

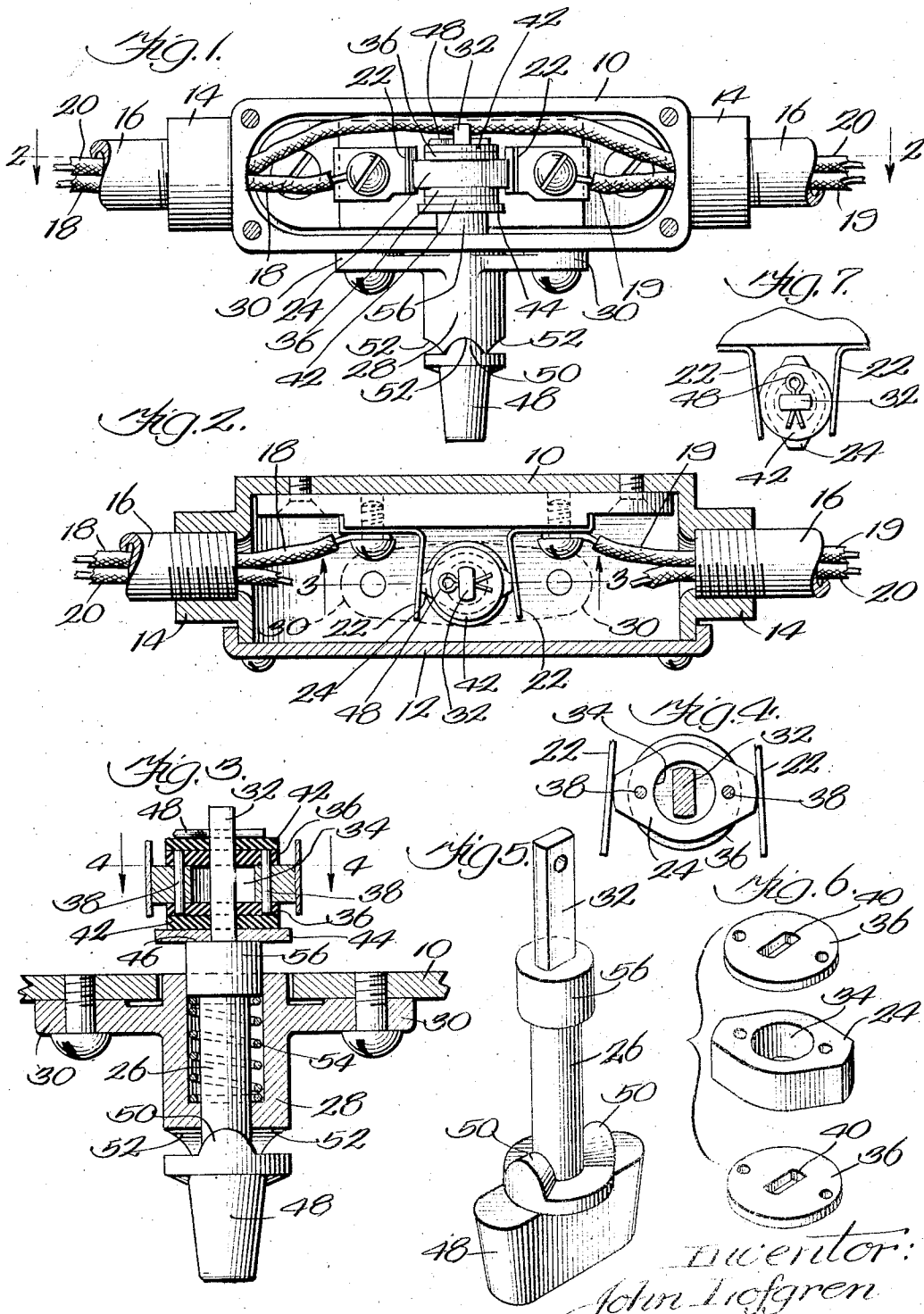
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ELECTRIC SWITCH

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ELECTRIC SWITCH.

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My invention relates to electric switches, especially for locomotive headlights and for use in other places where a rugged, durable switch is required and one which can be relied upon to maintain the position in which it is set, regardless of shocks and jars incidental to severe operating conditions. One of the objects of my invention is to provide a switch having a rotatable shaft for controlling the circuit and a simple and effective lock for preventing accidental rotation of the shaft. Another object, associated with the first is to provide a lock of impossible character whereby a reasonable amount of torque applied to the shaft by hand will rotate it and overcome the locking effect. Still another object is to provide simple and efficient means for supporting the bridging element on the shaft and at the same time thoroughly insulating it from the shaft and from the switch housing.

I accomplish my objects by the mechanism illustrated in the accompanying drawings, in which

Figure 1 is a top assembly view of a switch embodying the invention. The cover is shown removed for the purpose of revealing the internal construction.

Figure 2 is a sectional view on the line 2—2 Figure 1.

Figure 3 is a sectional view on the line 3—3 Figure 2.

Figure 4 is a view taken on the line 4—4 Figure 3, and showing the bridging element and associated parts.

Figure 5 is a perspective view of the rotatable shaft.

Figure 6 is a distributive view of the bridging element and associated insulating washers, showing their forms and suggesting the manner in which they are assembled.

Figure 7 is a fragmentary detail showing the switch terminals and associated parts when the switch is on open circuit, as distinguished from the closed circuit position shown in Figure 4.

Like numerals denote like parts throughout the several views.

In the form selected to illustrate the invention the device has a main housing 10 provided with a cover 12. The housing has the usual bosses 14, which are internally threaded to receive the threaded end of conduit 16 through which the circuit conductors 18, 19, 20 pass.

Suitably mounted within the housing, and electrically connected to the conductors 18, 19 are two spring switch terminals 22. Between these terminals is a bridging element 24 of conductive material, which is elongated in such manner that when rotated to one position, as shown in Figures 1 to 4, it will engage the terminals and electrically connect them, but when rotated to a position approximately at right angles, as shown in Figure 7, it will be out of contact with said terminals and hence break the circuit.

According to the design illustrated the bridging element 24 is controlled by a shaft 26, which is journaled within a bearing or housing 28 having wings 30 by which it is bolted to the housing 10 as best shown in Figures 1 and 3. The shaft has a flattened stem 32 lying inside of the main housing 10. The bridging element 24 has a central opening 34 which is large enough to freely accommodate the stem without touching it, as will be evident by reference to Figure 3. There is an insulating washer 36 on each side of the bridging element, these washers being fastened to the bridging element by pins 38, which pass through the bridging element and washers as best illustrated in Figure 2. The washers have slots 40 at the center, which enable them to make a sliding fit with the stem 32. The result is that the washers are supported upon the stem and rotated by it.

On the outer side of each washer 36 is an outer washer 42, which is also slotted in such manner as to fit slidably over the stem 32. A washer 44 which bears against the shoulder 46 on shaft 26 forms an abutment for one of the washers 42 while a cotter pin 48 confines the other washer 42 and holds the parts assembled as best illustrated in Figure 3. This construction and arrangement of parts has several advantages. One is that it is extremely simple. The washers 36 can readily be formed by punching, after which the pins 38 are simply slipped into place. The outer washers 42 confine the pins and at the same time insulate them from the associated parts. Another advantage is that the bridging element and pins are very thoroughly insulated from the shaft and from the main housing of the device, so that the danger of grounding is reduced to a minimum. Another advantage is that the washers, being interposed between the terminals and the bridging element, 110

tween the switch terminals 22 when the bridging element is in open circuit position, as in Figure 7, serve as spreaders for the terminals and prevent them from reaching the side of the bridging element. To gain this effect the diameter of the washers is greater than the width of the bridging element, so that the washers project beyond the edges of the bridging element. The length of the bridging element, however, is greater than the diameter of the washers so it may make contact with the terminal when rotated to closed circuit position shown in Figure 4.

The shaft 26 is rotated by means of a handle 48 which by preference is cast integral with it. On the inner side this handle has two lugs 50 designed to seat in recesses 52 formed in the end of the housing 28. In other words the portions 50, 52 constitute interfitting parts which tend to prevent rotation of the shaft when the interfitting parts are seated. These parts are inclined at the sides so as to be cam-like, with the result that torque applied to the shaft tends to induce a longitudinal movement of the shaft and an unseating of the interfitting parts as well as a rotary movement of the shaft. The recesses 52 are arranged 90 degrees apart so that the interfitting parts will seat in either of two positions at right angles to each other.

The interfitting parts tend to be held seated by means of a helical compression spring 54, which surrounds the shaft, and at one end abuts against the outer end of the housing 28 and at the inner end abuts against a collar 56 formed on the shaft near the inner end of the housing 28, as best shown in Figure 3. The result of this construction is that an impositive lock is formed, and the spring will normally hold the interfitting parts snugly seated and thus prevent any rotation of the shaft, although when the operator desires to rotate the shaft he may do so by exerting a reasonable amount of torque upon the handle 48.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an electric switch the combination of a casing having switch terminals therein spaced apart, an angularly movable and longitudinal slidable shaft mounted on said casing and having its inner ends disposed between said switch terminals, a spring surrounding a portion of said shaft and tending normally to force the shaft in one direction, co-operative locking means on the shaft and on the switch casing for impositively holding the shaft in a predetermined angular position with respect to the switch casing, said portion of the shaft disposed between the switch terminals being angular in cross section, a plurality of insulating wash-

ers having apertures of corresponding cross section and slidably disposed on the angular portion of the shaft but turnable therewith, an elongated bridging element having a central opening insulatively spaced from said shaft, said bridging element being disposed between the insulating washers, pins detachably passing through certain of said washers and through said bridging element, the ends of said pins being confined in position by said washers.

2. In an electrical switch the combination of a casing having switch terminals, a switch operating shaft mounted in the casing and having its inner end of angular cross section and disposed between the switch terminals, said shaft being mounted for both longitudinal movement and angular movement, means cooperating with the longitudinal movement of said shaft for impositively locking the shaft from angular movement, a plurality of insulating washers slidably mounted on the angular portion of said shaft to rotate with said shaft, an elongated large bridging element mounted on said shaft between certain of said washers and having a relatively large bore surrounding and spaced from the shaft, means for rigidly connecting said bridging element with said washers to move the bridging element angularly when the washers are moved angularly.

3. In an electric switch the combination of a casing having switch terminals, said casing having a lateral outstanding projection provided with a hollow boss, a shaft mounted in said boss, said shaft having an outer turning handle and a head spaced from the handle, said head slidably fitting within said boss, a coil spring in said boss between said head and the end of the boss, cam shaped locking detent on the inner face of the turning handle of the shaft, the inner end of the shaft having an angular portion, a plurality of washers mounted on said angular portion to rotate therewith but slidable longitudinally relatively thereto and an elongated bridging element mounted on said washers and having a central bore surrounding and spaced from said shaft, a means for connecting said bridging element with certain of said washers.

4. In an electric switch the combination of a casing having switch terminals, a switch shaft mounted on the casing and having an inner head forming a shoulder and an inner angular portion disposed between said terminals, a plurality of washers having central openings corresponding to the cross section of the angular portion of the shaft and certain of which have marginal spaced apart holes, said washers being disposed on said shaft, an elongated bridging element disposed between certain of said washers, said bridging element having a relatively large bore surrounding and spaced from said

shaft and having marginal holes adapted to register with the marginal holes of certain of said washers, detachable pins passing through the marginal holes of certain of said washers and the bridging element, and other washers having imperforate portions in registry with the marginal holes of the first mentioned washer, said second mentioned washers overlying the free ends of the pins for holding the pins from endwise movement.

5. In an electric switch, the combination of relatively broad switch terminals, and a relatively broad rotary bridging element for electrically connecting and disconnecting said terminals, a longitudinal slidable switch operating shaft having its inner end of angular section and disposed between said switch terminals and passing through a relatively large bore in the bridging element so as to be insulated therefrom, insulating washers mounted on said shaft for angular movement therewith, and slidably relative to said shaft to permit the free endwise movement of said shaft and means for interconnecting the insulating washers and the bridging element for driving the bridging element through the intermediary of the in-

sulating washers and an impositive locking mechanism operated by the longitudinal movement of the switch shaft for holding the bridging element in desired angular position with respect to the switch terminals.

6. In an electric switch, the combination of switch terminals, a connected rotary bridging element for electrically connecting and disconnecting said terminals and an insulating washer at the side of the bridging element between the terminals, the diameter of the washer being greater than the width and less than the length of the bridging element whereby when the bridging element is in one position it will make contact with the terminals and when rotated at approximately right angles, the washer will prevent the terminals from reaching the side of the bridging element, a shaft slidably passing through the bridging element and washer and insulated from the bridging element and an impositive locking mechanism adapted to be operated by the slidable movement of said shaft for impositively holding the bridging element in desired shifted position.

In witness whereof, I have hereunto subscribed my name.

JOHN LOFGREN.