

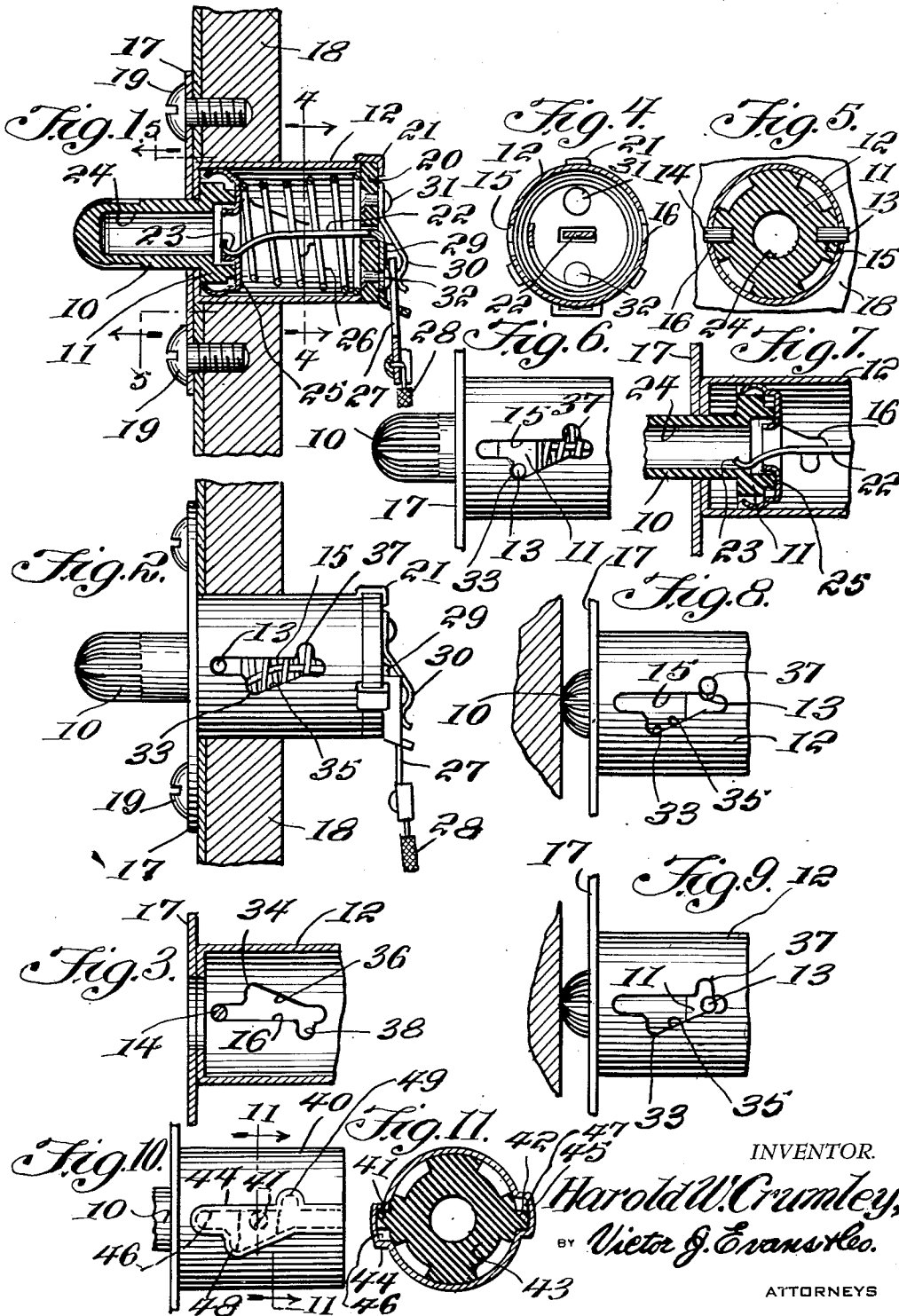
April 15, 1952

H. W. CRUMLEY

2,592,660

PLUNGER TYPE CAM ACTUATED SWITCH

Filed Aug. 19, 1949



UNITED STATES PATENT OFFICE

2,592,660

PLUNGER TYPE CAM ACTUATED SWITCH

Harold W. Crumley, Johnson City, Tenn.

Application August 19, 1949, Serial No. 111,190

1 Claim. (Cl. 200—159)

1

This invention relates to plunger type switches of the type used in motor vehicle doors wherein the door engages a plunger and actuates a switch to break the circuit to a light in the vehicle and wherein the switch automatically lights the light when the door is opened; and in particular the invention relates to latch means incorporated in switches of this type whereby the switch may be manually set to break the circuit with the door open and wherein cam surfaces are provided for automatically returning the switch to the usual operative position as the door is closed.

The purpose of this invention is to provide a latch element in a plunger type switch whereby the switch may be manually set to break the circuit to a light in a vehicle with the door of the vehicle in the open position.

Plunger type switches of this type are used universally for holding circuits open with doors, windows and the like in the closed position and switches of this type operate automatically to light lights or sound alarms when the doors, windows and the like are opened. However, it is often desired to have the door, window or the like open without lighting the light. With this thought in mind this invention contemplates a plunger type switch having latch elements incorporated therein whereby the plunger is pressed inward slightly and rotated to temporarily hold the switch with the circuit broken.

The object of this invention is, therefore, to provide means in a plunger type switch for temporarily retaining the plunger in a position with the circuit broken and in which continued movement of the plunger releases the temporary latching means.

Another object of the invention is to provide temporary latching means in plunger type switches that may be incorporated in switches of this type without changing the size or design thereof.

A further object of the invention is to provide a plunger type switch having temporary latching means therein which is of a simple and economical construction.

With these and other objects and advantages in view, the invention embodies an electric switch in which the contacts are incorporated in a cylinder with a plunger having a head slidably mounted in the cylinder and resiliently held outwardly by a spring and in which notches are provided in the cylinder for receiving projections on the head of the plunger to retain the plunger in the cylinder with the contacts through the switch open.

2

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

Figure 1 is a longitudinal section through the switch illustrating the relative positions of the parts therein.

Figure 2 is an elevational view showing the temporary latching slots with the cam surface in one side thereof that is provided in the opposite walls of the cylinder of the switch.

Figure 3 is a view showing the slot in the opposite side of the cylinder.

Figure 4 is a cross section through the cylinder taken on line 4—4 of Figure 1 showing the contacts in the inner end thereof.

Figure 5 is a cross section through the cylinder taken on line 5—5 of Figure 1 showing the pins incorporated in the head of the plunger of the switch.

Figure 6 is a detail showing an elevational view similar to that shown in Figure 2 showing the switch latch pin in the notch for retaining the switch in the open position.

Figure 7 is a detail showing a longitudinal section through the switch similar to that shown in Figure 1 illustrating the position of the contact prongs with the latching means in the position shown in Figure 6 and with the circuit through the switch broken.

Figure 8 is an elevational view similar to that shown in Figures 2 and 6 showing the latching pin in the position of holding the plunger within the switch casing.

Figure 9 is a similar view showing the latching pin freely positioned in the slot with the plunger held inwardly by the door of the vehicle or other object.

Figure 10 is an elevational view similar to that shown in Figure 2 illustrating a modification wherein grooves are recessed in the inner surface of the cylindrical wall of the cylinder instead of using open slots through the wall.

Figure 11 is a cross section through the switch shown in Figure 10 showing latching pins on the head of the plunger positioned in grooves in the inner surface of the switch cylinder.

Referring now to the drawings wherein like reference characters denote corresponding parts the plunger type cam actuated switch of this invention includes a plunger 10 having a head 11 positioned with the head slidably mounted in a cylinder 12 and with pins 13 and 14 extended from opposite sides of the head 11 positioned in slots 15 and 16, respectively in the cylinder 12.

In the design shown the switch, which is particularly adapted for door frames of motor ve-

3

hicles is provided with a face plate 17 on which the cylinder 12 is mounted and, as illustrated in Figure 1 the face plate is secured in a frame 18 by screws 19.

It will be understood that this installation is only typical as the latching means may be incorporated in plunger type switches of this type that are used for various purposes.

The inner end of the cylinder 12 is closed by a disc 20 of insulating material and the disc secured in position by fingers 21 extended from the end of the cylinder. A contact prong 22, carried by the disc 20 extends through the center of the cylinder and the end of the prong is provided with a shoe 23 that rides on the inner surface of an opening 24 in the plunger when a circuit through the switch is broken, and that engages a contact ring 25 positioned in the end of the plunger and grounded to the frame 18 through the cylinder 12 and plate 17 when the plunger is extended outwardly as shown in Figure 1 in which the circuit is completed and a lamp in the circuit is lighted. The plunger is resiliently held outwardly by a spring 26 and the prong 22 is positioned to engage a contact 27 of a wire 28 with the contact 27 resiliently held against the outer end 29 of the prong by a spring clip 30. The spring clip 30 is secured to the disc 20 by a rivet 31 and the prong is mounted by a rivet 32 on the opposite side of the disc.

The head 11 of the plunger is free to slide in the cylinder and the pins 13 and 14 carried by the plunger head are normally free to slide longitudinally in the slots 15 and 16. However, when it is desired to retain the plunger in an inner position with the circuit broken the plunger is pressed inwardly and turned slightly in a clockwise direction wherein the pin 13 passes into a notch 33 in the slot 15 and the pin 14 passes into a notch 34 in the slot 16. By this means the plunger is temporarily held inwardly of the switch and the circuit broken and the door of a vehicle in which the device may be positioned may remain open.

The switch remains in this position with the circuit broken and when the door is closed the plunger is actuated thereby inwardly with the pin 13 traveling on the cam surface 35 and the pin 14 on the cam surface 36 of the slots 15 and 16, respectively whereby the plunger is rotated until the pins are centered in the slots and should the door be released the plunger will snap outwardly with the pins traveling longitudinally of the slots and the circuit will be completed to light the light.

Should it be desired to hold the plunger in the inner position it may be pressed inwardly and turned in a counterclockwise direction with the pin 13 passing into a notch 37 and the pin 14 into a notch 38 and the plunger may remain in this position until it is manually released.

In the design illustrated in Figures 10 and 11 the pin slots, instead of being cut through the material of the cylinder are indented from the inside in the opposite sides of the wall of a cylinder 40 similar to the cylinder 12 and projections 41 and 42 are provided on the plunger head 43 to correspond with the pins 13 and 14. The material of the wall of the cylinder is forced outwardly from the inside providing ridges 44 and 45 with grooves 46 and 47 on the inside and the grooves are provided with notches 48 corresponding with the notches 33 and 34 for holding the plunger partly extended with the circuit broken, and also notches 49 corresponding to the notches

4

37 and 38 for retaining the plunger in the cylinder with the circuit broken. With the parts arranged in this manner the grooves or slots 46 and 47 open through the inner end of the cylinder to facilitate inserting the plunger head with the pins or projections 41 and 42 thereon in the cylinder. The plunger is resiliently held by a spring similar to the spring 26 and the contacts are formed similar to the contacts illustrated in Figure 1.

With the parts arranged, either as illustrated in Figure 1 or as shown in Figure 10 the knurled outer end of the plunger may be gripped by the thumb and fore finger of a hand and pressed slightly inwardly and turned in a clockwise direction when it is desired to turn off the lights or break a circuit to a signal with a door, window or the like, open. Should the door be closed wherein the plunger is forced inwardly the pins ride along the cam surfaces 35 and 36, rotating the plunger in a counterclockwise direction until the pins are in line with the longitudinal center of the switch which is also the center of the slots 15 and 16 and should the door be again opened the spring will snap the pins and plunger outwardly to the positions shown in Figures 2 and 3 wherein the device will operate the same as if this latching means had not been incorporated in the switch.

When it is desired to hold the plunger all of the way in the switch or switch casing the plunger is pressed inwardly and turned counterclockwise so that the pins pass into the notches 37 and 38 and the plunger will be held in this position until it is pressed inwardly by manually actuating the plunger.

The coils of the spring 26 are positioned whereby rotating the plunger in a clockwise direction winds the spring whereby the torsion of the spring has a tendency to return the plunger by rotating the plunger in a counterclockwise direction when it is released. The spring, therefore, coacts with the cam surfaces to facilitate returning the plunger to the usual operative position.

The device is illustrated in a form of plunger actuated switch adapted to be incorporated in frames of motor vehicle doors and it will be understood that the latch means may be incorporated in switches of other designs and also in switches used for other purposes.

With this arrangement the usual automatic switch is altered to provide a combination manual and automatic switch, whereby the switch may be manually set to hold the light circuit open with the door open, which operation is automatically canceled when the door is closed, and whereby the switch may be manually set to permanently hold the light circuit open, or make the switch inoperative until manually released.

It will be understood that other modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

In an electric switch, the combination which comprises a cylindrical casing having an outer end with an opening of reduced diameter therein and an inner end, said casing having a longitudinally disposed slot in the wall thereof with a substantially triangular shaped recess in the wall and extended from one side of the slot, said recess having a shoulder extended laterally of the slot and positioned substantially at a right angle to the slot, said recess having a sloping cam

