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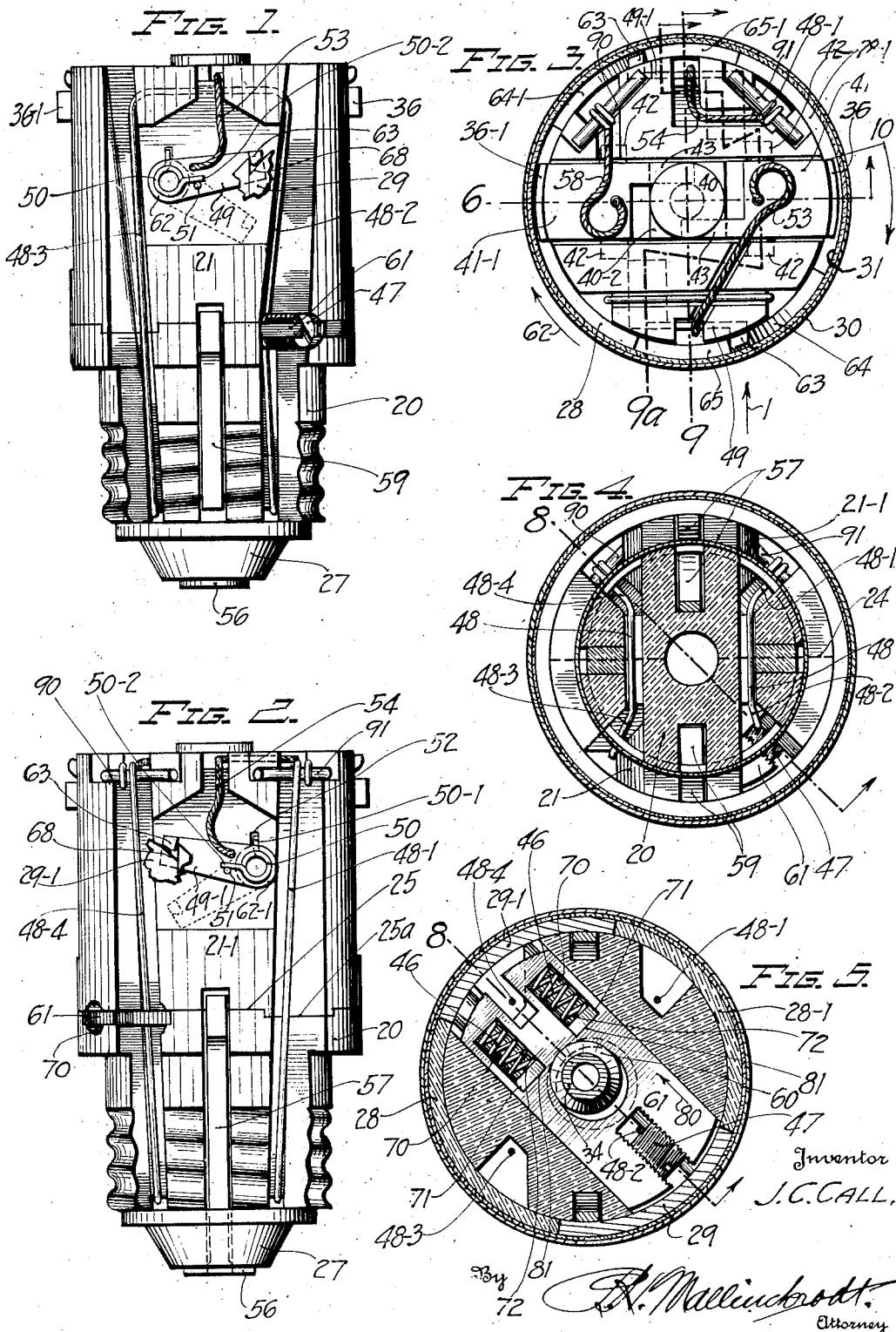
J. C. CALL

1,738,867

AUTOMATIC FUSE PROTECTOR

Filed May 1, 1926

3 Sheets-Sheet 1



Dec. 10, 1929.

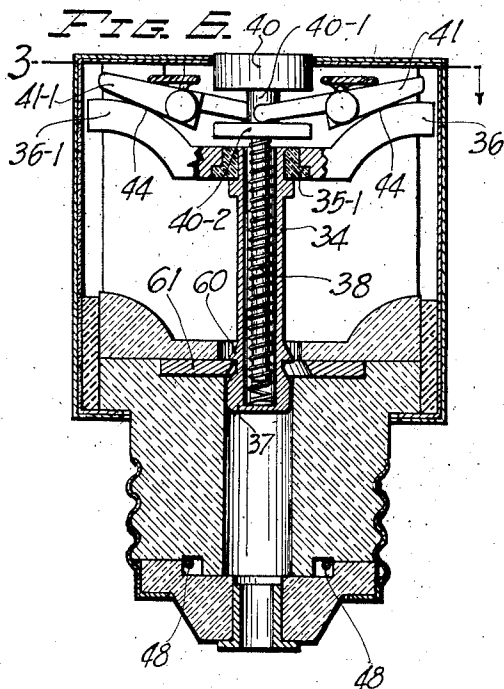
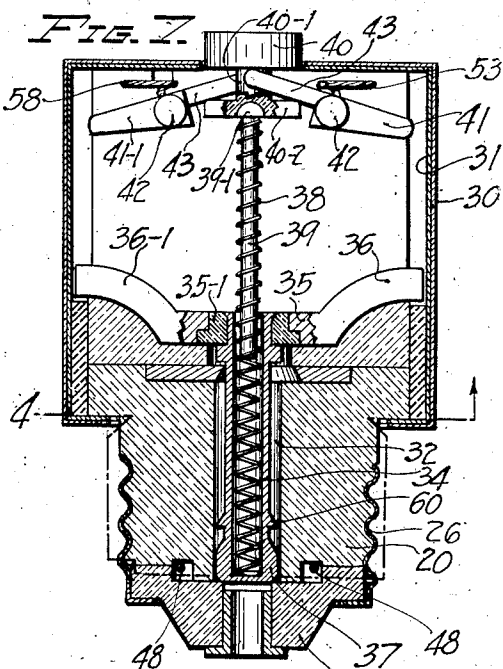
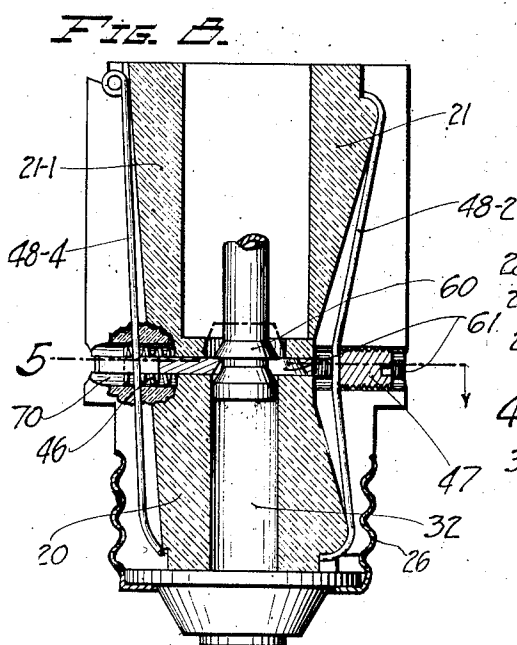
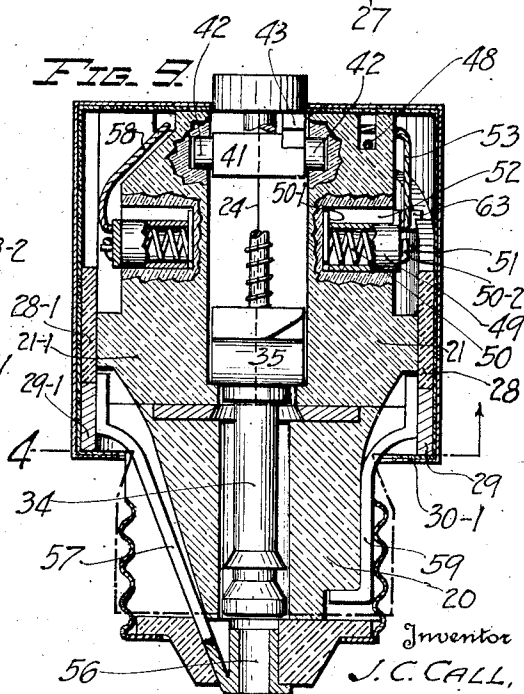
J. C. CALL

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AUTOMATIC FUSE PROTECTOR

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3 Sheets-Sheet 2



Inventor  
J. C. CALL,  
By *A. Mallinbrodt.*  
Attorney

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J. C. CALL

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AUTOMATIC FUSE PROTECTOR

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3 Sheets-Sheet 3

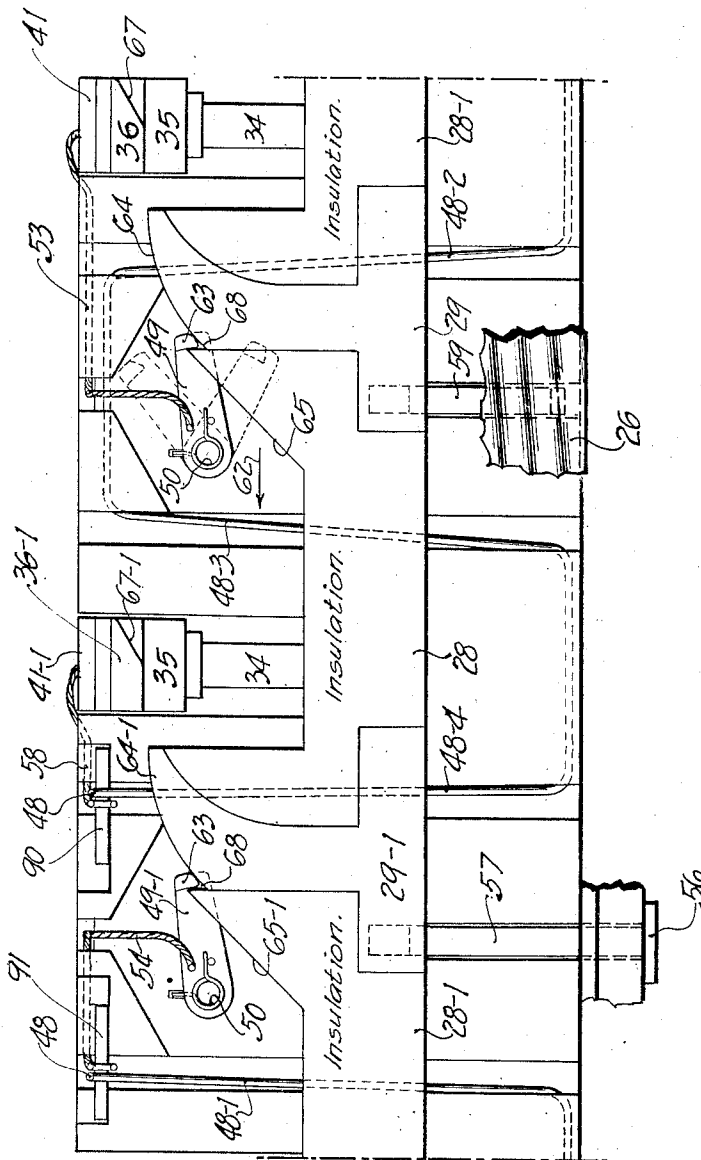


FIG. 11.

Inventor  
J. C. CALL,

By

*H. Mallinckrodt*  
Attorney

## UNITED STATES PATENT OFFICE

JOSEPH C. CALL, OF BANCROFT, IDAHO

## AUTOMATIC FUSE PROTECTOR

Application filed May 1, 1926. Serial No. 106,057.

This invention relates to an automatic fuse protector and its principal objects are:

First. To perform the functions of a circuit breaker by protecting an electric circuit against damage from overloads or shorts.

Second. To provide the equivalent of a perpetual fuse thus avoiding the continued expense of buying new fuses.

Third. To save time and annoyance by indicating at a glance, any particular fuse element of a plurality that may have "blown."

Fourth. To provide the convenience of replacing what amounts to a burned out fuse, by simply a slight movement of a rotatable sleeve.

Fifth. To furnish in one convenient structure the combined advantages of a fuse and a circuit-breaker.

Sixth. To provide, if desired, a fuse as an integral part of the circuit-breaker.

Seventh. To be so arranged that it may be self-contained in substantially the limited space of an ordinary fuse plug, adapting it to standard fuse blocks and metal cabinets without alterations to either one. This gives small electrical equipment, such as house lighting circuits, the same circuit-breaker protection that is usually given only to circuits of larger capacity.

Eighth. To operate in any position.

Ninth. To be proof against having any of its parts displaced by jarring.

Tenth. To be controlled electro-thermally instead of electro-magnetically, thereby eliminating any hum or noise when operating on an A. C. line.

Eleventh. To protect a motor circuit against damage from a dead short on the line while providing the time element for allowing a momentary over-load when the motors are starting. Ordinarily, circuit-breakers designed for motor circuits, will not prevent the fuse from blowing when there is a dead short on the line, and conversely, when designed to take care of a dead short, will not remain closed when motors are starting.

Twelfth. To make it impossible to damage the device or the line, should the former be closed with a short on the line.

In attaining the objects just outlined, I provide a main switch, an auxiliary switch, an electro-thermic element and a fuse element, all in circuit, electrically, with each other.

The main switch is controlled by the electro-thermic element, the latter being adjusted to cause it to open, preferably by means of a snap mechanism, when more than a predetermined amount of current passes through the circuit, this amount being less, of course, than is required to blow the fuse element.

By again closing, or re-setting, the main switch after each release, the fuse may be made to serve indefinitely. Before the re-setting can take place however, the circuit must be opened at another point or points, and remain open during the re-setting of the main switch to guard against dead shorts on the line. Shortly thereafter, the auxiliary switch is again closed, which restores the operative capacity of the device. The proper sequence in the movements of the auxiliary switch and the main switch during this restoration, is accomplished by the re-setting mechanism, which may consist of suitably related cams.

The fuse element may be directly associated with the other parts in a self-contained structure, or not, as desired.

In the plug type of this device, designed to fit any ordinary fuse block, the self-contained operating parts are supported by a cylindrical body structure made of insulating material such as porcelain, properly recessed and channeled to receive them. The body structure is enclosed by a shell, forming a casing or housing which is rotatable in relation thereto.

The main switch is released by the lengthening of a heated wire when an excessive current is passing through the circuit, this release being effected with a sharp snap, leaving the contents widely separated, and preventing any possibility of sustained arcing. The releasing mechanism is so arranged that no stress is placed upon the highly heated wire after the moment of release.

The re-setting of the device is accomplished by means of the rotatable shell, the latter having internal cams for engaging both sets of switch members. Before the main switch contacts are brought to a bearing upon each other, the auxiliary switch members are opened, so that the closing of the main switch is effected with no current passing through it, thus establishing the certainty that the main contacts can never be held in the closed position by the re-setting mechanism, even momentarily, should there be a dead short on the line while the re-setting operation takes place.

As soon as the main switch contacts have been re-set, a slight further rotation of the shell again causes the auxiliary switch to be closed, preferably with a snap, thus re-establishing the circuit.

A movable button in engagement with the main switch, protrudes from the outside of the shell and serves to indicate whether or not the switches are in the normal position.

The features of this invention for which the protection of Letters Patent is desired, are collectively grouped in the claims which conclude this specification.

In the drawings, which illustrate merely one desirable form of this invention:

Fig. 1 represents an elevation with the shell and the re-setting cams omitted, looking in the direction of the arrow 1 in Fig. 3;

Fig. 2, a similar elevation diametrically opposed to the elevation in Fig. 1, but reflected from a mirror plane;

Fig. 3, a top plan, the upper part of the casing having been removed, leaving the side walls in section on line 3 in Fig. 6;

Fig. 4, horizontal sections in different planes on line 4 in Figs. 7 and 9, reflected from a mirror plane;

Fig. 5, horizontal section on line 5, Fig. 8, some parts in plan;

Fig. 6, a vertical section on line 6, Fig. 3, parts in the foreground in elevation, with main switch contacts closed;

Fig. 7, same as Fig. 6, but with main switch contacts open;

Fig. 8, a vertical section on line 8, Figs. 4 and 5, fragmentary parts in the foreground being in elevation, and other parts being broken away;

Fig. 9, a vertical section, principally on line 9 in Fig. 3, with minor sections in different planes taken substantially along line 9<sup>a</sup> in Fig. 3, various parts being broken away for convenience, and other parts in the foreground shown in elevation;

Fig. 10, a panoramic development of the elevation around the body, beginning at 10, Fig. 3, and proceeding in the direction of the corresponding arrow; the housing shell being removed, but the re-setting cams left in place. This figure is somewhat diagrammatic in form.

Referring to the drawings, 20 indicates the plug or base portion of the body structure, while 21 and 21<sup>1</sup> indicate the superposed portions of the body structure. Parts 21 and 21<sup>1</sup> are separated from each other along the central plane represented by the line 24 in Fig. 4, and these two portions may again be separated from the base 20 along a plane indicated by the line 25 in Fig. 2, the tongue and groove joint 25<sup>a</sup> preventing axial shifting. The parts just mentioned may be made of any material having suitable insulating properties, such as porcelain, the separation of the parts from each other being for convenience in manufacturing and assembling.

The lower portion of the plug 20 may be threaded and enclosed by the usual conductor shell 26, the latter being flanged along its lower edge to hold the insulating piece 27 in place.

The body portions 21 and 21<sup>1</sup> are surrounded by the concentric composite cam sleeve composed of the sections 28 and 28<sup>1</sup> made of insulating material and of sections 29 and 29<sup>1</sup> made of electrically conductive material, such as metal, preferably iron, these sleeve sections being interlocked with each other, as shown in Fig. 10. The cam sleeve sections are tightly pressed into the housing shell 30, which may be made of metal such as brass, lined with insulating paper 31. The bottom of the operating sleeve may be crimped over to form the flange 30<sup>1</sup> which serves to hold the base 20 in place. The shell 30 with its inserted cam sleeve is substantially concentric with and rotatable relatively to, the body parts of the structure.

Within the bore 32 of the base 20 is the hollow stem 34, which at its upper end carries the crosshead 35 terminating in the contacts 36 and 36<sup>1</sup>, the crosshead being insulated from the stem by the bushing 35<sup>1</sup>. The stem 34 is movable up and down and is loosely held in alignment with the bore 32 by means of the enlargement 37. The bore of the stem 34 accommodates the compression spring 38 together with the pin 39, the said spring being arranged to re-act against the head 39<sup>1</sup> of the pin, which in turn is seated in, and presses upwardly against, the button structure 40, which latter is shouldered to form the neck 40<sup>1</sup> and the substantially square flange 40<sup>2</sup> (Fig. 3).

Oscillating contacts 41 and 41<sup>1</sup> of the main switch are pivoted at 42 and are provided with the rearwardly extending lever arms 43 movably engaging the button structure 40, and riding on opposite edges of the square flange 40<sup>2</sup>.

The crosshead contacts 36 and 36<sup>1</sup>, and the oscillating contacts 41 and 41<sup>1</sup> constitute the main switch of the device, open in Fig. 7 and closed in Fig. 6. It will be observed that in closing the main switch, the extremities of the respective contacts will be first to come

into bearing with each other, and as the cross-head is pushed home to the closed position, the contacting surfaces will have a mixed sliding and rolling or wiping action against each other. Thus, the final bearing surfaces at 44 will always be in condition to make an excellent electrical contact.

Near its lower end, the stem 34 has the collar 60 shaped as the frustum of a cone and arranged to be engaged by the slidable latch 61 (Figs. 5, 6 and 8). The compression springs 46, operative in recesses 70 of the body and in the slots 71 of the slide, (Figs. 5 and 8) bear against the stationary faces 72, and tend to withdraw the latch from engagement with the collar 60. Normally, this is prevented by the adjustable screw 47 threaded in the opposite end of the slide and bearing against leg 48<sup>2</sup> of the electro-thermic control wire 48 the latter being tensioned by springs 46. Wire 48 has its two ends securely anchored on pins 90 and 91 which rest in notched portions of the body; its position in the electrical circuit will presently be described.

When a current in excess of the predetermined capacity of the device, passes through the wire 48, the same is correspondingly overheated and thereby excessively lengthened, allowing springs 46 to draw the latch out of engagement with collar 60, the stress on the hot wire being relieved almost instantly, however, by reason of the contact of faces 81 of the latch, with springs 46. This travel of the latch causes the stem 34 with its crosshead 35 to be snapped down by the spring 38, the latter exerting its force against the bottom of enlargement 37, and re-acting against the button structure 40, pushing the button upwardly to the position shown in Fig. 7. This figure shows the widely separated positions of the reciprocating contacts 36 and 36<sup>1</sup> from the oscillating contacts 41 and 41<sup>1</sup> respectively, when the main switch is open.

The auxiliary switch consists of the arms 49 and 49<sup>1</sup>, having the integral sleeve portions 62 and 62<sup>1</sup> respectively, within which are the coiled springs 50, whose ends 50<sup>1</sup> are held in the slots 52 formed in the body structure. The other ends 50<sup>2</sup> of the coiled springs bear against the pins 51 fastened in the arms 49 and 49<sup>1</sup>, urging these latter downwardly. The full lines in Figs. 1 and 2 show arms 49 and 49<sup>1</sup> in the normal or closed position of the auxiliary switch. These arms have an oscillating motion about the axes of sleeves 62 and 62<sup>1</sup> respectively, these latter being rotatively disposed in recesses in the body structure. The arm 49 is electrically connected by means of the pig-tail 53 to the main switch contact 41, while the other arm 49<sup>1</sup> is electrically connected by means of the pig-tail 54 to the leg 48<sup>1</sup> of the wire 48. The functioning of the auxiliary switch arms 49 and 49<sup>1</sup> will presently be made clear.

### Electrical circuit

The electrical circuit through the device, assuming the various parts to be in the conductive or operative position, will now be described in detail. The circuit may be best followed by referring principally to Fig. 10.

The current from one leg of the line (not indicated) enters the bushing 56, passes through the integral brush 57, through the cam sleeve conductor 29<sup>1</sup>, through the auxiliary switch conductor arm 49<sup>1</sup>, through pig-tail 54, then consecutively through the legs 48<sup>1</sup>, 48<sup>2</sup>, 48<sup>3</sup> and 48<sup>4</sup> of the thermic control wire 48, through pig-tail 58, through the main switch oscillating contact 41<sup>1</sup>, through the crosshead contact 36<sup>1</sup>, through crosshead 35, through crosshead contact 36, through main switch oscillating contact 41, through pig-tail 53, through auxiliary switch conductor arm 49, through cam sleeve conductor 29, through brush 59, and out through the metallic shell 26 into the return leg of the line.

Supposing the various parts of the device to be in the set or normal working position, with current flowing through the circuit just described, then an excessive influx would overheat the wire 48, allowing the springs 46 to draw the slide 61 in the direction of the arrow 80 in Fig. 5, thereby releasing the stem 34 and causing the main switch to snap open through the action of spring 38, in the manner already described, thus preventing any injury, by the over-load, to this device or to the circuit which it protects.

In order to re-set the device, the shell is rotated in the direction of the arrow 62 in Figs. 3 and 10, the first result of this action being to cause the conductors 29 and 29<sup>1</sup> to pass under the lugs 63 of the auxiliary switch arms 49 and 49<sup>1</sup> respectively, until the said lugs have become disengaged by dropping over the upper corners of the cam portions 64 and 64<sup>1</sup>, thereby allowing the arms 49 and 49<sup>1</sup> to be forced by springs 50, into the lower positions indicated by dotted lines in Figs. 1, 2 and 10, thus leaving the auxiliary switch open.

The further rotation of the shell with its re-setting cams, will cause the cam portions 65 and 64 to engage the inclined face 67<sup>1</sup> of the crosshead contact 36<sup>1</sup>, and simultaneously will cause the cam portions 65<sup>1</sup> and 64<sup>1</sup> to engage the inclined face 67 of the crosshead contact 36, thereby raising the crosshead 35 with its stem 34, again compressing the spring 38, and finally, causing the cone face of collar 60 to engage a portion of the surface defining the inverted countersunk opening in the slide 61, forcing the same against the tension of wire 48 until the bottom surface of slide 61, at which moment the tension of the wire 48, exerted through the toggle action of the two branches of leg 48<sup>2</sup>, against the

screw 47, causes the slide 61 to slip back under the collar 60 to the position shown in Figs. 6 and 8, thereby again compressing the light springs 46 and leaving the main switch again in the operative position.

Meanwhile, the cam 65<sup>1</sup> will have advanced under the lug 63 of auxiliary switch arm 49, and cam 65 will have advanced under lug 63 of auxiliary switch arm 49<sup>1</sup>, and as these are made of insulating material, no current will pass, thus permitting the safe re-setting of the main switch parts, as previously described. A little further rotation of the shell brings the upper corners of the cams 64 and 64<sup>1</sup> somewhat beyond the crosshead contact members, and when the position shown in Fig. 10 has been reached, the lugs 63 of the auxiliary switch arms 49 and 49<sup>1</sup> respectively, will have slipped over the upper corners of the cams 65<sup>1</sup> and 65, and come to rest in the notches 68, as shown in Fig. 10, thus completing the re-setting of the device.

Each complete half turn of the sleeve with its re-setting cams completes a re-setting cycle, and each set of cams 65 and 64, and 65<sup>1</sup> and 64<sup>1</sup> will operate alternately upon the main switch contacts and the auxiliary switch contacts in an endless series of re-setting cycles.

It will be noted that the turning of the re-setting cams in the wrong direction to any considerable extent, is prevented by the ratchet tooth action of the vertical faces just below the upper corners of the cams 64 and 65, and 64<sup>1</sup> and 65<sup>1</sup> against the auxiliary switch arm lugs 63.

The pig-tails 53 and 54 may constitute the fuse element where it is desired to have the fuse within the structure of the device, otherwise the fuse may be located at a point remote therefrom.

Novel features possessed by the present invention, besides those already emphasized, include:

(a) Heavy main switch contacts with a long quick break between them, forming substantially a circuit-breaker.

(b) Main switch and auxiliary switch each arranged to break at two points, thereby doubling the length of the gaps that would otherwise be available.

(c) One spring serving to separate the main spring contacts when these are opened, and also to hold the contacts firmly together when the circuit is closed.

(d) The pressure on both main switch contacts always equalized regardless of wear resulting from long use.

(e) The back and forth or looped disposal of the electro-thermal control, making it possible to use a wire of comparatively long length within the limited space of the restricted fuse plug dimensions.

(f) Toggle arrangement of control wire to

obtain sufficient translated motion to trip lock, releasing main switch members.

While a typical embodiment of this invention is herein shown and described, it should be clearly understood that all the detailed parts thereof, may or may not, appear in the preferred forms, and also, that the preferred forms may be varied from time to time, depending upon the circumstances and conditions governing and governed by, the development of this invention and the arts to which it is incident, therefore its scope is broadly stated in the claims.

Having fully described my invention, what I claim is:

1. A self-contained fuse protector comprising in combination, a main switch, an auxiliary snap switch, a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a movable member having cams operative to re-set said switches in predetermined mutual relation to each other.

2. A self-contained fuse protector comprising in combination, a main switch, an auxiliary snap switch, a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a movable member having cams operative upon said switches in cycles, each cycle embracing at predetermined intervals (a) opening auxiliary switch; (b) closing main switch, (c) closing auxiliary switch.

3. A self-contained fuse protector comprising in combination, a main switch, an auxiliary switch, a thermal control having a wire, a co-acting slide extending transversely of the said wire, the slide being arranged to trip said main switch under predetermined conditions; and a re-setting mechanism operative upon said switches in predetermined mutual relation to each other.

4. A self-contained fuse protector comprising in combination, a main switch, an auxiliary switch, a thermal control having a wire, a co-acting slide extending transversely of the said wire, the slide being arranged to trip said main switch under predetermined conditions; and a re-setting mechanism operative in cycles, each cycle embracing at predetermined intervals, (a) opening auxiliary switch, (b) closing main switch, (c) closing auxiliary switch.

5. A self-contained fuse protector comprising in combination, a plurality of reciprocal, non-oscillating, snap-release contacts arranged for engagement with a plurality of oscillating stationary contacts constituting a main switch, spring pressed oscillating arms constituting an auxiliary switch; a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a re-setting mechanism operative upon said switches in predetermined mutual relation to each other.

6. A self-contained fuse protector comprising in combination, a plurality of reciprocal, non-oscillating, snap-release contacts arranged for engagement with a plurality of oscillating stationary contacts constituting a main switch, spring pressed oscillating arms constituting an auxiliary switch; a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a re-setting mechanism operative in cycles, each cycle embracing at predetermined intervals, (a) opening auxiliary switch, (b) closing main switch; (c) closing auxiliary switch.

7. A self-contained fuse protector comprising in combination, a plurality of reciprocal, non-oscillating, snap-release contacts arranged for engagement with a plurality of oscillating stationary contacts constituting a main switch, spring pressed oscillating arms constituting an auxiliary switch; a thermal control having a wire and co-acting slide arranged to trip said main switch under predetermined conditions; and a re-setting mechanism operative in cycles, each cycle embracing at predetermined intervals, (a) opening auxiliary switch, (b) closing main switch, (c) closing auxiliary switch.

8. A self-contained fuse protector comprising in combination, a plurality of reciprocal, non-oscillating, snap-release contacts arranged for engagement with a plurality of oscillating stationary contacts constituting a main switch, spring pressed oscillating arms constituting an auxiliary switch; a thermal control having a wire and a co-acting slide arranged to trip said main switch under predetermined conditions; and a re-setting mechanism operative upon said switches in predetermined mutual relation to each other.

9. A self-contained fuse protector comprising in combination, a main snap switch, an auxiliary snap switch, a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a re-setting mechanism consisting of a rotatable sleeve having cams operative upon said switches in predetermined mutual relation to each other.

10. A self-contained fuse protector comprising in combination, a main snap switch, an auxiliary snap switch, a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and re-setting rotatable sleeve having cams operative in cycles, each cycle embracing at predetermined intervals, (a) opening auxiliary switch, (b) closing main switch, (c) closing auxiliary switch.

11. A self-contained fuse protector comprising in combination, a main snap switch, an auxiliary switch, a thermal control element, a slide normally stressed against said control element, said slide arranged to trip said main switch when the control element is excessively heated, means for relieving slide stress from said control element when ex-

cessively heated; and a re-setting mechanism operative upon said switches in predetermined mutual relation to each other.

12. A self-contained fuse protector comprising in combination, a main snap switch, an auxiliary switch, a thermal control element, a slide normally stressed against said control element, said slide arranged to trip said main switch when the control element is excessively heated, means for relieving slide stress from said control element when excessively heated; and a re-setting mechanism operative in cycles, each cycle embracing at predetermined intervals, (a) opening auxiliary switch, (b) closing main switch, (c) closing auxiliary switch.

13. A self-contained fuse protector comprising in combination, a main snap switch, spring pressed oscillating arms constituting an auxiliary switch, a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a re-setting mechanism consisting of a rotatable sleeve having cams operative upon said switches in predetermined mutual relation to each other.

14. A self-contained fuse protector comprising in combination, a main snap switch, spring pressed oscillating arms constituting an auxiliary switch, a thermally actuated releasing mechanism for said main switch, all in circuit with each other; and a re-setting mechanism consisting of a rotatable sleeve having cams operative in cycles, each cycle embracing at predetermined intervals (a) opening auxiliary switch, (b) closing main switch, (c) closing auxiliary switch.

15. A self-contained fuse protector comprising in combination, a main snap switch, spring pressed oscillating arms constituting an auxiliary switch, a thermal control having a wire and co-acting slide arranged to trip said main switch under predetermined conditions; and a re-setting mechanism consisting of a rotatable sleeve having cams operative upon said switches in predetermined mutual relation to each other.

16. A self-contained fuse protector comprising in combination, a main snap switch, spring pressed oscillating arms constituting an auxiliary switch, a thermal control having a wire and co-acting slide arranged to trip said main switch under predetermined conditions; and a re-setting mechanism consisting of a rotatable sleeve having cams operative in cycles, each cycle embracing at predetermined intervals, (a) opening auxiliary switch, (b) closing main switch, (c) closing auxiliary switch.

17. In combination, a body of fuse plug type, with a circuit breaker comprising a snap switch, an auxiliary snap switch and electro-thermic control co-operatively disposed therein; and a rotatable sleeve enclosing said fuse

plug, said sleeve having re-setting cams operative upon said switches.

18. In combination, a body of fuse plug type, a circuit breaker and an auxiliary snap switch co-operatively disposed therein; and a rotatable sleeve having means for re-setting said snap switch.

19. In combination, a circuit breaker, a snap switch in circuit therewith, and a rotatable sleeve having cams operative on said snap switch; said snap switch arranged to be opened while the circuit breaker is being closed, and closed after circuit breaker is again in position for automatic release.

20. In combination, a body of fuse plug type, with a circuit breaker and an auxiliary snap switch co-operatively disposed therein; and a rotatable sleeve extending around said body, said sleeve having re-setting cams operative upon said auxiliary snap switch.

21. In combination, a body of fuse plug type, with a circuit breaker and an auxiliary double-break snap switch, co-operatively disposed therein; and a rotatable sleeve extending around said body, said sleeve having re-setting cams operative upon said auxiliary snap switch.

22. In a fuse protector, the combination with oscillating contacts comprising non-flexing pivoted members, of reciprocating contacts arranged in co-operative relation thereto, means for normally holding the said reciprocating contacts in bearing with said oscillating contacts, an electro-thermal mechanism arranged to release said holding means, and a rotatable sleeve having means for returning said reciprocating contacts to said normal bearing.

23. A circuit-breaker having an electro-thermal control, an auxiliary snap switch normally in circuit with said circuit-breaker, and a rotatable sleeve having re-setting means operative upon said circuit-breaker and upon said auxiliary switch in a predetermined sequence.

24. In a fuse protector, a switch with electro-thermal control comprising a spring lock engaging said switch, and a looped wire having toggle branches extending longitudinally of the body of said protector, said wire when excessively heated being operative to disengage said lock.

25. A fuse protector comprising a body of fuse plug type, and a circuit-breaker with electro-thermal control operatively disposed in said body, said control consisting of a lock for said circuit-breaker, a looped wire having toggle branches extending longitudinally of the body of said protector, said wire when excessively heated being operative to release said lock, and means for tensioning said wire.

26. A fuse protector comprising a circuit-breaker with electro-thermal control, a locking member tensioned against said control at low temperatures and means for relieving

said tension at predetermined higher temperatures.

27. A fuse protector comprising a body of fuse plug type and a circuit-breaker with electro-thermal control operatively disposed in said body, said control consisting of a lock for said circuit-breaker, a looped wire having toggle branches engaging said lock, and means for relieving said tension at predetermined higher temperatures.

28. A fuse protector comprising a body of fuse plug type and a circuit-breaker with electro-thermal control operatively disposed in said body, said control consisting of a slidable latch operatively engaging said switch, a heatable wire engaging said latch, means for normally tensioning the latch against said wire, and means for relieving said tension at comparatively high temperatures.

29. In a fuse protector, a switch with electro-thermal control comprising a spring lock engaging said switch, a heatable looped wire having toggle branches normally tensioned by said lock, and means for relieving said tension when said wire reaches substantially a predetermined temperature.

30. In a fuse protector, a switch having a spring-pressed reciprocative contact member, an electrically heatable wire extending longitudinally of the body of said protector in circuit with said switch, a spring-pressed latch normally holding said contact member in the closed position and simultaneously tensioning the said wire, said latch arranged to release the contact member when said wire elongates, means for relieving the tension upon said wire when the latter is excessively heated, and a re-setting mechanism arranged to return said contact member to its closed position.

In testimony whereof I sign my name hereto.

JOSEPH C. CALL.