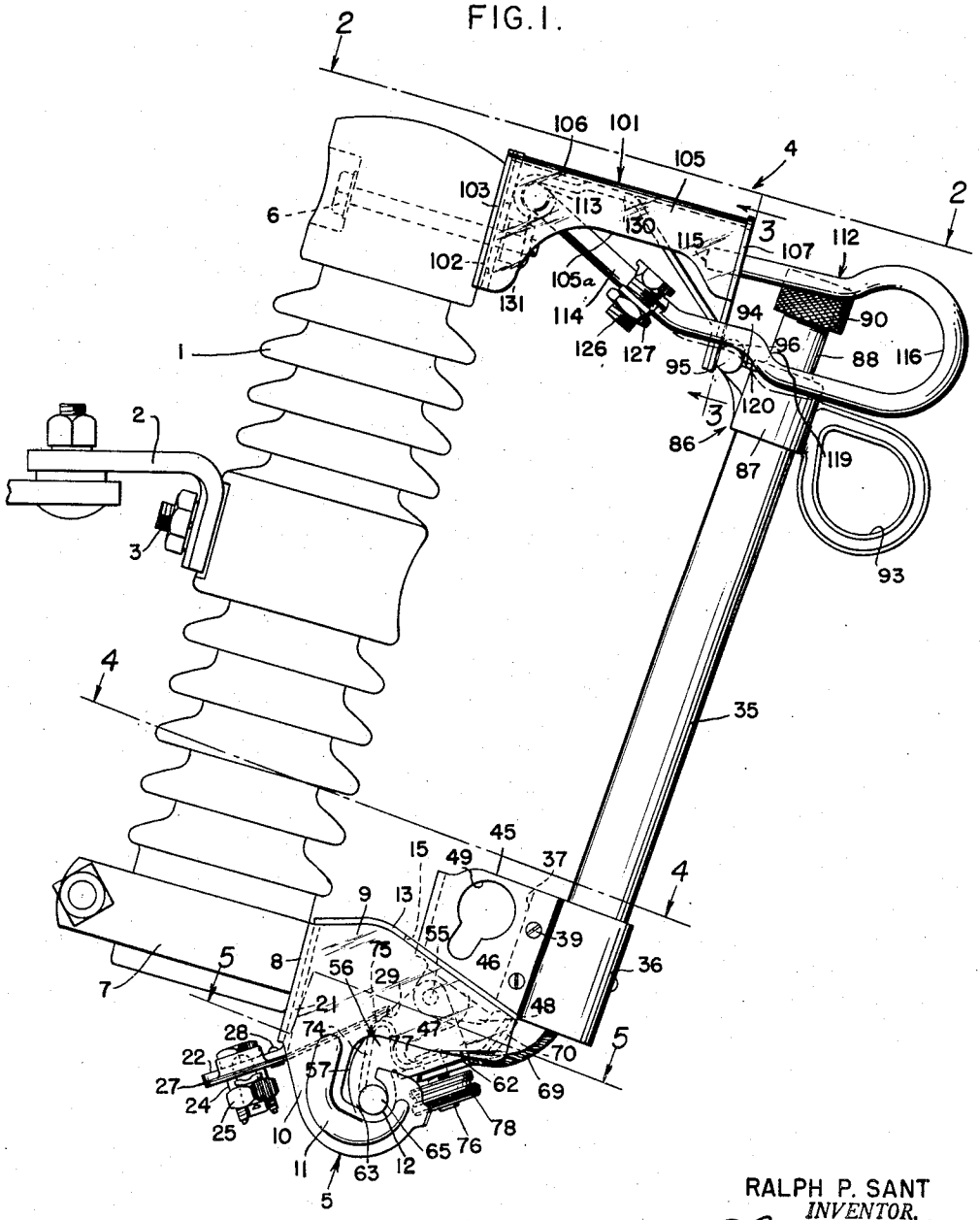
March 1, 1955 R. P. SANT 2,703,349

FUSE CONSTRUCTION

Filed Aug. 27, 1953 3 Sheets-Sheet 1

FIG. 1.



RALPH P. SANT
INVENTOR.

BY Charles A. Bradley

ATTORNEY

March 1, 1955 R. P. SANT 2,703,349

FUSE CONSTRUCTION

Filed Aug. 27, 1953 3 Sheets-Sheet 2

FIG. 2.

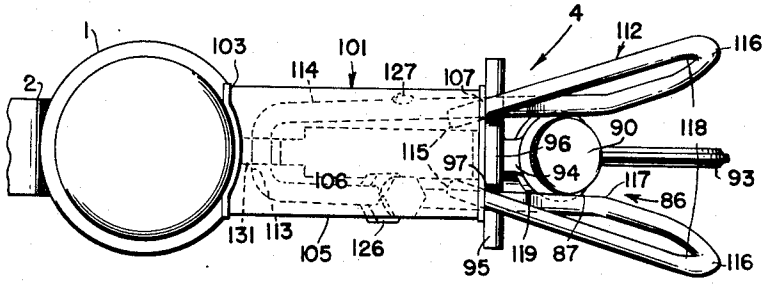


FIG. 4.

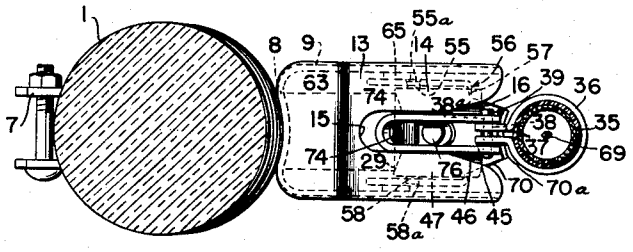


FIG. 5.

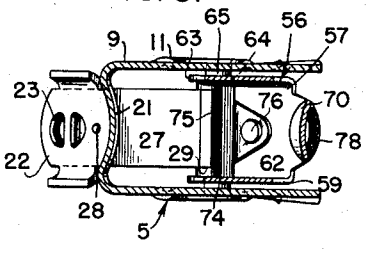
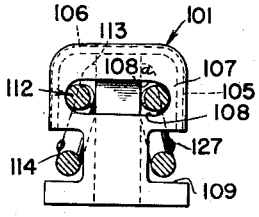


FIG. 3.



RALPH P. SANT
INVENTOR.

BY Charles A. Sundell

ATTORNEY

March 1, 1955 R. P. SANT 2,703,349

FUSE CONSTRUCTION

Filed Aug. 27, 1953 3 Sheets-Sheet 3

FIG. 6.

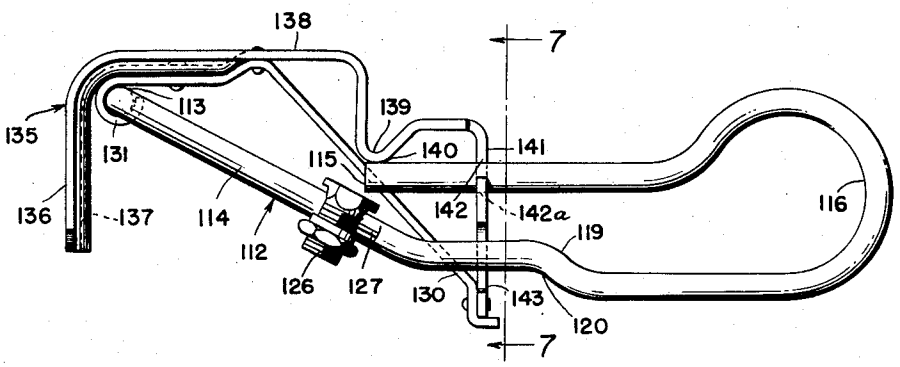
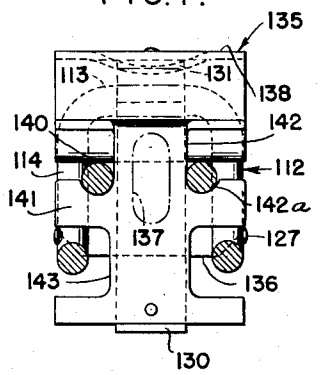


FIG. 7.



RALPH P. SANT
INVENTOR.

BY Charles A. Grindell

ATTORNEY

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FUSE CONSTRUCTION

Ralph P. Sant, South Milwaukee, Wis., assignor to McGraw Electric Company, Milwaukee, Wis., a corporation of Delaware

Application August 27, 1953, Serial No. 376,818

6 Claims. (Cl. 200—113)

This invention relates to improvements in fuse construction.

Cut-outs heretofore made by those skilled in the art have generally included two spaced terminals normally insulated from each other and having means for electrically connecting the terminals, swingably mounted therebetween. Frequently the electrical connecting member consists of an expulsion tube having therein a fusible section joining a contact at the lower end of the tube with a durable or expendible cap at the upper end of the tube. The contact at the lower end of the tube is usually pivotally carried through a system of linkage to enable the fuse tube to be swung to closed circuit position and to facilitate self-disconnecting if the fusible section ruptures due to excess current. Force necessary to urge the fuse tube to drop out after the fusible section ruptures may be derived from resiliency in the upper contact. Sufficient time delay to allow the fusible section to burn clear before the fuse tube drops out is effected by the propulsion of the tube against the upper contact spring for the duration of expulsion of the expanding gases from the lower end of the tube.

It is apparent from the foregoing remarks that to complete an electrical circuit through a fuse cutout construction the current must flow through a multiplicity of relatively stationary and relatively movable parts. To reduce the ohmic resistance which occurs as a natural consequence of the current flowing between the parts of a cut-out, designers usually resort to use of heavy castings, usually of brass or bronze. High resistance joints between the moving parts are then often shunted by a highly conductive flexible means to minimize joint resistance. But, since the fuse tube connecting the terminals is generally removable there will always remain at least one electrical junction at each terminal which cannot be solidly connected to the movable conductive member. Consequently, it is desirable to employ means to reduce this joint resistance to a bare minimum.

Despite the heavy castings generally employed to comprise the terminals of the fuse cut-out constructions known to the art, little has been accomplished to assure smooth operation and accurate alignment between the fixed terminals and the movable contacts when the cut-out is urged to closed position. The conductive member which connects the fixed terminals often has a tendency to rock laterally on its pivotal supports and a tendency to creep out of the hook-like bearings. This is a frequent cause of annoying misalignment and jerky motion evident when the usual cut-out is being operated.

To obviate the foregoing undesirable features found in conventional fuse constructions this invention has as one of its objects to provide a cut-out using low cost materials having high mechanical strength and comparatively low electrical conductivity merely as a structural support for parts which need to be made of more expensive highly conductive materials.

Another object of this invention is to provide guide means to assure positive alignment at the upper and lower terminals of the movable contacts carried by the fuse tube and stationary contacts carried by the fixed terminals when the fuse tube is being swung to closed circuit position.

A further object of this invention is to employ a lower shunt contact embodied in the circuit through the fuse construction in such manner as to effect high electrical conductivity without interfering with removal of the fuse tube when in open circuit position.

A still further object is to spring bias the lower contact shunt for the double purpose of maintaining electrical contact between relatively movable parts and to urge the trunnions upon which the fuse tube pivots into positive seating engagement with the hook-like bearings of the lower terminal.

A still further object is to provide an arc baffle which adequately protects the parts of the fuse construction from the erosive effects of the hot gases evolved incidental to rupture of the fusible section within the fuse tube.

Other objects will appear within the following description.

Embodiments of the invention are shown in the accompanying drawings, in which:

Fig. 1 is a side elevation showing one form of the invention, such view showing an open type of a cut-out in the form of a drop-out fuse.

Fig. 2 is a plan view relative to the upper end of Fig. 1.

Fig. 3 is a view taken on the line 3—3 of Fig. 1 showing the upper contact support.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1 showing the lower cartridge contact assembly.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1 showing the lower contact and link assembly with the bifurcated connector bolt removed.

Fig. 6 is a side elevation view showing an alternative embodiment of an upper contact support.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6.

Referring to Fig. 1 it will be seen that the device comprises an elongated insulator 1 supported intermediate its ends by a strap 2 held by a bolt 3 passing through insulator 1 and provided with upper and lower terminals indicated generally by the reference characters 4 and 5 respectively.

The upper terminal 4 is preferably secured to insulator 1 by a bolt 6 and the lower terminal 5 is secured by welding to a clamping band 7. Lower terminal 5 comprises a back plate 8 arcuately shaped to conform to the contour of the clamping band 7. Two spaced side plates 9 butt the back plate 8 at right angles and may be integral with the back plate or welded thereto. These may be of metal having an electrical conductivity which is low compared to pure copper for reasons which will be explained later. Depending from each side plate 9 is a hook-like portion 10 which has an embossed portion 11 following the curvature of the outer margin of the hook-like portion to serve as a means to stiffen and reinforce the side plate. The hook-like portion 10 defines an arcuate bearing surface or trunnion receiving portion 12 having its axis in alignment with a similar bearing surface spaced laterally a distance equal to the width of back plate 8. A cover plate 13 is shaped to fit the contour of the side plates 9 and may be welded thereto or formed of one piece integrally therewith. Cover plate 13 is bifurcated at its outer end to form prongs 14 disposed equidistant about the center line of the cover plate to define a slot 15 having a flared entrance 16.

Though the entire lower hinge assembly has been described as being composed of a number of parts it should be readily apparent that it may be easily stamped from a single piece of metal and bent thereafter to form a box-like structure having an open bottom and front. Hence, only a single joint on the center line of the cover plate 13 need be welded.

A terminal mounting strap 21 is imposed upon the back plate 8 interiorly of the lower hinge assembly and may be riveted to the back plate or stamped integral therewith. Strap 21 is bent toward the center line of supporting insulator 1 to form a flat portion 22 having two crescent shaped holes 23 for receiving a bifurcated bolt connector 24 engageable with a load wire (not shown). A flat reinforcing spring 27 bears upon the flat end portion 22 and is secured thereto by a rivet 28. A contact shunt 29 of Phosphor bronze having its end portion 30 bent upon itself is superposed upon the reinforcing spring 27. Reinforcing spring 27, contact shunt 29 and end portion 22 are all perforated by congruent crescent shaped holes 23 and are held in secure electrical contact by tightening nut 25 on bifurcated bolt connector 24.

A drop-out fuse tube is provided as indicated by the reference character 35. Fuse tube 35 is equipped at its lower end with a split sleeve like clamp 36 which fits tightly around the fuse tube and may be pinned thereto. Clamp 36 is formed with two spaced integral lips 37 bent to extent radially in parallel relative to a vertical plane coincident with the axis of the arcuate portion of clamp 36. Two holes 38 receive bolts 39 which urge lips 37 toward each other to contribute to the clamping force on tube 35.

A U-shaped cartridge contact support referred to generally by reference character 45 embraces the lips 37 of clamp 36 and is rigidly held in engagement therewith by the bolts 39 extending through holes 38*a* of the support 45. Contact support 45 may be formed of any ferrous or poorly conducting metal as is also the case with tube clamp 36 because neither part is relied upon to carry current. In examining support 45 it will be seen to consist of a flat piece of metal bent back upon itself to form a U-shaped piece. The sides 46 of support 45 are spaced from each other in a vertical plane and have their lower margins bent outward to form symmetrical shoulders 47. These shoulders are bent downward again at a right angle to form vertically extending skirts 48 spaced parallel to each other equidistant from a vertical plane midway between sides 46. The sides 46 are perforated by a large hole 49 engageable by a hook-stick (not shown) when the fuse has been pivoted to open circuit position. Skirts 48 freely receive a pivot pin 55.

A lower contact referred to generally by numeral 56 is linked pivotally to the cartridge contact support 45 by means of pin 55. Lower contact 56 consists of a channel shaped member 57 having a countersunk hole 58 through each leg 59. Pin 55 carries channel 57 and is prevented from moving laterally by peening its ends 55*a* into the countersunk holes 58. The legs 59 extend vertically upward from the bottom 62 of channel 57 and also have depending portions 63 integral with the legs. Each depending portion 63 has a hole 64 in lateral alignment with the other through which a trunnion pin 55 is pressed and peened into place. The bottom 62 of channel 57 is also extended in a direction opposite from the depending portions 63 to form a gas baffle 70 which curves upward generally from bottom 62. Baffle 70 is bent arcuately across its width to a radius substantially conforming to that of fuse tube 35. When the baffle 70 is in its normal position, maintained while the fuse tube 35 is in its closed circuit position, its end 70*a* bears against the lower end of the lower tube clamp 36. It thereby performs the triple function of preventing the lower contact 56 from rocking over center, of deflecting the hot gases incidental to rupture of the fusible section (not shown) within fuse tube 35 and of ejecting the leader 69 on the fusible section.

A contact cam 74 is located between the legs 59 of the channel member 57. Cam 74 is substantially S-shaped and is formed of a highly conductive flat metallic piece which bears upon the bottom of channel 57 and is secured thereto over a flat bearing area 75. A flat headed shoulder bolt 76 passes through a hole 77 in cam 74 and the bottom of channel member 57. The bolt 76 is brazed (not shown) to cam 74 and bottom of channel 57 to assure permanent positioning and good electrical connection of the parts. A knurled nut 78 is screwed on bolt 76 for the purpose of electrically connecting a fuse link leader 69 which depends from the fuse tube 35.

The upper end of fuse tube 35 is provided with an upper contact 86 consisting preferably of copper or bronze. Contact 86 comprises a hollow tubular body member 87 which fits snugly over the outer periphery of fuse tube 35 and may be pinned thereto by any suitable means. The upper part of tubular body member 87 has a neck portion 88 integral therewith for receiving a closure cap 90. This cap may be of the solid variety or the frangible type which fractures when subjected to excessive pressures due to gases being generated within the fuse tube.

An eye 93 is cast integral with the tubular body member 87 and extends radially therefrom for the purpose of engaging a hook-stick (not shown) when it is desired to swing the fuse tube on trunnions 65.

Diametrically opposite of eye 93 and also integral with tubular body 87 is a web 94 which carries a round contact rod 95 integral therewith and spaced from the axis of the tube 35 and extending laterally to each side

of a plane coincident with the eye 93. A guide pad 96 protrudes radially upward from rod 95 intermediate its ends to form shoulders 97 which rise vertically and are parallel to each other.

An upper fixed terminal 4 consists of an upper contact support 101 fastened to insulator 1 by a bolt 6 which passes through an elongated hole 102 in back plate 103. A gasket of any resilient material is preferably placed between the back plate 103 and insulator 1 though it is not shown in the views. Providing back plate 103 with an elongated hole 102 permits vertical movement enabling proper spacing of the upper and lower terminals to assure optimum electrical contact and facile operation of the fuse cut-out. It will further be noted that back plate 103 is slightly curved to allow it to conform to the contour of the outer periphery of insulator 1.

Two side plates 105 and a cover plate 106 abut back plate 103 at right angles thereto and are preferably rigidly joined by fillet welds (not shown). Side plates 105 have their lower margins 105*a* cut upwardly in a generally arcuate shape to permit ready access for making an electrical connection with the split bolt connector 126. Of course, the side plates 105 and cover plate 106 are preferably stamped as a single piece and bent thereafter to form the desired assembly.

A front plate 107 is welded to the ends of side plates 105 and cover 106 in a plane substantially parallel to back plate 103 spaced at the opposite ends of said plates as shown in Fig. 2.

It will here be especially noted that the entire upper contact support 101 can be made of a comparatively poorly conductive ferrous metal having good corrosion resistant qualities such as the commonly known Cor-Ten. Coating the metal by hot-dipping in a suitable galvanizing metal is generally desirable to enhance corrosion resistance and to improve the appearance of the contact support. Note also that the contact support is not required to act as a conducting member for the principal current carried by the fuse cut-out, thereby justifying the use of ferrous metals.

Front plate 107 is provided with a horizontally disposed elongated hole 108 and notches 109 for allowing passage therethrough of a contact spring 112 preferably fabricated of hard-drawn copper and having a circular cross section as shown in Fig. 3.

An alternative type of upper contact support 135 is shown in Figs. 6 and 7. It comprises a single piece of corrosion resistant metal having a back plate 136 and an elongated mounting hole 137 similar to those parts referred to by 103 and 102 respectively in the other views. The top plate 138 is integral with the back plate 136 and has a portion bent arcuately to form a lateral groove 139 defining a bearing point 140 at its under side. The front plate 141 depends from the top plate 138 and is integral therewith. Plate 141 has notches 142 and 143 cut into its margins to receive contact spring 112. A reinforcing strap 130 may be riveted or brazed to front plate 141 and top plate 138 as shown and said strap 130 may have a hooked-end 131 to freely hold spring 112. The ends 115 of spring 112 bear upon the point 140 and also reside within an arcuate depression 142*a* in notch 142 thereby limiting their vertical movement. The lower portion of spring 112 passes through the lower notch 143 freely, thereby permitting resilient vertical movement and pressure against contact rod 95 as seen in Fig. 1.

Spring 112 consists of a long rod bent symmetrically about its midpoint 113 to form an approximate U-shape having two legs 114 which are curvately bent back upon their own lengths at a point 116 intermediate their ends 115 and midpoint 113. Each leg 114 is kinked in laterally opposite directions outwardly in the same plane at a point 117 to define a widened mouth 118 having converging sides to function as vertical aligning means when the upper fuse contact 86 is swung to closed position. Leg 114 is given an additional offset bend 119 to define a latching and contact surface 120 which functions as a retaining means to hold contact rod 95 in electrical and mechanical engagement with spring contact 112.

Legs 114 may carry a bifurcated bolt connector 126 which is retained against sliding movement on the legs by protuberances 127 formed by indentation. Connector 126 is usable to connect an incoming hot-line wire (not shown) directly to the contact spring 112 thereby avoiding electrical conduction through any parts which are relatively movable and subject to developing high re-

sistance joints due to oxidation or corrosion of the parts. It is also evident that the circuit length has been reduced to a bare minimum, resulting in accompanying minimum electrical resistance.

A reinforcing strap 130 interposed between the legs 114 of the U-shaped contact spring is anchored to front plate 107 and cover plate 100 by any suitable means such as brazing or riveting. Strap 130 has at one end a hook-like bent portion 131 for receiving spring 112 at its mid-point 113. Hook 131 is further bent toward closure but with a limitation that spring 112 must be able to swivel freely in a vertical plane. Legs 114 of spring 112 lie freely in notches 109 of front plate 107. End 115 of spring 112 passes through elongated hole 108 from front toward the rear and bears with considerable pressure on the edge 108*a* causing the entire spring contact 112 to be strongly biased in a downwardly direction.

In the operation of this fuse cut-out it will be seen that the lower contact 56 acts as an intermediate link between trunnion pin 65 and the cartridge contact support 45 which in turn holds tube clamp 36. When the cut-out is in closed position a conductive fuse leader 69 extends from the lower end of fuse tube 35 and is rigidly held therein against longitudinal displacement. The end of the leader 69 is coiled around shoulder bolt 76 and held in tension. This tensile force tends to urge the end 70*a* of the gas baffle 70 into tight contact relation with the fuse tube clamp 36. Hence, the entire lower contact 56 is restrained against pivotal movement on pin 55. It is as if the cartridge contact support 45 was integral with lower contact 56 and the combined structure being pivotal on trunnion pin 55 within the hook-like bearing surface 12.

When the lower linkage is unitarily held by the tensile force of the fuse leader as heretofore described the contact cam 74 carried by the lower contact 56 is urged into resilient electrical contact with shunt 29 which is biased toward cam 74 by reinforcing spring 27. Both cam 74 and shunt 29 are preferably silver plated to minimize electrical resistance therebetween. The current through the fuse cut-out then follows the lowest resistive and most direct path from the fuse leader 69 to the bolt 76 and cam 74, through one wiping joint between cam 74 and shunt 29 and directly to the bifurcated bolt connector 24 to the external load-line (not shown).

It is to be noted that the invention avoids having any electrical current of appreciable magnitude being conducted through parts which are merely pinned for pivotal connection therebetween. When the entire fuse tube 35 is pivoted on trunnions 65 to closed circuit position it is to be observed that said trunnions are strongly biased into bearing relation in the trunnion receiving surfaces 12 by the coercive force produced by the reinforcing spring 27 urging shunt 29 against cam 74. This positive bearing action prevents a lateral rocking on the trunnions 65 as effectively as if the trunnions resided in a completely enclosed bearing.

Proper vertical alignment of the fuse tube is further assured while swinging into closed position by having the sides 46 of the cartridge contact support 45 enter the flared entrance 16 of the slot 15 in the cover plate 13 of the lower hinge. Since the width of the slot 15 is only slightly greater than the space separating the sides 46, said sides are unable to shift laterally and a smooth sliding guidance is established. Proper lateral guidance is established at the upper end of the fuse tube 35 simultaneously by cooperation of guide pad 96 with contact spring 112 as will be elaborated upon in an ensuing paragraph.

To pivot the entire fuse tube 35 on trunnion 65 it is necessary to engage the hook-eye 93 with an insulated stick (not shown) and swing the tube 35 therewith to closed position. It will then be noted that cap 90 threaded to upper fuse contact 86 normally protrudes in a generally upward direction between the legs 114 of upper contact spring 112. Should a fusible section (not shown) within the fuse tube 35 rupture with an accompanying excessive gas pressure the cap 90 would fracture to release the pressure. Of course, a non-frangible cap may also be used. Then upon rupture of the fusible section hot gases are expelled from the lower end of fuse tube 35 and are deflected so as to avoid damage to the lower contact by gas baffle 70.

When the fuse tube 35 is pivoted to closed circuit position as described in the last paragraph it carries with it the upper fuse contact 86 and its tubular member 87. Tubular member 87 has a web 94 having integral therewith a guide pad 96 with shoulders 97 adjoining a contact rod 95. In the closing operation, the guide pad shoulders 97 enter the mouth 118 of contact spring 112 to thereby centrally align the fuse tube 35 coincidentally with a vertical plane taken through insulator 1. As previously described, lateral guidance is established at the lower end of fuse tube 35 by entrance of support 45 into slot 15. Lateral stability of fuse tube 35 is further assured by the positive seating of the trunnions 65 into the receiving portion 12 caused by the force of spring 27 against cam 74 when the cut-out nears closed position. Further pivotal movement causes the outer periphery of the contact rod 95 to drop into the offset at 119 and to bear in high pressure engagement against the curvate contact area 120 on spring 112. This curvate area 120 also acts to prevent the contact rod from releasing itself from closed circuit position.

Further inward movement of the contact rod 95 is prevented by its abutting against the front plate 107 of upper contact support 101.

Attention is called to the simplicity of connecting the incoming live wire (not shown) to the upper contact spring 112 by a direct connection thereto by means of bifurcated bolt connector 126. This, of course, effects a reduction in resistance because the current is not required to flow through relatively movable parts having high resistance joints.

It is to be appreciated that upper contact spring 112 normally exerts a tremendous vertical pressure on contact rods 95 when the fuse tube 35 is in closed position. This force is developed by reaction of the ends 115 of contact spring 112 against the upper edge 108*a* of elongated hole 108 in front plate 107 as shown in Fig. 1 and against bearing point 140 as shown in Fig. 7. When the fusible section within the fuse tube 35 ruptures the tension on its leader is relieved as is the counterforce holding contact rod 95 against curvate shoulder 120. Spring 112 then biases the fuse 35 downwardly to released position. After a short delay the cartridge contact support 45 collapsibly pivots on pin 55 causing the lower contact to pivot simultaneously on trunnions 65.

The end 70*a* of gas baffle 70 swings radially when the tensile stress on fuse leader 69 is relieved to remove the fuse leader from the tube 35. Thereafter the entire fuse cut-out swings on trunnions 65 to open circuit position.

It is claimed:

1. In a fuse cut-out comprising an insulating support having an upper and lower terminal, an expulsion fuse tube pivotally mounted on the lower terminal for swinging into electrical engagement with the upper terminal, a fuse link in said tube electrically connecting said terminals, said fuse link extending from the lower end of said tube, the combination of a pivot support on said lower terminal comprising a hood-like member having relatively spaced hook-like bearings, the top of said hood-like member having a slot flared outwardly in a horizontal direction toward the lower end of said fuse tube in a plane coincident with the path of swinging movement of said fuse tube, a support member secured to and embracing the lower end of said tube and having an extension projecting laterally of said tube and into said slot on said hood prior to electrical engagement of the fuse tube by the upper terminal, a pivot link member pivotally connected to said extension and having trunnions disposed in said hook-like bearings, said link member normally disposed in said hood-like member and held against pivotal movement through the medium of said fuse link, a contact cam carried by said link member, a shunt attached to said hood-like member, resilient means for biasing said shunt into contact relation with said cam and for urging said trunnions against said hook-like bearings and a gas baffle on the link member normally engaging the support member adjacent the lower end of the fuse tube.

2. In a fuse cut-out comprising an insulating support having an upper and lower terminal, an expulsion fuse disposed between said terminals, a fuse link in said tube electrically connecting said terminals, said fuse link extending from the lower end of said tube, the combination of a pivot support on said lower terminal compris-

ing a hood-like member having relatively spaced hook-like bearings, the top of said hood-like member having a slot flared outwardly in a horizontal direction toward the lower end of said tube, a support member secured to and embracing the lower end of said tube and having an extension projecting laterally of said tube and into said slot on said hood, a pivot link member pivotally connected to said extension and having trunnions disposed in said hook-like bearings, said link member normally disposed in said hood-like member and held against pivotal movement through the medium of said fuse link, a contact cam carried by said link member, a shunt supported by said lower terminal, a spring superposed upon said shunt for biasing said shunt into contact relation with said cam and for urging said trunnions against said hook-like bearings, and a gas baffle on said link member normally engaging the support member adjacent the lower end of said tube.

3. In a fuse cut-out comprising an insulating support having an upper and lower terminal, an expulsion fuse tube disposed between said terminals, a fuse link in said tube electrically connecting said terminals, the combination of a pivot support on said lower terminal comprising a hood-like member having relatively spaced hook-like bearings, the top of said hood-like member having a slot flared outwardly in a horizontal direction toward the lower end of said tube and serving as a lower guide entrance, a support member secured to and embracing the lower end of said tube and having an extension projecting laterally of said tube and into said slot in said hood, a pivot member connected to said extension and having trunnions disposed in said hook-like bearings, said pivot member normally disposed in said hood-like member, the upper terminal comprising a bonnet-like member, a spring contact supported by said bonnet-like member and having laterally spaced relatively resilient leg portions flared outwardly of each other from said bonnet and serving as an upper guide entrance, a contact carried by the upper end of said fuse tube and having a guide pad integral therewith provided with opposed shoulders slidably receivable in said upper guide entrance, whereby said upper and lower guide entrances cooperate to maintain said fuse tube in vertical alignment with said upper and lower terminals when said tube is being pivoted on its pivot support.

4. In a fuse cut-out comprising an insulating support having an upper and lower terminal, an expulsion fuse tube disposed between said terminals and pivotally mounted on said lower terminal for swinging movement relative to said upper terminal, the combination of a spring contact support comprising a bonnet-like member having upper and lower entrances on one end thereof, a reinforcing member rigidly connected to the top and said one end of said bonnet-like member and having a wire receiving arcuate portion adjacent the other end of said bonnet-like member, a U-shaped spring contact comprising a resilient wire bent intermediate its ends to form a base portion disposed in said arcuate portion, substantially parallel leg portions on said spring contact extending through said lower entrances, the outer ends of the wire being bent outwardly and backwardly to provide a guide entrance and spring anchoring portions extending into said upper entrances, said leg portions each having an offset portion serving as a latching element adjacent said lower entrances of said one end of said bonnet-like member, a contact rod carried by the upper end of said fuse tube spaced laterally from the axis of said tube and yieldingly engageable with said spring contact at said offset portion when said fuse tube is swung to closed position against the one end of said bonnet-like member, a guide pad intermediate the ends of said contact rod and having shoulders slidably receivable within said guide entrance of said spring contact.

5. In a fuse cut-out comprising an insulating support having an upper and lower terminal, an expulsion fuse disposed between and electrically connecting said terminals and pivotally mounted on said lower terminal for swinging movement relative to said upper terminal, said upper terminal comprising a bonnet-like spring contact support having upper and lower entrances at one end, a reinforcing member rigidly connected to the top of said support adjacent the other end thereof and to said one end, said member having a wire receiving arcuate portion adjacent said other end of said support, a U-shaped spring contact comprising a wire bent intermediate its ends to form a base portion disposed in said arcuate portion at said other end of said support, substantially parallel leg portions on said spring contact extending loosely through said lower entrances, the outer ends of said spring contact being bent outwardly and backwardly and loosely extending through said upper entrances, said leg portions each having an offset portion serving as a latching element adjacent said one end of said support, a contact rod carried by the upper end of said fuse tube electrically engageable with said latching element when said fuse tube is swung to closed position, and a line connector connected to said spring contact whereby a line may be clamped directly to said spring contact and engaging surfaces of the supporting structure are electrically by-passed.

6. In a fuse cut-out comprising an insulating support having an upper and lower terminal, an expulsion fuse disposed between and electrically connecting said terminals and pivotally mounted on said lower terminal for swinging movement relative to said upper terminal, said upper terimnal comprising a bonnet-like spring contact support having an entrance at one end, a reinforcing member rigidly connected to the top of said support adjacent the other end thereof and to said one end, said member having a wire receiving arcuate portion adjacent said other end of said support, a U-shaped spring contact comprising a wire bent intermediate its ends to form a base portion disposed in said arcuate portion at said other end of said support, substantially parallel leg portions on said spring contact extending through said entrance, the outer ends of said spring contact being bent outwardly, said leg portions each having an offset portion serving as a latching element adjacent said one end of said support, a contact rod carried by the upper end of said fuse tube electrically engageable with said latching element when said fuse tube is swung to closed position, and a line connector connected to said spring contact whereby a line may be clamped directly to said spring contact and engaging surfaces of the supporting structure are electrically by-passed.

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