Oct. 25, 1927.

1,646,440

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ELECTRIC SWITCH

Filed June 5, 1926

Fig. 1.

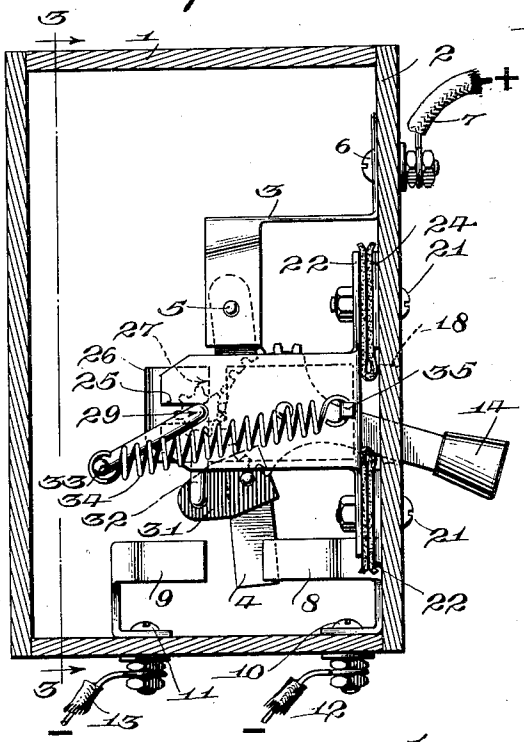


Fig. 2.

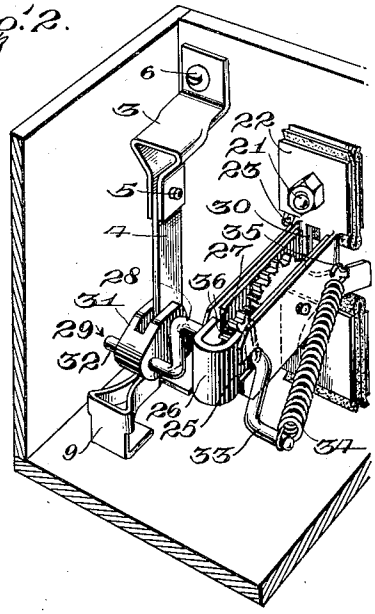


Fig. 3.

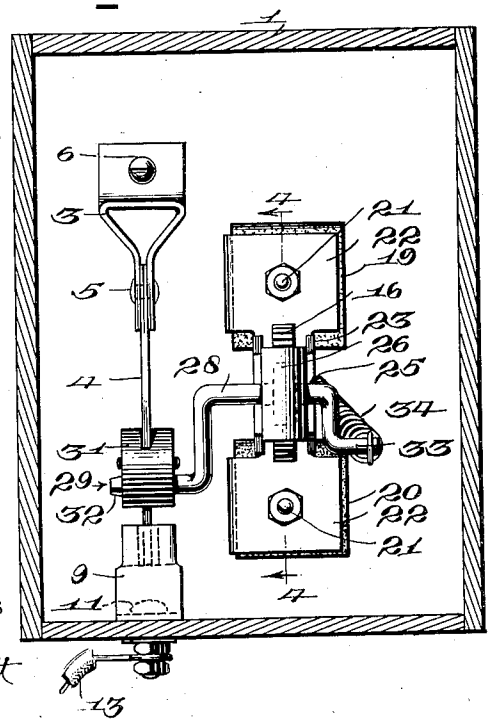
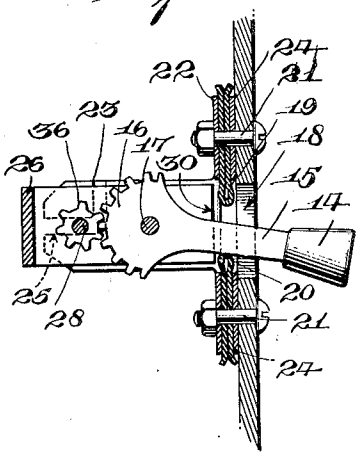


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

Application filed June 5, 1926. Serial No. 113,982.

This invention is an improvement in electric switches, one of the objects being to utilize the device either as a two-pole or three-pole switch and to make possible the operation of the switch without the characteristic noise.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 is a sectional view of the box, the switch being shown in elevation,

Figure 2 is a detail perspective view showing the working parts of the switch, a portion of the switch box being shown in section,

Figure 3 is a cross section taken substantially on the line 3—3 of Figure 1,

Figure 4 is a detail cross section taken on the line 4—4 of Figure 3.

In carrying out the invention, provision is made of a box 1 which has a cover plate 2 secured in place in any appropriate manner. The box and cover plate are made of insulating material, but in practice they may be made of metal to agree with perhaps universal custom, and provided with insulating parts wherever required.

According to the present showing most of the switch structure is carried by the cover plate. This structure comprises a metallic hanger 3 upon which the switch blade 4 is pivotally mounted as at 5. The hanger is secured to the cover plate 2, the place 6 also serving as the connection for a wire 7 which, for present purposes may be regarded as the positive wire. The switch blade is movable between terminals 8 and 9 secured to the box 1 at 10 and 11. These places also serve as connections for wires 12 and 13 which may both be regarded as negative.

Movement of the switch blade 4 between the terminals 8 and 9 is accomplished by a handle 14. This handle is fitted on the exposed part of a lever 15 which carries a gear segment 16 inside of the switch box. In practice the parts 14, 15 and 16 are preferably made of fiber or some other insulating material. The lever 15 is pivoted upon a stud 17 which not only serves as a rivet, as presently appears, but also as the fulcrum upon which the lever 15 rocks.

The lever 15 rides back and forth in a slot 18 (Fig. 4) in the cover plate, and the action of the lever is noiseless due to the provision of resilient elements or bumpers 19 and 20 appropriately situated to engage the edges of the lever at the extremities of up and down movement. These bumpers are clamped in place by the bolts 21 which secure the flanges 22 of an outer frame member 23 upon the cover plate 2. The flanges 22 are made in such a way that they can be bent around upon themselves to provide an extra piece 24 between which and the flanges proper the resilient elements 19 and 20 are clamped. The resilient elements preferably consist of rubber inserts, but material other than rubber may be employed to good advantage.

The outer member 23 referred to is part of a frame of peculiar construction. The member 23 itself comprises a pair of parallel arms (Fig. 2), the extremities of which are provided with straight slots 29. An inner frame member 26 consists of a piece of metal bent upon itself into U-shape and provided with a pair of L-slots 27. The bases of the two kinds of slots are supposed to meet when the outer and inner frame members are assembled so as to form a round hole in which the main part 28 of a blade-actuating shaft 29 is journaled. The extremities of the inner frame member 26 may be made to rest upon the bottom part of the outer frame member 23 at places between the flanges 22. This bottom part of the outer frame member has a slot 30 through which the lever 15 extends.

It can now be seen that the stud 17, mentioned before, serves as a rivet for holding the outer and inner frame members together because this stud is inserted through both frame parts and fixed in position either by riveting or otherwise. The gear segment 16 is mounted upon the stud between the components of the inner frame member 26 as plainly shown in Figure 2. A link 31 of insulating material connects one crank end of the shaft 29 with the switch blade 4. The opposite extremity of the shaft is formed into a second crank 33 with which one end of the spring 34 is connected. The other end of the spring is connected to a lug 35 stamped up from the outer frame member. The main part 28 of the shaft carries a pinion 36 with which the gear segment 16 meshes.

The operation is readily understood. Assume first that the switch is intended to be

used as a three-pole switch. Wires 12 and 13 are connected with both terminals 8 and 9 at 10 and 11, the positive wire 7 being connected with the switch blade hanger 3 as at 6. Movement of the handle 14 in a downward direction (Figs. 1 and 4) will turn the blade-actuating shaft 29 in a counter clockwise direction bringing the blade 4 into engagement with the terminal 8 so that current is conducted through the wire 12. Movement of the switch handle in the opposite direction will have the opposite effect, bringing the blade 4 into engagement with the terminal 9 and conducting current through the wire 13.

Assume that the switch is desired to be used as a two-pole switch. This is accomplished by simply omitting one or the other of the wires 12 and 13. The terminal 8 or 9 from which the wire is omitted then serves as a dead back point for the switch blade 4.

The switch is positive in action. The switch lever 15 is moved up and down by manual effort. The spring 34 plays no part in moving the actuating shaft 29 or the switch blade 4 merely serving to hold the switch blade 4 in either of its adjusted positions after the desired movement thereof has been accomplished by the lever 15. In either event the spring 34 pulls upon the second crank 33 (Fig. 1) on a line at one side or the other of the center of the main part 28 of the shaft 29. The spring therefore holds the switch blade 4 in either position of adjustment quite positively.

As has already been brought out, the action of the lever 15 is noiseless. The resilient elements or bumpers 19 and 20 extend toward each other sufficiently far into the path of the lever 15 to be engaged by the lever. These elements are of soft resilient material and absorb any sound incident to the striking of the lever thereagainst.

The peculiar manner in which the resilient elements or bumpers are clamped between the folded over portions 24 of the flanges 22 is brought out. The outer and inner frame members 23 and 26 are assembled as shown, and when assembled are held by the strip 17 and not only act as a rivet but also as a fulcrum for the switch lever 15 and gear segment 16. The combined slots 25 and 27 provide bearings for the main part 28 of the shaft 29.

While the construction and arrangement of the improved electric switch is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:—

1. An electric switch comprising a hanger providing a positive terminal connection, a negative terminal, a blade pivoted at one end to swing upon the hanger, revoluble means having a crank and a link connected with the blade, means to turn the revoluble means and thereby to swing the blade, and resilient means connected with the crank assuming position at either side of the center of said revoluble means, thereby to hold the blade in positions of engagement or disengagement with said negative terminal.

2. An electric switch comprising a hanger serving as a positive terminal connection, a negative terminal, a blade pivoted upon the hanger, a shaft having two crank ends, a link connecting one of the cranks with the blade, resilient means connected with the other crank, and means for turning the shaft to move the blade into positions of engagement or disengagement with the negative terminal causing the resilient means to assume a position either at one side or the other of the shaft and thus hold the blade in either adjusted position.

3. An electric switch comprising a hanger serving as a positive terminal connection, a negative terminal, a blade pivoted upon the hanger, a shaft having two crank ends, an insulating link connecting one of the cranks with the blade, means upon which the shaft is journaled, a spring connected at one end upon said means and at the other with the remaining crank assuming a position either at one side or the other of the center of the shaft and thereby holding the blade in either of two positions of adjustment, a lever pivoted upon the mounting of the shaft, and cranks between the lever and the shaft operated by movement of the lever to adjust the switch blade.

4. An electric switch comprising a hanger serving as one terminal connection, a complementary terminal, a blade pivoted upon the hanger, a movable lever for swinging the blade upon its pivot to engage or disengage said other terminal, and bumpers in the path of the lever being engageable thereby at the extremity of movement in either direction to absorb the noise of contact.

5. An electric switch comprising a hanger serving as one terminal connection, a complementary terminal, a blade pivoted upon the hanger, a lever for swinging the blade to either engage or disengage the other terminal, a mounting upon which the lever is pivoted, and resilient elements incorporated in the mounting being in positions of engagement by the lever at either extremity of movement.

6. An electric switch comprising a hanger serving as one terminal connection, a complementary terminal, a blade pivoted upon the hanger, a lever for moving the blade into positions of engagement or disengagement with said complementary terminal, a mounting upon which the lever is pivoted having flange portions bent upon themselves, and resilient elements clamped be-

tween said bent portions being in positions of engagement with the edges of the lever at the extremities of movement of the lever to prevent noise.

7. An electric switch comprising a case, a hanger secured within the case serving as one terminal connection, a complementary terminal also secured within the case, a blade pivoted upon the hanger, a lever for swinging the blade into positions of engagement or disengagement with said complementary terminal, a mounting within the case upon which the lever is pivotally carried, flanges on the mounting being bent upon themselves, resilient elements situated within said bent portions being in the path of the lever and engaged thereby at the extremities of its movement, and means securing said mounting means upon the case and clamping said resilient elements in place.

8. An electric switch comprising a swinging switch blade, a shaft, a connection between the shaft and the blade causing swinging of the blade upon turning of the shaft, a lever, gearing between the lever and the shaft so that movement of the lever turns the shaft, a supporting frame comprising an outer member and an inner member, said members being fitted together and provided with slots forming a bearing for the shaft when said members are fitted upon the shaft, and a stud securing the frame members together and passing through the lever, thereby providing a fulcrum therefor.

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