



(12)

EUROPEAN PATENT APPLICATION

- (43) Date of publication:
25.12.2024 Bulletin 2024/52

(21) Application number: 24305952.4

(22) Date of filing: 17.06.2024
- (51) International Patent Classification (IPC):
H01H 3/42 (2006.01) H01H 5/10 (2006.01)
H01H 19/18 (2006.01) H01H 19/64 (2006.01)

(52) Cooperative Patent Classification (CPC):
H01H 3/42; H01H 5/10; H01H 19/186; H01H 19/64

- (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 ME MK MT NL
NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

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- (30) Priority: 19.06.2023 CN 202321578648 U

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DC ISOLATING SWITCH

- (57) Embodiments of the present disclosure provide a DC isolating switch comprising an operating mechanism, the operating mechanism comprising an operating handle and a first rotating shaft, the operating handle being disposed on the first rotating shaft and rotating around the first rotating shaft; and a cam comprising a main portion and a second rotating shaft, the main portion being disposed on the second rotating shaft and capable

of rotating around the second rotating shaft, wherein a side of the main portion facing the operating mechanism is provided with an arc groove, a part of the first rotating shaft is disposed within the arc groove, and in a case that the main portion rotates around the second rotating shaft, different portions of a groove wall of the arc groove contact the first rotating shaft.

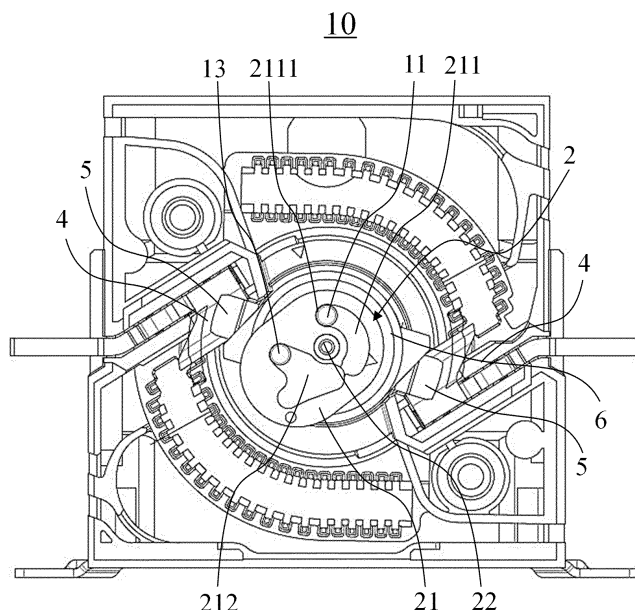


FIG. 2

Description

FIELD

[0001] Embodiments of the present disclosure generally relates to the field of electrical devices, and more specifically, to a DC isolating switch.

BACKGROUND

[0002] There is a high demand for a DC isolating switch having a small volume and a high voltage. When the DC isolating switch switches from a closed state to an opened state, an arc may be generated in a gap between contacts. A conventional DC isolating switch drives a moving contact and a stationary contact to separate from each other through an energy released by an elastic part, such that the arc is transferred and extinguished. Therefore, in order to meet a requirement of quickly extinguishing the arc, an elasticity of the elastic part is generally set to be large. However, the large elasticity will drive a cam to hit a main body mechanism with a large impact force, and a counter-impact force of the main body mechanism on the cam also leads to a phenomenon of deflection of the cam due to an uneven force, which will lead to easy fracture of a cam shaft and affect a service life of the DC isolating switch.

SUMMARY

[0003] An object of the present disclosure is to provide a DC isolating switch to at least partially solve the above problem.

[0004] The present disclosure provides a DC isolating switch comprising an operating mechanism, the operating mechanism comprising an operating handle and a first rotating shaft, the operating handle being disposed on the first rotating shaft and rotating around the first rotating shaft; and a cam comprising a main portion and a second rotating shaft, the main portion being disposed on the second rotating shaft and capable of rotating around the second rotating shaft, wherein a side of the main portion facing the operating mechanism is provided with an arc groove, a part of the first rotating shaft is disposed within the arc groove, and in a case that the main portion rotates around the second rotating shaft, different portions of a groove wall of the arc groove contact the first rotating shaft.

[0005] For the DC isolating switch, in case of needing to quickly extinguish the arc, the main body mechanism may generate a counter-impact force on the cam, which may lead to a phenomenon of deflection of the cam due to an uneven force. In embodiments according to the present disclosure, since in a case that the main portion rotates around the second rotating shaft, different portions of the groove wall of the arc groove contact the first rotating shaft, the first rotating shaft shares a part of the counter-impact force to which the cam is subjected, re-

ducing the counter-impact force borne by the second rotating shaft, thereby preventing the second rotating shaft from breaking and increasing the service life of the DC isolating switch. Thus, the DC isolating switch according to the present disclosure is capable of solving the problem that the second rotating shaft is prone to fracture due to the need of quickly extinguishing the arc.

[0006] In some embodiments, the operating mechanism further comprises an actuating shaft disposed on the operating handle and capable of rotating together with the operating handle, a side of the main portion facing the operating mechanism is further provided with an actuating groove, the actuating shaft is capable of moving within the actuating groove and contacts the groove wall of the actuating groove to push the main portion to rotate around the second rotating shaft.

[0007] In some embodiments, the arc groove comprises a first end, a second end and an identification position located between the first end and the second end, wherein in a case that the main portion rotates around the second rotating shaft to switch the first rotating shaft from being adjacent to the first end to being adjacent to the identification position, the DC isolating switch switches from a closed state to an opened state.

[0008] In some embodiments, the DC isolating switch further comprises a moving contact and a driving part connected to the moving contact, a side of the cam away from the operating mechanism is provided with a driving groove mating with the driving part, and the driving part is disposed within the driving groove.

[0009] In some embodiments, an outer side wall of the driving part is provided with a first limiting part, the DC isolating switch further comprises a second limiting part, wherein in a case that the first rotating shaft is adjacent to the identification position, a gap exists between the first limiting part and the second limiting part, during a process of the first rotating shaft switching from being adjacent to the identification position to being adjacent to the second end, the first limiting part moves toward the second limiting part, and in a case that the first rotating shaft is adjacent to the second end, the first limiting part contacts the second limiting part.

[0010] In some embodiments, the actuating groove is provided with a protrusion, wherein during a process of the main portion rotating around the second rotating shaft to switch the first rotating shaft from being adjacent to the identification position to being adjacent to the second end, the protrusion moves toward the actuating shaft, and in a case that the first rotating shaft is adjacent to the second end, the actuating shaft contacts the protrusion.

[0011] In some embodiments, the DC isolating switch further comprises a mounting part provided with a pair of arc holes thereon, the actuating shaft passes through one arc hole of the pair of arc holes, in a case that the operating handle is rotated, the actuating shaft is capable of moving along the corresponding arc hole.

[0012] In some embodiments, the operating mecha-

nism further comprises a third rotating shaft and a pair of elastic parts, one end of one elastic part of the pair of elastic parts is connected to the mounting part, and the other end is connected to the actuating shaft, one end of the other elastic part of the pair of elastic parts is connected to the mounting part, and the other end is connected to the third rotating shaft, the third rotating shaft passes through the other arc hole of the pair of arc holes, and in a case that the operating handle is rotated, the third rotating shaft is capable of moving along the corresponding arc hole.

[0013] It should be understood that what is described in this section is not intended to limit the key features or important features of the embodiments of the present disclosure, nor is it intended to limit the scope of the present disclosure. Other features of the present disclosure will be readily understood by the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The above and other features, advantages and aspects of the various embodiments of the present disclosure will become more apparent in conjunction with the accompanying drawings and with reference to the following detailed description. In the drawings, like or similar reference numerals denote like or similar elements, in which:

FIG. 1 shows a schematic structural diagram of a portion of a DC isolating switch according to some embodiments of the present disclosure, in which the operating handle is not shown;

FIG. 2 shows a schematic structural diagram of a portion of a DC isolating switch according to some embodiments of the present disclosure, in which the DC isolating switch is in a closed state, and the operating handle, the elastic part, and the mounting part are not shown;

FIG. 3 shows a schematic structural diagram of a portion of the DC isolating switch as shown in FIG. 2, in which the DC isolating switch is in an opened state;

FIG. 4 shows a schematic structural diagram of a portion of the DC isolating switch as shown in FIG. 2, in which the first rotating shaft is adjacent to the second end;

FIG. 5 shows a schematic structural diagram of a portion of a cam according to some embodiments of the present disclosure, in which the second rotating shaft is not shown;

FIG. 6 shows a schematic structural diagram of the cam as shown in FIG. 5 along another viewpoint.

[0015] List of reference symbols:

10 represents a DC isolating switch;
1 represents an operating mechanism, 11 repre-

sents a first rotating shaft, 12 represents an elastic part, 13 represents an actuating shaft, and 14 represents a third rotating shaft;

2 represents a cam, 21 represents a main portion, 211 represents an arc groove, 2111 represents a first end, 2112 represents a second end, 2113 represents an identification position, 212 represents an actuating groove, 213 represents a rotating hole, 214 represents a driving groove, 22 represents a second rotating shaft, and 23 represents a protrusion;

3 represents a mounting part, 31 represents an arc hole;

4 represents a stationary contact; 5 represents a moving contact; 6 represents a driving part, 61 represents a first limiting part; 7 represents a second limiting part.

DETAILED DESCRIPTION

[0016] Preferred embodiments of the present disclosure will be described in greater detail below with reference to the accompanying drawings. Although preferred embodiments of the present disclosure are shown in the accompanying drawings, it should be understood, however, that the present disclosure may be realized in various forms without being limited by the embodiments set forth herein. Rather, these embodiments are provided to make the present disclosure more thorough and complete and to enable the scope of the present disclosure to be communicated in its entirety to those skilled in the art.

[0017] The term "including" and variations thereof denote open-ended inclusion, i.e., "including but not limited to." Unless specifically stated, the term "or" denotes "and/or". The term "based on" means "at least partially based on". The terms "an example embodiment" and "an embodiment" denote "at least one example embodiment". The term "another embodiment" denotes "at least one additional embodiment". The terms "first", "second", etc. may refer to different or identical objects.

[0018] As described above, a counter-impact force of a main body mechanism on a cam leads to a phenomenon of deflection of the cam due to an uneven force, which will lead to easy fracture of a cam shaft and affect a service life of a DC isolating switch. The embodiments of the present disclosure provide a DC isolating switch to solve a problem that a second rotating shaft is prone to fracture due to the need of quickly extinguishing an arc. In the following, the principles of the present disclosure will be described in conjunction with FIGS. 1 to 6.

[0019] FIG. 1 shows a schematic structural diagram of a portion of a DC isolating switch 10 according to some embodiments of the present disclosure, in which the operating handle is not shown. FIG. 2 shows a schematic structural diagram of a portion of a DC isolating switch 10 according to some embodiments of the present disclosure, in which the DC isolating switch 10 is in a closed state, and the operating handle, the elastic part 12, and

the mounting part 3 are not shown. As shown in FIGS. 1 to 2, the DC isolating switch 10 described herein generally includes an operating mechanism 1, a cam 2, a mounting part 3, a stationary contact 4, a moving contact 5, a driving part 6, and a second limiting part 7.

[0020] As shown in FIG. 1, the mounting part 3 serves as a mounting carrier, which is used to set the operating mechanism 1. The mounting part 3 is provided with a pair of arc holes 31 thereon. The operating mechanism 1 includes an operating handle (not shown in the figure), a first rotating shaft 11, a pair of elastic parts 12, an actuating shaft 13, and a third rotating shaft 14.

[0021] Continuing as shown in FIG. 1, the first rotating shaft 11 is disposed on the mounting part 3, and the first rotating shaft 11 is limited by the mounting part 3. The operating handle is disposed on the first rotating shaft 11. Upon being driven, the operating handle is capable of rotating around the first rotating shaft 11 relative to the mounting part 3.

[0022] Continuing as shown in FIG. 1, in some embodiments, one end of one elastic part 12 of the pair of elastic parts 12 is connected to the mounting part 3, and the other end is connected to the actuating shaft 13. One end of the other elastic part 12 of the pair of elastic parts 12 is connected to the mounting part 3, and the other end is connected to the third rotating shaft 14. The actuating shaft 13 passes through one arc hole of the pair of arc holes 31. The third rotating shaft 14 passes through the other arc hole of the pair of arc holes 31. Both the actuating shaft 13 and the third rotating shaft 14 are disposed on the operating handle. Therefore, during a process of the operating handle rotating around the first rotating shaft 11, the actuating shaft 13 and the third rotating shaft 14 are capable of moving along the corresponding arc hole 31, simultaneously. It should be noted that the actuating shaft 13 and the third rotating shaft 14 have opposite paths of movement within the corresponding arc hole 31. That is, as shown in FIG. 1, in a case that the actuating shaft 13 rotates counterclockwise along the corresponding arc hole 31, the third rotating shaft 14 rotates clockwise within the corresponding arc hole 31. In a case that the actuating shaft 13 rotates clockwise along the corresponding arc hole 31, the third rotating shaft 14 rotates counterclockwise within the corresponding arc hole 31.

[0023] Utilizing the above configuration, as shown in FIG. 1, in a case that the operating handle is rotated, the actuating shaft 13 and the third rotating shaft 14 are capable of moving along the corresponding arc hole 31, respectively, and the paths of movement of the actuating shaft 13 and the third rotating shaft 14 are opposite. Then, in a case that the operating handle moves to a certain position, the actuating shaft 13 and the third rotating shaft 14 are capable of driving the corresponding elastic part 12 to a dead point position, that is, a straight line is formed approximately between the pair of elastic parts 12. The pair of elastic parts 12 are unstable at the dead point position, and the pair of elastic parts 12 are compressed

by the force. The elastic part 12 in a compressed state is capable of releasing energy and driving the actuating shaft 13 and the third rotating shaft 14 to continue to move within the corresponding arc holes 31, thereby driving the operating handle to switch the DC isolating switch 10 between the closed state and the opened state. In a case that the pair of elastic parts 12 are in the dead point position, the moving contact 5 and the stationary contact 4 are in a critical state between a separated state and a connected state. That is, the moving contact 5 and stationary contact 4 are about to separate or about to connect.

[0024] It can be understood that during a process of the pair of elastic parts 12 switching from other positions to the dead point position, the operator needs to turn the operating handle to drive the elastic part 12 to move. In a case that the pair of elastic parts 12 are switched to the dead point position, the elastic part 12 is compressed to store energy. The elastic part 12 in the compressed state is capable of releasing energy and driving the actuating shaft 13 and the third rotating shaft 14 to move, thereby driving the operating handle to move without the need for the operator to apply force to rotate the operating handle.

[0025] An exemplary structure of the DC isolating switch 10 is further described below in connection with FIGS. 3 to 4. FIG. 3 shows a schematic structural diagram of a portion of the DC isolating switch 10 as shown in FIG. 2, in which the DC isolating switch 10 is in an opened state. FIG. 4 shows a schematic structural diagram of a portion of the DC isolating switch 10 as shown in FIG. 2, in which the first rotating shaft 11 is adjacent to the second end 2112. FIG. 5 shows a schematic structural diagram of a portion of a cam 2 according to some embodiments of the present disclosure, in which the second rotating shaft 22 is not shown. As shown in conjunction with FIGS. 2 to 5, the cam 2 includes a main portion 21 and a second rotating shaft 22. The main portion 21 is provided with a rotating hole 213 thereon, and the main portion 21 is disposed on the second rotating shaft 22 through the rotating hole 213. The main portion 21 is capable of rotating around the second rotating shaft 22. A side of the main portion 21 facing the operating mechanism 1 is provided with an arc groove 211 and an actuating groove 212. A part of the actuating shaft 13 is disposed within the actuating groove 212, and the third rotating shaft 14 is not in contact with the cam 2. Since the actuating shaft 13 is capable of rotating together with the operating handle, in a case that the operating handle is rotated, the actuating shaft 13 is capable of moving within the actuating groove 212 and contacts a groove wall of the actuating groove 212 to push the main portion 21 to rotate around the second rotating shaft 22. A part of the first rotating shaft 11 is disposed within the arc groove 211. In a case that the actuating shaft 13 pushes the main portion 21 to rotate around the second rotating shaft 22, different portions of a groove wall of the arc groove 211 contact the first rotating shaft 11. It will be appreciated that since the

first rotating shaft 11 is fixed on the mounting part 3, the first rotating shaft 11 cannot move. However, since the main portion 21 is capable of rotating around the second rotating shaft 22, the first rotating shaft 11 is capable of contacting different portions of the groove wall of the arc groove 211.

[0026] It is noted that there is a spacing between a part of the first rotating shaft 11 located within the arc groove 211 and the bottom of the groove of the arc groove 211. There is also a spacing between a part of the actuating shaft 13 located within the actuating groove 212 and the bottom of the groove of the actuating groove 212.

[0027] Continuing as shown in FIGS. 2 to 5, in some embodiments, the arc groove 211 includes a first end 2111, a second end 2112, and an identification position 2113 located between the first end 2111 and the second end 2112. In a case that the operating handle is rotated, the actuating shaft 13 is capable of moving along the arc hole 31. A part of the actuating shaft 13 moves within the actuating groove 212 and contacts the groove wall of the actuating groove 212 to push the main portion 21 to rotate around the second rotating shaft 22, such that the first rotating shaft 11 switches from being adjacent to the first end 2111 to being adjacent to the identification position 2113, and the DC isolating switch 10 switches from the closed state to the opened state.

[0028] An exemplary structure of the cam 2 is described further below in connection with FIG. 6. FIG. 6 shows a schematic structural diagram of the cam as shown in FIG. 5 along another viewpoint. As shown in FIGS. 2 to 4 and FIG. 6, a side of the cam 2 away from the operating mechanism 1 is provided with a driving groove 214 mating with the driving part 6. The driving part 6 is provided within the driving groove 214. The moving contact 5 is connected to the driving part 6 and is provided in correspondence with the stationary contact 4. By utilizing the above configuration, the moving contact 5 and the driving part 6 are capable of moving together with the cam 2. As shown in FIG. 2, in a case that the cam 2 drives the moving contact 5 to move and connects the moving contact 5 to the stationary contact 4, the DC isolating switch 10 is in the closed state. As shown in FIG. 3, in a case that the cam 2 drives the moving contact 5 to move and separates the moving contact 5 from the stationary contact 4, the DC isolating switch 10 is in the opened state.

[0029] With the above configuration, in a case that the main portion 21 rotates around the second rotating shaft 22, the main portion 21 can drive the driving part 6 to move together. The driving part 6 drives the moving contact 5 to move towards or away from the stationary contact 4 to realize switching of the DC isolating switch 10 between the opened state and the closed state.

[0030] Returning to FIG. 2, in a case that the first rotating shaft 11 is adjacent to the first end 2111, the moving contact 5 is connected to the stationary contact 4 and the DC isolating switch 10 is in the closed state. Returning to FIG. 3, in a case that the operating handle is rotated,

the actuating shaft 13 is capable of moving synchronously. The actuating shaft 13 moves within the actuating groove 212 and contacts the groove wall of the actuating groove 212 to push the main portion 21 to rotate around the second rotating shaft 22. During a process of the movement, the first rotating shaft 11 switches from being adjacent to the first end 2111 to being adjacent to the identification position 2113, and the main portion 21 drives the moving contact 5 to move away from the stationary contact 4. In a case that the first rotating shaft 11 is adjacent to the identification position 2113, the moving contact 5 is separated from the stationary contact 4 and the DC isolating switch 10 is in the opened state.

[0031] Continuing back to FIG. 4, an outer side wall of the driving part 6 is provided with a first limiting part 61. In a case that the first rotating shaft 11 is adjacent to the identification position 2113, the first limiting part 61 is provided in correspondence with the second limiting part 7 and there is a spacing between the first limiting part 61 and the second limiting part 7. The spacing facilitates elongating an arc column of the arc to make the arc voltage larger, thereby facilitating the extinguishing of the arc. During a process of the first rotating shaft 11 switching from being adjacent to the identification position 2113 to being adjacent to the second end 2112, the first limiting part 61 moves toward the second limiting part 7. In a case that the first rotating shaft 11 is adjacent to the second end 2112, the first limiting part 61 contacts and hits the second limiting part 7.

[0032] It should be noted that in a case that the actuating shaft 13 moves along the corresponding arc hole 31 and causes the actuating shaft 13 to move to an end of the arc hole 31, although the actuating shaft 13 is limited by the end of the arc hole 31 and cannot continue to move, the cam 2 is capable of continuing to move due to the inertia to cause the first limiting part 61 to hit the second limiting part 7, and causing the first rotating shaft 11 to switch from being adjacent to the identification position 2113 to being adjacent to the second end 2112. The elasticity of the elastic part 12 is generally set to be large due to the need for quick extinguishing of the arc. Therefore, the force released by the elastic part 12 enables the first limiting part 61 to quickly hit the second limiting part 7.

[0033] On the one hand, a rapid hitting of the first limiting part 61 on the second limiting part 7 is easy to lead to a phenomenon that the cam 2 is subjected to an uneven force and is deflected, which in turn leads to the second rotating shaft 22 of the cam 2 being subjected to a force and breaking. To solve the above problem, as shown in FIGS. 2 to 4, in some embodiments, a part of the first rotating shaft 11 is provided within the arc groove 211. In a case that the main portion 21 rotates around the second rotating shaft 22, different portions of the groove wall of the arc groove 211 contact the first rotating shaft 11. Utilizing the above configuration, since the first rotating shaft 11 is always in contact with the groove wall of the arc groove 211, in a case that the first limiting part

61 quickly hits the second limiting part 7, the first rotating shaft 11 shares a part of the counter-impact force on the cam 2 and reduces the counter-impact force on the second rotating shaft 22, thereby effectively preventing the second rotating shaft 22 from breaking and increasing the service life of the DC isolating switch 10.

[0034] On the other hand, the rapid hitting of the first limiting part 61 on the second limiting part 7 is also easy to lead damage to the first limiting part 61 and/or the second limiting part 7. To solve the above problems, as shown in FIGS. 2 to 4, in some embodiments, the actuating groove 212 is provided with a protrusion 23. During a process of the main portion 21 continuing to rotate around the second rotating shaft 22 due to inertia and causing the first rotating shaft 11 to switch from being adjacent to the identification position 2113 to being adjacent to the second end 2112, the protrusion 23 moves toward the actuating shaft 13, and in a case that the first rotating shaft 61 is adjacent to the second end 2112, the actuating shaft 13 contacts the protrusion 23. Utilizing the above configuration, the force exerted by the actuating shaft 13 on the protrusion 23 is also capable of preventing the main portion 21 from continuing to rotate, thereby reducing the force of the first limiting part 61 hitting the second limiting part 7, which in turn allows the first limiting part 61 and/or second limiting part 7 are less likely to be damaged, which is benefit for increasing the service life of the DC isolating switch 10. It is to be understood that, as shown in FIG. 4, the force exerted by the actuating shaft 13 on the protrusion 23 causes the main portion 21 to have a tendency to rotate clockwise, thereby causing the first limiting part 61 to have a tendency to move away from the second limiting part 7, which is benefit for reducing the force exerted by the first limiting part 61 hitting the second limiting part 7.

[0035] As shown in FIGS. 3 to 4, in some embodiments, in a case that the actuating shaft 13 contacts the groove wall of the actuating groove 212, the actuating shaft 13, the first rotating shaft 11, and the second rotating shaft 22 are all capable of contacting the main portion 21. With the above configuration, the parts of the actuating shaft 13, the first rotating shaft 11, and the second rotating shaft 22 in contact with the main portion 21 form a triangle. In other words, a three-axis positioning helps to ensure the stability of the cam 2 during movement, and prevents the cam 2 from shifting, so that the second rotating shaft 22 will not be subjected to a force, thereby preventing the second rotating shaft 22 from breaking, and increasing the service life of the DC isolating switch 10.

[0036] The cam 2 of the embodiments according to the present disclosure can be applied to various DC isolating switches 10 so as to the problem that the second rotating shaft is prone to fracture due to the need of quickly extinguishing the arc. It should be understood that the cam according to the embodiments of the present disclosure may also be applied to other components, and the embodiments of the present disclosure are not limited in this regard.

[0037] Various embodiments of the present disclosure have been described above, and the foregoing description is exemplary and not exhaustive, and is not limited to the various embodiments disclosed. Without departing from the scope and spirit of the various embodiments described, many modifications and changes will be apparent to one of ordinary skill in this field. The terminology used herein has been chosen to best explain the principles, practical applications, or improvements to the technology in the marketplace of the respective embodiments, or to enable others of ordinary skill in this field to understand the respective embodiments disclosed herein.

Claims

1. A DC isolating switch (10), **characterized by** comprising:

an operating mechanism (1) comprising an operating handle and a first rotating shaft (11), the operating handle being disposed on the first rotating shaft (11) and rotating around the first rotating shaft (11); and

a cam (2) comprising a main portion (21) and a second rotating shaft (22), the main portion (21) being disposed on the second rotating shaft (22) and capable of rotating around the second rotating shaft (22), wherein a side of the main portion (21) facing the operating mechanism (1) is provided with an arc groove (211), a part of the first rotating shaft (11) is disposed within the arc groove (211), and in a case that the main portion (21) rotates around the second rotating shaft (22), different portions of a groove wall of the arc groove (211) contact the first rotating shaft (11).

2. The DC isolating switch (10) of claim 1, **characterized in that** the operating mechanism (1) further comprises an actuating shaft (13) disposed on the operating handle and capable of rotating together with the operating handle, a side of the main portion (21) facing the operating mechanism (1) is further provided with an actuating groove (212), the actuating shaft (13) is capable of moving within the actuating groove (212) and contacts the groove wall of the actuating groove (212) to push the main portion (21) to rotate around the second rotating shaft (22).
3. The DC isolating switch (10) of claim 2, **characterized in that** the arc groove (211) comprises a first end (2111), a second end (2112) and an identification position (2113) located between the first end (2111) and the second end (2112), wherein in a case that the main portion (21) rotates around the second rotating shaft (22) to switch the first rotating shaft

(11) from being adjacent to the first end (2111) to being adjacent to the identification position (2113), the DC isolating switch (10) switches from a closed state to an opened state.

4. The DC isolating switch (10) of claim 3, **characterized in that** the DC isolating switch (10) further comprises a moving contact (5) and a driving part (6) connected to the moving contact (5), a side of the cam (2) away from the operating mechanism (1) is provided with a driving groove (214) mating with the driving part (6), and the driving part (6) is disposed within the driving groove (214). 5 10
5. The DC isolating switch (10) of claim 4, **characterized in that** an outer side wall of the driving part (6) is provided with a first limiting part (61), the DC isolating switch (10) further comprises a second limiting part (7), wherein in a case that the first rotating shaft (11) is adjacent to the identification position (2113), a gap exists between the first limiting part (61) and the second limiting part (7), during a process of the first rotating shaft (11) switching from being adjacent to the identification position (2113) to being adjacent to the second end (2112), the first limiting part (61) moves toward the second limiting part (7), and in a case that the first rotating shaft (11) is adjacent to the second end (2112), the first limiting part (61) contacts the second limiting part (7). 15 20 25 30
6. The DC isolating switch (10) of claims 5, **characterized in that** the actuating groove (212) is provided with a protrusion (23), wherein during a process of the main portion (21) rotating around the second rotating shaft (22) to switch the first rotating shaft (11) from being adjacent to the identification position (2113) to being adjacent to the second end (2112), the protrusion (23) moves toward the actuating shaft (13), and in a case that the first rotating shaft (11) is adjacent to the second end (2112), the actuating shaft (13) contacts the protrusion (23). 35 40
7. The DC isolating switch (10) of claim 2, **characterized in that** the DC isolating switch (10) further comprises a mounting part (3) provided with a pair of arc holes (31) thereon, the actuating shaft (13) passes through one arc hole (31) of the pair of arc holes (31), in a case that the operating handle is rotated, the actuating shaft (13) is capable of moving along the corresponding arc hole (31). 45 50
8. The DC isolating switch (10) of claim 7, **characterized in that** the operating mechanism (1) further comprises a third rotating shaft (14) and a pair of elastic parts (12), one end of one elastic part (12) of the pair of elastic parts (12) is connected to the mounting part (3), and the other end is connected to the actuating shaft (13), one end of the other elastic 55

part (12) of the pair of elastic parts (12) is connected to the mounting part (3), and the other end is connected to the third rotating shaft (14), the third rotating shaft (14) passes through the other arc hole of the pair of arc holes (31), and in a case that the operating handle is rotated, the third rotating shaft (14) is capable of moving along the corresponding arc hole (31).

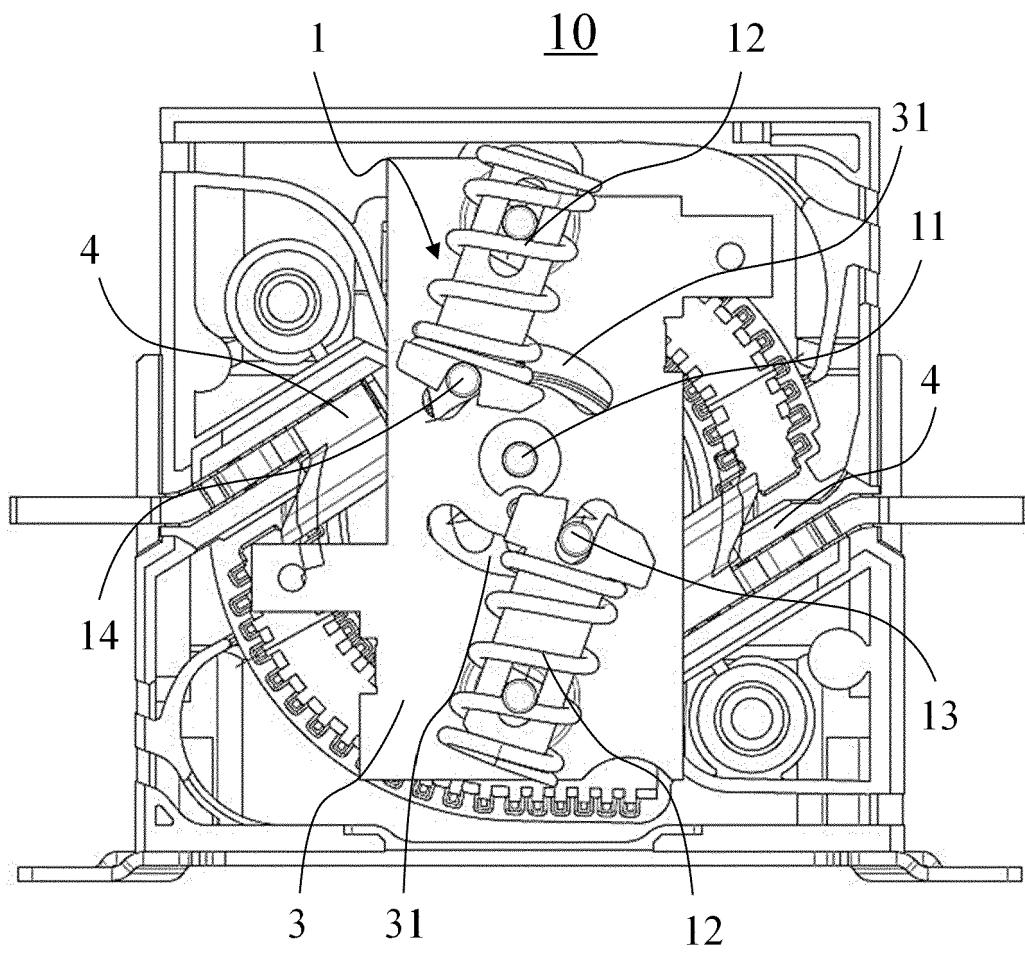


FIG. 1

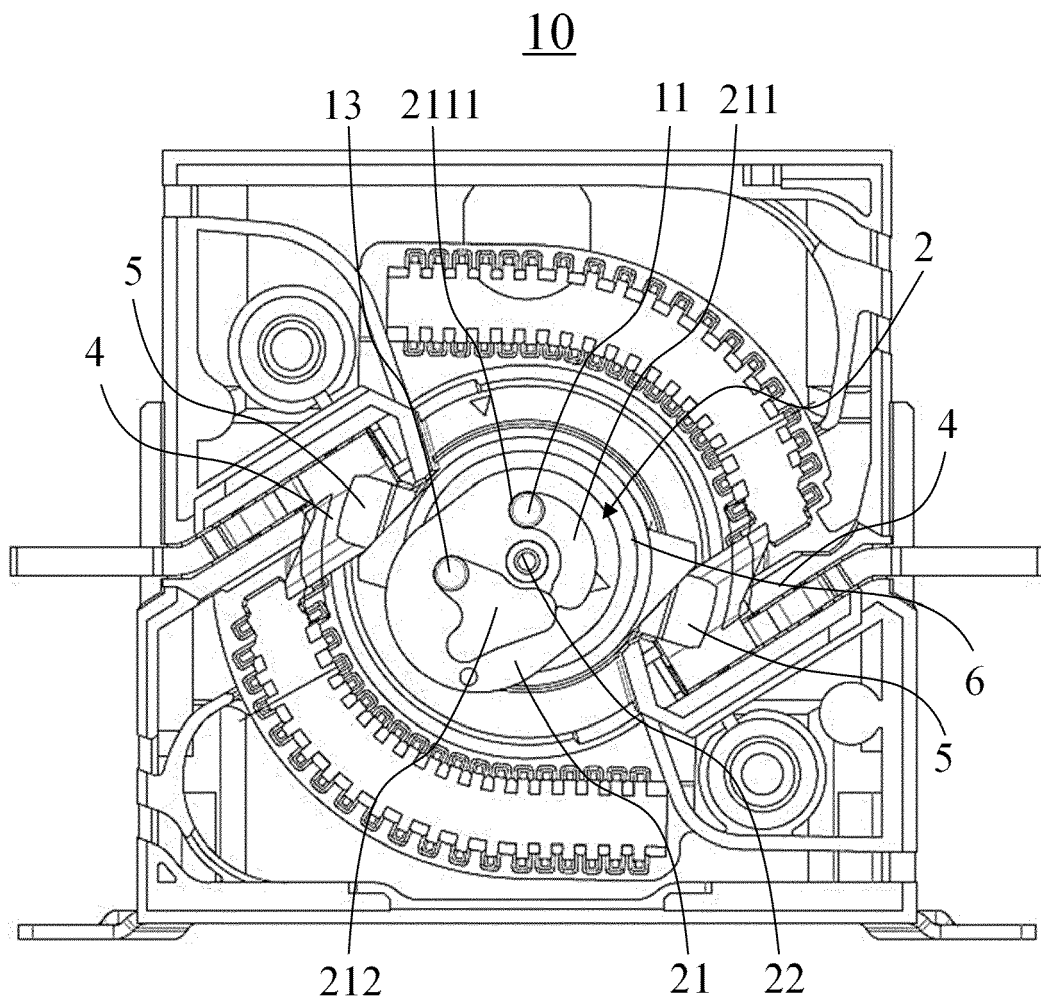


FIG. 2

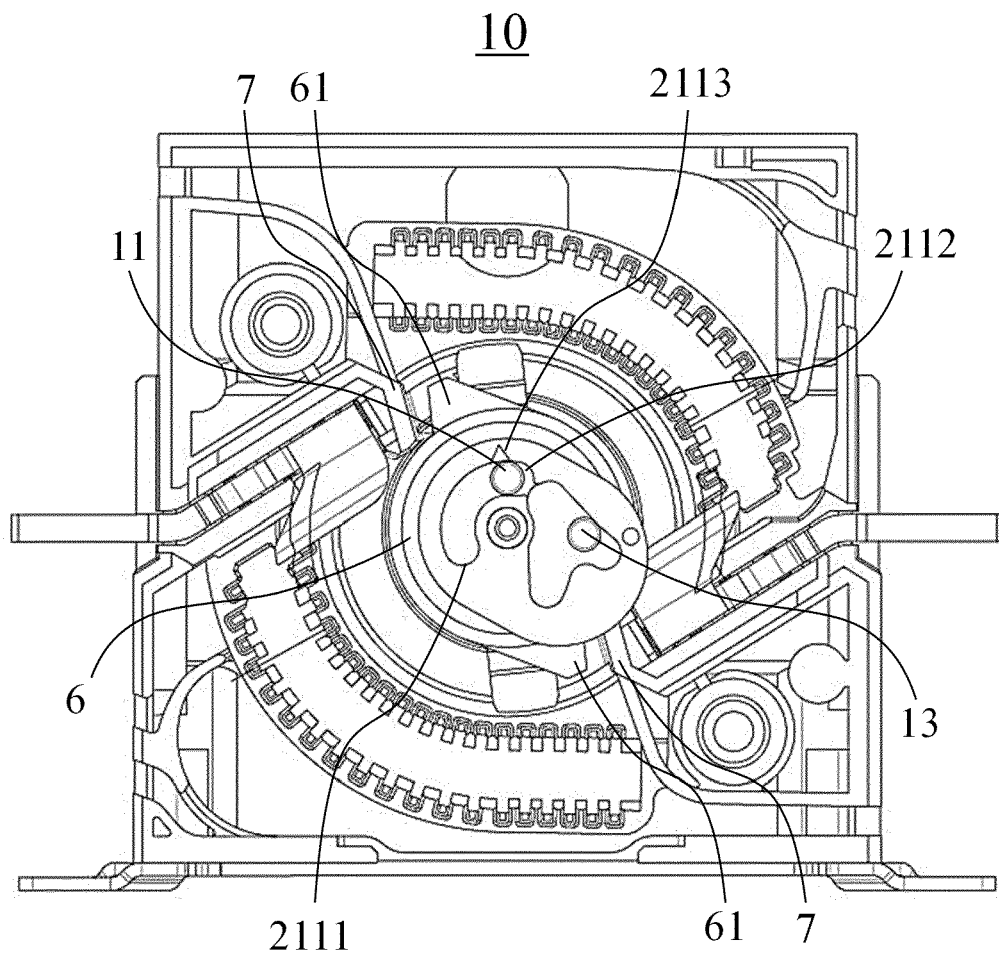


FIG. 3

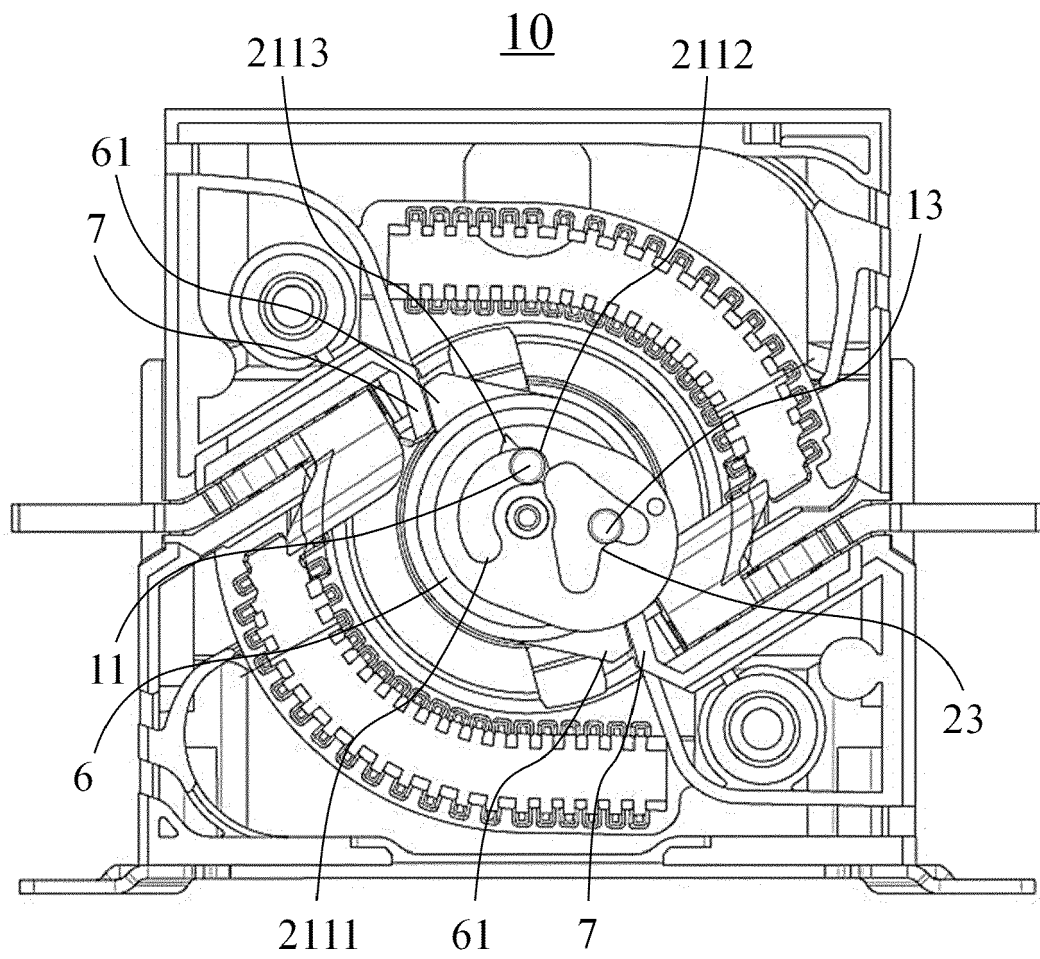


FIG. 4

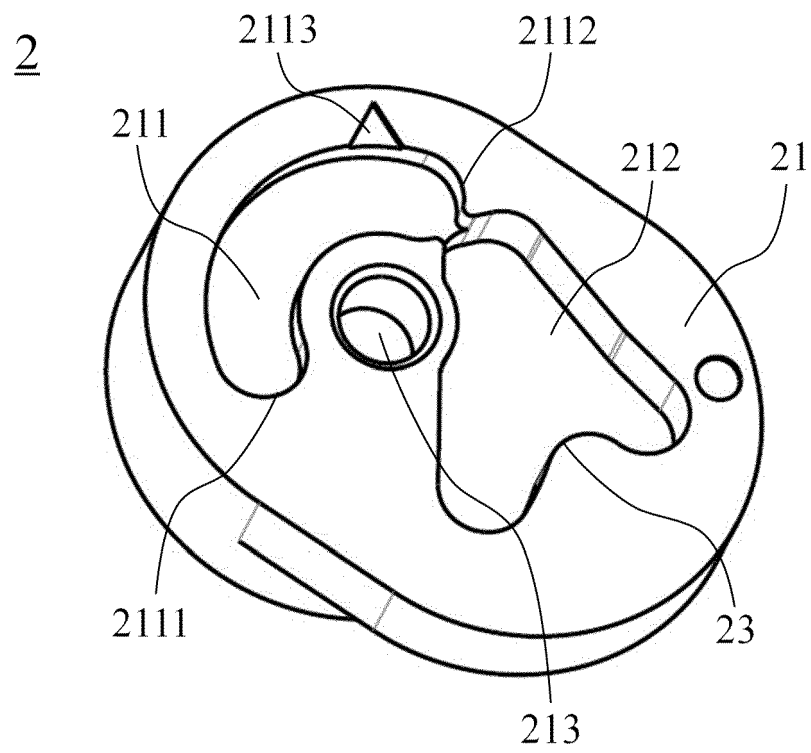


FIG. 5

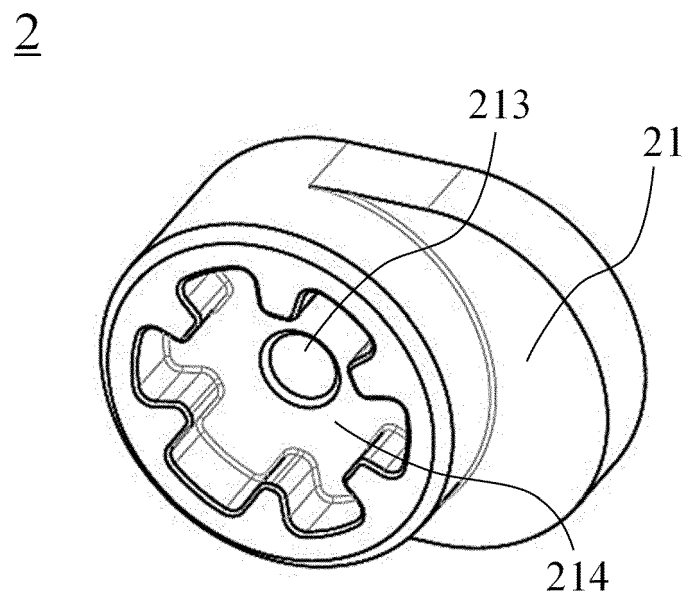


FIG. 6



EUROPEAN SEARCH REPORT

Application Number

EP 24 30 5952

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 104 425 147 A (SIEMENS AG) 18 March 2015 (2015-03-18)	1	INV. H01H3/42
Y	* page 7, paragraph 0035 - page 9, paragraph 0052; figures 1, 2, 5, 6, * -----	2-8	H01H5/10 H01H19/18
Y	US 2023/115069 A1 (HUANG JIANYONG [CN] ET AL) 13 April 2023 (2023-04-13)	2-8	ADD. H01H19/64
A	* page 3, paragraph 0050 - page 4, paragraph 0065; figures 5, 7-9, 16 * -----	1	
A	CN 107 622 883 A (ZHEJIANG KERUIPU ELECTRICAL CO LTD) 23 January 2018 (2018-01-23) * page 4, paragraph 0019 - page 5, paragraph 0021; figures 1-6 * -----	1-8	
A	CN 218 038 969 U (GREEN CENTURY TECH CO LTD) 13 December 2022 (2022-12-13) * page 7, paragraph 0067 - page 14, paragraph 0113; figures 1-4 * -----	1-8	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 October 2024	Examiner Pavlov, Valeri
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 24 30 5952

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14 - 10 - 2024

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 104425147 A	18-03-2015	CN 104425147 A	18-03-2015
		EP 2843676 A1	04-03-2015
US 2023115069 A1	13-04-2023	CN 110189955 A	30-08-2019
		DE 112019000690 T5	05-08-2021
		US 2023115069 A1	13-04-2023
		WO 2020252832 A1	24-12-2020
CN 107622883 A	23-01-2018	NONE	
CN 218038969 U	13-12-2022	CN 113345747 A	03-09-2021
		CN 115602473 A	13-01-2023
		CN 115602474 A	13-01-2023
		CN 115602475 A	13-01-2023
		CN 218004705 U	09-12-2022
		CN 218038967 U	13-12-2022
		CN 218038968 U	13-12-2022
		CN 218038969 U	13-12-2022

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EPO FORM P0459

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