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Continuation of application Ser. No.
569,726, Aug. 2, 1966, now abandoned.

[54] **SIGNALLING SYSTEM WITH INDICATING MEANS**
3 Claims, 10 Drawing Figs.

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240/8.4, 240/8.41, 340/380, 350/96
 [51] Int. Cl. **B60q 1/00,**
G07b 5/16
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80, 85, 380; 16/108, 109; 24/(Inquired); 248/56;
287/(Inquired), 20, 23; 240/8.4, 8.41, 1 (EI);
350/96; 250/227; 315/77, 129—133

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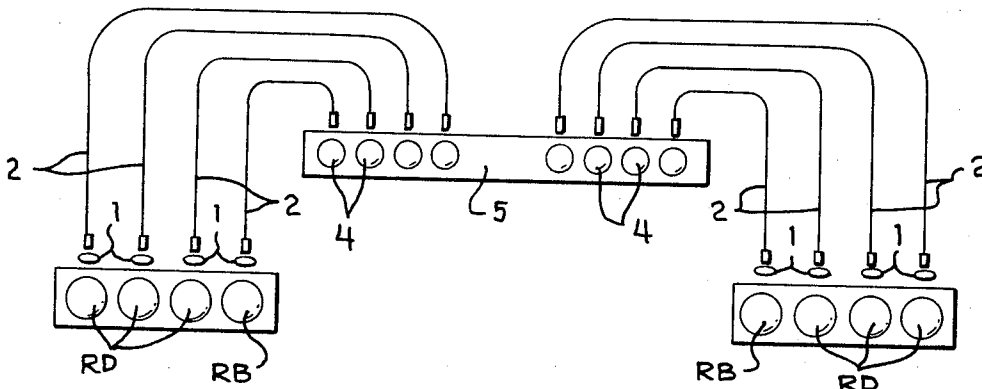
Primary Examiner—Thomas B. Habecker

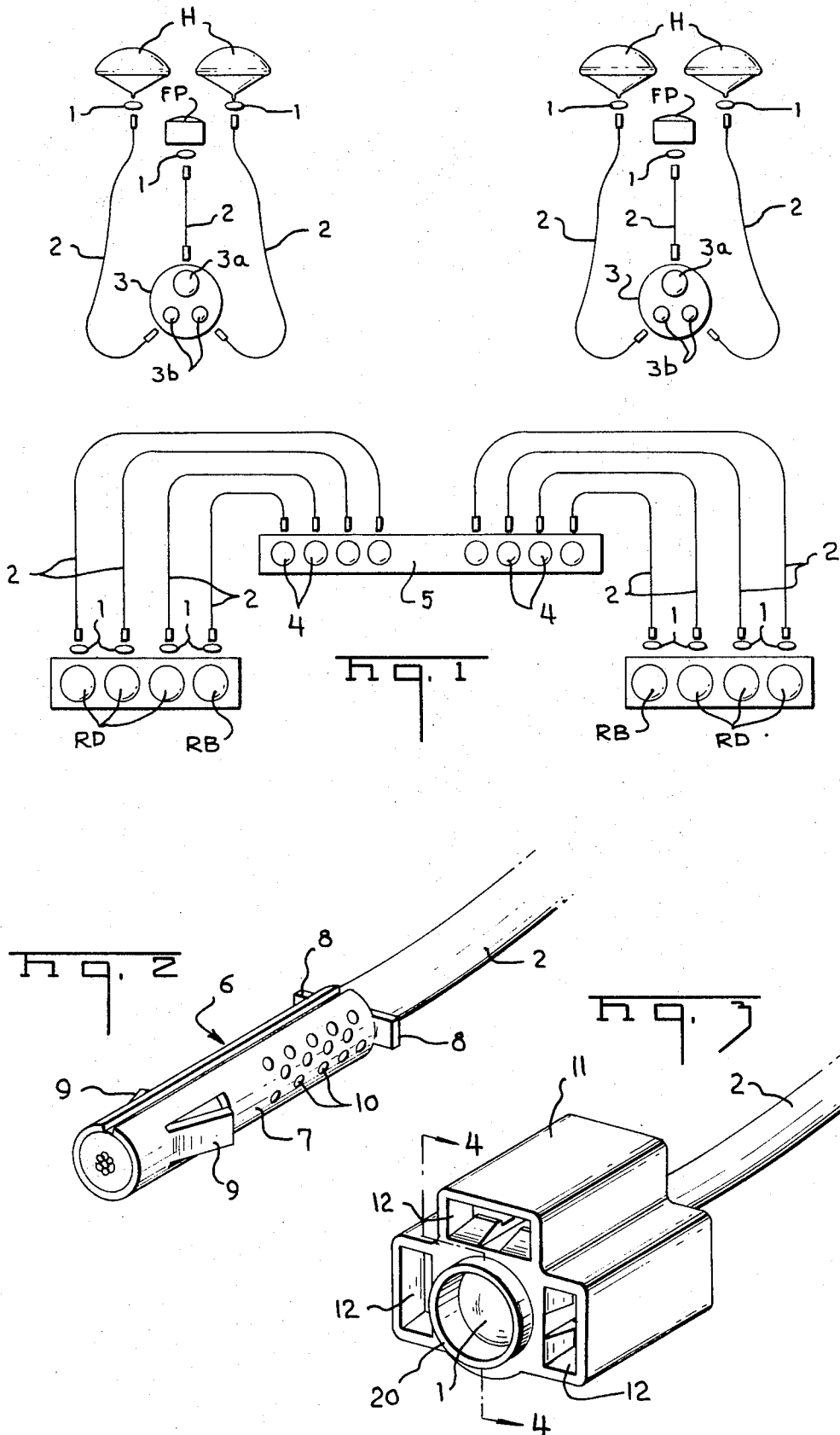
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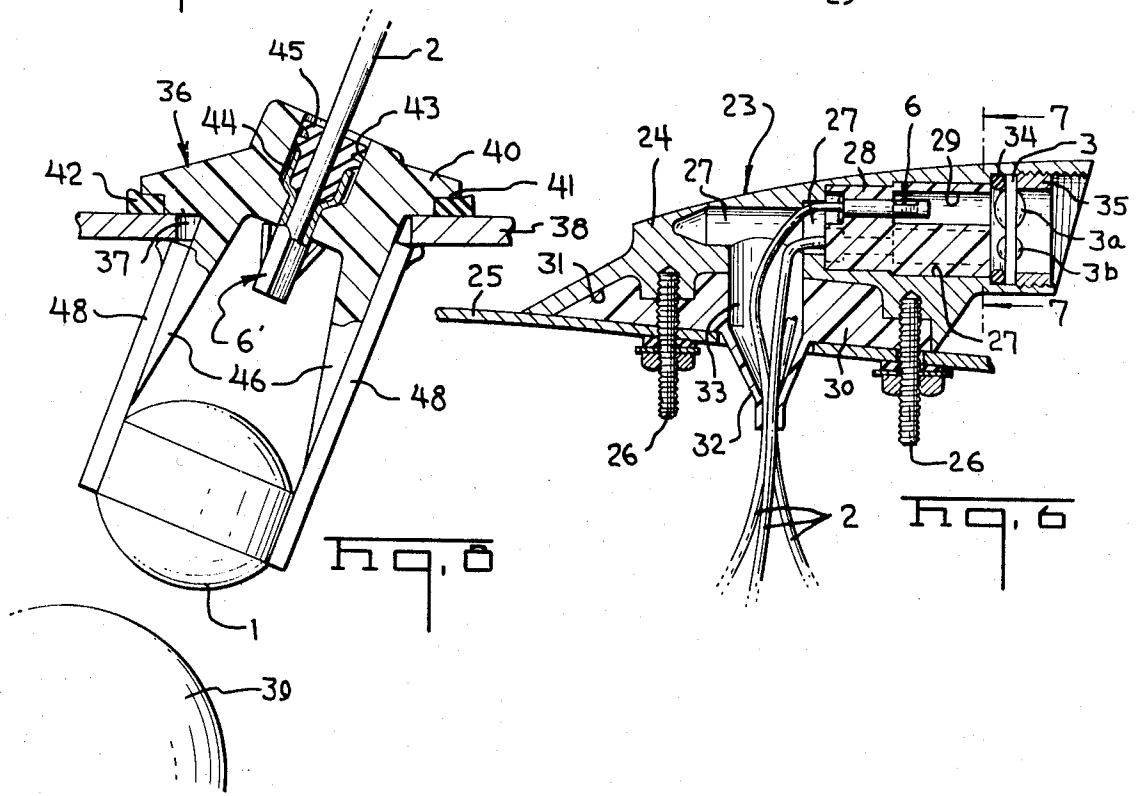
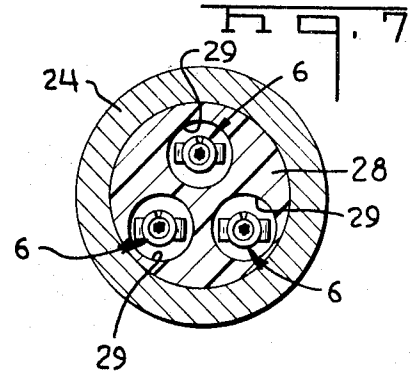
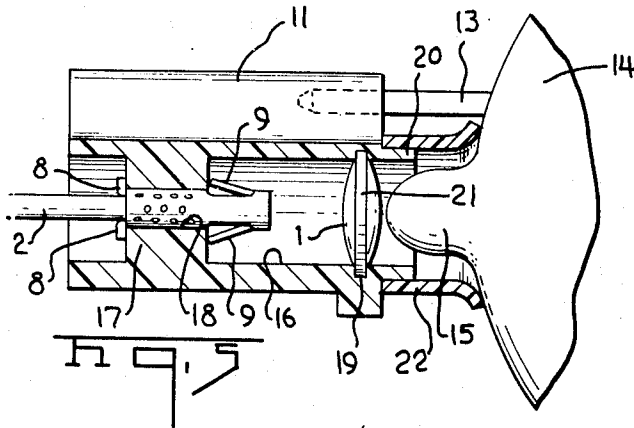
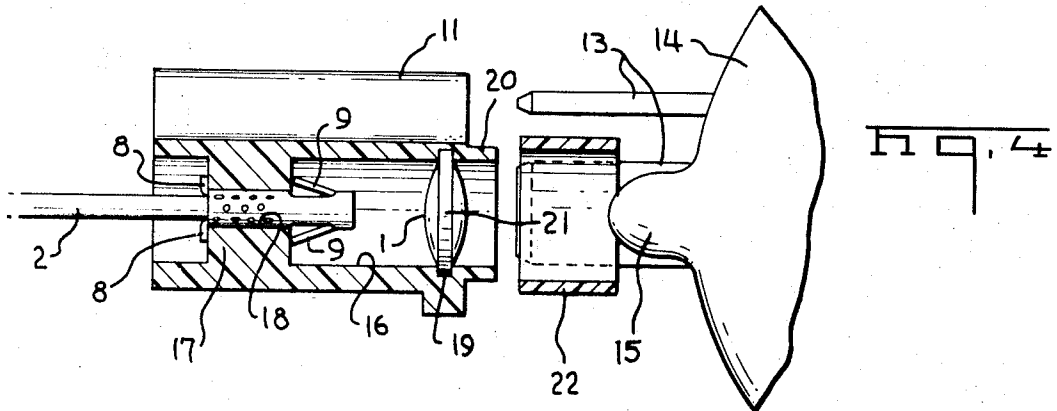
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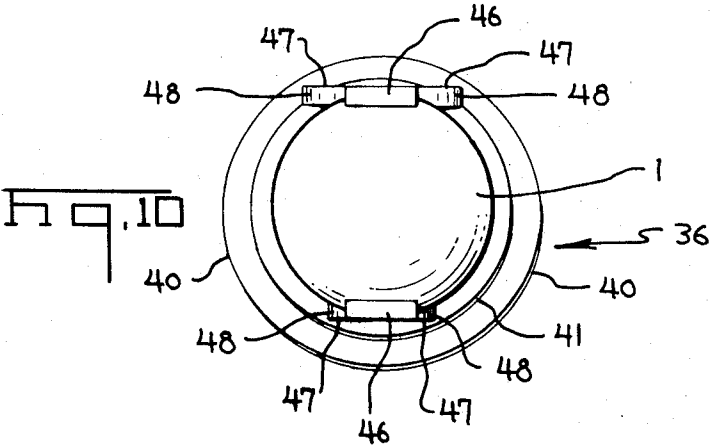
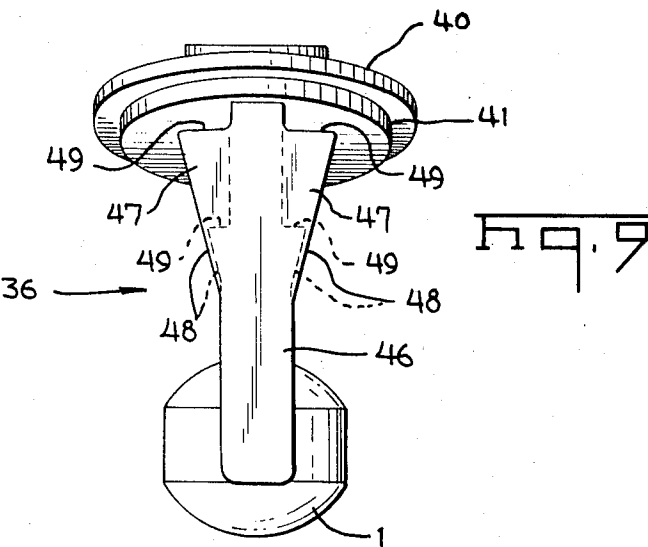
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 Seitchik

ABSTRACT: A signalling system for use on vehicles indicates the condition of the lighting system thereof by the use of fiber optic means extending between the lighting means of the lighting system and indicating means positioned within the vehicle for observation by an operator thereof.









SIGNALLING SYSTEM WITH INDICATING MEANS

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of application Ser. No. 569,726, filed Aug. 2, 1966, and now abandoned.

This invention relates to a signalling system and more particularly to a signalling system in which fiber optic members are used.

In the field of signalling systems wherein signalling is effected by means of energization of light bulbs or the like, a source of supply, conductors, sockets and other equipment such as switches, relays or the like have to be used in order to operate the signalling system. Such a signalling system provides many areas that can cause failure of the signalling system and, therefore, improper operation thereof. Faulty switches or relays, burned-out bulbs and loose connections are among the most prevalent things that cause improper operation of this type of signalling system.

An object of the invention is to provide a signalling system to overcome the disadvantages of the electric signalling systems.

Another object of the invention is the provision of a fiber optic signalling system to indicate the condition of light means.

A further object of the invention is to provide termination means for fiber optic members which effectively terminates the fiber optic members and concentrates light for effective utilization.

An additional object of the invention is the provision of termination means for fiber optic members which spaces the light-concentrating means at the proper distance between a light source and an end of a fiber optic member.

Still another object of the invention is to provide termination means for fiber optic members that is readily mountable on and dismountable from a mounting member.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there are shown and described illustrative embodiments of the invention; it is to be understood, however, that these embodiments are not intended to be exhaustive nor limiting of the invention but are given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

The foregoing and other objects are achieved by a preferred embodiment of a signalling system comprising a sealed light source and a light source, electrical terminal means on the sealed light source, an area adjacent the electrical terminal means through which light from the sealed light source passes, reflection means for the light source, connector housing means having electrical connector means therein mateable with the electrical terminal means, the connector housing means having a passageway alignable with the area, lens means in the passageway, a termination and lens means mountable in an aperture of the reflection means including a lens member disposed adjacent the light source, indicating means having lens elements therein, fiber optic means extending between the connector housing means and termination and lens means and the indicating means, terminal members secured to ends of the fiber optic means, and means on the connector housing means, termination and lens means and the indicating means and the terminal members to secure the terminal members in the connector housing means, termination and lens means and indicating means at the proper focal length with respect to the lens means, lens member and lens elements.

In The Drawings:

FIG. 1 is a diagrammatic illustration of the signalling system of the invention;

FIG. 2 is a perspective view of a terminal member secured onto the end of fiber optic means;

FIG. 3 is a perspective view of a connector housing in which electrical connectors and the terminal member of FIG. 2 are secured;

FIG. 4 is an exploded and cross-sectional view taken along lines 4-4 of FIG. 3;

FIG. 5 is a view similar to FIG. 4 with the parts thereof in an assembled condition;

FIG. 6 is a cross-sectional view of an indicating means;

FIG. 7 is a view taken along lines 7-7 of FIG. 6;

FIG. 8 is a partially sectioned view of a termination and lens member;

FIG. 9 is a side elevational view of the termination and lens member of FIG. 8; and

FIG. 10 is a bottom plan view of FIG. 9.

The invention will be described in conjunction with an automotive lighting system; however, it is to be understood that the invention can be used in conjunction with other lighting systems.

Turning now to FIG. 1, an automotive lighting system is diagrammatically illustrated including headlights H, front parking and directional lights FP, backup lights RB and rear park and directional lights RD. The rear directional lights RD can be a single light source within the light housing containing backup lights RB or they can be as illustrated and sequentially operated to indicate the direction in which the automobile is to turn.

Lens members 1 collect light from headlights H and front parking and directional lights FP and transmit the collected light via fiber optic members 2 to lens elements 3. Similarly, lens members 1 transmit light collected from rear backup lights RB and rear park and directional lights RD via fiber optic members 2 to lens components 4 disposed in mounting member 5. Lens elements 3 and mounting member 5 are mounted on the automobile in positions for easy observance by an operator of the automobile in order to readily ascertain the operating conditions of the various light sources.

Fiber optic members 2 comprise a covering member of compressible or resilient plastic surrounding fiber optic elements made from any suitable combination of light transmitting materials and the number of fiber optic elements depends upon the amount of light to be transmitted. The fiber optic members are of the type manufactured by E. I. duPont de Nemours and Company under the trademark Crofon. The fiber optic members are flexible so that in bending the fiber optic members to accommodate a desired situation, the fiber optic elements move relative to each other, and, if the ends of the fiber optic members are not properly terminated, the ends of the fiber optic elements extend outwardly from the ends of the covering member at an irregular interval thereby resulting in an improper alignment for the ends of the fiber optic elements because they are most effective when the ends of all the fiber optic elements are located in the same or substantially the same plane.

FIG. 2 illustrates termination member 6 secured on the end of fiber optic member 2. Termination member 6 comprises a circular body 7 having outwardly directed ears 8 at one end and locking lances 9 struck out from body 7 proximate the other end. Openings 10 are disposed in body 7 between ears 8 and lances 9 and these openings include inwardly directed beveled sections.

The termination members are made in a U-shaped configuration so that the fiber optic member can be inserted therein and the termination member is then placed into crimping dies (not shown) to crimp the termination members onto the fiber optic member. The termination member is crimped onto the fiber optic member in accordance with the disclosure of U.S. Pat. application, Ser. No. 557,797, filed Jun. 15, 1966, now Pat. No. 3,517,981, so as not to restrict the transmission characteristics of the fiber optic member. The inwardly beveled sections of openings 10 penetrate the covering member so as to securely position the termination member on the fiber optic member. After the termination member has been crimped onto the fiber optic member, the portion of the

fiber optic member extending outwardly from the front end of the termination member is cut off at the front end of the termination member so that the fiber optic elements are located at the front end of the termination member.

The termination members are susceptible to mass production by automatic machinery and are conveniently formed by shaping a sheet metal blank or strip of a suitable material such as, brass or the like, in successive forming steps. The metal is sufficiently hard and resilient and has springlike characteristics, yet it is sufficiently malleable to permit crimping of the termination members onto fiber optic members to effect an excellent mechanical connection therewith.

FIGS. 3 through 5 illustrate a connector housing 11 of a suitable dielectric material which comprises openings 12 extending therethrough to receive electrical connectors of the type disclosed in U.S. Pat. No. 2,774,951 or the like for engagement with electrical terminals 13 located on the rear portion of a sealed beam headlight 14. A sealing nipple 15 is located on sealed beam headlight 14 within the area delimited by electrical terminals 13. Sealing nipple 15 is formed during the formation of headlight 14 and light passes therethrough when headlight 14 is energized.

A passageway 16 is located in housing 11 and an annular wall 17 is located in passageway 16 proximate the outer end thereof. An opening 18 extends through annular wall 17 in communication with passageway 16. An annular groove 19 is disposed in passageway 16 proximate the front end of housing 11 and an annular extension 20 extends outwardly from the front end of housing 11. Lens member 1 has an annular flange 21 mateable with annular groove 19 so as to secure lens member 1 within passageway 16.

As can be discerned, termination member 6 is disposed within opening 18 of annular wall 17 with ears 8 engaging the rear surface of wall 17 so as to limit the movement of termination member 6 in one direction and locking lances 9 engage the forward surface of wall 17 to limit the direction of movement of the termination member in the other direction. When inserting termination member 6 within opening 18, locking lances 9 conveniently move inwardly during the insertion of the termination member within opening 18 and spring outwardly when they move free of opening 18 to engage the forward surface of wall 17 so that ears 8 and lances 9 lock the termination member in position within connector housing 11. Locking lances 9 also space the front end of termination member 6 from lens member 1 so that light which is transmitted through sealing nipple 15 is concentrated on the end of the fiber optic member via the lens member.

Connector housing 11 is applied to the sealed beam headlight with electrical terminals 13 electrically mating with the electrical connectors within housing 11 and sealing nipple 15 being disposed adjacent lens member 1 as illustrated in FIG. 5. In order to keep sealing nipple 15 and lens member 1 from getting dirty, a sealing member 22 in the form of a tubular rubber member or the like is disposed on annular extension 20 and in engagement with the surface of sealed beam headlight 14 surrounding sealing nipple 15. FIGS. 6 and 7 illustrate an indicating member 23 to indicate the condition of headlights H and front parking and directional lights FP on one side of the automobile. Indicating member 23 can be mounted at any desirable location for observation by an operator of the automobile. Indicating member 23 comprises a housing 24 secured to a mounting member 25 by means of bolts 26. A stepped passageway 27 is located in housing 24 and a terminal holder 28 is disposed in passageway 27. Terminal holder 28 has passageways 29 disposed therein similar in configuration to passageway 16 in connector housing 11 in which termination members 6 terminated on the ends of fiber optic members 2 are secured. A sealing member 30, preferably of rubber or the like, is disposed in a recess 31 in the bottom of housing 24 and includes a flexible boot 32 to sealingly engage fiber optic members 2. Stepped passageway 27 communicates with an opening 33. Lens element 3 is located in the forward end of passageway 27 against an O-ring

34 and is held in position by means of an annular nut 35. Lens element 3 includes a large lens section 3a and small lens sections 3b which are disposed in alignment with respective passageways 29. Lens section 3a indicates the condition of front parking and directional lights FP and lens sections 3b indicate the condition of the outboard and inboard or top and bottom headlights.

FIGS. 8 through 10 illustrate a termination mounting member which is removably mounted in an aperture 37 of a light housing 38 of lights FP, RB, and RD. The inside surface of light housing 38 generally has reflective material thereon to serve as a reflector for light bulb 39. Mounting member 36 comprises a flange section 40 engaging one surface of light housing 38. A stepped section 41 is located in flange section 40 in which a gasket 42 is disposed in order to form a seal between flange section 40 and housing 38. A stepped passageway 43 extends through flange section 40 and receives therein termination member 6' which is similar to termination member 6 except that the outer end has a bell mouth 44 which serves as a stop to limit movement of the termination member in one direction in passageway 43 and to receive therein a sealing grommet 45 which surrounds fiber optic member 2 and engages the wall of passageway 43 to form a seal thereat.

Leg members 46 extend outwardly from flange section 40 and lens member 1 is located at the free ends thereof. Stiffly flexible fins 47 extend outwardly from the sides of leg members 46. Fins 47 have a triangular configuration and are provided with leading edges 48 and trailing edges 49. Leading edges 48 facilitate the insertion of mounting member 36 within aperture 37 of light housing 38 and the engagement of leading edges 48 with the wall of aperture 37 causes fins 47 to flex inwardly until trailing edges 49 are clear of the aperture and with the fins then returning to their original unflexed positions so that trailing edges 49 engage the other surface of housing 38 in order to secure the mounting member in position on the light housing. If it is desired to remove mounting member 36 from light housing 38, fins 47 are flexed inwardly by applying pressure thereto until trailing edges 49 can fit within aperture 37 whereupon mounting member 36 is withdrawn from the light housing.

If desired, trailing edges 49 may be inclined to accommodate light housings that have different thicknesses. Also, the trailing edge of the right-hand fins when viewing each of leg members 46 may be axially offset with respect to the left-hand trailing edges to accommodate a wider variety of housing thicknesses.

Leg members 46 are illustrated as being angularly disposed with respect to flange section 40 and this is to fit in the arcuate part of the light housing, but it is to be understood that the angular disposition of leg members 46 with respect to flange section 40 will be such so as to properly position lens member 1 and termination members 6' with respect to light bulb 39.

As can be discerned, a unique and novel signalling system has been disclosed to indicate the condition of a lighting system of an automobile or the like. In addition, novel housing and termination-mounting members have been disclosed.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiments of the invention, which are shown and described herein, are intended as merely illustrative and not as restrictive of the invention.

We claim:

1. A signalling system comprising a sealed light source means, electrical terminal means on the sealed light source means, an area adjacent the electrical terminal means through which light from the sealed light source means passes, connector housing means having electrical connector means therein mateable with the electrical terminal means, the connector housing means having a passageway alignable with the area, lens means in the passageway, reflection means for a second light source means, a termination and lens means mountable in an aperture of the reflection means including a lens member

disposed adjacent said second light source means, indicating means having lens elements therein, fiber optic means extending between the connector housing means and the termination and lens means and the indicating means, terminal members secured to ends of the fiber optic means, and means on the connector housing means, termination and lens means and the indicating means and members to secure the terminal members in the connector housing means, termination and lens means and indicating means at the proper focal length with respect to the lens means, lens member and lens elements.

2. A signalling system for the sighting system of an automobile comprising headlight means, front parking and directional light means, rear parking and directional light means, said headlight means including electrical terminal means and an area adjacent thereto through which light passes from said headlight means, housing means having electrical connector means therein electrically engageable with said electrical terminal means, lens means in said housing means in alignment with said area, termination mounting means on said front parking and directional light means and said rear parking and directional light means, lens member means on said termination mounting means, indicating means on said automobile and including lens element means, fiber optic means between said lens means and termination mounting means and said indicating means, termination means on said fiber optic means,

and means on said termination means and said housing means, termination mounting means and indicating means to secure ends of said fiber optic means therein and properly position these ends focally relative to said lens means, lens member means and lens element means.

3. A lighting system for vehicles comprising head and tail lights, each including a casing and light source means in said casing, said casings of said head lights having electrical terminals thereon connected to said light source means thereof and an area adjacent said electrical terminals through which light from the light source means passes, housing means having connector means for engagement with said terminal means and a passageway in alignment with said areas, indicating means on the vehicle spaced from said head and tail lights, flexible light transmitting members extending between said head and tail lights and said indicating means, mounting means in said tail lights adjacent said light source means thereof, termination means on ends of said flexible light transmitting members, and means provided by said termination means removably mateable with said housing means, said mounting means and said indicating means so that ends of said light transmitting members receive light from said light source means and transmit the light to said indicating means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,569,933 Dated March 9, 1971

Inventor(s) BRUCE CAMERON LONGENECKER ET AL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the claims:

Claim 1, column 4, line 73, "refection"
should read - - - reflection - - - .

Column 4, line 75, "refection" should read
- - - reflection - - - .

Claim 2, column 5, line 11, "sighting" should
be deleted and - - - lighting - - - inserted.

Column 5, line 23, "leans" should read
- - - lens - - - .

Claim 3, column 6, line 14, "form" should read
- - - from - - - .

Signed and sealed this 13th day of July 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents