March 11, 1958 S. C. WURM 2,826,655

WARNING SIGNAL SWITCH

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FIG. 1

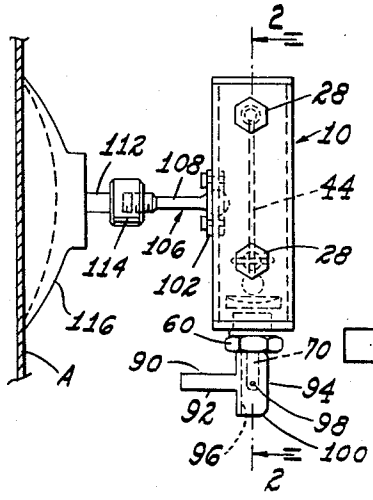


FIG. 2

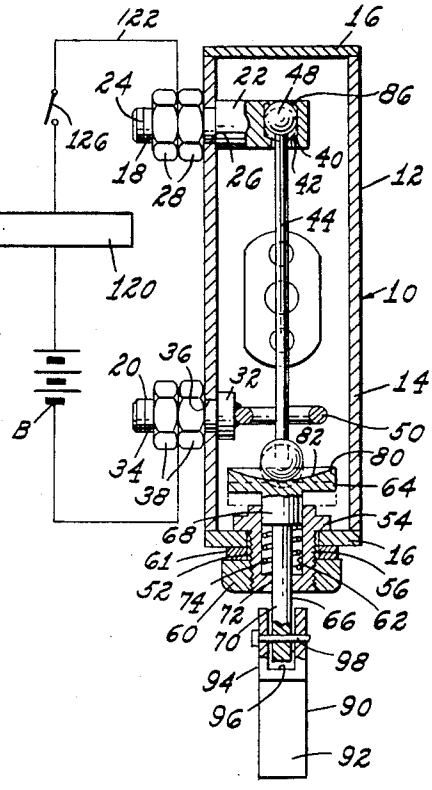
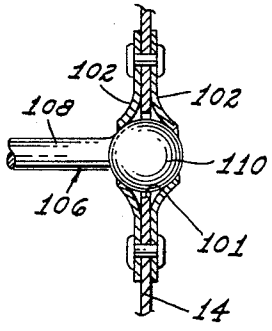


FIG. 3



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WARNING SIGNAL SWITCH

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6 Claims. (Cl. 200—61.51)

This invention relates to electrical switches and refers more particularly to a warning signal switch.

One object of this invention is to provide a switch for closing an electrical circuit whenever the switch unit or its mounting is disturbed. The switch is designed particularly for use with an alarm used in connection with an automobile to prevent its theft. The switch is such that the slightest movement of the automobile is sufficient to disturb the switch or its mounting to the degree necessary to close the switch and thereby energize the alarm.

Another object is to provide a warning signal switch which is composed of a relatively few simple parts and capable of being inexpensively manufactured.

Other objects of the invention will become apparent as the following description proceeds, especially when considered with the accompany drawing, wherein:

Fig. 1 is a side elevational view of a switch embodying the invention.

Fig. 2 is a sectional view taken along the line 2—2 on Fig. 1.

Fig. 3 is an enlarged fragmentary view of a portion of Fig. 1, partly in section.

Referring now more particularly to the drawing, the switch is indicated generally at 10 and comprises a hollow casing 12 which is formed of a suitable transparent dielectric material such as Lucite. The casing 12 has a cylindrical side wall 14 and the ends are closed by caps 16. A pair of terminals 18 and 20 are provided. The terminal 18 has an enlarged pendulum supporting portion 22 within the casing adjacent the upper end, and a reduced portion 24 integral with the portion 22 extends through a suitable opening 26 in the side wall of the casing. A pair of nuts 28 are threaded on the reduced outer end portion 24 of the terminal 18 to lock it in place on the casing.

The other terminal 20 has a ring supporting portion 32 within the casing and a reduced portion 34 extending through a suitable opening 36 in the side wall of the casing. A pair of nuts 38 are threaded on the reduced portion of the terminal 20 to secure it in place on the casing.

The terminals 18 and 20 are carried by the casing in vertically spaced relationship to each other and these terminals are of course formed of a suitable electrically conductive material.

The upper terminal 18 has a cup-shaped recess 40 in the upper side of the pendulum supporting portion 22, and a passage 42 in the bottom of the portion 22 connects into the bottom of recess 40. An elongated pendulum 44, of suitable electrically conductive material, extends into the recess 40 through passage 42. The upper end of the rod is enlarged as indicated at 48, and the enlarged portion is of greater diameter than the passage 42 but of less diameter than the recess 40 so that the pendulum is loosely supported by the upper terminal 18.

A ring 50 of suitable electrically conductive material

is secured to the portion 32 of terminal 20 and loosely surrounds the lower end portion of the pendulum 44. The passage 42 in the upper terminal is of a diameter sufficiently greater than that of the pendulum to permit the pendulum to swing in any direction into engagement with the ring 50.

A bushing 52 is carried by the bottom cap of the casing. This bushing has an annular flange 54 adjacent the upper end within the casing, and the relatively reduced portion 56 extends downwardly through a suitable opening in the bottom cap of the casing. A nut 60 is threaded on the lower end portion of the bushing and a fiber washer 61 is sleeved over the external portion of the bushing between the bottom of the casing and the nut. The bushing is tightly secured to the casing by drawing the nut up tight.

The bushing has a through passage 62 extending from the upper end to the lower end, and a clamp 64 of Bakelite or similar dielectric material has a stem part 66 which projects through the passage 62 in the bushing and beyond the lower end thereof. The stem part 66 has an upper cylindrical portion 68 which has a close sliding fit in the upper cylindrical portion of the passage 62, and the lower end portion 70 of the stem part is cylindrical and has a close sliding fit in the lower reduced cylindrical portion 72 of the passage 62. A compression coil spring 74 surrounds the lower portion 70 of the stem part 66 in the annular space between the stem part and the bushing. The upper end of the spring bears against the shoulder between the enlarged upper portion and the reduced lower portion of the stem part and the lower end of the spring bears against the shoulder between the enlarged upper portion and the reduced lower portion of the passage 62. The spring thus normally urges the clamp upwardly to the position illustrated in Fig. 2.

The clamp has a head portion 80 at the upper end of the stem part and the upper surface 82 of the head portion is concave as illustrated. In the Fig. 2 position of the clamp, the upper surface 82 thereof bears against the ball 84 threaded on the lower end of the pendulum 44 to urge the pendulum upwardly. The inner end of the pendulum supporting part 22 of the upper terminal 18 is peened over as indicated at 86 after assembly of the pendulum with the upper terminal to confine the upper end of the pendulum to the recess 40 when the pendulum is urged upwardly by the clamp. In this position of the pendulum, with its lower end engaged by the clamp and its upper end bearing against the peened-over portion, the pendulum cannot swing.

An operating lever 90 is carried by the lower end portion of the stem part. The lever 90 is generally T-shaped having a gripping stem 92 and a head 94 extending transversely of the gripping stem at one end thereof. The head 94 is formed with a channel or recess 96 along the top edge thereof extending from one side of the head to the other. The recess 96 is sufficiently wide to receive the lower end of the stem part, and a pin 98 extending through the head across the recess pivotally connects the lever 90 to the stem part. When the lever is in the generally upright position of Fig. 2, the clamp is free to move upwardly by spring 74 to lock the pendulum against swinging. However, the lever may be turned ninety degrees in either direction to the position of Fig. 1 in which one end of the head will bear against the lower end of the bushing 52 and retract the clamp to the Fig. 1 position in which it is withdrawn to a position beneath the pendulum and wherein the enlarged upper end of the pendulum is supported by the base of the recess 40 to enable it to swing freely. The upper end of the head 94 of the lever is rounded at the opposite ends as shown at 100 so that the head will have a camming action against

the bushing as the lever is swung to the Fig. 1 position. Thus it is not necessary to withdraw the clamp with a downward pull, the camming action making it possible to retract the clamp by merely rotating the lever to the Fig. 1 position.

The casing has an opening **101** in its cylindrical side wall, and apertured plates **102** and **104** are secured to the inner and outer sides of the cylindrical side wall of the casing with their apertures registering with the opening **101**. A mounting **106** is provided including an arm **108** having a ball **110** on the outer end, the ball being received within the registering apertures in the plates **102** and **104** and the opening **101**. The apertures in the plates are of somewhat smaller diameter than the ball so that the portions of the plates defining these apertures bear against opposite sides of the ball. Since the plates are resilient, they frictionally engage the ball as illustrated in Fig. 3 so as to retain the casing in any desired position of adjustment or setting with respect to the ball. The arm **108** is connected to an arm **112** by a coupling **114**, and a suction cup **116** is secured to the outer end of arm **112**. The suction cup may be mounted on the instrument panel A of an automobile, for example, or on any other part of the vehicle. Obviously the switch may also be attached to any vehicle or other device which is desired to be protected. Thus it may be attached to a fixed wall, for example, in position to be engaged by a door or window when opened, thereby protecting against unauthorized entry.

In use, the switch will be connected in the circuit of an alarm such as the audible signal device **120**. The leads **122** and **124** of the circuit are respectively connected to the terminals **18** and **20** through battery B, and a manual switch **126** is provided in the circuit.

In use, the switch will be attached to any portion of the vehicle such as the instrument panel A. Preferably the switch will be located in a concealed area. The casing will then be oriented with respect to the swivel connection provided by the ball **110** so that the pendulum hangs freely and does not contact any portion of the ring **50**, the clamp **64** of course being retracted during this adjustment. Assuming that the switch **126** is closed and the clamp retracted, the vehicle may now be left unattended, and is completely protected against theft. Any slight disturbance of the vehicle, as might be occasioned by a person entering the vehicle, will cause the pendulum to swing into at least momentary contact with the ring to complete the circuit to the alarm **120** energizing the latter to produce an audible alarm or signal.

When not in use, the switch may be rendered inoperative by swinging the lever **90** to the Fig. 2 position in which the pendulum is clamped against swinging. Also, the switch **126** may be opened.

It will be understood that the ball at the lower end of the pendulum is secured thereto, as by a threaded connection, after the pendulum has been assembled with the upper terminal.

The coupling **114** enables replacing the rod **112** and suction cup with another type of mounting, such as a mounting plate or bracket.

The clamp **64** not only prevents the circuit from being closed by movement of the casing, but it also prevents the pendulum from swinging when the switch is not in use. The switch **126**, while it opens the circuit, obviously will not prevent the pendulum from swinging. Needless swinging of the pendulum would result in excessive wear.

What I claim as my invention is:

1. An electrical switch comprising a casing, a first electrical terminal carried by said casing with a portion exteriorly of said casing for connection in an electrical circuit and a portion interiorly of said casing, a pendulum of electrically conductive material within said casing, the upper end of said pendulum being swivelly connected to said interior portion of said terminal and depending therefrom, a second electrical terminal carried by said casing beneath said first terminal and having a portion exteriorly of said casing for connection in the electrical circuit and a portion interiorly of said casing including a ring of electrically conductive material loosely encircling the lower end portion of said pendulum, said pendulum being adapted to contact said ring to complete the circuit between said terminals upon swinging of said pendulum as when said casing is disturbed, means for mounting said casing in a position in which said pendulum hangs freely within said ring and out of contact therewith, a clamp carried by said casing for movement from a lower inoperative position to an upper operative position engaging the lower end of said pendulum and holding it in a position out of contact with said ring, an actuating lever for said clamp pivoted thereto for swinging movement from an inoperative position to an operative position, said lever having a cam portion engageable with a portion of said casing upon movement of said lever to operative position effective to withdraw said clamp to inoperative position, and spring means for moving said clamp to operative position in the inoperative position of said lever.

2. An electrical switch comprising a support, a first electrical terminal carried by said support, a pendulum of electrically conductive material swivelly supported by said terminal and depending therefrom, a second electrical terminal carried by said support including a ring of electrically conductive material spaced beneath said first terminal and loosely encircling said pendulum, said pendulum being adapted to contact said ring to complete a circuit between said terminals upon swinging of said pendulum as when said support is disturbed and a releasable clamp carried by said support for movement from an inoperative position to an operative position holding said pendulum out of contact with said ring, an actuating lever for said clamp pivoted thereto for swinging movement from an inoperative position to an operative position, said lever having a cam portion engageable with a portion of said support upon movement of said lever to operative position effective to move said clamp to inoperative position, and spring means for moving said clamp to operative position in the inoperative position of said lever.

3. An electrical switch comprising a support, a first electrical terminal carried by said support, a pendulum of electrically conductive material swivelly supported by said terminal and depending therefrom, a second electrical terminal carried by said support including a ring of electrically conductive material spaced beneath said first terminal and loosely encircling said pendulum, said pendulum being adapted to contact said ring to complete a circuit between said terminals upon swinging of said pendulum as when said support is disturbed, a releasable member supported for movement from an inoperative position to an operative position holding said pendulum out of contact with said ring, means for moving said member to its operative and inoperative positions including an actuating lever pivoted to said member for swinging movement from an operative to an inoperative position, an abutment, said lever having a cam portion engageable with said abutment upon movement of said lever to operative position effective to move said member to inoperative position.

4. The structure set forth in claim 3 including resilient means normally urging said member to operative position.

5. An electrical switch comprising a support, a first electrical terminal carried by said support, a pendulum of electrically conductive material swivelly supported by said terminal and depending therefrom, a second electrical terminal carried by said support including a ring of electrically conductive material spaced beneath said first terminal and loosely encircling said pendulum, said pendulum being adapted to contact said ring to complete a circuit between said terminals upon swinging of said

pendulum as when said support is disturbed, a releasable member supported for movement from an inoperative position to an operative position holding said pendulum out of contact with said ring, means for moving said member to its operative and inoperative positions including a camming element engageable with said member and selectively operable to move said member to inoperative position.

6. An electrical switch comprising a support, a first electrical terminal carried by said support, a pendulum of electrically conductive material swivelly supported by said terminal and depending therefrom, a second electrical terminal carried by said support including a ring of electrically conductive material spaced beneath said first terminal and loosely encircling said pendulum, said pendulum being adapted to contact said ring to complete a circuit between said terminals upon swinging of said pendulum as when said support is disturbed, a releasable member supported for movement from an inoperative

position to an operative position holding said pendulum out of contact with said ring, means for moving said member to its operative and inoperative positions including an abutment, and a camming element engageable with said abutment and said member, said camming element being movable while in engagement with said abutment and member and operative by reason of such movement and in cooperation with said abutment to move said member to inoperative position.

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