Aug. 28, 1928. 1,682,211

J. W. BISHOP

SWITCH

Filed April 4, 1923

Fig. 1

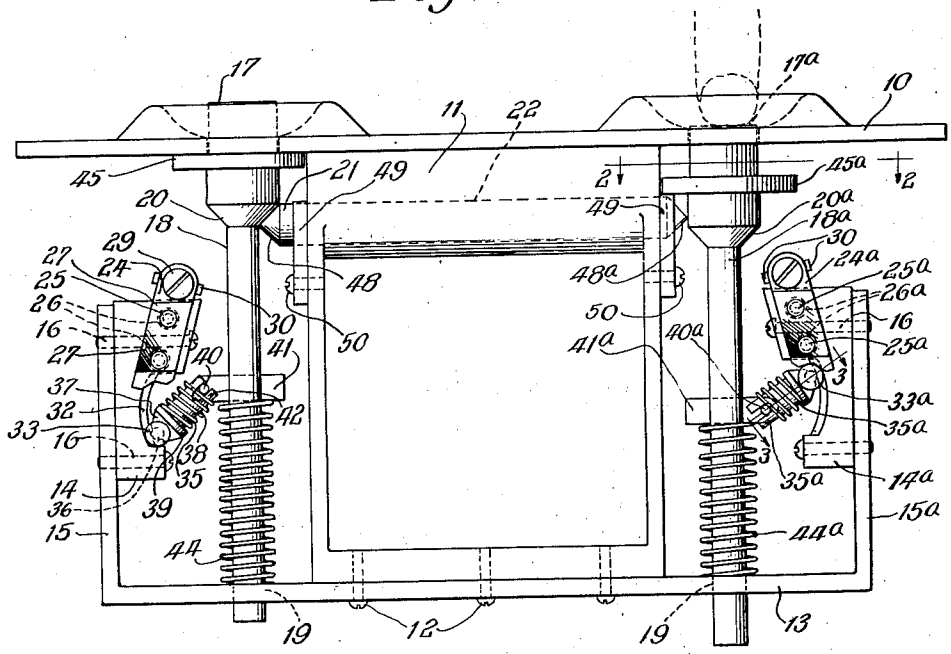
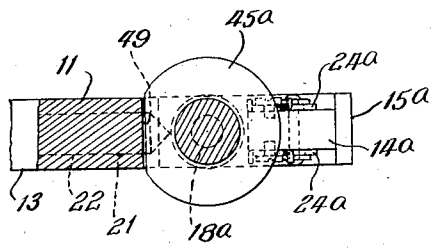
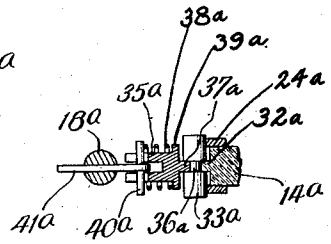


Fig. 2

Fig. 3





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Patented Aug. 28, 1928. 1,682,211

UNITED STATES PATENT OFFICE.

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SWITCH.

Application filed April 4, 1923. Serial No. 629,761.

The main object of my invention is to provide an improved switch for controlling a plurality of circuits which has independently actuated switch mechanisms adapted to lock one another against operation.

Other objects of my invention are to provide an improved switch which has independently actuated switch mechanisms and is adapted to hold one switch mechanism inoperative when another switch mechanism is operated; which has a plurality of independently actuated switch mechanisms and is adapted to prevent simultaneous operation thereof; and which has a plurality of switch mechanisms of the push-button type and is adapted to hold the push button of one switch mechanism inoperative when another switch mechanism is actuated.

Other objects of my invention will become apparent as the following description progresses, reference being had to the accompanying drawing, wherein

Fig. 1 is a side elevation of a switch embodying the novel features of my invention.

Fig. 2 is a section taken on line 2—2 of Fig. 1, and

Fig. 3 is a section taken on line 3—3 of Fig. 1.

As shown in the drawing, my improved switch is preferably provided with a face plate 10 having an inwardly projecting frame member 11 formed integral therewith. A bent bar 13 adapted to support a pair of insulating blocks 14 and 14ª is secured to the inner end of the frame member 11 by screws 12. The insulating blocks 14 and 14ª are rigidly secured to inwardly projecting legs 15 and 15ª of the bent bar 13 by means of screws 16. Each of the insulating blocks 14 and 14ª has associated with it one of a pair of push buttons 17 and 17ª, the push button 17 being associated with the insulating block 14 and the push button 17ª being associated with the insulating block 14ª. The push buttons 17 and 17ª are slidably mounted in the face plate 10 and in the bent bar 13. For this and other purposes the inner end of the push button 17 terminates in an elongated rod 18 having a diameter less than the diameter of the outer end of the push button 17, and the push button 17ª terminates in a similar elongated rod 18ª. The rods 18 and 18ª are received in apertures 19 of the bent bar 13. It will be noted that the push buttons 17 and 17ª are provided with beveled surfaces 20 and 20ª adapted to engage and displace a plunger 21 disposed between the push buttons and slidably journaled in a bore 22 of the frame member 11. The plunger 21 provides means for locking either of the push buttons 17 and 17ª against displacement when the other of the push buttons is depressed to actuate a switch mechanism associated with it.

The switch mechanism associated with the push button 17 comprises a pair of wiring terminals 24, one of which is riveted to either side of the insulating block 14 by rivets 25. The rivets 25 are insulated from the wiring terminals 24 in the usual manner by means of insulating sleeves 26 and insulating strips 27. Each wiring terminal 24 is provided with a screw 29 and integral ears 30, by means of which an electrical conductor (not shown) forming part of an electric circuit may be connected to the wiring terminal. One end of each of the wiring terminals 24 lies adjacent the upper end of an arcuate track 32 formed in the insulating block 14 and they may be engaged by a metallic roller 33 associated with the track 32. Engagement of the wiring terminals 24 by the roller 33 will of course complete an electric connection between the wiring terminals and close the circuit of which the wiring terminals form a part.

As shown in Figs. 1 and 3 the roller 33 is carried in one end of a lever 35, the roller 33 having an annular groove 36 intermediate its ends which is adapted to receive a tongue 37 of the lever 35. The tongue 37 is grooved so that it may rotatably journal the roller 33, the roller 33 being held in the groove by means of the track 32 and a helical compression spring 38 wound about the lever 35. One end of the helical compression spring 38 bears against a shoulder 39 turned upon the lever 35, and the other end of the spring bears against a pin 40 which serves to loosely pivot the lever 35 to a bar 41 rigidly secured in the rod 18 of the push button 17. One end of the bar 41 is received between bifurcations 42 of the lever 35 and the pin 40 of the bar 41 is received in slots formed in the bifurcations 42.

The roller 33 and the lever 35 are normally held in the position shown in Fig. 1 through the medium of a helical compression spring 44 wound around the rod 18 of the push button

17 and having one of its ends resting against the bent bar 13, and the other end of the spring 44 rests against the bar 41. It is apparent that the spring 44 yieldingly holds the push button 17 in a position wherein a collar 45 formed upon the push button will engage the inner surface of the face plate 10, and it is also apparent that when the collar 45 is in engagement with the face plate 10 the roller 33 and lever 35 will be positioned as shown in Fig. 1, and will not be in engagement with the wiring terminals 24. However, the roller 33 may electrically connect the wiring terminals 24 if the push button 17 is depressed, for in that event the downward movement of the pin 40 will compress the compression spring 38 until the pin 40 reaches a position relative to the roller 33, wherein the spring 38 may cause the lever 35 to drive the roller 33 along the track 32 until it engages the wiring terminals 24. The roller 33, lever 35 and push button 17 will then be in positions relatively to the insulating block 14 which are identical to the positions in which the push button 17^a, lever 35^a and the roller 33^a are shown relative to the insulating block 14^a, and the circuit which includes the terminals 24 will be closed.

The radius of the circle of which the track 32 is an arc is preferably of greater length than the distance between the axes of the roller 33 and pin 40 when the roller 33 and pin 40 are in the positions relative to each other shown in Fig. 1. This design enables the spring 38 to snap the roller 33 into and out of engagement with the wiring terminals 24 so that arcing between the terminals and the roller is reduced to a minimum.

The lever 35^a and roller 33^a form part of a switch mechanism associated with the push button 17^a, which is identical with the switch mechanism associated with the push button 17, and which comprises the lever 35 and roller 33. Thus the bearing block 14^a is provided with wiring terminals 24^a rigidly secured to the insulating block 14^a by rivets 25^a which are insulated from the wiring terminals 24^a, and the wiring terminals 24^a may be electrically connected by the roller 33^a carried by the lever 35^a which is loosely pivoted by means of a pin 40^a to a bar 41^a carried by the rod 18^a of the push button 17^a. The several parts of the two switch mechanisms are identical in construction and are interchangeable as aforesaid, although they need not be to fall within the scope of my invention.

The aforementioned plunger 21 provides means whereby simultaneous depression of the push buttons 17 and 17^a is prevented and which effectually locks either of the push buttons against displacement when the other push button is in a position wherein the roller 33 or the roller 33^a is held in engagement with the wiring terminals 24 or the wiring terminals 24^a respectively. Each end of the plunger 21 is provided with a conical surface, one of which, designated by the reference character 48, is adapted to be engaged by the push button 17, and the other, which is designated by the reference character 48^a, is adapted to be engaged by the push button 17^a. Fig. 1 illustrates the manner in which the plunger 21 locks one of the push buttons against displacement when the other push button is held in a position wherein it causes its associated wiring terminals to be electrically connected by the roller 33 or the roller 33^a. Thus the conical surface 48 of the plunger 21 is in engagement with the beveled surface 20, and the push rod 21, and the push button 17 cannot be depressed as displacement thereof would necessitate displacement of the plunger 21 in a direction toward the push button 17^a. This displacement is impossible as the push rod 21 is in engagement with that portion of the push button 17^a having the larger diameter. It will be readily understood, however, that if the push button 17^a is released, the compression spring 44^a associated with it will return it to the position wherein the switch mechanism actuated by it is in an open circuit condition. The push button 17 may then be depressed, as its beveled surface 20 will drive the plunger 21 toward the push button 17^a until the conical surface 48^a is in engagement with the beveled surface 20^a of the push button 17^a.

I have provided a pair of stops 49 rigidly secured to the frame member 11 by screws 50, the stops 49 serving to limit the downward movement of the push buttons 17 and 17^a by engaging the collars 45 and 45^a of the push buttons 17 and 17^a respectively.

In the operation of the device either of the push buttons may be depressed to actuate its switch mechanism which will then close the circuit associated with the push button. But simultaneous closing of the circuits is prevented by the plunger 21, and as long as either of the circuits is in a closed condition, the switch mechanism associated with the other circuit is held in an inoperative condition.

I am aware that changes in the form, construction and arrangements of parts may be made without departing from the spirit and without sacrificing the advantages of the invention and I reserve the right to make all such changes as fairly fall within the scope of the following claims:

I claim:

1. In a switch, the combination with a plurality of switch mechanisms each comprising a push button, a lever loosely pivoted to the push button, a roller carried by the lever, a track for the roller, yielding means for keeping the roller in engagement with the track, a terminal adapted to be engaged by the roller, and yielding means for holding the push button in a position wherein the roller is disengaged from the terminal, of means controlled by the push buttons for preventing

simultaneous operation of the switch mechanisms.

2. In a switch, the combination with a plurality of switch mechanisms, each comprising a push button, a lever loosely pivoted to the push button, a roller carried by the lever, a track for the roller, yielding means for keeping the roller in engagement with the track, a terminal adapted to be engaged by the roller, and yielding means for holding the push button in a position wherein the roller is disengaged from the terminal, of a plunger slidably mounted in the switch and adapted to engage the push buttons to prevent simultaneous operation of the switch mechanisms.

JOSEPH W. BISHOP.