May 6, 1947. C. P. COREY ET AL 2,420,166

SAFETY CONTROL DEVICE FOR DISCONNECTING SWITCH

Filed March 1, 1946

Fig. 1.

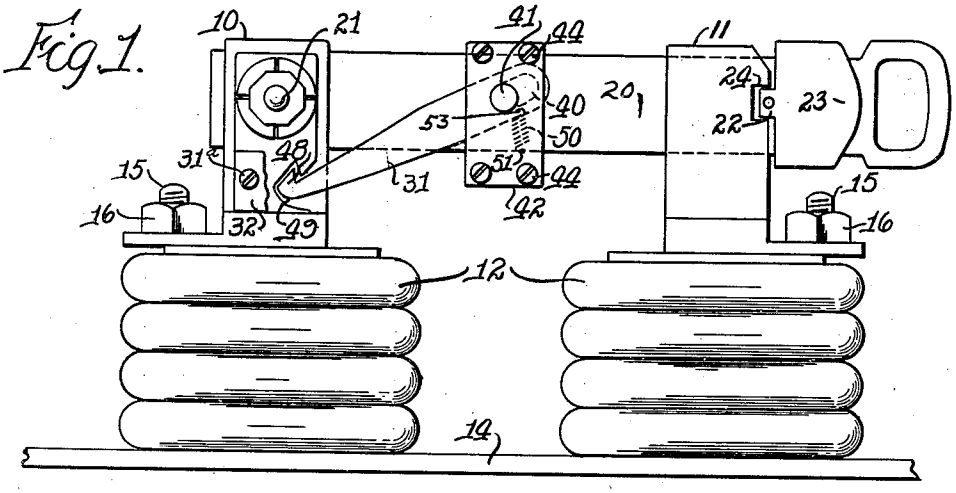


Fig. 2.

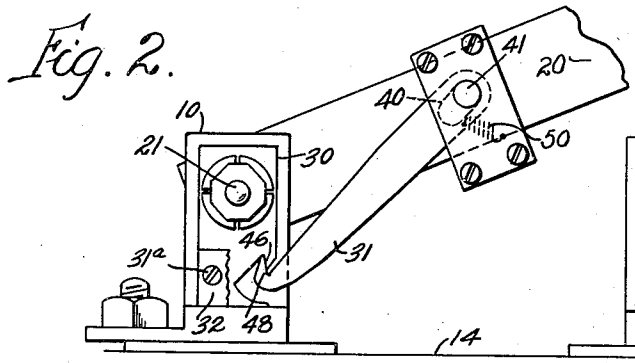


Fig. 5.

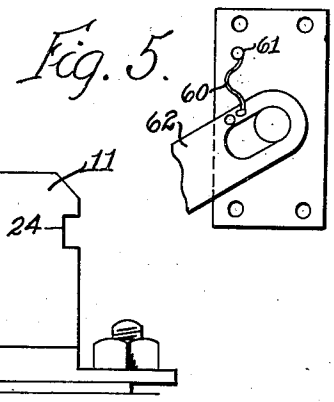


Fig. 3.

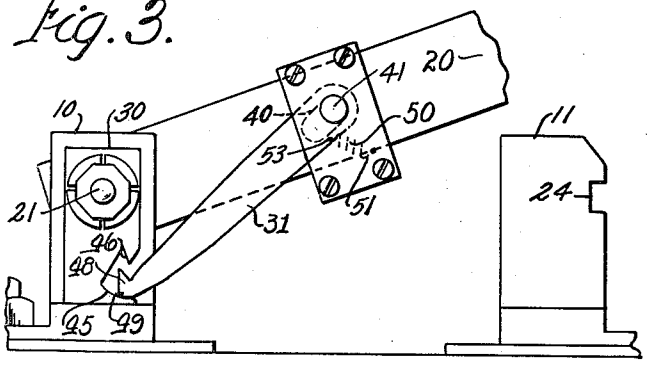
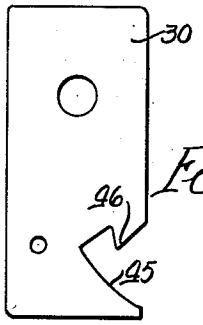


Fig. 4.



INVENTORS
Clement P. Corey.
Earl R. Deming.
BY Chas. T. Hawley
ATTY.

Patented May 6, 1947 2,420,166

UNITED STATES PATENT OFFICE

2,420,166

SAFETY CONTROL DEVICE FOR DISCONNECTING SWITCHES

Clement P. Corey and Earl R. Deming, Millbury, Mass.

Application March 1, 1946, Serial No. 651,202

6 Claims. (Cl. 200—169)

1

This invention relates to switches used in power plants and elsewhere for disconnecting or cutting out a section of a power line for changes or repairs or other desired purpose. Such disconnecting switches are not designed to be opened under load. If so opened, a heavy arc may occur, with more or less disastrous results.

In order to prevent such occurrence, it is now customary in power plants to require that all such switches be first opened for a short distance only. If no arc occurs, the line may be assumed to be dead and the opening movement may be completed. If the line is alive, a relatively short arc will occur and the switch can be immediately closed and damage avoided. The human element remains, however, and switches are occasionally thrown wide open, regardless of rules, and with serious results if on live circuits.

It is the general object of our invention to provide a control device which makes it impossible to open the associated disconnecting switch otherwise than by the step-by-step procedure above outlined.

To the attainment of this object, we provide means to lock the switch after it has been opened a small amount only, and to unlock the switch for further opening movement by a slight return movement of the switch bar from its locked position. We also provide a construction in which all parts are restored to initial position by fully closing the switch.

Our invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a side elevation of a disconnecting switch with our improved safety device applied thereto;

Figs. 2 and 3 are partial side elevations similar to Fig. 1 but showing the parts in successive operative positions;

Fig. 4 is an enlarged side elevation of a cam and lock plate; and

Fig. 5 is a detail side elevation showing a modified construction.

Referring to the drawings, we have shown a disconnecting switch having brackets or stands 10 and 11 mounted on insulators 12 which in turn are secured to a base plate 14. Studs 15 and nuts 16 are provided for connecting line wire terminals to the stands 10 and 11. A switch bar 20 is pivoted at 21 to the stand 10 and is normally seated between spaced side portions of the stand

2

11. The bar 20 is held in closed position by a lug 22 formed on a handle member 23 and received in a notch 24 in the stand 11. The handle member 23 is slidably and yieldably mounted on the bar 20 and may be pulled outward to disengage the lug 22 when the switch is to be opened. All of the parts thus far described are of usual commercial construction and in themselves form no part of our invention.

Our improved safety device comprises a cam and lock plate 30 (Fig. 4) and a locking lever 31 (Fig. 1). The cam plate 30 is secured to the side of the stand 10 and is retained in position by the pivot stud 21 and by a screw 31a which also secures a cover plate 32.

The lever 31 is provided with a slot 40 in its upper end and is mounted on a stud 41 in a slidable support 42. The support 42 may be adjusted lengthwise of the bar 20 and may be secured in any desired position by tightening the clamping screws 44.

The cam plate 30 has a cam surface 45 and a locking lug or holding projection 46. The lever 31 has a hook 48 and a cam surface 49. A coil spring 50 is connected at one end to a stud 51 in the support 42 and at the other end to the lever 31 at a point 53. The point 53 is so selected that when the lever 31 is in the position shown in Fig. 1, the spring will tend to raise the hook 48, and when in the position shown in Figs. 2 and 3, it will tend to depress the hook 48.

Having described the construction of our improved safety device, the operation thereof is as follows:

When the switch bar 20 is moved to closed position, the cam surface 49 of the lever 31 engages the cam surface 45 (Fig. 4) of the cam plate 30 and the lever 31 is shifted upward and to the right relatively to the bar 20, the parts assuming the position shown in Fig. 1.

As the bar 20 is thereafter raised, the hook 48 will engage the lug 46 and the lever 31 will be shifted relatively to the bar 20 to the position shown in Fig. 2, in which position the bar 20 is locked against further opening movement.

During this shifting of the lever 31 relative to the bar 20, the point of connection 43 between the lever 31 and the spring 50 has shifted to the left, as also shown in Fig. 2. The bar 20 may then be given a slight return movement to the position shown in Fig. 3, if no arc has been formed between the bar 20 and the stand 11 on the initial opening movement.

On such return movement, the spring 50 will cause the hook 48 to drop below the lug 46. The

locking device is thereby disengaged and the swinging upward movement of the switch bar **20** may be completed.

When the switch is thereafter closed, the parts first return to the position shown in Fig. 3. The cam surface **45** thereafter coacts with the surface **49** on the end of the lever **31** to shift the lever **31** back to the position shown in Fig. 1, thus completing the cycle of operations.

We have thus provided positive and mechanical locking means by which a disconnecting switch can be opened only by a step-by-step procedure, with a short initial opening movement followed by a slight return movement before the opening movement can be completed. With our improved safety device in operation, no dependence need be placed on the memory or good intentions of the operator, as the switch cannot be opened except by following the outlined procedure.

In the modification shown in Fig. 5, the construction and operation is the same as previously described, except that a flat compression spring **60** secured at **61** is substituted for the tension coil spring **50** previously described. As the spring **60** is in compression rather than under tension, the spring **60** is mounted above the locking lever **62** rather than below the lever as in Fig. 1. The operation, however, is identical

Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what we claim is:

1. In a disconnecting switch having a stand and a switch bar pivoted thereto, in combination, a locking projection fixed to said stand, a locking lever pivotally and shiftably mounted on said switch bar and having a locking hook at its free end, and a spring shiftable with said lever to opposite sides of the pivot of said lever and effective to move said hook toward said projection when said switch bar is in closed position and to move said hook away from said projection after said lever has been shifted longitudinally by locking engagement and after said hook has been freed from said locking projection by slight and partial return movement thereof.

2. The combination in a disconnecting switch as set forth in claim 1, in which a fixed cam plate is provided which coacts with the free end of the locking lever to move the hook on said lever into position to engage the locking projection on the stand on return of said switch bar to fully closed position.

3. The combination in a disconnecting switch as set forth in claim 1, in which the locking lever has a longitudinal slot through which a pivot-pin on the switch bar extends, and in which the spring engages the lever adjacent said pin and is operative alternately at opposite sides of said pin as said lever is shifted longitudinally, whereby the spring action is reversed.

4. The combination in a disconnecting switch as set forth in claim 1, in which a fixed cam plate is provided which coacts with the free end of the locking lever to move the hook on said lever into position to engage the locking projection on the stand on return of said switch bar to fully closed position and which provides clearance for the hook to drop when freed from said projection and only partially returned to initial position.

5. The combination in a disconnecting switch as set forth in claim 1, in which the locking lever has a longitudinal slot through which a pivot-pin on the switch bar extends, and in which a tension spring engages the lever adjacent said pin and is operative alternately at opposite sides of said pin to raise and lower said hook as said lever is shifted longitudinally to reverse the spring action.

6. In a disconnecting switch, a switch bar, means to lock said bar after predetermined and limited travel from closed position, said locking means being mounted for longitudinal shifting on said bar, and a single spring means effective to render said locking means alternately operative and inoperative in accordance with the longitudinal relation of the switch bar and the locking means.

CLEMENT P. COREY.
EARL R. DEMING.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,750,693	Steinmayer	Mar. 18, 1930
1,825,820	Read	Oct. 6, 1931
1,864,548	Nordhem	June 28, 1932
1,253,286	Sierad	Jan. 15, 1918
1,933,285	Strai	Oct. 31, 1933
2,251,115	Crabbs	July 29, 1941