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(54) **ARC CONTACT ASSEMBLY AND CIRCUIT BREAKER**

(57) The present invention provides an arc contact assembly and a circuit breaker. The arc contact assembly comprises: a base; a support rod, a support rod lower end being erected on the base in a first direction perpendicular to the base, and a threaded part being formed at the support rod upper end; an arc contact body 400, comprising: a contact point and a bottom remote from the contact point, with a threaded hole being provided at the bottom, and being fitted round the threaded part of the support rod; a length compensation mechanism, comprising: a thermal bimetallic spring member, a first connecting member and a second connecting member, wherein a spring upper end of the thermal bimetallic spring member is connected to the second connecting member, and a spring lower end of the bimetallic spring is connected to the first connecting member, such that the thermal bimetallic spring member gives rise to a torque when experiencing deformation according to temperature, so that the arc contact body rotates around the threaded part and moves in a direction away from the base, guided by the mating of the threads. This solves the problem that an arc contact in the prior art is unable to meet the requirement for a high electrical life, in particular of 20 times or more, due to loss.

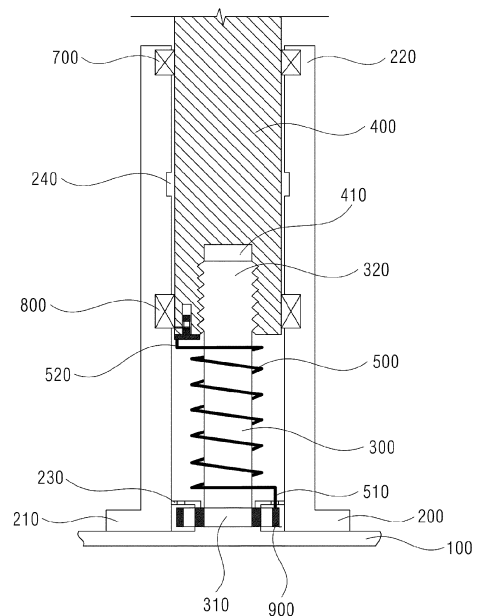


Fig.1

Description

Technical field

[0001] The present invention relates to the field of electrical equipment, and in particular to an arc contact assembly and a circuit breaker.

Background art

[0002] In an existing circuit breaker, when the circuit breaker cuts off a short circuit current, an arc contact will gradually be eroded by burning due to the action of the arc, and thus suffer loss, and the length of the arc contact will decrease due to this loss. When the arc contact is reduced by burning to a certain degree, i.e. when the length of the arc contact decreases to the point where it is unable to perform the cut-off function of the circuit breaker, the circuit breaker will reach the limit of electrical life. According to the special requirements of the market at the present time, the electrical life is required to be such that the rated short circuit current can be cut off more than 20 times. However, existing arc extinguishing devices are unable to achieve a lifespan of greater than 20 times.

[0003] This problem has so far not been completely solved; moreover, most of the solutions currently in development might affect other aspects of performance, so are unable to meet existing standards.

Summary of the invention

[0004] The main object of the present invention is to provide an arc contact assembly, in order to solve the problem that an arc contact in the prior art is unable to meet exacting requirements relating to extended electrical life due to loss, and in particular the problem of being unable to meet the requirement to attain an electrical life of 20 times or more.

[0005] In order to achieve the abovementioned object, according to one aspect of the present invention, an arc contact assembly is provided, comprising: a base; a support rod, comprising: a support rod upper end and a support rod lower end, wherein the support rod lower end is erected on the base in a first direction perpendicular to the base, and a threaded part is formed at the support rod upper end; an arc contact body, comprising: a contact point and a bottom remote from the contact point, with a threaded hole being provided at the bottom, the arc contact body being fitted round an end of the support rod by the mating of threads of the threaded hole and the threaded part; a length compensation mechanism, comprising: a thermal bimetallic spring member, a first connecting member and a second connecting member, wherein the thermal bimetallic spring member comprises a first spring body component having a first coefficient of thermal expansion and a second spring body component having a second coefficient of thermal expansion; a spring upper

end of the thermal bimetallic spring member is connected to the second connecting member arranged at the base, and a spring lower end of the bimetallic spring that is remote from the base is connected by to the first connecting member arranged at the arc contact body, such that the thermal bimetallic spring member gives rise to a torque in the direction of the upward spiralling of the threads of the threaded part when experiencing deformation according to temperature, so that the arc contact body rotates around the threaded part and moves in a direction away from the base, guided by the mating of the threads.

[0006] In this way, when the circuit breaker cuts off current, the arc generated will cause the ambient temperature to rise, and the thermal bimetallic spring member gives rise to a torque in the same direction as the upward spiralling of the threads due to the temperature rise. At this time, the spring lower end is stationary relative to the base via the second connecting member, but the spring upper end of the thermal bimetallic spring member rotates due to the torque, and transmits the torsion to the arc contact body through the first connecting member, such that the arc contact body rotates upward in the direction of the threads, guided by the mating of the threads. Thus, the elevation of the arc contact body compensates for loss suffered by the arc contact body due to erosion by burning, thus extending the electrical life of the arc contact and the circuit breaker, and thereby meeting electrical life requirements. Here, the thermal bimetallic spring member is a heat-sensitive bimetallic spring, formed of metals with different linear expansion coefficients. When the temperature changes, the thermal bimetallic spring member gives rise to a torque, because the two metals have different linear expansion. Preferably, the thermal bimetallic spring member is a helical bimetallic spring, and is fitted round the outside of the support rod, making the structure compact. It must be pointed out that the design and movement of the spring here are related to the temperature generated by the arc, and the amount by which the arc contact is lifted is related to the duration of the arc and the arc energy. Thus, it is possible to achieve precise length compensation through quantitative design of the movement of the spring, without affecting the normal operation of the circuit breaker.

[0007] Furthermore, according to an embodiment of the present invention, a pin hole is further provided at the bottom of the arc contact body, and the first connecting member comprises: a first connecting body, having a first side facing the arc contact body and a second side facing the base; a pin post, erected on the first side, and inserted in the pin hole in such a way as to be movable in the first direction; wherein the spring upper end is connected to the second side.

[0008] In this way, when the thermal bimetallic spring member is heated and gives rise to a torque, the torque is transmitted to the pin post via the first connecting body, and the pin post transmits the torque to the arc contact body through the action of force on the inner wall of the

pin hole; under the pushing action of the circumferential force applied by the pin post, the arc contact body moves in the direction of the upward spiralling of the threads, thereby achieving lifting. Here, the inner diameter of the pin hole is slightly larger than the diameter of the pin post, so the pin post is able to move in the pin hole in the axial direction, i.e. the first direction. Thus, the thermal bimetallic spring member will not be stretched with the lifting of the arc contact body, thereby ensuring that the thermal bimetallic spring will not be affected by other forces.

[0009] Furthermore, the pin post is provided with a long hole extending in the first direction, the long hole having a limiting opening perpendicular to the first direction; a limiting pin extending perpendicular to the first direction is provided at an inner wall of the pin hole opposite the limiting opening, such that the limiting pin is inserted in the long hole and is movable in the first direction relative to the pin post.

[0010] In this way, when the arc contact body is being lifted, the limiting pin located in the long hole can prevent the pin post from coming out of the pin hole due to the arc contact body being lifted too far, thus avoiding failure of torque transmission.

[0011] Furthermore, according to an embodiment of the present invention, the second connecting member comprises a one-way bearing, the one-way bearing comprising a bearing inner ring and a bearing outer ring, the bearing inner ring being fitted round the periphery of the support rod lower end in a fixed manner, and the spring lower end being connected to the bearing outer ring.

[0012] When the thermal bimetallic spring member is heated and gives rise to a forward torque, the one-way bearing is in a locked state in the direction of the forward torque, i.e. the spring lower end of the thermal bimetallic spring member at this time is fixed on the base and does not rotate. The spring upper end drives the arc contact body to rotate with it by means of the generated torque, thereby lifting the arc contact body. After the arc has been cut off, the temperature will gradually fall, at which time the thermal bimetallic spring member gives rise to reverse torque due to the change in temperature at this time. The one-way bearing is movable in the direction of the reverse torque, so the spring lower end of the thermal bimetallic spring member pushes the one-way bearing to rotate, releasing the reverse torque generated; thus, the frictional force experienced by the arc contact body from the threaded connection is greater than the torque of the thermal bimetallic spring member, so the arc contact body is stationary. In this way, reverse rotation of the arc contact body and consequent lowering thereof are prevented when the thermal bimetallic spring member cools.

[0013] Furthermore, according to an embodiment of the present invention, the arc contact assembly comprises an annular boss, the annular boss protruding upward from a surface of the base, the support rod lower end being erected on the annular boss, the annular boss supporting the one-way bearing, and the outer diameter of

the annular boss being equal to the diameter of the inner ring of the one-way bearing.

[0014] In this way, the provision of the annular boss reduces friction between the rotating outer ring of the one-way bearing and the base, thus ensuring normal rotation of the one-way bearing, and reducing frictional wear.

[0015] Furthermore, according to an embodiment of the present invention, the arc contact assembly further comprises a guide tube, a guide tube lower end of the guide tube being erected on the base in a fixed manner, such that the support rod, the arc contact body and the bimetallic spring are located in the guide tube.

[0016] In this way, as a result of providing the guide tube, it is possible to guide the movement of the arc contact body, thereby avoiding a situation where lifting movement is hindered due to unbalanced radial forces. Preferably, an inner wall of the guide tube is in contact with the arc contact body. This not only enables better guiding of the arc contact body, but also enables external heat to be prevented from entering the guide tube, thus avoiding a situation where the temperature of the thermal bimetallic spring member rises too high through heating.

[0017] Furthermore, according to an embodiment of the present invention, the guide tube comprises a first annular accommodating groove provided at an inner wall from a guide tube upper end of the guide tube; a gas blocking ring is provided in the first annular accommodating groove, such that the gas blocking ring completely occupies the first annular accommodating groove and an inner circumferential wall of the gas blocking ring lies against the periphery of the arc contact body in a sealed fashion, so as to block the entry of external high-temperature gas into the guide tube.

[0018] In this way, by blocking the entry of external heat into the guide tube, it is possible to avoid excessive heating of the thermal bimetallic spring; moreover, the guide tube is preferably not in direct contact with the arc contact body here, only being in contact with the arc contact body via the gas blocking ring, thereby reducing the area of friction, and reducing the resistance encountered by the arc contact body when moving. Here, the gas blocking ring also performs a guiding function.

[0019] Furthermore, according to an embodiment of the present invention, the guide tube comprises a second annular accommodating groove provided at the inner wall between the guide tube lower end and the guide tube lower end, such that an inner circumferential wall of a guide ring arranged in the second annular accommodating groove and completely occupying the second annular accommodating groove lies against the periphery of the arc contact body at all times during movement of the arc contact body, so as to guide the movement of the arc contact body in the first direction.

[0020] In this way, as a result of the guide ring being provided close to the bottom of the arc contact body, the radial forces sustained by the arc contact body are more balanced; thus, the guiding function of the guide tube is

performed more effectively through the joint action of the guide ring and the gas blocking ring.

[0021] Furthermore, according to an embodiment of the present invention, the guide tube comprises a third annular accommodating groove, the third annular accommodating groove being provided at the inner wall of the guide tube between the first annular accommodating groove and the second annular accommodating groove; an electric contact element can be placed in the third annular accommodating groove.

[0022] In this way, as a result of providing the third annular accommodating groove between the guide tube and the arc contact body, it is possible to provide an electric contact element in the third annular accommodating groove, so as to establish an additional electrical connection between the guide tube and the arc contact body, so that current flows to the guide tube via the electric contact element, thus increasing the current conduction quantity.

[0023] According to another aspect of the present invention, a circuit breaker is provided, comprising the arc contact assembly according to any one of the embodiments described above.

[0024] Furthermore, according to an embodiment of the present invention, the operating voltage of the circuit breaker is in the range of 3 KV - 1000 KV, and the circuit breaker is in particular an SF₆ circuit breaker or a high-voltage AC circuit breaker compliant with the standards DL/T 402 and GB/T 9694.

[0025] The circuit breaker according to the present invention thus also has the various advantages mentioned above which relate to the arc contact assembly.

[0026] Applying the technical solution of the present invention, as a result of providing an arc contact assembly, when the thermal bimetallic spring member of the arc contact assembly is heated and gives rise to torque, the torque thus generated is utilized to rotate the arc contact body so that it is lifted, thereby compensating for the reduction in length suffered by the arc contact due to erosion by burning when heated. In this way, the problem that an arc contact in the prior art is unable to meet exacting requirements relating to extended electrical life due to loss is solved.

Brief description of the drawings

[0027] The drawings accompanying the description which form part of the present application are intended to provide further understanding of the present invention. The exemplary embodiments of the present invention and the descriptions thereof are intended to explain the present invention, but do not constitute an improper limitation thereof. In the drawings:

Fig. 1 shows a schematic diagram of an embodiment of the arc contact assembly according to the present invention.

Fig. 2 shows a partial enlarged schematic diagram of the first connecting member in an embodiment of the arc contact assembly according to the present invention.

[0028] The drawings include the following reference labels.

5	100:	base;
	200	guide tube;
10	210	guide tube upper end;
	220	guide tube lower end;
	230	limiting element;
	240:	third annular accommodating groove;
15	300:	support rod;
	310:	support rod lower end;
	320:	gas flow channel;
	400:	arc contact body;
	410:	threaded hole;
20	420:	pin hole;
	430:	limiting pin;
	500:	bimetallic spring;
	510:	spring upper end;
	520:	spring lower end;
25	600:	first connecting member;
	610:	first connecting body;
	620:	pin post;
	630:	long hole;
	700:	gas blocking ring;
30	800:	guide ring;
	900:	one-way bearing.

Detailed description of the invention

[0029] 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 invention is explained in detail below with reference to the drawings, in conjunction with embodiments.

[0030] 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.

[0031] Unless specified otherwise, words relating to orientation which are used in the present invention 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 directions; 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 invention.

[0032] It is intended to solve the problem that an arc contact in the prior art is unable to meet electrical life requirements due to loss.

[0033] Fig. 1 shows a schematic diagram of an embodiment of the arc contact assembly according to the

present invention. In Fig. 1, the arc contact assembly comprises; a base 100; a support rod 300, comprising: a support rod upper end 320 and a support rod lower end 310, wherein the support rod lower end 310 is erected on the base 100 in a first direction perpendicular to the base 100, and a threaded part is formed at the support rod upper end 320; an arc contact body 400, comprising: a contact point and a bottom remote from the contact point, with a threaded hole 410 being provided at the bottom, the arc contact body 400 being fitted round an end of the support rod 300 by the mating of the threads of the threaded hole 410 and the threaded part; a length compensation mechanism, comprising: a thermal bimetallic spring member 500, a first connecting member 600 and a second connecting member, wherein the thermal bimetallic spring member 500 comprises a first spring body component having a first coefficient of thermal expansion and a second spring body component having a second coefficient of thermal expansion; a spring upper end of the thermal bimetallic spring member is connected to the second connecting member arranged at the base, and a spring lower end of the bimetallic spring that is remote from the base is connected by to the first connecting member arranged at the arc contact body, such that the thermal bimetallic spring member gives rise to a torque in the direction of the upward spiralling of the threads of the threaded part when experiencing deformation according to temperature, so that the arc contact body rotates around the threaded part and moves in a direction away from the base, guided by the mating of the threads.

[0034] The second connecting member comprises a one-way bearing 900, the one-way bearing 900 comprising a bearing inner ring and a bearing outer ring, the bearing inner ring being fitted round the periphery of the support rod lower end 310 in a fixed manner, and the spring upper end 510 being connected to the bearing outer ring. Here, the one-way bearing 900 is fitted round the support rod 300 in a fixed manner by an interference fit. An annular boss is formed in a region on the base 100 to which the support rod lower end 310 is connected, the annular boss supporting the one-way bearing 900, and the diameter of the annular boss being equal to the diameter of the inner ring of the one-way bearing 900.

[0035] The arc contact assembly according to the present invention further comprises a guide tube 200, the guide tube 200 being erected on the base 100 in a fixed manner via a guide tube lower end 210. It can be seen from Fig. 1 that the support rod 300, the arc contact body 400 and the thermal bimetallic spring 500 are all located in the guide tube 200. The guide tube 200 comprises a first annular accommodating groove provided at an inner wall from a guide tube upper end 220 of the guide tube 200; a gas blocking ring 700 is provided in the first annular accommodating groove, such that the gas blocking ring 700 completely occupies the first annular accommodating groove and an inner circumferential wall of the gas blocking ring 700 lies against the pe-

riphery of the arc contact body 400 in a sealed fashion, so as to block the entry of external high-temperature gas into the guide tube 200. The guide tube 200 comprises a second annular accommodating groove provided at the inner wall between the guide tube lower end 210 and the guide tube lower end 220, such that an inner circumferential wall of a guide ring 800 arranged in the second annular accommodating groove and completely occupying the second annular accommodating groove lies against the periphery of the arc contact body 400 at all times during movement of the arc contact body 400, so as to guide the movement of the arc contact body 400 in the first direction. The guide tube 200 further comprises a third annular accommodating groove 240, the third annular accommodating groove 240 being provided at the inner wall of the guide tube 200 between the first annular accommodating groove and the second annular accommodating groove; an electric contact element (not shown) can be placed in the third annular accommodating groove 240. The electric contact element can cause current to flow to the guide tube 200 via the electric contact element, thereby increasing the current conduction quantity. In this embodiment, the arc contact body 400 is not in direct contact with the guide tube 200.

[0036] In addition, it can also be seen that a limiting element 230 is formed above the one-way bearing 900. The limiting element 230 extends inward radially from the inner wall of the guide tube 200, and abuts the top of the inner ring of the one-way bearing 900 with a folded edge. The limiting element 230 and the annular boss together limit movement of the one-way bearing 900 in the first direction.

[0037] Fig. 2 shows a partial enlarged schematic diagram of the first connecting member in an embodiment of the arc contact assembly according to the present invention. In Fig. 2, a pin hole 420 is further provided at the bottom of the arc contact body 400, and the first connecting member 600 comprises: a first connecting body 610, having a first side facing the arc contact body 400 and a second side facing the base 100; and a pin post 620, erected on the first side, and inserted in the pin hole in such a way as to be movable in the first direction. The spring lower end 520 is connected to the second side. The pin post 620 is provided with a long hole 630 extending in the first direction, the long hole 630 having a limiting opening perpendicular to the first direction; a limiting pin 430 extending perpendicular to the first direction is provided at an inner wall of the pin hole 420 opposite the limiting opening, and the limiting pin 430 is inserted in the long hole 630 and is movable in the first direction relative to the pin post 620.

[0038] The operating principles of the arc contact assembly are explained below:

When the circuit breaker cuts off current, the arc generated will cause the ambient temperature to rise, and the thermal bimetallic spring member 500 gives rise to a forward (i.e. in the direction of the upward spiralling of the threads of the threaded part) torque due to the temper-

ature rise. At this time, the one-way bearing 900 is in a locked state in the direction of the forward torque, i.e. the spring lower end 510 of the thermal bimetallic spring member 500 at this time is in a stationary state relative to the base. The spring upper end 520 drives the arc contact body 400 to rotate with it around the threaded part of the support rod, by means of the generated torque. Specifically, the torque is transmitted to the pin post 620 via the first connecting body 610, and the pin post 620 transmits the torque to the arc contact body 400 through the action of force on the inner wall of the pin hole 420; under the pushing action of the pin post 620, the arc contact body 400 moves in the direction of the upward spiralling of the threads, thereby achieving lifting.

[0039] Here, the inner diameter of the pin hole 420 is slightly larger than the diameter of the pin post 620, so the pin post 620 is able to move in the pin hole 420 in the axial direction, i.e. the first direction. Thus, the thermal bimetallic spring member 500 will not be stretched with the lifting of the arc contact body 400, thereby ensuring that the thermal bimetallic spring member 500 will not be affected by other forces. Thus, the elevation of the arc contact body 400 compensates for the loss suffered by the arc contact body 400 due to erosion by burning. During this time, when the arc contact body 400 is being lifted, the limiting pin 430 located in the long hole 630 can prevent the pin post 620 from coming out of the pin hole 420 due to the arc contact body 400 being lifted too far, thus avoiding failure of torque transmission.

[0040] In the embodiment of Fig. 1, the thermal bimetallic spring member 500 is a heat-sensitive helical bimetallic spring, and is fitted round the outside of the support rod 300. The design and movement of the spring here are related to the temperature generated by the arc; the amount by which the arc contact is lifted is related to the duration of the arc and the arc energy. Thus, it is possible to achieve precise length compensation through quantitative design of the movement of the spring, without affecting the normal operation of the circuit breaker.

[0041] Conversely, after the arc has been cut off, the temperature will gradually fall, at which time the thermal bimetallic spring member 500 gives rise to a reverse torque due to the change in temperature. The one-way bearing 900 is movable in the direction of the reverse torque, so the spring lower end 510 of the thermal bimetallic spring member 500 pushes the one-way bearing 900 to rotate, releasing the reverse torque generated; thus, the frictional force experienced by the arc contact body 400 from the threaded connection is greater than the torque of the bimetallic spring 500, so the arc contact body remains stationary. In this way, reverse rotation of the arc contact body 400 and consequent lowering thereof are prevented when the bimetallic spring 500 cools.

[0042] In addition, as the gas blocking ring 700 blocks the entry of external gas carrying heat into the guide tube 200, excessive heating of the thermal bimetallic spring member 500 can be avoided, thus further achieving precise compensation of the arc contact.

[0043] Applying the technical solution of the present invention, as a result of providing an arc contact assembly having length compensation, when the bimetallic spring 500 of the arc contact assembly is heated and gives rise to torque, the torque thus generated is utilized to rotate the arc contact body 400 so that it is lifted, thereby compensating for the reduction in length suffered by the arc contact due to erosion by burning when heated. Here, the present invention has been implemented in the most preferred way, thus solving the problem that an arc contact in the prior art is unable to meet electrical life requirements due to loss.

[0044] It can be seen from the description above that the above embodiment of the present invention achieves the following technical effects:

1. It considerably increases the electrical life of the circuit breaker.
2. It performs length compensation by rotation, and this is conducive to uniform erosion of the arc contact by burning.
3. Uniform erosion by burning has the result that the end of the arc contact retains its original shape at all times, thus ensuring stable operation of the circuit breaker.

[0045] Obviously, the embodiments described above are merely some, not all, of the embodiments of the present invention. All other embodiments obtained by those skilled in the art on the basis of the embodiments in the present invention without any creative effort should fall within the scope of protection of the present invention.

[0046] It must be noted that the terms used here are intended merely to describe particular embodiments, not to limit exemplary embodiments according to the present application. As used herein, unless explicitly 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.

[0047] 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.

[0048] The above are merely preferred embodiments of the present invention, which are not intended to limit it; to those skilled in the art, various modifications and changes to the present invention are possible. Any amendments, equivalent substitutions or improvements etc. made within the spirit and principles of the present invention shall be included in the scope of protection

thereof.

Claims

1. An arc contact assembly, **characterized in that** the arc contact assembly comprises:

a base (100);
 a support rod (300), comprising: a support rod upper end (310) and a support rod lower end (320), wherein the support rod lower end (310) is erected on the base (100) in a first direction perpendicular to the base (100), and a threaded part is formed at the support rod upper end (320);
 an arc contact body (400), comprising: a contact point and a bottom remote from the contact point, with a threaded hole (410) being provided at the bottom, the arc contact body (400) being fitted round an end of the support rod (300) by the mating of threads of the threaded hole (410) and the threaded part;
 a length compensation mechanism, comprising:
 a thermal bimetallic spring member (500), a first connecting member (600) and a second connecting member, wherein the thermal bimetallic spring member (500) comprises a first spring body component having a first coefficient of thermal expansion and a second spring body component having a second coefficient of thermal expansion; a spring upper end (510) of the thermal bimetallic spring member (500) is connected to the second connecting member arranged at the base (100), and a spring lower end (520) of the bimetallic spring (500) that is remote from the base (100) is connected to the first connecting member (600) arranged at the arc contact body (400), such that the thermal bimetallic spring member (500) gives rise to a torque in the direction of the upward spiralling of the threads of the threaded part when experiencing deformation according to temperature, so that the arc contact body (400) rotates around the threaded part and moves in a direction away from the base (100), guided by the mating of the threads.

2. The arc contact assembly as claimed in claim 1, **characterized in that** a pin hole (420) is further provided at the bottom of the arc contact body (400), and the first connecting member (600) comprises:

a first connecting body (610), having a first side facing the arc contact body (400) and a second side facing the base (100);
 a pin post (620), erected on the first side, and inserted in the pin hole in such a way as to be movable in the first direction;

wherein the spring upper end (520) is connected to the second side.

3. The arc contact assembly as claimed in claim 2, **characterized in that** the pin post (620) is provided with a long hole (630) extending in the first direction, the long hole (630) having a limiting opening perpendicular to the first direction; a limiting pin (430) extending perpendicular to the first direction is provided at an inner wall of the pin hole (420) opposite the limiting opening, and the limiting pin (430) is inserted in the long hole (630) and is movable in the first direction relative to the pin post (620).
4. The arc contact assembly as claimed in claim 1, **characterized in that** the second connecting member comprises a one-way bearing (900), the one-way bearing (900) comprising a bearing inner ring and a bearing outer ring, the bearing inner ring being fitted round the periphery of the support rod lower end (310) in a fixed manner, and the spring upper end (510) being connected to the bearing outer ring.
5. The arc contact assembly as claimed in claim 4, **characterized in that** the arc contact assembly comprises an annular boss, the annular boss protruding upward from a surface of the base (100), the support rod lower end (310) being erected on the annular boss, the annular boss supporting the one-way bearing (900), and the outer diameter of the annular boss being equal to the diameter of the inner ring of the one-way bearing (900).
6. The arc contact assembly as claimed in claim 1, **characterized in that** the arc contact assembly further comprises a guide tube (200), a guide tube lower end (210) of the guide tube (200) being erected on the base (100) in a fixed manner, such that the support rod (300), the arc contact body (400) and the bimetallic spring (500) are located in the guide tube (200).
7. The arc contact assembly as claimed in claim 6, **characterized in that** the guide tube (200) comprises a first annular accommodating groove provided at an inner wall from a guide tube upper end (220) of the guide tube (200); a gas blocking ring (700) is provided in the first annular accommodating groove, such that the gas blocking ring (700) completely occupies the first annular accommodating groove and an inner circumferential wall of the gas blocking ring (700) lies against the periphery of the arc contact body (400) in a sealed fashion, so as to block the entry of external high-temperature gas into the guide tube (200).
8. The arc contact assembly as claimed in claim 7, **characterized in that** the guide tube (200) compris-

es a second annular accommodating groove provided at the inner wall between the guide tube lower end (210) and the guide tube lower end (220), such that an inner circumferential wall of a guide ring (800) arranged in the second annular accommodating groove and completely occupying the second annular accommodating groove lies against the periphery of the arc contact body (400) at all times during movement of the arc contact body (400), so as to guide the movement of the arc contact body (400) in the first direction.

9. The arc contact assembly as claimed in claim 8, **characterized in that** the guide tube (200) comprises a third annular accommodating groove (240), the third annular accommodating groove (240) being provided at the inner wall of the guide tube (200) between the first annular accommodating groove and the second annular accommodating groove; an electric contact element can be placed in the third annular accommodating groove (240).
10. A circuit breaker, **characterized in that** the circuit breaker comprises the arc contact assembly as claimed in any one of claims 1 - 9.
11. The circuit breaker as claimed in claim 10, **characterized in that** the operating voltage of the circuit breaker is in the range of 3 KV - 1000 KV.

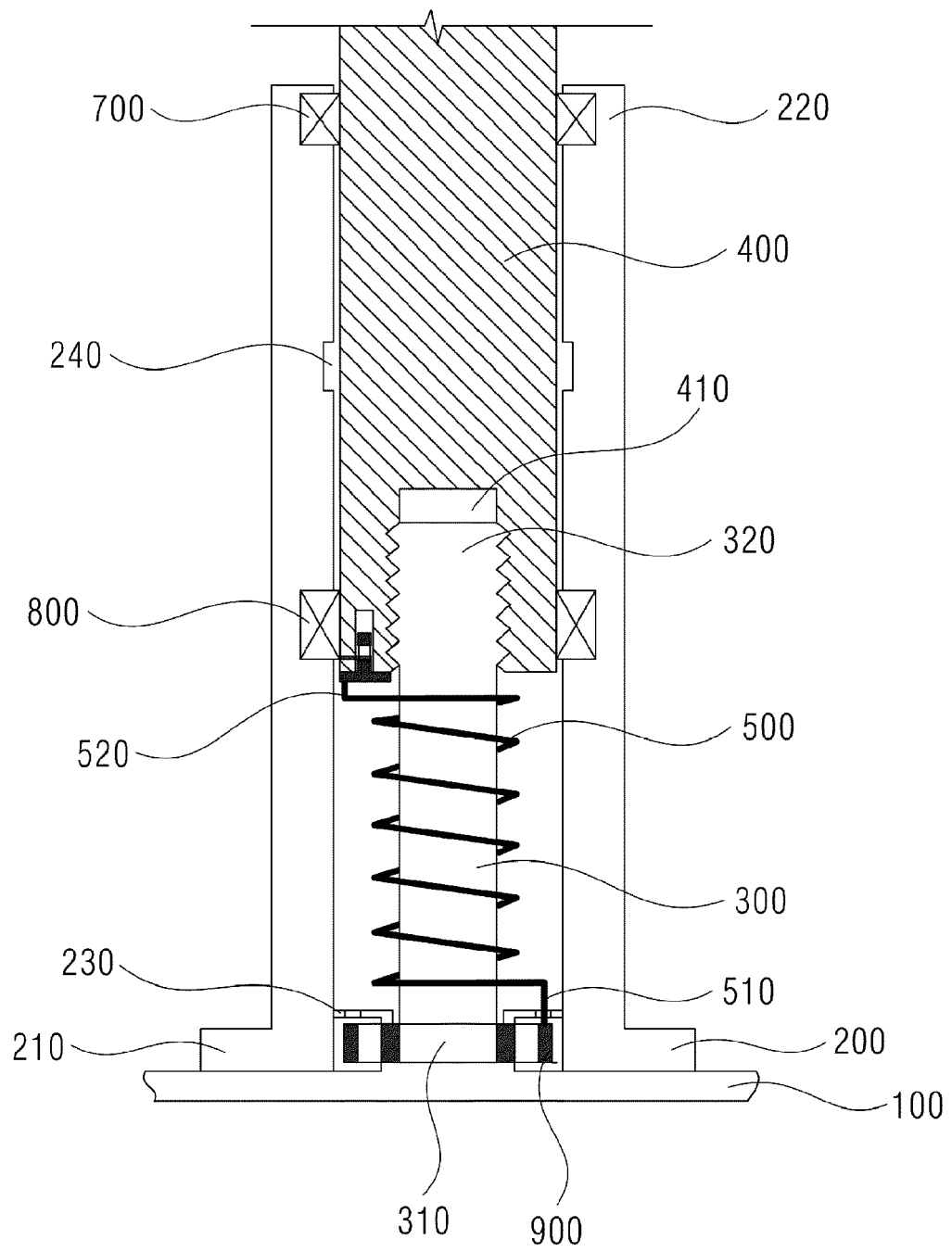


Fig.1

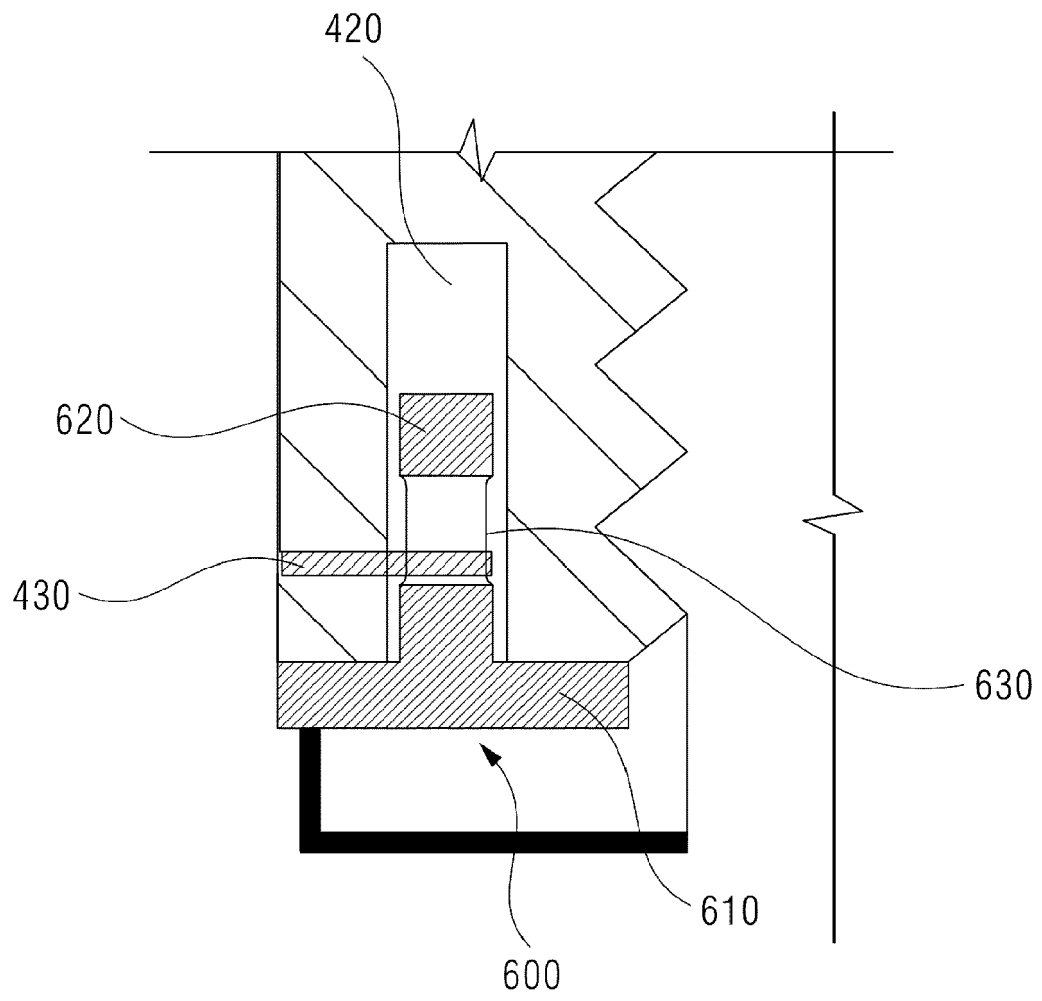


Fig.2



EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2012/038227 A1 (ABB TECHNOLOGY AG [CH]; MANTILLA JAVIER [CH] ET AL.) 29 March 2012 (2012-03-29) * page 10, line 19 - line 28; figures * -----	1-11	INV. H01H33/12 H01H3/40
			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 9 March 2022	Examiner Ramírez Fueyo, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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

EP 21 20 4286

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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09-03-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012038227 A1	29-03-2012	CN 103119677 A	22-05-2013
		EP 2619779 A1	31-07-2013
		US 2013213936 A1	22-08-2013
		WO 2012038227 A1	29-03-2012
