

CONTACTOR

TECHNICAL FIELD

The present invention relates to the field of low-voltage electrical appliances, and more particularly, to a contactor.

5

BACKGROUND ART

A contact support of a contactor is movably installed in a housing, at least one accommodating cavity is usually formed on the contact support, a moving contact is installed in the accommodating cavity, one end of a spring is installed on the moving contact, and the other end of the spring is installed on a top portion of the accommodating cavity. A stationary contact is fixedly installed on the housing and is opposite to the moving contact. When the contactor works, the moving contact moves up and down and the stationary contact is opened or closed, so that a working circuit is switched on or off.

The contact support moves under the attraction of an electric coil, so that the moving contact and the stationary contact are opened or closed, an electric arc is generated at the moment of opening or closing. In order to effectively isolate an interphase electric arc, an isolation insulator is usually arranged between two the contact support and the housing of the contactor, an intensity of the electric arc is determined by a magnitude of current at two ends of the contact and a magnitude of voltage applied to two ends of the contact, the larger the current voltage is, the stronger the electric arc is, and a strong electric arc impact is likely to cause a short circuit between the two phases; and normally, a space of the contactor may be increased in a horizontal or vertical direction, and an interphase electrical clearance and a creepage distance are increased, so as to avoid arc short circuit. However, this method is bound to increase the volume of products, especially when some auxiliary functions need to be added, which does not conform to the development trend of small size and diversified functions of low-voltage electrical appliances.

25

SUMMARY OF THE INVENTION

The present invention is intended to overcome the defects of the prior art and provide a contactor with simple structure and good arc isolation effect.

In order to achieve the object above, the following technical solution is used in the present

invention.

A contactor comprises a housing 1 and a contact support 2, wherein the contact support 2 is movably installed in an installation cavity 10 of the housing 1, a body 20 of the contact support 2 is provided with a plurality of lower accommodating cavities 22 for accommodating a moving contact, the plurality of lower accommodating cavities 22 are arranged at intervals, a side wall of the body 20 is provided with a plurality of limiting structures located between two adjacent lower accommodating cavities 22, and the plurality of limiting structures are matched with a plurality of plugboards 12 in the installation cavity 10;

the plugboard 12 comprises a connecting end portion 121 and a bending root portion connected to each other, the bending root portion of the plugboard 12 is connected to a side wall of the installation cavity 10 of the housing 1, each limiting structure of the contact support 2 comprises a first limiting plate 25 and a second limiting plate 26 formed by side walls of two adjacent lower accommodating cavities 22 extending respectively, the first limiting plate 25 comprises a connecting root portion 251 and a bending end portion connected to each other, the connecting root portion 251 of the first limiting plate 25 is connected to the body 20 and is spaced with the second limiting plate 26 to form an slot 27 matched with the connecting end portion 121 of the plugboard 12, and the bending end portion of the first limiting plate 25 is oppositely arranged with the bending root portion of the plugboard 12.

Preferably, the bending end portion of the first limiting plate 25 comprises a first turning segment 252 and a first linear segment 253, the first linear segment 253 is staggered with the connecting root portion 251 in parallel, and the first turning segment 252 is obliquely connected between the first linear segment 253 and the connecting root portion 251; the bending root portion of the plugboard 12 comprises a second turning segment 122 corresponding to the first turning segment 252 and a second linear segment 123 corresponding to the first linear segment 253, the second linear segment 123 is staggered with the connecting end portion 121 in parallel, and the second turning segment 122 is obliquely connected between the second linear segment 123 and the connecting end portion 121.

Preferably, the connecting root portion 25 of the first limiting plate 25 is staggered with the connecting end portion 121 of the plugboard 12 in parallel, the first turning segment 252 is staggered with the second turning segment 122 in parallel, and the first linear segment 253 is staggered with the second linear segment 123 in parallel.

Preferably, the connecting root portion 251 of the first limiting plate 25 and the second limiting plate 26 are flat and straight plate structures, and a length of the connecting root portion 251 of the first limiting plate 25 is equal to a length of the second limiting plate 26.

Preferably, a length of the first limiting plate 25 is greater than a length of the second limiting plate 26, and the bending end portion of the first limiting plate 25 protrudes out of the second limiting plate 26 and is bent towards the second limiting plate 26.

Preferably, a bottom end of the body 20 of the contact support 2 is provided with a bottom plate 21, the body 20 is vertically connected to a middle portion of a top surface of the bottom plate 21, the plurality of limiting structures are connected between the top surface of the bottom plate 21 and the side wall of the body 20 and distributed on two sides of the body 20 in central symmetry, the plurality of plugboards 12 matched with the plurality of limiting structures are also arranged on two sides of the installation cavity 10 in central symmetry, a movable hole 11 for the movement of the body 20 is formed between the plugboards 12 on the two sides, and the bottom plate 21 is matched with the installation cavity 10 in size, and can be blocked by the plugboard 12 during movement.

Preferably, the two sides of the body 20 of the contact support 2 protrude out of the bottom plate 21 to form two sliding bulges 201 located at the two sides, and an inside wall of the housing 1 is provided with two sliding slots 13 located at two sides of the movable hole 11 to match with the two sliding bulges 201.

Preferably, a side wall of the sliding slot 13 protrudes out of the inside wall of the housing 1, two sides of each sliding bulge 201 are provided with two limiting blocks 211 located on side edges of the bottom plate 21, and a gap between the limiting block 211 and the sliding bulge 201 is matched with the side wall of the sliding slot 13.

Preferably, three lower accommodating cavities 22 are arranged, and four limiting structures are arranged; and the three lower accommodating cavities 22 are arranged on one side of the body 20 of the contact support 2, and an empty cavity 23 is formed between the three lower accommodating cavities 22 in row and the other side of the body 20.

Preferably, a separation plate 28 is arranged between the empty cavity 23 and the adjacent lower accommodating cavity 22, and the housing 1 is provided with a baffle plate 14 matched with the separation plate 28.

According to the contactor of the present invention, the limiting structure on the contact support

is matched with the plugboard on the housing to form a laminated structure, so as to play a role of cutting off an electric arc. Meanwhile, the first limiting plate and the plugboard are provided with matched bending portions, the first limiting plate and the plugboard are spatially converted in a sectional bending manner, and an electric clearance and a creepage distance between two-phase charged parts of the contactor can be increased without additionally expanding a space of the contactor, so that the electric arc is further effectively cut off, and space utilization rate of products is improved. The structure is simple, not only an electric arc isolation effect is improved, and electric arc short circuit is effectively avoided, but also a volume of the product is reduced as much as possible or more spaces are provided for a functional module of the product, so that more auxiliary functional modules such as an auxiliary contact, a surge suppression module and the like can be accommodated, the purposes of miniaturization and functional diversification of the product are achieved, and the development trend of low-voltage electrical appliances is met.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an assembly diagram of a housing and a contact support of a contactor according to the present invention;

Fig. 2 is an assembly diagram of inverted housing and contact support according to the present invention;

Fig. 3 is an exploded view of the inverted housing and contact support according to the present invention;

Fig. 4 is a top view of the housing according to the present invention;

Fig. 5 is a stereoscopic diagram of the contact support according to the present invention;

Fig. 6 is a top view of the contact support according to the present invention; and

Fig. 7 is a front view of the contact support according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The detailed embodiments of a contactor of the present invention are further described hereinafter with reference to the embodiments shown in Figs. 1 to 7. The contactor of the present invention is not limited to the description of the following embodiments.

As shown in Figs. 1 to 7, the contactor of the present invention comprises a housing 1 and a

contact support 2, the contact support 2 is movably installed in an installation cavity 10 of the housing 1, a body 20 of the contact support 2 is provided with a plurality of independent lower accommodating cavities 22 for accommodating a moving contact of the contactor, and under the action of an electric coil of the contactor, the contact support 2 moves to drive the moving contact on the contactor and a stationary contact fixedly installed on the housing 1 to be opened or closed, thus realizing the disconnection or connection of a working circuit of the contactor; the plurality of lower accommodating cavities 22 are arranged at intervals, a side wall of the body 20 is provided with a plurality of limiting structures located between two adjacent lower accommodating cavities 22, and the plurality of limiting structures are matched with a plurality of plugboards 12 in the installation cavity 10; and particularly, the plugboard 12 comprises a connecting end portion 121 and a bending root portion connected to each other, the bending root portion of the plugboard 12 is connected to a side wall of the installation cavity 10 of the housing 1, each limiting structure of the contact support 2 comprises a first limiting plate 25 and a second limiting plate 26 formed by side walls of two adjacent lower accommodating cavities 22 extending respectively, the first limiting plate 25 comprises a connecting root portion 251 and a bending end portion connected to each other, the connecting root portion 251 of the first limiting plate 25 is connected to the body 20 and is spaced with the second limiting plate 26 to form an slot 27 matched with the connecting end portion 121 of the plugboard 12, and the bending end portion of the first limiting plate 25 is oppositely arranged with the bending root portion of the plugboard 12. During installation, the connecting end portion 121 of the plugboard 12 is inserted into the slot 27 between the first limiting plate 25 and the second limiting plate 26, and the bending root portion of the plugboard 12 is opposite to the bending end portion of the first limiting plate 25. The limiting structure on the contact support is matched with the plugboard on the housing to form a laminated structure, so as to play a role of cutting off an electric arc. Meanwhile, the first limiting plate and the plugboard are provided with matched bending portions, the first limiting plate and the plugboard are spatially converted in a sectional bending manner, and an electric clearance and a creepage distance between two-phase charged parts of the contactor can be increased without additionally expanding a space of the contactor, so that the electric arc is further effectively cut off, and space utilization rate of products is improved. The structure is simple, not only an electric arc isolation effect is improved, and electric arc short circuit is effectively avoided, but also a volume of the product is reduced as much as possible or more spaces are provided for a

functional module of the product, so that more auxiliary functional modules such as an auxiliary contact, a surge suppression module and the like can be accommodated, the purposes of miniaturization and functional diversification of the product are achieved, and the development trend of low-voltage electrical appliances is met.

5 Specifically, the bending end portion of the first limiting plate 25 comprises a first turning segment 252 and a first linear segment 253, the first linear segment 253 is staggered with the connecting root portion 251 in parallel, and the first turning segment 252 is obliquely connected between the first linear segment 253 and the connecting root portion 251; the bending root portion of the plugboard 12 comprises a second turning segment 122 corresponding to the first turning segment
10 252 and a second linear segment 123 corresponding to the first linear segment 253, the second linear segment 123 is staggered with the connecting end portion 121 in parallel, and the second turning segment 122 is obliquely connected between the second linear segment 123 and the connecting end portion 121. A multi-section bending structure of the first limiting plate matched with the plugboard is simple, compact and orderly, effectively increases the electrical clearance and the creepage distance
15 between the two phases of the product, and achieves good electric arc isolation effect. Further, the connecting root portion 251 of the first limiting plate 25 is staggered with the connecting end portion 121 of the plugboard 12 in parallel, the first turning segment 252 is staggered with the second turning segment 122 in parallel, and the first linear segment 253 is staggered with the second linear segment 123 in parallel. Each part of the first limiting plate is relatively staggered with each part of the
20 plugboard, thus further increasing the creepage distance of the product.

 In addition, the connecting root portion 251 of the first limiting plate 25 and the second limiting plate 26 are flat and straight plate structures parallel with each other, and a length of the connecting root portion 251 of the first limiting plate 25 is equal to a length of the second limiting plate 26; and an end portion of the second limiting plate 26 facing a side of the plugboard 12 is provided with an
25 inclined plane parallel staggered with the second turning segment 122 in parallel. Moreover, a length of the first limiting plate 25 is greater than a length of the second limiting plate 26, and the bending end portion of the first limiting plate 25 protrudes out of the second limiting plate 26 and is bent towards the second limiting plate 26. The electric arc isolation effect is better when the arrangement is more compact.

30 Fig. 2 and Fig. 3 show a movable installation structure of the contact support and the housing of

the present invention, a bottom end of the body 20 of the contact support 2 is provided with a bottom plate 21 for installing an armature of the contactor, a bottom surface of the bottom plate 21 is provided with two limiting bosses 212 at intervals, and a gap between the two limiting bosses 212 is matched with the armature of the contactor; and each limiting boss 212 is provided with a groove 213. The body 20 is vertically connected to a middle portion of a top surface of the bottom plate 21, the plurality of limiting structures are connected between the top surface of the bottom plate 21 and the side wall of the body 20 and distributed on two sides of the body 20 in central symmetry, the plurality of plugboards 12 matched with the plurality of limiting structures are also arranged on two sides of the installation cavity 10 in central symmetry, a movable hole 11 for the movement of the body 20 is formed between the plugboards 12 on the two sides, and the bottom plate 21 is matched with the installation cavity 10 in size, and can be blocked by the plugboard 12 during movement. The first linear segment 253 of the first limiting plate 25 extends to be flush with an edge of the bottom plate 21. The movable installation structure of the contact support and the housing is simple, which facilitates the movement of the contact support.

In addition, the two sides of the body 20 of the contact support 2 protrude out of the bottom plate 21 to form two sliding bulges 201 located at the two sides, and an inside wall of the housing 1 is provided with two sliding slots 13 located at two sides of the movable hole 11 to match with the two sliding bulges 201. The matching of the sliding bulge and the sliding slot plays a role of guiding and limiting the movement of the contact support, which improves the reliability. A side wall of the sliding slot 13 protrudes out of the inside wall of the housing 1, two sides of each sliding bulge 201 are provided with two limiting blocks 211 located on side edges of the bottom plate 21, and a gap between the limiting block 211 and the sliding bulge 201 is matched with the side wall of the sliding slot 13, which plays a role of further defining. During installation, the body 20 of the contact support 2 is installed in the movable hole 11, the sliding bulge 201 is clamped in the sliding slot 13 with a sliding gap, and the two side walls of the sliding slot 13 are correspondingly limited between the sliding bulge 201 and the two limiting blocks 211 on the two sides.

Figs. 5 to 7 show the detailed embodiments of the contact support of the present invention, three lower accommodating cavities 22 are arranged, four limiting structures are arranged, four limiting structures are arranged at the two sides of the body 20 of the contact support 2 in central symmetry, and two limiting structures located at the same side of the body 20 are respectively located in two

gaps of the three lower accommodating cavities 22; the three lower accommodating cavities 22 are arranged on one side of the body 20 of the contact support 2, and an empty cavity 23 is formed between the three lower accommodating cavities 22 in row and the other side of the body 20; and the body 20 of the contact support 2 is further provided with four independent upper accommodating
5 cavities 24 for accommodating the moving contact of the contactor, the four upper accommodating cavities 24 are arranged in row above the three lower accommodating cavities 22 in row, wherein the three upper accommodating cavities 24 are arranged corresponding to the three lower accommodating cavities 22, and the empty cavity 23 is arranged below the other upper accommodating cavity 24. According to the traditional contact support, the three lower accommodating cavities are uniformly
10 distributed on the body of the contact support and completely occupy the transverse direction of the body to ensure the electrical clearance between the two phases; under the condition of the same size as the traditional contact support, the contact support of the present invention ensures the electrical clearance and the creepage distance between the two phases based on the matching between the limiting structure provided with the bending portion and the plugboard of the bent housing, and can
15 arrange the three lower accommodating cavities in a staggered manner along the transverse direction of the body, thus leaving the empty cavity capable of accommodating other functional modules and improving the space utilization rate of products. Moreover, a separation plate 28 is arranged between the empty cavity 23 and the adjacent lower accommodating cavity 22, and the housing 1 is provided with a baffle plate 14 matched with the separation plate 28.

20 The contents above further describe the present invention in detail in the combination with detailed and preferred embodiments, and the detailed embodiments of the present invention cannot be recognized as being limited to the description. For those ordinary skilled in the art of the present invention, on the premise of not deviating from the concept of the present invention, many simple deductions or replacements may be further conducted, and shall be deemed as being included in the
25 protection scope of the present invention.

CLAIMS

1. A contactor, comprising a housing (1) and a contact support (2), wherein the contact support (2) is movably installed in an installation cavity (10) of the housing (1), a body (20) of the contact support (2) is provided with a plurality of lower accommodating cavities (22) for accommodating a moving contact, the plurality of lower accommodating cavities (22) are arranged at intervals, a side wall of the body (20) is provided with a plurality of limiting structures located between two adjacent lower accommodating cavities (22), and the plurality of limiting structures are matched with a plurality of plugboards (12) in the installation cavity (10);

the plugboard (12) comprises a connecting end portion (121) and a bending root portion connected to each other, the bending root portion of the plugboard (12) is connected to a side wall of the installation cavity (10) of the housing (1), each limiting structure of the contact support (2) comprises a first limiting plate (25) and a second limiting plate (26) formed by side walls of two adjacent lower accommodating cavities (22) extending respectively, the first limiting plate (25) comprises a connecting root portion (251) and a bending end portion connected to each other, the connecting root portion (251) of the first limiting plate (25) is connected to the body (20) and is spaced with the second limiting plate (26) to form an slot (27) matched with the connecting end portion (121) of the plugboard (12), and the bending end portion of the first limiting plate (25) is oppositely arranged with the bending root portion of the plugboard (12).

2. The contactor according to claim 1, wherein the bending end portion of the first limiting plate (25) comprises a first turning segment (252) and a first linear segment (253), the first linear segment (253) is staggered with the connecting root portion (251) in parallel, and the first turning segment (252) is obliquely connected between the first linear segment (253) and the connecting root portion (251); the bending root portion of the plugboard (12) comprises a second turning segment (122) corresponding to the first turning segment (252) and a second linear segment (123) corresponding to the first linear segment (253), the second linear segment (123) is staggered with the connecting end portion (121) in parallel, and the second turning segment (122) is obliquely connected between the second linear segment (123) and the connecting end portion (121).

3. The contactor according to claim 2, wherein the connecting root portion (251) of the first limiting plate (25) is staggered with the connecting end portion (121) of the plugboard (12) in parallel, the first turning segment (252) is staggered with the second turning segment (122) in parallel, and the first linear segment (253) is staggered with the second linear segment (123) in parallel.

4. The contactor according to claim 1, wherein the connecting root portion (251) of the first limiting plate (25) and the second limiting plate (26) are flat and straight plate structures, and a length of the connecting root portion (251) of the first limiting plate (25) is equal to a length of the second limiting plate (26).

5. The contactor according to any one of claims 1 to 4, wherein a length of the first limiting plate (25) is greater than a length of the second limiting plate (26), and the bending end portion of the first limiting plate (25) protrudes out of the second limiting plate (26) and is bent towards the second limiting plate (26).

6. The contactor according to claim 1, wherein a bottom end of the body (20) of the contact support (2) is provided with a bottom plate (21), the body (20) is vertically connected to a middle portion of a top surface of the bottom plate (21), the plurality of limiting structures are connected between the top surface of the bottom plate (21) and the side wall of the body (20) and distributed on two sides of the body (20) in central symmetry, the plurality of plugboards (12) matched with the plurality of limiting structures are also arranged on two sides of the installation cavity (10) in central symmetry, a movable hole (11) for the movement of the body (20) is formed between the plugboards (12) on the two sides, and the bottom plate (21) is matched with the installation cavity (10) in size, and can be blocked by the plugboard (12) during movement.

7. The contactor according to claim 6, wherein the two sides of the body (20) of the contact support (2) protrude out of the bottom plate (21) to form two sliding bulges (201) located at the two sides, and an inside wall of the housing (1) is provided with two sliding slots (13) located at two sides of the movable hole (11) to match with the two sliding bulges (201).

8. The contactor according to claim 7, wherein a side wall of the sliding slot (13) protrudes out of the inside wall of the housing (1), two sides of each sliding bulge (201) are provided with two limiting blocks (211) located on side edges of the bottom plate (21), and a gap between the limiting block (211) and the sliding bulge (201) is matched with the side wall of the sliding slot (13).

9. The contactor according to claim 1, wherein three lower accommodating cavities (22) are arranged, and four limiting structures are arranged; and the three lower accommodating cavities (22) are arranged on one side of the body (20) of the contact support (2), and an empty cavity (23) is formed between the three lower accommodating cavities (22) in row and the other side of the body (20).

10. The contactor according to claim 9, wherein a separation plate (28) is arranged between the empty cavity (23) and the adjacent lower accommodating cavity (22), and the housing (1) is provided with a baffle plate (14) matched with the separation plate (28).