June 25, 1940. E. M. MEYER 2,205,928

FUSE CUTOUT

Filed March 25, 1935 2 Sheets-Sheet 1

Fig. 1

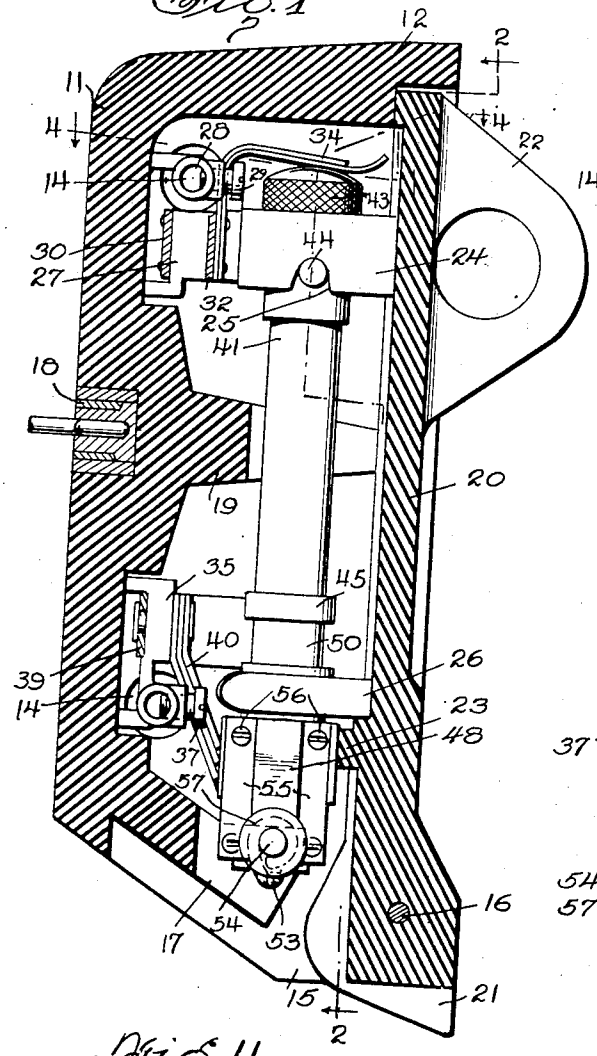


Fig. 2

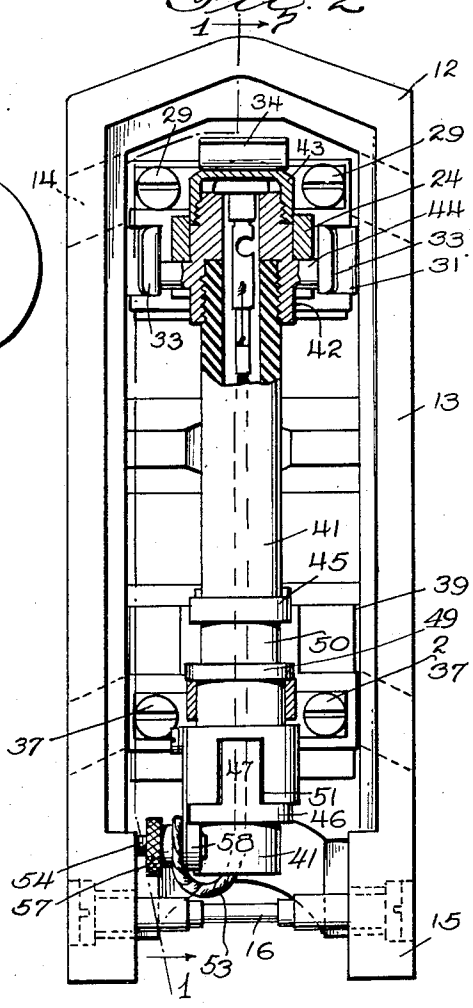


Fig. 4

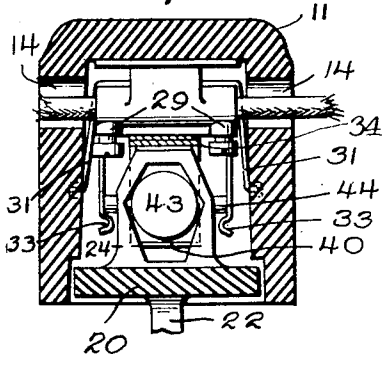
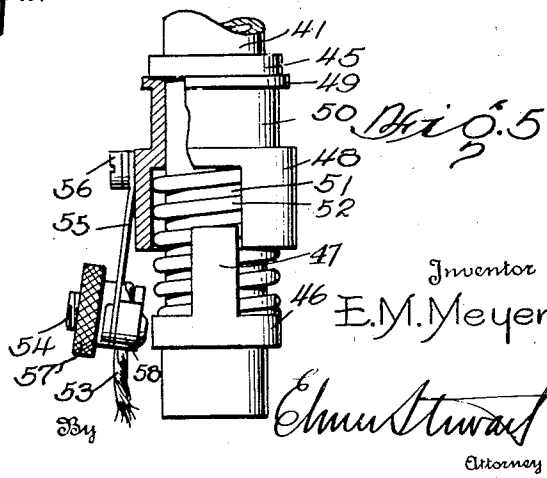


Fig. 5



Inventor
E. M. Meyer
By
Attorney

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Fig. 3

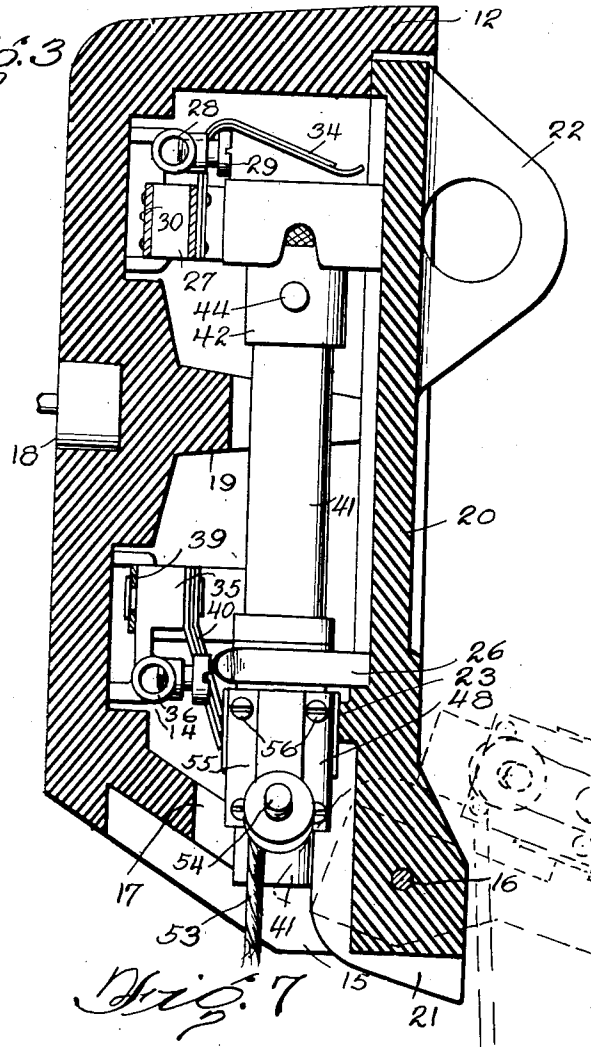


Fig. 6

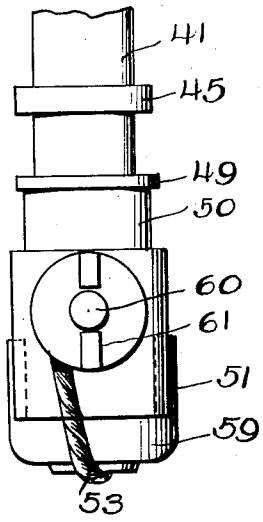
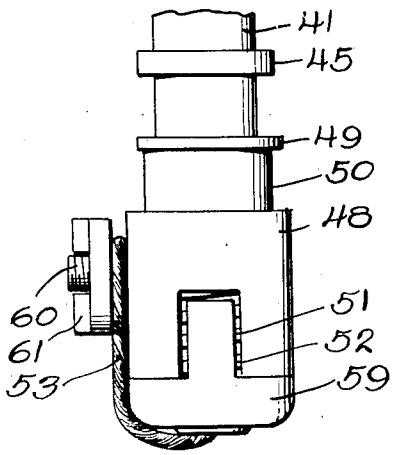


Fig. 7



Inventor

E. M. Meyer

By Elmer Stewart

Attorney

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UNITED STATES PATENT OFFICE

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FUSE CUTOUT

Edwin M. Meyer, Parkersburg, W. Va., assignor to Porcelain Products, Inc., Findlay, Ohio, a corporation of Ohio

Application March 25, 1935, Serial No. 12,971

12 Claims. (Cl. 200—114)

This invention relates to an improvement in electrical fuse cutouts and the devices with which they are assembled and operated. Cutouts for high tension electric circuits are customarily mounted in exposed places and in special housings. These cutouts function through the action of fusible links which serve to break the circuits under abnormal service conditions. The replacement of such a fuse when blown frequently necessitates the inspection of several such fuse housings before the blown fuse is located, causing considerable delay and expense in restoring the interrupted service.

It is an object of my invention to meet this problem by providing a fuse cutout in a housing so arranged that in the event of the fuse link becoming broken, a visual indication will be given of the fact by the cover of the housing falling into an open position by gravity.

It is also an object of my invention to have the cover of the housing, together with the holder of the broken fuse link, dropped away from the terminals of the circuit and thus maintain an effective break in the circuit.

A further object of my invention is to provide means by which the cover of the housing will be maintained in closed position so long as the fuse is in serviceable condition unless deliberately opened by the expenditure of considerable manual force. This result is accomplished by making the fuse-holder itself a part of the latching means for the cover.

Among the objects of my invention is the provision of means operating instantly on the breaking of the fuse link to disengage the cover from its latch and to permit the cover to fall open by the force of gravity.

Incidental to my invention I have provided novel means by which the fuse link itself is used to control the position of the fuse-holder and of the cover for the housing.

For the purpose of illustrating the preferred form of my invention I have illustrated the same in the accompanying drawings in which

Fig. 1 is a vertical section of my fuse cutout taken on the line 1—1 of Fig. 2;

Fig. 2 is a vertical front view of the device with the cover removed and taken along the line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 1 showing in full lines the position of the parts when the fuse link has been blown and in dotted lines the ultimate position with the cover open;

Fig. 4 is a transverse cross-section taken on the line 4—4 of Fig. 1;

Fig. 5 is an enlarged view partly in section of the fuse-holder unlatched;

Fig. 6 is an enlarged side view of an alternative form of fastening for the fuse-holder and

Fig. 7 is a similar view taken at right angles to Fig. 6.

The essential features of my invention comprise a fuse-holder so designed as to form a connecting link between the housing cover and its latch and operable to unlatch the cover whenever the fuse is blown. By my arrangement the cover tends to drop into open position by gravity, thus effectively maintaining the electrical circuit open. At the same time the fuse-holder is placed in convenient position for its safe removal and replacement without further handling or removal of the housing cover. In the unlatching movement of the fuse-holder it is partially released from one of its retaining means on the cover and thus its complete removal is facilitated.

Referring particularly to the form of the invention shown in the drawings I have provided a housing 11 of the conventional form for expulsion fuses. This housing 11 is made of some suitable insulating material which may be porcelain; a phenol-formaldehyde condensation product or some artificial resin. This housing is open at the front but has a top 12 capable of withstanding the weather. The side walls 13, 13 have suitable openings 14 positioned for the convenient insertion of the high tension electric cables of the circuit which it is intended to protect. The side walls also have two wings 15 spaced at the bottom end for carrying the pivot trunnions 16 of the cover.

The bottom of the housing 11 has an opening 17 opposite the open end of the fuse-holder. Suitable means 18 are provided in the rear wall of the housing by which the latter may be mounted rigidly upon a cross arm, pole or other structure. It is to be understood that the housing is adapted to be mounted in vertical position as shown in Fig. 1 but preferably tilted forward to a slight extent to facilitate the action of gravity in causing the cover to drop down into open position.

The interior of the housing is open except for the transverse barrier or baffle 19 which fits closely around the fuse-holder and serves to prevent any arcing of the electric current between the top and bottom terminals.

The cover 20 is made of the same or similar composition as the housing. The cover is hinged at the bottom on the trunnions 16. The cover also has one or more angular extensions 21 of

the bottom which are adapted on the opening of the cover, to come into contact with the bottom of the housing and form stops limiting the opening or downward movement of the cover. The cover has on its upper portion a finger hold, grip or the like 22 by which a fuse-attaching pole or other implement can be used in opening or closing the cover against the force of the latching means.

The inside of the cover has a slight transverse ledge 23 which forms an abutment or positioning means for the fuse-holder.

The upper portion of the interior of the cover has fixedly secured thereto a collar 24 of brass or other conducting material in which the fuse-holder is received. The sides of the collar 24 are vertically slotted as at 25 to form seats for latching lugs mounted on the fuse-holder. In actual use this retaining loop may be molded integral with the door if the door is made of an artificial resin such as "Bakelite."

On the inner wall of the cover and directly above the abutment 23 there is a pair of spring clips 26 suitably proportioned to hold the fuse-holder rigidly in the collar 24 and against the abutment 23.

The terminals for the cables of the electric circuit in which the cutout is to be used, are positioned against the back walls of the housing and opposite the openings 14, 14 in the side walls. These terminals comprise castings of brass or similar material in the form shown in Figs. 1 and 2. The upper terminal comprises a casting 27 which has at its upper end an apertured terminal tube 28. This tube extends for the full width of the interior of the housing as shown in Fig. 2 for the convenience of co-operating with either of the openings 14, 14. The customary binding screws 29, 29 are provided, one at each end of the tube 28.

The main portion of the terminal casting 27 has a strap or yoke 30 across its back portion. This yoke has arms 31 extending forwardly and with off-set ends which seat in the side walls of the housing and anchor the terminal against the pull exerted in the unlatching movement of the fuse-holder.

The front face of the casting 27 carries a similar latch yoke 32. The latch arms 33 forming part of the latch yoke 32 extend forwardly and face inwardly opposite the slots 25 of the collar 24 when the cover is closed.

The casting 27 also carries a laminated spring contact 34 which extends upwardly from the terminal and opposite the top of the housing or above the end of the fuse-holder as shown in Fig. 1.

The lower terminal consists of a similar casting 35 also having a cable-receiving tube 36 and binding screws 37, 37. The casting 35 has a yoke 39 the ends of which are anchored in the side walls of the housing in the same manner as the arm members 31.

The top of the casting 35 carries an oblique contact member 40 built up of laminations of resilient brass or the like.

The fuse-holder proper consists of a tube 41 made of suitable fiber composition. The upper end of this tube carries a brass ferrule 42. This ferrule has a screw-threaded cap 43 which serves to clamp the button head of the fuse link. Extending laterally from each opposite side of the ferrule 42 is a brass lug 44. These lugs are sufficiently long to extend beyond the collar 24 and underneath the ends of the latch yoke 33 as will be evident from Figs. 2 and 4. Since these lugs 44 pass through the slots 25 of the collar it follows that the lugs serve to hold the cover in closed position as long as the fuse-holder maintains its upper position of installation. When, however, the tube 41 and the ferrule 42 are caused to move downwardly withdrawing the lugs 44 from the slots 25, the lugs pass beyond the lower ends of the latch members 33. This results in releasing the cover and it then falls by gravity away from the housing.

Suitably spaced on the tube 41 there is firmly attached a metallic ring 45 which serves as a stop or abutment for the tube in its downward movement.

The lower end of the tube 41 has a second ferrule 46 in the form of a fixed ring with opposite wings or guides 47 as shown on Fig. 5. The ferrule 46 is spaced from the extreme lower end of the tube 41 so that the attaching means for the fuse link need not project beyond the open end of the tube 41.

Intermediate the ring 45 and the second or lower ferrule 46 there is provided a sleeve 48. This sleeve is freely slidable on the tube 41. The upper portion of the sleeve 48 is cylindrical and terminates in a flange 49 thus providing a grooved seating portion 50. The lower portion of the sleeve 48 is generally square in cross-section with the forward corners slightly rounded. Two opposite faces are slotted as shown at 51 in Fig. 2 to provide guideways for the guides 47. As shown in Fig. 5 the lower portion of the sleeve is spaced away from the tube 41 a distance sufficient to accommodate the compression coil spring 52. The coil spring rests against the second ferrule 46 and against a shoulder in the sleeve 48 thus constraining the latter to rest against the upper ring or stop 45.

One side of the squared portion of the sleeve 48 carries a binding post for the free end of the stranded fuse link 53.

In the preferred form of my device the binding post 54 is in turn mounted upon spring arms 55 anchored to the side of the sleeve 48 by screws 56, rivets or the like. A knurled nut 57 on the binding post 54 serves to fasten the fuse link 53. Beneath the free end of the spring arms 55 there is provided a latch bar 58. This latch bar 58 engages over the end of the lower ferrule 46 when the spring 52 is compressed. The latch bar is held in this position by tension from the fuse link 53. When the link 53 fuses and breaks, spring arms 55 withdraw latch 58 into the position shown in Fig. 5 and permit the spring 52 to force the ferrule 46 down. In this movement the tube 41 is brought down so that the lugs 44 are withdrawn from the slots 25 and from the latch members 33. This results in the release of the cover in the manner above described and its fall away from the vertical path between the terminals. In this operation the grooved portion 50 being gripped by the spring clip 26 obviously is the fixed position with relation to which the tube and its permanently attached parts are moved by spring 52.

A simple and satisfactory modification of the tube holding and releasing means is shown in Figs. 6 and 7. In this modification the sleeve 48 is the same as above described. The lower ferrule 59 takes a slightly different form, however, but cooperates with the tube 41 and sleeve 48 in the same manner by means of spring 52. A binding post 60 extends outwardly from one side of the sleeve 48. The fuse link 53 in the

form of a flexible stranded cable is wrapped around the binding post 60 and held tightly in position by means of a winged nut 61. In this arrangement the fuse link 53 withstands the strain of spring 52 without reliance upon a latch or other mechanical means. In other respects the operation is the same as that above described.

From the above description it will be readily understood by those familiar with this art that I have provided a simple and efficient means of arranging the fuse-holder in the closed housing in such manner that the maintenance of the cover in latched position is dependent upon the serviceable condition of the fused link and that this link forms an intermediate portion of the latching device. The fuse-holder is released for rapid withdrawal from one terminal contact by the melting of the fuse link. In this way the blown condition of the cutout is rendered easily observable from a distance and the manner of interrupting the circuit is rendered more certain and effective.

The preferred form of my device has been described by way of example without limiting changes in minor details within the scope of the appended claims.

What I claim is:

1. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse-tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule extending transversely beyond the collar and seated in the recesses thereof, latches mounted within the housing and engaging said lugs, resilient means on the tube for impelling it to move relatively to the sleeve and to release the lugs from the latches, and means to control said resilient means.

2. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse-tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, resilient means on the tube for impelling it to move relatively to the sleeve and to release the lugs from the latches, and a fuse link controlling said resilient means.

3. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse-tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, resilient means on the tube for impelling it to move relatively to the sleeve and to release the lugs from the latches, a fastening on the sleeve and a fuse link attached thereto for controlling said resilient means.

4. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse-tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, resilient means on the tube for impelling it to move relatively to the sleeve and to release the lugs from the latches, a spring-held latch on the sleeve, a fastening on the latch and a fuse link attached thereto for holding said spring-held latch.

5. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover; a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, a second ferrule on the opposite end of the tube, a coil spring between the sleeve and the second ferrule, and means to hold said coil spring under compression and the lugs in contact with the recessed collar and first named latches.

6. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, a second ferrule on the opposite end of the tube, a coil spring between the sleeve and the second ferrule, a fastening on the sleeve and a fuse link attached thereto for controlling said spring and holding the lugs in contact with the recessed collar and first named latches.

7. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, a second ferrule on the opposite end of the tube, a coil spring between the sleeve and the second ferrule, a spring-held latch on the sleeve, a fastening on the latch and a fuse link attached thereto for holding the latch against the second named ferrule and with the lugs in contact with the recessed collar and first named latches.

8. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, a second ferrule on the opposite end of the tube, said second named ferrule having guides slidable through the sleeve, resilient means on the tube for impelling it to move relatively to the sleeve and to release the lugs from the latches, and means to control said resilient means.

9. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse-holder slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, latches mounted within the housing and engaging said lugs, a second ferrule on the opposite end of the tube, a fixed ring intermediately of the tube, a coil spring forcing the sleeve toward the ring, and releasable means holding the sleeve spaced from the ring and with the lugs in posi-

tion to engage the recessed collar and first named latches.

10. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a recessed collar attached to the cover, a spring clip on the cover spaced from the collar, a sleeve held by said clip, a fuse-tube slidable in said sleeve, a ferrule on one end of the tube, lugs on the ferrule engaging the recessed collar, a terminal mounted in the housing opposite the collar of the cover, latching means on the terminal for engagement with the lugs on the ferrule, a resilient conductor on the terminal for contact with the end of the ferrule, resilient means on the tube for impelling it to move relatively to the sleeve and to release the lugs from the latching means, and means to control said resilient means.

11. A fuse cutout comprising a housing, a cover hinged to the housing and adapted to swing open by gravity, a collar attached to the cover, said collar being slotted, a spring clip on the cover spaced from the collar, an abutment on the cover adjacent the spring clip, a lower terminal in the housing, a spring contact on the terminal, an upper terminal in the housing, a spring contact on the upper terminal, a latch on the upper terminal, a fuse-holder consisting of a tube having at one end a ferrule with a removable cap resting against said spring contact, a lug on the ferrule extending laterally beyond the slotted collar and into engagement with the latch, a ring on the tube, a second ferrule on the opposite end of the tube, a guide on the second ferrule spaced from the tube, a slidable sleeve on the tube, a grooved seat on the sleeve for the spring clip, a coil spring between the sleeve and the second ferrule, a spring arm on the sleeve, a latch on the spring arm, a binding post on the spring arm and a fuse link passing from the upper ferrule through the tube to the binding post and holding the latch in engagement with the second ferrule.

12. A fuse cutout comprising a housing, a cover hinged to the housing, a collar attached to the cover, a spring clip on the cover remote from the collar, a sleeve removably held by said clip, a fuse-tube slidably held in said collar and sleeve, said sleeve having an enlarged recessed end, a fuse-tube slidably held in said collar and sleeve, a ferrule fixed on the side of the fuse-tube, a coil-spring seated in the recessed end of the sleeve and against said ferrule, and a spring-latch on the sleeve for engagement with said ferrule.

EDWIN M. MEYER.