Oct. 20, 1925. 1,558,415

G. B. THOMAS

ELECTRIC SWITCH

Filed May 19, 1922 2 Sheets-Sheet 1

Fig. 1.

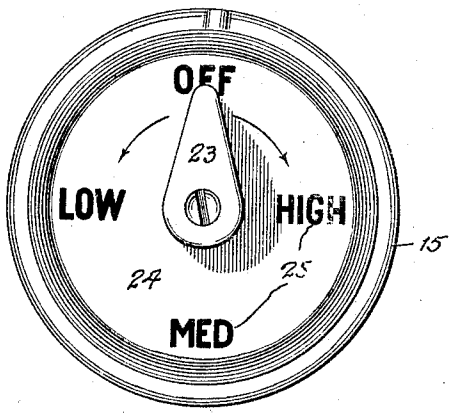


Fig. 2.

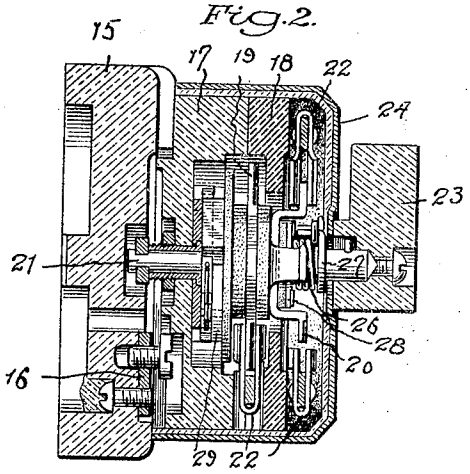
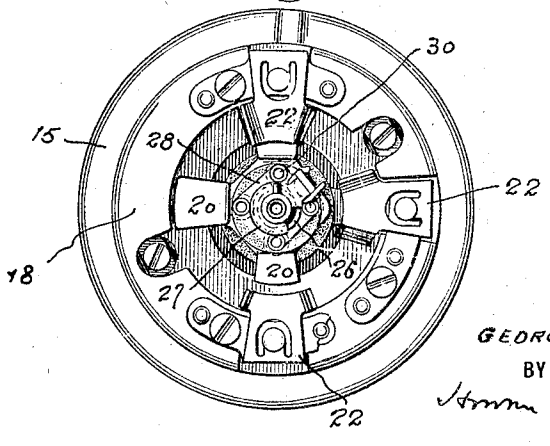


Fig. 3.



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Fig. 4.

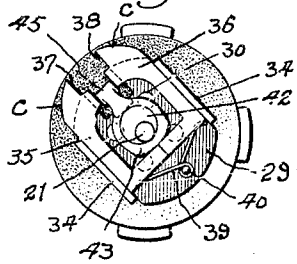


Fig. 6.

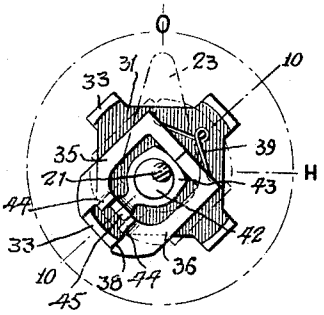


Fig. 5.

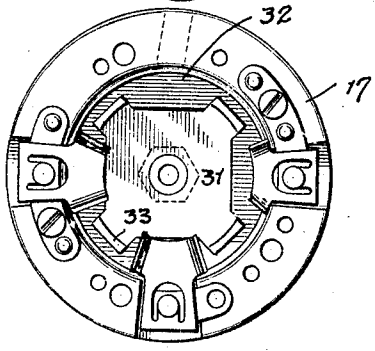


Fig. 7.

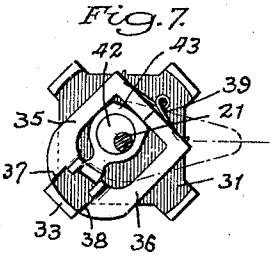


Fig. 10.

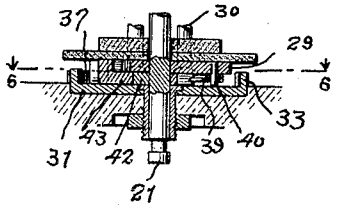


Fig. 8.

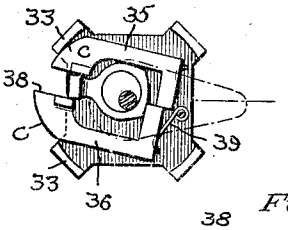


Fig. 12.

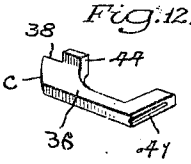


Fig. 11.

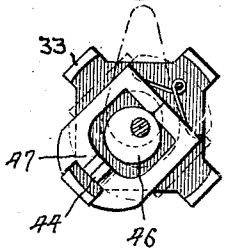
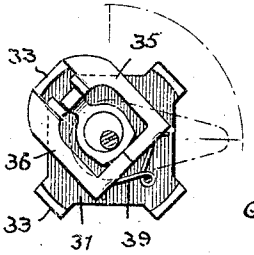


Fig. 9.



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Patented Oct. 20, 1925. 1,558,415

UNITED STATES PATENT OFFICE.

GEORGE B. THOMAS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE BRYANT ELECTRIC COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRIC SWITCH.

Application filed May 19, 1922. Serial No. 562,223.

To all whom it may concern:

Be it known that I, GEORGE B. THOMAS, a citizen of the United States of America, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to electric switches, and particularly to an escapement mechanism for rotary snap switches. The object of my invention is to provide a simple and efficient escapement for a rotary snap switch of the reversible type.

In the accompanying drawings—

Fig. 1 is a plan view of a switch of the general type to which my invention relates;

Fig. 2 is a vertical central section therethrough;

Fig. 3 is a plan view thereof with the cover removed;

Fig. 4 is an inverted plan of the switch mechanism detached;

Fig. 5 is a plan view of the lower portion of the insulating switch body from which the mechanism of Fig. 4 has been detached;

Fig. 6 is a section through the switch mechanism on the line 6—6, Fig. 10;

Figs. 7, 8 and 9 are similar views showing the mechanism in different stages of operation;

Fig. 10 is a broken central section through a portion of the mechanism to which the invention relates;

Fig. 11 is a similar view of a modified construction; and

Fig. 12 is a perspective of one of the latches.

In its general features the present switch is of the type shown in my copending application Ser. No. 484,353, filed July 13, 1921, but it will be understood that this construction is shown merely by way of example, and that the escapement, to which my invention particularly relates, may be applied to a switch of any appropriate type. As shown, the switch comprises a sub-base 15, upon which are mounted various wire terminal plates, of which one, 16, is illustrated in Fig. 2. The insulating body of this switch comprises a pair of blocks 17 and 18, which may be of porcelain or suitable insulating composition. The switch blades 19 and 20 are rotatably mounted on the switch spindle 21 and cooperate with appropriate contacts 22. The switch spindle is rotated in either direction by the handle 23, which overlies the cover 24, on which are displayed suitable legends 25 which indicate the connections established by the switch blades in different positions. The operative connection between the spindle and the blades is established through the switch spring 26, the offset ends of which straddle lugs on the spring winding washers 27 and 28, the washer 27 being fast with the spindle 21, while the washer 28 is fast with the built-up switch member. The built-up switch member as shown, comprises, washer 28, the blades 19 and 20, insulating spacing washers and a bottom plate 29, the parts being united by the holding rivets 30 into a unit, the elements of which are rigid with relation to each other.

With the exception of the bottom plate 29, the parts above described are of standard construction and may be varied in many ways well understood in the art.

The invention relates particularly to the escapement mechanism. As shown in Figs. 4 to 10 inclusive, this mechanism comprises a stop plate 31 rigidly secured in fixed position in a depression 32 formed in the upper face of the switch block 17. At suitably spaced intervals, stop flanges 33, of which four are here shown, are struck up from the margin of this plate. In assembled position the switch unit rests upon this plate, the bottom plate 29, which for convenience will be hereinafter denominated the guide plate, having opposite guide flanges 34, which rest upon and ride the stop plate 31 within the area defined by the stop lugs 33 of the latter. Engaged between the guide plate 29 and the stop plate 31 is a pair of latching slides 35 and 36 provided with oppositely faced detent faces 37 and 38 adapted to straddle one of the stop lugs 33 of the plate 31. The outer edges of the slides 35 and 36 bear against and are guided by the flanges 34 on opposite sides of the guide plate 29. The slides are constantly forced outward by a spring 39, which may be in the form of a coil of piano wire mounted on the pin 40 carried by the guide plate 29, the opposite ends of the coil being extended to form spring fingers which engage in grooves 41 (Fig. 12) in the adjacent ends of the slides 35 and 36. The adjacent margins of the slides are recessed to accommodate the

spindle 21 and the eccentric 42 thereon, as well as a bearing piece 43 actuated by the cam, against which the slides are pressed at one end by the spring 39. At their opposite ends the slides are provided with offset guide lugs 44, between which freely works a spacing lug 45 extended from the bearing piece 43. Cam surfaces *c* opposite the detent faces 37 and 38 of the latch slides function as will be hereinafter explained.

The operation of the escapement will be readily followed from Figs. 6 to 10. Assuming the switch to be at rest in Fig. 6, the detent faces 37 and 38 of the slides 35 and 36 straddle one of the stop flanges 33 of the plate 31. It is obvious that upon rotation of the spindle 21 in either direction, the switch member is not free to rotate until the detaining latch slide 35 or 36 is drawn inward sufficiently to pass the detent flange 33. Assuming the spindle to be turned clockwise by rotation of the handle 23, the cam 42, through the bearing piece 43, shifts both of the slides 35 and 36 inward, and thus moves both of the detaining faces 37 and 38 out of engagement with the flange 33 of the stop plate which they straddle. During this inward movement of the slides, the switch spring 26 is placed under tension as usual, so that upon the escape of the face 38 of slide 36 from the stop flange 33, the switch member is rotated with a snap action in clockwise direction. The slides 35 and 36, together with the bearing member 43, are carried with it by the flanges 34 of the guide plate 29. As they rotate around the spindle 21 and cam 42, the spring 39 forces both slides outward to detaining position. The cam surface *c* of the slide 35 bears against the succeeding stop 33, and the slide is forced back thereby against the action of one finger of the spring 39, while the slide 36 remains in outwardly projecting position and impinges against the side of the stop, thus halting the switch member in its next position. Immediately the switch member is halted by the engagement of the detaining slide 36 against the stop 33, the slide 35 is forced outward by its arm of the spring 39 and engages the opposite edge of the same stop.

Upon rotation of the switch spindle in opposite direction, the operation of the escapement is the same, but the slide 36 is now inoperative, while slide 35 becomes effective. In either case, it is obvious that but one of the slides, viz, the one effective to act as a latch, need be withdrawn by the cam, and by properly shaping the latter this result can be obtained. It is further obvious that as the slide 35, during its rotation, is cammed back by the engagement of its cam face *c* against the succeeding stop 33, (see Fig. 8) it further tensions the spring 39 and thus increases the outward stress of the latter against the slide 36 which presents its detaining face 38 to the stop.

In Fig. 11 I have illustrated a modified construction in which the bearing member 43 is eliminated, while the actuating cam 46 bears directly against one end of the slides. The rectilinear guidance of the slides is secured by arranging the lugs 44 at the ends of the fingers 47, which are of sufficient extent to hold the slides in engagement with the guide flanges 34 of the guide plate 29. The mechanism is otherwise identical.

Various other modifications in details of construction will readily occur to those skilled in the art, without departing from what I claim as my invention.

I claim—

1. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops, a pair of independent latch slides arranged side by side and adapted to embrace between them any one of said stops, said slides being rotatable with the switch member, one of said latch slides controlling the rotation of the switch member in one direction, and the other controlling the rotation of the switch member in the opposite direction, a spring for rotating the switch member in either direction, and means operated by the switch spindle for tensioning the switch spring and for shifting the detaining latch slide rectilinearly out of engagement with its associated stop on rotation of the spindle in either direction.

2. An electric switch comprising a reversely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops, a pair of independent latch slides arranged side by side and adapted to embrace between them any one of said stops, said slides being rotatable with the switch member, one of said latch slides controlling the rotation of the switch member in one direction, and the other controlling the rotation of the switch member in opposite direction, a spring for rotating the switch member in either direction, and means operated by the switch spindle for tensioning the switch spring and for shifting the detaining latch slide rectilinearly out of engagement with its associated stop on rotation of the spindle in either direction, together with spring means constantly urging the latch slides into stop-engaging position.

3. An electric switch comprising a reversely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops, a pair of independent latch slides arranged side by side and adapted to embrace between them any one of said stops, said slides being rotatable with the switch member, one of said latch slides controlling the rotation of the switch member in one direction, and the other con-

trolling the rotation of the switch member in opposite direction, a spring for rotating the switch member in either direction, and means operated by the switch spindle for tensioning the switch spring and for shifting the detaining latch slide rectilinearly out of engagement with its associated stop on rotation of the spindle in either direction, the inoperative latch slide having a displacing engagement with the succeeding stop on the rotation of the switch member.

4. An electric switch comprising a reversely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops, a pair of independent latch slides arranged side by side and adapted to embrace between them any one of said stops, said slides being rotatable with the switch member, one of said latch slides controlling the rotation of the switch member in one direction, and the other controlling the rotation of the switch member in opposite direction, a spring for rotating the switch member in either direction, and means operated by the switch spindle for tensioning the switch spring and for shifting the detaining latch slide rectilinearly out of engagement with its associated stop on rotation of the spindle in either direction, the inoperative latch slide having a displacing engagement with the successive stop on the rotation of the switch member, together with spring means tensioned by the displacement of the inoperative latch slide and increasing the effect of said spring to force the operative slide into stop-engaging position.

5. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops arranged around but spaced from the spindle, a pair of independent latch slides arranged side by side and adapted to embrace between them any one of said stops, said slides being rotatable with the switch member and extending in opposite directions beyond the switch spindle and recessed on their adjacent margins to accommodate the latter, a spring for rotating the switch member in either direction, and means operated by the switch spindle for tensioning the switch spring and for shifting the detaining latch slide rectilinearly out of engagement with its associated stop on rotation of the spindle in either direction, together with latch-returning spring means engaging both of the slides to one side of the spindle.

6. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops spaced around the spindle, a pair of independent latch slides in sliding engagement with each other but spaced apart at their latching ends to embrace between them any one of said stops, said latch slides being rotatable with the switch member, a spring for rotating the switch member in either direction, and means operated by the switch spindle for tensioning the switch spring and for shifting the detaining latch slide rectilinearly out of engagement with its associate stop on rotation of the spindle in either direction.

7. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops spaced around the spindle, and an escapement mechanism comprising a pair of rectilinearly displaceable independent latch slides arranged side by side in sliding engagement and adapted to engage between their latching faces any one of said stops, said slides being recessed on their adjacent margins to accommodate the switch spindle and operating cam, together with a cam on the spindle operatively engaging said slides at one end to displace the detaining slide out of engagement with the stop embraced between the slides on the rotation of the spindle in either direction.

8. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops spaced around the spindle, and an escapement mechanism comprising a pair of rectilinearly displaceable independent latch slides arranged side by side in sliding engagement and adapted to engage between their latching faces any one of said stops, said slides being recessed on their adjacent margins to accommodate the switch spindle and operating cam, a cam on the spindle operatively engaging said slides at one end to displace the detaining slide out of engagement with the stop embraced between the slides on the rotation of the spindle in either direction, together with a bearing piece interposed between the cam and slides and serving to transmit the motion of the cam to the slides.

9. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops spaced around the spindle, and an escapement mechanism comprising a pair of rectilinearly displaceable independent latch slides arranged side by side in sliding engagement and adapted to engage between their latching faces any one of said stops, said slides being recessed on their adjacent margins so accommodate the switch spindle and operating cam, a cam on the spindle operatively engaging said slides at one end to displace the detaining slide out of engagement with the stop embraced between the slides on the rotation of the spindle in either direction, together with a bearing piece interposed between the cam

and slides and serving to transmit the motion of the cam to the slides, said bearing member having an arm extending between the slides at their stop-engaging ends and serving as a spacer therefor.

10. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops arranged around the spindle, and an escapement mechanism comprising a pair of independent latch slides adapted to embrace between their latching faces any one of said stops, spring means constantly tending to press said latch slides in the same direction and into detaining engagement with the stop engaged between the latching faces thereof, means operated by the spindle for displacing the detaining slide out of engagement with the stop on the rotation of the spindle in either direction.

11. An electric switch comprising a reversely and freely rotatable switch spindle, a switch member mounted thereon, a group of stationary stops arranged around the spindle, and an escapement mechanism comprising a pair of independent latch slides adapted to embrace between their latching faces any one of said stops, spring means constantly tending to press said latch slides in the same direction and into detaining engagement with the stop engaged between the latching faces thereof, means operated by the spindle for displacing both of said slides out of engagement with the detaining stop on the rotation of the spindle in either direction.

In testimony whereof I have signed my name to this specification.

GEORGE B. THOMAS.