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AUTOMATICALLY ADJUSTABLE HINGE SWITCH

Filed Oct. 10, 1962

2 Sheets-Sheet 1

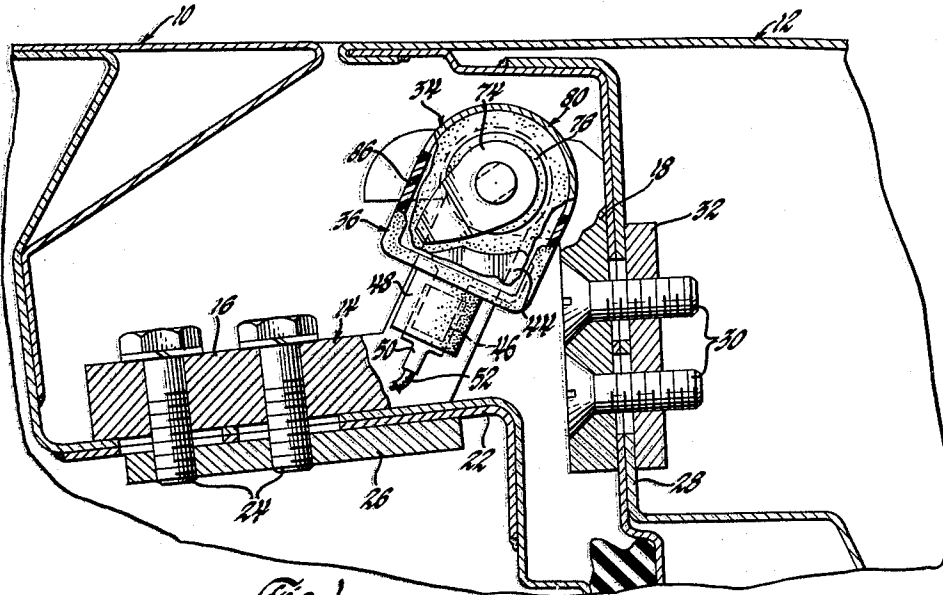


Fig. 1

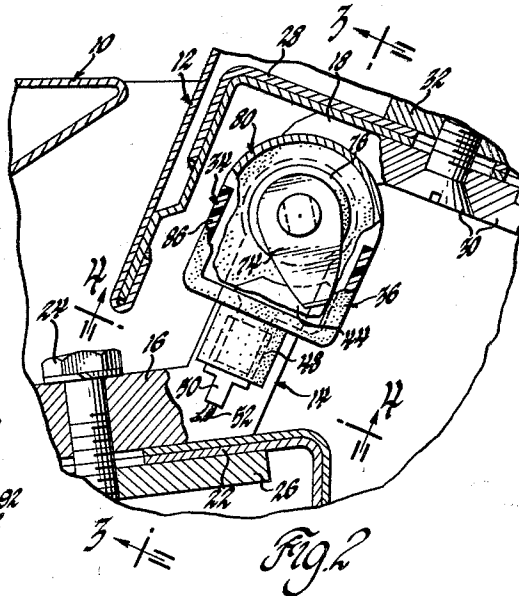


Fig. 2

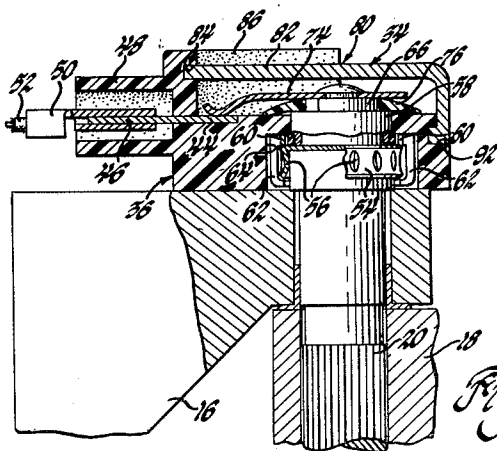


Fig. 3

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AUTOMATICALLY ADJUSTABLE HINGE SWITCH
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This invention relates to switches and more particularly to closure operated switches for controlling an electrical circuit in response to movement of a closure.

In vehicle bodies, the dome or courtesy light circuit or other circuit is usually controlled by a switch mounted on the body pillar and operated by engagement with the door upon movement of the door between open and closed positions. Body conditions and production variations often result in extreme difficulties in locating the switch on the body pillar to ensure that the switch will be engaged by the door at the desired position of the door during its range of movement.

This invention provides a switch which overcomes such difficulties since the switch is mounted on the door hinge and operated by movement of the hinge members relative to each other upon opening and closing movement of the door.

One feature of this invention is that it provides an improved closure operated switch. Another feature of this invention is that it provides an improved closure operated switch adapted to be mounted on a closure hinge and operated by movement of the hinge members relative to each other upon opening and closing movement of the closure. A further feature of this invention is that it provides an improved closure operated switch adapted to be mounted on the stationary hinge member of a vehicle body door hinge and operated by movement of the movable hinge member relative to the stationary hinge member upon movement of the door between open and closed positions. Yet another feature of this invention is that it provides an improved vehicle closure operated switch which may be mounted on a vehicle body in any random switch position but which is automatically indexed to the desired switch position by movement of a vehicle closure.

These and other features and advantages of the switch of this invention will be readily apparent from the following specification and drawing wherein:

FIGURE 1 is a partially broken away partial sectional view of a vehicle body having a closure mounted thereon for movement between open and closed positions and embodying a switch according to this invention, with the closure being shown in closed position and the switch being shown in open position;

FIGURE 2 is a view similar to FIGURE 1 showing the closure in open position and the switch in closed position;

FIGURE 3 is a partially broken away sectional view taken generally along the plane indicated by line 3—3 of FIGURE 2;

FIGURE 4 is a view taken generally along the plane indicated by line 4—4 of FIGURE 2, and

FIGURE 5 is an exploded perspective view of a portion of FIGURE 1.

Referring now particularly to FIGURES 1 and 2 of the drawing, a vehicle body 10 includes a door 12 which is mounted on the body for movement between a closed position, as shown in FIGURE 1, and an open position, as

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shown in FIGURE 2, by a conventional door hinge assembly 14 which generally includes a stationary female hinge member 16 and a movable male hinge member 18 pivotally interconnected by a hinge pin 20, FIGURE 3, which is secured to member 18 and journaled in the legs of member 16. Hinge member 16 is mounted on a body wall or pillar 22 by bolts 24 threaded into a tapped mounting plate 26, and hinge member 18 is mounted on the jamb face or wall 28 of door 12 by bolts 30 threaded into a tapped mounting plate 32.

In order to control the dome or courtesy light circuit or other circuit of the body, not shown, in response to movement of the door, a switch 34, according to this invention, is mounted on the hinge assembly 14 and operated by movement of the movable hinge member 18 and hinge pin 20 relative to the stationary hinge member 16 to alternately open and ground the circuit.

Referring now particularly to FIGURE 5 of the drawing, the switch 34 generally includes a housing 36 of plastic or other insulating material having a pair of depending integral arms 38 terminating in lugs 40. As best shown in FIGURE 3, housing 36 has the lower wall thereof seating on the upper edge of the stationary hinge member 16, and the arms 38 straddle this hinge member and have the lugs 40 thereof engaging under lugs 42 of the hinge member to secure the housing to the hinge member 16. The stationary switch contact 44 is mounted within a complementary shaped recess in the upper wall of housing 36 and includes a terminal 46 located within a housing extension 48 for connection to a connector 50. An electrical conductor 52 connects the connector 50 to the remaining portion of the electrical circuit, which is conventional and not shown.

The upper end of the hinge pin 20 extends outwardly or above the upper edge of the hinge member 16 and an indexing member 54 is mounted on the hinge pin extension by providing the member 54 with a plurality of peripheral indentations 56 which frictionally grip the hinge pin extension. A housing 58 surrounds and covers the member 54 and the hinge pin extension, with the housing 58 being connected to the member 54 for synchronous movement therewith by a pair of lateral tabs 60 extending through slots 62 of the housing. As best shown in FIGURE 3, the housing 36 includes an enlarged bore 64 freely receiving the housing 58 therein, with the housing 58 including an integral extension or bearing portion 66 which is journaled within an aperture 68 of the housing 36 opening to the bore 64 thereof.

A generally double D-shaped rivet or lug 70 is secured to the portion 66 of housing 58 and is received within a complementary shaped opening 72 provided in the movable switch contact or arm 74 so that the arm 74 may be secured to the housing 58 by peening over the end of the lug 70. A generally concave-convex shaped sealing washer 76 is located between the arm 74 and the portion 66 and has the edge thereof located in seating engagement with the upper wall of housing 36 to seal the upper wall of the housing. The contact arm 74 is grounded to the body 10 by the housing 58, the member 54 and the hinge assembly 14, while the stationary contact 44 is insulated from the body 10 by the switch housing 36.

A housing cover member 80 includes an extension 82 having the edge portions thereof received within a continuous groove 84 provided in wall 86 of the housing 36, and

a generally semi-circular shaped wall 86 which forms a continuation of the wall 86 and has the flange 90 thereof received within a groove 92 of housing 36.

When the door is in closed position, as shown in FIGURE 1, the contact arm 74 is out of engagement with the contact 44 so that the light circuit from the conductor 52 to ground is open. As the door moves toward the open position of FIGURE 2, the member 54 will move with the hinge pin 20 and the hinge member 18 and in turn rotate the housing 58 and the contact arm 74 so that the contact arm moves into engagement with the contact 44 to ground the light circuit. The light circuit may be energized at the desired position of the door during its range of movement by either increasing or decreasing the extent of the contact 44. Thus, if it is desired that the light circuit be energized upon movement of the door 12 through a few degrees of door opening movement, the contact 44 will be increased in extent from that shown in the drawings, and likewise may be decreased in extent from that shown in the drawings if it is desired to delay energization of the light circuit until the door 12 has moved through a greater number of degrees of door opening movement.

The switch assembly 34 is completely assembled prior to installation on the body and may be installed on the body with the contact arm 74 at any random position with respect to the contact 44 since the arm 74 will be automatically indexed to the desired position upon initial door opening or closing movement. This is a very distinct advantage of the switch of this invention and permits ease of installation with a minimum expenditure of time. The switch assembly 34 will normally be installed when the door is in an open position since the hinge 14 is easily accessible. If the contact arm 74 is located out of engagement with the contact 44 as shown in FIGURE 1 when the assembly 34 is installed and the door 12 is closed, the arm 74 will initially rotate clockwise until it engages the wall 86 of housing 36. Thereafter, arm 74, housing 58 and indexing washer 54 will remain stationary as the washer 54 slips relative to the hinge pin 20 so that the arm 74 will be automatically indexed to its position, as shown in FIGURE 1, when the door reaches closed position. Should the contact arm 74 be located in any other position, it will be automatically indexed to the desired position during the initial closing movement of the door 12 in the manner previously described.

Thus, this invention provides a new and improved closure operated switch.

What is claimed is:

1. In a vehicle body, the combination comprising hinge means including a pair of pivotally interconnected hinge members movable relative to each other through a predetermined range of movement to move a vehicle body closure between open and closed terminal positions, switch means mounted on said hinge means and operated by movement of said hinge means relative to each other, said switch means including a stationary contact mounted on one of said hinge members and a movable contact mounted on the other of said hinge members, said movable contact being located out of engagement with said stationary contact in one terminal position of said closure and being located in engagement with said stationary contact in the other terminal position of said closure, and means operative upon movement of said closure to automatically index said first and second contacts relative to each other and locate said contacts in their desired relative positions corresponding to the terminal positions of said closure.

2. In a vehicle body, the combination comprising, hinge means including a pair of pivotally interconnected hinge members movable relative to each other through a predetermined range of movement to move a vehicle body closure between open and closed terminal positions, switch means mounted on said hinge means and operated by movement of said hinge means relative to each other, said switch means including a stationary contact mounted on one of said hinge members and a movable contact mounted

on the other of said hinge members, said movable contact being located out of engagement with said stationary contact in one terminal position of said closure and being located in engagement with said stationary contact during a selected portion of said predetermined range of movement, and means operative upon movement of said closure to automatically index said first and second contacts relative to each other and locate said contacts in their desired relative positions corresponding to said one terminal position of said closure.

3. In a vehicle body, the combination comprising, hinge means including stationary and movable pivotally interconnected hinge members for mounting a vehicle body closure on said body for movement between open and closed terminal positions, switch means mounted on said hinge means and operated by movement of said movable hinge member, said switch means including a stationary contact mounted on said stationary hinge member and a movable contact mounted on said movable hinge member, said movable contact being located out of engagement with said stationary contact in one terminal position of said closure and being located in engagement with said stationary contact during a selected portion of said predetermined range of movement, and means operative upon movement of said closure to automatically index said first and second contacts relative to each other and locate said contacts in their desired relative positions corresponding to said one terminal position of said closure.

4. In a vehicle body, the combination comprising, hinge means including a pair of pivotally interconnected hinge members movable relative to each other through a predetermined range of movement to move a vehicle body closure between open and closed terminal positions, switch means operated by movement of said hinge means relative to each other and including a stationary contact and a movable contact, means mounting said stationary contact on one of said hinge members, means adjustably mounting said movable contact on the other of said hinge members, said movable contact being located out of engagement with said stationary contact in one terminal position of said closure and being located in engagement with said stationary contact during a selected portion of said predetermined range of movement, and means responsive to movement of said closure for adjusting said movable contact relative to said other hinge member to locate said contacts relative to each other in the terminal positions of said closure.

5. In a vehicle body, the combination comprising, hinge means including a pair of hinge members pivotally interconnected by a hinge pin for movement relative to each other through a predetermined range of movement to move a vehicle body closure between open and closed terminal positions, a stationary switch contact mounted on one of said hinge members, a movable switch contact, means adjustably mounting said movable switch contact on said other hinge member for movement into and out of engagement with said stationary switch contact as said hinge members move relative to each other to selectively energize and deenergize an electrical circuit, and means responsive to movement of said closure from one terminal position to the other terminal position to adjustably locate said movable switch contact on said other hinge member in a position corresponding to the desired position of said movable switch contact relative to said stationary switch contact in said other terminal position of said closure.

6. In a vehicle body, the combination comprising, hinge means including a pair of hinge members pivotally interconnected by a hinge pin for movement relative to each other through a predetermined range of movement to move a vehicle body closure between open and closed terminal positions, a stationary switch contact mounted on one of said hinge members, a movable switch contact, means adjustably mounting said movable switch contact on said hinge pin for movement into and out of engagement with said stationary switch contact as said hinge

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members move relative to each other to selectively energize and deenergize an electrical circuit, and means responsive to movement of said closure from one terminal position to the other terminal position to adjustably locate said movable switch contact on said hinge pin in a position corresponding to the desired position of said movable switch contact relative to said stationary switch contact in said other terminal position of said closure.

7. In a vehicle body, the combination comprising hinge means including stationary and movable hinge members pivotally interconnected for movement relative to each other through a predetermined range of movement to mount a vehicle body closure on a vehicle body for movement between open and closed terminal positions, a stationary switch contact mounted on said stationary hinge member, a movable switch contact, means adjustably

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mounting said movable switch contact on said movable hinge member for movement into and out of engagement with said stationary switch contact as said hinge members move relative to each other to selectively energize and deenergize an electrical circuit, and means responsive to movement of said closure from open position to closed position to adjustably locate said movable switch contact on said movable hinge member in a position corresponding to the desired position of said movable switch contact relative to said stationary switch contact in said closed terminal position of said closure.

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