May 23, 1933. E. M. SORENG 1,910,645

PUSH-PULL LIGHTING SWITCH

Filed Oct. 23, 1931

Fig. 1

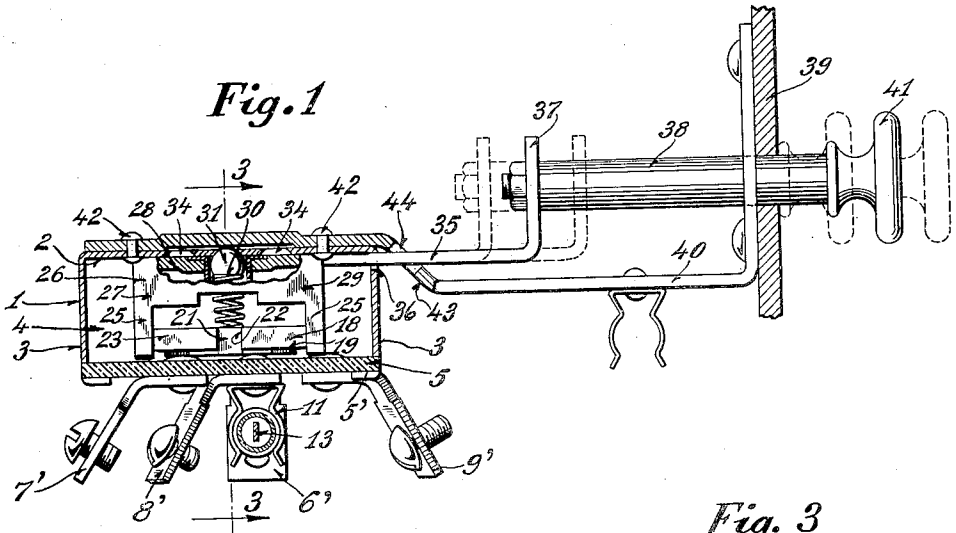


Fig. 2

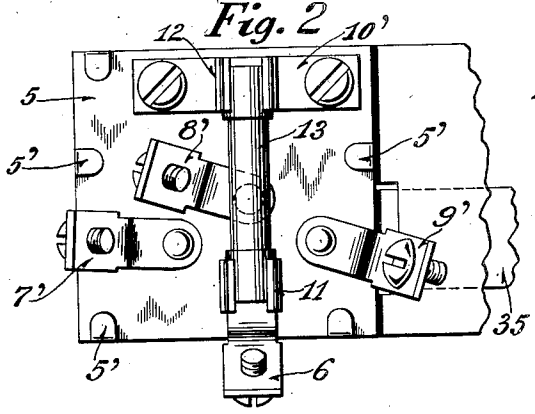


Fig. 3

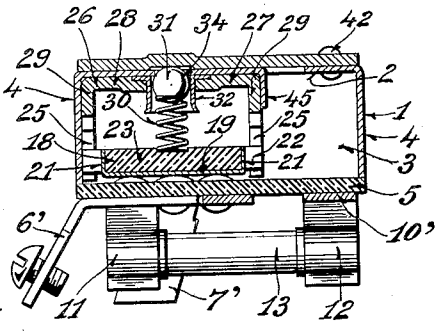


Fig. 4

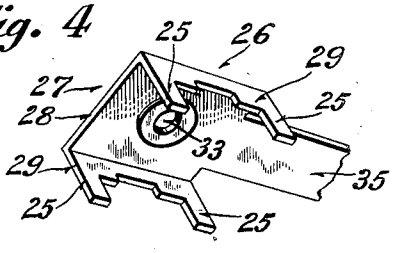


Fig. 5

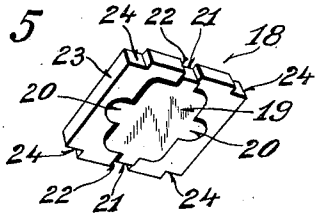
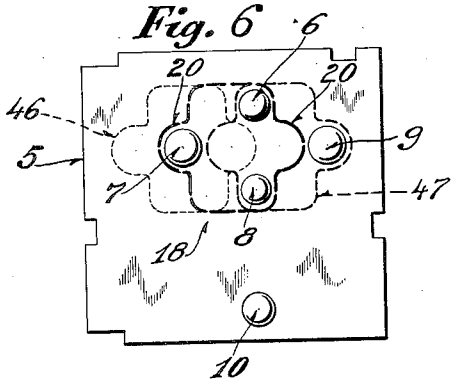


Fig. 6



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Patented May 23, 1933

1,910,645

UNITED STATES PATENT OFFICE

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PUSH-PULL LIGHTING SWITCH

Application filed October 23, 1931. Serial No. 570,544.

This invention relates to certain new and useful improvements in switches and refers more particularly to push and pull lighting switches for automotive vehicles and the like.

It is an object of this invention to simplify the construction of switches of this character and to reduce their cost of manufacture.

Another object of this invention resides in the provision of novel means for mounting the movable contactor of the switch for linear motion across a terminal head carrying stationary contacts.

Another object of this invention is to provide detent means for indicating the different positions of the movable contactor and a spring for the detent means which also affords contact pressure for the movable contactor.

Another object of this invention is to provide a switch of the character described which is so constructed as to enable the entire mechanism to be assembled in a comparatively small housing.

A further object of this invention resides in the specific structure of the movable contactor and its connection with the actuator.

And a still further object of this invention is to provide a switch mechanism of the character described in which all portions thereof are secured in proper assembled relationship upon the attachment of the terminal head to the casing.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawing one complete example of the physical embodiment of this invention is illustrated constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a transverse section view through a switch embodying this invention;

Figure 2 is a bottom view of the switch illustrating the exterior of the terminal head;

Figure 3 is a cross section view taken through Figure 1 on the plane of the line 3—3;

Figure 4 is a detail perspective view of the actuating member for the movable contactor;

Figure 5 is a perspective view of the movable contactor; and

Figure 6 is a section view taken through Figure 1 on the plane of the line 6—6 and illustrating the relationship of the movable contactor to the stationary contacts.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts throughout the several views, the numeral 1 represents an enclosing casing, which is preferably of rectangular shape and comprises a flat bottom wall 2, end walls 3, and side walls 4. The entire casing may be formed of sheet metal, with the end and side walls bent downwardly from the bottom wall 2. The open front of the housing is closed by a terminal head 5 formed of insulating material and secured to the outer edge of the end and side walls by a plurality of tanks 5′ extended therefrom and bent over the terminal head.

The terminal head 5 mounts a plurality of stationary contacts 6, 7, 8, 9, and 10, which may be the heads of rivets securing terminals 6′, 7′, 8′, 9′, and 10′ to the outer face thereof in electrical connection with the stationary contacts. The rivets which mount the terminals 6′ and 10′ and form the contacts 6 and 10 also serve to mount fuse clips 11 and 12 respectively. A fuse 13 is received in these clips to electrically bridge the terminals 6′ and 10′; so that a lead, not shown, connected with a battery or other source of electrical current, and attached to the terminal 10′ conducts current to the terminal 6′ through the fuse.

The stationary contact 6 is thus a live contact and may be electrically connected with the other stationary contacts through a movable contactor indicated generally by the

numeral 18. The movable contactor comprises a metal plate 19 of substantially rectangular shape with a pair of lugs 20 projected from two opposite sides and a pair of tangs 21 directed laterally from the other opposite sides. These tangs engage in notches 22 formed in the opposite sides of a movable contactor carrier 23 formed of insulating material, to secure the plate 19 to the carrier. The carrier 23, like the metal plate 19 is of rectangular shape, but larger than the plate, and has its four corners provided with notches 24 into which arms 25 forming part of an actuator indicated generally by the numeral 26 engage.

The actuator 26 is formed of sheet metal and comprises a substantially "U" shaped head portion 27 having a central web 28 and side flanges 29. The side flanges 29 have their medial portions cut out to form the arms 25, and it is observed that the height of the arms is substantially the same as the distance between the flat bottom wall 2 of the casing and the inner surface of the terminal head 9, so that the "U" shaped head of the actuator is confined between the bottom of the casing and the terminal head. Consequently the carrier 23 is held in proper engagement with the arms of the actuator upon the securement of the terminal head in position closing the open front of the casing.

The carrier plate 23 is yieldably urged toward the terminal head to provide contact pressure by a spring 30 confined between the carrier plate 24 and a ball member 31 guided for movement axial to the spring, by a tubular member 32 secured in an aperture 33 in the web 28 of the actuator head. The tubular member 32 is suitably flanged at its opposite ends to maintain the same assembled with the actuator head.

Besides providing contact pressure the spring 30 yieldably urges the ball member 31 through the tubular member 32 into engagement with the bottom wall 2 of the casing. Three recesses 34 are formed in the bottom wall 2 of the casing in straight alignment and in the path of the ball member moving with the actuator, into which the ball member engages to indicate the different positions of the contactor.

To effect the movement of the contactor to and from its different positions defined by the engagement of the ball member 31 in the recesses or indentations 34, the actuator has a flat arm 35 extended therefrom which passes through an opening 36 in one end wall 3 of the housing. The extreme end of the flat extension is directed laterally as at 37 and has one end of an actuating stem 38 secured thereto. The stem 38 may be projected through the dash board 39 of an automobile, or any other suitable support from which the switch is to be mounted by a bracket 40, and carries a knob or handle 41 to facilitate actuation of the stem and consequently the contactor.

The mounting bracket may be secured to the housing 1 by having one end portion overlying the bottom wall 2 riveted thereto as at 42, and to increase the compactness of the structure the mounting bracket is offset as at 43 and apertured as at 44 to accommodate the actuator extension. The opposite end of the bracket may be attached to the dash board or other suitable support in any desired manner.

From Figure 3 it is observed that the head 27 of the actuator is positioned at one side of the casing and is guided for movement therein by having one flange 29 engaging the adjacent side wall 4 and its other flange 29 engaging a tongue 45 struck from the bottom wall 2 of the housing.

Referring now particularly to Figure 6 it is noted that the size and shape of the contactor plate 19 with respect to the arrangement of the stationary contacts is such that when the contactor is in its extreme inward position depicted in dotted lines 46, the live contactor 6 has no contact with the contactor plate 19 so that the switch is then in its "off" position. In its intermediate position illustrated in heavy dotted lines, the live contactor 6 is electrically connected only with the stationary contacts 7 and 8 and when the movable contactor is in its outermost position as depicted in dotted lines 47 the live contactor 6 is electrically connected with the stationary contacts 8 and 9.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art to which an invention of the character described appertains, that this invention provides an exceptionally compact and simple push and pull switch which is particularly well adapted for use as an automobile lighting switch; and that by reason of its simple construction lends itself readily to economical manufacture.

What I claim as my invention is:

1. A switch comprising a box-like casing having an open side, a terminal head closing said open side, stationary contacts on the inner surface of the terminal head, a movable contactor adapted for linear motion across the terminal head to electrically connect different sets of contacts at different positions of its linear motion, an actuator having a part extending to the exterior of the housing for imparting linear motion to the movable contactor, arms carried by the actuator and extending across the space between the terminal head and the wall of the casing opposite said head to hold the actuator in its plane of movement, and a connec-

tion between the movable contactor and said arms.

2. A switch comprising a casing having an open side, and a flat wall opposite the open side, an insulated terminal head closing the open side parallel to said flat wall, stationary contacts on the terminal head exposed on the inner surface thereof, a movable contactor within the casing and adapted upon linear motion across the terminal head to electrically connect different groups of stationary contacts at different positions of its linear motion, a flat rectangular member of insulating material with which the movable contactor is connected and having notches adjacent its four corners, and an actuator for imparting linear motion to the movable contactor comprising a head formed of bendable metal to substantially "U" shape with its central web in engagement with the flat wall of the casing and its side flanges cut away at their medial portions to define spaced arms which extend across the distance between the terminal head and said casing wall to properly position the actuator between the terminal head and the flat casing wall and to slidably engage in the spaced notches at the corners of the insulating member carrying the movable contactor, said engagement of the arms with the insulating member enabling flatwise movement of the insulating member toward and away from the terminal head, spring means for yieldably urging the flat insulating member toward the terminal head, and a handle member extended from the head of the actuator exteriorly of the casing.

3. A switch comprising a casing having an open side and its wall opposite the open side flat, an insulated terminal head closing said open side of the casing and parallel to said flat wall, stationary contacts carried by the terminal head and exposed at the inner surface thereof, a movable contactor adapted for linear motion across the terminal head to electrically connect different groups of stationary contacts at different positions of its linear motion, an actuator for imparting linear motion to the movable contactor and comprising a member having portions extending across the space between the terminal head and the flat wall opposite to maintain the actuator properly positioned between the terminal head and said opposite flat wall, an insulated connection between said portions and the movable contactor enabling free movement of the contactor toward and away from the terminal head, detent means for indicating the position of the movable contactor including a detent member guided by the actuator for free movement independent of the actuator toward and away from the flat wall opposite the terminal head, said detent being engageable in indentations in the flat wall upon linear movement of the actuator, and spring means for yieldably urging said detent member toward the flat wall and the movable contactor toward the terminal head.

4. A switch comprising a casing having an open side and its wall opposite the open side flat, an insulated terminal head closing said open side of the casing and parallel to said flat wall, stationary contacts carried by the terminal head and exposed at the inner surface thereof, a movable contactor adapted for linear motion across the terminal head to electrically connect different groups of stationary contacts at different positions of its linear motion, means for imparting linear motion to the movable contactor comprising an insulated plate connected with the contactor, an actuator having a portion extending across the space between the terminal head and the parallel flat wall to properly position the actuator between the terminal head and the opposite flat wall, said actuator portion having a transversely sliding engagement with said insulated plate to enable flatwise movement of the movable contactor towards and from the terminal head, handle means projecting from said actuator exteriorly of the casing, detent means for indicating the position of the movable contactor including a detent member carried by the actuator for free movement independent of the actuator toward and away from said flat wall and engageable in indentations formed in the flat wall, and a spring confined between said detent member and the insulated plate member carrying the movable contactor to afford contact pressure and yieldably urge the detent member toward the flat wall.

5. A switch comprising a casing having an open side and its wall opposite the open side flat, an insulated terminal head closing the open side of the casing and parallel to said flat wall, stationary contacts carried by the terminal head and exposed at the inner surface thereof, a movable contactor adapted for linear motion across the terminal head to electrically connect different groups of stationary contacts at different positions of its linear motion, a plate member of insulating material with which the movable contactor is connected, an actuator within the casing having a portion extending across the space between the terminal head and the opposite flat wall to maintain the actuator properly located between the terminal head and the opposite flat wall, said actuator portion having a transversely sliding engagement with the insulated member enabling movement of the movable contactor towards and from the terminal head, handle means extending from said actuator exteriorly of the casing, detent means for indicating the position of the movable contactor including a tubular member mounted in an opening in the actuator

adjacent the flat wall of the casing, a detent member freely movable in said tubular member and engageable in indentations formed in the flat wall, and spring means having a portion received in said tubular means and confined between the detent member and the insulated member carrying the movable contactor to afford contact pressure and yieldably urge the detent member toward the flat wall.

6. A switch comprising a substantially rectangular casing having an open side, a terminal head closing said open side, contacts carried by the terminal head, a movable contactor within the casing and adapted for linear motion across the terminal head to engage different groups of contacts at different positions of movement, an actuator for imparting linear motion to the movable contactor, said actuator being narrower than the rectangular casing and having one side slidably engaged with one inner wall of the casing, a handle for the actuator extending exteriorly of the casing, and a flange carried by the casing wall opposite the terminal head for holding the actuator against the first mentioned inner wall of the casing whereby said actuator is held against said wall to leave a clear space adjacent the opposite wall of the casing.

7. A switch comprising a substantially rectangular casing open at one side and having flat walls, a terminal head closing the open side, stationary contacts carried by the terminal head, a movable contactor within the casing adapted for linear motion across the terminal head to engage different groups of contacts at different positions of movement, an actuator for imparting linear motion to the movable contactor and having a handle portion extending exteriorly of the casing, said actuator and movable contactor being disposed at one side of the casing with the actuator engaging the adjacent flat wall, and a flange struck from the wall of the casing opposite the terminal head to cooperate with said flat wall and guide the actuator and movable contactor for linear motion.

8. In a switch of the character described, a casing having an open side and a flat wall opposite said open side, a terminal head closing the open side and substantially parallel to said flat wall, stationary contacts on said terminal head, a contactor movable across the terminal head for engagement with the stationary contacts, an actuator within the casing having portions engageable directly with the terminal head and the opposite flat wall to hold the actuator in its proper plane of movement, an operative connection between the actuator and the movable contactor enabling free flatwise movement of the contactor towards and from the terminal head, and a handle for the actuator projecting from the casing.

9. In a switch of the character described, a casing provided with a terminal head and a flat wall spaced from and parallel with said terminal head, an actuator within the casing slidably engaged with the flat wall and having a plurality of spaced elements extending across the space between the flat wall and the terminal head and slidably engageable with the terminal head to hold the actuator in a plane of movement parallel with said flat wall and terminal head, and a contactor disposed between said spaced actuator carried elements and having a free transverse sliding connection therewith whereby said contactor is shiftable by the actuator but is free to move and adjust itself to the terminal head.

10. In a switch of the character described, a substantially rectangular casing having an open side opposite a flat wall, a terminal head closing the open side and substantially parallel to the flat wall, stationary contacts on the terminal head, a movable contactor within the casing adapted for movement endwise with respect to the rectangular casing for selective engagement with the stationary contacts, an actuator within the casing to move the contactor, said actuator comprising a wall slidably engaged with said flat casing wall opposite the terminal and a plurality of spaced arms carried by said wall and extending across the space between the flat casing wall and the terminal head for slidable engagement with the terminal head to hold the actuator in its proper plane of movement within the casing, an operative connection between the movable contactor and said spaced arms whereby movement of the actuator is imparted to the contactor and the contactor is free to move flatwise toward and away from the terminal head, a spring having one end engaged with the contactor to yieldably urge the same toward the terminal head, the opposite end of said spring receiving support from the flat casing wall through an opening in the adjacent wall of the actuator, and a handle for the actuator projecting from the end wall of the casing.

In testimony whereof I have hereunto affixed my signature.

EDGAR M. SORENG.