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80336 München (DE)(54) **DUAL POWER TRANSFER SWITCH AND POWER SUPPLY CABINET INCLUDING THE SAME**

(57) The present disclosure relates to a dual power transfer switch including a main shaft, a first drive disc integrated with the main shaft and a second drive disc arranged coaxially with the first drive disc. The first drive disc includes a first stop surface, at least one first pin and at least one first pin hole. The first stop surface protrudes from a surface of the first drive disc. The at least one first pin is fixed on the first drive disc. The second drive disc includes a second stop surface, at least one second pin

and at least one second pin hole. The second stop surface protrudes from a surface of the second drive disc. The at least one second pin is fixed on the second drive disc. The at least one first pin cooperates with the at least one second pin hole, the at least one second pin cooperates with the at least one first pin hole, and the second stop surface abuts against the first stop surface so that the first drive disc and the second drive disc rotate together in a circumferential rotation direction.

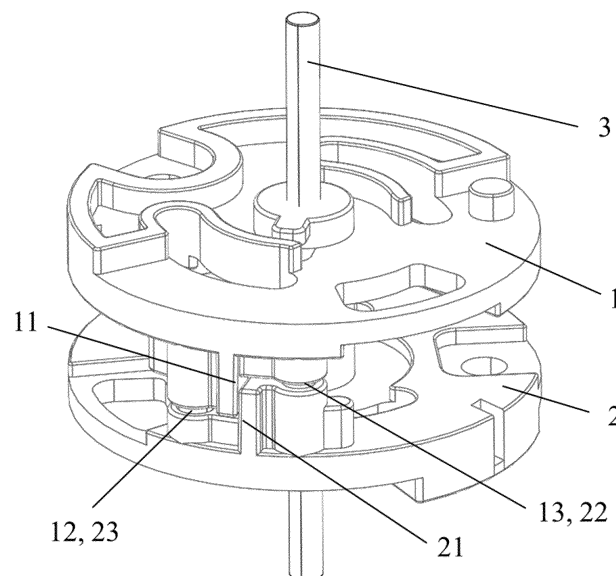


Figure 3

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a dual power transfer switch and a power supply cabinet including the dual power transfer switch.

BACKGROUND

[0002] Dual power transfer switch equipment (TSE) is a very common in helping to improve the continuity of power supply. That is a power supply system that provides two power supplies (common power supply and backup power supply). When the common power supply fails, the TSE switches to the backup power supply. Therefore, the operation reliability of the TSE is very critical to the continuity of power supply, and the operation reliability of the TSE mechanism is the basis for the reliable operation of the TSE.

[0003] In the TSE mechanism, two drive discs that rotate together are usually used to transmit torque, thereby actuating the closing operation and the opening operation of the TSE mechanism. In order to transmit a large torque, a single pin connection is used between the two drive discs. The pin and the main shaft (usually a square shaft or a D-section shaft) require a larger size, which deteriorates the transmission efficiency of the operating torque of the TSE or the miniaturization of the TSE, thereby affecting the reliability of the TSE transferring operation or increasing the manufacturing cost.

SUMMARY

[0004] The present disclosure aims to provide a dual power transfer switch. Torque is transmitted between a first drive disc and a second drive disc of the dual power transfer switch through at least two pairs of pins and pin holes and through stop surfaces abutting against each other so as to provide more reliable torque transmission performance. The first drive disc is integrated with the main shaft, which can reduce the torque stress of the main shaft, thereby reducing the size of the main shaft, reducing the friction force from the pivot hole when the main shaft rotates, improving the reliability of the dual power transfer switch, and reducing the manufacturing cost.

[0005] The present disclosure provide a dual power transfer switch for electrically connecting with a first power supply and a second power supply. The dual power transfer switch includes a main shaft; a first drive disc integrated with the main shaft and a second drive disc arranged coaxially with the first drive disc. The first drive disc includes a first stop surface, at least one first pin and at least one first pin hole. The first stop surface protrudes from a surface of the first drive disc. The at least one first pin is fixed on the first drive disc. The second drive disc includes a second stop surface, at least one second pin

and at least one second pin hole. The second stop surface protrudes from a surface of the second drive disc. The at least one second pin is fixed on the second drive disc.

[0006] The at least one first pin cooperates with the at least one second pin hole, the at least one second pin cooperates with the at least one first pin hole, and the second stop surface abuts against the first stop surface so that the first drive disc and the second drive disc rotate together in a circumferential rotation direction and so that:

the first power supply is turned on, and the second power supply is turned off;
both the first power supply and the second power supply are turned off; or
the first power supply is turned off and the second power supply is turned on.

[0007] In some examples, the first drive disc and the second drive disc are separated from each other in the axial direction.

[0008] In some examples, the first drive disc further includes a first sliding groove provided on another surface of the first drive disc opposite to the first stop surface and the second drive disc further includes a second sliding groove provided on another surface of the second drive disc opposite to the second stop surface

[0009] In some examples, the first sliding groove and the second sliding groove are arranged to be angularly staggered relative to each other in the circumferential rotation direction.

[0010] In some examples, the dual power transfer switch further includes:

a first driving mechanism including a first housing, a first spring, and a first driving member arranged on a first movable contact corresponding to the first power supply, the spring acting between the first driving member and the first housing, the first driving member being movably mounted inside the second sliding groove of the second drive disc.

a second driving mechanism including a second housing, a second spring, and a second driving member arranged on a second movable contact corresponding to the second power supply, the second spring acting between the second driving member and the second housing, the second driving member being movably mounted inside the first sliding groove of the first drive disc;

wherein the first driving mechanism, the second drive disc, the first drive disc and the second driving mechanism are arranged in sequence in a direction of a rotation axis, the first drive disc is configured to actuate the first driving member to move between a first power supply closing position and a first power supply opening position, the second drive disc is configured to actuate the second driving member to move between a second power closing position and

a second power opening position, and the first drive disc and the second drive disc rotate together so that:

when the first driving member is in the first power supply closing position, the second driving member is in the second power supply opening position, at this time the first power supply is turned on, and the second power supply is turned off;

when the first driving member is in the first power supply opening position, the second driving member is in the second power supply closing position, at this time the first power supply is turned off, and the second power supply is turned on; or

when the first driving member is in the first power supply opening position, the second driving member is in the second power supply opening position, at this time both the first power supply and the second power supply are turned off.

[0011] In some examples, the first drive disc and the second drive disc have a same structure.

[0012] In some examples, the first drive disc is integrated with the main shaft by welding, adhesive bonding or injection molding and the main shaft is a circular shaft.

[0013] In some examples, a manual operation knob is fixed on an end of the main shaft, and the dual power transfer switch is configured to actuate the first drive disc and the second drive disc rotate together in the circumferential rotation direction by applying torque to the manual operation knob.

[0014] In some examples, the dual power transfer switch is configured to drive the first drive disc and the second drive disc to rotate together in the circumferential rotation direction by driving at least one of the first drive disc, the second drive disc and the main shaft through an electromagnet or a motor.

[0015] An embodiment of the present invention provides a power supply cabinet, including: a first power supply, a second power supply, and the dual power transfer switch as described above.

[0016] The beneficial effects of the technical solutions of the present disclosure are in that: the dual power transfer switch transmit torque between the first drive disc and the second drive disc by a plurality of cooperating features, so that the first drive disc and the second drive disc can rotate together in the circumferential rotation direction to actuate the switch operation, thereby providing more reliable torque transmission performance. At the same time, the first drive disc is integrated with the main shaft, which can reduce the torque stress of the main shaft, so that a smaller-sized main shaft can be manufactured, the transmission efficiency is improved, and the manufacturing cost is reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] In order to clearly illustrate the technical solutions of the embodiments of the disclosure, the drawings of the embodiments will be briefly described in the following; it is obvious that the drawings described below are only related to some embodiments of the disclosure and thus are not limitative of the disclosure.

Fig. 1 shows a perspective diagram of the first drive disc and the main shaft of the dual power transfer switch according to an embodiment of the present disclosure;

Fig. 2 shows a perspective diagram of the second drive disc of the dual power transfer switch according to an embodiment of the present disclosure;

Fig. 3 shows a perspective diagram of the first drive disc and the second drive disc after being assembled according to an embodiment of the present disclosure;

Fig. 4 shows a perspective diagram of the dual power transfer switch according to an embodiment of the present disclosure;

Fig. 5 shows a schematic diagram of the positions of the first drive disc and the second drive disc according to an embodiment of the present disclosure when the first power supply is turned on and the second power supply is turned off;

Fig. 6 shows a schematic diagram of the positions of the first drive disc and the second drive disc according to an embodiment of the present disclosure when the first power supply and the second power supply are both turned off;

[0018] Fig. 7 shows a schematic diagram of the positions of the first drive disc and the second drive disc according to an embodiment of the present disclosure when the first power supply is turned off and the second power supply is turned on.

List of reference

[0019]

- | | |
|----|-------------------------|
| 1 | first drive disc |
| 11 | first stop surface |
| 12 | first pin |
| 13 | first pin hole |
| 14 | first sliding groove |
| 2 | second drive disc |
| 21 | second stop surface |
| 22 | second pin |
| 23 | second pin hole |
| 24 | second sliding groove |
| 3 | main shaft |
| 4 | manual operation knob |
| 5 | first driving mechanism |
| 51 | first housing |

52 first spring
 53 first driving member
 6 second driving mechanism
 61 second housing
 62 second spring
 63 second driving member

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0020] In order to make objects, technical details and advantages of the technical solutions of the present disclosure apparent, the technical solutions of the embodiments will be described in a clearly and fully understandable way in connection with the drawings related to the embodiments of the disclosure. The same reference numbers in the drawings represent the same components. It should be noted that the described embodiments are just a part but not all of the embodiments of the disclosure. Based on the described embodiments herein, those skilled in the art can obtain other embodiment(s), without any inventive work, which should be within the scope of the disclosure.

[0021] Unless otherwise defined, technical terms or scientific terms used in the present disclosure are intended to be understood in the ordinary meaning of the ordinary skill of the art. The words "first", "second", and similar terms used in the present disclosure do not indicate any order, quantity, or importance, but are used to distinguish different components. Similarly, the words "a", "an", "the" or the like does not necessarily indicate quantity limitations. The words "comprise", "include" or the like means that the elements or items preceding the word include the elements or items after the word and their equivalents, but do not exclude other elements or items. The words "connect", "interconnect" or the like are not limited to physical or mechanical connections, but may include electrical connections, either directly or indirectly. The words "upper", "lower", "left", "right" and the like are only used to indicate the relative positional relationships, and when the absolute position of the object described is changed, the relative positional relationship may also change accordingly.

[0022] The dual power transfer switch according to the present disclosure will be described in detail below in connection with the accompanying drawings.

[0023] It should be noted that the "dual power transfer switch" mentioned in the present disclosure refers to a switch mechanism that selects one of two power supplies. It automatically or manually switch the load circuit from the first power supply to the second power supply (backup power). In the dual power transfer switch, two drive discs or drive plates that rotate together are usually used to transmit torque so as to actuate the closing operation and the opening operation of the dual power transfer switch.

[0024] Fig. 1 shows a perspective diagram of the first drive disc and the main shaft of the dual power transfer switch according to an embodiment of the present dis-

closure; Fig. 2 shows a perspective diagram of the second drive disc of the dual power transfer switch according to an embodiment of the present disclosure.

[0025] The dual power transfer switch according to an embodiment of the present disclosure includes:
 5 a first drive disc 1, a second drive disc 2 and a main shaft 3. The first drive disc 1 is integrated with the main shaft 3. The first drive disc 1 includes a first stop surface 11, at least one first pin 12 and at least one first pin hole 13.
 10 The first stop surface 11 protrudes from a surface of the first drive disc 1 and the at least one first pin 12 is fixed on the first drive disc 1. The second drive disc 2 is arranged coaxially with the first drive disc 1. The second drive disc 2 includes a second stop surface 21, at least one second pin 22 and at least one second pin hole 23.
 15 The second stop surface 21 protrudes from a surface of the second drive disc 2 and the at least one second pin 22 is fixed on the second drive disc 2.

[0026] In the present embodiment, the at least one first pin 12 cooperates with the at least one second pin hole 23, the at least one second pin 22 cooperates with the at least one first pin hole 13, and the second stop surface 21 abuts against the first stop surface 11 so that the first drive disc 1 and the second drive disc 2 rotate together in a circumferential rotation direction and so that:

the first power supply is turned on, and the second power supply is turned off;
 both the first power supply and the second power supply are turned off; or
 the first power supply is turned off and the second power supply is turned on.

[0027] It should be noted that the "switching operation" described in the present disclosure includes, but is not limited to, closing (i.e., "turning on" or "connecting") and opening (i.e., "turning off" or "disconnecting") operations of the power supply. In the turning on or closing position, the movable contact contacts the static contact, and the power supply connects to the load and supplies power to the load; in the turning off or opening position, the movable contact does not contact the static contact, and the power supply and the load is turned off and no power is supplied to the load.

[0028] As shown in Fig. 1, the first drive disc 1 and the main shaft 3 are integrated. For example, the first drive disc 1 may be integrated with the main shaft 3 by welding, adhesive bonding or injection molding. In addition, for example, the main shaft 3 is a circular shaft. In the present embodiment, the first drive disc 1 is integrated with the main shaft 3 by welding. Specifically, the rotation center of the first drive disc 1 (in this embodiment, the center of the circle of the first drive disc 1) is provided with a through hole through which the main shaft 3 can pass. After the main shaft 3 passes through the through hole, the first drive disc 1 and the main shaft 3 are integrated by a welding process. The embodiments of the present disclosure are not limited to this, and those skilled in the art

can also use other integral manufacturing processes commonly used in the art, including but not limited to adhesive bonding or injection molding.

[0029] As shown in Fig. 1, the first drive disc 1 is in the shape of a circular disc as a whole, and the lower surface of the first drive disc 1 is provided with the first stop surface 11, the first pin 12 and the first pin hole 13. For example, the first drive disc 1 further includes a first sliding groove 14 provided on another surface of the first drive disc 1 opposite to the first stop surface 11. In Fig. 1, the first sliding groove 14 is provided on the upper surface of the first drive disc 1.

[0030] The first stop surface 11 protrudes downwardly from the lower surface of the first drive disc 1, and the first stop surface 11 is formed as a side surface perpendicular to the upper surface and the lower surface of the first drive disc 1. In this embodiment, the first stop surface 11 is provided between the first pin 12 and the first pin hole 13. The present disclosure is not limited to this, and the positional relationship among the first stop surface 11, the first pin 12 and the first pin hole 13 can be changed according to actual conditions.

[0031] The first pin 12 also protrudes downwardly from the lower surface of the first drive disc 1. One end of the first pin 12 is fixedly connected to the first drive disc 1, and the other end is a free end extending downwardly for cooperating with the second pin hole 23 of the second drive disc 2. The size of the first pin 12 is configured to be suitable for cooperating with the second pin hole 23.

[0032] The first pin hole 13 is shown as a dashed part in Fig. 1, and its size is configured to be suitable for cooperating with the second pin 22.

[0033] As shown in Fig. 2, the second drive disc 2 is in the shape of a circular disc as a whole, and its size (for example, outer diameter or thickness) may be the same as the first drive disc 1. The upper surface of the second drive disc 2 is provided with the second stop surface 21, the second pin 22 and the second pin hole 23. The rotation center of the second drive disc 2 (in this embodiment, the center of the circle of the second drive disc 2) is also provided with a through hole through which the main shaft 3 can pass. For example, the second drive disc 2 further includes a second sliding groove 24 provided on another surface of the second drive disc 2 opposite to the second stop surface 21. In Fig. 2, the second sliding groove 24 is provided on the lower surface of the second drive disc 2.

[0034] The second stop surface 21 protrudes upwardly from the upper surface of the second drive disc 2, and the second stop surface 21 is formed as a side surface perpendicular to the upper surface and the lower surface of the second drive disc 2. In this embodiment, the second stop surface 21 is provided between the second pin 22 and the second pin hole 23. The present disclosure is not limited to this, and the positional relationship among the second stop surface 21, the second pin 22 and the second pin hole 23 can also be changed according to actual conditions.

[0035] The second pin 22 protrudes upwardly from the upper surface of the second drive disc 2. One end of the second pin 22 is fixedly connected to the second drive disc 2, and the other end is a free end extending upwardly for cooperating with the first pin hole 13 of the first drive disc 1. The size of the second pin 22 is configured to be suitable for cooperating with the first pin hole 13.

[0036] In the embodiments of the present disclosure, the fit of the pin and the pin hole may be a clearance fit or an interference fit, and the fit mode may be selected according to actual needs and ease of assembly. When the fit between the pin and the pin hole is a clearance fit, the outer diameter of the pin is smaller or slightly smaller than the inner diameter of the pin hole. When the fit of the pin and the pin hole is an interference fit, the outer diameter of the pin is larger or slightly larger than the inner diameter of the pin hole.

[0037] In other embodiments, the numbers of the first pin 12 and the second pin 22 may be two or more respectively. In this case, the numbers of the first pin hole 13 and the second pin hole 23 may be the same as the numbers of the first pin 12 and the second pin 22 respectively. The numbers of pin and pin hole can be selected according to actual conditions, such as the magnitude of the transmitted torque.

[0038] Optionally, the first drive disc 1 and the second drive disc 2 are separated from each other in the axial direction.

[0039] Optionally, the first sliding groove 14 and the second sliding groove 24 are arranged to be angularly staggered relative to each other in the circumferential rotation direction. This arrangement mainly takes into account the three-position contact switch operation. Specifically, in addition to being connecting to the first power supply or the second power supply, the movable contact can also stay in the middle position (i.e., double disconnecting position) in which both the first power supply and the second power supply are disconnected. The operating position of the dual power transfer switch will be described in detail below in conjunction with the accompanying drawings.

[0040] Fig. 3 shows a perspective diagram of the first drive disc and the second drive disc after being assembled according to an embodiment of the present disclosure. The second drive disc 2 is assembled to the first drive disc 1 by passing its through hole through the main shaft 3, forming the perspective diagram as shown in Fig. 3. When being assembled, the first pin 12 and the second pin 22 cooperates with the second pin hole 23 and the first pin hole 13 respectively, and the first stop surface 11 abuts against the second stop surface 21 at the same time. With the above configuration, the characteristics of torque transmission between the first drive disc 1 and the second drive disc 2 include at least: the first pin 12 and the second pin hole 23, the second pin 22 and the first pin hole 13, and the first stop surface 11 and second stop surface 21. Therefore, compared with the traditional single pin and pin hole pair, or transmitting the torque

only by the main shaft, the dual power transfer switch of the embodiment of the present disclosure can transmit larger torque, and the main shaft does not need to be stressed. Thus, the size of the main shaft can be as small as possible to improve the reliability of the dual power transfer switch and reduce the manufacturing cost.

[0041] Fig. 4 shows a perspective diagram of a dual power transfer switch according to an embodiment of the present disclosure.

[0042] For example, the dual power transfer switch of the embodiment of the present disclosure may further include: a first driving mechanism 5 and a second driving mechanism 6, as shown in Fig. 4.

[0043] The first driving mechanism 5 includes a first housing 51, a first spring 52, and a first driving member 53 provided on a first movable contact corresponding to the first power supply. The first spring 52 acts between the first driving member 53 and the first housing 51. The first driving member 53 is movably mounted inside the second sliding groove 24 of the second drive disc 2.

[0044] The second driving mechanism 6 includes a second housing 61, a second spring 62, and a second driving member 63 provided on a second movable contact corresponding to the second power supply. The second spring 62 acts between the second driving member 63 and the second housing 61. The second driving member 63 is movably mounted inside the first sliding groove 14 of the first drive disc 1.

[0045] The first driving mechanism 5, the second drive disc 2, the first drive disc 1 and the second driving mechanism 6 are arranged in sequence in the direction of the rotation axis. The first drive disc 1 is configured to actuate the first driving member 53 to move between a first power supply closing position (in this position, the first movable contact does not contact the first static contact, and the first power supply does not supply to the load) and a first power supply closing position (in this position, the first movable contact contacts the first static contact, and the first power supply supplies to the load). The second drive disc 2 is configured to actuate the second driving member 63 to move between a second power closing position (in this position, the second movable contact contacts the second static contact, and the second power supply supplies to the load) and the second power opening position (in this position, the second movable contact does not contact the second static contact, and the second power supply does not supply to the load). The first drive disc 1 and the second drive disc 2 rotate together so that:

when the first driving member 53 is in the first power supply closing position, the second driving member 63 is in the second power supply opening position, at this time the first power supply is turned on, and the second power supply is turned off;

when the first driving member 53 is in the first power supply opening position, the second driving member 63 is in the second power supply closing position, at this time the first power supply is turned off, and the

second power supply is turned on; or
when the first driving member 53 is in the first power supply opening position, the second driving member 63 is in the second power supply opening position, at this time both the first power supply and the second power supply are turned off.

[0046] In order to facilitate the clarity and conciseness of the illustration, the first power supply, the second power supply, the first movable contact and the second movable contact are not shown in Fig. 4. Those skilled in the art can implement the configuration of the power supply and the movable contact by common technical means, and the embodiment of the present disclosure does not limit it.

[0047] Optionally, the first spring 52 and the second spring 62 may be pneumatic springs, mechanical springs or other elastic elements. In this embodiment, both the first spring 52 and the second spring 62 are pneumatic springs.

[0048] The first drive member 53 and the second drive member 63 are fitted in the installation features of the first drive disc 1 and the second drive disc 2, respectively.

[0049] Optionally, the first drive disc 5 and the second drive disc 6 have a same structure. Specifically, both the first driving mechanism 5 and the second driving mechanism 6 may adopt a modular driving mechanism, such as a Schneider INS switch.

[0050] The operation schematic of the dual power transfer switch will be described in detail below with reference to Figs. 5 to 7.

[0051] Fig. 5 shows a schematic diagram of the positions of the first drive disc 1 and the second drive disc 2 according to an embodiment of the present disclosure when the first power supply is turned on and the second power supply is turned off. Fig. 6 shows a schematic diagram of the positions of the first drive disc 1 and the second drive disc 2 according to an embodiment of the present disclosure when the first power supply and the second power supply are both turned off. Fig. 7 shows a schematic diagram of the positions of the first drive disc 1 and the second drive disc 2 according to an embodiment of the present disclosure when the first power supply is turned off and the second power supply is turned on.

[0052] It should be noted that the positional schematic diagrams of Figs. 5 to 7 are all views viewed from the bottom of Fig. 4. For ease of description, irrelevant parts are omitted, and the first drive disc 1, the second drive disc 2, the first spring 52, the second spring 62, the first driving member 53, and the second driving member 63 are schematically shown in the same plane. In addition, in the embodiments shown in Figs. 5 to 7, the first drive disc 1 includes two first sliding grooves 14, and the second drive disc 2 includes two second sliding grooves 24. The movement positions of the two first sliding grooves 14 or the two second sliding grooves 24 are symmetrical. Therefore, only a half view of the first drive disc 1 and the second drive disc 2 is shown.

[0053] In this embodiment, the connection between the first driving member 53 and the second sliding slot 24 is a pin-sliding groove connection, and the connection between the second driving member 63 and the first sliding groove 14 is also a pin-sliding groove connection. The first driving member 53 and the second driving member 63 are thus shown as circular cross-sections of pins respectively.

[0054] As shown in Fig. 5, the first driving member 53 and the second driving member 63 are overlapped together, and they are arranged back and forth relative to the paper plane. In this case, the first driving member 53 is in the first power supply closing position, the second driving member 63 is in the second power supply opening position, and thus the first power supply is turned on, and the second power supply is turned off.

[0055] Further, as shown in Fig. 6, when the first drive disc 1 and the second drive disc 2 rotate together in the circumferential rotation direction (the direction indicated by the arrow in the figure), since the first sliding groove 14 and the second sliding groove 24 are angularly staggered relative to each other in the circumferential rotation direction, one side wall of the second sliding groove 24 firstly touches the first driving member 53, thereby actuating the first driving member 53 to overcome the spring force of the first spring 52 to move along the circular track as shown in the figure. After passing through the horizontal line (indicated by the dashed line) in Fig. 6, the spring force of the first spring 52 acts on the first driving member 53, so that it is out of contact with the side wall of the second sliding groove 24 and moves toward the other side wall of the second sliding groove 24 until coming into contact with it.

[0056] As the first drive disc 1 and the second drive disc 2 further rotates, the first driving member 53 moves to the first power supply opening position, and the second driving member 63 is still in the second power supply opening position. At this time both the first power supply and the second power supply are turned off. This is the "double disconnecting position" as described above.

[0057] Further, the first driving disc 1 and the second driving disc 2 continue to rotate, and one side wall of the first sliding groove 14 comes into contact with the second driving member 63, thereby actuating the second driving member 63 to overcome the spring force of the second spring 62 to move along the circular track as shown in the figure also. After passing through the horizontal line (indicated by the dashed line) in Fig. 7, the spring force of the second spring 62 acts on the second driving member 63 to make it out of contact with the side wall of the first sliding groove 14 and move toward the other side wall of the first chute 14 until coming into contact with it. As shown in Fig. 7, the first driving member 53 is still in the first power supply opening position, and the second driving member 63 is in the second power supply closing position. At this time the first power supply is turned off, and the second power supply is turned on.

[0058] The key movement positions of the dual power

transfer switch and the principle of actuating the power supply to turn on and turn off according to the embodiments of the present disclosure are described above. Based on the above configuration, those skilled in the art can know that when the first drive disk 1 and the second drive disk 2 rotate in the opposite direction to the above embodiment, the movement process of the dual power transfer switch is reversed to that of the above embodiment. The first power supply is turned off (the first driving member 53 is in the first power supply opening position) and the second power supply is turned on (the second driving member 63 is in the second power supply closing position), then the first power supply is turned off (the first driving member 53 is in the first power opening position) and the second power supply is turned off (the second driving member 63 is in the second power supply opening position), and then the first power is turned on (the first driving member 53 is in the first power supply closing position) and the second power supply is turned off (the second driving member 63 is in the second power supply opening position).

[0059] The dual power transfer switch described in the embodiments of the present disclosure can be driven manually or electrically. For example, one end of the main shaft 3 may be fixed with a manual operation knob 4. The dual power transfer switch is configured to actuate the first drive disc 1 and the second drive disc 2 rotate together in the circumferential rotation direction by applying torque to the manual operation knob 4. For example, the user can rotate the manual operation knob 4 to actuate the rotation.

[0060] Alternatively, the dual power transfer switch is configured to drive the first drive disc 1 and the second drive disc 2 to rotate together in the circumferential rotation direction by driving at least one of the first drive disc 1, the second drive disc 2 and the main shaft 3 through an electromagnet or a motor. In order to facilitate the clarity and conciseness of the illustration, the electromagnet or the motor is not shown in Fig. 4. Those skilled in the art implement electric driving by common technical means. For example, a stepping motor and a gear transmission mechanism can be used to drive the first drive disc 1, which is not limited in the embodiment of the present disclosure.

[0061] An embodiment of the present invention also provides a power supply cabinet, including: the first power supply, the second power supply, and the dual power transfer switch as described above.

[0062] In summary, the embodiment of the present invention provides a dual power transfer switch and a power supply cabinet including the dual power transfer switch. The dual power transfer switch transmit torque between the first drive disc and the second drive disc by a plurality of cooperating features, so that the first drive disc and the second drive disc can rotate together in the circumferential rotation direction to actuate the switch operation, thereby providing more reliable torque transmission performance. At the same time, the first drive disc

is integrated with the main shaft, which can reduce the torque stress of the main shaft, so that a smaller-sized main shaft can be manufactured, the transmission efficiency is improved, and the manufacturing cost is reduced.

[0063] The above are only specific implementations of the present disclosure, but the scope of the present disclosure is not limited to this. Within the technical scope disclosed in the embodiments of the present disclosure or with the ideas disclosed in the embodiments of the present disclosure, any change, substitution, or combination can be easily conceived by anyone familiar with the technical field, and they should all fall within the protection scope of the embodiments of the present disclosure.

Claims

1. A dual power transfer switch for electrically connecting with a first power supply and a second power supply, **characterized in that** it comprises:

a main shaft (3);
 a first drive disc (1) which is integrated with the main shaft (3), wherein the first drive disc (1) comprises a first stop surface (11), at least one first pin (12) and at least one first pin hole (13), the first stop surface (11) protrudes from a surface of the first drive disc (1), the at least one first pin (12) is fixed on the first drive disc (1); and a second drive disc (2) which is arranged coaxially with the first drive disc (1), wherein the second drive disc (2) comprises a second stop surface (21), at least one second pin (22) and at least one second pin hole (23), the second stop surface (21) protrudes from a surface of the second drive disc (2), the at least one second pin (22) is fixed on the second drive disc (2);
 wherein the at least one first pin (12) cooperates with the at least one second pin hole (23), the at least one second pin (22) cooperates with the at least one first pin hole (13), the second stop surface (21) abuts against the first stop surface (11) so that the first drive disc (1) and the second drive disc (2) rotate together in a circumferential rotation direction and so that:

the first power supply is turned on, and the second power supply is turned off;
 both the first power supply and the second power supply are turned off; or
 the first power supply is turned off and the second power supply is turned on.

2. The dual power transfer switch according to claim 1, **characterized in that** the first drive disc (1) and the second drive disc (2) are separated from each other

in an axial direction.

3. The dual power transfer switch according to claim 1 or 2, **characterized in that**:

the first drive disc (1) further comprises: a first sliding groove (14) provided on another surface of the first drive disc (1) opposite to the first stop surface (11),
 the second drive disc (2) further comprises: a second sliding groove (24) provided on another surface of the second drive disc (2) opposite to the second stop surface (21).

4. The dual power transfer switch according to claim 3, **characterized in that** the first sliding groove (14) and the second sliding groove (24) are arranged to be angularly staggered relative to each other in the circumferential rotation direction.

5. The dual power transfer switch according to claim 4, **characterized in that** it comprises:

a first driving mechanism (5) comprising a first housing (51), a first spring (52), and a first driving member (53) arranged on a first movable contact corresponding to the first power supply, the spring (52) acting between the first driving member (53) and the first housing (51), the first driving member (53) being movably mounted inside the second sliding groove of the second drive disc (2);

a second driving mechanism (6) comprising a second housing (61), a second spring (62), and a second driving member (63) arranged on a second movable contact corresponding to the second power supply, the second spring (62) acting between the second driving member (63) and the second housing (61), the second driving member (63) being movably mounted inside the first sliding groove (14) of the first drive disc (1);
 wherein the first driving mechanism (5), the second drive disc (2), the first drive disc (1) and the second driving mechanism (6) are arranged in sequence in a direction of a rotation axis, the first drive disc (1) is configured to actuate the first driving member (53) to move between a first power supply closing position and a first power supply opening position, the second drive disc (2) is configured to actuate the second driving member (63) to move between a second power supply closing position and the second power opening position, the first drive disc (1) and the second drive disc (2) rotate together so that:

when the first driving member (53) is in the first power supply closing position, the second driving member (63) is in the second

power supply opening position, at this time
the first power supply is turned on, and the
second power supply is turned off;
when the first driving member (53) is in the
first power supply opening position, the sec- 5
ond driving member (63) is in the second
power supply closing position, at this time
the first power supply is turned off, and the
second power supply is turned on; or
when the first driving member (53) is in the 10
first power supply opening position, the sec-
ond driving member (63) is in the second
power supply opening position, at this time
both the first power supply and the second
power supply are turned off. 15

6. The dual power transfer switch according to any of
claims 1-5, **characterized in that** the first drive disc
(5) and the second drive disc (6) have a same struc- 20
ture.
7. The dual power transfer switch according to any of
claims 1 - 6, **characterized in that** the first drive disc
(1) is integrated with the main shaft (3) by welding,
adhesive bonding or injection molding, the main 25
shaft (3) is a circular shaft.
8. The dual power transfer switch according to any one
of claims 1-7, **characterized in that** a manual oper- 30
ation knob (4) is fixed on an end of the main shaft
(3), and the dual power transfer switch is configured
to actuate the first drive disc (1) and the second drive
disc (2) rotate together in the circumferential rotation
direction by applying torque to the manual operation 35
knob (4).
9. The dual power transfer switch according to any one
of claims 1-7, **characterized in that** the dual power
transfer switch is configured to drive the first drive
disc (1) and the second drive disc (2) to rotate to- 40
gether in the circumferential rotation direction by
driving at least one of the first drive disc (1), the sec-
ond drive disc (2) and the main shaft (3) through an
electromagnet or a motor. 45
10. A power supply cabinet, **characterized in that** it
comprises: a first power supply, a second power sup-
ply, and the dual power supply transfer switch ac-
cording to any one of claims 1-9. 50

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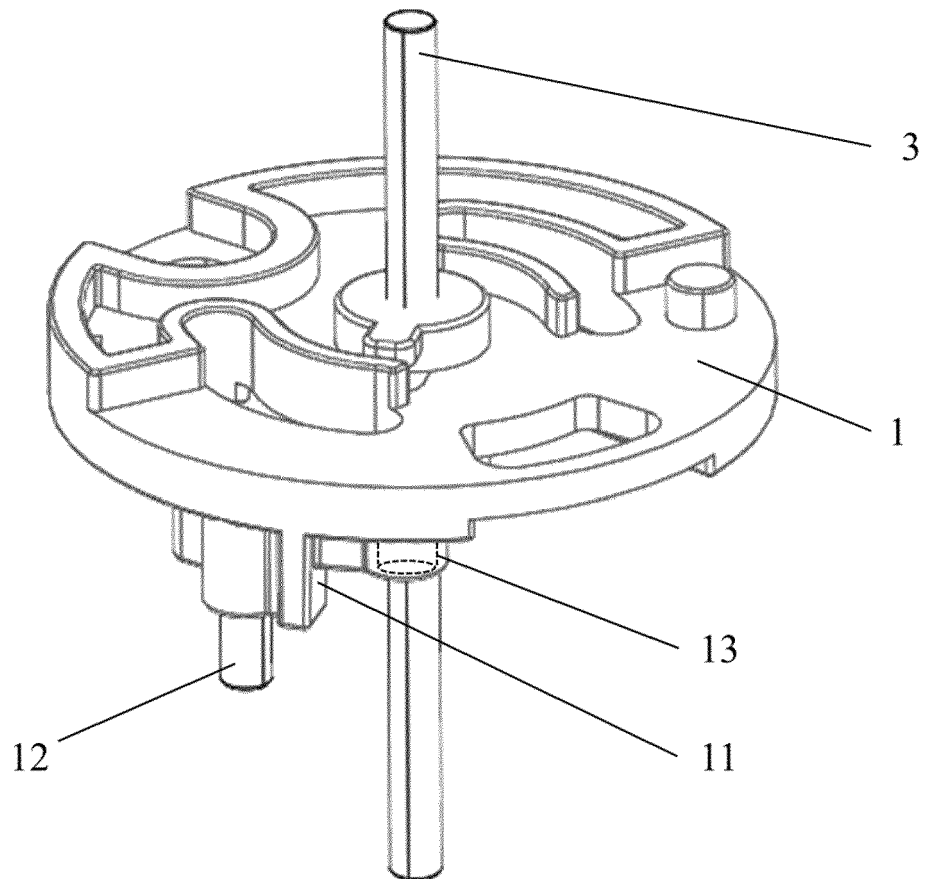


Figure 1

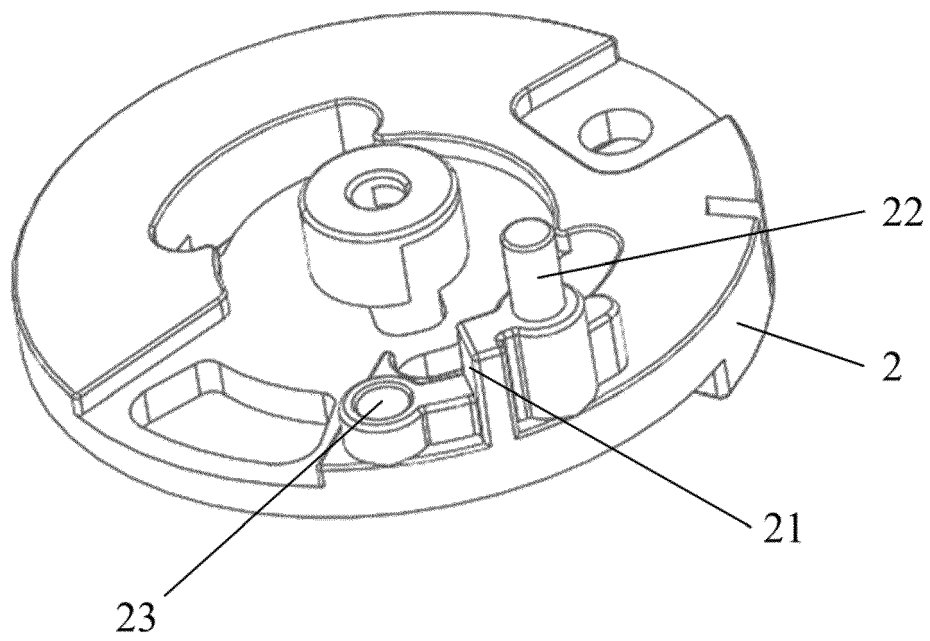


Figure 2

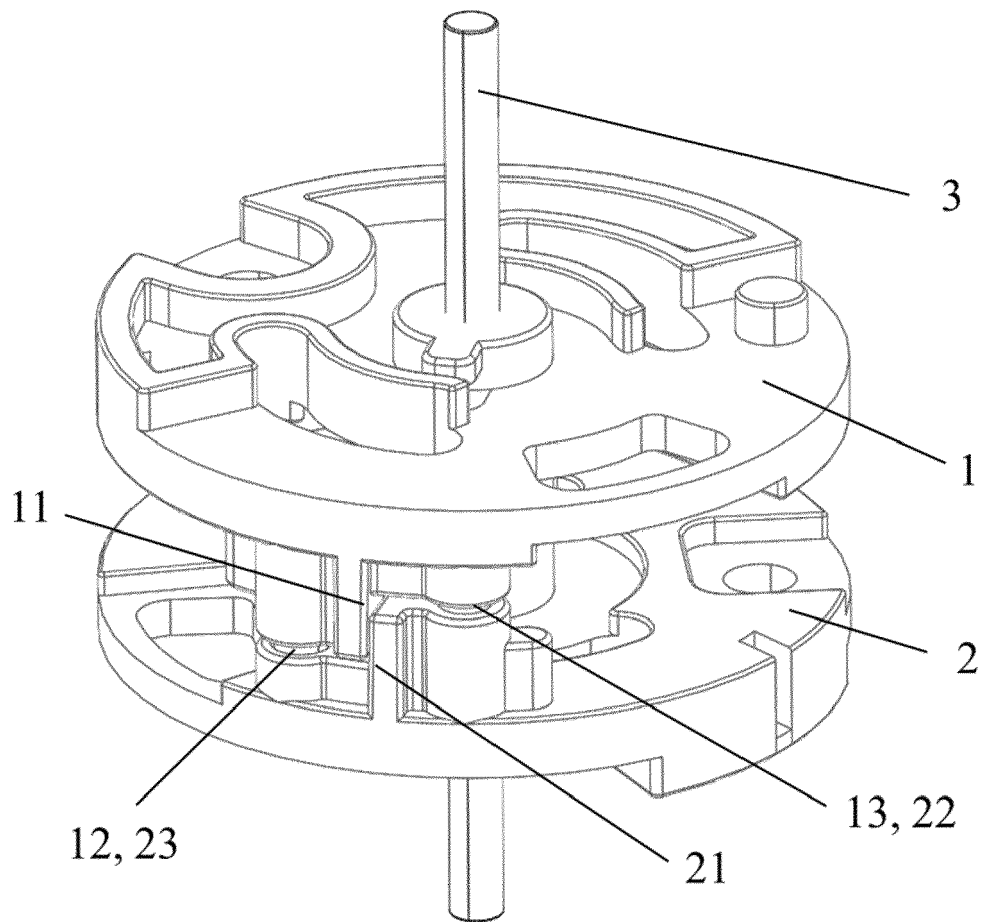


Figure 3

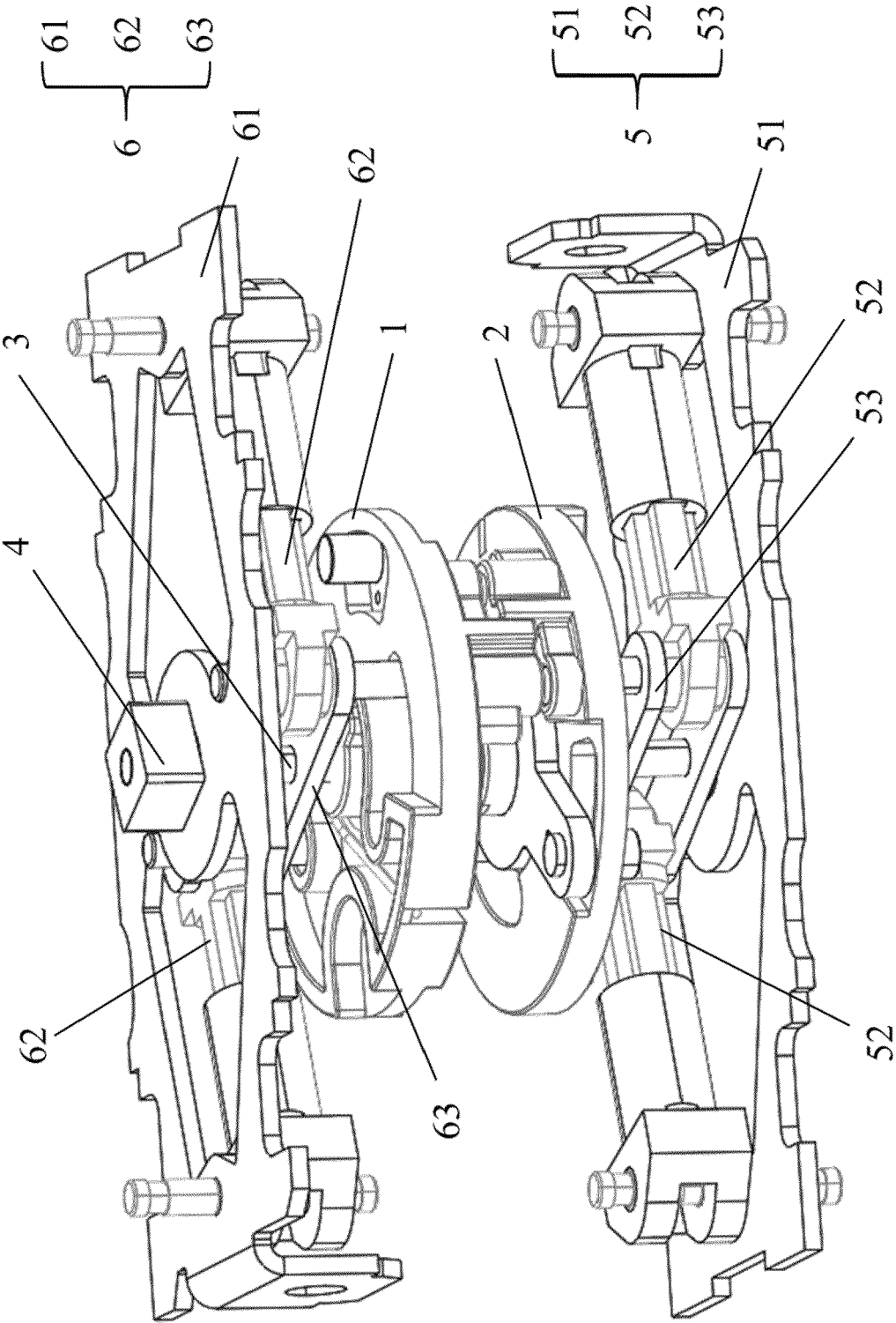


Figure 4

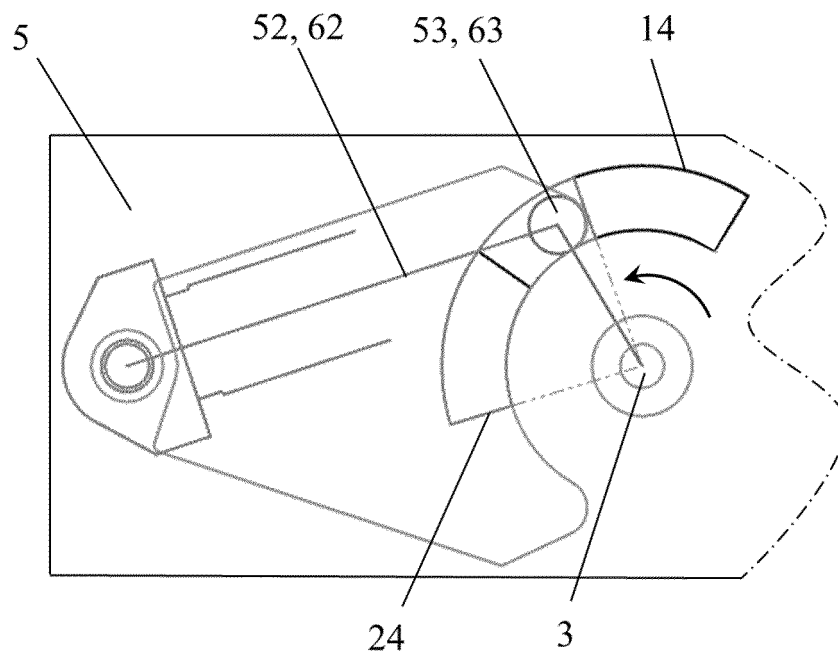


Figure 5

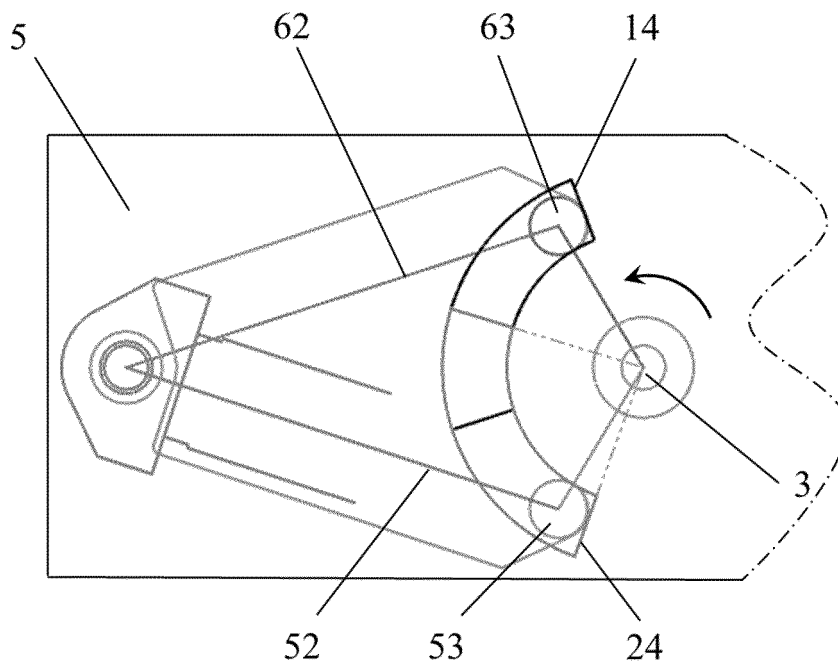


Figure 6

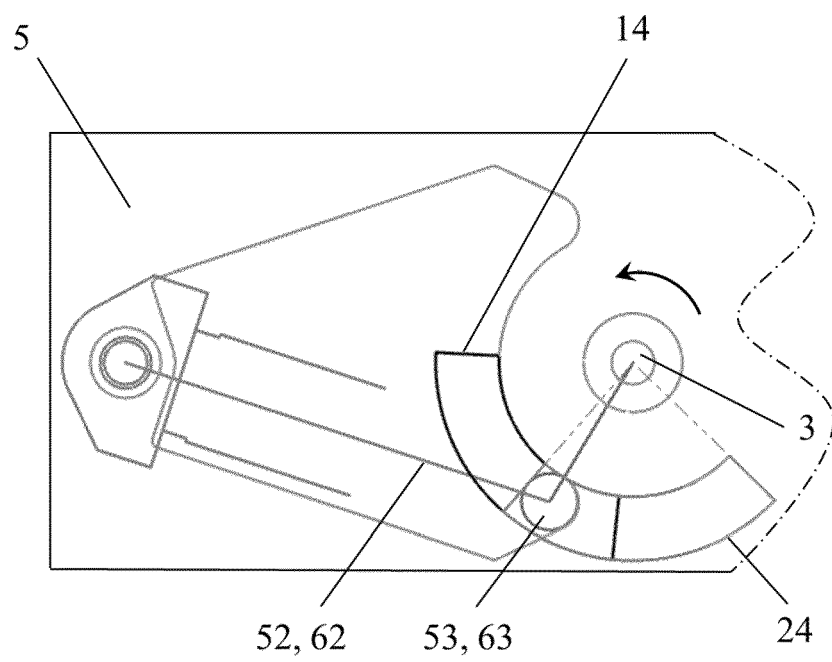


Figure 7



EUROPEAN SEARCH REPORT

Application Number
EP 21 30 5232

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A	EP 3 567 622 A1 (SCHNEIDER ELECTRIC IND SAS [FR]) 13 November 2019 (2019-11-13) * page 4, paragraph 0028 - page 7, paragraph 0048; figures 1-8 *	1-10	ADD. H01H3/58 H01H5/10 H01H5/12 H01H9/24
A	CN 208 271 762 U (SCHNEIDER ELECTRIC IND SAS) 21 December 2018 (2018-12-21) * page 7, paragraph 0052 - page 9, paragraph 0079; figures 1-5 *	1-10	
			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 16 June 2021	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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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16-06-2021

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