

[54] **PUSH BUTTON TYPE DOOR HANDLE ASSEMBLY FOR ENERGIZING AN AUXILIARY LIGHTING CIRCUIT OF A VEHICLE**

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[51] Int. Cl.² **B60Q 3/02**

[58] Field of Search **315/84; 240/2.13; 200/61.64, 61.67, 61.68, 61.74, 61.81**

[56] **References Cited**

UNITED STATES PATENTS

3,280,321 10/1966 Overesch 240/2.13

Primary Examiner—James B. Mullins

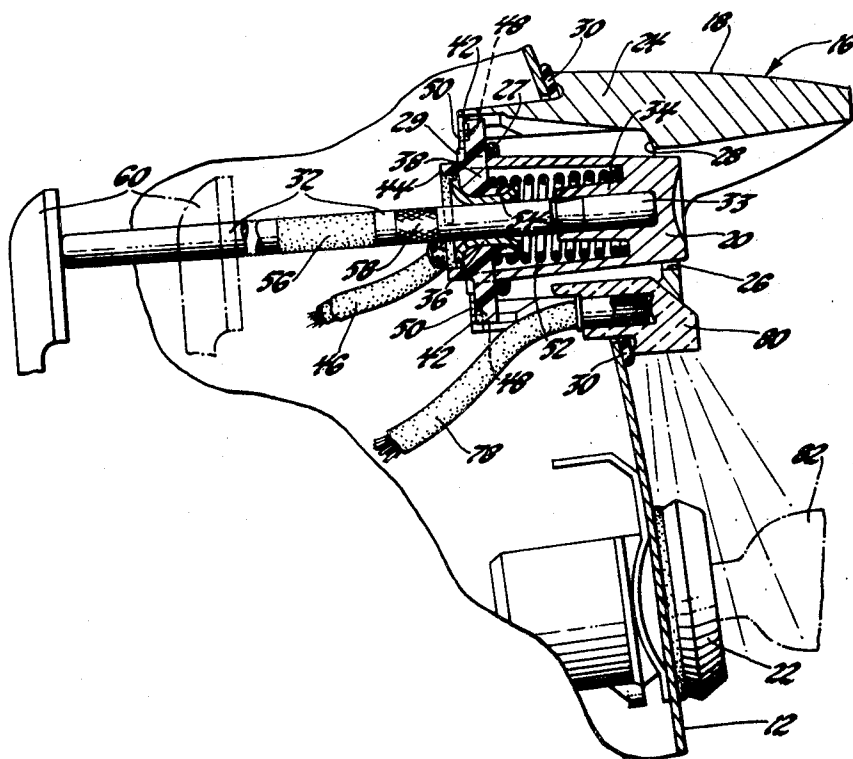
Attorney, Agent, or Firm—James A. Kushman

[57] **ABSTRACT**

A door handle assembly adapted for use with a vehicle having an auxiliary lighting circuit so that depression of a push button of the handle assembly grounds the circuit to an associated door lock to thereby energize

the auxiliary lighting. A handle of the assembly defines a housing with an opening that receives the push button and an electrically conductive push rod of the assembly has an elongated configuration with one end thereof mounted to the push button. A plastic insert supports an electrically conductive terminal of an annular configuration which slidably receives the push rod in a guiding manner. A helical spring encircles the push rod and has one end thereof seated by the push button and the other end thereof seated by the insert so as to bias the push button to an extended position and to also engage a slot and projection arrangement on the handle housing and insert in a manner that securely locates the insert. An insulator on the push rod normally engages the terminal when the push button is in the extended position to electrically isolate the terminal and the push rod. The depression of the push button moves the insulator out of engagement with the terminal so that the push rod electrically contacts the terminal and upon engagement of the free end of the push rod with an associated electrically grounded door lock, the terminal is grounded through the push rod. The handle assembly is then capable of electrically grounding the auxiliary lighting circuit to cause energization of the circuit. The housing of the handle also supports a lens which transmits light from an elongated fiber optic arrangement that is adapted to receive the light from the auxiliary lighting circuit and the lens is adapted to illuminate an outside key cylinder associated with the door lock.

3 Claims, 5 Drawing Figures



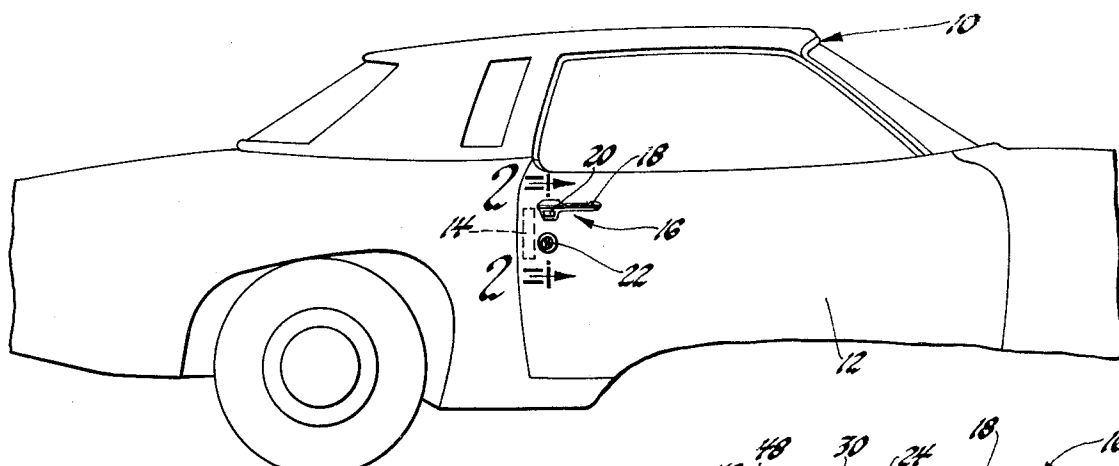


Fig. 1

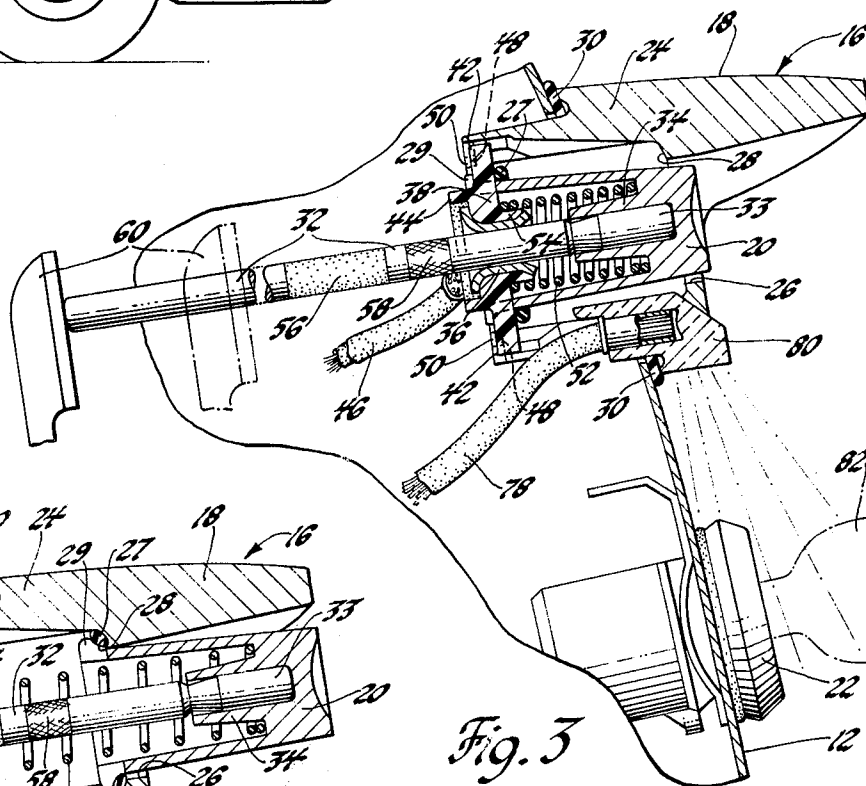


Fig. 2

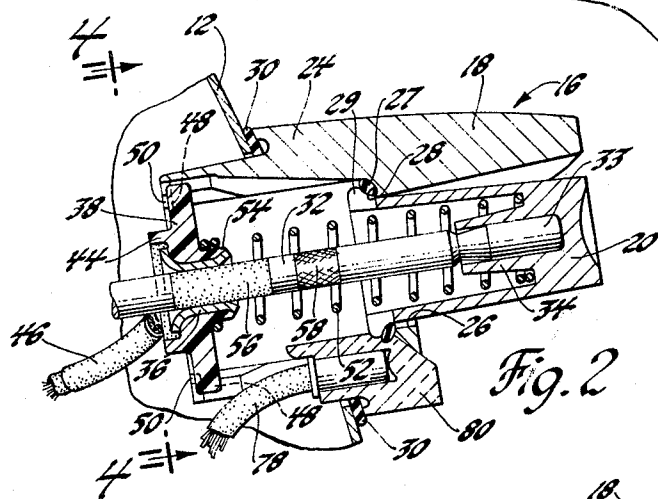


Fig. 3

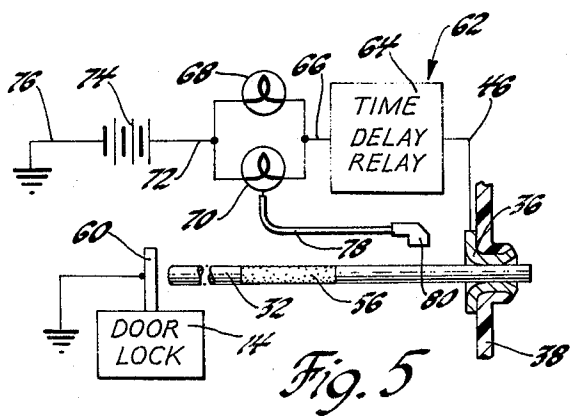


Fig. 4

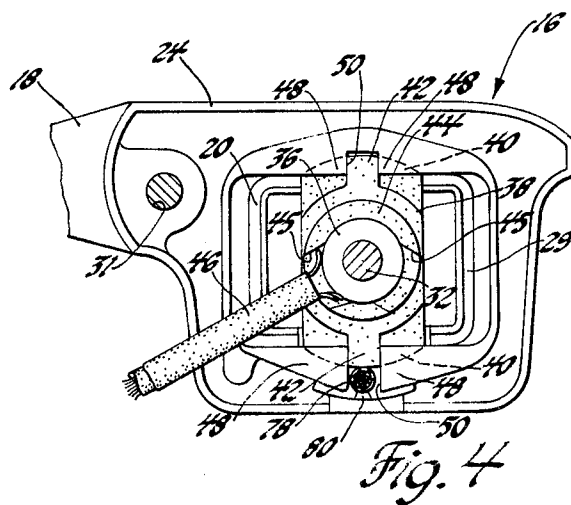


Fig. 5

PUSH BUTTON TYPE DOOR HANDLE ASSEMBLY FOR ENERGIZING AN AUXILIARY LIGHTING CIRCUIT OF A VEHICLE

THE BACKGROUND OF THE INVENTION

This invention relates generally to a push button type door handle assembly adapted for use with a vehicle to energize an auxiliary lighting circuit of a vehicle upon depression of a push button of the handle assembly.

The prior art shows many vehicle door handle assemblies of the push button type in which manual depression of a push button of the handle assembly is adapted to energize an auxiliary lighting circuit of the vehicle to provide an auxiliary lighting function. For example, the patent of Marchant U.S. Pat. No. 3,214,214, which is assigned to the assignee of the present invention, discloses such a door handle assembly in which the auxiliary lighting illuminates an outside key cylinder associated with the door lock on which the door handle assembly operates. The patent of Massoll U.S. Pat. No. 3,265,927, which is also assigned to the assignee of the present invention, discloses a door handle assembly that is adapted to energize an auxiliary lighting circuit including the dome light or another interior light upon depression of the push button of the handle assembly.

Conventional push button type door handles include an elongated push rod which engages and moves the outside operating or unlatching member of the associated door lock in a manner that unlatches the lock to permit opening door movement. This type of door lock is well known in the prior art and the unlatching member thereof is generally electrically grounded to the vehicle and composed of an electrically conductive metal.

SUMMARY OF THE INVENTION

The present invention provides an improved push button type door handle assembly adapted to energize an auxiliary lighting circuit upon depression of a push button of the handle assembly.

One feature of the invention is that an electrically conductive push rod of the assembly is mounted by the push button and has an elongated configuration slidably received in a guiding manner within an aperture of an electrically conductive terminal that is adapted to be connected to the auxiliary lighting circuit, and an insulator normally electrically isolates the push rod from the terminal when the push button is in an extended position thereof, but depression of the push button electrically engages the terminal with the push rod so that the terminal is grounded through the push rod when the push rod electrically engages the grounded unlatching member of a door lock on which the handle assembly is adapted to operate. Another feature of the invention is that the terminal has an annular configuration and is supported on a handle housing of the assembly by an insulated insert, and a helical spring encircling the push rod has one end thereof seated against the push button and the other end thereof seated against the insulated insert so as to bias the push button to an extended position and to also bias the insert into engagement with the housing in a manner that locates the insert on the housing. Another feature of the invention is that the housing of the handle assembly and the insert are provided with a slot and projection arrangement that is interengaged by the bias of the spring to ensure the positioning of the insert on the housing, and the housing also mounts a

lens with an elongated fiber optic arrangement that is adapted to receive light from the auxiliary lighting circuit so as to illuminate the conventional outside key cylinder for controlling the locked or unlocked condition of the door lock.

BRIEF DESCRIPTION OF THE DRAWINGS

The above specified features and other features, objects and advantages of the present invention are readily apparent from the following detailed description of the preferred embodiment and the drawings in which:

FIG. 1 is a side elevation view of a vehicle including a door handle assembly constructed in a manner according to the present invention;

FIG. 2 is an enlarged sectional view of the door handle assembly taken generally along line 2—2 of FIG. 1 and shows the handle assembly with a push button thereof in an extended position;

FIG. 3 is a view similar to FIG. 2 but shows the push button of the handle assembly in a manually depressed position wherein this handle assembly is adapted to energize an auxiliary lighting circuit of the vehicle;

FIG. 4 is a back view of a portion of the handle assembly taken generally along line 4—4 of FIG. 2; and

FIG. 5 is a schematic view which shows an auxiliary lighting circuit of the type with which the handle assembly of this invention is adapted to be utilized.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring generally to FIG. 1, a vehicle generally indicated by 10 includes a door 12 whose forward end is mounted by unshown hinge arrangements for conventional swinging movement about a generally vertical axis between open and closed positions. A conventional door lock shown by hidden lines in FIG. 1 is indicated by numeral 14 and latches the door 12 in closed position in the usual manner. The door 12 also supports a door handle assembly according to the present invention which is generally indicated by numeral 16. This handle assembly includes a handle 18 that can be manually grasped to pull the door open subsequent to unlatching of door lock 14 as well as a push button 20 that is manually depressed to unlatch the door lock 14 in a manner that will be described. Below the door handle assembly 16, the door 12 supports an outside key cylinder 22 that is connected to door lock 14 to control the locked or unlocked condition thereof in a conventional manner.

Referring to FIGS. 2 and 3, the handle 18 of the handle assembly defines a housing 24 which opens laterally with respect to the vehicle at an opening 26 for push button 20. The push button 20 shown has a rectangular cross section as can be seen by additional reference to FIG. 4. The push button 20 may also, of course, have a generally circular cross section as push buttons have had in the past. A seal 27 encircles the push button 20 and in the FIG. 2 condition where the push button is in an extended position, this seal engages a rectangular seat 28 on the housing as well as a peripheral flange 29 on the inner end of the push button. This engagement seals the interior of housing 24 from the environment. A seal 30 shown in FIGS. 2 and 3 is located between the handle 18 and the door 12 to likewise seal the interior of the door from the environment. A number of screw holes like the one indicated by 31 in FIG. 4 per-

mit conventional screws to attach the door handle assembly 16 to door 12 in the usual manner.

An electrically conductive push rod of the handle assembly is indicated by 32 and has an elongated configuration with a generally circular cross section that can be seen in FIG. 4. FIGS. 2 and 3 show that one end 33 of the push rod is secured within an embossment 34 on the inside of the hollow construction of push button 20. An annular electrically conductive terminal 36 defines an aperture that slidably receives the push rod 32 in a guiding manner. This terminal 36 is mounted on a plastic insert 38 which has a somewhat rectangular configuration with rounded ends when viewed as in FIG. 4. Positioning flanges 40 at the ends of the insert define these rounded ends and include respective projections 42 that are aligned with each other extending inwardly with respect to the vehicle. Between the projections 42 as seen in FIG. 4, the plastic insert 38 includes an annular rib 44 that encloses the terminal 36. A pair of grooves 45 are provided in rib 44 at four and eight o'clock positions as viewed in FIG. 4. The eight o'clock groove 45 receives a wire 46 that is attached to terminal 36. The four o'clock groove 45 receives the wire 46 when the insert 38 is used with a door handle assembly of the opposite hand to the one disclosed. This is necessary since wire 46 must extend in opposite directions with respect to the insert 38 on left and right-hand door assemblies.

The housing 24 of handle 18 also includes a pair of positioning flanges 48 that are spaced above and below the upper and lower sides of the push button opening 26 located inwardly from this opening. These positioning flanges 48 of the housing, as best seen in FIG. 4, define respective slots 50 which are aligned with each other. Upon assembly of the door handle assembly, a helical spring 52 is placed over the push rod 32 so that one of its ends seats against the push button 20 encircling the embossment 34 that mounts the adjacent end 33 of the push rod. The other end of the spring 52 is seated about an annular rib 54 on the opposite side of plastic insert 38 from rib 44. The push button 20 is first inserted outwardly through the push button opening 26 and the plastic insert 38 then is inserted to within the housing 24. This insertion of the plastic insert 38 takes place with the elongated configuration of the insert extending at 90° to the orientation shown in FIG. 4 so that the positioning flanges 40 of the insert may clear the positioning flanges 48 of the housing. The insert 38 is then rotated 90° to its FIG. 4 position so that the bias of the spring 52 will position the projections 42 of the insert within the slots 50. The positioning flanges 40 of the plastic insert and the positioning flanges 48 of the housing are thus engaged so as to secure the insert in position and the projection and slot arrangement ensures this positioning against rotation or other movement. It is thus evident that the electrical terminal 36 is electrically isolated from the handle housing 24 by the insert 38 and the push button 20 is also biased outwardly with respect to the vehicle to its FIG. 2 extended position.

The push rod 32 of handle assembly 16 includes an annular insulator 56 that is mounted about the push rod 32 so as to engage the electrical terminal 36 when the push button 20 is in its FIG. 2 extended position. Upon manual depression of the push button 20 by a person's thumb as he grasps the handle 18, the push button 20 moves toward its FIG. 3 position so that the insulator

56 moves out of engagement with the terminal 36 and allows the push rod to electrically contact this terminal. A knurled portion 58 of the push rod cleans the terminal 36 each time it passes through the terminal to ensure this electrical contact, and the free end of the push rod moves toward a conventional unlatching member 60 of door lock 14. This unlatching member is electrically grounded to the vehicle due to the mounting of the door lock to the vehicle door, and engagement of push rod 32 with the unlatching member thus electrically grounds the push rod as the push button 20 is depressed. The push rod 32 thus carries a current itself to electrically ground the terminal 36 as well as the wire 46 that is connected to the terminal, and the terminal 36 guides the push rod during its movement.

The electrical grounding of terminal 36 by push rod 32 is used to energize and auxiliary lighting circuit of the vehicle such as the circuit 62 shown by FIG. 5. Referring to FIG. 5, auxiliary lighting circuit 62 includes a time delay relay 64 that is connected to terminal 36 by the wire 46 previously described and functions to maintain the circuit closed for a predetermined period of time, such as 15-30 seconds, even after the terminal 36 is disconnected from ground by movement of push button 20 back to its extended position. A wire 66 connects the time delay relay to a parallel lighting arrangement consisting of a dome light 68 for lighting the vehicle roof and an additional light 70 whose function will be described later. Lights 68 and 70 are connected by a wire 72 across a source of power such as battery 74 and the battery is grounded by a wire 76. An elongated fiber optic arrangement 78 shown by schematic in FIG. 5 receives illumination from light 70 and transmits this light to a lens 80. As seen in FIGS. 2 through 4, the lens 80 is mounted by the housing 24 of handle 18 below the push button 20. This lens transmits light received from the light 70 via the fiber optic arrangement 78 so as to shine onto the key cylinder 22 and to thereby provide illumination when a person is attempting to insert a key 82 within the key cylinder to unlock door lock 14.

The operation of the door handle assembly 16 proceeds by a person depressing the push button 20 to ground the push rod 32 to the unlatching member 60. Through the auxiliary lighting circuit 62 shown in FIG. 5, and the time delay relay 64 thereof, this grounding thus provides a momentary illumination of both the dome light 68 and the light 70 that lights the lens 80 via the fiber optic arrangement 78. A person may then use both hands to find the key 82 that is inserted into the lock cylinder 22, as in FIG. 3, to unlock the door lock. The door lock 14 shown is of the "uncoupling" type where the unlatching member 60 may be moved to its unlatching position by push rod 32 even when the door lock 14 is locked. However, this movement does not unlatch the door lock since the latch mechanism thereof is then uncoupled from the unlatching member 60. After the key unlocking, however, a subsequent depression of the push button 20 again causes the push rod 32 to move the unlatching member and to then unlatch the door lock. A "blocking" type of door lock may also be used in which the unlatching member 60 is blocked from moving to its unlatching position when the door lock is locked. Both of these types of door locks are well known in the prior art and are thus not described herein in detail. The only requirement is that the unlatching member 60 of the door lock must be electrically grounded.

It should of course be realized that the door handle assembly of this invention may be utilized with other types of auxiliary lighting circuits than the particular one that is herein shown so as to provide a grounding of the circuit and subsequent energization thereof upon depression of the push button 20.

The invention thus provides an improved vehicle door handle assembly.

What is claimed is:

1. A push button type door handle assembly adapted for use with a vehicle door having a door lock including an electrically conductive and grounded unlatching member, the door handle assembly comprising:

a handle defining a housing;

a push button mounted by the housing for movement from an extended position to a depressed position upon manual depression thereof;

a spring for biasing the push button to the extended position;

an electrically conductive push rod of an elongated configuration with one end thereof mounted to the push button;

an electrically conductive terminal mounted on the housing and defining an aperture that slidably receives the push rod in a guiding manner; and

an insulator on the push rod that engages the terminal to electrically isolate the push rod and terminal when the push button is in the extended position, the push rod sliding through the terminal upon manual depression of the push button so that the insulator moves out of engagement with the terminal as the push rod moves into electrical engagement therewith, and the manual depression of the push button moving the other end of the push rod into electrical contact with the electrically grounded unlatching member of the door lock so that the push rod electrically grounds the terminal upon such depression and thereby permits the handle assembly to be used to energize an auxiliary lighting circuit of the vehicle.

2. A push button type door handle assembly adapted for use with a vehicle door having a door lock including an electrically conductive and grounded unlatching member, the handle assembly comprising:

a handle including a housing defining a push button opening which opens laterally outwardly with respect to a vehicle on which the door handle is used, the housing also including a pair of spaced flanges located inwardly with respect to the vehicle from the push button opening on opposite sides thereof;

a push button received by the opening of the housing for movement from an extended position to a depressed position upon manual depression thereof;

an electrically conductive push rod of an elongated configuration with one end thereof mounted to the push button;

an electrically insulated insert received by the housing between the push button opening and the flanges and having an electrically conductive terminal with an annular configuration supported thereon, the terminal slidably receiving the push rod in a guiding manner;

a helical spring encircling the push rod with one end thereof seated against the push button and the other end thereof seated against the insert so as to bias the push button to the extended position and to also bias the insert into engagement with the

spaced flanges of the housing in a manner that locates the insert; and

an insulator on the push rod that engages the terminal to electrically isolate the push rod and terminal when the push button is in the extended position, the push rod sliding through the terminal upon manual depression of the push button so that the insulator moves out of engagement with the terminal as the push rod moves into electrical engagement therewith, and manual depression of the push button moving the other end of the push rod into electrical engagement with the electrically grounded unlatching member of the door lock so that the push rod electrically grounds the terminal upon such depression and thereby permits the handle assembly to be used to energize an auxiliary lighting circuit of the vehicle.

3. A push button type door handle assembly adapted for use with a vehicle door having an outside key cylinder for controlling the locked or unlocked condition of an associated door lock carried by the door and including an electrically conductive and grounded unlatching member, the handle assembly comprising:

a handle including a housing defining a push button opening which opens laterally outward with respect to a vehicle on which the door handle assembly is used, the housing including a pair of spaced positioning flanges located inwardly with respect to the vehicle from the push button opening on opposite sides thereof and defining respective positioning slots in alignment with each other, the lower side of the housing having positioning means for receiving a lens;

a light transmitting lens received by the housing so as to transmit light onto the outside key cylinder;

an elongated fiber optic arrangement with one end thereof connected to the lens to transmit light thereto and with the other end thereof adapted to receive light from an auxiliary lighting circuit of the vehicle;

a push button received by the opening of the housing for movement from an extended position to a depressed position upon manual depression thereof;

an electrically conductive push rod of an elongated configuration having a circular cross section, one end of the push rod being mounted on the push button;

a plastic insert received by the housing between the push button opening and the positioning flanges of the housing, the insert having a pair of positioning flanges with projections thereon pointing toward the slots in the positioning flanges of the housing, and the insert also having an electrically conductive terminal with an annular configuration supported thereon and slidably receiving the push rod in a guiding manner;

a helical spring encircling the push rod with one end thereof seated against the push button and the other end thereof seated against the insert so as to bias the push button to the extended position and to also bias the insert so the flanges thereof engage the flanges of the housing with the projections of the insert flanges received by the slots of the housing flanges to thereby locate the insert; and

an insulator on the push rod that engages the terminal to electrically isolate the push rod and terminal when the push button is in the extended position,

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the push rod sliding through the terminal upon manual depression of the push button so that the insulator moves out of engagement with the terminal as the push rod moves into electrical contact therewith, and the manual depression of the push button moving the other end of the push rod into electrical contact with the electrically grounded

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unlatching member of the door lock so that the push rod electrically grounds the terminal and thereby permits the handle assembly to be used with the auxiliary lighting circuit to energize the circuit and thus shine light onto the outside key cylinder.

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