

Oct. 7, 1958

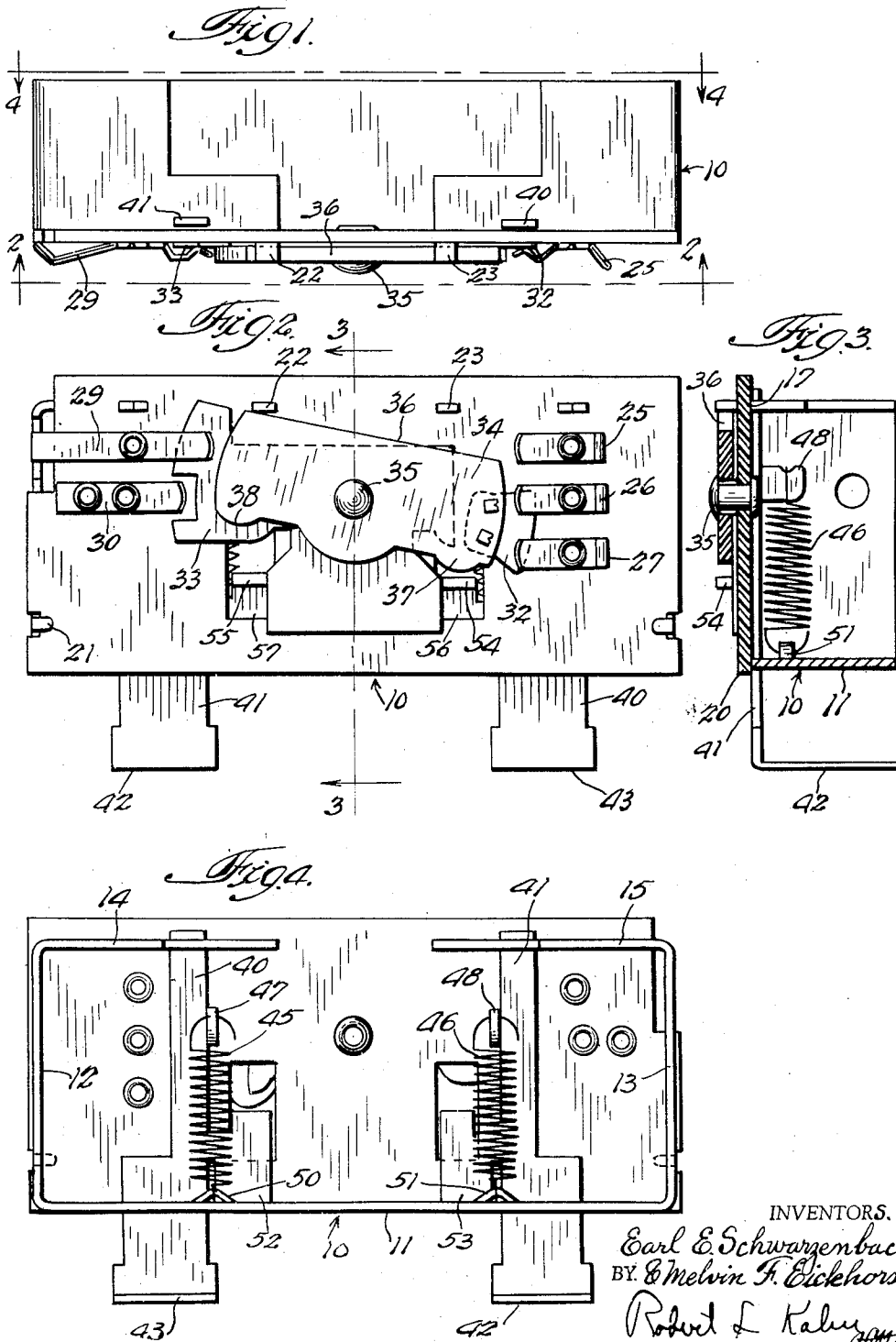
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2,855,472

ELECTRIC SWITCH MEANS

Filed March 20, 1957

2 Sheets-Sheet 1



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Fig. 5.

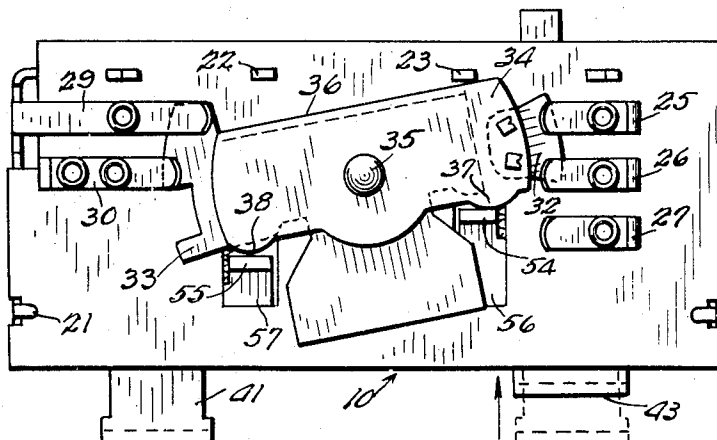


Fig. 6.

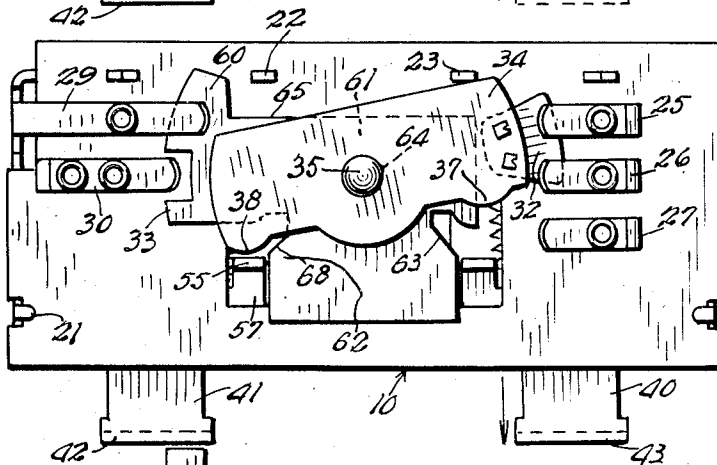


Fig. 7.

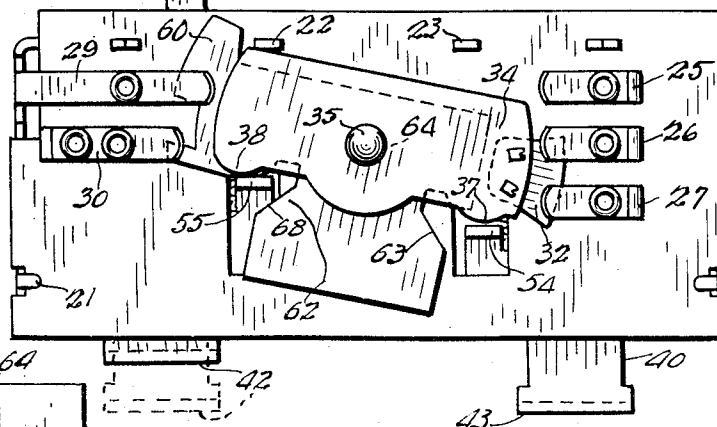
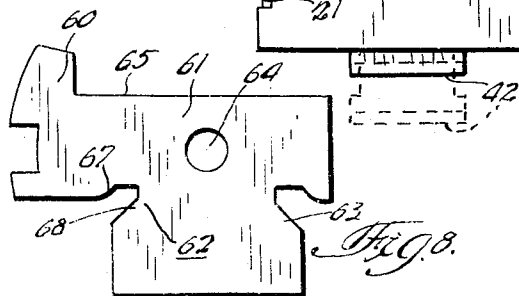


Fig. 8.

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ELECTRIC SWITCH MEANS

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4 Claims. (Cl. 200—6)

This invention relates to electric switch means and more particularly to a simple and compact construction having alternate stable settings combined with off-normal unstable settings for each stable setting.

In certain instances it is desirable to provide for a push button actuation of switches for obtaining one of two stable conditions of switches and provide means for super-imposing upon each stable switch position a temporary change in switch conditions. Thus for example, it may be desirable to have a pair of push buttons for actuating switches from one condition to another and permit such switches to remain in such conditions until the push buttons are again actuated. It is also desirable to super-impose upon the push buttons settings temporary settings from each stable switch position.

In accordance with this invention a simple construction is provided for effecting the above. In order that the invention may be understood reference will now be made to the drawings wherein an exemplary embodiment is illustrated. It is understood that variations may be made without departing from the scope of the invention as defined by the appended claims.

Referring to the drawings,

Figure 1 is a rear elevation of a switch embodying the present invention.

Figure 2 is a view along line 2—2 of Figure 1.

Figure 3 is a section along line 3—3 of Figure 2.

Figure 4 is a view along line 4—4 of Figure 1.

Figures 5, 6 and 7 are views similar to Figure 2 but showing the switch in different positions.

Figure 8 is a detail of the lost motion movable contact.

The construction comprises frame 10 having front wall 11, side walls 12 and 13 and rear wall portions 14 and 15. Frame 10 may conveniently be made of a single strip of metal bent to form a general C shape. Frame 10 has top edge 17 which has disposed thereon insulating panel 20 of rigid material, such as Bakelite or the like. Panel 20 may have any desired shape and is here illustrated as being generally rectangular. Insulating panel 20 is retained on frame 10 by suitable means, such as for example ears or tabs 21 extending from the frame and passing through suitable openings or slots in the insulating panel. Frame 10 has ears 22 and 23 projecting through panel 20, these ears functioning as stops, as will be apparent later.

Disposed on insulating panel 20 are a number of stationary contacts. As illustrated in the drawings, stationary contacts 25, 26 and 27 are disposed in a line across the width of panel 20. These contacts may be spring contacts and may be constructed in any desired fashion. As an example, the spring contacts illustrated in United States Patent No. 2,186,949 may be used. Contacts 25 to 27 inclusive are disposed adjacent one end of insulating panel 20. Adjacent the other insulating end of the panel are additional stationary contacts 29 and 30.

Cooperating with the various stationary contacts are movable contacts 32 and 33 respectively. Movable contact 32 is carried by insulating arm 34 rockably mounted

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at its center on rivet 35. Movable contact 32 consists of a simple blade or strip of stiff metal which may engage two adjacent contacts of the three contacts. Insulating arm 34 has rear edge 36 adapted to cooperate with ears 22 and 23 for limiting the movement of the arm. Arm 34 is also provided with portions 37 and 38 at the front edge thereof, said portions providing for actuation by push rods.

Disposed immediately below the face of insulating panel 20 are push rods 40 and 41. These push rods are slidably supported by suitable slots cut into top edge 17 of frame 10, the push rods being long enough so that in all positions the push rods will extend beyond front wall 11 and rear wall portions 14 and 15 of the frame. The exact shape of the push rods is unimportant. Push rods 40 and 41 have finger engaging portions 42 and 43 accessible from front wall 11 of the switch. The push rods are biased outwardly by springs 45 and 46 extending between fingers 47 and 48 on the push rods and loops 50 and 51 punched out from wall 11 of frame 10. Outward movement of the push rods to the positions shown in Figure 4 is limited by push rod portions 52 and 53 engaging the inside of wall 11.

Push rods 40 and 41 have upstanding fingers 54 and 55 extending upwardly through openings 56 and 57 in insulating panel 20. Fingers 54 and 55 are adapted to engage edge portions 37 and 38 of rockable arm 34. As is illustrated in Figures 2 and 5 respectively, rockable arm 34 has two stable rest positions, this being determined by actuation of the appropriate push rod.

Movable contact 33, illustrated in detail in Figure 8, has contact portion 60, mounting portion 61 and push rod engaging portions 62 and 63. The entire movable contact, which is here illustrated as being of one piece, is rockably secured to rivet 35 as by apertured portion 64. Movable contact 33 has rear edge 65 which is undercut so that it will not reach stops 22 and 23 in any position of the movable contact. This is desirable in this particular structure for the reason that stops 22 and 23 are of metal and the movable contact is also of one piece of metal. In the event that contact portion 60 is insulated from the rest of the structure illustrated in Figure 8 then the position of rear edge 65 may be such that stops 22 and 23 may be engaged. However as will be shown later, movable contact 33 is adequately stopped.

Actuating portions 62 and 63 of movable contact 33 are each shaped to provide shoulders 67 and 68. Operating fingers 54 and 55 of the push rods will cooperate with shoulders 67 and 68 of the proper actuating portion for moving contact 33 on its axis in a direction determined by the direction of movement of the push rod.

That push rod which will oscillate movable contact 33 will be the same push rod which has been last actuated to rock arm 34. As an example, in Figure 2, the switch is in a rest position where push rod 41 has just been actuated. If push rod 41 is actuated again, the switch will assume the position illustrated in Figure 7 where movable contact 33 bridges fixed contacts 29 and 30. Release of push rod 41 will permit movable contact 33 to return to the position illustrated in Figure 2. In this example, contact 32 may be considered to be in one fixed position. Contact portion 60 of contact 63 may be moved temporarily to the position shown in Figure 7.

If push rod 40 is actuated, and is not released, the switch will assume the position illustrated in Figure 5. Release of push rod 40 will permit movable contact 33 to assume its rest position as illustrated in Figure 6.

Movable contact 33 has the same rest position irrespective of the position of insulating arm 34. On the other hand, movable contact 33 will be moved from its rest position either rearwardly or forwardly depending upon which push rod is operated,

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Movable contact 32 or a movable member may be considered as means having one of two stable positions determined by two actuating members, in this case two push rods. Rockable member 33 may be considered as consisting of contact portion 60 and rocking means consisting of portions 62 and 63 which are operated by the push rod means, said contact portion being biased to one position and movable therefrom to one side or the other side of its bias position by operation by one or the other push rod. It is possible to replace contact portion 60 with a series of contacts or by suitable means for controlling suitable means.

As illustrated here, contacts 29 and 30 are normally isolated from each other as far as the switch is concerned and are connected together electrically upon oscillation of movable contact 33 in either direction. It is possible to have additional contacts to contacts 29 and 30 to obtain different switching actions.

What is claimed is:

1. An electric switch construction comprising a flat base having front and rear portions, a pair of laterally spaced push rods, means for slidably supporting said rods to be movable along parallel lines extending between the front and rear portions of the base, spring means for biasing said rods to a front position, a first rockable member comprising a flat strip, pivot means for securing said first member on said base at a point between said rods, said member lying flat on said base and having actuating portions laterally of the pivot means, said member actuating portions being at the edge facing the front of the base, a finger on each rod shaped to engage the adjacent actuating portion of the first rockable member only when the rod moves from the front to the rear of the base, said rocking member being rockable about its pivot upon inward rod travel, a second rockable flat member disposed against the first rockable member and being pivotally secured by the same pivot means as the first rockable member, said second rockable member having actuating portions at the front edges for cooperation with the two rods, the finger on a rod engaging the adjacent actuating portion of the second rockable member, each actuating portion on the second rockable member having a slot whose edges are engaged by the cooperating rod finger, each slot being so shaped that when one push rod finger is moved inwardly, the two rockable members may be moved to one extreme

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position and upon release of the one push rod to permit it to return to its outward position, the finger thereof moves the second rockable member from its one extreme position to an intermediate position, the other rod correspondingly moving the two rockable members to the other extreme position and returning the second rockable member to its intermediate position upon release of the second push rod, subsequent inward movements of a push rod after initial actuation of the first rockable member serving only to rock the second rockable member between its extreme position and intermediate position, and electric switches controlled by said two rockable members.

2. The construction according to claim 1 wherein said two rockable members carry movable contacts and wherein said base carries fixed contacts, said movable and fixed contacts comprising the electric switches controlled by said two rockable members.

3. The construction according to claim 1 wherein said base has depending front and rear wall portions with aligned slots therethrough for supporting said two push rods, said base having slots in which the push rod fingers may slide when the push rods move, and ears on said base for cooperation with the rear edges of said two rockable members for limiting the swing of said rockable members.

4. The construction according to claim 1 wherein said first rockable member carries a movable contact at one end thereof, a plurality of stationary contacts carried by said base for cooperating with said movable contact, said second rockable member carrying a movable contact at an end thereof remote from the first named movable contact, stationary contacts carried by said base for cooperation with said last movable contact of the second rockable member, said cooperating contacts comprising the electric switches controlled by said two rockable members.

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