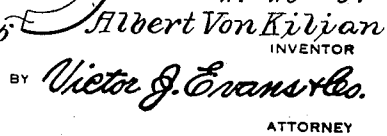


2,042,369

Filed April 23, 1935



UNITED STATES PATENT OFFICE

2,042,369

ONE-BUTTON SWITCH

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Application April 23, 1935, Serial No. 17,857

1 Claim. (Cl. 200—70)

This invention relates to electrical switches, and has for the primary object the provision of a device of this character whereby the operation of a single push button in the same direction will open and close the switch with the circuit making and breaking element thereof moving with maximum rapidity from its positions for reducing electric arcing between the contacts of the switch to a minimum.

Another object of this invention is the provision of a switch of the above stated character which will be simple, durable and efficient and which may be manufactured and sold at a low cost.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawing, in which

Figure 1 is a vertical sectional view illustrating a switch constructed in accordance with my invention and showing the switch in circuit breaking position.

Figure 2 is a similar view showing the switch in circuit making position.

Figure 3 is a side elevation illustrating the switch in circuit breaking position.

Figure 4 is a fragmentary end elevation showing the circuit making and breaking element of the switch in engagement with the contacts of the switch.

Figure 5 is a perspective view illustrating the circuit making and breaking element.

Figure 6 is a perspective view illustrating a sliding plate receiving its movement from a slidable push button.

Figure 7 is a perspective view illustrating a shifting link or member.

Figure 8 is a side elevation illustrating an actuating plate or member.

Figure 9 is a plan view illustrating the same.

Figure 10 is a plan view illustrating a modified form of my invention, that is, an operating lever forming an integral part of the rockable member of the switch taking the place of the push button disclosed in Figures 1 to 3.

Figure 11 is an edge view illustrating the same.

Referring in detail to the drawing, the numeral 1 indicates a base constructed of a suitable insulating material and has a chamber 2 in which project spaced resilient contacts 3 supported by binding posts 4 mounted to the base. The binding posts are adapted to be connected to conductors of an electric circuit, the contacts 3 being spaced so as to interrupt the electric circuit.

Removably mounted to the base 1 is a bracket 5 of substantially U-shape providing leg portions

6 and a bight portion 7. The leg portions 6 are detachably secured to the base by screws or like fasteners 8 with the bight portion traversing the chamber 2 and apertured to slidably receive a push button 9. A plate 10 is removably secured to the bight portion of the bracket 5 and carries a collar 11 through which the push button slides and cooperates with the bight portion in efficiently supporting the push button for sliding movement. A collar or flange 12 is formed on the push button to abut the bight portion 7 of the bracket for limiting the movement of the push button in one direction. A recess 13 is formed in the push button 9 to receive an extension 14 formed integrally with one end of a sliding plate 15 and which operates between the leg portions 6 of the bracket. The extension 14 fitting in the recess 13 will permit the sliding plate to have a limited pivotal movement with respect to the button 9. The plate 15 is provided with an elongated slot 16 to loosely receive a shaft 17 carried by the legs 6 of the bracket 5 above the chamber 2. The shaft 17 forms a journal for a swingable circuit maker and breaker 18 which includes a head or block 19 constructed of a suitable insulating material and has secured thereto spaced arms 20, apertured, as shown at 21, to receive the shaft 17. One of the arms 20 has notches 22 and 23 which are arranged oppositely to one another. The other arm 20 carries oppositely extending stops 24 adapted to abut one of the legs 6 of the bracket 5 for limiting the swinging movement of the circuit maker and breaker 18 in either direction. The circuit maker and breaker is adapted to move outwardly and inwardly of the chamber, as shown in Figures 1 and 2. The head 19 is grooved to receive a contact strip 25 provided with oppositely arranged resilient portions 26 projecting outwardly of the groove and which are adapted to frictionally engage the stationary contacts 3 when the circuit maker and breaker moves into the chamber. The strip 25 frictionally engages the stationary resilient contacts 3 so as to bridge said contacts and thereby close the electric circuit.

A rockable member 27 is journaled on the shaft 17 between the arms 20 of the circuit maker and breaker and includes an elongated body 28 having a slot 29 to slidably receive the sliding plate 15. The end walls of the body 28 incline in opposite directions to one another, as shown at 30, and 31. Shoulders 32 and 33 are formed at opposite edges of the plate 15 and the latter tapers from said shoulders in the direction of its free end. The tapered portion of the plate operates in the slot 29 of the rockable member 27. Arcuately curved arms 34 and 35 are formed on the body 28 of the rockable member and adjacent one end of said rockable member. The arm 34 is located at one side of the body of the

rockable member while the arm 35 is located at an opposite side of the body of said rockable member.

A shifting plate 36 is provided with a slot 37 to receive the shaft 17. The shifting plate 36 is located between one of the arms 20 of the circuit maker and breaker 18 and one side of the body 28 of the rockable member 27. Projections 38 and 39 are formed on opposite sides of the shiftable plate 36 and projections 40 and 41 are formed on opposite sides of the shifting plate 36 and lie in close proximity to the projections 38 and 39. The projections 40 and 41 extend in an opposite direction to the projections 38 and 39. The projections 38 and 39 alternately engage in the notches 22 and 23 of the circuit making and breaking element 18 during the operation of the switch. The projections 40 and 41 cooperate with the arms 34 and 35 during the operation of the switch.

A coil spring 42 is mounted to the bracket 5 and provided with spring arms 43 and 44. The spring arm 43 engages a keeper 45 on the plate 15 for urging the plate in the direction of the button 9, maintaining the extension 11 of the plate 15 in the recess of the button and also acting to urge the button in its outermost position with respect to the bracket 5. The resilient arm 44 is connected to the shifting plate 36 by a link 46, placing said shifting plate under tension at all times.

An inward and outward movement of the push button, as shown in Figure 1, will bring about a rapid movement of the circuit maker and breaker 18 from the position shown in Figure 2 to the position shown in Figure 1. It is to be understood that the push button 9 is manually pushed in one direction and released and the resilient arm 43 acts to return the push button to its initial position. The manual movement of the push button in Figure 1 slides the plate 15 and the shoulder 32 thereof being in engagement with the end wall 30 of the body 28 of the shifting member rocks said shifting member upon the shaft 17. As the shifting member 27 rocks the arm 35 abuts the extension 39 of the shifting plate 36, causing a sliding movement of the latter against the tension of the spring arm 44. At this time the extension 30 of the shifting plate 36 is overlapped by the arm 34, permitting the shifting plate 36 to pivot on the arm 34, the arm 35 advancing the shifting plate 36 by engaging the projection 39 until the projection 39 is opposite the notch 23 of the circuit maker and breaker. The arm 34 at this time disengages the projection 38 permitting the plate 36 to shift and bring the projection 39 into the notch 23. At this time the shoulder 32 disengages the end 30 of the shifting member 27. The projection 39 entering the notch 23 acts to move the circuit making and breaking element 18 rapidly into engagement with the contacts 33. The push button 9 when manually released returns to its normal position by the action of the spring arm 43 carrying the plate 15 into the position shown in Figure 2, bringing the shoulder 32 into engagement with the extension 40 on the shifting plate and the arm 34 in engagement with the projection 38, thus positioning the parts so that on the next manually actuated movement of the push button the rockable member 27 through the shifting plate 36 causes a rapid movement of the circuit making and breaking element 18 from the position shown in Figure 2 to the position shown in Figure 1. It

will be understood that during this latter mentioned operation of the circuit making and breaking element the shifting plate 36 is caused to slide against the tension of the spring arm 44 by the arm 34 shoving on the projection 38 and the projection 39 pivoting on the arm 35 until the projection 39 rides off of the arm 35 when the projection 38 drops into the notch 22 causing a swinging movement of the circuit making and breaking element from the position shown in Figure 2, to the position shown in Figure 1. Thus it will be seen that the circuit making and breaking element has a snap action when moving from one position to another position, this movement being extremely rapid will permit the circuit to be made and broken with minimum arcing at the contacts.

Referring to my modified form of invention, as shown in Figures 10 and 11, the rockable plate 27 is substituted by a rockable plate 46 and the latter is journaled on the shaft 17 and is equipped with the arms 34 and 35. Integral with the rockable plate 46 is a lever 47 taking the place of the push button 9. A movement of the lever 47 in one direction will rock the rockable plate 46 in one direction and movement of the lever 47 in an opposite direction rocks the rockable plate in an opposite direction. When employing the lever 47 the plate 15 and push button 9 are eliminated and the arm 43 of the spring is anchored in any suitable way to one of the legs 6 of the bracket 5.

Having described the invention, I claim:

A switch comprising an insulating base, a bracket secured to the base, spaced contacts secured to the base, a push button slidably secured to the bracket, a shaft secured to the bracket, a circuit making and breaking element including an insulated head carrying arms journaled to said shaft and a contact strip to move into and out of engagement with the spaced contacts by the swinging movement of said element on the shaft, stops on one of said arms to engage with the bracket for limiting the swinging movement of the circuit making and breaking element in opposite directions, a sliding plate pivoted to the push button and having a slot with the shaft extending loosely therethrough and provided with a tapered portion, shoulders on opposite edges of said plate, one of said arms of the circuit making and breaking element having notches extending in opposite directions, a rockable member journaled on said shaft and provided with a slot to receive said slidable plate and its ends adapted to be alternately engaged by the shoulders of the sliding plate during the sliding movement of said sliding plate under the influence of the push button, arcuate-shaped arms formed on said rockable member and arranged upon opposite sides of the latter, a shifting plate having a slot loosely receiving said shaft, pairs of projections on the shifting plate and one pair of said projections adapted to be alternately abutted by said arms and to be alternately engaged by the arms whereby the shifting plate will be caused to pivot first upon one arm and then upon the other arm and to slide relative to the shaft for alternately engaging the other pair of projections with the notches of the circuit making and breaking element, and spring means connected to the shifting plate and to the sliding plate for returning the push button to its initial position when manually released and for normally urging the shifting plate in one direction.

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