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(54) **ARC EXTINGUISHING STRUCTURE AND DUAL POWER CHANGEOVER SWITCH**

(57) The invention relates to an arc extinguishing structure and a dual power changeover switch with the arc extinguishing structure. The arc extinguishing structure includes an arc extinguishing chamber (10) and an arc extinguishing shell (20). The arc extinguishing chamber (10) comprises a plurality of arc extinguishing grids (11) separated from each other and arranged as a first arc extinguishing grid group (A) and a second arc extinguishing grid group (B) that is separated from the first arc extinguishing grid group (A) by an arc extinguishing chamber gap (17). The arc extinguishing shell (20) is used for accommodate the arc extinguishing chamber (10) and provided with an arc jetting opening (26) that is aligned with the arc extinguishing chamber gap (17). The arc extinguishing structure is provided with an arc travelling channel (L) communicated with the arc jetting opening (26) and having a bent structure.

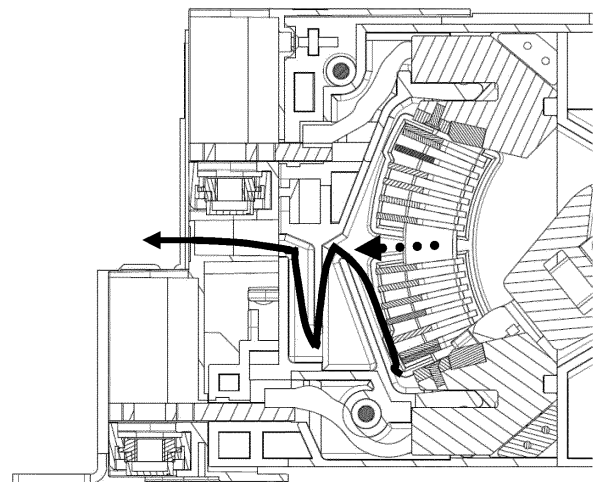


Fig. 9

Description

TECHNICAL FIELD

[0001] The invention relates to an arc extinguishing structure and a dual power changeover switch with the arc extinguishing structure.

BACKGROUND

[0002] Arc generated when contacts of switches and circuit breakers are disconnected is generally divided and cooled by an arc extinguishing chamber in an arc extinguishing system until it is extinguished. Usually, there is an air outlet at a rear end of the arc extinguishing system, and an arc travelling channel is arranged between the air outlet and the arc extinguishing chamber. Arc generated by the breaking current will escape from the air outlet through the arc travelling channel before it is completely extinguished, which will reduce the safety of the product.

[0003] In order to prevent arcing, an arc extinguishing device with zero arcing is usually provided. Usually, an arc filter sheet formed by a multilayer filter screen is placed between the rear end position of the arc extinguishing chamber and the air outlet, and metal particles generated by arc are prevented from being ejected from the air outlet through the layers. However, this kind of arc extinguishing device with zero arcing is not only inconvenient to install, but also takes up a large space, which will correspondingly increase the cost.

[0004] It is thus desirable to have an arc extinguishing device, which not only can realize the arc extinguishing effect of zero arcing, but also does not need the multilayer arc filter screen which leads to inconvenient installation and takes up large space.

SUMMARY

[0005] In view of the problems and demands mentioned above, the present disclosure proposes an improved arc extinguishing structure and a dual power changeover switch with the arc extinguishing structure, which solves the above problems and brings other technical effects by the following technical features.

[0006] The invention provides an arc extinguishing structure, which comprises: an arc extinguishing chamber comprising a plurality of arc extinguishing grids separated from each other, and the plurality of arc extinguishing grids are arranged as a first arc extinguishing grid group and a second arc extinguishing grid group that is separated from the first arc extinguishing grid group by an arc extinguishing chamber gap; an arc extinguish shell accommodating the arc extinguishing chamber, and the arc extinguishing shell is provided with an arc jetting opening that is aligned with the arc extinguishing chamber gap. The arc extinguishing structure is also provided with an arc travelling channel communicated with the arc jetting opening and has a bent structure.

[0007] According to a preferred scheme, the arc extinguishing chamber further comprises a first insulating side plate and a second insulating side plate arranged in parallel with the first insulating side plate, and the plurality of arc extinguishing grids are held between the first insulating side plate and the second insulating side plate.

[0008] According to a preferred scheme, each arc extinguishing grid comprises a first mounting edge and a second mounting edge which are opposite to each other and respectively mounted to the first insulating side plate and the second insulating side plate.

[0009] According to a preferred scheme, the plurality of arc extinguishing grids are arranged so that the projections thereof on a plane in which the first insulating side plate or the second insulating side plate extends are arc-shaped.

[0010] According to a preferred scheme, the arc extinguishing structure further comprises a first additional arc extinguishing grid abutting an outer side of an end arc extinguishing grid in the first arc extinguishing grid group that is farthest from the arc extinguishing chamber gap, and a second additional arc extinguishing grid abutting an outer side of an end arc extinguishing grid in the second arc extinguishing grid group that is farthest from the arc extinguishing chamber gap.

[0011] According to a preferred scheme, in the first arc extinguishing grid group and the second arc extinguishing grid group, the thickness of the end arc extinguishing grid farthest from the arc extinguishing chamber gap is greater than that of other arc extinguishing grids.

[0012] According to a preferred scheme, the arc travelling channel is at least partially defined by a plurality of walls that are spaced from and staggered with each other.

[0013] According to a preferred scheme, the arc extinguishing shell comprises a first wall and a second wall extending towards each other, and the arc jetting opening is defined between the ends of the first wall and the second wall.

[0014] According to a preferred scheme, the arc extinguishing structure further comprises a third wall defining the arc travelling channel, wherein the third wall is spaced from the arc jetting opening and arranged downstream of the arc jetting opening to block the arc jetting opening.

[0015] According to a preferred scheme, the first wall, the second wall and the third wall are perpendicular to the opening direction of the arc jetting opening.

[0016] According to a preferred scheme, the arc extinguishing structure further comprises a fourth wall which is used for defining the arc travelling channel and is opposite to the third wall in extension direction, and the fourth wall is located on a side of the third wall away from the arc extinguishing chamber and is spaced apart from the third wall. The third wall and the fourth wall at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening.

[0017] According to a preferred scheme, the fourth wall is parallel to the third wall.

[0018] According to a preferred scheme, the arc extin-

guishing structure further comprises a fifth wall which is used for defining the arc travelling channel and extends in an opposite direction to the fourth wall, and the fifth wall is located on a side of the fourth wall away from the arc extinguishing chamber and is spaced apart from the fourth wall. Wherein the fourth wall and the fifth wall at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening.

[0019] According to a preferred scheme, the spacing between the fourth wall and the fifth wall is greater than the spacing between the third wall and the fourth wall.

[0020] According to a preferred scheme, the fifth wall is parallel to the fourth wall.

[0021] According to a preferred scheme, the arc extinguishing structure is arranged such that a first cavity is formed at the end position of the third wall, and a second cavity is formed at the end position of the fifth wall downstream of the fourth wall, wherein the volume of the second cavity is larger than that of the first cavity.

[0022] According to a preferred scheme, the third wall is connected with the first wall and perpendicular to the opening direction of the arc jetting opening; the extending direction of the second wall forms an acute angle with the extending direction of the third wall, so that the distal end of the second wall inclines towards the third wall.

[0023] The present disclosure also provides a dual power changeover switch, which has an arc extinguishing structure as described in any one of the preceding schemes.

[0024] According to a preferred scheme, the dual power changeover switch comprises a first stationary contact and a second stationary contact, and the first arc extinguishing grid group and the second arc extinguishing grid group are respectively connected to the first stationary contact and the second stationary contact through respective arc striking plates.

[0025] According to a preferred scheme, the first stationary contact and the second stationary contact are both of U-shaped structures.

[0026] Hereinafter, a more detailed description of the optimal embodiments for implementing the present disclosure will be given with reference to the accompanying drawings, so that the features and advantages of the present disclosure can be easily understood.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] In order to explain the technical solutions of the embodiments of the invention more clearly, the drawings of the embodiments of the invention will be briefly introduced below. The drawings are only used to show some embodiments of the present invention, but not to limit all the embodiments of the present invention.

Fig. 1 shows a schematic diagram of a first embodiment of an arc extinguishing chamber proposed by the present disclosure;

Fig. 2 shows a schematic diagram of a second em-

bodiment of an arc extinguishing chamber proposed by the present disclosure;

Fig. 3 shows a partial sectional view of a dual power changeover switch proposed by the present disclosure, in which a movable contact engages the first stationary contact;

Fig. 4 shows a partial sectional view of the dual power changeover switch proposed by the present disclosure, in which the movable contact engages the second stationary contact;

Fig. 5 shows a partial sectional view of the dual power changeover switch proposed by the present disclosure, in which the movable contact is in a middle position;

Fig. 6A shows the travelling direction of the arc coming from the arc extinguishing chamber, and Fig. 6B shows further arc travelling path of the arc coming from the arc extinguishing chamber;

Fig. 7 shows a partial cross-sectional view of the dual power changeover switch, especially a partial enlarged view of the joint part between the stationary contact and the arc extinguishing chamber;

Fig. 8 shows a partial view of another embodiment of a dual power changeover switch;

Fig. 9 shows the arc travelling path in the embodiment shown in Fig. 8.

List of reference signs

[0028]

- 10 Arc extinguishing chamber
- 11 Arc extinguishing grid
- 12 First insulating side plate
- 13 Second insulating side plate
- 14 First additional arc extinguishing grid
- 15 Second additional arc extinguishing grid
- 16 Arc striking plate
- 20 Arc extinguishing shell
- 21 First wall
- 22 Second wall
- 23 Third wall
- 24 Fourth wall
- 25 Fifth wall
- 26 Arc jetting opening
- 27 First cavity
- 28 Second cavity
- 29 Air outlet
- 30 Chamber
- 31 First stationary contact
- 32 Second stationary contact
- 33 Movable contact
- 34 Cavity
- A First arc extinguishing grid group
- B Second arc extinguishing grid group
- L Arc travelling channel

DETAILED DESCRIPTION

[0029] In order to make the objectives, technical solutions, and advantages of the embodiments of the present disclosure clearer, the technical solutions of the embodiments of the present disclosure will be described clearly and completely in conjunction with the accompanying drawings of the embodiments of the present disclosure. In the drawings, the same reference numerals refer to the same components. Obviously, the described embodiments are part of the embodiments of the present disclosure, rather than all of the embodiments. Based on the described embodiments of the present disclosure, all other embodiments obtained by those of ordinary skill in the art without inventive work are within the protection scope of the present disclosure.

[0030] Compared with the embodiments shown in the drawings, the feasible embodiments within the scope of protection of the present disclosure may have fewer components, other components not shown in the drawings, different components, differently arranged components or differently connected components, etc. In addition, two or more components in the drawings may be implemented in a single component, or a single component shown in the drawings may be implemented as a plurality of separate components.

[0031] Unless otherwise defined, the technical terms or scientific terms used herein should have the ordinary meaning understood by those people with ordinary skills in the field to which this disclosure belongs. The words "first", "second" and similar words used in the present disclosure do not indicate any order, quantity, or importance, but are only used to distinguish different components. Similarly, similar words such as "a", "an" or "the" do not necessarily mean quantitative restriction. Words "comprise" or "include" and other similar words mean that the elements or objects appearing in front of the word contain the elements or objects listed after the word and their equivalents, without excluding other elements or objects. Words like "connected" or "coupled" are not limited to physical or mechanical connections, but can comprise electrical connections, whether direct or indirect. The directional terms such as "upper", "lower", "left", "right", "top", "bottom", "clockwise", "counterclockwise" mentioned in the text are only used to describe relative position relationships with respect to the drawings, and when the absolute position of a described object changes, the relative position relationship may also change accordingly.

[0032] The present disclosure provides an arc extinguishing structure for dual power changeover switch, which at least comprises an arc extinguishing chamber and a special curved arc travelling channel at the rear end of the arc extinguishing chamber. This structure can effectively avoid arcing, and can realize zero arcing when breaking at rated current.

[0033] The disclosure also provides a dual power changeover switch, which comprises a first stationary

contact, a second stationary contact, a movable contact and the arc extinguishing structure mentioned above.

[0034] In the following, the characteristics of the arc extinguishing structure and the dual power changeover switch with the arc extinguishing structure will be described in details in combination with the specific embodiments shown in the attached drawings. In which, Figs. 1 and 2 respectively show schematic diagrams of the first embodiment and the second embodiment of the arc extinguishing chamber proposed by the present disclosure. Figs. 3 to 5 show partial cross-sectional views of the dual power changeover switch proposed by the present disclosure, in which the movable contact of the dual power changeover switch engages the first stationary contact in Fig. 3, the movable contact of the dual power changeover switch engages the second stationary contact in Fig. 4, and the movable contact is in a middle position in Fig. 5. Fig. 6A shows the arc travelling direction of the arc extinguishing chamber, and Fig. 6B shows the further arc travelling path of the arc coming from the arc extinguishing chamber. Fig. 7 shows a partial cross-sectional view of the dual power changeover switch, especially a partial enlarged view of the joint part between the stationary contact and the arc extinguishing chamber. Fig. 8 shows a partial view of another embodiment of a dual power changeover switch. Fig. 9 shows the arc travelling path in the embodiment shown in Fig. 8.

[0035] In general, the arc extinguishing structure proposed in this disclosure includes an arc extinguishing chamber 10 and an arc extinguishing shell 20 for accommodating the arc extinguishing chamber 10.

[0036] For the specific structure of the arc extinguishing chamber 10, please refer to Fig. 1 and Fig. 2, which respectively show the schematic diagrams of the first embodiment and the second embodiment of the arc extinguishing chamber proposed by this disclosure. In any embodiment, the arc extinguishing chamber 10 includes a plurality of arc extinguishing grids 11 spaced apart from each other and arranged as a first arc extinguishing grid group A and a second arc extinguishing grid group B that is separated from the first arc extinguishing grid group A by an arc extinguishing chamber gap 17. When installed on a dual power changeover switch, the first arc extinguishing grid group A and the second arc extinguishing grid group B are respectively used to extinguish the arc generated when switching the first stationary contact 31 and the second stationary contact 32.

[0037] Preferably, the arc extinguishing chamber 10 further includes a first insulating side plate 12 and a second insulating side plate 13 arranged in parallel with the first insulating side plate 12, and the plurality of arc extinguishing grids 11 are held between the first insulating side plate 12 and the second insulating side plate 13. More preferably, each arc extinguishing grid 11 may include two mounting edges opposite to each other, which are respectively mounted to the first insulating side plate 12 and the second insulating side plate 13. As shown in the attached drawings, the mounting edges may be pro-

vided with connection protrusions which can be riveted into corresponding connection openings of the first insulating side plate 12 and the second insulating side plate 13. Both the first insulating side plate 12 and the second insulating side plate 13 are made of insulating materials.

[0038] Preferably, the plurality of arc extinguishing grids 11 are arranged such that their projections on the plane where the first insulating side plate 12 or the second insulating side plate 13 is located are arc-shaped. In particular, referring to Figs. 3 to 9, which show the projection of a plurality of arc extinguishing grids 11 on the plane where the first insulating side plate 12 or the second insulating side plate 13 is located, the arc-shaped arrangement of the plurality of arc extinguishing grids 11 can be seen. The arc-shaped arrangement of the arc extinguishing grids makes it possible to reduce back jetting of arc particles towards the contact side and facilitate the arc to move forward.

[0039] A small angle, which is less than 5 degrees, exists between two adjacent arc extinguishing grids 11 of the plurality of arc extinguishing grids 11.

[0040] In a preferred scheme, the arc extinguishing chamber further comprises a first additional arc extinguishing grid 14 and a second additional arc extinguishing grid 15, wherein the first additional arc extinguishing grid 14 abutting an outer side of the arc extinguishing grid in the first arc extinguishing grid group A that is farthest from the arc extinguishing chamber gap, and the second additional arc extinguishing grid 15 abutting an outer side of the arc extinguishing grid in the second arc extinguishing grid group B that is farthest from the arc extinguishing chamber gap. This is shown in Fig. 2 as a second embodiment of the arc extinguishing chamber. By making two arc extinguishing grids superposed together near the stationary contact, the ablative resistance can be improved. At the same time, this scheme does not need to manufacture arc extinguishing grids with different thicknesses, and will not make the process complex.

[0041] Alternatively, in the first arc extinguishing grid group A and the second arc extinguishing grid group B, the thickness of the end arc extinguishing grid farthest from the arc extinguishing chamber gap may be greater than that of other arc extinguishing grids. The thicker end arc extinguishing grid can also have the ablation-resistant effect, as the additional arc extinguishing grid do.

[0042] In this disclosure, the arc extinguishing chamber 10 is accommodated in an arc extinguishing shell 20, and the arc extinguishing shell 20 has an arc jetting opening 26. Thus, the arc extinguishing shell is a semi-closed cavity structure, wherein its arc jetting opening 26 is aligned with the arc extinguishing chamber gap 17 while it is closed by wall structures in the other directions. Due to the high arc temperature of the contact, a higher air pressure is formed inside the semi-closed cavity structure, while the air pressure outside the arc jetting opening 26 is lower, which accelerates the arc to run out from the arc jetting opening 26 due to the large air pressure dif-

ference.

[0043] The arc extinguishing structure is also provided with an arc travelling channel L communicating with the arc jetting opening 26 and having a bent structure. The arc travelling channel L is partially defined by a plurality of spaced and staggered walls which can be a part of the arc extinguishing shell 20 or separate structures from the arc extinguishing shell 20, and the walls are all made of arc-resistant insulating materials. Preferably, the arc travelling channel L has several channel turning parts, and is divided into several channel portions by these channel turning parts. These channel portions guide the arc in different or even opposite directions.

[0044] When the first stationary contact and/or the second stationary contact are disconnected, due to the effect of air blowing and electrodynamic force, the arc travels from corresponding contact to the arc extinguishing chamber, in which it is cut and cooled by the arc extinguishing grids, after which the remaining arc will be discharged from the arc jetting opening in the middle of the arc extinguishing chamber and run to the arc travelling channel. Reference can be made to Figs. 6A and 6B, wherein Fig. 6A shows the arc travelling direction of the arc coming from the arc extinguishing chamber, and Fig. 6B shows the further arc travelling path of the arc coming from the arc extinguishing chamber along the arc travelling channel L.

[0045] In this disclosure, an arc travelling channel L with a special bending structure is provided at the rear end of the arc jetting opening of the arc extinguishing chamber. The arc travelling channel is narrow and long, and it bends several times while extending to the air outlet of the dual power changeover switch. The arc travelling channel consists of a number of walls with respective height, which are staggered and overlapped with each other, and grooves and cavities are formed between the walls, which can accommodate metal particles generated by the arc. The arc is pushed and blocked by the wall surface of the arc travelling channel, resulting constantly increasing contact area between the arc and the side wall of the arc travelling channel, which makes the length of the arc become lengthened constantly, thus strengthening the cooling and deionization of the arc and achieving the effect of arc extinguishing. In this way, the residual arc can be eliminated between the arc extinguishing chamber and the air outlet, avoiding arcing at the air outlet and preventing the arc from reaching the outside of the dual power changeover switch.

[0046] Hereinafter, the arc extinguishing structure of the present disclosure and its arc travelling channel L will be described in detail. Figs. 3-5 and 6A-6B relate to the first embodiment of the arc extinguishing structure, and Figs. 8-9 relate to the second embodiment of the arc extinguishing structure.

[0047] In the embodiment of the present disclosure, each wall forming the arc travelling channel L may be a part of the arc extinguishing shell 20 or a structure separate from the arc extinguishing shell 20.

[0048] Referring first to Figs. 3-5 and 6A-6B, the arc extinguishing shell 20 includes a first wall 21 and a second wall 22 extending toward each other, and the aforementioned arc jetting opening 26 is defined between the ends of the first wall 21 and the second wall 22.

[0049] Further, the arc extinguishing structure may further include a third wall 23 defining the arc travelling channel L and spaced apart from the arc jetting opening 26 and arranged downstream of the arc jetting opening 26 to block the latter. In this way, the arc ejected from the arc jetting opening 26 changes direction due to the obstruction of the third wall 23, as shown in Fig. 6B.

[0050] Preferably, the arc extinguishing structure is arranged such that the first cavity 27 is formed at the end position of the third wall 23. The first cavity may accommodate metal particles, so as to avoid the pollution caused by the metal particles gathering at the contacts and moving parts.

[0051] Preferably, the first wall 21, the second wall 22 and the third wall 23 are all perpendicular to the opening direction of the arc jetting opening 26.

[0052] Further, the arc extinguishing structure may further include a fourth wall 24 which is used for defining the arc travelling channel L and extends in an opposite direction to the third wall 23, and the fourth wall 24 is located on a side of the third wall 23 away from the arc extinguishing chamber 10 and spaced apart from the third wall 23. The third wall 23 and the fourth wall 24 at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening 26. By means of the overlapping, the arcing of the arc can be blocked and a better arcing-eliminating effect can be achieved.

[0053] Preferably, the fourth wall 24 is parallel to the third wall 23.

[0054] Further, the arc extinguishing structure may further include a fifth wall 25 which extends in an opposite direction to the extending direction of the fourth wall 24 and is used for defining the arc travelling channel L. The fifth wall 25 is located on the side of the fourth wall 24 away from the arc extinguishing chamber 10 and spaced apart from the fourth wall 24.

[0055] Preferably, the fourth wall 24 and the fifth wall 25 at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening 26. Similarly, this overlapping can block the arcing of the arc and achieve a better effect of eliminating the arc light.

[0056] Preferably, the fifth wall 25 is parallel to the fourth wall 24.

[0057] Preferably, the arc extinguishing structure is arranged such that a second cavity 28 is formed at the downstream of the fourth wall 24 and at an end position of the fifth wall 25, and the volume of the second cavity 28 is larger than that of the first cavity 27. Because the second cavity is larger than the first cavity, it has a lower air pressure, which is convenient for the arc to run in the arc travelling channel.

[0058] Preferably, the spacing between the fourth wall 24 and the fifth wall 25 is greater than the spacing be-

tween the third wall 23 and the fourth wall 24. In this way, it is easier to make the second cavity 28 at the end position of the fifth wall 25 downstream of the fourth wall 24 larger than the first cavity 27 in volume.

[0059] Referring now to Figs. 8-9, it relates to a second embodiment of the arc extinguishing structure. In this embodiment, the arc extinguishing structure also includes a first wall 21 and a second wall 22 extending toward each other, and the aforementioned arc jetting opening 26 is defined between the ends of the first wall 21 and the second wall 22.

[0060] Further, the arc extinguishing structure also includes a third wall 23 defining the arc travelling channel L, wherein the third wall 23 is connected with the first wall 21 and perpendicular to the opening direction of the arc jetting opening 26.

[0061] In this embodiment, the extending direction of the second wall 22 forms an acute angle with the extending direction of the third wall 23, and the distal end of the second wall 22 inclines toward the third wall 23. Furthermore, a chamber 30 is formed between the second wall, the third wall and the arc extinguishing structure, and the volume of the chamber is large due to the inclined arrangement of the second wall. The chamber can prevent metal particles from falling back to the inside of the mechanism in the upright installation position to cause pollution.

[0062] In addition, the inclined arrangement of the first wall and the second wall also prevents the arc particles from impinging on the wall and then spraying backward into the contact area, and also guides the high-temperature gas and particles to move in the direction of the large cavity. Specifically, this inclined arrangement allows a larger cavity 34 to be formed at the arc jetting opening, between the arc extinguishing chamber and the first and second walls, so that in the direction of the dashed arrow in Fig. 9, the space is enlarged, the air pressure is reduced, and air blowing is thus guided.

[0063] The third wall 23 is spaced apart from the arc jetting opening 26 and arranged downstream of the arc jetting opening 26 to block the arc jetting opening. Thus, the arc ejected from the arc jetting opening 26 changes direction due to the obstruction of the third wall 23, as shown in Fig. 9.

[0064] In this embodiment, preferably, the arc extinguishing structure may further include a fourth wall 24 defining the arc travelling channel L and extends in an opposite direction to the third wall 23, and the fourth wall 24 is located on the side of the third wall 23 away from the arc extinguishing chamber 10 and spaced apart from the third wall 23. The third wall 23 and the fourth wall 24 at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening 26. Through this overlap, the arcing of the arc can be blocked, so as to achieve a better arcing-eliminating effect. The arc travelling direction is shown by the solid arrow in Fig. 9.

[0065] Preferably, the fourth wall 24 is parallel to the third wall 23.

[0066] Fig. 7 shows a partial cross-sectional view of the dual power changeover switch, especially a partial enlarged view of the joint part between the stationary contact and the arc extinguishing chamber.

[0067] As mentioned above, in addition to the arc extinguishing structure, the dual power changeover switch of the present disclosure also includes a first stationary contact 31 and a second stationary contact 32, which can be used for the main power supply and the standby power supply respectively. Preferably, each stationary contact is equipped with an arc striking plate made of ferromagnetic material to attract the arc to quickly enter the arc extinguishing chamber, and the arc striking plate can be connected with the corresponding stationary contact by means of screws, welding or riveting. Specifically, the first arc extinguishing grid group A and the second arc extinguishing grid group B of the arc extinguishing structure are connected to the first stationary contact 31 and the second stationary contact 32 through their respective arc striking plates 16.

[0068] Preferably, as shown in Fig. 7, the first stationary contact 31 and the second stationary contact 32 are both of U-shaped structures to form a magnetic field that pushes the arc to move toward the arc extinguishing chamber.

[0069] The exemplary implementations of the solutions proposed by the present invention has been described in details above with reference to the preferred embodiments, but it is understood by those skilled in the art that without departing from the concept of the present invention, various modifications and variations can be made to the above specific implementations, and various technical features and structures proposed by the present invention can be combined in various ways without exceeding the protection scope of the present invention.

Claims

1. An arc extinguishing structure, comprising:

an arc extinguishing chamber (10) comprising a plurality of arc extinguishing grids (11) spaced apart from each other, wherein the plurality of arc extinguishing grids (11) are arranged as a first arc extinguishing grid group (A) and a second arc extinguishing grid group (B) that is separated from the first arc extinguishing grid group (A) by an arc extinguishing chamber gap (17);
an arc extinguishing shell (20) for accommodating the arc extinguishing chamber (10), wherein the arc extinguishing shell (20) is provided with an arc jetting opening (26) that is aligned with the arc extinguishing chamber gap (17);
wherein the arc extinguishing structure is also provided with an arc travelling channel (L) communicated with the arc jetting opening (26), and

the arc travelling channel (L) has a bent structure.

2. The arc extinguishing structure according to claim 1, wherein the arc extinguishing chamber (10) further comprises a first insulating side plate (12) and a second insulating side plate (13) arranged in parallel with the first insulating side plate (12), the plurality of arc extinguishing grids (11) being held between the first insulating side plate (12) and the second insulating side plate (13);
wherein each arc extinguishing grid (11) comprises two mounting edges opposite to each other and mounted respectively to the first insulating side plate (12) and the second insulating side plate (13).

3. The arc extinguishing structure according to claim 2, wherein the plurality of arc extinguishing grids (11) are arranged so that the projections thereof on a plane in which the first insulating side plate (12) or the second insulating side plate (13) extends are arc-shaped.

4. The arc extinguishing structure according to claim 1, further comprising:

a first additional arc extinguishing grid (14) abutting an outer side of an end arc extinguishing grid in the first arc extinguishing grid group (A) that is farthest from the arc extinguishing chamber gap; and
a second additional arc extinguishing grid (15) abutting an outer side of an end arc extinguishing grid in the second arc extinguishing grid group (B) that is farthest from the arc extinguishing chamber gap.

5. The arc extinguishing structure according to claim 1, wherein in the first arc extinguishing grid group (A) and the second arc extinguishing grid group (B), the thickness of the end arc extinguishing grid farthest from the arc extinguishing chamber gap is greater than that of other arc extinguishing grids.

6. The arc extinguishing structure according to claim 1, wherein the arc travelling channel (L) is at least partially defined by a plurality of walls that are spaced from and staggered with each other.

7. The arc extinguishing structure according to claim 1, wherein the arc extinguishing shell (20) comprises a first wall (21) and a second wall (22) extending towards each other, and the arc jetting opening (26) is defined between the ends of the first wall (21) and the second wall (22).

8. The arc extinguishing structure according to claim 7, wherein the arc extinguishing structure further

comprises a third wall (23) defining the arc travelling channel (L); and

wherein the third wall (23) is spaced from the arc jetting opening (26) and arranged downstream of the arc jetting opening (26) to block the arc jetting opening;

wherein the first wall (21), the second wall (22) and the third wall (23) are perpendicular to the opening direction of the arc jetting opening (26).

9. The arc extinguishing structure according to claim 8, wherein the arc extinguishing structure further comprises a fourth wall (24) which is used for defining the arc travelling channel (L) and extends in an opposite direction to the third wall (23), and the fourth wall (24) is located on a side of the third wall (23) away from the arc extinguishing chamber (10) and is spaced apart from the third wall (23); and

wherein the third wall (23) and the fourth wall (24) at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening (26);

wherein the fourth wall (24) is parallel to the third wall (23).

10. The arc extinguishing structure according to claim 9, wherein the arc extinguishing structure further comprises a fifth wall (25) which is used for defining the arc travelling channel (L) and extends in an opposite direction to the fourth wall (24), and the fifth wall (25) is located on a side of the fourth wall (24) away from the arc extinguishing chamber (10) and is spaced apart from the fourth wall (24); and

wherein the fourth wall (24) and the fifth wall (25) at least partially overlap on a plane perpendicular to the opening direction of the arc jetting opening (26);

wherein the spacing between the fourth wall (24) and the fifth wall (25) is greater than the spacing between the third wall (23) and the fourth wall (24).

11. The arc extinguishing structure according to claim 10, wherein the fifth wall (25) is parallel to the fourth wall (24).

12. The arc extinguishing structure according to claim 10, wherein the arc extinguishing structure is arranged such that a first cavity (27) is formed at the end position of the third wall (23), and a second cavity (28) is formed at the end position of the fifth wall (25) downstream of the fourth wall (24), wherein the volume of the second cavity (28) is larger than that of the first cavity (27).

13. The arc extinguishing structure according to claim 8, wherein the third wall (23) is connected with the first wall (21) and perpendicular to the opening direction of the arc jetting opening (26); and

wherein the extending direction of the second wall (22) forms an acute angle with the extending direction of the third wall (23), and the distal end of the second wall (22) inclines towards the third wall (23).

14. A dual power changeover switch comprising an arc extinguishing structure according to any one of claims 1 to 13.

15. The dual power changeover switch according to claim 14, wherein the dual power changeover switch comprises a first stationary contact (31) and a second stationary contact (32); and

wherein the first arc extinguishing grid group (A) and the second arc extinguishing grid group (B) are respectively connected to the first stationary contact (31) and the second stationary contact (32) through respective arc striking plates (16); wherein the first stationary contact (31) and the second stationary contact (32) are both of U-shaped structures.

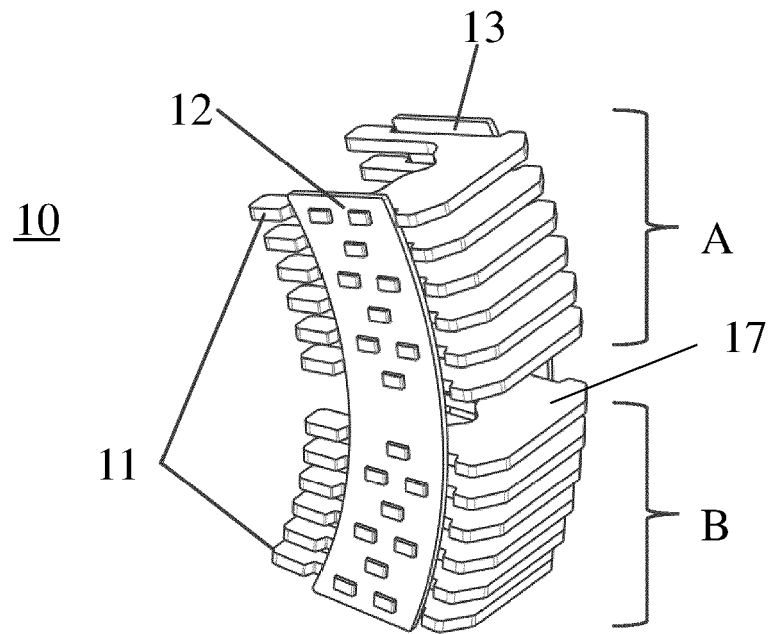


Fig. 1

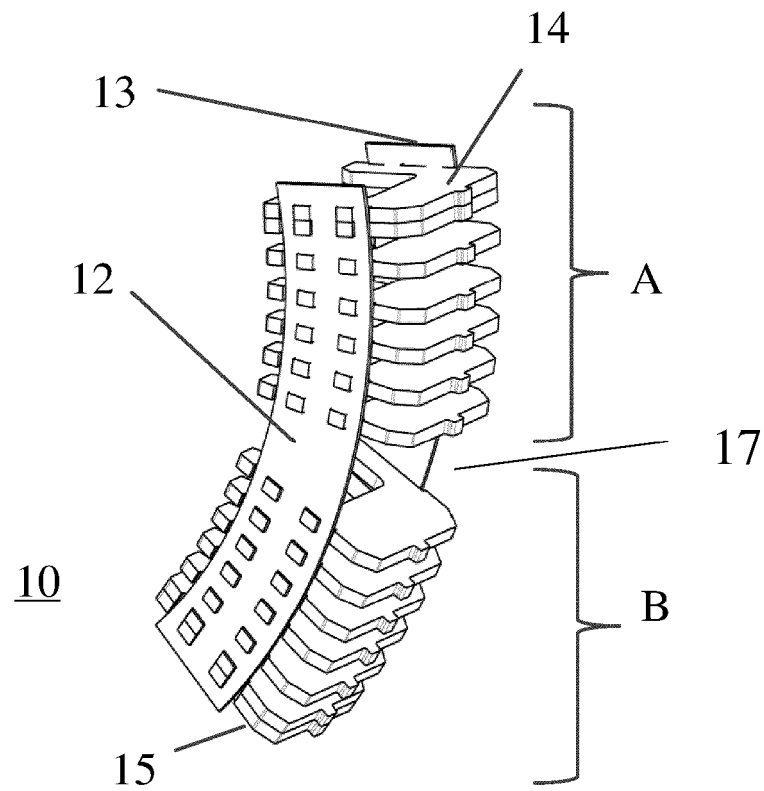


Fig. 2

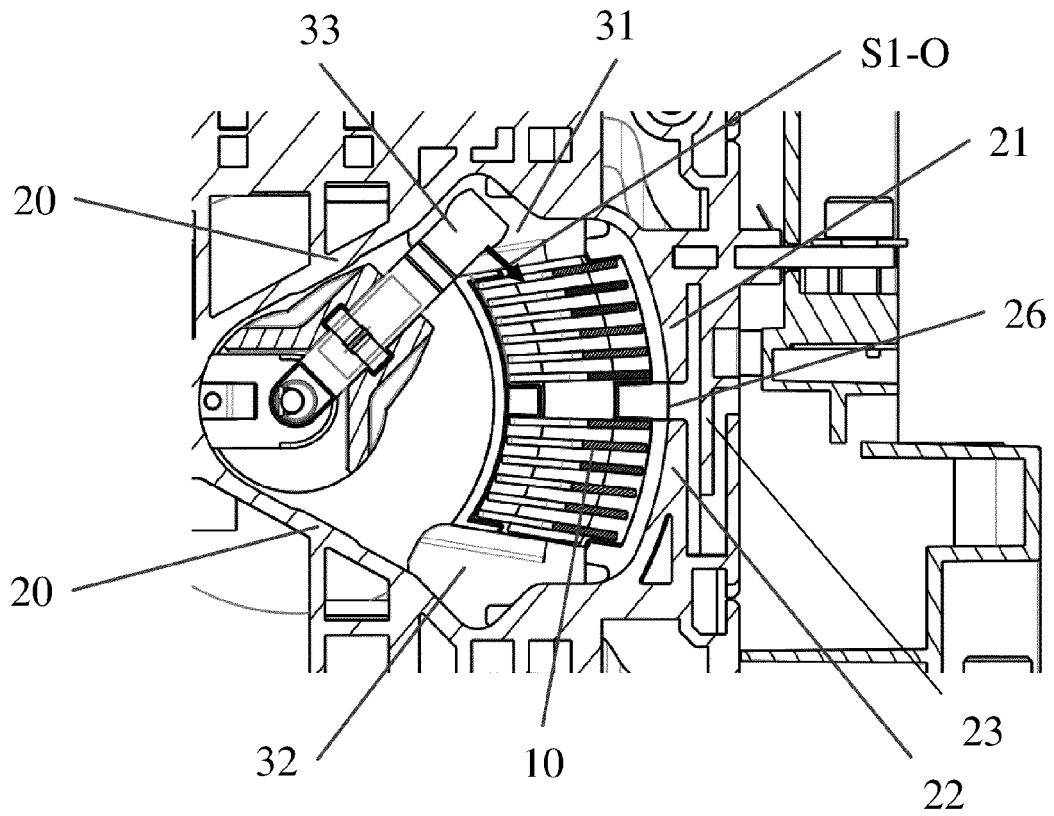


Fig. 3

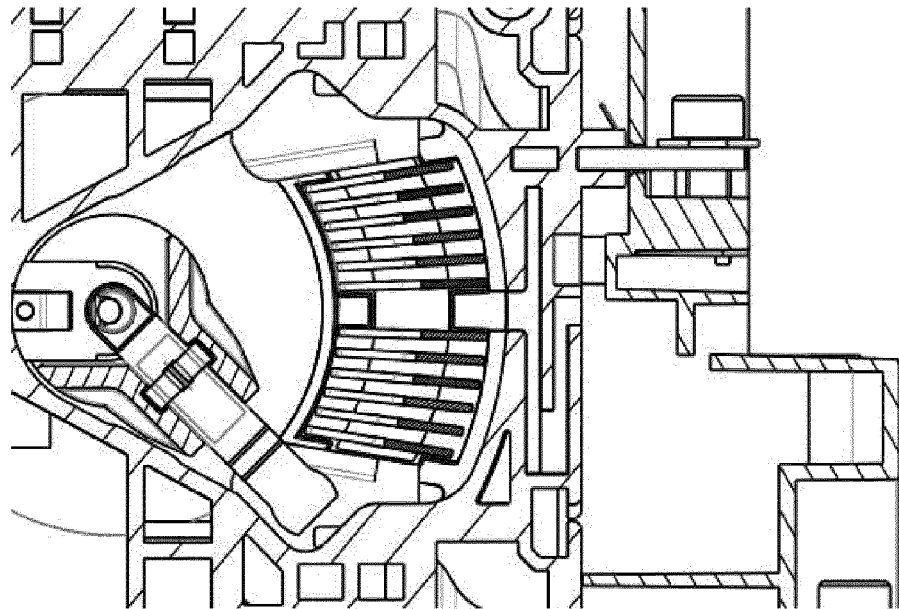


Fig. 4

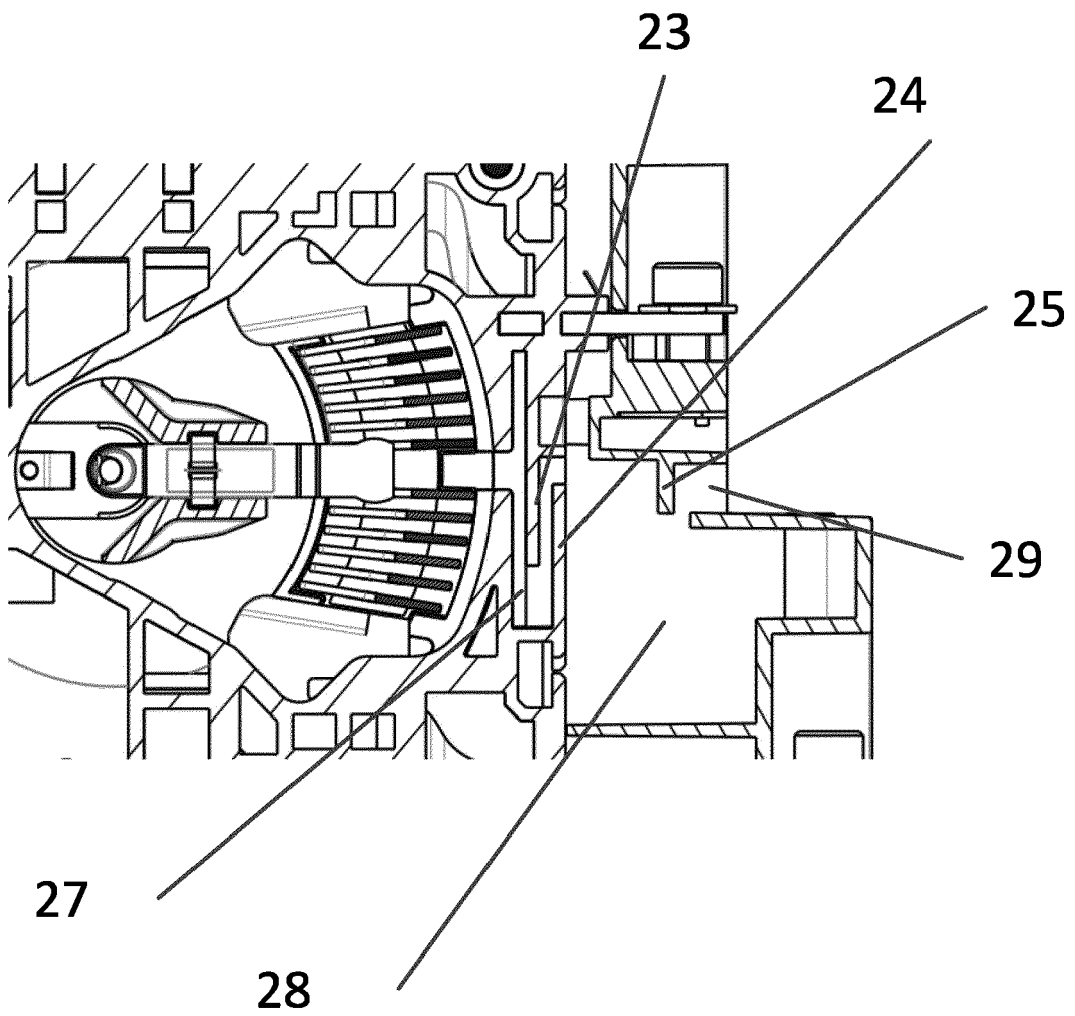


Fig. 5

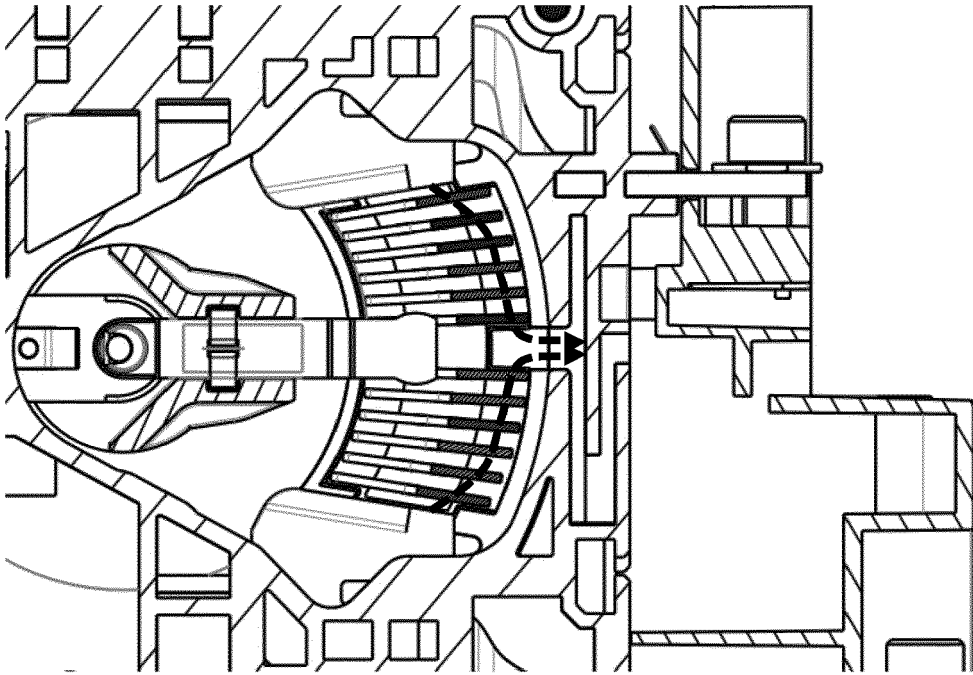


Fig. 6A

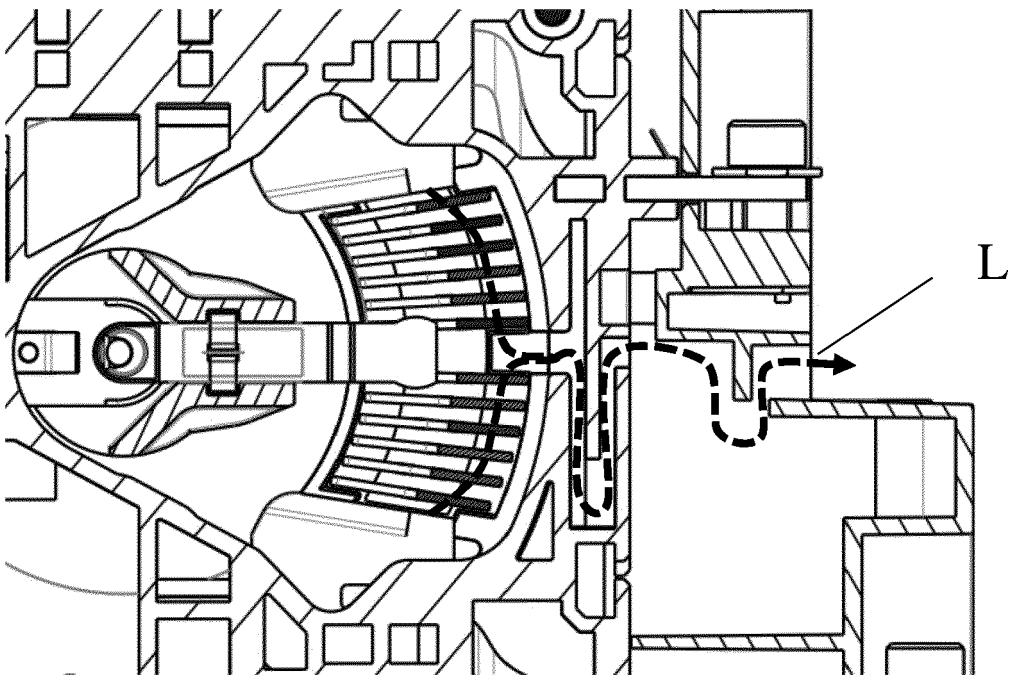


Fig. 6B

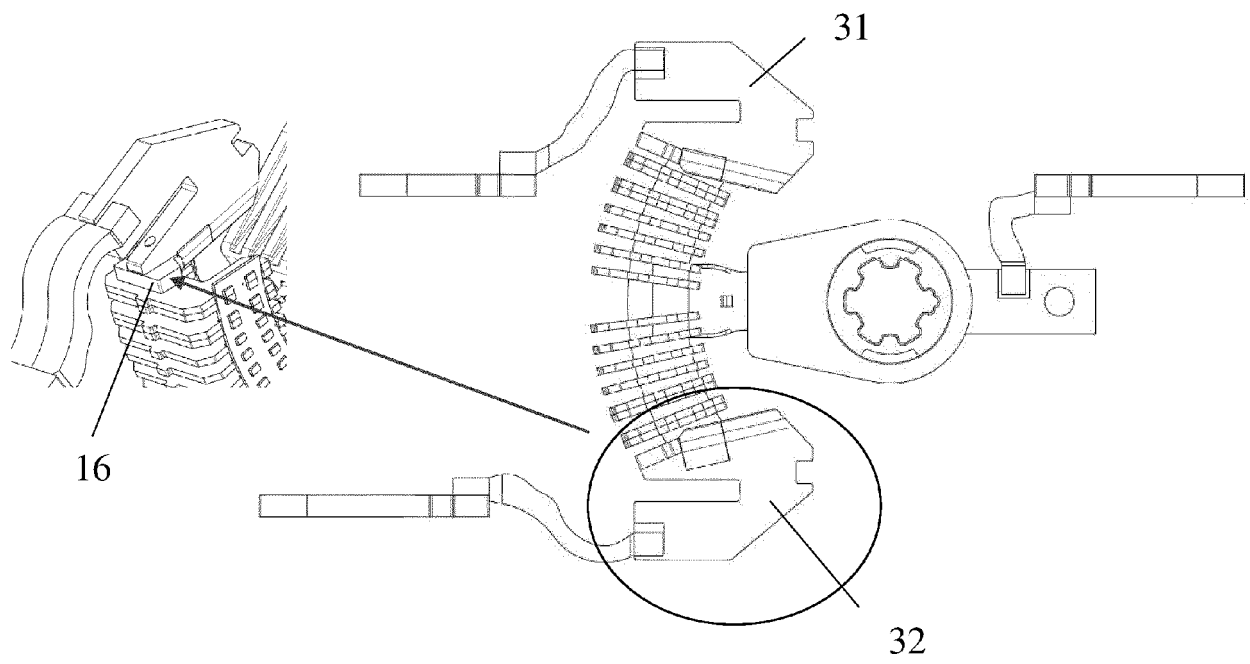


Fig. 7

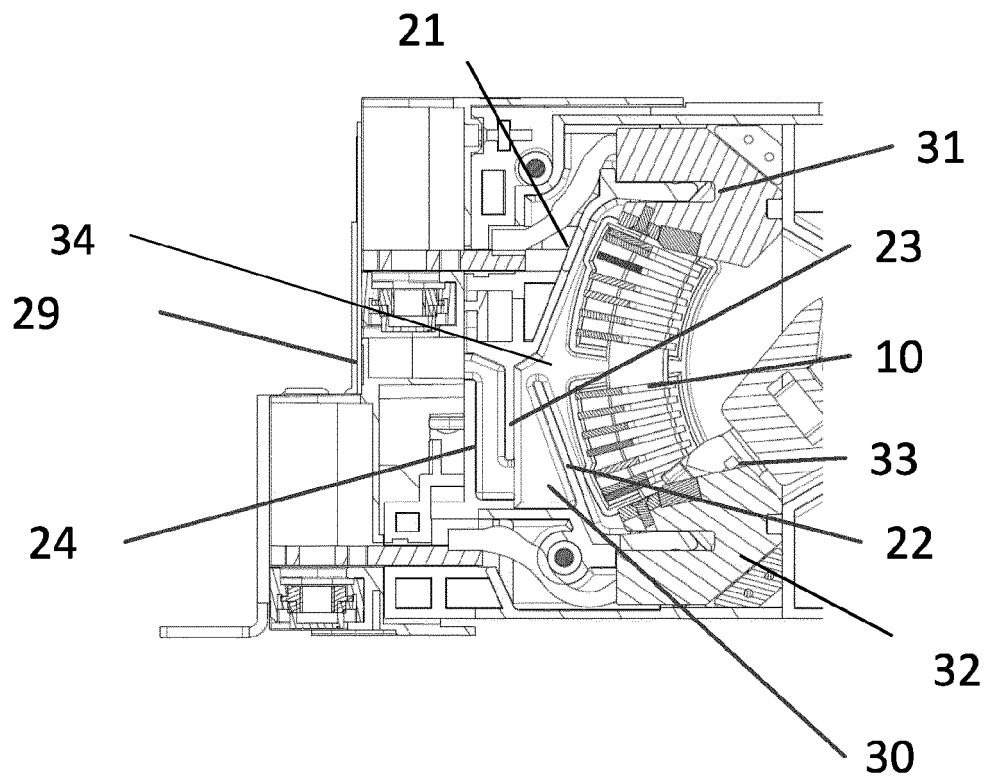


Fig. 8

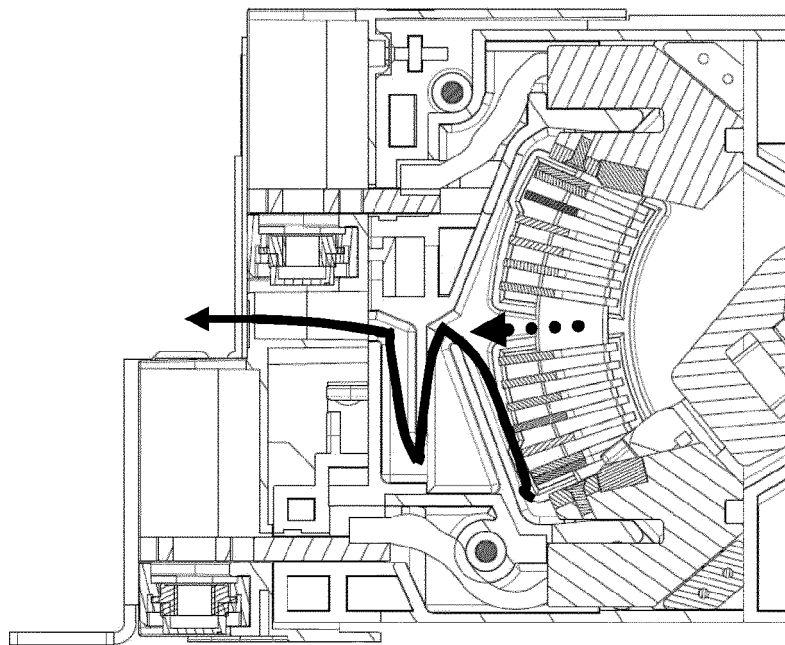


Fig. 9



EUROPEAN SEARCH REPORT

Application Number

EP 23 30 5438

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Place of search

Date of completion of the search

Examiner

Munich

3 August 2023

Bauer, Rodolphe

CATEGORY OF CITED DOCUMENTS

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The members are as contained in the European Patent Office EDP file on
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