Sept. 8, 1925. 1,552,561

E. H. JACOBS

SWITCH

Filed May 6, 1921 2 Sheets-Sheet 1

Fig. 1

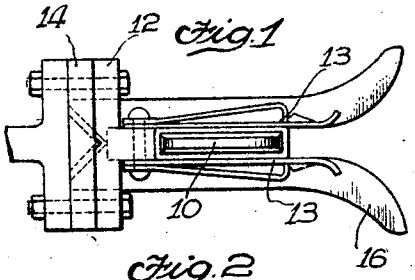


Fig. 2

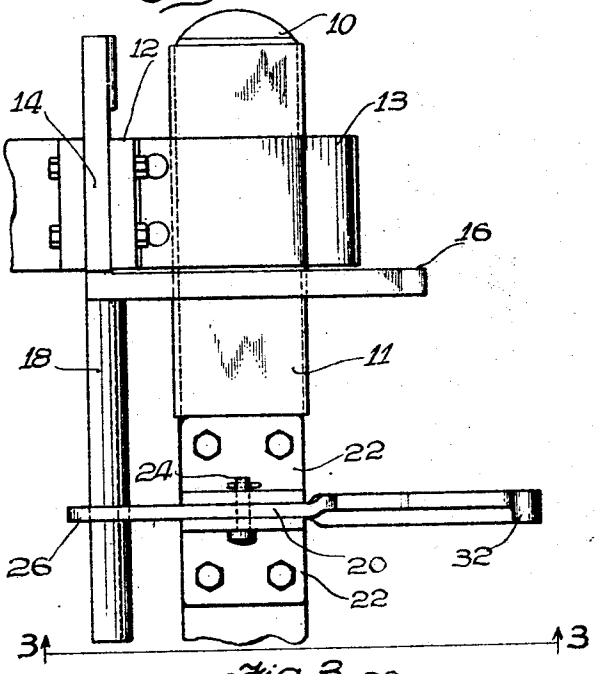
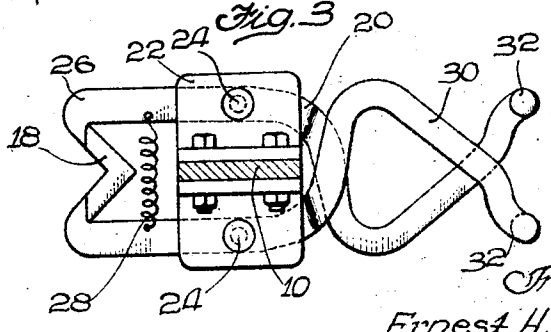


Fig. 3



Inventor
Ernest H. Jacobs
By Brown Boucher, Dunn
Attorneys

Sept. 8, 1925. 1,552,561

E. H. JACOBS

SWITCH

Filed May 6, 1921 2 Sheets-Sheet 2

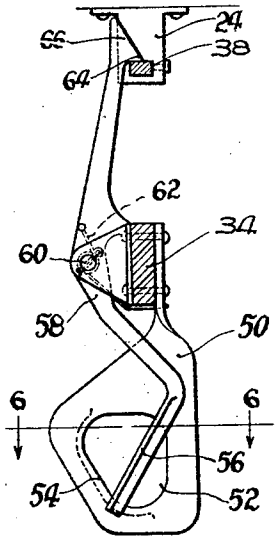


Fig. 4

Fig. 5.

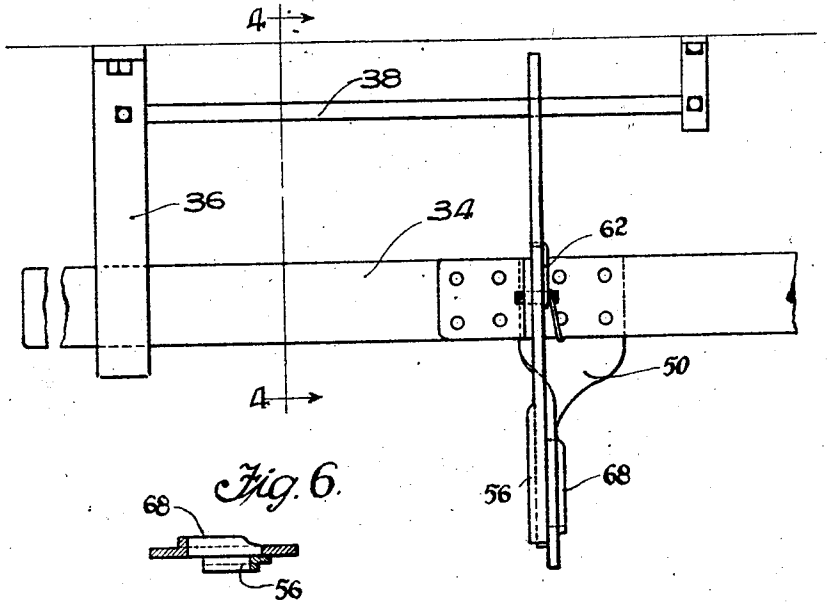


Fig. 6.

Inventor
Ernest H. Jacobs
By Brown Boutell & Dunn
Attorneys

Patented Sept. 8, 1925. 1,552,561

UNITED STATES PATENT OFFICE.

ERNEST H. JACOBS, OF CHICAGO, ILLINOIS, ASSIGNOR TO ELECTRICAL ENGINEERS EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SWITCH.

Application filed May 6, 1921. Serial No. 467,260.

To all whom it may concern:

Be it known that I, ERNEST H. JACOBS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Switches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to switches, and is especially useful in connection with the large disconnecting or air break switches employed in the distribution of power at high voltages.

One object of my invention is to provide a combined locking and manipulation device for such switches, which will operate efficiently on long switches, as well as short ones. It is for this reason that the invention is particularly useful in high voltage work because the switches for such work must necessarily be of relatively great lengths.

On account of the lengths of these switches employed for this work, differences in thermal expansivity, as well as inadequate rigidity of the supporting elements upon which the switch and the contacts therefor are mounted, will often result in relatively large shifting movement between the contact fingers and the switch blades, longitudinally of the blades.

Another object of my invention is to provide locking means for switches which will not be rendered inoperative or thrown out of adjustment by any normal displacement of the blades with respect to the contact fingers longitudinally of the blades. Another object of my invention is to provide locking means comprising a minimum number of relatively simple parts, cheap to manufacture, easy to assemble and durable in service.

Another object is to devise such a locking means, capable of being embodied in switches of well known standard type of design.

Further objects and advantages of my invention will be apparent as the description proceeds.

In the accompanying drawings:

Figure 1 is a top plan view of part of a disconnecting switch illustrating the application thereto of locking means according to my invention;

Figure 2 is a side view of the same parts, and

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a section on line 4—4 of Figure 5, showing an embodiment of my invention employing only a single pivoted member;

Figure 5 is a side view of the same device; and

Figure 6 is a detail section on line 6—6 of Figure 4.

In the embodiment of my invention illustrated in Figures 1, 2 and 3, I have illustrated duplicate locking elements pivoted for movement in a plane normal to the switch blade, and stationary means adapted to be engaged by said elements to lock the switch in closed position. Referring to Figure 1 the switch blade 10 is enlarged by a sheath 11 where it engages the resilient contact elements 13, projecting from block 12 mounted on a support 14 to which one cable is suitably connected. The free end of the switch blade enters between guide shoes 16 which bring the blade into correct alignment before it touches elements 13. Projecting from support 14 and preferably integral with shoes 16 and the support is provided a bar 18 extending past guide shoes 16 a sufficient distance to allow for all ordinary longitudinal displacement of the blade 10 with respect to the support. This bar is preferably of irregular cross-section to increase the strength and rigidity thereof.

The improved locking means illustrated comprises duplicate locking members 20 pivoted on opposite sides of the blade 10 by means of supporting clips 22 and pintles 24. The locking members 20 terminate at their upper ends in hooks 26 and are normally held in the position illustrated by a spring 28. The lower portions of the locking members 20 cross each other and are then bent back to form inclined portions 30 terminating in short pins 32. Switches of this type are normally opened by a hook mounted on the end of a pole held by the operator. It will be obvious that the hook for opening the switch may be inserted between the inclined portions 30 and that a pulling force will engage these portions and force them apart until the pins 32 come into contact.

The resulting rotation of the locking members 20 about the pintles 24 will obviously withdraw hooks 26 from engagement with the bar 18 and permit the switch to be opened. In closing the switch, the operator inserts the large hook as before between the sloping portions 30 and pushes the switch into closed position. As the switch moves toward closed position, the inclined sides of bar 18 will engage hooks 26 and rotate the locking members to open them and permit bar 18 to enter and be received in locking position.

In practically every condition of service the engagement of the pulling hook with the crossing portions of members 20, will open them when the switch is being closed, but the arrangement disclosed ensures proper locking action if the switch blade moves into closed position regardless of how it is actuated.

As above explained the rigid guide members 16 bring the blade 10 into alignment with the spring contact 13 and guide the blade into proper contacting position. These guide members 16 have the additional function of taking up the lateral re-action of the locking members 20 when they are moved to release the bar 18. If the pull upon the members 20 is not exactly equal, there will be a resulting lateral re-action and this should not be imposed upon the spring contacts 13 or it will tend to injure them. The fingers 36 are rigid and take up this lateral re-action and serve also as protective means for preventing any arcing from coming upon either the spring fingers 13 or upon the detent members 26 or 18.

In Figures 4, 5 and 6, I have illustrated another form of my invention, in which only one pivoted locking member is employed. In this type of construction, the blade 34, contact fingers 36 and locking bar 38 take the place of the corresponding parts in Figure 1. A combined pulling eye and guide member 50 is formed of a piece of sheet metal suitably fastened to the side of the switch blade 34 and twisted through about 90° into a plane normal to the axis of the switch blade. The eye 52 has an inclined face 54 on one side opposing an inclined contact piece 56 formed on the end of the locking lever 58 pivoted at 60 and normally held in the position illustrated in Figure 4 by a suitable spring 62. The upper hook 64 and inclined end piece 66 operate to lock the switch and to deflect the locking member as the switch is closed. It will be obvious that when the operator inserts the pulling hook in the eye 52, it will engage between the inclined faces 54 and 56 and as it slides outward rotate the lever 58 to unlock the switch. In forming the eye 52, a flange 68 (see Figure 6) is preferably formed by bending over the metal at the edge of the eye, and the face 56 similarly comprises a flange of approximately the same width. This provides a relatively large surface for frictional engagement with the pulling hook, to increase the life of the device.

Without further elaboration, the foregoing will so fully explain the gist of my invention, that others may, by adapting current knowledge, readily employ the same for various uses, wthout departing from certain features which properly constitute essential aspects of my invention.

I claim:

1. In a device of the class described, in combination, a pivoted switch blade, a stationary locking element extending longitudinally parallel to the switch blade when the latter is closed, and means carried by the switch blade movable in a plane normal thereto for engaging the locking member to lock the switch in closed position.

2. In a device of the class described, in combination, a switch blade, a pulling eye lying in a plane normal thereto, said eye being shaped to produce a lateral deflection of the pulling hook inserted therein to open the switch, and means normally locking the switch in closed position, and moved by engagement with the pulling hook in its lateral deflection, into unlocked position to permit the switch to be opened.

3. In a device of the class described, in combination, a movable switch blade, means carried by the blade and pivoted for movement in a plane normal thereto, for locking the blade in closed position, means forming an eye to receive a pulling hook, and means interposed in the path of the pulling hook in said eye, for moving said locking means into inoperative position to release said knife blade.

4. In a device of the class described, in combination, a movable switch blade, a stationary catch element extending longitudinally parallel to said switch blade, and latch means carried by said switch blade for engagement with said stationary element at any point along its length, for locking said switch blade in closed position.

5. The combination recited in claim 4, in combination with means operative by the pulling force exerted to open said switch, to release said locking means and permit said switch to be opened.

6. In combination, a pivoted switch blade, and a pulling eye carried thereby, said eye lying in a plane normal to said blade, and remote from the end thereof.

7. In a device of the class described, in combination, a switch blade, a pulling eye lying in a plane normal thereto, and means normally locking said blade in closed position and operated by a pulling hook engaging said eye, for releasing said blade.

8. In a device of the class described, in

combination, a switch blade, and a pulling eye carried by said blade and permanently lying in a plane substantially normal thereto.

9. In a device of the class described, in combination, a switch blade, a pulling eye on said blade lying in a plane normal thereto, and means movable in the plane of said eye for locking said blade in closed position.

10. In a device of the class described, in combination, a switch blade, and duplicate locking elements pivoted on said blade, the free ends of said elements cooperating to form an eye for a pulling hook for opening and closing said switch.

11. In combination, a pivoted switch blade, a free contact, a hinged contact, a stationary catch member extending from said free contact towards the hinged contact, a co-operating latch element pivoted on the blade on an axis parallel to the longitudinal axis of the blade.

12. In combination, a pivoted switch blade, a free contact member co-operating therewith, a stationary detent member extending from said free contact member and lying substantially parallel to the switch blade when it is in the closed position, and a movable latch member pivoted on the blade and co-operating with the detent member, said latch member swinging in a plane substantially at right angles to the axis of the switch blade.

13. In a switch, a movable blade, a stationary locking bar extending along the blade when the same is closed, a detent pivoted on the blade to swing laterally into and out of engagement with the bar, and guiding means for the end of the blade, said guiding means taking up the lateral re-action of the detent.

14. In a switch, a movable blade, a spring contact for engaging the blade, a stationary locking bar extending along the blade when the same is closed, a detent pivoted on the blade to swing laterally into and out of engagement with the bar, and rigid guiding means for the end of the blade, said guiding means taking up the lateral reaction of the detent, and extending beyond the spring contact.

In witness whereof, I hereunto subscribe my name this 30th day of April, 1921.

ERNEST H. JACOBS.