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DROP-OUT FUSE CONSTRUCTION

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This invention relates to a drop out fuse and is particularly directed to a drop out fuse of the expulsion type.

Objects of this invention are to provide a drop out fuse in which the fuse tube is supported in position and is held in this position by latching means adjacent the lower portion of the tube, such latching means being restrained from releasing motion by the fuse link so that when the fuse link is ruptured the latching means is released and the fuse tube drops downwardly and outwardly from operative to inoperative position.

Further objects are to provide a drop out fuse in which the motion of the parts, upon blowing of the fuse link, results in the separation of at least one contact carried by the fuse tube from the corresponding stationary contact to thereby greatly increase the gap in the circuit and prevent leakage.

Further objects are to provide a construction of drop out fuse having the characteristics enumerated above, in which the top of a fuse tube is closed to thereby prevent rain from entering, in which the upper contact forms in effect a sleet hood for the upper portion of the fuse tube, and in which one member of the latching means acts in the manner of a sleet hood for the lower mechanism of the fuse tube.

Further objects are to provide a construction in which the lower portion of the fuse tube first moves downwardly and outwardly and releases the latching means upon blowing of the fuse link, and in which means are provided to assist in the initial downward motion of the fuse tube.

Further objects are to provide a drop out fuse which, though having the characteristics outlined, nevertheless is of simple construction, is composed of relatively few parts, all of which are easy to produce, and which may be easily detached and re-fused and repositioned.

Embodiments of the invention are shown in the accompanying drawing, in which Figure 1 is a side elevation, partly in section, of one form of the invention.

Figure 2 is a detailed view, partly in section, showing a modified form of latching means.

Referring to the drawing, particularly Figure 1, it will be seen that the device comprises a fuse tube 1 provided with an upper contact 2, which includes the usual nut 3 for locking the upper portion of the link 4 in place, and which is also provided with a lower collar or member 5 clamped to the fuse tube in any suitable manner. If desired, this member 5 may carry an outwardly projecting lip 6 whereby it may be manipulated

by a switch stick in repositioning the fuse after re-fusing. The upper contact 2 may be provided with a ring 7 which can be engaged by the hook of the switch stick so that the fuse may be rocked into operative position.

The device may be carried from a base member 8 from which upper and lower insulators 9 and 10 project. These insulators carry the upper and lower stationary contacts of the device. The upper insulator 9 may carry the terminal receiving member 11, a sleet hood in the form of a downwardly opening casing 12, and an outwardly projecting, inwardly looped phosphor-bronze upper spring contact 13. Preferably the upper portion of the device, for example, the sleet hood 12, is provided with a stop 14 to arrest the inward rocking motion of the fuse tube when the fuse tube is being rocked into closed or operative position.

The lower contact includes a bracket 15 which carries a pin 16. The pin, in reality, is a tube adapted to receive the corresponding terminal of the line conductor, and is provided with a set screw 17 which passes through the bracket 15 and the tube 16 and serves not only to hold the pin or tube 16 in place, but also to clamp the conductor within the tube or pivot pin.

The latching means includes a phosphor-bronze latching member 18 which is relatively wide and which acts as a sleet hood for the lower mechanism positioned beneath such member. This latching member 18 is springy and is provided with a shouldered portion 19, beneath which a nose or projecting lip 20, preferably integral with the member 5, is adapted to hook and to thereby latch the fuse in closed position.

A hinge arm or lever 21 is pivotally mounted upon the collar or member 5 by means of the pivot pin 22. Preferably the lever or hinge arm 21 is bifurcated adjacent its upper portion, as shown in Figure 1, so as to straddle a portion of the member 5. It is also provided with a pair of hook-like portions 23 which constitute open hooks and which are located on opposite sides of the bracket 15 and are hooked over the pivot member 16. This permits unhooking of the fuse tube when the fuse tube has rocked to inoperative or open position.

The lever 21 is provided with clamping means, such as a thumb nut 24, for clamping the lower end of the link 4, which projects from the bottom of the fuse tube, to such lever.

It will be seen that the lever 21 is held in position by means of the fuse link 4. However, when this fuse link is ruptured, the lever 21 is released,

the usual expulsion action taking place within the fuse tube 1. The downward pressure, due to both the weight of the fuse tube 1 and its associated parts and the downward spring pressure from the upper contact member 13, urges the fuse tube downwardly. The lever 21 pivots about the pivot pin 16 and rocks the upper pivot point 22, and consequently the lower portion of the fuse tube, outwardly and downwardly. This moves the portion 20 of the latching means from the latching member 18, and thus the latching means is released and the fuse is permitted to swing downwardly and outwardly.

It is obvious that the latching member 18 need not be made as a spring member, but it could be made as a cast or rigid member, as indicated at 25 in Figure 2. In this case it would be pivoted to the upper portion of a bracket carried by the lower contact, as by means of the pivot pin 26. A spring 27 is provided for urging the latching member 25 downwardly, a shouldered arm 28 limiting the downward motion of the latching member. The latching member engages the nose 20 previously described. This latching member is also provided with a slanting face 29, corresponding to the slanting face 30 of the latching member 18. This construction, therefore, in each instance permits the rocking of the fuse into closed or operative position after re-fusing, as the nose 20 in each instance would move beneath the face 30 or the face 29, as shown in Figures 1 and 2 respectively, and would raise the latching member until the nose 20 was positioned against the restraining shoulder of the latching means.

It will be seen that a very simple and easily constructed type of drop out fuse has been provided in which the latching means is provided for the lower portion of the fuse tube, and in which the initial downward motion of the fuse tube is accelerated or aided by the upper contact member.

It will be seen, further, that the construction is very simple and involves a very small number of easily constructed and relatively rugged parts.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. A fuse construction comprising upper and lower terminal members, a fuse having upper and lower contacts electrically connected to said terminal members, a fuse link carried by said fuse, and lever mechanism for bodily lowering said fuse out of contact with said upper terminal member and rocking said fuse outwardly, said lever mechanism including latch means adjacent the lower end of said fuse normally restrained from releasing by said fuse link, said lever mechanism normally holding said fuse in an elevated operative position, and said latch means normally locking said fuse in operative position.

2. A fuse construction comprising upper and lower terminal members, a fuse having upper and lower contacts electrically connected to said terminal members, a fuse link carried by said fuse, and lever mechanism for bodily lowering said fuse out of contact with said upper terminal member and rocking said fuse outwardly, said lever mechanism including latch means adjacent the lower end of said fuse normally restrained from releasing by said fuse link, said lever mechanism normally holding said fuse in an elevated opera-

tive position, and said latch means normally locking said fuse in operative position, said upper terminal member having means urging said fuse downwardly.

3. An expulsion fuse construction comprising upper and lower terminal members, a fuse pivotally supported from said lower terminal member and having upper and lower contacts normally electrically connected to said upper and lower terminal members, said fuse having a tubular body portion closed at its upper end and open at its lower end, a fuse link within said tubular body portion extending outwardly from the open lower end of said tubular body portion, and means mechanically controlled by the lower projecting portion of said fuse link for latching said fuse to said lower terminal member to normally hold said fuse in operative position, the upper end of the fuse link being relatively immovably held to said tubular body portion, the tubular body portion of said fuse dropping outwardly to inoperative position when said last mentioned means is released upon rupture of said fuse link.

4. An expulsion fuse construction comprising upper and lower terminal members, a fuse having a tubular body portion closed at its upper end and open at its lower end, said fuse having upper and lower contacts normally electrically connected to said upper and lower terminal members, a link electrically joining the contacts of said fuse and projecting from the lower end of said tubular body portion, a lever pivotally supported from said fuse tube and from said lower terminal member, said lever having a downwardly projecting portion normally secured to said fuse link, and latch mechanism controlled by said lever for locking said fuse to said lower terminal member, whereby said fuse is held in normal position by said lever and said lever is restrained against latch releasing motion by said fuse link, the upper end of the fuse link being relatively immovably held to said tubular body portion.

5. A fuse comprising terminal members, a fuse tube having contacts normally electrically connected to said terminal members, said fuse tube being normally held in operative position and automatically movable therefrom to inoperative position, said fuse tube having a fuse link located within the tube and projecting from one end thereof and normally electrically connecting the contacts of said fuse tube, and latching means for latching said fuse tube to one of said terminal members, said latching means including a latch member carried by said last mentioned terminal member, and a catch member movable with respect to said latch member and carried by said fuse tube, said catch member being movable from said latch member and being restrained from motion by said fuse link, said latch and catch members constituting the sole locking means for holding said fuse tube in operative position and for releasing said fuse tube to allow said tube to move from operative to inoperative position.

6. A fuse comprising upper and lower terminal members, a fuse tube having upper and lower contacts normally electrically connected to said upper and lower terminal members, said fuse tube being pivotally mounted adjacent said lower terminal member and adapted to rock outwardly away from said upper terminal member, said fuse tube having a fuse link electrically joining said contacts and projecting from one end of said fuse tube, a lever pivotally mounted with

respect to both said lower terminal member and said fuse tube and normally restrained from motion by the projecting portion of said fuse link, and latch means controlled by said lever for directly locking said fuse tube to said lower terminal member.

7. A fuse comprising upper and lower terminal members, a fuse tube having upper and lower contacts normally electrically connected to said upper and lower terminal members, said fuse tube being pivotally mounted adjacent said lower terminal member and adapted to rock outwardly away from said upper terminal member, said fuse tube having a fuse link electrically joining said contacts and projecting from one end of said fuse tube, a lever pivotally mounted with respect to both said lower terminal member and said fuse tube and normally restrained from motion by the projecting portion of said fuse link, and latch means adjacent the lower portion of said fuse controlled by said lever for directly locking said fuse tube to said lower terminal member, said upper terminal member having means urging said fuse tube downwardly.

8. A fuse comprising upper and lower terminal members, a fuse tube having upper and lower contacts normally electrically connected to said upper and lower terminal members, said fuse tube having a fuse link electrically joining said contacts and projecting from one end of said fuse tube, a lever pivotally mounted with respect to both said lower terminal member and said fuse tube and normally restrained from motion by the projecting portion of said fuse link, and latch means controlled by said lever for directly locking said fuse tube to said lower terminal member, said upper terminal member having means urging said fuse tube downwardly and having a sleet hood positioned over said last mentioned member and over the upper portion of said fuse tube.

9. A fuse comprising spaced terminal members, a fuse tube having spaced contacts normally electrically connected to said terminal members, one of said terminal members having catch means, said fuse tube having latch means adjacent the lower end thereof normally interlocking with said catch means to lock said fuse tube to said last mentioned terminal member, said fuse tube being pivotally mounted adjacent said latch means, and means controlling the latch means and restraining said latch means against releasing motion with respect to said catch means, and a fuse link normally electrically adjoining said contacts and restraining said last mentioned means against motion.

10. A fuse comprising spaced terminal members, a fuse tube having spaced contacts normally electrically connected to said terminal members, one of said terminal members having catch means, said fuse tube having latch means adjacent the lower end thereof normally interlocking with said catch means to lock said fuse tube with respect to said last mentioned terminal member, and means controlling the latch means and restraining said latch means against releasing motion with respect to said catch means, and a fuse link normally electrically adjoining said contacts and restraining said last mentioned means against motion, said catch means constituting a sleet hood.

11. A fuse comprising upper and lower terminal members, a fuse tube having upper and lower contacts normally electrically connected to said

upper and lower terminal members, said fuse tube having a fuse link electrically connecting said contacts and projecting outwardly from the lower end of said fuse tube, a movable catch member carried by said lower contact and having a shouldered portion, a latch member carried by said fuse tube and normally engaging said shouldered portion to lock said fuse tube to said lower terminal member, said fuse tube being pivotally supported with respect to said lower terminal member, and means restraining said latch means from detaching motion with respect to said catch means and being itself controlled by said fuse link.

12. A fuse comprising upper and lower terminal members, a fuse tube having upper and lower contacts normally electrically connected to said upper and lower terminal members, said fuse tube having a fuse link electrically connecting said contacts and projecting outwardly from the lower end of said fuse tube, a movable catch member carried by said lower contact and having a shouldered portion, a latch member carried by said fuse tube and normally engaging said shouldered portion to lock said fuse tube to said lower terminal member, said fuse tube being pivotally supported with respect to said lower terminal member, and means restraining said latch means from detaching motion with respect to said catch means and being itself controlled by said fuse link, said catch means having a cam face engageable by said catch means when said fuse tube is rocked into operative position.

13. An automatic fuse switch having upper and lower terminal contacts, a fuse tube having upper and lower contact blocks, a catch on the lower terminal contact engaging the lower contact block, a lever pivotally supporting said tube, and a fuse link in said tube connecting the upper contact block and said lever to hold said lower contact block in engagement with said catch.

14. In a drop-out fuse, an insulating support having upper and lower terminal contacts and a fuse cartridge normally occupying an operative position and extending vertically between said contacts, said cartridge being pivotally supported by the lower terminal contact and frictionally engaging the upper terminal contact, in combination with latch means coacting between the cartridge and said lower terminal contact to hold the cartridge in circuit closing position, and a fuse link in the cartridge controlling said latch means, whereby when said fuse link is ruptured said latch means is released and said fuse cartridge rocks outwardly from operative to inoperative position.

15. A circuit interrupting switch comprising upper and lower terminal members, an arcing tube having upper and lower contacts electrically connected to said terminal members, a flexible conductor in said tube electrically connecting said upper and lower terminal members, lever mechanism for bodily lowering said tube out of contact with said terminal members and rocking said tube outwardly, said lever mechanism including latch means adjacent the lower end of said tube, said lever mechanism normally holding said tube in an elevated operative position, and said latch means normally locking said fuse in operative position, and current controlled means for releasing said lever mechanism.

16. An automatic circuit interrupting switch construction comprising upper and lower terminal members, an arcing tube having upper and lower contacts electrically connected to said

terminal members, a flexible link carried by said tube electrically connecting said upper and lower terminal members, lever mechanism for bodily lowering said tube out of contact with said upper terminal member and rocking said tube outwardly, said lever mechanism including latch means adjacent the lower end of said tube, said lever mechanism normally holding said tube in an elevated operative position, and said latch means normally latching said tube in operative position, said upper terminal member having means urging said tube downwardly, and means operative on an overload for releasing said lever mechanism.

17. An automatic circuit interrupting switch having upper and lower terminal contacts, an arcing tube having upper and lower contact blocks, a catch on the lower terminal contact engaging the lower contact block, a lever pivotally supporting said tube, and a flexible link in said tube electrically connecting the upper contact block with the lower contact block, and means holding said lever against pivotal movement relative to said tube and operative on overload to release said lever.

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