United States Patent

[11] 3,553,448

[72] Inventors **Joseph W. Davis;**
Arthur J. Little, Springfield, Ill.

[21] Appl. No. **787,822**
[22] Filed **Dec. 30, 1968**
[45] Patented **Jan. 5, 1971**

[73] Assignee **Stewart-Warner Corporation**
Chicago, Ill.
a corporation of Virginia

[54] **CAR TRUNK SWITCH AND LAMP ASSEMBLY**
10 Claims, 8 Drawing Figs.

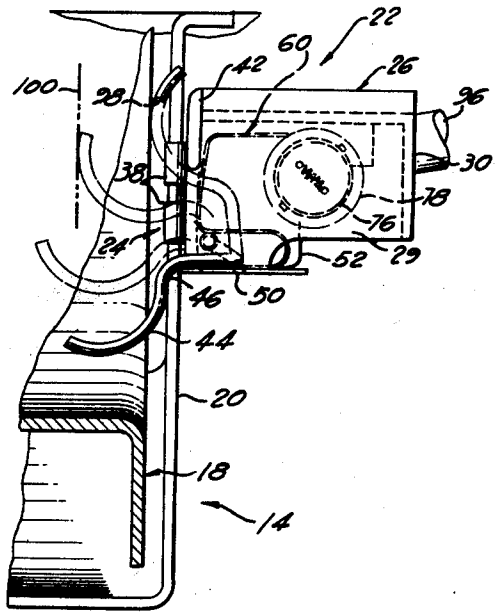
[52] **U.S. Cl.** **240/7.1,**
240/2, 240/52.1, 315/84, 200/61.62
[51] **Int. Cl.** **B60q 1/00**
[50] **Field of Search** 240/2S, 7.1,
8.18, 52.1, 44.27, 122, DOS; 200/61.62, 61.63;
315/84

[56] **References Cited**
UNITED STATES PATENTS

2,101,748	12/1937	Michel et al.	240/7.1
2,166,062	7/1939	Koch, Jr.	240/7.1X

Primary Examiner—John M. Horan
Assistant Examiner—Alan A. Mathews
Attorneys—Augustus G. Douvas, William J. Newman and Norton Lesser

ABSTRACT: The following specification describes a hinge-operated, auto-trunk lamp and switch assembly having a scroll-shaped spring blade accommodating variations in travel of the switch-operating lever. The lever and switch are adjustably positioned relative the trunk lid hinge.



PATENTED JAN 5 1971

3,553,448

SHEET 1 OF 2

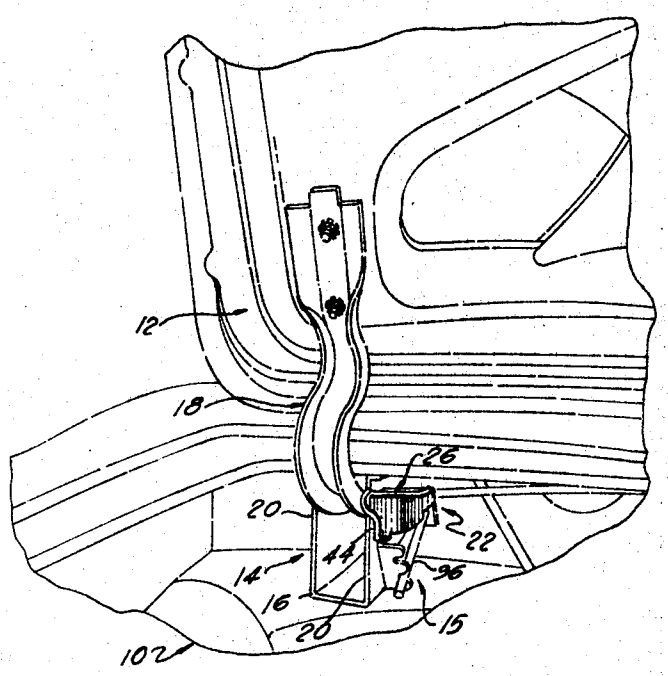


FIG. 1.

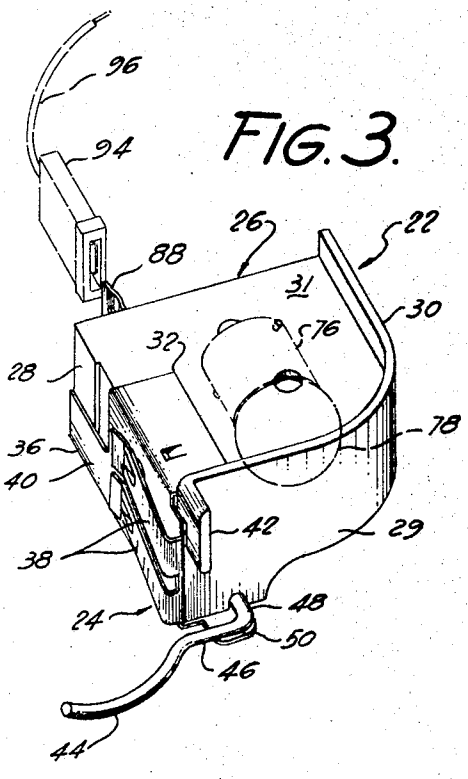


FIG. 3.

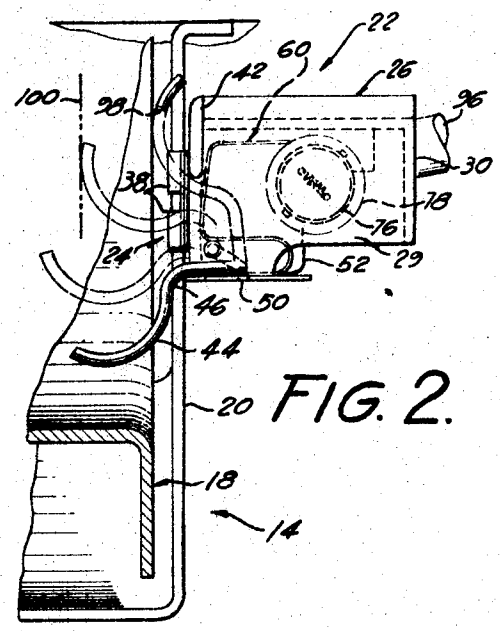


FIG. 2.

INVENTORS

Joseph W. Davis.
Arthur J. Little.

By Morton Levy.
ATTORNEY

FIG. 4.

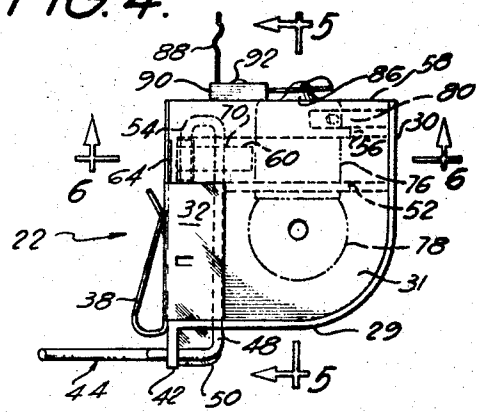
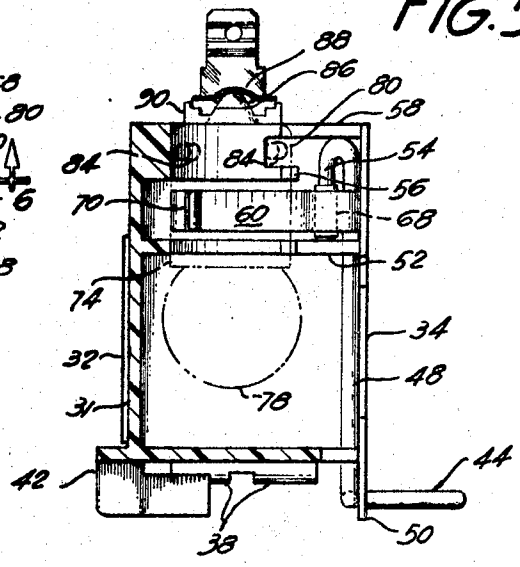


FIG. 5.



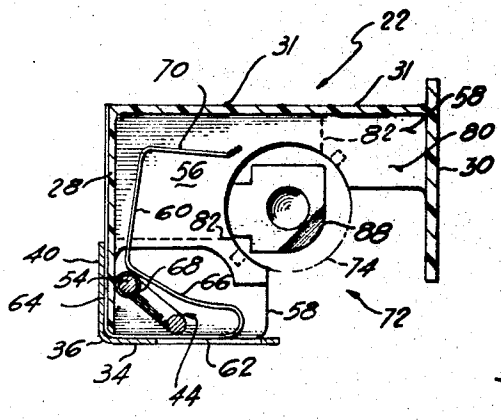
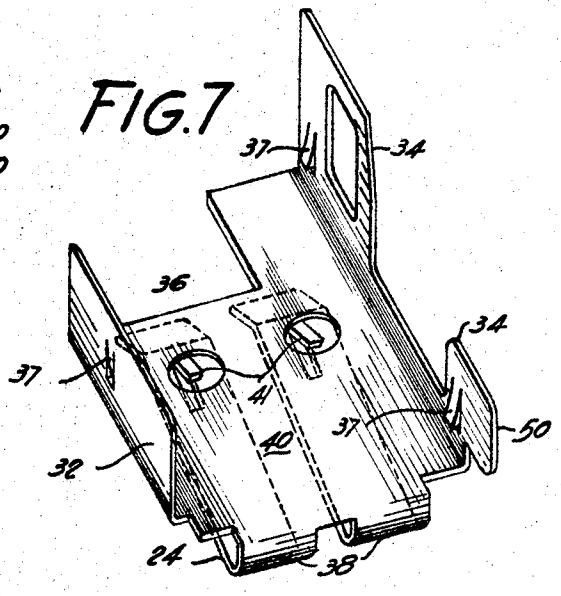


FIG. 6.

FIG. 7



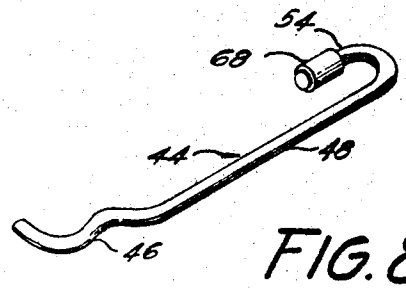


FIG. 8.

INVENTORS

Joseph W. Davis

Arthur J. Little

By Morton Lesser

ATTORNEY

CAR TRUNK SWITCH AND LAMP ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates in general to auto-trunk lamp switches and more particularly to a lever-operated trunk lamp and switch assembly controlled by a trunk lid hinge.

2. Description of the Prior Art

The problems from which the invention arises are created by the large variation in position and travel of a trunk-lid hinge or related parts as compared to variations in travel accommodated by the usual lamp switch blade and operating lever. The trunk-lid hinges are made of relatively large stamped parts whose tolerances are subject to considerable variation so that when the hinges are assembled in an auto there are large variations in position and travel of the hinge arm. Since the switches are relatively small, the travel of the switch blades or levers either do not accommodate many of the variations in hinge position or travel or require excessive adjustment.

The usual practice heretofore has often been to utilize a switch having a plunger operating under its own bias when the trunk lid is raised to disengage the plunger. These switches, however, usually require a separate lamp assembly and are relatively expensive in addition to presenting mounting and adjustment problems.

SUMMARY OF THE INVENTION

It is therefore proposed in the present invention to utilize a unitary switch and lamp assembly which is assembled to one of the trunk-lid hinge brackets by an economical spring clip. This permits facile adjustment of the assembly so that the lid-hinge arm operates the switch-lever arm at a limit position of hinge-arm travel with the trunk lid open. The switch lever arm is slidingly engaged with a resilient switch or spring blade, which in turn is slidingly engaged with the lamp-bulb socket by the operated lever arm to avoid excessive stress on the blade despite a large lever-arm movement. Thus, the lever-arm can travel a relatively large distance beyond that necessary to complete the lamp circuit to accommodate large variations in the hinge-arm positions. Closure of the trunk lid permits the lever arm to return to the normal position under bias of the spring blade assisted initially by a flexible plastic stop located at the position of maximum lever-arm travel.

Accordingly, one object of the present invention is to provide an economical auto-trunk lamp and switch assembly which is positively operated on opening the trunk lid and accommodates a wide range in either the position or travel of the trunk lid.

Other objects and features of the present invention will become apparent on examination of the following specification and claims together with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a portion of an auto trunk with a hinge having the switch and lamp assembly employing the principles of the present invention;

FIG. 2 is a front end view of the switch and lamp assembly together with a fragmentary view of the hinge illustrating the various angles through which the switch-lever arm travels;

FIG. 3 is an isometric view of the switch and lamp assembly illustrating a portion of an electrical connection therefor;

FIG. 4 is a top elevational view of the switch and lamp assembly;

FIG. 5 is a sectional view taken through the lines 5–5 in FIG. 4;

FIG. 6 is a sectional view taken through the lines 6–6 in FIG. 4;

FIG. 7 is an isometric view illustrating the switch and lamp frame; and

FIG. 8 is an isometric view illustrating the switch lever arm.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, a portion of an auto trunk is indicated by the reference character 10 with a portion of the lid for the trunk indicated at 12. The lid is pivotally supported on the trunk by means of a pair of hinges such as 14, each having a conventional tensioning or adjusting assembly such as 15.

Each hinge 14 comprises a generally U-shaped bracket 16 depending from an upper wall portion of the trunk and a curved, generally U-shaped-in-cross-section hinge arm 18. Arm 18 is fixed at one end to the lid 12 supported adjacent the other end between arms 20 of the bracket 16 for pivotal movement about a horizontal axis.

A switch and lamp assembly 22 is adjustably mounted on one of the bracket arms 20 by means of a spring clip 24 best seen in FIGS. 2, 3 and 4. The switch and lamp assembly 22 comprises a plastic housing 26 having sidewalls 28, 29 and 30 and a top wall 31, but no bottom wall. The sidewall 30 is fitted between the end legs 32 and 34 of a U-shaped metal frame 36, best seen in FIGS. 3 and 7. Barbs 37 on the legs 32 and 34 engage a small aperture in the top wall 31 and against the sidewall 28, respectively, to secure the housing 26 in position after it is slid into engagement with the frame. Frame 36 has an extended bifurcated leg 38 folded back generally parallel to the back wall 40 of the frame 36 to form the spring clip 24 for mounting the assembly 22 on bracket arm 20. The clip 24 permits vertical adjustment of assembly 22 along the bracket arm 20 and a barb 41 on each bifurcation of leg 38 serves to further secure the assembly.

The walls 29 and 30 extend above the top wall 31 and the front wall 29 forms a stop against the upper leg 32 of frame 36 when the housing is slidingly engaged with the frame. A flexible stop 42 at the juncture of walls 28 and 29 and extending parallel to wall 28 and forwardly of wall 29 is also formed on the housing adjacent the upper end of wall 29 for terminating travel of a switch lever 44.

The switch lever 44 comprises a generally L-shaped wire or rod of about one-eighth inch diameter having legs 46 and 48 with leg 46 having a curved or arcuate end adapted to be engaged against hinge arm 18. In the unoperated or normal position the crank arm or leg 46 rests against a horizontal stop or platform 50 projecting forwardly from the bottom wall 34 of the frame 36 and extends over the hinge arm 18 as seen in FIG. 2. The other leg 48 of the lever arm lies on the lower frame wall 34 and passes through a generally circular recess at the bottom of wall 29. The leg 48 extends rearwardly through a generally circular recess at the bottom of a second wall 52 located intermediate the front and rear of the housing and terminates in a U-shaped bend having a bend 54 extending forwardly in the housing toward the wall 52 and parallel to leg 48. The back leg of the U-shaped bend on the end of leg 48 passes through a recess in the bottom of thickened wall portion 56 and butts against a rear wall 58 of the housing 26.

The lever arm 44 is therefore pivotable about the axis of leg 48 and it is biased into counterclockwise rotation as seen in FIGS. 1, 2 and 3 by a scroll-shaped spring blade 60 seen in FIGS. 4, 5 and 6 seated between the wall 52 and wall portion 56. The scroll-shaped blade 60 is approximately .01 inch thick and includes a base leg 62 held between the leg 48 and bracket wall 34 and having a tab 64 at one end fitted between wall 28 of the housing and the wall 40 of the frame to secure the blade. A folded back leg 66 extends from the other end of the base leg 62 towards and engages with lever arm leg 54 which is provided with an antifriction plastic sleeve 68 at the engaged position. Leg 66 then extends upwardly toward the top wall 31 of the housing and terminates in a freely suspended, cantilever end or contact leg 70 extending toward the central vertical plane of the housing.

The intermediate wall 52 and the thickened wall portion 56 including the rear wall 58 extend from wall 28 to the wall 30 for a short distance down from the top wall 31 to the right of the central vertical plane of the housing as seen for wall 58 in FIG. 6 to define a cutaway 72 and each of these walls has an

arcuate passageway 74 adjacent the juncture of the central vertical and horizontal planes of the housing for receiving the socket 76 of a lamp or bulb 78. The arcuate passageway 74 in walls 52 and 56 extends somewhat over 180° of an arc of the socket 76 so that the socket is fit therein by deflection of a portion of walls 52 and 56 after insertion of the lamp through cutaway 72. A recess 80 between the rear wall 58 and wall portion 56 defines edges 82 behind wall portion 56 for engagement with the conventional socket lugs 84 of the lamp to restrain rotational movement of the lamp while walls 56 and 58 restrain axial movement of the lamp in respective directions.

The rear end of the lamp socket protrudes slightly beyond the rear wall 58 of housing 26 where the central terminal 86 thereon is engaged by an L-shaped spring terminal 88. One leg of the terminal 88 fits between the arms 90 of a block integrally formed on the rear wall 58 and a projection 92 intermediate the arms 90 extends through an aperture in the terminal and is then deformed to retain the terminal. An electrical connection is adapted to be extended to the terminal 88 by means of the socket 94 and conductor 96 for lighting the lamp when the spring blade 60 is engaged with the socket 76 to ground the lamp through the frame 36 and bracket 16.

The leg 20 of bracket 16 is pressed between the bifurcated leg 38 and wall 40 of spring clip 24. The switch assembly 22 is vertically adjusted on leg 20 until the arcuate portion of lever arm leg 46 is tangentially engaged with the sidewall of the U-shaped hinge arm 18 with the trunk lid 12 is the open position as indicated by the almost vertical position 98 of leg 46 in FIG. 2. With the tangential engagement, additional pivot force on the lever 44 is exerted only by sideward movement of arm 18 or surface irregularities. The lever arm 44 together with lever arm leg 54 are pivoted clockwise, therefore, as viewed in the drawings to press the contact leg 70 into engagement with the socket 76. The contact leg 70 may travel only one-eighth inch, for example, to first engage the socket 76, while the legs 46 and 54 rotate through an arc as short as 10°. Thereafter the legs 46 and 54 may continue to rotate pressing blade legs 66 and 70 further to the right as seen in FIG. 6; however, the sliding engagement between leg 70 and the socket periphery permits the blade to simply slide along the socket, while leg 54 slides along blade leg 66. After leg 54 passes the vertical position it simply slides downwardly along blade leg 66 without stressing the blade unnecessarily until the lever leg 46 engages stop 42 to terminate movement of the leg 54 within 15° or 20° of the vertical position of leg 54. With the electrical connection established to the rear terminal 88, the lamp 78 is lighted on engagement of blade 70 with socket 76 and the lamp light extends through the open bottom of the housing to light the interior of the trunk.

In the vertical position indicated at 98 the lever arm leg 46 will be pressed against the flexible plastic stop 42 by the tangential engagement with the side of the hinge arm 18, but since this represents a limit position for the hinge arm 18 relative adjacent leg 20, enough flexibility is provided for stop 42 to accommodate the pressure developed thereover without permitting overtravel of the lever arm.

For many situations the side of the hinge arm 18 may be located at the position indicated at 100 in FIG. 2 or even further to the left when the lid is open. This may be one-half inch or more to the left of the position shown at 98; however, since the lever leg 46 is rotated thereby through at least a minimum arc, the contact leg 70 engages with socket 76 to light the lamp. Likewise, the vertical wall surface of hinge arm 18, due to its tangential relationship with operated lever 44, can assume any one of a large number of limit positions without affecting the limit position of operated lever 44.

When the trunk lid is closed, the hinge arm 18 pivots downward and the sidewall thereof moves away from its tangent position relative leg 46 to disengage from the lever arm. The flexible plastic stop 42 imparts a bias towards counterclockwise rotation as seen in FIG. 2, if leg 46 is engaged therewith, but the bias of the scroll blade 60 as the leg 66 resumes its normal position relative base leg 62, in any event, serves to rotate leg 54 and lever arm 44 counterclockwise. The lever arm 44 pivots counterclockwise until arm 46 engages stop 50 with the scroll blade 60 disengaged from the lamp socket 76 to extinguish the lamp. The hinge arm 18 may continue to pivot downwards to its lower limit position and can disengage from leg 46.

The leg 46 resting on stop 50 extends approximately three-quarters inch to 1 inch to the left of wall 28 so that it overlies the upper wall surface of hinge arm 18 to accommodate just about any normal variation in position of arm 18. Arm 44 is therefore engaged by the arm 18 on upward movement of opening of lid 12 despite large variations in the possible axial position of arm 18 and the tangential engagement of arm 18 with arm 44 thereafter permits the switch to accommodate large variations in the upper limit position of arm 18.

The foregoing constitutes a description of one embodiment of the invention whose inventive concepts are believed set forth in the accompanying claims.

We claim:

1. An assembly for lighting an auto trunk having a trunk lid connected to a hinge arm pivotally mounted on a bracket arm for enabling said lid to pivot between an open and a closed position, the improvement comprising an electrically nonconductive housing for carrying a lamp, a metal frame carrying said housing, means carried by said housing for completing one electrical connection to said lamp, a spring blade secured adjacent one end to said frame, a lever pivotally carried by said frame slidingly engaging said blade intermediate the blade ends in response to a pivotal movement by said lever in one direction with said blade biasing said lever to a home position and adapted to slidingly engage said lamp for completing a second electrical connection to light said lamp in response to said lever arm being pivoted against said bias, and means for adjustably positioning said frame along said bracket arm to enable said hinge arm to pivot said lever in said one direction against said bias for lighting said lamp in response to said lid being opened and enable said bias to return said lever to said home position for extinguishing said lamp in response to said lid being closed.

2. The assembly claimed in claim 1 in which said lever comprises a rod having a leg adapted to tangentially engage said hinge arm in any one of a plurality of positions of said hinge arm corresponding to open positions of said lid.

3. The assembly claimed in claim 2 in which said leg is adapted to overlap the upper surface of said hinge arm at lease one-half inch in response to said lid being in said closed position.

4. The assembly claimed in claim 1 in which said lever comprises a leg adapted to be pivoted by said hinge arm substantially 90° from said home position to a position substantially parallel to said bracket arm in response to said lid being moved to said open position.

5. In the assembly claimed in claim 4, a resilient plastic stop engaging said leg in response to said leg being pivoted said 90° for terminating additional pivoting of said leg.

6. The assembly claimed in claim 1 in which said lever has an elongate leg defining a pivot axis and an offset leg, and said blade has one leg seated against said pivot axis leg and a second leg extending therefrom for engagement with said offset leg whereby pivoting of said offset leg about said pivot axis pivots said extending leg with sliding engagement between said offset and extending legs.

7. The assembly claimed in claim 6 in which said extending leg has a freely suspended end adapted to slidingly engage said lamp in response to the pivoting movement of said extending leg.

8. The assembly claimed in claim 6 in which an antifriction sleeve is provided on said offset leg for engagement between said offset and extending legs.

9. An assembly for lighting an auto trunk having a trunk lid connected to a hinge arm pivotally mounted on a bracket arm for enabling said lid to pivot between an open and a closed

position, the improvement comprising an electrically nonconductive housing for carrying a lamp, a metal frame carrying said housing, a lever pivotally carried by said frame, means carried by said housing for completing one electrical connection to said lamp, a spring blade secured adjacent one end to said frame and slidingly engaged by said lever intermediate the blade ends for biasing said lever to a home position and adapted to slidingly engage said lamp for completing a second electrical connection to light said lamp in response to said lever arm being displaced against said bias, and means for adjustably positioning said frame along said bracket arm to engage said lever tangentially with said hinge arm in said lid-open position and displace said lever against said bias for moving said blade to engage said lamp for lighting said lamp and disengaged from said tangential position in response to the movement of said lid to said closed position for enabling said bias to return said lever to said home position for extinguishing said lamp.

10. An assembly for lighting an auto trunk having a trunk lid connected to a hinge arm mounted on a vertical bracket arm for pivotal movement to open and close said lid, the improvement comprising a plastic housing having means for detachably carrying a lamp, a metal frame carrying said housing, a lever pivotally carried by said frame and having a normal position relative said frame, means on said frame for adjustably positioning said frame on said bracket arm with said hinge arm tangentially engaged with said lever in response to said hinge arm being pivoted to open said lid with said lever arm being displaced thereby from said normal position, means carried by said housing for completing one electrical connection to said lamp, a scroll-shaped spring blade secured adjacent one end to said frame and slidingly engaged by said lever intermediate the blade ends for biasing said lever to said home position and adapted to slidingly engage said lamp for completing a second electrical connection to light said lamp in response to said lever arm being displaced from said home position against said bias.