June 3, 1952 J. B. DICKSON 2,599,437

SWITCH

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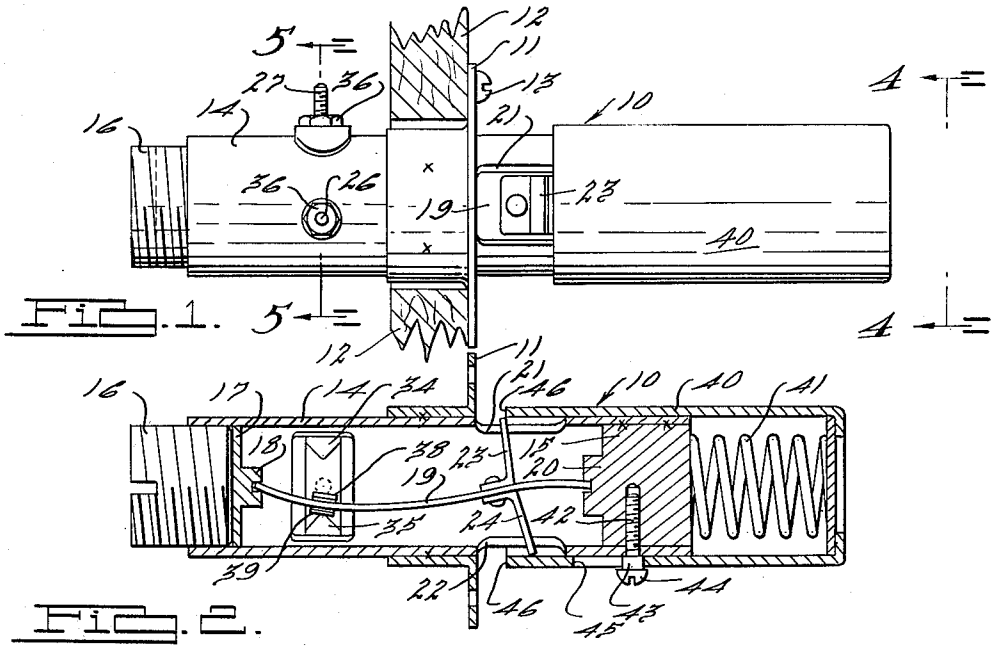


Fig. 1.

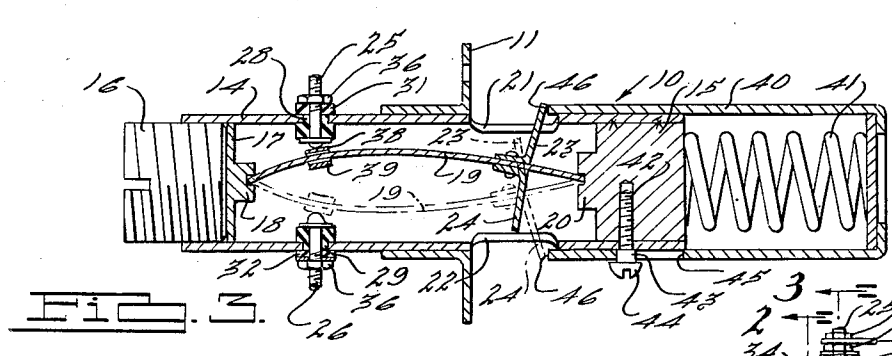


Fig. 2.

Fig. 3.

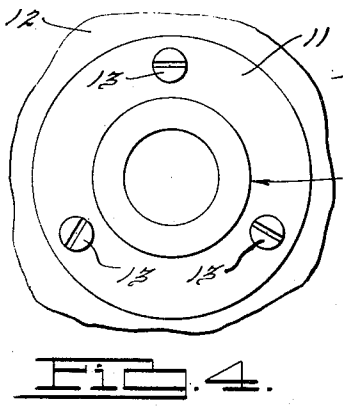


Fig. 4.

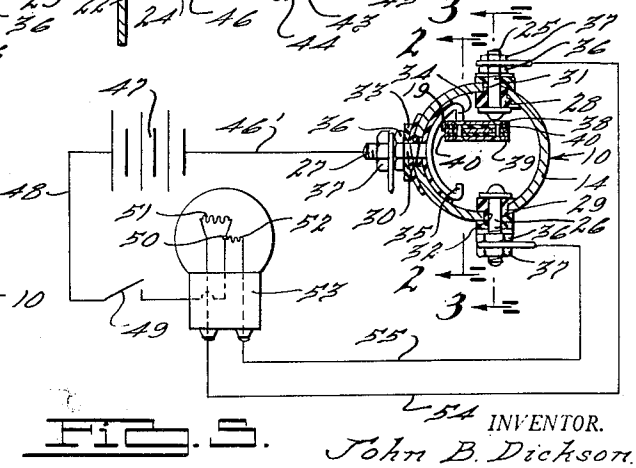


Fig. 5.

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SWITCH

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8 Claims. (Cl. 200—67)

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My invention relates to an improved switch for lighting systems and, more particularly, to a foot dimmer switch for a motor vehicle.

The objects of my invention are to provide a switching device for a motor vehicle lighting system having a relatively few movable parts compared to conventional switches employed for the same purpose; to provide a switch of the type having very few components thereby facilitating assembling and manufacturing thereof; and to provide a switch of very sturdy and lasting construction.

Other objects and advantages of my invention will become more apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of my improved switch.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 5 and showing the switch in a compressed position.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 5.

Fig. 4 is an end view taken on the line 4—4 of Fig. 1.

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 1 and showing a typical electrical system with which my improved switch may be used.

In the drawings I have shown my improved switch, generally designated by the numeral 10, welded to a bracket 11 which is secured to a motor vehicle floor board 12 by screws 13.

The switch 10 comprises a cylindrical tube 14 having one end thereof permanently closed by a plug 15. The other end of the tube 14 is threaded to receive a threaded plug 16. The innermost extremity of the plug 16 engages a disc 17 which is provided with an integrally connected slotted projection 18 which positions one extremity of a flat spring 19. The other extremity of the spring 19 is positioned by a slotted projection 20 which is integrally connected to the innermost extremity of the plug 15. The spring 19 is disposed in a bowed position within the tube 14, the amount of bow being determined by how far the plug 16 is threaded into the threaded end of the tube 14.

The tube 14 is provided with registering slots 21 and 22 disposed in opposite surfaces of the tube. The spring 19 is provided with two ears 23 and 24 secured to the opposite faces thereof which extend outwardly in opposite directions. As viewed in Fig. 3, the ear 23 has its free end extending through the slot 21. If, however, as indicated by the dotted lines in Fig. 3, the spring

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19 is bowed in an opposite direction, the ear 24 has its free end extending through the slot 22.

The cylindrical wall of the tube 14 is provided with three electrical contact members 25, 26 and 27 which are secured to the wall of the tube through holes 28, 29, and 30 therein, respectively. The contact members 25 and 26 are insulated from the tube 14 by rubber-like sleeves 31 and 32, respectively, while the contact member 27 is insulated from tube 14 by a rubber-like member 33. The contact member 27 is a C configuration having contact tips 34 and 35; the former being adjacent the member 25; the latter being adjacent the member 26. The outer end portions of all of the contact members 25, 26 and 27 are provided with nuts 36 and 37. The nuts 36 secure the respective contact members to the tube 14 while the nuts 37 secure electrical conductors, hereinafter described, to the respective contact members 25, 26, and 27.

The spring 19 is provided with contact plates 38 and 39 which are secured to the respectively opposite flat faces of the spring with insulation material 40 adhered therebetween. The plates 38 and 39 are so disposed on the spring 19 that when the spring is in a bowed position as shown in Fig. 3, the plate 38 engages the innermost tip of the contact member 25 and the tip 34 of the member 27 thereby electrically connecting them. When the spring 19 is in the bowed position as indicated by the dotted lines in Fig. 3, the plate 39 engages the innermost tip of the contact member 26 and the tip 35 of the member 27 effecting an electrical connection therebetween.

In order to effect the motion of the spring 19 from one bowed position to the other as indicated in Fig. 3, the switch 10 is provided with a cylindrical cup 40 which receives the end of the tube 14 having the plug 15 therein. The tube 14 and the cup 40 are mounted for relative telescoping movement, the tube and the cup being urged apart by a helical spring 41 which is disposed within the cup 40 between the floor thereof and the extremity of the plug 15. The amount of movement of the cup and tube relative to each other is controlled by a set screw 42 which is threaded through the wall of the tube into the plug 15. A reduced portion 43 of a head 44 of the screw 42 is disposed within a slot 45 in the wall of the cup 40 thereby limiting the movement of the cup relative to the tube to the length of the slot 45.

As more clearly seen in Fig. 3, the switch 10 is in its normal or uncompressed position. In this position the open end face 46 of the cup 40 engages either the ear 23 or 24 depending upon

which bowed position the spring 19 is in. When the spring 19 is in the position as indicated by the solid lines of Fig. 3 and the plate 38 is engaging the member 25 and the tip 34 of the member 27, the end face 46 engages the ear 23. When the cup 40 is moved downwardly toward the floor board 12, as shown in Fig. 2, the outer tip of the ear 23 is moved downwardly forcing the spring 19 over center whereupon it will quickly move with snap action to its other bowed position where the plate 39 engages the member 26 and the tip 35 of the member 27. In this position the tip of the ear 24 engages the inner surfaces of the cylindrical cup 40. During the downward motion of the cup 40 this ear slidably engages the inner wall of the cup. When the cup 40 is released to its normal position, the spring 19 moves to the position as indicated by the dotted lines in Fig. 3, the outer end of ear 24 moving to a position adjacent the open end face 46 of cup 40. It is obvious that, if this motion of the cup 40 was repeated, the spring 19 would be moved with snap action back to original bowed position. As a result all that need be done by the operator is to compress the switch and release it as many times as desired, and each time the spring 19 will snap from one bowed position to another.

The position of the ears 23 and 24 relative to the spring 19 is not critical. It is apparent that the ears may be moved a short distance rightwardly or leftwardly, as viewed in Figs. 2 and 3, without effecting the operation of the springs. If the ears 23 and 24 were positioned on the spring 19 at a location which approximates the maximum bow point of the spring, any force applied to the ears would tend to twist the spring 19 then to effect movement from one bowed position to another. It is, therefore, very desirable to position the ears relative to the spring at a location substantially as shown in the drawings so that minimum force is required to effect the snap action of the spring from one bowed position to the other.

In Fig. 5, I have shown a typical electrical system with which my improved switch may be employed. A conductor 46' connects the member 27 to one terminal of a battery 47. The other terminal of the battery 47 is connected by a conductor 48 through a switch 49 to a common terminal 50 of filaments 51 and 52 of a lamp 53. The member 25 is connected to the other terminal of the filament 51 by a conductor 54, while the member 26 is connected to the other terminal of the filament 52 by a conductor 55. When the switch 49 is closed and the spring 19 is in the position, as shown in Fig. 5, the current flows from the battery 47 through the conductor 48, the filament 51, the conductor 54, the contact member 25, the plate 38, the contact member 27, and back to the battery through conductor 46', thereby lighting the lamp 53 by energizing the filament 51. When the spring 19 is in the position as indicated by the dashed lines in Fig. 3 and the switch 49 is closed, the current flows from the battery 47 through the conductor 48, the filament 52, the conductor 55, the contact member 26, the plate 39, the contact member 27, and back to the battery through conductor 46', thereby lighting the lamp 53 by energizing the filament 51.

Although I have shown my improved switch so employed to change from one circuit to another, it should be realized that in the broader aspects of my invention, the switch may be employed for a multiplicity of uses.

I claim:

1. A switching device for regulating a lighting system comprising a tubular member closed at both ends and having a pair of opposed slots intermediate said ends, electrical contact elements having portions disposed within said tubular member, a resilient member within said tubular member between said closed ends and disposed in a bowed position to electrically contact one of said contact elements, said resilient member being adapted to be disposed in another bowed position to electrically contact another of said contact elements, opposed ears secured to said resilient member and having one thereof extending into one of said slots, and means adapted to engage said ears and to urge the same in substantially the direction of the length of said tubular member to effect movement of said resilient member from one bowed position to another.

2. A switching device for regulating a lighting system comprising a tubular member closed at both ends, electrical contact elements having portions disposed within said tubular member, a resilient member within said tubular member disposed between said closed ends in a bowed position to electrically contact one of said contact elements, said resilient member being adapted to be disposed in an oppositely bowed position to electrically contact another of said contact elements, opposed ears secured to said resilient member, and means adapted to engage said ears, and to urge the same in substantially the direction of the length of said tubular member to effect snapping movement of said resilient member from one bowed position to another.

3. A switching device for regulating a lighting system comprising a tubular member having opposed abutments therein, electrical contact elements having portions thereof disposed within said tubular member, a flat resilient member within said tubular member disposed between said abutments in a bowed position to electrically connect a pair of said contact elements, said resilient member being adapted to be disposed in another bowed position to electrically connect another pair of said contact elements, opposed ears secured to said resilient member, and a spring pressed cylindrical cup having one end of said tubular member receivable therein and adapted to alternately engage said ears to effect movement of said resilient member from one bowed position to another.

4. A switching device for optionally changing an electric system from a first circuit to a second circuit comprising a tubular member, contact elements for said first and second circuits disposed in said tubular member, resilient means within said tubular member disposed in a bowed position to contact one of said contact elements to close one of said circuits, said resilient means being adapted to be bowed in an opposite direction to connect another of said contact elements to close the other of said circuits, and a spring pressed cylindrical cup having one end of said tubular member receivable therein and adapted to engage said resilient means to effect snapping movement thereof from one bowed position to another.

5. A switching device for regulating a lighting system comprising first and second telescoping tubular members, electrical contact elements having portions thereof within said first tubular member for connecting said switch into said systems, a flat spring within said first tubular member disposed in a bowed position to contact at

least one of said contact elements, said spring adapted to be bowed in an opposite position to contact at least another of said contact elements, and opposed ears secured to said spring and adapted to be engaged by said second tubular member to effect movement of said spring from one bowed position to another.

6. An electrical switch comprising first and second telescoping tubular members, a flat spring disposed within said second member in a bowed position, electrical contact points disposed within said second member, and opposed ears secured to said spring and extending outwardly therefrom, said first tubular member having portions adapted to selectively engage said ears to effect over-center movement of said spring from one bowed position to another for cooperation with said contact points.

7. An electrical switch comprising inner and outer telescoping tubular members, said inner member having closed ends and opposed slots, circuit means within said inner member, a flat spring disposed within said inner member between said ends in a bowed position, and opposed ears secured to said spring and extending outwardly therefrom, one of said ears having a portion extending out of one of said slots when said spring is in said bowed position, said outer tubular member having portions adapted to selectively engage said ears to effect over-center movement of said spring from one bowed position to another for controlling electrical operation of said circuit means.

8. A switching device for controlling an electrical circuit comprising a tubular member having opposite abutments therein, contact surfaces for said circuit disposed within said tubular member, spring means extending lengthwise within said tubular member disposed between said abutments and bowed in one direction to engage said surfaces, said spring means being adapted to be bowed in an opposite direction to disengage said surfaces, and means for effecting movement of said spring means from one bowed position to another including a tubular member receiving a portion of said first mentioned tubular member therein in a telescoping manner and engageable with said spring means.

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