Feb. 15, 1949. D. C. HUBBARD 2,461,898

FUSE GUARD FOR CUTOUTS

Filed Dec. 19, 1947

Fig. 1

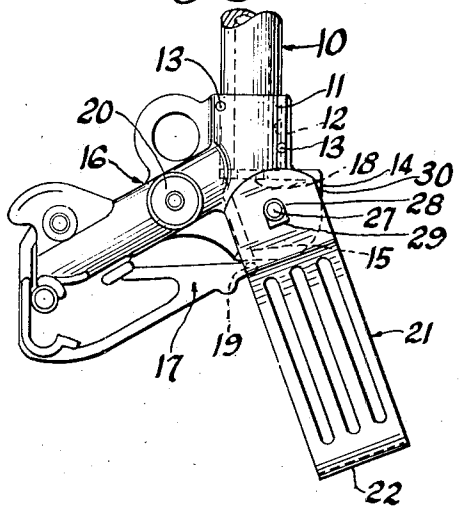


Fig. 2

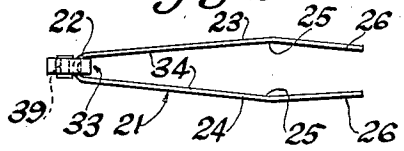


Fig. 3

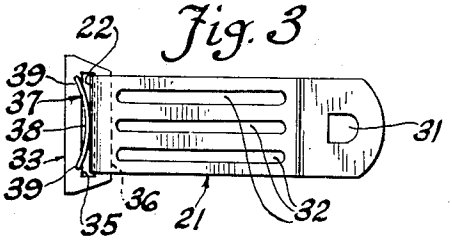
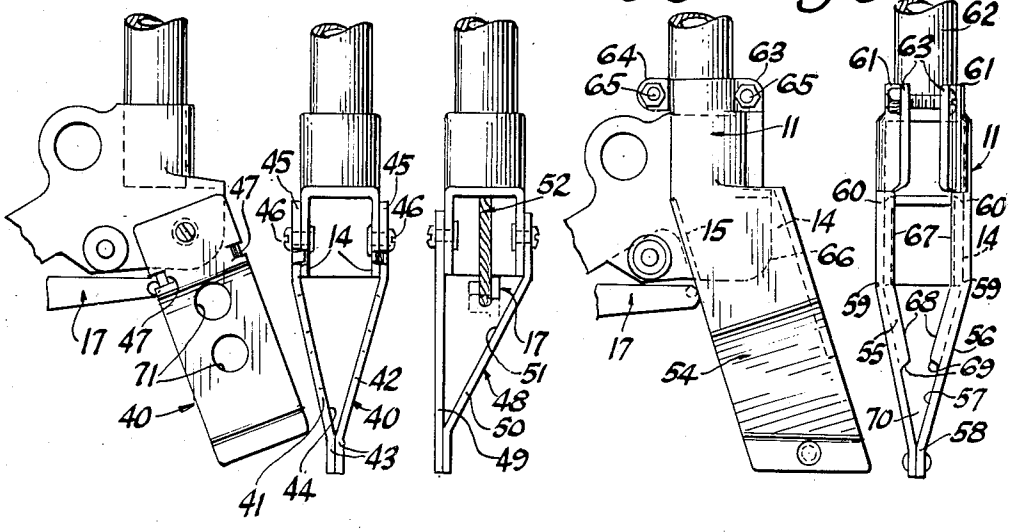


Fig. 4 Fig. 5 Fig. 6 Fig. 7 Fig. 8



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Patented Feb. 15, 1949

2,461,898

UNITED STATES PATENT OFFICE

2,461,898

FUSE GUARD FOR CUTOUTS

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Application December 19, 1947, Serial No. 792,804

16 Claims. (Cl. 200—127)

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The present invention relates to fuse guards for cut-outs, and is particularly concerned with the provision of a device for stopping and retaining the fuse leader which is expelled from the insulating tube of a cut-out fuse unit when the fuse is melted.

One of the objects of the invention is the provision of a fuse leader guard which will not interfere with the discharge of the gases from the open end of the fuse tube, and which will not interfere with the operation of a fuse throw-out lever or ejector.

Another object is the provision of a leader guard which may be so mounted that it can be moved out of the way into another position when the fuse tube is being provided with a new fuse.

Another object is the provision of a fuse guard which is adapted to deflect the leader from its engagement with the throw-out lever when the fuse melts, and which is adapted to retain the leader hanging from the guard below the fuse tube.

Another object is the provision of a fuse guard which is provided with a movable part adapted to be used to release the fuse leader from the guard, this part being a part of every guard and being so arranged that there is no possibility of rattling which might cause a static disturbance.

Still another object is the provision of a fuse leader guard or leader holding device which is simple in construction, sturdy, capable of economical manufacture and which is adapted to be attached to the standard fuse tubes of the prior art without affecting the normal operation of a fused drop-out cut-out to which it is attached.

Other objects 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 single sheet of drawings accompanying the specification,

Fig. 1 is a fragmentary side elevational view of the fuse tube of a fused drop-out cut-out, having its lower opening fitting provided with a fuse guard embodying the invention;

Fig. 2 is a fragmentary front elevational view of a modification, which includes a movable element adapted to be used in releasing the fuse leader from the guard;

Fig. 3 is a fragmentary side elevational view of the guard of Fig. 2;

Fig. 4 is a fragmentary side elevational view of a modification;

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Fig. 5 is a fragmentary front elevational view of this modification;

Fig. 6 is a fragmentary front elevational view of another modification adapted to deflect the leader from engagement with the ejector leader when the fuse is blown;

Fig. 7 is another fragmentary side elevational view of another modification; and

Fig. 8 is a fragmentary front elevational view of the modification of Fig. 7.

Referring to Fig. 1, 10 indicates a fuse tube unit of a fuse cut-out drop-out which is closed at its upper end and open at its lower end, and provided at its lower end with a metal contact fixture 11.

The metal contact fixture 11 has a bore 12 for receiving the insulating tube 10 to which it is secured by a plurality of pins 13. The fixture 11 has a pair of depending side flanges 14 and a curved back wall 15 forming a guard or baffle wall for directing the gases away from the operator, the right side and bottom of this fixture being open.

The fuse tube unit fixture 11 may also be provided with a lateral extension 16 upon which is pivoted a spring pressed throw-out lever 17. The fuse has its upper end secured in the top of the fuse tube unit 10, and its leader extends out of the aperture 18 in the bottom of this unit and about a groove or pin 19 at the end of the throw-out lever 17, the end of the leader being finally secured by a clamping nut 20.

The present leader guards may be utilized with fuse tube units of the type having a throw-out lever as well as those which do not have a throw-out lever. The fuse leader guard of Fig. 1 is indicated in its entirety by the numeral 21, and may consist of a strip of hard drawn spring-tempered steel which has been bent to substantial U-shape by means of an easy bend 22 at the juncture of the two legs 23, 24.

The legs 23, 24 of the leader guard 21 may diverge from the bend 22 until the obtuse bend 25 in each leg brings the end portions 26 into substantial parallelism when they are mounted on the fuse tube. The legs 23, 24 are initially so bent toward each other that they must be spread to put the guard on the fuse tube fixture where the legs of the guard press together to be retained upon trunnions.

The trunnions on the fuse tube lower fixture 11 are indicated by 27, and they may consist of integral laterally projecting aligned lugs having an outer cylindrical portion 28 and an inner rectangular extension 29. The rectangular ex-

tension 29 is located close to the flat sides 30 of the fixture 11, and the rectangular extension 29 extends downwardly in the direction in which the guard is to be held in fixed position.

The guard 21 has each of its legs 23, 24 provided with a D-shaped aperture 31, the apertures 31 being in alignment with each other and having their flat side lowermost. Thus the apertures 31 are adapted to fit upon the combined round and rectangular inner portion of each trunnion 27, engaging the flat sides 30 of the fixture 11, the complementary squared portions preventing any pivotal movement of the guard.

In this position the guard is located downwardly and toward the right of the discharge aperture 18 in the fuse tube in position to receive and retain the leader, but not necessarily in alignment with the fuse tube. Thus the blast guard 15 directs the blast and leader outwardly toward the right. The legs 23, 24, may, however, be sprung apart until the squared portions of the leg apertures 31 and trunnions 27 are out of engagement with each other, and then the legs are rotatably mounted upon the rounded portions 28 of the trunnions 27.

The guard may be pivoted counterclockwise toward the right and upward out of the way during the re-fusing of the tube. If desired, the guard can also be removed by springing the legs apart.

Each of the legs 23, 24 is also preferably provided with the elongated apertures 32 which extend parallel to each other, and are preferably equally spaced and located so that the leader guard does not interfere with the discharge of the gases from the lower open end of the fuse tube.

Referring now to Figures 2 and 3, these show a modification in which a guard, similar to the guard 21 in construction, is provided with an anvil or hammering element 33, which is movably mounted on the U-shaped bend 22 in such position that it may be used to hammer or force a leader out of engagement with the wedging walls 34 located toward the bottom of the leader guard 21.

The anvil 33 may consist of a piece of metal strap having a centrally located rectangular aperture 35 of sufficient length to receive the U-shaped bend of the leader guard 21. The aperture 35 is of sufficient width to permit a lateral movement of the anvil 33 on the U-shaped bend 22, whereby the inner edge 36 of the anvil 33 will engage and dislodge any leader that is wedged between the walls 34.

In order to prevent any rattling of the anvil 33 on the leader guard 21, a leaf spring 37 is provided having a central bend 38 engaging the U-shape bend 22 and having each of its ends slotted at 39 to engage on both sides of the anvil 33. The spring 37 prevents rattling of the anvil and ordinarily holds it in the position of Figure 3.

Referring now to Figures 4 and 5, these show a modified form of leader guard indicated in its entirety by the numeral 40. The leader guard 40 may be constructed of two identical stamped metal straps 41, 42, welded or riveted together at two parallel end portions 43 at the bottom or it may be a single strap bent to this form. The straps 41, 42, in this case form a V-shaped opening with a sharper wedging recess 44.

The upper ends of the legs 41, 42 form attaching flanges 45 which are parallel to each other, and are apertured to receive the rivet or screw bolts 46 which pass through these attaching flanges and through the side walls 14 of the lower

tube fixture, by means of which the leader guard is pivotally mounted on the blast guard.

The attaching flanges 45 are provided with stop lugs 47 punched out of the edge of each flange and adapted to engage the lower edge of the blast guard walls 14, as shown at the left in Figure 4, to determine the range of pivotal movement of the leader guard. Thus the leader guard may be tilted outwardly toward the right, in Figure 4, out of alignment with the fuse tube but in position to intercept and retain the fuse leader.

The stop lug 47 on the right side, in Figure 4, limits the upward pivotal movement in a counterclockwise direction of the leader guard 40, and its presence also makes the two straps identical so that they will both have the left-hand stop member 47 which is more important than the right-hand stop member 47. The diagonal position of the leader guard 40, tilted toward the right, also puts it in position to prevent it from interfering with the sweep of the ejector arm 17.

Referring to Figure 6, this is a modification shown in a view similar to Figure 5 of a leader guard 48, which is so constructed that it will deflect the leader from its engagement with the ejector lever 17. In this case the two legs 49, 50 are of unequal length because the leg 49 is straight while the leg 50 extends diagonally downward and over to the leg 49. This locates the inner surface 51 of leg 50 under the leader 52 which passes around a pin 53 carried by the ejector lever 17.

When the leader 52 is blown outward it is deflected toward the left, (in Figure 6) by the surface 51 on leg 50 of leader guard 48.

Referring to Figures 7 and 8, this is a modification in which the leader guard 54 is of a slightly different construction so that it may be attached to the fuse tube units now on the market. The leader guard 54 consists of a pair of sheet metal strips 55, 56, bent to form a V-shaped wedging opening 57 between them, and having parallel attaching flanges 58 riveted or welded together.

The strips 55, 56 form an obtuse bend at 59 so that the upper portions 60 of the strips extend parallel to each other, and these upper portions are long enough to extend up beyond the lower contact fixture 11 on the fuse tube so that the upper portions 60 may terminate in clamping band formations 61 which are bent inwardly to fit against the fuse tube 62.

These clamping band formations may have outwardly projecting flanges 63 in front and 64 in back for receiving the screw bolts 65, by means of which the clamping band formations 61 are drawn together to clamp the leader guard on the fuse tube 62.

The present guard includes a further feature in that the legs 55, 56 are wider and extend forwardly beyond the forward edges 66 of the side flanges 14 of the blast guard on the lower fixture 11, and the legs 55, 56 have inwardly turned guide flanges 67. These guide flanges 67 present an aperture between them of the full width of the blast guide of the tube, but below the blast guard the side flanges 67 approach each other at 68 and have a downwardly facing shoulder at 69, leaving a diamond pointed recess 70 for retaining the fuse leader by wedging engagement with the V-shaped walls 57.

At the rear side, however, toward the fuse throwout lever 17 the legs 55, 56 present a full opening so that they will not interfere with the fuse throw-cut lever. In this modification it will be noted that the leader guard 54 again ex-

tends diagonally forward and toward the right out of alignment with the fuse tube, but in position to intercept a leader which is directed downwardly and toward the right by the blast guard rear wall 15.

All of the leader guards of Figures 4 to 8 may be provided with apertures 71 in their side walls, these serving as vents for discharging the gas which emerges from the fuse tube. In some embodiments of the invention these vents may not be necessary.

The operation of the present fuse guards will be apparent from the description of their structure and the functions of the parts. When the fuse is blown the throw-out lever draws the fuse leader out of the tube and the leader is expelled from the tube also by the rush of gases which are directed downwardly and toward the right by the blast guard.

The leader guard does not interfere with the discharge of gases, but it does intercept and retain the fuse leader, the latter being wedged into the V-shaped space at the bottom of the guard. The leader may be easily removed by using the movable anvil for forcing it out of its wedging recess, and the guard may be pivoted out of the way during the re-fusing of the tube, if desired.

It will thus be observed that I have invented an attachment for fuse tube units of a fused drop-out cut-out which is adapted to intercept the leader of the fuse when it is expelled from the tube, and to retain it by wedging engagement of the leader between two V-shaped walls.

The present leader guards are simple and capable of economical manufacture, and may be attached to all kinds of fuse tube units. The guards do not interfere with the operation of the fuse throw-out lever, and most modifications may be pivoted out of the way during the re-fusing operation.

The guards do not interfere with the expulsion of the gases, and while they do not intercept the molten particles of the fuse they are adapted to intercept the fuse leader and hold it until removed by the operator.

While I have illustrated preferred embodiments 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. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit.

2. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard being pivotally mounted on said contact fixture to be rotated upwardly out of the way during the re-fusing of the unit.

3. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard being pivotally mounted on said contact fixture to be rotated upwardly out of the way during the re-fusing of the unit, the said guard being provided with punched stop members adjacent the upper end of one of its legs for engagement with the contact fixture to limit the rotation of said pivotally mounted guard.

4. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said legs being provided with apertures for exhaust of the gases caused by fusing of the fuse.

5. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard being constructed of a single integral strip of metal bent back upon itself into V-shape.

6. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the

fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard supporting at its apex a metal anvil member having an enlarged aperture through which the guard passes, for use in jarring the leader out of wedging engagement with the guard in releasing the leader.

7. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard supporting at its apex a metal anvil member having an enlarged aperture through which the guard passes, for use in jarring the leader out of wedging engagement with the guard in releasing the leader, and a leaf spring mounted in said enlarged aperture and engaging the apex of the guard to hold the anvil against rattling or vibration.

8. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard supporting at its apex a metal anvil member having an enlarged aperture through which the guard passes, for use in jarring the leader out of wedging engagement with the guard in releasing the leader, and a leaf spring mounted in said enlarged aperture and engaging the apex of the guard to hold the anvil against rattling or vibration, the said leaf spring being bowed outwardly at its middle and having rectangular slots at its ends, said slots engaging the opposite sides of the anvil.

9. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard being constructed of a pair of strips of metal welded together at the apex of said V.

10. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said guard being constructed of spring-tempered steel having its legs initially tensioned to resiliently engage the sides of the contact fixture.

11. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the pivotal mounting for said guard comprising a pair of trunnions and apertures for connecting the guard to the contact fixture.

12. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the pivotal mounting for said guard comprising a pair of trunnions and apertures for connecting the guard to the contact fixture, the said trunnions being carried by the contact fixture and having a flat-sided portion adjacent the fixture and the apertures being located in the legs and having a flat portion for engagement with the flat-sided part of the trunnion to hold the guard at an angle to the open end of the tube.

13. The combination of a fuse tube unit of the type having an insulating tube for housing a fuse, said tube having a lower metal contact fixture provided with a pivoted fused throwout lever, the fuse having a leader extending out of the lower open end of the tube and said leader being engaged by said throwout lever, with a fuse guard comprising a substantially V-shaped

metal member having diverging legs for engaging each side of the fuse tube unit to support the V-shaped metal member below the open end of the tube, so that the fuse leader when withdrawn from said tube will be guided into the V-shaped restriction of the guard to be wedged therein and held from complete release from the fuse tube unit, the said contact fixture being formed below the open end of the tube with a blast-directing chute extending at an angle to the axis of the tube, and the guard being held at substantially an equivalent angle in the direction of the blast.

14. The combination of a fuse tube unit for a fused cut-out, said unit having a tube open at its lower end for receiving the fuse and leader and having a contact fixture at its lower end provided with a diagonally extending blast chute, with a fuse guard comprising a substantially V-shaped metal member having bearing apertures adjacent its ends, and laterally projecting trunnions carried by the contact fixture for engagement in said apertures.

15. The combination of a fuse tube unit for a fused cut-out, said unit having a tube open at its lower end for receiving the fuse and leader and having a contact fixture at its lower end provided with a diagonally extending blast chute, with a fuse guard comprising a substantially V-shaped metal member having bearing apertures adjacent its ends, and laterally projecting trunnions carried by the contact fixture for engagement in said apertures, the said apertures being

rounded at their outer ends and having a lower rectangular portion, and said trunnions having outer cylindrical portions and inner partially round and rectangular portions.

16. The combination of a fuse tube unit for a fused cut-out, said unit having a tube open at its lower end for receiving the fuse and leader and having a contact fixture at its lower end provided with a diagonally extending blast chute, with a fuse guard comprising a substantially V-shaped metal member having bearing apertures adjacent its ends, and laterally projecting trunnions carried by the contact fixture for engagement in said apertures, the said apertures being rounded at their outer ends and having a lower rectangular portion, and said trunnions having outer cylindrical portions and inner partially round and rectangular portions, the said guard being resilient and tensioned to engage the contact fixture and to engage the trunnions at the rectangular portions thereof except when sprung apart to rotate on the cylindrical portions of the trunnions.

DAVID C. HUBBARD.

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