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ILLUMINATED OBSTRUCTION MARKER

Filed Jan. 25, 1963

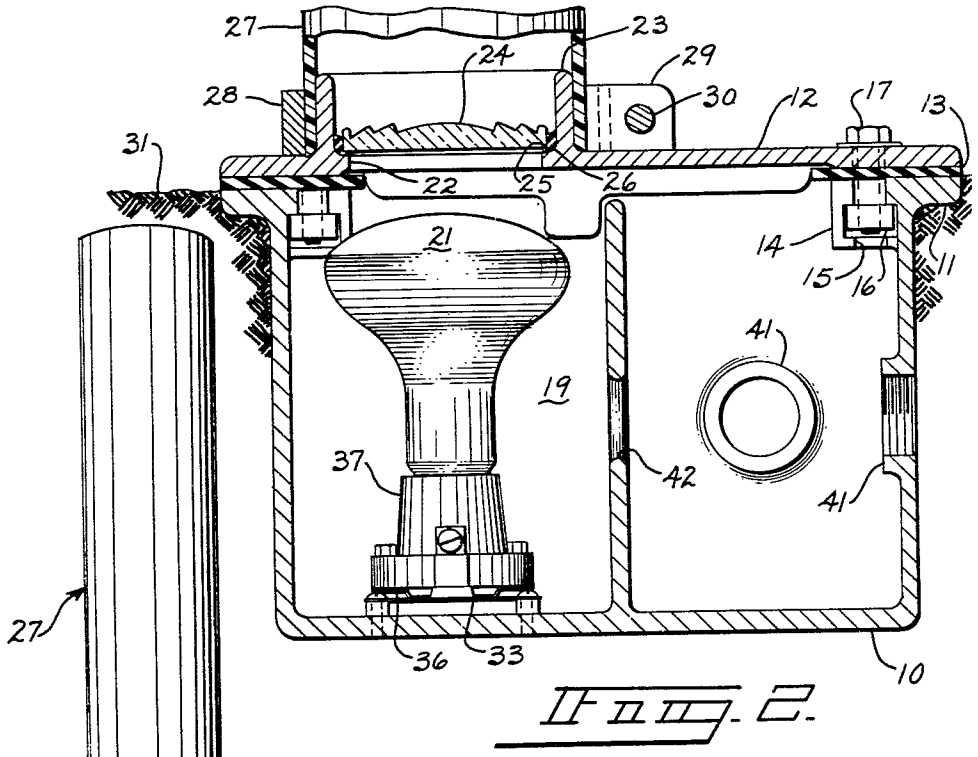


FIG. 2.

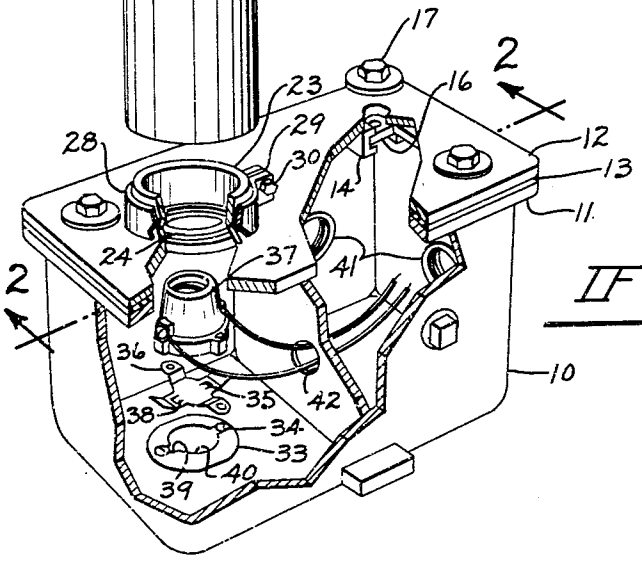


FIG. 1.

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ILLUMINATED OBSTRUCTION MARKER

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The present invention relates to illuminated obstruction markers and to light bulb housings for such markers which are adapted to be installed below grade.

An object of the present invention is the provision of a new and improved obstruction marker having a light bulb enclosure adapted to be installed below grade and a vertically extending tube centered over the light bulb so that the tube is illuminated from the inside.

A further object of the invention is the provision of an obstruction marker of the immediately above described type in which the obstruction marker is free of any guard or protector around the vertically extended illuminated tube and the tube is made from a bendable plastic which can be bent over without damage should it be struck by passing vehicles.

A further object of the invention is the provision of a new and improved obstruction marker of the above mentioned type in which a heat resistant glass lens is positioned between the light bulb and the vertically extending illuminated plastic tube to seal off the plastic tube from the light bulb enclosure and to direct the light from the bulb to the interior surface of the tube.

A further object of the invention is the provision of a light bulb enclosure of the above mentioned type in which the top of the enclosure is provided with a vertically extending annular boss which is centered over the light bulb surrounding an opening through which light from the bulb shines, and around which boss the lower end of the plastic tube is fitted—the annular boss projecting high enough above the enclosure so that the tire of a vehicle, if it should run directly over the enclosure, will not deform into the enclosure far enough to damage its internal structure including the lens and light bulb.

A still further object of the invention is the provision of a new and improved light bulb enclosure that is adapted to be installed below grade, which enclosure has an internal partition that separates the enclosure into two compartments—the bulb being positioned in one compartment with the partition confining radiated heat from the light bulb to the compartment in which the light bulb is situated, and there being openings in the partition adjacent its top and bottom so that convective air curents from the bulb pass through the partition to the other of the compartments where the air currents are cooled by the cooler surfaces of the enclosure which are shielded from the radiation of the light bulb.

The invention resides in certain constructions and combinations and arrangements of parts; and further objects and advantages of the present invention will become apparent to those skilled in the art to which its relates from the following description of a preferred embodiment described with reference to the accompanying drawing, forming a part of this specification, and in which:

FIG. 1 is an isometric view of an illuminated obstruction marker constructed in accordance with the present invention;

FIG. 2 is a vertical sectional view taken approximately on the line 2—2 of FIG. 1.

The illuminated obstruction markers for highways, airport runways, and the like, which are used today, usually include light bulb enclosures which project at least partially above grade and which include heavy protectors or guards around the enclosures. These protectors

are highly objectionable in that they partially hide the illumination of the markers from oncoming traffic.

According to the present invention an obstruction marker is provided having a light bulb enclosure that is adapted to be positioned below grade. The obstruction marker includes a vertically extending translucent tube which projects upwardly from the light bulb enclosure, so that the inside of the tube is illuminated by the light from the enclosure. The tube preferably includes a fluorescent pigment which causes all interior surfaces of the tube to glow when it is illuminated from the inside, and which also causes the tube to glow under the influence of reflected light from the outside of the tube. It is an important feature of the invention that the vertically extending tube be made from plastic which is bendable during all normal ambient temperatures to which it will be subjected, so that the tube can be bent over at a nearly 90° angle without breaking, if it should be struck by accident by any passing vehicle. A further feature of the invention is that the vertically extending tube need not be protected by a guard structure which would shield the glow of the vertically extending tube from oncoming traffic.

The light bulb housing shown in the drawing generally comprises a rectangularly shaped cast box 10 the upper side of which is open and which is provided with a flange 11 around its periphery. The open side of the box is adapted to be closed off by means of a cover plate 12 which is placed over the flange 11 with a gasket 13 therebetween and is bolted in position. The top and side corners of the enclosure are provided with integrally cast shelves 14 having slots 15 therein adapted to receive and non-rotatably support nuts 16 of bolts 17 that are used to hold the cover plate in place. The enclosure includes a vertically extending partition 18 which extends crosswise of the enclosure and divides the enclosure into generally two equal parts 19 and 20. An electric light bulb 21, and preferably a light bulb with a reflector base is positioned in the compartment 19 in such manner that its light will pass up through an opening 22 of approximately the diameter of the light bulb in the top cover plate 12 of the enclosure. An annular upwardly extending boss or rim 23 is provided around the opening for several purposes, and a heat impervious lens 24 is provided over the opening 22 to generally seal off the heat of the enclosure from the outside. In the embodiment shown in the drawing there is a slight ledge 25 between the opening and the annular upwardly extending boss 23, and the heat impervious lens 24 is positioned down on this ledge 25 and is sealed in place with silicone cement 26.

The size of the enclosure will generally depend upon the size of the light bulb which is intended to be enclosed therein. In the embodiment shown in the drawing a light bulb of approximately 100 watts is intended to be used. The enclosure shown in the drawing has an internal dimension of approximately 9½ inches by 5 inches, and the partition member 18 is located approximately in the center of the box.

As previously stated the annular upwardly extending boss provides a plurality of functions. One of these functions is to provide a cylindrical surface over which the lower end of the plastic tubular sleeve 27 is positioned and clamped in place. Any suitable means can be used for clamping the lower end of the tubular member in place and as shown in the drawing a cast aluminum ring 28 is used having a pair of flanges 29 through which a suitable bolt 30 extends. Upon taking up of the bolt, the ring is clamped around the external periphery of the lower end of the tube 27 to squeeze it inwardly against the outer surface of the annular boss 23. In the embodiment shown in the drawing, the annular boss 23 is made integral

with the top cover plate 12, so that it acts as a curb which prevents water from running in through the opening 22 in the top cover plate 12.

The obstruction marker is intended to be placed alongside of traffic lanes, as for example on the curb alongside of automotive highways, so that during an accident, for example, it would be possible for the wheel of an automobile or truck to pass directly over the top of the light enclosure. The annular upwardly extending boss 23 is made high enough and strong enough so that the tire of an automotive vehicle which passes directly over the opening in the cover plate will not bulge down far enough to abut the heat resistant lens 24 to break the same. The cover 12 is suitably reinforced so that it will take the load of a heavy truck, and it is intended that the light enclosure will be placed flush with the surface of the surrounding grade as shown in the drawing at 31 so there will be no appreciable impact by the tire upon the light enclosure.

The preferred light transparent plastic tubular members 27 which are used in conjunction with the light bulb enclosures are preferably made from a type of polyethylene plastic which is pliable between temperatures of —20° F. and 200° F. These tubes are suitably cast with a closed upper end so that they will keep rain and the like out of the annular boss 23 and thus out of the light bulb compartment. As previously mentioned, suitable fluorescent pigments are mixed with the polyethylene powder before it is cast into the desired shape, so that the plastic tubes will not only transmit light, but will also reflect light from their outer surfaces. The plastic tubes 27 that are used may be of any desired height and it has been found that a height of about 1½ feet to 2½ feet provide an acceptable marker for highway lanes. Should a highway vehicle pass directly over such a tube 27, the frame of the vehicle will strike against the vertical tube and bend it into nearly a 90° angle thereby allowing the vehicle to pass over the obstruction marker without damage either to the marker or to the vehicle.

The light bulb may be supported in its compartment in any suitable manner and is preferably supported by means of a shock resistant mounting 32, so that passing traffic will not produce undue vibration upon the filaments of the bulb 21. In the supporting structure shown in the drawing, an annular metallic ring 33 is supported between a pair of machine screws 34 and a stamped flexible member 35 having upwardly extending legs 36 is clipped to the metallic ring 33. A commercial porcelain lamp base 37 is suitably bolted to the upwardly extending legs 36. The stamped member 35 has a pair of ears 38 deformed downwardly which are adapted to slide into matching lateral branches 39 of the central opening 40 of the annular ring 33. The portion of the ring 33 surrounding the opening 40 is approximately cammed so that the lamp base 37 is tightened into position by rotation approximately 90°.

The enclosure is generally completed by suitable threaded bosses 41 in the side walls of the compartment 20 of the light enclosure through which conduits containing the electrical lead lines extend. It is intended that the heavy conductor wires in the conduits will be terminated within the second compartment and that a smaller size flexible wire will communicate these heavy lead wires to the base of the lamp so that these heavy lead wires will not restrain motion of the lamp base relative to the body of the enclosure.

The second compartment 20 of the body of the enclosure not only contains wiring which should preferably be shielded from the heat of the light bulb but provides another very important function. The partition member 18 extends within approximately ½ inch of the top cover plate, so that most of the radiated heat from the light bulb is reflected by the partition and confined within the compartment 19 in which the light bulb is situated. The compartment in which the light bulb is situated therefore becomes considerably hotter than does the other compartment 20 which is shielded from the radiation of the light bulb. Inasmuch as the dissipation of heat is a function of the difference in temperature across the surfaces through which the heat must pass, the dissipation of the heat through the side walls of the light enclosure to the surrounding ground or concrete, as the case might be, is caused to be quite high for the side walls of the compartment 19 in which the light bulb is situated. The air within the light bulb compartment 19 is, of course, also heated up, and because the partition member 18 does not extend all the way to the top of the box, this hot air flows over into the other compartment 20 where it is brought into contact with the cooler surfaces of the box surrounding the second compartment 20. This air gradually is cooled and moves to the bottom of the second compartment 20 and then through an opening 42 in the partition 18 adjacent the lower part of the bulb. This circulation of air through opening 42 brings cooler air into contact with the light bulb 21 where it is heated by the light bulb and recirculated again up over the top of the partition 18. The second compartment 20, therefore, provides cooler surfaces of the box which serve the function of cooling the recirculating convective air currents. The opening 42 is preferably kept a predetermined distance up from the bottom of the enclosure so that water which enters through the conduits in the side walls of the box will be trapped within the bottom of the second enclosure and will be kept isolated from the light bulb base. The opening 42 in the partition also serves the function of providing an access from the compartment 20 through which the wires of the light bulb base can pass.

It will be apparent that the objects heretofore enumerated as well as others have been accomplished and that there has been provided an illuminated obstruction marker, the light enclosure of which is positioned beneath grade while the illuminated portion of which extends above grade in an unguarded manner, and is made from a plastic which can be struck by the framework of a passing vehicle without damage either to the plastic tube or to the vehicle.

What I claim is:

1. A marker light and the like adapted to be positioned in horizontal surfaces, said marker light comprising: a metallic enclosure adapted to be positioned beneath said horizontal surface with the top surface of said enclosure being generally flush with said horizontal surface, a light bulb in said enclosure beneath said horizontal surface, said enclosure having an opening in its top surface generally centered over said light bulb, said enclosure also having a vertically extending hollow boss projecting from said top surface of said enclosure with the sidewalls of said boss extending around said opening in said top surface and having a height which extends an appreciable distance above said opening, and a tubular light transmitting member that is hollow throughout substantially its full height and made from a bendable translucent plastic material telescoped over said hollow boss, said tubular light transmitting member extending a distance several times said height of said boss above said top surface of said enclosure and being internally illuminated by said light bulb.

2. The marker light of claim 1 wherein the bottom end of said hollow generally tubular light transmitting member is clamped around said vertically extending hollow boss, and wherein said tubular light transmitting member is unguarded from passing vehicles.

3. A marker light and the like adapted to be positioned in horizontal surfaces, said marker light comprising: a metallic enclosure adapted to be positioned beneath said horizontal surface with the top surface of said enclosure being generally flush with said horizontal surface, a light bulb in said enclosure, said enclosure having an opening in its top surface generally centered over said light bulb, said enclosure also having a vertically extending hollow boss projecting from said top surface

of said enclosure a predetermined distance with the side walls of said boss extending around said opening in said top surface, a hollow generally tubular light transmitting member made from a bendable translucent plastic material positioned vertically over said hollow boss, said tubular light transmitting member extending a distance several times said predetermined distance above said top surface of said enclosure and being illuminated internally by said light bulb, and a heat resistant glass lens secured to the top of said enclosure sealing off said opening to seal off said light bulb and the enclosed space of said enclosure from said hollow generally tubular light transmitting member.

4. A marker light and the like adapted to be positioned in horizontal surfaces, said marker light comprising: a metallic enclosure adapted to be positioned beneath said horizontal surface with the top surface of said enclosure being generally flush with said horizontal surface, a partition in said enclosure dividing said enclosure into two interconnected air spaces, said partition having an opening adjacent the top surface of said enclosure communicating said air spaces, a light bulb in one of said air spaces positioned at an elevation generally below said opening in said partition, said partition having an opening therethrough communicating said air spaces adjacent the lower portion of said light bulb, said enclosure having an opening in its top surface generally centered over said light bulb, a heat resistant glass lens secured to the top of said enclosure sealing off said opening to substantially isolate the air space within said enclosure, said enclosure also having a vertically extending hollow boss projecting out of said top surface of said enclosure by a predetermined distance with the sidewalls of said boss extending around said opening in said top surface, and a hollow generally tubular light transmitting member made from a bendable translucent plastic material positioned vertically over said hollow boss, said tubular light transmitting member extending a distance several times said predetermined distance above said top surface of said enclosure and being illuminated internally by said light bulb, and whereby the radiant heat from said light bulb is confined to said chamber in which said light bulb is situated and convection currents from said light bulb are cooled by the relatively cool surfaces of the other of said compartments from which said partition effectively isolates radiant energy.

5. A light box comprising: a metallic enclosure, a partition in said enclosure dividing said enclosure into two interconnected air spaces, said partition having an opening adjacent the top surface of said enclosure communicating said air spaces, a light bulb in one of said air spaces positioned at an elevation generally below said opening in said partition, said partition having an opening therethrough communicating said air spaces adjacent the lower portion of said light bulb, said enclosure having an opening in its top surface generally centered over said light bulb, a heat resistant glass secured to the top of said enclosure sealing off said opening to substantially isolate the air space within said enclosure, and whereby the radiant heat from said light bulb is confined to said chamber in which said light bulb is situated and convection currents from said light bulb are cooled by the relatively cool surfaces of the other of said compartments from which said partition effectively isolates radiant energy.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,153,773 October 20, 1964

Robert B. Wood

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 51, for "curents" read -- currents --; column 3, line 53, for "approximately" read -- appropriately --.

Signed and sealed this 2nd day of March 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents