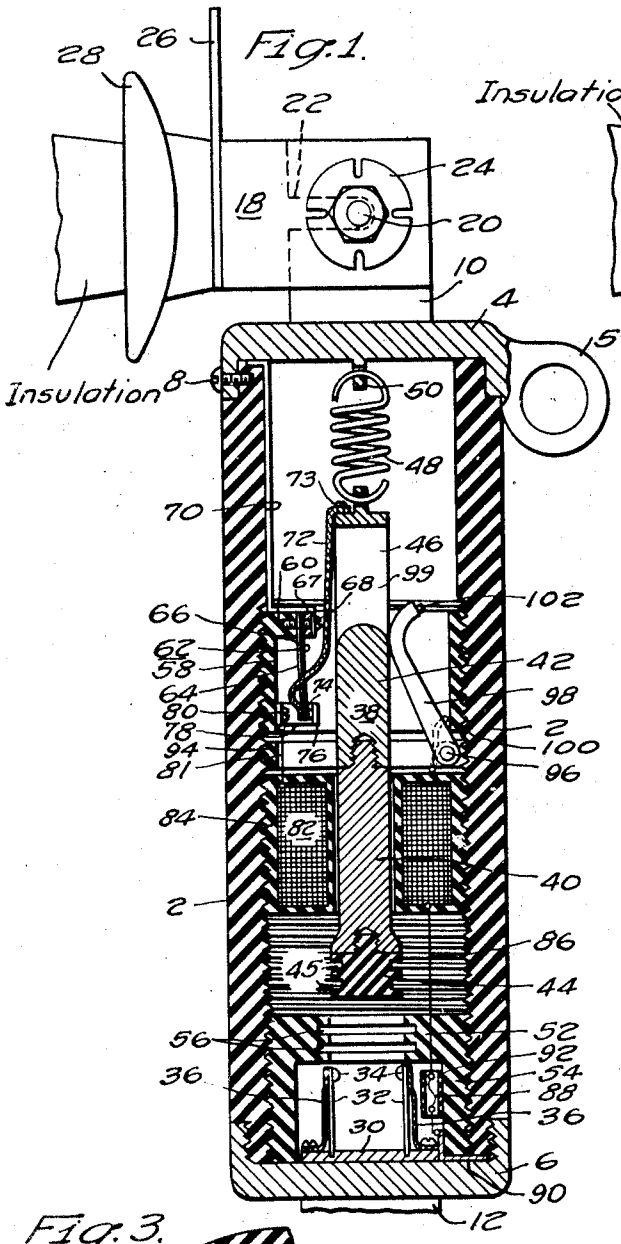
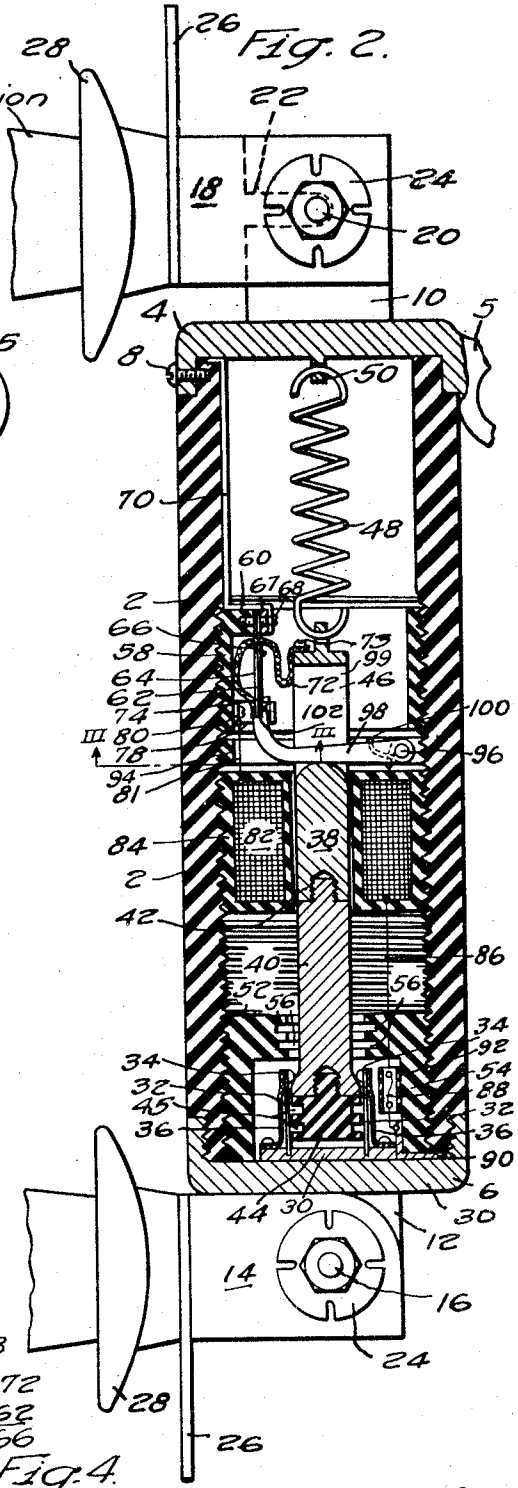
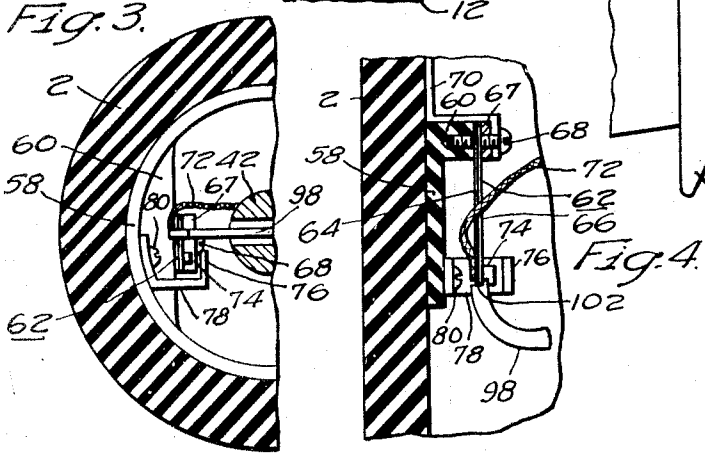
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CIRCUIT INTERRUPTER

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CIRCUIT INTERRUPTER

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Our invention relates generally to electric circuit interrupting apparatus, and more particularly to interrupting apparatus capable of automatically interrupting a circuit in response to the passage therethrough of currents above a predetermined value, and which will operate to automatically reclose the circuit a predetermined time after an interrupting operation.

We have embodied our invention in a reclosing circuit breaker structure which is particularly adapted for relatively low voltage distribution work, 15 kilovolts and under, although it should be understood that certain principles of our invention may be used with interrupters of higher voltage ratings.

One object of our invention is to provide a novel circuit breaker which is operable to automatically reclose the circuit following an interrupting operation, and which is compact in structural form, and economical to manufacture.

Repeating fuse structures are often employed in the protection of circuits subjected to rapidly clearing faults to restore service on these lines after one fuse blows. Such constructions are quite complex and cumbersome and therefore expensive to manufacture. Furthermore, each blown fuse in such structures must be manually re-fused.

Our improved circuit breaker construction is designed in one application thereof to replace repeating fuse constructions, and all the functions thereof with additional advantages.

Another object of our invention is to provide a circuit breaker of the type described with at least one disconnecting contact so that the breaker may be movably mounted so as to be readily disconnectible from its associated circuit.

Another object of our invention is to provide a novel construction of a small oil circuit breaker with all of the parts thereof mounted compactly in a single unitary container, arranged to automatically reclose the circuit following an interrupting operation.

A further object of our invention is to provide in a circuit breaker construction of the type capable of automatically reclosing the circuit following an interrupting operation, novel means for automatically determining the number of successive reclosing operations.

Another object of our invention is to provide in a circuit breaker, novel latch means for maintaining the breaker contacts closed.

A still further object of our invention is to provide novel control and motive means for a movable circuit breaker contact to effect automatic reclosure of said contact following a circuit interrupting operation.

These and other objects of our invention will become more apparent upon consideration of the following specification of a preferred embodiment thereof, taken in connection with the attached drawing, in which:

Figure 1 is a longitudinal sectional view of a circuit interrupter constructed in accordance with our invention and illustrating a break contact with which the interrupter may be associated;

Fig. 2 is a view of our novel interrupter similar to that shown in Fig. 1, but with the contacts thereof shown in a closed position, and with a hinge contact mounting for the device also shown;

Fig. 3 is a partial transverse sectional view taken substantially on the line III—III of Fig. 2 and looking in the direction of the arrows; and

Fig. 4 is an enlarged partial longitudinal sectional view showing the bimetal control means.

Referring to the drawing, we have shown our interrupter as being enclosed in a substantially cylindrical insulating casing 2 which may be of any desired insulating material, such, for example, as fiber, porcelain or glass. The casing 2 is provided with end terminal caps 4 and 6 for closing the opposite ends thereof and forming terminals for the interrupter. The terminal cap 4 is provided with an integral peripheral flange adapted to telescope over the reduced end of casing 2 and be secured thereto, for example, as by the screws 8. The terminal cap 4 is also provided with an integral hookeye extension 5 for the reception of a hook stick or other operating member for a purpose to be hereinafter further described.

The terminal cap 6 at the opposite end of the casing 2 is provided with an interiorly threaded flange adapted to be threadedly engaged with the outer surface of the adjacent reduced outer end of the casing 2. The terminal caps 4 and 6 are provided with outwardly projecting substantially centrally positioned terminal tongues 10 and 12, respectively. The terminal tongue 12 is adapted to be received between the sides of a split hinge contact 14 so as to be pivotally mounted therebetween on a pivot bolt 16 which passes through aligned apertures in the sides of the terminal contact 14 and hinge tongue 12. The other terminal tongue 10 which may be termed a break terminal tongue is adapted to be received between the sides of a split break contact 18, the sides of which are connected by a spread-preventing bolt 20, to prevent undue spreading of the sides of the

split contact 18. The break terminal tongue 10 is provided with a notch 22 opening on the side of the tongue adjacent the break contact 18 for receiving the bolt 20 in the closed position of the interrupter. The contact bolts 20 and 16 are provided with resilient cup-shaped washers 24 at each side thereof for limiting the pressures which may be exerted by the bolt and for providing some resiliency for relative outward movement of the sides of the split contacts.

Each of the contacts 14 and 18 are provided with integral laterally extending terminal portions 26 to which line conductors may be secured, respectively, and each contact is suitably secured to supporting insulators 28 which may be, in turn, mounted in any desired manner on a support.

It is believed obvious that the structure thus far described is that of a disconnecting type of circuit interrupter similar to a disconnecting switch, and that the circuit may be interrupted to provide a relatively large air gap in the circuit by merely exerting a pull on the hook-eye 5 to rotate the interrupter about pivot bolt 16 for movement of its break terminal tongue 10 into or out of engagement with respect to the break contact 18. Thus, in addition to the various functions which will be hereinafter set forth, it is obvious that our novel interrupter is capable of performing the function of a disconnecting switch as respects interrupting the circuit to provide a large air gap therein.

On the inner surface of the interrupter terminal cap 6 we secure a supporting plate 30 such, for example, as by welding or the like, which has its exposed surface notched to receive a plurality of resilient contact supporting strips 32, the inner ends of which are received in the above mentioned notches and secured therein, such, for example, as by soldering or welding. Each contact strip 32 is provided at its outer end, either integral therewith or fixedly attached thereto, with laterally projecting contact button portions 34. The outer ends of the resilient contact strips 32 and the contact buttons 34 are electrically connected to the supporting base 30 by flexible shunts 36 of a good conducting material such as, for example, copper or the like.

A slidably mounted contact rod 38 is provided to cooperate with the contact buttons 34, and as shown is substantially centrally mounted with respect to the insulating casing 2, and slidable substantially longitudinally of the casing. The contact rod 38, as shown, is made up of three sections with one end section 42 being of a conducting magnetic material, such, for example, as iron or the like. The section 42, as shown, has an interiorly threaded socket for receiving a reduced threaded projection on the intermediate section 40 which should be of conducting material which is substantially non-magnetic such, for example, as brass. In the same manner an outer insulating portion 44 is secured to the opposite end of the intermediate section 40 and is provided with peripheral grooves 45. The outer end of the magnetic section 42 is provided with an integral apertured projection 46, through the aperture of which is hooked one end of a coil tension spring 48 with the outer end of the spring anchored to an eyelet 50 integral with the inner surface of the terminal cap 4.

On the side of the fixed contact buttons 34 towards the movable contact rod 38, we provide a centrally apertured insulating baffle member 52, which may be of any desired insulating material preferably an insulating material which is capable of evolving an arc extinguishing gas when in proximity to an electric arc, such as fiber or the like. The baffle 52 is provided with a laterally extending integral sleeve portion 54, the outer surface of which is threaded to engage the interior threads provided on the inner surface of the cylindrical casing 2. The central aperture through the baffle 52 is provided with annular grooves 56.

The closed circuit position of the contacts is shown in Fig. 2, and it will be observed that when the contact rod 38 is moved upwardly to open the circuit that an arc will be drawn between the contact buttons 34 and the lower end of the conducting section 40 of the contact rod, which arc will be confined as the contact rod moves upwardly, between closely spaced walls of insulating material defining the exterior surface of the insulating rod section 44 and the interior surface of the aperture in baffle 52. This will closely confine and compress the arc while exposing the same to the reservoirs of arc extinguishing liquid present in the notches 45 and 56 of the insulating members 44 and 52, to thereby effectively extinguish the arc. This arc extinguishing structure is similar to that shown in the copending application of B. P. Baker, Serial No. 230,946, filed September 21, 1938, now Patent No. 2,253,009, issued August 19, 1941, and assigned to the assignee of this application.

Somewhat above the middle of the insulating casing 2, we provide an annular insulating supporting sleeve 58, the outer surface of which is threaded to engage with the threaded interior surface of the casing 2, and this supporting sleeve is provided at its upper end with an integral laterally extending chordal segment 60 for supporting a bimetallic control strip 62. The bimetal control strip 62 has one end thereof secured to the outer surface of the segment 60 by a clamping plate 67 secured to the segment 60 as by screws 68 which pass through the clamping bar and bimetal 62 to find threaded engagement in the segment 60. The screw 68 also serves to mechanically and electrically secure a conducting strip 70 to the clamping plate and the upper end of the bimetal strip 62. The conducting strip 70 extends from the upper end of the bimetal strip 62 to the inner wall of the casing 2 and along this wall to be secured between the adjacent end of the casing and the terminal cap 4.

The bimetallic control strip 62 is constructed in a manner well known in the art with two metallic laminations 64 and 66 suitably secured together as by welding or the like, and which laminations are of materials having different coefficients of expansion. In this particular instance, it is desired to have the lower end of the bimetal deflect to the left as seen in the drawing. Therefore, the lamination 66 should be of a material having a relatively high coefficient of expansion such, for example, as brass or the like, and the lamination 64 should be of a material having a lower coefficient of expansion, such, for example, as a nickel steel alloy. A flexible conductor 72 has one end thereof secured to the upper end of the conductor rod 38 as by a screw 73 and the lower end of the conductor is connected to the lower end of the bimetal control strip 62 in any desired manner such, for example, as by soldering or the like.

As seen more particularly in Fig. 3, the lower end of the bimetal strip 62 is provided with a

laterally projecting contact button 74, positioned at one side of the longitudinal center of the bimetal strip 62, for cooperation with one leg 76 of a generally U-shaped bracket member 78, the outer leg of which is secured to the insulating supporting sleeve 58, for example, as by the screw 80. The bracket 78 is adapted to be connected to one end of a solenoid coil 82 by a conductor 81.

The solenoid coil 82 is suitably supported in a hollow annular insulating support 84, the outer surface of which is threaded to be threadedly engaged with the inner threaded surface of the casing 2. The insulating support 84 may be of any desired insulating material preferably a moldable or plastic material which may be formed about the solenoid coil 82.

A conductor 86 is adapted to connect the other end of the solenoid coil 82 to one terminal of a fusible element 88, the other terminal of which is connected to a conducting strip 90 having one end angularly bent to be clampingly received between the adjacent end of the insulating casing 2 and end terminal cap 6. It will be observed that the fusible element 88 is provided with an insulating sleeve 92 for a purpose to be hereinafter referred to.

Intermediate the insulating supports 58 and 84 we have provided an annular supporting member 94 which may be either of metal or insulating material, for supporting a latch member for maintaining the movable contact in engagement with the fixed contact buttons 34. The supporting sleeve 94 like the other supporting sleeves, is exteriorly threaded to threadedly engage with threads formed on the inner wall of the casing 2.

The supporting sleeve 94 is provided with a pivot supporting ear for supporting a pivot pin 96 on which is pivotally mounted a latch lever 98. A coil biasing spring 100 has an intermediate portion thereof coiled about the pivot pin 96, and has its end portions engaging with the latch lever 98 and supporting sleeve 94, respectively, for biasing the latch lever 98 in a counterclockwise direction as seen in Figs. 1 and 2. The outer end of the latch lever 98 is turned laterally and notched as at 102 for latching engagement with the free end of the bimetal strip 62 as is clearly shown in Fig. 2.

The electrical circuit through our interrupter may now be traced from the upper contact terminal 26 through the break contact 18, break terminal tongue 10, terminal cap 4, conductor 70 to the upper end of the bimetal strip 62. As shown in Fig. 1, the circuit then proceeds from the bimetal strip 62, its contact button 74, U-shaped bracket 78, conductor 81, solenoid 82, conductor 86, fusible element 88, conducting strip 90 to the lower terminal cap 6, hinge terminal tongue 12, hinge contact 14 and its terminal 26. In this position of the parts, the solenoid 82 is energized so as to attract the magnetic portion 42 of the moving contact rod 38 and move the lower end of the conducting section 40 of the contact rod quickly into engagement with the relatively fixed contact buttons 34 against the bias of coil tension spring 48.

As is apparent from Figs. 1 and 2 of the drawing, the latch lever 98 is adapted to move into a lateral slot 99 through the outer end of the magnetic section 42 of the moving contact rod, so that when the rod moves from the position shown in Fig. 1 to the position shown in Fig. 2, the latch lever 98 is moved in a counterclockwise direction under the influence of its biasing spring 100, so that the outer curved end thereof engages the lower portion of the bimetal strip 62. This engagement will take place before the limit of motion in a downward direction of the contact rod 38 is reached and substantially at the same time or slightly thereafter the lower end of the conducting rod portion 40 engages contact buttons 34. Thereafter continued movement of these parts will enable the latch lever 98 to exert a camming action on the bimetal strip 62 to move the lower end of the same towards the left as seen in Figs. 1 and 2 to thereby disengage the bimetal contact button 74 from the conducting bracket 78, thus interrupting the circuit to the solenoid 82 and permitting the lower end of the bimetal strip to become seated in the notch 102 at the extremity of the latch lever 98. This is the position shown in Fig. 2 of the drawing. Engagement of rod portion 40 with contact buttons 34 obviously short circuits the solenoid 82, and continued movement in the locked position shown in Fig. 2 is due to the momentum of the contact rod 38 and associated parts moving therewith.

In Fig. 2 of the drawing the circuit through the solenoid is interrupted, and the circuit through the interrupter now extends from the lower end of the bimetal strip 62 by way of flexible conductor 72, moving contact rod 38, relatively fixed contact buttons 34, shunts 36, contact supporting plate 30 to the lower terminal cap 6. This is the normal closed circuit position of the interrupter. Upon the occurrence of an overload on the circuit associated with the interrupter, above a predetermined magnitude, the bimetallic strip 62 will become heated and the lower end thereof will be deflected toward the left as seen in Figs. 1 and 2, for the reasons described above, so as to free the lower end of the strip 62 from the notch in the latch lever 98. This will then permit the coil tension spring 48 to quickly draw the contact rod 38 away from the relatively fixed contact buttons 34 to the position shown in Fig. 1.

The contacts will remain in an open position following such an interrupting operation until the bimetal has had time to cool and move back to the position shown in Fig. 1 where the contact button 74 thereof again closes the solenoid circuit, whereupon the contact 38 is moved into and locked in engagement with the relatively fixed contact buttons 34 in the manner described above.

If the overload has been cleared, the interrupter contacts will then remain closed. However, if the overload is still present, the contacts will again be opened automatically in the manner described above, and, after a predetermined time depending upon the length of time required for dissipating heat from the bimetallic strip 62, the contacts will again be closed.

It is understood, of course, that our interrupter is designed to be operated with the casing 2 substantially entirely filled with an arc extinguishing liquid such, for example, as an insulating oil with at least the bimetal strip 62 conducting section 40 of contact rod 38, relatively fixed contacts 32, 34 and fusible element 88 being submerged beneath the surface of the liquid. It can be readily appreciated that in accordance with the description of the operation stated above that if a permanent overload or a short circuit appears on the line with which our interrupter is associated that the interrupter contacts would

keep on interrupting and reclosing the circuit an indefinite number of times. Therefore, to avoid needless wear on the moving parts of the interrupter, and especially in view of the fact that it has been found that all faults not of a permanent character are usually cleared in a relatively few seconds, so that approximately 90% of self-clearing faults will be removed by the third successive reclosure of the associated circuit, we will now proceed to describe means for limiting the number of successive operations of our interrupter.

This is accomplished by the fusible element 88 connected in circuit with solenoid 82 so as to be energized only during the relatively short time when the contact rod 38 is being moved by the solenoid 82 into engagement with the fixed contact buttons 34. The fusible element 88 is constructed so as to have low heat dissipating characteristics, and it is for this purpose that the insulating sleeve 92 is provided about the fusible element, that is, for inhibiting the dissipation of heat from the fusible element. Thus, on the first reclosure of our interrupter the fusible element 88 will be heated a certain degree, and if a second reclosure immediately succeeds the first, the fusible element 88 will not as yet have lost all of the heat generated thereby on the first reclosure, and therefore will be heated to a higher temperature. Similarly, if a third reclosure immediately succeeds the second, the fusible element will be heated to a still higher temperature, such that, if the interrupter attempts to reclose on a fourth immediately successive interruption the fuse will be thereby heated to a high enough temperature to melt and thereby interrupt the solenoid circuit, so that it will be ineffective to reclose the interrupter contacts.

When the fusible element 88 blows, the interrupter then remains open and will require merely replacement of the fusible element to again put the same in service. Replacement of the fusible element 88 may be easily and quickly made by unscrewing the casing 2 from the terminal cap 6, whereupon the casing 2 may be replaced by another casing, or may be readily manipulated to attach one terminal of a replacement fusible element 88 to the conductor 86 and the other terminal thereof to the conducting strip 90. Thereafter the casing may be threaded into the terminal cap 6 and the break contact tongue 10 moved into engagement with the contact tongue 18 to thereby place our interrupter in condition for service.

It is believed obvious from the foregoing that we have provided a novel, compact and relatively simplified form of automatic reclosing circuit breaker, adapted to be mounted disconnectingly with respect to an associated circuit, and further having means for limiting the number of successive reclosures thereof to lock the contacts of the interrupter open in the event an excessive number of reclosures is attempted, together with relatively simple means whereby the interrupter may again be placed in serviceable condition following a lockout operation. It will be noted, furthermore, that the automatic operation of both opening and reclosing the interrupter contacts, and of locking the contacts in a closed position is controlled by a single control member, namely, the bimetal strip 62. The bimetal strip is capable of occupying three operative positions in one of which, as shown in Fig. 1, it controls energization of the contact closing means 82, and in another of which, as shown in Fig. 2, it cooperates with a latching means to lock the contacts closed, and in a third position (not shown) to the left of that shown in Fig. 2 it operates to release the latch holding the contacts closed and thereby permit them to be opened. This single control member also operates with a time lag, since it depends for its movement to the positions stated above upon the time required to heat the strip 62 which will be a relatively long time on light overloads and correspondingly shorter times on heavier overloads.

Having described a preferred embodiment of our invention in accordance with the patent statutes, we desire that our invention be interpreted as broadly as possible inasmuch as it will be obvious, particularly to persons skilled in the art, that many changes may be made in the particular structure disclosed without departing from the broad spirit and scope of our invention. Therefore, we desire that the following claims be interpreted as broadly as possible and that they be limited only by the prior art and by what is expressly stated therein.

We claim as our invention:

1. In a circuit interrupter including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, and means controlled by said electro-responsive means for closing said contacts in their closed position, electro-responsive leasing operation, said electro-responsive means including a movable control element movable to three different operative positions, including, respectively, a normal position at which said contacts are latched closed, a latch releasing position, and a position for actuating said contact closing means.

2. In a circuit interrupter including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, means controlled by said electro-responsive means for closing said contacts a predetermined time after a latch releasing operation, said electro-responsive means including a movable control element movable to three different operative positions, including, respectively, a normal position at which said contacts are latched closed, a latch releasing position, and a position for actuating said contact closing means, and said electro-responsive means being constructed and arranged in a manner such that said control element is relatively slowly moved to its aforesaid positions.

3. In a circuit interrupter including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, and means controlled by said electro-responsive means for closing said contacts a predetermined time after a latch re-

leasing operation, said electro-responsive means including a movable element normally biased to a position in which it energizes said contact closing means, said element being positioned at said normal position to be engaged by said latch means in its latching movement to be moved thereby to a second position wherein said contacts are latched closed and said contact closing means is deenergized, and said element being movable to a third position in response to said currents above a predetermined magnitude to release said latch means.

4. In a circuit interrupter including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, means controlled by said electro-responsive means for closing said contacts a predetermined time after a latch releasing operation, said electro-responsive means including a bimetal element connected in the circuit through said interrupter and having a movable portion which normally occupies a position for energizing said contact closing means, said portion in its normal position being engageable by a part of said latch means in its movement to latched position so as to be moved thereby to a second or latching position, and said portion being movable in response to said currents above a predetermined magnitude to a third position for releasing said latch means.

5. In a circuit interrupter, contact means mounted for movement into and out of engagement with respect to cooperating contact means, means biasing said contact means away from said cooperating contact means, contact closing means operable when energized to move said contact means into engagement with said cooperating contact, movable latch means associated with said movable contact means and cooperable with a bimetallic element for latching said contact means in engagement, said bimetallic element being electrically connected in the circuit through said interrupter so as to move in response to the passage of currents therethrough above a predetermined value to release said movable latch means, and said bimetallic element normally adapted to occupy a position for energizing said contact closing means.

6. In a circuit interrupter, contact means mounted for movement into and out of engagement with respect to cooperating contact means, means biasing said contact means away from said cooperating contact means, contact closing means operable when energized to move said contact means into engagement with said cooperating contact, movable latch means associated with said movable contact means and normally biased to cooperate with a bimetallic element for latching said contact means in engagement, said bimetallic element being electrically connected in the circuit through said interrupter so as to move in response to the passage of currents therethrough above a predetermined value to release said movable latch means, said bimetallic element normally adapted to occupy a position for energizing said contact closing means, and said movable latch means in its movement to latched position being positioned to engage said bimetallic element and move the same from its said last mentioned position.

7. In a circuit interrupter, including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, electrically operated means controlled by said electro-responsive means for closing said contacts a predetermined time after a latch releasing operation, and means in circuit with said electro-responsive contact closing means for interrupting the circuit therethrough in response to a predetermined number of successive contact closing operations thereof.

8. In a circuit interrupter including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, and electrically operated means controlled by said electro-responsive means for closing said contacts a predetermined time after a latch releasing operation, and fusible means in circuit with said electro-responsive contact closing means for interrupting the circuit therethrough in response to a predetermined number of successive contact closing operations thereof.

9. In a circuit interrupter including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, electro-responsive means for releasing said latch means in response to passage through the interrupter of currents above a predetermined value to permit said contacts to separate, solenoid means the energization of which is controlled by said electro-responsive means for closing said contacts a predetermined time after a latch releasing operation, and fusible means in circuit with said solenoid means and the characteristics of which are such that it will fuse to open the solenoid means circuit to render said solenoid means inoperative after a predetermined number of successive energizations thereof.

10. In a circuit interrupting device, a substantially closed container having a pair of terminals, interrupting means in said container including relatively fixed and movable contacts connected to said terminals, respectively, control means automatically controlling the movement of said movable contact into and out of engagement with respect to said relatively fixed contact, said moving contact being actuated in one direction of movement by electrical means controlled by said control means, and circuit interrupting means in circuit with said electrical means for interrupting the circuit and rendering said electrical means inoperative after a predetermined number of successive energizations thereof.

11. In a circuit interrupting device, a substantially closed container adapted to contain an arc extinguishing liquid and having a pair of terminals, interrupting means in said container including relatively fixed and movable contacts connected to said terminals, respectively, bimetallic means automatically controlling the movement of said movable contact into and out of engagement with respect to said relatively fixed contact, said moving contact being actuated in

one direction of movement by electrical means controlled by said bimetallic means, and current responsive thermal circuit interrupting means in circuit with said electrical means for interrupting the circuit and rendering said electrical means inoperative after a predetermined number of successive energizations thereof, said contacts, bimetallic means and current responsive thermal interrupting means positioned to be below the level of said liquid.

12. In a circuit interrupter, including at least one pair of separable contacts, means biasing at least one of said contacts away from the other of said contacts, latch means for maintaining said contacts in their closed position, motive means for moving at least said one contact into engagement with the other of said contacts, a control element movable to one operative position for releasing said latch means to permit said biasing means to separate said contacts to interrupt the circuit, said element being movable in response to a circuit interrupting operation to a second operative position for causing said motive means to reclose said contacts, and means responsive to reclosure of said contacts to move said element to a third position to render said motive means inactive.

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