

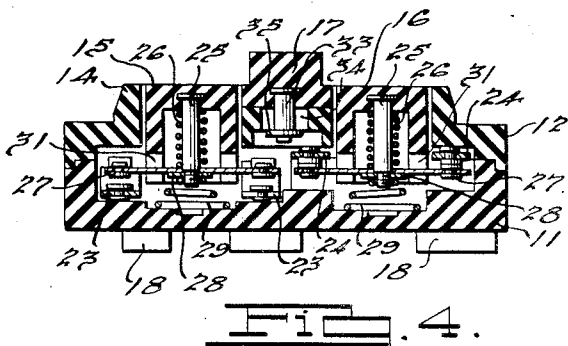
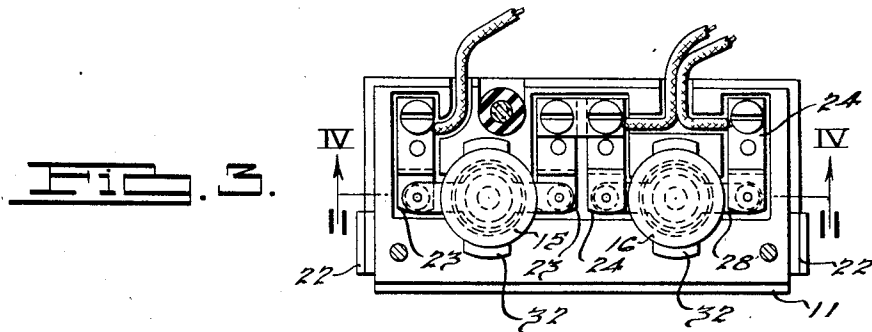
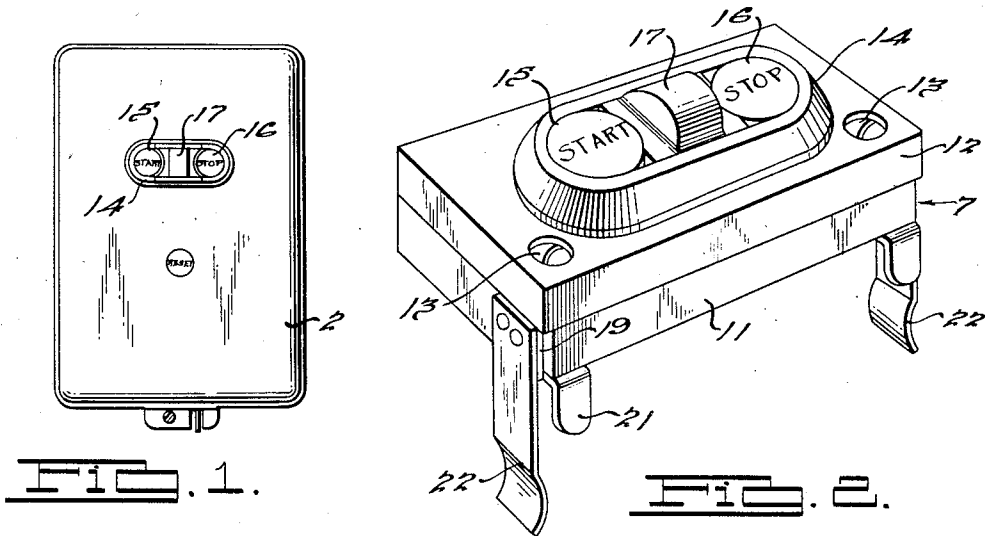
Nov. 28, 1944.

J. BIERNFELD

2,363,854

PUSH BUTTON SWITCH AND MOUNTING

Original Filed Dec. 1, 1937 2 Sheets-Sheet 1



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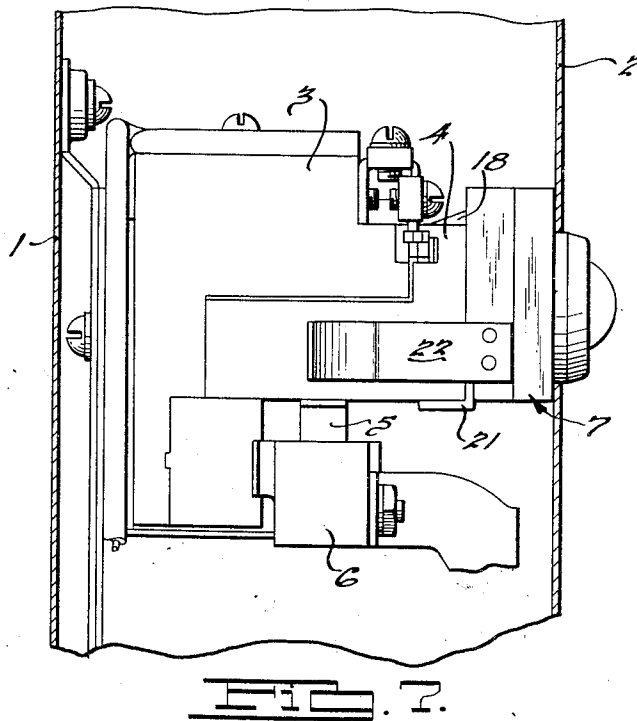
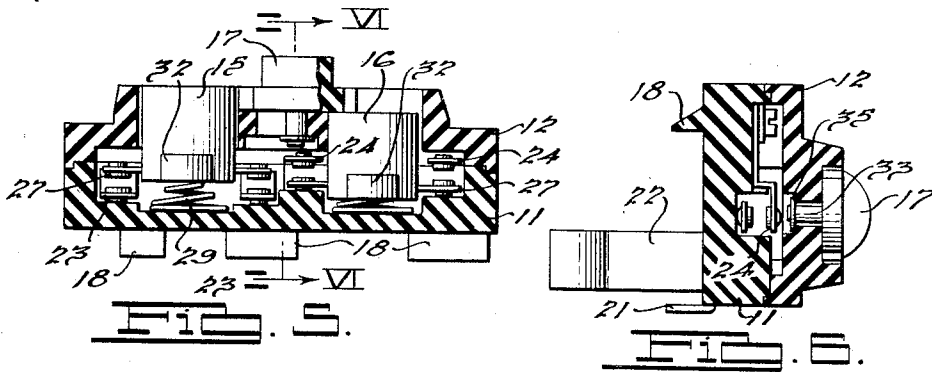
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PUSH BUTTON SWITCH AND MOUNTING

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PUSH BUTTON SWITCH AND MOUNTING

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Original application December 1, 1937, Serial No. 177,409. Divided and this application January 31, 1941, Serial No. 376,777

8 Claims. (Cl. 200—5)

This invention relates to electric circuit controlling devices and more particularly to the construction and mounting of the controlling means for an electromagnetically operated electric switch.

This application is a division of my application Serial No. 177,409 filed December 1, 1937 for Electric switch, now Patent No. 2,254,768, dated September 2, 1941.

One object of the invention is an improved and simplified mounting for the push button control station of an electric switch in which the station is rigidly mounted in operating position, but may be readily removed when desired.

Another object of the invention is the provision of an improved form of push button electric switch.

Another object of the invention is an electric push button switch having provisions for blocking the push buttons in depressed actuating position.

Other objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawings illustrating certain preferred embodiments in which:

Figure 1 is a front elevational view of an enclosed electromagnetic switch with the push button station mounted in accordance with the present invention.

Figure 2 is a perspective view of the push button electric switch.

Figure 3 is a vertical sectional view along the line of juncture between the cover and base portion of the switch.

Figure 4 is a sectional view on the line IV—IV of Figure 3.

Figure 5 is a partial sectional view similar to Figure 4 but with the locking element actuated to hold the right hand push button depressed.

Figure 6 is a sectional view on the line VI—VI of Figure 5.

Figure 7 is a sectional view through the enclosing box showing the electromagnetic switch and push button station in side elevation in the manner in which the push button station is mounted.

The electric switch, according to the present invention, is mounted within an outer enclosing box 1 having a removable cover 2. Within the box is disposed an electromagnetically operated electric switch, the details of whose construction are more specifically described in the parent application of which this is a division, but which includes cooperating insulating formations 3 and

4 forming isolated chambers at least partially enclosing stationary contact elements. Also within the chambers are disposed movable contacts mounted on carriers 5 which are in turn supported on a common insulating member 6 driven by the electromagnetic operator, not shown. The front face of the insulating member 4 has a plane surface and against its front face is disposed the flat plane surface of the back of the push button station 7, shown in its mounted and supported position in Figure 7, in perspective in Figure 2, and in sectional views in Figures 3 to 6 inclusive. The push button control unit includes a back or base insulating portion 11 and a front or cover portion 12 attached together by studs 13. The cover has a forwardly projecting oval shaped portion 14 within which are disposed the push buttons 15 and 16 and a locking element 17. At the back upper portion of the base section 11 are gripping extensions 18 adapted to engage the top surface of the insulating member 4, and at the lower back face of the base 11 are mounted metallic bracket portions 19 having integral fingers 21 engageable with the bottom surface of the insulating member 4. Upon the brackets 19 are mounted resilient fingers 22 engageable with the opposite sides of the insulating member 4. The mounting of this push button control unit is shown in Figures 1 and 7. The back face of the base 11 is placed directly against the front face of the front insulating member 4 forming a part of the contact enclosing assembly in which position the gripping projections 18 and fingers 21 engage with the top and bottom surfaces of the insulating member while the fingers 22 frictionally engage the opposite sides of the insulating member. The unit is thus mounted in place and movement thereof is limited to a frontwise removal which movement is, however, restrained by the frictional engagement of the elements 18, 21 and 22 with the insulating member. When the cover 2 of the outer enclosing box is secured in place, an opening in the cover thereof closely receives the projecting oval portion 14 which extends through this opening with the back surface of the cover 2 engaging the front surface of the cover portion 12 of the push button control unit which is thus securely maintained in operating position. When the cover 2 is removed, the push button station may be readily disassembled from its position on the insulating member forming the contact enclosure by simply pulling the same out of its frictional engagement therewith.

Upon the base 11 are mounted cooperating

pairs of spaced stationary contact elements 23 and 24. The push buttons 15 and 16 are of hollow construction, as shown, and have pins 25 rigid therewith. Light compression springs 26 are disposed about the pins 25 and against the springs 26 are disposed bridging contact plates 27. Washers 28 disposed against abutments adjacent the ends of the pins 25 limit the position of the bridging contacts 27 away from the push buttons and the washers are mounted in place by depressed compression springs 29 having their smaller ends securely threaded upon the ends of the pins 25. The bridging contacts 27 are prevented from turning with respect to the push buttons by being depressed within the slots 31 therein. The push buttons 15 and 16 are provided with projections 32 slidably engaged with cooperating openings in the base 11 to prevent rotation of the push buttons and engageable by the cover 12 to prevent removal thereof while the cover is in place. The locking slider 17 has a pin 33 rigid therewith and extending through an elongated slot 34 in the cover 12. A washer 35 having a diameter greater than the width of slot 34 maintains the locking slider 17 securely in position on the cover 12 and limits its movement to one parallel to the face of the cover. The push button 15 is a start push button and push button 16 is a stop push button; as viewed in Figure 4, it is seen that the stationary contacts 23 and 24 and bridging elements 27 for the two push buttons are reversely directed so that push button 15 is normally open and push button 16 is normally closed. The depression of push button 15 will close the circuit through contacts 23 and if they are connected in series with the energizing coil of the electromagnetic switch, will effect energization thereof and actuation of the switch to closed circuit position. The closing of the switch will ordinarily close a holding circuit about the start push button in a conventionally known manner, and opening of this push button thereafter will not effect opening of the electromagnetic switch. However, depression of push button 16 after the electromagnetic switch has been closed will open the circuit of its energizing coil at another point and will effect the de-energization thereof to move the switch to open position. The slider 17 is used to lock either of the push buttons in depressed position, and, as viewed in Figure 5, has been slidably moved to the right, thus placing its body portion directly above a part of the push button 16 and preventing frontward movement thereof under the bias of its compressed spring 29. In the operation of the push buttons, a relatively heavy compression spring 29 biases them in their forward position and depression of the push buttons is accompanied by a compression of this spring. When the bridging contacts 27 are stopped either by engagement with the base 11 as in push button 16 or by engagement with the stationary contacts as in push button 15, further depression of the push buttons results in the compressing of springs 26 and in the case of push button 15, a resilient contact pressure through the force exerted by its spring 26. While the push button switch has been described as directly mounted upon the switch which it controls and operating to effect energization and deenergization of the operating coil of this switch, it is, of course, obvious that the mechanism of the push button unit is of general application and may be used alone or in functional relation.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims:

What is claimed is:

1. An electric switch assembly comprising an outer enclosing box having an openable cover, an electromagnetically operated switch within the box and including insulating portions at least partially enclosing the cooperating contacts thereof, an auxiliary push button switch for controlling the energization of said electromagnetically operated switch and mounted within said box on said insulating formations, said push button switch having relatively rigid projections engageable with said formations to properly locate the position of the push button switch, said push button switch having elongated resilient projections frictionally engageable with said insulating formations to releasably maintain the push button switch in position thereon, said box cover interlocking with said push button switch when in its closed position to positively prevent movement thereof.
2. In a push button operated electric switch, stationary and movable contacts, a push button operator for manipulating said movable contact, spring means biasing said push button to its outward position, and a reciprocable member manually movable in front of said push button in its depressed position to prevent return outward movement thereof and to maintain the push button in its operated position.
3. In a push button electric switch assembly, a pair of push button operated electric switches each including stationary and movable contacts, a push button operator for manipulating the movable contact and spring means biasing the push button to its outward position, and means disposed between said push buttons and optionally movable in opposite directions over the return path of a depressed push button whereby said push button is maintained in its depressed, operated position.
4. In a push button operated electric switch assembly, a base and cover member cooperating to form a chamber, a pair of push button control switches within said chamber including push button operators accessible through the cover, stationary and movable contacts within the chamber and means biasing the push buttons to their outward positions, a locking member slidably mounted upon said cover between said push buttons, said member being movable into the return path of either depressed push button as desired whereby such push button will be maintained in its depressed, operated position.
5. In a push button operated electric switch, spaced stationary contacts, a hollow push button, a post within said push button and rigid therewith, a spring about said post, a bridging contact member slidably mounted on said post, means limiting the movement of said bridging contact in its removal direction, and spring means cooperating with a part rigid with said push button and biasing it to its outward position.
6. In a push button operated electric switch, a stationary contact, a hollow push button, a post within said push button and rigid therewith, a compression spring about said post, a

movable contact slidably mounted on said post and a compression spring having one end connected to said post and its other end against a fixed part thereby biasing said push button to its outward position.

7. In a push button operated electric switch, a stationary contact, a hollow push button, a post within said push button and rigid therewith, a compression spring about said post, a movable contact slidably mounted on the post and projecting through a slot in the side wall of the push button, and a second compression spring biasing the push button to its outward position.

8. In a push button operated electric switch, a stationary contact, a hollow push button, a

post within said push button and rigid therewith, a compression spring about said post, a movable contact slidably mounted on said post and projecting through a slot in the side wall of said push button for cooperating with said stationary contact, a washer on said post providing an abutment against which said movable contact is pressed by said spring, and a tapered coil spring having its smaller end mounted on the end of said post to maintain said washer, the opposite end of said tapered spring being engageable with a fixed part to bias the push button to its outward position.

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