This invention relates to clearance marker lights which are mounted on a roadway vehicle and which are connected to a conductive cable by a screw or pin piercing the cable to make contact to the conductive core therein; and more specifically, the invention is directed to means for guiding the piercing pins into contact with the conductive cable.

The invention is an improvement in the invention disclosed in patent issued to Black, No. 3, 087,051. That patent discloses a trailer having a conductive cable disposed in a groove extending around the upper portion of the trailer and a plurality of clearance marker lights each adapted to be fastened to the trailer in a position overlying the groove and cable. Each marker light has a screw electrically connected to a light bulb and projecting from the base in a position to pierce the cable when the marker light is fastened to the trailer. This invention has proved to be very successful, particularly in reducing the cost of installing marker lights. The application of the invention to trailers has saved about fifty cents for each marker light installed.

It has been the objective of the present invention to improve upon the marker light of that patent by providing structure which assures the making of desired electrical contact between the piercing pin and the conductive core on installation and thereby eliminating the adverse effects of carelessness in the mounting of the marker lights.

If in installing the marker lights, the workmen are not careful, it is possible for the piercing pin to be canted slightly. This canteing results into two possible defects in the installation. First, the pin could miss the conductive core entirely or make such a minimal contact with the core that it could not perform satisfactorily as a conductive contact. Second, the pin could engage the surrounding metal of the trailer and short out the system.

The invention eliminates these two possible defective installations and additional advantages, as will be described below, by providing a guide for the piercing pin which projects from the base of the marker light into the cable carrying groove. The guide has a bore which, when the marker light is in position, has an axis aligned with the center of the cable. The piercing pin is guided as it passes through the bore and engages the center of the conductive core of the cable.

The guide is preferably configured so that its outside surface snugly engages the walls forming the cable receiving groove thereby blocking any movement of the guide transversely with respect to the groove. Further the guide preferably has its projecting end concavely configured so as to receive the cable in the concavity. This concavity not only assures a perfect alignment between the piercing pins and the cable core, but additionally forms a seal between the insulative material in the cable and the surface of the guide which prevents the seepage of water to the pin which might tend to cause a shorting out of the system.

The guide can be a block molded integrally with the base of the marker light or it can be a separate bushing which is seated in the base of the marker light. The separate bushing is preferred, for with the separate bushing it is easier to hold tolerances and thereby to assure centering exact depth of penetration and other critical aspects of the making of the electrical connection.

It has been still another objective of the invention to provide marker lights of the type described, each having a separate guide bushing, the bushing having a concave end surface adapted to engage the cable, the bushing and marker light base having cooperating configured surfaces which fix the position of the bushing and its concave surface so that the axis of the concavity is parallel to the axis of the conductor when the marker light is in position on the trailer.

While the invention will be described with particular reference to its location in the upper portion or quarter panel of a trailer, it should be well understood that the invention can be applied to the lower rub rail or to any other portion of the vehicle structure wherein it is possible and advisable to dispose the cable in a groove adapted to receive a piercing connection to complete the electrical circuit to the bulb within the light. Further, the invention is not necessarily restricted to marker lights, but can be applied to other vehicle lights such as the brake lights, turn signal lights, and the like.

These and other objectives of the invention will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a plan view of a marker light having its lens removed, the marker light being installed on a trailer;

FIG. 2 is a cross-sectional view taken along lines 2—2 of FIG. 1,

FIG. 3 is a cross-sectional view taken along lines 3—3 of FIG. 1,

FIG. 4 is a perspective view of the guide bushing, and

FIG. 5 is a disassembled perspective view illustrating the assembly of the marker light to the trailer.

Referring to the drawings, a marker light, indicated at 10, is shown mounted on a quarter panel 11 which in the illustrated embodiment is an extruded aluminum section. The quarter panel is a term of the art which refers to the rail which extends horizontally around the top of the trailer. The quarter panel is channel shaped and has an over hanging flange 12 to which the roof sheets are fastened and a lower flange 13 which is mounted on the upper edge of the walls of the trailer. Between the two flanges is a longitudinally extending groove 15 which receives a cable 16 having a conductive core 17 surrounded by insulating or dielectric material 18. The groove has side walls 19 which extend outwardly beyond the cable. The quarter panel may also have a wide trough 20 providing side walls 21 between which the groove 15 is centered.

In the illustrated form of the invention a circular marker light is shown and it should be understood that the invention has application to any configuration of marker light. The marker light preferably has a base 22 of rubber or other insulative, resilient material. Rubber is selected because of its low cost and because of its characteristic ability to absorb vibrations which might tend to damage the marker light structure.

When the marker light is secured to the base, a lens 23, shown in broken lines in FIG. 2, may be snapped into position on the base and held there by a mating lip and groove between the base and lens, as indicated at 24. A metallic back up plate 26 overlies most of the inside surface of the base to provide the needed rigidity of the base and to provide structure for the mounting of a light bulb 27 on the marker light. The bulb 27 is mounted in a socket 28, the socket being fixed to a bracket 29 which is welded, or otherwise secured, to the plate 26. A pair of screws 33 pass through the bracket 29, plate 26, base 22 to threaded holes 34 in the quarter panel and ground the socket to the quarter panel as well as secure the marker light to the quarter panel.

As indicated, the ground connection to the bulb is
made by the attachment of the bracket 29 to the quarter panel the bracket being connected to the ground side of the socket 28 by a conductive pigtail 37. The other side of the electrical connection to the bulb is made by a conductor 35 which is secured by a connector 39 and a piercing screw 40 to the conductive core 17 of the cable 16. The piercing screw 40 passes through a bore 43 of a guide bushing or block 44. One end 45 of the guide bushing is square and is received in a mating square opening 46 in the base. The bushing has a circular collar 47 which is received in a circular opening 48 in a skirt 49 which projects from the outside surface 50 of the base. The skirt has an outside surface 51 which is square and which is adapted to snugly engage the side walls 21 of the trough 20. The bushing has a projecting end 53 which is generally rectangular having parallel side walls 54. The end surface 55 is concave being curved as a cylinder whose axis is parallel to the axis of the cable 16, and which is adapted to mate with the outer surface of the cable.

The combined base, bushing, trough, groove and cable are dimensionally designed to cause the cylindrical surface 55 to bear tightly against the cable when the marker light is centered into position. This assures proper alignment of the piercing screw with the center of the cable core 17 and forms a water tight seal about the cable. Further, the side walls 54 of the projecting end of the bushing are dimensioned for a snug engagement with the side walls 39 of the groove 15 to block transverse movement of the bushing with respect to the groove.

The bushing could be molded integrally with the rubber base, however, it is preferred to mold the bushing as a separate member of nylon or other plastic, which is dimensionally stable and which admits of the holding of a desired tolerance. Further, a nylon bushing is somewhat more resilient than the rubber and assures that it will not compress to the extent that the piercing pin projects beyond the cable core into the quarter panel. On each side of the skirt 49 is an embossment 60 having the cross-sectional configuration of the trough 20 and groove 15. The embossments 60 mate with the trough and groove when the marker light is seated in position on the quarter panel and provide a proper alignment of all the elements of the marker light with the elements of the quarter panel, particularly including the conductive cable. In the application of the invention, the bushing is seated in the hole 46 and the skirt 49 and the piercing screw 40 is threaded either all of the way through the bushing or substantially all of the way through the bushing. The base of the marker light is then applied to the quarter panel with the embossment 60, the bushing 44 and the skirt 49 seated in the mating portions of the trough 20 and groove 15 respectively. The screws 33 are then applied to the threaded holes 34 thereby securing the base to the quarter panel and providing the ground connection to the bulb 27. Because of the proper alignment of the base provided by the embossment and the rectangular surface of the skirt 49 and the mating rectangular surfaces of the bushing 45 and hole 46, the cylindrical concavity 55 is pressed into tight engagement with the surface of the cable thereby forming the water tight seal referred to above. If the screw 40 has been threaded all the way through the guide bushing, the tightening of the screws 33 to fasten the base to the quarter panel cause the pointed end of the screw 40 to pierce the cable to the conductive core as shown in FIG. 2. On the other hand, if the screw has not been completely threaded through the bushing, after the base is fixed to the quarter panel the screw can be given one or two turns to bring the head firmly against the electrical connector 39. The screw and bushing are dimensioned so that when the head of the screw firmly contacts the connector 39, the end of the screw will have been projected precisely into the center of the conductive core 17 of the cable 16.

We claim:
1. In a vehicle a cargo container having a recessed portion defining a groove, a cable disposed in said groove and having a conductive core, said recessed portion having side walls defining the groove extending beyond said cable, a marker light having a base mounted over said recessed portion, said base having a hole aligned with said groove, an insulative bushing having one end configured to mate with said hole and being disposed in said hole, the other end of said bushing having side walls snugly received between the walls of said groove, said bushing having a transverse hole, said bushing having an end surface which is concave and which receives said cable when said bushing is in said groove, a bulk mounted on said base, a conductive pin having one end electrically connected to said bulk, said pin passing through said transverse hole in said bushing and terminating in said conductive core.
2. In a vehicle a cargo container having a recessed portion defining a groove, a cable disposed in said groove and having a conductive core, said recessed portion having side walls defining said groove extending beyond said cable, a marker light having a base mounted over said recessed portion, said base having a hole aligned with said groove, an insulative bushing having one end configured to mate with said hole and being disposed in said hole, the other end of said bushing having side walls snugly received between the walls of said groove, said bushing having a transverse hole, a bulk mounted on said base, a conductive pin having one end electrically connected to said bulk, said pin passing through said transverse hole in said bushing and terminating in said conductive core.
3. In a vehicle a cargo container having a recessed portion defining a groove, a cable disposed in said groove and having a conductive core, said recessed portion having side walls defining said groove extending beyond said cable, a marker light having a base mounted over said recessed portion and groove, said base having a hole aligned with said groove, an insulative bushing having one end configured to mate with said hole and being disposed in said hole, the other end of said bushing having side walls snugly received between the walls of said groove, said bushing having a transverse hole, a bulk mounted on said base, a conductive pin having one end electrically connected to said bulk, said pin passing through said transverse hole in said bushing and terminating in the center of said cable, said base having an embossment projecting integrally from said base on each side of said bushing, said embossment being configured to mate with said groove thereby properly aligning said bushing with said groove.
4. In a vehicle a marker light having a base, a bulk mounted on said base and a conductive pin connected to said bulk and adapted to project from said base into a conductive cable lying in a groove in a supporting structure, a guide for said pin comprising, a bulk of insulative material projectible from the base and having a bore extending therethrough, said block having surfaces engageable with said groove.
to prevent transverse movement of said block with respect to said groove, said bore being aligned with the groove when said block is disposed in said groove whereby said pin passing through said bore will pierce the cable lying in said groove.

5. In a marker light having a base, a bulb mounted on said base and a conductive pin connected to said bulb and adapted to project from said base into a conductive cable lying in a groove in a supporting structure, a guide for said pin comprising, a block of insulative material for mounting in a hole in said base and having a bore extending there-through, said block having surfaces engageable with said groove to prevent transverse movement of said block with respect to said groove, said bore being aligned with the groove when said block is disposed in said groove whereby said pin passing through said bore will pierce the cable lying in said groove.

6. In a marker light having a rubber base, a bulb mounted on said base and a conductive pin connected to said bulb and adapted to project from said base into a conductive cable lying in a groove in a supporting structure, a guide for said pin comprising, a block of insulative material projectible from the said base and having a bore extending between the inside and outside of said marker light, said block having surfaces engageable with said groove to prevent transverse movement of said block with respect to said groove, said block having an end surface concavely curved to engage the surface of said cable, said bore being aligned with the center of said groove when said block is disposed in said groove whereby said pin passing through said bore will pierce the center of a cable lying in said groove.

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