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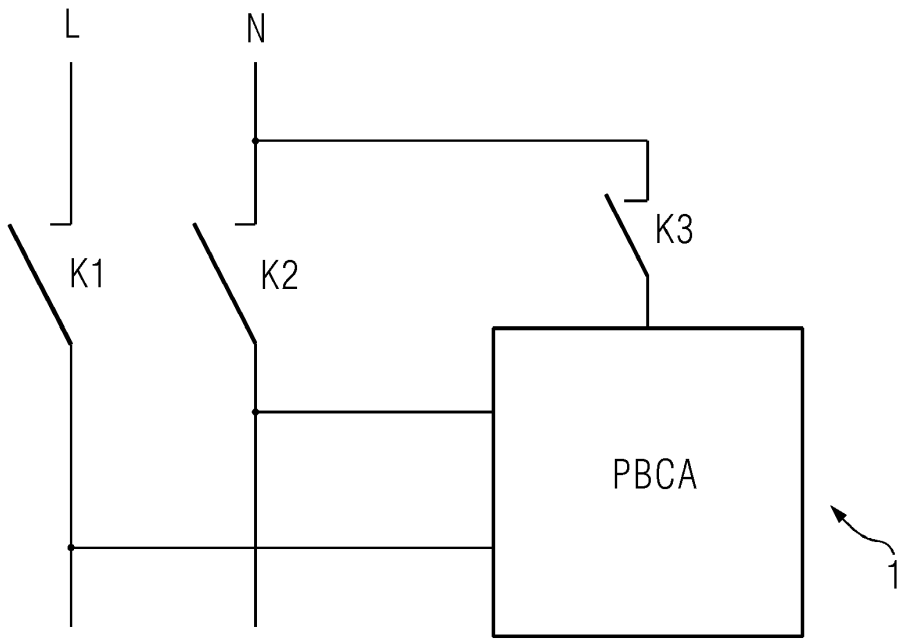
(54) **CIRCUIT BREAKER CIRCUIT CONTACT PROTECTION MECHANISM**

(57) Disclosed in the present invention is a circuit breaker circuit contact protection mechanism. The circuit breaker circuit contact protection mechanism comprises a circuit and a moving contact, and an actuating mechanism and a moving contact protective cover; the actuating mechanism drives a first end of the moving contact to move so that the first end comes into contact with or is disconnected from the first contact. The actuating mechanism moves in linkage with the moving contact protective cover and the first end respectively; when the first end is in contact with the first contact, the moving contact protective cover is located outside a region of contact of the first end and the first contact, and when the first end gradually moves away and is disconnected from the first contact, the moving contact protective cover moves towards a region between the first end and the first contact and finally moves to the region between the first end and the first contact. The present invention solves the technical problem of breakdown by high voltage between contacts due to insufficient electric gap and creepage distance when the voltage is too high.

FIG 1



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Description

Technical field

[0001] The present invention relates to the field of circuit protection, in particular a circuit breaker circuit contact protection mechanism.

Background art

[0002] An arc fault detection circuit breaker is also an electrical line protection apparatus, abbreviated as AFDD (arc fault detection device), the main function thereof being to detect and distinguish dangerous ground arc faults, parallel arc faults and series arc faults, and to promptly drive the action of an apparatus causing a current to be cut off, to avoid an electrical fire. It employs embedded system digital circuit control and an original arc characteristic identification algorithm, is small in volume but strong in functionality, integrates a leakage current protection function, realizes automatic monitoring of and protection against fault arcs and leakage currents, and effectively ensures the safety of low-voltage distribution lines and electrical equipment as well as the safety of humans.

[0003] Two power supply modes are generally used for a circuit board design of the abovementioned arc fault detection circuit breaker. Fig. 1 is a schematic diagram of a circuit connection structure of a circuit of the present invention. Specifically, a protection circuit for preventing damage to a circuit board in different power supply modes is disclosed in the circuit shown in fig. 1.

Content of the invention

[0004] A circuit breaker circuit contact protection mechanism provided in the present invention effectively solves the technical problem in the prior art that due to the fact that circuit contacts are too close together, it is not possible to ensure that there is sufficient creepage distance, and the electric gap might be broken down.

[0005] In an optional embodiment, the present application provides a circuit breaker circuit contact protection mechanism, comprising a first contact and a moving contact, and an actuating mechanism. The first contact is electrically connected to a circuit. The moving contact is a conductor for connecting the first contact to another contact on the circuit. The actuating mechanism drives a first end of the moving contact to move so that the first end comes into contact with or is disconnected from the first contact. A moving contact protective cover is an insulator, the actuating mechanism moving in linkage with the moving contact protective cover and the first end respectively; when the first end is in contact with the first contact, the moving contact protective cover is located outside a region of contact of the first end and the first contact, and when the first end gradually moves away and is disconnected from the first contact, the moving contact protective cover moves towards a region between the first end and the first contact and finally moves to the region between the first end and the first contact.

[0006] Clearly, when the first contact and the moving contact come into contact or are disconnected, the moving contact protective cover is driven by the actuating mechanism to form a barrier between the first contact and the moving contact to prevent breakdown by high voltage. In addition, the actuating mechanism is used to enable movement of the moving contact protective cover and the first end in linkage, increasing the compactness of the mechanism design.

[0007] In another optional embodiment, the actuating mechanism comprises a base and a driving member, and a first connecting rod. A first track and a second track are disposed on the base, the first end sliding along the first track so that the first end comes into contact with or is disconnected from the first contact. The driving member slides along the second track. One end of the first connecting rod is rotatably connected to the driving member, and another end of the first connecting rod slides along the first track and is rotatably connected to the moving contact. A third track is disposed on the moving contact protective cover so that the driving member slides on the third track and is rotatably connected to the moving contact protective cover, a first rotation shaft being disposed on the moving contact protective cover, the first rotation shaft being disposed on the base so that the moving contact protective cover rotates along the first rotation shaft to form a lever mechanism, and the moving contact protective cover being provided with a shield to realize movement in linkage to a region between the first end and the first contact when the first end moves away from the first contact. This embodiment provides a specific actuating mechanism structure and manner of movement in linkage.

[0008] In another optional embodiment, the actuating mechanism further comprises an operating handle and a second connecting rod; a second rotation shaft is disposed on the operating handle, the second rotation shaft being disposed on the base and causing the operating handle to rotate on its own axis along the second rotation shaft. One end of the second connecting rod is rotatably connected to the driving member and slides along the second track; another end of the second connecting rod is rotatably connected to the operating handle and disposed on one side of the second rotation shaft so that the second connecting rod and the operating handle form an eccentric wheel structure. This embodiment provides a specific structure of a manner in which an actuating structure moves in linkage with the operating handle.

[0009] In another optional embodiment, the two ends of the first connecting rod are first connecting rod rotation shafts disposed in a radial direction of the first connecting rod, the first connecting rod rotation shafts at the two ends of the first connecting rod being for rotatably connecting to the driving member and the moving contact respectively, and the first connecting rod rotation shaft

rotatably connected to the moving contact being inserted in the first track, the first track being a long hole. This embodiment provides a specific structure of the first connecting rod, and a specific connection relationship with the driving member and the moving contact.

[0010] In another optional embodiment, the two ends of the second connecting rod are second connecting rod rotation shafts disposed in a radial direction of the second connecting rod, the second connecting rod rotation shafts at the two ends of the second connecting rod being for rotatably connecting to the operating handle and the driving member respectively, and the second connecting rod rotation shaft rotatably connected to the driving member being inserted in the second track, the second track being a long hole. This embodiment provides a specific structure of the second connecting rod, and a specific connection relationship with the operating handle and the driving member.

[0011] In another optional embodiment, the first contact comprises an elastic connecting plate, one end of the elastic connecting plate being connected to the circuit, and another end being an elastic extensible end. The embodiment provides a specific structure in which the elastic connecting plate is disposed on the first contact.

[0012] In another optional embodiment, the moving contact protective cover is further provided with a first rotation shaft and a shield, the first rotation shaft being disposed in a radial direction of the moving contact protective cover. The shield is disposed in a manner corresponding to a contour of the moving contact; the third track is disposed in a length direction of the moving contact protective cover. This embodiment provides a specific moving contact protective cover structure.

[0013] In another optional embodiment, the third track and the shield are disposed on two sides of the first rotation shaft. This embodiment provides a structural positional relationship among the third track, the shield and the first rotation shaft.

[0014] In another optional embodiment, the third track is a long hole disposed in the length direction of the moving contact protective cover. This embodiment provides a specific structure of the third track.

[0015] In another optional embodiment, the shield is disposed at an end of the moving contact protective cover. This embodiment provides a specific position in which the shield is disposed.

Description of the accompanying drawings

[0016] Preferred embodiments of the present invention are described in detail below by referring to the accompanying drawings, to give those skilled in the art a clearer understanding of the abovementioned and other features and advantages of the present invention. In the drawings:

Fig. 1 is a schematic diagram of a circuit connection structure of a circuit of the present invention.

Fig. 2 is a schematic diagram of the internal structure of a circuit breaker when a moving contact and a first contact are disconnected in the present invention.

Fig. 3 is a schematic diagram of the internal structure of the circuit breaker when the moving contact and the first contact are in contact in the present invention.

Fig. 4 is a partial enlarged schematic diagram of the assembled structure of a moving contact protective cover and a base in the present invention.

Fig. 5 is a simplified structural drawing of the present invention when the moving contact and the first contact are disconnected.

Fig. 6 is a simplified structural drawing of the present invention when the moving contact and the first contact are in contact.

Fig. 7 is a schematic diagram of the layout of a first track and a second track on the base of the present invention.

Fig. 8 is a schematic diagram of the external structure of the moving contact protective cover of the present invention.

Fig. 9 is a structural schematic diagram of a first connecting rod of the present invention.

Fig. 10 is a structural schematic diagram of a second connecting rod of the present invention.

[0017] The reference labels are as follows:

Label	Meaning
1	circuit
11	first contact
2	moving contact
3	actuating mechanism
31	first end
4	moving contact protective cover
41	third track
42	first rotation shaft
43	shield
5	base
51	first track
52	second track
6	driving member

(continued)

Label	Meaning
7	first connecting rod
71	first connecting rod rotation shaft
8	operating handle
81	second rotation shaft
9	second connecting rod
91	second connecting rod rotation shaft
111	elastic connecting plate
10	second contact

Particular embodiments

[0018] To enable clearer understanding of the technical features, object and effects of the present invention, particular embodiments of the present invention are now explained with reference to the accompanying drawings, in which identical labels indicate identical parts. In the drawings showing various embodiments, identical final two digits indicate components which are structurally identical, or structurally similar but functionally identical.

[0019] To make the drawings uncluttered, only parts relevant to the present invention are shown schematically in the drawings, but these do not represent the actual structure thereof as a product. Furthermore, to make the drawings uncluttered and easy to understand, with regard to components having the same structure or function in certain drawings, only one of these is described schematically, or only one of these is labelled.

[0020] The applicant has found that, as shown in fig. 1, a circuit board connection circuit having a protection function is disclosed in the figure. Two power supply modes are provided for a circuit breaker design, if only two switch contacts, K1 and K2, are used. In one of these power supply modes, a circuit board will be damaged as a result of being directly connected to a power supply system. Thus, in the present application, an arrangement in which a switch node K3 is added is also provided to solve the abovementioned problem. At the same time, a corresponding actuating mechanism 3 is also designed in a circuit breaker to solve the problem of the time sequence of contact or opening of the switch nodes K1, K2 and K3. However, the applicant has also found that the moving contact is too close to the contact, and there is no corresponding protection mechanism to prevent the problem of breakdown by high voltage due to the electric gap and creepage distance between the two parts being insufficient.

[0021] Fig. 2 is a schematic diagram of the internal structure of a circuit breaker when a moving contact and a first contact are disconnected in the present invention; fig. 3 is a schematic diagram of the internal structure of the circuit breaker when the moving contact and the first contact are in contact in the present invention. Fig. 4 is a partial enlarged schematic diagram of the assembled structure of a moving contact protective cover and a base in the present invention. Fig. 5 is a simplified structural drawing of the present invention when the moving contact and the first contact are disconnected. Fig. 6 is a simplified structural drawing of the present invention when the moving contact and the first contact are in contact.

[0022] To overcome the above shortcomings, as shown in figs. 2 to 6, the present application provides a circuit breaker circuit contact protection mechanism, comprising a circuit 1 and a moving contact 2, an actuating mechanism 3, and a moving contact protective cover 4. A first contact 11 is a closing contact of a K3 switch in the circuit 1, and the moving contact 2 is essentially a conductor connecting K2 and K3 contacts. Since two ends in contact with the moving contact 2 are at the same potential, as can be seen from fig. 1, the actuating mechanism 3 drives a first end 31 of the moving contact 2 to move so that the first end 31 comes into contact with or is disconnected from the first contact 11. Here, the actuating mechanism 3 need not be specially defined, as long as it drives the first end 31 of the moving contact 2 to come into contact with or be disconnected from the first contact 11. At the same time, the actuating mechanism 3 moves in linkage with the moving contact protective cover 4 and the first end 31 respectively; the actuating mechanism 3 causes the moving contact protective cover 4 to move in cooperation with both the first end 31 and the first contact 11, according to a movement relationship between the first end 31 and the first contact 11. When the first end 31 and the first contact 11 are disconnected, the moving contact protective cover 4 presents an obstruction between the first end 31 and the first contact 11. Since the moving contact protective cover 4 is an insulator, a creepage distance and an electrical gap between the first end 31 and the first contact 11 are enabled to attain a required safe distance, preventing breakdown of the two parts due to high voltage. When the first end 31 and the first contact 11 come into contact, the moving contact protective cover 4 does not impede contact between the two parts.

[0023] To clarify the technical solution and advantages of the present invention, the present invention is explained in further detail below with reference to the accompanying drawings and embodiments. It should be understood that the particular embodiments described here are merely intended to explain the present invention elaboratively, not to limit the scope of protection thereof.

[0024] Furthermore, as shown in figs. 2 to 6, in an optional embodiment, the present application provides a circuit breaker circuit contact protection mechanism, comprising a circuit 1 and a moving contact 2, as well as an actuating mechanism 3 and a moving contact protective cover 4; a first contact 11 is electrically connected to the circuit 1. The moving contact 2 is a conductor for connecting the first contact 11 to another contact in the circuit 1. The other contact here is represented as a K2

contact, of course along with subsequent further improvement of the circuit 1. By an extension of this logic, generalization to other contact connections is possible. The actuating mechanism 3 drives a first end 31 of the moving contact 2 to move so that the first end 31 comes into contact with or is disconnected from the first contact 11. The actuating mechanism 3, in addition to a purely mechanical mechanism, may also cooperate with certain electrically driven mechanisms. The moving contact protective cover 4 is an insulator. The actuating mechanism 3 moves in linkage with the moving contact protective cover 4 and the first end 31 respectively, specifically in the following way: when the first end 31 is in contact with the first contact 11, the moving contact protective cover 4 is located outside a region of contact of the first end 31 and the first contact 11; when the first end 31 gradually moves away and is disconnected from the first contact 11, the moving contact protective cover 4 moves towards a region between the first end 31 and the first contact 11, and finally moves to the region between the first end 31 and the first contact 11. This embodiment provides a technical solution in which a creepage distance and an electrical gap between the first end 31 and the first contact 11 therein are ensured by means of the moving contact protective cover 4, and secondary design of the moving contact protective cover 4 is simplified through movement in linkage with the original actuating mechanism 3.

[0025] Fig. 7 is a schematic diagram of the layout of a first track and a second track on a base of the present invention. As shown in figs. 2 to 7, in another optional embodiment, the actuating mechanism 3 comprises a base 5 and a driving member 6, and a first connecting rod 7. The base 5 here is a general concept; all components capable of providing rigid body support for the actuating mechanism 3 and other components can be understood to be bases 5; here, neither the specific structure of the base nor the quantity thereof are defined. A first track 51 and a second track 52 are disposed on the base 5; the first end 31 slides along the first track 51 so that the first end 31 comes into contact with or is disconnected from the first contact 11. In general, the first contact 11 here is designed as a fixed elastic contact; the driving member 6 slides along the second track 52; one end of the first connecting rod 7 is rotatably connected to the driving member 6, and another end thereof slides along the first track 51 and is rotatably connected to the moving contact 2. The rotatable connection here is preferably an articulated connection. In a specific actual product, the actuating mechanism 3 and other components connected thereto are all designed in a two-dimensional system. In other words, this can be understood to mean that the actuating mechanism 3 and other components connected thereto are a connecting rod mechanism, but there is no restriction to being designed in a two-dimensional system. Preferably, the first track 51 here is an arcuate track, and the second track 52 is a straight track. A third track 41 is disposed on the moving contact protective cover 4, so that the driving member 6 slides on the third track 41 and is rotatably connected to the moving contact protective cover 4; the rotatable connection here may also be understood to be an articulated connection. A first rotation shaft 42 is disposed on the moving contact protective cover 4; the first rotation shaft 42 is disposed on the base 5 so that the moving contact protective cover 4 rotates along the first rotation shaft 42 to form a lever mechanism. The moving contact protective cover 4 is provided with a shield 43 to realize movement in linkage to a region between the first end 31 and the first contact 11 when the first end 31 moves away from the first contact 11. It must be specifically pointed out that a triggering apparatus (i.e. motive power apparatus) of the actuating mechanism 3 can attain the design requirements of the present application as long as it can cause the driving member 6 to slide up and down along the second track 52 as required; this embodiment provides a specific structure of an actuating mechanism 3, and discloses the manner in which the specific structure moves in linkage with the moving contact protective cover 4. Based on the description of the embodiment above, it can be discovered that the manner of movement in linkage is a manner of gradual change. In other words, the movement of the moving contact protective cover 4 and the movement of the first end 31 and the first contact 11 is a process of gradual change; the moving contact protective cover 4 (in particular the shield 43 thereof) gradually moves to a region between the first end 31 and the first contact 11 or moves away from the region of contact of the two parts.

[0026] In another optional embodiment, the actuating mechanism 3 further comprises an operating handle 8 and a second connecting rod 9. A second rotation shaft 81 is disposed on the operating handle 8; the second rotation shaft 81 is disposed on the base 5 and causes the operating handle 8 to rotate on its own axis along the second rotation shaft 81. One end of the second connecting rod 9 is rotatably connected to the driving member 6 and slides along the second track 52; another end of the second connecting rod 9 is rotatably connected to the operating handle 8, and is disposed on one side of the second rotation shaft 81 so that the second connecting rod 9 and the operating handle 8 form an eccentric wheel structure. The rotatable connection here may also be understood to be an articulated connection. In this embodiment, a triggering mechanism of the actuating mechanism 3 and a corresponding mechanical mechanism are provided, and sliding of the driving member 6 is realized by controlling the operating handle 8.

[0027] Fig. 9 is a structural schematic diagram of the first connecting rod of the present invention. As shown in fig. 9, in another optional embodiment, the two ends of the first connecting rod 7 are first connecting rod rotation shafts 71 disposed in a radial direction of the first connecting rod 7. The first connecting rod rotation shafts 71 at the two ends of the first connecting rod 7 are for rotatably connecting to the driving member 6 and the moving contact 2 respectively, and the first connecting rod rotation shaft 71 rotatably connected to the moving

contact 2 is inserted in the first track 51; the first track 51 is a long hole. This embodiment provides a specific structure of the first connecting rod, and further discloses the manner in which sliding of the moving contact 2 in the first track 51 is realized at the same time as articulated connection is realized. This is because the first connecting rod rotation shaft 71 connected to the moving contact 2 serves as a rotation shaft of the articulated connection therein, and also serves as a slider sliding in the first track 51.

[0028] Fig. 10 is a structural schematic diagram of the second connecting rod of the present invention. As shown in fig. 10, in another optional embodiment, the two ends of the second connecting rod 9 are second connecting rod rotation shafts 91 disposed in a radial direction of the second connecting rod 9. The second connecting rod rotation shafts 91 at the two ends of the second connecting rod 9 are for rotatably connecting to the operating handle 8 and the driving member 6 respectively, and the second connecting rod rotation shaft 91 rotatably connected to the driving member 6 is inserted in the second track 52; the second track 52 is a long hole. This embodiment provides a specific structure of the second connecting rod, and further discloses the manner in which sliding of the driving member 6 in the second track 52 is realized at the same time as articulated connection is realized, because the second connecting rod rotation shaft 91 connected to the driving member 6 serves as a rotation shaft of the articulated connection therein, and also serves as a slider sliding in the second track 52.

[0029] In another optional embodiment, the first contact 11 comprises an elastic connecting plate 111; one end of the elastic connecting plate 111 is connected to the circuit 1, and another end is an elastic extensible end. In this embodiment, the first contact 11 is a fixed elastic contact, but it needs to have a certain degree of elasticity; this also foreshadows subsequent design. A specific description will be provided in the basic principles and operating process of the circuit breaker circuit contact protection mechanism below; no further superfluous description is provided here.

[0030] Fig. 8 is a schematic diagram of the external structure of the moving contact protective cover of the present invention. As shown in fig. 8, in an optional embodiment, the present application provides a specific structure of the moving contact protective cover. A third track 41 and a first rotation shaft 42, and a shield 43, are disposed on the moving contact protective cover 4. The third track 41 is disposed in a length direction of the moving contact protective cover 4, the first rotation shaft 42 is disposed in a radial direction of the moving contact protective cover 4, and the shield 43 is disposed in a manner corresponding to the contour of the moving contact. In this embodiment, preferably, the shield 43 is an arcuate structure for the purpose of shielding the first end 31 therein.

[0031] In another optional embodiment, the third track 41 and the shield 43 are disposed on two sides of the first rotation shaft 42. The design scheme of this embodiment is due to the fact that when a lever mechanism has a fulcrum in the middle and displacement moving ends at two ends, the efficiency of displacement change thereof is highest.

[0032] In another optional embodiment, the shield 43 is disposed at an end of the moving contact protective cover 4. Preferably, in an actual design process, the end provided with the shield 43 is a free end of the moving contact protective cover 4.

[0033] Operating process and basic principles of the circuit breaker circuit contact protection mechanism:

The operating process and basic principles of the protection mechanism are described in detail for the present application. In the circuit 1 shown in fig. 1, L represents a live line, and N represents a neutral line. K1, K2 and K3 represent three switch nodes of the circuit 1 respectively. The structure of the circuit 1 is exactly the same as the circuit in fig. 1. The main purpose of the circuit 1 is to supply power for a circuit board, and it must be noted here that in addition to the need to control the opening/closing of K1, K2 and K3, there is also a corresponding switch time sequence. Specifically, when contact closing takes place, the closing of K2 must be later than the closing of K3; correspondingly, when disconnection takes place, the disconnection of K2 must be earlier than the disconnection of K3. Corresponding to the specific mechanism thereof, as shown in figs. 2 to 4, the first contact 11 is a closing contact of the K3 switch, and a second contact 10 lower down in the figure is a closing contact of K2. Since the moving contact 2 is a conductor, it can be seen from the circuit 1 that the closing contact at one end of K3 and the closing contact at one end of K2 are at the same potential, therefore the moving contact 2 may be understood to be connected to N and connected in series with a conductive wire of K3. Furthermore, in order to realize a time sequence problem when K2 and K3 are connected, the actuating mechanism 3 disclosed in figs. 2 to 6 is used; the use of the actuating mechanism 3 is continued in the present application. The difference is that an elastic structure of the first contact is changed to the elastic connecting plate 111. When the first end 31 has first touched the first contact 11, at this time the second contact 10 is not connected to the moving contact 2. The actuating mechanism 3 will continue to push the first end 31 of the moving contact 2 to move towards the first contact 11; at this time, since the first contact 11 is an elastic end, the first contact 11 will continue to retract so as to ensure that the second contact 10 comes into contact with the other end of the moving contact 2 to achieve the energization time sequence requirement. Conversely, the second contact 10 is disconnected from the moving contact 2 first. Since the first contact 11 is an elastic end, at this time the first end 31 of the moving contact 2 is not disconnected from the first contact 11; the first end 31 and the first contact 11 are gradually separated and disconnected as the moving contact 2 continues to move away along the first track

51. In this process, the requirement regarding the time sequence is also simultaneously met.

[0034] When the abovementioned time sequence condition is met, the moving contact protective cover 4 is also introduced for this improvement. The moving contact protective cover 4 realizes movement in linkage with the actuating mechanism 3 through the third track 41 disposed above. A further improvement is accomplished, with the structure of the original actuating mechanism 3 being substantially unchanged. When rotating, the operating handle 8 will rotate on its own axis around the second rotation shaft 81; due to the eccentric mechanism formed by the second connecting rod 9 and the operating handle 8, the second connecting rod 9 will drive the driving member 6 rotatably connected to the other end thereof to slide along the second track 52. During sliding of the driving member 6, the moving contact protective cover 4 will be driven to swing along the first rotation shaft 42. During swinging of the moving contact protective cover 4, placement is carried out with the positions of the first end 31 and the first contact 11 when in contact according to a position of swing of the shield 43 on the moving contact protective cover 4 to achieve the abovementioned effect of movement in linkage. The first end 31 will go into contact with or be disconnected from the first contact 11 according to the sliding of the first connecting rod 7 in the first track 51. In relation to the manner of contact and disconnection of the moving contact 2 and the second contact 10.

[0035] The present invention has the following beneficial effects:

The moving contact protective cover 4 is disposed in the actuating mechanism 3. The moving contact protective cover 4 moves in linkage with the original actuating mechanism 3 to block a space between the first contact 11 and the first end 31 when the two parts are disconnected, thereby meeting a design requirement of the two parts in terms of creepage distance and electrical gap.

[0036] An entire actuating mechanism 3 having a specific structure is specifically designed; after providing the moving contact protective cover 4, the time sequence requirement for the moving contact 2 coming into contact with and being disconnected from the first contact 11 and the second contact 10 respectively is still ensured.

[0037] The elastic structure of the original first contact 11 is changed; the elastic connecting plate 111 is used to achieve a structural design requirement of the actuating mechanism 3 for the first contact 11.

[0038] A specific structure of the moving contact protective cover 4 is disclosed, such that it is further optimized at the same time as being able to attain a design requirement.

[0039] The above are merely preferred embodiments of the present invention, which are not intended to limit it. Any amendments, equivalent substitutions or improvements etc. made within the spirit and principles of the present invention should be included in the scope of protection of the p resent invention.

Claims

1. A circuit breaker circuit contact protection mechanism, **characterized by** comprising:

   a first contact (11), electrically connected to a circuit (1); and
   a moving contact (2), being a conductor for connecting the first contact (11) to another contact on the circuit (1);
   an actuating mechanism (3), driving a first end (31) of the moving contact (2) to move so that the first end (31) comes into contact with or is disconnected from the first contact (11);
   a moving contact protective cover (4), being an insulator, the actuating mechanism (3) moving in linkage with the moving contact protective cover (4) and the first end (31) respectively; when the first end (31) is in contact with the first contact (11), the moving contact protective cover (4) is located outside a region of contact of the first end (31) and the first contact (11), and when the first end (31) gradually moves away and is disconnected from the first contact (11), the moving contact protective cover (4) moves towards a region between the first end (31) and the first contact (11) and finally moves to the region between the first end (31) and the first contact (11).

2. The circuit breaker circuit contact protection mechanism as claimed in claim 1, **characterized in that** the actuating mechanism (3) comprises:

   a base (5), with a first track (51) and a second track (52) being disposed on the base (5), the first end (31) sliding along the first track (51) so that the first end (31) comes into contact with or is disconnected from the first contact (11); and
   a driving member (6), sliding along the second track (52) ;
   a first connecting rod (7), with one end of the first connecting rod (7) being rotatably connected to the driving member (6), and another end of the first connecting rod (7) sliding along the first track (51) and being rotatably connected to the moving contact (2);
   a third track (41) being disposed on the moving contact protective cover (4) so that the driving member (6) slides on the third track (41) and is rotatably connected to the moving contact protective cover (4), a first rotation shaft (42) being disposed on the moving contact protective cover (4), the first rotation shaft (42) being disposed on the base (5) so that the moving contact protective cover (4) rotates along the first rotation shaft (42) to form a lever mechanism, and the moving contact protective cover (4) being pro-

vided with a shield (43) to realize movement in linkage to a region between the first end (31) and the first contact (11) when the first end (31) moves away from the first contact (11).

3. The circuit breaker circuit contact protection mechanism as claimed in claim 2, **characterized in that** the actuating mechanism (3) further comprises:

an operating handle (8), with a second rotation shaft (81) disposed on the operating handle (8), the second rotation shaft (81) being disposed on the base (5) and causing the operating handle (8) to rotate on its own axis along the second rotation shaft (81);
a second connecting rod (9), with one end of the second connecting rod (9) being rotatably connected to the driving member (6) and sliding along the second track (52), and another end of the second connecting rod (9) being rotatably connected to the operating handle (8), and being disposed on one side of the second rotation shaft (81) so that the second connecting rod (9) and the operating handle (8) form an eccentric wheel structure.

4. The circuit breaker circuit contact protection mechanism as claimed in claim 2, **characterized in that** the two ends of the first connecting rod (7) are first connecting rod rotation shafts (71) disposed in a radial direction of the first connecting rod (7), the first connecting rod rotation shafts (71) at the two ends of the first connecting rod (7) being for rotatably connecting to the driving member (6) and the moving contact (2) respectively, and the first connecting rod rotation shaft (71) rotatably connected to the moving contact (2) being inserted in the first track (51), the first track (51) being a long hole.

5. The circuit breaker circuit contact protection mechanism as claimed in claim 3, **characterized in that** the two ends of the second connecting rod (9) are second connecting rod rotation shafts (91) disposed in a radial direction of the second connecting rod (9), the second connecting rod rotation shafts (91) at the two ends of the second connecting rod (9) being for rotatably connecting to the operating handle (8) and the driving member (6) respectively, and the second connecting rod rotation shaft (91) rotatably connected to the driving member (6) being inserted in the second track (52), the second track (52) being a long hole.

6. The circuit breaker circuit contact protection mechanism as claimed in claim 1, **characterized in that** the first contact (11) comprises:
an elastic connecting plate (111), one end of the elastic connecting plate (111) being connected to the circuit (1), and another end being an elastic extensible end.

7. The circuit breaker circuit contact protection mechanism as claimed in claim 2, **characterized in that** the moving contact protective cover (4) is further provided with:

a first rotation shaft (42), disposed in a radial direction of the moving contact protective cover (4); and
a shield (43), disposed in a manner corresponding to a contour of the moving contact;
the third track (41), disposed in a length direction of the moving contact protective cover (4).

8. The circuit breaker circuit contact protection mechanism as claimed in claim 7, **characterized in that** the third track (41) and the shield (43) are disposed on two sides of the first rotation shaft (42).

9. The circuit breaker circuit contact protection mechanism as claimed in claim 7, **characterized in that** the third track (41) is a long hole disposed in the length direction of the moving contact protective cover (4).

10. The circuit breaker circuit contact protection mechanism as claimed in claim 7, **characterized in that** the shield (43) is disposed at an end of the moving contact protective cover (4).

FIG 1

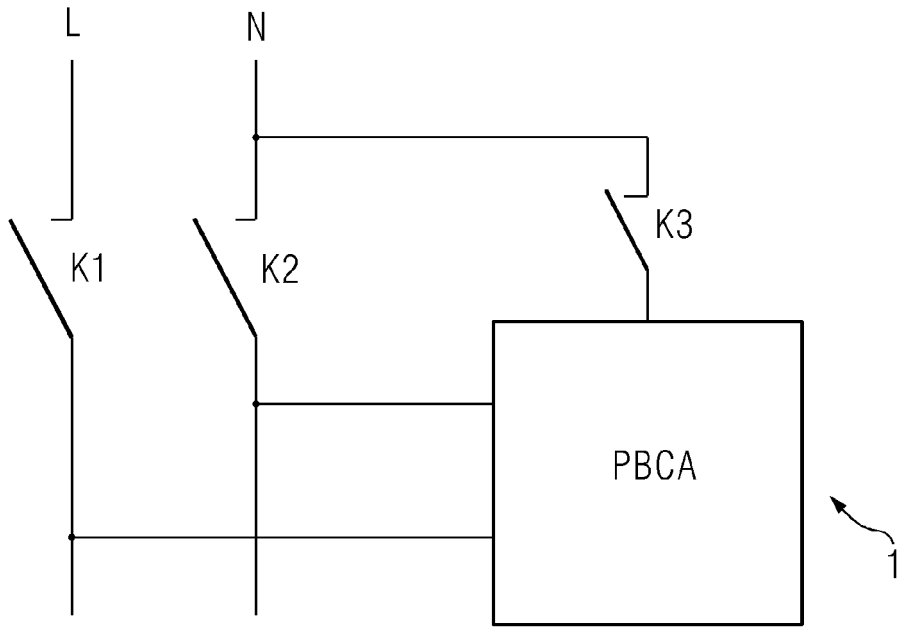


FIG 2

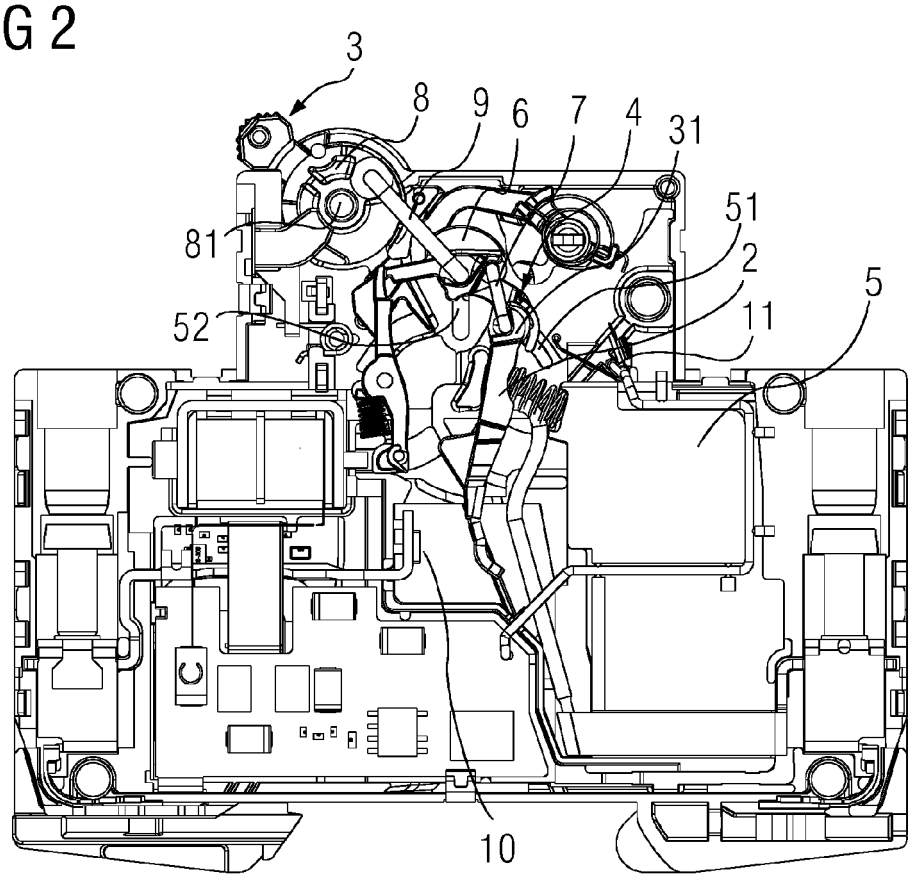


FIG 3

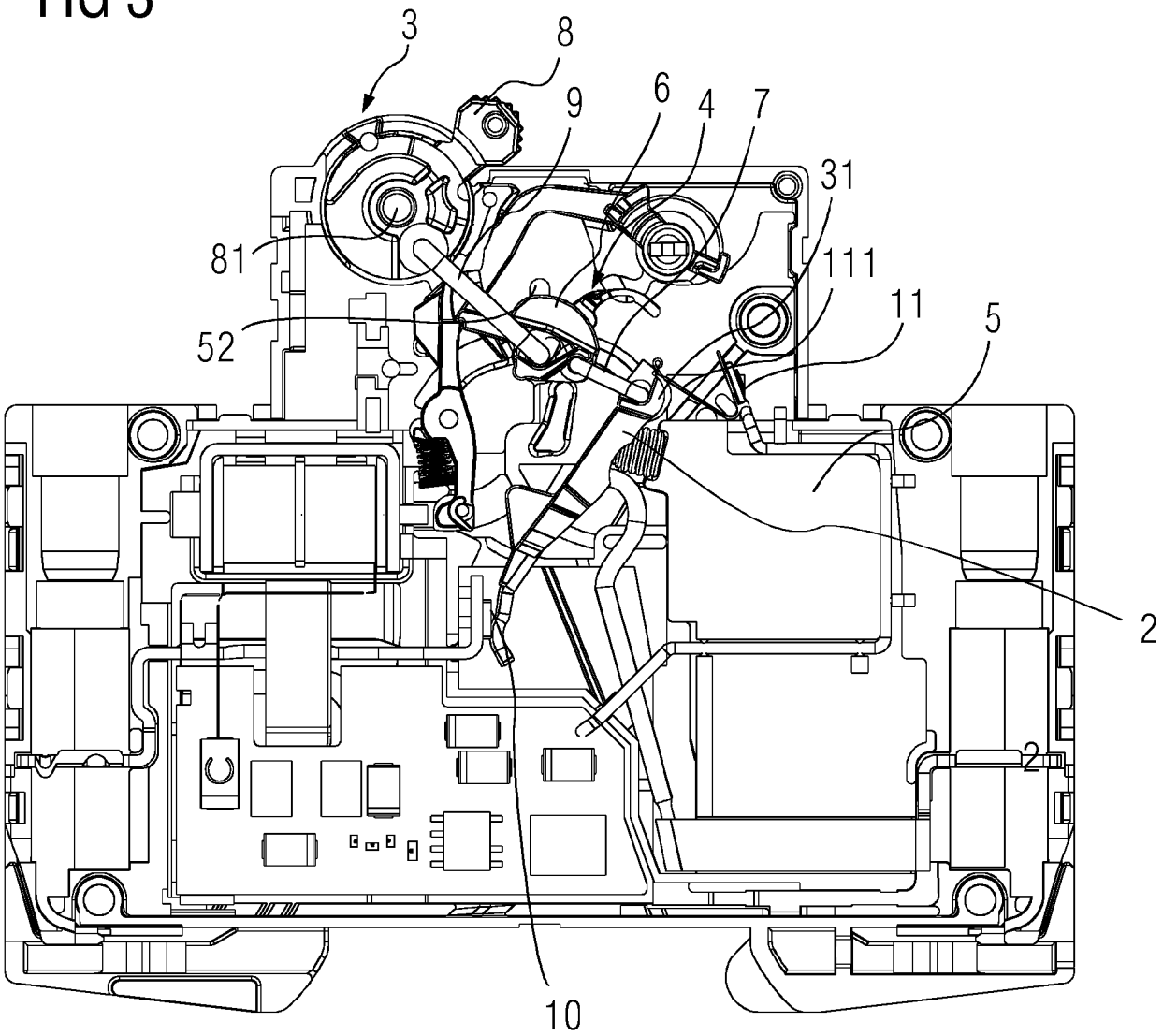


FIG 4

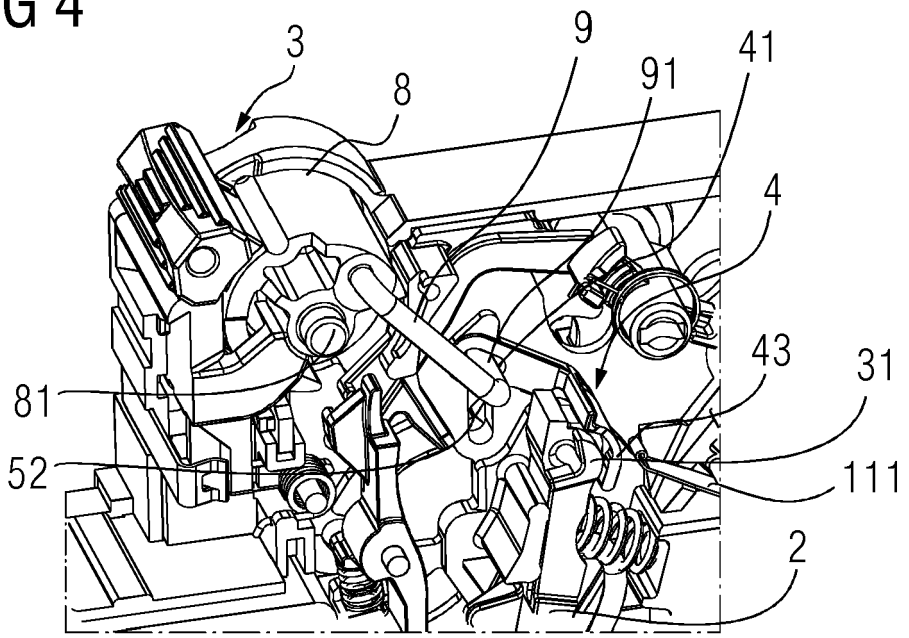


FIG 5

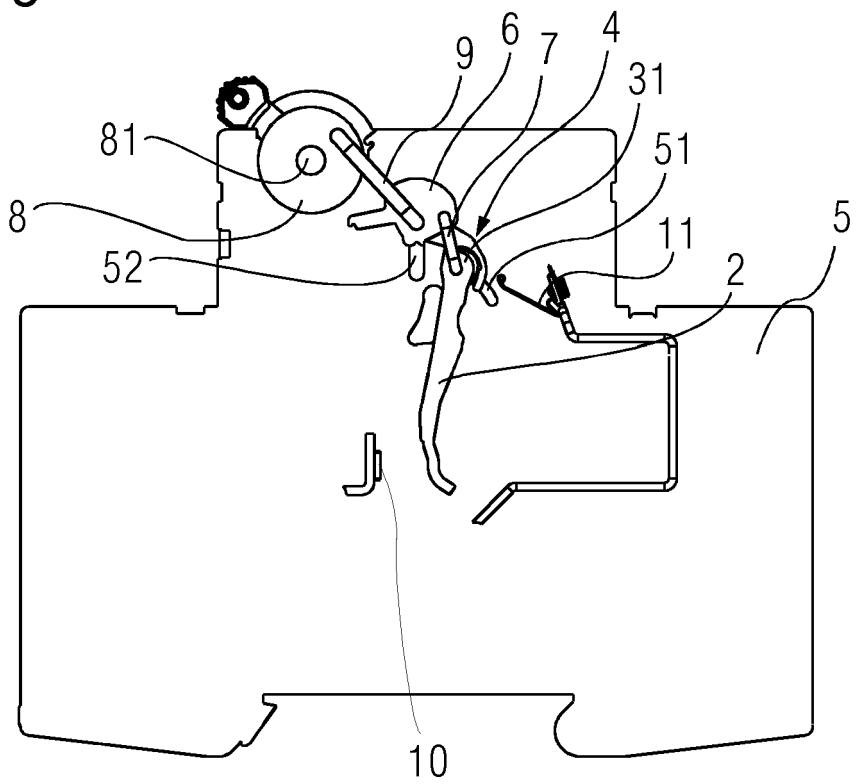


FIG 6

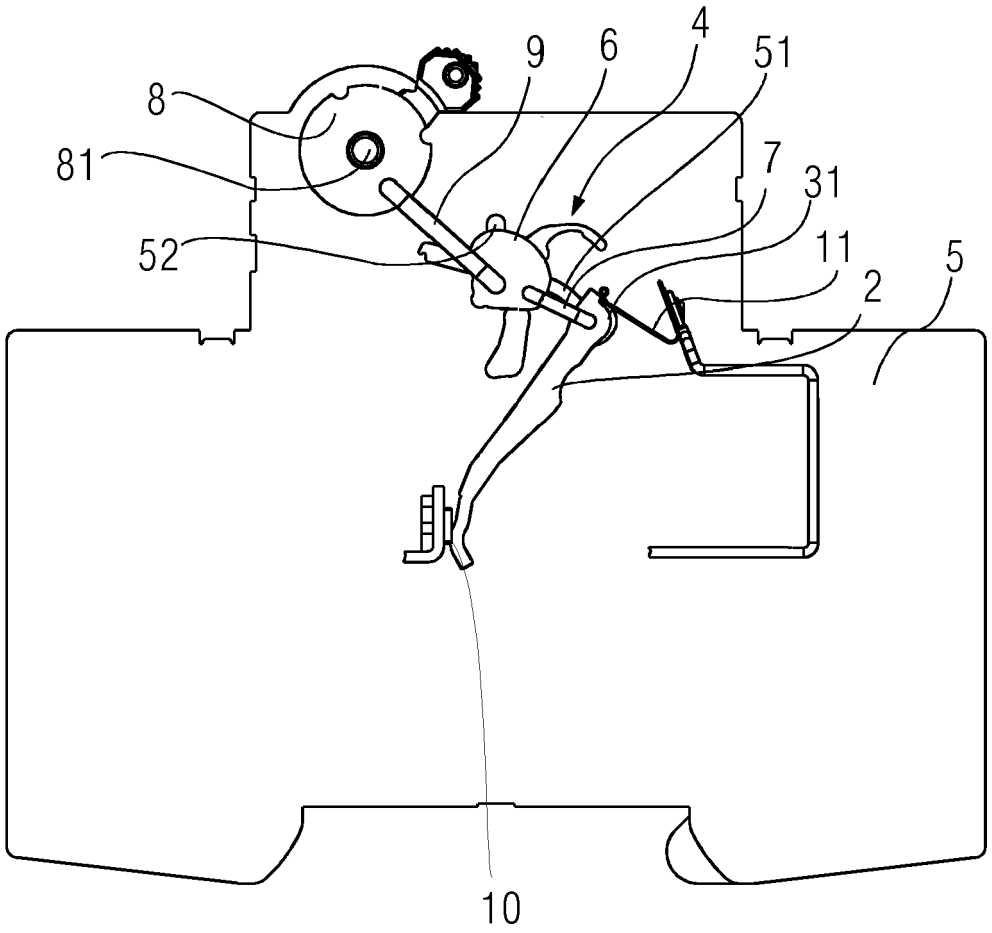


FIG 7

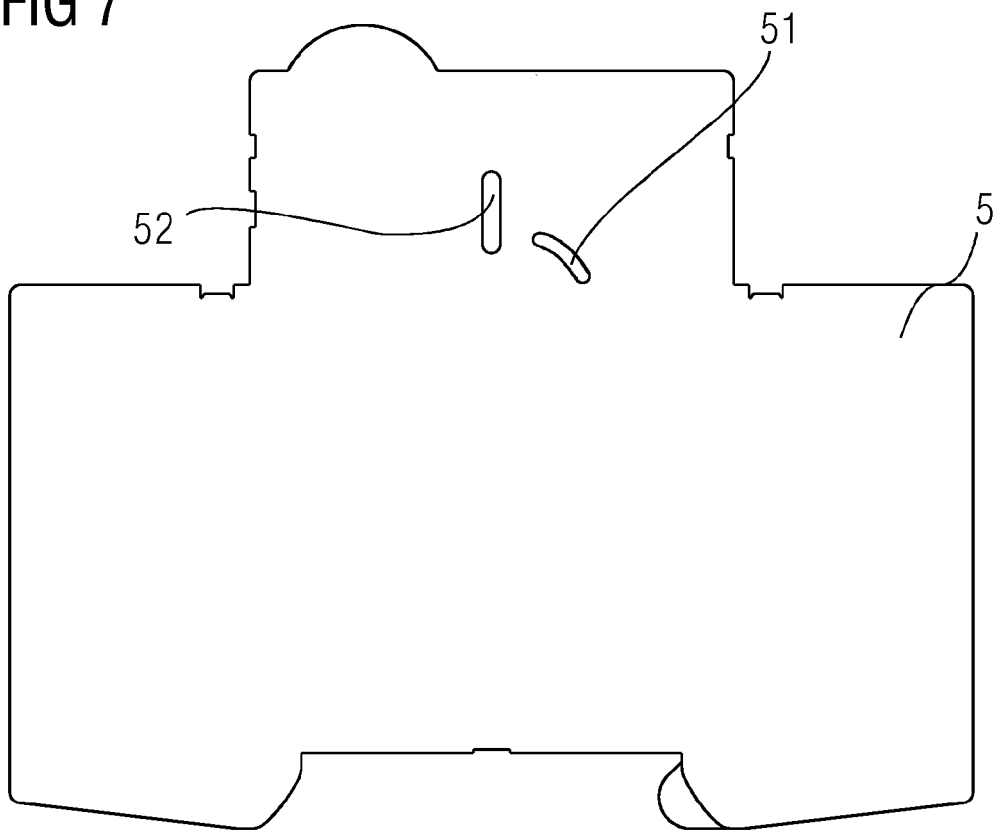


FIG 8

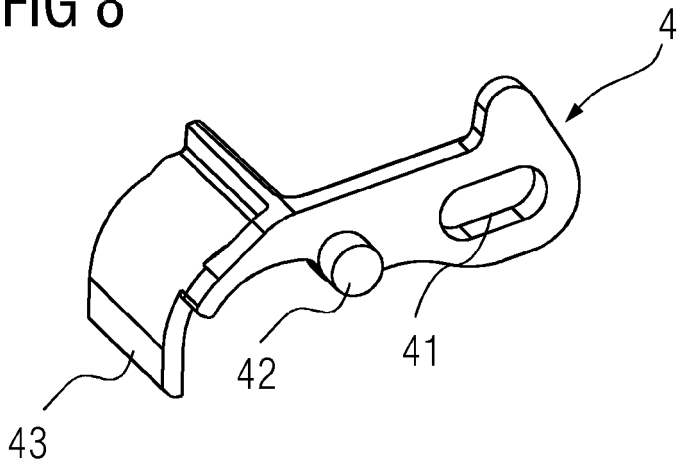


FIG 9

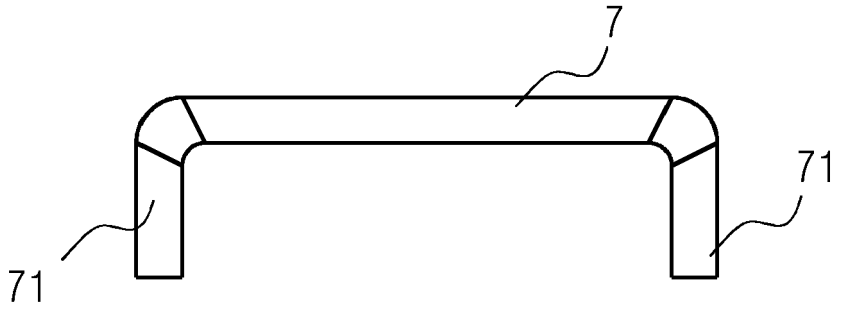
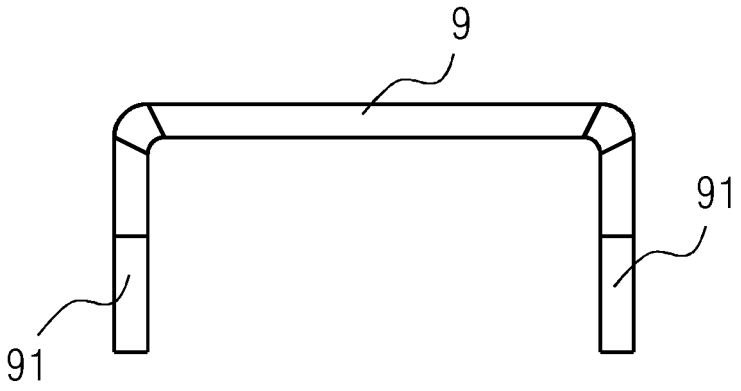


FIG 10



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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 2884

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A	DE 34 12 273 A1 (KOPP GMBH & CO KG HEINRICH [DE]) 10 October 1985 (1985-10-10) * page 7, line 20 - page 8, line 10; figures 1,2 *	1-10	INV. H01H71/46
A	US 2002/105771 A1 (SIMMS KEVIN ANTHONY [US] ET AL) 8 August 2002 (2002-08-08) * paragraphs [0038] - [0065]; figures 3-5,10-12 *	1-10	
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H01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 July 2019	Arenz, Rainer

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