

1,309,840.

C. BRAMMING.
ELECTRIC SWITCH.
APPLICATION FILED MAY 3, 1917.

Patented July 15, 1919.
2 SHEETS—SHEET 1.

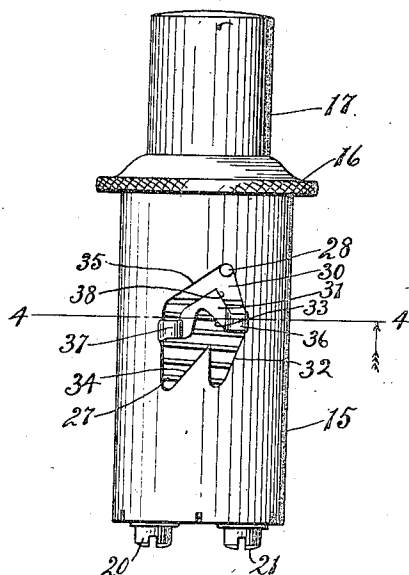


Fig. 1.

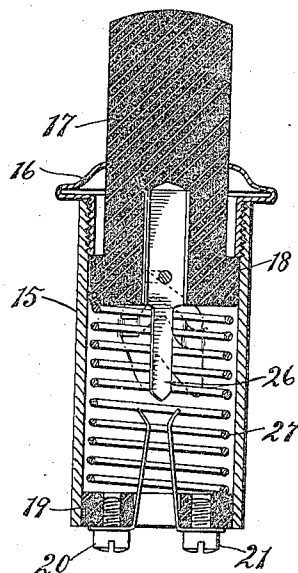


Fig. 2.

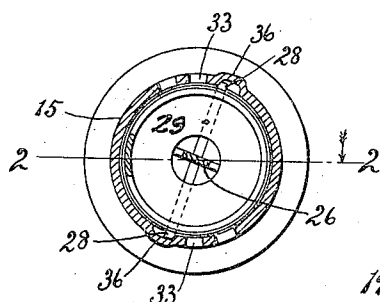


Fig. 4.

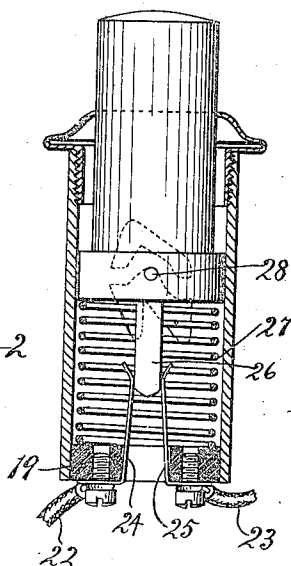


Fig. 3.

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2 SHEETS—SHEET 2.

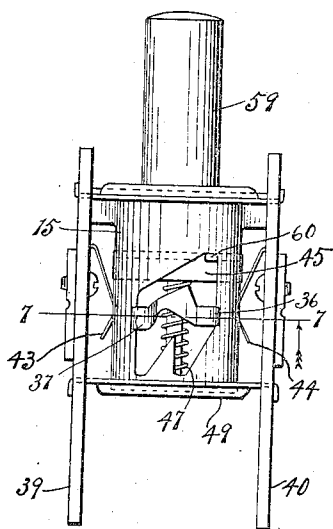


Fig. 5.

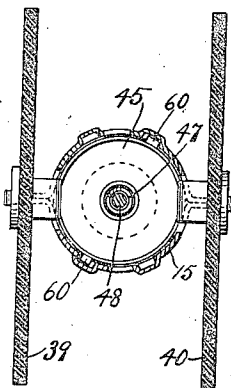


Fig. 7.

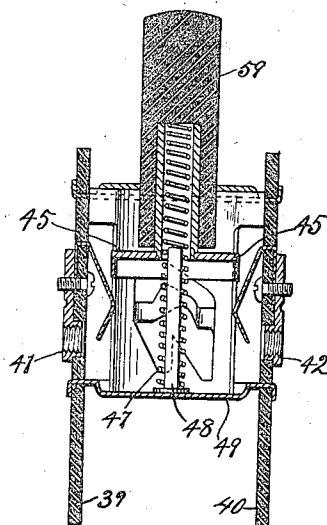


Fig. 6.

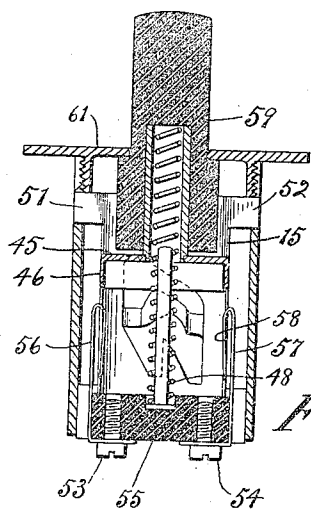


Fig. 8.

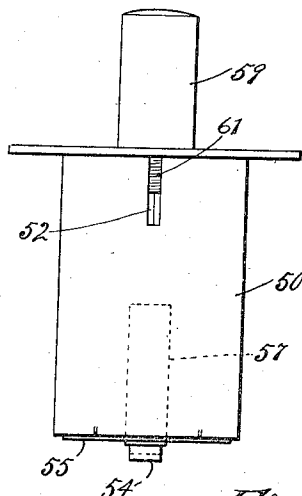


Fig. 9.

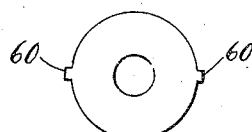


Fig. 10.

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UNITED STATES PATENT OFFICE.

CARL BRAMMING, OF CHICAGO, ILLINOIS, ASSIGNOR TO ACCESSORIES MANUFACTURING CO., A CORPORATION OF ILLINOIS.

ELECTRIC SWITCH.

1,309,840.

Specification of Letters Patent.

Patented July 15, 1919.

Application filed May 3, 1917. Serial No. 166,237.

To all whom it may concern:

Be it known that I, CARL BRAMMING, a citizen of the United States, and resident of Chicago, county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to electric switches of the plunger or push button type, its object being to provide an improved form of construction in which a single plunger effects the closing and opening of the circuit by alternate inthrusts.

The invention consists of a device such as hereinafter described and illustrated in the accompanying drawings in which—

Figure 1 is a side view of the switch,

Figure 2 is a central longitudinal section showing the circuit open and taken on the line 2—2 of Fig. 4,

Figure 3 is a similar view showing the circuit closed,

Figure 4 is a transverse section on the line 4—4 of Fig. 1,

Figure 5 is an elevation of the device in modified form,

Figure 6 is a longitudinal section thereof,

Figure 7 is a transverse section on the line 7—7 of Fig. 5,

Figure 8 is a longitudinal section of the device as shown in Figs. 5, 6 and 7, but with a modified form of shell,

Figure 9 is a side elevation of the switch as shown in Fig. 8, and

Figure 10 is a detail of the connector plate or plunger as shown in Figs. 6 and 8.

The switch as illustrated in Figs. 1 to 4 and 8 and 9 is especially adapted for use in connection with the tail lamps of automobiles to comply with the laws of certain States requiring such lamps to be controlled only at the rear of the car. In any of its forms as shown it may be used as a wall switch.

In the form shown in Figs. 1 to 4 the switch mechanism is inclosed within a tubular shell or casing 15 provided with an apertured flanged cap 16 at one end, the flange serving as a limiting stop when the shell is inserted in the casing of the lamp or an aperture in a wall. A push button 17 slidably fits within the aperture of the cap 16 and is preferably provided at its inner end

with an enlarged head as shown at 18 for engaging the inner surface of the casing.

A plug 19 of insulating material fits within the opposite end of the casing 15 and carries the binding posts 20, 21 to which the wires 22, 23 are attached. The plug 19 is centrally apertured and a pair of spring terminals 24, 25, secured respectively to the binding posts 20, 21, extend inwardly through this aperture and are spaced apart for cooperation with a plunger 26 carried by and extending axially from the push button 17. A helical spring 27 reacting between the push button 17 and the plug 19 normally holds the button in retracted position and the plunger 26 out of engagement with the spring contacts 24, 25.

Studs, as 28, project radially from the head 18 of the push button and as shown are the ends of a rod 29 set diametrically through the button and passing through the inner portion of the plunger 26, thereby serving to secure the plunger to the push button. These studs cooperate with cams and detents formed in the wall of the casing 15, these cams serving to so guide the plunger that it may be advanced for the purpose of closing the circuit. These cams are preferably formed by cutting away the wall of the casing 15 to form an aperture 30 across which the material is left to form a bridge 31. In the open circuit position the stud 28 engages the outer end of the aperture 30 thereby limiting the outward movement of the plunger. The inthrust of the plunger carries the stud to the inner end of the aperture and as it approaches this end it engages an oblique or cam edge 32 of the aperture and is deflected toward the longitudinal median line of the aperture, incidentally turning the plunger, although this turning action is immaterial to the operation of the switch as such. Upon the plunger being relieved it is moved backwardly by the spring 27 until the stud 28 engages an oblique or cam edge 33 of the bridge 31 deflecting it still farther to the left (referring to the structure as illustrated in Fig. 1) and presently stopping the outward movement, leaving the plunger still in engagement with the contacts 24, 25 as shown in Fig. 3.

For opening the circuit the plunger is again thrust inwardly, the stud 28 presently engaging an oblique or cam edge 34 formed on an outwardly extending tongue at the

inner end of the aperture 30 and is still further deflected to the left. Upon the pressure being relieved the plunger is moved outwardly by the spring, the stud 28 coming into engagement with an oblique or cam edge 35 at the outer end of the aperture and inclined in the opposite direction whereby the stud is deflected to its original position and ready for the next closing movement. At its ends the bridge 31 is looped outwardly, or radially as shown at 36, 37, to provide an unobstructed path for the stud 28 as it moves inwardly and outwardly in closing and opening the circuit. This arrangement of cams therefore provides for a proper positioning of the stud to aline it with the free ways across the bridge in both the circuit closing and opening movements and for guiding it to such a position when engaged by the bridge 31 as a detent that upon the next intrust it will certainly encounter the deflecting cam 34, the cam edges 31, 34 overlapping. For the purpose of avoiding the possibility of the stud being caught by the detent or bridge 31 in its initial advance movement the bridge is provided with an additional cam surface or edge 38 leading to the loop 36.

It will be understood that the cam arrangement described is in duplicate and at opposite sides of the casing 15.

The construction shown in Figs. 5 to 10 is essentially the same as that already described, differing only in slight matters of detail. In Figs. 5, 6, and 7 the casing 15 is shown as mounted between a pair of disks 39, 40 which provide for securing the switch in a position of service, this arrangement being desirable in connection with certain forms of so-called spot lights now commonly used on automobiles. The binding posts 41, 42 are secured to the disks 39, 40, and the spring contact elements 43, 44, project inwardly therefrom, through suitable apertures in the casing 15. In this instance the plunger takes the form of a disk 45 preferably having an annular inwardly projecting flange 46 giving a somewhat extended bearing surface for engagement with the spring contact elements. The spring 47 for retracting the plunger is of less diameter than the spring 27 of the construction previously described and extends through the plunger instead of encircling it. Preferably a staying pin 48 is fixed in the bottom plate 49 of the switch and extends along the axis of the spring.

In the construction of Figs. 8 and 9 the shell or casing 15 is housed within a barrel 50 and anchored thereto by means of lugs 51, 52. The plunger 45 is of the same form as shown in Figs. 5 and 6. The binding posts 53, 54 are secured to plate 55 of insulating material fitted within the inner end of the casing 15. The spring contacts 56,

57, extend from the binding posts inwardly but outside of the casing 15, their inner ends being folded inward as shown at 58 and extending through suitable slots in the casing 15, these slots being of such width as to prevent short circuiting.

The cam action is the same in all of the forms of construction.

In the constructions of Figs. 5 to 10 the plunger 45 is in swiveled engagement with the push button, its stem 59 fitting loosely in an aperture therein, within which aperture the spring 47 also enters and seats.

The lugs 60 for engaging the cams are formed integral with the plunger. The withdrawal of the button from the barrel 50 is prevented by the engagement of its enlarged inner end with the cap 61 thereof.

By this arrangement there is no turning movement imparted to the button from the plunger nor can the plunger be turned by rotating the button.

Various changes in the device can be made without departing from the scope of the invention in its broader aspects. For example, while there is shown a pair of spring terminals and a plunger connector for completing the circuit between them, the invention is applicable to electrical connectors of the plug and socket type in which case the plunger may constitute one terminal or a pair of terminals of the circuit. Specific embodiments of the invention in such forms are made the subject of separate applications for Letters Patent.

I claim as my invention:

1. In an electric switch, in combination, a pair of spring terminals, a spring-retracted plunger connector in one position directly connecting said terminals, and means for varying the length of alternate movements of the plunger in either direction, the plunger remaining in engagement with the terminals at the end of its shorter outward movement and being releasable therefrom by the shorter inward movement.

2. In an electric switch, in combination, a pair of spring terminals, a spring retracted plunger connector cooperating with the terminals, a detent for holding the plunger in engagement with the terminals, a lateral projection on said plunger, a sleeve surrounding said plunger and having an aperture therein adapted to receive said projection and limit its movements in all directions, the walls of said aperture comprising a cam for moving the plunger into engaging relation with the detent, and a cam for moving the plunger out of engaging relation with the detent on the next subsequent intrust.

3. In an electric switch, in combination, a pair of terminals, a spring-retracted plunger connector cooperating with the terminals, and a casing inclosing the plunger and

provided with means for limiting its longitudinal range of movement in all positions of the plunger and for holding it in partially advanced position and for engaging it with and disengaging it from said holding means on alternate inthrasts.

4. In an electric switch, in combination, a pair of spring terminals, a spring retracted plunger connector for cooperating with the terminals and having a lateral stud, a casing carrying the terminals and inclosing the plunger and having its wall apertured to receive the stud such aperture being shaped to form, at its inner end, a pair of cams for shifting the stud laterally and at its outer end an oppositely inclined cam for shifting the stud laterally in the opposite direction, a bridge crossing the aperture and forming a detent to engage the stud when deflected by the first of said pair of cams and having at its ends ways to permit the passage of the stud.

5. In an electric switch, in combination, a pair of spring terminals, a spring retracted plunger connector for cooperating with the terminals and having a lateral stud, a casing carrying the terminals and inclosing the plunger and having its wall apertured to receive the stud, such aperture being shaped to form, at its inner end, a pair of cams for shifting the stud laterally and at its outer end an oppositely inclined cam for shifting

the stud laterally in the opposite direction, a bridge crossing the aperture and forming a detent to engage the stud when deflected by the first of said pair of cams, having at its ends ways to permit the passage of the stud, and a cam for deflecting the stud to aline it with the second of the first named pair of cams.

6. In an electric switch, in combination, a casing, a spring-retracted plunger inclosed within the casing and comprising a contact element, a stud, and a cam cooperating with the stud, such parts being located one upon the casing and one upon the plunger, a stop for engaging the stud to retain the plunger in partially advanced position, the cam being configured to continuously inclose the stud and to bring it into and out of engagement with the limiting stop on alternate inthrasts of the plunger, and a pair of terminals engageable by the contact element when the plunger is in partially advanced position.

7. A switch comprising a casing adapted for attachment to a wall, a pair of terminals carried by the casing, a connector plunger housed within and inseparable from the casing, and means for maintaining the plunger in engagement with the terminals and for disengaging it therefrom on alternate inthrasts.

CARL BRAMMING.