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(54) **OPERATING MECHANISM FOR DUAL-POWER CHANGEOVER SWITCH AND DUAL-POWER CHANGEOVER SWITCH**

BETÄTIGUNGSMECHANISMUS FÜR EINEN ZWEISTROM-UMSCHALTER UND
ZWEISTROM-UMSCHALTER

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to an operating mechanism for a dual-power changeover switch and a dual-power changeover switch.

BACKGROUND

[0002] Dual-power changeover switches are widely used in industrial fields, especially in emergency power supply systems or places where power outage is not permitted. Based on the status of a power supply circuit, the dual-power changeover switch allows a load circuit connected to one power supply to be connected to another power supply, for example, switching between commercial power grid and standby power supply, thus maintaining continuous and reliable operation of the load circuit.

[0003] Like other power distribution components, the dual-power changeover switch can also be divided into different housing frames according to the current level. However, compared with products such as circuit breakers and contactors, the demand for dual-power changeover switch is relatively small. In order to achieve the purpose of reducing cost and increasing production efficiency, it is an extremely effective means to reuse components and parts for housing frames of different current levels to the maximum extent.

[0004] Dual-power changeover switch is generally divided into two portions, which are an operating mechanism and a breaking unit, respectively. The operating mechanism transfers energy to a movable contact carrier of the breaking unit so that the movable contact performs opening and closing motions. For modular designs, more and more attentions have been paid to the case where a high-current dual-power changeover switch employs part of modules of a low-current dual-power changeover switch. For example, the reused module can be the operating mechanism of the dual-power changeover switch. Of course, the breaking unit can also be reused to a certain extent. Such layout is especially suitable for products with smaller demand and larger number of components and parts.

[0005] Moreover, for a relatively wider breaking unit, that is, if the ratio of a length to a diameter of the movable contact carrier is large (it can be considered as an elongate shaft), it is easy to result in nonsynchronous closing between poles when drive at a single side.

[0006] Therefore, there is a need for a dual-power changeover switch that can reliably switch synchronously under the condition of reusing modular units.

[0007] EP 3 933 869 A1 discloses an operating mechanism for a dual power supply changeover switch capable of switching among a dual-off position, a first power-on position and a second power-on position. The operating mechanism includes: a first supporting plate and a second supporting plate which are parallel to each other

and spaced apart from each other; a plurality of first supporting members configured to fix the first supporting plate and the second supporting plate together; a first electromagnet assembly and a second electromagnet assembly which are symmetrically mounted on the first supporting plate and the second supporting plate about a symmetry plane; and an output assembly mounted on the first supporting plate and the second supporting plate along a rotation axis in the symmetry plane, the output assembly is capable of rotating around the rotation axis and has a first driving rod, the first driving rod protrudes from the second supporting plate and is connected to a movable contact carrier. The first electromagnet assembly and the second electromagnet assembly are configured to drive the output assembly to rotate in a first direction and a second direction which are opposite to each other, respectively, and hence to drive the movable contact carrier of the dual power supply changeover switch to rotate by the first driving rod.

SUMMARY

[0008] The purpose of the present disclosure is to provide an operating mechanism for a dual-power changeover switch and a dual-power changeover switch. Such an operating mechanism can ensure that a dual-power changeover switch reusing a modular unit can perform reliable synchronous switching, with simple structure and low cost.

[0009] The above objective of the present disclosure is achieved by the operating mechanism and the dual-power changeover switch described below.

[0010] On the one hand, the present disclosure provides an operating mechanism for a dual-power changeover switch, the operating mechanism is configured to drive breaking units of poles of the dual-power changeover switch simultaneously, so that the dual-power changeover switch can be switched between different states. The operating mechanism includes: a manual operating device arranged on a first side of a housing of the dual-power changeover switch and configured to rotate around a rotation axis under the action of a driving force; a synchronizing rod connected to the manual operating device in a transmission way, including a first end located close to the first side and a second end located close to a second side of the housing opposite to the first side, and configured to be rotatable around an extension direction of the synchronizing rod when the manual operating device rotates; a first driving member arranged on the first end of the synchronizing rod and connected with a first driving disc assembly at a first end of a main shaft shared by the breaking units of the poles; and a second driving member arranged on the second end of the synchronizing rod and connected with a second driving disc assembly at a second end of the main shaft, wherein the first driving member and the second driving member are configured to rotate simultaneously in a same direction, with the synchronizing rod as a rotation shaft, when the

synchronizing rod rotates, so as to drive the first driving disc assembly and the second driving disc assembly to rotate, thereby driving the main shaft to perform an opening motion and a closing motion

[0011] In an embodiment, the operating mechanism further includes a first transmission assembly arranged on the first side of the housing and a second transmission assembly arranged on the second side of the housing, wherein the first transmission assembly is arranged between the first driving member and the first driving disc assembly, and the second transmission assembly is arranged between the second driving member and the second driving disc assembly.

[0012] In an embodiment, the first transmission assembly and the second transmission assembly are the same and are each provided with at least one gear.

[0013] In an embodiment, the first driving member and the second driving member are the same and are each in the form of a gear.

[0014] In an embodiment, the first driving member and the second driving member are respectively connected with the first end and the second end of the synchronizing rod through spline connectors.

[0015] In an embodiment, the spline connector has an arc surface.

[0016] In an embodiment, the operating mechanism further includes a third transmission assembly, which is connected with the first driving member and configured to drive the first driving member to rotate when the manual operating device rotates, thereby driving the synchronizing rod to rotate.

[0017] In an embodiment, the third transmission assembly includes at least one gear.

[0018] In an embodiment, the main shaft is movable between a first position corresponding to a first power-on state of the dual-power changeover switch and a second position corresponding to a second power-on state of the dual-power changeover switch.

[0019] In an embodiment, the main shaft is movable among a first position corresponding to a first power-on state of the dual-power changeover switch, a dual-separation position corresponding to a dual-separation state of the dual-power changeover switch, and a second position corresponding to a second power-on state of the dual-power changeover switch.

[0020] In an embodiment, the first driving disc assembly and the second driving disc assembly are configured to be rotatable when driven by an electromagnetic operating mechanism of the dual-power changeover switch, thereby driving the main shaft to perform the opening motion and the closing motion.

[0021] In an embodiment, the first driving disc assembly includes a first protrusion arranged thereon, and the second driving disc assembly includes a second protrusion arranged thereon, wherein the first protrusion is connected to the first end of the main shaft, and the second protrusion is connected to the second end of the main shaft.

[0022] In an embodiment, the rotation axis and an extension direction of the synchronizing rod are parallel to an extension direction of the main shaft, respectively.

[0023] On the other hand, the present disclosure also provides a dual-power changeover switch, which includes the operating mechanism as described above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Advantages and objectives of the present disclosure can be better understood from the following detailed description of preferred embodiments of the present disclosure in conjunction with the accompanying drawings. The drawings are not drawn to scale in order to better show the relationships among various components in the drawings. In the drawings:

Fig. 1 is a front view of a dual-power changeover switch according to an embodiment of the present disclosure;

Fig. 2 is an oblique view of a dual-power changeover switch according to an embodiment of the present disclosure;

Fig. 3 is a partial schematic view of a dual-power changeover switch according to an embodiment of the present disclosure, in which an operating mechanism is shown;

Fig. 4 is a partial schematic view of a dual-power changeover switch according to an embodiment of the present disclosure, in which part of an operating mechanism and various poles of the dual-power changeover switch are shown;

Fig. 5 is a partial schematic diagram of breaking units of various poles of a dual-power changeover switch according to an embodiment of the present disclosure, in which a main shaft and a main shaft crank arm are shown;

Fig. 6 is a schematic diagram of an operating mechanism of a dual-power changeover switch according to an embodiment of the present disclosure;

Fig. 7 is a schematic diagram of a synchronizing rod of an operating mechanism of a dual-power changeover switch according to an embodiment of the present disclosure; and

Fig. 8 is a schematic diagram of a first driving member of an operating mechanism of a dual-power changeover switch according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0025] Various embodiments according to the present disclosure will be described in details with reference to the accompanying drawings. Here, it should be noted that in the drawings, the same reference numerals are given to components having basically the same or similar structures and functions, and repeated descriptions thereof will be omitted. Unless otherwise specified, the

terms "first direction", "second direction", "rotation direction", "left side", "right side" and the like herein are all described with respect to the drawings of the present disclosure. The term "including A, B, C, etc., in sequence" only indicates the arrangement order of the included components A, B, C, etc., and is not intended to exclude the possibility of including other components between A and B and/or between B and C. The description of "first" and its variants is only for distinguishing various components, and is not intended to limit the scope of the present disclosure. The term "first component" can be written as "second component" and so on, without departing from the scope of the present disclosure.

[0026] The drawings accompanying the specification are schematic diagrams to assist in explaining the concept(s) of the present disclosure, and schematically show the shapes of various parts and their relationships.

[0027] Hereinafter, preferred embodiments according to the present disclosure will be described in details with reference to Figs. 1 to 8.

[0028] The dual-power changeover switch 100 shown in Fig. 1 includes four poles which are A, B, C and N, respectively. In some other embodiments, the dual-power changeover switch may include three poles, which is not limited in the present disclosure. The dual-power changeover switch of the present disclosure can be used for a large current of about 630A, for example. Of course, the dual-power changeover switch of the present disclosure can also be used for larger current, which is not limited in the present disclosure. Compared with the low-current dual-power changeover switch, the width of the dual-power changeover switch of the present disclosure (i.e., the sum of the widths of all the poles) can reach about 180 mm. Therefore, the ratio of the length to the diameter of the movable contact carrier of the dual-power changeover switch shown in Fig. 1 is relatively larger, and as shown in Fig. 5, a main shaft 102 shared by breaking units of all the poles of the dual-power changeover switch is an elongate shaft. In the case of such elongate shaft, when driven at a single side, it may lead to inconsistent torsions of various portions of the main shaft, resulting in nonsynchronous opening and closing motions of the breaking units of various poles. The "main shaft shared by all the poles" mentioned here refers to a common shaft that can drive the opening and closing motions of the movable contact carrier of the breaking unit of each of the poles, and the main shaft extends to pass through the movable contact carriers of the breaking units of all the poles.

[0029] The operating mechanism according to the present disclosure can simultaneously drive the breaking units of various poles of the dual-power changeover switch, especially driving from both sides of the dual-power changeover switch, so that the dual-power changeover switch can be switched between different states.

[0030] As shown in Figs. 1 to 6, the operating mechanism includes a manual operating device 1, a synchro-

nizing rod 2, a first driving member 3, and a second driving member 4.

[0031] The manual operating device 1 is arranged on a first side of a housing 101 of the dual-power changeover switch 100 and is configured to rotate around a rotation axis under the action of a driving force. The "housing" mentioned here refers to the entirety of all the housing frames on which various components and parts of the dual-power changeover switch are arranged. As shown in Figs. 1 to 3, the manual operating device 1 is arranged on the first side at the left of the figure. For example, the manual operating device 1 can be arranged on a left housing frame 103, as shown in Figs. 2 and 3. As shown in Fig. 6, the manual operating device 1 can be a manual operating panel, which is arranged on the housing frame 103 through a rotation shaft of the manual operating panel, with a rotation axis of the manual operating panel shown as "A" in the figure. In some other embodiments, the manual operating device 1 can also be arranged on a right housing frame 104, that is, on a second side of the housing 101 opposite to the first side. It should be noted that the operating mechanism of the present disclosure only has the manual operating device arranged at one of its sides.

[0032] As shown in Figs. 2 and 3 and Figs. 6 and 7, the synchronizing rod 2 is connected to the manual operating device 1 in a transmission way, and includes a first end 21 located close to the first side of the housing 101 and a second end 22 located close to the second side of the housing 101 opposite to the first side, and is configured to rotate around its extension direction when the manual operating device 1 rotates. The synchronizing rod 2 is rotatably arranged on the housing 101, for example, on the left housing frame 103 and the right housing frame 104.

[0033] The first driving member 3 is arranged on the first end 21 of the synchronizing rod 2 and connected with a first driving disc assembly 5 at a first end of the main shaft 102 shared by the breaking units of all the poles. The first end of the main shaft 102 is located close to the first side of the housing 101, that is, the first end is a left end. It can be considered that the first driving disc assembly 5 is located on the first side of the housing 101, for example, it's arranged on the left housing frame 103.

[0034] The second driving member 4 is arranged on the second end 22 of the synchronizing rod 2 and connected with a second driving disc assembly 6 at a second end of the main shaft 102. The second end of the main shaft 102 is located close to the second side of the housing 101, that is, the second end is a right end. It can be considered that the second driving disc assembly 6 is located on the second side of the housing 101, for example, it's arranged on the right housing frame 104.

[0035] The first driving disc assembly 5 and the second driving disc assembly 6 are configured to be capable of rotating when driven by an electromagnetic operating mechanism of the dual-power changeover switch, thereby driving the main shaft to perform opening and closing

motions. That is to say, the first driving disc assembly 5 and the second driving disc assembly 6 are part of an automatic operating mechanism of the dual-power changeover switch. The electromagnetic operating mechanism includes electromagnets 13, 14, 15 and 16 shown in Fig. 6. The electromagnets 13 and 14 are located on the first side of the housing 101, and the electromagnets 15 and 16 are located on the second side of the housing 101, for example, on their respective housing frames. Additionally, as shown in Fig. 6, the first driving disc assembly 5 includes a first central turntable 51 and a first driving disc 52 coaxially arranged on the left side of the housing 101, and correspondingly, the second driving disc assembly 6 includes a second central turntable 61 and a second driving disc 62 coaxially arranged on the right side of the housing 101. The first central turntable 51 is rotatable around its rotation shaft when driven by the electromagnets 13 and 14, thereby driving the first driving disc 52 to rotate therewith. The second central turntable 61 is rotatable around its rotation shaft when driven by the electromagnets 15 and 16, thereby driving the second driving disc 62 to rotate therewith.

[0036] Furthermore, the first driving disc assembly 5 includes a first protrusion 53 provided thereon, and the second driving disc assembly 6 includes a second protrusion 63 provided thereon. The first protrusion 53 is connected to the first end (i.e., the left end) of the main shaft 102, and the second protrusion 63 is connected to the second end (i.e., the right end) of the main shaft 102. As shown in Figs. 3 and 6, the first protrusion 53 is in the form of a pin, which is arranged on the first driving disc 52 and inserted into a groove on a left crank arm 1021 of the main shaft 102 by passing through the left housing frame 103 of the housing 101. Similarly, the second protrusion 63 is also in the form of a pin, which is arranged on the second driving disc 62 and inserted into a groove on a right crank arm 1022 of the main shaft 102 by passing through the right housing frame 104 of the housing 101. The first protrusion 53 and the second protrusion 63 may also have other forms.

[0037] For example, when driven by the electromagnets 13 and 15, the first central turntable 51 and the first driving disc 52, as well as the second central turntable 61 and the second driving disc 62 can rotate together in the counterclockwise direction in Fig. 6, thereby driving the main shaft to move to a first position corresponding to a first power-on state of the dual-power changeover switch, for example. When driven by the electromagnets 14 and 16, the first central turntable 51 and the first driving disc 52, as well as the second central turntable 61 and the second driving disc 62 can rotate together in the clockwise direction in Fig. 6, thereby driving the main shaft to move to a second position corresponding to a second power-on state of the dual-power changeover switch, for example. Of course, when driven by the electromagnetic operating mechanism, the first central turntable 51 and the first driving disc 52, as well as the second central turntable 61 and the second driving disc 62 can

also collectively drive the main shaft to move to a dual-separation position corresponding to a dual-separation state of the dual-power changeover switch.

[0038] The first driving member 3 and the second driving member 4 as described above are configured to simultaneously rotate in the same direction around the synchronizing rod 2 as a rotation shaft when the synchronizing rod 2 rotates, so as to drive the first driving disc assembly 5 and the second driving disc assembly 6 to rotate, thereby driving the main shaft to perform opening motion and closing motion. That is to say, under the action of the manual operating mechanism of the present disclosure, the main shaft 102 can move between the first position corresponding to the first power-on state of the dual-power changeover switch and the second position corresponding to the second power-on state of the dual-power changeover switch, or, the main shaft 102 can move among the first position corresponding to the first power-on state of the dual-power changeover switch, the dual-separation position corresponding to the dual-separation state of the dual-power changeover switch, and the second position corresponding to the second power-on state of the dual-power changeover switch. The first driving member 3 and the second driving member 4 may be exactly the same, for example, both in the form of gears. For example, the first driving member 3 and the second driving member 4 may be exactly the same gears with the same size and the same form of teeth. For example, the first driving member 3 and the second driving member 4 can simultaneously rotate in the counterclockwise direction in Fig. 6 or simultaneously rotate in the clockwise direction in Fig. 6.

[0039] The manual operating device 1 and the electromagnets 13, 14 in the operating mechanism of the present disclosure can be used for driving a small-current dual-power changeover switch at a single side. The operating mechanism of the present disclosure reuses the module(s) of the low-current dual-power changeover switch by adding electromagnets 15 and 16, which reduces the manufacturing cost, the designing cost and the product cost. Additionally, the main shaft is driven simultaneously at both sides by using the synchronizing rod as well as the first driving member and second driving member which rotate coaxially. In this way, the occurrence of nonsynchronous opening and closing motions of various poles due to the torsion of the main shaft is reduced, and the reliable synchronous switching can be ensured in the high-current dual-power changeover switch.

[0040] As shown in Fig. 6, the operating mechanism also includes a first transmission assembly 7 arranged on the first side of the housing 101 and a second transmission assembly 8 arranged on the second side of the housing 101. The first transmission assembly 8 is arranged between the first driving member 3 and the first driving disc assembly 5, and the second transmission assembly 8 is arranged between the second driving member 4 and the second driving disc assembly 6. Fur-

thermore, the first transmission assembly 7 and the second transmission assembly 8 are exactly the same. For example, the first transmission assembly 7 and the second transmission assembly 8 are each provided with at least one gear. As shown in Fig. 6, the first transmission assembly 7 and the second transmission assembly 8 are each provided with one gear. For example, the first transmission assembly 7 engages with the first driving member 3 in the form of gear and the teeth of the first central turntable 51 of the first driving disc assembly 5, respectively, and the second transmission assembly 8 engages with the second driving member 4 in the form of gear and the teeth of the second central turntable 61 of the second driving disc assembly 6, respectively. By arranging the first transmission assembly 7 and the second transmission assembly 8 to cooperate with the first driving member 3 and the second driving member 4, respectively, the transmission torque of the synchronizing rod 2 can be reduced. For example, the transmission torque of the operating mechanism of the present disclosure is about 4 N·m. This makes it possible to reduce the deformation of the synchronizing rod, to ensure the synchronous driving at the left and right sides of the synchronizing rod, and to further improve the synchronization of the switching between opening motion and closing motion of various poles of the dual-power changeover switch.

[0041] As shown in Figs. 7 and 8, the first driving member 3 and the second driving member 4 are respectively connected with the first end 21 and the second end 22 of the synchronizing rod 2 through spline connectors 9. For example, the spline connector 9 has an arc surface. This structure can ensure accurate and tight transmission of torque.

[0042] As shown in Fig. 6, the operating mechanism also includes a third transmission assembly 10, which is arranged between the manual operating device 1 and the synchronizing rod 2 and transmits the driving force of the manual operating device 1 to the synchronizing rod 2. For example, the third transmission assembly 10 is connected with the first driving member 3, and is configured to drive the first driving member 3 to rotate when the manual operating device 1 rotates, thereby driving the synchronizing rod 2 to rotate, so that the first driving member 3 and the second driving member 4 can rotate simultaneously in the same direction. The third transmission assembly 10 may include at least one gear. For example, the third transmission assembly 10 includes two gears shown in Fig. 6. By providing the third transmission assembly 10, the position of the synchronizing rod 2 can be adjusted, so that the current loop (not shown in the figure) of the breaking unit can be bypassed. Additionally, the third transmission assembly 10 can also cooperate with the manual operating device 1, so as to adjust the magnitude of the force for manual operation.

[0043] Although not shown in the figure, the rotation axis A of the manual operating device 1 and the extension direction of the synchronizing rod 2 are parallel to the extension direction of the main shaft 102, respectively.

In some other embodiments, the rotation axis A of the manual operating device 1 may not be parallel to the extension direction of the synchronizing rod 2.

[0044] Under automatic operation, the synchronizing rod, the first and second driving members that rotate coaxially, and other transmission assemblies added in the manual operating mechanism of the present disclosure are all driven members which will not be subject to the force exerted by the automatic operating mechanism and will not affect the synchronization of the automatic operation.

[0045] In the operating mechanism disclosed in the present disclosure, the driving mechanisms at the first side and the second side (i.e., the left side and the right side) of the housing of the dual-power changeover switch are symmetrically arranged, and the driving chains and the directions of polarization at both sides are completely consistent with each other in addition to the introduced deformation and the error of the synchronizing rod per se, which ensures the synchronization of the movement of the first driving disc assembly and the second driving disc assembly to the greatest extent, thereby ensuring the synchronization of the opening and closing motions of the breaking units of various poles of the dual-power changeover switch.

[0046] Additionally, gears are utilized in the operating mechanism disclosed in the present disclosure for transmission, so that the torque transmitted by the synchronizing rod can be simply and directly adjusted, which leads to simple structure and low costs.

Claims

1. An operating mechanism for a dual-power changeover switch, the operating mechanism being configured to drive breaking units of poles of the dual-power changeover switch (100) simultaneously, so that the dual-power changeover switch can be switched between different states, the operating mechanism comprises

a manual operating device (1) arranged on a first side of a housing (101) of the dual-power changeover switch and configured to rotate around a rotation axis (A) under the action of a driving force;

a synchronizing rod (2) connected to the manual operating device (1) in a transmission way, the synchronizing rod (2) comprising a first end (21) located close to the first side and a second end (22) located close to a second side of the housing opposite to the first side, and the synchronizing rod (2) being configured to be rotatable around an extension direction of the synchronizing rod (2) when the manual operating device (1) rotates;

a first driving member (3) arranged on the first

- end (21) of the synchronizing rod (2) and connected with a first driving disc assembly (5) at a first end of a main shaft (102) shared by the breaking units of the poles; and
 a second driving member (4) arranged on the second end (22) of the synchronizing rod (2) and connected with a second driving disc assembly (6) at a second end of the main shaft (102), wherein the first driving member (3) and the second driving member (4) are configured to rotate simultaneously in a same direction, with the synchronizing rod (2) as a rotation shaft, when the synchronizing rod (2) rotates, so as to drive the first driving disc assembly (5) and the second driving disc assembly (6) to rotate, thereby driving the main shaft (102) to perform an opening motion and a closing motion.
2. The operating mechanism according to claim 1, wherein the operating mechanism further comprises a first transmission assembly (7) arranged on the first side of the housing (101) and a second transmission assembly (8) arranged on the second side of the housing (101), wherein the first transmission assembly (7) is arranged between the first driving member (3) and the first driving disc assembly (5), and the second transmission assembly (8) is arranged between the second driving member (4) and the second driving disc assembly (6).
 3. The operating mechanism according to claim 2, wherein the first transmission assembly (7) and the second transmission assembly (8) are the same and are each provided with at least one gear.
 4. The operating mechanism according to claim 1, wherein the first driving member (3) and the second driving member (4) are the same and are each in the form of a gear.
 5. The operating mechanism according to claim 4, wherein the first driving member (3) and the second driving member (4) are respectively connected with the first end (21) and the second end (22) of the synchronizing rod (2) through spline connectors (9).
 6. The operating mechanism according to claim 5, wherein the spline connector (9) has an arc surface.
 7. The operating mechanism according to claim 4, further comprising a third transmission assembly (10) which is connected with the first driving member (3) and configured to drive the first driving member (3) to rotate when the manual operating device (1) rotates, thereby driving the synchronizing rod (2) to rotate.
 8. The operating mechanism according to claim 7, wherein the third transmission assembly (10) comprises at least one gear.
 9. The operating mechanism according to claim 1, wherein the main shaft (102) is movable between a first position corresponding to a first power-on state of the dual-power changeover switch and a second position corresponding to a second power-on state of the dual-power changeover switch.
 10. The operating mechanism according to claim 1, wherein the main shaft (102) is movable among a first position corresponding to a first power-on state of the dual-power changeover switch, a dual-separation position corresponding to a dual-separation state of the dual-power changeover switch, and a second position corresponding to a second power-on state of the dual-power changeover switch.
 11. The operating mechanism according to claim 1, wherein the first driving disc assembly (5) and the second driving disc assembly (6) are configured to be rotatable when driven by an electromagnetic operating mechanism of the dual-power changeover switch, so as to drive the main shaft (102) to perform the opening motion and the closing motion.
 12. The operating mechanism according to claim 11, wherein the first driving disc assembly (5) comprises a first protrusion (53) arranged thereon, and the second driving disc assembly (6) comprises a second protrusion (63) arranged thereon, wherein the first protrusion (53) is connected to the first end of the main shaft (102), and the second protrusion (63) is connected to the second end of the main shaft (102).
 13. The operating mechanism according to claim 1, wherein the rotation axis (A) and an extension direction of the synchronizing rod (2) are parallel to an extension direction of the main shaft (102), respectively.
 14. A dual-power changeover switch, comprising the operating mechanism according to any one of claims 1 to 13.

Patentansprüche

1. Betätigungsmechanismus für einen Doppelleistungsumschalter, wobei der Betätigungsmechanismus konfiguriert ist, um Unterbrechungseinheiten von Polen des Doppelleistungsumschalters (100) gleichzeitig anzutreiben, so dass der Doppelleistungsumschalter zwischen verschiedenen Zuständen umgeschaltet werden kann, wobei der Betätigungsmechanismus umfasst:

- eine manuelle Betätigungsvorrichtung (1), die auf einer ersten Seite eines Gehäuses (101) des Doppelleistungsumschalters angeordnet ist und konfiguriert ist, um sich unter der Wirkung einer Antriebskraft um eine Drehachse (A) zu drehen; eine Synchronisierstange (2), die mit der manuellen Betätigungsvorrichtung (1) auf eine Übertragungsweise verbunden ist, wobei die Synchronisierstange (2) ein erstes Ende (21), das sich nahe der ersten Seite befindet, und ein zweites Ende (22), das sich nahe einer zweiten Seite des Gehäuses gegenüber der ersten Seite befindet, umfasst, und wobei die Synchronisierstange (2) so konfiguriert ist, dass sie um eine Erstreckungsrichtung der Synchronisierstange (2) drehbar ist, wenn sich die manuelle Betätigungsvorrichtung (1) dreht; ein erstes Antriebselement (3), das am ersten Ende (21) der Synchronisierstange (2) angeordnet ist und mit einer ersten Antriebsscheibenanordnung (5) an einem ersten Ende einer Hauptwelle (102) verbunden ist, die von den Unterbrechungseinheiten der Pole gemeinsam genutzt wird; und ein zweites Antriebselement (4), das am zweiten Ende (22) der Synchronisierstange (2) angeordnet ist und mit einer zweiten Antriebsscheibenanordnung (6) an einem zweiten Ende der Hauptwelle (102) verbunden ist, wobei das erste Antriebselement (3) und das zweite Antriebselement (4) konfiguriert sind, um sich gleichzeitig in einer gleichen Richtung mit der Synchronisierstange (2) als eine Drehwelle zu drehen, wenn sich die Synchronisierstange (2) dreht, um die erste Antriebsscheibenanordnung (5) und die zweite Antriebsscheibenanordnung (6) zur Drehung anzutreiben, wodurch die Hauptwelle (102) angetrieben wird, um eine Öffnungsbewegung und eine Schließbewegung auszuführen.
2. Betätigungsmechanismus nach Anspruch 1, wobei der Betätigungsmechanismus ferner eine erste Übertragungsanordnung (7), die auf der ersten Seite des Gehäuses (101) angeordnet ist, und eine zweite Übertragungsanordnung (8), die auf der zweiten Seite des Gehäuses (101) angeordnet ist, umfasst, wobei die erste Übertragungsanordnung (7) zwischen dem ersten Antriebselement (3) und der ersten Antriebsscheibenanordnung (5) angeordnet ist und die zweite Übertragungsanordnung (8) zwischen dem zweiten Antriebselement (4) und der zweiten Antriebsscheibenanordnung (6) angeordnet ist.
 3. Betätigungsmechanismus nach Anspruch 2, wobei die erste Übertragungsanordnung (7) und die zweite Übertragungsanordnung (8) gleich sind und jeweils mit mindestens einem Zahnrad versehen sind.
 4. Betätigungsmechanismus nach Anspruch 1, wobei das erste Antriebselement (3) und das zweite Antriebselement (4) gleich sind und jeweils in Form eines Zahnrads vorliegen.
 5. Betätigungsmechanismus nach Anspruch 4, wobei das erste Antriebselement (3) und das zweite Antriebselement (4) jeweils mit dem ersten Ende (21) und dem zweiten Ende (22) der Synchronisierstange (2) durch Keilverbinder (9) verbunden sind.
 6. Betätigungsmechanismus nach Anspruch 5, wobei der Keilverbinder (9) eine Bogenoberfläche aufweist.
 7. Betätigungsmechanismus nach Anspruch 4, ferner umfassend eine dritte Übertragungsanordnung (10), die mit dem ersten Antriebselement (3) verbunden ist und konfiguriert ist, um das erste Antriebselement (3) zur Drehung anzutreiben, wenn sich die manuelle Betätigungsvorrichtung (1) dreht, wodurch die Synchronisierstange (2) angetrieben wird, um sich zu drehen.
 8. Betätigungsmechanismus nach Anspruch 7, wobei die dritte Übertragungsanordnung (10) mindestens ein Zahnrad umfasst.
 9. Betätigungsmechanismus nach Anspruch 1, wobei die Hauptwelle (102) zwischen einer ersten Position, die einem ersten eingeschalteten Zustand des Doppelleistungsumschalters entspricht, und einer zweiten Position, die einem zweiten eingeschalteten Zustand des Doppelleistungsumschalters entspricht, beweglich ist.
 10. Betätigungsmechanismus nach Anspruch 1, wobei die Hauptwelle (102) zwischen einer ersten Position, die einem ersten eingeschalteten Zustand des Doppelleistungsumschalters entspricht, einer Doppeltrennposition, die einem Doppeltrennzustand des Doppelleistungsumschalters entspricht, und einer zweiten Position, die einem zweiten eingeschalteten Zustand des Doppelleistungsumschalters entspricht, beweglich ist.
 11. Betätigungsmechanismus nach Anspruch 1, wobei die erste Antriebsscheibenanordnung (5) und die zweite Antriebsscheibenanordnung (6) konfiguriert sind, um drehbar zu sein, wenn sie von einem elektromagnetischen Betätigungsmechanismus des Doppelleistungsumschalters angetrieben werden, um die Hauptwelle (102) anzutreiben, um die Öffnungsbewegung und die Schließbewegung auszuführen.
 12. Betätigungsmechanismus nach Anspruch 11, wobei die erste Antriebsscheibenanordnung (5) einen ers-

ten Vorsprung (53) umfasst, der darauf angeordnet ist, und die zweite Antriebsscheibenanordnung (6) einen zweiten Vorsprung (63) umfasst, der darauf angeordnet ist, wobei der erste Vorsprung (53) mit dem ersten Ende der Hauptwelle (102) verbunden ist und der zweite Vorsprung (63) mit dem zweiten Ende der Hauptwelle (102) verbunden ist.

13. Betätigungsmechanismus nach Anspruch 1, wobei die Drehachse (A) und eine Erstreckungsrichtung der Synchronisierstange (2) jeweils parallel zu einer Erstreckungsrichtung der Hauptwelle (102) sind.

14. Doppelleistungsumschalter, umfassend den Betätigungsmechanismus nach einem der Ansprüche 1 bis 13.

Revendications

1. Mécanisme d'actionnement pour un commutateur de transfert à double alimentation, le mécanisme d'actionnement étant configuré pour entraîner simultanément des unités de rupture de pôles du commutateur de transfert à double alimentation (100) de telle sorte que le commutateur de transfert à double alimentation puisse être commuté entre différents états, le mécanisme d'actionnement comprenant :

un dispositif d'actionnement manuel (1) disposé sur un premier côté d'un boîtier (101) du commutateur de transfert à double alimentation et configuré pour tourner autour d'un axe de rotation (A) sous l'action d'une force d'entraînement ;

une tige de synchronisation (2) reliée au dispositif d'actionnement manuel (1) par voie de transmission, la tige de synchronisation (2) comprenant une première extrémité (21) située près du premier côté et une deuxième extrémité (22) située près d'un deuxième côté du boîtier opposé au premier côté, et la tige de synchronisation (2) étant configurée pour pouvoir tourner autour d'une direction d'extension de la tige de synchronisation (2) lorsque le dispositif d'actionnement manuel (1) tourne ;

un premier élément d'entraînement (3) disposé sur la première extrémité (21) de la tige de synchronisation (2) et relié à un premier ensemble disque d'entraînement (5) à une première extrémité d'un arbre principal (102) partagé par les unités de rupture des pôles ; et

un deuxième élément d'entraînement (4) disposé sur la deuxième extrémité (22) de la tige de synchronisation (2) et relié à un deuxième ensemble disque d'entraînement (6) à une deuxième extrémité de l'arbre principal (102), dans lequel le premier élément d'entraînement

(3) et le deuxième élément d'entraînement (4) sont configurés pour tourner simultanément dans le même sens, avec la tige de synchronisation (2) comme arbre de rotation, lorsque la tige de synchronisation (2) tourne, de manière à entraîner la rotation du premier ensemble disque d'entraînement (5) et du deuxième ensemble disque d'entraînement (6), entraînant ainsi l'arbre principal (102) à effectuer un mouvement d'ouverture et un mouvement de fermeture.

2. Mécanisme d'actionnement selon la revendication 1, dans lequel le mécanisme d'actionnement comprend en outre un premier ensemble de transmission (7) disposé sur le premier côté du boîtier (101) et un deuxième ensemble de transmission (8) disposé sur le deuxième côté du boîtier (101), dans lequel le premier ensemble de transmission (7) est disposé entre le premier élément d'entraînement (3) et le premier ensemble disque d'entraînement (5), et le deuxième ensemble de transmission (8) est disposé entre le deuxième élément d'entraînement (4) et le deuxième ensemble disque d'entraînement (6).

3. Mécanisme d'actionnement selon la revendication 2, dans lequel le premier ensemble de transmission (7) et le deuxième ensemble de transmission (8) sont identiques et sont chacun pourvus d'au moins un engrenage.

4. Mécanisme d'actionnement selon la revendication 1, dans lequel le premier élément d'entraînement (3) et le deuxième élément d'entraînement (4) sont identiques et se présentent chacun sous la forme d'un engrenage.

5. Mécanisme d'actionnement selon la revendication 4, dans lequel le premier élément d'entraînement (3) et le deuxième élément d'entraînement (4) sont respectivement reliés à la première extrémité (21) et à la deuxième extrémité (22) de la tige de synchronisation (2) par l'intermédiaire de connecteurs cannelés (9).

6. Mécanisme d'actionnement selon la revendication 5, dans lequel le connecteur cannelé (9) présente une surface en arc.

7. Mécanisme d'actionnement selon la revendication 4, comprenant en outre un troisième ensemble de transmission (10) qui est relié au premier élément d'entraînement (3) et configuré pour entraîner la rotation du premier élément d'entraînement (3) lorsque le dispositif d'actionnement manuel (1) tourne, entraînant ainsi la rotation de la tige de synchronisation (2).

8. Mécanisme d'actionnement selon la revendication

7, dans lequel le troisième ensemble de transmission (10) comprend au moins un engrenage.

9. Mécanisme d'actionnement selon la revendication 1, dans lequel l'arbre principal (102) est mobile entre une première position correspondant à un premier état de mise sous tension du commutateur de transfert à double alimentation et une deuxième position correspondant à un deuxième état de mise sous tension du commutateur de transfert à double alimentation. 5 10
10. Mécanisme d'actionnement selon la revendication 1, dans lequel l'arbre principal (102) est mobile entre une première position correspondant à un premier état de mise sous tension du commutateur de transfert à double alimentation, une position de double séparation correspondant à un état de double séparation du commutateur de transfert à double alimentation, et une deuxième position correspondant à un deuxième état de mise sous tension du commutateur de transfert à double alimentation. 15 20
11. Mécanisme d'actionnement selon la revendication 1, dans lequel le premier ensemble disque d'entraînement (5) et le deuxième ensemble disque d'entraînement (6) sont configurés pour tourner lorsqu'ils sont entraînés par un mécanisme d'actionnement électromagnétique du commutateur de transfert à double alimentation, de manière à entraîner l'arbre principal (102) pour effectuer le mouvement d'ouverture et le mouvement de fermeture. 25 30
12. Mécanisme d'actionnement selon la revendication 11, dans lequel le premier ensemble disque d'entraînement (5) comprend une première saillie (53) disposée sur lui, et le deuxième ensemble disque d'entraînement (6) comprend une deuxième saillie (63) disposée sur lui, dans lequel la première saillie (53) est reliée à la première extrémité de l'arbre principal (102), et la deuxième saillie (63) est reliée à la deuxième extrémité de l'arbre principal (102). 35 40
13. Mécanisme d'actionnement selon la revendication 1, dans lequel l'axe de rotation (A) et une direction d'extension de la tige de synchronisation (2) sont respectivement parallèles à une direction d'extension de l'arbre principal (102). 45
14. Commutateur de transfert à double alimentation, comprenant le mécanisme d'actionnement selon l'une quelconque des revendications 1 à 13. 50

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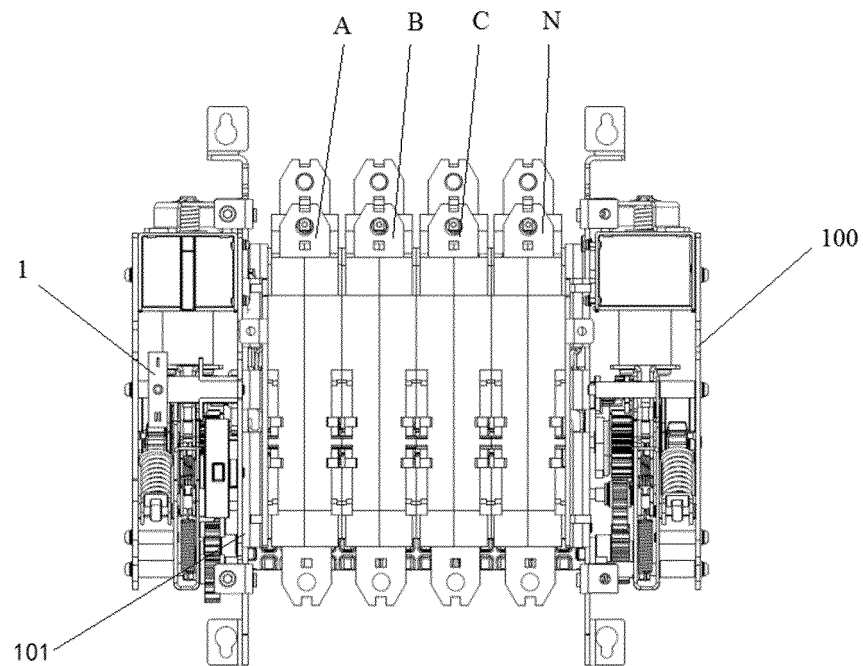


FIG. 1

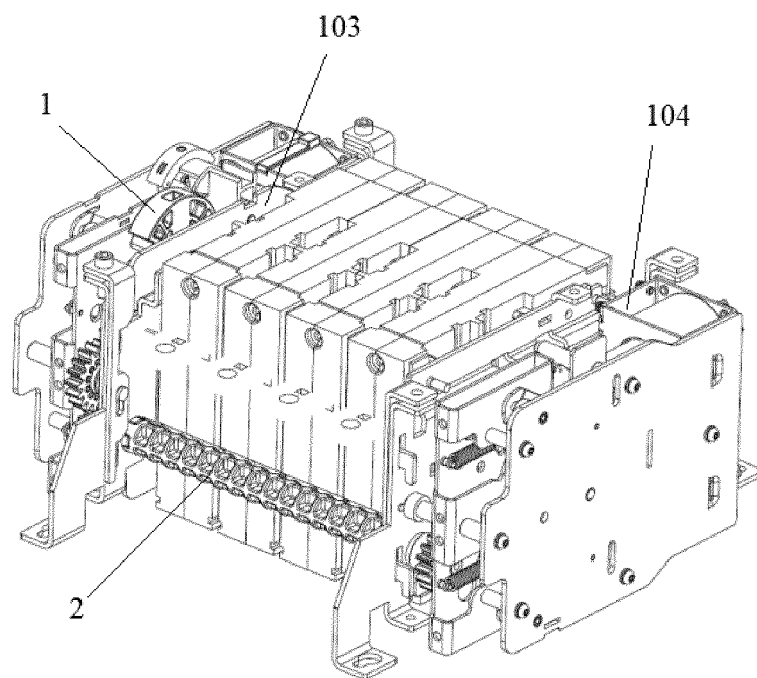


FIG. 2

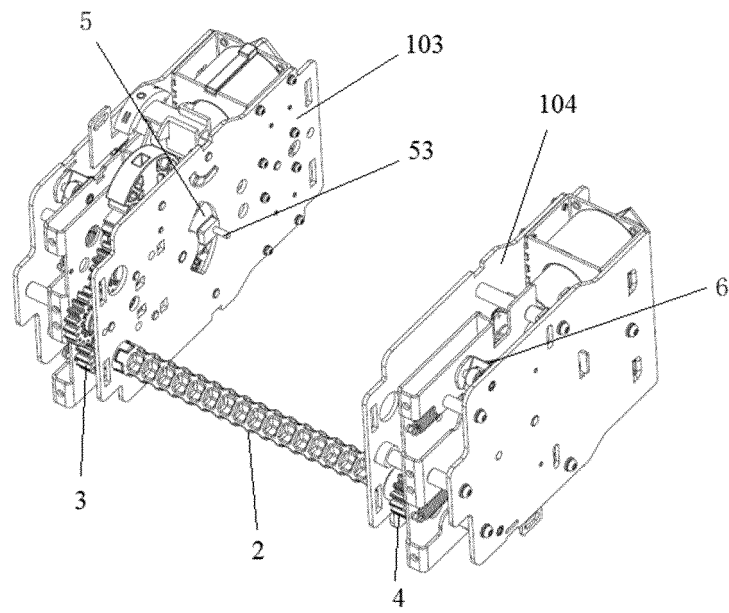


FIG. 3

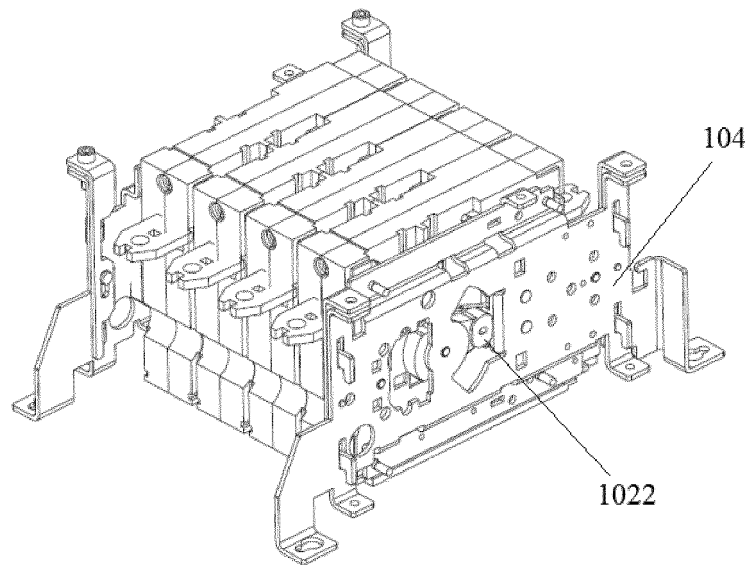


FIG. 4

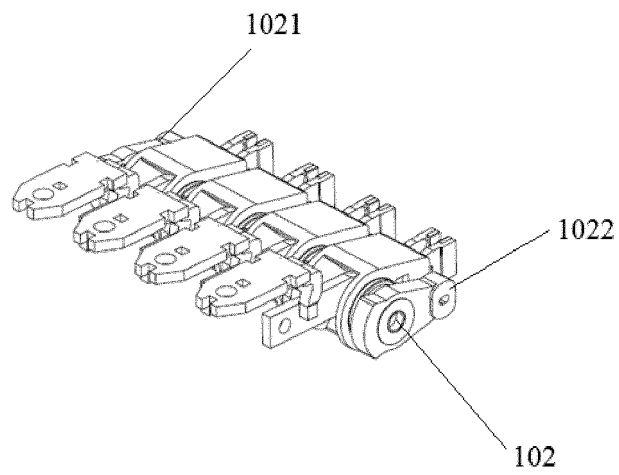


FIG. 5

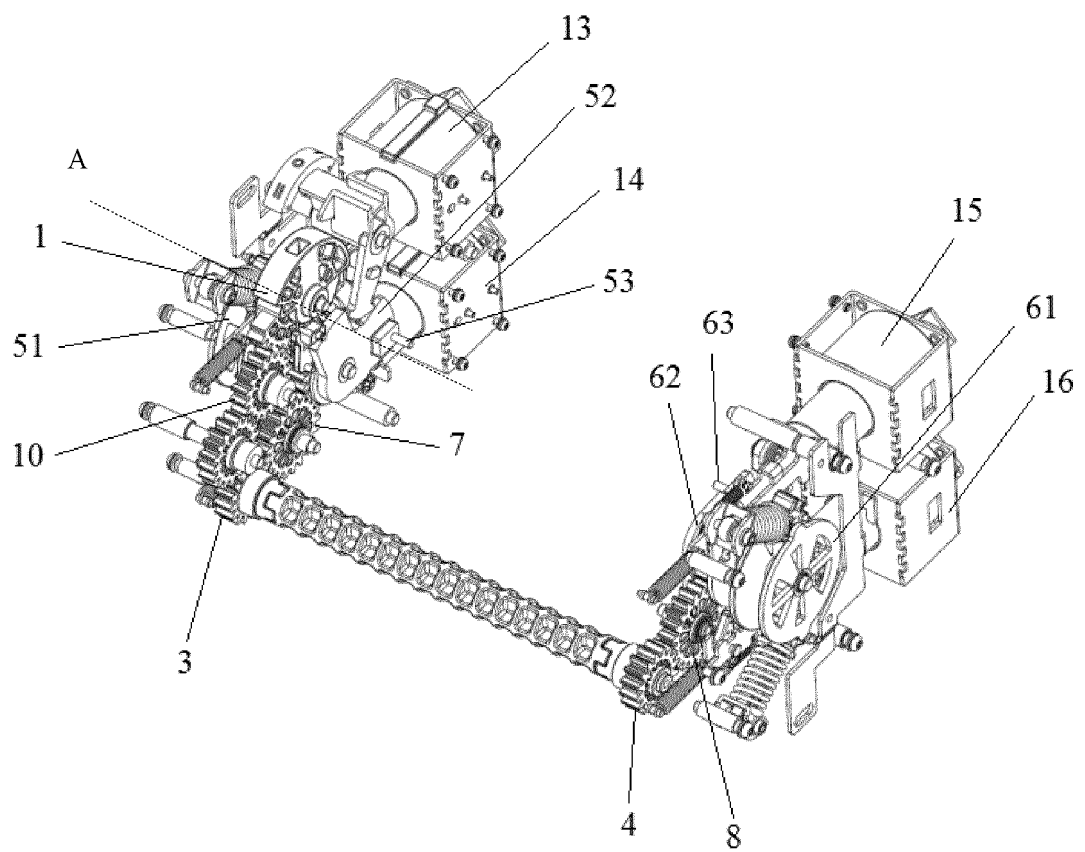


FIG. 6

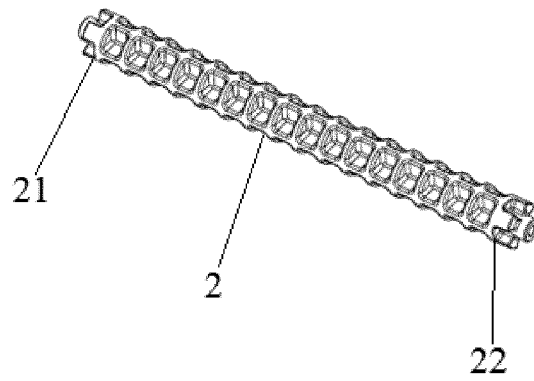


FIG. 7

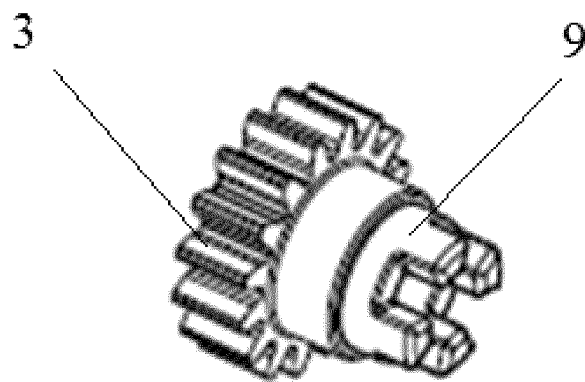


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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