Feb. 1, 1927. 1,616,277

H. H. OSBORN

ELECTRIC SWITCH

Filed July 17, 1922 2 Sheets-Sheet 1

Fig. 1

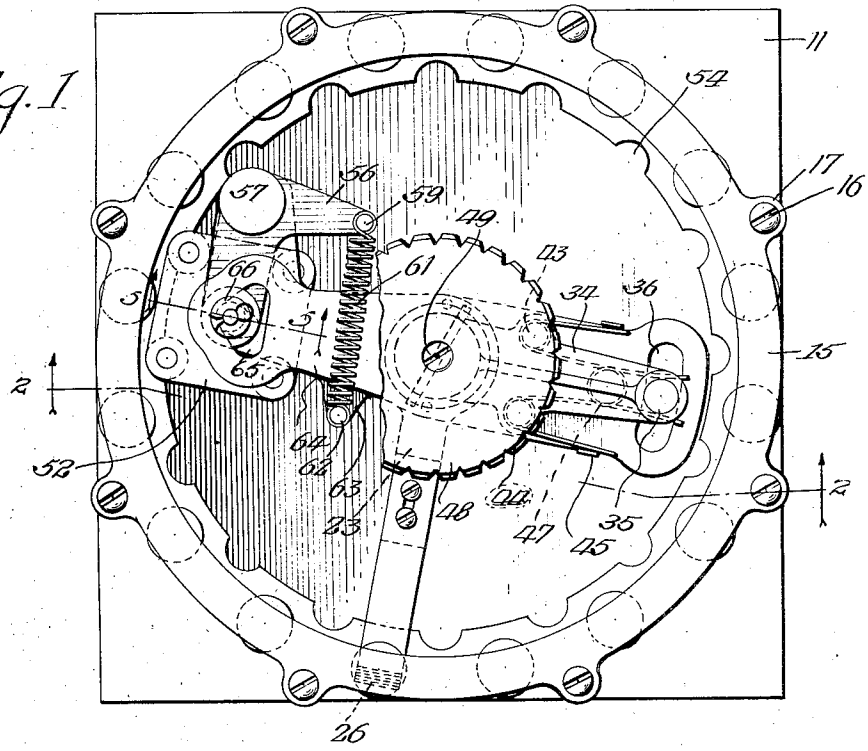
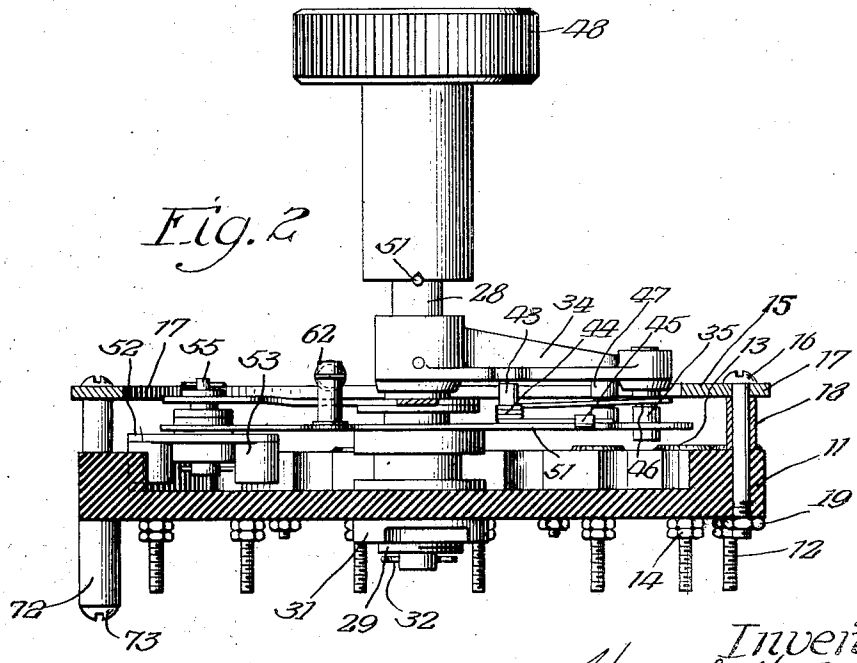


Fig. 2



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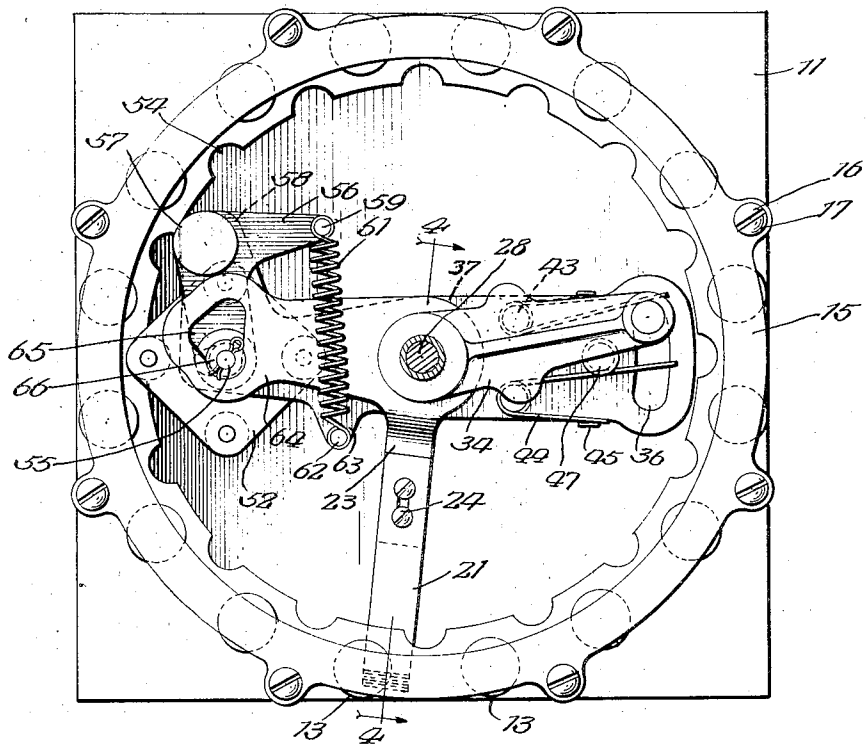


Fig. 3

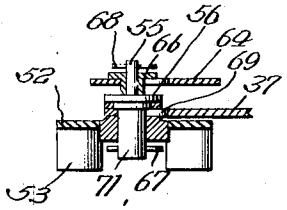
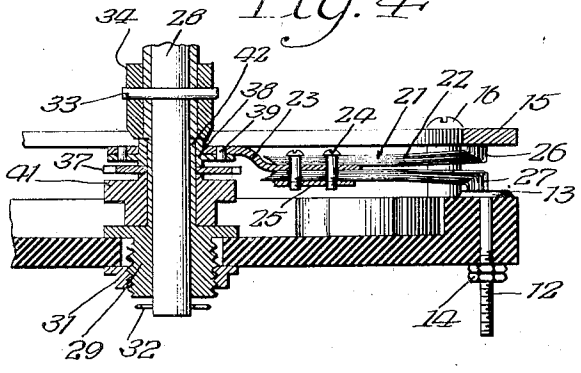


Fig. 5

Fig. 4



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UNITED STATES PATENT OFFICE.

HOWARD H. OSBORN, OF CHICAGO, ILLINOIS, ASSIGNOR TO H. G. FISCHER & CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRIC SWITCH.

Application filed July 17, 1922. Serial No. 575,444.

This invention relates in general to electric switches, and refers more particularly to means for positively and sharply throwing a switch blade from one button to another, and for positively locking said blade in contact with any button to which it is turned.

A principal object of the invention is the provision of an improved type of switch operable without likelihood of the blade sticking at any point and without likelihood of incomplete movement which would leave it in inoperative position.

A further object of the invention is the provision of a switch of this character provided with means for positively holding the blade in any of its predetermined positions and requiring special and considerable effort to move it from locked position, thus insuring against accidental throwing of the switch and inexact operation thereof.

A still further object of the invention is the provision of switch operating mechanism of the positive character described, operable with equal facility in either direction, and without limit to its movement.

Another and highly important object of the invention is the provision, in an electric switch construction, of locking means movable in its operation past center relatively to the point upon which it operates without appreciable movement of the blade carrying mechanism, and of spring means tensioned by such movement so as to subsequently throw the blade sharply from one of its contact points to another.

One of the particular objects of the invention is the provision of a slot and roll connection between the blade carrying mechanism and the throwing and locking mechanisms which permits accomplishment of the objects above stated.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a top plan view of a switch embodying the principles of my invention;

Fig. 2 is a vertical sectional view taken substantially on the line 2—2 of Fig. 1;

Figure 3 is a plan view similar to that of Fig. 1, the parts being shown in different position and omitting the operating knob;

Fig. 4 is a detail section taken substantially on the line 4—4 of Fig. 3; and

Fig. 5 is a detail section taken substantially on the line 5—5 in Fig. 1.

Upon the drawings illustrating my invention I have shown an insulated base member 11, adapted for attachment to a suitable part of the apparatus with which it is to be employed, and having a plurality of posts 12 extending therethrough and forming spaced apart contact points or buttons 13 about the periphery of the plate 11. It will be understood that electric wires may be secured to these points by means of nuts 14 and the posts may be provided in any desired number according to particular requirements. The current conducting upper contact ring 15 is secured to the plate by means of screws 16 extending through projections 17 therein and through the plate 11, collars 18 being provided between said ring and said plate to maintain the spaced relationship thereof and nuts 19 being fitted onto the inner ends of said screws 16. A blade 21 consisting of a plurality of copper leaves 22 arranged in upper and lower groups and secured to a supporting arm 23 by means of screws 24 and a block 25 are provided with oppositely turned ends 26 and 27 adapted to contact respectively with the ring 15 and the contact buttons 13. The arm 23 is secured to a shaft 28 extending through a shouldered and externally threaded sleeve or block 29, a nut 31 being secured onto the block 29 and a cotter pin 32 holding the shaft against vertical movement. The shaft 28 has secured thereto by a pin 33 a lever 34 carrying at its outer end a depending post or pin 35 engaging in a slot 36 in a centrally pivoted lever 37. Both the arm 23 and the lever 37 are rotatable upon the shaft 28, the arm 23 being secured to a collar 38 by pins 39 and the lever 37 being carried between said collar and a larger collar 41 therebeneath, a sleeve 42 upon the shaft forming a bearing surface for these last mentioned parts.

Upon the lever 37 are two posts 43 upon which are positioned two wire springs 44 having ends engaged behind lugs 45, opposite and longer ends engaging in grooves 46 in the pin 35. A grooved central post 47 extends upwardly from the lever 37 and just

behind the pin 35 when the latter is centered in the slot 36, the purpose of this post being to prevent movement of either of the springs past center, thus assisting in centering the lever 34.

A hand wheel or knob 48 is secured by a screw 49 and a pin 51 to the shaft 28, and operation thereof actuates the lever 34. The pin 35 upon reaching the end of the slot 36 actuates the lever 37 about the shaft 28 and through the instrumentality of this last mentioned lever the switch blade is thrown in a manner to be now described.

A rectangular locking member 52 is provided at its corners with depending pins 53 engageable in pairs in recesses 54 provided in the wall of a central depression in the material of the plate 11. This member is carried on a pin 55 upon which also the end of the lever 37 is pivoted and a bell crank lever 56 has one end loosely connected with said pin and is pivoted at 57 onto a projection 58 of the lever 37, the opposite end of said bell crank being provided with an upstanding post 59 to which is secured one end of a spring 61 having its opposite end connected to a post 62 upstanding from a projection 63 on the opposite side of the lever 37. The arm 23 has an extension 64 provided with a triangular slot 65 into which extends a roller 66 rotatably secured upon the pin 55, all said parts being held upon the pin 55 by cotter pins 67 and 68.

The lever 37 is provided with a slot 69 engaging a sleeve 71 on the pin 55 and actuation of said lever 37 by the lever 34 moves said pin 55 and the roller 66 and sleeve 71 from the positions shown in Fig. 1 to those shown in Fig. 3, at the same time turning the locking member 52 and drawing inwardly the inner arm of the bell crank lever 56. It will be observed that through the operation of the roller 66 in the slot 65 the movement to the position shown in Fig. 3 may be accomplished without appreciable movement of the arm 23 and such movement tensions the spring 61. After the member 52 has turned past center of the pivot provided by one of the depending pins 53 engaging in one of the recesses 54 its movement will be sharply completed and the spring 61 serves to throw the arm 23 to the next button 13. In this manner the blade 21 is caused to maintain its contact with one button until the actuating parts just described have been positively moved to the position from which, by reason of the construction which I have provided, they throw said blade to the next adjacent button. The balance and pressure of the parts in operation are such as to prevent an incomplete movement, since the spring 61 and the shape of the member 52 practically necessitate engagement of two of the pins 53 in the recesses 54. The spring 44, it will be noted, serves to assist in bringing the parts to the position of Fig. 3, and the spring 61 completes the movement after the member 52 has moved past center.

Current is communicated to the ring 15 by means of a post contained in the sleeve 72 and extending through the plate 11, a screw 73 being inserted in the lower end of said sleeve to hold an electric wire in contact therewith. The operation of my switch practically insures completion of a circuit between said ring and one of the buttons 13 at all times and it is believed that the efficiency of the mechanism which I have provided will be manifest.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. An electric switch, comprising a base, a plurality of contact buttons in said base, a current conducting member spaced from said buttons, a switch blade adapted to communicate current from said member to one of the buttons, and operating mechanism for said blade comprising a rectangular locking member engaged at its corners in interior peripheral recesses in said base and means for moving said member about one of said recesses as a fulcrum point with preliminary motion not appreciably affecting said blade and final motion exerting a sharp throwing action upon the blade to move it from one of said buttons to another.

2. An electric switch, comprising a base, a plurality of contact buttons in said base, a current conducting member spaced from said buttons, a switch blade adapted to communicate current from said member to one of the buttons, and operating mechanism for said blade comprising a pivoted locking member having parts engageable in recesses spaced about the wall of a depression in said base, a slotted arm carrying said blade, and means including a roll operable in the slot of said arm for moving said locking member about said wall with preliminary motion not appreciably affecting said blade and final motion exerting a sharp throwing action upon the blade to move it from one of said buttons to another.

3. An electric switch, comprising a base, a plurality of contact buttons in said base, a current conducting member spaced from said buttons, a switch blade adapted to communicate current from said member to one to the buttons, and operating mechanism

for said blade comprising a pivoted locking member having parts engageable in recesses spaced about the wall of a depression in said base, a slotted arm carrying said blade, means including a roll operable in the slot of said arm for moving said locking member about said wall, and spring tensioned means for moving said arm with a sharp throwing action upon completion of the movement of said roll in said slot.

4. An electric switch, comprising a base, a plurality of contact buttons in said base, a current conducting member spaced from said buttons, a switch blade adapted to communicate current from said member to one to the buttons, and operating mechanism for said blade comprising a manually operable shaft upon which the blade is pivoted, a rigid operating arm extending from said shaft, a slotted lever operable by said rigid arm and movable a distance independently of said blade, a locking member operable by said lever and connections between said lever and said blade causing quick movement of the latter from one button to another after partial rotary movement of said locking member.

5. An electric switch, comprising a base, a plurality of contact buttons in said base, a current conducting member spaced from said buttons, a switch blade adapted to communicate current from said member to one of the buttons, and operating mechanism for said blade comprising a locking member, actuating means for said member and said blade, and a roll and slot connection between said means and said blade whereby said locking member may be partially moved by said means prior to actuation of the blade.

6. An electric switch, comprising a base, a plurality of contact buttons in said base, a current conducting member spaced from said buttons, a switch blade adapted to communicate current from said member to one to the buttons, and operating mechanism for said blade comprising a locking member, actuating means for said member and said blade, a roll and slot connection between said means and said blade whereby said locking member may be partially moved by said means prior to actuation of the blade, and spring means for thereafter sharply throwing said blade.

7. A control switch for electrical apparatus, comprising, a base, a plurality of contact buttons in said base, a current conducting member secured to said base and spaced from said contact buttons, a control shaft rotatably secured to said base having an operating handle and a switch operating arm secured thereto, a switch blade for transmitting current from said current conducting member to one of said contact buttons pivotally secured to said control shaft, and means interposed between said control shaft operating arm and the switch blade and arranged for rolling contact with the arm for controlling the movement of said switch blade.

8. A control switch for electrical apparatus, comprising, a base, a plurality of contact buttons in said base, a current conducting member secured to said base and spaced from said contact buttons, a control shaft rotatably secured to said base having an operating handle and a switch operating arm secured thereto, a switch blade for transmitting current from said current conducting member to one of said buttons pivotally secured to said control shaft, and means pivoted on said control shaft and engaging said operating arm and the switch blade for causing intermittent motion of the switch blade.

9. A control switch for electrical apparatus, comprising, a base, a plurality of contact buttons in said base, a current conducting member secured to said base and spaced from said buttons, a control shaft rotatably secured to said base having an operating handle and a switch operating arm secured thereto, a switch blade for transmitting current from said current conducting member to one of said buttons pivotally secured to said control shaft, and means connecting said switch control arm and switch blade for controlling the movement of the switch blade, said means, comprising, a lever pivoted intermediate its ends to the operating shaft and yieldably engaging the switch operating arm at one end, and means pivoted to the other end of said lever engaging in a slotted portion of said switch blade and in recesses in the body.

10. A control switch for electrical apparatus, comprising, a base, a plurality of contact buttons in said base, a current conducting member secured to said base and spaced from said contact buttons, a control shaft rotatably secured to said base having an operating handle and a switch operating arm secured thereto, a switch blade for transmitting current from said current conducting member to one of said contact buttons pivotally secured to said control shaft, and means pivoted on said control shaft and interposed between the control shaft operating arm and the switch blade for controlling the movement of the switch blade, said means including a rotatable device having rolling contact with the base.

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