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(54) **ISOLATING SWITCH**

(57) The present utility model relates to an isolating switch, comprising: a first static conductor, connected to an external conductor, forming a sleeve shape, and having a first inner cavity and a first inner surface provided with a first electrically conductive part; a first moving contact, arranged in the first inner cavity, in electrical communication with the first static conductor by means of the first electrically conductive part, and capable of moving along a length direction of the sleeve; a second moving contact, arranged coaxially with and separated from the first static conductor, forming a sleeve shape, having a second inner cavity and a second inner surface provided with a second electrically conductive part and a third electrically conductive part that are separated, and capable of moving along a length direction of the sleeve thereof; a second static conductor, arranged in the second inner cavity, in electrical communication with the second moving contact by means of the second electrically conductive part, and connected to another external conductor; a transmission apparatus, connected to the first and second moving contacts, and driving the first and second moving contacts to simultaneously move towards or away from each other, to cause the third electrically conductive part to be in contact with or to be separated from the first moving contact, so as to achieve the effects

of accelerating opening speed, mitigating burning of the contact, and prolonging the electrical life of the isolating switch.

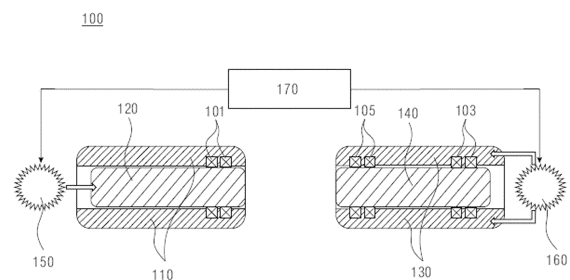


Figure 1

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## Description

### Technical field

**[0001]** The present application relates to an isolating switch, in particular to an isolating switch having moving contacts at two sides.

### Background art

**[0002]** An isolation switch is a switching device mainly used for power supply isolation, switchover operations, and the connection and cutoff of small-current circuits. When an isolation switch is at the open position, there is an obvious disconnection sign and an insulating distance meeting specified requirements between the contacts; at the closed position, the isolation switch can carry current under normal circuit conditions and current under abnormal conditions (e.g. short circuit) for a specified time. The isolation switch has no arc extinction means, and the contacts thereof are made of an alloy resistant to arc burning.

**[0003]** However, if the isolation switch is opened when there is current in the circuit, the static contact of the isolation switch will be burnt due to arcing. As the separation distance between the moving contact and the static contact increases, the root of the arc transfers to the moving contact of the isolation switch, and as a result, the moving contact is also burnt to a certain degree. As the number of operations increases, the degree of burning gradually worsens, and will eventually affect the electrical life and internal electric field distribution of the switching device.

**[0004]** One method of mitigating the burning of contacts due to arcing in an isolation switch is to increase the contact separation speed of the isolation switch. When the contact separation speed is increased, the arc produced between the contacts can be elongated rapidly; this results in a sharp drop in electric field strength in the arc gap, so that the arc is rapidly extinguished, thus mitigating contact burning.

**[0005]** Thus, to mitigate contact burning, fast isolation switches in which the moving contact speed is increased to achieve rapid separation of the moving contact and static contact are already being used. However, the separation speed of the moving contact and static contact is limited by mechanical characteristics, so the mitigation of contact burning in the isolation switch is also limited. Thus, the problem of contact burning in isolation switches awaits further solution.

### Summary of the utility model

**[0006]** The main objective of the present application is to provide an isolation switch, to at least solve the problem in the prior art that contact burning in isolation switches is difficult to alleviate.

**[0007]** To achieve this objective, according to one as-

pect of the present application, an isolation switch is provided, comprising: a first static conductor connected to an external conductor, the first static conductor having a sleeve shape and having a first inner surface and a first internal cavity, with a first conductive part provided on the first inner surface; a first moving contact, arranged in the first internal cavity of the first static conductor and maintaining electrical connection with the first static conductor via the first conductive part, and movable in the length direction of the sleeve shape; a second moving contact, arranged coaxially with the first static conductor at a certain axial distance therefrom, the second moving contact having a sleeve shape and having a second inner surface and a second internal cavity, and being movable in the length direction of the sleeve shape of the second moving contact, wherein a second conductive part and a third conductive part are provided on the second inner surface, the second conductive part and third conductive part being separated by a predetermined distance and in electrical connection with each other, and the third conductive part being located between the first conductive part and the second conductive part; a second static conductor, arranged in the second internal cavity of the second moving contact and maintaining electrical connection with the second moving contact via the second conductive part, and being connected to another external conductor; and a drive means, connected to the first moving contact and the second moving contact and configured to: drive the first moving contact and the second moving contact such that the first moving contact and the second moving contact simultaneously move toward or away from each other, so that the third conductive part contacts or separates from the first moving contact.

**[0008]** In this way, instead of the conventional method of providing a moving contact and a static contact at two sides of the isolation switch, the first moving contact and the second moving contact capable of moving simultaneously are provided at two sides of the isolation switch, and contact/separation of the first moving contact and second moving contact is utilized instead of contact/separation of a moving contact and a static contact to close/open the isolation switch. Thus, the simultaneous movement of the first moving contact and second moving contact toward or away from each other is used to open/close the switch. Compared with the conventional method of opening/closing with a moving contact at one side only, the contact opening/closing speed can be doubled, so that the arc produced during opening is elongated to extinction more quickly, thereby mitigating the burning of contacts.

**[0009]** Further, according to an embodiment of the present application, the third conductive part and the first moving contact come into contact through the movement of the first moving contact and the second moving contact toward each other; and the third conductive part and the first moving contact separate through the movement of the first moving contact and the second moving contact

away from each other.

**[0010]** In this way, when opening the isolating switch, the use of the movement of the first moving contact and second moving contact away from each other can double the opening speed compared with the speed of conventional opening with a moving contact at one side only, making it possible to extinguish the arc produced during opening more quickly.

**[0011]** Further, according to an embodiment of the present application, the first conductive part is disposed annularly on the first inner surface of the first static conductor, and the second conductive part and the third conductive part are disposed annularly on the second inner surface of the second moving contact.

**[0012]** In this way, by configuring the first static conductor to surround the first moving contact, with the annular first conductive part disposed between the first moving contact and the first static conductor, the first moving contact is enabled to maintain good electrical connection with the first static conductor via the annular first conductive part while moving relative to the first static conductor. By configuring the second moving contact to surround the second static conductor, with the annular second conductive part and annular third conductive part disposed between the second moving contact and second static conductor, the second moving contact is enabled to maintain good electrical connection with the second static conductor via the annular second conductive part while moving relative to the second static conductor. Moreover, this configuration is also conducive to achieving good electrical connection between the first moving contact and the sleeve-shaped second moving contact via the annular third conductive part.

**[0013]** Further, according to an embodiment of the present application, the first conductive part, the second conductive part and the third conductive part each comprise a spring finger.

**[0014]** In this way, tight contact between the static conductor and the moving contact can be achieved by using the annular spring finger, thereby maintaining good electrical connection between the first moving contact and the first static conductor and good electrical connection between the second moving contact and the second static conductor. Moreover, the annular spring finger can also achieve good electrical connection between the first moving contact and the second moving contact in a closed state.

**[0015]** Further, according to an embodiment of the present application, the drive means comprises: a first drive shaft, connected to the first moving contact to drive the first moving contact to move in the length direction of the sleeve shape of the first static conductor; a second drive shaft, connected to the second moving contact to drive the second moving contact to move in the length direction of the sleeve shape of the second moving contact; and a drive mechanism, connected to the first drive shaft and the second drive shaft and configured to: upon receiving a closing signal, drive the first drive shaft and

the second drive shaft such that the first moving contact and the second moving contact simultaneously move toward each other, and upon receiving an opening signal, drive the first drive shaft and the second drive shaft such that the first moving contact and the second moving contact simultaneously move away from each other.

**[0016]** In this way, using the drive means having the drive mechanism, first drive shaft and second drive shaft, the first moving contact and the second moving contact can be driven to simultaneously move toward/away from each other, in response to the corresponding closing signal/opening signal.

**[0017]** Further, according to an embodiment of the present application, the first static conductor and the second moving contact have the same sleeve shape, and/or the first moving contact and the second static conductor have the same cylindrical shape.

**[0018]** In this way, by configuring the first static conductor and second moving contact to have the same shape, and the first moving contact and second static conductor to have the same shape, the isolating switch can be formed as a symmetrical structure, making it easier to simplify the manufacture of the isolating switch and miniaturize its dimensions.

**[0019]** In embodiments of the present application, an isolation switch is provided, comprising: a first static conductor connected to an external conductor, having a sleeve shape and having a first inner surface and a first internal cavity, with a first conductive part provided on the first inner surface; a first moving contact, arranged in the first internal cavity of the first static conductor and maintaining electrical connection with the first static conductor via the first conductive part, and movable in the length direction of the sleeve shape; a second moving contact, arranged coaxially with the first static conductor at a certain axial distance therefrom, having a sleeve shape and having a second inner surface and a second internal cavity, with a second conductive part and a third conductive part provided on the second inner surface, the second conductive part and third conductive part being separated by a predetermined distance and in electrical connection with each other; a second static conductor, arranged in the second internal cavity of the second moving contact and maintaining electrical connection with the second moving contact via the second conductive part, and being connected to another external conductor; and a drive means, connected to the first moving contact and the second moving contact and configured to drive the first moving contact and the second moving contact such that the first moving contact and the second moving contact simultaneously move toward or away from each other, so that the third conductive part contacts or separates from the first moving contact, in order to at least solve the problem in the prior art that contact burning in isolation switches is difficult to mitigate further, and thereby achieve the effects of slowing down contact burning in isolation switches and increasing the electrical life of isolation switches.

## Brief description of the drawings

**[0020]** The drawings accompanying the description which form part of the present application are intended to provide further understanding of the present application. The schematic embodiments of the present application and the descriptions thereof are intended to explain the present application, but do not constitute an improper limitation thereof. In the drawings:

Fig. 1 is a drawing of the connection structure of an isolation switch in an open state according to an embodiment of the present application.

Fig. 2 is a drawing of the connection structure of an isolation switch in a closed state according to an embodiment of the present application.

**[0021]** The drawings include the following reference labels.

- 100: Isolating switch
- 101: First conductive part
- 103: Second conductive part
- 105: Third conductive part
- 110: First static conductor
- 120: First moving contact
- 130: Second moving contact
- 140: Second static conductor
- 150: First drive shaft
- 160: Second drive shaft
- 170: Drive mechanism

## Detailed description of embodiments

**[0022]** It must be explained that in the absence of conflict, embodiments in the present application and features in embodiments can be combined with each other. The present application is explained in detail below with reference to the drawings, in conjunction with embodiments.

**[0023]** It must be pointed out that unless otherwise specified, all technical and scientific terms used in the present application have the same meanings as those generally understood by those skilled in the art.

**[0024]** Unless stated otherwise, words relating to orientation which are used in the present application such as "up, down, top and bottom" generally relate to the directions shown in the drawings, or relate to the components themselves in the vertical, perpendicular or gravity direction; similarly, to facilitate understanding and description, "inner and outer" mean inner and outer relative to the profile of each component itself. However, the abovementioned words relating to orientation are not intended to limit the present application.

**[0025]** Fig. 1 is a drawing of the connection structure of an isolation switch in an open state according to an embodiment of the present application. As shown in

Fig. 1, the isolation switch 100 comprises: a first static conductor 110 connected to an external conductor, the first static conductor 110 having a sleeve shape and having a first inner surface and a first internal cavity, with a first conductive part 101 provided on the first inner surface; a first moving contact 120, arranged in the first internal cavity of the first static conductor 110 and maintaining electrical connection with the first static conductor 110 via the first conductive part 101, and movable in the length direction of the sleeve shape; a second moving contact 130, arranged coaxially with the first static conductor 110 at a certain axial distance therefrom, the second moving contact 130 having a sleeve shape and having a second inner surface and a second internal cavity, and being movable in the length direction of the sleeve shape of the second moving contact, wherein a second conductive part 103 and a third conductive part 105 are provided on the second inner surface, the second conductive part and third conductive part being separated by a predetermined distance and in electrical connection with each other, the third conductive part 105 being located between the first conductive part 101 and the second conductive part 103; a second static conductor 140, arranged in the second internal cavity of the second moving contact 130 and maintaining electrical connection with the second moving contact 130 via the second conductive part 103, and being connected to another external conductor; and a drive means, connected to the first moving contact 120 and the second moving contact 130 and configured to: drive the first moving contact 120 and the second moving contact 130 such that the first moving contact 120 and the second moving contact 130 simultaneously move toward or away from each other, so that the third conductive part 105 contacts or separates from the first moving contact 120.

**[0026]** In this way, closing of the isolation switch 100 is achieved by contact between the third conductive part 105 and the first moving contact 120, and opening of the isolation switch 100 is achieved by separation of the third conductive part 105 and the first moving contact 120.

**[0027]** Specifically, the first moving contact 120 maintains electrical connection with the first static conductor 110 via the first conductive part 101, and thus maintains electrical connection with the external conductor; the second moving contact 130 maintains electrical connection with the second static conductor 140 via the second conductive part 103, and thus maintains electrical connection with the other external conductor. Thus, the first moving contact 120, the first conductive part 101, the first static conductor 110 and the external conductor maintain electrical connection and are at equal potential; the second moving contact 130, the second conductive part 103, the third conductive part 105, the second static conductor 140 and the other external conductor maintain electrical connection and are at equal potential.

**[0028]** Thus, when the third conductive part 105 is in contact with the first moving contact 120, electrical connection between the first moving contact 120 and the

second moving contact 130 is realized (i.e. the isolation switch 100 is in a closed state), thereby realizing electrical connection between the external conductor and the other external conductor. When the third conductive part 105 is separated from the first moving contact 120, disconnection of the first moving contact 120 from the second moving contact 130 is realized (i.e. the isolation switch 100 is in the open state), thereby realizing disconnection of the external conductor from the other external conductor.

**[0029]** In this way, instead of the conventional method of providing a moving contact and a static contact at two sides of the isolation switch, the first moving contact and the second moving contact capable of moving simultaneously are provided at two sides of the isolation switch, and contact/separation of the first moving contact and second moving contact is utilized instead of contact/separation of a moving contact and a static contact to close/open the isolation switch. Thus, the use of the simultaneous movement of the first moving contact and second moving contact to achieve opening/closing can double the contact opening/closing speed compared with the conventional method of opening/closing with a moving contact at one side only.

**[0030]** As shown in Fig. 1, at this time, the third conductive part 105 is in contact with the second static conductor 140, but the third conductive part 105 is separated from the first moving contact 120, so the first moving contact 120 is disconnected from the second moving contact 130; thus, the isolation switch 100 is also disconnected.

**[0031]** In this embodiment, the first static conductor 110 and the second static conductor 140 are always stationary, whereas the first moving contact 120 and the second moving contact 130 can move in parallel with each other.

**[0032]** In this embodiment, the drive means comprises: a first drive shaft 150, connected to the first moving contact 120 to drive the first moving contact 120 to move in the length direction of the sleeve shape of the first static conductor 110; a second drive shaft 160, connected to the second moving contact 130 to drive the second moving contact 130 to move in the length direction of its own sleeve shape; and a drive mechanism 170, connected to the first drive shaft 150 and second drive shaft 160 and configured to: upon receiving a closing signal, drive the first drive shaft 150 and second drive shaft 160 such that the first moving contact 120 and second moving contact 130 move toward each other, and upon receiving an opening signal, drive the first drive shaft 150 and second drive shaft 160 such that the first moving contact 120 and second moving contact 130 move away from each other.

**[0033]** Fig. 2 is a drawing of the connection structure of an isolation switch in a closed state according to an embodiment of the present application. The only difference between the component connection state of the isolation switch 100 shown in Fig. 2 and the component

connection state shown in Fig. 1 is that in Fig. 2, the third conductive part 105 is in contact with the first moving contact 120, and not in contact with the second static conductor 140.

**[0034]** Since the third conductive part 105 is in contact with the first moving contact 120, the first moving contact 120 and the second moving contact 130 are in electrical connection, i.e. the isolation switch 100 is in the closed state.

**[0035]** As the isolation switch 100 is in the closed state when the third conductive part 105 is in contact with the first moving contact 120, and the isolation switch 100 is in the open state when the third conductive part 105 is separated from the first moving contact 120, the simultaneous movement of the first moving contact 120 and second moving contact 130 located at two sides may be utilized to open/close the isolation switch. Thus, compared with the conventional method of opening/closing with a moving contact at one side only, the contact opening/closing speed can be doubled, so that the arc produced during opening is elongated to extinction more quickly, thereby alleviating arc-induced burning of the isolation switch contacts.

**[0036]** In this embodiment, the third conductive part 105 and the first moving contact 120 come into contact through the movement of the first moving contact 120 and the second moving contact 130 toward each other; and the third conductive part 105 and the first moving contact 120 separate through the movement of the first moving contact 120 and the second moving contact 130 away from each other.

**[0037]** That is, the movement direction of the second moving contact 130 is parallel to the movement direction of the first moving contact 120, such that when the first moving contact 120 and second moving contact 130 move simultaneously, the third conductive part 105 on the second inner surface of the second moving contact 130 contacts or separates from the first moving contact 120.

**[0038]** Next, the closing process and opening process of the isolation switch 100 according to an embodiment of the present application are described with reference to Figs. 1 and 2.

**[0039]** In the open state shown in Fig. 1, in response to the closing signal, the drive mechanism 170 simultaneously drives the first drive shaft 150 and second drive shaft 160 such that the first moving contact 120 and second moving contact 130 move toward each other. That is, the first moving contact 120 moves horizontally toward the right, while the second moving contact 130 moves horizontally toward the left. The first moving contact 120 and second moving contact 130 each move a specific distance to reach a closed position. As the second moving contact 130 moves, the third conductive part 105 on the second moving contact 130 separates from the second static conductor 140. When the first moving contact 120 and second moving contact 130 reach the closed position shown in Fig. 2, the third conductive part

105 is in tight contact with the first moving contact 120. At this time, the isolation switch 100 has completed the closing process, and is in the closed state.

**[0040]** It should be noted that in the process of the first moving contact 120 and second moving contact 130 moving, the first moving contact 120 remains in contact with the first conductive part 101 at all times, and the second static conductor 140 remains in contact with the second conductive part 103 at all times.

**[0041]** In the closed state shown in Fig. 2, in response to the opening signal, the drive mechanism 170 simultaneously drives the first drive shaft 150 and second drive shaft 160 such that the first moving contact 120 and second moving contact 130 move away from each other. That is, the first moving contact 120 moves horizontally toward the left, while the second moving contact 130 moves horizontally toward the right. The first moving contact 120 and second moving contact 130 each move a specific distance to return to an open position in the open state. As the first moving contact 120 and second moving contact 130 moves, the third conductive part 105 on the second moving contact 130 separates from the first moving contact 120. When the first moving contact 120 and second moving contact 130 reach the open position shown in Fig. 1, the third conductive part 105 is separated from the first moving contact 120 and in tight contact with the second static conductor 140. At this time, the isolation switch 100 has completed the opening process, and is in the open state.

**[0042]** It should be noted that when there is current in the circuit in which the isolation switch 100 is located, an arc arises in a gap between the third conductive part 105 and the first moving contact 120 at the moment when they separate, and this arc is rapidly elongated to extinction as the third conductive part 105 and first moving contact 120 rapidly separate.

**[0043]** In this embodiment, the first conductive part 101 is disposed annularly on the first inner surface of the first static conductor 110, and the second conductive part 103 and third conductive part 105 are disposed annularly on the second inner surface of the second moving contact 130.

**[0044]** At this time, the first static conductor 110 surrounds the first moving contact 120, and the annular first conductive part 101 is disposed between the first moving contact 120 and the first static conductor 110, such that the first moving contact 120, while moving relative to the first static conductor 110, can maintain good electrical connection with the first static conductor 110 via the first conductive part 101. By configuring the second moving contact 130 to surround the second static conductor 140, with the annular second conductive part 103 and annular third conductive part 105 disposed between the second moving contact 130 and second static conductor 140, the second moving contact 130 is enabled to maintain good electrical connection with the second static conductor 140 via the second conductive part 103 while moving relative to the second static conductor 140. In addition,

the first moving contact 120 is arranged coaxially with the second static conductor 140, such that when the first moving contact 120 and the sleeve-shaped second moving contact 130 move toward each other, the second moving contact 130 can surround the first moving contact 120 to realize good electrical connection via the third conductive part 105.

**[0045]** Here, the first moving contact 120 may be cylindrical, with a radius slightly smaller than the inner diameter of the first static conductor 110. The second static conductor 140 may be cylindrical, with a radius slightly smaller than the inner diameter of the second moving contact 130.

**[0046]** Further, the first conductive part 101 may be embedded annularly in a sidewall of the first static conductor 110 and exposed through the first inner surface of the first static conductor 110, so as to be in tight contact with the first moving contact 120. Further, the second conductive part 103 and third conductive part 105 may be embedded annularly in a sidewall of the second moving contact 130 and exposed through the second inner surface of the second moving contact 130, so as to be in tight contact with the second static conductor 140 or the first moving contact 120.

**[0047]** Further, in this embodiment, the first conductive part 101, second conductive part 103 and third conductive part 105 each comprise a spring finger. Further, the first conductive part 101, second conductive part 103 and third conductive part 105 each consist of a spring finger. Thus, compressive deformation of the annular spring finger can be used to achieve tight contact between the moving contact and the spring finger, thereby achieving good electrical connection between the moving contact and the corresponding static conductor, and good electrical connection can also be achieved between the first moving contact 120 and the second moving contact 130 via the annular spring finger.

**[0048]** Further, in this embodiment, the number of spring finger(s) included in each conductive part is not limited to two as shown in the figures. Each of the first conductive part 101, second conductive part 103 and third conductive part 105 may comprise one or more spring fingers.

**[0049]** It should be noted that Figs. 1 and 2 show schematic sectional drawings of the first static conductor 110, the first moving contact 120, the second moving contact 130, the second static conductor 140, the first conductive part 101, the second conductive part 103 and the third conductive part 105.

**[0050]** In this embodiment, the first static conductor 110 and the second moving contact 130 may have the same sleeve shape. In this embodiment, the first moving contact 120 and the second static conductor 140 may have the same cylindrical shape. Thus, the isolation switch 100 may be formed as a structure with left-right symmetry; in this way, the structure of the isolation switch can be simplified, and the size thereof can be reduced.

**[0051]** Further, the first static conductor 110 and the

second moving contact 130 may be formed of the same material. The first moving contact 120 and the second static conductor 140 may be formed of the same material.

[0052] It should be noted that the isolation switch 100 according to embodiments of the present application may be applied to high-voltage circuits or low-voltage circuits, and in particular may be applied in gas insulated metal enclosed switchgear (GIS). Obviously, the embodiments described above are merely some, not all, of the embodiments of the present application. All other embodiments obtained by those skilled in the art based on the embodiments in the present application without inventive effort shall fall within the scope of protection of the present application.

[0053] It must be noted that the terms used herein are intended merely to describe particular embodiments, not to limit exemplary embodiments according to the present application. As used herein, unless clearly indicated otherwise in the context, the singular form is also intended to include the plural form; in addition, it should also be understood that when the terms "include" and/or "comprise" are used herein, they indicate the existence of features, steps, operations, devices, assemblies and/or combinations thereof.

[0054] It must be explained that the terms "first", "second", etc. in the description, claims and abovementioned drawings of the present application are used to distinguish between similar objects, but not necessarily used to describe a specific order or sequence. It should be understood that data used in this way can be interchanged as appropriate so that the embodiments of the present application described here can be implemented in an order other than those shown or described here.

[0055] The above are merely preferred embodiments of the present application, which are not intended to limit it; to those skilled in the art, various modifications and changes to the present application are possible. Any amendments, equivalent substitutions or improvements etc. made within the spirit and principles of the present application shall be included in the scope of protection thereof.

## Claims

1. An isolation switch, **characterized by** comprising:

a first static conductor (110) connected to an external conductor, the first static conductor (110) having a sleeve shape and having a first inner surface and a first internal cavity, with a first conductive part (101) provided on the first inner surface;

a first moving contact (120), arranged in the first internal cavity of the first static conductor (110) and maintaining electrical connection with the first static conductor (110) via the first conductive part (101), and movable in the length direc-

tion of the sleeve shape;

a second moving contact (130), arranged coaxially with the first static conductor (110) at a certain axial distance therefrom, the second moving contact (130) having a sleeve shape and having a second inner surface and a second internal cavity, and being movable in the length direction of the sleeve shape of the second moving contact (130), wherein a second conductive part (103) and a third conductive part (105) are provided on the second inner surface, the second conductive part and third conductive part being separated by a predetermined distance and in electrical connection with each other, and the third conductive part (105) being located between the first conductive part (101) and the second conductive part (103);

a second static conductor (140), arranged in the second internal cavity of the second moving contact (130) and maintaining electrical connection with the second moving contact (130) via the second conductive part (103), and being connected to another external conductor; and a drive means, connected to the first moving contact (120) and the second moving contact (130) and configured to: drive the first moving contact (120) and the second moving contact (130) such that the first moving contact (120) and the second moving contact (130) simultaneously move toward or away from each other, so that the third conductive part (105) contacts or separates from the first moving contact (120).

2. The isolating switch as claimed in claim 1, **characterized in that:**

the third conductive part (105) and the first moving contact (120) come into contact through the movement of the first moving contact (120) and the second moving contact (130) toward each other; and

the third conductive part (105) and the first moving contact (120) separate through the movement of the first moving contact (120) and the second moving contact (130) away from each other.

3. The isolating switch as claimed in claim 1, **characterized in that:**

the first conductive part (101) is disposed annularly on the first inner surface of the first static conductor (110), and

the second conductive part (103) and the third conductive part (105) are disposed annularly on the second inner surface of the second moving contact (130).

4. The isolating switch as claimed in claim 3, **characterized in that** the first conductive part (101), the second conductive part (103) and the third conductive part (105) each comprise a spring finger.

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5. The isolating switch as claimed in claim 1, **characterized in that** the drive means comprises:

a first drive shaft (150), connected to the first moving contact (120) to drive the first moving contact (120) to move in the length direction of the sleeve shape of the first static conductor (110);

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a second drive shaft (160), connected to the second moving contact (130) to drive the second moving contact (130) to move in the length direction of the sleeve shape of the second moving contact (130); and

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a drive mechanism (170), connected to the first drive shaft (150) and the second drive shaft (160) and configured to:

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upon receiving a closing signal, drive the first drive shaft (150) and the second drive shaft (160) such that the first moving contact (120) and the second moving contact (130) simultaneously move toward each other, and

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upon receiving an opening signal, drive the first drive shaft (150) and the second drive shaft (160) such that the first moving contact (120) and the second moving contact (130) simultaneously move away from each other.

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6. The isolating switch as claimed in claim 1, **characterized in that:**

the first static conductor (110) and the second moving contact (130) have the same sleeve shape, and/or

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the first moving contact (120) and the second static conductor (140) have the same cylindrical shape.

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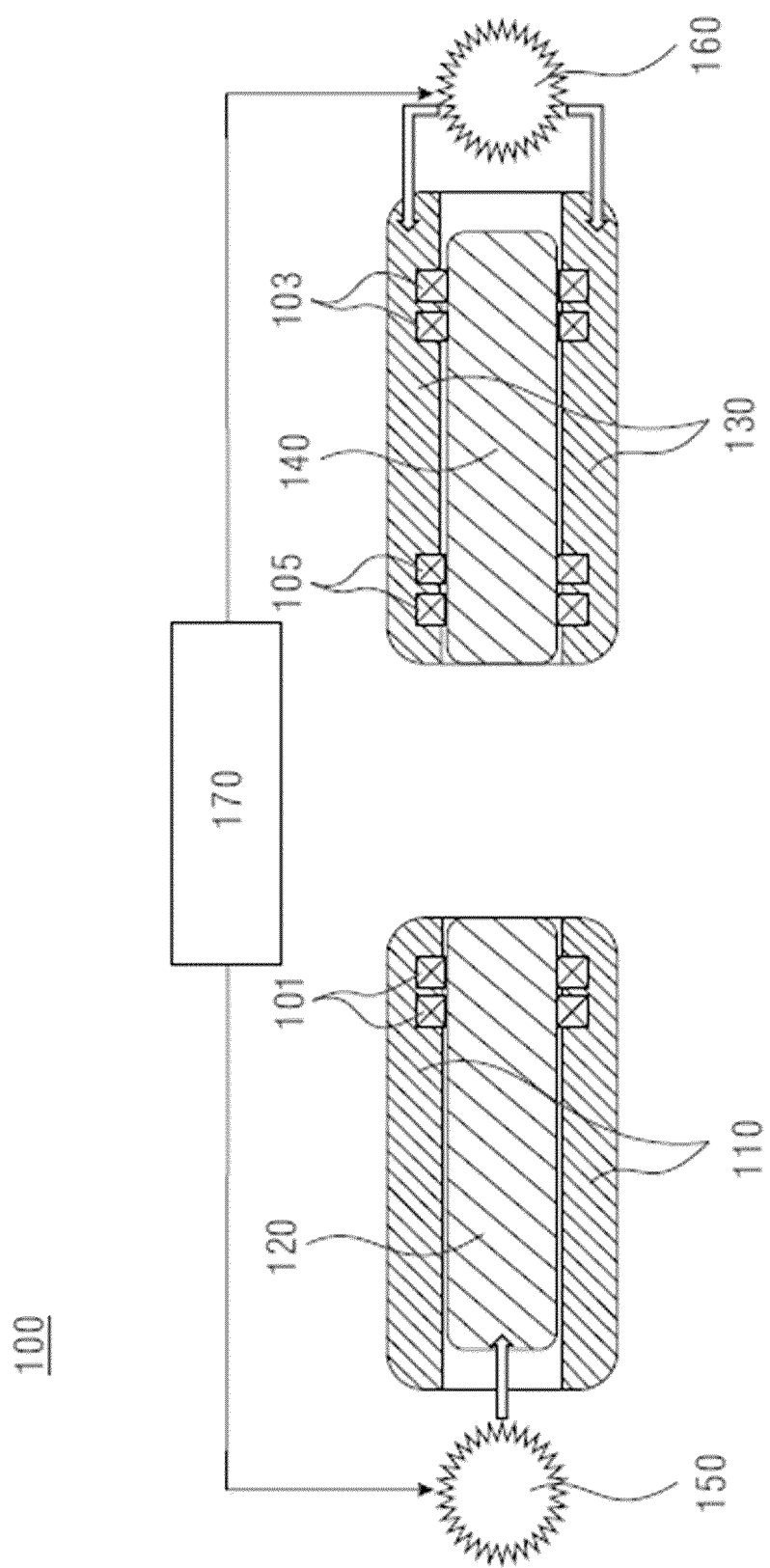


Figure 1

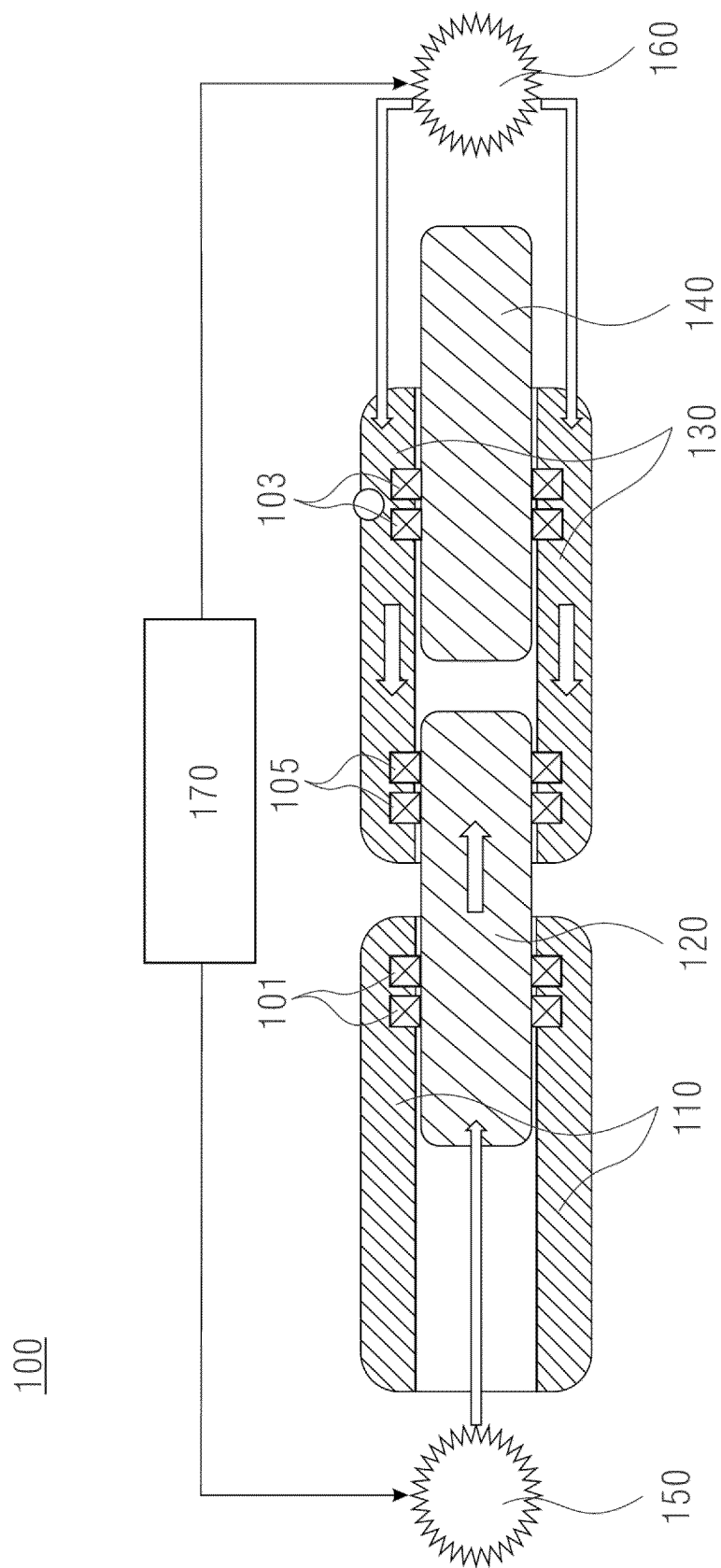


Figure 2

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2023/051803

## A. CLASSIFICATION OF SUBJECT MATTER

INV. H01H1/36

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                        | Relevant to claim No. |
|-----------|---------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | US 5 416 286 A (DIXON JR ALFRED R [US])<br>16 May 1995 (1995-05-16)<br>column 5, line 23 - line 66<br>figure 1            | 1-6                   |
| A         | EP 3 836 182 A1 (ABB SCHWEIZ AG [CH])<br>16 June 2021 (2021-06-16)<br>paragraph [0031] - paragraph [0035]<br>figures 1, 2 | 1-6                   |
| A         | EP 2 405 544 A2 (EATON CORP [US])<br>11 January 2012 (2012-01-11)<br>paragraph [0013] - paragraph [0018]<br>figure 1      | 1-6                   |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

31 May 2023

Date of mailing of the international search report

15/06/2023

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
PCT/IB2023/051803

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| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| US 5416286                                | A  | 16-05-1995          | NONE                       |                     |
| -----                                     |    |                     |                            |                     |
| EP 3836182                                | A1 | 16-06-2021          | CN 112951643 A             | 11-06-2021          |
|                                           |    |                     | EP 3836182 A1              | 16-06-2021          |
|                                           |    |                     | US 2021183597 A1           | 17-06-2021          |
| -----                                     |    |                     |                            |                     |
| EP 2405544                                | A2 | 11-01-2012          | EP 2405544 A2              | 11-01-2012          |
|                                           |    |                     | US 2012008256 A1           | 12-01-2012          |
| -----                                     |    |                     |                            |                     |