



(11)

EP 3 229 257 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
11.10.2017 Bulletin 2017/41

(51) Int Cl.:
H01H 71/62 (2006.01)

(21) Application number: **15865299.0**

(86) International application number:
PCT/CN2015/093751

(22) Date of filing: **04.11.2015**

(87) International publication number:
WO 2016/086747 (09.06.2016 Gazette 2016/23)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

- **YANG, Yingjie**
Yueqing
Zhejiang 325603 (CN)
- **WANG, Keming**
Yueqing
Zhejiang 325603 (CN)
- **MA, Shigang**
Yueqing
Zhejiang 325603 (CN)

(30) Priority: **01.12.2014 CN 201420743118 U**

(71) Applicant: **Zhejiang Chint Electrics Co., Ltd.**
Yueqing, Zhejiang 325603 (CN)

(74) Representative: **Petraz, Gilberto Luigi et al**
GLP S.r.l.
Viale Europa Unità, 171
33100 Udine (IT)

(72) Inventors:

- **LUO, Jingxiang**
Yueqing
Zhejiang 325603 (CN)

(54) **CIRCUIT BREAKER LOCKING DEVICE**

(57) A circuit breaker locking device comprises an executing lever and a pressing plate, wherein a hole shaft of the executing lever is rotatably mounted in a base of a circuit breaker. An elastic piece is arranged between one end of the executing lever and the base, and the other end of the executing lever is provided with a locking end which can be connected with a locking portion at one side of the pressing plate in a locking manner. The pressing plate is mounted in the base and can rotatably oscillate relative to the base. The locking portion at one side of the pressing plate comprises an unlocking surface and a locking surface which correspond to the locking end respectively and are adjacent to each other, and a sliding step is arranged between the unlocking surface and the locking surface. A contact portion which is in contact connection with a circuit breaker operating mechanism is arranged at the other side of the pressing plate. A magnetic flux which can drive the pressing plate to oscillate is also arranged above the pressing plate correspondingly. The circuit breaker locking device provided by the utility model is firm in locking structure, stable in action process and simple in mechanical structure.

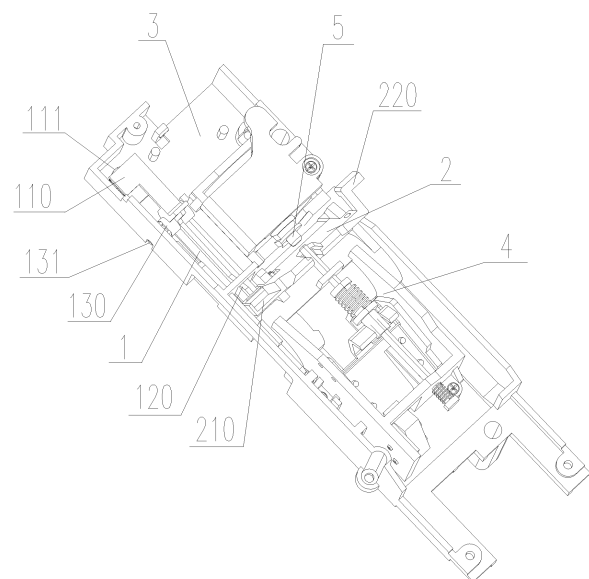


Fig. 1

EP 3 229 257 A1

Description

TECHNICAL FIELD

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

BACKGROUND ART

[0002] There is a need for a circuit breaker to ensure that a switch should not be switched on after a tripping trouble until the circuit breaker is unlocked artificially after the trouble is removed, in a high-current power consumption site. But some circuit breakers at present are not provided with effective locking devices, such that a mechanism can store energy at once after the circuit breaker undergoes a tripping trouble, and therefore a switching-off semi-shaft pushes a pressing plate of a controller base backwards to ensure that the circuit breaker can be switched on. As thus, the safety of operation personnel and the safety of customer's power consumption equipment are affected when the circuit breaker is switched on after a system has a fault. Meanwhile, a part of existing circuit breakers are also provided with locking devices, but because the locking devices are relatively complicated in structure, the stability of locking parts are reduced, and therefore the reliability of the locking devices is reduced.

SUMMARY OF THE INVENTION

[0003] An objective of the present utility model is to overcome the defects of the prior art and provide a circuit breaker locking device, which is firm in locking structure, stable in action process and simple in mechanical structure.

[0004] To achieve said objective, the present utility model adopts the following technical solutions:

a circuit breaker locking device comprises an executing lever 1 and a pressing plate 2, wherein a hole shaft of the executing lever 1 is rotatably mounted in a base 3 of a circuit breaker; an elastic piece 111 is arranged between one end of the executing lever 1 and the base 3, and the other end of the executing lever 1 is provided with a locking end 120 which can be connected with a locking portion 210 at one side of the pressing plate 2 in a locking manner. The pressing plate 2 is mounted in the base 3 and can rotatably oscillate relative to the base 3. The locking portion 210 at one side of the pressing plate 2 comprises an unlocking surface 211 and a locking surface 212 which correspond to the locking end 120 respectively and are adjacent to each other, and a sliding step 213 is arranged between the unlocking surface 211 and the locking surface 212; a contact portion 220 which is in contact connection with a cir-

cuit breaker operating mechanism is arranged at the other side of the pressing plate 2. A magnetic flux 5 which can drive the pressing plate 2 to oscillate is also arranged above the pressing plate 2 correspondingly. The magnetic flux 5 can push the pressing plate 2 to oscillate when the circuit breaker has a fault, such that the locking end 120 arranged inside the unlocking surface 211 slides into the locking surface 212 along the sliding step 213 under the energy-releasing acting force of the elastic piece 111 so as to lock the pressing plate 2. Meanwhile, the contact portion 220 capable of oscillating with the pressing plate 2 can limit the operating mechanism to prevent the operating mechanism from resetting.

[0005] Further, the locking end 120 comprises a first acting surface 121 and a second acting surface 122 which are of a V-shaped structure and are connected to each other; the second acting surface 122 is connected with the end part of the executing lever 1 and parallel to the executing lever 1, and an acting end 123 formed at the junction of the first acting surface 121 and the second acting surface 122 can be in contact connection with the locking surface 212; the first acting surface 121 can be in obliquely contact connection with the corresponding side of the sliding step 213, and therefore a triangular structure can be formed by the locking surface 212, the first acting surface 121 and one side of the sliding step 213 in case of locking.

[0006] Further, a slope 213b which can be matched with and in contact connection with the first acting surface 121 is arranged at one side, corresponding to the first acting surface 121, of the sliding step 213, and an obtuse angle is formed between the slope 213b and the locking surface 212.

[0007] Further, a circular arc surface 213a which is in sliding contact with the bottom of the locking end 120 is arranged at the top of the sliding step 213.

[0008] Further, the pressing plate 2 is mounted on a support 4 in the base 3; a locking portion 210 and a contact portion 220 are formed by extending respectively from two sides of the pressing plate 2; a driving portion 240 corresponding to the magnetic flux 5 is arranged in the middle of the pressing plate 2; a rotary mounting portion 230 also extends out from the driving portion 240; a mounting cone frustum 231 which can be rotatably connected with a hole shaft of the support 4 is arranged at each of two sides, corresponding to the pressing plate 2, of the rotary mounting portion 230; the magnetic flux 5 can push the driving portion 240 when the circuit breaker has a fault, such that the pressing plate 2 can oscillate downwards along the mounting cone frustums 231 relative to the support 4.

[0009] Further, a reset spring 232 which can drive the pressing plate 2 back to an initial position is mounted on the mounting cone frustums 231, and two ends of the reset spring 232 are linked to the pressing plate 2 and the support 4 respectively.

[0010] Further, a reset driving end 110 corresponding to the elastic piece 111 and the locking end 120 corresponding to the pressing plate 2 are arranged at two ends of the executing lever 1 respectively, and the reset driving end 110 can drive the elastic piece 111 to store energy when the device is reset, such that the locking end 120 slides back to the unlocking surface 211 from the locking surface 212; a fulcrum mounting hole 130 which is used for being rotatably connected with a hole shaft on the side wall of the base 3 is also formed in the middle of the executing lever 1; a shaft pin 131 can be mounted inside the fulcrum mounting hole.

[0011] Further, the elastic piece 111 can be a spring arranged between the end part of the executing lever 1 and the base 3, and a cone frustum 112 for limiting and fixing the spring is arranged at the bottom of one end of the executing lever 1.

[0012] Further, the contact portion 220 is of an L-shaped structure and comprises a horizontal baffle 221 and a vertical baffle 222 which are perpendicularly connected to each other; the vertical baffle 222 is arranged perpendicularly on one side wall of the pressing plate 2, and the horizontal baffle 221 is parallel to the side surface of the pressing plate 2; the horizontal baffle 221 can oscillate with the rotation of the pressing plate 2, thereby preventing a switching-off semi-shaft of the operating mechanism from resetting to a switchable-on position.

[0013] Further, a baffle 214 corresponding to one side wall of the pressing plate 2 is also arranged on the locking portion 210, and a connecting baffle 215 is arranged between the end part, corresponding to the locking surface 212, of the baffle 214 and the side wall of the pressing plate 2; a groove structure 216 corresponding to the locking end 120 is formed jointly by the connecting baffle 215, the baffle 214, one side wall of the pressing plate 2 and one side wall of the sliding step 213.

[0014] The circuit breaker locking device of the utility model realizes locking of the executing lever and the pressing plate to prevent the operating mechanism from resetting by means of the locking portion and the locking end, when the circuit breaker has a fault. And, the locking device is simple in mechanical structure, thereby improving the reliability and the stability of the locking process. Furthermore, the locking surface and the sliding step ensure that a stable and firm locking connection structure is formed between the locking end and the locking surface, and improve the firmness of the locking device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 is a structural schematic drawing of the utility model.

Fig. 2 is a structural schematic drawing of an executing lever of the utility model.

Fig. 3 is a structural schematic drawing of a pressing plate of the utility model;

Fig. 4 is a front structural schematic drawing of an initial state of the utility model.

Fig. 5 is a partial structural cross-sectional view along an A-A direction inside an imaginary line of Fig. 4.

Fig. 6 is a front structural schematic drawing of a locking state of the utility model.

Fig. 7 is a partial structural cross-sectional view along a B-B direction inside an imaginary line of Fig. 6.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The specific embodiments of a circuit breaker locking device of the utility model will be further illustrated as below in conjunction with the embodiments illustrated in Figs. 1-7. The circuit breaker locking device of the present utility model is not limited to the description in the following embodiments.

[0017] According to the structural schematic drawing of the utility model as illustrated in Fig. 1, the circuit breaker locking device of the utility model comprises an executing lever 1 and a pressing plate 2, wherein a hole shaft of the executing lever 1 is rotatably mounted in a base 3 of a circuit breaker. An elastic piece 111 is arranged between one end of the executing lever 1 and the base 3, and the other end of the executing lever 1 is provided with a locking end 120 which can be connected with a locking portion 210 at one side of the pressing plate 2 in a locking manner. The pressing plate 2 is mounted in the base 3 and can rotatably oscillate relative to the base 3. As illustrated in Fig. 3, the locking portion 210 at one side of the pressing plate 2 comprises an unlocking surface 211 and a locking surface 212 which correspond to the locking end 120 respectively and are adjacent to each other, and a sliding step 213 is arranged between the unlocking surface 211 and the locking surface 212. A contact portion 220 which is in contact connection with a circuit breaker operating mechanism is arranged at the other side of the pressing plate 2. A magnetic flux 5 which can drive the pressing plate 2 to oscillate is also arranged above the pressing plate 2 correspondingly. The magnetic flux 5 can push the pressing plate 2 to oscillate when the circuit breaker has a fault, such that the locking end 120 arranged inside the unlocking surface 211 slides into the locking surface 212 along the sliding step 213 under the energy-releasing acting force of the elastic piece 111 so as to lock the pressing plate 2. Meanwhile, the contact portion 220 capable of oscillating with the pressing plate 2 can limit a switching-off semi-shaft of the operating mechanism from resetting to a highest position, i.e., a switchable-on position. Because the executing lever is adopted to lock the pressing plate in the utility model, the switching-off semi-shaft of the operating mechanism cannot reset to a highest point to finish switching-on after the circuit breaker has a fault, and therefore a user can operate the circuit breaker to be

switched on after searching for a fault and remove the fault, so that the safety of operation personnel and the safety of power supply equipment are ensured.

[0018] In particular, a support 4 capable of clamping and mounting the pressing plate 2 is also arranged in the base 3, the pressing plate 2 is rotatably mounted in the support 4 and corresponds to the magnetic flux 5, and the magnetic flux 5 can receive a controller tripping instruction, i.e., pushing the pressing plate 2 to rotatably oscillate relative to the support 4 when the circuit breaker has a fault, such that the locking end 120 is connected with the locking surface 212 in a locking manner. The support not only facilitates to assemble the locking device, but also provides a stable support when the pressing plate oscillates and rotates so as to improve the stability and reliability of the locking process.

[0019] According to the structural schematic drawing of the executing lever 1 of the utility model as illustrated in Fig. 2, a reset driving end 110 corresponding to the elastic piece 111 and the locking end 120 corresponding to the pressing plate 2 are arranged at two ends of the executing lever 1 respectively. The locking end 120 comprises a first acting surface 121 and a second acting surface 122 which are of a V-shaped structure and are connected to each other. The second acting surface 122 is connected with the end part of the executing lever 1 and parallel to the executing lever 1, and an acting end 123 formed at the junction of the first acting surface 121 and the second acting surface 122 can be in contact connection with the locking surface 212. The first acting surface 121 can be in contact connection with the corresponding side of the sliding step 213, and therefore a triangular structure can be formed by the locking surface 212, the first acting surface 121 and one side of the sliding step 213 in case of locking. By means of the locking end having a V-shaped structure, when the executing lever locks the pressing plate, the stable triangular structure is formed by the locking end, the locking surface and the sliding step, such that the locked pressing plate is unlikely to shake, and therefore the stability of the locking device is improved. In particular, a circular arc surface 213a which facilitates the locking end 120 to slide to the locking surface 212 from the unlocking surface 211 can be arranged at the top of the sliding step 213. The first acting surface 121 having the V-shaped structure of the utility model obliquely acts on and contacts with the sliding step 131, and therefore, the first acting surface 121 can be in contact connection with the circular arc surface 213a stably, without sliding, and therefore the stability of locking connection is ensured. The reset driving end 110 can drive the elastic piece 111 to store energy when the device is reset, and therefore the locking end 120 slides from the locking end 212 back to the unlocking surface 211. It is easily conceivable that the locking device is at a locking state after the circuit breaker has a fault, and under this case, the elastic piece 111 is at an energy-releasing state to provide an acting force under which the locking end 120 is in contact locking with the locking surface 212.

When the locking device is reset after the fault is removed, the reset driving end 110 is pushed down in a manual manner, and under this case, the locking end 120 is moved to the unlocking surface 211, and the elastic piece 111 is at the energy-releasing state again.

[0020] A fulcrum mounting hole 130 which is used for being rotatably connected with a hole shaft on the side wall of the base 3 is also arranged in the middle of the executing lever 1, and a shaft pin 131 can be mounted inside the fulcrum mounting hole. The executing lever is stably and rotatably mounted to the side wall of the base, such that the stability of the locking end of the executing lever when the locking end is driven by the reset driving end is ensured, and the reliability of the executing lever in an oscillating action is improved. In particular, the elastic piece 111 can be a spring arranged between the end part of the executing lever 1 and the base 3, and a cone frustum 112 for limiting and fixing the spring is arranged at the bottom of one end of the executing lever 1. The spring is simple in structure and convenient to mount, such that the installation efficiency of the locking device is improved, and meanwhile the stability of the device during locking and resetting is ensured.

[0021] According to the structural schematic drawing of the pressing plate 2 of the utility model as illustrated in Fig. 3, the pressing plate 2 is mounted on a support 4 in the base 3; a locking portion 210 and a contact portion 220 are formed by extending respectively from two sides of the pressing plate 2; a driving portion 240 corresponding to the magnetic flux 5 is arranged in the middle of the pressing plate 2; a rotary mounting portion 230 also extends out from the driving portion 240; a mounting cone frustum 231 which can be rotatably connected with a hole shaft of the support 4 is arranged at each of two sides, corresponding to the pressing plate 2, of the rotary mounting portion 230; the magnetic flux 5 can push the driving portion 240 when the circuit breaker has a fault, such that the pressing plate 2 can oscillate downwards along the mounting cone frustums 231 relative to the support 4. The pressing plate is simple in structural design and is mounted in the support of the base, so that the reliability of the pressing plate during rotatable oscillating is ensured. In particular, the locking portion 210 comprises an unlocking surface 211 and a locking surface 212 which are adjacent to each other, and a sliding step 213 is arranged between the unlocking surface 211 and the locking surface 212. In particular, a circular arc surface 213a which is in sliding contact with the bottom of the locking end 120 is arranged at the top of the sliding step 213. By means of the circular arc surface, the process of the locking end sliding to the locking surface from the unlocking surface is more easy and fluent to ensure that the action of the executing lever that locks the pressing plate cannot lose efficiency and improve the reliability of the device. In addition, a baffle 214 corresponding to one side wall of the pressing plate 2 is also arranged on the locking portion 210, and a connecting baffle 215 is arranged between the end part, corresponding to the lock-

ing surface 212, of the baffle 214 and the side wall of the pressing plate 2. A groove structure 216 corresponding to the locking end 120 is formed jointly by the connecting baffle 215, the baffle 214, one side wall of the pressing plate 2 and one side wall of the sliding step 213. The baffle can be used for positioning the locking end to prevent the locking end from losing efficiency in a locking process and improve the stability of the locking device. Meanwhile, a groove structure having an enclosed structure is formed around the locking surface to improve the locking reliability. Moreover, the contact portion 220 is of an L-shaped structure and comprises a horizontal baffle 221 and a vertical baffle 222 which are perpendicularly connected to each other. The vertical baffle 222 is perpendicularly arranged on one side wall of the pressing plate 2, and the horizontal baffle 221 is parallel to the side surface of the pressing plate 2; the horizontal baffle 221 can oscillate with the rotation of the pressing plate 2, thereby preventing the switching-off semi-shaft of the operating mechanism from resetting to a highest position, i.e., a switchable-on position. The L-shaped contact portion is simple in structure and convenient to machine and mount, and the horizontal baffle can effectively prevent the operating mechanism from resetting, such that the working performance of the locking device is improved.

[0022] According to the front structural schematic drawing of an initial state of the utility model as illustrated in Fig. 4, the executing lever 1 is mounted at one side of the base 3 via the shaft pin 131, and the locking end 120 of the executing lever 1 is in contact connection with the locking portion 210 of the pressing plate 2 mounted on the support 4. The initial state of the utility model refers to that the pressing plate 2 is in a horizontal position when the locking device does not trigger locking in case that the circuit breaker has no fault, and therefore the contact portion 220 cannot prevent the switching-off semi-shaft of the operating mechanism from being switched on normally. According to the partial structural cross-sectional view along an A-A direction inside an imagery line as illustrated in Fig. 4, the elastic piece 111 at the reset driving end 110 of the executing lever 1 is at an energy-storage state under the initiate state, the locking end 120 at the other end of the executing lever 1 is placed in the unlocking surface 211, and the second acting surface 122 of the locking end 120 leans against one side wall of the unlocking surface 211 corresponding to the sliding step 213.

[0023] According to the front structural schematic drawing of a locking state of the utility model as illustrated in Fig. 6, a reset spring 232 which can drive the pressing plate 2 back to an initial position is mounted on the mounting cone frustums 231, and two ends of the reset spring 232 are linked to the pressing plate 2 and the support 4 respectively. When the locking end returns the unlocking surface from the locking surface, the pressing plate can drive the contact portion to return to an initial position under the resetting action force of the reset spring, such that the switching-off semi-shaft of the operating mech-

anism can be reset to a highest position, i.e., a switchable-on position, so as to ensure that the reset pressing plate can return to the accurate initial position and improve the working accuracy of the device. Under the locking state of the utility model, i.e., the locking device triggers locking when the circuit breaker has a fault, the magnetic flux 5 pushes the pressing plate 2 to overcome a resetting force of the reset spring 232 to oscillate and rotate clockwise relative to the support 4, and the locking end 120 of the executing lever 1 can lock the locking portion 210, and further the contact portion 220 oscillates clockwise with the pressing plate 2 to prevent the switching-off semi-shaft of the operating mechanism from returning to the highest position, i.e., the switchable-on position. According to the partial structural cross-sectional view along a B-B direction inside an imagery line of Fig. 6 as illustrated in Fig. 7, the sliding step 213 oscillates with the pressing plate 2 in a locking process, such that the second acting surface 122 loses its support, and therefore the locking end 120 slides downwards into the locking surface 212 to finish locking under the energy-releasing acting force of the elastic piece 111. The acting end 123 is in contact with the locking surface 212 under the locking state, and meanwhile a triangular structure can be formed by the locking surface 212, the first acting surface 121 and the sliding step 213. In particular, a slope 213b which can be matched with and in contact connection with the first acting surface 121 is arranged at one side, corresponding to the first acting surface 121, of the sliding step 213, and an obtuse angle is formed between the slope 213 and the locking surface 212. By means of the slope arranged at one side of the sliding step, an acting contact area of the first acting surface and the sliding step increases to prevent the contact surfaces from sliding and falling, and ensure that the pressing plate can be effectively locked. By means of the locking end having a V-shaped structure, the first acting surface 121 is in obliquely contact with the sliding step, and the contact stability can be effectively ensured due to the arrangement of the slope 213b. If the first acting surface 121 is not in obliquely contact with the sliding step, the slope 213b instead makes the locking end fall off easily. After removing a fault of the circuit breaker and unlocking the locking device after confirming that there is no fault, the user can push the reset driving end 110 manually, such that the elastic piece 111 can store energy again, and meanwhile the locking end 120 moves away from the locking surface 212. The pressing plate 2 returns to the initial position under the resetting force of the reset spring 232 after losing the locking of the locking end 120, and at this moment, the locking end 120 is placed inside the unlocking surface 211 again and is reset.

[0024] The utility model is further elaborated according to the above content in conjunction with the specific preferred embodiments, and it may not considered that the specific embodiments of the utility model are only limited to these descriptions. For those common skilled in the art, several simple deductions or replacements made

without departing from the concept of the utility model will fall into the protection scope of the utility model.

Claims

1. A circuit breaker locking device, comprising an executing lever (1) and a pressing plate (2), **characterized in that** a hole shaft of the executing lever (1) is rotatably mounted in a base (3) of a circuit breaker; an elastic piece (111) is arranged between one end of the executing lever (1) and the base (3), and the other end of the executing lever (1) is provided with a locking end (120) which can be connected with a locking portion (210) at one side of the pressing plate (2) in a locking manner; the pressing plate (2) is mounted in the base (3) and can rotatably oscillate relative to the base (3); the locking portion (210) at one side of the pressing plate (2) comprises an unlocking surface (211) and a locking surface (212) which correspond to the locking end (120) respectively and are adjacent to each other, and a sliding step (213) is arranged between the unlocking surface (211) and the locking surface (212); a contact portion (220) which is in contact connection with a circuit breaker operating mechanism is arranged at the other side of the pressing plate (2); a magnetic flux (5) which can drive the pressing plate (2) to oscillate is also arranged above the pressing plate (2) correspondingly; the magnetic flux (5) can push the pressing plate (2) to oscillate when the circuit breaker has a fault, such that the locking end (120) arranged inside the unlocking surface (211) slides into the locking surface (212) along the sliding step (213) under the energy-releasing acting force of the elastic piece (111) so as to lock the pressing plate (2); meanwhile, the contact portion (220) capable of oscillating with the pressing plate (2) can limit the operating mechanism to prevent the operating mechanism from resetting.
2. The circuit breaker locking device according to claim 1, **characterized in that** the locking end (120) comprises a first acting surface (121) and a second acting surface (122) which are of a V-shaped structure and are connected to each other; the second acting surface (122) is connected with the end part of the executing lever (1) and parallel to the executing lever (1), and an acting end (123) formed at the junction of the first acting surface (121) and the second acting surface (122) can be in contact connection with the locking surface (212); the first acting surface (121) can be in obliquely contact connection with the corresponding side of the sliding step (213), and therefore a triangular structure can be formed by the locking surface (212), the first acting surface (121) and one side of the sliding step (213) in case of locking.
3. The circuit breaker locking device according to claim 2, **characterized in that** a slope (213b) which can be matched with and in contact connection with the first acting surface (121) is arranged at one side, corresponding to the first acting surface (121), of the sliding step (213), and an obtuse angle is formed between the slope (213b) and the locking surface (212).
4. The circuit breaker locking device according to claim 1, **characterized in that** a circular arc surface (213a) which can be in sliding contact with the bottom of the locking end (120) is arranged at the top of the sliding step (213).
5. The circuit breaker locking device according to claim 1, **characterized in that** the pressing plate (2) is mounted on a support (4) in the base (3); the locking portion (210) and a contact portion (220) are formed by extending respectively from two sides of the pressing plate (2); a driving portion (240) corresponding to the magnetic flux (5) is arranged in the middle of the pressing plate (2); a rotary mounting portion (230) also extends out from the driving portion (240); a mounting cone frustum (231) which can be rotatably connected with a hole shaft of the support (4) is arranged at each of two sides, corresponding to the pressing plate (2), of the rotary mounting portion (230); the magnetic flux (5) can push the driving portion (240) when the circuit breaker has a fault, such that the pressing plate (2) can oscillate downwards along the mounting cone frustums (231) relative to the support (4).
6. The circuit breaker locking device according to claim 5, **characterized in that** a reset spring (232) which can drive the pressing plate (2) back to an initial position is mounted on the mounting cone frustums (231), and two ends of the reset spring (232) are linked to the pressing plate (2) and the support (4) respectively.
7. The circuit breaker locking device according to claim 1, **characterized in that** a reset driving end (110) corresponding to the elastic piece (111) and the locking end (120) corresponding to the pressing plate (2) are arranged at two ends of the executing lever (1) respectively, and the reset driving end (110) can drive the elastic piece (111) to store energy when the device is reset, such that the locking end (120) slides back to the unlocking surface (211) from the locking surface (212); a fulcrum mounting hole (130) which is used for being rotatably connected with a hole shaft on the side wall of the base (3) is also formed in the middle of the executing lever (1); a shaft pin (131) can be mounted inside the fulcrum mounting hole.

8. The circuit breaker locking device according to claim 1, **characterized in that** the elastic piece (111) can be a spring arranged between the end part of the executing lever (1) and the base (3), and a cone frustum (112) for limiting and fixing the spring is arranged at the bottom of one end of the executing lever (1). 5

9. The circuit breaker locking device according to claim 1, **characterized in that** the contact portion (220) is of an L-shaped structure and comprises a horizontal baffle (221) and a vertical baffle (222) which are perpendicularly connected to each other; the vertical baffle (222) is perpendicularly arranged on one side wall of the pressing plate (2), and the horizontal baffle (221) is parallel to the side surface of the pressing plate (2); the horizontal baffle (221) can oscillate with the rotation of the pressing plate (2), thereby preventing a switching-off semi-shaft of the operating mechanism from resetting to a switchable-on position. 10
15
20

10. The circuit breaker locking device according to claim 1, **characterized in that** a baffle (214) corresponding to one side wall of the pressing plate (2) is also arranged on the locking portion (210), and a connecting baffle (215) is arranged between the end part, corresponding to the locking surface (212), of the baffle (214) and the side wall of the pressing plate (2); a groove structure (216) corresponding to the locking end (120) is formed jointly by the connecting baffle (215), the baffle (214), one side wall of the pressing plate (2) and one side wall of the sliding step (214). 25
30

35

40

45

50

55

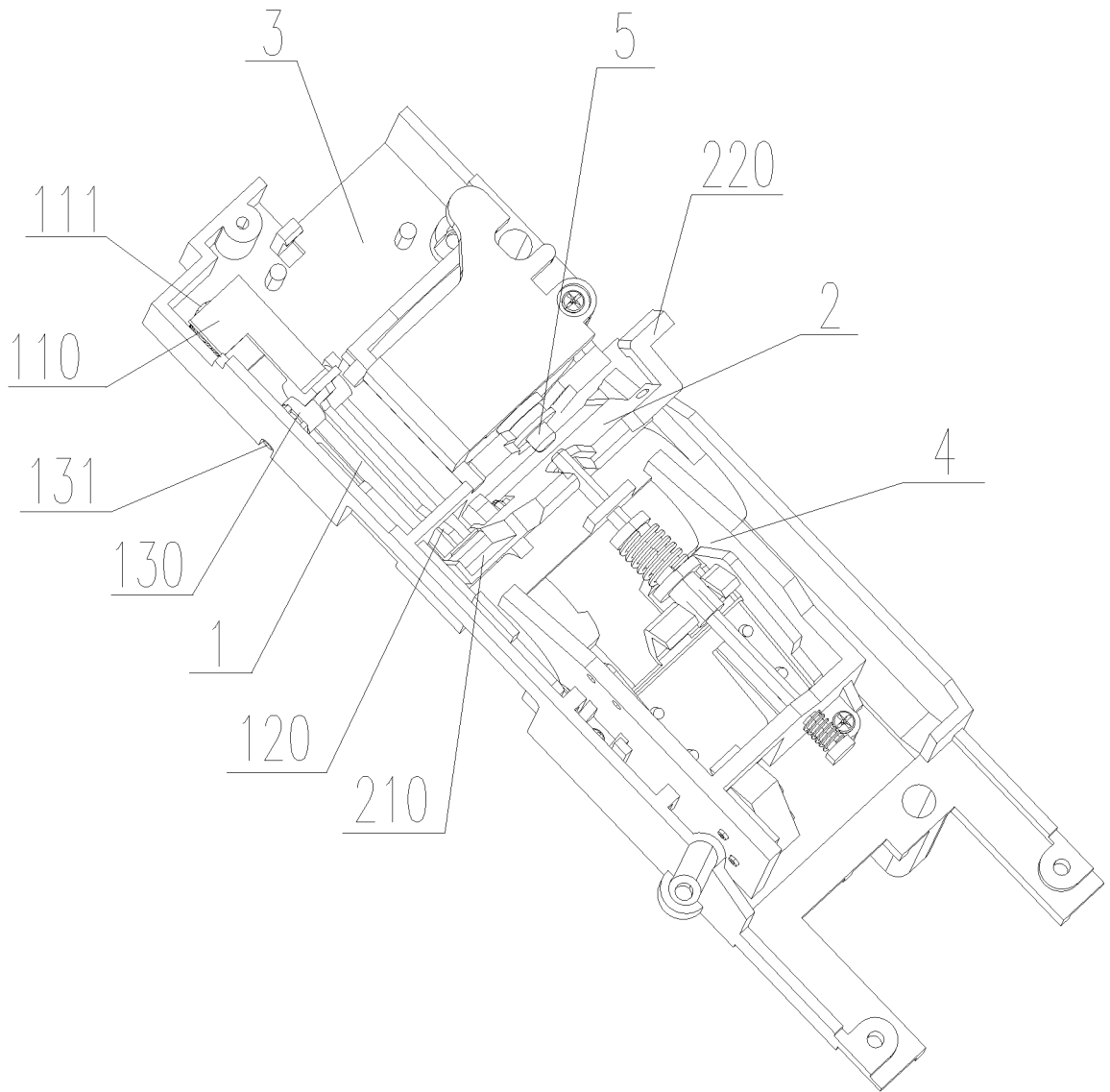


Fig. 1

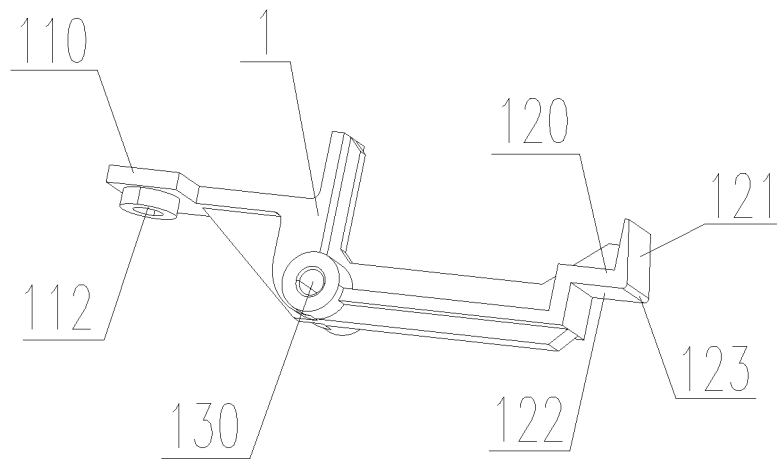


Fig. 2

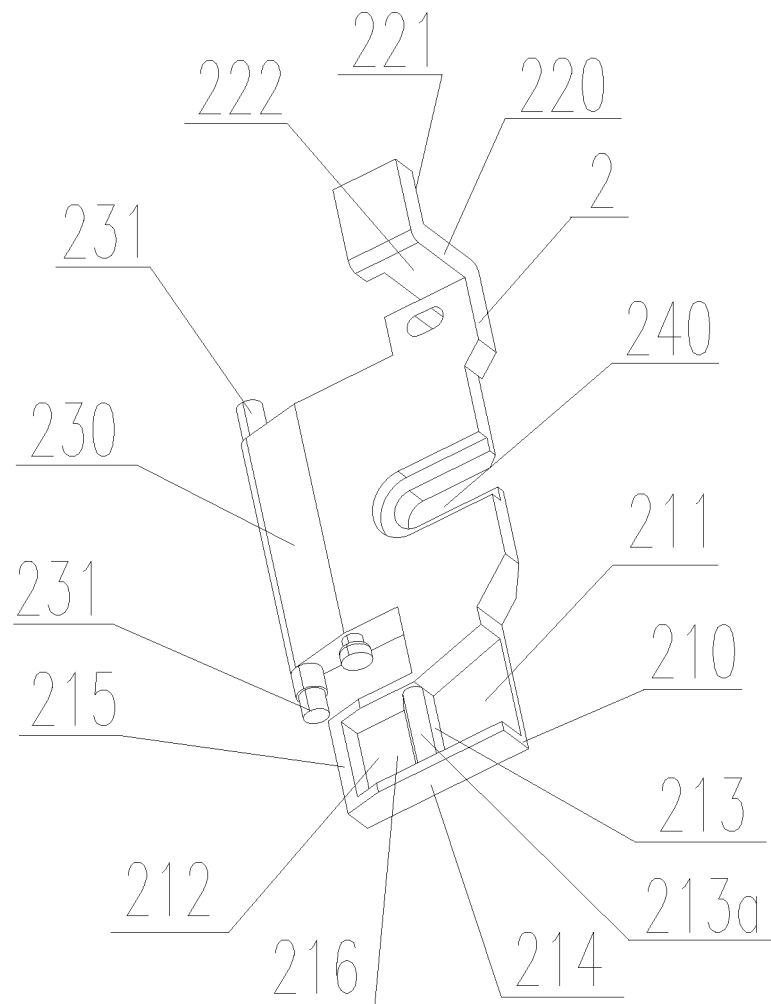


Fig. 3

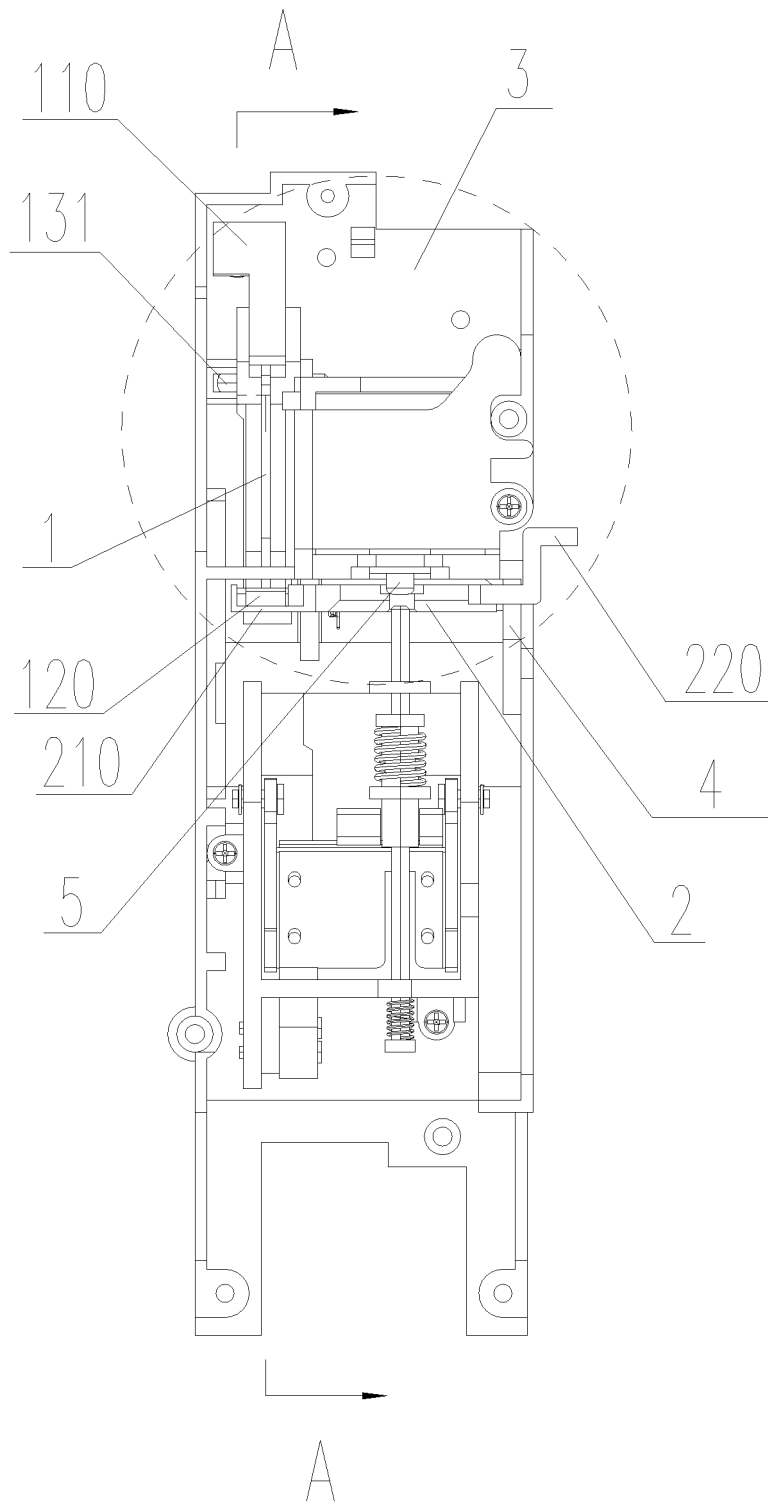


Fig. 4

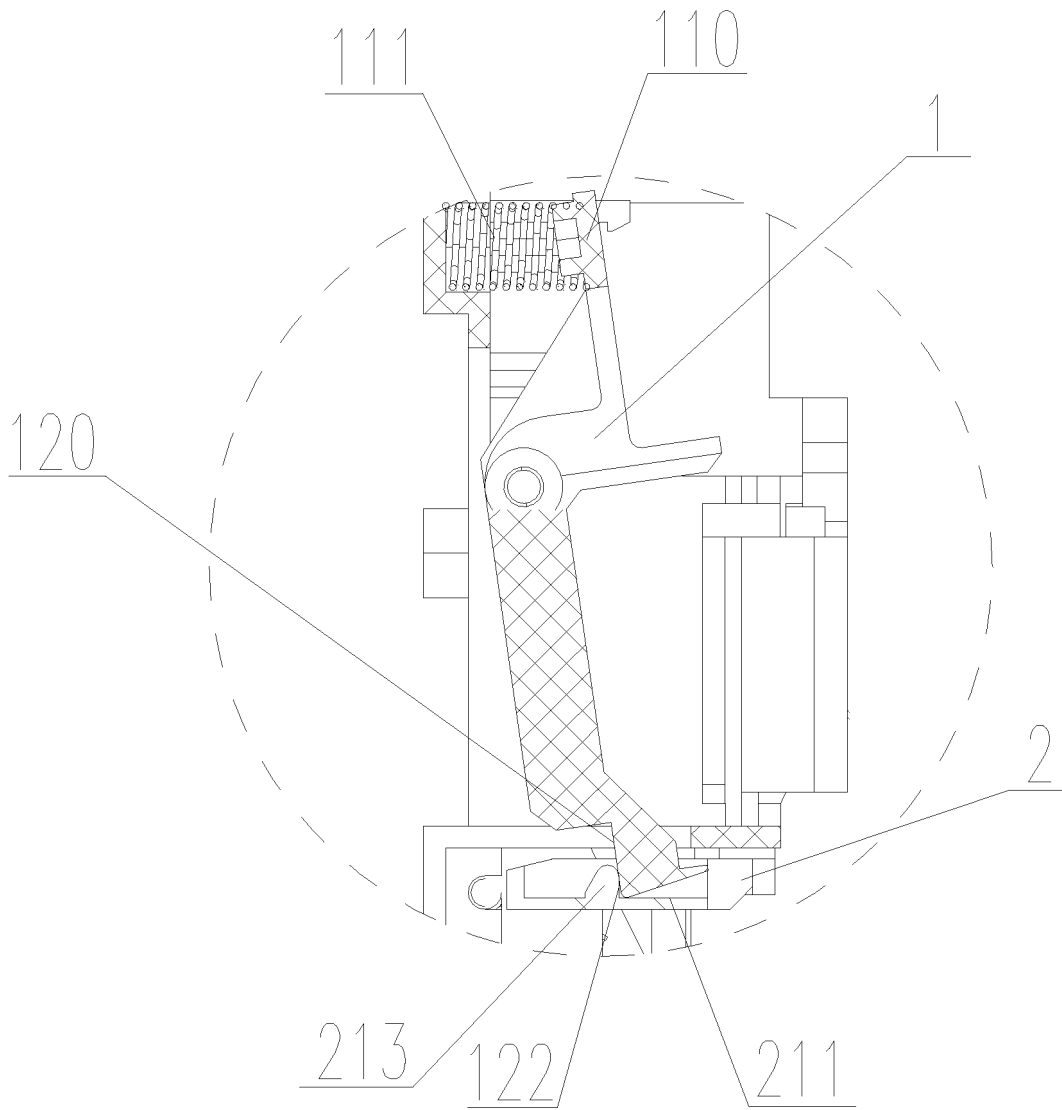


Fig. 5

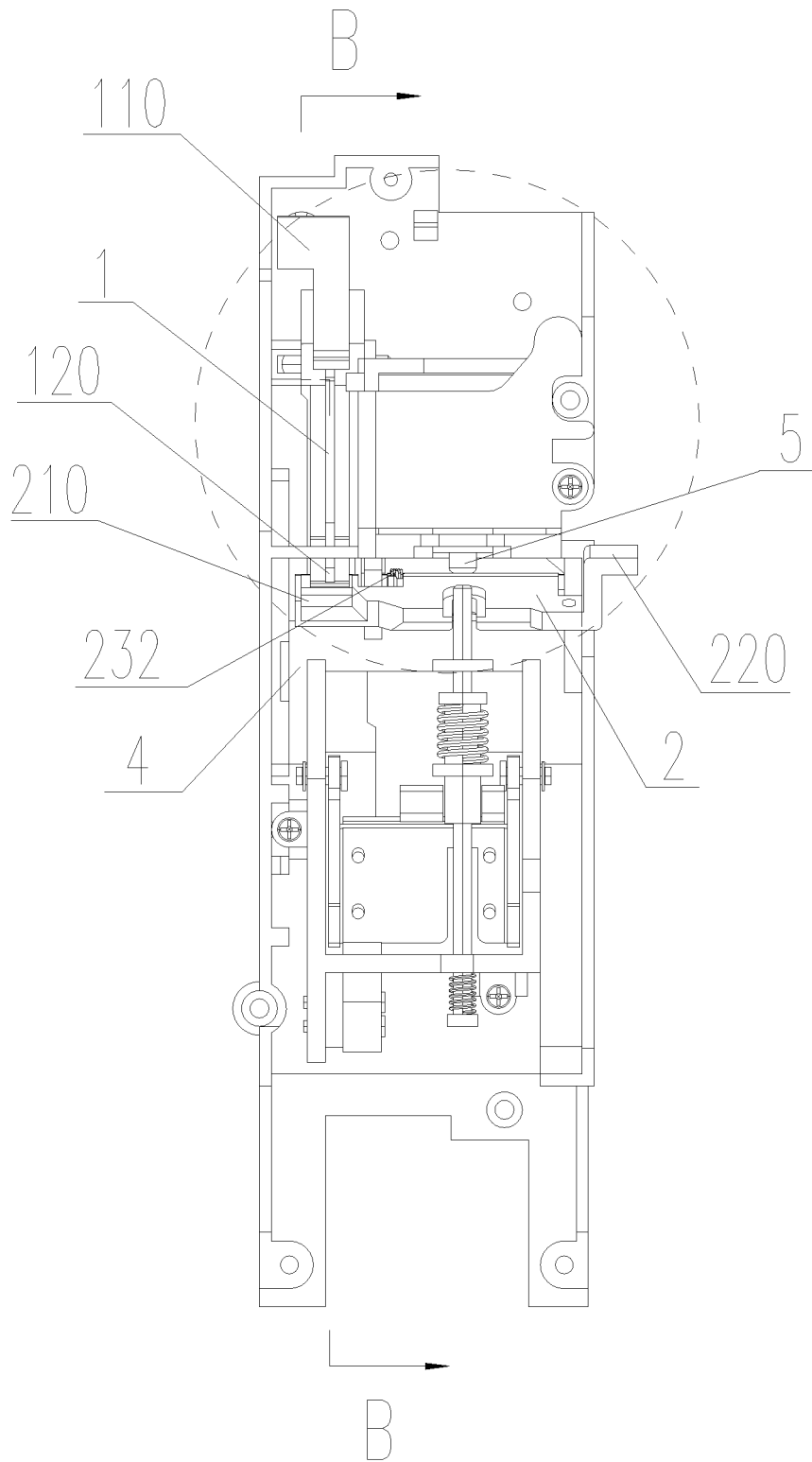


Fig. 6

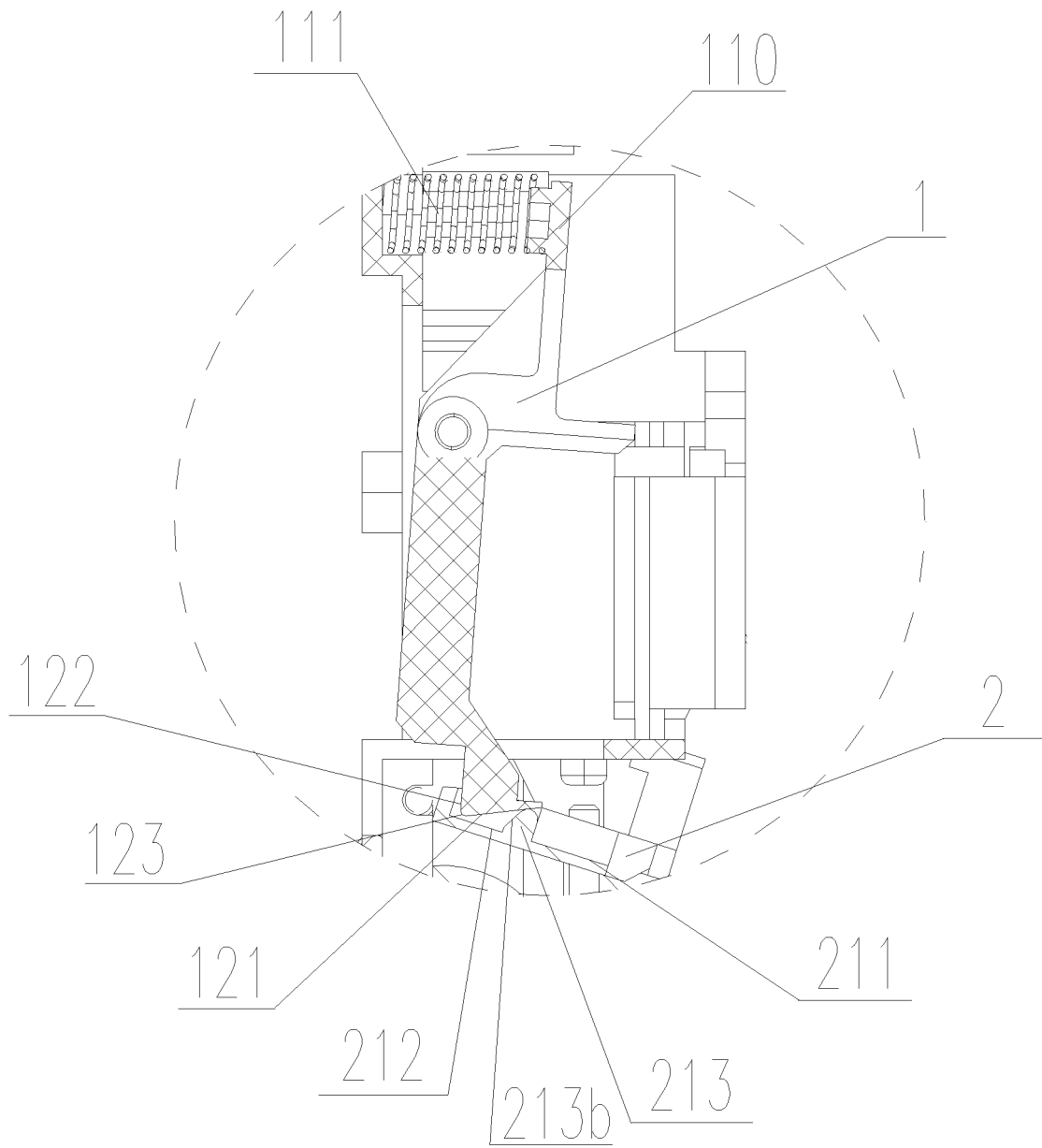


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2015/093751

A. CLASSIFICATION OF SUBJECT MATTER

H01H 71/62 (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)

WPI, EPODOC, CNPAT, CNKI: linkage, lock, locking, lever, step, flux, breaker

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 204348653 U (ZHEJIANG CHINT ELECTRICS CO., LTD.), 20 May 2015 (20.05.2015), claims 1-10	1-10
Y	CN 1226074 A (SCHNEIDER ELECTRIC S.A.), 18 August 1999 (18.08.1999), description, page 2, line 21 to page 5, line 6, and figures 1-6	1, 4-10
Y	CN 202210497 U (SHANGHAI LIANGXIN ELECTRICAL CO., LTD.), 02 May 2012 (02.05.2012), description, paragraphs 0023-0029, and figures 1-3	1, 4-10
A	US 5714940 A (EATON CORP.), 03 February 1998 (03.02.1998), the whole document	1-10

 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 02 February 2016 (02.02.2016)	Date of mailing of the international search report 14 February 2016 (14.02.2016)
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer LIU, Jingjing Telephone No.: (86-10) 62089413

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2015/093751

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 204348653 U	20 May 2015	None	
CN 1226074 A	18 August 1999	DE 69930494 T2	02 November 2006
		FR 2774806 B1	17 March 2000
		EP 0935272 B1	22 March 2006
		US 5982258 A	09 November 1999
		DE 69930494 D1	11 May 2006
		EP 0935272 A1	11 August 1999
		FR 2774806 A1	13 August 1999
		JP 2000208006 A	28 July 2000
		CN 1088249 C	24 July 2002
		ES 2259229 T3	16 September 2006
		JP 4152516 B2	17 September 2008
CN 202210497 U	02 May 2012	CN 102931040 A	13 February 2013
		CN 102931040 B	25 March 2015
US 5714940 A	03 February 1998	None	