July 15, 1958 R. A. WOOD 2,843,704

LOAD BREAK CUT-OUT

Filed March 9, 1955 2 Sheets-Sheet 1

FIG. 1

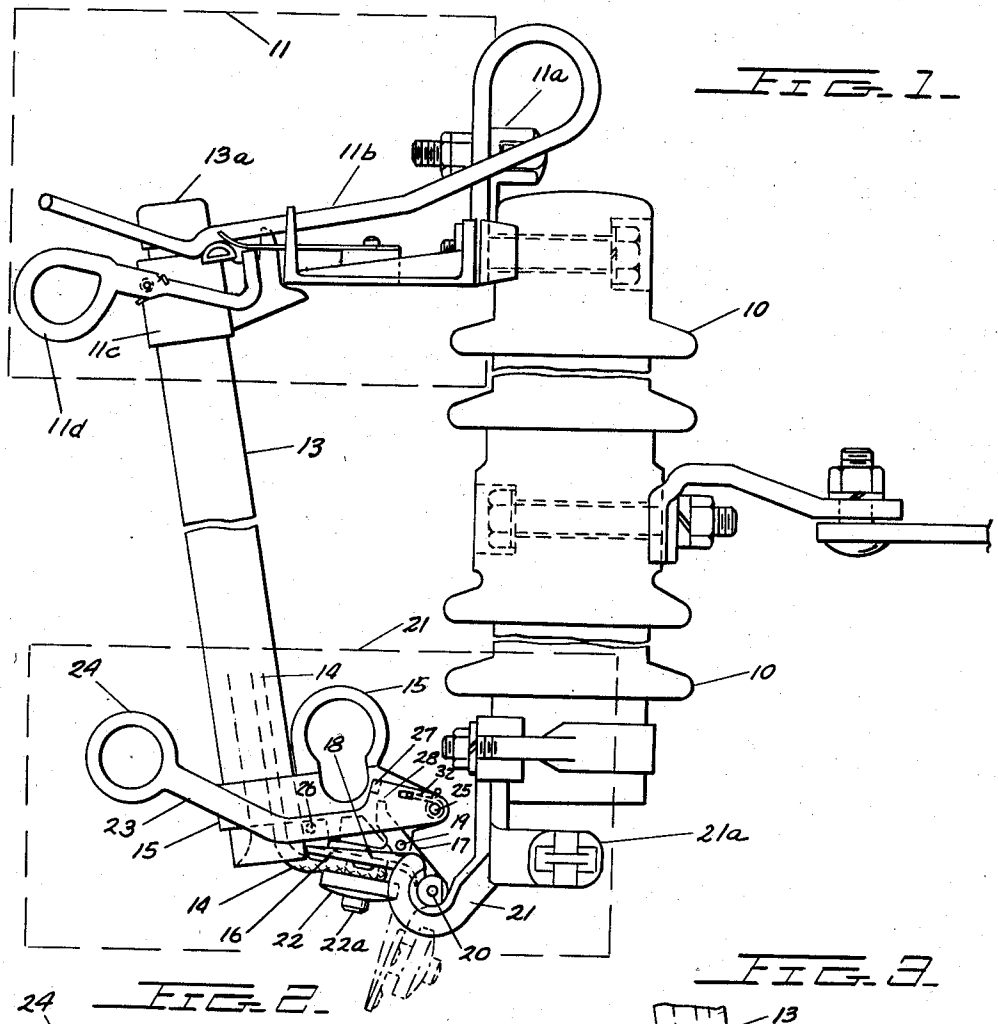


FIG. 2

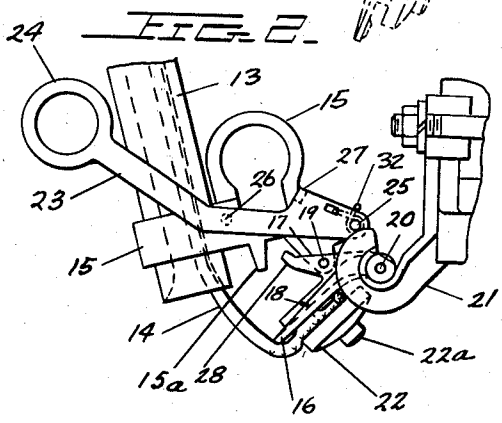
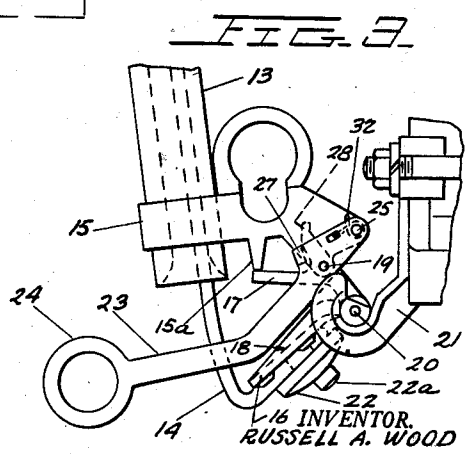


FIG. 3



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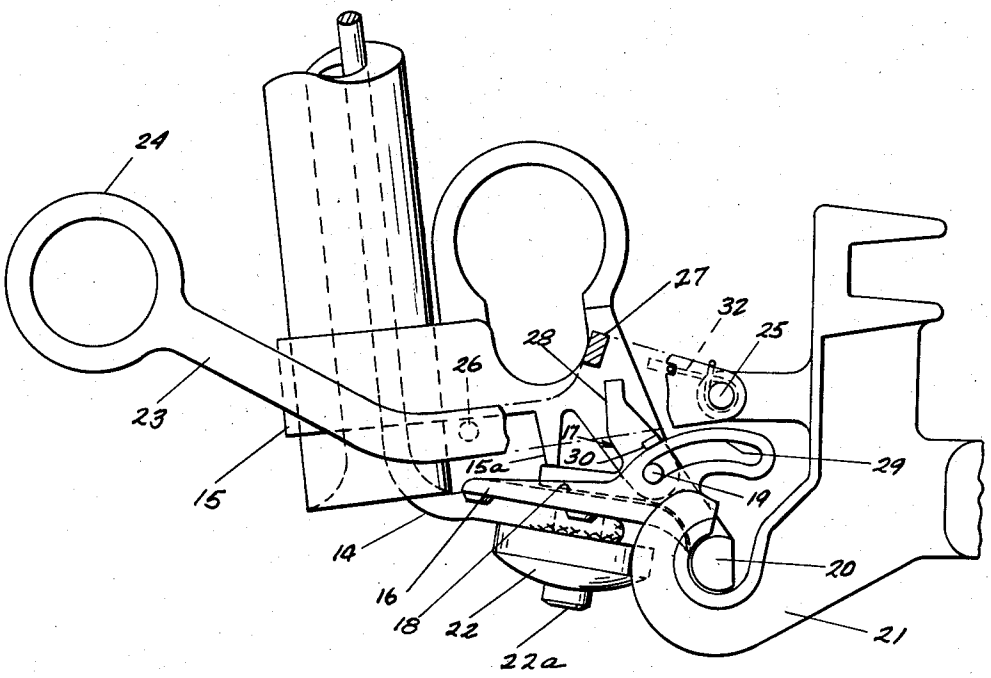
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FIG. 4



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2,843,704

LOAD BREAK CUT-OUT

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Application March 9, 1955, Serial No. 493,177

21 Claims. (Cl. 200—114)

My invention relates to a load break mechanism for a cut-out device.

For purposes of simplicity, I hereinafter describe my invention with reference to fuse cut-outs. However, it shall be noted that my novel load break mechanism can be used in cut-outs where there are main contacts in series with any interrupting means such as auxiliary contacts confined in an interrupting chamber. A device of this type to which my novel load break mechanism can be applied is the interrupter switch shown in U. S. Patent No. 2,383,795, issued August 28, 1945, and assigned to the assignee of the instant invention.

Fuse cut-outs are well known devices used in the interruption of fault currents and overload currents on distribution systems having relatively high voltage. They normally comprise a pair of contacts in series with a fuse link. The fuse link is then surrounded by a fuse tube or interrupting chamber which can be made of a fibre lined laminated phenolic tube with the bore and tube length dictated by the continuous current rating and voltage rating of the cut-out. The complete assembly is then supported between an upper and lower support.

The fuse tube ends can then be enclosed to operate for single vent or double vent operation with a device such as the expendible disc for a fuse cut-out, which I show in my co-pending application Serial No. 489,410, filed February 21, 1955.

Upon the occurrence of an over-load, the fuse link will melt and separate within the confines of the fuse tube. After clearance of the arc and interruption of the circuit, the main contacts can be disengaged.

It is often desirable to open the system protected by the fuse cut-out manually while the system is carrying load current. However, at distribution voltages of 5 to 17 kv., the arcing associated with the engaging contacts due to the continuous current and voltage can not be counted on to clear themselves in the air. It is, therefore, necessary to break the fuse link first and after the fuse link separates at a proper velocity to a predetermined distance the arc will be cleared in the fuse tube and the fuse cut-out contacts can be subsequently disengaged.

The type fuse cut-out normally used for this purpose, that is, for load break, has some type of a hinge arrangement that allows the cut-out fuse holder to disengage itself from the top contact upon separation of the fuse link. It is, however, possible that the arc inside the fuse tube would not be extinguished by the time the cut-out fuse contacts begin to disengage. Thus, the current flowing causes an arc across the disengaging contacts which may transfer around the fuse holder and interruption will not occur.

One system that has been used to keep the contacts from disengaging until the arc across the separated fuse link is extinguished shows a fuse hook to operate a lever arm which prys the fuse link apart with a lever arrangement that requires the operator to push upward with the fuse hook. The fuse hook is then maintained in the upward position by the operator until the arc across the separated fuse link has had a chance to clear inside the fuse tube. After the arc has cleared, the operator then allows the fuse holder to disengage from the upper contact by another motion of the lever arm to thereby open the fuse cut-out contacts.

This system has two severe disadvantages. The first is that if the operator releases his pressure on the fuse hook too quickly the fuse cut-out contacts will disengage before the arc across the fuse link has been completely extinguished.

The second disadvantage is that the operator must physically separate the relatively strong fuse link with an upward motion. An upward motion of this type requiring considerable force is an un-orthodox and awkward motion.

My invention provides a load break mechanism for a fuse cut-out which allows the operator to separate the fuse link for load break operation with a downward motion. The load break mechanism of my invention further provides a latch means to maintain the fuse cut-out contacts in the engaged position until the operator returns the operating lever to a second position after the arc across the fuse link has extinguished.

Two distinct advantages are inherent in my invention. The first is that the operator separates the fuse link physically with a downward motion of the fuse hook. This allows the operator to use his weight to separate the fuse link in contra-distinction to the upward push required in prior art load break cut-outs.

The second advantage presented by my invention is that after the physical separation of the fuse link, the ends of the broken fuse link will separate to a predetermined distance at a predetermined velocity in a manner controlled by the operator. Therefore, an operator can be sure that the fuse link has completely interrupted the arc before he returns the operating lever to a new position to thereby allow the fuse-out contacts to separate.

In principle, my novel invention can comprise a toggle which may have a fixed pivot and a movable pivot and having the toggle maintain the fuse cut-out contacts in the engaged position when the toggle is latched and a disengaged position when the toggle is unlatched. Therefore, when the toggle is in the unlatched position, the movable pivot can rotate about the fixed pivot to thereby allow the fuse holder to drop vertically from its upper latch and to subsequently completely disengage the upper contacts by having the complete fuse holder rotate about the fixed pivot.

The toggle system is normally latched to maintain the fuse cut-out contacts in the engaged position. The normally latched position can be maintained by the physically unseparated or fused fuse link. When the fuse link is separated due to overcurrent in the system, the latch is removed and the melted link is separated to a predetermined distance due to the rotation of the unlatched toggle and the complete fuse tube assembly subsequently rotates about the fixed pivot point to thereby disengage the fuse cut-out contacts.

On load break operation, the fuse link is physically broken by energization of the operating lever to thereby remove the first latch. This energization can be a manual rotation of the operating lever by an operator. However, before the first latch is removed, a second latch which is brought into position by the motion of the operating lever latches the toggle. Hence, when the fuse link separates and the separated fuse link ends are driven to a predetermined distance to insure the extinction of the arc, the toggle which is still latched maintains the fuse cut-out contacts in the engaged position. A subsequent operation of the operating lever then removes the second latch to thereby unlatch the toggle and allow the fuse

holder to rotate about the fixed pivot to effect disengagement of the fuse cut-out upper contacts.

Accordingly, it is a primary object of my invention to provide a cut-out device having a load break feature in which the upper and lower contacts of the load break cut-out are maintained closed and require a second manual operation to open the upper contacts after the fuse link is separated and interrupts the arc.

Another object of my invention is to provide a cut-out device which effects load break operation by a downward pull on the operating lever by the operator.

Still another object of my invention is to provide a toggle system for a fuse tube cut-out which is unlatched when the fuse link is separated by overcurrent and allows subsequent automatic separation of the main contacts after the arc is extinguished in the fuse tube and latches on load break operation to maintain the load cut-out contacts closed until after the fuse link is completely separated.

A still further object of my invention is to provide an operating lever for a cut-out device which latches the cut-out main contacts closed on load break operation until an interrupting means in series with the main contacts completely extinguishes the arc.

Another object of my invention is to provide a control means such as the above latch arrangement which will maintain the cut-out contacts closed on load break operation until an interrupting means in series with the main contacts completely extinguishes the arc.

These and other objects of my invention will be apparent from the following description when taken in connection with the drawings in which:

Figure 1 shows a side view of a complete fuse cut-out embodying my novel load break feature under normal current carrying conditions.

Figure 2 shows the load break mechanism of Figure 1 after operation on overload.

Figure 3 shows the load break mechanism of Figure 1 after load break operation.

Figure 4 shows a second embodiment of my novel load break mechanism under normal current carrying conditions.

In Figure 1, I show a complete load break cutout in which fuse support 10 supports the upper tube assembly shown in dotted box 11 and the lower tube assembly shown in dotted box 12.

My novel invention is directed to the mechanism of lower tube assembly 12. Fuse tube 13 is supported between upper tube assembly 11 and lower tube assembly 12 and the upper end is capped by an expendible disc cap or a cap 13*a*. Pryout lever 11*d* is provided for manual operation of the fuse cutout under no load conditions so that the fuse holder can be disengaged from the upper contact without breaking fuse link 14. Within fuse tube 13 is the fuse link 14. The fuse tube is then rigidly fastened to a lower tube support casting 15.

The main current path is now from terminal 11*a*, arc horn 11*b*, tube end 11*c*, fuse link 14, trunnion casting 16, hinge 21 and terminal 21*a*. Trunnion casting 16 acts as a latch for toggle link 17 along the surface 18 when fuse link 14 is in position prior to separation thereof. Toggle link 17 and lower tube support 15 are both pivotally supported at pivot 19. Protrusion 15*a* of lower tube support casting 15 acts as a stop for clockwise rotation of toggle link 17 about pivot point 19 and surface 18 of toggle link 17 acts as a stop for clockwise rotation of latch 16 about pivot point 20. Toggle link 17 has a second fixed pivot 20 which lies in hinge casting 21. The fuse link leader of fuse link 14 is fastened to the first latch member or trunnion casting 16 by means of nut 22 and stud 22*a*. Note that the fuse link leader can latch toggle link 17 directly as well as indirectly as shown in Figure 1.

Trunnion casting 16 is also shown in dotted lines in Figure 1 as being rotated about hinge 20 to the position it will assume when not held in the latch position by the fuse link leader and fuse link 14.

The operating lever of the fuse cut-out of Figure 1 is shown as lever 23 which can have an opening eye 24 at one end. Operating lever 23 is pivotally connected to the lower tube support casting 15 at pivot 25 and carries a pin 26 which can engage latch 16, and a second latch 27 which can latch toggle link 17 at the surface 28 when operating lever 23 is activated.

Operating lever 23 is maintained in the position shown in Figures 1 and 4 during normal operating condition by a biasing means such as spring 32 to keep latch 27 from accidentally engaging surface 23 of toggle link 17.

Although operating lever 23 has its pivotal connection 25 on the lower tube support casting 15 in Figure 1, it should be noted that it could have been mounted on the hinge casting 21 as is shown in Figure 4.

The operation of the particular embodiment which I show in Figures 1, 2 and 3 is as follows. During normal operating conditions, fuse link leader 14 maintains the first latch or trunnion casting 16 in engagement with toggle link 17 along surface 18, as shown in Figure 1. Hence, the fuse holder when latched in position in the upper tube support cannot rotate about pivot 20 and the main operating contacts at the upper tube support are maintained in engagement.

If the fuse link 14 is now separated due to fault conditions in the protected system as shown in Figure 2, latch 16 is free to rotate in a counterclockwise direction around pivot point 20 to the position shown. Since toggle link 17 is now unlatched, pivot 19 also rotates about pivot 20 in a counterclockwise direction to the position shown in Figure 2.

It should be noted that this operation can be accelerated by means of a spring bias in the mechanism. One such bias could be a downward force exerted by the arc horn 11B. Hence, fuse link 14 is separated to a predetermined distance to insure interruption of the arc.

Note that in this motion, lower tube support casting 15 drops in an approximately horizontal direction, thus dropping fuse tube 13 out of the latch position in the upper tube support. Once the upper tube support is unlatched, the fuse holder is now free to subsequently rotate around pivot point 20 to thereby completely disengage the fuse holder from arc horn 11B.

In summary, when the fuse cut-out of my invention operates under fault conditions, as shown in Figure 2, toggle link 17 is automatically unlatched by latch 16 to thereby unlatch the upper tube support and at the same time insure dielectric separation of the fuse link 14 for arc interruption and subsequently allow the fuse holder to rotate about pivot 20 to thereby disengage the main fuse cut-out contacts at the upper support.

In the case of load break operation, my novel load break mechanism operates as shown in Figure 3. Lever arm 23 which is normally held in the up position by a spring 32 is forced to rotate counterclockwise around pivot point 25. This can be accomplished by an operator by inserting a fuse hook in opening eye 24 and exerting a downward motion on the lever arm 23. In the course of the counterclockwise motion of the lever arm, a second latch 27 which is mounted on lever arm 23 engages the surface 28 of toggle link 17. Further rotation of operating lever 23 brings pin 26 which is fastened to lever arm 23 into engagement with the first latch member 16. A still further motion of lever arm 23 forces pin 26 to rotate the first latch 16 counterclockwise about pivot point 20 to thereby rupture fuse link 14. Figure 3 shows the mechanism after fuse link 14 has separated.

It should be noted, however, that when latch 16 is forced to disengage toggle link 17, a second latch 27 has already been placed in position to maintain toggle link 17 in the latched position. After fuse link 14 is ruptured, the first latch member 16 is rotated about pivot point 20 to the position shown in Figure 3. This assures a dielectric separation of the two ends of the ruptured fuse link 14 to extinguish the arc formed by the separation. How-

ever, in this case, pivot point 19 can not rotate about pivot point 20 and the fuse holder cannot drop down and disengage the cut-out contacts since latch 27 on lever arm 23 now latches toggle link 17 at the surface 28. Hence, load break operation is achieved in a smooth downward motion in which the operator can exert his full weight on a switch stick inserted in opening eye 24.

In summary, on the load break operation shown in Figure 3, fuse link 14 is ruptured and unlatches a first latch, and causes adequate separation of the ruptured end to insure arc extinguishment. However, since toggle link 17 is maintained latched by a second latch 27, the fuse holder can not rotate out of its upper latch position and the fuse cut-out contacts at the upper tube support are maintained in engagement. This assures the operator of complete load interruption on load break operation before he can open the main fuse cut-out contacts.

Once the fuse link 14 has completely extinguished the arc as shown in Figure 3, the operator can now lift operating lever 23 to its previous position to thereby unlatch toggle link 17 by removing the latch 27 from the toggle link surface 28. Pivot point 19 is then free to rotate about the fixed pivot 20 to thereby cause a downward motion of the fuse holder as shown in Figure 2, thus causing subsequent disengagement of the fuse holder from the upper latch assembly and subsequent rotation of the fuse holder about pivot point 20.

The embodiment of my novel load break mechanism, shown in Figure 4 illustrates a modification of the device shown in Figures 1, 2 and 3. Figure 4 illustrates that lever arm 23 can be pivoted at pivot point 25 which is now maintained on hinge casting 21. I further show the first latch or trunnion casting 16 as having a guide slot 29 at pivot point 19 in order to allow latch 16 to rotate counterclockwise during load break operation about pivot 20.

Stop 30 is now mounted on toggle link 17 to thereby prevent the first latch 16 from rotating counterclockwise about pivot 19 when toggle link 17 is locked in the position shown. Furthermore, stop 15*a* of lower tube support casting 15 is now positioned to engage toggle link 17 to thereby prevent clockwise rotation of toggle link 17 about pivot point 19.

The operation of the embodiment of Figure 4 is almost exactly the same as the operation of the load break mechanism of Figures 1, 2 and 3. That is, similar to Figure 2, if fuse link 14 interrupts fault current, the first latch 16 rotates counterclockwise about pivot 20 to thereby disengage toggle link 17 at surface 18. Since toggle link 17 is no longer latched, toggle link 17 and the first latch 16 can rotate counterclockwise as a unit around pivot 19 while pivot 19 rotates counterclockwise about pivot 20 to complete disengagement of the fuse holder from the upper contacts.

On load break operation, operating lever 23 is rotated counterclockwise about pivot 25 similar to the operation in Figure 3. Latch 27 is moved into the latch position at surface 28 of toggle link 17 and pin 26 engages the first latch 16 to subsequently rupture fuse link 14. The first latch 16 now rotates counterclockwise about pivot 20 by sliding between pivot 19 and stop 30 to thereby separate the ruptured fuse link to completely extinguish the arc formed. However, since toggle link 17 is now latched by latch 27, stop 30 mounted on toggle 17, prevents latch 16, from rotating about pivot 19, the fuse holder can not rotate about pivot 20 and the main fuse cut-out contacts are maintained in the engaged position. In order to unlatch the load break mechanism to allow the fuse holder contacts to disengage, the operating lever 23 is now moved upward to allow unlatching between latch 27 and toggle link 17.

In the foregoing, I have described my invention only in connection with preferred embodiments thereof. Many variations and modifications of the principles of my invention within the scope of the description herein are obvious. Accordingly, I prefer to be bound not by the specific disclosure herein but only by the appending claims.

I claim:

1. In a fuse cut-out comprising an operating means, a fuse tube and a fuse link; a toggle link operatively connected to said fuse tube; a first and second latch for said toggle link; said first latch constructed to maintain said toggle link in the latched position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means being manually operable to separate said fuse link during normal load conditions; said operating means operatively connected to move said second latch to latch said toggle link and to subsequently separate said fuse link when said operating means is energized.

2. In a cut-out device having main contacts and interrupting means in series; an interrupting chamber for said interrupting means; a toggle link operatively connected to said interrupting chamber positioned to maintain said main contacts engaged when said toggle link is latched; said interrupting means operatively connected to maintain said toggle latched when said interrupting means is uninterrupted and to unlatch said toggle when said interrupting means is interrupted; an operating means operatively connected to a latch member; said operating means being manually operable to separate said fuse link during normal load conditions; said latch member positioned to latch said toggle and said operating means constructed to subsequently cause interruption of said interrupting means when said operating means are energized.

3. In a cut-out device having main contacts and interrupting means in series; an interrupting chamber for said interrupting means; a toggle link operatively connected to said interrupting chamber positioned to maintain said main contacts engaged when said toggle link is latched; said interrupting means operatively connected to maintain said toggle latched when said interrupting means is uninterrupted and to unlatch said toggle when said interrupting means is interrupted; an operating means operatively connected to a latch member; said operating means being manually operable to separate said fuse link during normal load conditions; said latch member positioned to latch said toggle when said operating means is moved downward and said operating means constructed to subsequently cause interruption of said interrupting means when said operating means are energized.

4. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot; a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized; said first latch and said fuse link leader constructed to cause separation of said fuse link when said first latch is rotated about said first pivot.

5. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and

in the unlatched position when said fuse link is separated; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized.

6. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower support means; a toggle link; a first and second latch for said toggle link; a first and second pivot and a pivotally supported operating arm; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch fastened to the fuse link leader of said fuse link to thereby be positioned to latch said toggle link; said second latch positioned on said pivotally supported operating arm; said pivotally supported operating arm connected to position said second latch to latch said toggle link upon rotation of said pivotally supported operating arm and to subsequently engage said first latch and cause rotation of said first latch about said first pivot to thereby rupture said fuse link.

7. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower support means; a toggle link; a first and second latch for said toggle link; a first and second pivot and a pivotally supported operating arm; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch fastened to the fuse link leader of said fuse link to thereby be positioned to latch said toggle link; said second latch positioned on said pivotally supported operating arm; said toggle link and said first and second pivots positioned to allow said fuse tube to drop down to a predetermined position when said toggle link is unlatched; said pivotally supported operating arm connected to position said second latch to latch said toggle link upon rotation of said pivotally supported operating arm and to subsequently engage said first latch and cause rotation of said first latch about said first pivot to thereby rupture said fuse link.

8. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube supported between an upper tube latch assembly and a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch operatively connected to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said toggle link and said first and second pivots positioned to allow said fuse tube to drop down to a predetermined position to thereby unlatch said fuse tube from said upper tube latch assembly when said toggle link is unlatched; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized; said first latch and said fuse link leader constructed to cause separation of said fuse link when said first latch is rotated about said first pivot.

9. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch operatively connected to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said toggle link and said first and second pivots positioned to allow said fuse tube to drop down to a predetermined position when said toggle link is unlatched; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized.

10. In a fuse cut-out having main contacts, a fuse tube, a fuse link and an operating means; said fuse tube having an upper support and a lower support; said main contacts maintained in engaged position when said fuse tube is latched in said upper support; said main contacts to disengage when said fuse tube drops out of said upper support to an unlatched position; a toggle link having a first and second latch operatively connected to said fuse tube to maintain said fuse tube latched in said upper support when said toggle link is latched and to allow said fuse tube to drop out of said latched position in said upper support when said toggle link is unlatched; the fuse link leader of said fuse link and said first latch constructed to maintain said toggle in the latched position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means and said second latch constructed to latch said toggle link and subsequently separate said fuse link when said operating means is energized.

11. In a fuse cut-out having main contacts, a fuse tube, a fuse link and an operating means; said fuse tube having an upper support and a lower support; said main contacts maintained in engaged position when said fuse tube is latched in said upper support; said main contacts to disengage when said fuse tube drops out of said upper support to an unlatched position; a first and second pivot; a toggle link pivotally supported between said first and second pivots having a first and second latch operatively connected to said fuse tube to maintain said fuse tube latched in said upper support when said toggle link is latched and to allow said fuse tube to drop out of said latched position in said upper support when said toggle link is unlatched; said first latch pivotally supported on said first pivot; the fuse link leader of said fuse link and said first latch constructed to maintain said toggle in the latched position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means and said second latch constructed to latch said toggle link and subsequently force said first latch to pivotally rotate about said first pivot to separate said fuse link when said operating means is energized; said fuse tube lower support constructed to subsequently disengage main contacts in rotating about said first pivot.

12. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said operating means pivotally supported on said lower tube support means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized.

13. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube supported between an upper tube latch assembly and a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said operating means pivotally supported on said lower tube support means; said lower tube

support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch operatively connected to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said toggle link and said first and second pivots positioned to allow said fuse tube to drop down to a predetermined position to thereby unlatch said fuse tube from said upper tube latch assembly when said toggle link is unlatched; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized; said first latch and said fuse link leader constructed to cause separation of said fuse link when said first latch is rotated about said first pivot.

14. In a fuse cut-out having main contacts, a fuse tube, a fuse link and an operating means; said fuse tube having an upper support and a lower support; said main contacts maintained in engaged position when said fuse tube is latched in said upper support; said main contacts to disengage when said fuse tube drops out of said upper support to an unlatched position; a toggle link having a first and second latch operatively connected to said fuse tube to maintain said fuse tube latched in said upper support when said toggle link is latched and to allow said fuse tube to drop out of said latched position in said upper support when said toggle link is unlatched; the fuse link leader of said fuse link and said first latch constructed to maintain said toggle in the latched position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means being manually operable to separate said fuse link during normal load conditions; said operating means and said second latch constructed to latch said toggle link and subsequently separate said fuse link when said operating means is rotated; said operating means pivotally supported on said lower support.

15. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized; and means to guide said first latch in its rotation.

16. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized; and means to guide rotation of said first latch about said first pivot containing said second pivot.

17. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube supported between an upper tube latch assembly and a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch operatively connected to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said toggle link and said first and second pivots positioned to allow said fuse tube to drop down to a predetermined position to thereby unlatch said fuse tube from said upper tube latch assembly when said toggle link is unlatched; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is energized; said first latch and said fuse link leader constructed to cause separation of said fuse link when said first latch is rotated about said first pivot; and means to guide rotation of said first latch about said first pivot containing said second pivot.

18. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said first pivot supported in a hinge casting; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means pivotally supported on said hinge casting; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is rotated.

19. In a fuse cut-out comprising a fuse tube and a fuse link; said fuse tube having a lower tube support means; a toggle link; a first latch for said toggle link and a second latch for said toggle link; a first pivot, a second pivot and an operating means; said lower tube support means pivotally supported on said second pivot; said first pivot supported in a hinge casting; said toggle link pivotally supported between said first and second pivots; said first latch pivotally supported on said first pivot; said first latch constructed to be maintained in the latch position when said fuse link is fused and in the unlatched position when said fuse link is separated; said operating means pivotally supported on said hinge casting; said operating means operatively connected to move said second latch to latch said toggle link and to pivotally rotate said first latch about said first pivot when said operating means is rotated; and means to guide said first latch in its rotation.

20. In a cut-out device having cooperating contacts, interrupting means and control means; said cooperating contacts and said interrupting means being connected in series; a tube for said interrupting means, said tube comprising an interrupting chamber for said interrupting means; said cooperating contacts being comprised of a first support and a stationary contact; said first support and a second support respectively being positioned at each end of said tube; said interrupting means being electrically operatively connected to said second support to maintain said cooperating contacts in the engaged position; an operating lever operatively connected to said interrupting means and said control means; a latch; said operating lever being operatively connected to said control means; said operating lever being constructed to position said control means to maintain said cooperating contacts in engagement by means of said latch and to subsequently interrupt said interrupting means when said operating lever is moved in a first direction; and to in-

fluence said control means by means of said latch to cause disengagement of said cooperating contacts when said operating lever is moved in a second direction.

21. In a cut-out device having cooperating contacts, interrupting means and control means; said cooperating contacts and said interrupting means in series; a tube for said interrupting means, said tube comprising an interrupting chamber for said interrupting means; said cooperating contacts being comprised of a first support and a stationary contact, said first support and a second support respectively positioned at each end of said tube; said interrupting means electrically operatively connected to said second support to maintain said cooperating contacts in the engaged position; an operating lever operatively connected to said interrupting means and said control means; a latch; said operating lever being operatively connected to said control means; said operating lever being constructed to position said control means to maintain said cooperating contacts in engagement by means of said latch and to subsequently interrupt said

interrupting means when said operating lever is moved in a first direction; and to influence said control means by means of said latch to cause disengagement of said cooperating contacts when said operating lever is moved in a second direction; said operating lever pivotally supported on said second support.

References Cited in the file of this patent

UNITED STATES PATENTS

2,310,466	Schultz et al.	Feb. 9, 1943
2,328,818	Lindell et al.	Sept. 7, 1943
2,362,314	Schultz et al.	Nov. 7, 1944
2,400,850	Steinmayer et al.	May 21, 1946
2,514,163	Pittman	July 4, 1950
2,625,623	Baskerville	Jan. 13, 1953
2,630,508	Meisenheimer et al.	Mar. 3, 1953
2,637,795	Hubbard	May 5, 1953
2,680,171	Curtis et al.	June 1, 1954