

July 21, 1936.

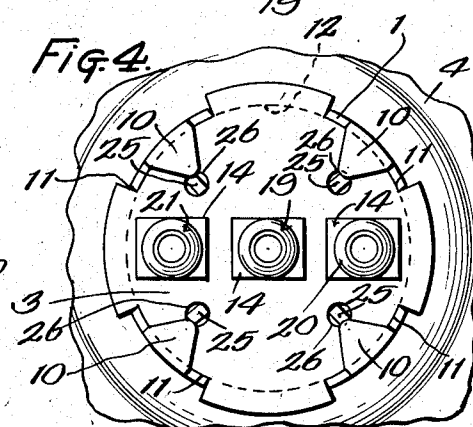
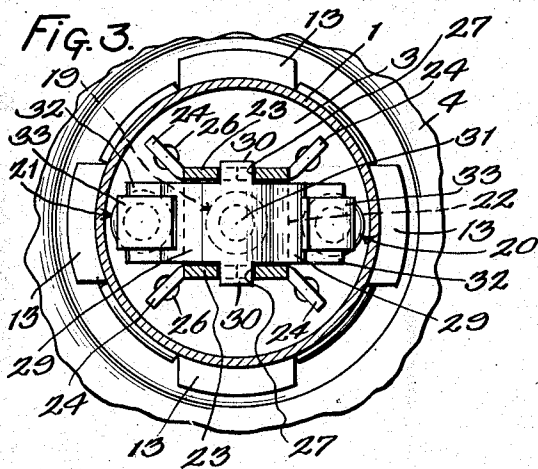
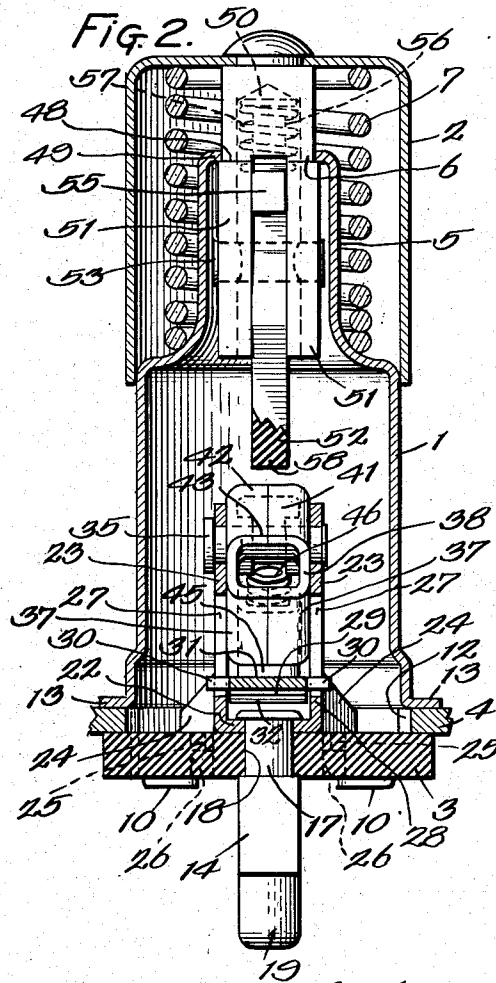
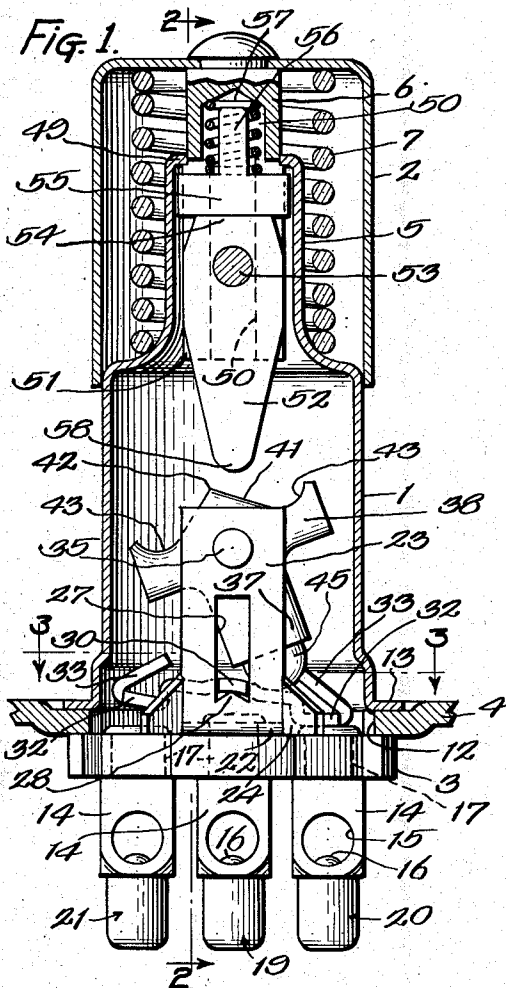
H. A. DOUGLAS

2,047,950

ELECTRIC SWITCH

Filed Jan. 18, 1934

2 Sheets-Sheet 1



INVENTOR
HARRY A. DOUGLAS
BY *Langum Horn* ATT. Y.

July 21, 1936.

H. A. DOUGLAS

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2 Sheets-Sheet 2

Fig. 5.

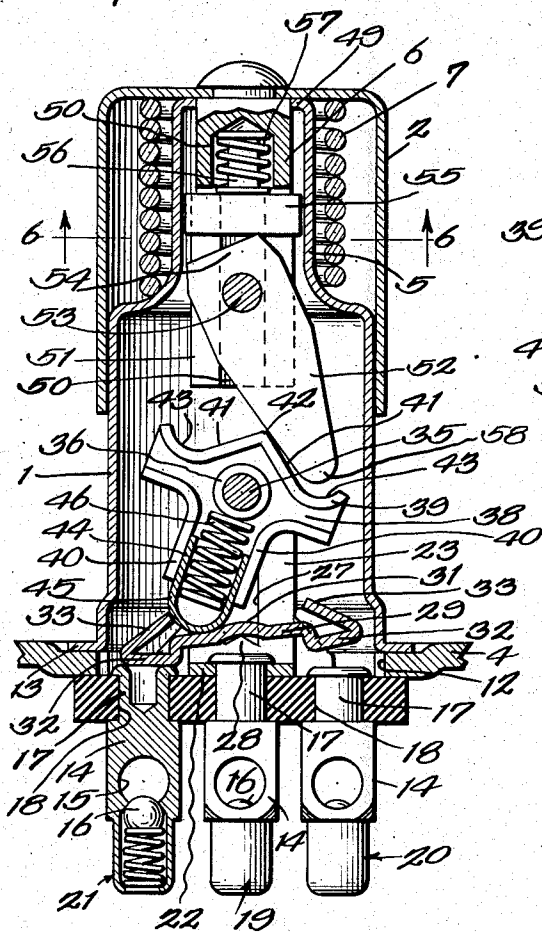


Fig. 7.

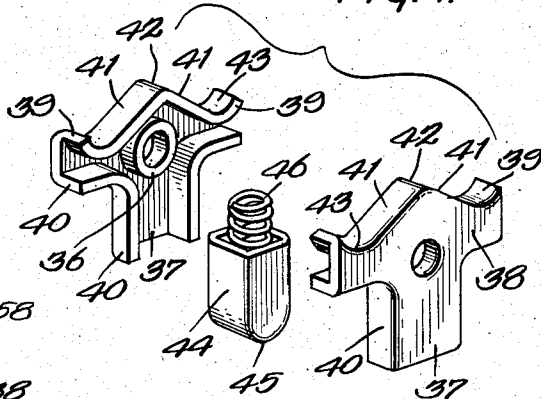


Fig. 8.

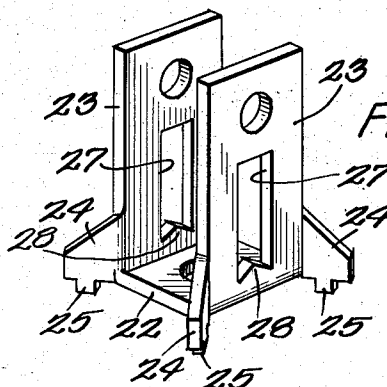


Fig. 6.

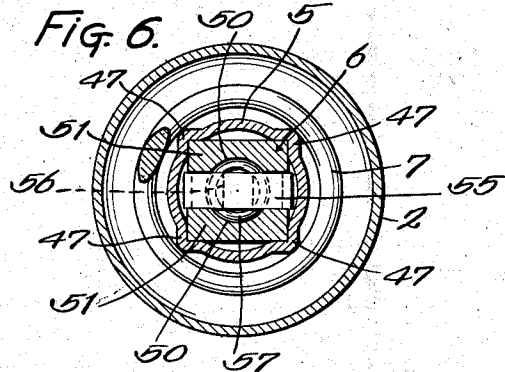
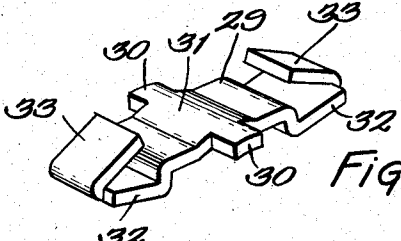


Fig. 9.



INVENTOR
HARRY A. DOUGLAS
BY *Raunum Mm*
ATTY.

UNITED STATES PATENT OFFICE

2,047,950

ELECTRIC SWITCH

Harry A. Douglas, Bronson, Mich.

Application January 18, 1934, Serial No. 707,131

4 Claims. (Cl. 200—68)

This invention relates to improvements in electric switches and more particularly to switching mechanism including a reciprocable actuating means adapted to be foot operated to alternately continue and discontinue different circuits passing therethrough.

It is an object of this invention to provide a simplified and economical structure which will be positive in operation and which will withstand the rough usage to which a foot operated switch is subjected. It is a further object to provide an electric switch of this type which is of particular advantage for controlling the bright and tilt filaments of motor vehicle headlights.

The advantages of such a switching mechanism when employed in connection with a main hand operated switch in the lighting system of an automobile, such as disclosed in this applicant's application executed concurrently herewith, Serial No. 696,445, filed November 2, 1933 in which the driver of the automotive vehicle having set his headlights in the bright position is able by a slight movement of his foot, upon approaching a car traveling in the opposite direction, to dim his bright lights without removing his hand from the steering wheel.

With these and other objects in view, reference is made to the accompanying sheets of drawings illustrating an embodiment of this invention, with the understanding that minor detail changes may be made without departing from the scope thereof.

In the drawings—

Figure 1 is a view in central vertical section of a preferred embodiment of this invention, with parts illustrated in elevation.

Figure 2 is a similar view in section taken on the line 2—2 of Figure 1, looking in the direction of the arrows with parts illustrated in elevation.

Figure 3 is a view in transverse section taken on the line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a bottom plan view of Figure 1.

Figure 5 is a view similar to Figure 1, illustrating more details in section and showing the moving parts in the act of changing position from Figure 1.

Figure 6 is a view in transverse section taken on the line 6—6 of Figure 1, looking in the direction of the arrows.

Figure 7 is a projected detail perspective view of the circuit continuing actuator parts.

Figure 8 is a detail view in perspective of the actuator support.

Figure 9 is a similar view of the circuit continuing member.

The embodiment of this invention, as illustrated, includes a metallic cylindrical casing 1 mounting a reciprocable metallic plunger cap 2 upon the upper end with a contact carrying closure 3 of insulating material mounted upon the lower end to secure a metallic mounting plate 4 between the end closure and body of the casing, whereby the casing 1 and plunger cap 2 may be inserted through an aperture in the floor board, not shown, of an automotive vehicle and secured thereto by the mounting plate 4, so that the plunger cap 2 may be readily depressed by the foot of the driver. The upper portion of the casing 1 is contracted to form a guide 5 for a reciprocable plunger 6 secured axially to the top of the plunger cap 2, as shown. A coil spring 7 surrounding the plunger guide 5 and plunger 6 is interposed within the cap 2 between the underside of the top and the expanding portion of the guide 5 to normally maintain the cap 2 in its uppermost position with the depending extension 8 of the cap wall in engagement with the stop 9 struck out from the adjacent wall of the casing 1.

The contact carrying closure 3 of insulating material is preferably in the form of a disc of greater diameter than the cylindrical casing 1 and is secured thereto by providing four fingers 10 depending from the lower wall of the casing adapted to pass through segmental recesses 11 provided in the circumference of the disc 3 and then bent over to engage the exterior surface of the closure disc 3, as shown in Figure 4. The mounting plate 4 is provided with a circular opening 12 having segmental enlargements to receive the body of the depending fingers 10 and the wall of the cylindrical casing 1 intermediate the depending fingers 10 is provided with segmental plate engaging members 13 struck out from the casing 1 at right angles thereto so that when the closure disc 3 is secured to the casing 1, the plate 4 is clamped between the closure disc and segmental extension 13 of the casing 1.

The switching mechanism together with its actuator and operating means is all carried within the casing 1 above the contact carrying closure disc 3. An electric circuit continuing contact is axially mounted upon the contact carrier 3 which also mounts two oppositely disposed similar contacts equidistant from the axial contact. Each contact is preferably constructed of metal with a rectangular portion 14 having an opening 15 passing therethrough and having a spring pressed dent or ball 16 at the lower side thereof to form

a plug receiving member of a snap terminal electric circuit continuing connection to an electric conductor, as disclosed in this applicant's prior copending application, Serial No. 565,127, filed September 25, 1931. The upper portion of the rectangular body 14 of each contact is provided with an axial cylindrical extension in the form of a sleeve 17 adapted to pass through a circular opening 18 provided in the contact carrier, and secured thereto with the rectangular portion 14 in engagement with the exterior of the carrier by spinning the metal of the end of the sleeve about the interior of the carrier, as shown in Figure 5, which at the same time forms a contact for engagement with a circuit continuing member or bridge.

In this embodiment of the invention, the axially mounted contact 19 is adapted to be connected with a battery or other source of electricity, not shown, and the contacts 20 and 21 on each side thereof are adapted to be connected to the circuits to be alternately continued from the contact 19. To continue these circuits a generally U-shaped bracket of metal is provided having a flat base 22, spacing apart parallel vertical arms 23, with an axial opening for receiving the extension 17 of the battery contact 19 which secures the base against the interior surface of the contact carrier 3. To insure rigidity and maintain the position of the bracket, it is preferable to provide each arm adjacent the base with a radial extension 24 having a depending foot 25 adapted to be received in a depression or aperture 26 provided therefore in the contact carrier 3, as shown in Figures 3 and 8.

Each arm is provided with a central rectangular opening 27 having a reentrant angular bottom adjacent the base 22 to provide a bearing 28 for a metallic rectangular circuit continuing member or bridge 29 having similar central oppositely disposed ears 30 adapted to be received in the openings 27 in the arms and rest upon the bearing 28. The body of the bridge 29 at this point is transversely curved upwardly slightly above the plane of the main body to form a ridge or rib 31 and each end is offset to form a flat portion 32 at such an angle as to engage the flat surface of the contact 21 when oscillated about the bearing 28 and be separated from the contact 20, as shown in Figure 5, and vice versa. The extremities of each portion 32 are each continued to form fingers 33 bent back at an acute angle over the flat surface 32, for a purpose hereinafter described.

The circuit continuing bridge 29 is caused to operate about its bearings 28 and 30 to engage either contact 20 or 21 and maintain such engagement by an actuator, indicated generally by the numeral 34, Figure 7, mounted on a pivot 35 carried between the arms 23 adjacent their upper ends. The actuator preferably includes two correspondingly shaped metallic sections in the form of a T provided with intumed flanges 36 about the openings provided for the reception of the pivot 35 at the juncture of the vertical and horizontal center lines of the depending tail 37 and the horizontal arms 38 and intumed flanges 39 across the top of the arms 38 and similar flanges 40 along the bottom of each arm 38 and contiguous side of the tail 37, which flanges are of such dimensions that when brought into engagement with each other the outer surfaces of the parts 37 and 38 will be snugly received between the arms 23 and capable of oscillation about the pivot 35. The upper surface of the arms 38

are provided with similar angular surfaces 41 forming an obtuse angle with each other and extending downwardly from the apex 42 lying in the vertical central line of the portion 37 above the pivot 35 with each angular surface 41 terminating in an upwardly curved end 43 tangential thereto. An actuating detent 44 is mounted to slide between the spaced apart members 37 guided by the flanges 40 thereon which detent is preferably in the form of a shell having a rounded closed lower end or nose 45 and open at the other end to receive a coil spring 46 adapted to bear against the pivot apertured flanges 36 to exert an outward pressure upon the nose. This detent not only connects the two sections to oscillate together, but also engages the circuit carrying bridge 29 to impart oscillation thereto. As shown in Figure 1, the actuator has been rotated about its pivot to cause the nose 45 of the detent to travel in engagement with the flat surface to rotate the bridge 29 to continue the circuit through contact 20 and maintain the connection by the tension of the spring 46 holding the nose 45 in engagement with the end of the intumed finger 33 of the bridge. When the actuator is caused to rotate about its pivot in the opposite direction, the spring 46 is compressed until the nose 45 rides over the rib 31 of the bridge and as the nose passes over the center thereof the spring imparts a snap movement to the bridge to tilt it to engage the contact 21, as shown in Figure 5.

The actuator is alternately thrown from one position to the other by an operating mechanism actuated by the depression of the plunger cap 2. The plunger 6 secured to said cap is preferably square in cross-section and the restricted portion 5 of the casing 1 within which the plunger reciprocates is preferably indented, as shown in Figure 6, to form guides 47 to prevent rotation of the plunger. The upper portion of the plunger which normally extends above the upper end of the restricted casing 5 when the cap is in the extended position is preferably reduced in cross-section to form a shoulder 48 and the metal of the casing at the end 49 is turned inwardly to engage the shoulder to limit the upward movement of the plunger. The plunger is provided with an axial bore 50 terminating in the recessed portion adjacent the cap 2 and is also provided with a central transverse slot forming two spaced apart legs 51 depending from the shoulder 48. An operating member 52 of insulating material is mounted between the legs 51 upon a pivot 53 centrally located thereon. Said operating member is preferably of the same width as the plunger 6 and is provided with a transverse flat upper end 54 adapted to be engaged by the bottom of a detent 55 likewise mounted between the legs 51 and having a guide pin 56 extending into the bore 50 surrounded by a coil spring 57 exerting pressure upon the detent to normally and resiliently maintain the operator 52 in axial alignment with the plunger. The operator is extended below the legs 51 of the plunger 6 and tapered to terminate in a semi-circular end 58 adapted to clear the apex 42 of the actuator 34 when the cap 2 is extended and when the cap 2 is depressed to engage and travel over the incline portion 41 thereunder until the end 58 engages the curved portion 39 of the actuator and snaps the detent 44 thereof over the central rib 31 of the circuit continuing bridge 29, as shown in Figure 5. The upper corners of the operator 52 are chamfered to clear the sides of the casing 5 when swinging on the pivot 53.

to operate the actuator and upon release of the cap 2 as the spring 7 returns it to the extended position the spring pressed defent 55 returns the operator 52 into alignment with the plunger 6, so that upon the next depression of the cap 2, the operator 52 throws the actuator 34 on the other side of its center to bridge the other contact.

What I claim is:

1. A plunger operated electric switch including a cylindrical casing, a contact carrier disc of insulating material closing one end thereof, the casing being reduced in diameter for a substantial distance from the other end, a plunger mounted to be guided and reciprocated within said reduced portion of the casing, an electric contact arranged axially in the contact carrying disc, a circuit continuing bracket extending thereabove and secured to said contact, a pair of equidistant oppositely disposed contacts arranged in the contact carrying disc on each side of the first contact, a circuit continuing bridge mounted for oscillation upon said bracket to alternately engage one contact while disengaging the other at the end of each oscillation, actuating means mounted for oscillation on said bracket above said bridge, said actuating means including a depending resilient member adapted to wipe over the upper side of the bridge and maintain contact therewith during oscillation and including a portion having oppositely disposed sloping surfaces on its upper side, means normally maintaining the plunger at the end of its travel most distant from the contact carrier, an operating finger of insulating material pivotally carried by said plunger and normally depending axially therebelow terminating adjacent the upper surface of said portion adapted upon reciprocation of the plunger to engage, travel over the adjacent sloping surfaces and oscillate said actuating means in one direction, the opposite ends of the oscillating bridge being provided with abutments to limit the travel of the resilient member depending from the actuating means and being provided with a raised rib along its axis of oscillation wiped over by said resilient member to snap the bridge to the end of its movement in that direction.

2. A plunger operated electric switch including a cylindrical casing, a contact carrier disc of insulating material closing one end thereof, the casing being reduced in diameter for a substantial distance from the other end, a plunger mounted to be guided and reciprocated within said reduced portion of the casing, an electric contact arranged axially in the contact carrying disc, a circuit continuing bracket extending thereabove and secured to said contact, a pair of equidistant oppositely disposed contacts arranged

in the contact carrying disc on each side of the first contact, a circuit continuing bridge mounted for oscillation upon said bracket to alternately engage one contact while disengaging the other at the end of each oscillation, actuating means mounted for oscillation on said bracket above said bridge, said actuating means including a depending resilient member adapted to wipe over the upper side of the bridge and maintain contact therewith during oscillation and including a portion having oppositely disposed sloping surfaces on its upper side, means normally maintaining the plunger at the end of its travel most distant from the contact carrier, an operating finger of insulating material pivotally carried by said plunger and normally depending axially therebelow terminating adjacent the upper surface of said portion adapted upon reciprocation of the plunger to engage, travel over the adjacent sloping surfaces and oscillate said actuating means in one direction, the said bracket being of U shape connected to the contact through its base with the upper ends of its opposite arms perforated to receive a pivot pin for the actuating means and the actuating means including two similar sections having intumed meeting flanges about the edge of each section and each section being perforated to receive the pivot pin with each perforation similarly flanged, the said sections being maintained in contact with each other by the arms of the bracket, and the resilient depending member of the actuating means being in the form of a shell having a rounded external nose mounted to reciprocate between the adjacent flanges with the closed end in engagement with a coil spring interposed between said flanges and the pivot flanges.

3. An electric switch, comprising: operating means including an oscillatable member movable bodily with said operating means; an oscillatable actuator, operable by said operating means; cooperating means, including an oscillatable member, coacting with said actuator to cause said actuator to oscillate with a snap movement; and means for mounting said actuator and each of said oscillatable members for oscillation about separate axes.

4. An electric switch, comprising: a casing; a reciprocating operator, mounted for movement in said casing; an actuator pivoted on said operator; and said casing having a portion of reduced cross-section, for cooperation with said actuator on the side of said actuator opposite from the direction of movement of the free end of said actuator, to limit movement of said actuator about the pivot of said actuator in said direction.

HARRY A. DOUGLAS.

CERTIFICATE OF CORRECTION.

Patent No. 2,047,950.

July 21, 1936.

HARRY A. DOUGLAS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, strike out lines 38 to 47 inclusive, comprising claim 3; and for the present claim number "4" read 3; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of September, A. D. 1936.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.

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