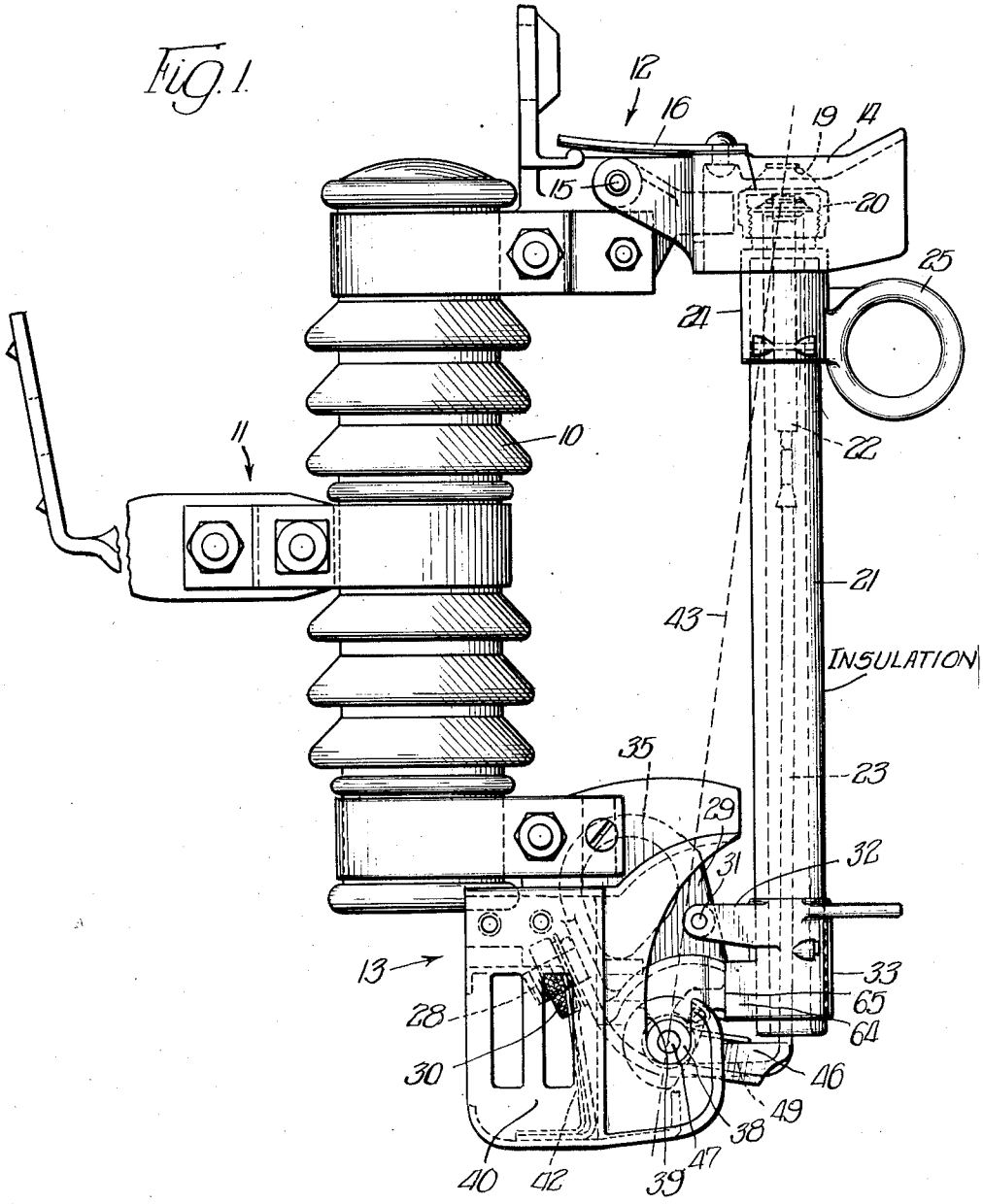
May 15, 1951 S. I. LINDELL 2,553,098

DROPOUT FUSE CONSTRUCTION

Filed Oct. 29, 1948 4 Sheets-Sheet 1

Fig. 1.



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DROPOUT FUSE CONSTRUCTION

Filed Oct. 29, 1948 4 Sheets-Sheet 2

Fig. 2

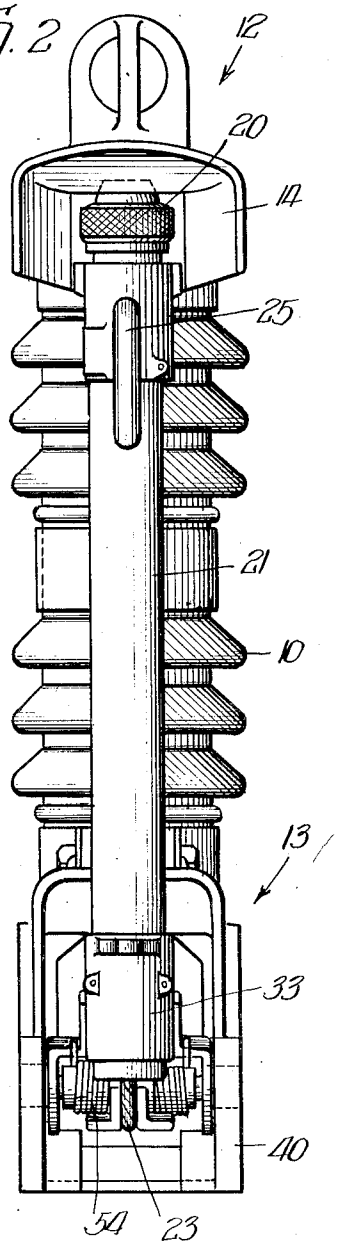
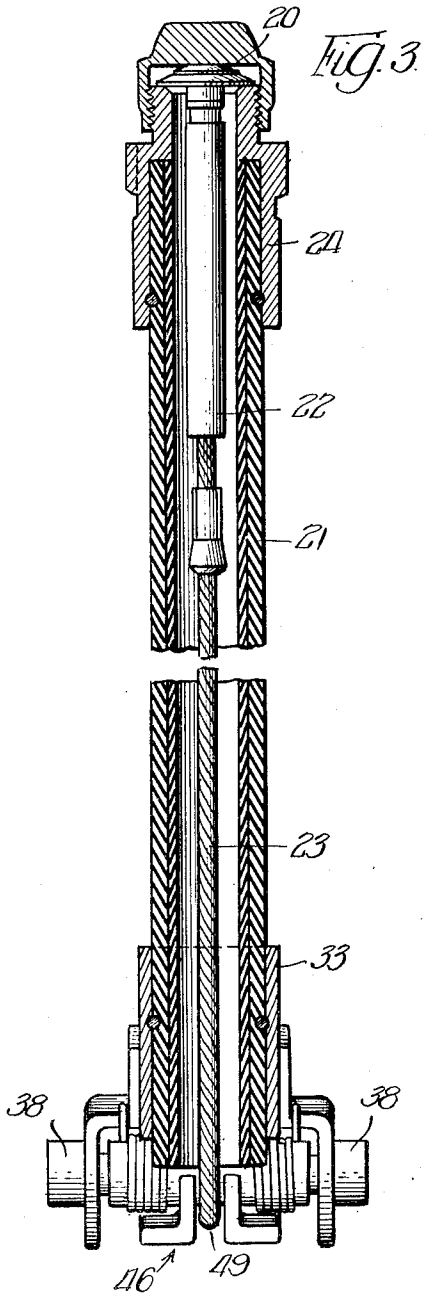


Fig. 3



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DROPOUT FUSE CONSTRUCTION

Filed Oct. 29, 1948 4 Sheets-Sheet 3

Fig. 4

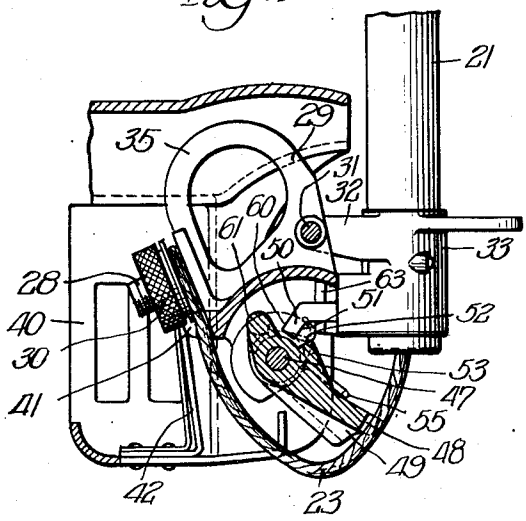


Fig. 5

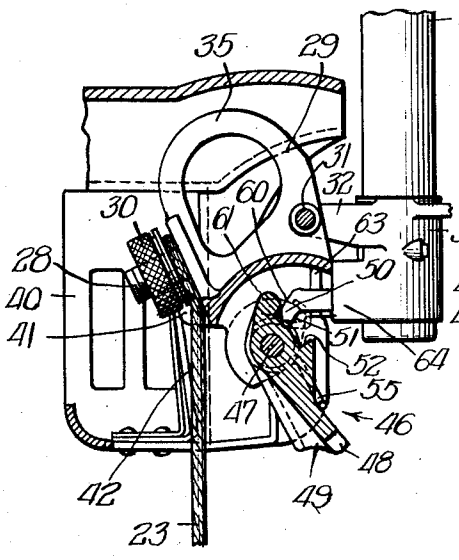
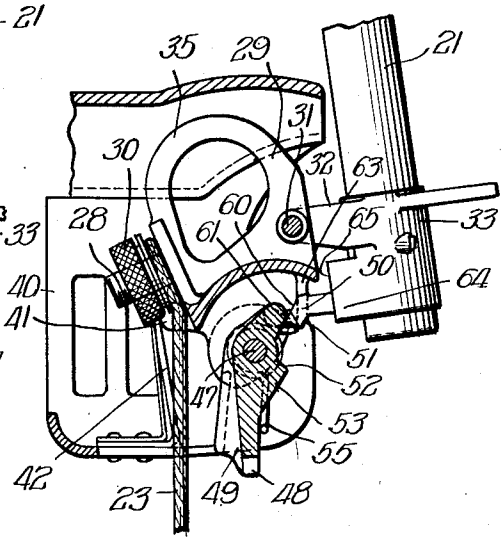


Fig. 6



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May 15, 1951 S. I. LINDELL 2,553,098

DROPOUT FUSE CONSTRUCTION

Filed Oct. 29, 1948 4 Sheets-Sheet 4

Fig. 7

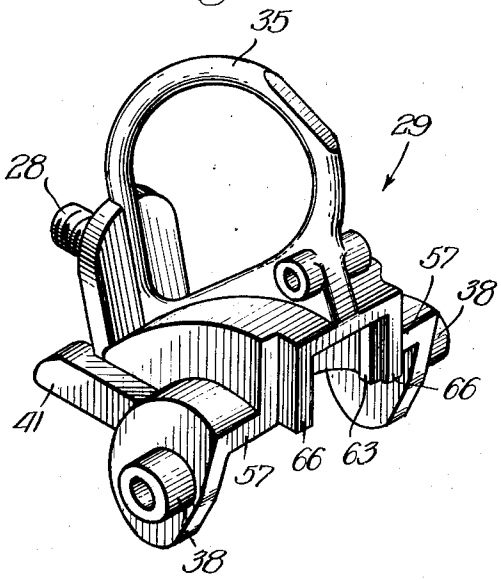


Fig. 8

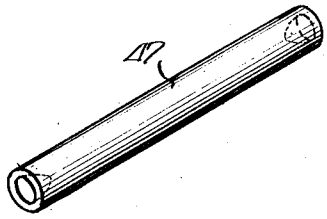


Fig. 9

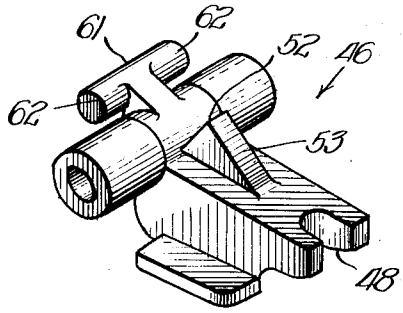
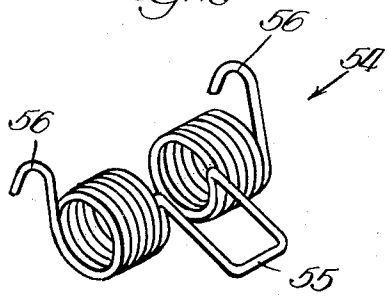


Fig. 10



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Patented May 15, 1951

2,553,098

UNITED STATES PATENT OFFICE

2,553,098

DROPOUT FUSE CONSTRUCTION

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Application October 29, 1948, Serial No. 57,347

14 Claims. (Cl. 200—114)

1

This invention relates to dropout fuse constructions. It has particular relation to improvements in the dropout fuse construction shown in Patent No. 2,328,813 which is assigned to the assignee of this application.

Among the objects of this invention are: To limit the tension stress applied to the fuse link in a dropout fuse construction in which the dropout action is effected by a double jointed hinge or toggle mechanism; to lock the toggle mechanism in the closed position so that only a relatively small part of the force tending to move it to the open position or of the force resulting from the shock or impact on closing is applied to the fuse link; to control the lock by the fuse link; to permit the flexible lead or cable of the fuse link to stretch a slight amount without releasing the lock; to break the toggle mechanism as a result of the blowing of the fuse link by impact and by spring action in the event that the toggle mechanism should fail to move or be slow in moving to the open position; to combine the locking mechanism and the impact releasing mechanism; and to construct the dropout mechanism so that its operation is unhindered substantially by corrosion of the moving parts or by sleet and ice.

Other objects of this invention will, in part, be obvious and in part appear hereinafter.

This invention is disclosed in the embodiment thereof shown in the accompanying drawings and it comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of this invention, reference can be had to the following detailed description, taken together with the accompanying drawings, in which:

Figure 1 is a view, in side elevation, of a dropout fuse construction in which this invention is incorporated;

Figure 2 is a view, in front elevation, of the dropout fuse construction shown in Figure 1;

Figure 3 is a longitudinal, sectional view of the fuse tube shown in Figures 1 and 2 and illustrating how a fuse link is located therein;

Figures 4, 5 and 6 are views, partly in side elevation and partly in section, showing successive stages in the operation of the toggle locking and releasing mechanism of the present invention; and

2

Figures 7, 8, 9, and 10 are perspective views of the elements making up the toggle, locking and releasing mechanism.

Referring now particularly to Figures 1 and 2 of the drawings, it will be observed that the reference character 10 designates an insulator which may be supported by a bracket 11 from a suitable cross arm or the like. The insulator 10 carries upper and lower line terminals 12 and 13 at its ends. It will be understood that other forms of insulation can be provided for maintaining the line terminals 12 and 13 in insulated spaced relation. The upper line terminal 12 carries a sleet hood 14 which is pivoted at 15 and is urged or biased downwardly about the pivot point 15 by a leaf spring 16.

It will be understood that the sleet hood 14 constitutes a part of the contact which is associated with the upper line terminal 12. It is provided with a recess 19 in its underside for making latching contact engagement with a cap 20 that is threaded on the upper end of a fuse tube 21 formed of insulating material in the conventional manner. Within the fuse tube 21 there is a fuse link 22 which may be of conventional construction and it is provided with a flexible lead or cable 23 that extends out of the lower open end of the fuse tube 21. It will be noted that the cap 20 is threaded on the upper end of a tubular upper fuse tube terminal 24 and that it serves to clamp the upper end of the fuse link 22 thereto. The upper fuse tube terminal 24 has an eye 25 formed integrally therewith for receiving the prong of a switch stick for operating the fuse tube 21 to the circuit closed position.

As indicated, the flexible lead or cable 23 of the fuse link 22 extends out of the lower end of the fuse tube 21. It is passed around a stud 28 which projects from a toggle member 29 that is shown more clearly in Figure 7 of the drawings. A clamp nut 30 threaded on the stud 28 serves to hold the flexible lead or cable 23 in good contact engagement with the toggle member 29.

The toggle member 29 constitutes a double pivot mounting for the fuse tube 21. It is pivoted at 31 between a pair of arms 32 which extend rearwardly from a tubular metallic fitting 33 that is fastened to the lower end of the fuse tube 21. It will be noted that the toggle member 29 has an integrally formed eye 35 for receiving the prong of a switch stick for placing the fuse tube in position on the lower line terminal 13.

The second pivot for the toggle member 29 is provided by trunnions 38 which extend from opposite sides thereof as shown in Figure 7. The

trunnions 38 are rockably mounted in slots 39 located in a support member 40 which, as shown, may form a part of the lower line terminal 13. It will be understood that the support member 40, in some cases, may be independent of the lower line terminal 13. For illustrative purposes, however, it is shown in the drawing as being an integral part of the lower line terminal 13. Good electrical connection is provided between the toggle member 29 to which the flexible lead or cable 23 is clamped and the support member 40 by rearwardly projecting contact members 41, Figure 5, on the toggle member 29 which engage spring contact fingers 42 that are carried by the support member 40. It will be understood that other contact arrangements can be provided for interconnecting the toggle member 29 and the lower line terminal 13.

It will be understood that the leaf spring 16 or the equivalent biasing means commonly used in this type of device urges the sleet hood 14 downwardly. This biasing force is applied to the cap 20 at the upper end of the fuse tube 21 and, together with the force of gravity, serves to bias the fuse tube 21 downwardly for rocking movement about the axis through the pivotal connection 31 and also about the axis through the trunnions 38. The force of the spring 16 acts on the fuse tube 21 and a component of it acts to break the toggle joint of which the toggle member is a part. It will be noted that the broken line 43, which extends through the cap 20 or point of application of this force and the axis through the trunnions 38, is slightly to the left of the pivot axis 31 so that the toggle member 29 is positioned slightly in advance of the center position rather than being positioned beyond the center position. Thus the toggle member 29 does not have to move past the center position in rocking to lower the fuse tube 21 from the closed position shown in Figure 1 and unlatch it from the sleet hood 14 to permit it to swing to the open position.

The flexible lead or cable 23 extends over a flipper 46 which is shown more clearly in Figure 9 of the drawings. The flipper 46 is rockably mounted on a pin or shaft 47, Figure 8, which extends through the trunnions 38. Thus, the flipper 46 is pivoted preferably to the toggle member 29 about the same axis that it is pivotally mounted on the support member 40. The outer end 48 of the flipper 46 is bifurcated for receiving the flexible lead or cable 23 and it is provided with a groove 49, Figure 3, on its underside through which the flexible lead or cable 23 extends for anchoring about the stud 28.

A tooth or detent 50, Figure 4, extends rearwardly and downwardly from the tubular metallic fitting 33 at the lower end of the fuse tube 21. The front face 51 of the tooth or detent 50 is arranged to engage a face 52 of a detent 53 which is formed integrally with the flipper 46. This arrangement of the faces 51 and 52 takes place when the fuse link 22 is installed in the fuse tube 21 as illustrated in Figures 1 and 3 of the drawings. In this position the plane of engagement of the faces 51 and 52 extends generally parallel to the broken line 43 and transversely of the longitudinal axis of the flipper 46 which, as shown in Figure 1 in the closed position of the dropout fuse, extends transversely of the longitudinal axis of the fuse tube 21. Since the faces 51 and 52 engage in a plane which is generally at right angles to the longitudinal axis of the flipper 46, relative movement between these faces through a slight extent is permitted as a result of stretching of the flexible lead or cable 23 without releasing the locking engagement provided by the detents 50 and 53 which engagement prevents the toggle member 29 from swinging away from the fuse tube 21. Because of the provision of the detents 50 and 53 which prevent the unlocking of the toggle member 29, and the lever ratios of the parts making up the toggle joint including the flipper 46, the force exerted by the leaf spring 16 and any other downward force exerted on the fuse tube 21 is transmitted only to a very minor extent to the fuse link 22. Since these forces ultimately are applied to the flexible lead 23 only to a very small degree because of the lever ratios involved, there is substantially no likelihood that the fuse link 22, particularly the low current links which are relatively weak mechanically, will be broken during the closing movement of the fuse tube 21.

The lock for the toggle mechanism provided by the detents 50 and 53 is located so as to act at right angles to the toggle member 29 and close to the axis through the trunnions 38. This permits the positioning of the axis 31 ahead of the center position represented by the broken line 43 and thus facilitates breaking of the toggle when the fuse link 22 blows. It also permits some rocking movement of the flipper 46 on stretching of the flexible lead 23 without materially effecting a shift in the position of the axis 31 and thereby changing the lever ratios of the toggle mechanism. At the same time there is a minimum of force transmitted through the toggle mechanism and flipper 46 to the fuse link 22 and thus there is little likelihood of its being broken even when a link of the lowest ampere rating is employed.

The tension which is applied to the fuse link 22 is limited substantially to that which is exerted by a coil spring 54 which is shown more clearly in Figure 10. The coil spring 54 has a central reverse bend section 55 which interfits with the detent 53, as shown in Figure 5. Also the spring 54 has hook ends 56 which engage with flanges 57, Figure 7, on the toggle member 29. The spring 54 acts between the toggle member 29 and the flipper 46 and serves on low current faults to withdraw the flexible lead or cable 23 after blowing of the fuse link 22. This serves to extinguish very quickly any arc which may be drawn within the fuse tube 21 and particularly arcs which are drawn as a result of operation of the fuse link 22 on low fault currents. The spring 54 also assists in breaking the toggle joint as will be pointed out presently.

It sometimes happens that, as a result of frictional resistance caused by corrosion or sleet, the toggle member 29 may fail to rock about the trunnions 38 when the fuse link 22 blows. When this occurs the fuse tube 21 remains in place between the terminals 12 and 13 and thus does not provide the air gap in the circuit which is desired to prevent leakage over the fuse tube 21 by its dropping out of contact engagement with the sleet hood 14.

With a view to insuring that the toggle member 29 does rock about its trunnions 38 so as to lower the fuse tube 21 and drop the cap 20 from engagement with the recess 19, an anvil member 60 is provided by the rear face of the tooth or detent 50. This anvil member 60 is arranged to be engaged by a hammer member 61 which constitutes an integral extension of the flipper 46. Ends 62, Figure 9, of the hammer

member 61 engage flanges 63, Figure 6, formed integrally with the toggle member 29 to limit the relative movement between the flipper 46 and the toggle member 29. In addition to the impact against the anvil member 60 by the hammer member 61 resulting from the kinetic energy of the flipper 46, the spring 54 acts in the same direction since it has not yet been completely unloaded. Sufficient force is exerted by the flipper 46 and the spring 54 to move the toggle member 29 under conditions most likely to be encountered in practice.

It will be noted that the hammer member 61 is positioned fairly close to the axis of rotation of the flipper 46. The center of gravity of the flipper 46 and the point of application of the force exerted by the spring 54 are spaced substantially further away from this axis. Further, the point of contact of the hammer member 61 with the anvil member 60 is along the line joining the axis 31 and the axis of the trunnions 38. Accordingly, the pry out action of the kinetic energy in the flipper 46 and of the spring 54 is increased by this construction.

As shown in Figure 6, the metallic fitting 33 has a rearwardly extending projection 64 from which the tooth or detent 50 projects. The projection 64 has a rear face 65 which abuts faces 66, Figure 7, of the toggle member 29. This fixes the position of the toggle member 29 in relation to the metallic fitting 33 and fuse tube 21. These faces 65 and 66 are held in engagement by the detents 50 and 53 when their faces 51 and 52 are in engagement.

The fuse link 22 is inserted in the fuse tube 21 when the latter is removed from its operative position on the upper and lower line terminals 12 and 13. The fuse link 22 is inserted through the upper open end of the fuse tube 21 when the cap 20 is removed. Thereafter the cap 20 is screwed into place as shown in Figure 3 for holding the fuse link in position in the fuse tube and its upper end in contact engagement with the upper fuse tube terminal 24. The flexible lead or cable 23 extends out of the lower open end of the fuse tube 21. Next the flipper 46 is swung to the position shown in Figure 1 of the drawings, the spring 54 is tensioned further, and the flexible lead or cable 23 is trained thereover and is passed around the stud 28. Then the clamp nut 30 is tightened to hold the flexible lead or cable 23 in good contact engagement with the toggle member 29.

When the fuse link 22 is installed as just described, the faces 51 and 52 of the detents 50 and 53 respectively are in engagement. Also, the faces 65 and 66 of the projection 64 and the toggle member 29 are in engagement. It is this locking engagement between the detents 50 and 53 which prevents the toggle member 29 from swinging away from the fuse tube 21 and holds the faces 65 and 66 in engagement. The flexible lead or cable 23 may stretch somewhat and permit the flipper 46 to rotate slightly about the pin or shaft 47. The faces 51 and 52 of the detents 50 and 53 remain in contact engagement although they move slightly relative to each other. The toggle member 29 is moved through an insignificant extent and the faces 65 and 66 separate only slightly. The pivot point 31 remains substantially in its original position and thus there is no substantial change in the lever ratios of the toggle mechanism even though the flexible lead 23 has stretched somewhat. This construction permits the toggle mechanism to be designed to have measured positive leverage so as to facilitate its being broken after the fuse link has been blown. Breakage of fuse links and failure of the toggle mechanism to release due to the placing of the axis too close to the center position along the line 43 are avoided. Also there is a positive sequence in operation since the toggle mechanism cannot break prematurely sufficiently to permit contact to be broken between the cap 20 and hood 14 but it can break to this extent only after the flipper has swung to move the flexible lead 23 and extinguish the arc.

The fuse tube 21 is placed in operative position with respect to the line terminals 12 and 13. In order to do this the prong of a switch stick is inserted in the eye 35 and the trunnions 38 are inserted in the slots 39 of the support member 40. Thereafter, the prong of the switch stick is removed from the eye 35 and inserted in the eye 25. The operator then swings the fuse tube 21 to the position shown in Figure 1 where the cap 20 engages the recess 19 in the sleet hood 14. When the fuse tube 21 is swung to the closed position, it is subjected to a substantial downward thrust as a result of this movement and the action of the spring 16. However, this thrust is applied to the fuse link 22 in a greatly diminished value because of the lever ratios involved and since the faces 51 and 52 of the detents 50 and 53 are in contact and serve, as above described, to resist thrust tending to rock the toggle member 29 away from the fuse tube 21.

In Figure 4 of the drawings the action of the present invention is illustrated immediately after the fuse link 22 has blown and the remaining portion of the flexible lead or cable 23 is being withdrawn from the fuse tube 21. In this showing the fuse tube 21 has not moved. Thus the pivot axis 31 and the axis of the pin or shaft 47 remain stationary. Since the flipper 46 is no longer restrained by the fuse link 22, it is swung in a clockwise direction by the spring 54. Since the spring 54 reacts against the toggle member 29 while swinging the flipper 46, the former is held thereby in its initial position. The face 52 of the detent 53 on the flipper 46 moves out of engagement with the face 51 on the tooth or detent 50. As a result, the fuse tube 21 is free to swing down and away from the upper line terminal 12 together with the toggle member 29. However, the circuit has been interrupted and any arc incident thereto has been drawn and extinguished within the fuse tube 21. There is then no arcing between the cap 21 and the sleet hood 14 when they separate.

It may be the case that the toggle member 29 is restrained by corrosion or sleet from movement which would effect the lowering and swinging out movement of the fuse tube 21. In order to overcome such resistance to movement of the toggle member 29, the anvil member 60 is impacted by the hammer member 61 when the flipper 46 has rocked to the position shown in Figure 5. By this time it has acquired considerable momentum and, as a result, the hammer member 61 strikes the anvil member 60 a blow which together with the remaining tension of the spring 54 is sufficient to cause the lower end of the fuse tube 21 and the toggle member 29 to swing outwardly, the latter about the axis through its trunnions 38. As pointed out before these forces act on the anvil member 60 close to the axis of the flipper 46 and thus are highly effective in pry-

ing out the detent 50 and the lower end of the fuse tube 21. The continued rocking movement of the flipper 46 is finally arrested when the ends 62 engage the flanges 63 of the toggle member 29. The toggle member 29 then continues to rock about the axis of the trunnions 38. This movement of the toggle member 29 lowers the pivot axis 31 of the fuse tube 21 and the net result is to lower the fuse tube 21 away and disengage its cap 26 from the sleet hood 14, thereby permitting it to swing outwardly away from the upper line terminal 12.

The toggle member 29 overlies the flipper 46 and, therefore, the likelihood of the latter being prevented from operating in the manner described by sleet is minimized.

Since certain changes can be made in the foregoing construction and different embodiments of the invention can be made without departing from the spirit and scope thereof, it is intended that all matter shown in the accompanying drawings and described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

What is claimed as new is:

1. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member and adapted to be restrained by said fuse link, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent stationarily mounted on the lower end of said fuse tube, and a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents.

2. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member and adapted to be restrained by said fuse link transversely of said fuse tube, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, and a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, the engaging faces of said detents being located in a plane transverse to said flipper whereby limited relative movement of said faces can take place on stretching of said fuse link without materially increasing the force required to be exerted by said fuse link in opposition to said force acting to rock said toggle member.

3. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member about the same axis that it is pivoted on said support means and adapted to be restrained by said fuse link, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent stationarily mounted on the lower end of said fuse tube, and a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents.

4. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member about the same axis that it is pivoted on said support means and adapted to be restrained by said fuse link transversely of said fuse tube, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, and a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, the engaging forces of said detents being located in a plane transverse to said flipper whereby limited relative movement of said faces can take place on stretching of said fuse link without materially increasing the force required to be exerted by said fuse link in opposition to said force acting to rock said toggle member.

5. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, fastening means on said toggle member for connecting one end of said fuse link thereto, a flipper pivoted on said toggle member and adapted to have said fuse link trained thereover, a spring reacting between said toggle member and said flipper for biasing the latter to withdraw from said fuse tube the portion of said fuse link released on blowing thereof, a detent stationarily mounted on the lower end of said fuse tube, and a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents.

6. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support

means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, fastening means on said toggle member for connecting one end of said fuse link thereto, a flipper pivoted on said toggle member about the same axis that it is pivoted on said support means and adapted to have said fuse link trained thereover, to hold it transversely of said fuse tube, a spring reacting between said toggle member and said flipper for biasing the latter to withdraw from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, and a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, the engaging faces of said detents being located in a plane transverse to said flipper whereby limited relative movement of said faces can take place on stretching of said fuse link without materially increasing the force required to be exerted by said fuse link in opposition to said force acting to rock said toggle member.

7. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member and adapted to be restrained by said fuse link, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, an anvil member on the lower end of said fuse tube, and a hammer member on said flipper arranged to strike said anvil member when said flipper is released on blowing of said fuse link to rock said toggle member away from said fuse tube for lowering it.

8. The invention, as set forth in claim 7, wherein a tooth is carried by the fuse tube at its lower end to constitute the first mentioned detent and the anvil with the side adjacent said fuse tube being engaged by the detent on the flipper and the opposite side being engaged by the hammer member.

9. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member and adapted to be restrained by said fuse link transversely of said fuse tube, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, the engaging faces of said detents being located in a plane transverse to said flipper whereby limited relative movement of said faces can take place on stretching of said fuse link without materially increasing the force required to be exerted by said fuse link in opposition to said force acting to rock said toggle member, an anvil member on the lower end of said fuse tube, and a hammer member on said flipper arranged to strike said anvil member when said flipper is released on blowing of said fuse link to rock said toggle member away from said fuse tube for lowering it.

10. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member about the same axis that it is pivoted on said support means and adapted to be restrained by said fuse link, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, an anvil member on the lower end of said fuse tube, and a hammer member on said flipper arranged to strike said anvil member when said flipper is released on blowing of said fuse link to rock said toggle member away from said fuse tube for lowering it.

11. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, a flipper pivoted on said toggle member about the same axis that it is pivoted on said support means and adapted to be restrained by said fuse link transversely of said fuse tube, a spring biasing said flipper for withdrawing from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is applied to said detents, the engaging faces of said detents being located in a plane transverse to said flipper whereby limited relative movement of said faces can take place on stretching of said fuse link without materially increasing the force required to be exerted by said fuse link in opposition to said force acting to rock said toggle member, an anvil member on the lower end of said fuse tube, and a hammer member on said flipper arranged

to strike said anvil member when said flipper is released on blowing of said fuse link to rock said toggle member away from said fuse tube for lowering it.

12. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, fastening means on said toggle member for connecting one end of said fuse link thereto, a flipper pivoted on said toggle member and adapted to have said fuse link trained thereover, a spring reacting between said toggle member and said flipper for biasing the latter to withdraw from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, an anvil member on the lower end of said fuse tube, and a hammer member on said flipper arranged to strike said anvil member when said flipper is released on blowing of said fuse link to rock said toggle member away from said fuse tube for lowering it.

13. In a dropout fuse construction wherein a fuse tube containing a fuse link is held by latch means to interconnect upper and lower line terminals, said lower line terminal having support means associated therewith, in combination, a toggle member for pivoting on said support means and on the lower end of said fuse tube for lowering it to disengage said latch means and permit said fuse tube to swing downwardly to open circuit position, fastening means on said toggle member for connecting one end of said fuse link

thereto, a flipper pivoted on said toggle member about the same axis that it is pivoted on said support means and adapted to have said fuse link trained thereover to hold it transversely of said fuse tube, a spring reacting between said toggle member and said flipper for biasing the latter to withdraw from said fuse tube the portion of said fuse link released on blowing thereof, a detent on the lower end of said fuse tube, a detent on said flipper for engaging said detent on said fuse tube as long as said flipper is restrained by said fuse link whereby force acting to rock said toggle member and lower said fuse tube is restrained by said detents, the engaging faces of said detents being located in a plane transverse to said flipper whereby limited relative movement of said faces can take place on stretching of said fuse link without materially increasing the force required to be exerted by said fuse link in opposition to said force acting to rock said toggle member, an anvil member on the lower end of said fuse tube, and a hammer member on said flipper arranged to strike said anvil member when said flipper is released on blowing of said fuse link to rock said toggle member away from said fuse tube for lowering it.

14. The invention, as set forth in claim 13, wherein a tooth is carried by the fuse tube at its lower end to constitute the first mentioned detent and the anvil with the side adjacent said fuse tube being engaged by the detent on the flipper and the opposite side being engaged by the hammer member.

SIGURD I. LINDELL.

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The following references are of record in the file of this patent:

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Number	Name	Date
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