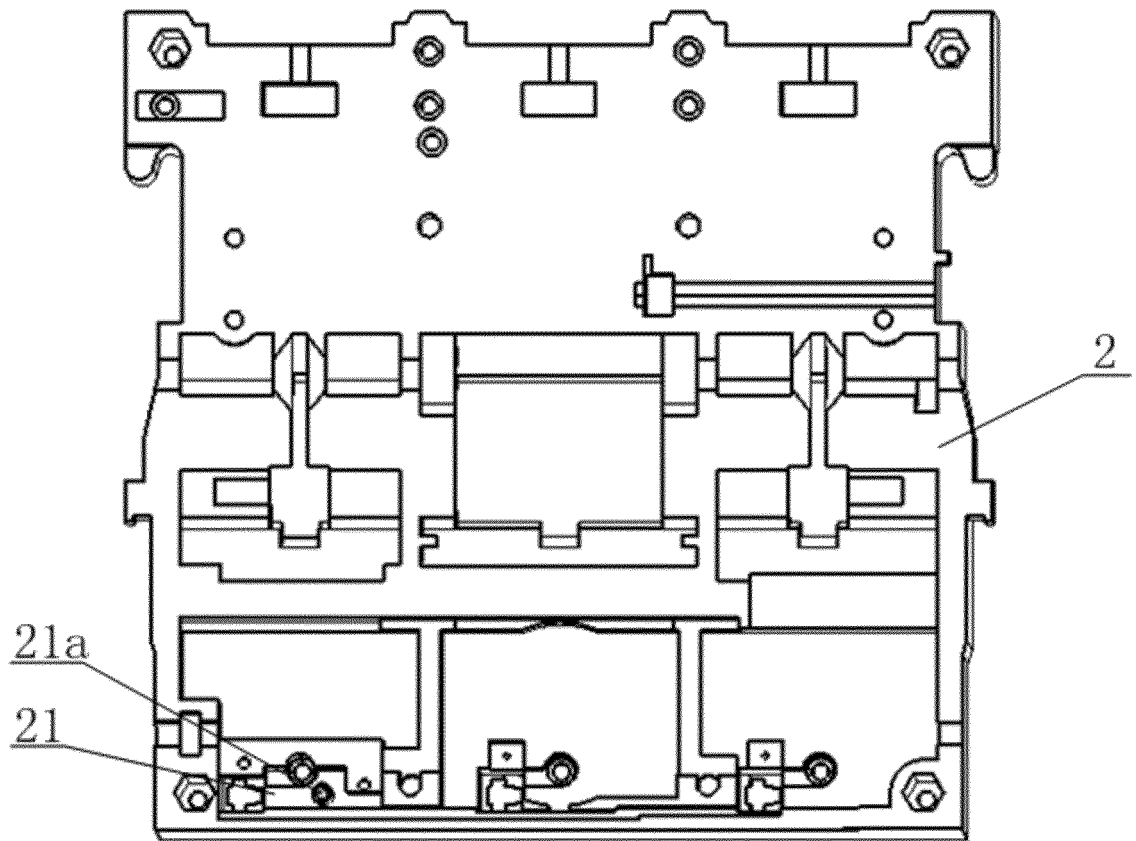


Fig. 3

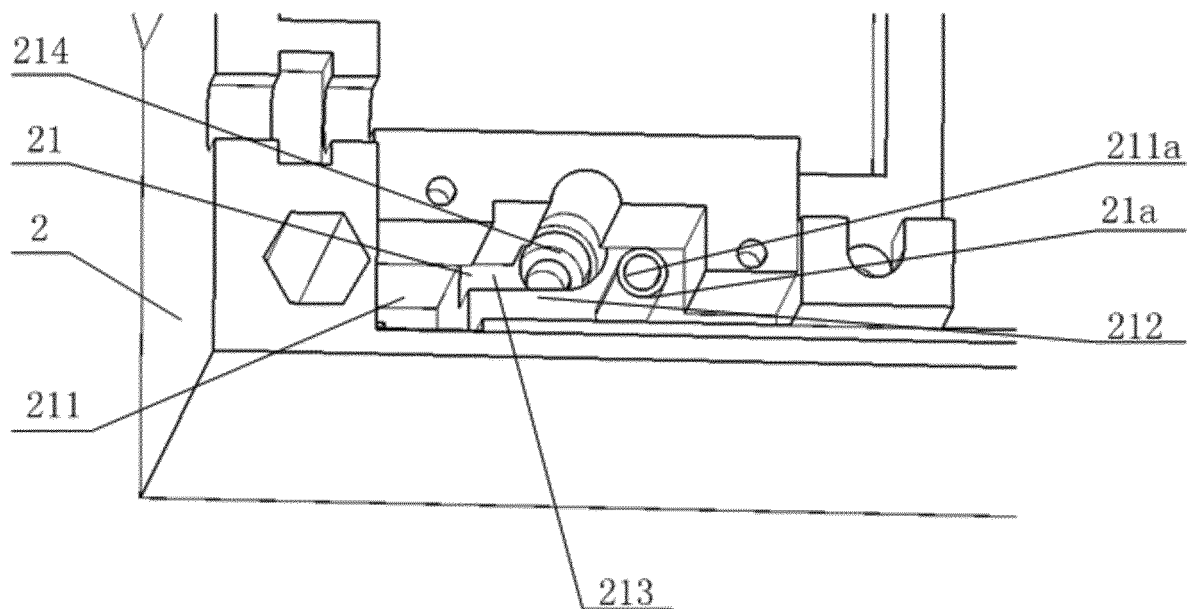


Fig. 4

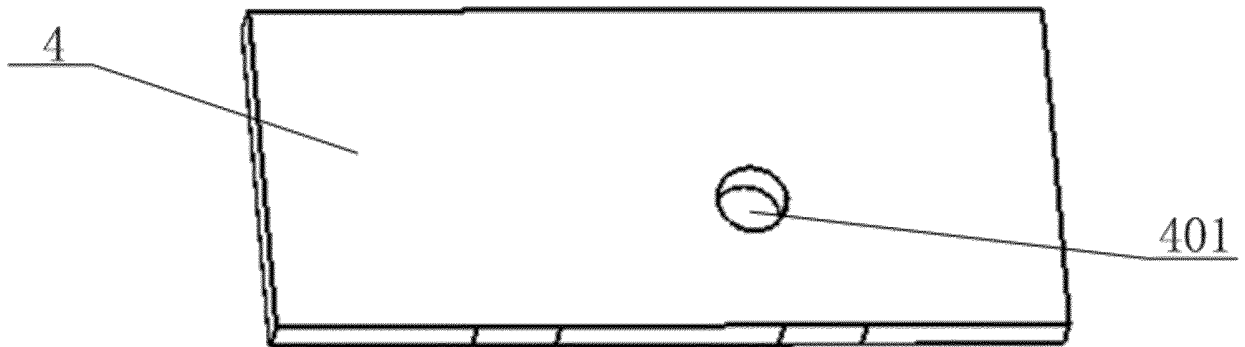


Fig. 5

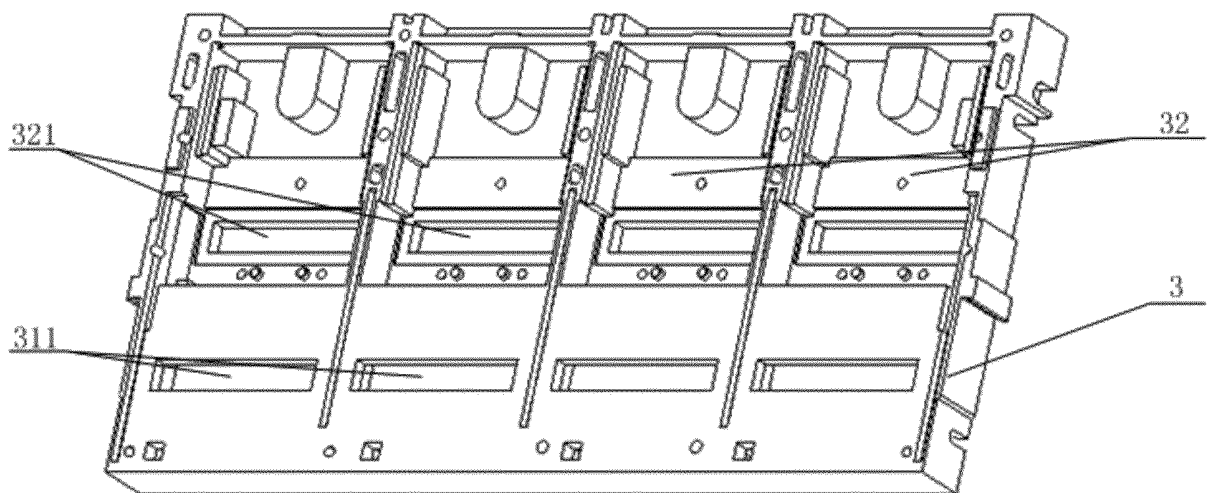


Fig. 6

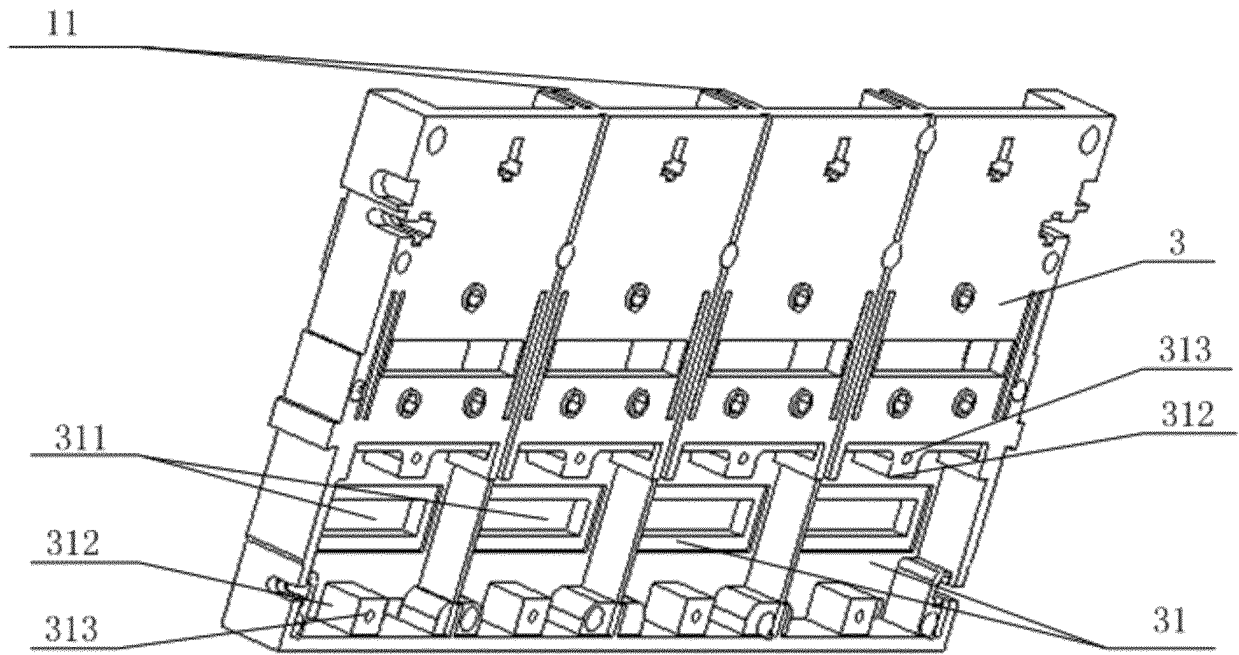


Fig. 7

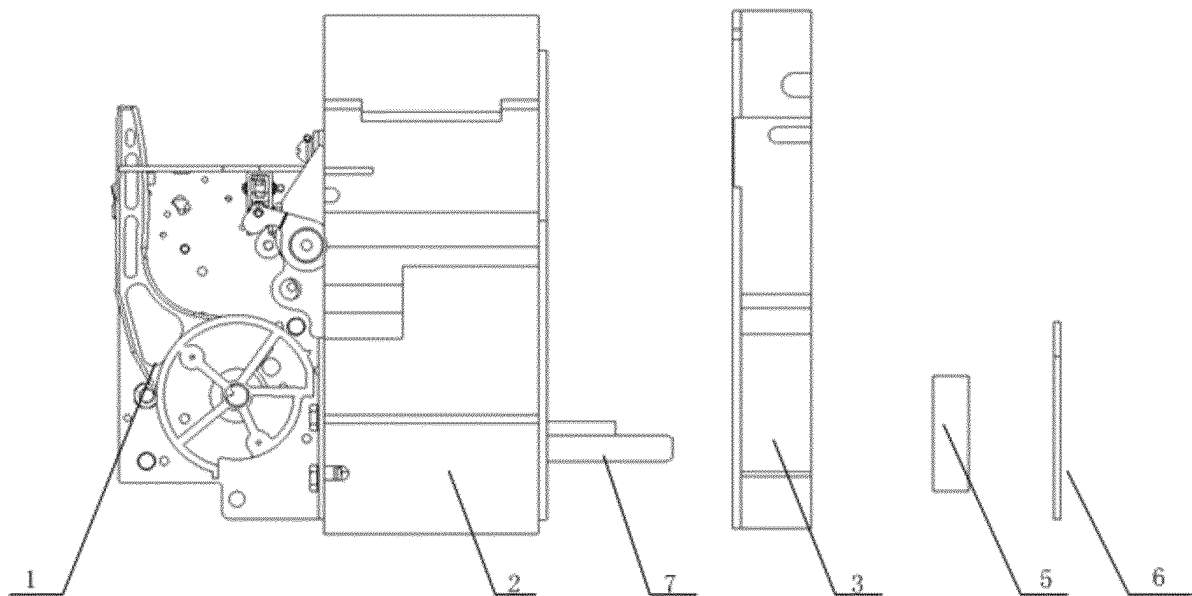


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/099789

A. CLASSIFICATION OF SUBJECT MATTER

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)

CNABS; CNTXT; CNKI; DWPI; SIPOABS: operating mechanism, current transformer; universal, breaker, switch, operation, handle, transformer, inductor, bus, casing, housing

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 205140890 U (ZHEJIANG CHINT ELECTRICS CO., LTD.), 06 April 2016 (06.04.2016), claims 1-10	1-10
X	CN 102693882 A (SHANGHAI MUNICIPAL ELECTRIC POWER COMPANY et al.), 26 September 2012 (26.09.2012), description, paragraphs 28-40, and figures 1-9	1-7
A	CN 203859080 U (TIANJIN YAMRY ELECTRICAL EQUIPMENT INSTALLATION CO., LTD.), 01 October 2014 (01.10.2014), the whole document	1-10
A	EP 0774768 A1 (EATON CORP.), 21 May 1997 (21.05.1997), the whole document	1-10

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

* Special categories of cited documents:

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09 December 2016 (09.12.2016)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 205140890 U	06 April 2016	None	
CN 102693882 A	26 September 2012	CN 102693882 B	16 July 2014
CN 203859080 U	01 October 2014	None	
EP 0774768 A1	21 May 1997	US 5652420 A	29 July 1997

Form PCT/ISA/210 (patent family annex) (July 2009)