Sept. 16, 1952 D. C. HUBBARD 2,611,054

FUSED DROP-OUT CUTOUT

Filed April 20, 1949 2 SHEETS—SHEET 1

Fig-1

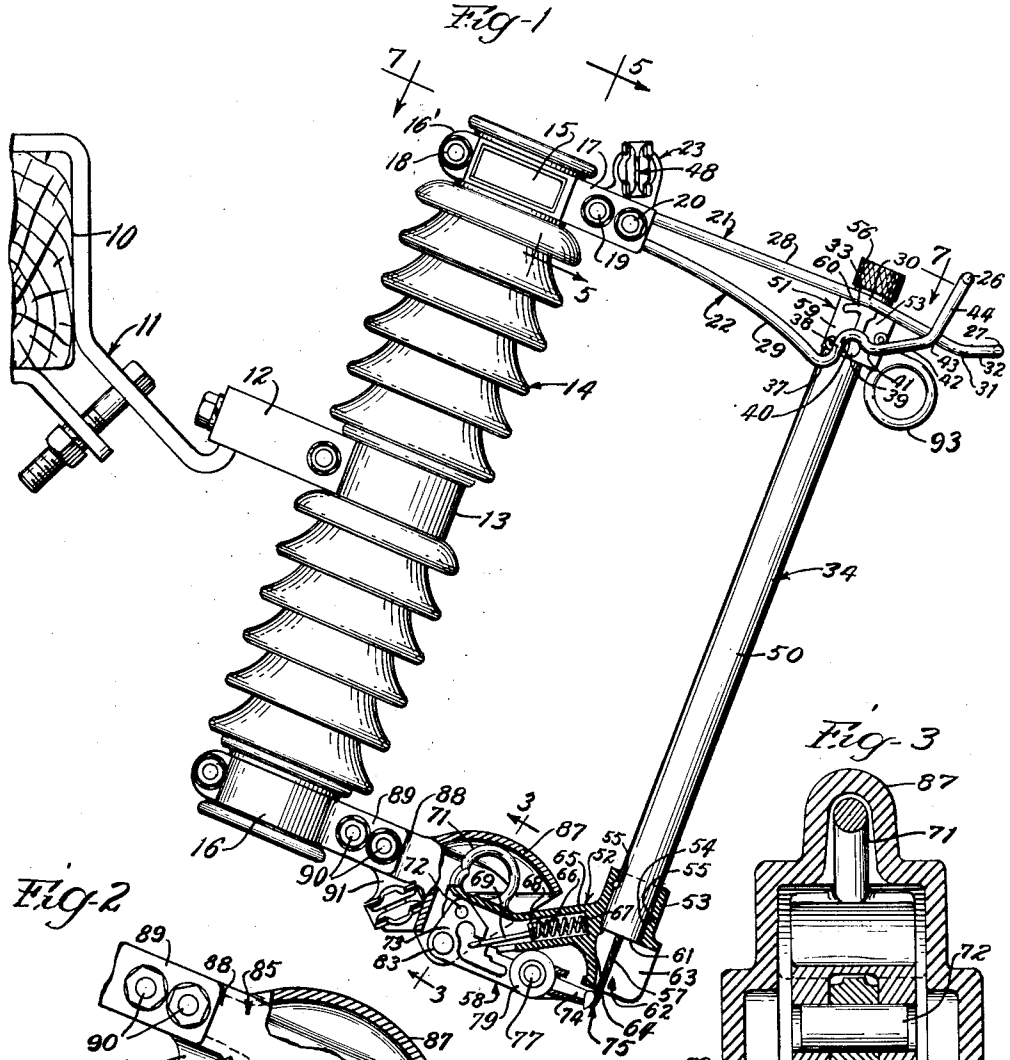


Fig-2

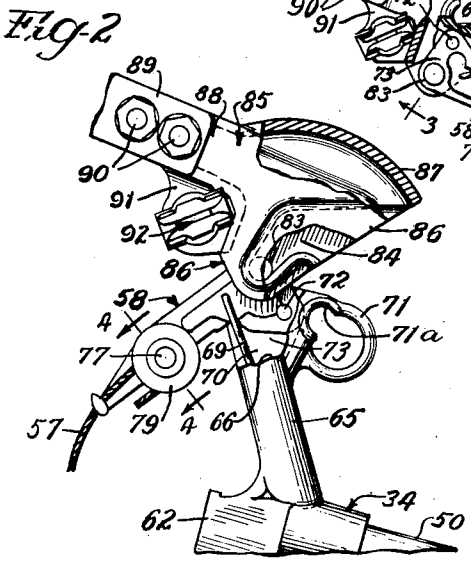


Fig-3

Inventor

David C. Hubbard

By: Robert H. Mendt

Atty.

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Fig-4

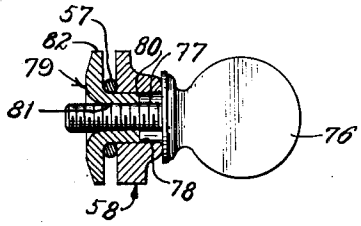


Fig-6

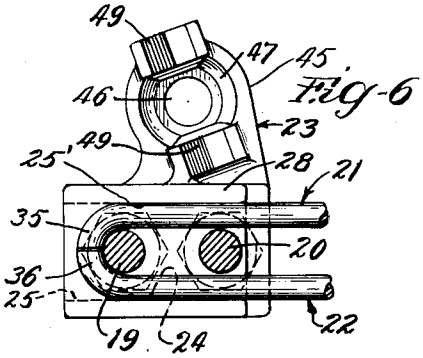


Fig-5

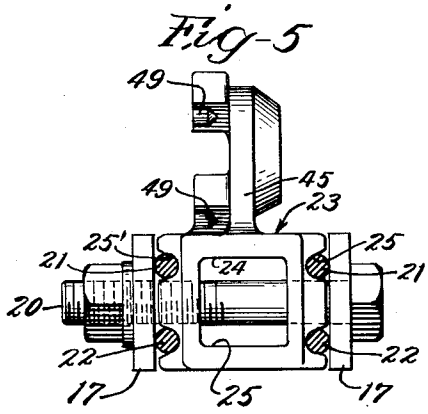
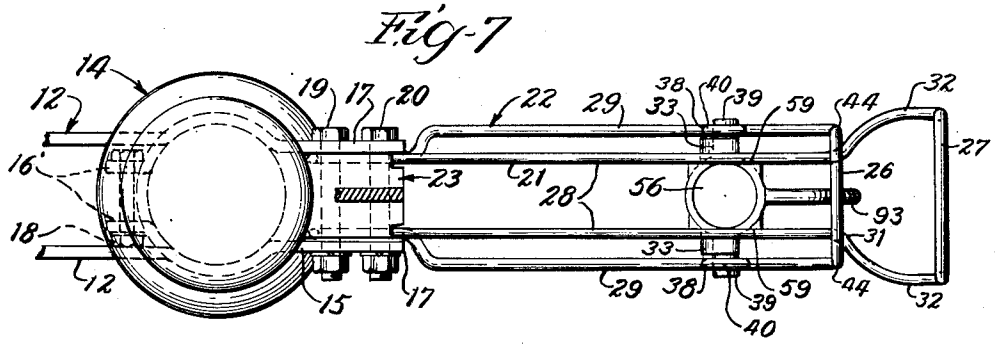


Fig-7



INVENTOR.

David C. Hubbard

BY

Robert H. Wendt

Atty.

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UNITED STATES PATENT OFFICE

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FUSED DROP-OUT CUTOUT

David C. Hubbard, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo., a corporation of Missouri

Application April 20, 1949, Serial No. 88,519

6 Claims. (Cl. 200—114)

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The present invention relates to fused drop-out cut-outs, and is particularly concerned with that type of cut-out in which a fuse tube unit is pivotally mounted on a lower contact fixture and latched against movement by engagement with an upper contact fixture and so arranged that when the fuse is melted the fuse tube unit moves downward to disengage its contacts from the upper contact fixture as the fuse is ejected from the tube.

One of the objects of the invention is the provision of an improved fused cut-out of the class described, in which provision is made for placing additional downward pressure on the fuse tube unit by means of spring arms which engage the fuse tube unit and urge it downwardly, thereby relieving the latching contacts from excessive pressure and permitting the fuse tube unit to become unlatched more easily than would be the case if heavy pressure were placed upon it by the latching member.

Another object of the invention is the provision of an improved contact arm structure for supporting the upper end of a fuse tube unit in a fused cut-out, the contact structure being so arranged that the break in the circuit occurs outwardly of the latching shoulders of the upper contacts, and auxiliary spring means being provided for positively moving the fuse tube unit relative to the latching contact upon blowing of the fuse.

Another object of the invention is the provision of an improved fused cut-out of the class described, the lower end of which is provided with an ejector arm, the mechanism of which is housed in an overhanging housing which is adapted to protect it from rain, sleet, snow, or the like, and the ejector arm of which is spring urged into a position in which the fuse tube unit is permitted to move downwardly relative to its support, this downward movement accomplishing an unlatching action at the top of the fuse tube unit so that it may have its upper end swung downward to assure a break in the circuit and to indicate the condition of the circuit.

Another object of the invention is the provision of an improved fused cut-out of the class described, which is sturdy, which breaks the circuit quickly, which is adapted to project the blast from the fuse away from the lineman, and which indicates by its position the condition of the circuit.

Another object is the provision of an improved fused cut-out having an ejector arm which is adapted to clear low current faults promptly,

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and in which the lower contact housing so encloses the operating mechanism that it is shielded from ice accumulations.

Another object is the provision of an improved fused cut-out in which the ring, by means of which the fuse unit is supported upon a disconnect stick, is provided with auxiliary bearing formations rotatably engaging the laterally projecting lug on the disconnect stick in such manner that wobbling of the fuse unit on the disconnect stick is prevented, so that the trunnions of the unit may be presented squarely to the housing and hook-shaped bearings that are provided to receive them.

Another object is the provision of an improved fused cut-out of the type in which the upper end of the fuse unit is engaged by a downwardly open latching spring formation, in which the lower housing casting is so constructed and provided with a limited tolerance, with respect to the lower fixture on the top unit, so that sky rocket action of the fuse tube on heavy fault currents is prevented by engagement of the lower tube casting with the lower housing, thus preventing excessive upward movement of the fuse tube and preventing the overstressing or damage to the top contact spring members.

A further object of the invention is the provision of improved contact arm and guide arm structures for engaging the upper end of the fuse tube unit, in which the primary current contacts which ride on the contact shoes at the side of the upper fuse tube unit are protected against pitting or arcing by means of auxiliary contact members which extend beyond the primary contacts and serve as guides for the fuse tube.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the two sheets of drawings accompanying this specification,

Fig. 1 is a side elevational view in partial section, showing a fused cut-out embodying my invention;

Fig. 2 is a fragmentary elevational view in partial section, showing the fuse tube unit in the position which it assumes when the fuse has blown;

Fig. 3 is a fragmentary sectional view, taken on the plane of the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a fragmentary sectional view, taken on the plane of the line 4—4 of Fig. 2, showing

the structure of the thumb screw by means of which the fuse leader is secured to the ejector arm;

Fig. 5 is a fragmentary sectional view taken on the plane of the line 5—5 of Fig. 1, looking in the direction of the arrows;

Fig. 6 is a fragmentary sectional view, showing the mode of attaching the upper resilient contact arms to the clamping band 15;

Fig. 7 is a top plan view of the unit of Fig. 1, taken on the plane of the line 7—7 of Fig. 1, looking in the direction of the arrows.

Referring to Fig. 1, the present fuse tube unit is preferably supported in such a position that its upper end tilts forwardly, away from the vertical position, so that it is ready to swing in a clockwise direction by gravity from the position of Fig. 1 to the position of Fig. 2.

For this purpose the cross arm 10 may be provided with a suitable bracket 11, which is secured to an insulator bracket 12, consisting of a strip of metal which has a cylindrical portion 13 passing around the insulator 14 between its ends. The insulator is preferably formed adjacent each end with a cylindrical portion for receiving the clamping bands 15 and 16 by means of which upper and lower contact arms are secured to the insulator.

The upper clamping band may consist of a pair of half cylindrical portions provided with radial attaching flanges 16' and 17, which are secured together by means of screw bolts 18 and 19, having suitable nuts, the bolts passing through apertures in the attaching flanges.

The attaching flanges 17 are preferably made longer so that they may be provided with apertures for a second securing bolt 20 by means of which resilient spring contact arms 21 and 22 are also secured to the clamping band 15.

The attaching flanges 17 may support a combined spacer and connector fixture 23, which consists of a metal casting having a cored through slot or oval aperture 24 for receiving the bolts 19 and 20. This casting 23 may be hollow from front to back, having a substantially rectangular through aperture 25 for the purpose of reducing weight and saving material. On each of the side walls of this fixture it is preferably provided with a forwardly open U-shaped groove 25', the legs of the groove extending in the direction of the contact arms 21 and 22.

The contact spring arms 21 and 22 are preferably made of extra high strength resilient copper alloy; and both of the springs 21 and 22 are preferably substantially U-shaped, being provided with a substantially straight transverse yoke 26 and 27 at their outer end and with a pair of legs 28, 29.

The upper spring member 21 has substantially straight legs 28, which both turn downwardly slightly at 30 and again upwardly at 31, to form a camming portion 32, against which the shoes 33 on the fuse tube unit 34 engage when it is being swung into the position of Fig. 1.

The legs 28 of the upper contact spring 21 are closer together inwardly of yoke 27; so that both legs 28 of the contact spring 21 may be disposed inside the legs 29 of the contact spring 22. At their free ends the legs 28 are provided with a downwardly curved end portion 35, which engages in the U-shaped groove 25' behind the bolt 19 so that the ends of the legs 28 are anchored against outward movement, in addition to being clamped by the attaching flanges 17, which clamp the ends of the springs in the grooves 25'.

The contact spring 21 is arranged in the upper part of the groove 25' and extends substantially normal to the axis of the insulator 14, with its legs in position to engage on the opposite sides of the fuse tube unit, above the shoes 33.

The lower contact spring 29 has the free ends of its legs also provided with upwardly curved end portions 36 (Fig. 6) which extend upwardly behind bolt 19 in groove 25', anchoring the ends of the legs 29 of the spring 22 to the casting 23. From the grooved casting 23 the lower contact spring 22 has its legs 29 offset outwardly and curved downwardly until the point 37, where the legs 29 are curved upwardly and have an upwardly extending portion 38 that serves as an abutment for engaging the side of the latching trunnions 39 on the fuse tube unit 34.

The upwardly extending portion 38 of the spring legs 29 is then provided with a partially cylindrical curved portion 40, which extends around the top of the latching trunnion 39 and extends downwardly on the right or outer side of the trunnions 39, thus providing a latching shoulder portion 41 for retaining the latching trunnions in engagement with the contact spring 22.

At the latching shoulder 41 the legs 29 are bent diagonally upward, this portion being indicated at 42; and the portion 42 forms a camming portion to be engaged by the latching trunnions 39, when the fuse tube unit is swung into the position of Fig. 1, so that the trunnions 39 may force the spring legs 29 upward until the trunnions 39 pass the shoulder 41 and are latched in the circular portion 40.

In order to make sure that the trunnions 39 will never get in between the two springs, the legs 29 are again bent upward at 43, and have an upwardly extending portion 44 leading to the transverse yoke 26, which upwardly extending portions 44 are located outside of the legs 28 of the upper spring 21.

The spring anchoring casting 23 is preferably provided with an upwardly extending central flange 45 (Fig. 5), which is formed with a transverse bore 46 and a tapering socket 47 for receiving a connector bolt 48. On the left side of the flange 45 this flange is provided with a pair of aligned V-shaped grooves 49, one on each side of the socket 47 for receiving a tap wire. The connector bolt 48 has an elongated head, the under side of which is provided with a through bore and a pair of similar aligned V-shaped grooves for engaging the opposite side of the tap wire.

When the connector bolt is drawn tightly into the socket 47 by its nut and spring washer, the tap wire is clamped between the grooves 49 on the flange 45 and the grooves on the under side of the head of the bolt 48.

Referring now to Fig. 1, the fuse tube unit consists of an insulating tube 50, the upper end of which carries a contact fixture 51, and the lower end of which carries a contact fixture 52. Each of these fixtures is provided with a tubular portion 53 having a bore 54 for receiving the end of the insulating tube 50, which may be anchored in bores 54 by means of transverse riveted pins 55 that pass through grooves in the side of the tube 50 and through apertures in the tubular portion 53.

The insulating tube 50 is open at its lower end, but its upper end is closed by the fixture 51, which

may have a threaded cap 56 that clamps the upper end of the cable or leader that supports a fuse inside the tube 50. The lower cable or leader 57 protrudes from the lower open end of the tube 50, and is secured to an ejector arm 58, further to be described.

The upper contact fixture 51 on the tube 50 is preferably provided with flat sides opposing the inner surfaces of the legs of the contact springs 21, 22, one of these sides being indicated at 59. Projecting laterally from the flat sides 59 on each side of the fixture 51 there are the spring engaging shoes 33, previously mentioned; and these are laterally projecting curved lugs, which, as seen in Fig. 1, curve away from the contact spring 21 at the rear edge. The purpose of this is so that the top 60 of each shoe 33 may act as a camming surface for engaging beneath the legs of spring 21 at the camming portions 32 to cam the spring 21 upward as the tube unit 34 has its top moved from right to left under the spring 21.

The shoes 33 project laterally far enough to engage the spring 21, but not far enough to engage the legs of spring 22; and the legs of spring 22 engage the outer surface of the shoes 33. The latching trunnions 39 comprise integral cylindrical pins projecting from the lower part of the flat surfaces 59 of the upper fixture 51 in opposite directions, in position to engage simultaneously in the latching portions 40 of the two legs of the contact spring 22.

The springs 21, 22 are provided with an initial downward tension or bend so that when they are engaged by the shoes 33 and trunnions 39, respectively, the springs are tensioned upward, urging the fuse tube unit 34 downward.

At its lower end the insulating tube 50 supports the fixture 52 fixedly secured to it, as previously described. This fixture comprises a cast metal member which is formed on three sides below the open end 61 of the tube with a blast chute 62. This blast chute comprises a pair of flat side walls 63 and a downwardly and forwardly sloping rear wall 64, leaving the blast chute open only at the bottom from the axis of the tube 50 forwardly toward the right.

Thus the gases and flame which are expelled from the insulating tube 50 are directed away from the lineman, who is usually disposed on the opposite side of the cut-out. The contact fixture 52 is provided with a diagonally, downwardly and rearwardly extending integral tubular member 65, this tubular member having a cylindrical bore 66, which houses a compression coil spring 67. The compression coil spring engages a washer 68, which is penetrated by the end of a strut 69 for transmitting the force of the spring to the ejector arm 58.

The strut 69 is bifurcated and its fork engages on opposite sides of the ejector arm. In addition to the tubular member 65, the lower contact fixture 52 carries a pair of flat side flanges 70 joined at the top by a yoke which carries a ring 71 for engagement with the laterally projecting lugs on an operating pole, such as a disconnect pole or a clamp stick.

The ring is used for supporting the fuse tube 34 from the long insulating pole when it is to be installed; and the fuse tube unit 34 then hangs downward from the ring 71 in substantially the position shown in Fig. 2. In order that the fuse unit may not wobble on the disconnect stick lug in ring 71, this ring has partial bearing flanges 71a on its upper left portion and extending axially from ring 71. These bearing flanges provide an elongated bearing surface on the disconnect stick lug, preventing wobbling of the fuse unit on the stick. The two flat side flanges 70 carried by the tubular member 65 serve to provide a pivotal support for the ejector lever 58, which is pivoted on these flanges by means of a pin 72 passing through the flanges and through the ejector lever at its extreme end.

The ejector lever has its pivoted end portion 73 of substantially triangular shape (Fig. 1); and it tapers down to a point at its free end 74, which is provided with a groove at 75 for receiving the leader cable 57. The ejector lever is provided intermediate its ends, and preferably close to the free end, with a thumb screw 76, having a threaded shank 77 which passes through a cylindrical aperture 78 in the ejector lever.

On the opposite side of the ejector lever there is a binder cap 79, (Fig. 4) having a cylindrical body 80 that slides in the bore 78, and having a threaded bore 81 engaging the threaded shank 77. The annular flange 82 on this cap is used to engage the leader cable 57 to secure its end fixedly to the ejector lever 58. By means of the thumb screw 76 the threaded shank 77 may be turned to cause the binder cap to clamp the cable without turning the binder cap.

At its pivoted end 73 the ejector lever 58 is preferably provided with a pair of laterally projecting contact trunnions 83; and these are located at the corner of the triangular portion 73, which is opposite to the pivot pin 72. The trunnions 83 are of such a size that they fit in a hook-shaped recess 84, which is provided in each of the side walls of a lower contact arm 85, which is carried by the clamping band 16.

The side walls 86 are joined by a curved wall 87, forming a hood on the fixture 85, which encloses the mechanism of the ejector lever 58 and protects it from rain, snow, and sleet. The hood, comprising the walls 86, 87, is large enough to receive the ring 71, which is housed therein, and which is also, therefore, free of snow and ice.

The contact arm fixture 85 comprises a cast metal member having the hood formation at its forward end, the hook being open toward the right and downwardly in Fig. 2. The hood is carried by a rectangular shank 88, which fits between the attaching flanges 89 of the clamping band 16; and these attaching flanges are secured to the shank 88 by a pair of screw bolts 90.

The contact arm 85 preferably supports an integral depending flange 91, which carries a connector assembly 92 substantially equivalent to the connector assembly 43, which is carried by the upper flange 23.

The installation and operation of the fused cut-out is as follows: Assuming that the fuse unit 34 is not fused, the cap 56 is removed; and the remains of the last fuse are removed from that end of the tube 50. A new fuse with its leader is passed through the tube 50, the button at its upper end engaging the end of the contact fixture 51, where it is secured by the screw cap 56.

The lower end of the leader 57 extends out the open end of the tube 61, where it is moved into the groove in the end of the ejector lever 58, the ejector lever being first rotated from the position of Fig. 2 to that of Fig. 1. With the ejector lever and the leader in the position of Fig. 2, the end of the leader cable 57 is secured to the ejector lever beneath the binder cap 79 by winding it about the body 80 and turning the thumb screw 76.

The ejector lever is now placing a tension on the fuse leader 57 and is ready to pull the remainder of the fuse out whenever the fuse is melted by an excessive current. The fuse tube unit 34, which has now been re-fused, is placed in the position of Fig. 2, and is hung by means of the ring 71 on the laterally projecting lug of a disconnect stick. It may then be lifted by means of the long insulating pole of the disconnect stick until the trunnions 83 may be inserted under the hood 87 and placed in the hook-like bearings 84 carried by the side walls 86. The fuse tube unit 34 is now pivotally mounted on the lower contact arm 85 by means of its trunnions 83.

The disconnect stick has its lug removed from the ring 71 at this time, and the lug is placed in the ring 93, which forms an integral part of the upper contact fixture 51. As the fuse tube unit is now hanging downward, it is pivoted in a counterclockwise direction in Fig. 2 on the lower trunnions 83 toward the position of Fig. 1.

As the fuse tube unit approaches the contact springs 21, 22, the shoe 33 first hits the camming surfaces 32 of the contact spring 21, moving that spring upward until the shoe passes the hump 31. Thereafter the latching trunnions 39 engage the camming portions 42 of the contact spring 22; and trunnions 39 force the legs of spring 22 upward until trunnion 39 passes the hump 41. The spring 22 then moves downward to latch the trunnions 39 in the latching portions 40.

At the same time the upper spring 21 is urging the fuse tube unit 34 downward by engaging the shoes 33. This downward movement is transmitted to the trunnions 83, and the downward force tends to open the ejector lever 58; but it is held against movement by the leader 57 of the fuse. When the fuse in the tube 50 is melted, the gases and parts of the fuse are discharged downwardly toward the right; and the ejector lever, which is pulling on the fuse leader 57, pulls the remaining part of the fuse out of the tube 50, assuring a quick mechanical break inside the tube.

As the ejector lever 58 pivots clockwise from the position of Fig. 1 to the position of Fig. 2, the triangular portion 73 of the ejector lever, with its trunnion 83 and pivot 72, acts like a toggle lever. It pivots on the supporting trunnions 83; and the pivot pin 72 moves forward and downward to the position of Fig. 2. As the pivot pin 72 moves forward and downward, the whole fuse tube unit 34 moves downward until the initial tension of the spring 22 is taken up; and the upper latching trunnions 39 move down far enough to clear the humps 41.

The upper spring 21 aids in moving the fuse tube unit downward; and when the latching trunnions 39 are able to clear the humps 41 on the spring 22, the fuse tube unit 34 pivots in a clockwise direction under the force of gravity from the position of Fig. 1 to that of Fig. 2. This assures a mechanical break between the contacts of the tube and the contact arms; and the depending position of the fuse tube unit 34 is an indication that the fuse has blown and that there is a fault on the line.

The present fuse tube unit is particularly effective in clearing low current faults promptly by reason of the structure of its ejector arm; and it is constantly maintained in good condition and shielded from ice accumulations.

The point of primary engagement between the upper resilient contact arms and the shoes on the fuse tube unit and between the upper trunnions and latching formations which engage them are protected against pitting or arcing because the physical break between the shoes and the contact arms does not take place until the shoes have passed outwardly beyond the primary contact positions, when the trunnions are completely unlatched and the arc is broken at the end of the contact arm, the contact arms which extend beyond the tube serving also as fuse tube guides.

The upper resilient contact arms cannot be overstressed by the skyrocket action of the fuse tube, which might result from the discharge of the blown fuse gases from the lower end of the tube, because the lower contact fixture on the tube is located in the overhanging housing of the contact arm, which it engages, to prevent upward movement of the fuse tube unit.

It will thus be observed that I have invented an improved cut-out in which both the fuse leader ejector and an auxiliary upper spring tend to move the fuse tube unit downward, unlatching it from an upper contact spring. Thus the fuse tube unit is placed under a downward tension; and as soon as the ejector lever is released, the fuse tube unit moves downward quickly, unlatching the upper end of the fuse tube unit to permit it to pivot upon its lower trunnion to accomplish a mechanical break of the circuit.

The present cut-out breaks the circuit very quickly inside the tube, which is followed by the breaking of the circuit outside of the tube; and the condition of the circuit is indicated by the fact that the fuse tube unit depends from the lower contact arm.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a fused drop-out cut-out assembly, the combination of an insulating support with upper and lower contact arms, said lower contact arm having a forwardly and downwardly open hood with inwardly and downwardly extending side wall grooves inside the hood, a fuse tube unit comprising an insulating tube having upper and lower contact fixtures, said lower contact fixture having oppositely extending lower trunnions pivotally mounting said unit on said lower arm in said grooves, a fuse ejector lever pivotally mounted on said lower contact fixture, said lower trunnions being mounted on opposite sides of said lever below said pivotal mounting, spring means urging said ejector lever downward against the restraint of a cable and fuse in said tube, oppositely extending upper trunnions carried by said upper contact fixture and said upper contact arm having downwardly open recesses for retaining said upper trunnions and urging the unit downward, and an auxiliary upper contact arm engaging said upper fixture and urging said unit downward to relieve the strain on the upper contact arm and to assist in urging the unit downward when the fuse blows and the ejector lever pivots downward to move the unit downward to unlatch the upper trunnions from the recesses in the upper contact arm more quickly.

2. In a fused drop-out cut-out assembly, the combination of an insulating support with upper and lower contact arms, said lower contact arm having a forwardly and downwardly open hood with inwardly and downwardly extending side

wall grooves inside the hood, a fuse tube unit comprising an insulating tube having upper and lower contact fixtures, said lower contact fixture having oppositely extending lower trunnions pivotally mounting said unit on said lower arm in said grooves, a fuse ejector lever pivotally mounted on said lower contact fixture, said lower trunnions being mounted on opposite sides of said lever below said pivotal mounting, spring means urging said ejector lever downward against the restraint of a cable and fuse in said tube, oppositely extending upper trunnions carried by said upper contact fixture and said upper contact arm having downwardly open recesses for retaining said upper trunnions and urging the unit downward, and an auxiliary upper contact arm engaging said upper fixture and urging said unit downward to relieve the strain on the upper contact arm and to assist in urging the unit downward when the fuse blows and the ejector lever pivots downward to move the unit downward to unlatch the upper trunnions from the recesses in the upper contact arm more quickly, said upper contact arm comprising a resilient wire member having two legs and a yoke, each leg having one of said recesses and being curved upwardly near its yoke to extend upwardly beyond the auxiliary contact arm at which contact is broken when the unit is pivoted on its lower trunnions.

3. In a fused drop-out cut-out assembly, the combination of an insulating support with upper and lower contact arms, said lower contact arm having a forwardly and downwardly open hood with inwardly and downwardly extending side wall grooves inside the hood, a fuse tube unit comprising an insulating tube having upper and lower contact fixtures, said lower contact fixture having oppositely extending lower trunnions pivotally mounting said unit on said lower arm in said grooves, a fuse ejector lever pivotally mounted on said lower contact fixture, said lower trunnions being mounted on opposite sides of said lever below said pivotal mounting, spring means urging said ejector lever downward against the restraint of a cable and fuse in said tube, oppositely extending upper trunnions carried by said upper contact fixture and said upper contact arm having downwardly open recesses for retaining said upper trunnions and urging the unit downward, and an auxiliary upper contact arm engaging said upper fixture and urging said unit downward to relieve the strain on the upper contact arm and to assist in urging the unit downward when the fuse blows and the ejector lever pivots downward to move the unit downward to unlatch the upper trunnions from the recesses in the upper contact arm more quickly, said auxiliary contact arm extending beyond the other upper contact arm in the direction of the opening movement of the unit, so that the circuit is broken at the auxiliary contact arm to avoid burning and pitting at the upper trunnions and said recesses.

4. In a fused drop-out cut-out assembly, the combination of an insulating support with upper and lower contact arms, said lower contact arm having a forwardly and downwardly open hood with inwardly and downwardly extending side wall grooves inside the hood, a fuse tube unit comprising an insulating tube having upper and lower contact fixtures, said lower contact fixture having oppositely extending lower trunnions pivotally mounting said unit on said lower arm in said grooves, a fuse ejector lever pivotally mounted on said lower contact fixture, said lower trunnions being mounted on opposite sides of said lever below said pivotal mounting, spring means urging said ejector lever downward against the restraint of a cable and fuse in said tube, oppositely extending upper trunnions carried by said upper contact fixture and said upper contact arm having downwardly open recesses for retaining said upper trunnions and urging the unit downward, and an auxiliary upper contact arm engaging said upper fixture and urging said unit downward to relieve the strain on the upper contact arm and to assist in urging the unit downward when the fuse blows and the ejector lever pivots downward to move the unit downward to unlatch the upper trunnions from the recesses in the upper contact arm more quickly, said unit having upwardly convex shoes above said trunnions for engaging said auxiliary contact arm and for breaking the circuit at said auxiliary contact arm.

5. In a fused drop-out cut-out assembly, the combination of an insulating support with upper and lower contact arms, said lower contact arm having a forwardly and downwardly open hood with inwardly and downwardly extending side wall grooves inside the hood, a fuse tube unit comprising an insulating tube having upper and lower contact fixtures, said lower contact fixture having oppositely extending lower trunnions pivotally mounting said unit on said lower arm in said grooves, a fuse ejector lever pivotally mounted on said lower contact fixture, said lower trunnions being mounted on opposite sides of said lever below said pivotal mounting, spring means urging said ejector lever downward against the restraint of a cable and fuse in said tube, oppositely extending upper trunnions carried by said upper contact fixture and said upper contact arm having downwardly open recesses for retaining said upper trunnions and urging the unit downward, and an auxiliary upper contact arm engaging said upper fixture and urging said unit downward to relieve the strain on the upper contact arm and to assist in urging the unit downward when the fuse blows and the ejector lever pivots downward to move the unit downward to unlatch the upper trunnions from the recesses in the upper contact arm more quickly, said upper contact arm comprising a spacing member having a pair of through bores and having U-shaped grooves on opposite sides extending about said bores, and said upper and auxiliary contact arms having, when assembled, U-shaped supporting end portions clamped in said grooves.

6. In a fused drop-out cut-out assembly, the combination of an insulating support with upper and lower contact arms, said lower contact arm having a forwardly and downwardly open hood with inwardly and downwardly extending side wall grooves inside the hood, a fuse tube unit comprising an insulating tube having upper and lower contact fixtures, said lower contact fixture having oppositely extending lower trunnions pivotally mounting said unit on said lower arm in said grooves, a fuse ejector lever pivotally mounted on said lower contact fixture, said lower trunnions being mounted on opposite sides of said lever below said pivotal mounting, spring means urging said ejector lever downward against the restraint of a cable and fuse in said tube, oppositely extending upper trunnions carried by said upper contact fixture and said upper contact arm having downwardly open recesses for retaining said upper trunnions and urging the unit downward, and an auxiliary up-

per contact arm engaging said upper fixture and urging said unit downward to relieve the strain on the upper contact arm and to assist in urging the unit downward when the fuse blows and the ejector lever pivots downward to move the unit downward to unlatch the upper trunnions from the recesses in the upper contact arm more quickly, said upper contact arm comprising a spacing member having a pair of through bores and having U-shaped grooves on opposite sides extending about said bores, and said upper and auxiliary contact arms having, when assembled, U-shaped supporting end portions clamped in said grooves, and clamping members carried by bolts in said bores for securing said latter end portions to said spacing member.

DAVID C. HUBBARD.

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