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(54) **OPERATING SYSTEM OF MINIATURE CIRCUIT BREAKER AND MINIATURE CIRCUIT BREAKER HAVING SAME**

BETRIEBSSYSTEM EINES MINIATURSCHUTZSCHALTERS UND MINIATURSCHUTZSCHALTER DAMIT

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(73) Proprietor: **Eaton Electrical Ltd.**
Suzhou (CN)

(72) Inventors:
- **GUO, Shunfeng**
  Suzhou (CN)
- **ZHOU, Hui**
  Suzhou (CN)
- **XIANG, Suming**
  Suzhou (CN)
- **ZHOU, Xiuying**
  Suzhou (CN)

(74) Representative: **Schwan Schorer & Partner mbB**
Patentanwälte
Bauerstraße 22
80796 München (DE)

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of electrical equipment, and relates in particular to an operating system of a miniature circuit breaker and a miniature circuit breaker having the same.

BACKGROUND

[0002] Miniature circuit breakers are widely employed as an important electrical protection device, and are generally mounted to a terminal distribution line, thus being used for current connection and loading or disconnection under normal and abnormal circuit conditions. The miniature circuit breaker generally includes an operating system, a tripping system, and other structures to achieve switching between closed and open states of the miniature circuit breaker in a normal or abnormal circuit.

[0003] An operating system of a miniature circuit breaker, the operating system being mounted to a circuit breaker body of the miniature circuit breaker ,the operating system comprising: a handle rotatably mounted to the circuit breaker body by means of a handle rotating shaft; a contact component, rotatably mounted to the circuit breaker body by means of a support rotating shaft and remaining in contact with a static contact on the circuit breaker body; a latch, rotatably mounted to the contact component; a linkage, two ends of which are rotatably connected to the handle and the latch respectively; a tripping rod , sleeved onto the support rotating shaft and capable of rotating relative to the contact component; and a torsion spring, one end of the torsion spring being connected to the latch and the second end of the torsion spring being connected to the tripping rod, the torsion spring being always in an energy storage state so as to push the tripping rod towards the latch to keep the tripping rod locked with the latch; wherein when the tripping rod, under the effect of an external force, overcomes a pushing force from the torsion spring to rotate away from the latch relative to the contact component, the tripping rod is unlocked from the latch, so that when the handle moves to an opening position, the handle is capable of driving, by means of the linkage and the latch, the contact component to move so as to be separated from the static contact, and the handle further drives the latch to rotate relative to the contact component such that the latch is locked with the tripping rod again is known from EP 0 577 586 A1.

[0004] Further , the operating system of the miniature circuit breaker may include a support rotating shaft rotatably mounted to a housing, a contact component rotatably sleeved onto the support rotating shaft, and a tripping component sleeved onto the support rotating shaft by means of a re-buckling torsion spring. Thus, during an opening operation of the circuit breaker, the tripping component overcomes the bias pressure of the re-buckling torsion spring to move to an unlocked state, then the contact component moves to an opening position, and finally the tripping component moves to a locked state again due to the resilience of the re-buckling torsion spring. However, the re-buckling torsion spring in the prior art generally has a relatively small spring wire diameter, which may increase the assembly difficulty of the operating system of the miniature circuit breaker and result in difficulty in implementing automated assembly.

[0005] In addition, the existing contact component generally includes a contact support frame having one end connected to the tripping component and an approximately middle region sleeved onto the support rotating shaft, and the other end of the contact support frame is connected, by means of a contact rivet, to a contact rod provided with a movable contact. In this way, the tripping component first drives the contact support frame to rotate, and then the contact support frame drives the contact rod to rotate about the contact rivet. Obviously, the foregoing design has the defects of a relatively large number of assembly components and relatively complex assembly.

[0006] Therefore, there is a need in the art for a miniature circuit breaker that has a simple structure and is easy to assemble.

SUMMARY

[0007] The present invention aims to provide an operating system of a miniature circuit breaker that can at least solve part of the foregoing problems.

[0008] The present invention further aims to provide a miniature circuit breaker having the foregoing improved operating system.

[0009] According to one aspect of the present invention, an operating system of a miniature circuit breaker is provided. The operating system is mounted to a circuit breaker body of the miniature circuit breaker, and comprises: a handle, rotatably mounted to the circuit breaker body by means of a handle rotating shaft; a contact component, rotatably mounted to the circuit breaker body by means of a support rotating shaft and remaining in contact with a static contact on the circuit breaker body; a latch, rotatably mounted to the contact component; a linkage, two ends of which are rotatably connected to the handle and the latch respectively; a tripping rod, sleeved onto the support rotating shaft and capable of rotating relative to the contact component; and a handle torsion spring, sleeved onto the handle rotating shaft, two ends of the handle torsion spring being respectively connected to the handle and the tripping rod, the handle torsion spring being always in an energy storage state so as to push the tripping rod towards the latch to keep the tripping rod locked with the latch; wherein when the tripping rod, under the effect of an external force, overcomes a pushing force from the handle torsion spring to rotate away from the latch relative to the contact component, the tripping rod is unlocked from the latch, so that when the

handle moves to an opening position, the handle is capable of driving, by means of the linkage and the latch, the contact component to move so as to be separated from the static contact, and the handle further drives the latch to rotate relative to the contact component such that the latch is locked with the tripping rod again.

[0010] Compared to the prior art, the operating system of the present invention can be mounted to the circuit breaker body of the miniature circuit breaker, and enables the miniature circuit breaker to move to a closed, tripping, or open state through cooperation between the handle, the latch, the contact component, and the tripping rod. The contact component and the tripping rod are both rotatably mounted to the circuit breaker body by means of the support rotating shaft, and the handle torsion spring that is always in an energy storage state can provide an acting force for pushing the tripping rod towards the latch, thereby maintaining a locked state when the tripping rod and the latch are locked and driving the two to return to a locked state when the tripping rod is unlocked from the latch. In this way, a re-buckling torsion spring usually mounted to the support rotating shaft can be eliminated, thereby greatly reducing the assembly difficulty of the operating system and facilitating automated assembly, and accordingly greatly improving the assembly efficiency of the operating system of the present invention.

[0011] Preferably, the contact component comprises a contact support frame sleeved onto the support rotating shaft and a contact rod extending from the contact support frame towards the static contact, a side of the contact rod facing the static contact is provided with a movable contact, and the contact support frame and the contact rod are integrally formed.

[0012] Preferably, the operating system further comprises a contact pressure spring disposed between the contact support frame and the circuit breaker body, the contact pressure spring being in an energy storage state.

[0013] Preferably, the contact support frame is provided with a recess used to accommodate an end portion of the contact pressure spring.

[0014] Preferably, the latch is provided with a first connecting hole configured to connect to the linkage and a second connecting hole configured to connect to the contact support frame.

[0015] Preferably, a first engagement member is provided at a side of the latch facing the tripping rod, and a second engagement member fitting with the first engagement member is provided at a side of the tripping rod facing the latch.

[0016] Preferably, a first position-limiting portion is formed at a side of the tripping rod facing the contact support frame, and a second position-limiting portion fitting with the first position-limiting portion is formed on the contact support frame.

[0017] Preferably, a connection member pressed against an end portion of the handle torsion spring is disposed on the tripping rod.

[0018] According to another aspect of the present invention, a miniature circuit breaker is provided, and comprises a circuit breaker body and the foregoing operating system.

[0019] One part of other features and advantages of the present invention will be obvious after those skilled in the art read the present application, and the other part will be described in the following specific implementations with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Embodiments of the present invention are described in detail in the following with reference to the accompanying drawings, wherein:

FIG. 1 is a schematic diagram showing a miniature circuit breaker in a closed state according to the present invention;

FIG. 2 is a front view of an operating system of the miniature circuit breaker in a closed state according to the present invention;

FIG. 3 is a back view of the operating system of the miniature circuit breaker in a closed state according to the present invention;

FIG. 4 is a schematic diagram showing the miniature circuit breaker in a tripping state according to the present invention;

FIG. 5 is a schematic diagram of the operating system of the miniature circuit breaker in a tripping state according to the present invention;

FIG. 6 is a schematic diagram showing the miniature circuit breaker in an open state according to the present invention; and

FIG. 7 is a schematic diagram of the operating system of the miniature circuit breaker in an open state according to the present invention.

Description of the reference numerals:

[0021] 100. Miniature circuit breaker; 10. Operating system; 11. Handle; 12. Contact component; 121. Contact support frame; 122. Contact rod; 123. Movable contact; 124. Mounting post; 13. Latch; 131. First engagement member; 14. Linkage; 15. Tripping rod; 151. Second engagement member; 153. Connection member; 16. Handle torsion spring; 161. First end of handle torsion spring; 162. Second end of handle torsion spring; 17. Support rotating shaft; 18. Contact pressure spring; 20. Housing; 21. Static contact; 22. Tripping system; 23. Push rod

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0022] A schematic scheme of the miniature circuit breaker and the operating system thereof disclosed in the present invention is described in detail below with reference to the accompanying drawings. Although providing the accompanying drawings is to present some

implementations of the present invention, the accompanying drawings do not need to be drawn according to the size of specific implementation schemes, and certain features can be enlarged, removed, or locally exploded to better illustrate and explain the disclosure of the present invention. Part of the components in the accompanying drawings can be positionally adjusted according to actual requirements without affecting the technical effect. In the description, the term "in the accompanying drawings" or similar terms do not necessary refer to all of the accompanying drawings or examples.

[0023] Some directional terms used in the following to describe the accompanying drawings, such as "in", "out", "upper", and "lower," and other directional terms are construed as having normal meanings thereof and refer to those directions involved when the accompanying drawings are viewed normally. Unless otherwise specified, the directional terms in the description are substantially in accord with conventional directions understood by those skilled in the art.

[0024] The terms "first", "first one," "second", "second one" and similar terms used in the present invention do not indicate any sequence, number, or importance in the present invention, and are used only to distinguish one component from other components.

[0025] The terms "join" and "connect" and similar terms used in the present invention refer to two components being indirectly connected to each other by an intermediate layer (such as an adhesive or a solder) or an intermediate member (such as a connection member or a transition member), and also refer to two components being directly connected to each other without any intermediate layer (such as an adhesive or a solder) or any intermediate member (such as a connection member or a transition member).

[0026] FIGs. 1 to 7 show, by way of example, a miniature circuit breaker 100 in the present invention. Compared to a conventional miniature circuit breaker 100, the miniature circuit breaker 100 of the present invention has less components and can be assembled automatically, thereby greatly improving assembly efficiency and reducing manufacturing costs. FIGs. 1 to 3 show the miniature circuit breaker 100 in a closed state, FIGs. 4 and 5 show the miniature circuit breaker 100 in a tripping state, and FIGs. 6 and 7 show the miniature circuit breaker 100 in an open state.

[0027] As shown in FIG. 1, the miniature circuit breaker 100 may include a circuit breaker body and an operating system 10 mounted to the circuit breaker body. The circuit breaker body may include structures such as a housing, a static contact, and a tripping system that are known to persons skilled in the art. It should be understood that other functions not mentioned in the involved structures of the miniature circuit breaker 100 in this embodiment and other structures not mentioned herein may be well known to those skilled in the art, so the details thereof are omitted herein. The operating system 10 includes a handle, a contact component 12, a latch 13, a linkage 14, a tripping rod 15, and a handle torsion spring 16.

[0028] Specifically, the handle may be rotatably mounted to the housing by means of a handle rotating shaft, and thus can be rotated to a closing or opening position under the effect of an external force. The latch 13 is rotatably connected to the contact component 12, and the two ends of the linkage 14 are respectively rotatably connected to the handle and the latch 13. The contact component 12 is rotatably mounted to the housing by means of a support rotating shaft 17, such that the handle can drive the latch 13 to rotate relative to the contact component 12 by means of the linkage 14, thereby driving the contact 123 component 12 to rotate relative to the housing by means of the linkage 14 and the latch 13. A line connecting a rotation center of the handle to a connecting point between the linkage 14 and the handle, a line connecting the connecting point between the linkage 14 and the handle to a connecting point between the linkage 14 and the latch 13, a line connecting the connecting point between the linkage 14 and the latch 13 to a rotation center of the contact component 12, and a line connecting the rotation center of the contact component 12 to the rotation center of the handle may be considered as a four-linkage mechanism. Hence, controlled by the handle, the contact component 12 rotates to a closing position to contact the static contact or rotates to an opening position to separate from the static contact, such that the miniature circuit breaker 100 is closed or opened.

[0029] The tripping rod 15 is rotatably sleeved onto the support rotating shaft 17 and can rotate relative to the contact component 12. As shown in FIGs. 1 and 2, the tripping rod 15 may be regarded as located in front of the contact component 12. The tripping rod 15 is locked with the latch 13 when the miniature circuit breaker 100 is in a closed or open state, thereby restricting rotation of the latch 13 to keep the miniature circuit breaker 100 in the corresponding closed or open state.

[0030] The handle torsion spring 16 may be mounted to the handle in an energy storage state and two ends of the handle torsion spring are respectively connected to the handle and the tripping rod 15. An end of the handle torsion spring 16, namely, a second end 162 of the handle torsion spring 16 that is connected to the tripping rod 15, can push the tripping rod 15 towards the latch 13 so that the tripping rod 15 and the latch 13 are kept in a locked state. As shown in FIG. 2, the miniature circuit breaker 100 is in a closed state. The handle torsion spring 16 is in a first energy storage state so that a first end 161 of the handle torsion spring 16 has a clockwise rotation trend and a second end 162 thereof has a counterclockwise rotation trend. Therefore, the first end 161 of the handle torsion spring can subject the handle to a clockwise pushing force, while the second end 162 of the handle torsion spring 16 can subject the tripping rod 15 to a clockwise pushing force, such that the tripping rod 15 is pushed towards the latch 13. It should be noted that the directions of the pushing forces to which the handle and the tripping rod 15 are subjected are limited by the rota-

tion center of the handle and the rotation center of the tripping rod 15, respectively.

[0031] Upon the occurrence of circuit abnormality, such as a short circuit or overload, a push rod of a tripping system, such as an electromagnetic tripping system, of the miniature circuit breaker 100 extends to the tripping rod 15 and pushes the tripping rod 15 to overcome the pushing force exerted by the handle torsion spring 16, such that the tripping rod is rotated counterclockwise. Accordingly, the tripping rod 15 is unlocked from the latch 13, and the four-linkage mechanism described above can move under the effect of a corresponding external force. At the time, the miniature circuit breaker 100 can be regarded as being in a closed and tripping state.

[0032] Then, the handle can perform an opening operation when the tripping rod 15 is unlocked from the latch 13. As an example, the handle may rotate clockwise by a certain angle from the closing position shown in FIGs. 1 and 2 to the position shown in FIGs. 4 and 5. The first end of the linkage 14 connected to the handle moves clockwise along the perimeter of the handle, and the second end 162 of the linkage 14 connected to the latch 13 drives the latch 13 to rotate clockwise. At the same time, the contact component 12 is driven by the handle by means of the latch 13 and the linkage 14 to the opening position where the contact component is separated from the static contact. At the time, the tripping rod 15 and the latch 13 are kept in a tripping state. At the time, the miniature circuit breaker 100 is regarded as being in an open and tripping state.

[0033] Afterwards, the handle continuously rotates clockwise from the position shown in FIGs. 4 and 5 to the opening position shown in FIGs. 6 and 7. The first end of the linkage 14 continuously moves clockwise along the perimeter of the handle, and the second end of the linkage 14 draws the latch 13 to rotate counterclockwise until the latch is locked with the tripping rod 15 again. At the time, the miniature circuit breaker 100 is regarded as being in an open state. Thus, during the period in which the miniature circuit breaker 100 changes from a closed state to a closed and tripping state, to an open and tripping state, and finally to an open state, the handle torsion spring 16 moves from the initial first energy storage state to the final second energy storage state. Hence, with the handle torsion spring 16 always in an energy storage state, the second end 162 of the handle torsion spring 16 connected to the tripping rod 15 can, when in the closed state and the open state, push the tripping rod 15 towards the latch 13 all the time to keep them locked, thereby limiting the movement of the four-linkage mechanism.

[0034] In addition, the tripping rod 15 and the contact component 12 in the operating system 10 provided by the present invention both rotate about the support rotating shaft 17, and the conventional re-buckling torsion spring sleeved onto the support rotating shaft 17 may be eliminated based on the arrangement of the handle torsion spring 16. In this way, the operating system 10 of the miniature circuit breaker 100 in the present invention can be assembled automatically, thereby greatly improving assembly efficiency. As an example, the contact component 12 may be first sleeved onto the support rotating shaft 17, and then the tripping rod 15 is sleeved onto the support rotating shaft 17; and then the latch 13 is mounted to the contact component 12, thereby forming the corresponding operating mechanism.

[0035] Optionally, the contact component 12 includes a contact support frame 121 and a movable contact rod that are integrally formed. The contact support frame 121 may be sleeved onto the support rotating shaft 17 and is rotatable about the support rotating shaft 17. The movable contact rod extends from the contact support frame 121 towards the static contact, such as extending generally downwards, and a side thereof that faces the static contact may be provided with a movable contact 123. Therefore, when the movable contact rod rotates about the support rotating shaft 17 along with the contact support frame 121 to the closing position, the movable contact 123 is in contact with the static contact, and correspondingly, when the movable contact rod rotates to the opening position, the movable contact 123 is separated from the static contact. In such a manner, compared to the conventional contact support frame 121 and the movable contact rod mounted to said contact support frame 121 by means of a contact rivet, the number of components required by the contact component 12 of the present invention can be reduced, and assembly efficiency can correspondingly be improved.

[0036] Optionally, the operating system 10 may further include a contact pressure spring 18 disposed between the contact support frame 121 and the housing in an energy storage state. As an example, when the miniature circuit breaker 100 is in an open state, the contact pressure spring 18 may be in a natural state, and when the miniature circuit breaker 100 is closed, the contact pressure spring stores energy, so as to provide a contact pressure between the movable contact 123 on the movable contact rod and the static contact when the miniature circuit breaker 100 is moving to the closed state, thereby achieving reliable contact between the movable contact 123 and the static contact of the miniature circuit breaker 100. Optionally, the contact support frame 121 may be provided with a recess used to accommodate one end of the contact pressure spring 18. The recess is easy to manufacture, and easy to arrange compared to conventional tension spring installation processes such as manually fastening one end of a tension spring to the contact support frame 121.

[0037] Optionally, a mounting post 124 may be disposed at a side, such as an upper side, of the contact support frame 121 opposite to the movable contact rod, and the latch 13 may be provided with a first connecting hole and a second connecting hole respectively connected to the linkage 14 and the mounting post 124. In this way, the latch 13 can be easily manufactured and easily installed.

[0038] Optionally, the latch 13 and the tripping rod 15 are respectively provided with a first engagement member 131 and a second engagement member 151 that can fit with each other at respective sides of the latch and the tripping rod that face each other. For example, the latch 13 may be provided with an engagement protrusion that protrudes towards the tripping rod 15, and the tripping rod 15 may be provided with a corresponding engagement recess. Obviously, it is also feasible to provide other mutually fitted engagement members on the latch 13 and the tripping rod 15.

[0039] Optionally, a first position-limiting portion, such as a position-limiting slot, may be formed at a side of the tripping rod 15 that faces the contact support frame 121, and a second position-limiting portion, such as a position-limiting protrusion, that fits with the slot wall of the position-limiting slot may be formed at a side of the contact support frame 121 that faces the tripping rod 15, thereby limiting the angle by which the tripping rod 15 can be rotated clockwise when the tripping rod 15 is unlocked from the latch 13. When the tripping rod 15 is in a tripping state, a counterclockwise rotation angle of the tripping rod 15 is restricted by the second end 162 of the handle torsion spring 16. In addition, when the tripping rod 15 is locked with the latch 13, the rotation stroke of the tripping rod 15 is restricted by the second end of the handle torsion spring 16 and the latch 13. It can be understood that other structures on the tripping rod 15 and the contact support frame 121 that are mutually fitted to achieve a position-limiting effect are also feasible.

[0040] Optionally, a connection member 153 pressed against the second end 162 of the handle torsion spring 16 may be further disposed on the tripping rod 15, to receive the pushing force exerted by the second end 162 of the handle torsion spring 16 in an energy storage state on the tripping rod 15. In an actual assembly process, the second end 162 of the handle torsion spring 16 only needs to be placed at a counterclockwise direction side of the connection member 153 with respect to the rotation center of the tripping rod 15. The assembly is extremely easy.

[0041] Optionally, a latch torsion spring may be disposed between the latch 13 and the mounting post 124, and a contact torsion spring may be disposed between the contact support frame 121 and the support rotating shaft 17. These elastic elements may be arranged to be in an energy storage state when the miniature circuit breaker 100 is in a closed state, so as to provide an elastic force enabling the contact support frame 121 and the latch 13 to move to the opening position after the tripping rod 15 is unlocked from the latch 13, thereby improving the operational reliability of the miniature circuit breaker 100.

[0042] It should be appreciated that although the description is presented according to each embodiment, each embodiment does not necessarily include only one independent technical solution. The presentation manner of the description is merely for clearness, and those skilled in the art should regard the description as a whole, and the technical solutions in the embodiments can also be appropriately combined to form other implementations comprehensible by those skilled in the art.

[0043] What is described above is merely exemplary specific implementations of the present invention, but is not intended to limit the scope of the present invention. Any equivalent change, modification, or combination made by those skilled in the art without departing from the conception and principle of the present invention shall fall within the protection scope of the present invention.

Claims

1. An operating system (10) of a miniature circuit breaker (100), the operating system (10) being mounted to a circuit breaker body of the miniature circuit breaker (100), the operating system (10) comprises:

   a handle, rotatably mounted to the circuit breaker body by means of a handle rotating shaft;
   a contact component (12), rotatably mounted to the circuit breaker body by means of a support rotating shaft (17) and remaining in contact with a static contact on the circuit breaker body;
   a latch (13), rotatably mounted to the contact component (12);
   a linkage (14), two ends of which are rotatably connected to the handle and the latch (13) respectively;
   a tripping rod (15), sleeved onto the support rotating shaft (17) and capable of rotating relative to the contact component (12); and
   a handle torsion spring (16), sleeved onto the handle rotating shaft, two ends of the handle torsion spring being respectively connected to the handle and the tripping rod (15), the handle torsion spring (16) being always in an energy storage state so as to push the tripping rod (15) towards the latch (13) to keep the tripping rod locked with the latch (13);
   wherein when the tripping rod (15), under the effect of an external force, overcomes a pushing force from the handle torsion spring (16) to rotate away from the latch (13) relative to the contact component (12), the tripping rod (15) is unlocked from the latch (13), so that when the handle moves to an opening position, the handle is capable of driving, by means of the linkage (14) and the latch (13), the contact component (12) to move so as to be separated from the static contact, and the handle further drives the latch (13) to rotate relative to the contact component (12) such that the latch is locked with the tripping rod (15) again.

2. The operating system (10) of the miniature circuit

breaker (100) according to claim 1, wherein the contact component (12) comprises a contact support frame (121) sleeved onto the support rotating shaft (17) and a contact rod (122) extending from the contact support frame (121) towards the static contact, a side of the contact rod facing the static contact is provided with a movable contact (123), and the contact support frame (121) and the contact rod (122) are integrally formed.

3. The operating system (10) of the miniature circuit breaker (100) according to claim 2, wherein the operating system (10) further comprises a contact pressure spring (18) disposed between the contact support frame (121) and the circuit breaker body, the contact pressure spring being in an energy storage state.

4. The operating system (10) of the miniature circuit breaker (100) according to claim 3, wherein the contact support frame (121) is provided with a recess used to accommodate an end portion of the contact pressure spring (18).

5. The operating system (10) of the miniature circuit breaker (100) according to claim 1, wherein the latch (13) is provided with a first connecting hole configured to connect to the linkage (14) and a second connecting hole configured to connect to the contact support frame (121).

6. The operating system (10) of the miniature circuit breaker (100) according to claim 1, wherein a first engagement member (131) is provided at a side of the latch (13) facing the tripping rod (15), and a second engagement member (151) fitting with the first engagement member (131) is provided at a side of the tripping rod (15) facing the latch (13).

7. The operating system (10) of the miniature circuit breaker (100) according to claim 2, wherein a first position-limiting portion is formed at a side of the tripping rod (15) facing the contact support frame (121), and a second position-limiting portion fitting with the first position-limiting portion is formed on the contact support frame (121).

8. The operating system (10) of the miniature circuit breaker (100) according to claim 1, wherein a connection member (153) pressed against an end portion of the handle torsion spring (16) is disposed on the tripping rod (15).

9. A miniature circuit breaker (100), **characterized by**: comprising a circuit breaker body and the operating system (10) of any one of claims 1 to 8.

Patentansprüche

1. Betriebssystem (10) eines Miniaturschutzschalters (100), wobei das Betriebssystem (10) an einem Schutzschaltergehäuse des Miniaturschutzschalters (100) montiert ist, wobei das Betriebssystem (10) Folgendes umfasst:

einen Griff, der mittels einer Griffdrehwelle drehbar am Schutzschaltergehäuse montiert ist;
eine Kontaktkomponente (12), die mittels einer Stützdrehwelle (17) drehbar am Schutzschaltergehäuse montiert ist und mit einem statischen Kontakt am Schutzschaltergehäuse in Kontakt bleibt;
eine Klinke (13), die drehbar an der Kontaktkomponente (12) montiert ist;
ein Gestänge (14), dessen beide Enden drehbar mit dem Griff bzw. der Klinke (13) verbunden sind;
eine Auslösestange (15), die auf die Stützdrehwelle (17) aufgeschoben ist und sich relativ zu der Kontaktkomponente (12) drehen kann; und
eine Grifftorsionsfeder (16), die auf die Griffdrehwelle aufgeschoben ist, wobei die beiden Enden der Grifftorsionsfeder jeweils mit dem Griff und der Auslösestange (15) verbunden sind, wobei sich die Grifftorsionsfeder (16) immer in einem Energiespeicherzustand befindet, um die Auslösestange (15) in Richtung der Klinke (13) zu drücken, um die Auslösestange mit der Klinke (13) verriegelt zu halten;
wobei, wenn die Auslösestange (15) unter der Wirkung einer äußeren Kraft eine Druckkraft von der Grifftorsionsfeder (16) überwindet, um sich relativ zu der Kontaktkomponente (12) von der Klinke (13) wegzudrehen, die Auslösestange (15) von der Klinke (13) entriegelt wird, so dass, wenn sich der Griff in eine Öffnungsposition bewegt, der Griff in der Lage ist, mittels des Gestänges (14) und der Klinke (13) die Kontaktkomponente (12) so zu bewegen, dass sie von dem statischen Kontakt getrennt wird, und der Griff außerdem die Klinke (13) dazu bringt, sich relativ zu der Kontaktkomponente (12) zu drehen, so dass die Klinke wieder mit der Auslösestange (15) verriegelt wird.

2. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 1,
wobei die Kontaktkomponente (12) einen Kontaktstützrahmen (121), der auf die Stützdrehwelle (17) aufgeschoben ist, und eine Kontaktstange (122) umfasst, die sich von dem Kontaktstützrahmen (121) in Richtung des statischen Kontakts erstreckt, wobei eine Seite der Kontaktstange, die dem statischen Kontakt zugewandt ist, mit einem beweglichen Kontakt (123) versehen ist, und der Kontaktstützrahmen

(121) und die Kontaktstange (122) einstückig ausgebildet sind.

3. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 2,
wobei das Betriebssystem (10) ferner eine Kontaktdruckfeder (18) umfasst, die zwischen dem Kontaktstützrahmen (121) und dem Schutzschaltergehäuse angeordnet ist, wobei sich die Kontaktdruckfeder in einem Energiespeicherzustand befindet.

4. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 3,
wobei der Kontaktstützrahmen (121) mit einer Aussparung versehen ist, die zur Aufnahme eines Endteils der Kontaktdruckfeder (18) dient.

5. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 1,
wobei die Klinke (13) mit einem ersten Verbindungsloch, das zur Verbindung mit dem Gestänge (14) konfiguriert ist, und einem zweiten Verbindungsloch, das zur Verbindung mit dem Kontaktstützrahmen (121) konfiguriert ist, versehen ist.

6. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 1,
wobei ein erstes Eingriffselement (131) an einer Seite der Klinke (13) vorgesehen ist, die der Auslösestange (15) zugewandt ist, und ein zweites Eingriffselement (151), das zu dem ersten Eingriffselement (131) passt, an einer Seite der Auslösestange (15) vorgesehen ist, die der Klinke (13) zugewandt ist.

7. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 2,
wobei ein erster Positionsbegrenzungsteil an einer Seite der Auslösestange (15), die dem Kontaktstützrahmen (121) zugewandt ist, ausgebildet ist, und ein zweiter Positionsbegrenzungsteil, der zu dem ersten Positionsbegrenzungsteil passt, an dem Kontaktstützrahmen (121) ausgebildet ist.

8. Betriebssystem (10) des Miniaturschutzschalters (100) nach Anspruch 1,
wobei ein Verbindungselement (153), das gegen einen Endteil der Grifftorsionsfeder (16) gedrückt wird, an der Auslösestange (15) angeordnet ist.

9. Miniaturschutzschalter (100), **gekennzeichnet durch** Folgendes:
umfassend ein Schutzschaltergehäuse und das Betriebssystem (10) nach einem der Ansprüche 1 bis 8.

Revendications

1. Système de commande (10) d'un disjoncteur miniature (100), le système de commande (10) étant monté sur un corps de disjoncteur du disjoncteur miniature (100), le système de commande (10) comprenant :

une poignée, montée de façon à pouvoir entrer en rotation sur le corps de disjoncteur au moyen d'un arbre rotatif de poignée ;
un composant de contact (12), monté de façon à pouvoir entrer en rotation sur le corps de disjoncteur au moyen d'un arbre rotatif de support (17) et restant en contact avec un contact statique sur le corps de disjoncteur ;
un loquet (13), monté de façon à pouvoir entrer en rotation sur le composant de contact (12) ;
une liaison (14), dont deux extrémités sont connectées de façon à pouvoir entrer en rotation à la poignée et au loquet (13) respectivement ;
une tige de déclenchement (15), emmanchée sur l'arbre rotatif de support (17) et apte à entrer en rotation par rapport au composant de contact (12) ; et
un ressort de torsion de poignée (16), emmanché sur l'arbre de rotation de poignée, deux extrémités du ressort de torsion de poignée étant respectivement connectées à la poignée et à la tige de déclenchement (15), le ressort de torsion de poignée (16) étant toujours dans un état de stockage d'énergie de façon à pousser la tige de déclenchement (15) vers le verrou (13) pour maintenir la tige de déclenchement verrouillée avec le loquet (13) ;
dans lequel lorsque la tige de déclenchement (15), sous l'effet d'une force externe, surmonte une force de poussée provenant du ressort de torsion de poignée (16) pour entrer en rotation à l'écart du loquet (13) par rapport au composant de contact (12), la tige de déclenchement (15) est déverrouillée du loquet (13), de sorte que lorsque la poignée se déplace vers une position d'ouverture, la poignée soit apte à entraîner, au moyen de la liaison (14) et du loquet (13), le composant de contact (12) à se déplacer de façon à être séparé du contact statique, et la poignée entraîne plus avant le loquet (13) à entrer en rotation par rapport au composant de contact (12) de telle sorte que le loquet soit à nouveau verrouillé avec la tige de déclenchement (15).

2. Système de commande (10) du disjoncteur miniature (100) selon la revendication 1, dans lequel le composant de contact (12) comprend un cadre de support de contact (121) emmanché sur l'arbre rotatif de support (17) et une tige de contact (122) s'étendant à partir du cadre de support de contact (121) vers le contact statique, un côté de la tige de contact faisant face au contact statique est pourvu d'un contact pouvant être déplacé (123), et le cadre de sup-

port de contact (121) et la tige de contact (122) sont formés d'un seul tenant.

3. Système de commande (10) du disjoncteur miniature (100) selon la revendication 2, dans lequel le système de commande (10) comprend en outre un ressort de pression de contact (18) disposé entre le cadre de support de contact (121) et le corps de disjoncteur, le ressort de pression de contact étant dans un état de stockage d'énergie.

4. Système de commande (10) du disjoncteur miniature (100) selon la revendication 3, dans lequel le cadre de support de contact (121) est pourvu d'un évidement utilisé pour accueillir une portion d'extrémité du ressort de pression de contact (18).

5. Système de commande (10) du disjoncteur miniature (100) selon la revendication 1, dans lequel le loquet (13) est pourvu d'un premier trou de connexion configuré pour se connecter à la liaison (14) et d'un deuxième trou de connexion configuré pour se connecter au cadre de support de contact (121).

6. Système de commande (10) du disjoncteur miniature (100) selon la revendication 1, dans lequel un premier élément de mise en prise (131) est prévu au niveau d'un côté du loquet (13) faisant face à la tige de déclenchement (15), et un deuxième élément de mise en prise (151) s'ajustant avec le premier élément de mise en prise (131) est prévu au niveau d'un côté de la tige de déclenchement (15) faisant face au loquet (13).

7. Système de commande (10) du disjoncteur miniature (100) selon la revendication 2, dans lequel une première portion de limitation de position est formée au niveau d'un côté de la tige de déclenchement (15) faisant face au cadre de support de contact (121), et une deuxième portion de limitation de position s'ajustant avec la première portion de limitation de position est formée sur le cadre de support de contact (121).

8. Système de commande (10) du disjoncteur miniature (100) selon la revendication 1, dans lequel un élément de connexion (153) pressé contre une portion d'extrémité du ressort de torsion de poignée (16) est disposé sur la tige de déclenchement (15).

9. Disjoncteur miniature (100), **caractérisé par** : le fait de comprendre un corps de disjoncteur et le système de commande (10) selon l'une quelconque des revendications 1 à 8.

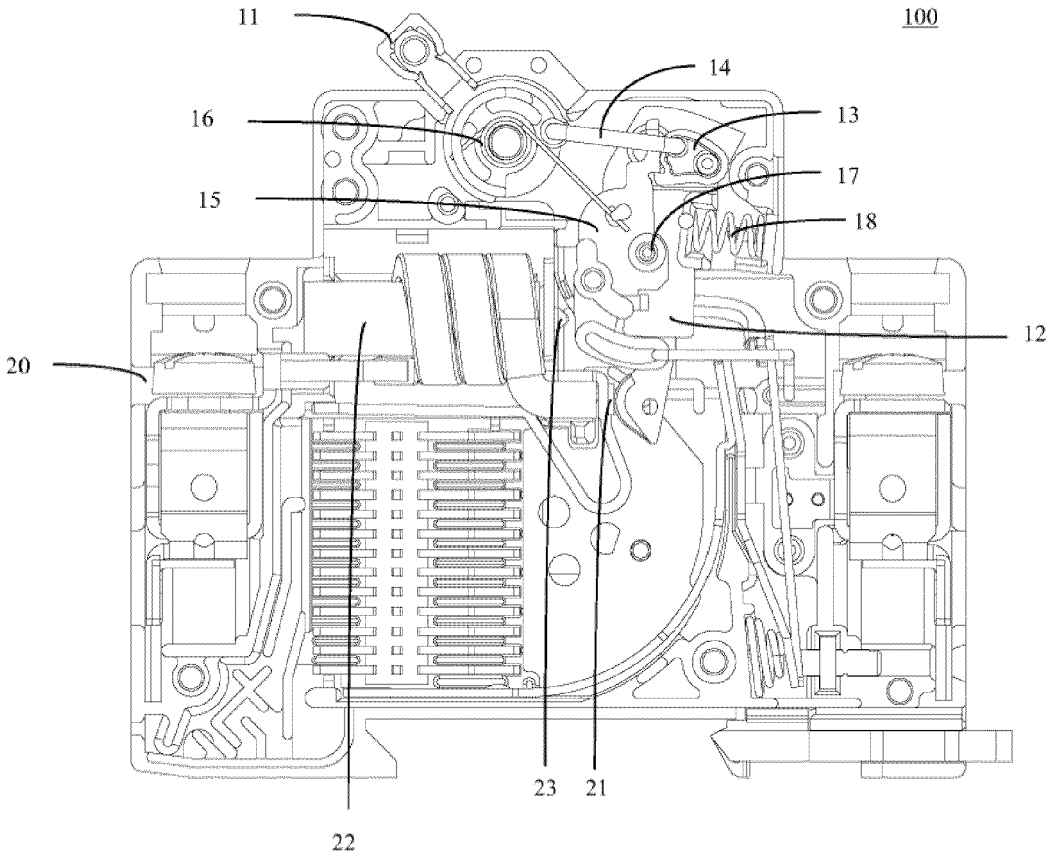

FIG. 1

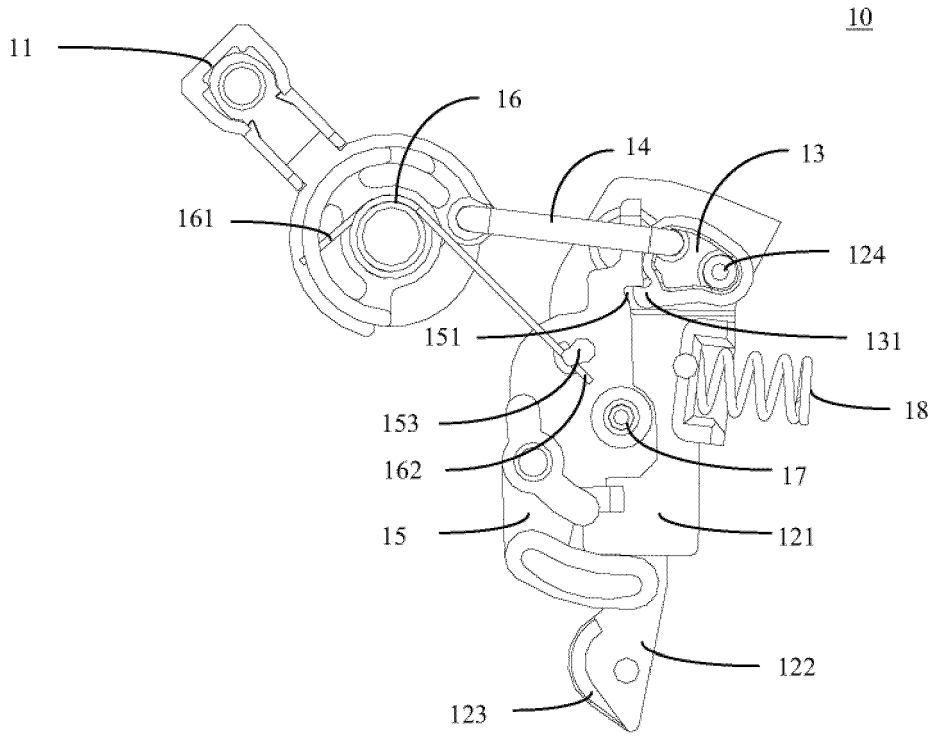

FIG. 2

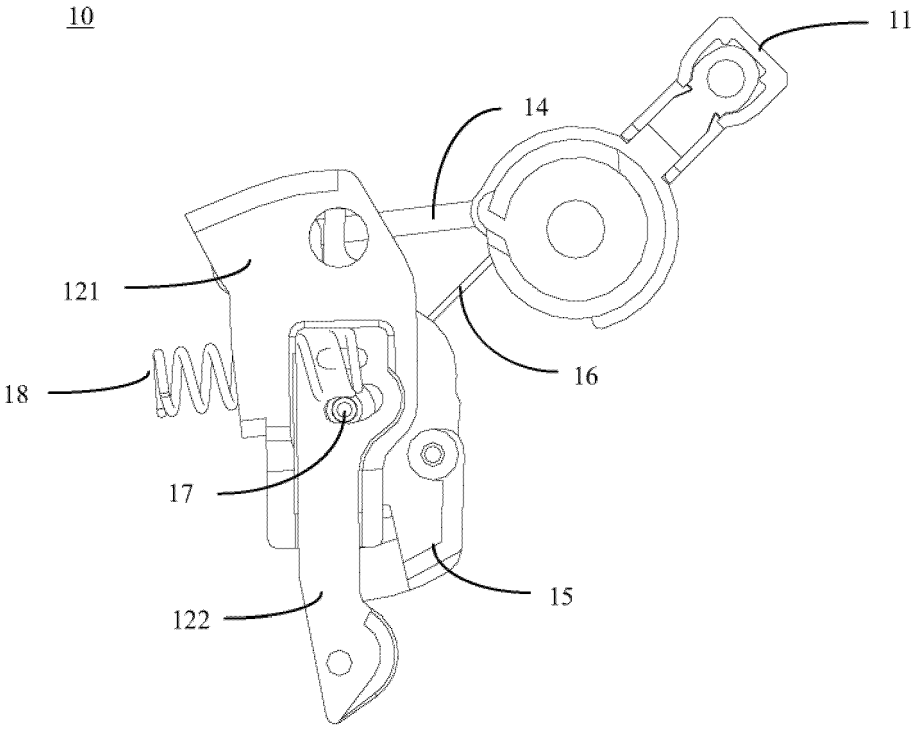

FIG. 3

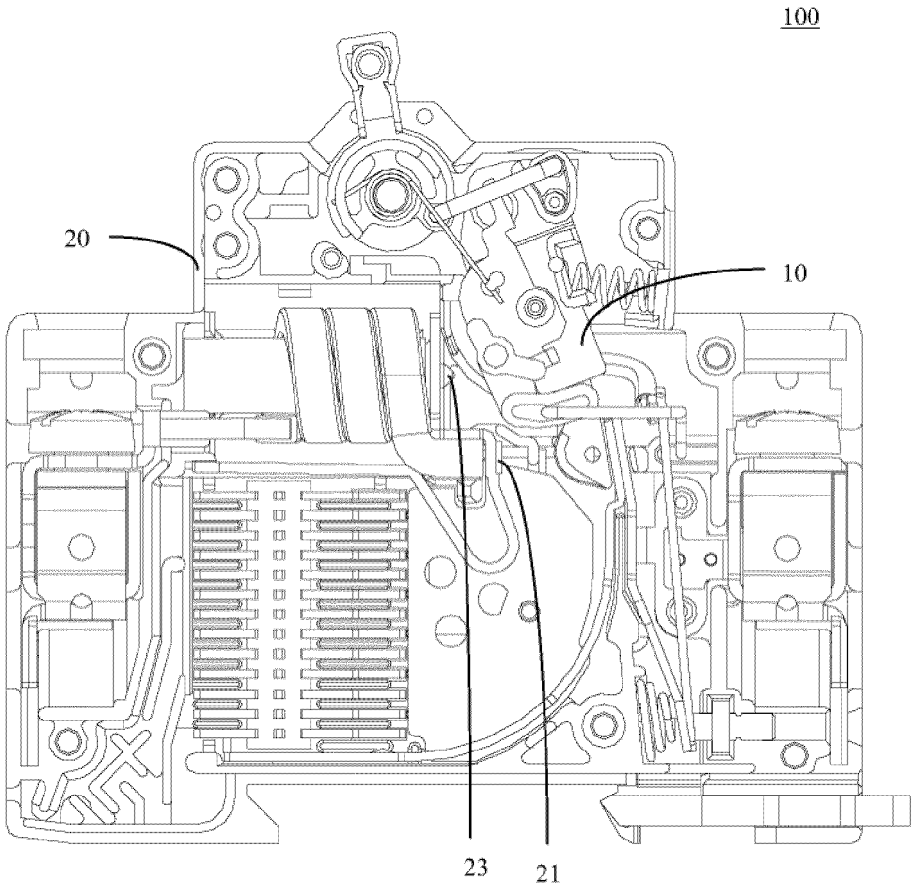

FIG. 4

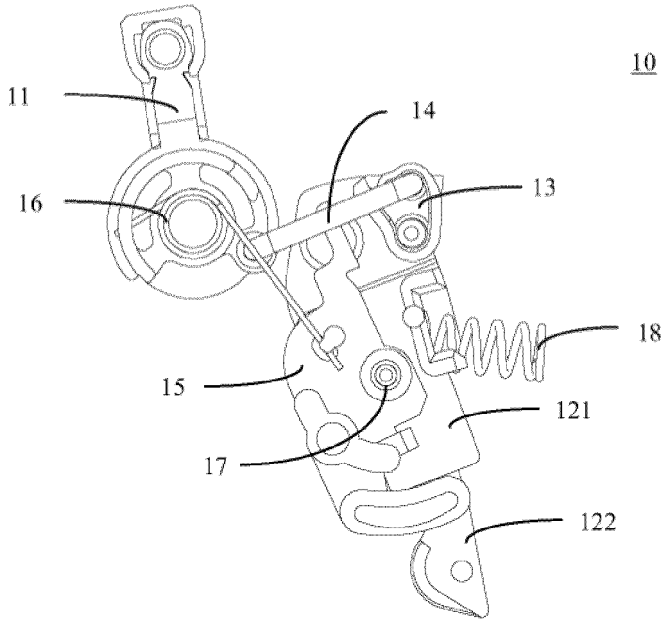

FIG. 5

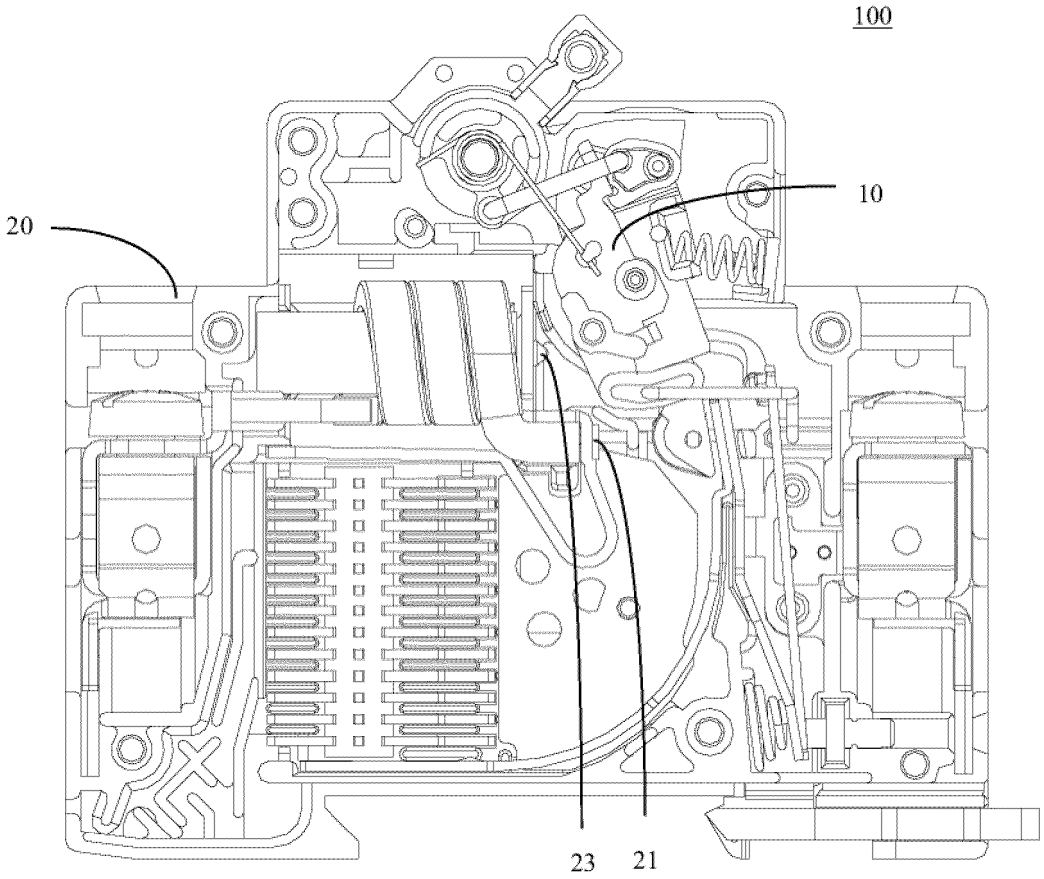

FIG. 6

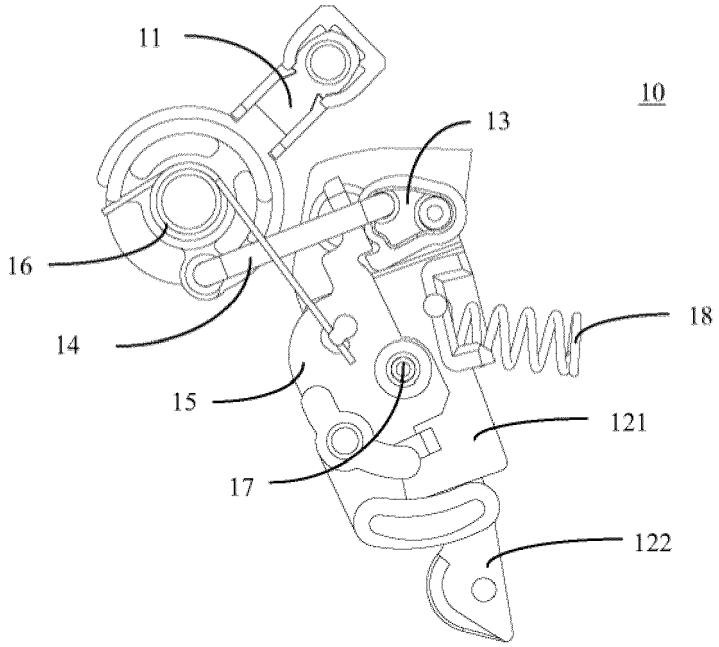

FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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