Oct. 19, 1954 W. FEW ET AL 2,692,318

ARC CHAMBER FOR CIRCUIT BREAKERS

Filed March 31, 1951 2 Sheets-Sheet 1

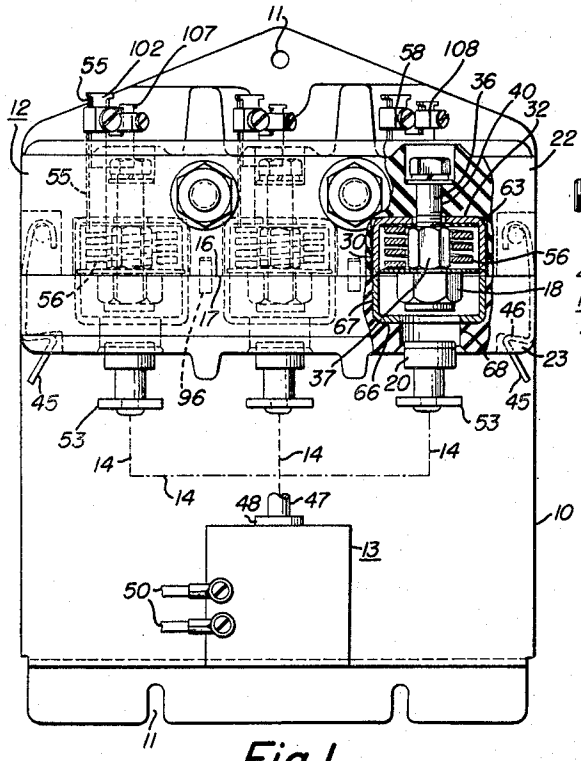


Fig. 1

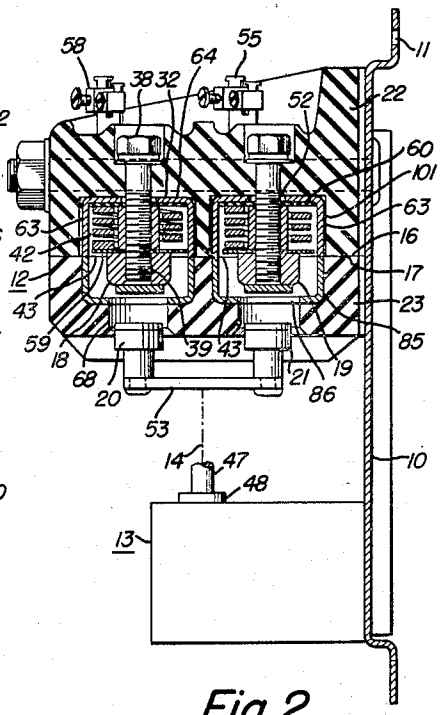


Fig. 2

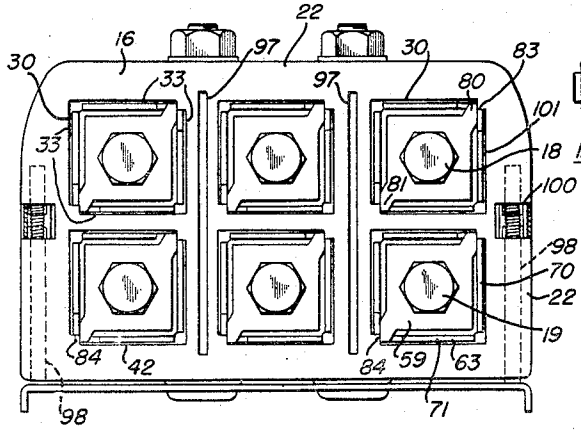


Fig. 3

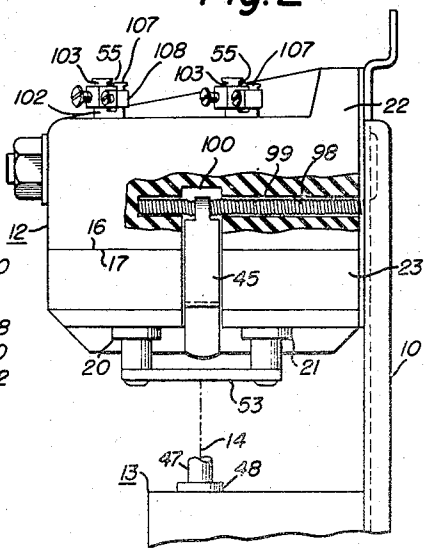


Fig. 4

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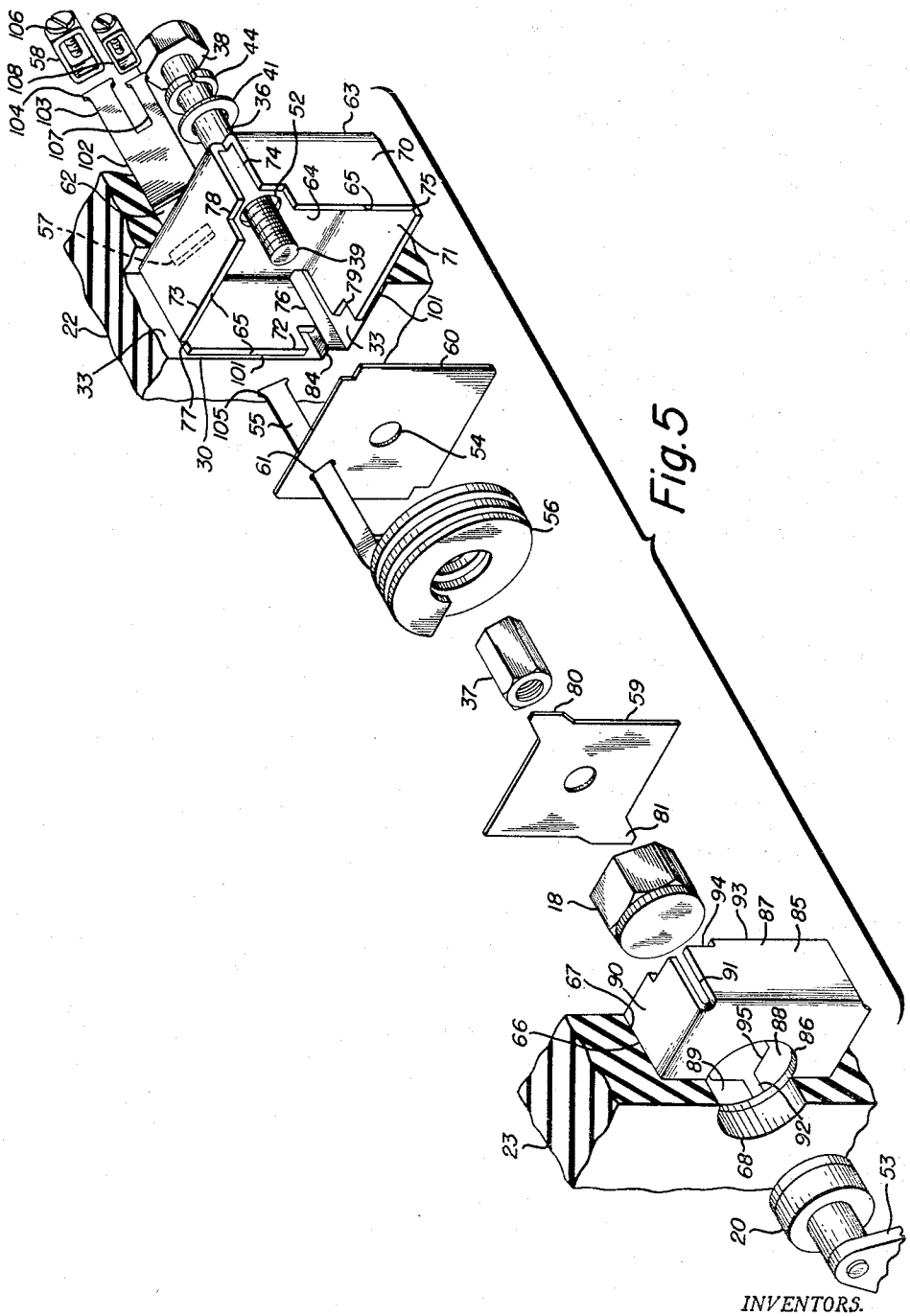


Fig. 5

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ARC CHAMBER FOR CIRCUIT BREAKERS

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Application March 31, 1951, Serial No. 218,626

14 Claims. (Cl. 200—147)

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This invention relates in general to electric circuit breakers or switches and more particularly to the construction of the arc chamber for the electrical contacts for interrupting the circuit.

The subject matter of this application constitutes an improvement upon the arc chambers disclosed in the three Peters Patents Nos. 2,411,892; 2,411,893; and 2,411,894.

An object of the invention is the provision of a split insulating housing comprising an insulating support member and a readily removable insulating body member having an arc chamber for an electric switch with stationary contact means mounted upon the insulating support member and with movable contact means projecting into an opening through the removable insulating body member, the contact means and the split insulating housing being so arranged that when the removable insulating body member is removed, the stationary contact means becomes readily exposed and accessible for inspection and replacement.

Another object of the invention is the provision of detachably removing the stationary contact means without removing the blow-out coil or magnetizing winding.

Another object of the invention is the provision of a low resistance connection between the blow-out coil and the stationary contact means.

Another object of the invention is the provision of mounting the blow-out or magnetizing winding and assembling and tightening the stationary contact means without twisting the assembly or mis-aligning the parts thereof.

Another object of the invention is the provision of heat radiation means to cool the contact means.

Another object of the invention is the provision of preventing a flashing back of the arc into the recess which surrounds the post element that supports the stationary contact means in the arc chamber.

Another object of the invention is the provision of supporting the stationary contact means upon the end of a post element mounted within the arc chamber or cavity, taken in combination with a plate having an area larger than that of the stationary contact means for restricting the entrance to the annular recess formed by the post element and the wall of the arc chamber or cavity surrounding the post element.

Another object of the invention is the provision of arranging the parts of the switch arc chamber to keep the chamber clean.

Another object of the invention is the provision

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of arranging the parts of the switch and the arc chamber whereby the parts may be economically manufactured and assembled, and at the same time providing an efficient arc chamber for extinguishing the arc upon the interruption of the electrical circuit.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a front elevational view of the invention with certain parts broken away to illustrate more clearly the construction of the arc chamber and the contact means;

Figure 2 is a side elevational view of the device shown in Figure 1, taken along the line 2—2 thereof;

Figure 3 is a view taken along the line 3—3 of Figure 1, being taken along the split between the insulating support member and the readily removable insulating body member, and showing the face of the insulating support member with the stationary contact means appearing thereon;

Figure 4 is a side elevational view of the device shown in Figure 1, and shows particularly the arrangement of the resilient clips for holding the removable insulating body member against the insulating support member; and

Figure 5 is an exploded view of the several parts comprising the arc chamber and the contact means.

With reference to the drawings, the circuit breaker or switch is designated generally by the reference character 12 and is arranged to be operated by an actuating electromagnet indicated by the reference character 13.

The switch 12 and the actuating electromagnet 13 may be mounted on a base 10 having holes 11 therein to facilitate the anchoring of the entire assembly to a suitable support or closure box or housing. The actuating electromagnet 13 may be of any suitable design or construction and is arranged to be electrically energized by the conductors 50, and acts to close the circuit breaker 12 when energized. The electromagnet 13 has an operating member 47 extending upwardly from the upper side thereof. As illustrated, the operating member 47 is in its lower or retracted position, being the position when the electromagnet is de-energized and the switch open. The downward travel of the operating member 47 opens the contacts and is arrested by means of a collar 48 engaging the upper surface of the electromagnet.

In the drawings, the switch 12 or circuit breaker

is arranged to interrupt a three-phase circuit by three sets of contacts designated, respectively, as A, B and C, disposed in a split insulating housing. The set of contacts A, B and C for the respective phases of the electric circuit are of the same construction and corresponding parts bear the same reference characters. As shown, each set of contacts is arranged to produce a "double-break" in the electrical circuit and comprises two stationary contact means 18 and 19 and two movable contact means 20 and 21. The contact means 18 and 20 comprise one pair of contacts and the contact means 19 and 21 are disposed closer to the base 10 than the contact means consisting of the contact means 18 and 20. The movable contact means 20 and 21 are connected together by a bridge member 53. As illustrated best in Figure 1, the bridge members 53 for the respective sets of contacts A, B and C are arranged to be simultaneously actuated by a motion transmitting means, which is illustrated by the dash-dot lines 14 and which is actuated by the operating member 47 of the actuating electromagnet 13.

Each of the pairs of contacts is arranged to be interrupted in a split insulating housing comprising two parts 22 and 23. The part 22 comprises an insulating support member and the part 23 comprises a removable insulating body member adapted to be detachably connected to the insulating support member by means of resilient clips 45. The insulating support member and the insulating body member have mating wall surfaces 16 and 17, respectively, abutting each other and forming the split between the members. The insulating split housing has individual arc chambers for each of the pair of separable contacts. The arc chambers are all identical and the construction is such that a part of the arc chamber is in the insulating support member 22 and the other part is in the insulated body member 23. Inasmuch as the construction of the arc chambers are all identical, the description will be in the singular for one of the chambers.

The insulating support member 22 has six cavities 30, one each for the arc chambers. The cavity 30 has a back wall 32 and an annular wall 33, comprising four sides defining a first portion of the chamber on the rear side of the split between the insulating support member 22 and the insulating body member 23. The removable insulating body member 23 has six cavities 66, one each for the arc chambers. Each of the cavities 66 comprises an annular wall 67 having four side surfaces defining a second portion of the chamber on the opposite side of the split between the insulating support member and the removable insulating body member. The four sides of the cavity 30 and the cavity 66 are respectively of the same size and register with each other to form the arc chamber. The removable insulating body member 21 also has an opening 68 extending from the second portion of the arc chamber to the outside thereof in which the movable contact means moves.

Mounted within the cavity 30 of the insulating support member 22 is a cup-shaped member 63 having a bottom or end portion 64 abutting against the back wall 32 of the cavity. The cup-shaped member 63 has four sides 70, 71, 72 and 73 fitting within the four side surfaces defining the cavity 30 or the first portion of the arc chamber, see Figure 5. The cup-shaped member 63 is constructed of magnetic material and comprises a shell mounted in the cavity 30. On the inside bottom of the cup-shaped member 63 is an insulating plate 60 having a centrally disposed hole 54 which is in alignment with a hole 52 in the back end wall of the cup-shaped member 63.

A post element 36 constructed of magnetic material and being in the form of a bolt having a head 38 is mounted on the insulating support member 22 and has a projection portion 39 extending through the hole 52 of the cup-shaped member 63 and the hole 54 of the insulating plate 60 into the arc chamber. The post element 36 is smaller than the hole 52 in the back wall of the cup-shaped member 63 and is radially spaced and electrically insulated therefrom. Upon the end of the projection portion 39 is mounted the stationary contact means. The post element 36 extends through an opening 40 in the back wall of the insulating support member 22 with the head 38 of the bolt in combination with a plain washer 41 and a lock washer 44 pressing against the outside surface of the insulating support member 22. The post element is securely mounted to the insulating support member 22 by means of a sleeve nut 37 threadably engaging the post element within the cup-shaped member 63 and bearing against the insulating plate 60. The projection portion 39 of the post element 36 supports the stationary contact means in the second portion of the chamber beyond the split between the insulating support member 22 and the insulating body member 23, whereby the stationary contact means is readily accessible upon removal of the insulating body member 23 from the insulating support member 22. The post element 36 defines, in combination with the first annular internal wall 33 of the cavity 30, an annular recess 42 having an open end 43 terminating substantially at the split between the insulating support member 22 and the insulating body member 23. Mounted within the annular recess 42 is a magnetizable winding or blow-out coil 56 which surrounds the post element 36. The magnetizable winding 56 has a terminal lead 55 which extends rearwardly through an opening or slot 61 in the insulating plate 60 and opening or slot 57 in the back end portion 64 of the cup-shaped member 63, and an opening or slot 62 in the back wall of the insulating support member 22. The size of the opening or slot 57 in the cup-shaped member 63 is larger than the opening or slot 61, so that the terminal lead 55 is insulated from the cup-shaped member 63. The terminal lead 55 extends to the outside of the insulating support member 22 and on the end thereof is mounted a terminal screw clamp 58 constituting a conductor terminal for connecting the magnetizable winding to an external circuit. The forward end of the magnetizable winding 56 which is in the form of a flat coil is electrically and mechanically connected to the rear side of a plate 59 by soldering, brazing or other means. In Figure 5 of the drawing, which is an exploded view, the plate 59 is not shown as being permanently connected to the end face of the coil, but this is done in order to better illustrate the several parts of the invention, but in actual construction the plate 59 is permanently connected to the end coil of the magnetizable windings. The area of the plate 59 is greater than that of the stationary contact means and thus it restricts the entrance to the annular recess 42 whereupon foreign particles caused by the arc are prevented from entering the recess and coating the inside surface therein, particularly the insulating plate 60. An object of preventing the foreign particles from

entering the recess is to keep the inside of the arc chamber and the insulating plate 60 clean.

The cup-shaped member 63 is provided with slots 74, 75, 76 and 77 along the corners thereof which extend from the back wall or end portion 64 to the outer peripheral end 65 thereof. The slots 74 and 76 which are diagonally disposed have widened area portions 78 and 79 in the region of the peripheral end 65 near the split between the two insulating support members 22 and the insulating body member 23. Diagonally opposite corners of the annular internal wall 33 of the cavity 30 are provided with ledges 83 and 84. The slots 74 and 76 are wider than the slots 75 and 77, whereby the top edge of the side 76 of the cup-shaped member 63 when inserted into the cavity slides along the ledge 83 and the bottom edge of the side 72 slides along the ledge 84, see Figures 3 and 5. This arrangement prevents the cup-shaped member 63 from being inserted wrong.

The plate 59 on diagonally opposite corners is provided with lateral portions 80 and 81 having ends that contact the inside surface of the cavity 30 and pass through the widened area portions 78 and 79, respectively. In other words, the plate 59 which is preferably of non-magnetic material, but of good electrical and heat conducting material, does not electrically contact the cup-shaped member 63 but is spaced and insulated therefrom. The ends of the laterally disposed extension portions 80 and 81 which engage the inside surface of the cavity 30 align the post element 36 and the magnetizable winding 56 within the annular recess so that when the stationary contact means is screwed onto the end of the post element, the parts are maintained in straight and fixed alignment. The stationary contact means can be removed from the end of the post element without removing the magnetizable winding or blow-out coil 56. The plate 59 is permanently connected to the end coil of the magnetizable winding 56, so that when the stationary contact means is screwed tightly against the outer face of the plate 59, a low resistance contact is established. In addition, the plate 59 constitutes a heat radiation member to keep the contact means cool.

Mounted within the cavity 66 of the insulating body member 23 is a cup-shaped member 85 having four side walls 87, 88, 89 and 90 fitting respectively within the four sides of the cavity 66. The cup-shaped member 85 is of the same general construction as the cup-shaped member 63 and is constructed of magnetizable material and has an end peripheral face 93 which is adapted to register with the end peripheral face 65 of the cup-shaped member 63. The cup-shaped member 85 is provided with corner slots in registration with the corner slots of the cup-shaped member 63. Two of the corner slots in the cup-shaped member 85, namely slots 91 and 92 which register with the corner slots 74 and 76 of the cup-shaped member 63 have widened areas 94 and 95 in order to provide additional space to keep the cup-shaped member 85 from contacting the plate 59. The cup-shaped member 85 is securely mounted or molded within the cavity 66 of the insulating body member 23 so that upon removal of the insulating body member 23 from the insulating support member 22, the cup-shaped members 85 remain permanently fixed therein. The end wall of the cup-shaped member 85 is provided with a hole 86 in alignment with the opening 68 in which the movable contact moves. The peripheral end face 93 of the cup-shaped member 85 is preferably ground flat with the mating surface 17 of the removable insulating body member 23 and likewise the peripheral end face 65 of the cup-shaped member 63 is made flush with the mating wall surface 16 of the insulating support member 22. The cup-shaped member 85 and the cup-shaped member 63 constitute a portion of the magnetic circuit along with the post member 36 for providing the flux for controlling the arc. The action of the flux is such to keep the inside of the arc chamber clean so that the insulating plate 60 is kept clean. Longitudinal barrier members 96 are provided in the face of the removable insulating body member 23 and are adapted to fit in longitudinal grooves 97 in the insulating support member 22 in order to insure positive separation between phases of the circuit being controlled.

The removable insulating support body member 23 may be easily removed by operating the resilient clips 45 which have at their forward ends a hook 46 for engaging a ledge in the front side of the removable insulating body member 23. The other ends of the clips 45 are hingedly connected respectively to coil springs 98 which are mounted in longitudinally extending holes 99 in opposite sides of the insulating support member 23. The sides of the insulating support member 23 are provided with slots 100 to receive the hinged ends of the clips 45 which means that the coil springs 98 are held between two spaced points at the hinged connection so that there is a certain amount of resiliency to that portion of the coil springs between the spaced points when operating the clips 45.

The terminal lead 55 for the magnetizable winding 56 extends to the rear of the insulating support member 22 and is adapted to be anchored to a supporting terminal clip 102 which is permanently molded into the outer side of the insulating support member 22. The permanently molded clip has a main tongue 103 with laterally extending ears 104 on the end thereof. The terminal lead 55 also has laterally extending ears 105 mounted at the end thereof which substantially register with the ears provided on the tongue 103 of the permanently molded clip when the magnetizing coil is mounted in the arc chamber. Mounted around the tongue 103 of the clip and the rearward extending terminal lead 55 is the terminal screw clamp or collar 58 which has a tightened screw 106 for holding an external conductor against the main tongue 103. The screw when loosened permits the terminal collar 58 to be inserted sidewise over the end of the tongue 103 and the end of the terminal lead conductor 55. When the terminal collar clears the ears it may then be turned or rotated through substantially 90° to its normal engagement position with the external conductor. When the terminal collar is in its normal engagement position, it cannot be longitudinally removed because of its engagement with the ears on the tongue 103 and on the terminal lead conductor 55. Thus the terminal collar 106 prevents the terminal lead 55 and the magnetizing winding 56 from falling out from the cup-shaped member 63, when the stationary contact means and the plate 59 are removed. When the screw is turned tight against the external conductor which is mounted within the terminal collar, a good electrical connection is provided

between the external conductor and the magnetizing winding 56.

The terminal clip 102 is also provided with an auxiliary tongue 107 having a terminal collar 108 mounted therearound whereby an auxiliary conductor may be electrically connected to the magnetizing winding 56 and the stationary contact means mounted on the stationary post element 36.

The insulating housings 22 and 23 are preferably constructed of material which will withstand high temperatures caused by the heat from the arc. However, if the arc is permitted to come directly in contact with the insulating material there might be a tendency for the material to decompose and form fine foreign particles of carbon which might tend to work their way into the arc chamber. In the event that fine carbon particles are formed by the temperature of the arc deteriorating the insulating members, the two metal cup-shaped members 63 and 65 which fit within the arc chamber formed by the insulating materials will constitute a mechanical barrier to make it difficult for the fine carbon particles to work their way into the arc chamber. In addition, the two metal cup-shaped members are in themselves good heat conductors and thus any heat from the arc is well distributed throughout the entire surface areas thereof, so that there is no one point of high concentration of heat directly affecting the insulating material.

It is to be observed that a small peripheral clearance 101 exists between the outside surface of the cup-shaped member 63 and the inside annular surface ofthe cavity 30. This clearance may be in the order of .002 of an inch up to substantially .015 of an inch. One object of this annular clearance between the outside surface of the cup-shaped member 63 and the internal wall of the cavity 30 is to prevent the heat of the arc which is transmitted to the metal cup-shaped member from being directly transmitted to the inside surface of the walls of the insulating housing of the cavity 30.

The male threads on the end of the post element 24 in combination with the female threads inside of the stationary contact means preferably provide a locking engagement therebetween in order to prevent the contact means from becoming loose. Any suitable thread engagement may be employed for this purpose.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said member, said insulating support member having a first annular wall defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element of magnetic material mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, magnetizable winding means mounted in the annular recess and surrounding the post element, a member constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, and a plate for said open end of said annular recess, said plate being in contact with said stationary contact means and constituting a terminal for said magnetizable winding means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess.

2. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said member, said insulating support member having a back wall and a first annular wall defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element of magnetic material mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, magetizable winding means mounted in the annular recess and surrounding the post element, a cup-shaped member having an end portion abutting against said back wall and having a plurality of annularly disposed side portions constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said side portions having slots therebetween extending from said back portion to said split, and a plate of non-magnetizable material for said open end of said annular recess and having edges spaced from said side portions, said plate being in contact with said stationary contact means and constituting a terminal for said magetizable winding means and

comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess.

3. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said member, said insulating support member having a back wall and a first annular wall comprising four side surfaces defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element of magnetic material mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, magnetizable winding means mounted in the annular recess and surrounding the post element, a cup-shaped member having an end portion abutting against said back wall and having four annularly disposed side portions fitting within the four side surfaces defining the first portion of said chamber and constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said side portions having four slots therebetween which extend from said back portion to said split, at least two of said slots in the region of said split having widened area portions, and a plate of non-magnetizable material for said open end of said annular recess and having edges spaced from said side portions, said plate being in contact with said stationary contact means and constituting a terminal for said magnetizable winding means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, said plate also having lateral extension portions projecting through said widened area portions and contacting the annular wall of the first portion of the chamber.

4. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said member, said insulating support member having a back wall and a first annular wall comprising four side surfaces defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall comprising four side surfaces defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element of magnetic material mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, magnetizable winding means mounted in the annular recess and surrounding the post element, a first cup-shaped member having an end portion abutting against said back wall and having four annularly disposed side portions fitting within the four side surfaces defining the first portion of said chamber and constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said side portions having four slots therebetween which extend from said back portion to said split, at least two of said slots in the region of said split having widened area portions, a plate of non-magnetizable material for said open end of said annular recess and having edges spaced from said side portions, said plate being in contact with said stationary contact means and constituting a terminal for said magnetizable winding means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, said plate also having lateral extension portions projecting through said widened area portions and contacting the annular wall of the first portion of the chamber, and a second cup-shaped member having an end portion provided with an aperture in alignment with said opening in which the movable contact moves and having four annularly disposed side portions fitting within the four side surfaces defining the second portion of said chamber and constituting a shell of magnetic material, said post element and said first and second cup-shaped members constituting a magnetic circuit for said magnetizable winding means.

5. A housing for a stationary contact means of a switch, said housing comprising an insulating support member having a back wall and an annular wall defining a cavity, a post element mounted on said back wall and having a projection portion extending into said cavity, said projection of said post element supporting said stationary contact means on the end thereof, said post element defining in combination with the annular internal wall of the cavity an annular recess having an open end opposite from said back wall, a hollow member having a rear end portion facing said back wall and having annularly disposed side portion means constituting a shell of magnetic material mounted in the annular recess and surrounding the post element, and a plate for said open end of said annular recess, said plate having a peripheral edge spaced from said annularly disposed side portion means of the hollow member, said plate supported by said post element on the rearward side of said stationary contact means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, said hollow member having forward edge

means, said stationary contact means being readily accessible and having a contact surface disposed forwardly of said forward edge means and of said plate.

6. A housing for a stationary contact means of a switch, said housing comprising an insulating support member having a back wall and an annular wall defining a cavity, a post element of magnetic material mounted on said back wall and having a projection portion extending into said cavity, said projection portion of said post element supporting said stationary contact means on the end thereof, said post element defining in combination with the annular internal wall of the cavity an annular recess having an open end opposite from said back wall, magnetizable winding means mounted in the annular recess and surrounding the post element, a plate for said open end of said annular recess and constituting a terminal for said magnetizable winding means and being in contact with said stationary contact, a cup shaped member having an end portion abutting against said back wall and having annularly disposed side portion means constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said plate having a peripheral edge spaced from said annularly disposed side portion means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess.

7. A housing for a stationary contact means of a switch, said housing comprising an insulating support member having a back wall, a front surface and an annular wall comprising a plurality of side surfaces defining a cavity between said back wall and said front surface, a post element of magnetic material mounted on said back wall and having a projection portion extending into said cavity, said projection portion of said post element supporting said stationary contact means on the end thereof, said post element defining in combination with the annular internal wall of the cavity an annular recess having an open end opposite from said back wall, magnetizable winding means mounted in the annular recess and surrounding the post element, a cup-shaped member having an end portion abutting against said back wall and having a plurality of annularly disposed side portions respectively fitting within the plurality of side surfaces defining the cavity and constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said plurality of side portions having slots therebetween which extend from said back portion to said front surface, at least two of said slots in the region of said front surface having widened area portions, and a plate of non-magnetizable material for said open end of said annular recess and having a peripheral edge spaced from said side portions, said plate being in contact with said stationary contact means and constituting a terminal for said magnetizable winding means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, said plate also having lateral extension portions projecting through said widened area portions and contacting the annular wall of the said cavity.

8. A housing for a stationary contact means of a switch, said housing comprising an insulating support member having a back wall, a front surface and an annular wall comprising a plurality of side surfaces defining a cavity between said back wall and said front surface, a post element of magnetic material mounted on said back wall and having a projection portion extending into said cavity, said projection portion of said post element supporting said stationary contact means on the end thereof, said post element defining in combination with the annular internal wall of the cavity an annular recess having an open end opposite from said back wall, magnetizable winding means mounted in the annular recess and surrounding the post element, a cup-shaped member having an end portion abutting against said back wall and having a plurality of annularly disposed side portions respectively fitting within the plurality of side surfaces defining the cavity and constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said plurality of side portions having slots therebetween which extend from said back portion to said front surface, at least two of said slots in the region of said front surface having widened area portions, a plate of non-magnetizable material for said open end of said annular recess and having a peripheral edge spaced from said side portions, said plate being in contact with said stationary contact means and constituting a terminal for said magnetizable winding means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, said plate also having lateral extension portions projecting through said widened area portions and contacting the annular wall of the said cavity, and means electrically insulating said post element from the end portion of said cup-shaped member.

9. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said member, said insulating support member having a back wall and a first annular wall defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element of magnetic material mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, magnetizable winding means mounted in the annular recess and surrounding the post element, a cup-shaped member having an end portion abutting against said back wall and having a plurality of annularly disposed side portions constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said side portions

having slots therebetween extending from said back portion to said split, a plate of non-magnetizable material for said open end of said annular recess and having edges spaced from said side portions, said plate being in contact with said stationary contact means and constituting a terminal for said magnetizable winding means and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, and an insulating plate disposed against the inside of the end portion of the cup-shaped member.

10. A housing for a stationary contact means of a switch, said housing comprising an insulating support member having a back wall and an annular wall defining a cavity, a post element of magnetic material mounted on said back wall and having a projection portion extending into said cavity, said projection portion of said post element supporting said stationary contact means on the end thereof, said post element defining in combination with an annular internal wall of the cavity an annular recess having an open end opposite from said back wall, magnetizable winding means mounted in the annular recess and surrounding the post element, a plate for said open end of said annular recess and constituting a terminal for said magnetizable winding means and being in contact with said stationary contact, a cup-shaped member having an end portion abutting against said back wall and having annularly disposed side portion means constituting a shell of magnetic material mounted in the annular recess and surrounding the magnetizable winding means and the post element, said annular wall of the cavity and the outside surface of said shell having a clearance therebetween, said plate comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess.

11. A housing for a stationary contact means of a switch, said housing comprising an insulating support member for supporting the stationary contact means on one side thereof, a post element mounted on said insulating support member and having a projection portion extending from said one side for supporting the stationary contact means, a magnetizable winding electrically connected to said stationary contact means and having a terminal lead extending through the insulating support member and projecting from a second side of the housing, a supporting terminal clip mounted upon the housing and having a tongue extending from said second side thereof, said tongue and said terminal lead being coextensive with each other, a terminal collar surrounding the tongue and the terminal lead and having means to receive an external conductor for connection thereto, and screw means on the terminal collar for electrically connecting the external conductor to said supporting terminal clip and said terminal lead, said tongue and said terminal lead having laterally extending ears which constitute abutment means to engage the terminal collar.

12. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said members, said insulating support member having a first annular wall defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside therein in which the movable contact means moves, a post element mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, a hollow member constituting a shell of magnetic material mounted in the annular recess and having annularly disposed side portion means surrounding the post element, and a plate for said open end of said annular recess and having edge means spaced inwardly from said side portion means of said hollow member, said plate supported by said post element and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess.

13. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said members, said insulating support member having a first annular wall defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, a first hollow member constituting a shell of magnetic material mounted in the annular recess and having annularly disposed side portion means surrounding a post element, a plate for said open end of said annular recess and having edge means spaced inwardly from said side portion means of said hollow member, said plate supported by said post element and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, and a second hollow member having an end portion through which said movable contact means moves and having annularly disposed side portion means surrounding said stationary contact means and mounted within the second portion of said chamber, said second hollow member con-

stituting a shell of magnetic material and spaced outwardly from the edge means of said plate.

14. A split housing having a chamber for a switch comprising stationary contact means and movable contact means, said split housing comprising an insulating support member and a readily removable insulating body member having mating wall surfaces extending transversely of said chamber and constituting the split between said members, said insulating support member having a first annular wall defining a first portion of said chamber on one side of said split, said removable insulating body member having a second annular wall defining a second portion of said chamber on the opposite side of said split, said removable insulating member also having an opening extending from the second portion of said chamber to the outside thereof in which the movable contact means moves, a post element mounted on the insulating support member and having a projection portion extending into said chamber, said projection portion of said post element supporting said stationary contact means on the end thereof beyond said split in the second portion of said chamber, whereby said stationary contact means is readily accessible upon removal of the insulating body member from the insulating support member, said post element defining in combination with the first annular internal wall of the chamber an annular recess having an open end terminating substantially at said split, a first hollow member constituting a shell of magnetic material mounted in the annular recess and having annularly disposed side portion means surrounding a post element, a plate for said open end of said annular recess and having edge means spaced inwardly from said side portion means of said hollow member, said plate supported by said post element and comprising an area greater than the area of said stationary contact means and restricting the entrance to said annular recess, and a second hollow member having an end portion through which said movable contact means moves and having annularly disposed side portion means surrounding said stationary contact means and mounted within the second portion of said chamber, said second hollow member constituting a shell of magnetic material and spaced outwardly from the edge means of said plate, said first and second hollow members having adjacently disposed end surfaces substantially in mating alignment with each other.

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