July 26, 1932. A. O. AUSTIN 1,868,482

ELECTRIC SWITCH

Filed Oct. 21, 1929

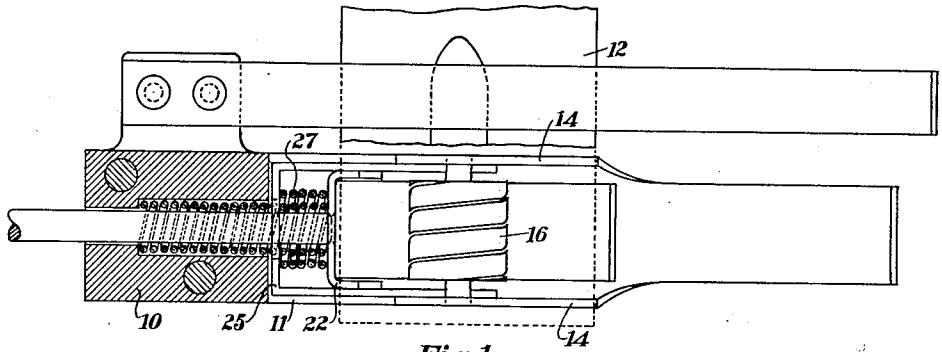


Fig. 1

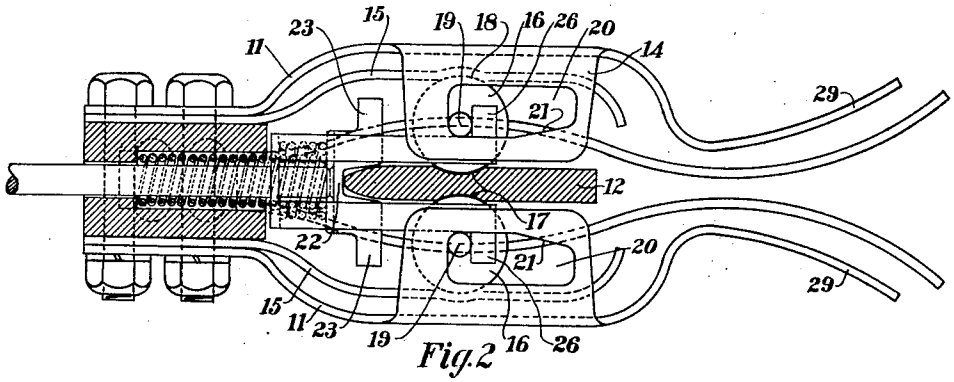


Fig. 2

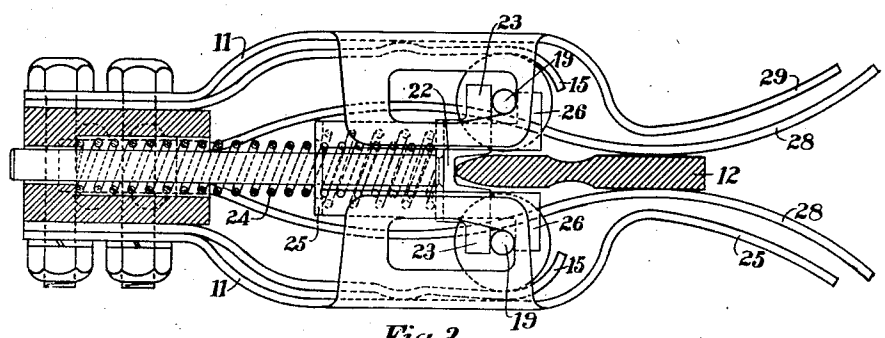


Fig. 3

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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Application filed October 21, 1929. Serial No. 401,031.

This invention relates to switches for opening and closing electric circuits and has for one of its objects the provision of switches for the purpose named which shall be of improved construction and operation, and in which the switch blade may be more readily moved into and out of closed position than in the case of switches as heretofore constructed.

A further object is to provide a switch in which the current carrying contacts will have rolling engagement and in which a minimum amount of relative movement is required for engaging and disengaging the contacting parts.

A further object is to provide a switch with roller contacts for engaging a switch blade, the contacts being separated a sufficient distance to permit the blade to enter between them before engagement of the contacts and blade.

Other objects and advantages will appear from the following description.

The invention is exemplified in the combination and arrangement of parts shown in the accompanying drawing and described in the following specification, and it is more particularly pointed out in the appended claims.

This application is in part a continuation of application, Serial Number 32,718, filed May 25, 1925, now Patent No. 1,740,640, issued Dec. 24, 1929.

In the drawing:

Fig. 1 is a plan with parts broken away and parts in section showing one embodiment of the present invention.

Fig. 2 is an end elevation with parts in section of the switch shown in Fig. 1.

Fig. 3 is a view similar to Fig. 2 showing the parts in a different relative position.

In heavy duty switches, and especially in the case of switches which are exposed to weather conditions or which are opened only occasionally, difficulty is frequently experienced in moving the blade relative to the fixed contacts. If the parts are corroded, this difficulty is increased and is especially noticeable where the switches are mounted in positions that are not easily accessible. The present invention overcomes these difficulties and at the same time provides sufficient electrical contact between the relatively movable parts.

In the form of the invention illustrated in the drawing, the numeral 10 designates a base block, from which arms 11 extend. The arms 11 are spaced apart and arranged at opposite sides of the switch blade 12. The arms 11 are provided with inwardly projecting flanges 14; there being one flange at each side of each arm. Disposed inside of the arms 11 are springs 15 which bear against the peripheries of rollers 16, forming contact members for the blade 12. The rollers 16 are pressed against opposite sides of the blade 12 by the springs 15 and roll upon the surfaces of the blade and the inner surfaces of the springs 15 when the blade is moved into or out of closed position. The blade 12 is preferably provided with depressions 17 at opposite sides thereof, and the springs 15 may also have depressions 18 for retaining the rollers 16 and blade 12 in the closed position of the switch.

The rollers 16 may have yielding surfaces to insure good contact between the rollers and blade. Pintles 19 project from the ends of the rollers into openings 20 in the flanges 14. The inner edges 21 of the openings 20 are inclined, as shown in the drawing, so that the rollers 16 are moved apart into the position shown in Fig. 3 when the switch is open, leaving sufficient space for the blade 12 to enter freely between the rollers without first contacting with the rollers. A cross head or follower 22 is disposed in the path of the blade 12 and is provided with lugs 23 for engaging the pintles 19 and moving the rollers to their outermost position shown in Fig. 3 when the blade 12 is opened. The cross head 22 is moved outwardly by spring 24, which spring is compressed as shown in Fig. 2 when the blade is closed. A second cross head 25 is provided with lugs 26 for engaging the sides of the pintles opposite that engaged by the lugs 23. A spring 27 is interposed between the cross-heads 22 and 25 and holds the lugs 26 against the pintles 19 for all positions of the cross heads.

Fig. 3 shows a switch blade 12 in the act of entering its closed position. The blade first engages arcing horns 28 so that any arcing will occur between the blade and horns and not injure the contact surfaces. Pick-up members 29 may be provided on the arms 11 to assist in directing the blade to its entering position. It will be noted from Fig. 3 that the blade enters between the rollers 26 while the rollers are separated. When the front edge of the blade contacts with the cross head 22, further movement of the blade will compress the spring 24 and displace the cross head, so that the pintles 19 are free to travel inwardly along the surfaces 21. The pintles are positively moved inwardly by the lugs 26 which are constrained to follow the cross head 22 and lugs 23 by the spring 27. The rollers will thus be carried inwardly between the two sets of lugs until they contact opposite faces of the blade 12. During further movement of the blade, the rollers will have rolling contact with the surface of the blade and with the inner faces of the springs 15, so that an easy movement will be secured and the rollers will, at the same time, be held in firm contact with the blade by the spring 15. The relative movement between the blade and rollers need be only very slight since the blade has entered between the rollers before it contacts with their surfaces. It will be apparent that the axes of the rollers will travel only half as fast as the cross head 22 after the rollers have contacted with the surfaces of the blade, so that the cross head will be withdrawn from engagement with the pintle 19 as shown in Fig. 2 when the blade has reached its closed position. The blade will be retained in its closed position by the depressions 17 in the blade and the depressions 18 in the spring 15 and will be firmly pressed against the blade by the springs.

When it is desired to open the switch, outward force is exerted on the blade 12, and since the engaging surfaces all have free rolling contacts, the blade will open easily although it may be covered with ice or may have become corroded. During the opening movement, the blade will travel twice as fast as the axes of the roller 16 so that when the pintles 19 reach the inclined portions 21 of the openings 20, the lugs 23 will be in engagement with the pintles 19, and if the blade continues its movement outward, the lugs 23 will force the pintles upwardly along the inclines 21 and thus separate the rollers from the blade. The break between the rollers 16 and the blade will occur before the break between the blade and the cross head 22, so that there will be no arcing between the blade and rollers. The final break, of course, will take place between the blade and arcing horns 28.

I claim:

1. An electric switch comprising a pair of relatively movable contact members, a roller interposed between said members and having rolling contact thereon, and spring actuated means for moving said roller out of the path of one of said members when said switch is opened.

2. An electric switch comprising a pair of contact members, a roller interposed between said members and having rolling contact with each of said members, a spring actuated follower for moving said roller out of the path of one of said members when said switch is opened, said follower being responsive to the movement of said last named member for permitting said roller to reengage said last named member when said switch is closed.

3. An electric switch comprising a pair of relatively movable members, a roller interposed between said members and having rolling engagement with each of said members, means for moving said roller out of the path of one of said members when said switch is opened, said means including a follower having a stop fixed thereon for engaging said last named member when said switch is closed, said follower being movable by said member into position to permit said roller to reengage said member.

4. A switch comprising a movable contact member, a pair of rollers arranged to engage said contact member at opposite sides thereof, guides for separating said rollers, a spring actuated follower for moving said rollers on said guides to their separated position when said switch is opened, said follower having a stop in fixed position thereon arranged to be engaged by said movable contact member when said switch is closed after said movable contact member has entered between said rollers, said follower being movable by said movable contact member to permit said rollers to move into contact with said movable contact member at opposite sides thereof.

5. An electric switch comprising a switch blade, a roller for engaging a lateral face of said blade, a guide for said roller for directing said roller into a retracted position out of the path of said blade, a spring actuated follower for moving said roller along said guide into said retracted position when said switch is opened, said follower being displaceable by said blade when said switch is closed to permit said roller to return to position to engage said blade, and spring actuated means for returning said roller to its engaging position.

6. An electric switch comprising a movable contact member, a roller contact for engaging said movable contact member, means for holding said roller contact out of the path of said movable contact member, a follower having an abutment face for engaging said movable contact member when said switch is closed, and means operated by said follower for returning said roller to a position for engaging said blade when said blade is closed.

7. A switch comprising a movable contact

member, and a roller the body of which is resilient for engaging said contact member to make electrical contact therewith.

8. A switch comprising a pair of relatively movable contact members, and a roller the body of which is resilient interposed between said members and having rolling contact with each of said members.

9. A switch comprising a movable contact member, a resilient roller engaging said contacting member, and a spring contact engaging said roller at the side thereof opposite said movable contact member, said roller having rolling engagement with said movable contact and said spring contact.

10. A switch comprising a blade, a roller arranged to engage said blade, and a pair of independently movable followers arranged to engage opposite portions of said roller to control the movement thereof.

11. A switch comprising a blade, a roller for engaging said blade, a pair of followers having a portion thereon to engage opposite portions of said roller to control movement of said roller, and a spring interposed between said followers for urging said followers toward said roller.

12. A switch comprising a blade, a roller for engaging said blade, a fixed contact member for engaging said roller at the side thereof opposite said blade, a pair of followers for engaging said roller to control the movement thereof, one of said followers being disposed in the path of said blade, and a spring interposed between said followers to permit one of said followers to move with said blade while the other of said followers continues with said roller.

13. A switch comprising a blade, a pair of rollers for engaging opposite sides of said blade, guides for separating said rollers to permit free entry of said blade between said rollers, and a follower disposed in the path of said blade and actuated thereby for moving said rollers into contact with opposite sides of said blade after said blade has entered between said rollers.

14. An electric switch comprising a pair of switch elements movable relative to each other to open and close said switch, a contact member interposed between said switch elements and having rolling engagement with both of said elements when said switch is closed, and means for restoring said contact member to a certain position relative to one of said elements when said switch is opened.

15. An electric switch comprising a pair of switch elements movable relative to each other to open and close said switch, a contact member mounted on one of said elements, means operating when said switch is open to hold said contact member in a receiving position, said contact member being moved away from said receiving position and rolled between said switch elements and having rolling engagement with both of said elements when said switch is closed, said holding means being operable to restore said contact member to its receiving position when said switch is opened.

16. An electric switch comprising a pair of switch elements movable relative to each other to open and close said switch, a roller interposed between said elements and having rolling engagement with both of said elements when said switch is closed, said roller being automatically movable to a receiving position when said switch is opened and rolled between said switch elements away from said receiving position when said switch is closed.

17. An electric switch comprising switch elements movable relative to each other to open and close said switch, a roller movably mounted on one of said elements and having rolling contact with both of said elements when said switch is closed, a spring yieldingly holding said roller in receiving position on the element on which it is mounted, said roller being rolled between said elements away from said receiving position when said switch is closed and automatically restored by said spring to said receiving position when said switch is opened.

In testimony whereof I have signed my name to this specification this 18th day of Oct., A. D. 1929.

ARTHUR O. AUSTIN.